CHAPTER 25

John Russell Malloch: Amateur Naturalist to Professional Taxonomist

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A naturalist becomes proficient and knowledgeable by observing living fauna and flora: fieldwork is the essential process for anyone interested in the natural world to become both competent and confident. A paradigm of this can be seen in the progress of John Russell Malloch (1875-1963) in his transition from amateur naturalist, brought up in Bonhill, fifteen miles west of Glasgow, Scotland, to professional scientist working in Washington, DC. A number of events have been selected during which Malloch developed his skills and interacted with fellow practitioners. Malloch was an entomologist whose specialism in Diptera (two-winged flies) was to win him accolades from his peers on an international scale. His story is simply stated but is on an unusual scale and hinged on tenacity, combative personality and fierce intelligence.

Getting Started

First Forays into Flies

As a young man starting about 1897 Malloch operated in the company of other local naturalists in the Glasgow area, then around 1903 joined a coterie of entomologists inclined mainly if not exclusively towards Diptera. They often collected together, attended meetings of local societies and met in their respective homes to discuss their finds. The study of most insects necessarily involves collecting samples to identify them to species level, often using microscopy. Proficiency in identifying the commoner species means they can be recognized in the field. Unfortunately for beginners, there are considerably fewer common species than there are rare ones; the former are simply numerically more abundant. This means that many species are essentially cryptic and to reveal them at all requires effort. Diptera is a very large order and extensive samples have to be collected and studied in order to attempt to account for the total fauna. This naturally results in collections that are numerically large in terms of preserved specimens, and which constantly grow to reflect local species diversity.

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FIGURE 25.1 *Labelling specimens; an early example from Bonhill and Cardross, Dumbartonshire, Scotland, from 1907.* PHOTO E.G. HANCOCK.

Malloch was brought up in a family of mill workers, living in accommodation provided by the mill owners; initially he followed the same path as head of his own family (Hancock 1998). The local industry specialized in designs printed with Turkey Red dye on cotton cloth. Malloch trained as an engraver for the pattern blocks. This skill would benefit him directly in the future, after emigration to North America, in providing a means of employment in the absence of entomological work. It also provided him with the ability to draw insects in a manner suitable for publication. However, during this formative period the demands of his work limited his ability to engage fully with the others – for example limiting his ability to travel into the city and to meet up with like-minded enthusiasts other than locally to his home base. His entire early collection seems to have been gathered within a short radius of Bonhill and is labelled as such (Fig 25.1).

At the time Malloch started collecting flies there were no comprehensive English texts to ease the learning process. A work by Theobald (1892), although promisingly titled, was of limited value since only one volume was produced, covering a very small number of families beyond the general introductory sections. At the early stages of study, simply to establish a name for a specimen it was necessary to engage with specialized literature, often European in origin, combined with sending specimens for corroboration to established experts. Perseverance was needed to gain confidence and ability, but combined local effort produced satisfactory results. It is also evident that familiarity with a number of foreign languages was useful in order to work with these resources.

Later, when applying for professional entomological work in North America in 1915, Malloch claimed to speak and read German and also read French, Spanish and Latin. This was probably true in the matter of dealing with the relevant scientific literature, although in the same application form he claimed to have a university education and to be un-married, neither of which was the case.[1]

One of the foreign texts available, Zetterstedt (1842-1860) is known to have been used from a copy bequeathed to The Hunterian, University of Glasgow, in 1933, by James Joseph Francis Xavier King (1855-1933), one of Malloch's friends. The Latin text is annotated in places, updating nomenclature – as seen for the local discovery of a species of cranefly misunderstood in Zetterstedt's day: he had provided text describing some species under two different names that turned out to represent the males and females of the same taxon. The relevant pages in King's copy have pencilled marginal notes correcting this, prompted by the first discovery in Britain of the species in question by Henderson (Hancock 2014). Such issues are resolved by fieldwork – finding several insects together immediately upon emergence or in the act of mating, for example.

Consulting the various essential German sources meant understanding terms such as *Schwinger* (which translates as vibrator). This referred to the haltere, the highly adapted hind wing that functions as a balancing organ and is a defining character of the Diptera. In the drawers of the collection established by Robert Henderson (1864-1940), also in The Hunterian, some manuscript labels refer to "swingers [*sic*] yellow", etc., as an identifying feature for some of the specimens. Seemingly he made no attempt to render the word into scientific English.

In Scotland Malloch, of working class parentage, worked alongside entomologists from the professional classes. For many of these men of business, of which Henderson was one, collecting was a hobby and the creation of a collection their main ambition. Some of them had the expensive foreign texts that Malloch could borrow occasionally when working on his own collection. Or as an alternative, Henderson suggested they might make more headway by Malloch coming to see him "besides the books some Saturday afternoon", rather than using the tables alone, "to the interests of Science in this particular

1 The records of the universities of both Glasgow and Strathclyde show Malloch neither matriculated on any courses nor did he refer contemporarily to attending any college. His brother did go to evening classes in chemistry and became a courier for insects between Malloch and the city-based collectors. Malloch's marriage certificate is dated 15 September 1899; his wife and children were to join him in Illinois in 1919 after the end of World War I.

way".[2] The tables refer to the identification keys given in Wingate (1906) which, despite its apparently parochial title, was the first publication to provide significant help to amateur dipterists for 2,210 of the then estimated British fauna of 2,884 species.[3] Its contemporary importance and impact has now largely been forgotten, superseded by keys to individual families produced later in the century; these latter, now supplemented by internet resources, were constantly expanded and updated. Wingate's plates and identification keys in couplets gave confidence to users and set a new standard for such manuals (Fig 25.2).

Malloch pinned and labelled the specimens he caught in the field as a means to an end – tools for study often leading to publication. On deciding to emigrate to North America he disposed of most of his Scottish insects to museums, clearly not driven by mere possession of them. Small but regular batches of flies, from 1900 onwards, went to the Royal Scottish Museum, Edinburgh, culminating in a large donation of 13,000 pinned specimens in 1910. A working relationship had developed between Malloch and Percy Hall Grimshaw (1869-1939), the entomologist employed at the Edinburgh museum, beginning when specimens were sent there for naming. Malloch's moths and bees were sold for £21 to Glasgow's City Museum in 1903, possibly seen as providing some recompense for the effort put into their preservation. It was indicative also of his interest changing at that time in favour of the Diptera.[4] There are a number of Malloch specimens in The Hunterian that came with King's and Henderson's collections, having been given to or exchanged with them during their years of collaboration.

2 Malloch–Henderson correspondence, 1904-1918 (rh2/1), The Hunterian, University of Glasgow (hereinafter referred to as the Malloch–Henderson archive), letter of 25 February 1907. Malloch already appears to have obtained access to a copy of Wingate, saying in an earlier letter: "It is a marvel for the money and what has been required for years for beginners". He noted too that King also was endeavouring to obtain it. (Malloch–Henderson archive, 21 May 1906).

3 William John Wingate (1846-1912) was vicar of St Peters in Bishop Auckland from 1897 in which area most of his collecting was done. By coincidence he was born and schooled in Glasgow until the family moved to Durham (Kramer 2013); his collection of flies is in The Hancock Museum, Newcastle-on-Tyne.

4 Glasgow City Museum archive, papers associated with acquisition of Malloch specimens, accession no. 1903-281, Glasgow Museums Resource Centre.

