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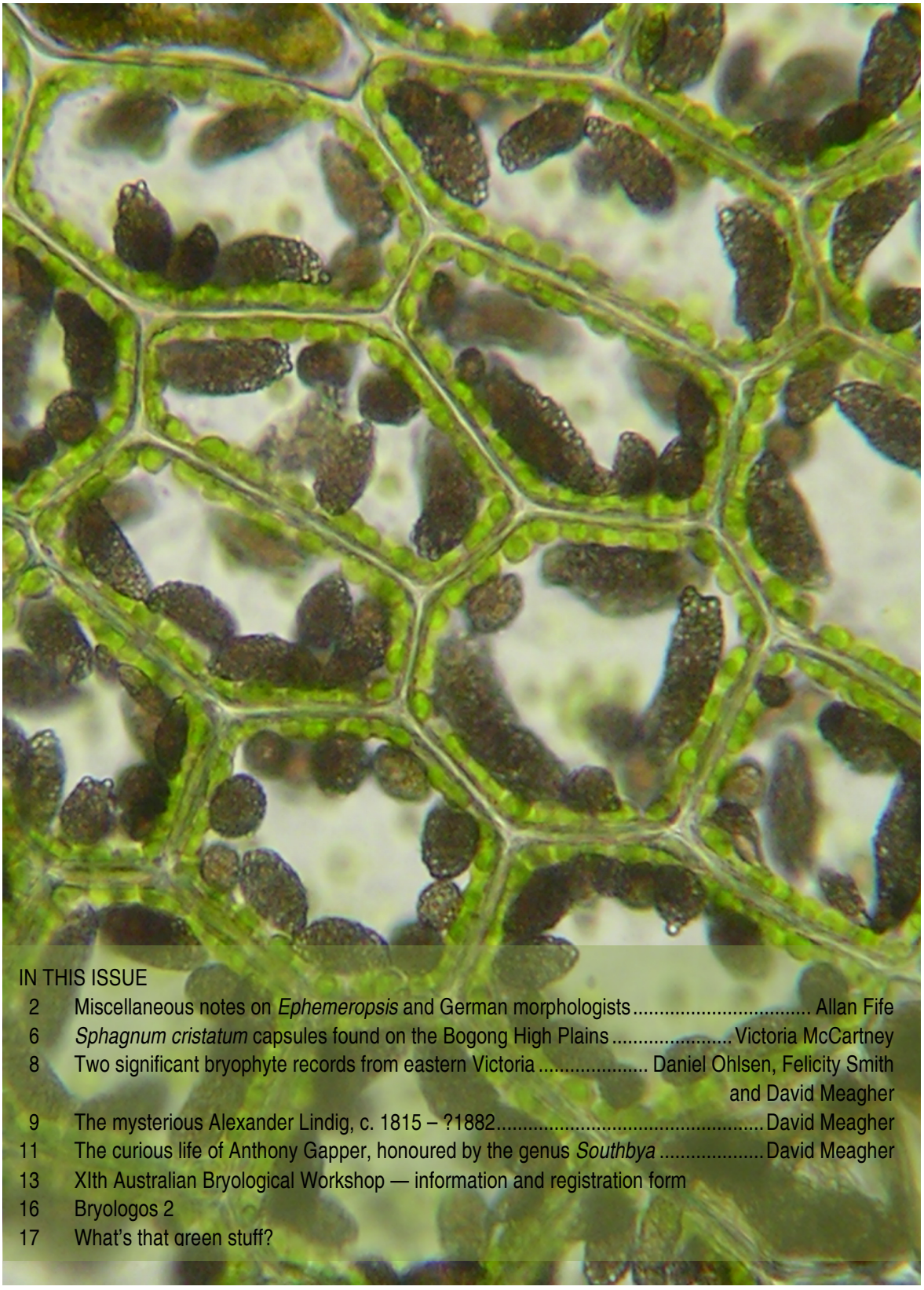

IN THIS ISSUE

Miscellaneous notes on *Ephemeropsis* and German morphologists

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The moss genus *Ephemeropsis* was considered remarkable by both morphologists and taxonomists from the time of its initial collection. The German morphologist and Professor of Botany at the University of München, K.I. Goebel made the first gatherings of sterile plants in the 1890s from near Tjibodas in western Java. Goebel incorporated his study of the virtually leafless gametophyte of *Ephemeropsis* into his major study of the developmental morphology of mosses (Goebel, 1892) and eventually into his monumental Organography of Plants (Goebel, 1905). For many years, at a period that arguably represented the apogee of German plant morphological studies, the moss eventually named *Ephemeropsis tjibodensis* was the object of intense interest by numerous German morphologists. The precision and the detail of the observation of many of the 'classical' German morphologists, epitomised by the work of Goebel, has probably never been surpassed, and these works remain treasure troves of precise information, even for bryologists working more than a hundred years later.

