Joseph Sidebotham's Lepidoptera

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Early in the 20th century the Manchester Museum received collections of Lepidoptera, Coleoptera and herbarium sheets from the heirs of Joseph Sidebotham (Logunov 2010, 2012). Sidebotham was born in 1824 and died in 1885. In many ways he epitomised the successful Manchester businessman, made rich by the cotton industry but also public spirited and having broad interests and apparently boundless energy. His father had owned and managed a cotton mill but died when Joseph was very young. He followed the same profession, becoming, after short attachment to another firm, a senior partner in a calico printing business which developed the use of synthetic alizarin red dyes to replace the traditional madder. He was married with six children, a supporter of the church, for some time justice of the peace and latterly owner of a substantial mansion outside the city. He was also an accomplished artist. Legacies from two cousins made it easy for him retire and follow a range of pursuits that included astronomy, photography, microscopy and natural history. He was an active member of the Manchester Literary and Philosophical Society, chairing meetings and presenting papers. His contributions in astronomy and photography have been noted by contemporaries and later commentators (anon. 1886; Hallett 1989) and especially in a memoir by a lifelong friend, the botanist and writer Leo Grindon (Grindon 1886). Sidebotham's interest in natural history led him to become a Fellow of the Linnean Society. As received by the Museum in 1919 his Lepidoptera collection was housed in a 40 and a 32-drawer cabinet containing over 1,900 species almost entirely British in origin and over 60% of the currently known total. It is interesting to consider what led a man of such diverse interests to acquire it.

In most respects the collection is conventional. Specimens are beautifully mounted but only a minority have labels. Most are set with the wings depressed so as to touch the bottom of drawers. This style of mounting existed in the UK until the 1860s, when grooved setting-boards arrived from the continent (Allen 1994). Whether it means that all or most of Sidebotham species were acquired before that date we do not know. The arrangement starts with butterflies and includes series of like individuals in a number of species that were rare in Britain at the time and were almost certainly

depleted by over collecting. These include 12 specimens of the Black veined white *Aporia crataegi*, three Bath white *Pieris daplidice*, 20 Large blue *Maculinea arion*, 25 Large copper *Lycaena dispar* and 12 Large tortoiseshell *Nymphalis polychloros*, victims of the Victorian urge for acquisition. Most being unlabelled we do not know where they came from. Some species do, however, tell a story. Sidebotham had ten Glanville fritillaries *Melitaea cinxia* which came from the Rev. JF Dawson, from their only British locality in the Isle of Wight where, even in 1824 when they were first discovered, they were uncommon (Salmon 2000). Most of the eight Queen of Spain fritillaries *Argynnis lathonia* and one of the Bath whites are labelled as taken by 'G. Parry' near Canterbury and three of the continental fritillary *Argynnis niobe* are labelled 'W. Wigan'. Both these names were associated with the practice of rearing continental insects and selling them as British (Salmon 2000). On this evidence, Sidebotham probably bought many specimens without much discrimination. He certainly obtained some material from auctions and other sources; the single spurge hawk moth *Hyles euphorbiae* cost him £2, which, in relation to average earnings, would be the equivalent of over £1,000 now[1]. The hawk moths interested him, perhaps because there had been 'good years' for immigration from the continent of species such as the Spurge, the Silver striped *Hippotion celerio* and the Bedstraw *Hyles galii,* which may occasionally have bred in Britain for a few generations (South 1909).

Further examination reveals two other aspects that are of more interest, one of them innovative and one somewhat contentious. It is evident both from his writing and from the collection that Sidebotham was interested in variation within species in relation to specific distinction. In the second half of the century, there was a heightened interest in species limits and variation on the part of both supporters and opponents of the idea of evolution. Sidebotham (1869) recognised that the questions where species end and what constitutes a variety were both difficult to answer and topical. He conducted an extensive breeding programme using the Magpie moth *Abraxas grossulariata* to investigate how much variation could be generated and showed that, although extreme forms were obtainable, none approach the appearance of its nearest British congenor *A. sylvata* (anon. 1870; Sidebotham 1870a). This is a somewhat biased example to

Fig 1 One of the drawers from Sidebotham's cabinet showing variation in wing patterns in the Magpie moth *Abraxas grossulariata*

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choose; the magpie moth was well known to be variable in wing pattern and there are species that approach it more closely in other parts of the range. However, the exercise illustrates a problem in which he took an interest, and the collection contains a representative range of varieties (Fig 1). His remarks on the results show that he recognised that the variation was largely inherited, and that broods with extreme parents tended to revert towards the mean for the species (Sidebotham 1870a).

