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## The Manchester Museum's Cassidinae Collection (Coleoptera: Chrysomelidae: Cassidinae)

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**ABSTRACT.** This paper presents the results of the documentation and databasing of the Manchester Museum's Cassidinae Collection. The collection was found to hold an estimated 73% of the Cassidinae world fauna; 250 species are represented by primary types (holo- or lectotypes). This collection was also compared to seven other Cassidinae collections from Europe; it was ranked first for the number of specimens and second for both the number of species and total number of species represented by type specimens. As well as the statistics of the collection, this paper gives a brief history of the collection and those involved in its development.

**Key words:** entomology, Cassidinae, Manchester Museum, collection, history, F. SPAETH, W. D. HINCKS, R. W. LLOYD.

### INTRODUCTION

Housing some two and a half million specimens, the Manchester Museum's Entomology Department is considered to be the third or fourth largest insect depositories in the UK (LOGUNOV 2010, 2012). The entomological collections date back to 1821, when the museum was founded by the Manchester Society for the Promotion of Natural History; see also ALBERTI (2009) for an account of Manchester Museum's history for the first 100 years (1890-1990). The oldest specimens held there are beetles which were collected by William KIRBY and then described by Thomas MARSHAM in 1802, predating the founding of the Manchester Museum (MM) (see JOHNSON 1996; LOGUNOV & MERRIMAN 2012). The Entomology Department at the Museum was established in 1908, when John HARDY (1844-1921) was appointed as 'Senior Assistant Keeper and Curator of Entomology' (LOGUNOV 2012).

The MM's Entomology department has particular strengths within its collection including the worldwide Dermaptera collection, C. H. SCHILL's world Lepidoptera collection, W. D. HINCKS and J. DIBB's collection of world Coleoptera and the F. SPAETH collection of Cassidinae to name but a few (see LOGUNOV 2010, for a more comprehensive list).

The Coleoptera collection, in particular the British Coleoptera collection, is of significance at the MM as it consists of many excellent individual collections. The British Coleoptera collection currently has a 92% representation of the British fauna, with 3,964 of the 4,000 British species of Coleoptera being represented (LOGUNOV 2012; see also JOHNSON 2004, 2009, for the comprehensive list of individual collections making up the British Coleoptera collection).

This paper will be focusing on the collection of Cassidinae held at the Manchester Museum. The Cassidinae make up a subfamily belonging to the large family Chrysomelidae (leaf beetles). They are commonly known as 'tortoise beetles', which is due to the shape of their elytra and prothorax. Once in their adult form they can use these to cover both their head and legs, just like the shell of a tortoise (MARSHALL 2006).

The aim of this paper is to provide an overview of the recent work on the MM's Cassidinae collection and of the collection itself, including a description of the constituent parts of the collection, the collection's most recent statistics and a brief history of the collection.

#### THE MM'S CASSIDINAE COLLECTION

The Cassidinae collection at the Manchester Museum has three main parts: the FRANZ SPAETH collection (Figs 1-2), the HINCKS collection (Fig. 3) and the British collection



1. The SPAETH Cassidinae Collection: (a) The layout of a collection drawer of the SPAETH Cassidinae collection (Drawer 28); (b) Specimen organisation in a drawer of the SPAETH Cassidinae collection (Drawer 25)

(Fig. 4). There are also some modern acquisitions that are incorporated in the main collection (e.g., donations from Drs Lech BOROWIEC and Lukas SEKERKA).

Each collection is allocated with its own unique accession number. These can be used to search for specimens in the collections on the MM's database and are mentioned in Table 1. All of the specimens in each of these collections have been provided with individual accession numbers (an example of this can be seen in Fig. 2b), with the exception of those of the British collection. This is due to these Cassidinae specimens being part of the aforementioned British Coleoptera collection, which is yet to be re-curated.

The housing of the Cassidinae collection varies amongst the constituent collections. The SPAETH collection resides in 60 glass-lidded, wooden drawers in 3 wooden cabinets. A drawer in the third cabinet can be seen in Fig. 5; it is one of the 40 original drawers in which the collection was moved to Manchester and for which an external cabinet (featured in Fig. 5) was built up (see HINCKS 1950). The layout of two of the



2. Three specimens from the SPAETH Cassidinae Collection: (a) *Calopepla atritarsis* Ptc, 1927 – Syntype. (b) *Polychalca (s.str.) punctatissima* LATREILLE, 1807. (c) *Omocerus (s.str.) purpureus* SPAETH, 1912 – Holotype



3. The HINCKS Cassidinae Collection, an example of one of the wooden store-boxes the specimens of the HINCKS collection are housed in (Box 1)



4. Three specimens from the Manchester Museum's Collection of British Cassidinae: (a) *Cassida flaveola* THUNBERG, 1794, collected by R. W. LLOYD; (b) *Cassida nebulosa* LINNAEUS, 1758, once part of the Kidson TAYLOR collection; (c) *Cassida hemisphaerica* HERBST, 1799, once part of the Britten collection



5. The third cabinet of the Spaeth Cassidinae collection and the author of this article: drawer 47 out of drawers 21–60 of the collection is being shown

Table 1. The number of specimens and species held in each of the Cassidinae collections at the Manchester Museum.

