Glasgow fungal collections

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ABSTRACT
Fungal specimens belonging to various Glaswegian Institutes and Universities are now brought together and are housed in the Glasgow Museums Resource Centre. A summary of the origins and numbers of the specimens is provided, along with notes on the main collectors. There are also brief references to the lichen and slime mould collections.

INTRODUCTION
Whilst researching the whereabouts of a lost copy of Elias Fries's *Scleromyceti Sueciae,* now safe at the Glasgow Museums Resource Centre (GMRC) (Watling, 2024), RW realised that many other non-lichenised fungal collections had now been brought together under one roof under the curation of KW.

The GMRC is a recent purpose-built store, managed by Glasgow Life on behalf of Glasgow City Council, housing over one million objects, nearly half of which are natural history specimens (https://collections.glasgowmuseums.com/mwebcgi/mweb?request=collection).

Glasgow Life Museums holds Glasgow's civic collection (Herb GLAM), which was previously housed in the Art Gallery and Museum at Kelvingrove (Jones, 1980). In 1991 the herbarium of the former Royal College of Science and Technology, now part of the University of Strathclyde (formerly Anderson's College, Glasgow) (Herb GGO) was gifted to the museum (Lloyd, 1964). A few years later, in 2005, the British herbarium of the University of Glasgow's former Department of Botany (Herb GL) was also transferred (Patton, 1954).

In total there are nearly 150,000 botanical specimens now housed at the GMRC, of which nearly 2,000 are non-lichenised fungi (see Table 1). Overall, botanical specimens date from the late 18th century to modern times, but most of the fungal specimens were collected in the 20th century.

The fungi now housed in the GMRC cover a wide timespan and help in our understanding of the distribution of Scottish fungi. They also contain clues to changes in the mycobiota. KW has been able to database the collections and both RW and KW felt strongly that the coverage and whereabouts of these collections should be made available to everyone for future research. The specimens are mostly of dried samples in paper packets or boxes, plus some (older) sections on herbarium paper or some (modern) freeze-dried specimens.

Apart from the fungarium at the Royal Botanic Gardens Kew, where there are many Scottish fungal specimens, there are three other significant collections all based in Scotland, *viz.* in the Royal Botanic Gardens Edinburgh, University of Aberdeen and Glasgow. The last is the subject of this paper.

Edinburgh has by far the largest mycological collection with over 150,000 specimens (https://www.rbge.org.uk/science-and-conservation/herbarium/our-collections/fungi). The Aberdeen collections are based on the specimens of Professor G. Dickie (Ainsworth *et al.*, 1996, p. 57) and of Professor Helenius Trail (Ainsworth *et al.*, 1996, p. 173). The latter's collections are unique in that they are arranged under the name of the substrate, as many are plant pathogens, and then under the name of the organism. They have been catalogued thanks to a grant from the British Ecological Society. Watling (1986) provides a review of historical Scottish mycological developments.

Collection	Fungi	Slime Moulds	Lichens
GL (University of Glasgow)	776	159	2,601
GL (Fries)	263	0	0
GGO (University of Strathclyde)	256	61	336
GLAM (Glasgow Museums)	702	0	2,445
Total	1,997	220	5,382

Table 1. Summary of fungal collections held at the Glasgow Museums Resource Centre. The total number of specimens is 7,599; GLAM, and therefore the overall total, exclude the *ca.* 700 specimens collected by Alan Silverside.

There are only a few very early references to local fungi. As early as 1777, the Reverend J. Lightfoot (Ainsworth *et al.*, 1996, p.110) had named a handful of larger fungi (Lightfoot, 1777) but, unfortunately, he retained no specimens. Fifteen years later, the Reverend David Ure named a handful of fungi but kept no specimens (Ure, 1793). Similarly, Thomas Hopkirk (Ainsworth *et al.*, 1996, p. 96), an influential Glasgow businessman, produced a long list of fungi for the Clyde area (Hopkirk, 1813) but kept no specimens even though his *Flora Glottiana* has become a clarion call to west coast mycologists as their starting point in distributional data for Scotland. Watling (2019) provides a review of some early recording in the Glasgow area.

The Kew fungarium was developed around the plant collections of Sir W.J. Hooker, the first director at Kew (Ainsworth *et al.*, 1996, p. 94) within which were many fungal specimens. Prior to this appointment, Hooker was Professor of Botany (1820-1841) at the University of Glasgow, where he employed J.F. Klotzsch (Ainsworth *et al.*, 1996, p.104) to collect fungi for him and arrange his herbarium of fungi. Although Klotzsch himself collected extensively around Glasgow and in neighbouring localities, only 56 specimens are today represented in the GMRC collection (Watling, 2014).