Breeding and exchange of these variant forms in the 19th century led to their playing a part in the origins of evolutionary genetics. Most are determined by single segregating genes, usually recessive in expression. Doncaster and Raynor (1906) discovered sex-linkage studying one of them. Variation in pigmentation within and between phenotypes of a yellow mutant was investigated quantitatively by Onslow (1919; Robinson, 1971), showing the expression of a major gene to be influenced by modifiers at other loci. This led to the recognition by EB Ford that gene expression was therefore selectable. Surveying all the available information and making some informed guesses GE Hutchinson (1969) concluded that one of the rare dominant forms was present at a frequency of about one in a million, presumably the mutation rate, while the dozen or so identified recessive phenotypes have frequencies between one in ten thousand and a few per cent. This level of polymorphism in a recessive could be maintained by mutation if selection against it was slight. The typical pattern is aposematic and variation probably has relatively little effect on fitness.

The effect of environment was under investigation when Sidebotham took several thousand Garden tiger moth larvae (*Arctia caja*) and raised them in separate lots on different food plants (Sidebotham 1870b). There was no effect of diet on colour over two generations, but he did note that hind wing colour differed between stocks collected at different locations. Specimens in his collection illustrate variation from almost white forewings to almost black, and some differences in hind wing colour (Fig 2). The inheritance of wing patterns has still not been properly investigated (Robinson 1971); more recent work has been on other aspects of genetics (Anderson *et*

Fig 2 Variation in the Garden tiger moth *Arctia caja*

al 2008).

Another enterprise made use of his skills as an illustrator. In association with fellow microscopist John Watson he made detailed examination and drawings of lepidopteran wing scales, especially those found in males and now known to disperse pheromones, referred to at the time as plumules and battledore scales and now as androconia (Sidebotham 1865b; Watson 1865, 1868, 1869). They vary in form between taxa. The intention, never completed, was to produce several hundred descriptive plates as an aid to identification and as further proof of the fixity and distinction of species. The two authors criticise HW Bates for supposing that several species of Heliconiinae, South American Mùllerian mimics, may have had a common origin (Watson 1868). They are, they assert, undoubted species with none of the plumules showing an "undecided form"; "it is much more probable and philosophical to suppose that an intelligent Creator placed His creatures in such localities and conditions as suited their various requirements… ". Similar emphasis on the clear difference between species as distinct from the evident variability within species was made by Sidebotham's contemporary and fellow entomologist TV Wollaston, for example in his critical review of *The Origin of Species* (Anon. 1860; see Cook 1995).

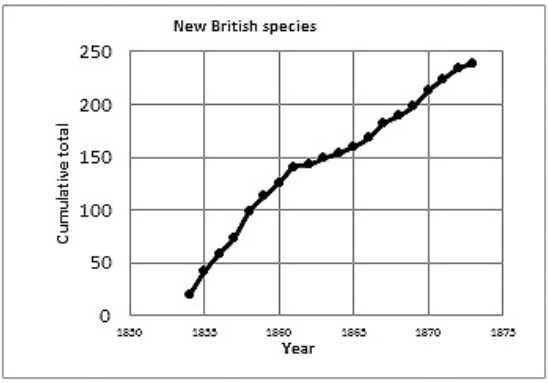

Fig 3 Cumulative number of species of Lepidoptera new to the British list for 20 years from 1854 noted by HT Stainton and HG Knaggs in *The Entomologist's Annual*

The richness of the British fauna was being uncovered during Sidebotham's time. At the beginning of the 19th century, the Linnean Society Fellow AH Haworth listed 740 species of British Lepidoptera (anon. 1802). This more than doubled to 1,838 in the next two decades (Stephens 1824), then rose more slowly to 2,160 in 1938 (Heslop 1938) and 2,982 by 2000 (Bradley 2000). Figure 3 shows the mid-century pattern of growth as recorded in Henry Stainton's *Entomologist's Annual*. It is natural to be interested in rare or previously unrecorded species, but there was always the question whether a new find was truly established. Kloet and Hincks (1945) list 2187 as British Lepidoptera, plus 46 that are "extinct, immigrant or doubtful". The pinned material and the numerous short notes published by Sidebotham show that he sought unusual material himself and shared his experiences with entomological associates, especially RS Edleston, a fellow calico printer and Joseph Chappell, an employee at Sir Joseph Whitworth's engineering works. A range of rare moth species was noted, together with rare plants (by Sidebotham) and by all three, rare and unusual beetles. Coleoptera were often collected by Chappell, Edleston or a few others but reported by Sidebotham (e.g.

