

## A SOCIAL AND BIOGRAPHICAL HISTORY OF BRITISH AND IRISH FIELD-BRYOLOGISTS

### *Introduction*

Like most enterprises, field-bryology began obscurely. Although more than 1,000 species of moss and liverwort are now known from Britain, herbalists of the Middle Ages knew only of “moss”, and referred to thalloid liverworts as “lichen”. Indeed, lichens themselves were classified as types of moss until Tournefort recognised them as a distinct group in 1694. Since then, fitfully but without long breaks, bryologists have continued to add species to the list of British bryophytes. So when, by whom, and in what circumstances were our other thousand-odd species of mosses and liverworts subsequently discovered? Who first found them in Britain, and who then found them new to different parts of the country?

What ambitions did bygone bryologists harbour as they set out to explore the world around them? How did their family backgrounds, upbringings, social worlds, and occupations influence what they found and failed to find? And how did popular interests and contemporary knowledge (such as knowledge or ignorance of species, of their life-cycles and variability in features, and the quality and comprehensiveness of bryofloras) influence what these bryologists saw and overlooked? For a fuller and more wide-ranging discussion of social and economic influences on the development of ideas in biology and of fashions in natural history, see *The History of Nature* at <http://ralph.cs.cf.ac.uk/HON/Hon.html>

### *The influence of microscopes*

In the 17<sup>th</sup> century, when international trade began adding pep to the economies of western Europe, a significant step forward from rudimentary mediaeval knowledge of bryophytes became possible with the invention of compound microscopes. The first cryptogamic consequence of this advance occurred when the Reverend John Ray (1627-1705) included over 80 mosses in the second edition of his *Synopsis Methodica Stirpium Britannicarum* (1696). Ray was advised and assisted in his treatment of cryptogams by **Samuel Doody** (1656-1706) and **William Vernon** (1666/7-c.1715). Doody worked as an apothecary in London, while Vernon, whose father owned an estate at Hertingfordbury near Hertford, was able to enjoy a full education, including a degree at Cambridge.

Doody and Vernon were contemporaries of the Reverend **Adam Buddle** (1662-1715), who acquired a greater knowledge of British bryophytes than any of his predecessors. As a young man he inherited a manor-house, farms, and land in Lincolnshire from his uncle (also Adam Buddle), and was presented to the living of North Farmbridge in Essex in 1703. In 1696-98 he was living at Hadleigh in Suffolk, and corresponding with Doody and Petiver, to whom he sent his collections of grasses and mosses, then the best in the kingdom. These were later sent to Tournefort (*Dictionary of National Biography*). In 1708 he wrote a new and complete English Flora which was never published, but the manuscript survives with his herbarium as part of the Sloane collections at the Natural History Museum in London.

**Richard Richardson** (1663-1741) came from a wealthy family living near Bradford in Yorkshire, a region whose prosperity was based on the textile industry. Nothing is known of Richardson's bryological activities, but he was an accomplished botanist, and exerted a pivotal influence on the interests and activities of his botanical contemporaries. For example, he advised Dillenius and Brewer regarding the itinerary and what to look out for on their tour of North Wales (see below).

**Samuel Brewer** (1670-1743) came from Trowbridge in Wiltshire, where his family was in the business of manufacturing woollens. From the next generation the Reverend **Littleton Brown** (1698-1749) of Bishop's Castle in Shropshire inherited real estate in several parishes of Shropshire and Montgomeryshire from his father, who was an attorney. Thus, Richardson, Buddle, Brewer and Brown all belonged to affluent families, enabling these naturalists to take up and sustain active interest in field-bryology. Indeed, these well-to-do gentlemen were early examples of what subsequently became clear was a general rule – that natural history is and always has been mainly (but not exclusively) a preserve of those comfortably placed in society. Even in the 21<sup>st</sup> century, when Britain's poor have more and better food, clothing and accommodation than their peers in previous centuries, there is little sign of the indigent taking up natural history.

Nevertheless, a minority of bygone field-bryologists have been poor, and several made significant discoveries in the first half of the 19<sup>th</sup> century, especially in the recently industrialised north of England (see pages 5-9), where a number of artisan bryologists were connected with the textile industry. Most of these working-class cryptogamists have left little in the way of herbaria, publications, or manuscripts as evidence of their bryological activities, so it is easy to underestimate their original contributions to elucidating Britain's bryoflora.

### *The influence of Continental botanists*

Notwithstanding the interests and activities of Doody and Vernon, followed by Buddle, Brewer and Brown, who all acquired reputations as accomplished “moss-croppers”, Continental botanists were the first to describe many European bryophytes, beginning with **Pier Antonio Micheli** (1679-1737) in his *Nova Plantarum Genera juxta Tournefortii methodum disposita* (1729) (‘New genera of plants, arranged according to the method of Tournefort’). Micheli was born into poverty but enjoyed patronage from the Medici family because of his interest in and knowledge of plants, and became university professor at Pisa and prefect of the Botanical Garden at Florence. In 1716 he founded the Società Botanica Fiorentina, one of the earliest botanical associations – and the first botanical society - in Europe. Best remembered nowadays for his mycological expertise, Micheli was also an accomplished geologist and cryptogamist, and described more than 1,400 new species, including many bryophytes and lichens in his *Nova Plantarum Genera*, in which he also became the first to describe antheridia, archegonia and paraphyses. He rightly supposed these were the sexual organs of bryophytes, but guessed their particular functions incorrectly.

William Sherard, an Oxford botanist, visited Micheli in Florence in 1717, and was sufficiently impressed by his preparations for the *Nova Plantarum Genera* that he returned to Oxford with some of Micheli's herbarium material. Shortly after, Sherard invited the German botanist **Johann Jakob Dillen (Dillenius)** (1684-1747) from Giessen to England. In 1719 Dillenius had published a local Flora of the district around Giessen; this included 200 species of mosses, of which 140 were new (Druce and Vines, 1907). After coming to Oxford in 1721, he added 60 more species to the third edition of Ray's *Synopsis* (1724), and then explored North Wales with Samuel Brewer in the summer of 1726. Brewer stayed on in the neighbourhood of Bangor and concentrated on mosses during the following winter, sending his collections to Dillenius, who wrote them up for his 'History of Mosses' (*Historia Muscorum in Qua Circiter Sexcentae Veteres et Novae...*) (1741), a book considerably influenced by Micheli's work, and in which he established genera such as *Sphagnum*, *Polytrichum*, *Mnium*, *Bryum*, *Fontinalis* and *Hypnum*, and illustrated them sufficiently accurately for their habits to be recognisable and the shapes of leaves and capsules all distinguishable.

#### *Elucidating the life-cycles of bryophytes*

Dillenius's *Historia Muscorum* was a great improvement over previous bryological literature, both for the number of species and the details of their structural differences which he described. However, another century was to elapse before naturalists understood general features of the life-cycles of mosses and liverworts. Dillenius and his contemporaries did not know the functions of the various structures they could see in mosses. Their ignorance hindered progress in distinguishing and delimiting species because in order to reliably distinguish variability within each species from differences between similar species, naturalists must not only become familiar with a generalised outline of how all species belonging to a class or phylum alter as they grow and mature, but also with differences between the features of similar species as each grows and matures.

**Johannes Hedwig** (1730-1799), born in Kronstadt (now Brassó in Romania) worked mainly in Leipzig, Germany, first as a physician, and later took up the study of mosses in the mid-1760s, at the age of about 35. He was one of the first cryptogamists to use a compound microscope for examining tiny structural details of bryophytes, doing his early botanical work as an independent amateur, and did not become a professor of botany until 1789. Hedwig demonstrated similarities between mosses and liverworts, and first defined the features which separate these two groups. He also described the life-cycles of mosses - but not liverworts - (1784) and correctly guessed but did not prove that antheridia were male and archegonia were female (1782).

It fell to another German, **Wilhelm Friedrich Benedikt Hofmeister** (1824-1877) to establish convincing links between visible form and biological function in the sexual lives of bryophytes (1851, 1862) by confirming that antheridia are male and archegonia are female, and elucidate the "alternation of generations" between gametophyte and sporophyte. Hofmeister was born and educated in Leipzig, where his father owned a music shop and publishing house (he published Wilhelm's book). Hofmeister Sr. was also sufficiently interested in botanical systematics to start a

herbarium and establish a botanical garden with encouragement from his friend Reichenbach. Wilhelm's severe short-sightedness enabled him to see minute details and make microscopical preparations, but his career began with apprenticeship at a music shop in Hamburg. He returned to Leipzig in 1841, where for more than a decade he combined botanical research with a full-time career in publishing and selling music. Thus, like Hedwig, Hofmeister did his most important botanical work as an amateur, independent of academic constraint. He became an authority on botanical embryology, and moved to Heidelberg as professor in 1863, and later to Tübingen in 1872.

Hedwig brought the taxonomy of mosses firmly into the modern era when he published Linnaean binomials in *Species Muscorum Frondosorum* (1801). Meanwhile in Britain, **James Dickson** (1738-1822) had described numerous species new to Britain. He was born in Peeblesshire, the son of Robert Dickson who had set up a nursery in Teviotdale in 1729. James's brother Walter also had a very fine nursery in Leith Walk at Edinburgh, once considered the best and most extensive in Scotland, while James himself established a nursery in Perth, before moving south to London when a young man. He found employment at nurseries to the west of the city, such as that of Jeffrey & Co. in Kensington, and also worked for a time at a nursery in Hammersmith. This was probably the famous Vineyard nursery, owned by fellow-Scots James Lee and Lewis Kennedy. He may also have worked as a gardener at one or more of the large estates on the outskirts of London, but in 1772 he set up his own business as seedsman and nurseryman in Covent Garden. By this time he was friendly with Joseph (later Sir Joseph) Banks, who allowed him free access to his extensive library and also introduced him to other botanists. On the domestic front, Dickson's first wife died young, and in 1786 he married the sister of Mungo Park, who made his reputation by exploring Africa.

Dickson's four volumes on British cryptogams (1785-1801) described 400 species, including numerous species new to Britain and were illustrated in water-colours by James Sowerby. **John Ziers** (d. 1793), a Polish apothecary living in London, helped Dickson with descriptions in the first three fascicles. Ziers left his collection of cryptogams to the prominent London physician John Sims, after which **Robert Brown** (1773-1858) stepped in to help Dickson with his fourth fascicle. Uncertainty exists about the extents to which Ziers and Brown knew their British bryophytes at first hand in the field as opposed to second hand in herbaria. Perhaps Latin was not Dickson's strong suit if he missed a formal education at school, causing him to rely on Ziers and Brown for writing up his discoveries. Whatever Dickson's failings as a scribe may have been, he was evidently an astute business-man, who left £3,500 to his wife, £2,000 to each of two daughters, and his half of the business in Covent Garden to his son (also James).

