

The Vasculum

The Society of Herbarium Curators Newsletter Volume 19, Number 1: January 2024



Table of Contents

Page

Message from the President.....	2
From the Editor's Desk.....	4
News from the Society.....	5
SPNHC-TDWG Joint Conference Details.....	6
West Virginia Herbarium Curators Annual Meeting.....	8
Art in Collections Spotlight: An interview with Caite Mae Ramos.....	10
<i>The Herbarium Handbook</i>	13
Book Review: <i>In the Herbarium-The Hidden World of Collecting and Preserving Plants</i>	16
Early Career Advice.....	18
Featured Herbarium.....	23
SHC Worldwide.....	31
Society Officers and Editorial Committee.....	36



We invite you to become an SHC member by visiting:

www.herbariumcurators.org/membership

Annual Dues

Student	\$5
Regular	\$10
Sustaining	\$25
Life	\$200

Join us online



SHC Website

www.herbariumcurators.org



Facebook

www.facebook.com/herbariumcurators



Twitter

www.twitter.com/socherbcurators



LinkedIn

www.linkedin.com/company/socherbcurators

Message from the President



Dear Members,

Happy New Year as we ring in 2024! I hope this finds the SHC community well.

I want to lead with a thank you to all the hard-working committees and leadership for the Society, and the folx promoting and supporting herbaria and herbarium curators. We have a special thank you to Michael Thomas for his work on maintaining the web-site and our membership list. Thank you, Tilottama Roy, for your efforts as Newsletter Editor of *The Vasculum*.

As we enter 2024, we will need to seat some critical leadership positions. Annually we elect a Member-at-Large. Please consider serving in the role and helping SHC navigate the 21st Century. This year we will also be electing a new Treasurer. This is a critical position for the SHC and I urge our members to consider serving the SHC in this role. Maribeth Latvis has done an excellent job in this position, and I encourage anyone with an interest to reach out to Maribeth with questions. If you are interested in either elected role or wish to nominate members, contact Past-President Erin Manzitto-Tripp.

At our last Executive Board (EB) Meeting, the EB recognized our affiliated societies as American Society of Plant Taxonomy (ASPT); International Association of Plant Taxonomists (IAPT); Botanical Society of America (BSA); and the Society for the Preservation of Natural History Collections (SPNHC). Shawn Krosnick has accepted a nomination to be the SHC liaison to the ASPT and Alina Freire-Fierro has accepted the Liaison role for the SPNHC. We are still looking to engage community members who are willing to serve as Liaisons to BSA and IAPT. Please consider helping the SHC through a liaison role.

Planning is underway for *Botany 2024* in Grand Rapids, Michigan on June 15-19. As part of planning, the SHC holds the annual members meeting and sponsors a special symposium. Past-President Erin Manzitto-Tripp serves as our Program Director. They are actively planning for a symposium topic. We hope to have a longer meeting time for the membership meeting this year and will work to schedule a time as soon as the program gets set. More information will be provided, along with the annual report, as we get closer to the conference date.

This year is also the International Botanical Conference from July 21-27 in Madrid, Spain. This is a great opportunity to engage our international membership. There has been discussion of holding a SHC Satellite Meeting during the conference and we have several EB members planning to attend. Reach out to our 3rd year Member-at-Large, Socorro Gonzalez, if you are interested in participating or assisting in the planning.

Looking forward to the next six months, we hope to hold a couple meetings of the SHC Executive Board to advance discussions related to annual meetings, engaging

membership, financial challenges, and sustainable growth of the society.

This will be my last *The Vasculum* letter as President of the Society of Herbarium Curators. Thank you to all the incredible people in SHC working to build the society and promote herbaria.

