



BOTANICAL SOCIETY

OF OTAGO



Newsletter

Number 98

March 2023

BSO MEETINGS AND FIELD TRIPS MARCH — JULY 2023

Location: Talks are hosted by Manaaki Whenua Landcare Research in the main seminar room, 764 Cumberland Street, Dunedin.

8th March, 5:20pm: The coastal sand dunes of Otago. Speaker: Teresa Konlechner. Sand dunes are an important feature of the Otago coast. However, the sand dunes of Otago have experienced considerable modification over the last 100 years. Human-induced destabilisation followed by stabilisation by exotic and invasive plants have altered geomorphic processes and the indigenous flora of the dunes. This talk provides an overview of past modification to Otago's dunes. It outlines the state of knowledge regarding the indigenous flora of Otago sand dune habitats and identifies priorities for conservation and restoration of these now uncommon sand dune species.

25th March, 8:00am: All day field trip to Rock and Pillar Range. We will travel to just north of Middlemarch to a carpark at the foot of the Rock and Pillar Range. From here the poled route of the Glencreag track is followed first through regenerating shrubland, then tall tussockland, and finally alpine cushionfield and rockland. Big Hut (1320 m above sea level) will provide a base for further exploration of the local botanical treasures. The return will be back the same way. This is a steep and arduous trip of c. 1000 m height gain. Participants need to have good fitness and be capable of walking for 3 hrs or more uphill and equivalent downhill. Be prepared for all weather conditions in an exposed alpine environment. The vehicle round trip is approximately 170 km. Depart Botany Department carpark at 8 am. Expected return approx. 6 pm. For more details contact the leader John Barkla mjbarkla@xtra.co.nz. *This date differs from that previously advertised.*

12th April, 5:20pm: Members night. Members are invited to bring items of botanical interest to the monthly meeting and talk about them. Items may be short slide shows, books, photographs, plants or any plant related object that has a story attached. You are invited to get in touch with Angela Brandt (brandta@landcareresearch.co.nz) or Stella Fish (sls.fish@outlook.com), who are organising the meeting, to chat about what you're thinking of bringing or to let them know you want to present a slide show.

15th April, 9:00am: Burns Reserve – one of Dunedin's hidden gems! The 87 hectares of coastal podocarp forest which makes up this reserve, lies on the flanks of Signal Hill high above Ravensbourne, Maia, Burkes and St Leonards. Though established in 1907 by residents concerned at the amount of deforestation on the West Harbour Hills, the Reserve had, until recently, been largely forgotten. Its flora includes good specimens of the original podocarp forest and a fabulous swath of Easter Orchid, *Earina autumnalis* and *Earina mucronata*, growing on a prominent rocky outcrop. The views of Taiaroa Head to Taieri Mouth are spectacular. Meet Botany Department carpark 9am Saturday 15th April 2023. Rain date Sunday 16th April 2023. Ring Robyn 021 235 8997

10th May, 5:20pm: AGM and Photographic Competition. The photographic competition is a popular and eagerly anticipated event for anyone interested in botanical photography. Enter your best photos and learn what makes a good photograph and how to improve your photographic skills from our panel of expert judges. Your photographs may be chosen for the BSO Calendar so this is your opportunity to have one month of fame. Start organising your entries now and don't wait until the last minute.

6th May: Fungal Foray to Waikaia. Waikaia Forest at Piano Flat is an isolated remnant of the mixed beech forests (red beech - *Nothofagus fusca*, mountain beech - *Nothofagus cliffortioides* and silver beech – *Nothofagus menziesii*) that once covered much of the area. The area supports a unique invertebrate fauna with several rare species being found there. Beech trees are dependent on various mycorrhizal fungi for their survival and growth. We plan to look at the fungal diversity of this forest in conjunction with Assoc. Prof. David Orlovich of the Otago University Botany Department as part of his

ongoing research. The trip is dependent on a DoC permit, so will be confirmed closer to the date. For further details and to arrange carpooling contact David Orlovich (david.orlovich@otago.ac.nz)

June talk

17th June, 9am: Ferntree Reserve, Dunedin. Join us on an easy morning's walk through Ferntree Reserve and adjoining streets. The small reserve, nestled between Taieri Road and Ferntree Drive, has a interesting array of naturally-occurring natives as well as planted natives and exotics. On its western boundary the reserve adjoins Dunedin's oldest house, Ferntree Lodge. The walk should take no more than a couple of hours and is graded easy. Meet and park at the southwestern extension of Helensburgh Road near the entrance to Leslie Groves Hospital at 9 am. Leaders John Barkla (027 326 7917) and Sharon Jones.

12th July, 5:20pm: Naturally uncommon ecosystems in Otago. Speaker: Scott Jarvie, Otago Regional Council. Naturally uncommon ecosystems are defined as having a total extent of less than 0.5% (i.e., <134 000 ha) of Aotearoa New Zealand's land area. These ecosystems are rich in threatened species, but many are poorly understood and nearly two thirds are classified as threatened, primarily from human associated threats, with a large proportion of these ecosystems being found on private land in lowland and coastal regions. This talk provides an overview of naturally uncommon ecosystems in the Otago region and discusses recent work to establish programmes to monitor extent and condition, focussing on inland saline (salt pans) and coastal turfs. In addition to the overview on naturally uncommon ecosystems, I will briefly touch upon work for a regional threat classification for indigenous vascular plants in Otago.

22nd July, 9:00am: Taieri River Track. We'll follow the track from Taieri Mouth to the John Bull Gully picnic area for lunch (4 km), and then return. The track passes through several vegetation types, including estuarine salt marsh, carr (wooded fen), podocarp forest, and open shrubland. A highlight will be stands of regenerating kahikatea, as well as Hall's totara, tree ferns, and miro.

The track is in good condition but is undulating, and cuts downhill to the picnic area alongside the river. Bring good walking shoes, water and lunch, and clothing for the weather. Meet at Botany car park at 9:00 a.m.; expected return by 3:30 p.m. 37km drive each way. If the weather is very poor on the Saturday, we'll switch the trip to Sunday. Contact Angela Brandt (brandta@landcareresearch.co.nz) 021 121 5657

Note: Please review the trip guidelines for participants, drivers and leaders on our website. [bso.org.nz/trip-guidelines](https://www.bso.org.nz/trip-guidelines)

Meeting details: Talks are usually on Wednesday evening starting at 5.30 pm unless otherwise advertised. Talks are to be hosted by Manaaki Whenua Landcare Research in the main seminar room, 764 Cumberland Street, Dunedin. Please check the website before each talk to confirm the location.

Items of botanical interest for our buy, sell and share table are always appreciated. The talks usually finish around 6.30 pm. Keen discussion might continue till 7 pm. Meetings may be held online via Zoom while gathering restrictions remain.

Field trip details: Field trips leave from Botany car park 464 Great King Street unless otherwise advertised. Meet there to car pool. Please contact the trip leader before Friday for trips with special transport and by Wednesday for full weekend trips. A hand lens and field guides always add to the interest. It is the responsibility of each person to stay in contact with the group and to bring sufficient food, drink and outdoor gear to cope with changeable weather conditions. Bring appropriate personal medication, including anti-histamine for allergies. Note trip guidelines on the BSO web site: www.bso.org.nz

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Cover art by Noelyn Buisman-Hung: Drymoanthus flavus. Winner of the 2022 Audrey Eagle Drawing Competition.