Dickson published before Hedwig in 1801, so was unable to use his bryological binomials, whereas subsequent British bryofloras were able to draw on Hedwig's nomenclature (Smith, 1804; Smith and J. Sowerby's 36 volumes, the last of which was published in 1814; Sir William Jackson Hooker's and Thomas Taylor's *Muscologia Britannica*, 2<sup>nd</sup> edition, 1827).

Liverworts, however, did not benefit from Hedwig's attention, and lagged behind mosses for much of the 19<sup>th</sup> century, not only in the study of their life-cycles and

discrimination of species, but also with their classification into genera and other supraspecific categories. This was true despite W.J. Hooker's *British Jungermanniae* (1812-1816), an appendix in the second edition of Hooker and Taylor's *Muscologia Muscorum* (1827), Hooker's account of cryptogams in Smith's *English Flora* (1833), and Hooker and William Wilson's contributions to J. de C. Sowerby's *Supplement* (1829-66).

### *Links between field-botany and the textile industry*

Continental cryptogamists had been the first to find and describe many European bryophytes, with Micheli, Dillenius, and then Hedwig leaving British bryologists in their wake. The first generation of English botanists to take significant interest in their bryoflora included Samuel Brewer (c.1669-1743), Adam Buddle (1662-1715) and Richard Richardson (1663-1741). Indeed, they were better placed geographically than their Continental counterparts for finding many "Atlantic" species, which need plentiful moisture and humidity in order to survive.

Brewer's family – and probably also those of Buddle and Richardson – were connected with the textile industry. The botanical author John Claudius Loudon (1783-1843) first commented on the connection between textiles as an occupation and natural history as a hobby. This link might seem improbable at first glance, but closer consideration reveals several contributory factors which substantiate it.

First, the English woollen industry had been organised along entrepreneurial mercantile lines since the Middle Ages, and the cloth industry also developed similarly. In this respect the English textile trade anticipated developments only seen in other trades after the Industrial Revolution. In the 15<sup>th</sup>-17<sup>th</sup> centuries, non-textile trades remained largely mediaeval, organised as craft-gilds and run by master-craftsmen, each of whom had a few apprentices and journeymen living with him. In contrast, English textile merchants of the 15<sup>th</sup>-17<sup>th</sup> centuries partly escaped the conforming attitudes and lives of contemporary England. Their entrepreneurial mentality and capitalistic life-styles prompted questioning and inquisitive attitudes to their environment – precisely the mind-set needed by naturalists if they are to notice what others have hitherto overlooked.

In addition to their distinctive mind-set, the life-styles of many textile merchants also distinguished them from their contemporaries, for they travelled over long distances and in doing so were well placed to notice that different species of animals and plants inhabited different districts and countries. This made merchants realise that all species have unique and finite geographical distributions, a feature of natural history which straightaway captured the imagination of travelling naturalists. Geographical differences in wildlife became universally appreciated when more people travelled widely and frequently in later eras, but remained an improbable cause of interest for most Englishmen of the 16<sup>th</sup> century, who would have been unlikely to realise how different the flora of, say, the Welsh hills was to that of pastoral country in southern England.

And thirdly, the textile industry's far-flung trading connections required merchants to be literate, in order that they might send and receive enquiries, instructions and orders,

exchange contracts, and keep accurate accounts. This literacy was also essential for an informed study of natural history, enabling merchants to compare and contrast what they found with what others had previously found elsewhere.

Critical and enquiring attitudes, opportunity and incentive to travel, and literacy explain a good deal of why those working in the textile industry took interest in natural history. But there was also a very powerful social incentive for them to pursue their hobby as naturalists, for like practically everyone else they aspired to join the gentry in the social class above their own, and therefore copied them in their interests.

By the 16<sup>th</sup> and 17<sup>th</sup> centuries, the rigours and exigencies of survival no longer intruded on the lives of the English upper class with brutal, daily insistence, for they had attained a standard of living sufficient to partly insulate them from nature's vagaries and vicissitudes. Instead, the English upper class was able to indulge in an early instance of inverted snobbery by taking a voluntary rather than compulsory interest in nature. There was no more powerful means of advertising one's superior social status than by taking up natural history, and wealthy industrial barons of the textile industry muscled in on natural history as a way of proclaiming their affluence, while also declaring their intention of joining the upper class. But whereas most leisured land-owners - for whom the soiling of hands in trade or labour was anathema - regarded natural history as more of a dilettantish abstraction than a reason for muddying oneself in wayside and woodland, for the upwardly mobile bourgeoisie of middle England natural history was yet another means of demonstrating superior ability and performance. So while members of the upper class proclaimed their control over nature by acquiring large libraries and gardens to die for, it was middle class naturalists who went out, searched for, and found species anew.

The capitalist organisation of the textile trade was also unusual for bringing together people of very different backgrounds, as well-to-do merchants contracted with artisans. Attitudes and interests held by people of one class and background rubbed off on folk from lower social strata, and just as wealthy merchants aped the interest in natural history of the leisured social class above them, so artisan weavers followed the lead of the merchants they worked with or for, and took up natural history in their spare time. Indeed, weavers used hand-lenses at work in order to examine fibres, so were pre-equipped to study the intricacies of small plants. For these reasons, in the late 17<sup>th</sup> and early 18<sup>th</sup> centuries, several districts in which textile industries were important became hotbeds of ardour for field-botany, particularly around Norwich and Manchester. Only later, in the 19<sup>th</sup> century, did the socially divisive impersonality of working life in the factory alienate employer from employee, and deter further permeation of interests down the social hierarchy.

Thus, the link between botany as a hobby and textiles as an occupation had nothing whatever to do with any supposed predisposition to brilliant floral colourings and intricacies of botanical form woven or sewn into patterns on wool or cloth, or finely developed appreciation of shapes and patterns, and everything to do with economic performance and social standing.

Brewer and perhaps also Buddle and Richardson came from families which had made money from textiles, while later in the 18<sup>th</sup> century a number of prominent British botanists of the 17<sup>th</sup> and 18<sup>th</sup> centuries had connections with the woollen trade.

William Jackson Hooker's father was a confidential clerk in a firm of worsted manufacturers, Sir James Edward Smith (1758-1828) made his fortune as a woollen-manufacturer, Albert Wilson's paternal grandfather was a woollen-manufacturer, and Charles Hobkirk's father was also in the woollen trade, while on a much less financially spectacular scale Edwin Lees's (1800-1887) father was a woollen-draper and William Gardiner's father was a weaver.

The link between the industry of textiles and pastime of botany – clear and present from the time of Brewer in the late 17<sup>th</sup> and early 18<sup>th</sup> centuries until W.J. Hooker in the late 18<sup>th</sup> and early 19<sup>th</sup> centuries - remained strong for bryologists later in the 19<sup>th</sup> century, but latterly perhaps became more attributable to tradition than any direct connection between occupational cause and leisured effect. Of a later generation, William Phillips Hamilton (1840-1910) joined his mother's family of tailors in trade at Shrewsbury, William Henry Pearson (1849-1923) was a yarn-agent in Manchester, both the father and grandfather of James Alfred Wheldon (1862-1924) were drapers at Northallerton in Yorkshire, Albert Wilson's (1862-1949) father was a tailor and draper, and Arnold Thompson's (1876-1959) father was a cloth-manufacturer. Indeed, the prominence of these bryologists from industrial northern England is the main reason why several of the early meetings of the newly formed British Bryological Society (see below) in the 1920s were held in that part of the country.

But were there other reasons too why early British field-botany was so disproportionately influenced by naturalists who worked in or were connected with textile-industries? Did botanical interest spread to artisans from mercers and merchants? Refugee-weavers from the Continent brought botanical interests with them to England; the Huguenots in particular brought their interests in natural history, mathematics, and the use of flowers to adorn their homes. But to what extent were immigrant weavers from the Continent also influenced by native members of the communities in which they settled and by people in other trades and professions? And to what extent did English weavers take interest in botany before the Continental refugees arrived? How important for sustaining and stimulating weavers' interest in field-botany were the changes in their working conditions during the Industrial Revolution, when a factory-based life-style devoid of contact with the countryside so abruptly and disruptively replaced cottage-industries in rural environments, and created a yearning for that which had been lost? (One might contrast weavers with working farmers, who are in daily contact with nature and very rarely join natural history societies and field clubs.) To what extent did weavers' interest in natural history stimulate them to become literate? Were those who worked in the textile industry interested in other literary pastimes too? And did textile-merchants and weavers of East Anglia and north-west England really develop greater botanical interests and expertise than their counterparts working in the textile industries of the West Country and the Scottish Lowlands? This supposition may be based more on ignorance than fact, and we doubtless have more to discover about the botanical proclivities of textile-workers in the latter regions. Certainly, Scotland's eastern seaboard – from Edinburgh north to Dundee, where topography lent itself to the production of textiles – spawned more accomplished botanists than the west of the country. Indeed, J.C. Loudon, who was brought up in Scotland, was the first to comment on a strong link in the weaving communities of the Scottish Lowlands between field-botany and the textile industry.

Even though we do not know the answers to these questions, the connection between textiles and field-botany appears a convincing one, and East Anglia, northern England, southern and eastern Scotland and Northern Ireland were not only where Protestant weavers settled but also where many of the British bryologists most active during the first half of the 19<sup>th</sup> century lived – quite the opposite of nowadays, when a much larger proportion of bryologists live in south-eastern England.

It is also worthy of notice that many of those associated with field-botany followed dissenting religious sects. One reason for this was their education, which was invariably much more rational and intellectual in flavour than that offered at the time at Oxbridge. Prominent examples of dissenting botanists are James Edward Smith from Norwich, William Wilson from Warrington, Hugh Dixon, and the working-class bryologists of northern England, a list which can easily be extended. Many Quakers in particular were denied entry to English universities and professions, as well as shunning the armed services because of their pacifist beliefs, and so turned to trades and mercantilism. Perhaps they sought consolation in nature for the sectarian discrimination and prejudice they encountered in everyday life.

However that may be, British bryology has always been a pastime for bourgeoisie rather than aristocracy or working class. To be sure, a few exceptions come to mind, but the British Bryological Society of the 21<sup>st</sup> century is no more overrun either by gentry or the unemployed of inner cities than botanical circles were in Buddle's day.

**William Gardiner** (1808-1852) was the son of a weaver (also William) at Dundee in Scotland, and certainly working-class. William Gardiner senior and his brother Douglas were much interested in natural history, and would have known the MacVicar family (see Symers MacVicar, below). William Gardiner junior became apprenticed to an umbrella-maker in Dundee and followed that trade until 1844 when he became a professional plant-collector, exploring, for example, the hills of Clova and Perthshire. In 1846 he issued *Twenty Lessons on British Mosses*, the first attempt to reach a popular bryological market, and one which might equally entitle Gardiner to be included in this article's section in "Popularisers" (below). A second series, with specimens, appeared in 1849. Gardiner also wrote a *Flora of Forfarshire* (1848).