On behalf of the Society of Herbarium Curators,

Anna K. Monfils

President of the Society of Herbarium Curators (2022-2024)

The Society of Herbarium Curators (SHC) unites the world's herbarium professionals in discussion, training, action, and support for the benefit of herbaria, science, and society. SHC envisions a network of innovative, well-trained herbarium professionals, empowered to recognize and address local and global stakeholder needs with organizationally sustainable strategies that advance the well-being of herbaria, science, and society. For more information, please join us online:

— www.herbariumcurators.org —

Cover Photos: (Top) *Amphilophium buccinatorium* (DC.) L.G. Lohmann, a member of the plant family Bignoniaceae, Lúcia's main study group (Photo credit: Lúcia Lohmann); (Bottom) Lúcia Lohmann at the University & Jepson Herbaria examining Bignoniaceae specimens (Photo credit: Staci Markos).



From the Editor's Desk

Dear Fellow Herbarium Enthusiasts,

As we stand on the threshold of a new year, it is with great pleasure that I extend my warmest greetings to our cherished community of herbarium lovers. As we bid farewell to the past and embark on a new journey, let us find inspiration in the resilience and beauty that the world of herbaria offers.

As we all know, herbaria are not merely collections of pressed plants, but rather sanctuaries where the pages of nature's history unfold, revealing stories of evolution, adaptation, and the intricate dance of life that has been ongoing for millennia.

In the spirit of our shared passion, this issue of *The Vasculum* aims to be a source of appreciation, knowledge, and connection for herbarium enthusiasts and experts in our community. Through the pages of our newsletter, we aspire to weave a narrative that not only celebrates the meticulous work of researchers and scholars worldwide, but also invites each of you to explore and appreciate the rich tapestry of botanical wonders. Our current issue, as usual, has been enriched by articles that cover a broad range of topics, including news, views, and perspectives from herbaria all across the globe.

As always, our readers' and our contributors' enthusiasm for herbaria is the driving force behind the success of our newsletter. Whether you are a seasoned botanist, an avid nature lover, or someone just beginning to discover the enchantment of pressed plants, your unique perspective and experiences enrich the fabric of our collective journey.

I extend my heartfelt gratitude to each member of our Society for being an integral part of our community and our newsletter. Your love for herbaria is the driving force behind our shared exploration of the botanical world, and I am confident that together we will continue to nurture and cultivate this passion for years to come.

Thank you for your dedication and enthusiasm! Hope you all have a wonderful 2024 ahead!

Tilottama Roy
Editor, *The Vasculum*
Associate Professor, Department of Biology
Missouri Western State University

News from the Society

The Martin L. Grant Herbarium (ISTC) Is Now Housed in Iowa State University's Ada Hayden Herbarium

The University of Northern Iowa's Martin L. Grant Herbarium (ISTC) has been transferred on permanent loan to the Ada Hayden Herbarium (ISC-IA) at Iowa State University, and ISTC's estimated 50,000 specimens are accessible for study or loan. Directors/curators of ISTC included Martin L. Grant, Lawrence J. (Larry) Eilers, Kay E. Klier, and Steve L. O'Kane, Jr. Additional collectors of note associated with ISTC include K. Heil, T. G. Lammers, J. W. Lehmann, J. H. Peck, D. M. Roosa, K. E. Van Norman, and W. C. Watson. The decision to transfer ISTC resulted from the retirement of Dr. O'Kane, who had been ISTC's Curator since 1996. With the addition of the holdings of ISTC to those originally held at ISC and the transfer of the holdings of IA in 2004, the Ada Hayden Herbarium now contains around 710,000 specimens. Please reach out to Deborah Q. Lewis, Curator of the Ada Hayden Herbarium (ISC/IA/ISTC) at dlewis@iastate.edu for more information.

Call for Nominations for SHC Treasurer

The Society of Herbarium Curators is seeking candidates to run for the position of Treasurer. This elected position is amongst the most important leadership roles within the society. The elected individual will serve as Treasurer for a duration of four-years, during which time this individual will also be member to the Executive Committee. This is an excellent experience and opportunity to help direct the growth of our society. Elections will be held this spring (2024).

If you would like to nominate others to run for Treasurer at SHC, or if you wish to self-nominate and be considered for this position, please reach out to Erin Manzitto-Tripp at erin.manzittotripp@colorado.edu.