<b>Cassidinae Collections at the Manchester Museum</b>	<b>Number of species</b>	<b>Number of specimens</b>
<b>The Franz Spaeth Collection (F2019)*</b>	2211	23094
<b>The Hincks Collection (F2441)</b>	467	5096
<b>The British Collection (F3263)</b>	11	809

\* - Numbers in brackets are the accession numbers of corresponding collections

Table 2. A comparison of the species in the Manchester Museum's collection of Cassidinae and the species making up the world fauna of Cassidinae.

<b>Tribe</b>	<b>World fauna (number of species)</b>	<b>MM's Collection (number of species)</b>	<b>MM's representation of world fauna (%)</b>
<b>Aspidimorphini</b>	285	229	80.35
<b>Basiprionotini</b>	94	74	78.72
<b>Cassidini</b>	1401	1031	73.59
<b>Delocranini</b>	3	2	66.67
<b>Dorynotini</b>	53	36	67.92
<b>Eugenysini</b>	34	24	70.59
<b>Goniocheniini</b>	30	21	70
<b>Hemisphaerotini</b>	42	33	78.57
<b>Imatidiini</b>	82	45	54.88
<b>Ischyrosynchini</b>	68	56	82.35
<b>Notosacanthini</b>	266	148	55.64
<b>Omocerini</b>	150	111	74
<b>Spilophorini</b>	30	22	73.33
<b>Stolaini</b>	552	426	77.17
<b>Totals</b>	<b>3090</b>	<b>2258</b>	<b>73.07</b>

Table 3. Type Specimens of the Manchester Museum's collection of Cassidinae. The number of species (including synonyms) in each tribe that is represented by at least one of the type specimens stated has been collected in this table. Those species that are represented by both holotype and paratype or lectotype and paralectotype have been counted in column 2 or 6 respectively, but not in the individual type columns.

Tribe	H	H + P	P	S	L	L + PI	C
<b>Aspidimorphini</b>	10	2	12	145	0	5	7
<b>Basiprionotini</b>	11	1	1	39	0	0	0
<b>Cassidini</b>	105	0	20	402	2	2	14
<b>Delocranini</b>	0	0	0	0	0	0	0
<b>Dorynotini</b>	4	0	0	12	0	0	0
<b>Eugenysini</b>	1	0	0	9	0	0	0
<b>Goniocheniini</b>	1	0	0	5	0	0	0
<b>Hemisphaerotini</b>	5	0	0	14	0	0	0
<b>Imatidiini</b>	5	0	2	20	0	0	0
<b>Ischyrosynchini</b>	0	0	1	13	0	0	0
<b>Notosacanthini</b>	54	0	3	69	0	0	0
<b>Omocerini</b>	16	0	1	31	0	0	0
<b>Spilophorini</b>	1	0	0	4	0	0	0
<b>Stolaini</b>	25	0	1	133	0	0	0
<b>Totals</b>	<b>238</b>	<b>3</b>	<b>41</b>	<b>896</b>	<b>2</b>	<b>7</b>	<b>21</b>

original drawers is shown in Fig. 1. Any newly donated specimens are integrated in to the Spaeth collection. The HINCKS collection resides in 18 storage boxes; there are 8 wooden store-boxes similar to the one shown in Fig. 3 and 10 cardboard store-boxes which are then placed in sealed polythene bags to further protect the specimens. The British collection's specimens are currently in two glass-lidded, wooden drawers in one of the steel cabinets that house the whole of the British Coleoptera collection.

The majority of the MM's Cassidinae collection was databased between September 2011 and March 2012. During this time each specimen of both the SPAETH and HINCKS collections was assigned an individual accession number. Then both collections were both documented to the basic museum standard: full taxon names, accession numbers, number of specimens, type status and current location were all input in to the MM's KE EMu database (=electronic museum). This information is now available online via the MM's website or directly via the insect collection search area of the site (<http://emu.man.ac.uk/mmcustom/EntQuery.php>). The information for the British collection was already in the database and online prior to our project, but each individual specimen is yet to be labelled with its own accession number.