**John Nowell** (1802-1867) was an exemplary working-class bryologist. He was born and remained poor in Todmorden, Lancashire, received very little formal education, and worked long hours as a hand-loom weaver. Yet he corresponded with and was highly esteemed by several of the other leading bryologists of his day, such as William Wilson. He took up bryology in about 1830, and discovered *Cinclidium stygium* near Malham in 1836. This moss was new to the British list, as were *Atrichum crispum* from near Rochdale in 1848, and *Zygodon gracilis* from near Malham in 1856 (Foster, 1980; Blockeel, 1981).

**William Henry Pearson** (1849-1923) was a prominent bryologist in the textile industry, working on his own account as a yarn-agent in Manchester. He lived in Eccles in the 1870s, where Benjamin Carrington fired his interest in liverworts, culminating in the two-volume *Hepaticae of the British Isles* (1899 and 1902).

In East Anglia, three botanists of the late 18<sup>th</sup> and early 19<sup>th</sup> centuries were to profoundly influence subsequent developments in British field-botany. Each member



of this botanical triumvirate was connected with the local textile trade, from which their families derived considerable wealth, and each inherited sufficient of this wealth to enable them to pursue their botanical interests without constant financial worries. Of the three, only James Edward Smith (1758-1828) took little discernible interest in bryology. His father was a wealthy non-conformist wool-merchant, whereas **Dawson Turner** (1775-1858), a banker at Yarmouth, had both consanguineous and commercial connections with the cloth-trade. Turner, the eldest surviving son of the head of a Yarmouth bank, went up to Cambridge in 1793, but returned home the next year, following his father's death, and inherited a fortune which enabled him to indulge his passion for plants, and cryptogams in particular. His bent for botany as a young man did not damagingly dent his finances, and his effects were valued at approaching £70,000 when he died.

With the Continent closed to cultural and commercial traffic during the post-Revolutionary Napoleonic era, British botanists could neither seek vascular plants abroad nor correspond easily with continental botanists, so were obliged to look for botanical diversions closer to home. Moreover, most British vascular plants had been discovered and described by the early 19<sup>th</sup> century. These are the reasons why Turner co-authored the first book to list the regional occurrences of British flowering plants and ferns, and also investigated cryptogams, where there remained great scope for discovering species new to science as well as Britain.

Turner lost active interest in botany in his mid-forties, and in 1820 donated the bulk of his herbarium to his friend **William Jackson Hooker** (1785-1865), who was the third East Anglian botanist to profoundly influence British bryology in the 19<sup>th</sup> century. As with Samuel Brewer's family in Wiltshire, some of Hooker's ancestors were woollen-merchants in Devon. William's father, Joseph Hooker (1753-1845) was a confidential clerk in a firm of wool-staplers at Exeter, but left to settle in Norwich, where he married the daughter of a worsted-manufacturer. Like his son, Joseph Hooker began his botanical career by studying mosses. William was born in Norwich, where his father was in business with Dawson Turner. Like Smith and Turner, William Hooker came into an inheritance sufficient to soften his exposure to life's exigencies, so was able to devote much of his youth and early adulthood to natural history. He botanised in the wilds of Scotland with Turner in 1806, and after marrying his daughter Maria Sarah in 1815, the couple spent their honeymoon in Ireland where they met Whitley Stokes and Thomas Taylor. Both these Irish physicians took interest in and contributed to bryology, and both also suffered setbacks to their careers on account of their non-conformism.

Whitley Stokes (1763-1845) was a Lecturer in Natural History and later Professor of Medicine at Trinity College Dublin, and a family friend of **Ellen Hutchins** (1785-1815). Miss Hutchins was born in Ballylickey, County Cork. Her health suffered while she was at school in Dublin, but improved after she went to live with Dr Stokes, who encouraged her to take up natural history and put her in touch with Dawson Turner and James Townsend Mackay, who was curator at the Botanical Gardens at Glasnevin. In 1805 she returned to Ballylickey to care for her mother and an invalid brother, and spent much of her leisure observing, describing and drawing plants around her home. Unfortunately, a family feud which had lasted since her father's death came to a head in 1813, resulting in Ellen, her mother and brother being dispossessed by another brother. Ellen's mother fell ill and died, and Ellen herself

was also ill by this time, having contracted tuberculosis. She went to live with another brother and his family in Ardnagashel, Bantry, County Cork, where she died in 1815, aged 30.

**Thomas Taylor** (1786-1848), whose forebears had been established near Kenmore in County Kerry since the 17<sup>th</sup> century, was born in a boat on the River Ganges, the son of an Indian lady and Joseph Irwin Taylor, a major in the Bengal Artillery (Lyne and Moriarty, 1984; Sayre, 1987). He was distantly related to Ellen Hutchins, and after spending his early childhood in India, at the age of seven was sent to school in Cork. In 1802 he went to Trinity College at Dublin, graduating as a physician in 1814, and practised in Dublin until 1820. He met Hooker during the latter's honeymoon in 1815, and the two became life-long friends, co-authoring *Muscologia Britannica* (1818). Taylor returned to Cork in 1820, taking up the chair of Botany and Natural History at the Royal Cork Scientific Institute. In 1830 he retired to the family's estate at Dunkerron near Kenmore, where he concentrated on botany and prepared accounts of bryophytes and lichens for James Mackay's *Flora Hibernica* (1836) (Nelson and Parnell, 1992) while farming his land and acting as physician at the local workhouse, as well as discharging other responsibilities as Justice of the Peace and magistrate.

Hooker lived at Halesworth in Suffolk after his marriage, but an increasing family and shrinking income persuaded him of his need to accept the chair of botany at Glasgow in 1820. There he stimulated much enthusiasm for field-botany, and Scotland became as important a centre as Ireland for British bryology, particularly during the 1820s and 1830s, when the universities at Glasgow and Edinburgh were at their most vibrant. Botanical interest in Scotland at the time centred on these two universities, whereas those working in textile industries in the Scottish Lowlands seem not to have taken up bryology with the enthusiasm shown by working and professional classes in contemporary northern England.

Another prominent and productive member of the Scottish cryptogamists' circle, **Robert Kaye Greville** (1794-1866) was born at Bishop Auckland in County Durham, the son of a rector. Intended for the medical profession, he studied and drew plants while still a boy, and later preferred a life of independence to the professional yoke. He married in 1816, settled in Edinburgh, and participated in university life, joining botanical excursions with Hooker, Graham, and others. In 1823 he began to publish his *Scottish Cryptogamic Flora* in monthly parts, with plants drawn and coloured by himself. This work extended to six yearly volumes containing 360 octavo plates. Greville's collection of Scottish cryptogams forms the core of the herbarium at the Royal Botanic Gardens in Edinburgh, where some of his beautiful coloured drawings still lie in packets with the plants they illustrate.

#### *Links between field-botany and medicine*

The botanical proclivities of textile-workers not only exerted profound influence on the development of British field-bryology through the East Anglian axis of Turner and Hooker, but also threw up a remarkable number of bryologists in northern England during the first part the 19<sup>th</sup> century. Some of these were artisans (Foster, 1979; Blockeel, 1981; Secord, 1996), while others were medical men or druggists.

Many medicines were extracted from flowering plants in olden times, so doctors and pharmaceutical chemists needed to know where to find and how to distinguish these species, and a high proportion of field-botanists were either physicians or apothecaries. Some of these herbalists extended their interest to other plants they found. The Apothecaries' Act of 1815, by requiring doctors and pharmacists to know how to identify plants, re-stimulated botanical interests among those following these occupations for much of the 19<sup>th</sup> century. After the time of Doody, prominent pharmaceutical chemists in field-bryology included Burrell, E.M. Holmes, Milsom, Mitten and Wheldon, while doctors who took interest in bryology included Braithwaite, Carrington, Hedwig, F.A. Lees, Macvicar, Stirton and Taylor.

**William Mitten** (1819-1906) was born at Hurstpierpoint, Sussex, and became a pharmaceutical chemist there. His neighbour, the lichenologist William Borrer (1781-1862) encouraged him to concentrate his botanical interests on mosses and allowed Mitten the use of his library and herbarium. Mitten made good use of Borrer's generosity and facilities, adding a number of species to the British list, as well as providing an extremely valuable service to individuals and institutes wanting names and descriptions for specimens collected overseas. One of these explorers who brought bryophytes for Mitten to determine, Alfred Russel Wallace, did not leave empty-handed, for he carried off Mitten's eldest daughter, Annie.

Ron Porley has recently discovered that Mitten collected the very rare *Orthotrichum consimile* at Hurstpierpoint in 1846, but Mitten thought his gathering was *O. pulchellum*. Mitten later correctly described *O. consimile* from Vancouver as a species new to science, not realising that he had collected the same species from near his home 18 years previously.

**James Alfred Wheldon** (1862-1924) embodied a botanical link between textiles and pharmacy, for he came of a family of drapers but qualified as a pharmacist. He was brought up in Northallerton, Yorkshire. His father was a keen and active naturalist, and his eldest son, Harold James, became one too. James Wheldon became a chemist and druggist in 1884, and was the pharmacist at H.M. Prison, Walton, Liverpool from 1891 until 1922. In 1907 he co-authored the *Flora of West Lancashire* with Albert Wilson (see below).

Wheldon's home town of Northallerton is only a few miles up the road from Thirsk. With the demise of the Botanical Society of London, Thirsk effectively became the hub of British amateur field-botany from 1857 until a disastrous fire in 1864, the story of which is vividly recounted in David Allen's *The Botanists* (1986). The Thirsk Botanical Exchange Club's interests extended to mosses, and John Gilbert Baker (1834-1920) who formed the club at Thirsk and his father were wholesale drapers and grocers, so perhaps they supplied goods to the Wheldons in nearby Northallerton.

Like Wheldon, J.G. Baker's son Edmund Gilbert Baker (1864-1949) became a pharmacist, and later assistant keeper at the Natural History Museum (then known as the British Museum). Both Wheldon and E.G. Baker undertook their pharmaceutical training in London - did they know each other? And in a further strange coincidence, after Wheldon qualified he set up in business in York, where his premises, natural history collections and library were destroyed by fire on New Year's Eve, 1890, just as the Thirsk Club's stock had perished in 1864. After this set-back to his career in

York, Wheldon moved to Liverpool to take up a post at the prison, where the prison's chaplain, Reverend Samuel Gasking, probably joined the Moss Exchange Club in 1899 with Wheldon's encouragement.