FROM THE COMMITTEE

Chairs notes

Gretchen Brownstein

Kia ora koutou

Hope everyone enjoyed the hot sunny summer here in Otago. What a contrast to the rain and flooding in the top half of the North Island? The lack of rain here in Otago meant lower flows in the rivers and lower lake levels. While this creates issues for some plants (and animals!); the newly exposed silts are great habitat for turf species like *Limosella lineata*, *Isolepis basilaris*, and *Montia angustifolia*. Late summer is an ideal time to see these species in flower. Look for them along lake shores and river margins or damp places with recently exposed silts and gravels. These tiny plants are best appreciated from very close-up (ie laying on your belly with your nose millimeters above the ground). I will admit, I spent a good portion of my summer lying in the mud admiring these plants.

Thinking about flowing of time and changes, Audrey Eagle passed away in November. Among her many contributions, Eagle was the BSO Patron, started the Audrey Eagle Publishing Fund, and was even a judge for the BSO drawing competition. For more about Eagle's amazing contributions to botany, see the tribute from John Barkla below.

In other news, the photo competition is back. We've got a special category this year for all those amazing photos of mosses, lichens, and liverworts. Looking forward to seeing everyone's entries!

As always, hope you are having wonderful outdoor adventures. Feel free to share photos, drawings or a few words about any of your botanical finds.

Happy botanising,

Gretchen

Secretaries notes

Angela Brandt

Ngā mihi o te tau hou – happy new year! Welcome to several new members and welcome back to our many long-time members. I want to send my thanks

to the many members who have provided feedback of various kinds over the past year – on the events we've hosted, having more regular Zooming of talks, the types of communications we send out. It's very helpful to the committee to know what's been going well and what kind of changes we might make to benefit members and the Society.

I hope everyone's been out botanising and taking beautiful photographs this summer (including for the annual photo competition!). I traded in a month of long, (somewhat) warm days for a visit to my family in Oregon, USA, for the Christmas holidays – first winter Christmas I've had in a decade! It was a lovely visit, notable for the lack of leaves on deciduous trees but also clearer skies (when the clouds parted) than my summer visits that fall in the midst of wildfire season. One Christmas tradition I was excited to renew was going out to a local tree farm to cut our Christmas tree. We have always been partial to noble firs (*Abies procera*), a native tree of the Pacific Northwest US. It was quite different to once again have a specially grown, many years old, winter-time fir this Christmas than the spring-budding, wilding *Pinus contorta* (with cones!) that I've come to appreciate as my NZ version of a Christmas tree. And, though the colours were right, the holly in my Mom's backyard wasn't as spectacular as the flowering pōhutukawa and rata that I usually get to see at Christmastime nowadays – even when the storm of freezing rain coated it in ice! Needless to say, it was both a great trip away and also nice to return, to longer days and (much) warmer weather!



Editors notes

Lydia Turley

What a summer we have had! It has certainly been more relaxing than usual, with the Newsletter publication delayed until March—although as I write this it's still sunny and I'd rather be in the garden!

I hope that all of you have had the chance to make the most of the summer. If you've had any interesting botanical adventures, consider writing a note for the newsletter to share with the rest of us.

Thanks to our lovely contributors. Alex Wearing is a constant star, this time with a well-researched report on talks given by Cryptogam students. John Barkla, David Lyttle and Allison Knight have put a lot of thought into writing a lovely obituary for Audrey Eagle, and a welcome to Alan Mark, our new patron.

The cover illustration was the winner of the 2022 Audrey Eagle Drawing Competition. Isn't it wonderful?!

Editors guidelines: Suggestions and material for the newsletter are always welcome. We welcome stories, drawings, reviews, opinions, articles, photos, letters – or anything else you think might be of botanical interest. Remember to include photo captions and credits. Please keep formatting to a minimum. Send your feedback, comments or contributions to lydiamturley@gmail.com. Copy for the next newsletter is due on *10 June 2023*. Earlier submissions are most welcome.

Disclaimer: The views published in this newsletter reflect the views of the individual authors and are not necessarily the views of the Botanical Society of Otago.

Treasurers Notes

Mary Anne Miller

Reminder:

2023 Subscriptions due

Your yearly subscription is now due (note it hasn't increased). Please see the inside back page for a membership form. If unsure about your membership status please contact me at:

maryanne.miller@gmail.com

End of 2022 financial update

Once again we ended the year in a positive financial position. There was \$7,300 in the Everyday account, \$13,200 in the Audrey Eagle Publishing Fund and \$5,700 in the Saver account.

Newsletters we received from other NZ Botanical Societies can be borrowed. If interested please email me (see address above).

New members

A warm welcome to new members Victoria Bruce, On Lee Lau and Jo Sinclair. To our existing members, thanks for your continuing support.



*Lone Sheep on Black Birch peak. The picture deceives, as the scree on Black Birch peak is covered with a veritable flock of sheep (*Haastia pulvinaris*). Judges choice, 2022 Photo Competition (Photo: Alyth Grant)*

CORRESPONDENCE AND NEWS



2023 Photographic Competition

Categories:

1. Plant Portrait
2. Plants in the Landscape
3. Mosses, Lichens, Liverworts and Fungi

Broad and creative interpretation of the categories is encouraged!

Prizes: \$50 for the winner of each category

Entry forms are available on the BSO website www.bso.org.nz/photo-competition. Entries close **17th April 2023**.

Entries will be judged on technical and artistic merit by a panel of three judges. A Members' Choice award will be voted on by members.

Photos will be displayed on the BSO website and winners will be announced at the AGM meeting in May.

Entrants must be current members of the Botanical Society of Otago. Membership forms can be downloaded from the BSO website www.bso.org.nz

ARTICLES

Tribute to Audrey Eagle*John Barkla*

Audrey Eagle died at Birchleigh Rest Home, Mosgiel, on 27 November 2022, aged 97. Much has been written of Audrey's life and extraordinary achievements but to the Botanical Society of Otago (BSO), she was a long-time friend, supporter, and for 14 years, our Patron.

Audrey was born in Timaru in 1925. She was raised and educated in England where she trained as an engineering draughtswoman, a training that influenced her later botanical drawings which are notable for their detail and accuracy. She married Harold Eagle in 1949 and the couple opted to move back to New Zealand. Audrey was one of the founding members of the Waikato Branch of the Royal Forest and Bird Protection Society.

During this time she participated in various field trips and excursions, developing a passion for the New Zealand flora. She once remarked that she thought the best way to learn about the plants was to draw them. This idea was perhaps the genesis of her remarkable career as a botanical illustrator which ultimately culminated in 'Eagle's Complete Trees and Shrubs of New Zealand' which incorporated and extended the material from her two previous books. In scope, it is more comprehensive than any work of botanical illustration covering New Zealand's trees and shrubs that had been produced hitherto and it is unlikely that a project of this magnitude will ever be completed again by one artist.

I first met Audrey in May 1991 when she assisted on a DOC trip with John Heaphy, Wayne Hutchinson, Colin Ogle, Robyn Ogle, and myself, in a survey for *Veronica speciosa* along the coastal cliffs of north Taranaki. Over two days we searched the coast between the clifftops at Mokau south to Pukearuhe. At that time Audrey lived in New Plymouth, following the death of her husband Harold in 1988.

I knew a little of Audrey's background before ever meeting her though. Rather famously, she was the last person to collect a specimen of the now extinct mistletoe *Trilepidea adamsii*, on the first Waikato

Branch Forest and Bird Society field trip in 1954. The only known illustrations of it are hers and 19th - early 20th century botanical artist Fanny Osborne. This mistletoe gives its name to the newsletter of the New Zealand Plant Conservation Network and the Network's logo utilises the Franny Osborne illustration.

I rekindled my friendship with Audrey again in Dunedin when I moved there in 1997. She had moved a year earlier to be closer to her daughter Alison. Audrey lived out at Macandrew Bay on the Otago Peninsula, and soon developed a garden containing many of the special plants she had come to know and appreciate.