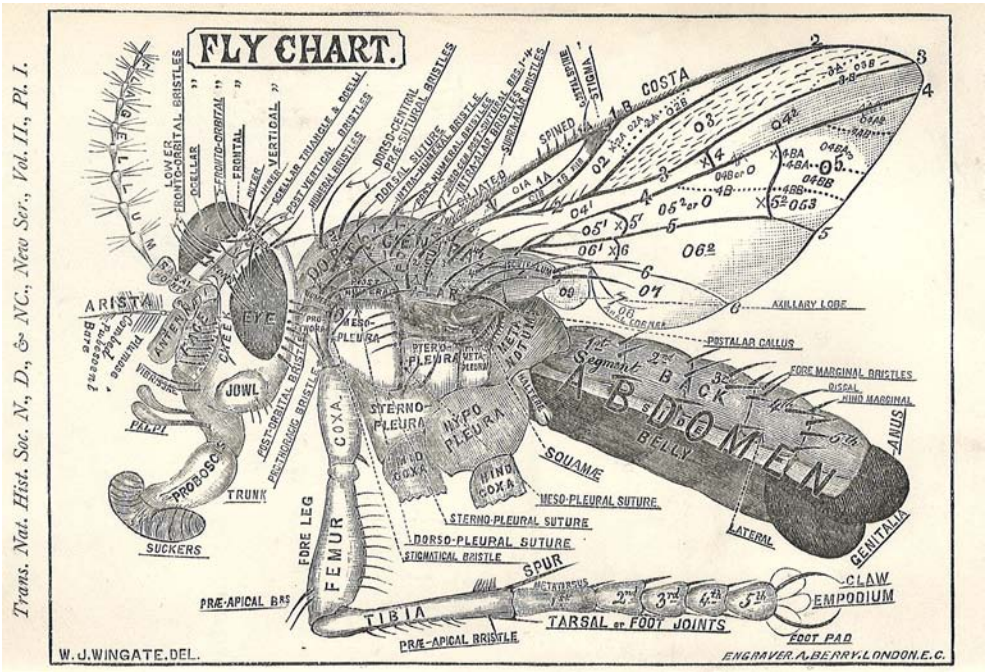
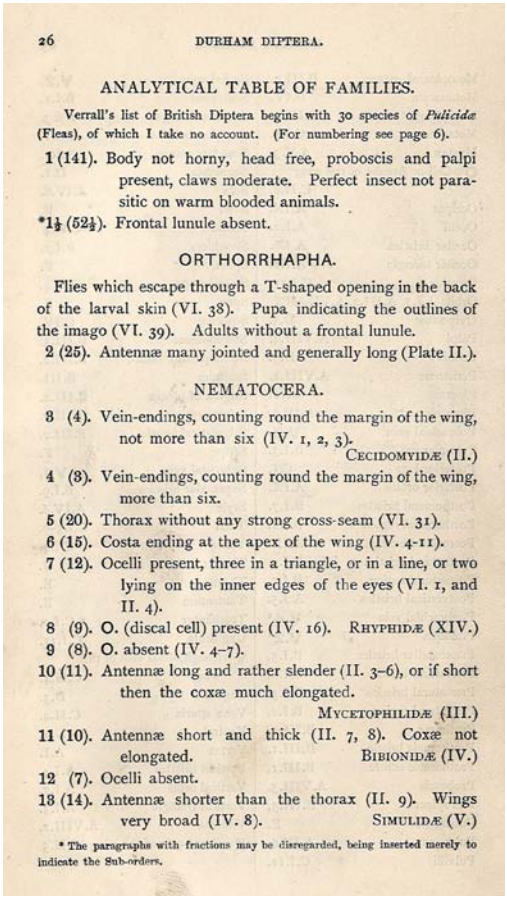


FIGURE 25.2 *The whole insect plate (a) and two pages showing examples of keys (b, c) from W.J. Wingate, "A preliminary list of Durham Diptera" (1906).* PHOTOGRAPH COURTESY OF NATIONAL MUSEUMS SCOTLAND. *a*

The Numbers Game

These west of Scotland naturalists applied individual and collective effort, exchanged specimens and consulted with like-minded others with the result that their endeavour built up a species list for the area that rivalled that of any other part of the British Isles. In addition to Malloch, Henderson and King were Alexander Ross (1857-1940) and Andrew Adie Dalglish (?-1924). George W. Ord (1871-1899), a promising young curator at Kelvingrove Museum in Glasgow had been involved before his untimely demise from cancer. This extended fieldwork was a source of local pride and, in the case of Malloch, it provided the means for eventual career enhancement. Malloch frequently referred to the numbers of species he had collected both within certain families and in his collection as a whole. To some extent this was a product of the time. George Henry Verrall (1848-1911), the national synthesizer, had published his lists of British flies (Verrall 1901) following his earlier 'centuries' papers (e.g., Verrall 1894). This was not designed as a challenge but the Glasgow-based group set



26 DURHAM DIPTERA.

ANALYTICAL TABLE OF FAMILIES.

Verrall's list of British Diptera begins with 30 species of *Pulicidæ* (Fleas), of which I take no account. (For numbering see page 6).

1 (141). Body not horny, head free, proboscis and palpi present, claws moderate. Perfect insect not parasitic on warm blooded animals.

*1½ (52½). Frontal lunule absent.

ORTHORRHAPHA.

Flies which escape through a T-shaped opening in the back of the larval skin (VI. 38). Pupa indicating the outlines of the imago (VI. 39). Adults without a frontal lunule.

2 (25). Antennæ many jointed and generally long (Plate II.).

NEMATOCERA.

3 (4). Vein-endings, counting round the margin of the wing, not more than six (IV. 1, 2, 3). CECIDOMYIDÆ (II.)

4 (3). Vein-endings, counting round the margin of the wing, more than six.

5 (20). Thorax without any strong cross-seam (VI. 31).

6 (15). Costa ending at the apex of the wing (IV. 4-11).

7 (12). Ocelli present, three in a triangle, or in a line, or two lying on the inner edges of the eyes (VI. 1, and II. 4).

8 (9). O. (discal cell) present (IV. 16). RHYPHIDÆ (XIV.)

9 (8). O. absent (IV. 4–7).

10 (11). Antennæ long and rather slender (II. 3–6), or if short then the coxæ much elongated. MYCETOPHILIDÆ (III.)

11 (10). Antennæ short and thick (II. 7, 8). Coxæ not elongated. BIBIONIDÆ (IV.)

12 (7). Ocelli absent.

13 (14). Antennæ shorter than the thorax (II. 9). Wings very broad (IV. 8). SIMULIDÆ (V.)

* The paragraphs with fractions may be disregarded, being inserted merely to indicate the Sub-orders.

310 DURHAM DIPTERA.

XXXVI.

15 (16). Four pairs of dorso-central bristles, that is at least one pair of præsutural bristles present. BLEPHAROPTERA, Lw. (511)

16 (15). Only three pairs of dorso-central bristles, that is no præsutural bristles present. TEPHROCHLAMYS, Lw. (513)

TABLE OF SPECIES.

506. HELOMYZA.

1 (14). Meso-pleuræ fine haired.

2 (7). Arista short haired or pubescent.

3 (4). Arista with very short pubescence. (2253. *humilis*, Mg.)

4 (3). Arista distinctly but not long haired.

5 (6). No dark spot at the end of V.2. (2254. *inornata*, Lw.)

6 (5). A dark spot at the end of V.2. (*nemorum*, Mg.)

7 (2). Arista long haired.

8 (9). Tip of the wing clouded, and also showing dark and clear spots.
2255. *Helomyza rufa*, Fln.
Hesleden, 1 ♀, 18–8–99; Bishop Auckland, 1 ♀, 3–3–00.

9 (8). Tip of the wing without the cloud, although dark spots may be present.

10 (11). Scutellum with fine hairs all over. (*nemorum*, Mg.)

11 (10). Scutellum bare except at its sides.

12 (13). Thorax grey-brown. (*fœda*, Lw.)

13 (12). Thorax yellow.
2256. *Helomyza pectoralis*, Lw.
Hesleden, 1 ♂, 13–8–00; Shull, 1 ♀, 7–7–02.