Call for sessions relevant to natural history at ASTC 2024 Annual Conference

The Association of Science and Technology Centers (ASTC)—the U.S.-based membership organization for science centers and museums—has included a special call for sessions relevant to work in natural history museums and related settings in the Call for Proposals for the ASTC 2024 Annual Conference, which will be held September 28–October 1 in Chicago. ASTC is especially interested in sessions relevant to those working with natural history collections, research taking place in natural history settings, and content focused on natural sciences.

Affiliation with an ASTC-member organization is not required to submit a session proposal nor to be a presenter. ASTC especially welcomes first-time submissions and proposals from people who have not previously attended an ASTC conference.

The deadline for submission is February 16, 2024. See the Call for Proposals for details and a link to the submission form (<https://www.astc.org/astc-2024/call-for-proposals/>).

SPNHC-TDWG Joint Conference 2024

Where:

Ginowan City, Okinawa, Japan

When:

2-6 September 2024

Theme:

Enhancing Local Capacity, Elevating Global Standards

Website:

<https://spnhc.org/events/event/spnhc-tdwg-2024/>

Contact Us:

okinawa2024@spnhc.org

We are thrilled to announce that the 39th annual meeting of the Society for the Preservation of Natural History Collections (SPNHC) will be held in Asia for the first time in nearly forty years of the organization's history. Even more exciting, the meeting will be organized jointly with the Biodiversity Information Standards (TDWG) in a hybrid format to support in-person and virtual networking across the globe.

The conference venue, the Okinawa Convention Center, is located next to a beach in Ginowan City on the Okinawa Island, Okinawa, Japan. The nearest airport is Naha Airport (Code: OKA), less than a 4-hour flight from Tokyo hub airports. The local time zone is Japan Standard Time (UTC+09:00) or 13 hours ahead of the Eastern Daylight Time. You can find affordable accommodations near the venue as well as in downtown Naha.

The conference will run from Monday through Friday, 2-6 September 2024. The week will be packed with the main program and fun events, but please plan to arrive early and extend your stay afterward as optional field trips and collection tours will be arranged on the weekends immediately prior to and following the official meeting schedule.



Figure 1: SPNHC logo (Credit: Osaka Natural History Center)



Figure 2: Okinawa Convention Center (Credit: Okinawa Convention Center)

The Ryukyu Islands are characterized by their subtropical to tropical biota and embrace a higher level of species richness and endemism, contributing to flora and fauna unique to each island group. Because of their ecological significance, a part of the region is protected as Natural World Heritage sites. Okinawa is also known for its rich history, tradition, arts, and culture. You don't want to miss the amazing opportunities Okinawa has to offer!

We highly encourage participation from under-represented regions and diverse communities. We welcome any inspiring topics from global-scale integration of natural history collections into biodiversity knowledge infrastructures to smaller-scale community capacity building that can contribute to the overarching theme "Enhancing Local Capacity, Elevating Global Standards."

The SPNHC-TDWG 2024 program is in active development. Our call for organized sessions (symposia, workshops, etc.) and individual contributions will be open very soon. Please check out our meeting website, social media posts and emails from us for the latest updates including abstract submission instructions and deadlines.