Audrey became a keen supporter of the BSO, which was re-invigorated in 1999 under the stewardship of Dr. J. Bastow Wilson and Barbara Anderson. Newsletter No. 15 of that year includes her request for specimens of nine taxa from the Canterbury/Otago region for what she was then calling Volume 3 of 'Eagle's Trees and Shrubs of New Zealand'.

David Lyttle, stalwart of the BSO, recalls first getting to know Audrey in 2002 when he joined the BSO, at which time she was a regular attendee at meetings and participant in field trips.

*"Through a shared interest in growing native plants, I ended up visiting Audrey's home in Macandrew Bay in December 2004 to help her divide her Poor Knights Lily plants (*Xeronema callistemon*) (Fig. 1). She had three pots lined up on her deck each containing a vigorous plant in full bloom. We successfully divided and re-potted the crop and I was rewarded with three plants that I still have, though my plants have never matched Audrey's originals. Audrey's garden was a treasure trove of rare and unusual native plants which she had propagated so she could get material in flower or in fruit for her work. There was a fine specimen of *Pittosporum obcordatum* growing next to her letter box so you did not need to remember the street number to know you were at the right address. Her gardening interests were not confined to native plants. She grew a selection of ornamentals and was an accomplished vegetable grower. She had her own strain of runner beans that she considered far superior to anything that came from a garden shop and was*

happy to bring the seed along to BSO meetings and share it with other members. At this stage she was still in the process of completing the illustrations for 'The Complete Trees and Shrubs'. Her work area was meticulously tidy and the visitor could see the great care and patience that went into producing a finished watercolour painting."



Fig. 1. Audrey's *Xeronema callistemon* on her deck at Macandrew Bay, Dunedin. Photo David Lyttle.

Many botanists, both local and much further afield supported Audrey in the lead up to the publication of her life's work by gathering specimens, and providing notes and taxonomic advice. In particular she spoke highly of Tony Druce, Colin Ogle, Peter de Lange, Shannel Courtney and locally, Professor Alan Mark. One sought-after shrub was what we knew by the tag name of *Pimelea* "Turakina" (now *Pimelea actea*). I remember collecting and sending Audrey a fruiting specimen, and much later she wrote a thank you note to which were attached the seeds of this threatened plant, such was her concern for the welfare of the species.

'Eagle's Complete Trees and Shrubs of New Zealand' was published by Te Papa Press in 2006 and the two-volume set brought together Audrey's botanical artworks from her best-selling 1975 and 1983 publications. This was followed by a 6-month long exhibition of her botanical paintings at the Otago Museum.

In the lead up to this magnum opus it became apparent that there was insufficient space in the books for all the wealth of comments and observations that Audrey had amassed since she started gathering such information in 1967. The BSO wanted to ensure this valuable information was made accessible to the wider botanical community and worked with Audrey to publish a Supplement to coincide with the publication of her artistic volumes. Funds for this

project were generously provided by the Wellington and Nelson Botanical Societies and the Waikato and Dunedin Branches of the Royal Forest and Bird Protection Society, all organisations that Audrey had a long association with.

Profits from this venture, donated by Audrey, were the basis of a self-perpetuating fund established by the BSO as the 'Audrey Eagle Publishing Fund'. The aim of the Fund is to promote the dissemination of New Zealand botanical literature by contributing to publication costs.

Audrey published a second supplement in 2014, (digital only) that contains the specific locality of where, by whom and when, the specimens illustrated in 'Eagle's Complete Trees and Shrubs of New Zealand', were collected.

In 2004 the BSO held the first Audrey Eagle Botanical Drawing Competition. Audrey, along with Allison Knight, judged the competition and Audrey awarded prizes during the AGM that year. The competition bearing her name continues to be a regular and popular BSO fixture to this day.

Audrey participated in a trip to the Chatham Islands in 2007, led by Peter Johnson (Fig. 2). This trip was notable for the number of BSO members on it and another prominent New Zealand botanical artist, J. Bruce Irwin. Audrey enjoyed herself immensely in the company of fellow botanists and was often seen comparing notes with Bruce.



Fig. 2. Audrey on the Chatham Islands in 2007. Photo David Lyttle.

In 2008 Audrey became the Patron of the BSO. She continued to attend Society meetings, the occasional field trip, wrote articles for the newsletter, promoted the drawing competition and provided sketches that graced the cover of our newsletter.

Over the years Audrey received numerous honours and awards for her work. The BSO nominated Audrey for the 2009 Allan Mere Award. This was a very popular nomination supported by several Botanical Societies and other botanical colleagues. We had the great pleasure of seeing the Allan Mere presented to Audrey at the monthly Botanical Society of Otago meeting on 14th October 2009. Perhaps the most fitting award recognising her contribution to New Zealand botanical science was the honorary doctor of science degree awarded to her by the University of Otago on the 4th May 2013 (Fig. 3).



Fig. 3. Audrey with Alan Mark and Kath Dickinson prior to her DSc graduation 2013. Photo David Lyttle.

With advancing years, we saw less and less of Audrey but some members, especially Allison Knight, kept in contact and updated her on Botanical Society matters. Audrey Eagle contributed so much to the BSO and we always felt honoured to have someone of such botanical standing in our midst. Her presence, kindness, and huge generosity are greatly missed but her name and memory live on in so many of our Society's activities.

Honours and Awards

In 1976 Audrey received a **Nature Conservation Council citation**.

She was winner of two **Watties Book of the Year Awards** (now known as the Ockham New Zealand Book Awards); third prize in 1976 for 'Trees and Shrubs of New Zealand' and second prize in 1983 for 'Trees and Shrubs of New Zealand second series'.

In 1985 Audrey won the **Loder Cup** and in the

same year became a **Distinguished Life Member of the Royal Forest and Bird Protection Society**.

Audrey was appointed a **Companion of the New Zealand Order of Merit** in the 2001 Queen's Birthday Honours, for services to botanical art.

In 2007, the two-volume edition of *Eagles Complete Trees and Shrubs of New Zealand* earned her the **Montana Medal for Non-Fiction** and the **Booksellers Choice Award**. Audrey was a recipient of the **Allan Mere Award** by the New Zealand Botanical Society, in 2009. The University of Otago conferred an **honorary doctor of science degree** on her in 2013.

In 2017 Audrey was selected as one of the **Royal Society Te Aparangi's "150 women in 150 words"** celebrating the contributions of women to knowledge in New Zealand.

Acknowledgement

Many thanks to David Lyttle for sharing his memories of Audrey and for helpful suggestions and comments on this Tribute.

This Tribute was first published in the Newsletter of the New Zealand Plant Conservation Network, *Trilepidea* No. 226

Welcome to our new Patron, Emeritus Professor Sir Alan Mark

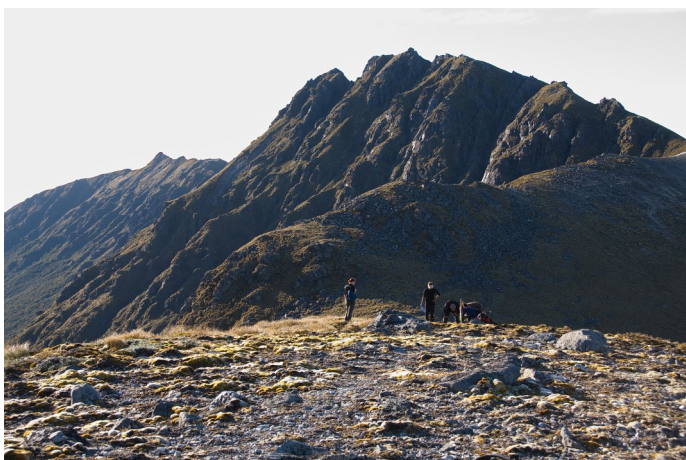
David Lyttle and Allison Knight

It is with great pleasure that we welcome Emeritus Professor Sir Alan Mark as the new Patron of the Botanical Society of Otago, following our previous illustrious patron, Audrey Eagle. Sir Alan is a longstanding member of the BSO and has been an active participant and contributor to the activities of the Society.