The result of this project is that the details of each of the species of the Cassidinae collection are now available via the internet, allowing them to be searched for easily. The exact location of a species within the collection can easily be extracted from the KE EMu database at the museum or obtained from museum staff.

The MM's Cassidinae collection is quite large, containing nearly 30,000 specimens; Table 1 shows this as well as the number of specimens each of the constituent collections has and the number of species in each of these collections. The SPAETH collection is largest, containing just over 23,000 specimens. This is over 3,000 more than the estimated figure of 20,000 HINCKS provided in his two articles on the collection after the museum acquired it (HINCKS 1950 & 1951). While the British collection seems to have rather small number of species, this collection is in fact rather comprehensive. It was revised by Lukas SEKERKA in 2006 and currently holds 11 of the 14 species of Cassidinae recorded from the British Isles (cf. COX 2008).

As well as compiling statistics on the number of specimens, the inputting of the collections' data on to KE EMu has also enabled the comparison of the MM's collection to the list of the world fauna of Cassidinae by BOROWIEC & SWIĘTOJAŃSKA (2012). It has been estimated that the MM houses approximately 73% of the world fauna for Cassidinae. MM's representation of world fauna for each tribe has also been estimated. Table 2 shows each of these as well as the previously mentioned total representation.

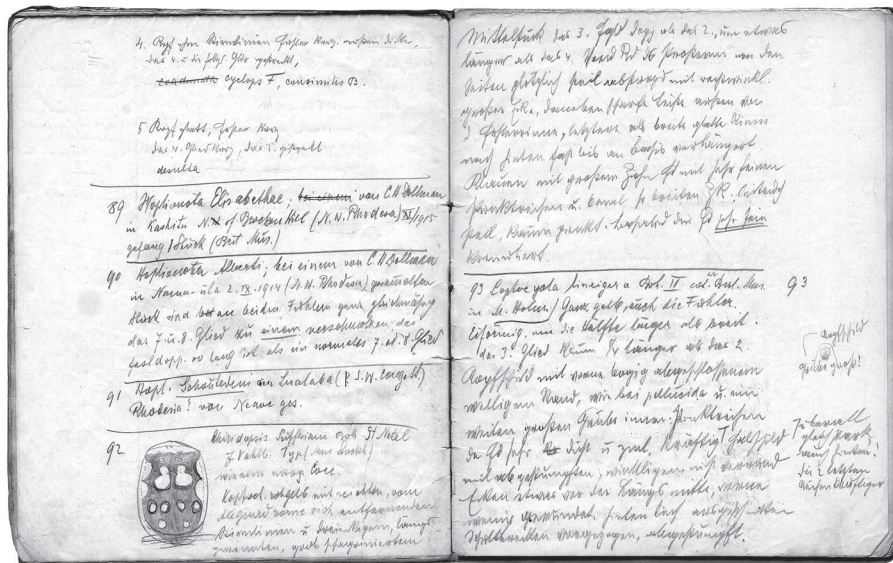
It has also been possible to extract information about type specimens in the Cassidinae collection. As the most important museum specimens, the number of deposited types in a natural history collection is a measure reflecting its scientific quality and international reputation. The MM's collection contains the primary types – holotypes and lectotypes – of 250 species (see Table 3). The table also shows the other type material that is present in the MM's collection. A large number of syntypes (896) and a comparatively low number of lectotypes (9) in this collection seem to indicate that the corresponding species names represented by such types are in need of taxonomic revision. The large amount of type specimens in the SPAETH collection is due to the



fact that the collection contains both the types of the majority of the species he himself described (1212 in total, see STAINES 2005), and also type material described by others: most of the types by WAGENER and ‘cotypes’ of FAIRMAIRE, BALY, PIC, CHAMPION, WEISE, etc. (HINCKS 1950, 1951; REPORT 1949-1950).

The species names included in the Tables 2 and 3 are only those which have been published and are included in ‘Cassidinae of the world – an interactive manual’ by BOROWIEC & SWIĘTOJAŃSKA (2012). There are many specimens within the SPAETH Cassidinae collection that have been named and marked as types, but remain unpublished as of yet. They more than likely are still unrecognised names as SPAETH’s final manuscript was partly destroyed during the Second World War and remained unpublished, so it may be that these names did have corresponding descriptions. This was included in HINCKS’ original assessment of that collection when he received it in 1950. He wrote that the collection contained many new species that SPAETH had named and described in his unpublished manuscript (HINCKS 1950). It is likely that further study of these specimens along with the examination of SPAETH’s unpublished manuscript(s) would clarify the status of these unpublished names.

