

C.T. White Address 2020:

A BRIEF HISTORY OF BRYOLOGICAL EXPLORATION IN QUEENSLAND

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“The Queensland moss flora, a very small one, should not offer many difficulties in the compilation of a mere list” – C.J.Wild, 1888.

Introduction

“Bryophyte” is a collective term for three distinct lineages of land plants, these being the mosses (Bryophyta), liverworts (Marchantiophyta) and hornworts (Anthocerotophyta). They are the second most diverse group of land plants after the angiosperms (flowering plants), often forming a conspicuous and critical component of the biodiversity particularly in mesic areas. Globally, bryophytes include approximately 18,000 species in more than 1000 genera consisting of 12,800 species of moss, 5,000 species of liverwort and 150 species of hornwort (Gradstein *et al.* 2001). As of 2019, there are over 1,000 species of bryophyte recorded from Queensland, more than double the recorded species diversity of the Gymnosperms and Pteridophytes (Table 1).

Table 1. The number of native species in the Queensland flora (source: Brown & Bostock 2019)

| Kingdom | Native species |
|--|-----------------------|
| Angiosperms (flowering plants) | 8,201 |
| Gymnosperms (conifers, cycads and allies) | 66 |
| Pteridophytes (ferns and fern allies) | 392 |
| Bryophytes (mosses, liverworts and hornworts) | 1,026 |

Queensland has the greatest bryophyte diversity compared with other Australian states and territories (Fig. 1) reflecting the climatic range and diversity of habitats across the state. At the time of writing, the Australian Virtual Herbarium (AVH) indicates that some 42,000 bryophyte specimens have been collected from Queensland and are accessioned in Australian and New Zealand herbaria.

However, many Queensland bryophyte specimens are accessioned in foreign herbaria, particularly those collected prior to the emergence of local experts. Early botanists and naturalists who took an interest in Queensland bryophytes tended to send their specimens to established bryologists in Europe and the United Kingdom (Ramsay, 2006). Hence many type specimens of Queensland bryophytes are held in overseas herbaria.

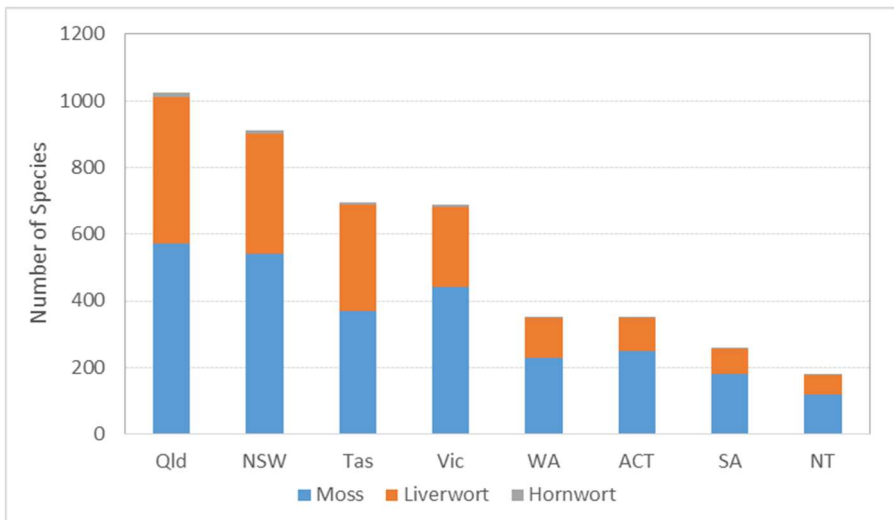


Figure 1. Approximate number of moss, liverwort and hornwort species for each Australian state and territory. (Source: Brown & Bostock (2019) and AVH).

Analysing AVH (2020) data, we can see the pattern of collecting effort of bryophytes in Queensland over time indicating that the 1970s to 1990s was a particularly active time for bryological exploration in Queensland (Fig. 2).

Bryological Exploration in Queensland

Our current knowledge of the Queensland bryophyte flora is based the contributions of many botanists and natural historians over many decades. The following is by no

means a complete list of botanists and natural historians who have significantly contributed to bryophyte collections held in many herbaria but merely a glimpse of the lives of a few that have enriched our understanding of this significant component of the biodiversity of Queensland.

