The Svalbard plant collection in the Arctic Herbarium at the University of Lancaster (LANC)

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ABSTRACT

A detailed examination (and cataloguing) has been made of material collected from the Svalbard archipelago which is currently held in the University of Lancaster herbarium, U.K. (**LANC**). This paper briefly outlines the background to its formation and to its collectors and contents. However, full details of the relevant specimens are available on the internet and can be accessed via the link:
http://biol.lancs.ac.uk/svalbard/data.pdf

INTRODUCTION

The Lancaster University herbarium as a whole contains a wide range of preserved European plant specimens as well as an important specialised section loosely known as the 'Arctic Herbarium'. The latter is divided into geographical regions circumscribing the arctic: i.e. Alaska Yukon, Canada, Greenland (the largest section), Iceland, Fennoscandia, Svalbard, and northern Russia (in two sections, west & east). However, it is the Svalbard section of the herbarium upon which this paper is based.

The Svalbard archipelago lies well to the north of the Arctic Circle and has several months of permanent daylight each year. It comprises four main islands: Barentsøya, Edgeøya, Nordaustlandet and Spitsbergen, of which the latter is the largest and most widely known. Smaller islands include Bjornøya, Hopen, Kong Karl's Land, Kvitøya, Prinz Karl's Forland and the Sjuøyane group. Together, they lie between latitudes approximately 76˚ 30′ N and 80˚ 30′ N, well to the north of northern Norway and within 1000 kilometres of the North Pole. To the west of the archipelago the North Atlantic Current, a remnant of the warm Gulf Stream, favourably influences the climate but the eastern side with its southward-flowing cold Artic Current is very adversely affected. A consequence is that the western coastal regions of Spitsbergen and especially the central parts, have a climate much warmer than would be expected at these high latitudes. Here, and especially in the inner fjord areas, quite a rich flora has developed, such that in addition to monocotyledons such as grasses and sedges, there is a surprising variety of colourful flowering plants. The latter number more than one hundred species and need to make the most of the period of relative warmth and permanent daylight of high summer to complete their flowering and reproductive cycle. Elsewhere, and especially on the much colder north and east sides of the archipelago, the flora can be extremely sparse, much of the region comprising polar desert or even permanent ice-cap. To the south of the archipelago, the two principal coastal currents meet near the isolated island of Bjornøya and here again the climate is harsh, often with periods of persistent fog. In fact the name Svalbard means 'cold shores'.

It is sometimes thought that the discovery of Svalbard dates back to the twelfth century but it was the Dutchman, Willem Barents, who is more often credited with this when he sailed along the Spitsbergen coast in 1596. Thereafter, other nations paid visits and exploited the archi-pelago's waters by whaling until stocks were drastically depleted and the practice ceased. Later, early in the twentieth century, coal mining became a minor industry in some locations whilst others, especially in the north, became bases for expeditions participating in high arctic exploration either by boat or balloon.

Nowadays, apart from the settlement of Longyearbyen on Isfjord (Spitsbergen) with its population of around 2000 and a few other very minor settlements and research stations, Svalbard is completely uninhabited; most of it is designated as a strictly controlled National Park. Recently, the Norwegian government has capitalised on Svalbard's geographical isolation by constructing a 'doomsday' seed bank near Longyearbyen. This is designed to store seed from as many of the world's crop varieties and wild relatives as possible and is precautionary in preventing their genetic diversity being adversely affected by man-made or natural disasters.

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EARLY BOTANICAL EXPLORATION ON SVALBARD

Prior to the early twentieth century there was little serious botanical exploration carried out on Svalbard. What took place was very much a side-line to other seemingly more serious matters such as arctic exploration and whaling.

Probably the earliest to make any contribution to the flora was the Englishman, Constantine John Phipps (1744–1792). In 1773 he sailed north (a young Horatio Nelson was with him as a crew member) in an attempt to reach the North Pole. In doing so he reached the Seven Islands (Sjuøyane), which are the most northerly ones in Svalbard, but was turned back there by dense pack ice. One of the islands of this group was later named Phippsøya in his memory. He is thought to be the first European to provide a description of the polar bear and the ivory gull, both of which he saw on the voyage. As for plants, he is credited with the discovery of *Phippsia algida* (the genus being named after him by Daniel Solander). He also found *Ranunculus sulphureus,* also subsequently described by Solander, as well as four saxifrages and seven other flowering plants. All these together with other items of natural history are detailed in the Appendix to his book '*A Voyage towards the North Pole undertaken by His Majesty's command 1773'* (Phipps 1774).