14 (1). Meso-pleuræ quite bare.

15 (31). Arista plumose.

16 (22). Arista long plumed.

17 (19). Mid femora with thorn-like bristles on the underside.

FIGURE 25.2 *b c*

about targeting the totality of species in their area. The species diversity of British and Irish Diptera (currently in excess of 8,000 species) meant it was inevitable that any fieldwork would quickly reveal more. This process continues today and for Diptera it is a relatively mundane event to discover species new to the country or to science and goes generally unnoticed. In more popular groups, by comparison – as in the vertebrates or flowering plants – finding a new species is a cause of much rejoicing and media attention. As Malloch developed his interest in Diptera, he included in his letters to Henderson statistics concerning the number of species he had obtained. By 16 January 1907, he was able to tell Henderson that he had:[5]

5 Malloch–Henderson archive. For 'Bloomfield's Norfolk list' see Bloomfield 1903.

> … more than 709 species of Diptera from the West [of Scotland] not including Tipulidae. Of course, some of them are not finally decided but they are all different and I believe that when I get the whole of my species sorted out … I shall have 800. I want to get a good list in fact a better list than the English collectors. Bloomfield's Norfolk list has only 500 species and he calls that good!

Practising Natural History

Natural history as an approach to information-gathering is initially observational and descriptive. Its methodology informed the development of the first phase of taxonomy during the Enlightenment. As a technique it reached a peak of achievement with Darwin's work on natural selection. At the same time, laboratory-based and experimental work began to make an impact on the investigative approach. The frontiers of science are always going to change as new technologies enable different or more sophisticated analyses, but often they address the same old questions and are additions to the armoury of scientific work – not a substitute for what has gone before.

One of Malloch's earliest publications concerned the natural history of a moth, *Tinea imella*, that he had found in 1901 in a sandpit near his home. Communicating initially with Charles Goldring Barrett (1836-1904), author of some of the principal contemporary works on British moths, Malloch was asked to investigate further. He was able to observe over sixty specimens within a week and to make some notes on their behaviour. He could not locate larvae in the field and the alternative of obtaining eggs from females for captive breeding also failed. Later he found large numbers of pupae on the surface of the ground and revealed after "a deal of searching owing to a small portion left [the food] seems to have been a knitted woollen stocking and must have been partly buried and overgrown with grass" (Malloch 1903: 150). This habit is found in other related tineid moths whose larvae feed in the wild on wool and feathers, either on the bodies of dead vertebrate animals or inside their nests. It explains how some members of the group have adopted human dwellings and become household pests. The larvae of *T. imella* today remain undescribed, so Malloch got as close to finding them as any subsequent entomologist.

Malloch was busy conducting fieldwork at every opportunity. One report of his work was read at a meeting on 28 January 1908, subsequently appearing in the *Proceedings of the Glasgow Natural History Society*:

> On behalf of Mr J.R. Malloch of Bonhill, Mr Alexander Ross brought before the meeting some interesting material sent for exhibition. This included a collection of dipterous insects belonging to the family Pho-

> ridae, which had been captured in Dumbartonshire, mainly in the neighbourhood of Bonhill. Of the 52 species shown, 3 were new to the British list and 29 new to science. As these flies are generally very small, Mr Malloch had prepared very accurate drawings of the wings of several species so as to illustrate their characteristic venation.
>
> He also submitted a collection of predaceous Diptera, along with the prey upon which they were feeding when captured. The former consisted chiefly of specimens of *Scatophaga stercoraria* and *S. squalida*, while the insects upon which they were feeding were various species of Chironomidae, Bibionidae Tipulidae, etc.
>
> Mr Malloch likewise showed specimens of *Neottiophilum praeustum*, a dipteron new to the Clyde area, which had been bred from pupae taken from the nest of a greenfinch.

Malloch's absence would have been due to the impossibility of his attending the meetings in Glasgow on a weekday evening, because of the nature of his employment.

Environmental concerns were seldom mentioned a century ago, but in one paper Malloch decided to include historical data from the nineteenth-century work of Cameron (1876) because they "will in after years prove interesting as many of the collecting grounds are now beyond hope from the collector's point of view" (Malloch 1914a). This was with reference to habitats altered or destroyed by Glasgow's urban expansion. It included an update of the account of sawflies by Dalglish (1901) although it had proved difficult for Malloch to resolve nomenclaturally some of the older records. He cast doubt on any possibility of doing so for "the genus *Dolerus*, which Cameron seems to have imperfectly understood". The paper duly received a reaction to Malloch's opinion of Cameron's abilities. Dalglish (1914) felt that Cameron would be vindicated in time and then made his point: "It was not my intention to take notice of [Malloch's] list, but on looking over it I find so many omissions and inaccuracies that I feel compelled to point these out"; he then proceeded to do so for more than twenty taxa over the next three pages. Clearly, Malloch could not let this stand and in the next issue (Malloch 1914b) stated that his notes had been written five years ago before his departure for America. The "accidental omissions" he regarded as trivial and would have been rectified had he stayed in Scotland. What was more, he accepted "Dalglish's criticisms as an addition to our knowledge of the group, not as criticisms of myself or my work. I consider that the work should have been undertaken by Dalglish in 1901 when he compiled the list for the Glasgow *Handbook*". There is no public record of what Dalglish thought of this and presumably Malloch felt his statement sufficiently

protected his developing reputation in the United States. He was clearly sensitive to any criticism even over a piece of relatively insignificant faunistics.

Like Malloch, Peter Cameron (1847-1912) had worked in the textile printing industry but moved away from the Glasgow area and thereafter does not appear to have contributed in any meaningful way to local discussions. After a few earlier local papers on Hymenoptera he started work on his magnum opus (Cameron 1882-1893). Arising from his own fieldwork, new species were named after the Glasgow sites where they had been first found.[6] Unfortunately this widely lauded start was not maintained and an obituary castigated in a frank manner much of his output for lack of rigour (Morley 1913). Cameron's body was found in an isolated cottage in Derbyshire, his demise attributed to alcoholism (King 1912). King was more sympathetic than Morley and concluded "we will have to wait for time to tell if his work during this period under very adverse conditions will stand … as much of it was done not in the first place for the love of it but for bread and butter". Any connections with his earlier Scottish faunistic work had been broken before Malloch and Dalglish's petty interaction in the context of local sawfly diversity.

Towards Knowledge

Field experience brings insight into how particular species behave and where and when to find them but as referred to above with less popular groups the first hurdle to overcome is to name the organisms. Malloch (1912a: 133) stated succinctly that "The want of reliable descriptions of species in English in many families of insects is one of the principal reasons why there are so few students of these families; and even when one understands German and French, it is not always easy to obtain the books upon the group one is interested in." In that paper Malloch provided a key to twenty-six species of *Fannia* (the genus to which one of the common house flies belongs) and provided detailed descriptions of each one. When he wrote this account he quoted the work of Stein (1895) as an important source, showing that he not only had access to it but indeed read the German text. The importance of the position of bristles on the head and body (the chaetotaxy) were emphasized (Fig. 25.3). He acknowledged the contribution of Grimshaw at the Royal Museum of Scotland who devised a terminology for the surface of the legs. A bristle could be said to be antero-ventral, dorso-lateral, apico-dorsal, and so on and comparisons allowed between species in an unequivocal manner (Grimshaw, 1905). This scientific

6 These include *Nematus cadderensis* Cameron, 1875 and *Dolerus possilensis* Cameron 1882, named from Cadder Wilderness and Possil Marsh, sites on the urban fringe of Glasgow regularly visited by local naturalists.