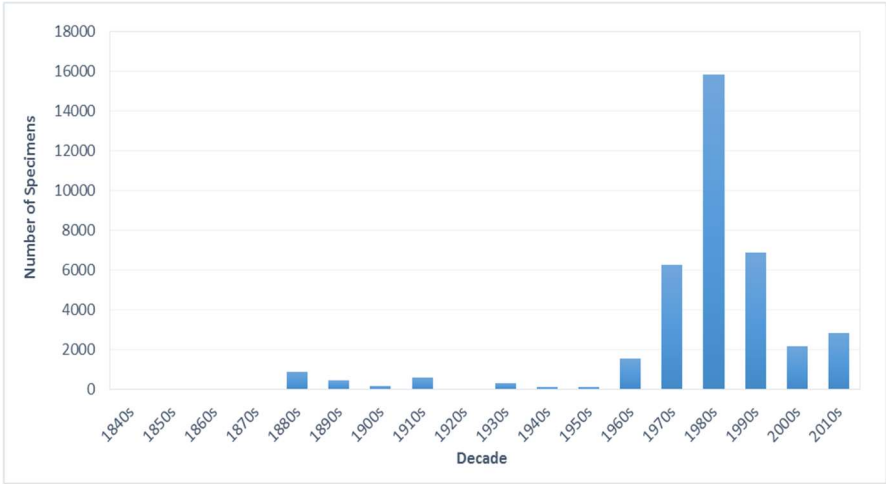


Figure 2. The number of bryophyte specimens collected from Queensland per decade (AVH, 2020).

Banks and Solander

Sir Joseph Banks and Dr Daniel Solander (**Error! Reference source not found.**) were part of James Cook’s *Endeavour* voyage, which explored the east coast of Australia during 1770. Banks and Solander made many important botanical collections over several weeks around the present-day Cooktown while the *Endeavour* was beached and repaired after sustaining damage on the Great Barrier Reef. While Banks and Solander collected thousands of botanical specimens during the *Endeavour* voyage, there seems to be a noticeable lack of bryophytes. It is possible that some specimens of trees or shrubs collected by Banks and Solander from north Queensland may have had epiphytic or epiphyllous bryophytes growing on them, but this has not been investigated.

Robert Brown

The renowned Scottish botanist, Robert Brown (Fig. 4), developed an interest in botany while studying medicine at the University of Edinburgh. After dropping out



Figure 3. Detail of William Parry painting of Joseph Banks (standing) and Daniel Solander (seated).

of his medical studies, Brown enlisted in the Fifeshire Regiment of Fencibles and was posted to Northern Ireland shortly thereafter (Burbidge, 1966). Brown's regiment saw very little action and as a consequence, Brown had time to devote to

botany. It was during this time that Brown developed an interest in bryophytes, particularly mosses.

Brown accompanied Matthew Flinders as naturalist on the *Investigator* during its four-year circumnavigation of New Holland between 1801 and 1805. He prepared for this voyage by studying plant specimens collected by Banks and Solander during Cook's voyage (Burbidge, 1966). Over the course of the *Investigator's* voyage, Brown collected about 3400 plant specimens of which approximately 2000 were new to Western science (Burbidge, 1966). Brown also collected bryophytes during this voyage including specimens of the genera *Dawsonia* and *Leptostomum*, both of which were new to Western science and later described by him (Brown, 1811). While the specimens of *Dawsonia* and *Leptostomum* referred to in the protologue (Fig. 4) were not collected from Queensland (Brown, 1811), there is the possibility, given Brown's early interest in mosses, that he collected bryophytes from coastal areas in Queensland during the *Investigator* voyage. Brown was also an accomplished microscopist, describing and naming the cell nucleus, observing cytoplasmic streaming and what is now known as Brownian motion (Burbidge, 1966).



Figure 4. Portrait of Robert Brown by Henry William Pickersgill (left) and illustration of *Dawsonia* and *Leptostomum* specimens (Brown, 1811).

Ludwig Leichhardt

The German explorer and naturalist Ludwig Leichhardt arrived in the colony of New South Wales on 14th of February 1842 (Erdos, 1967). Leichhardt was initially hopefully of a government appointment in his fields of interest and when this did not eventuate, he set out on his own on a specimen collecting journey from Newcastle to Moreton Bay in Queensland (Erdos, 1967). On the 4th of July 1843, Leichhardt collected a specimen of the moss *Euptychium cuspidatum* from what was then known as Three Mile Scrub. This specimen, accessioned at the National Herbarium of Victoria (MEL), is the earliest known bryophyte specimen collected from Queensland (Fig. 5). Leichhardt collected a number of bryophyte species new to Western science during his expeditions, some of which formed type collections. This includes specimens of *Camptochaete leichhardtii* and *Dicranoloma leichhardtii*, which are named in his honour.