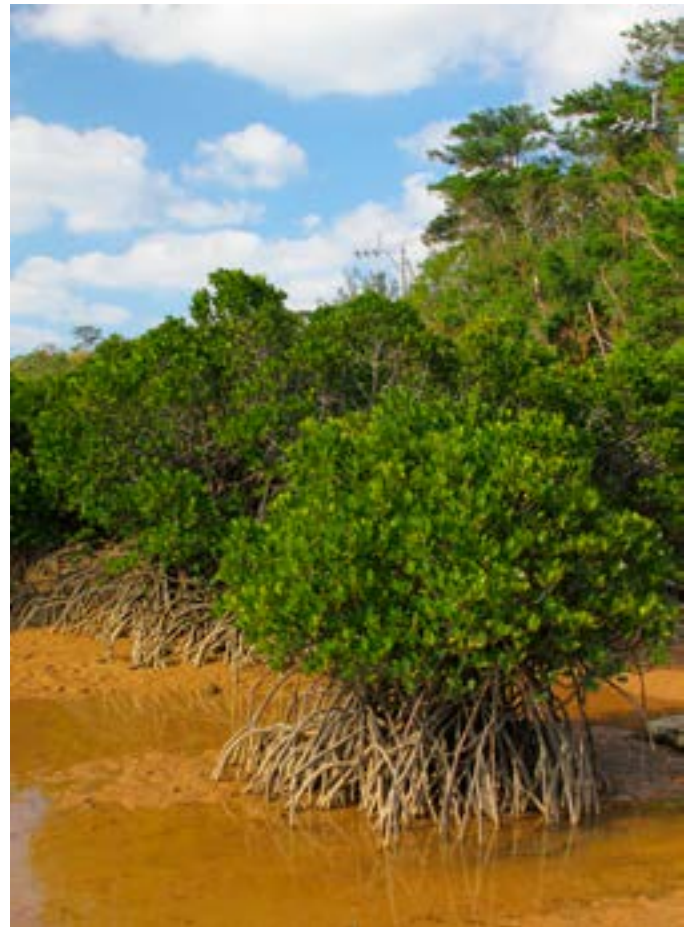


Figure 3: *Rhizophora stylosa* Griff. from Okinawa (Photo credit: Okinawa Convention & Visitors Bureau)

Mariko Kageyama
SPNHC-TDWG 2024 Organizing Committee

West Virginia Herbarium Curators Annual Meeting

On October 27, 2023, the West Virginia Herbarium curators met at the WV Department of Natural Resources headquarters in Elkins, WV. Attending were Donna Ford-Werntz (WVA), Pamela Puppo (MUHW), Kathy Gregg (WVW), Jay Raymond (WVIT), and James Vanderhorst, Brian Streets, and John Burkhardt (all from WVHP, West Virginia Heritage Program). A tour of the WV DNR herbarium showcased a table covered with specimens of new state records (Fig. 1) and included discussion of how best to curate some 400-500 specimens by noted physician and avid plant collector E. E. Hutton, whose collections spanned the years 1928-1997. Live discussion of various herbarium concerns, accomplishments, and plans followed during lunch at a local Venezuelan restaurant.

After lunch we were treated to an illustrated recap by Pam Puppo of a recent workshop she attended at the Association of Southeastern Biologists Meeting in Winston-Salem, North Carolina called “Supporting inclusive and sustainable research infrastructure for systematics (SISRIS) by connecting scientists and their specimens.” This workshop was organized by Andrea Weeks (GMUF) and Shawn Krosnick (HTTU) and more information can be found on their website, <https://github.com/aweeks3/SISRIS>. A valuable outcome of this presentation is that more WV herbaria and curators will be participating in GBIF, ORCID, and Bionomia!



Figure 1. Jay Raymond, Pam Puppo, Brian Streets, John Burkhardt, and Kathy Gregg observing new state records for West Virginia (Photo credit: Donna Ford-Werntz)

With lovely fall weather, we adjourned to enjoy a colorful fall hike around the Fox Forest Wildlife Management Area, located adjacent to the WV DNR headquarters (Figs. 2, 3). Although the first face-to-face meeting of WV herbarium curators was held in June 2013, the group communicated almost entirely by telephone and email, with occasional, fortuitous encounters at WV Native Plant Society meetings and fieldtrips, until Pam Puppo organized a Zoom meeting in December 2021 (see *The Vasculum*, 17.1). Another in-person meeting took place in November 2022 on the campus of WV Wesleyan College, where we toured Wesleyan’s herbarium (WVW) and Buckhannon’s Nature Park and Learning Trail. In the future we hope to continue meeting annually, to further strengthen our collaborations and enhance our collections.