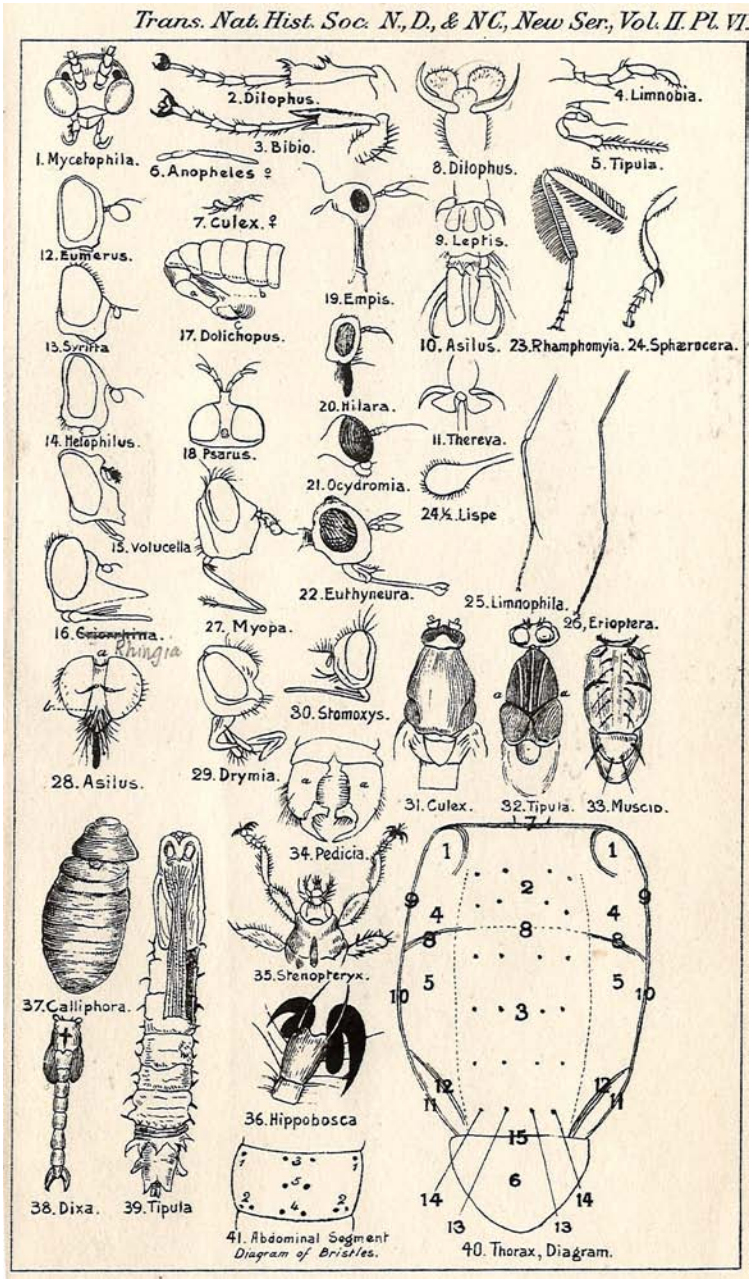


FIGURE 25.3 *Plate from Wingate (1905) with features of some genera of flies and his chaetotaxy notation for bristle distribution over thorax and abdomen.* PHOTOGRAPH COURTESY OF NATIONAL MUSEUMS SCOTLAND.

approach to keying species was not for the faint-hearted and required a degree of concentrated effort and needed a microscope or powerful lens. On one occasion Malloch commented to Henderson in a matter-of-fact way that he could not work on his collections in his spare time during the week in winter: he could only do so at weekends, so even if electricity had been installed in the house the light must have been insufficient to see minute detail after dark. Nevertheless, by this period Malloch had grasped the necessary skills and become confident in publishing the results and his analysis of them.

Asserting His Position

During this Scottish phase of his development Malloch approached the Diptera in a concerted and orderly manner. He took one family at a time and worked on it with the specimens he had collected using available literature and sending examples to experts for naming. He was sometimes the grateful recipient from these other entomologists of gifts or exchanges of species he had been unable to collect. He began to publish accounts of groups such as the Psychodidae (Malloch 1907), Phoridae (Malloch 1911) and the genus *Fannia* (Malloch 1912). In relation to the first-named family, the moth flies, only two species had been recorded from the west of Scotland in the book published to mark the meeting of the British Association for the Advancement of Science in Glasgow (Elliot et al. 1901).[7] Malloch decided in 1907 "to do something towards obtaining a better idea of the number of species at least in this locality during the past summer". He added twenty-one species plus one thought to be new to science that was to have been described separately by the specialist in the family, Alfred Edward Eaton (1845-1929). Once decided, Malloch obviously did not hesitate to devise, undertake and complete a project. It is evident even at this early stage in his career that he had a high degree of confidence in his own abilities.

As a result from his own publications people started to consult him, reversing the earlier situation. When Albert Harry Hamm (1861-1951) of Oxford sent him some material, four species were introduced as new to Britain and provision of a key to species for the genus, *Amaurosoma*, was presented, although as a precaution he had checked with Collin concerning one of the species (Malloch 1909).

7 The section on this part of the Diptera was compiled by Grimshaw; the two moth fly species had been collected by King (Elliott et al. 1901: 259).

He began to critique the work of others. Malloch had sent specimens for identification to James Edward Collin (1876-1968), nephew and inheritor of Verrall's wealth and collections. He was one of the established Diptera experts in Britain to whom Malloch had posted many specimens from his early fieldwork.[8] But on 5 February 1908 he told Henderson that as far as his Agromyzidae were concerned Collin seemed unable to help any further.[9] Malloch had tried to use Schiner (1860-1862) and found the same mistakes as in Zetterstedt: "when he described *curvipalpis* this species is the same as *bicornis* of Kalt[enbach] and instead of the projecting portions being the palpi they are vibrissae!. Collin originally said it was '*nana* group' but they have white halteres which I could not accept so I sent it back suggesting *curvipalpis*. There are several Collin could not name …" Later Collin was to receive more forthright advice from Malloch which needs to be quoted at length to get the full flavour:[10]

> My Dear Collin,
>
> I have seen the first part of a paper by you on the British species of the genus *Limnophora* and want to draw your attention to the fact that you are liable to make errors if you have not seen my recent papers on the North American Anthomyiidae. You say that no author has used the characters of the setulose third wing-vein and prosternum, but you will find that both have been used by me in recent papers, some of them three years ago. I have also used another set of characters for the erection of the genus *Lispoides* but have refrained from going into the matter very fully till I have had time to thoroughly study all my material from Europe and the exotic forms in my hands … I regret I have not been in constant correspondence with you as there are many of my papers on the Anthomyiidae that you will have to consult on the family, especially on generic characters. I have not used many of the characters used by the older authors and have introduced many new characters so that you will be able to work them into your scheme of classification if you intend to go into the whole family in Britain.
>
> I am not egotistical in this matter but having gained some proficiency in the classification of the family and priority of publication I am merely

8 Verrall–Collin Collection, Correspondence files. 1905-1939. Hope Department, Oxford University Museum, hereinafter referred to as Verrall–Collin archive.

9 Malloch–Henderson archive.

10 Verrall–Collin archive, 10 May 1921.

> drawing your attention to the matter to prevent your having to retract statements made in error.
>
> Sincerely Yours
> J.R. Malloch
>
> p.s. see Exotic Muscaridae, Ann. Mag. Nat. Hist., 1921.

Unfortunately, Collin does not appear to have kept a copybook so there is no record of his response, if any. It is worth noting that his uncle had grasped the significance of the use of hairs, spines and setae earlier than Grimshaw or Malloch, as can be seen in his review of an American paper on the subject (Verrall 1909).