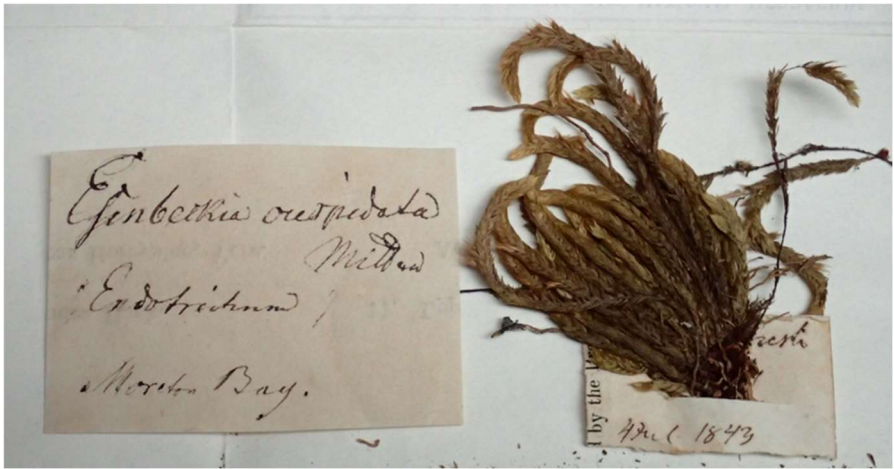


Figure 5. Specimen of *Euptychium cuspidatum* (MEL1001415A) collected by Ludwig Leichhardt on the 4th of July 1843 from Three Mile Scrub.

Amalie Dietrich

Koncordie Amalie Dietrich (Fig. 6) was born into a middle-class family at Siebenlehn, Germany on 26 May 1821. She learnt field collection techniques initially from her mother and these were later developed when she met Wilhelm Dietrich whom she married in 1846. Although trained as a chemist, Wilhelm

preferred collecting natural history specimens for sale to apothecaries, an endeavour which Amalie also took part (Gilbert, 1972). Between 1845 and 1861, Amalie and



Figure 6. Undated photograph of Amalie Dietrich (Source: State Library of Queensland).

Wilhelm made a frugal existence collecting Alpine specimens to sell to as medicines to chemists and as natural history collections to museums (Sumner, 1993). Over time it appears that most of the field collecting was left to Amalie while Wilhelm began spending more of his time mounting and processing specimens (Sumner, 1993). Their daughter Charitas was born in March 1848 and Wilhelm appears to have refused to look after their daughter during Amalie’s extended collecting trips (Sumner, 1993). In 1861, Amalie discovered Wilhelm was having an extra-marital and left with Charitas to settle in Hamburg where she sold her prepared collections to support herself and her daughter (Gilbert, 1972). During her time in Hamburg, Amalie was introduced to the wealthy shipping merchant Johann Caesar Godeffroy, who had recently established his own private museum. Museum Godeffroy’s collections grew through the employ of expert collectors sent around the globe and material acquired by the captains of his various ships (Sumner, 1993). Godeffroy was eventually persuaded by well-known scientists to employ Amalie as a natural

history collector and sent her to collect natural history specimens from the fledgling Colony of Queensland (Gilbert, 1972).

Leaving her daughter in the care of family friends, Amalie departed Germany for Queensland, arriving in the Moreton Bay settlement in August 1863 (Gilbert, 1972). At this time, Amalie was a middle-aged, single mother who spoke no English. Completely unconcerned about appearance and discomfort, she immediately set to work, diligently collecting specimens of anything she encountered including algae, fungi, plants, wood, bryophytes, amphibians, reptiles, birds, corals, sea slugs, insects, spiders, marsupials, and artefacts and remains of Indigenous peoples (Gilbert, 1972). Australian natural history specimens were rare in Europe during the time Amalie was collecting in Queensland and her shipments of specimens were eagerly awaited back in Germany and elsewhere. She spent the better part of a decade collecting specimens from Brisbane (1863-1865), Gladstone (1865), Rockhampton (1866), Mackay (1866, 1869), Lake Elphinstone (1868) and Bowen (1870-1872). While Amalie was actively collecting in southern and central parts of the state, John Dallachy was making what is likely the first collections of bryophytes from north of Cardwell in the Wet Tropics region, sending several specimens to Ferdinand von Mueller at the Victorian herbarium.



Figure 7. Distribution map of Amalie Dietrich’s bryophyte collection localities from the Brisbane region (AVH, 2020) (left) and a specimen of the moss *Braithwaitea sulcata* (MEL 34484A) collected by Dietrich (right).