The nomenclatural issues surrounding both the generic name *Ephemeropsis* and its type species are very complex and I do not wish to be diverted by these. In my tentative opinion the species *E. tjibodensis* should be cited as *Ephemeropsis tjibodensis* K.I.Goebel ex Fleisch. and, for the purpose of this discussion, both the genus *Ephemeropsis* K.I.Goebel and the species *E. tjibodensis* K.I Goebel are taken as validly published names. The citations for the nomenclaturally relevant publications are given in detail by Fleischer (1908, p. 945).

Fleischer (1899) seems to have been the first to describe the development and morphology of the *Ephemeropsis* capsule. Subsequently, Fleischer (1908) published an extremely detailed and remarkably accurate description and illustration of *E. tjibodensis* that remains a hallmark in our knowledge of this epiphyllous species. Anyone interested in the morphology of this remarkable plant should start by reading Fleischer's description in his influential Der Flora von Buitenzorg (see http://www.biodiversitylibrary.org/item/9#324, vol. 3, p. 945 et seq., accessed on 26 April 2010). Fleischer's concepts of moss classification, outlined in Der Flora von Buitenzorg, substantially influenced V.F. Brotherus. Fleischer's concepts were incorporated into the classification in Engler & Prantl's *Die natürlichen Pflanzenfamilien* (Brotherus, 1924–25). Brotherus's classification, drawing strongly on that of Fleischer, was highly influential and pervaded, and arguably dominated, thoughts about moss classification for much of the twentieth century. Subsequent noteworthy discussions of *E. tjibodensis* were provided by Fleischer (1929) and Renner (1935). The descriptions of the genus *Ephemeropsis* (and the family Nemateaceae) in Brotherus (1907 & 1925) are derived, despite apparent publication date discrepancies, from the publications of Goebel and Fleischer.

Early 20th-century German writings on a Javanese moss, however remarkable its morphology, would probably have remained of purely academic interest to Australasian botanists but for the April 1928 collection by K.W. Allison, of a remarkably similar moss in New Zealand. Allison's initial collection was made near Atiamuri, on the volcanic plateau of the North Island; it was growing epiphytically on Manuka (*Leptospermum scoparium*) bark. Over the next seven years, *Allison* made numerous collections of this species in the Rotorua–Atiamuri–Taupo region. Part of his earliest collection was sent to H.N. Dixon who noted some differences but nevertheless considered the Atiamuri material conspecific with *E. tjibodensis* (Dixon, 1928).

Dixon's publication, together with Allison's repeated collection and distribution of material from the volcanic plateau generated a renewed interest in the genus *Ephemeropsis*. Some of Allison's material, and particularly a collection he made in November 1930 (*K.W. Allison 633*) was

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forwarded to Theodor Herzog at Jena, and this material was studied by morphologist and the then professor of botany at the University of Jena, Otto Renner. Renner was probably influenced by Goebel's detailed studies of the protonemal morphology of *Ephemeropsis* during the period 1908–1920, when he was the bryophyte curator at München under Goebel; Renner later became, like Goebel, Professor of Botany at München. Renner (1935) methodically compared the Allison collections to authentic *E. tjibodensis* and concluded that the morphological differences between New Zealand and Malesian collections required distinction at the generic level. He coined the now little used name *Archephemeropsis trentepohlioides*. Among the differentia that Renner used in his diagnosis were protonemal branches subequal in length and not divaricating, lacking differentiated holdfasts (often termed 'Hapteren' by both himself and Fleischer, 1908). Renner (1935, p. 88) argued that the superficial similarity of the two taxa is a result of convergent reduction in a hookeriaceous group.

Sainsbury (1951) proposed that New Zealand material be treated as specifically distinct but congeneric with the Malesian material. Soon afterwards Willis (1953) recorded the collection of a single capsule of *Ephemeropsis trentepohlioides* from Tasmania's Florentine Valley but it was only 45 years later that Tasmanian collections from two additional sites were recorded by Dalton (1998).

Because of conflicting taxonomic and nomenclatural opinions, particularly at the generic level, regarding the Australasian taxon, and because I needed a name to apply to it in the Moss Flora of New Zealand, I decided to compare the two species myself. I have examined a range of Malesian and SE Asian specimens (mostly from the Singapore herbarium) of *E. tjibodensis*. I have examined the full range of *Ephemeropsis trentepohlioides* in CHR and WELT, as well as type material from the Jena herbarium.

I have been able to confirm independently many, but not all, of the distinctions which Renner noted between the New Zealand and the Malesian taxa, and have summarized these in Table 1. The features which differentiate the taxa most convincingly are the presence/absence of an exostome furrow, the nature of the endostome, the nature of the exothecial cells and spores. I have found some morphological features extremely difficult to observe (usually more difficult in the New Zealand species than in the Malesian). Indeed, microscopic preparations of the exostome teeth, the endostome and the stomata of *Ephemeropsis trentepohlioides* have been among the most difficult microscopic dissections I have ever attempted. I have summarised my morphological observations in Table 1.