Figure 2. Retiring state ecologist James Vanderhorst (left) leading a tour of FFWMA. L-R, Donna Ford-Werntz (WVA), Brian Streets (WVHP), John Burkhart (state heritage botanist), and Pam Puppo (MUHW) (Photo credit: Kathy Gregg)



Figure 3. Inevitable selfie. L-R, Jay Raymond (WVIT), John Burkhart, Donna Ford-Werntz, James Vanderhorst, Kathy Gregg, Pam Puppo, and Brian Streets enjoying an outing in FFWMA (Photo credit: Pam Puppo)



Katharine B. Gregg
Curator, George Rossbach Herbarium (WVW)
West Virginia Wesleyan College, Buckhannon, WV 26201

Art in Collections Spotlight: An interview with Caite Mae Ramos

Art has the potential to communicate complex feelings and ideas and forge emotional connections with the observer. As such, artistic expression can serve as a powerful tool to engage members of the public on issues related to biodiversity and conservation, often in ways that science alone cannot. As repositories of plant biodiversity in space and time, herbarium collections are accustomed to scientific research use of specimens—for example, as a source of genetic, spatial, or trait data—in addition to botanical outreach and education. Here, we feature an example of how our plant specimens could foster interdisciplinary collaborations with artists to promote an appreciation of plant diversity in new audiences. We sat down for a Q and A with **Caite Mae Ramos**, an interdisciplinary artist pursuing an MFA at the University of Arkansas, whose work integrates herbarium specimens:

Tell us a little about yourself—what inspires your work?

My practice utilizes woodworking, growing plants, social media, and drawing to investigate the natural world and human interactions with it. I'm interested in creating scenarios and objects that reflect our linked means of survival to instigate a curiosity and camaraderie in what it takes to be alive.



Figure 1: Caite Mae Ramos (third from left) and the UARK Herbarium team

How did you first hear about the UARK herbarium? Or, what led to the collaboration with the plant natural history collection?

I had a project idea I wanted to do with native grasses, but even with years of plant ID experience, grasses were wildly intimidating, and I knew I needed someone to go out with me and show me where they grow in context. I approached a friend who immediately told me I needed to talk to botanist Jennifer Ogle, Collections Manager at the University of Arkansas Herbarium (UARK).

I went on a nature walk she was leading and afterwards awkwardly asked for her email. She very generously met up with me for coffee and French fries and invited me to the plant collection. Flash forward a year and I'm still overwhelmingly impressed and enthralled with the horde of knowledge and information stemming from that place.

What perspectives does the UARK herbarium provide to your work?

I've always had a fascination with systems and methods of recording. After going to the herbarium, I was struck by how potent these methods were—specifically to show place and time. What plants are growing where and at what time is such a beautiful, grounding way to show where we're at as humans. A perspective through the lens of the land. What a refreshingly novel way to view the world around us while also encouraging care towards the natural world and the presence to be observant.

Going to the herbarium reminds me of the importance of taking note—observationally or literally. Looking at the different handwriting and notes of the botanists felt so intimate and personal. Not only was I looking at the specimens, I could glimpse at a plant and get an idea of what the land around us once looked like—and what the possible trajectory of its future could look like—and this was the source.

Your most recent exhibit “Remnants Revisited” focuses on big bluestem (*Andropogon gerardi*). What drew you to this species, in particular?

I remember the first time walking into a prairie space and it was the only plant that greeted me face to face. It's oriented with the same verticality of the standing human form, and I was immediately struck by its presence, individually and collectively.

Andropogon gerardi Vitman (big bluestem) is native to local remnant prairies here [in Arkansas] as well as to the prairies in South Dakota, where my family is from. This grass has become a link, a way to understand where I'm at now, and a way to further connect with my heritage from my father's side as an Oglala Lakota of The Oceti Sakowin Oyate (The Great Sioux Nation), of which I am a citizen.