Sir Alan has devoted much of his long life to botanical causes and continues to have a base in the Botany Department here at Otago. He has made outstanding contributions to botany, both as an academic teacher and researcher in the Department of Botany at the University of Otago and as an ardent

ecologist and conservationist, devoting much of his own time to these causes. Sir Alan is recognised as one of New Zealand's leading plant ecologists, specialising in the ecology of indigenous tussock grasslands, alpine lands, wetlands, shrublands, forests and lakeshores. He has published some 200 scientific papers. His scientific work underpins our understanding of tussock grasslands and alpine ecosystems and highlights their important role in water capture.

Early on, Alan saw the importance of long-term monitoring of plants. He has initiated a series of long-term projects studying the effects of climate change on alpine ecosystems. These include the first GLORIA (Global Observation Research Initiative in Alpine Environments) sites in the Southern Hemisphere, part of an international network which aims to document changes in biodiversity and vegetation patterns, caused by climate change in the world's high mountain ecosystems. Other localities he has studied include Mt Aspiring National Park, Secretary Island, Maungatua and the Old Man Range where, due to his efforts, data sets covering several decades now exist.



Alan with students on GLORIA site, Mt Burns

He is deeply grounded in his New Zealand 'sense of place' and New Zealand's native plants are at the core of that connection. He has played a pivotal role in advancing a wide range of important conservation issues and first became actively involved in national conservation over the proposed raising of Lakes Manapouri and Te Anau for hydroelectric development. He maintains the importance of science in supporting conservation values and this has come to the fore spear-heading the formation of conservation reserves for tussock grasslands and other vulnerable and ecologically important non-

forested areas. Over the years he has served on many different organisations involved with conservation and environmental issues most notably the Manapouri-Te Anau Lake Guardians which he chaired for the first 26 of its existence. Alan was knighted (KNZM) in 2001 for his services to conservation in New Zealand. In 1975 he was awarded the Loder Cup which acknowledged his outstanding achievements in flora conservation work. He received an Honorary DSc from the University of Otago in 2014 in recognition of a lifetime of scientific research and the Allan Mere Award from the New Zealand Botanical Society in 2015 (nominated by the Botanical Society of Otago).



Alan admiring regeneration in Knights Bush

Alan was always a scientist who did not stay in the ivory tower. He was accustomed to 'getting his hands dirty' and not only communicated his science through professional means, but was willing to get out and do practical things such as native tree planting, cutting out wilding trees and keeping reserves weed-free. His long-standing efforts to get rid of heather from the Wilderness Reserve near Te Anau is one example of many such activities. More importantly, he actively recruited and encouraged others to participate in these tasks. He has a long history of engaging practically with, and giving talks to community groups, talking to the media, and leading the charge for New Zealand and its unique biota. Although Alan is now over 90 he continues to maintain an interest in botanical research and environmental issues.

In 1973, after many years of labour, he published

New Zealand Alpine Plants with Nancy Adams as co-author and illustrator. This seminal work has served as an indispensable reference for botanists and recreational users of the mountains alike, who are interested in the New Zealand alpine flora. It has been carried on many a BSO field trip. In 2012 its successor, *Above the Treeline A Nature Guide to Alpine New Zealand* was published. A second, enlarged, revised edition of this authoritative work was published in 2021. As principal author of this comprehensive volume on the New Zealand alpine flora, Alan has widened our horizons yet again by including chapters by experts on non-vascular plants; lichens, mosses liverworts and fungi, as well as on birds, lizards and invertebrates. Over the years, Alan has been a great friend and supporter of the Botanical Society of Otago and it is a great honour that he has agreed to become our patron.

steady hands and the ability to relocate a specimen while bouncing round. Approximately 99 plant species can be found on The Snares, 22 vascular and 77 non-vascular, so there are plenty of subjects to practise on.



The selenian forest viewed from a sea tunnel (Photo: Stella Fish)



Alan in his garden with a flowering specimen of the high-alpine giant rosette lobelia *Lobelia keniensis* propagated from seed he collected on Mt Kenya in 1966

Botanising from the edge... of a boat.

Stella Fish

Up close and personal is to be expected when looking at plants. How else are you meant to confirm whether those are simple or hooked hairs? But, at times, this isn't always possible. Travel 200 km south of Invercargill to The Snares/Tini Heke. These islands are home to millions of sea birds, so landing permits are elusive, meaning only binocular botany while zodiac cruising is available. But don't let this limit you, there is still plenty to see!

Binocular boat botanising is an important and underrated skill, but requires a few things. Namely

The larger the plants the easier it is to botanise with this method, so the forest is a helpful place to start. Let your attention be drawn to the two tree daisies, *Macrolearia lyallii* and *Brachyglottis stewartiae*, which lend these islands their selenian appearance. With binocular assistance they are distinguishable by comparing the adaxial leaf surface. *M. lyallii* has white tomentum whereas *B. stewartiae* is shiny and green or compare the inflorescences - dark for the former and yellow for the latter.



Macrolearia lyallii and *Brachyglottis stewartiae* (Photo: Stella Fish)

Now for the smaller plants. The dramatic granite cliffs bear two species of *Poa*; *P. astonii* and *P. tennantiana*. Search for their panicles, less than 12 cm and narrow for *P. astonii* and greater than 9 cm and broad in *P. tennantiana*. At the base of these cliffs, closer to the water line, there may be green mossy cushions - but do not be fooled! - these are another

vascular plant, *Colobanthus muscoides*, its similarity noted in its species epithet.



Clumps of *Colobanthus muscoides* against the lichen covered rocks (Photo: Stella Fish)

With luck, the rest of the people in the zodiac may be interested in black and white birds that spend a strange amount of time on the ground. This means pauses, or at least slow cruises, around the inlets, ideal for looking at the mossy seeps and the twisted tree trunks. With over three times the number of vascular plants, the bryophytes are far more varied and diverse. While binocular botany might not enable species, or even genus level, identification, it is still possible to admire the array of colours, growth forms, and textures.

The former is more likely to be seen and can be found in the forests, on its margins and in open fields. *Anisotome acutifolia*, however, is known only from three sites on the main island. Little is known about this species' ecology, with seedlings not observed and even the sex of the plants is unknown. So, if detected, be sure to take notes!



The endemic *Azorella robusta* with flowering *Veronica elliptica* (Photo: Stella Fish)

Binocular boat botanising, an underrated technique for some of those inaccessible places. Next time you take a trip to The Snares, or even Fiordland, be sure to pack them and see what you can find.

Student Articles from BTNY365

Why do Botanic Gardens Exist?