**Albert Wilson** (1862-1949) came from a family of Quakers, and both his parents were interested in natural history. His paternal grandfather was a woollen-manufacturer at Thornton, Yorkshire, but like Wheldon, Albert Wilson studied in London to become a chemist, and after registering as a qualified pharmaceutical chemist in 1884, he returned to Bradford, Yorkshire, where he had been apprenticed. He became interested in bryophytes after meeting Wheldon in 1898, and they became good friends, exploring Westmorland and the Scottish Highlands together, and co-authoring the *Flora of West Lancashire* (1907). Wilson was also a friend of John Foggitt (born 1861/2) of Thirsk (later of Southport and Kirkby Lonsdale); three generations of Foggitts of Thirsk were botanists, starting with Thomas J. (1810-1895), his son William (1835-1917), and then grandson Thomas Jackson (1858-1934), who married Gertrude *née* Bacon, co-discoverer of *Carex microglochin* in Scotland in 1923.

**William Holmes Burrell** (1865-1945) was a joiner's son from Norfolk, and trained as a pharmacist, registering in 1886. He kept a shop at Sheringham-on-Sea, Norfolk, until 1903, and lived in Yorkshire from 1914 until his death. His nephew, **Francis Eric Milsom** (?1889-1945) also became a pharmacist and a noted bryologist.

In Manchester, **William Wilson** (1799-1871), son of a druggist in Warrington on the border between Cheshire and Lancashire, became a solicitor, but took up field-botany while recovering from illness. Wilson's father was well-to-do, for in 1820 he bequeathed £1,000 to provide for his married daughter, and having arranged for his widow to enjoy the use of his dwelling-houses and household goods, named his two sons as tenants in common of his messuages, lands and tenements. In 1827 Henslow, the Cambridge botanist, introduced Wilson to Hooker, who wrote to him that year, recommending the study of mosses as a subject in need of attention, and he participated in a five-day excursion in the hills of Breadalbane, after which he stayed on at Killin. Later he "spent nearly two years in Ireland, where, no doubt under Hooker's influence, he studied mosses, which from 1830 engrossed his whole attention" (*Dictionary of National Biography*). Marriage to a widowed cousin in 1836 curtailed his botanical explorations, and his *magnum opus*, *Bryologia Britannica*, appeared in 1855.

After Wilson, the next large-scale publishing venture in British bryology came from **Robert Braithwaite** (1824-1917). He was the son of a ship-owner and master mariner in the Merchant Service at Whitby, Yorkshire, trained for a medical career in London, became a general practitioner in Clapham, and lived in London for the rest of his adult life. Braithwaite married Charlotte Elizabeth, daughter of Nathaniel Bagshaw Ward. Ward was also a physician working in the same part of London, as well as a keen field-botanist, but is now most remembered for inventing the aquarium and the Wardian case in which ferns and other delicate plants could be safely transported in ships and also grown indoors.

During his medical training in London, Braithwaite took up with Ward's social circle in the East End, where he met the Quekett brothers and acquired a life-long interest in

microscopy, a predilection which remained more important to him than field-work for the rest of his life.

Braithwaite's lasting contribution to British bryology is his three volumes of *The British Moss-flora* (1887-1905), illustrated by himself. A delightful obituary by H.N. Dixon in the *Journal of Botany* recounts that "this elaborate.... work of art.... bears all the marks of the amateur in the original and highest sense of the word.... and indeed in some measure defeated its own purpose, for [Braithwaite's] intense desire to make it artistically perfect, the high finish of the illustrations, [and].... elaboration of the synonymy, brought the work to such a size and cost, while at the same time extending .... its publication over so many years as to prejudice very greatly its sale...."

Having recalled the warm cheer that he derived from Braithwaite's letter of congratulation on finding *Tortula vahliana* while a student at Cambridge, Dixon resumes his dissection of Braithwaite. "Genial and generous as he was.... he could feel and resent a slight or injury. Even in what might be supposed the thornless path of bryology, offences *will* come, and one does occasionally in treading that path come across what our American allies expressively term a 'snag'." Braithwaite, it transpires from the obituary, was little interested in intraspecific variation, whereas such varieties were of the utmost importance to Dixon (who had superseded Braithwaite as the doyen of British muscologists), "for it happens to be the system on which Nature works."

"....Dr Braithwaite was not a great field-botanist", continued Dixon in his obituary of Braithwaite. "*Trematodon ambiguus* in its lonely outpost on Schiehallion [in central Perthshire] stands to his credit, but I do not think he added much else to our British Moss Flora. Nor did he ever speak of field-work as if he took much delight in it.... He told me.... of an expedition with Dr Stirton and Ewing to the Hebrides, when Stirton was to show him the locality, on Benbecula, for some rare or unique *Campylopus* found there thirteen years earlier. Arrived at the spot there was naught but a potato patch to be seen, and the *Campylopus* appeared to have joined the ranks of extinct species. On the return journey they had unpleasant experiences, being nearly overtaken by the tide and nearly or quite benighted by fog. Braithwaite must have looked back on the Outer Hebrides with somewhat similar feelings to Dr Johnson. It could have been no great comfort to him when Dr Stirton wrote later that he found he had taken them to the wrong spot for the *Campylopus*!"

**James Stirton** (1833-1917) was one of a number of botanists who trained for the medical profession, and was also one of several who showed great aptitude in mathematics – others being Thomas Barker, Sir James Stirling and Henry Herbert Knight. Stirton spent his medical career in Glasgow, and explored the Scottish hills, particularly Ben Lawers. He found *Tortella limosella* new to science near Arisaig in 1906 - a moss which has yet to be refound anywhere. Stirton also took much interest in lichens.

**Benjamin Carrington** (1827-1893) came from Lincoln, and was Medical Officer of Health at Eccles, Lancashire for 18 years. He was an authority on liverworts, and the first parts of his *British Hepaticae* appeared in 1874 and 1875, but ill health prevented him from completing this work. While a student at Edinburgh, he met Greville, W.J.

Hooker and Balfour, who must have kindled his interest in bryology. Carrington collected his first liverwort in 1850 – *Anthelia julacea* from the hills near Glen Shee, and subsequently added to the British list *Gymnomitrium crenulatum*, *G. corallioides*, *Scapania cuspiduligera* and *Eremonotus myriocarpus*, as well as *Riccia beyrichiana* from Barmouth in Wales. He stimulated W.H. Pearson’s interest in liverworts (pages 8-9).

**Frederick Arnold Lees** (1847-1921) was the son of a temperance-preacher, Frederick Richard Lees (1815-1897), and practised medicine in Leeds for much of his working life. He edited the second edition of *The London Catalogue of British Mosses* in 1881, published under the direction of the Botanical Record Club, of which he was a prominent and active member. To this catalogue he added a list of liverworts.

#### *Other bryologists of the 19<sup>th</sup> century*

**Richard Spruce** (1817-1893) was born at Ganthorpe, Castle Howard, Yorkshire, and followed his father into teaching for five years at York, during which time he wrote a paper about the mosses of Eskdale. He explored the Pyrenees in 1845-6 and South America from 1849-64, where he collected bryophytes, many of them new to science. He retired to Coneysthorpe, Castle Howard, in 1876. Spruce is mainly remembered for his seminal work on the South American bryoflora, but as a young man added *Myrinia pulvinata* to the British list in 1842, followed by seven more species in 1843.

**Henry Boswell** (1837-1897) of Oxford succeeded at the age of 25 to his father’s business of manufacturing and selling portmanteaux, trunks, bags, dressing-cases, hats, hosiery and shirts. In 1877 he issued (with Charles Hobkirk) the first edition of the *London Catalogue of British Mosses and Hepatics*, and (with Frederick Lees) the second edition in 1881. He gradually lost interest in field-bryology after the middle years of the 19<sup>th</sup> century, as choice botanical sites around Oxford became damaged or ruined. Boswell explored with other bryologists who were at the University, such as Crouch and Ley (see below), but had no time for those who “split” species or changed their names.

#### *Popularisers of the 19<sup>th</sup> century*

A number of naturalists who did not discover rare bryophytes nevertheless contributed significantly to field-bryology by publishing books aimed at a flourishing demand for works of natural history in the mid and late 19<sup>th</sup> century.

The Reverend **Miles Joseph Berkeley** (1803-1889) was principally a mycologist, but wrote a *Handbook of British Mosses* (1863); a second, posthumous edition appeared in 1895. He was born at Biggin Hall, near Oundle, Northamptonshire, the second son of Charles Berkeley and his wife Charlotte, daughter of James Munn, a landscape-painter of Blackheath, Kent. Charlotte was sister to the water-colour artist Paul Sandby Munn (1773-1845). Paul Munn knew the artist John Sell Cotman (1782-1842), who was acquainted with Dawson Turner through Turner’s mother Elizabeth, who was born a Cotman.

While Berkeley was an undergraduate at Cambridge, Henslow stimulated his interest in natural history. He also met R.K. Greville and Dugald Carmichael of Appin, Argyll during trips to the Scottish Highlands in the summers of 1823 and 1824.

**Mordecai Cubitt Cooke** (1825-1914), like Berkeley, was mainly a mycologist, but wrote a *Handbook of British Hepaticae* (1894). He became a schoolmaster in London, and his complicated domestic ties were elucidated long after he died (English, 1987).

**Robert Mackenzie Stark** (1815-1873) was the son of the Reverend William Stark, minister of Dirleton, East Lothian. He became a nurseryman at Edinburgh, and knew Greville and George Walker Arnott, who assisted him with finding and identifying bryophytes. Stark specialised in alpine plants, and wrote *A Popular History of British Mosses* (1854; 2<sup>nd</sup> edition 1860).

Sir **Edward Fry** (1827-1918) was born into the wealthy Quaker family which founded the firm of chocolate-makers. He wrote *British Mosses* (1892), of which a second edition appeared in 1908. He subsequently co-authored *Liverworts* (1911) with his daughter Agnes. Fry was a judge in the High Court, also Lord Justice, and probably knew Sir **James Stirling** (1836-1916) who was also a judge and had joined the Moss Exchange Club by 1899. Stirling, in his turn, was a life-long friend of **Thomas Barker** (1838-1907). Like Stirling, Barker was born in Aberdeen, studied mathematics at Cambridge, and also became a founding member of the Moss Exchange Club. Barker was an accomplished field-bryologist, and was also Professor of Mathematics at Manchester for 20 years from 1865. In 1898, he discovered *Grimmia arenaria* in North Wales, new to Britain.

**James Eustace Bagnall** (1830-1918) was born and died in Birmingham, where his father (also James) owned a warehouse. The Bagnalls were not well off, though, and James junior left school at the age of 14 to become a clerk. Eventually he became chief clerk at a factory for manufacturing pen-nibs.

Lacking a tertiary education, and surrounded by factories, Bagnall did not discover the delights of botany until the age of 34, when a friend lent him a microscope. He taught himself botany, and collected his articles about bryophytes into a *Handbook of Mosses* (1886), which was published as one of a 'Young Collector' series, and in which Bagnall outlined the structure, classification, distribution and habits of mosses, as well as describing how to collect and preserve them.