Amalie was recalled to Germany in November 1872 where she worked for Godeffroy and lived above his museum until his company went bankrupt. Charitas married a pastor by the name of Bischoff and 15 years after her mother's death in 1891, wrote a successful biography about Amalie called *Amalie Dietrich: Ein Leben* (Sumner, 1993). Amalie did not keep a journal and many of the letters she sent to her daughter Charitas during her time in Australia were burnt when she and Charitas had a falling out. Charitas struggling financially at the time of writing and needed the biography to sell well. Hence it is now believed that *Amalie Dietrich: Ein Leben* is part fact, part fiction, and part plagiarised (Sumner, 1993). However, the success of the book, having many reprints in Germany has resulted in Dietrich being more widely known in her home country than in Australia.

Amalie Dietrich's contribution to Queensland bryology cannot be underestimated. She collected numerous bryophyte specimens during her time in Queensland, mainly from the Brisbane region (Fig. 7). Many of these were new to Western science with Amalie's specimens often forming the type specimens. In a number of cases the species author honoured Amalie in the species epithet. Bryophyte species whose type were collected by her include: *Aongstroemia dietrichiae* (= *Dicranella dietrichiae*), *Fissidens dietrichiae*, *Macromitrium sordidevirens* (= *Macromitrium aurescens*), *Barbula subcalycina*, *Frullania dietrichiana* (= *Frullania seriata*), *Endotrichella dietrichiae* (= *Garovaglia elegans* subsp. *dietrichiae*), and *Holomitrium dietrichiae*.

C.J.Wild

The 1880s and 1890s appears to be a particularly burgeoning time for bryological exploration in Queensland. A number of prominent botanists and natural historians were particularly active at this time, with the likes of F.M.Bailey, C.J.Wild, J.F.Shirley, H.Tryon and F.Whitteron all making significant contributions to the accumulating bryophyte knowledge of the young colony. Charles James Wild (Fig. 8) was born into a middle-class family on the 19th of March 1853 at Macclesfield, south of Manchester, England (Franks, 2019). Originally trained as a joiner, Charles appears to have been exposed to natural history in his leisurely pursuits outside of his working hours. Between 1877 and 1883, Charles had collected over 250 plant specimens, mainly bryophytes, from various locations in Wales, Scotland, and the north-west of England (Franks, 2019). In addition to his interest in botany, Charles was also drawn to entomology and conchology as well as other fields such as archaeology. He was an active member of several learned societies including the Botanical Locality Record Club, the Manchester Microscopical Society, Berwickshire Naturalists Club, Lancashire Botanists Association, and Forfarshire Naturalists Society (Franks, 2019).

In 1883, the then 30-year-old Wild emigrated to the Colony of Queensland as an assisted immigrant arriving in Brisbane on the 12th of October. It is unclear what Wild's vocation was during his early days in Brisbane but as an assisted migrant he most likely worked in his trade. If Wild's specimen collection dates are correct, it appears that he made his way to Toowoomba shortly after arriving, collecting some



Figure 8. Undated photograph of C.J.Wild. Original photograph has been lost. Reproduced by kind permission of the Queensland Museum. Source: Mather (1986).

20 bryophyte specimens in this locality during November 1883 (Franks, 2019). Regardless of his vocation, he was active in collecting bryophytes, insects, and shells, donating a number of the latter to the Queensland Museum (Franks, 2019). On the 13th of November 1886, the Field Naturalists Club, a section of the Royal Society of Queensland, undertook an excursion to a swamp lying between the Brisbane River and Hamilton and Nundah. It seems likely that Wild was part of this excursion as he collected bryophyte specimens from these localities at the same time. Wild was associated with Dr. Joseph Bancroft with his obituary stating that he spent some time with “Dr Bancroft in the southern districts” (Franks, 2019). During this time, Wild collected bryophytes from scrub areas of Pimpama, Beenleigh, Enoggera, and Woolston as well as from Burpengary and Deception Bay. It was during a Field

Naturalists' excursion to Woolston Scrub during July 1888 that Wild collected type material for a new genus of moss, which was named *Wildia* in his honour (Franks, 2019). Wild became a subscribing member to the Royal Society of Queensland in 1888, later delivering two presentations on bryophytes and publishing three articles in the 1888 *Proceedings of the Royal Society of Queensland*. It was in the first of these that Wild (1888) offers the extraordinary claim appearing at the beginning of this article.