In addition to this, there are 1180 specimens within the MM’s Cassidinae collection that have yet to be identified; specimens from both the SPAETH and the HINCKS collection have undetermined specimens. There is the possibility that within these specimens there are species that are currently absent from the Cassidinae collection and their identification will add to this collection’s scientific value, as their addition would increase in the MM’s representation of the world fauna of Cassidinae. Furthermore, undescribed species are likely to occur amongst these undetermined specimens. Those from the



6. A page from one of FRANZ SPAETH’S handwritten notebooks. Taken from a notebook (archive item 355, box 2) in the SPAETH archive at the Manchester Museum, this shows SPAETH’S notes and drawings of the distinguishing features of *Chridopsis suffriani* (BOHEMAN, 1854); the notebook is dated 1930



The SPAETH archive contains all the material he himself kept alongside his Cassidinae collection in Vienna (HINCKS 1951). Amongst the SPAETH archive there are his extensive notes, correspondence (339 letters in total), his Cassidinae manuscripts (in German) and the card-indices of the collection. It has recently undergone cataloguing (completed in July 2012), resulting in a comprehensive list of all the items within the archive. Items of note include handwritten notes on the taxon with rough drawings (Fig. 6), as well as translated descriptions with SPAETH's corresponding detailed drawings (Fig. 7). SPAETH also had two small books with his Cassidinae work that he may have referred to when writing descriptions of new species. The first (archive item 351, box 2), when translated from German, is named "Figures-tables and colour chart for entomological terminology" and written by Julius MÜLLER. It contains a colour wheel that could have been used to accurately name the colour of body parts of a specimen. The rest of the book is made up of hundreds of drawings of the various features of the morphology of various groups of insect. The second (archive item 387, box 4), written by Ein Handbuch and edited by Julius MÜLLER, is named '*Terminologica Entomologica*'. While it is in German, it seems to be a detailed dictionary of insect terminology. Together they would have proved extremely useful to SPAETH during the writing of his species descriptions. According to a personal stamp and handwritten date in the book cover, SPAETH purchased both of these books on the 13th of March 1902. This was at the beginning of his many years of study on the taxon, being just 4 years after his first publication on the Cassidinae. Also housed in the SPAETH archive (archive item 357, box 2) is 'Madagascan Cassidinae', with corresponding figure drawings by W. D. HINCKS (LOGUNOV 2012).

#### THE DEVELOPMENT OF THE COLLECTION

While many people have worked with and studied the specimens that make up the MM's Cassidinae collection, there are several noteworthy men whom are associated with it.

#### **Franz SPAETH (1863-1946)**

Franz SPAETH (Fig. 8), who became "an authority on world Cassidinae" (STAINES 2005: p. 1) in the first half of the 20th century, began his career working for the city of Vienna, Austria after studying law. He rose through the ranks, eventually becoming the assistant to the Mayor, whom at this time was Dr. Karl LUEGER. After LUEGER's death in 1910, SPAETH became the director at Ziegel Industries, Vienna, working there until 1927 (STAINES 2005).

However, his work overlapped with his passion for entomology and during the 1880s SPAETH was studying Coleoptera under Dr. Ludwig GANGLBAUER. He specialised on Cassidinae, spending most of his life studying and collecting them. SPAETH published his first paper on the Cassidinae in 1898 and published a total of 141 taxonomic papers until his death in 1943, with some of his unfinished works being published posthumously (STAINES 2005). He became the authority on these beetles, having spent at least 45