Although at the outset I hoped that I would be able to reach a firm conclusion based on independent observations about generic placement of the Australasian species, I have been unable to reach a convincing conclusion and have ultimately found this exercise fascinating but frustrating. I now believe that a conclusion concerning the relationships of *Ephemeropsis trentepohlioides* cannot be drawn using morphological characters alone. Rather, its relationships need to be resolved in a study of the entire Daltoniaceae, probably using morphological and molecular or other non-traditional methods.

For now it seems preferable to follow the generic assignment used by Sainsbury (1955a) and hence most familiar to Australasian workers. The following morphological observations highlight the differences between the Australasian *E. trentepohlioides* and the Malesian *E. tjibodensis*.

My observations are that the inner layer of peristome tooth is radially thicker (c. 18 µm thick vs. c. 3–4 mm thick) than the outer layer and roughly equal in tangential width to the outer layer at mid-tooth level. My observations conflict with Renner's (1935, see fig. 27c and text on p. 85). The similarity of the thickening pattern of exostome teeth has influenced my taxonomic conclusions.

Three gametophytic structures present in *Ephemeropsis tjibodensis* but absent from *E. trentepohlioides* were given special attention by Renner (1935). My observations on these structures are discussed below.

Ephemeropsis tjibodensis has distinctive elongate terminal protonemal filaments (the 'Assimilationsorgane' of Brotherus, 1925, p. 215). These filaments are discussed by Renner (see his figs. 15 & 16) who terms them 'Assimilatoren'. He discusses in detail their developmental association with what he terms 'Brutkörpen' (p. 70–72). Such 'Assimilatoren' are absent in the NZ taxon, but I do not consider this a fundamental developmental difference. 'Brutkörper'

development is discussed by Renner (1935, pp. 66–68 and see his figs. 3–12). These 'brood-bodies' are also described and well-illustrated by Fleischer (1908, p. 947 and fig. 164 c). My understanding is that such structures, also, are consistently lacking in *E. trentepohlioides*.

E. tjibodensis, which apparently is always epiphyllous, has characteristic paired, fan-shaped and flattened holdfasts ('Hapteren') in abundance on the protonemal strands. These are portrayed accurately by Renner (1935, fig. 23). Such specialised 'Hapteren' do not occur in the predominantly twig-dwelling *E. trentepholioides*.

The sexuality of the two taxa is very difficult to ascertain. *Ephemeropsis tjibodensis* fruits rarely and Renner (p. 74) noted that Goebel never saw fruit. Fleischer (1908, p. 945) described it as 'zweihäusig und schienbar einhäusig (rhizautöcisch).' *Ephemeropsis trentepohlioides*, by contrast, frequently fruits and appears to be consistently rhizautoicous.

The decision to place these two species in either one genus (*Ephemeropsis*) or two genera is a particularly difficult one. An argument in favour of the recognition of either one or two genera can be made with equal facility.

The thickening pattern of the inner and outer layers of the exostome teeth is similar in both species. I believe that Renner misinterpreted and given undue emphasis to what he thought was a difference in this thickening pattern. In my opinion the indisputable differences in protonemal structures is less impressive than the overall sporophytic (including peristome tooth structure). I contend that the overall morphological and ecological similarity of these species to be indicative of relationship. I concede that my phenetic approach to this question is not a fashionable one but I see no alternative, until a detailed analysis of the Daltoniaceae is accomplished, perhaps using molecular as well as morphological characters. The latter will need to be studied with extreme care to improve upon the observations of Goebel, Renner, Fleischer and their contemporaries.

I conclude that our Australasian endemic species is best retained in the genus *Ephemeropsis* K.I. Goebel and that *Ephemeropsis trentepohlioides* (Renner) Sainsbury (1951) is the preferred name for this species.

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Table 1 Morphological comparison of *Ephemeropsis tjibodensis* (Malesia) and *E. trentepohlioides* (Australasia).