Belen Mino

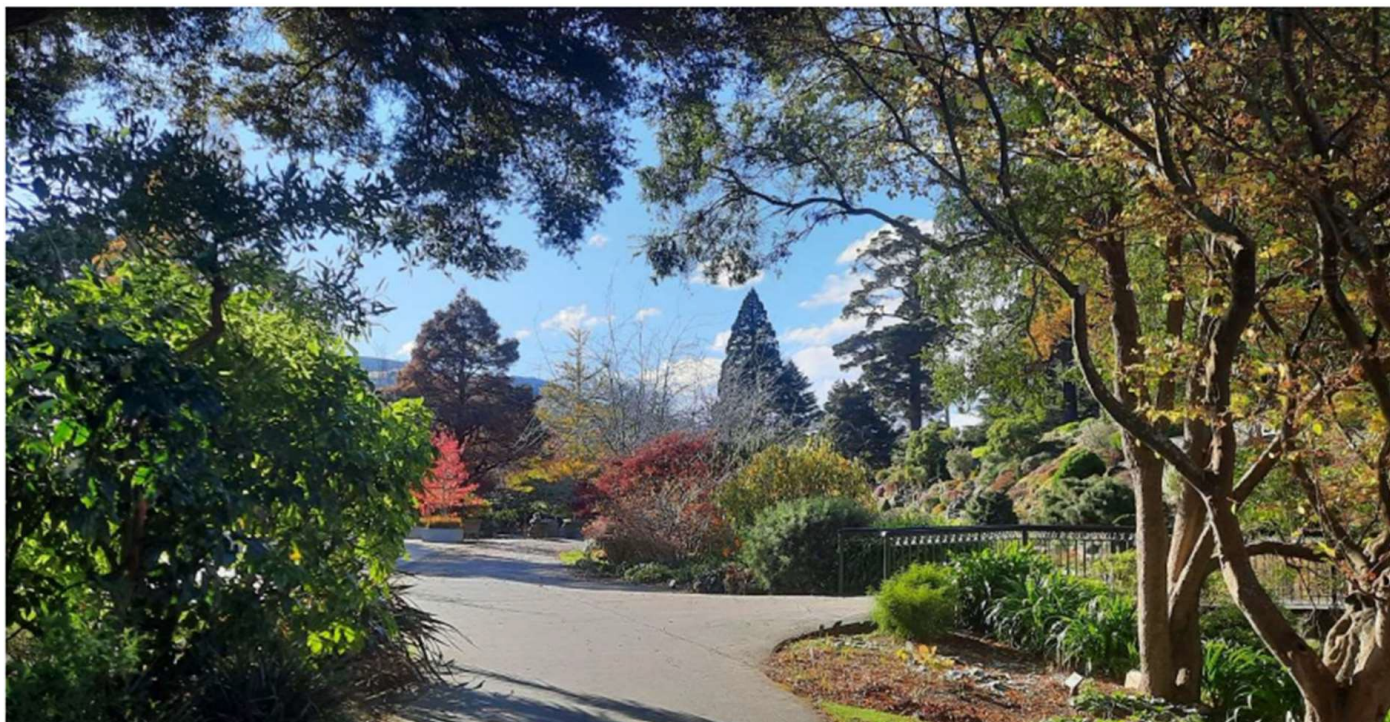
Botanical gardens, botanic gardens, the (insert city name here) gardens or “The Botans”. There are many names for these places that house a lot of plants and biodiversity, but why do they exist?

They certainly have a lot to offer that, even as a plant lover, I had never thought about, which means there is a possibility that there are others who haven't either. Not until I sat down to do some research, reflected on my experiences, and asked others about their own, did I learn that botanical gardens have a rich history of providing important resources for scientific research into medicine, biodiversity, and ecology while also promoting good mental health.



One of the many mossy seeps on the island (Photo: Stella Fish)

But island endemics are the main attraction of these offshore places. It is okay to admit it. The Snares has two, *Azorella robusta* and *Anisotome acutifolia*.



The Dunedin Botanic Gardens in the Autumn (Photo: Belen Mino)

I walk through the local botanical gardens at least once every week to get to university. The scenery is always changing, especially when the seasons start to change. In winter, the trees are bare, there might be some frost blanketing the grass, mimicking the frosted tips of 90's boyband heartthrobs. The only pops of colour are some bursts of green from the grass and some perennial plants that can survive the frosts and chilly winds. In the distance, one can see the cacti thriving within the warmth of the glass-house, oblivious to the cold temperatures outside. Spring comes, and there is bright green as far as the eye can see. Pink, yellow, white, purple and orange buds and blossoms adorn the sides of paths and up above as you walk through the rose arches. Summer offers bright green grass; and the warm weather brings kids and ducks together in a feeding-eating frenzy, with squeals of delight and quacks that sound like maniacal laughter. The chilly days start up again once autumn comes around, and orange, yellow and brown are back in fashion among the trees and rosehips can be spotted on naked rose bushes.

Humans have had a love, fascination, and appreciation for nature for as long as we have existed, with an understanding that plants are essential for our survival as they provide sustenance, nutrients and oxygen. It all started when hunter-gatherers did not have supermarkets and had to rely on local knowledge to identify edible plants from the toxic ones so that they could live to see another day. Lat-

er, animals and plants that served as a source of food were domesticated during the Neolithic revolution and, although it is largely unknown why this happened, it is recognised that taking care of crops is a physically demanding and time-consuming task that could have played a large role in the creation of an economy and the formation of larger communities (Weisdorf, 2005). From then on, knowledge on how to care for and grow plants has advanced, and the first known botanic gardens started to appear.

Without our human curiosity and a deep-seated interest in plants, the medicinal properties of plants might not have been discovered. Plants have been used for medicinal purposes as far back as 60,000 years ago. For a while in human history, this was the only form of medicine available until western medicine arrived over the last century (Pan et al., 2014). One of the earliest botanical gardens was the Botanical Garden of Padua (Chen and Sun, 2018), created in Italy in 1545 for growing and studying medicinal herbs, which ultimately improved the quality of local healthcare. Additionally, botanical gardens can play a beneficial, indirect role in our mental health (Weylen, 2006). Not only is a stroll through the gardens as a form of exercise a way to boost serotonin levels, but studies have shown that regularly interacting with nature can increase positive mood and feelings of calm. I asked my flatmate what she liked most about the local botanical gardens, and she agreed "there are some nice spots where other people do not pass by that much, so you can hide away by yourself and have time and

space to think". Visits to Botanical gardens could even make people more empathetic toward nature ("Nurtured by nature," 2020).

When asked what they enjoy about our local Dunedin Botanic Garden, students of the University of Otago had mixed responses. With most students attending lectures either online from their homes or inside the university buildings, the scenery can get a bit monotonous, which allows the gardens to be used as an escape "they make Dunedin feel like a much nicer place. Like the walk to uni is way better through the botans than following state highway 1." "It's like being out of the city, away and in nature." For the plant lovers, it can also be a way to enjoy having a garden close by if owning one is not a feasible option. "It is (also) cool seeing the variety of plants and I get mad plant envy, especially as someone from Gen Z who won't be able to have their own place and garden for years".



Thick curtains of Tillandsia usneoides at the Cunningham House in the Christchurch Botanic Gardens (Photo: Belen Mino)

Using botanical gardens for conservation purposes is common. Two examples are the Ōtari- Wilton's Bush plant collections in the Wellington Gardens, which aim to conserve endangered plants of New Zealand and nearby islands in collaboration with research and conservation groups. "Seedlings of threatened species are raised and either kept in the gardens as a conservation measure or returned to the wild in plant conservation recovery programmes". Outside of New Zealand, botanical gardens of the Chinese Academy of Sciences have collected around 20,000 species of vascular plants from 2013 to 2018 for the purpose of conservation (Chen and Sun, 2018). With over 27,000 taxa in its living collections, and 8.5 million preserved plant and fungal species, the Kew Gardens are the biggest and most diverse botanical gardens in the world. Managed by The Royal Botanic Gardens, (a botanical research institution) Kew gardens are also

taking steps in response to climate change such as storing seeds of endangered, endemic, or economically important species and assessing the extinction risk of plant species before it is too late (Brewer, 2020).

Botanical gardens have existed for centuries, each built with a purpose in mind, yet they collectively have a plethora of uses and importance in communities. They are free public spaces that offer a peaceful refuge from a concrete and asphalt urban life but can also offer a great deal of knowledge to a layperson, a student, a scientist, a community, or a politician. They are important places for the conservation of endangered plant species. But most importantly, they allow us to appreciate nature and look after what we have.