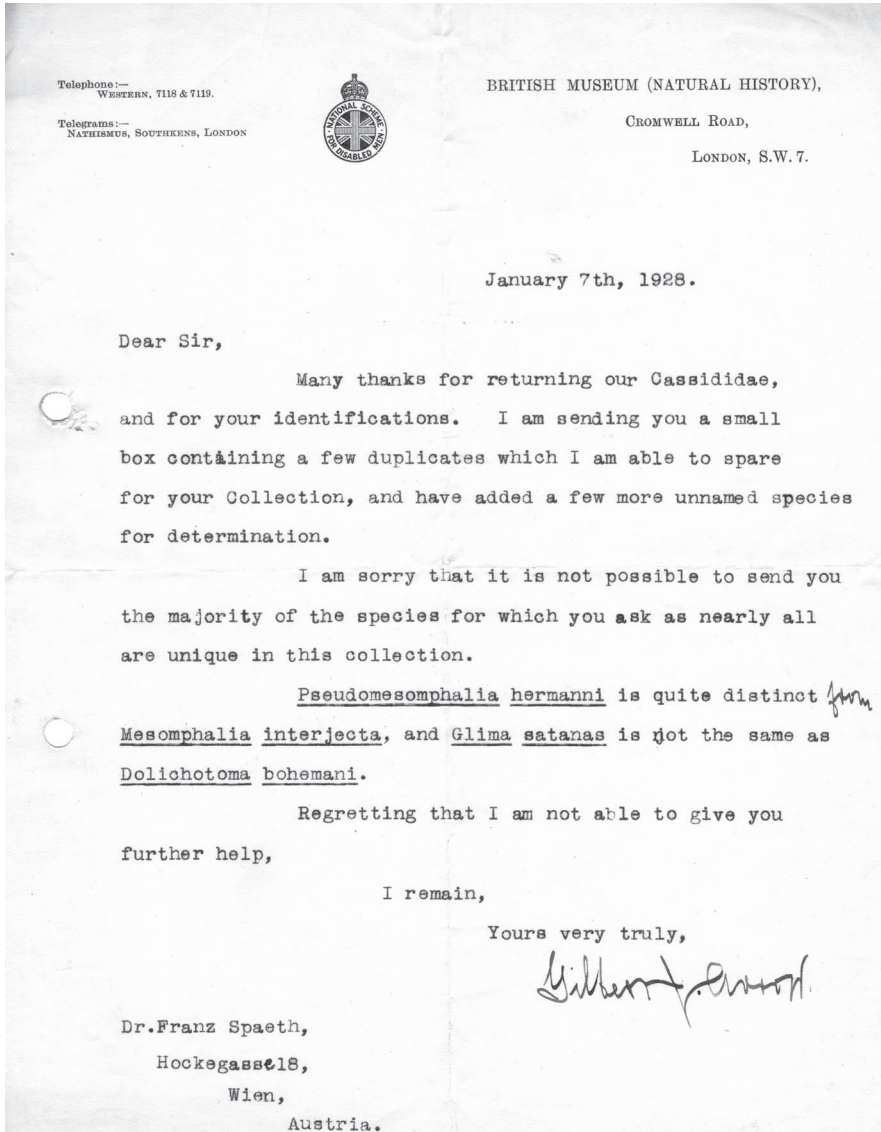
years focusing his study on them. His interest in the Cassidinae began 10 years prior to his first paper on the taxon; he purchased a copy of Boheman's monograph in 1888 according to the receipt he left in the first volume (HINCKS 1951).

During his study on the Cassidinae he was building up his private collection, which included material obtained from notables such as WAGENER, FAIRMAIRE, BALY, PIC, CHAMPION and WEISE (HINCKS 1951; REPORT 1949-1950). This collection became extremely rich and had significant scientific value due to SPAETH's expertise on the sub-family. Nearly all Cassidinae material was being sent to him for study and identification (HINCKS 1950). Letters from the British Museum of Natural History that have been kept in the SPAETH archive at the MM (Fig. 9) show that he was allowed to retain voucher specimens of certain species that he had requested. This was most likely to make his private collection as comprehensive as possible. SPAETH also added the DONCKIER and the VAN DER POLL collections that he purchased to further his own collection (HINCKS 1951; Report 1949-1950). Prior to World War II, SPAETH's collection of Cassidinae contained approximately 20,000 specimens arranged within 80 large cabinet drawers. To keep this important collection safe, at some point in the war it was moved in to the basement of the Naturhistorisches Museum in Vienna in a considerably condensed form of only 40 drawers (HINCKS 1950; STAINES 2005). While the collection survived the war without any damage, SPAETH's most recent manuscript was partially lost during the bombing in Vienna. It was still to be finished and published, but the first section had already been set up for printing and subsequently destroyed by the bombing (HINCKS 1950). After the war the collection remained in its condensed condition but was returned to SPAETH's Vienna flat (HINCKS 1950; STAINES 2005).



8. Franz SPAETH; this photograph was taken in his study in Vienna in approximately the late 1930s

In 1950, his Cassidinae collection was acquired for the Manchester Museum. It was down to a friendship between the then Assistant Keeper of Entomology at the MM, Walter D. HINCKS and Robert W. LLOYD (see below) and also the latter's extraordinary generosity that the MM gained this collection (HINCKS 1950; JOHNSON 1996; REPORT 1949-1950). After visiting the collection in Vienna in February 1950, where it had been



9. Letter sent to Franz SPAETH from Gilbert ARROW at the British Museum in 1928. This is one (archive item 50, box 2) of 339 letters that SPAETH kept with his Cassidinae notes and collection in Vienna, which are now part of the SPAETH archive at the MM

preserved by SPAETH's family since his death in 1943, HINCKS was able to purchase on behalf of and move this Cassidinae collection to the Manchester Museum with R. W. LLOYD as the benefactor (HINCKS 1950).