At a much later date, around the turn of the nineteenth century, the Scotsman William Speirs Bruce made several visits to the archipelago. Bruce was essentially a naturalist and paid his first visit when invited to join Prince Albert of Monaco's exploratory oceanographic expedition in 1898; he also paid a further visit a year later. During his time there Bruce collected plants, several preserved specimens of which are retained in the Svalbard herbarium (see below). He also discovered the presence of coal and other minerals which, in 1909, led him to form the Scottish Spitsbergen Syndicate with the aim of exploiting these natural resources.

Prior to Bruce's first visit, the Swedish palaeo-botanist, Alfred Nathorst had visited several parts of the archipelago. His main interest, however, was plant fossils and the glacial plant flora of the region. He made several discoveries within his subject, publishing them in a paper titled "Om vegetationen på Spetsbergens västkust" (Nathorst 1871).

As the early twentieth century proceeded, interest in Svalbard's flora accelerated with botanists such as Dahl, Elton, Hoeg, Lid, Lynge, Mathery-Dupraz, Resvoll-Holmsen, Rudmose Brown, Summerhayes and Tolmatchew making visits there. These can be considered to be the first modern-era botanists to the islands. In the LANC Svalbard herbarium there are in fact specimens collected by Bruce, Dahl, Lid, and Lynge, but all subsequent additions originate from the 1960s onwards.

THE SVALBARD HERBARIUM

The formation of the Arctic Herbarium began in 1961 and was initiated by Geoffrey Halliday whilst on the staff of Leicester University (1958–1968).This followed his first expedition to East Greenland to study its flora. On leaving Leicester, Halliday transferred to Lancaster University and became a member of the academic staff there and was permitted to bring the arctic collection with him.

The total number of sheets in this collection now numbers several thousand, approximately 665 of which are from Svalbard with about 75% of the 165 known native species being represented by at least one sheet. In consequence, this provides a very useful base reference for anyone interested in, or wishing to learn more of, the specialised flora and is also a useful facility to aid identification.

Much of the material originates from university expeditions and, whilst parts of the archipelago are reasonably well covered, others are not covered at all. This is largely due to two factors: easier access such as to the Isfjorden region, and to the particular interests of various expeditions which have concentrated on limited areas such as Bellsund, van Mijenfjorden and Wijdefjorden. The total number of contributors to the herbarium is only twenty-one and several of these have contributed just a very few sheets. However, Derek Spicer (218 sheets), Alasdair Neilson (107) and Sven Manum (70) have been particularly prolific and their combined collections represent almost 60% of the overall total. Other collectors are mentioned below and of these Martin Halliday (no relation to Geoffrey Halliday), Robert Harper and Derek Spicer were Leicester University undergraduates at that time, Alasdair Neilson was a Cambridge graduate then at Glasgow University and K. Vaughton was at Oxford.

Of special historical interest are nineteen sheets collected in 1898 and 1899 by William Speirs Bruce (see above). Most of these are from the remote, and at that time relatively unexplored, islands of Bjørnøya, Barentsøya and Hopen, the two latter situated towards the eastern side of the archipelago. Bruce also made a few collections from Spitsbergen itself, i.e. at Recherchefjorden and Raudfjorden. At the Raudfjorden locality he collected *Cerastium arcticum* and *Luzula confusa*, the actual locality being quaintly described on the sheet as 'opposite the Princess Alice'. This is a reference to his ship (owned by Prince Albert 1 of Monaco) which ran aground on a submerged rock in Raudfjorden, north-west Spitsbergen in 1899 and close to a headland now known as Bruce Point. When the ship was finally floated clear, the expedition terminated as it was necessary to sail south to the mainland for repairs. Bruce's name is also commemorated in a remote abandoned settlement known as Brucebyen in Billefjorden which lies close to the impressive glacier front of the Nordenskjøldbreen. It still survives today and comprises four huts built by Bruce in the early twentieth century. It is still sometimes used by expeditions.