Further reading:

Wellington Botanical Gardens conservation and their collaborations: <https://wellingtongardens.nz/our-gardens/otari-wiltons-bush/>

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Coccolithophores: The Funky Fashionistas of the Ocean

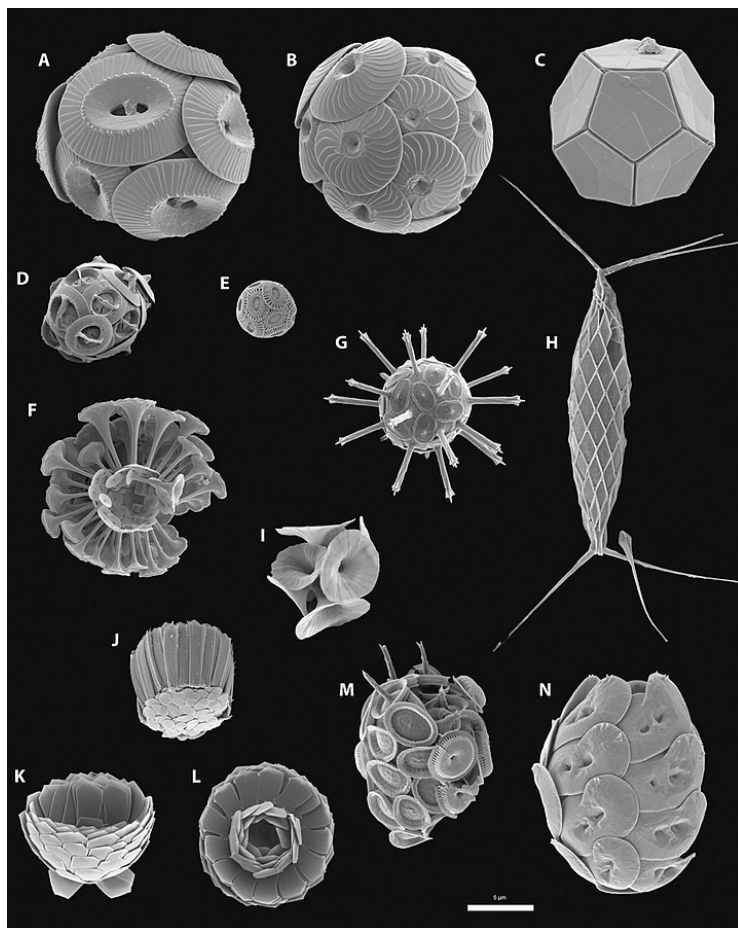
Ariane Turton

What would you say if I told you the largest group of photosynthesizers in the world were also the best dressed? In the wake of last year's bland Met Gala, I've turned to the funky looks of marine phytoplankton for comfort, in particular, the beautiful coccolithophores. Their shells, so delicate and intricate, seem to be illustrated by the artistic hand of nature. From a garden of blooming flowers, to trumpets or a beehive, the sheer artistic diversity hidden at a microscopic level in the ocean is unmatched. As well as looking good, these beautiful organisms are one of the main drivers of the marine carbon cycle, and have even made up some pretty iconic landmarks!

Phytoplankton are one-celled marine organisms which photosynthesize. These microscopic organisms are responsible for around 40% of the total atmospheric carbon fixed annually, while only accounting for 1-2% of global plant biomass (Falkowski, 1994). They play a fundamental role as a keystone species in the marine food web. Coccolithophores are a type of microalgae which form calcium carbonate "plates" in intricate patterns around themselves. They not only fix atmospheric carbon dioxide, like other phytoplankton, but also store carbon in their individual "plates" or coccoliths. When they die, these plates become separated and are deposited on the seafloor, storing the carbon in sediment. They are regarded as a vital component of the open ocean biological carbon pump (De Vargas et al., 2007).

The iconic White Cliffs of Dover are actually made up of dead coccolithophore material! Due to the durability of their outer shells, coccolith remains can be used to date sediment. The remnants of their calcite shells in sediments are called "calcareous nannofossils", tiny chalky fossils which can be examined under the microscope for use in biostratigraphy (Faris et al., 2021). This is the process of using fossilised biological materials to date the layers of a sediment, or "strata", to a specific time period.

I have always been entranced by the intricacy and diversity of these microalgae. The forces of evolution have shaped these organisms to resemble a



The diversity of coccolithophores. Photo credit to Monteiro, F.M., Bach, L.T., Brownlee, C., Bown, P., Rickaby, R.E., Poulton, A.J., Tyrrell, T., Beaufort, L., Dutkiewicz, S., Gibbs, S. and Gutowska, M.A. from <https://advances.sciencemag.org/content/2/7/e1501822>, licensed under the Creative Commons Attribution-Share Alike 4.0 International licence. No changes have been made to this image.

bouquet of exotic flowers, trumpets, a virus particle, a sunflower, and little UFO's, and all for reasons we still don't quite understand. The alga expends a lot of energy forming its coccoliths, and therefore it must perform some function for survival. Raven and Crawford (2012) outline the possible explanations we have for why coccoliths are formed, citing the possibility that increased sinking due to the heavy plates could bring the coccolithophores into deeper, more nutrient-rich waters. Another theory is that these plates protect against pathogenic infection by viruses, or may be in an attempt to protect themselves from grazing by other marine organisms. It has also been posited that the coccosphere may protect the alga from UV radiation at the ocean's surface. Regardless of the true function, I think that the mystery of the coccosphere encapsulates why I love science - there are some things we may never know for sure, but that doesn't stop us marvelling at their wonder.

Unfortunately, through the lens of a changing climate, these little organisms are at risk of their intricate shells dissolving due to ocean acidification. As the levels of CO₂ in the atmosphere heighten, the ocean absorbs it in a dissolved form, where its ions become carbonic acid (Beaufort et al., 2011). This lowers the pH of the ocean, threatening some calcifying organisms like corals and coccolithophores due to an increase of bicarbonate. Ocean acidification has been definitively linked to malformation of calcifying organisms. However, it is largely unknown what the combined effects of ocean acidification and ocean warming will mean for coccolithophores. The ocean is expected to become warmer, fresher, and more acidic in the future. It is expected that, with ocean warming, ocean stratification will become more prevalent, meaning the divide will become more intense between the warmer water at the surface, where photosynthesis can take place, and the cooler waters below, where the nutrient upwell from. This may lead to a decrease of primary production in the ocean. This threat to coccolithophores, and plankton as a whole, has the potential to have ripple effects and cause significant damage upstream in the food chain.

Coccolithophores, though tiny, are diverse and beautiful. Their effects on the global carbon cycle are not to be trivialised, as they contribute to the single largest carbon sink on the planet in their sea-floor deposits. They are also a keystone of the marine food web, and are incredibly useful for biostratigraphy of sediments. However, the changing climate and increase of carbon dioxide in the atmosphere is a threat for all calcifying organisms. As a huge contributor to carbon sequestration and a massive primary producer in the ocean, threats to coccolithophores will completely change the ecology of the ocean. Although we are unsure what exact purpose the ornate coccoliths provide to these tiny life forms, one thing is for certain - the diversity of these phytoplankton are inspiring, both artistically and scientifically. I have been captivated by these little organisms and the funky clothes they wear, and I hope that I have shown you their beauty as well. It's certainly better than what the celebrities give us on the red carpets!

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How lichens help scientists monitor the health of forests

Arlo Priest Forsyth

He tina ki runga, he tāmōre ki raro.

To flourish above, one must be firmly rooted below.

Lichens have been misunderstood for centuries, but as we are learning more about them, we are also learning the messages they convey. They are nature's writing on the walls, the words that Tāne Māhuta cannot speak himself. Lichens can tell us about how well life is thriving and, in their absence, they tell us if the land is being poisoned.