Malloch occasionally expressed his ideas about writing for publication and in the process reflected on others' contributions. In a short article (Malloch 1911),[11] having said he had collected specimens that increased the known British species by an additional fifth, he continues: "to prevent the following notes being of an uninteresting and formal nature, I propose to give them as nearly as possible in accordance with the time of the insect's appearance and not with the order of its sequence in the list of species." He included also habitat information and essentially adopted a field-based approach rather than a procedural taxonomic one. This clearly chimed with the original observations that had provided the data and impetus for publication. He described his style in the introduction to one of his most important publications using rather Victorian style prose (Malloch 1917). Data obtained from collecting fresh specimens and making observations in the field were seminal to the production of this definitive work, which had been two years in preparation:

> I have been steadily acquiring material … [which] includes more examples of immature stages of Diptera as a basis for classification than have been brought together elsewhere in the United States. It is, moreover, my opinion … incumbent upon [any entomologist] to publish not only his new data, be they new species or life histories, but incidentally to link up such facts already published as have a direct bearing on the subject … the purpose is to enable the observant student of nature and the economic entomologist to recognize those forms that often come to their notice

11 The article appeared in print after Malloch had emigrated to North America, due a delay in printing.

> and thus obviate frequent delays and discouragement … an effort has been made to avoid the use of pedantic terminology.
>
> The writer is of the opinion … that clarity of expression can be attained and conciseness compassed by the use of language that is understood by the non-entomological reader, much of the terminology and phraseology incessantly cropping out in entomological publications being due either to the training or the personal whim of the writers.

Malloch's expression of opinions in the last sentence is typical. It might be seen why he was not always an easy colleague. His fellow workers might have objected strongly to being accused of personal whim when they thought they were striving for scientific accuracy and hence achieving uniformity. Terminological inexactitude is an issue in all subject areas. In entomology there are many problems with naming parts of insect structure and anatomy while attempting to ascribe homologies between families and orders and reflect common evolutionary origins. Discussion and disagreement on these issues continue today.

Emigration to North America

Getting Established

Malloch was not content with a life working in the textile industry of the Vale of Leven, at the south end of Loch Lomond. He had made a number of comments from at least 1903 onwards to friends and acquaintances about not being in the country in the near future, while remaining imprecise in terms of where exactly he would be. Malloch's autobiographical account of his life and career was written in 1951 on request from Charles Paul Alexander (1889-1982), who was compiling data on dipterists of the world throughout history. In this Malloch said: "In April 1910 I made up my mind to come to America … and 1 May 1910, a Sunday, arrived in New York City". He had an "intention to see the country and possibly in a few years to return to Scotland where I had the beginnings of a political career." This apparently enigmatic statement is probably that referred to in some of his correspondence when he said he could not meet for field trips on some Saturdays as he was to address meetings of the Land Value Campaign.[12]

12 Malloch–Henderson archive. The Land Values Taxation (Scotland) Bill (1906) proposed the payment of an extra tax based on land ownership. Presumably Malloch was in favour,

For some reason, after a short time working as an engraver Malloch moved from the east coast to Medicine Hat, Alberta, living in a hotel from which he wrote to Collin. They maintained correspondence through most of Malloch's active period in North America.[13] Malloch asked on 21 September 1911 for a reprint of a paper that had just appeared and then explained that:

> I have been travelling over quite a large portion of North America for the last eighteen months and have only made a sort of temporary settlement here. I have collected a few specimens here more because it a sort of second nature of mine than because I expect to be able to form any large collection. It is quite probable that I may be back in Scotland or England again.

In the spring of 1912 Malloch moved to Washington, DC, having written to Leland Ossian Howard (1857-1950) and been offered some work. That winter had been "a cold one, with one period 45 degrees below and this made me realize I was no arctic explorer".[14] Howard was then chief entomologist in the Department of Agriculture and must have been convinced of Malloch's potential on paper and then in practice, since after a brief return to Scotland in July 1912 Howard asked Malloch to return to work on the blackfly (Simuliidae) collection. Malloch was unhappy with his progress since he was "not allowed to undertake fieldwork and the materials available for study was only old stuff with all the larvae and pupae in alcohol". Due to lack of funds Malloch's work was terminated and for the second half of 1913 he resorted to earning a living by engraving while he worked on a paper for the Philadelphia Academy at weekends. Before leaving Washington he had already initiated a fruitful correspondence with Stephen Alfred Forbes (1844-1930), director of the Illinois State Laboratory of Natural History, and negotiated a start for the State Survey from October 1913 at $125 per month – the same salary as in Washington. During these negotiations Malloch (Fig. 25.4) stressed to Forbes his abilities, offered copies of his recently published papers and stated his willingness to work "within systematic or field even for a short time[.] I shall be very pleased to come to Illinois".[15]

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since (if enacted) once ownership and rateable value had been established, the richer sector of society would be obliged to pay more tax.

13 Verrall–Collin archive.

14 Alexander, C.P., correspondence, 1935-1955, Smithsonian Archives, Record Unit 7298, Box 35 [hereafter referred to as Alexander papers], Doc. 2764A.

15 Urbana–Champaign Archives, Staff Appointments Files, record series 2/5/15, box 38, folder: "Malloch, John R.", letter dated 30 August 1913.

FIGURE 25.4
John Russell Malloch aged forty-five, taken in Urbana, IL (1920).
PHOTOGRAPH IN THE COLLECTION OF E.G. HANCOCK.

Professional Career Consolidated

It was obvious that Malloch was now intent on a career as a professional scientist. During his first sojourn in Washington he had seen in print or sent off for publishing nine papers in 1912 (three jointly with Frederick Knab) and an astonishing nineteen in 1913 (e.g., Malloch 1912b, 1912c, 1913a, 1913b). While in Philadelphia, apparently in a voluntary capacity, he crammed in some work on the Costa Rica collections of Philip Powell Calvert (1871-1961) that appeared shortly afterwards (Cresson and Malloch 1914). Completion of that manuscript was a stated reason for his slightly delayed start in Illinois. Once settled into his salaried position there Malloch carried out his duties on three fronts. His job title was given as Illustrator and Custodian in 1916, but he was also sent out to farming communities in order to assess the progress of insect pests and the effectiveness of measures to control them. Lastly he published many more papers on a wide range of entomological subjects not necessarily related directly to his work in Illinois. In May 1921 he returned to work for the national biological survey based in Washington until his official retirement in 1935; a few small contracts thereafter resulted in publication.

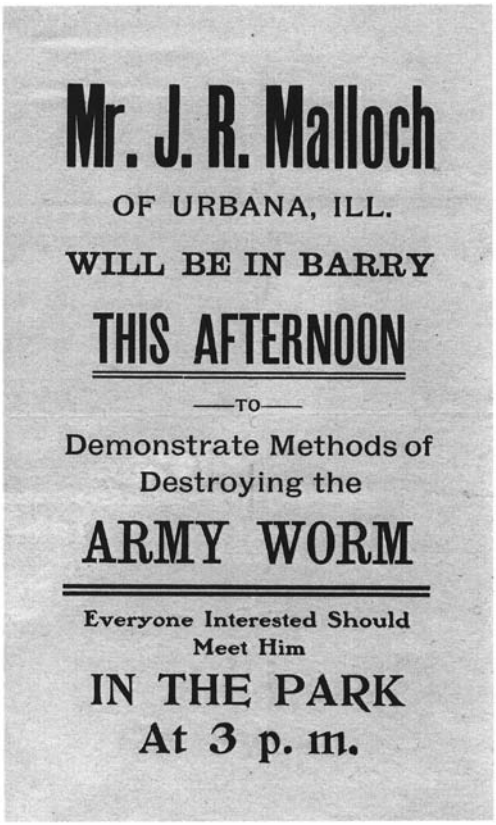


FIGURE 25.5
Poster advertising free advice to farmers in Illinois for dealing with army worm devastations. PHOTOGRAPH COURTESY OF URBANA-CHAMPAIGN ARCHIVES, UNIVERSITY OF ILLINOIS.