Features	*E. tjibodensis*	*E. trentepohlioides*
Sporophyte features		
Exostome tooth length	c. 210 µm	c. 150 µm
Furrowing, orientation, and ornamentation of peristome teeth	Furrowed for 2/3 length; erect when dry; median zigzag line extending nearly to apex; outer surface transversely striate.	Not furrowed; strongly reflexed when dry; with median zigzag line extending c. 1/3 the tooth length or absent; outer surface transversely striate.
	Inner layer of tooth approx. equally thickened (radially) as the outer layer and considerably narrower tangentially (in surface view) than the outer layer,	Inner layer of tooth thicker (radially) than the outer layer (c. 18 µm thick vs c. 3–4 mm thick) and roughly equal in tangential width to the outer layer at mid tooth level.
Endostomal basal membrane	Present, c. 87 µm high.	Highly reduced or apparently sometimes absent (character state personally observed but not confirmed, November 2009).
Endostome segments	Well-developed, from c. ¾ to nearly equal the height of the teeth, narrowly perforate; cilia nil.	Lacking
Capsule length	c. 0.3–0.5 mm.	0.5–0.7 (–0.85) mm.
Spores	c. 50–60 µm long, oblong and unicellular.	60–96 µm long, fusiform, and mostly 1–3 transversely septate.
Exothecial cells	Tranverse wells uniformly thickened and curved; not collenchymatous.	Walls thin-walled; collenchymatous.
Stomata	Numerous, arranged in a single row, phaneropore.	Either few and scattered or none, cryptopore.
Gametophyte features		
Sexuality	Reportedly dioicous or (rarely?) autoicous.	Autoicous (male and female gametangia buds connected by protonemal filaments).
Holdfasts on protonema filaments (‘Hapteren’)	Present; paired, fan-shaped and flattened.	Absent.
Elongate terminal protonemal filaments (‘Assimilatoren’)	Present and conspicuous.	Absent.

Sphagnum cristatum capsules found on the Bogong High Plains

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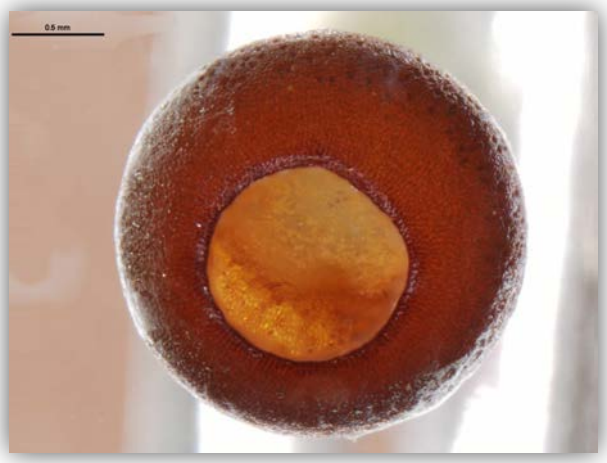
I am a 2nd year PhD candidate at the La Trobe University Albury–Wodonga campus. My field of study is groundwater-dependent ecosystems on the Bogong High Plains, Victoria. While carrying out field work for my PhD in the Watchbed Creek catchment area, my supervisor Phil Suter and I came across some *Sphagnum cristatum* capsules. *Sphagnum* capsules are very rarely known from Australia, unlike most other areas of the world. The capsules were extremely hard to see with only a few present, and were found in more protected areas in the peatland. These were found on Friday 18 February 2011 and were photographed and documented on Monday 21 February 2011.

I collected a couple of capsules and returned to La Trobe University to photograph them as I was aware that very few people were privileged to see them, let alone photograph them. The following images were taken as a stacked montage to obtain the three-dimensional views that you can see. They were taken with a Nikon SMZ 1500 microscope camera.

This picture shows the *Sphagnum cristatum* capsules in the field growing near *Empodisma minus*.

Sphagnum cristatum sporophyte with the capsule and calyptra still joined and the operculum intact. Capsule is approximately 2.2 mm long and 2.2 mm wide.

Sphagnum cristatum sporophyte with the capsule fully exposed.



Sphagnum cristatum capsule opening. Capsule opening is approximately 1 mm wide.

Two significant bryophyte records from eastern Victoria

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Bryces Gorge, hidden deep in the highlands of eastern Victoria, is one of the most spectacular gorges in southern Australia. It also holds some botanical surprises. Deep within its depths grows *Asplenium hookerianum* Colenso, and in a cleft in its western cliffs is a large population of *Blechnum vulcanicum* (Blume) Kuhn — ferns otherwise known only from New Zealand and Tasmania. Because of this unusual fern flora we recently visited the gorge to investigate its bryophyte flora.

Along a creek that plunges into the gorge we found ***Temnoma quadripartitum*** (Hook.) Mitten, a species previously known from Patagonia, New Zealand and a few subantarctic islands (Engel 1978, Engel & Glenny 2008). It was growing on soil in the shade of low shrubs on the creek bank, at about 1400 metres asl. The material we collected agrees perfectly with var. *quadripartitum* (Figure 1).

In the gorge itself we found ***Marsupidium perpusillum*** (Colenso) E.A.Hodgs., known previously only from New Zealand and Tasmania (Figure 2). In the field it can be distinguished from Australian *Tylimanthus* species by having both the dorsal and ventral leaf margins rounded, and from *Marsupidium surculosum* by having the leaf insertion shallowly succubous rather than more or less transverse and by the leaf apices being very variably lobed, with the ventral lobe larger than the dorsal. We did not see marsupia in any of the populations we found.

Among numerous other notable species found in the gorge were *Plagiomnium novae-zealandiae* (Colenso) T.J.Kop., *Trichocolea rigida* R.M.Schust. and *Amphidium tortuosum* (Hornsch.) Cufod.