Wild was appointed to the Queensland Museum as a temporary insect collector in January 1889, collecting primarily in the south-east (Mather, 1986). It is evident that Wild was not only collecting insects, as was his vocation, but also collecting bryophytes and shells, with many bryophyte collections corresponding to locations where Wild was deployed, such as Nerang, Mudgeeraba, Burleigh Heads and the Glasshouse Mountains (Franks, 2019). In mid-1890, the Queensland Museum decided to dispatch Wild to north Queensland, to collect insects along the railway being constructed between Cairns and Herberton (Mather, 1986). He remained in the area for 16 months and collected some 290 plant specimens with over half being bryophytes (Franks, 2019).

While the Queensland Museum's insect collection "today bears little evidence of specimens" from Wild's time in north Queensland (Mather, 1986), his collection of bryophytes represent the first major collection of these plants from the Wet Tropics region adding to the 70 specimens that F.M.Bailey collected from the Bellenden Ker range expedition the previous year (Franks, 2019). After having the "ill fortune to lose his collecting gear from the back of a runaway packhorse", Wild was instructed "to travel less continuously but as a rule remain in each locality for not less than 3 months" eventually being recalled to Brisbane in 1891 (Mather, 1986). After his sojourn to north Queensland, it appears that Wild largely stopped collecting bryophytes with only two additional specimens collected after 1891 (Franks, 2019).

Wild held various positions over the course of his 22 year association with the Queensland Museum, including insect collector (1889-1893), messenger (1893-1901), entomologist (1901-1905), acting director (1905-1910), and finally as insect collector once again (1910-1911). He collected over 800 bryophyte specimens from Queensland, establishing a solid basis for future bryological studies (Fig. 9). Wild's collections of bryophytes from south-east Queensland are of particular importance since many specimens were collected from areas of vine forest from the greater Brisbane area which no longer exist. For example, Wild made significant collections from scrub areas in Ashgrove, Enoggera, Newmarket, Woolston and Pimpama. His only foray into taxonomy was naming an epiphytic hornwort (*Dendroceros subtropicus*) he collected from Mount Tamborine (Wild, 1893). Several bryophyte taxa have been named for Wild and in all cases his collections were used as the type. All are now reduced to synonymy: *Aulacopilum wildii* (= *Solmsiella solmsiellacea*),

Barbula wildii (= *Didymodon topiaceus*), *Fissidens wildii* (= *Fissidens curvatus*), *Frullania wildii* (= *Frullania pentapleura*), *Lejeunea wildii* (= *Acrolejeunea securifolia*), *Plagiobryum wildii* (= *Plagiobryum cellulare*), *Wildia solmsiellaea* (= *Solmsiella solmsiellaea*).

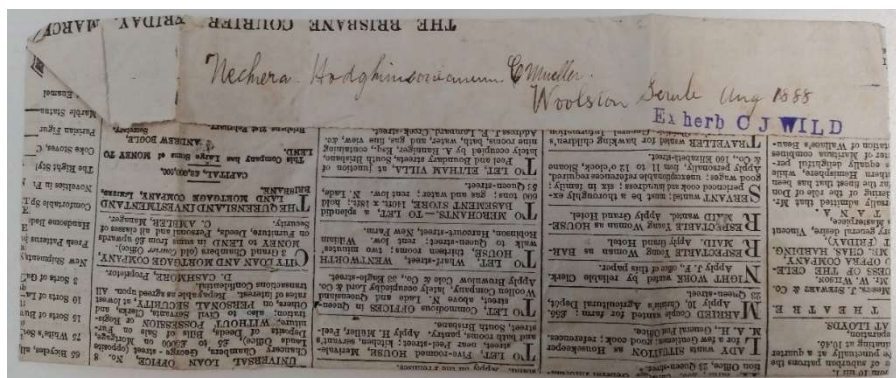


Figure 9. Collection of *Calyptothecium recurvulum* (BRI AQ642216) made by C.J.Wild from Woolston Scrub, August 1888. Many of Wild's collections at the Queensland Herbarium remain in the original packet used for collection, in this case a page from The Brisbane Courier, 2nd March 1888.

Rev. W.W.Watts

William Walter Watts (Fig. 10) was born on the 5th of October 1856 near Ivybridge, Devonshire, England (Ramsay, 1980). He became a student at New College London where he studied for the Congregation Ministry. Watts was a gifted student and he gained several scholarly prizes (Ramsay, 1980). After ordination in 1882, he served the ministry at Stratford-on-Avon. However, a breakdown in his health resulted in



Figure 10. Rev. William Walter Watts resplendent in field attire with plant press and vascuum (Source: Churchill, 2015).