Bagnall systematically explored his home county of Warwickshire, wrote the *Flora of Warwickshire* (1891), and made a start on Staffordshire after retiring in 1897.

**Charles Codrington Pressick Hobkirk** (1837-1902) was a son of David Thomas Hobkirk, who was engaged in the woollen trade at Huddersfield, Yorkshire. The Hobkirks were merchants; David Hobkirk's elder brother (also Charles Codrington Pressick Hobkirk) was a seed-merchant. The names of Codrington and Pressick had been perpetuated through five previous generations, from the time of Christopher Prissick (died 1718), who was a merchant of Carlton, Cleveland, Yorkshire and London. He married Sarah Codrington in Barbados in 1699, she probably being the

daughter of Christopher Codrington (1639/40-1698), who was Deputy Governor of the island.

Hobkirk the bryologist became a bank-manager at Huddersfield and Dewsbury, Yorkshire, and wrote a *Synopsis of British Mosses* (1873), with a second edition in 1884. With Boswell he also prepared the first edition of the *London Catalogue of British Mosses* (1877).

**Margaret Plues** (1828-1901) wrote *Rambles in Search of Mosses* (1861). She was a younger daughter and one of eight children of the Reverend William Plues (c.1785-1851) of Ripon, Yorkshire, and his wife Hannah (*née* Swire). William was headmaster of Ripon Grammar School from 1840 until he died, and Margaret's eldest brother, Samuel Swire Plues (c.1816-1898) trained in law and became Attorney General for British Honduras. Margaret did not marry, and lived successively with three of her elder sisters. At the time of the 1881 Census, Margaret lived in Fulham Road, London, working as an artist in painting and embroidery, with 14 boarders (all female, and nearly all dressmakers). She converted to Roman Catholicism and entered a convent at Weybridge, Surrey, where she died.

Another authoress, **Frances Elizabeth Tripp** (1832-1890), wrote *British Mosses, their homes, aspects, structure and uses* (1868; 2<sup>nd</sup> edition in two volumes, 1874; 3<sup>rd</sup> edition, 1888). She illustrated the book with the likenesses of living specimens, which she etched on to copper plates. These were then coloured by Benjamin Fawcett. Like Plues, Tripp was an unmarried daughter of a priest, the Reverend Robert Henry Tripp (1801-1880) of Altarnan, Cornwall.

#### *Elucidating the geographical distributions of species: The Moss Exchange Club*

As the 19<sup>th</sup> century wore on, it became more difficult to find and describe previously unknown species of vascular plants in Europe, so this interest began to give way to finding known species in new places. Alongside Floras for identification, county Floras appeared which recorded the flowering plants and ferns present in particular districts. Mapping the geographical distributions of these species became a British vogue in the mid-19<sup>th</sup> century, and also started to influence the attitudes and activities of British bryologists.

In contrast to vascular plants, documentation of western Europe's bryodiversity remained incomplete, particularly for liverworts, offering naturalists the possibility of finding and describing species new to science, and stimulating unprecedented numbers of a new generation of naturalists reaching maturity to take up bryology in the second half of the 19<sup>th</sup> century. Study of small organisms was also made much easier by the elimination of achromatic and aspheric aberration from the lenses of microscopes and hand-lenses, for this greatly improved their quality of image. Moreover, mass-production of metal and glassware by machines had superseded manufacture of components of microscopes by hand. These developments standardised and improved the quality of microscopes, as well as making them more widely and readily available, so driving down the costs of manufacture and prices, and making them affordable for many more naturalists.



In consequence the 1850s and '60s saw the birth of more prominent field-bryologists than any other period. During these two decades were born, for example, Armitage, Bellerby, Binstead, Burrell, Dixon, J.B. Duncan, Ingham, Jameson, D.A. Jones, Knight, MacVicar, Meldrum, Nicholson, Waddell, Wheldon, and Albert Wilson. Neither before nor since have so many active and accomplished bryologists occurred in one generation, and they were just sufficiently numerous to make formation of a national club viable as they reached maturity at the end of the century. 23 members formed the Moss Exchange Club in 1896, and these had become 34 two years later, when the Sullivant Moss Club (1898) was founded in North America. These two clubs promoted communication between bryologists, and later the cooperative pooling of information necessary for working out the geographical distributions of species.

In what was to prove the tail-end of the fore-mentioned apogee of Irish field-bryology, the Reverend Cosslett Herbert Waddell was a prime figure in establishing the Moss Exchange Club, probably encouraged by his older colleague the Reverend Henry William Lett.

**Henry William Lett** (1838-1920) was the second son of the Reverend Charles Lett (1804/5-1887) of the Church of Ireland, and Elizabeth Mary (*née* Corry), who was very probably related to Thomas Hughes Corry (1859-1883), a botanist who drowned in Lough Gill, aged 23. Charles Lett succeeded Henry David Corry (Elizabeth's late brother) as incumbent at Hillsborough, Co. Down, and by 1851 had become Rector of the parish of Dunaghy, Glebe Townland, Co. Antrim.

After graduating from Trinity College, Dublin, Lett followed his father into holy orders, becoming curate of Derriaghy, Co. Antrim (1861-63), Meigh and Camlough (1863-65), Rector of Moyntaghs, Co. Armagh (1875-86), and in 1886 of Aghaderg, Loughbrickland, Co. Down.

He took up bryology from about the time he graduated in 1860, and this interest culminated in his *Hepatics of the British Isles* (1902). Lett discovered *Adelanthus lindenbergianus* new to science.

The Reverend **Cosslett Herbert Waddell** (1858-1919) became vicar at Saintfield and subsequently Rector of Grey Abbey, County Down. Most of his botanical work was in bryology, his most significant contribution to British and Irish bryology being as prime instigator in forming the Moss Exchange Club in 1896, which subsequently became the British Bryological Society in 1923. Waddell was the son of Cosslett Waddell and Maria (*née* Langtry), a cousin of Edward Langtry, a wealthy ship-builder at Belfast and first husband of Lillie Langtry, the English actress, and mistress to Edward Prince of Wales in the 1870s.

Its title indicates that the Moss Exchange Club was originally established in order to facilitate the exchange of mosses between members, so that they might extend their herbaria and improve their expertise in identifying a greater range of species. These requirements arose because British bryologists lacked up-to-date, easily obtainable, affordable guides to identifying mosses and liverworts. As it happened, Dixon (see below) brought out his *Handbook of British Mosses* in the very year that the Club was founded – a clear instance of one itch provoking two different scratches.

With the comparatively narrow aim of exchanging mosses, it quickly became apparent that bryological beginners felt deterred from joining the Club because they were unable to name their gatherings and therefore could not participate in the exchange. The Club therefore established a beginners' section, whose members could have their plants named by drawing on the greater expertise of those in the Club's "senior" section. The new section did indeed successfully attract beginners who wished to learn to recognise bryophytes by having their gatherings reliably named, and thereby also incidentally prompted the start of a popular and very useful system of refereeing which remains in place to this day.

Dixon's *Handbook* (and a few years later, also MacVicar's for liverworts, see below) went some way to obviating the need for exchange of gatherings, but even these excellent guides could not entirely prevent uncertainties and misidentifications, and the exchange of bryophytes between members not only remained popular, but also necessary for eliminating errors. Moreover, these exchanges prompted another development – accumulation of vouchers to prove the existence of particular species in particular vice-counties and localities. This in turn led to the publication of *Census Catalogues* which listed the known geographical distributions of species within the British Isles. Like the system of refereeing, retention of vouchers from different vice-counties has continued to the present, with vouchers nowadays being deposited in the national bryological herbarium BBSUK at Cardiff.

By the time that the beginners' section became established, the title of the Moss Exchange Club no longer reflected the fact that its activities extended beyond that of merely exchanging gatherings. Its title also gave no indication that some of its members also took interest in liverworts and hornworts. Certainly, most British bryologists gave less attention to liverworts than to mosses in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries because the species were less well understood and the literature far poorer. This changed with the publication of MacVicar's *Handbook* (see below) in 1912.

During the 19<sup>th</sup> century, and even into the early part of the 20<sup>th</sup>, ignorance of liverworts was hindering a better understanding of the species and their distributions. Bryologists were still having to rely on Hooker's *Hepaticae Britannicae* (1812-16), and even most leading members of the Moss Exchange Club, when offering to help beginners with their identifications, were restricting their offers to mosses (Foster, 1979). This difficulty was only resolved when MacVicar's *Handbook of British Hepatics* appeared in 1912.

**Symers Douglas Macdonald MacVicar** (1857-1932), like Greville and Braithwaite, trained for medicine, and was one of those fortunate physicians who enjoyed the indulgence of "neither requiring nor caring" to suffer the daily doses of discipline experienced by those who find themselves obliged to work for a living, and prefer to devote their active adult years to natural history. He acquired an interest in natural history from his father John Gibson MacVicar (1800-1884), who as well as being a priest was also sometime Professor of Natural History at St. Andrews University. J.G. Macvicar was himself the son of a priest, Patrick MacVicar of Dundee, and his wife Agnes (*née* Gibson), the daughter of the Reverend John Gibson. J.G. MacVicar gave up his chair at St. Andrews in order to go to Ceylon (now Sri Lanka) as chaplain

of a new branch of the Scottish Church. But the family returned to Scotland in 1852 and settled at Moffatt, Dumfries-shire in 1853, where Symers was born.

His mother Janet (Jessie) Robertson Macdonald, who died in 1900, was a daughter of David Macdonald (*né* Robertson) of Kinlochmoidart in west Inverness-shire, who was the son of the historian William Robertson (1721-1793), and great grand-daughter on her mother's side of Donald Macdonald who lost his head and the property of Kinlochmoidart in the uprising of 1745.

After marrying Ada Julia Robertson (*née* Littledale, 1844-1920), the widow of his cousin William David Alexander Robertson (1833-1883) of Kinlochmoidart, MacVicar settled to his new estate and swapped the practice of medicine for the more leisurely study of liverworts, which form such a prominent and luxuriant part of Kinlochmoidart's vegetation. This culminated in *The Student's Handbook of British Hepatics* (1912; 2<sup>nd</sup> ed. 1926), an inexpensive and portable book, but also a comprehensive guide to British liverworts which provided a long-needed stimulus to and means by which less accomplished naturalists could advance their expertise in hepatics. MacVicar's *Handbook* is now out of date, but still stands as a model for guides of its type, with clear, concise descriptions directly accompanying H.G. Jameson's life-like drawings.