FUNGI

University of Strathclyde (Herb GGO)

Professor Blodwen Lloyd Binns, a microbiologist at the then Royal College of Science and Technology, was instrumental in saving the herbarium, which had been "discovered" in the 1950s. She spent many years cataloguing and researching this historic collection (Lloyd, 1964; Nelson, 2014). The GGO botanical collections comprises 13,400 objects of which 256 are fungal specimens.

Professor Roger Hennedy (Ainsworth *et al.*, 1996, p. 90), who authored the first flora of the Clyde area (Hennedy, 1865), started as a woodcutter before becoming Professor at the then Anderson College, Glasgow. Fungi were not included in his book and, although known as an algologist and vascular plant botanist, he accumulated some 77 fungal specimens now held in Glasgow, a significant number for this early period. They are dated between 1857 and 1865, except for one dated 1845 (Fig. 1).

Several of Hennedy's specimens are initialled by Charles Bagge Plowright, a very influential mycologist in the early 1900s (Ainsworth *et al.*, 1996, p. 139); he was a G.P. acting from King's Lynn and earlier had studied in Glasgow. It is presumed that Lloyd Binns had some of the material vetted by him. Plowright was the author of what was, until recently, the standard work on British rust-fungi (Plowright, 1889), although some ten years earlier he had distributed around 300 specimens in the form of an exsiccati collection named *Sphaeriacei Britannici.*

The largest number of specimens (116) was collected by the Reverend Robert Barr in the 1930s. Barr was the longest serving minister at the Neilston (Old) Parish Church. He collected from a broad range of local sites, including around the Neilston Manse (Fig. 2), but several result from his visits to the east of Scotland and attendance at the forays of the Cryptogamic Society of Scotland. There are 17 specimens collected from Fyvie Castle and Durris during an excursion to Aberdeenshire over three days in October 1931.

Fig 1. *Geaster fimbriatus* (sessile earthstar). Collected by Professor Roger Hennedy from the Isle of Cumbrae in 1861. C.B. Plowright (CBP initialled) checked it. The label information is quite detailed for such an old specimen (Herb GGO: B.2008.47.5.319). (Photo: © CSG CIC Glasgow Museums Collection)

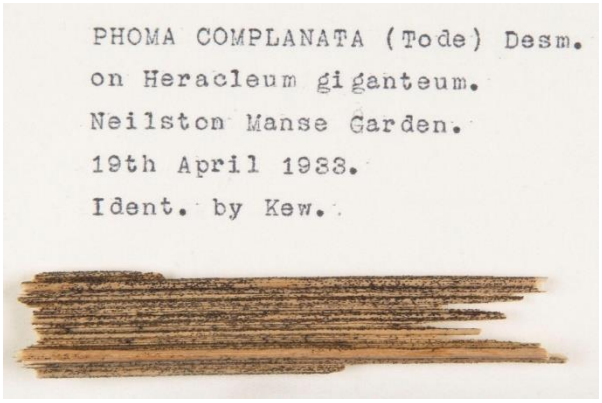

Fig. 2. *Phoma complanata* (= *Calophoma complanata*). Collected by the Reverend Robert Barr in 1933 from the manse garden at Neilston in 1933. The fungus is a pathogen of umbellifer species. It is described as growing on giant hogweed (*Heracleum mantegazzianum*), a novel plant at the time (Herb GGO: B.2008.47.5.326). (Photo: © CSG CIC Glasgow Museums Collection)

Also present during this excursion was R.B. Johnstone who added 23 specimens to the herbarium. There are 12 specimens, collected a little earlier (1911-1922) by Daniel Andrew Boyd (see below for more details on these collectors). Johnstone is also known to have collaborated with Professor G.F. Scott Elliot, who is represented by 10 specimens. Lloyd Binns named the GGO cryptogamic herbarium in Scott Elliot's honour. He was Professor at the then Glasgow and West Scotland Technical College (1895-1903), and president of the Dumfries and Galloway Natural History and Antiquarian Society (1902-1909). A few specimens from their collaboration are held in the Edinburgh fungarium and are noted in Watling (2025), which is a revision of Stevenson (1879).

There is a scattering of other old specimens, e.g. those provided by "Mr Combe" (1862) and "Dr Ayres" (1844), and some of note connected with wine production and dry rot by "Dr Colquhoun" (1862).