Collections were made under permit 10006072 issued by the Department of Sustainability and Environment, Victoria. Vouchers of *Temnoma quadripartitum* and *Marsupidium perpusillum* are to be lodged in MEL.

Figure 1 Part of a shoot of *Temnoma quadripartitum* var. *quadripartitum* from Bryces Gorge. Shoot width 2.1 mm.

Figure 2 *Marsupidium perpusillum* from Bryces Gorge. Shoot widths 3.0 mm.

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The mysterious Alexander Lindig (c. 1815 – ?1882)

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Little is known of the life of Alexander Lindig, even though four bryophyte genera and a fossil ammonoid genus have been named after him. In bryology the genera are *Lindigia* Hampe 1862, *Lindigia* Gottsche 1864, *Lindigella* Trevis. 1877 and *Lindigianthus* Kruijt & Gradst. 1985. Trevisan (1877: 423) erected the liverwort genus *Lindigella* to replace *Lindigia* Gottsche, a later homonym of the moss genus *Lindigia* Hampe. The best description published of him is 'a somewhat mysterious figure of German origin who moved to Bogotá in 1859, where he lived for four years' (Seppelt & Griffin 1997: 214). I hope that this article removes some of the mystery surrounding Lindig, and encourages some research into his life, which seems to warrant more recognition than has so far been accorded him.

Alexander (Alejandro) Lindig was a German botanist from Dresden who worked for some time in Bogotá, Colombia (Schümacher 1884: 402). He collected plants (mostly cryptogams) in various parts of Central and South America, and named the fern genus *Trachypremnon* (a synonym of *Cyathea*). He also collected a wide variety of animals, from beetles to birds.

Nothing is known of Lindig's early years in Germany, if indeed he was born there. This is not surprising because births, deaths and marriages were not recorded systematically in Germany until the second half of the 19th century. However, it seems that he might have been in Colombia by 1847, when an Alejandro Lindig was listed as a member of the Sociedad Filarmonica in Bogotá (*La*

Dia 414: 2). He was one of the founders of the Escuela de Ciencias Naturales in Bogotá (Piedrahita 2005a), Sociedad Caldas (Forero 1991: 56) and Sociedad de Naturalistas Neogranadinos (Piñeros et al. 2002: 166). In 1856 he was a member of staff at the new Colejio de Niñas (Children's College) in Bogotá: 'El personal del Colejio será este…señores José Caicedo Rójas, Alejandro Lindig i Francisco Boada.' (Peña 1856: 2). Hampe (1862: 527) politely referred to him as 'Dr. Lindig', although it seems he did not have that qualification. Piedrahita (2005b: 281) includes a photograph, taken in 1859 in Bogota, in which Lindig can be seen seated with four other founding members of the Sociedad de Naturalistas Neogranadinos. He appears to be a small, slight man, perhaps in his early 40s, in which case he would have been born around 1815. In 1858 German naturalist Hermann Karsten named *Lindigia*, a fossil animal genus from the Mesozoic discovered in western Colombia, noting that he was obliged to Lindig for the beautiful specimens he obtained (Karsten 1858: 104).

It is possible to trace Lindig's wherabouts between 1863 and 1883 from the lists of members of the Kaiserlich-königlichen zoologisch-botanischen Gesellschaft (Royal Zoological-Botanical Society) in Vienna (Anon. 1863–1883). The first year in which Lindig is listed is 1863, with an address in Bogota, where he was listed in each subsequent year until 1869. By 1870 he had returned to Dresden and was listed as living at Pragerstrasse 14. The last entry for him is in 1882 at the same address, suggesting that he may have died in that year.

Kruijt and Gradstein (1985: 166) erected the genus *Lindigianthus* to accommodate *Lejeunea cipaconea* Gottsche, the type of which had been collected by Lindig in New Granada in 1860 (Gottsche 1864: 150–151). In fact, Lindig's collections from New Granada (at that time the Confederación Granadina, which included most of modern-day Colombia and Panama and parts of Ecuador and Venezuela) are mentioned on almost every page of Gottsche's paper, accounting for almost all of the dozens of new species Gottsche described. It is no wonder that Gottsche felt obliged to name a genus after him.

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The curious life of Anthony Gapper, honoured by the genus *Southbya*

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The name Anthony Gapper has never appeared in the bryological literature, yet he is honoured by a genus and family of liverworts — *Southbya* and Southbyaceae. This article sets out as much as can be gleaned about his curious life, and how the genus *Southbya* came to be named for him.