Watts being sent to Australia where he became pastor of the new Congregational Church at Milton in Brisbane in 1887 (Ramsay, 1980). A specimen of the liverwort *Frullania simmondsii* was collected from “near Brisbane” by Watts during August 1887. Disastrous floods in 1893 and financial depression which followed forced Watts to leave Queensland for a brief stay in New Zealand where his interest in bryophytes is thought to have truly begun (Ramsay, 1980).

Watts returned to Australia in 1895 and applied for and was ordained into the Presbyterian Ministry, which Watts felt was more appropriate in the colonies than the Congregational Church (Ramsay, 1980). He was appointed as minister to the Ballina Charge in north-east New South Wales in 1896 and held the position until 1903 (Downs & Ramsay, 2019). It was during this time that his bryological career began in earnest, surveying, collecting and cataloguing the bryophytes of the Big Scrub, amassing over 4000 specimens from this region.

Watts became the Honorary Curator of Cryptogams at the National Herbarium of New South Wales in 1909 and in 1913 undertook a seven-week trip to the Wet Tropics, collecting over 550 bryophyte specimens. He corresponded regularly and often with renowned Finnish bryologist Viktor Brotherus sending him somewhere between 3000 and 4000 bryophyte specimens. Watts wrote to Brotherus on the 26th of August 1913 describing his trip to the Wet Tropics, stating that he “was not equipped for climbing Bellenden Ker, but I collected at its base and around Bartle Frere which is even higher than Bellenden Ker” (Ramsay, 1980). Enclosed in this letter was a photograph of Watts in “bush attire”. Watts’ legacy to Australian bryology is significant. He has over 13,000 bryophyte specimens accessioned in Australian herbaria with over 230 bryophyte species named for him or based on his collections (Downs & Ramsay, 2019). Following the death of Watts in 1920, bryological research in Australia largely stalled until the end of the Second World War (Ramsay, 2006).

Hugo Flecker

Hugo Flecker (Fig. 11) was born on the 7th of December 1884 in Prahran in Melbourne, Victoria. The Flecker family relocated to Adelaide where Hugo undertook schooling eventually enrolling in medicine at the University of Adelaide (Pearn, 1996). Hugo eventually transferred to the University of Sydney, completing his medical studies in 1908 (Pearn, 1996). After undertaking postgraduate studies at the Royal College of Surgeons, Edinburgh and a brief stint working in Canada, Flecker returned to Australia shortly before the outbreak of World War I (Clarkson, 1990). With the outbreak of war, Flecker enlisted in the 1st Australian Imperial Force, serving with the rank of Captain, and later Major, with the Royal Army Medical Corps at various field hospitals and casualty clearing stations in Egypt and western Europe (Clarkson, 1990). His World War I service came to an end in 1917 and he was demobilised back to Australia. At the beginning of the 1920s, he set up as a radiotherapist in Melbourne before relocating his practice to Cairns in 1932 where he was one of the few specialists north of Brisbane (Pearn, 1996).

Flecker had a broad interest in natural history from a young age. While completing his medical studies at the University of Sydney, Flecker became a member of the Sydney University Students’ Science Club and the Naturalists’ Club of New South Wales (Clarkson, 1990). Flecker was also active in the Field Naturalists’ Club of Victoria after he returned from war service (Clarkson, 1990). After resettling in Cairns and finding no organisation to coordinate the activities of amateur naturalists in the area, Flecker approached the Mayor of Cairns to chair a public meeting to consider forming such a club (Clarkson, 1990). The outcome of this public meeting was the formation of the North Queensland Naturalists’ Club, with Flecker elected the foundation president (Clarkson, 1990).

Just over a year after establishing the North Queensland Naturalists' Club, Flecker was encouraged by C.T.White, the Queensland Government Botanist, to establish a regional herbarium (Clarkson, 1990). In a letter to Flecker, dated 2nd October 1933, C.T.White wrote:

“Personally I think if the North Queensland Naturalists' Club wants to do good work with the flora the best way, perhaps, would be to form a local herbarium, and to collect plants assiduously on your various rambles, sending specimens to me for identification and report. In this way, working in the rich flora of North Queensland, you cannot fail to make extensive additions to the knowledge of our flora, because the flora of North Queensland is far from being completely known”.