University of Glasgow (Herb GL)

The British herbarium of the University of Glasgow's former Department of Botany consists of nearly 70,000 specimens of which 776 are fungi stored in the 31 boxes (not including the 263 specimens of Fries's *Scleromyceti Sueciae*; see below). There appear to be no specimens associated with 19th century Professors of Botany such as Sir W.J. Hooker, J.H. Balfour or G.A. Walker Arnott. The specimens are mostly dated from the 1930s to the 1960s.

Stephen Hutchinson was a lecturer in mycology in the Department of Botany and, although he was not a systematist, he was the person who first brought to attention the existence of an uncut copy of Fries's *Scleromyceti Sueciae* (Watling, 2024). He contributed only a few specimens (41), his main contribution being through his students, *viz.* Geoff Hadley (41) who was later a mycologist at the University of Aberdeen and contributed specimens there; Dorothy Losel (née McTeague) (40), later at the University of Sheffield; and J. Taggart (5). In addition, he hosted Richard Korf, a founder of the journal *Mycotaxon*, from Syracuse University, Ithaca, U.S.A.. Korf added seven specimens, some in collaboration with "W. Fletcher" (presumably the former Professor of Botany at Strathclyde University).

One of the earliest collectors was Daniel Andrew Boyd (Ainsworth *et al.*, 1996, p. 24) who donated 127 specimens dating from 1892 to 1933 (Fig. 3). Although he was a Writer to the Signet in Scotland, he never practised, instead devoting himself until his death to natural history. Boyd collected extensively and enthusiastically around Saltcoats and Stevenston (Ayrshire), and East Kilbride (Lanarkshire). He first took an interest in basidiomycetes, of which there does not appear to be any voucher material, but then became fascinated with microfungi on which he later became an expert, certainly in their collection. Boyd was a past president of the Scottish Cryptogamic Society and, along with Donald Patton, co-authored the second

Fig. 3. *Cylindrosporeum niveum* (= *Ramularia calthae*): an example of a microfungus collected by Daniel Boyd in 1920 from Skelmorlie Glen, Ayrshire. It occurs as leaf spots on marsh marigolds (*Caltha palustris*) (Herb GL: B.2008.48.5.43). (Photo: © CSG CIC Glasgow Museums Collection)

edition of the British Association booklet (1928). He published many articles and added many species to the British list (Ainsworth & Waterhouse, 1989; Ramsbottom, 1963). A tiny fraction of his specimens is discussed by Watling (2021) who demonstrated the great importance of his work for our understanding of the distribution of Scottish fungi.

Due to Boyd's communications with John Ramsbottom (Ainsworth *et al.*, 1996, p. 144) and Annie Lorraine Smith (Ainsworth *et al.*, 1996, p. 161), who were both at the British Museum of Natural History, now the Natural History Museum, his specimens went there for confirmation of their identity or their description as new species, or to W.B. Grove (Ainsworth *et al.*, 1996, p. 81), the British authority on stem and leaf fungi, who was based at the Birmingham Technical School. The Natural History Museum collections went to Kew under what was termed the Morton agreement whereby the Natural History Museum no longer kept fungal specimens, which is ironic, as lichens are now recognised and classified as fungi.

By far the largest contributor to GL collection was Robert B. Johnstone, who collected 202 specimens chiefly between 1913 and 1934 (Fig. 4). His son, R.H. Johnstone (Ainsworth *et al.*, 1996, p. 102), was also a very active amateur mycologist (adding 54 specimens), who collected many larger fungal specimens both about Glasgow and when he attended field meetings in various localities in the U.K. He became unofficial curator of the fungal collections held by the University of Glasgow Department of Botany until his death, after which Pam Wilkins (wife of Regius Professor Malcolm Wilkins) had a watching brief until the former Departments of Zoology and Botany were remoulded to fit modern trends.

Fig. 4. *Auricularia auricula-judae* (jelly ear). One of over 200 specimens of fungi collected by R.B. Johnstone, mainly in the 1930s (Herb GL: B.2008.48.5.435). (Photo: © CSG CIC Glasgow Museums Collection)

Several of the collections Johnstone administered are from the British Mycological Society and European Mycological Congress forays in 1950 and 1960 respectively, with specimens collected by the late Professor John Manners (34 specimens), University of Southampton, the late Professor John Webster (9) then Sheffield University, later Exeter, and the late Derek Reid (3) of the Botanic Gardens, Kew, London. The dedicated amateur mycologist J.T. Palmer of Stockport, Cheshire added nine specimens but he also examined and redetermined the gasteromycetes in the collection whilst researching for his compilation of the British gasteromycetes (Palmer, 1968).

John Walton was Professor of Botany at the University of Glasgow (1930-1962) and, although a palaeobotanist, added 23 fungal specimens. He also realised the significance of Hutchinson's opinion on the importance of the *Scleromyceti Sueciae* mentioned above.