Lichens are classically thought of as an association between two or three symbionts; a fungus (the mycobiont) and a photosynthesising alga or cyanobacteria (the photobiont). However, lichen have undergone a flurry of research in the past 20 years that show they are much more akin to

miniature ecosystems (Hawksworth and Grube 2020). Lichens are often overlooked, so you may not have noticed them much, but lichens are everywhere. From the small and bush-like *Usnea antarctica* found, unsurprisingly, in Antarctica, to the crust forming *Acarospora strigata* found in Death Valley, California, lichens can survive and thrive in even the most extreme environment. They are so common here in Dunedin that I can barely go more than 5 metres along most streets before encountering one. When I walk through a forest or section of native bush, the sheer amount of lichens covering the trees and rocks never ceases to amaze me.



Cladonia lichen in McGoun's track. Photo credit: Arlo Priest Forsyth

Each one of these lichens is not, as it may seem, a passive observer that largely stays the same. In fact, each one of them is a dynamic machine, able to go completely dormant when dry, and rear into photosynthesising action when hydrated. According to one study, lichens in native beech forest here in Aotearoa are so abundant and so efficient, that they contribute significantly to the nitrogen budget of these forests (Green and Lange 1991). It comes as no surprise to me, therefore, that these amazing filters are so harshly impacted by pollution.

Each lichen is like a tiny forest in itself, with microscopic organisms as inhabitants, and like a forest, the air and water flows through them freely

as an open system. They have no filtering mechanism for pollutants, making them highly sensitive to heavy metal contamination and sulphur dioxide (Bačkor and Loppi 2009). One of the main components of air pollution is sulphur dioxide, which is emitted as the result of burning fossil fuels or any other substance that contains sulphur. When dissolved in water it makes acidic ionic compounds which disrupt photosynthesis, but also causes problems in both plant and animal respiratory systems in high enough amounts. Being so sensitive to their environment, lichens have been used as biological indicators of air pollution since the 1950s.

There are a number of ways that researchers have utilised lichens for measuring air quality in any given area. These include mapping lichen diversity, using younger and older lichens along a branch to assess historical atmospheric changes. Lichens can even be transplanted from a clean environment into a study area for a specific time, and the change in chemical makeup, thallus health, and growth form measured (Sujetovienė 2014). These techniques can be used to measure all sorts of pollutants, including heavy metals. Species of *Cladonia*, a common genus of lichens, was even found to drastically change its morphology in response to heavy metal contamination when it was growing beside a zinc smelter. These lichens formed a highly reduced and granule-like fungal body, instead of the strong and upright bodies typical of the *Cladonia* genus. Intriguingly, the granular lichen bodies contained many more heavy metals than their more

upright relatives. These lichens changed their form, and accumulated more heavy metals in the granular structures from the atmosphere, in a more polluted environment (Oszczka et al. 2018). As this



Pseudocyphellaria faveolata. Photo credit: Arlo Priest Forsyth

pollution was more from the air and not the substrate, and it marked out the borders of the suitable habitat for the lichen, it allows for more precise bio-monitoring of industrial contamination of the environment.

It is important to use organisms for bio-monitoring because it shows you, qualitatively, how well life is thriving in an area. Without having some metric of how the environment reacts to pollution, it is completely useless to know even the exact composition of the air. A similar ethos is used in monitoring of rivers, but using fish instead. Fish communities typically exist near the top of their respective food chains, above even macroinvertebrates such as crabs and crayfish, and respond predictably to almost all forms of anthropogenic pollution (Li et al. 2010). This has led to many different, fish-based, river bio-monitoring indices being created and used across the world.

Much of the research and usage of lichens as bio-indicators has been done in urban environments, which makes intuitive sense, as these areas are the most immediately effected by air pollution. However, air pollution does not stay directly above its source, and a study from Malaysia using lichens actually suggests that much of urban air pollution ultimately ends up in the surrounding natural ecosystems (Abas and Awang 2017). Therefore, it's important to expand the monitoring of lichens back to their originating ecosystems, not just places like urban or industrial areas, and more fully monitor the impact of our polluting on the wider area we live in.

Humanity has taken on stewardship of the world. The effects of climate change prove that the dominant view of the natural world as something separate to us, something that we can subjugate without consequences, is wrong. Nature is in every aspect of our lives. I can walk a mere three steps from my backdoor and encounter lichens and moss on the fence, see trees growing in the backyard. We are able to use these naturally occurring tools to listen to the landscape; to take its pulse, to see the poison we make in the lungs of our world; but we must learn to use them effectively, and incorporate this knowledge into our kaitiakitanga.

Kā mihi ki a koutou



Lichens colonising a fire hydrant. Photo credit: Arlo Priest Forsyth

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REPORTS

An Amalgamation of Cryptogams: A Showcase of their Dynamic Life Histories and Understated Role in the Ecosystem, a talk by members of the Cryptogang: Aimee Pritchard, Stella Fish and Kacey Hutchinson, 12th October 2022

Alex Wearing

Cryptogam is derived from the word for “hidden reproduction”. A cryptogam is a plant or plant-like organism that reproduces through spores rather than seeds or blooms. Algae, bryophytes, lichens and pteridophytes are considered cryptogams.

The Cryptogang was formed in 2010 by John Steel. It has frequent meetings to identify cryptogams and use plant keys. The Cryptogang also go on field trips. An Amalgamation of Cryptogams covered the interests and showcased the knowledge of three members.

The first talk was by Aimee Pritchard, who gave an overview of bryophyte (mosses, hornworts, and liverworts) ecology. She said that bryophytes were one of New Zealand’s overlooked plant functional groups. Bryophytes are classified by the substrate they live on. The substrate affects bryophyte responses to different climate conditions and bryophyte diversity. Bryophytes facilitate habitat creation. They are primary colonizers of bare rock and their decomposition forms initial topsoil. Bryophytes are also ecosystem engineers, influencing soil dynamics, nutrient cycling, soil temperature, and hydrology. They stabilize habitats and, later in successional sequences, provide growing stations for colonization by other plant species and sources of nutrients.

Bryophytes are characterized by a high level of diversity at small spatial scales. People have affected the global distribution of bryophytes, increasing the range of some species, but also being responsible for many extinctions.

In New Zealand, there are 520 species of moss (19% endemic), 608 species of liverworts (45% endemic), and 13 species of hornworts (60% endemic).

Aimee Pritchard also talked about bryophytes as indicators of biodiversity, microclimates, climate change, and their influence on community structure and hydrology. She also spoke about their desiccation tolerance, and the characteristics and significance of aquatic bryophytes. Aimee Pritchard concluded her talk by suggesting that bryophytes have been overlooked in the past because they are small and they are often difficult to sample and store. There has also been a lack of specialists.

The second talk was by Stella Fish who talked about the phyllosphere, with a focus on epiphyllous liverworts. The phyllosphere is the aerial region of the plant colonized by microbes. Bryophytes, fungi, algae, and cyanobacteria can all live on leaf and stem surfaces. The phyllosphere is a physically, chemically, and biologically distinct environment. It can be a hostile environment due to rapid changes in temperature and humidity, limited nutrient availability, and solar irradiation.

Liverworts are small green plants with leaf-like stems or lobed leaves occurring in moist habitats. They exhibit a lot of morphological, anatomical and ecological diversity. Liverworts are evergreen, thick or thin textured and can be long-lived. Liverworts are sensitive to forest fragmentation and changes in community structure, which can lead to local extinctions.

New Zealand has a rich liverwort flora. There has not been much research on New Zealand liverworts, but new species are being described.

Stella Fish’s talk showcased both the utility and delights of microscopic investigations. It was illustrated by superb photographs (e.g., a leaf which hosted five species of liverworts, and a liverwort which was growing on a discarded Coca-Cola bottle).