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see anon., 1865). Some of these alleged sightings seemed to raise questions about location of the find, the possibility that they record a species later extinct in Britain or are perhaps outright forgeries (AA Allen 1967a,b). As to the last, in the words of David Allen (1994: p. 170), "fraudulence battens on ignorance", and unfortunately it was not uncommon among natural history dealers at the late 19th century "to the extent of importing quantities of insects at a cheap rate from France and Germany and claiming that they had been caught in Britain". Morris & Johnson (2005) concluded that some of the Coleoptera records were indeed deliberate frauds, adding "Although Sidebotham is not unique in being responsible for the only records of some of 'our' rarest weevils, he introduced ..... far more species currently regarded as extinct or dubious than any other contemporary coleopterist." With respect to Lepidoptera there is no reason to allege deliberate misrepresentation although one case, at least, is surprising. This concerns the White prominent *Leucodonta bicoloria* (Fig 4). Sidebotham (1874) says that in about 1862 it was found in Staffordshire by a Mr Joseph Smith, where it was later also taken by Chappell. Two specimens in his collection are credited to Chappell, 1865 and 1866. The moth occurs in Europe in mature woodland, a specimen was captured in Devon in 1880 (South, 1909), probably a stray immigrant, and it is seen occasionally in southwest Ireland. Apart from that, it gets into the British lists on the basis of Sidebotham's reports alone.

Fig 4 Specimens in Sidebotham's collection of the White prominent *Leucodonta bicoloria,* taken by Joseph Chappell in Staffordshire

With over a thousand species present, those loosely referred to as micro-Lepidoptera form an important part of the collection and are the section to which most of the new British species were added. They are beautifully prepared, identified and carefully arranged. In some cases there are also mounted larvae, pupal cases or leaves with larval mines (Fig 5). Most are represented by series of individuals. Sidebotham published no notes on these and one is left to wonder how he came to assemble them, what proportion he caught, or bought or received as presents, and what their significance was for him. The Manchester Museum has a very extensive holding of micro-Lepidoptera, of which the Sidebotham collection is only a small part (Logunov 2010, 2012). In addition, 2,289 specimens come from the collection of Lord Walsingham (1843–1919)

Fig 5 One of the original drawers of microlepidoptera showing the care taken over display, including pre-adult stages and leaves with characteristic mines. Lower right: the holotype of *Elachista holdenella* Stainton, 1854 (Elachistidae, now, a junior synonym of *E. atricomella* Stainton, 1849)

made up to 1928 (Report, 1927–28).This was obtained from the Natural History Museum in exchange for a single specimen of another local oddity, the Manchester moth *Euclemensia woodiella*. Several dozen specimens of that insect were collected in 1829 by a local Manchester man Robert Cribb just north of the city. For various reasons, only three now exist and it is otherwise quite unknown (see Logunov 2011; it was the subject of another note by Sidebotham, 1884, and there is a Wikipedia entry). Although Sidebotham did not have specimens of the Manchester Moth he may have hoped to obtain them. In his collection a space reserved for *E. woodiella* (Fig 6) contained a photograph made by Sidebotham himself of two specimens which originally be-

Fig 6 The photograph of the Manchester Moth (*Euclemensia woodiella*) made by J Sidebotham and placed in the collection instead of the specimens which he did not have. Lower right: the reverse side of the photo with Sidebotham's signature and the date

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longed to the Manchester Museum. Both are intact, while the specimen now in the Museum is badly damaged and lacks its abdomen (Logunov 2011: fig. 1). The other main collection of micro-Lepidoptera is 20th-century material assembled by local specialist Hugh N Michaelis (1904–95). It was donated in 1964 and is carefully labelled with much local material dating from 1910–1960 (Logunov 2010). These and part of Sidebotham's material are presently being pooled with other British Lepidoptera at the Manchester Museum in new stainless-steel and dust-proof cabinets, providing an exceptionally comprehensive reference source. The larger of Sidebotham's cabinets containing macro-Lepidoptera will remain intact as a historical museum artefact: viz., an example of the personal collection of a Victorian Aurelian. Some other features of Sidebotham's life, interests and setbacks are covered elsewhere (Cook 2015).

We are grateful to Philip Rispin for his help with the collection and the illustrations.

NOTE

[1] See www.concertina.com/calculator/index (accessed 10 March 2015)

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