Some of the sheets in the Svalbard herbarium are duplicated in others such as the Botanical Museum, University of Oslo (**O**). Johannes Lid collected in Bellsund, Isfjorden and Wijdefjorden in 1920 and 1924 (represented here by 12 sheets), B Lynge in Bellsund in 1926 (13) and Eilif Dahl in Isfjorden and Dicksonfjorden in 1936 (4). Other than these early collections and those of Bruce and the occasional sheet from other botanists, by far the greatest amount of material derives from the period 1962–1970. This was the result of the combined efforts of several botanists. Listed chronologically these are, F. Hørl & J. Schweitzer who collected at Adventfjorden and Sassendalen in 1961 (4 sheets); A. H. Neilson mainly at Wijdefjorden and elsewhere in the north and north-east in 1962 (107); S. Manum at Isfjorden (especially Boheman on the northern shore) and Bellsund in 1962 & 1964 (70); A. Jenkinson at Reinsdyrflya in 1963 (7); D. P. Spicer mainly in north Spitsbergen (Wijdefjorden, Austfjorden, Ny Alesund) in 1964 & 1965 (218; of which 35% are Poaceae); M. B. W. Halliday at van Mijenfjorden and Isfjorden in 1965 (64); R. S. Harper at van Mijenfjorden and Adventdalen in 1965 (45); S. M. Cobb & C. Martell at Liefdefjorden in 1966 (15); H. Schweitzer on Bjørnøya in 1967 (7); K. Vaughton at van Mijenfjorden in 1968 (33) and J. W. Squier in Sassendalen (Isfjorden) in 1970 (32). With collecting nowadays limited, the present author has added a modest number of sheets (22) mainly of the commoner plants but including 6 sheets of *Draba*; all these were collected in the Isfjorden area in July 2007 & 2008. Other than these, no new material has been added within the last 35 years or so. A series worth commenting upon is Neilson's nine sheets of *Draba* collected on the remote, bleak island of Nordaustlandet along with one sheet of the scarce *Ranunculus pedatifidus* from Edgeøya. Neilson devoted much of his time to studying and collecting the plants of these two islands, later publishing an account of their flora (Neilson 1968, 1970). Spicer, who had a special interest in *Draba*, subsequently produced a dissertation on the Svalbard species (Spicer 1969). As stated above, scientific expeditions to the archipelago during the 1960s have been a major contributor, especially those from the University of Leicester in 1965 (collector M. B. W. Halliday) and from Oxford University in 1968 (K. Vaughton). J. Lid's small collection originated from the two earlier Norwegian Spitsbergen Expeditions of 1920 and 1924.

Of the total number of sheets in the herbarium, 3% are of pteridophytes (*Lycopodium, Equisetum* and *Cystopteris*) and 40% of monocotyledons (65% of these being Poaceae). Lower plants such as lichens are not represented.

A summary of all the details of each individual collection is available in an electronic document located at:

http://biol.lancs.ac.uk/svalbard/data.pdf

The information in that document is taken directly from the sheets and includes locality, date, collector and collection number, geographical coordinates (where known) and ecological notes. For non-critical species where the correct identification can be relied upon, these notes provide useful information on the distribution, phenology and ecology of the Svalbard flora without the necessity of having to physically examine each specimen. Where critical species have been determined or confirmed, this is also indicated. When consulting the document it should be borne in mind that a semi-colon [;] is used to separate each individual collection. The nomenclature used is that of the original collector(s) and/or herbarium compiler and, in only a few cases, has this been modified or updated. Locality

names are as given on the sheets and the systematic arrangement follows that currently in use in the herbarium.

Abbreviations used in the electronic document are as follows: N = north; S = south; E = east; W = west; c. = circa, det. = determined/ confirmed by: AOC. = A. O. Chater; ED = E. Dahl; AG = A. Game; MF = M. J. Y. Foley; GH = G. Halliday; EH = E. Hultén; KJ = K. Jacobsen; JL = J. Lid; BL = B. Lynge; AM = A. Melderis; JAN = J. A. Nannfeldt; TP = T. Prestø; AJR = A. J. Richards; IR = I. Rønning; PDS = P. D. Sell.

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