There is little doubt that the specimens donated or examined in Glasgow by Mrs N.L. Alcock were encountered in her capacity as a plant pathologist at the Department of Agriculture and Fisheries for Scotland and based in offices at the Royal Botanic Garden Edinburgh. Similarly, the collections assigned to Dr John Grainger and those of Barbara Colson are from their time as plant pathologists at, respectively, the West of Scotland Agricultural College, Auchincruive, Ayrshire and the plant pathology laboratory of the Royal Horticultural Society at Wisley, Surrey.

Glasgow Museums (Herb GLAM)

Glasgow Museums holds 702 specimens, mostly collected locally and from the late 1970s to post-2000. These are part of Glasgow's civic collection, several being formerly displayed in popular exhibits at the Kelvingrove Art Gallery and Museum.

There is a small number of 19th century specimens some of which are of considerable historical interest. There are 29 fungal specimens collected by the Reverend John Fleming, some dating from 1799. Fleming became Professor of Natural Philosophy at Aberdeen University in 1834, which was just after Klotzsch left Glasgow. He left the established church in 1843 and two years later he became Professor of Natural Sciences at the Free Church College in Edinburgh. He was elected president of the Botanical Society of Edinburgh three times. His herbarium was gifted to Glasgow Museums by a relative, Major Fleming, and comprises over 2,700 specimens (including geological and zoological objects, though the majority are botanical).

As noted above, one of the oldest collections of specimens now in the GMRC is a small quantity of Klotzsch material. It is thought to belong to the Fleming collection, but how Fleming came to own these specimens is unknown. The 56 specimens were collected mostly in 1831 and mainly from the Glasgow area but include several from Inveraray, Argyll. The collection adds to our understanding of the historical distribution of the mycobiota although none of the exsiccati are significant, apart from a milk-cap he identified as the much-confused *Agaricus smithii* (Fig. 5). As indicated by Klotzsch in his notes and repeated by Berkeley (1836), *A. smithii* was named after the Reverend Colin Smith, who collected the specimens at Inveraray, and not, as many have thought, the well-known English mycologist Worthington G. Smith (Smith, 1918). Colin Smith collected other material at Inveraray, now in the GMRC. Fleming's fungus appears to be close to, if not conspecific with, what is known today as *Lactaria mammosus* Fr., a milk-cap described as new two years later than Berkeley's description. Berkeley supported Klotzsch in thinking it distinct, suggesting it was intermediate between "*Agaricus Volémum*" [*sic*] (now *Lactifluus volemus* (Fr.) Kuntze) and *Agaricus subdulcis* (now *Lactaria subdulcis* Pers. Gray). Unfortunately, there is a slight discrepancy in habitat details, as Klotzsch indicated it was found in beech woods (*Fagus sylvatica*) "in mountainous places" and that it had also been found by Hooker in Helensburgh and Klotzsch himself in Glasgow. The material in hand has basidiospores agreeing in their ornamentation with *L. mammosus* and the cystidia are in good agreement. However, slight differences such as habitat, tuberculated pileus-margin etc. would not support the case for resurrecting "*smithii*" and placing it in its rightful genus, even though the specimen is probably the type of the taxon.

A small but interesting set of specimens in the Museums' collection, dating to 1846, is that of James Davies. These were collected from the Edinburgh area, especially the

Fig. 5. *Agaricus smithii* (*Lactarius* sp. – milk-cap). A taxonomically important early collection from Inveraray, Argyll in 1831. It is one of Johan Klotzsch's specimens, forming part of the John Fleming collection. Klotzsch's signature can be seen below the text (Herb GLAM: NHB.1980.27.27).
(Photo: © CSG CIC Glasgow Museums Collection)

Fig. 6. *Agaricus procerus* (*Chlorophyllum rachodes* – shaggy parasol). An example of one of several specimens, dated 1846, from the Botanic Garden in Edinburgh made by James Davies, about whom nothing is currently known (Herb GLAM: NHB.1882.31.8). (Photo: © CSG CIC Glasgow Museums Collection)

Botanic Gardens (12 specimens in total) (Fig. 6) and donated as part of the Glasgow Botanical Society's collection in 1882. We have no further information on Davies or his connection to Glasgow.

Most of the specimens in the collection result from the activities of museum staff along with members of the GNHS on a range of forays, many in the 1980s. Dr Agnes Walker was probably the most conspicuous and active collector until her retirement in the early 1990s; she added many specimens to the collections made during local forays or from further afield elsewhere in Scotland and abroad (although these last are not in the collection). Her forays were often in collaboration with members of the Kelvingrove staff, including Charlie Palmar, Gwyneth Jones and Geoff Hancock, and she was a participant in many GNHS excursions, some led by Dr Alan Silverside. Other contributors include N. Reid, J. Shore, J. Garry, G.L. Vares and S. Buchan.