The *Student's Handbook of British Hepatics* greatly eased naturalists' difficulties when it appeared in 1912, and **Hugh Neville Dixon** (1861-1944) wrote an equally needed pocket-guide to British mosses in 1896. Dixon's father and grandfather, both Robert Walker Dixon, were farmers and flour-millers at Wickham Bishops, Witham, Essex. His mother was born Susan Goodman, daughter of Joseph Goodman, a farmer and miller at Wyton and Houghton near Huntingdon. Hugh's elder brother trained for a medical career, but died after several years of illness, aged only 33. His younger brother was born deaf-mute, and Dr Thomas Arnold helped him to learn to speak at his school in Northampton. After graduating from Cambridge in 1883, Hugh went as a teacher to assist Dr Arnold at his school, and succeeded him as principal the following year, remaining in post until he retired in 1914. Having grown up with his younger brother, Hugh's early experience of communicating with a deaf-mute must not only have greatly assisted him in his chosen career, but doubtless also inspired his choice. A further facilitating factor would have been that Dr Arnold, like the Dixons, was a devout Congregationalist.

MacVicar and Dixon were gifted communicators as well as consummate field-bryologists, whose guides were indispensable during most of the 20<sup>th</sup> century for those wishing to learn their British bryophytes. Not least of the attributes of Dixon's and MacVicar's pocket-guides were the Reverend H.G. Jameson's illustrations.

The Reverend **Hampden Gurney Jameson's** (1852-1939) first names indicate old family connections. Jameson's mother was born Mary Ann Gurney, member of a family of Quaker bankers which produced many fine naturalists. One branch of the Gurney family was long-established in Norfolk, in business with Dawson Turner and the Hookers early in the 19<sup>th</sup> century. The Hampdens were prominent Parliamentarians at the time of the Civil War, and the Reverend John Hampden Gurney (1802-1862) was also a priest in the capital, as well as author of miscellaneous tracts and father of Edmund Gurney, a philosophical writer. William

Kingsbury (1744-1818) was a dissenting minister in London, and Jameson's father, William Kingsbury Jameson, left upwards of £50,000 when he died in 1864, as did John Hampden Gurney in 1862 – both most worthy baton-holders in the battalion of well-to-do families which spawned prominent naturalists.

Jameson's significant contribution to British field-bryology was as a communicator rather than discoverer. He brought out his *Illustrated Guide to British Mosses* (1893) before providing the drawings for Dixon's guide in 1896 and MacVicar's in 1912. He was vicar at Eastbourne from 1896 until 1917, so may well have been instrumental in arranging for the publication of both books in that town.

In contrast to the reputations of MacVicar, Dixon and Jameson as gifted communicators, that of **William Robert Sherrin** (1871-1955) rests mainly on his abilities with the spoken word rather than published pages. The son of a water-colour artist, Sherrin had a taxidermist's shop at Ramsgate in Kent, and then in 1895 joined the British (now Natural History) Museum in London. In 1919 he became curator at the South London Botanical Institute. He organised and led botanical meetings, and gave immense help and encouragement to those he met in London who wished to learn their bryophytes. A number of "Sherrin's boys" went on to become accomplished bryologists, most notably P.W. Richards and E.C. Wallace.

**Ernest Charles Horrell** (1870-1944), however, was less popular with his fellow-bryologists. To judge from the MEC's notebooks around the turn of the century, he seems to have had a wearily didactic streak in him; perhaps he acquired this from his father Thomas, who was a Wesleyan Methodist minister. Ernest was convicted in 1888 of stealing books from libraries while a student at Leeds, for which he was sentenced to two months' imprisonment. However, he succeeded in becoming a schoolmaster, and by 1901 was a lecturer in botany at London. Horrell stimulated preparation of the first Census Catalogues for mosses and liverworts, and also ran the newly formed "Beginners' Section" of the MEC, which had attracted 30 members by 1903.

#### *Some bryologists of the Welsh border*

Long before the Moss Exchange Club came into existence, the Welsh border had been home to several bryologists of repute. After Littleton Brown's time, another priest, the Reverend **Edward Williams** (1762-1833) was Shropshire's next accomplished bryologist. His father, also Edward (1730/31-1824), lived at Eaton Mascott, south-east of Shrewsbury, and became the second husband of Barbara Letitia Corbet (*née* Mytton, c.1732-1796) of Uffington, by whom he had nine children, Edward being the second-born. Barbara was a daughter of John Mytton (c.1690-1756) of Halston near Shrewsbury and Mary Elizabeth Davenport (1678-1771), daughter of Henry Davenport of Davenport House.

After graduating from Oxford, Williams was inducted to the livings of Battlefield and Uffington, Shropshire, which were in the gift of his half-brother, John Corbet of Sundorn Castle, near Shrewsbury. He also became Rector of Chalsfield, Kent in 1817. Williams compiled the first (unpublished) list of bryophytes from Shropshire, and found *Ricciocarpos natans* at Eaton Mascott in 1802, as well as other plants such

as *Antitrichia curtispindula* and *Targionia hypophylla* which are rare in or absent from Shropshire nowadays.

**James Frederick Crouch** (1809-1888), like Williams, was an Oxford man, but hailed originally from Cainhoe, Bedfordshire, where his younger brother William (1818-1846) held the incumbency and formed a herbarium of local plants, and near where his nephew Charles (1855-1944) farmed and botanised. J.F. Crouch took up the living of Pembridge, Herefordshire in 1849, and remained Rector there for 39 years until his death.

Crouch knew the bryologist Henry Boswell (see above) from his Oxford days, as Augustin Ley did later, and Crouch also preceded Ley into the field in Herefordshire, where he began to elucidate the county's bryoflora and laid the foundation for Ley's treatment in the *Flora of Herefordshire* (1889), which Crouch just failed to live to see.

For upwards of thirty years from the 1870s, the Reverend **Augustin Ley** (1842-1911) was the foremost bryologist of the southern Welsh Marches. Augustin was the son of the Reverend William Henry Ley (died 1887), who became vicar of Sellack in Herefordshire in 1841. The Leys originated from Devon, where generations had served in holy orders. Augustin went to Oxford, like his father before him, and after a spell as curate at Buxton in Derbyshire, returned to Herefordshire in 1874, and eventually succeeded his father at his incumbency. He set about recording the flora of Herefordshire and the Welsh Marches, finding innumerable species new to the region.

In 1878 he married his cousin, Sarah Lucy Du Buisson, but Sarah caught a chill and died soon after they returned from honeymoon. Thereafter, Ley devoted himself entirely to his pastoral duties and botany, the latter culminating in the *Flora of Herefordshire* (1889). For the last quarter of the 19<sup>th</sup> century, Ley was one of the most active field-botanists in the country, collecting and exchanging many thousands of specimens. However, his energies were waning by the time the Moss Exchange Club was established in 1896, and he never joined that Club. *Oxyrrhynchium (Eurhynchium) schleicheri* was described and added to the British list through Ley's field-work.

The Welsh border remained a region of prominence during the early years of the Moss Exchange Club, with several bryologists taking on the mantle of Brown, Williams, Crouch and Ley.

**William Phillips Hamilton** (1840-1910) was born in Cape Town, South Africa, the son of William Hamilton, the master of a merchant vessel, and his wife Elizabeth (*née* Phillips, c.1809-1891). Elizabeth Phillips was born at Hanwood, near Shrewsbury, where her own mother, Elizabeth *née* Cross was born. Elizabeth junior's younger brother, William Phillips (1822-1905), became a noted mycologist. Elizabeth junior met William Hamilton when she went out to South Africa as governess to the children of a Captain Barnes.

Hamilton *père* died in about 1858, and Elizabeth brought her two sons back to Shrewsbury, where her relatives were tailors. Both Hamilton boys were apprenticed to the family firm, and William Phillips Hamilton very likely acquired his interest in natural history from his uncle William Phillips (1822-1905), who was an

accomplished mycologist. Hamilton himself became a well-respected bryologist, adding many species to Shropshire's list.

**Richard de Gylpyn Benson** (1856-1904) lived a few miles south of Shrewsbury in Church Pulverbatch at the northern end of the Long Mynd. He came of professional families. His father, Richard Brownlow Benson (1831-1914), was the son of the Reverend John Benson (died 1860) who was curate of Upton Magna near Shrewsbury early in his clerical career, and subsequently Rector of Norton-sub-Hamden in Somerset. John Benson married Frances Gilpin (1794-1865), daughter of the Reverend William Gilpin (1757-1848), headmaster of a highly regarded school at Cheam in Surrey, and a noted proponent of the Enlightenment movement, who extolled the beauty of the Wye valley at Tintern. Later he became Rector at Pulverbatch for many years.

Like the Leys and Du Buissons, the Gilpins and Bensons intermarried several times. Richard de Gylpyn Benson's mother, Elizabeth Barbara (*née* Gilpin, 1831-1917) was a grand-daughter of William Gilpin by his son Bernard, and Elizabeth's sister Annette married Charles Benson, a brother of Richard's.

Richard Brownlow Benson had qualified as a physician and set up in Harley Street, London, but had to retire from practice at the age of 27 with a spinal complaint, and joined his maternal grandfather's family at Church Pulverbatch, where he became pastor.

Richard de Gylpyn Benson qualified as a solicitor in London, but succumbed to ill health like his father before him, and retired to Church Pulverbatch, taking up bryology as a pastime.

Like Hamilton and Benson, **Arthur William Weyman** (1860-1935) was a founding member of the Moss Exchange Club in 1896. He discovered *Cinclidotus riparius* in the River Teme at Ludlow, as well as *Bryum weigeli* on the Long Mynd. He was the third son of Thomas Weyman (1819-1873), a solicitor at Ludlow, Shropshire, and Mary Maria (*née* Bluck, 1826/7-1901). All three sons became solicitors. The eldest, Henry Thomas became a partner in the family firm, but the second, Stanley John, forsook law and became a successful historical novelist.

Arthur William Weyman married Emma Seward Wood, daughter of the Reverend Horace Seward Wood. There were Seward Woods at Vowchurch in Herefordshire, one of which, Geoffrey Howarth Spencer Wood (1927-1957) became a botanist and collected bryophytes in Borneo, where he was killed by a camp-fire.

The Reverend **Charles Herbert Binstead** (1862-1940) succeeded Ley in the field in Herefordshire as the county's principal moss-cropper, but hailed from the north country. His father was a Land and Mineral Surveyor at Grasmere in the Lake District, and before that the Binsteds had lived at Wakefield in Yorkshire. Binstead's paternal grandfather was a Vice-Admiral in the Royal Navy.

After going up to Oxford and then preparing for a career in the church, Binstead's first post as curate was in Cumbria, the region where he spent his boyhood, but in 1890 he moved south and spent the next fifty years at various incumbencies in the

diocese of Hereford. He added many mosses to the county's list, and also retained an interest in the Lake District's bryodiversity, writing papers on the moss flora of both regions. He also bryologised considerably in Somerset (his wife's family came from that county), adding *Cheilothela chloropus* to the British list at Clevedon, as well as *Scorpidium turgescens* from Ben Lawers in Scotland.