Fieldwork in Illinois

Economic entomology was one of the main functions of the Survey. In 1914 a well-documented trip by Malloch as adviser during the season for crop-damage by army worms is probably typical of the way it was carried out.[16] From 31 May to 15 June 1914 he went to twelve townships and nearby farms in an area between 60 to 100 miles west of Urbana. In each place he observed and reported on the extent of the damage and talked to farmers individually and collectively (Fig. 25.5). Army worms are the caterpillars of a noctuid moth which destroy the roots of plants. Before the development of more effective chemical pesticides one technique was the creation of dry and dusty ditches between fields into which the migrating grubs fell and then could be killed by kerosene or

16 Urbana–Champaign Archives, University of Illinois, Natural History Chief Office File, Record Series 43/1/5 (Box 4), hereafter referred to as the Illinois archives, letters and telegrams dated 31 May to 15 June 1914.

ingesting poisoned bran (Flint 1921). In the year 1914 the descriptions sent from Malloch to Forbes are interesting on several fronts. He itemizes the insects seen on the farms that were a variety of pests on various crops but also predators that controlled them to an observable extent. The difficulties of both carrying out treatment and persuading farmers of the potential effectiveness of such procedures are of interest. One Barry farmer on 5 June 1914 despaired at the lack of progress but he had not followed advice to put down poisoned bran after 5.00pm (armyworms migrate to new food sources nocturnally) and was "unjustly stigmatising the treatment as useless".[17] Malloch suggested to Forbes that 100 leaflets containing advice be sent immediately care of a local doctor and concluded by saying he was to "address a meeting here this afternoon as per the enclosed circular ... [and] try to get the farmers to take not an apathetic approach or 'philosophical' stance but to have them move to combat the pests". He was able to report to Forbes two days later from the town of Hull that:

> I am glad to say [it] passed off very satisfactorily. There was a good attendance ... and interest [also] on matters which proved to me that farmers hereabouts are fully cognizant of the importance of the work of the Office and are prepared to avail themselves of the services and advice of its staff.
>
> Today I had over 50 farmers and interested parties and before I spoke on the life history of the army worm, Hessian fly and wheat fly (*Meromyza*) [wheat stem fly, family: Chloropidae], I took them over some fields which were infested and obtained examples [including some] parasites and by means of my pocket lens endeavoured to have them realize what some of the smaller insects looked like ... I believe I have created an interest in our work that will bear fruit later.

The poisons that were available could not always be used where there were stock animals and crushing the caterpillars by rolling was limited sometimes by the roughness of the ground, its slope or even the lack of equipment in the area. The situation was not universally bad, as Malloch related in a letter from Carlinville on 31 May 1914:[18]

> [Army worms] are in several vacant lots in the town and almost all the timothy is destroyed. It is too late to do much for their suppression here and I fear this will be the case in most places as far south. Parasitism is

17 Illinois archives, 5 June 1914

18 Illinois archives.

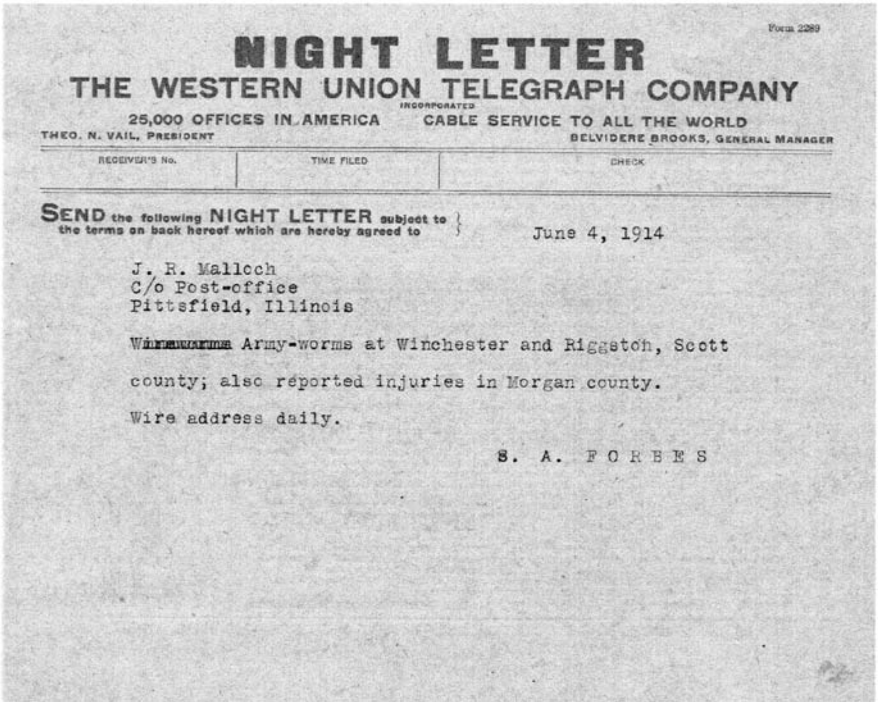
> very prevalent here, particularly noticeable … where *Apanteles* cocoons are abundant. *Winthemia 4-pustulata*, the tachinid fly, is also common which would seem to indicate a considerable reduction in the numbers of the second brood and a great probability that next spring there will be no recurrence of the attack.
>
> As circumstances tending towards the reduction of the worms I may mention that sparrows and hogs, particularly the latter, are busily devouring them here.

Malloch and Forbes exchanged nine letters and nine telegrams (Fig. 25.6). This correspondence indicates an extremely busy and fraught few days at the peak of an outbreak affecting the economy of these rural communities.[19] It was probably not the most enjoyable kind of fieldwork for a taxonomist, but the Illinois crop fields were of great value to both the state and nation.

Under the direction of Forbes on these and similar occasions, Malloch fulfilled the duties of the State Laboratory of Natural History. In 1917 it became the Illinois Natural History Survey and fieldwork underpinned their mission, which included surveying the state for its natural resources and for its economic importance, particularly relevant to agriculture in the case of entomology, research and education (Smith 1977). Apart from papers on taxonomy, Malloch produced some scientific publications more in line with his employer's requirements. A paper on the genus *Tiphia*, wasp parasites of agricultural beetle pests, provides an example of how fieldwork practised by him was both important to the work of the Survey and an advance in scientific knowledge (Malloch 1918):

> About two years ago I undertook to work up this mass of material [obtained by rearing or general collection] … to determine how many species there are affecting white grubs in Illinois and the distribution of the various species. At the outset of my work I encountered great difficulties to progress [with inadequate earlier descriptions and apparent paucity of characters and so] I was forced to the conclusion that it was necessary for me obtain specimens from more diverse localities … consequently on every possible occasion during my field work in 1917 I collected specimens of *Typhia* … At Dubois, in the southern part of the state many examples of several small species were taken by sweeping black-jack oak and later in the year some of the same species were found under the same conditions at Havana and at Meredosia.

19 Illinois archives.



Form 2289

NIGHT LETTER

THE WESTERN UNION TELEGRAPH COMPANY

INCORPORATED

25,000 OFFICES IN AMERICA CABLE SERVICE TO ALL THE WORLD

THEO. N. VAIL, PRESIDENT BELVIDERE BROOKS, GENERAL MANAGER

RECEIVER'S No.	TIME FILED	CHECK

SEND the following NIGHT LETTER subject to the terms on back hereof which are hereby agreed to

June 4, 1914

J. R. Malloch
C/o Post-office
Pittsfield, Illinois

[illegible] Army-worms at Winchester and Riggston, Scott county; also reported injuries in Morgan county. Wire address daily.

S. A. FORBES

FIGURE 25.6 *Example of a telegram sent to Malloch on his peripatetic visits to farms in western Illinois.* PHOTOGRAPH COURTESY OF URBANA–CHAMPAIGN ARCHIVES, UNIVERSITY OF ILLINOIS.