One prolific forager and collector was the late Dick Hunter, well known to older members of GNHS from forays in the 1980s. He was a Greenkeeper at Milngavie Golf Course, near Glasgow, and had a passionate interest in larger fungi, many of which he illustrated in colour. He sent RW many specimens for determination or confirmation, always supported by good descriptions of his finds and sketch-book paintings. His collections are from around Milngavie and some were collected along with Elizabeth Farquharson, a member of the South East Scotland Fungus Group. Agnes Walker and KW also benefitted from attending courses at Kindrogan and many expertly determined specimens from that area are in the collection; KW's attendance resulted in an additional 60 specimens.

MYXOMYCETES (SLIME MOULDS)

Although now recognised as not being closely related to fungi, slime moulds have traditionally been studied and curated along with fungi within botanical collections. There are two important collections of Myxomycetes now in the GMRC. Both collections contain type material and were made by Arthur Lister and his daughter, Gulielma, well-known for their various editions of *A Monograph of the Mycetozoa* (Lister, 1894) (Ainsworth *et al.*, 1996, p. 111). The GGO collection contains 61 specimens and the GL collection 159; the latter set was gifted to Professor F.O. Bower of the Botany Department following a visit by the Listers to Glasgow in 1901. The specimens were collected mostly from southern England including Luton, Flitwick (Bedfordshire) and Lyme Regis (Dorset); in total 36 of the specimens are of species named by the Listers.

LICHENS

In addition to the above, the GMRC holds a large collection of lichens (lichenised fungi), consisting of dried samples in labelled paper packets. These are described briefly in this paper but are worthy of a separate, full-length article (see Table1).

The smallest collection is that of Herb GGO with 336 specimens. They are mostly linked to the chief collectors Hennedy, Scott Elliot and Scouler, and their correspondents, and they include some overseas material.

Herb GL comprises solely British material (2,601 specimens) many dating from the 19th century. A large collection is that of the Reverend David Lillie (many from northern Scotland), and there are also "*Lichenes Brittanici exsiccati*" specimens by the Reverend William Leighton.

The museum's civic collection comprises over 2,500 specimens, of which nearly 1,000 are from overseas. The largest and most important are those of James Stirton, some 300 of which are type specimens of names that he published. The British collection includes a collection by William Mudd (273 specimens) as well as more recent collections by Pauline Topham and museum staff.

DISCUSSION

The above-mentioned collectors contributed massively to our early knowledge of the fungi of the Clyde area. The historical specimens held at Glasgow are limited in scale but include valuable specimens from 19th century pioneers. Together with specimens held elsewhere, they represent valuable vouchers for ongoing mycological research into our historical Scottish fungal flora.

The first half of the 20th century saw more active forays and collecting by amateurs, linked to early natural history societies. The University of Glasgow collection developed during this period and reflected an academic interest in plant pathogens. Later in 20th century, much of the local activity relates to excursions of local naturalists, many linked to the GNHS. However, by the new millennium a small group of more serious amateurs and academics came together to form the Clyde and Argyll Fungus Group, inaugurated in 2007. Founding members included Alan Silverside, Graeme Walker, David Walkinshaw, Dick Peebles, Robin Jones and RW. The group is very active today, generating many records, many of species new to the area, and made possible by the dedicated work of Dick Peebles; if any specimens are retained to substantiate the record they are currently in private hands. Dick Peebles tries to attend all the fungus forays in the west and records assiduously all the species seen. These records are placed on the national database run by the British Mycological Society (FRDBI: Fungal Records Database of Britain and Ireland).

Yet to be fully processed is an extensive and important collection made by the late Alan Silverside of the University of the West of Scotland (formerly Paisley College of Technology) who sadly died in November 2023. He collected extensively in Scotland, with many specimens from sites along the River Clyde from Blantyre to Lanark, and other places including about Paisley, the Renfrewshire Hills, Ardentinny in Cowal and the Kindrogan Field Centre, Perthshire where he conducted a fungus course for students. Alan was the leading authority on fungi in the west of Scotland and produced a checklist of the Fungal Flora of the Clyde area (Silverside, 1991). Many unprocessed specimens and microscopic slides were found at his flat after his death, which Graeme Walker and KW were able to extract with permission from the family. These are in the process of being curated: there are well over 700 specimens, a significant contribution to the museum's collection and a valuable reference collection of some of the rarer fungi found in Scotland.

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