Soon after HINCKS' visit the collection, in its condensed, 40-drawer condition, was sent from Vienna to Northolt, London via British Empire Airways then to Manchester via rail. The drawer's glass lids, SPAETH's unfinished manuscript and all the other material he kept with his Cassidinae collection were not flown to Manchester with the drawers of specimens, but were sent separately via rail (HINCKS 1950, see also Fig. 10). As previously mentioned, this material is now held in the SPAETH archive at the MM. While the MM currently houses SPAETH's Cassidinae collection, the Naturhistorisches Museum in Vienna houses other collections compiled by him (STAINES 2005).

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Dept. of Entomology,  
Feb. 16th. 1950

Dear Mr. Sayce,

I am pleased to report that my mission to Vienna, on behalf of the Museum, has been satisfactorily concluded. I have offered to purchase the Spaeth collection of Cassid beetles and the relevant literature for the sum of £1,100 sterling. The proposed arrangements are as follows. The collection alone is to be purchased by Mr. R. W. Lloyd for the sum of £800 and I have ~~xx~~ written to him today regarding this matter. The literature, catalogues, card indices etc. are to be purchased by the Museum for the sum of £300. I wish to emphasize that this division is purely a nominal one arranged to suit our position and the needs of the Spaeth family. May I also underline the extreme delicacy of the transaction in respect to the Russian occupation of Vienna and their rigid censorship of all mail. Thus in our letter of acceptance, which will initiate the packing of the collection in accordance with the instructions which I left, we should surely state that the Museum acknowledges and accepts as per Herr Spaeth's letter of the 9th. Feb. which I attach to this report.

For political reasons it is hoped that Mr. Lloyd will be able to make his payment to Holland. The Museum's payment will be made direct to Vienna and will cover, nominally, the glass covers to the cabinet drawers and the books and indices which will be despatched in the normal way, by rail. This consignment will be insured at the cost of Herr Spaeth. On account of its weight the outer cabinet must be left behind but the drawers containing the specimens, without their glass lids, will be packed in accordance with my instructions and flown by British Empire Airways direct from Vienna to Northolt (about 8 hours). From Northolt the collection will come by rail unless alternative arrangements are made. It will be necessary for us to obtain an import licence from the Board of Trade for both consignments. The collection will be insured for £1,000 at our charge and all packing and delivery costs are to be borne by the Museum. If necessary the firm of Hinkler (entomological suppliers in Vienna) will secure the specimens in their drawers (under supervision) and a further small cost to the Museum may thus be incurred.

The collection was concentrated into 40 drawers as a war time measure

and is still in this state. The condition is generally excellent and the richness of the collection is well indicated by its high proportion of unique type specimens. I brought back with me from Vienna as many of the catalogues and lists relating to the collection as I could force into my personal baggage.

May I express my appreciation of the help the University has given me. I sincerely hope that I may prove to have handled satisfactorily a transaction which has been of an extremely delicate nature from its very inception.

Yours sincerely

W. D. Hincks  
Assistant Keeper, in charge of Entomology.

10. Letter sent to Mr Sayce (the Director of the MM at that time) from Walter D. Hincks on the 16th February, 1950. This is one (archive item 481, box 5) of 11 letters pertaining to the Franz Spaeth Cassidinae collection and related matters concerning his unpublished monograph that are kept in the Spaeth archive at the MM

### Walter Douglas HINCKS (1906-1961)

Walter Douglas HINCKS (Fig. 11) was "one of England's greatest entomologists" (KLOET 1961: p. 183), but his initial interest in entomology began as a hobby. He had studied at the Leeds College of Pharmacy and then was employed by a large firm of manufacturing chemists. He joined the Leeds Naturalists' Club and studied insects in his spare time. While he studied all Orders of insects, he had quickly become proficient in Coleoptera (KLOET 1961). HINCKS developed a close friendship with another amateur entomologist, John R. DIBB (1906-1973), who was in fact an insurance surveyor by

profession (ANONYMOUS 1974). Together they soon became leading experts on a small family of beetles, the Passalidae, while determining how well they could perform on their own original research (KLOET 1961). Their collection of Passalidae is currently housed at the Manchester Museum and contains 4259 specimens of 267 species (including 14 represented by holotypes). During this time HINCKS also studied many other insect groups, including the Cassidinae (KLOET 1961).

In 1939 HINCKS first met George S. KLOET, the future co-author to one of HINCKS' most notable works – the 'Check List of British Insects'. At the time KLOET was presenting his unfinished version at the Congress of the Society for British Entomology. It was not until 1942, however, that HINCKS got in touch with KLOET and was able to volunteer to help finish the 'Check List'. By the end of 1945 the pair had entirely rewritten the 24 volumes of the 'Check List' and it had been published. Work had begun on a second edition of the 'Check List' 12 months prior to HINCKS' death and was never completed (KLOET 1961).