Figure 2: ‘Remnants Observed’: An Exhibition; Caite Mae Ramos, 2023; Photo Documentation by Mallory Berry

Beyond the positive environmental balance prairie grasses provide, big bluestem became a conduit for investigating a curiosity and care towards the land, while also providing a sense of relief; a reminder of the community in what's growing around us. *Andropogon gerardi* has taught me to never judge the significance of something by its appearance or presence (there's a lot we can't see). There's potency in the collective. And to stop slouching.

You also hold a Botanical Sketching group at the Botanical Garden of the Ozarks in Fayetteville, AR. What do you hope people gain from this?

It's really important to look at the ways in which we interact with the natural world. How we're all straining for survival is so primal, messy, absurd, and glorious.

The Botanical Sketchers of the Ozarks was founded by me and another Artist and Master Gardener named Karla Caroway. We both have experienced the importance of drawing from observation. Drawing can be an incredible tool for learning, and for relearning how to see. It utilizes your mind, body, sight, and you can infuse whatever emotion or perspective you're feeling that day through your mark-making. We hope people will look at the natural world surrounding them a little more and sit with what they find. We really wanted to create a space that was comfortable to do this in and build a little community as well.



What projects do you see on the horizon, or what is your next artistic muse/project?

The main site of my research has been taking place on an unprotected remnant prairie called

"The Oak Knoll", located on University of Arkansas property. I'd like to bring attention to this space particularly as this site is integral to my practice and could be converted to another use at any time. This remnant is a fraction of what's left of thousands of acres of continuous prairie in South Fayetteville and as most of the readers in *The Vasculum* probably know, it's of great importance to conserve and protect these rare and biodiverse spaces.

Figure 3: 'Remnants Rest'; Caite Mae Ramos, 2023; Photo Documentation by Mallory Berry

To see more of Caite's work and activities, please check out their Instagram @wetplantlet.

Maribeth Latvis
Director, The University of Arkansas Herbarium (UARK)
Caitlyn Ramos, MFA (2025)
The University of Arkansas and UARK