Anthony Gapper was born in 1799 at Bridgewater, in the English county of Somerset, to the Reverend Edmund and Mary (née Barrett) Gapper. In 1823 he took up medical practice in Bristol, and by 1825 was a member of the Bristol Philosophical and Literary Society, serving on the committee. In 1826 he emigrated to Richmond Hill in Upper Canada (now Ontario), where he joined his brothers William and Richard who had recently retired from the British Army after serving in the Napoleonic Wars. His widowed mother and sister Mary (married name O'Brien) joined them in 1828. Anthony practised medicine there but also spent much time exploring the countryside, cataloguing the flora and fauna, but in 1829 he returned to England, probably because of the death of his brother Edmund. He then took up medical practice again in Bridgewater. In 1830 he published a paper on the mammals of Upper Canada, describing four new species. One of these was not formally named in his manuscript, so the editor took the opportunity to name it *Arvicola gapperi*, which is now known as *Clethrionomys gapperi,* Gapper's Red-backed Vole.

On 10 June 1831 Anthony Gapper married Octavia Geraldine Ibotson (b. 1807) at St Swithins in Walcot, Somerset. They had five children: Edmund (b. 1833), Anthony (b. 1836), Mary (b. 1836), an unnamed daughter stillborn (1838), and Claudia (b. 1841). And in the following year he was once more collecting plants around Bridgewater.

The year 1835 was providential for Gapper. In February his grandfather's niece, Mary Southby, willed Bulford Manor and its lands to him, with the proviso that he change his name to Southby. Bulford Manor, on the flats between the Avon River and Nine Mile River in Bulford, Wiltshire, was built in the 17th century, and came into the Southby family in 1716 by the marriage of Anne Duke to Richard Southby. Their eldest daughter Charity (Anthony's grandmother) married Edward Gapper in 1752, and their eldest son Richard (Mary's father) married Edward's sister, Ann Gapper, in 1754. Thus the Gapper and Southby families became entwined.

Mary Southby inherited the estate equally with her sister (also called Charity) in 1791, after their father, brother Richard and sister Elizabeth all died within a few months of each other. When Charity died widowed and childless in 1830, Mary was left with the whole estate. When she died she was a spinster whose closest relatives were her uncle's grandchildren, Anthony, Richard, Mary and Lucy Gapper. Anthony must have spent time at Bulford Manor and Mary must have been very fond of him. In April 1835 he was granted a royal licence and authority that 'he and his issue may, in compliance with the last will and testament of Mary Southby, late of Bulford aforesaid, take and use the surname of Southby only, and also bear the arms of Southby'. Thus Anthony Gapper became Anthony Gapper Southby, taking up residence in the manor with his family. In 1836 he was listed as a Land Tax Commissioner for Wiltshire, indicating his rise in the social ranks.

In 1845 he accompanied Richard Spruce on a crossing of the Pyrenees. Spruce wrote: 'On the 2nd of August, accompanied by Dr. Southby, a compatriot enthusiastic in the pursuit of natural history, I crossed the central chain by the Port de Cauterets to the baths of Penticosta in Aragon', a trek that took four days. In creating the liverwort genus *Southbya*, based on material collected on this expedition, Spruce stated: 'To no one can I with more propriety dedicate a new genus of Pyrenean Cryptogamia than to Dr. Southby, my companion in so many interesting excursions in those mountains, and a gentleman accomplished in almost every branch of natural history.'

The next decade saw great misfortune for Southby. In 1849 his wife died at 43 years of age. Then his daughter Mary, who had married William Shaw, a young surgeon in the Bengal Medical Service of the East India Company in 1855, was murdered in the massacre at Cawnpore (Kanpur)

in 1857, during the Indian mutiny. She was only 20 years old. Her husband, who had been moved to Lucknow just before Cawnpore was besieged, died in the siege of Lucknow a few months later.

In these dreadful years Southby still continued to take an active interest in natural history. He was an original member of the Wiltshire Archaeological and Natural History Society (formed in 1853) and is noted in numerous volumes of the society's magazine as a collector of plants around Bulford and Amesbury. In the 1860s and 1870s he was a benefactor of various churches, including St John the Evangelist (St Leonard's) in Bulford, providing stipends for the vicars. His broad scientific interests are reflected in patents he was awarded in this period, including one for 'improvements in the manufacture of paper'.

Anthony Gapper Southby died in 1883, and the manor and the rest of his estate passed to his eldest son Edmund, who lived only another three years. Edmund had passed the preliminary examinations in classics and mathematics at the Royal College of Surgeons in 1853, but appears to have turned to engineering rather than medicine. He did, however, gain some fame as the author of a handbook on practical brewing that ran to several editions, including at least two published after his death. In 1886 the manor and grounds were sold to J.L. Hill, who in turn sold it to the War Department in 1898, together with almost 2000 acres of land. As of 2010 the property was still in the hands of the Ministry of Defence, although plans had been drawn up for its sale.