All this and more was undertaken by HINCKS whilst also working in the Pharmaceutical sector, but in 1947 he was able to leave this sector behind and work solely in the entomology (KLOET 1961). He had accepted the post of Assistant Keeper in Entomology at the Manchester Museum which allowed him to work full time in the area that he most enjoyed, but now with the resources Manchester had to offer. In 1957, his title was renamed to Keeper in Entomology (LOGUNOV 2012). While at the museum he began the task of rearranging the collections and expanding the department's library in order to



11. Walter Douglas HINCKS. This photograph was acquired from a photo album compiled by Harry BRITEN, which is currently kept in the archive of the Manchester Entomological Society (archive item 1, box 1) at the MM. The date is unknown, but most likely the late 50s

make the MM's Entomology Department the unsurpassed reference and study centre in the North of England (KLOET 1961). He acquired many great collections on behalf of the museum and his own collections were purchased by the Museum, including his collection of Chrysomelidae, which contained his Cassidinae collection (JOHNSON 1996; KLOET 1961; REPORT 1961-1962). Even though this task was yet to be completed when he died, his plan could easily be followed by his successors (KLOET 1961).

When he became ill, HINCKS still had some works to finish including the second edition of the 'Check List of British Insects' with KLOET and the third and fourth volumes of 'Dermaptera of the World'. He also had many things he wanted to do such as translate from German and edit SPAETH's unpublished manuscripts on the Cassidinae. His illness, however, proved to be fatal and his life was cut short at the peak of his outstanding entomological career (KLOET 1961).

### **Robert Wylie LLOYD (1868-1958)**

Robert Wylie LLOYD (Fig. 12) is also of great significance to the compilation of the Cassidinae collection at the Manchester Museum. LLOYD had a passion for collecting. He had an excellent entomology collection and unique library, which he bequeathed to



12. Robert Wylie LLOYD, the merchant and philanthropist, whose generosity allowed the Manchester Museum to acquire the SPAETH collection of Cassidinae



the MM in 1958 (CHAMPION 1958; SLOAN 1998). Within this collection was his British Coleoptera collection. This outstanding collection was integrated into the MM's British Coleoptera collection, including Cassidinae specimens, and the 180 drawers in which his beetles were donated were used to re-house the British collection of Coleoptera (LOGUNOV 2012).

LLOYD was a successful businessman. He was said to be ruthless and was described as being firm and hard with those he deemed unworthy. However, he was also considered to be very generous to anyone he judged to be deserving of either his time or money. These traits, along with his determination and self-discipline, allowed him to be successful in his ventures (CHAMPION 1958; SLOAN 1998).

LLOYD, a keen collector, had items from a wide variety of interests – from entomological collections to watercolour drawings. The MM has benefitted greatly from this generous man; they received not only his British Coleoptera collection and other items such as some Oriental and Japanese antiquities (REPORT 1958-1959; LOGUNOV & MERRIMAN 2012) but he also was the benefactor behind the acquisition of the Franz SPAETH Cassidinae collection.

LLOYD took great care to keep all his collections in the best condition possible whilst he owned them. He wanted the same care and attention to be given to them in



13. Harry BRITTEN. This photograph was most likely taken whilst he was collecting specimens in Cheshire in approximately the 1950s

order for future generations to be able to enjoy and study them. He allocated of each of his collections to its most ideal place allowing each one to be available to those that had an established interest in that area. As well as this, he placed his collections in order to complement the collections already housed by that museum/establishment (for more information on LLOYD's collections, in particular his TURNER watercolour collection, see SLOAN 1998).

### **The British Cassidinae collection and recent acquisitions**

The British Cassidinae collection has been assembled by the Keepers/Curators at the Manchester Museum. It has been contributed to by notable collections as well as with the specimens collected by the staff themselves during the course of their own research.