FIGURE 25.7 *Specimen labels in museum style from locations near Washington,* DC, *in 1921.* PHOTO E.G. HANCOCK.

In May 1921 Malloch returned to work for the national biological survey based in Washington, DC, and immediately set about collecting (Fig. 25.7). Even after his official retirement in 1935 he got a few small contracts that resulted in further publications.

Malloch's Personality

A flavour of Malloch's ideas on the work of others can be seen from some of the quotations above. A selection of similar opinions demonstrates how he thought in relation to their and his own abilities. He regarded some entomologists as entrenched in attitudes that he considered a product of their privileged backgrounds but his criticisms began with what he thought were inadequacies in their entomology. The use of hairs and setae were becoming very important for Diptera and Malloch described meeting with Grimshaw in Edinburgh during his brief and last return to Scotland in 1912 to discuss chaetotaxy.[20] Malloch then recalled sharing a room in Washington with August Busck (1870-1944), who apparently disliked this terminology. In this room one day Malloch:

> … in conversation with H.S. Barber [1882-1950] indicated the possibilities of the use of these more exact terms. Barber said that an innovation of this nature would prove acceptable to other entomologists and at that Busck butted in a pompous manner, the tone that he invariably used and I saw red. My last and only reply to him was that "Lepidopterists like him saw only the outer and inner sides of their bugs". He was a pompous ass!

He additionally commented that "Busck may have become inoculated with this pomposity through contact with Lord Walsingham and others, and therefore too great to notice the likes of me". Malloch was not always antagonistic or unfriendly and was a good correspondent and kept in contact with old acquaintances. In another recollection concerning Henry Guard Knaggs (1832-1908) Malloch commented:

> Dr Tutt (Noctuidae) was a voluminous writer and Knaggs wrote me asking if I knew him and bluntly he said that he was "Omnipotent. Tutt knew every moth and if he didn't then God had never made it and it could not be a noctuid". I did not carry out any plan for making an acquaintance with anyone so exclusive … Tutt and Knaggs ended up as "bitter enemies"

20 Alexander papers, Doc. 2764a..

> chiefly over a small matter of opinion as to the distinctiveness of a species on which could be determined by proper field work.

He could disagree with and antagonize people he had never met. Understandably, someone who had worked for many years would feel proprietorial on a group and not take too kindly to Malloch intruding into their perceived domain. Walter Scott Patton (1876-1960) and Malloch argued substantially about nearly everything to do with the family Muscidae whether about species, hierarchies or nomenclature.[21] It is useful to consider the basis of these interchanges and to ask whether Malloch was operating objectively and scientifically rather than being simply argumentative. An analysis of the Patton-Malloch relationship has been made (Thompson and Pont 1993) and is instructive:

> Patton did an enormous amount of fieldwork and breeding of *Musca* species in South India and this bore fruit when he returned to England and began extensive studies on the taxonomy and systematics of *Musca*: he was able to combine his first-hand knowledge [from] these early years of practical work [which] underpinned all his subsequent systematic research … But he could not reach any accord with Malloch and the two remained irreconcilable. It is clear now that even Patton misidentified a great deal of material: throughout his long career he re-identified, misidentified and changed his mind about species limits and names and his keys are generally poor, based on rather weak characters and difficult to use.
>
> Malloch too misidentified species. It is obvious that much of their argument over detail can be resolved once it is known what species they actually meant by particular names: for instance, both had dogmatic views over where "*planiceps* Wiedemann" should be placed, yet neither correctly identified this species and, as they were probably not even discussing the same species, their discord appears completely futile … The present system … represents a synthesis of [their] work.
>
> Malloch advanced knowledge of the family Muscidae to a quite remarkable degree and … showed the innovative approach and remarkable ability to perceive new characters that are evident in all his work. He discovered several valuable features for identifying and classifying species of *Musca*, some of which were adopted, albeit reluctantly, by Patton … subsequent work has acknowledged merit in both.

21 *In litt.*, Adrian C. Pont to E.G. Hancock, 15 December 1995.

Malloch was not impervious to his own personality. In a letter back to Scotland to his old Glasgow friend Henderson, he recounted progress in the Anthomyiidae:[22]

> I am at work with the laudable intention of displacing and in some measure discrediting the work of two eminent Teutons who framed a classification in 1911 based on the male genitalia. I have done a lot already to show their work is not of value[23] … I find in most cases the reception I get here is cordial but in some few instances I have met with opposition and when all is said and done I do not blame the parties very much as it does seem that I am butting in on their preserves. However, they have to consider me and my work whether they like me and it or not.
>
> I am expecting one of our leading Dipterists here this morning … he is the official cataloguer for the country, self-appointed. He does not like me but he has to come here and bring his bugs for help especially in the Anthomyiidae. We get along very well because he is unaware of the fact I know what he thinks of me. He was looked up to as the only authority … till I came and has taken it rather hard. Lately he printed a paper against my advice … had to straighten out the tangle. One species I have named after him as a sort of consolation prize.[24]

Waldo Lee McAtee (1883-1962) was sympathetic to Malloch's attitudes. Shortly after Malloch had officially retired, McAtee wrote:[25]

> Personal relationships were his stumbling block as they are for many of us, but I think that of those who object to Malloch, there are a good pro-

22 Malloch–Henderson archive, 26 September 1918.

23 Malloch was referring to the Polish entomologists Johann Andreas Schnabl (1838-1912) and Henryk Dziedzicki (1847-1921), who were not German.

24 This was John Merton Aldrich (1866-1934) who visited Illinois to discuss these insects. Malloch must have formed a low opinion of Aldrich's taxonomic abilities from when he first worked in Washington DC. Aldrich's appointment as curator of Diptera was said by Malloch to have been bolstered by his promise to donate his collection and library to the Smithsonian but said the library was sold after his death and left a large gap in coverage. Alexander papers, Malloch's recollections, letter, 11 June 1951. Alexander papers, letter of 29 November 1935. An annual compendium, now *American Men and Women of Science*. Eugene Amandus Schwarz (1844-1928) after studying at Harvard made several expeditions to the American West collecting Coleoptera, worked in agricultural entomology and had a major role in organizing the Smithsonian collections of insects.

25 Alexander papers, letter of 29 November 1935.

> portion who do so unconsciously because they cannot endure association with anyone of greater ability then themselves. This is a human but rather foolish point of view … as it must be apparent to anyone of intelligence that almost every person in the world knows more about some certain thing than anyone else.
>
> We agree perfectly on Malloch's attainments and to my mind, it is an almost fatal objection to the value of the system of starring in American Men of Science that such men as Malloch and old Dr Schwarz never received [it].[26]

Later in correspondence also with Alexander, he wrote: "Due to jealousies and in part to his brusque manner he was disliked by some (usually his inferiors) but he was sound and productive."[27]

Achievements

Malloch operated as a systematist mainly in the Diptera and so his performance can be judged within that realm. The products of taxonomy and systematics such as descriptions of new species and the construction of phylogenies are hypotheses put forward to be tested by peer review during and subsequent to publication. These data establish the means for testing ideas and make taxonomy a recognizable scientific process. The survival of species names has been used as a measure of the proficiency of taxonomists. If proposed names are found to be invalid for whatever reason or the species had already been described by other(s) they fall into the margins of checklists and inventories. Conversely, the more of their names survive with time, the better practitioner that person is.

Mayr (1969) usefully defined stages that are evident in systematic studies of groups of organisms. Alpha-taxonomy emphasizes species descriptions and their arrangement in genera. Beta-taxonomy identifies relationships between groups and constructs robust hierarchical classifications. His gamma stage is concerned with intra-specific variation, and seeks to identify the evolutionary changes in behaviour, ecology and levels of diversity. Mayr also discussed and

26 An annual compendium, now *American Men and Women of Science*. Eugene Amandus Schwarz (1844-1928) after studying at Harvard made several expeditions to the American West collecting Coleoptera, worked in agricultural entomology and had a major role in organizing the Smithsonian collections of insects.