Figure 11. An early photograph of Hugo Flecker taken December 1907 (Source: NSW State Archives).
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Thus, the North Queensland Naturalists' Club Herbarium was established in the grounds of the Cairns City Council's nursery. Flecker and members of the North Queensland Naturalists' Club did collect plants, including bryophytes, assiduously during their "various rambles". The herbarium collection grew from around 1600 specimens in 1937 to upwards of 10,680 specimens when the herbarium was donated to the CSIRO Division of Forest Research at Atherton (QRS) in 1971 (Clarkson, 1990). From 1933 until 1948 Flecker instituted and co-ordinated a census of plants indigenous to the area as a cumulative supplement to the North Queensland Naturalist (Pearn, 1996).



Figure 12. Distribution map of Hugo Flecker's bryophyte collection localities from Queensland (AVH, 2020) (left) and a specimen of *Beschereillia elegantissima* (BRI AQ0718274) collected by him in 1936 (right).

At the time the herbarium was donated to QRS, the collection included some 468 bryophyte specimens collected by Flecker and other member of the North Queensland Naturalists' Club (Fig. 12). A number of new moss species were described based on specimens collected by Flecker. Since there was no cryptogamic collection at QRS, the bryophyte collection was passed onto the Australian National Herbarium (CANB), which was rapidly establishing the largest cryptogamic collection in the Southern Hemisphere.

Ilma Stone

From the 1970s to the turn of the millennium, there was a surge in interest in Queensland bryophytes with a massive increase in collecting effort (Fig. 2). This was largely thanks to the efforts of two bryologists: Ilma Stone and Heinar Streimann. Ilma Grace Stone (Fig. 13) was born in Brunswick, Melbourne on the 11th of June 1913 and studied botany at the University of Melbourne where she was one of only 18 women on campus (Seppelt *et al.*, 2002). By the age of 20, Ilma had completed her Master of Science degree successfully undertaking a study of sclerotia-forming fungi causing disease in ornamental plants (Seppelt *et al.*, 2002). Ilma then chose to suspend her botanical career, instead marrying and raising a family.



Figure 13. Photograph of Dr. Ilma Stone taken in 1991 (Source: Australian Geographic).

While undertaking domestic duties during 1957, Ilma heard on the radio that the University of Melbourne was seeking laboratory demonstrators for the School of Chemistry (Seppelt *et al.*, 2002). With the encouragement from her husband, Ilma contacted the School of Botany to ask if they were also seeking demonstrators, which fortuitously, they were. So, 23 years after finishing her Masters, Ilma returned to the University of Melbourne to resume her academic career as a part-time demonstrator and researcher (Seppelt *et al.*, 2002).

Ilma completed her PhD by 1963 by undertaking a morphogenic study of stages of life-cycle of some Victorian cryptogams, particular fern gametophytes (Seppelt *et al.*, 2002). While Ilma was initially interested in ferns, from 1969 onwards she focused mainly on mosses, stating that they were ‘a greatly neglected field in Australia and much in need of critical revision’. It was around this time that another eminent bryologist, George Scott, took up a senior research fellow position at Monash University marking the beginning of a resurgence in the study of Australian bryophytes (Brown, 2011). By 1976, Scott and Stone had collaborated and produced the landmark publication *The Mosses of Southern Australia* (Scott & Stone, 1976), which not only provided detailed descriptions and illustrations for temperate moss species but also listed tropical and subtropical species.



Figure 14. Distribution map of Ilma Stone’s bryophyte collection localities from Queensland (left) (Source: AVH, 2020) and type specimen of *Stoneobryum bunyaense* (BRI AQ0717382) named in her honour (right).

Ilma hated the cold and would regularly travel to northwards to Queensland to avoid Melbourne winters and to collect tropical species of moss (Brown, 2011). As a result, Ilma's accrued one of the most comprehensive collections of mosses from tropical Queensland (Brown, 2011). Ilma regularly collected mosses from Queensland from 1969 until 1994, amassing over 14,000 specimens (Fig. 14) with these largely accessioned in the National Herbarium of Victoria (MEL). During her career, Ilma published over 70 scientific papers, the first of which when she was 45 and 52 after she retired in 1978 (Brown, 1911). She described some 25 species, several genera and one new moss family, Viridivellaraceae (Brown, 2011). Several species and two moss genera (*Stonea* and *Stoneobryum*) have been named to commemorate Ilma and honour her extraordinary contribution to Australian bryology.