**Eleonora Armitage** (1865-1961) was the only founding lady-member of the Moss Exchange Club. Her father was bailiff for the Herefordshire estates of Guy's Hospital, and her mother was a Perceval, grand-daughter of Spencer Perceval, the Prime Minister who was shot in the lobby of the House of Commons in 1812. Eleonora was the third daughter in a family of four sons and four daughters. As was usual in the 19<sup>th</sup> century, only the boys were formally educated for the professions, the girls being taught at home by their mother, and then the older daughters taught the younger ones. Later, Miss Armitage earned a little money by helping to lay out friends' gardens, working with their men. In her spare time she used to set off by bicycle on her explorations of the countryside, and slept at farmhouses long before the modern habit of "bed and breakfasting" came into fashion.

**Henry Herbert Knight** (1862-1944) was the second son of the Reverend Henry John Knight (1827-1900), of a clerical family from Kettering, Northamptonshire and Frances Elizabeth (*née* Allen, 1834-1931), the eldest daughter of John Allen, gentleman (died 1871), whose family had for generations farmed land around Malvern on the border between Herefordshire and Worcestershire. This link with Worcestershire was doubtless why Henry John Knight accepted the living at Abberton and Flyford Flavell in that county, where Henry Herbert and his brother were brought up.

Knight went to Cambridge, graduating with distinction in mathematics, and took up a teaching post at Llandovery College, Carmarthenshire in 1887, where he taught for 20 years, and during which time he explored and recorded the bryoflora of his adopted county. In 1907 he retired and went to live with his widowed mother in Cheltenham, Gloucestershire, where his maternal aunt's husband owned a retail business.

Knight discovered a great number of species new to both Carmarthenshire and Gloucestershire, and was held in sufficiently high regard by other members of the Moss Exchange Club to be appointed referee for liverworts in 1911, a position he held for 22 years.

**John Bishop Duncan** (1869-1953) worked in banks in the West Midlands for much of his career, but retired to Berwick-upon-Tweed in the 1920s, where he lived a few doors along the street from a cousin on his mother's side of the family. His parents came from Dalkeith, near Edinburgh, where in turn their fathers had been a carter and a grocer. John Bishop Duncan's father, though, became a teacher, and brought up his young family at Moffat in south-west Scotland. The Duncans very likely knew the MacVicars, for Symers MacVicar's father, John Gibson MacVicar, held the incumbency of Moffat from 1853 until his death in 1884. Duncan joined the Moss Exchange Club in 1901 and subsequently became a leading British bryologist, adding many species to the county-lists in the West Midland shires, as well as supplementing the British list with *Octodiceras fontanum* from the River Severn and *Plagiothecium piliferum* from the Scottish Highlands.

*Other leading field-bryologists of the early 20<sup>th</sup> century*

**Daniel Angell Jones** (1861-1936) came of Welsh stock, and lived in Merionethshire (Gwynedd) for most of his life. His father, also Daniel (born 1825/6 at Llanbedr, near Ruthin, Denbighshire) was a self-employed house-painter in Liverpool at the time of Daniel's birth, but by 1864 the family had moved to Portmadog, Caernarvonshire, and to Harlech, Merionethshire by 1868. Daniel spent the rest of his childhood there with his three younger sisters and two younger brothers. By 1871 their father had changed his line of business, and kept a grocer's shop.

Daniel Angell Jones became a schoolteacher, and taught at Machynlleth down the Welsh coast for six years from 1886, but moved back to Harlech in 1892, where he remained until he retired to Cheltenham in 1924. Perhaps he bryologised there with Knight. In 1931 he moved again to Bristol, where he spent his last five years.

Jones added several bryophytes to the British list, including the liverworts *Gymnocolea acutiloba* from the Rhinog mountains just inland from Harlech, *Riccia crozalsii* and *Scapania nimbosa*. He was also pivotal in reconstituting the Moss Exchange Club as the British Bryological Society in 1923.

**William Ingham** (1854-1923) was born into a working class family at Bradford, near Manchester, Lancashire. His father, George, was a collier in 1851, a labourer at an ironworks in 1871, and unemployed in 1881. William was the fifth of seven children, and did well to rise above his circumstances. He was educated at York Training College and London University. Perhaps he became acquainted with J.A. Wheldon (see above) during the time they both lived and worked in York. Ingham also acted as a character-witness at the trial of E.C. Horrell (see above). By 1891 he was married with two children and living in York, where he became an inspector of schools for the Education Office.

Ingham succeeded C.H. Waddell as Secretary of the Moss Exchange Club in 1903, remaining in that post until he fell terminally ill in 1922, and also edited the *Census Catalogue of British Mosses* (1907) and *Census Catalogue of British Liverworts* (1913). He was a keen and accomplished bryologist, and knew Yorkshire's bryoflora very well, adding about 20 species to the county's list, some of the liverworts being new to Britain as well.

The Reverend **David Lillie** (1854/5-1940) was one of eight children of the Reverend William Lillie (?1801-1875), minister of Watten, Wick, Caithness from 1843 until he died. David Lillie also subsequently became minister at Watten. David's daughter Helen became a medical doctor, and went to Punjab with her brother William who served the Church there. After returning to Britain from Punjab, William became a lecturer in and professor of Biblical Studies at Aberdeen University.

David Lillie found *Tayloria tenuis* and *Barbilophozia atlantica* in Caithness, both new to Britain, but ploughed a lonely furrow as a bryologist in the far north of Britain, and had no opportunities for meeting other members of the Moss Exchange Club, for the



club held no meetings. David's brother George, who was an inspector of the poor for Lybster, Caithness, may also have been a botanist.

**William Edward Nicholson** (1866-1945) was born in Lewes, Sussex, at the opposite end of the country to Lillie. He was the eldest son of five children of Edward Andrews Nicholson (1827-1913) and his wife Emily Louisa (*née* Blaker, 1838-1921).

Edgar Blaker's brother John married a Mary Borrer (1809-1880) of Portslade in 1839; it seems likely that Mary was related to the lichenologist William Borrer (1781-1862) of Hurstpierpoint, Sussex. In any event, it is remarkable and worthy of comment that three highly accomplished cryptogamic botanists – the three Williams Borrer, Mitten and Nicholson – should have lived in the same district. Indeed, Borrer helped Mitten, who in turn guided Nicholson's early steps in bryology.

Bryologically, Nicholson took greater interest in liverworts than mosses, and added several species to the British list. He was also a long-time and good friend of Dixon, and often travelled abroad with him on bryological expeditions.

*Establishment of the British Bryological Society, and the rise of academic bryologists in the second half of the 20<sup>th</sup> century*

Most early members of the Moss Exchange Club had passed from relative youth to middle-age by the time of the First World War, so were not called up, and the Club's activities were little affected by hostilities. Indeed, although members realised that their initial aim of exchanging mosses was becoming rather obsolete, and increasingly felt a need to promote more progressive activities for the Club, they were sufficiently set in their ways when William Ingham (the Club's long-serving honorary secretary) fell terminally ill in 1922 for their new resolve to materialise only as a renaming of the MEC as the British Bryological Society in 1923, and instituting annual summer meetings. The exchanges went on, annual reports continued to appear, and the new Society remained as much a club for the bryologically initiated as the MEC had been.

Unlike the Great War, the Second World War profoundly disrupted bryological activities in Britain and Ireland. For one thing, the Second War was partly fought over Britain, affecting all human activity there, and the BBS's activities were suspended from 1939 until 1946. In addition, though, a final consequence of the proliferation of British bryologists born in or around the 1860s and in their prime at the turn of the century was their passing during the 1930s and '40s. Accordingly, when bryological activity resumed after the Second World War, a new generation of younger bryologists assumed control of the BBS.

Before the Second World War, nearly all leading members of the BBS were amateur bryologists, and academic bryologists had mainly learnt their field-bryology from them (Jones, 1983). But with the expansion of British universities after the war, a cohort of young academic bryologists joined the BBS and soon figured prominently among the best field-bryologists in Britain. Suddenly, the British Bryological Society's most active and accomplished members were young, professional scientists who sought to replace the Society's pre-war, old-world, club-atmosphere with a fresh, scientific outlook. Bryology in the field was mainly a pastime for them, but

professionally they championed research into the genetics, cytology, biochemistry, physiology, ecological interactions and evolutionary affinities of bryophytes, welding a biological approach onto the Society's long-standing interests of searching for bryophytes in the field, identifying them, and elucidating their geographical distributions. These post-war academicians effectively hi-jacked the BBS by creating a vehicle – the *Transactions of the British Bryological Society*, later the *Journal of Bryology* – to publish their findings and further their careers, while at the same time greatly advancing the kind and quality of the Society's publications.

**Edmund Frederick Warburg** (1908-1966) was a son of Sir Oscar Emanuel Warburg (1876-1937) of Headley, Epsom, Surrey and London, a business-man and sometime Chairman of London County Council, and from whom Edmund acquired his love of botany. The Warburgs were of German-Jewish origin, and Edmund's German relatives included the botanical systematist Otto Warburg (1859-1938), and the biochemist Otto Heinrich Warburg (1883-1970) who invented the manometer and won a Nobel Prize.

Edmund's mother was born Catherine Byrne, a daughter of the judge Sir Edmund Widdrington Byrne (1844-1904).

Warburg read natural sciences at Cambridge, where T.G. Tutin further stimulated botanical interests kindled by Edmund's father. In 1938 he became assistant lecturer at Bedford College, London, but his interest in bryology did not begin until the Second World War, when opportunities for studying the natural history of flowering plants were more limited. In 1948 he moved from Bedford College to Oxford as demonstrator in botany and curator of the Druce herbarium, and where he married Primrose Barrett, daughter of Gilbert Barrett and grand-daughter of Sir William Churchman of Melton, Suffolk. The Churchmans were a wealthy family who had made their money from cigarettes. Warburg became Reader in Plant Taxonomy at Oxford in 1964.

In addition to co-authoring the standard contemporary British Flora for vascular plants (*Flora of the British Isles*. 1952; 2<sup>nd</sup> edition 1962), Warburg also edited the 3<sup>rd</sup> edition of *A Census Catalogue of British Mosses* (1963). His exceptional ability as a field-botanist enabled him to add several bryophytes to the British list, including *Molendoa warburgii* which he found in the Outer Hebrides in 1946, and recognized as new to science.

**Paul Westmacott Richards** (1908-1995) was the youngest of four sons of Dr Harold Meredith Richards (1864-1942) of Walton-on-the-hill, Surrey, a Welshman and medical administrator, and his wife Mary Cecilia (*née* Todd, died 1941). Through his mother, to whom he owed his early botanical inclination, Paul Richards was descended from the Westmacott family of sculptors – Sir Richard the elder (1747-1808), Sir Richard the younger (1775-1856), Richard (1799-1872) and James Sherwood Westmacott (1823-1900). Paul's elder brother, Owain Westmacott Richards (1901-1984) became a distinguished entomologist.