27 Alexander papers, letter of 12 December 1951.

justified the role of taxonomists and systematists as he considered there was uncertainty in the minds of some biologists as to their function. Some think he or she should be content with identifying specimens and devising keys, perhaps also keeping collections in good order and merely pigeonholing specimens (Mayr 1969). In practice, a synthesis of many kinds of knowledge and theory are applied to the process of classification, thus not only describing the world but contributing to its understanding.

A principal reason for Alexander querying how Malloch had performed regarding numbers of new species and genera was to position himself within the pantheon of Diptera taxonomists.[28] Ultimately Alexander's own figures were to exceed all others and in 1,054 publications he had described 11,755 species and 278 genus group names of insect, almost entirely of the cranefly family, Tipulidae *sensu lato* (Oosterbroek 2009).[29] This feat Malloch would not achieve numerically and neither did he appear to be interested in such a contest. In response to Alexander's specific request as to how many species Malloch had named, he was unable to say as he had never bothered to count them. Eventually, helped by McAtee, Alexander arrived at an estimate of 3,500 species. A recent and thorough analysis by F. Christian Thompson, included as a footnote in a transcription of this correspondence, established that Malloch named 3,710 species and 543 genus-group names over a wide range of families of Diptera and some other orders particularly the Hemiptera.[30]

In the context of the role of fieldwork in the creation of collections and to increase understanding of the natural world, it should be noted that Malloch did not collect beyond North America or Scotland. Yet he made significant contributions to the subject on a world scale, particularly the Australian region. Similarly, Alexander wrote many important papers on Nearctic cranefly biology and systematics based almost entirely on his own fieldwork but never ventured beyond its boundaries. Individual collectors and museums around the world sent their specimens for the two men to describe and so both relied on the collecting enterprises of others to operate on a world scale.

Concerning Malloch's abilities, his former colleagues and contemporaries such as Waldo Lee McAtee (1883-1962) praised his work, saying that he "has such a keen eye and ability to detect characters of significance in classification

28 Alexander archive, letter dated October 1951.

29 Alexander was a long-lived entomologist who spent his entire working life concentrating on these insects. He was at the top end of the longevity for those naturalists mentioned in this Malloch story. With an average figure of nearly seventy-nine years, it is tempting to conclude fieldwork engenders a long and healthy life.

30 Alexander papers, Doc. 2764a.

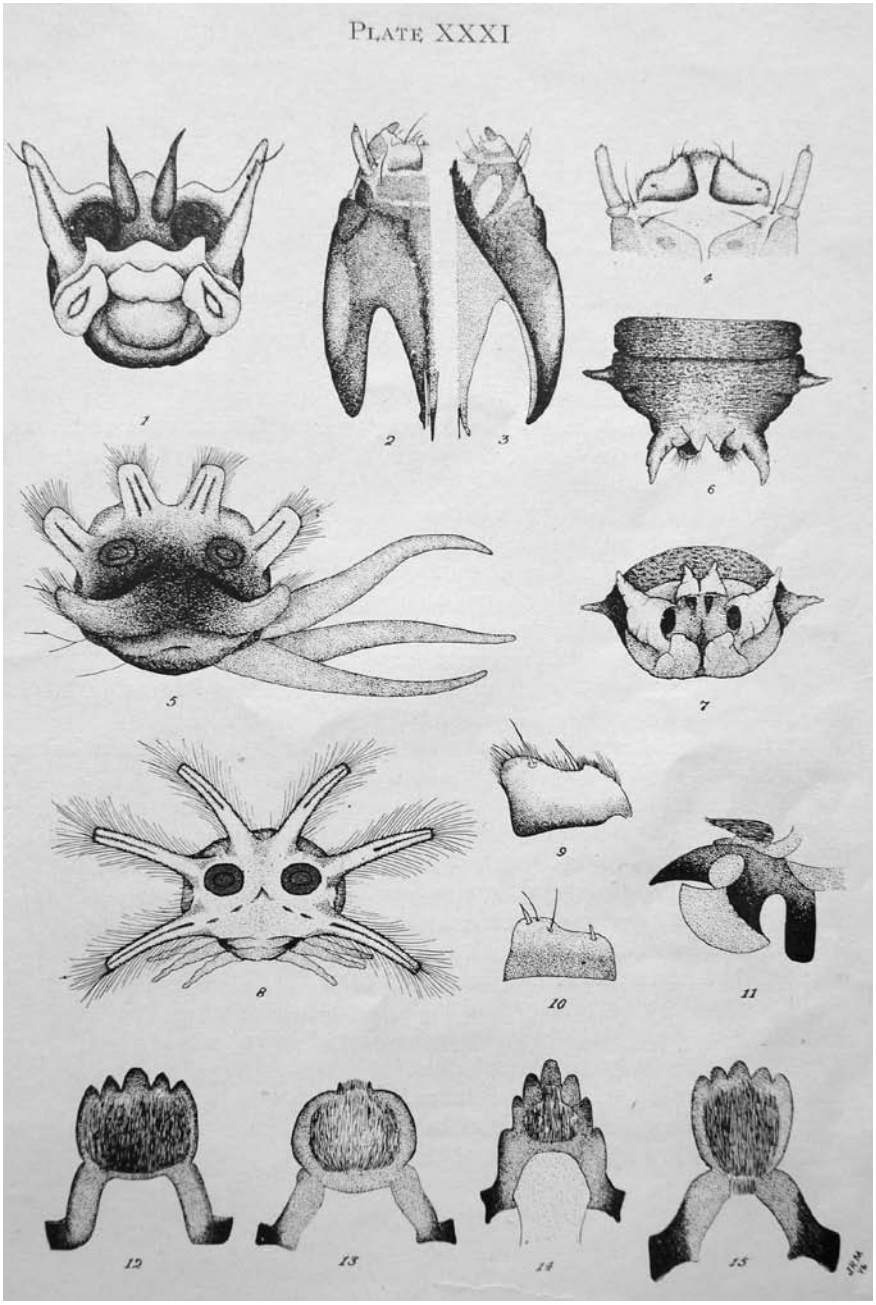


FIGURE 25.8 *One of thirty plates from Malloch's seminal work of 1917 on the phylogeny of Diptera using larval characters, all of which were drawn by himself. It depicts the spiracular fields and details of head structures in some cranefly species.* PHOTO E.G. HANCOCK.

that he would have become a leader regardless of the group of insects to which he chose to devote his attention."[31] This was echoed in the obituary by Sabrosky (1963): "His memory was phenomenal and it was often said he carried a card index in his head … throughout his work his keen eye for significant albeit obscure and overlooked characters resulted in many strikingly useful additions to taxonomic knowledge, and his intuitive insight into relationships furnished his papers with many helpful notes scattered through the discussions". Sabrosky also praised the publication on phylogenetic classification (Malloch 1917) based on larval characters and "illustrated by 30 plates of drawings by Malloch himself" (Fig. 25.8).

Possessed of all the attributes of a good naturalist, a keen field worker and a sharp scientific mind, Malloch's progress from amateur to professional seems almost inevitable when combined with his personality and ambition.

Acknowledgements

F. Christian Thompson, prior to his retirement from the Smithsonian, kindly made available copies of the various sources relevant to Malloch's career; staff and colleagues at Illinois, Oxford University Museum, National Museums of Scotland, and Glasgow City Museums with equal kindness and efficiency resourced and made available relevant papers. Adrian Pont made some most useful comments with reference to some of the practitioners with whom Malloch interacted.

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