Kacey Hutchinson talked about lichens (foliose, crustose, and fruticose), and the interaction between mycobiont (the fungal component, usually an ascomycete, rarely a basidiomycete) and photobiont (the photosynthetic component, a green alga or cyanobacteria) partners. She also talked about the many uses of lichen by people (e.g., dyes, beers, food, Viagra, bioindicators). Kacey Hutchinson discussed some of the main features used for lichen

identification, noting that lichens can be difficult to differentiate and distinguish. The bulk of Kacey Hutchinson's talk was devoted to many superb photographs of lichens that showed their diversity and beauty.

The study of cryptogams has been greatly facilitated by technological developments in microscopy, and in the creation, manipulation and storage of small-scale digital images. Also, better keys for their identification have been produced. In the past, cryptogams were certainly overlooked in many ways. I can remember New Zealand Forest Service Forest Reconnaissance plot survey sheets from the 1980s, where there was a space for estimating moss percentage cover and that seemed to represent the extent of interest of the role of bryophytes in indigenous forest community structure. Moreover, accurate identification of bryophytes was difficult.

In a recent article, *The Many Meanings of Moss*¹, Nikita Arora notes "Moss is ancient, and grows at a glacial pace, but it lives alongside us everywhere, country and city, a witness to the human world and its catastrophic speed. What can we learn by tuning in to "moss time"?". If we extend this interest in learning to all aspects of bryophytes, it is obvious that we can learn a lot.

Aimee Pritchard, Stella Fish, and Kacey Hutchinson deserve commendation for the time and effort they have devoted to gaining expertise in bryophytes, and for the exquisite quality of their photographs. Their enthusiasm is contagious. Hopefully, it will encourage more people to study and appreciate cryptogams, and to seek out the Cryptogang.

Note

1. This article can be found at: theguardian.com/environment/2022/nov/03/the-many-meanings-of-moss.

2022 Audrey Eagle Drawing Competition Results, 9th November 2022

Angela Brandt

We had three beautiful entries in the 2022 Audrey Eagle Drawing Competition from two of our members. Warm thanks go to Marcia Dale and Belinda Smith-Lyttle for judging the entries.

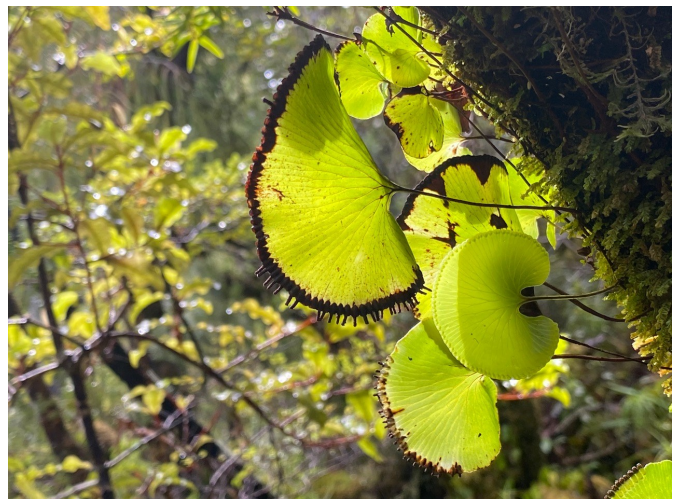
Congratulations to Noelyn Buisman-Hung for winning first place with her drawing of *Drymoanthus flavus* (little spotted orchid). The judges considered the entry beautifully rendered, with the shapes of leaf and stem well-captured and the species' identifying features well-depicted.

Callista Booth-Richards won the second place prize with her entry of *Nepenthes bokorensis* (a tropical pitcher plant). The judges found it immediately recognisable and well-presented, with the detail of the pitcher rim done very well. Callista also took third place with her entry of *Hibiscus rosa-sinensis* (Chinese hibiscus), which was well laid out, making good use of diagnostic features and scale bars.

Well done to our competition entrants! We look forward to seeing more beautiful work from members in the next competition, which will be held in 2024.



Lichen (Photo: Craig Stonyer)



Kid-me-not (Photo: John Knight)

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Website: <http://www.bso.org.nz>Email: bso@otago.ac.nz**Committee 2022-2023**Chair: **Gretchen Brownstein**Vice Chair: **John Barkla**Secretary: **Angela Brandt**Treasurer: **Mary Anne Miller**Newsletter Editor: **Lydia Turley**Website Editor: **Stella Fish**Publications (Native plants of Dunedin): **David Lyttle**Publications (Lichens): **Allison Knight**University Liaison: **Matt Larcombe**Botanical art: **Sharon Jones**Committee: **David Orlovich**Committee: **Taylor Davies-Colley**BrowsteinG@landcareresearch.co.nzmjbarkla@xtra.co.nzBrandtA@landcareresearch.co.nzmaryanne.miller53@gmail.comlydiamturley@gmail.comsls.fish@outlook.comdjl1yttle@gmail.comallison.knight.nz@gmail.commatt.larcombe@otago.ac.nzsharon.jones388@gmail.comdavid.orlovich@otago.ac.nztaylordaviescolley@gmail.comPlease submit copy for next newsletter to Lydia Turley by 10th June 2023**This Newsletter was published on 28 February 2023.****ISSN 0113-0854 (Print) ISSN 1179-9250 (Online)***Ephemeral wetlands -- Mud turfs developing as the pond dries out over summer (Photo: Gretchen Brownstein)*



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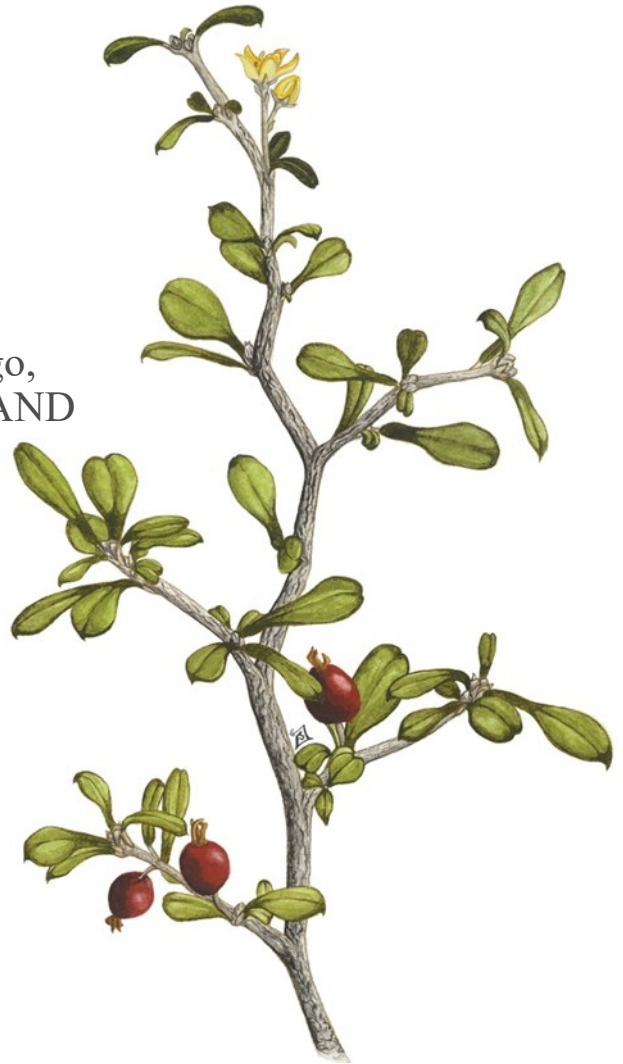
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Right: Corokia cotoneaster branch (Artist: Sharon Jones)



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