One of the main contributors was Harry BRITTEN (1870-1954; Fig. 13), one of the greatest British entomologists (HINCKS 1954). He donated his private entomological collection to the MM in 1951, just a few years before he died, which contained approximately 60,000 specimens in 200 boxes (REPORT 1950-1951; HINCKS 1954). This was only around a year after he had donated 51 British specimens to the MM (Report 1949-1950). Both of these donations contained Coleoptera (and Cassidinae; see Fig. 4). BRITTEN's collection was at an impeccable standard due to his excellent collecting and mounting skills, which the MM also benefitted from during his 18 years as Assistant Keeper in Entomology there (HINCKS 1954; JOHNSON 1996; LOGUNOV 2012). Other collections that have made a significant contribution to the British Cassidinae collection include that of John Kidson TAYLOR (1839-1922), who bequeathed his second entomological to the MM. The first entomological collection he compiled went to Joseph SIDEBOTHAM (1824-1885), a calico printer and JP whose interests ranged from botany and entomology through astronomy and photography (see LOGUNOV & MERRIMAN 2012, for further details). SIDEBOTHAM's collection was also donated to the Museum and has specimens currently residing in the British Cassidinae collection (STANDEN 1922). As previously mentioned, R. W. LLOYD's British Coleoptera collection also significantly contributed to the British Cassidinae collection (CHAMPION 1958; SLOAN 1998).

There are also specimens making up the Manchester Museum's Cassidinae collection that have been donated in recent years. Lech BOROWIEC donated a series of 20 paratype specimens to the MM. Out of the 20 specimens he donated, there are 16 species that are currently recognised by the online Cassidinae catalogue (BOROWIEC & SWIĘTOJAŃSKA 2012). Lukas SEKERKA also donated specimens to the MM, first in 2006 and again in 2011, including 26 paratype specimens. Out of the 154 specimens he donated, there are 39 currently recognised species (BOROWIEC & SWIĘTOJAŃSKA 2012).

As well as donating specimens to the museum, both BOROWIEC and SEKERKA have worked on specimens from the parts of the collection already discussed.

## DISCUSSION

The Cassidinae collection at the Manchester Museum is one of the best collections in Europe. In Table 4, the MM Cassidinae collection's representation of Cassidinae world fauna is compared with seven other notable Cassidinae collections. It is the biggest collection, with nearly 30,000 specimens and just over 9,000 more than the second biggest collection at the Department of Biodiversity and Evolutionary Taxonomy at the Wrocław University in Poland. The Manchester Museum's collection has the second largest representation of Cassidinae world fauna, with only Wrocław University having a more comprehensive collection than the Manchester Museum, containing approximately 80% of the species of Cassidinae.

It is also rank second for its total number of type specimens; ranking third for the number of species with primary types and first for the number of species with secondary types (paratypes, syntypes, paralectotypes and cotypes). The MM has just 206 less species type specimens than the Naturhistoriska Riksmuseet in Stockholm, Sweden. While this collection in Stockholm has a small representation of the Cassidinae world fauna, it has a significant majority of species with type specimens, especially primary types. This is mainly due to the BOHEMAN collection residing there.

The figures on the Cassidinae collection at the Manchester Museum may increase due to the many specimens that were found to have either had an unrecognised name or to be unidentified during the cataloguing of the SPAETH Cassidinae collection and HINCKS collections. All of the unrecognised and undetermined specimens from the SPAETH collection have recently been sent to Lukas SEKERKA (Czech Republic), in the hope he can identify and publish them.

There is still some work to be done on the Cassidinae collection. As with many collections in natural history museums around the world, the nomenclature of both the SPAETH and HINCKS collections require updating and re-housing when the financial resources and manpower for these tasks are available.

Given the entire Manchester Museum's Cassidinae collection is available online, it can now be accessed by researchers interested in the group. The collection, however, is not only used by those studying the Cassidinae or Coleoptera, but by a wide variety of people. For example, many of the entomological collections are regularly used in art and design projects, making up to 30% of the visitors to the Entomology Department.

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Table 4. A comparison of some notable Cassidinae collections from various museums in Europe. The table shows the data for eight museums, ordered in respect to the representation of the Cassidinae world fauna each collection exhibits. The table also includes the number of species presented by type specimens.

Museum	Number of species	Number of specimens	Representation of world fauna (%)	Primary Types (Holotypes & Lectotypes)	Secondary Types (Paratypes, Syntypes, Paralectotypes & Cotypes)	Total number of type specimens
Department of Biodiversity and Evolutionary Taxonomy, Wrocław University, Poland.	2468	21119	79.87	239	929	1168
The Manchester Museum, The University of Manchester, UK.	2258	29173	73.04	248	973	1221
Humboldt Universität, Berlin, Germany.	1200-1500	10000-15000	40-50	341	688	1029
Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland.	1059	c. 6000	34.27	8	205	213
Naturhistoriska Riksmuseet Stockholm, Sweden.	920	c. 1700	29.77	820	607	1427
Museum d'Histoire Naturelle, Paris, France.	361	2013	11.68	78	142	220
Narodni Muzeum, Prague, Czech Republic.	316	c. 3800	10.23	3	90	93
Musee Royal d'Afrique Centrale, Tervuren, Belgium.	210	c. 8960	6.80	44	210	254

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