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XIth Australian Bryophyte Workshop — Sapphire Coast, NSW
2–7 September 2012

Workshop accommodation
Accommodation will be in shared facilities at Manna Park Eco-Reserve and Science Centre, which is surrounded by natural bushland, 9 km north of Merimbula on Red Hill Road, off Sapphire Coast Drive. There are several national parks nearby, and some excellent beaches. A supermarket, pharmacy and other shops are a short drive away. Further details will be provided in the next circular. Please note that mobile phone reception in the immediate Manna Park area is problematic, as it is in a 'dark spot'. Reception is normal closer to Merimbula and along the Pacific Highway.

Arrival & departure
There are direct flights into Merimbula from Melbourne and Sydney, as well as regular bus services. For those coming from elsewhere, flying into Canberra may be your best option. We can pick up people from Canberra airport for transport to Merimbula, but there will be limited seats available. Departure will be from Canberra airport at 2 pm on Sunday 2 September. The return to Canberra will be on Friday 7 September, arriving about 1 pm.

Field trips and collecting
There will be daily field trips to a variety of ecosystems, including warm and cool temperate rainforest, wet sclerophyll forest, coastal heath and inland wetlands.
Collecting will be possible in accordance with the NSW Government, Office of Environment & Heritage, NSW National Parks & Wildlife Service permit conditions. This includes lodging material with the New South Wales state herbarium (NSW) or Australian National Herbarium, Canberra (CANB).

Registration
Fill out the registration form and send it with payment by post, fax or email, to:
Post — D. Christine Cargill, ANBG, GPO Box 1777, Canberra, ACT, 2601
Fax — (02) 62509432: Attention Chris Cargill
Email — Chris.Cargill*environment.gov.au (replace * with @ to email)

Payment
The cost is AU$400, which includes all accommodation, meals and minibus transport. Full payment upon registration is required. The Australian Bryophyte Group can provide a discount on the workshop fee to a small number of students who wish to attend the workshop. To be eligible you will need to give a presentation of your research, either as a poster or as a talk. To apply, please contact Chris Cargill as above.

Insurance
Unfortunately it is financially impossible for us to provide personal insurance for you as part of the workshop. Please ensure that you have adequate insurance cover for all eventualities, from your departure to your return home.

Cheque
Pay: Dale Christine Cargill
Send to: D. Christine Cargill
Australian National Botanic Gardens
GPO Box 1777
Canberra. ACT. 2601

Bank transfer
Acct Name: Dale Christine Cargill
BSB: 062903
Acct No.: 10693584

XIth Australian Bryophyte Workshop — Registration Form

Fill out the form and send along with full payment. Because there is a limit of 35 participants, places will be allocated in the order that registrations are received.

Name: _____

Address:_____
_____
_____
_____
_____
_____

Phone: (H)_____(W)_____(M)_____

Email:_____

Arrival information including time and location (can provide at a later date):
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Meal requirements: Vegetarian Yes / No Other_____

Please list any special requirements, including allergies:
_____
_____
_____
_____

Is there a person you would like to room share with?_____

Presentations
If you would like to give a talk (15 minutes), poster presentation or special interest class, please provide a title. (An abstract will be required at a later time.)

_____
_____
_____
_____
_____
_____

Emergency contact details

Name: _____

Address:_____
_____
_____
_____
_____
_____

Phone: (H) _____(W)_____(M)_____

Email:_____

For credit card payment, please provide the following information:

Cardholder: _____

Card type: _____

Card number: _____

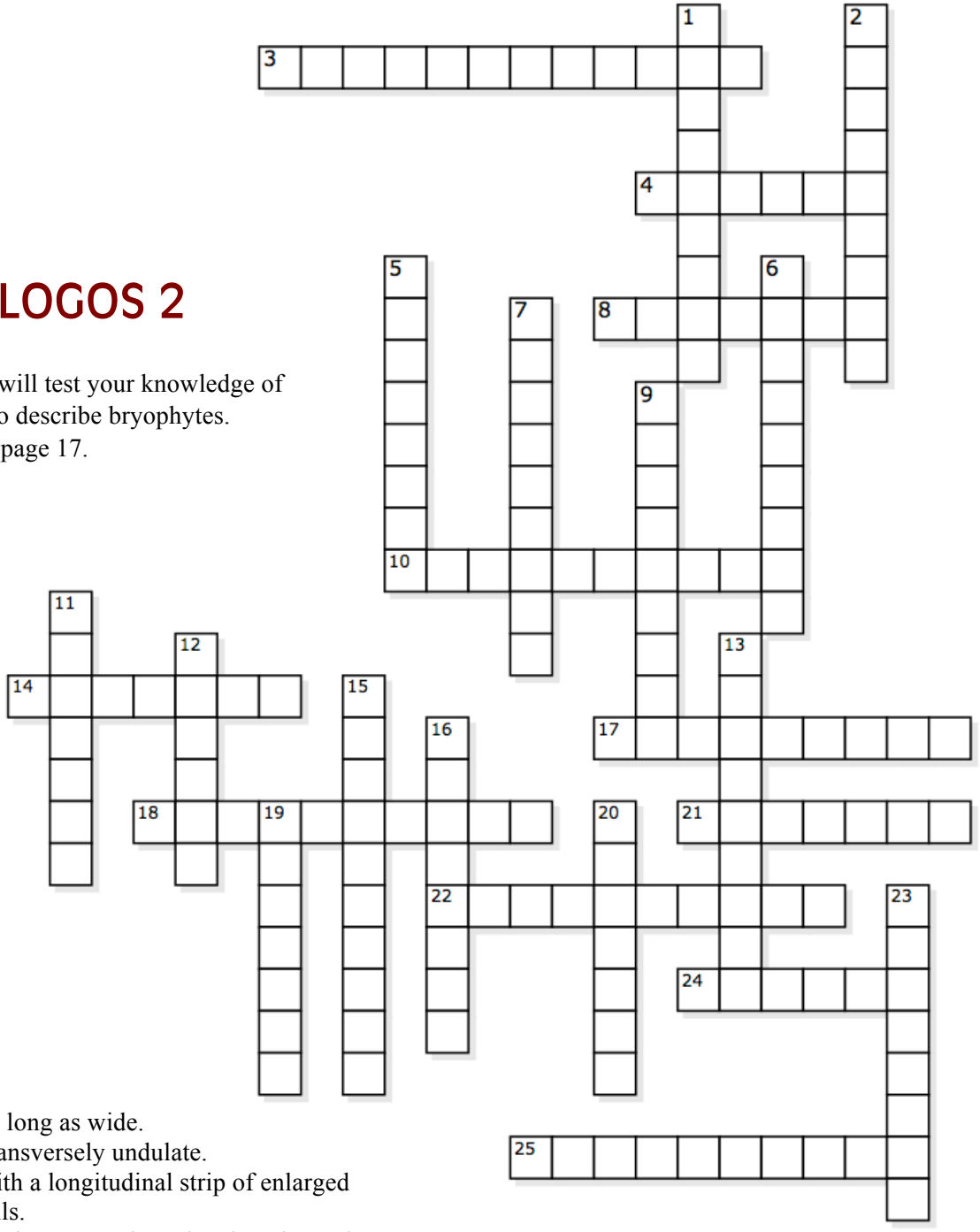
Expiry date __ __ /__ __

CCV number __ __ __

NOTE: If you are concerned about credit card security, please send the expiry date and CCV number in a separate fax or email, or phone Chris with the details.

BRYOLOGOS 2

This puzzle will test your knowledge of terms used to describe bryophytes.
Answers on page 17.



Across

3 As long as wide.
4 Transversely undulate.
8 With a longitudinal strip of enlarged cells.
10 Having gynoecia and androecia on the same plant.
14 With longitudinal pleats or folds.
17 Having warty thickenings or swellings.
18 Arranged in one row.
21 Joined, as in a leaf to an underleaf.
22 Flattened into one plane.
24 Turned or bent to one side of the stem.
25 With leaves in two rows on opposite sides of the stem.

Down

1 Shaped like a tongue.
2 Flattened against the stem.
5 Shaped like a pear.
6 Having a roughened appearance because of small thickenings on the surface.
7 Of leaves, inserted on the stem so that the ventral margin is closer to the stem apex than the dorsal margin.
9 Loosely overlapping.
11 Curved like a sickle.
12 Spreading at an angle of 45° to 90° to the stem.
13 With the surface covered in narrow thickenings aligned parallel to each other.
15 Like a bunch of grapes.
16 With a whitish, greyish or bluish waxy appearance.
19 Grooved or furrowed.
20 Armed with long, hair-like processes.
23 With small, knot-like swellings.

What's that green stuff?

This green stuff is a moss from New Zealand and mainland Australia. It belongs to a genus of about 25 species, scattered throughout the world. The sterile shoots are trailing and complanate, whereas the fertile shoots are upright and dendroid. There is a strong costa that joins up at the leaf apex with a border of elongate cells around the leaf margin. The plants grow on wet rock or soil along streams (especially around waterfalls) and on boggy soil in dense forest.

Cover photo

Cells of *Acrobolbus cinerascens* (Lehm. & Lindenb.) Mitt., showing the dark, granular oil bodies. (D.A.M.)

Bryologos 2

Across: 3 isodiametric 4 rugose 8 vittate 10 monoecious 14 plicate 17 verrucose (or verrucate) 18 uniseriate 21 connate 22 complanate 24 secund 25 distichous

Down: 1 lingulate 2 appressed 5 pyriform 6 papillose 7 succubous 9 imbricate 11 falcate 12 patent 13 striolate 15 botryoidal 16 glaucous 19 sulcate 20 ciliate 23 nodulose

What's that green stuff?

Plagiomnium novae-zealandiae (Colenso) T.J.Kop., photographed in Bryces Gorge, eastern Victoria. (D.A.M.)

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