Heinar Streimann

Born in Turtu, Estonia on the 19th of December 1938, Heinar Streimann (Fig. 15) would become one of Australia's foremost bryologists. The Streimann family fled Estonia in 1950, eventually emigrating to Australia and settling in Seymour, Victoria (Ramsay, 2002). After matriculating from high school, Heinar moved to Melbourne to take a job with the Bureau of Meteorology (Elix & Craven, 2002). In the early 1960s, Heinar took a job with the Department of Forests at Bulolo, Papua New Guinea where he surveyed and planned roads for the expanding forestry industry (Elix & Craven, 2002). It was during his time in Papua New Guinea that Heinar's passion for botany began (Ramsay, 2002). Heinar was able to pursue his botanical interests and eventually began teaching botany at the Forestry College at Bulolo (Elix & Craven, 2002). His work at the Forestry College allowed Heinar to travel and collect widely in Papua New Guinea and, although his focus was primarily on woody plants, he managed to also include the less conspicuous plants of the tropical forest including the cryptogams (Elix & Craven, 2002).

During 1973, Heinar moved to Canberra to take up a role with the Australian National Herbarium (CANB) where he expanded the cryptogam collections from 14 packets to the largest collection of cryptogams in the Southern Hemisphere (Ramsay, 2002). The Australian National Herbarium now houses over 95,000 bryophyte specimens and over 90,000 specimens of fungi and lichen (AVH, 2020). During his time at Canberra he studied part-time for a degree in Applied Science (University of Canberra) and later he completed a Master of Science degree at the University of New South Wales working on a revision of the Meteoriaceae in Australia (Elix & Craven, 2002).



Figure 15. Heinar Streimann in 2000. Photograph by M. Fagg (Source: Australian National Botanic Gardens).

Heinar regularly collected bryophytes from Queensland between 1973 and 2001, amassing over 7,500 specimens (Fig. 16). He co-authored, with Judith Curnow, the *Catalogue of Mosses of Australia and Its External Territories* bringing together in a compact volume, the names, publication data and distribution by state for all the known Australian species (Ramsay, 2002). He is commemorated in the names of several species of moss and liverwort and has two genera, the lichen *Streimannia* and the moss *Bryostreimannia* named in his honour (Elix & Craven, 2002).

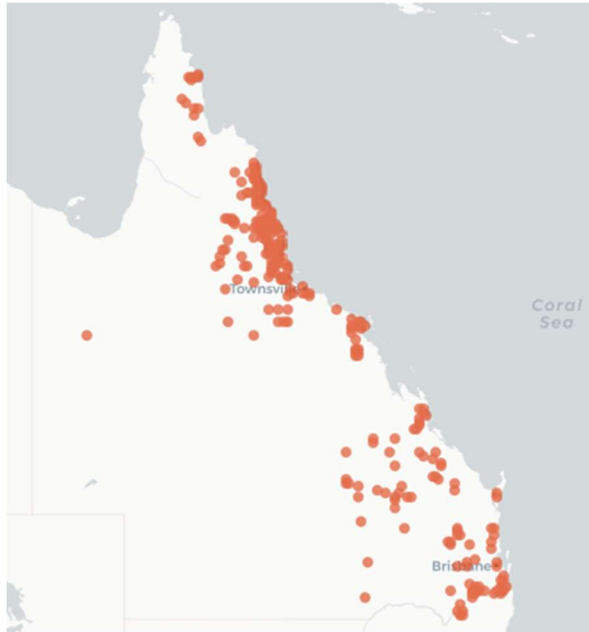


Figure 16. Distribution map of Heinar Streimann’s bryophyte collection localities from Queensland (Source: AVH, 2020).

Conclusion

Our knowledge of the diversity and distribution of the Queensland bryophyte flora far from complete. As herbaria and other natural history collections around the world digitise and make their collections readily accessible to the public, we will find more information regarding Queensland bryophytes. However, our present understanding of the Queensland bryoflora is only possible because of the endeavour and passion of professional bryologists and dedicated natural historians in the past. With the advent of citizen scientist digital portals, such as iNaturalist and the Atlas of Living Australia, and engagement programs such as BioBlitzes, our knowledge of the Queensland bryophyte flora will continue to grow.

Acknowledgements

I acknowledge the Traditional Owners of lands on which bryophyte collections were made, and recognise their Elders past, present and emerging. Nimal Karunajeewa (MEL) is thanked for taking photographs of the Leichhardt and Dietrich specimens

appearing in this article. The Director and staff of the Queensland Herbarium have been most helpful in allowing access to specimens, the specimen database and documents. I also acknowledge all those collectors and natural historians who gave pause and found awe and wonder in the bryophytes and have helped our always growing understanding of this group of plants.

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