In 1911 the family moved to Cardiff, Dr Richards's home town, where Paul attended the High School from 1918 until 1920, and where Arthur Wade from the National Museum introduced him to bryology. The family moved back to London in 1920, and

Paul attended school there until 1925. He also met W.R. Sherrin at the South London Botanical Institute, and through him also met Wallace, Catcheside and Lousley. After two years at University College, London, Richards went up to Cambridge in 1927, where he was influenced by Godwin, met E.W. Jones and Warburg, and joined an expedition to British Guiana in 1929. He graduated in 1931, but remained at Cambridge for several years more, and went to Sarawak in 1932. Cambridge crackled with intellectual ambition in the 1920s and '30s, and this band of bryologists trod the cobbles with other botanists such as Godwin and Tutin, as well as the economist Keynes and the mathematician and geneticist Fisher. The poet Houseman was there, along with Enoch Powell the future politician. And this was the generation of the future spies Burgess, Maclean and Philby.

After the Second World War, Richards took up the chair of botany at Bangor, where Derek Ratcliffe was one of his first Ph.D. students, and remained in post until his retirement in 1976, after which he returned to live in Cambridge.

Richards greatly influenced the direction and momentum of bryological research in Britain after the Second World War, and was the leading figure in transforming the British Bryological Society from its pre-war image of amateurs on holiday in the field to a proficiently organised post-war society, with several members engaged in scientific research, and a prestigious publication – the new *Transactions*.

**Eustace Wilkinson Jones** (1909-1992) was born in Walsall, Staffordshire, the elder son of Oscar Jones and Alice (*née* Wilkinson). He attended the local grammar school before reading natural sciences at Cambridge (1928-31). He joined the British Bryological Society in 1933, and the following year took up a teaching post at the School of Forestry in Oxford, where he remained until retirement in 1972. He completed his Ph.D. in 1937. His interests in African bryophytes began in 1947-8, when he joined (from Oxford) a Cambridge expedition to Nigeria.

His grandfather was a keen naturalist, and started him on his studies of plants, but this interest did not develop until his time at Cambridge, when he met Richards and other botanists there. Jones confirmed the rare liverwort *Lophozia capitata* as a British species, after finding it in Berkshire in 1950.

**Harold Leslie Keer Whitehouse** (1917-2000) was a son of Arnold Whitehouse, a science-teacher at Churchdown, Gloucestershire, and his wife Marjorie (*née* Kininmonth). He developed an early interest in natural history, and became interested in bryophytes while still at school. He went up to Cambridge in 1936, where he met the older Richards and joined him on regular local bryological excursions. He began to study for a Ph.D. at Cambridge under the supervision of D.G. Catcheside, but the Second World War interrupted his studies, and he joined the RAF photographic unit at Medmenham, Buckinghamshire, where he met Warburg, who had also been posted there.

Whitehouse returned to Cambridge after the war, completed his Ph.D. and joined the staff of the Botany School as demonstrator, becoming lecturer in 1952 and finally Reader in 1969, retiring in 1984. His professional research was in genetics, but he did a lot of bryological study too, most notably on tuberous mosses of arable fields. This

interest enabled him to clarify distinctions between numerous similar species, including *Dicranella staphylina* as new to science.

As editor from 1968 until 1977, Whitehouse developed the *Transactions of the British Bryological Society* into the *Journal of Bryology*, and was also a pioneering photographer of bryophytes in the days before digital imagery, taking remarkably fine close-up photographs of bryophytes using a fixed-focus single-lens reflex camera.

**Eric Vernon Watson** (1914-1999) was born the second of three brothers at Cranleigh, Surrey, and brought up mainly by his mother, Mary Vernon (*née* Pearson) in their large family home. His Scottish father, James George Watson (died 1931) was a banker and financial manager who spent much of his time away, working in the Congo of central Africa until 1927, where he helped to meet the demand for copper.

Watson attended school in Cranleigh, and studied botany at Edinburgh (B.Sc. in 1935, and later a Ph.D.), where he learned his bryology from William Young (1865-1947) who worked at the Royal Botanic Garden in Edinburgh. Watson's brothers Bruce and Donald also went to Edinburgh, and their mother moved there after their father died. Donald became a bird-artist.

Eric Watson lectured in botany at Liverpool from 1938 to 1939, Harvard (1939-40), and was appointed Senior Lecturer at Harper Adams Agricultural College, Shropshire (1941-46). He spent the remainder of his academic career at Reading, retiring in 1979. For many years he was referee for the Bryaceae and *Philonotis*. His most influential contribution to field-bryology was and continues to be his introductory *British Mosses and Liverworts*, which passed through three editions, and helped a great many botanists to gain confidence with identifying bryophytes.

**Alan Cyril Crundwell** (1923-2000) was brought up in Farnham, Surrey, the elder son of four children of Ernest Frederic Crundwell, a wealthy second-generation solicitor, and his wife Enid Hazel (*née* Iles, 1900-1985). After preparatory school, Crundwell went to Berkhamstead, and then Oxford in 1941, gaining an upper second class Honours in botany. He was interested in natural history as a child, and worked for the Ministry of Agriculture during the Second World War.

Crundwell joined the BBS in 1945, and bryologised with Eustace Jones. He moved north in 1949 to become assistant lecturer in botany at Glasgow, and during the 1950s became friendly with Warburg, whom he met at BBS meetings. He was also friendly with the Swedish bryologist, Elsa Nyholm, became very knowledgeable about the genus *Bryum*, and later collaborated with Whitehouse. He added about 20 species of bryophytes to the British list (e.g. *Rhizomnium magnifolium* from Angus in 1977), and described about six of these new to science. After retiring from Glasgow, Crundwell moved to Headley Down, Hampshire, not far from his elderly mother and his brother.

#### *Other amateur bryologists of the mid-20<sup>th</sup> century*

**Edward Charles Wallace** (1909-1986), like Crundwell and Jones, never married, leaving him plenty of time for bryology. He lived all his life from the age of two in what was once his parents' house in Sutton, Surrey. He was the only child of a

printer, later taxi-driver, who did not encourage his son in his botanical proclivities, which had become apparent at an early age. However, at the age of 13 he met W.R. Sherrin at the South London Botanical Institute, who fostered his botanical interests, and he joined the British Bryological Society in 1926.

He left Sutton County Grammar School at the age of 16, and went to work for W.H. Smith & Son, the bookseller and newsagent, with whom he remained for his entire working life, apart from the Second World War when he served as a medical orderly in India and Burma. He retired in 1972, when the office he worked in was transferred out of London, and lived alone after his mother died in about 1965.

Like Ingham before him, Wallace served as Secretary of the BBS for many years - from 1947 until 1969. He was a very accomplished field-bryologist, and knew the bryoflora of Surrey extremely well. He also regularly explored Scotland, finding *Hygrohypnum polare* in 1952, *Pohlia crudoides* in 1968, and *Campylopus subporodictyon* in 1971 – all new to the British list, and described *Tortella inflexa* in 1957.

**Ursula Katharine Duncan** (1910-1985) was primarily a lichenologist, but also a highly accomplished field-bryologist. Her mother, born Beatrice Dorothy Weston, was the youngest daughter of a London stockbroker, Percy Weston, but Ursula had numerous naval connections on both sides of her family. Her father, John Alexander Duncan, was a naval commander, who retired from the Navy after the First World War, and took his family to live on the Duncans' estate at Parkhill, near Arbroath.

Ursula's paternal grandmother, Frances Euphemia, was a daughter of Admiral Sir William Edmonstone (1810-1888), Bart, CB, MP, and elder sister to Alice Frederica (1868-1947) who married George Keppel (1865-1947), third son of the 7<sup>th</sup> Earl of Albemarle. Alice became mistress to King Edward VII, and was also a great-grandmother of Camilla, the present Duchess of Cornwall. In addition she was mother of the illegitimate Violet (1894-1972), who loved the poet Victoria (Vita) Sackville-West. From much earlier generations, the Edmonstones had descended from numerous royal and other aristocratic families.

#### *The closing years of the 20<sup>th</sup> century: the era of the professional field-bryologist*

By the late 20<sup>th</sup> century, fierce cuts in public expenditure had brought the demise of most taxonomic and ecological research in British universities. Funding shifted academic attention away from field-science towards increasingly esoteric, laboratory-based studies of what happens inside economically important organisms – investigations offering much better prospects of medical or agricultural dividends than ivory-tower research into the taxonomy and ecology of bryophytes. The content and style of the *Journal of Bryology* became increasingly recondite as bryological research delved into electron microscopy, biochemistry, and other laboratory-based disciplines far removed from amateur bryology. In consequence, no second generation of university-based field-bryologists appeared. In their stead, the upper echelons of the BBS became populated by a new breed of professional field-bryologist working away from academia in conservation-agencies or as self-employed botanical surveyors.

From the time that the *Transactions* became the *Journal* in 1972, a separate *Bulletin* appeared twice yearly, communicating the Society's business, meetings, new vice-county records, etc. But by the end of the 20<sup>th</sup> and beginning of the 21<sup>st</sup> century, amateur members felt hard done by as they compared the smart and expensive *Journal* (on which so much of their subscriptions seemed to be spent) with the much smaller and cheaper *Bulletin*. Accordingly, in order to meet the interests of amateur members, the *Bulletin* transformed itself into *Field Bryology* in 2004.

It remains sobering to reflect, however, that in the 21<sup>st</sup> century, after more than a century of existence, the BBS has still not published a single handbook, Flora or guide to help amateur bryologists identify the plants they find. The Society published an excellent three-volume *Atlas of the Bryophytes of Britain and Ireland* (1991-1994), with authors contributing notes for species they were most familiar with, demonstrating that a corporate, multi-authored publication can succeed. Now, in the early years of the 21<sup>st</sup> century, numerous members of the BBS have at last begun to pool their efforts and expertise in preparing a *Field-guide to British and Irish Bryophytes*. This guide is being prepared as electronic files containing descriptions, notes on habitat, digital images and distribution-maps. These will be published on-line as drafts for bryologists to test and criticise, prior to their publication as a book. Thereafter the files will remain on-line, to be amended and revised when errors become noticed, and new interpretations of species, better images, and more up-to-date maps become available. In this way, new editions of the field-guide can be printed without having to repeat the heroic origination-efforts associated with traditional publishing methods. Publishing the *Field-guide* will make it easier for naturalists to identify bryophytes, enabling the BBS to take a significant additional step towards its professed aim of "promoting the study of mosses and liverworts" and accelerate in years to come the rate at which more is learnt of the identities, distributions, haunts and ecological preferences of British bryophytes.

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