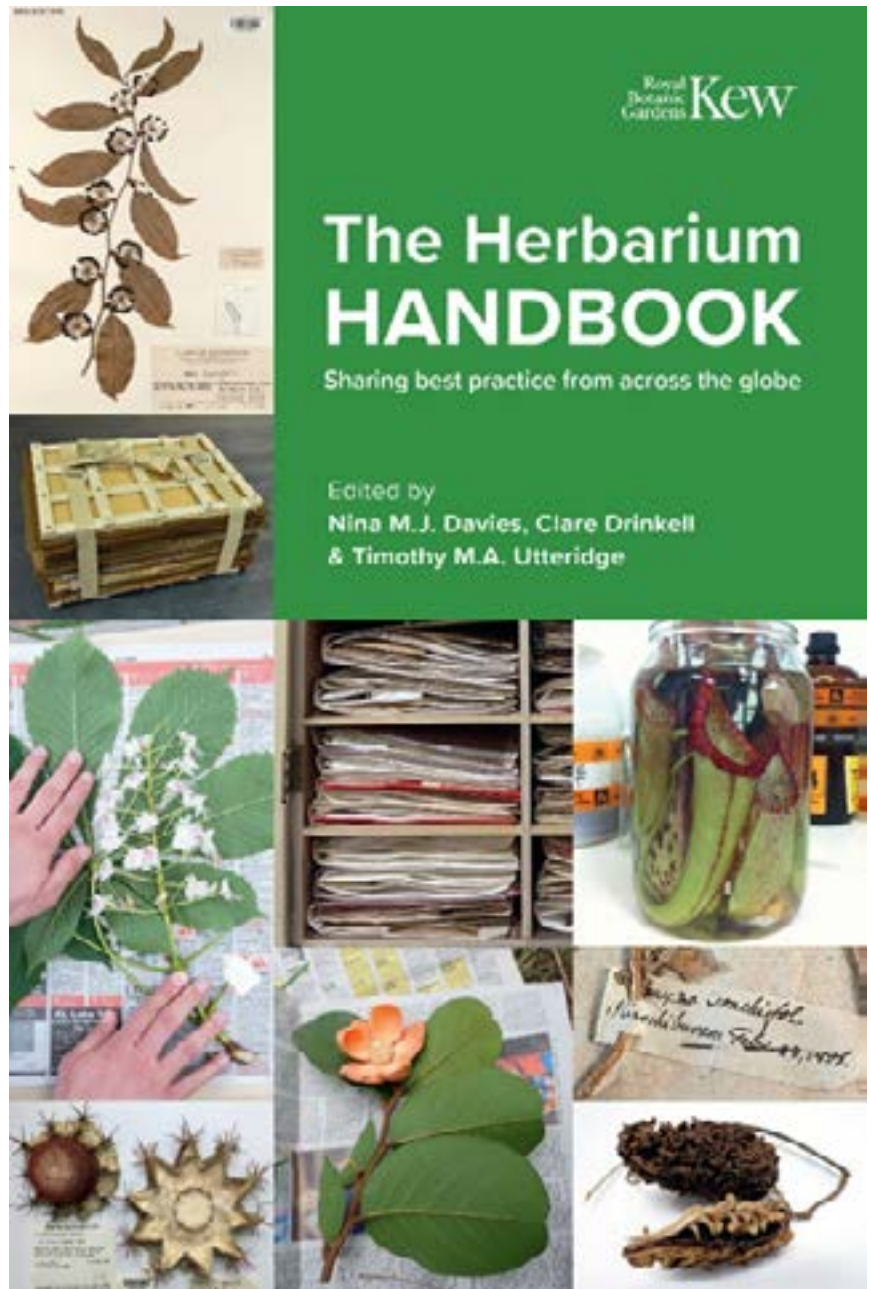
The Herbarium Handbook

Editors: Nina Davies, Clare Drinkell, Timothy Utteridge. 290 pp, 234 x 156 mm. Over 700 colour photographs. Paperback, ISBN 9781842467695. Kew Publishing, TW9 3AE, UK 2023.

The *Herbarium Handbook* (Fig. 1) is a key addition to Kew Publishing's series of handbooks, sitting alongside the *Kew Plant Glossary*, *Tropical Plant Families Identification Handbook*, and *Temperate Plant Families Identification Handbook*. This book is a new version of *The Herbarium Handbook*, first compiled and edited by Kew botanists Leonard Forman and Diane Bridson in 1989, following a popular International Diploma Course in Herbarium Techniques. Those who are familiar with this manual will know it as a valuable resource for some of the fundamental aspects of herbarium care and management: the preparation, housing, preserving, and organisation of herbarium collections, and associated subjects.

This latest version has undergone a major transformation not only in design but also in concept, yet we hope to have captured some of the essence of the original book. Now updated, we hope it is an inclusive and accessible guide reflective of contemporary herbarium practises. We have consulted widely, drawing upon expertise of authors at Kew and in herbaria across the world, and setting out best practise application in herbaria of any size or location. The book is a richly illustrated reference tool intended to help with training the next generation of staff, interns, and volunteers, share ideas on techniques and workflows and advise on time-saving and cost-effective processes.

Figure 1: Cover of The Herbarium Handbook (Image copyright © Board of Trustees, RBG, Kew.)



We aimed for the handbook to carry many different voices, and these are interspersed throughout the chapters as useful anecdotes, herbarium highlights (Fig. 5) and personal profiles gathered from partners and collaborators across the world, all playing a key role in contributing a collective knowledge to the handbook. From Japan to Australia, Scotland to Kenya and USA to Brazil, in all there are more than 70 contributing authors from 19 herbaria large and small, historic and new.

Figure 4: Introduction to Databasing and Digitisation (Image copyright © Board of Trustees, RBG, Kew)



Fig. 5 East Africa Herbarium highlighted (Image copyright © Kennedy Matheka)



Clare Drinkell, Nina Davies
Senior Curator-Botanist Africa & Herbarium Curation Manager
Kew Herbarium, UK

Book Review:

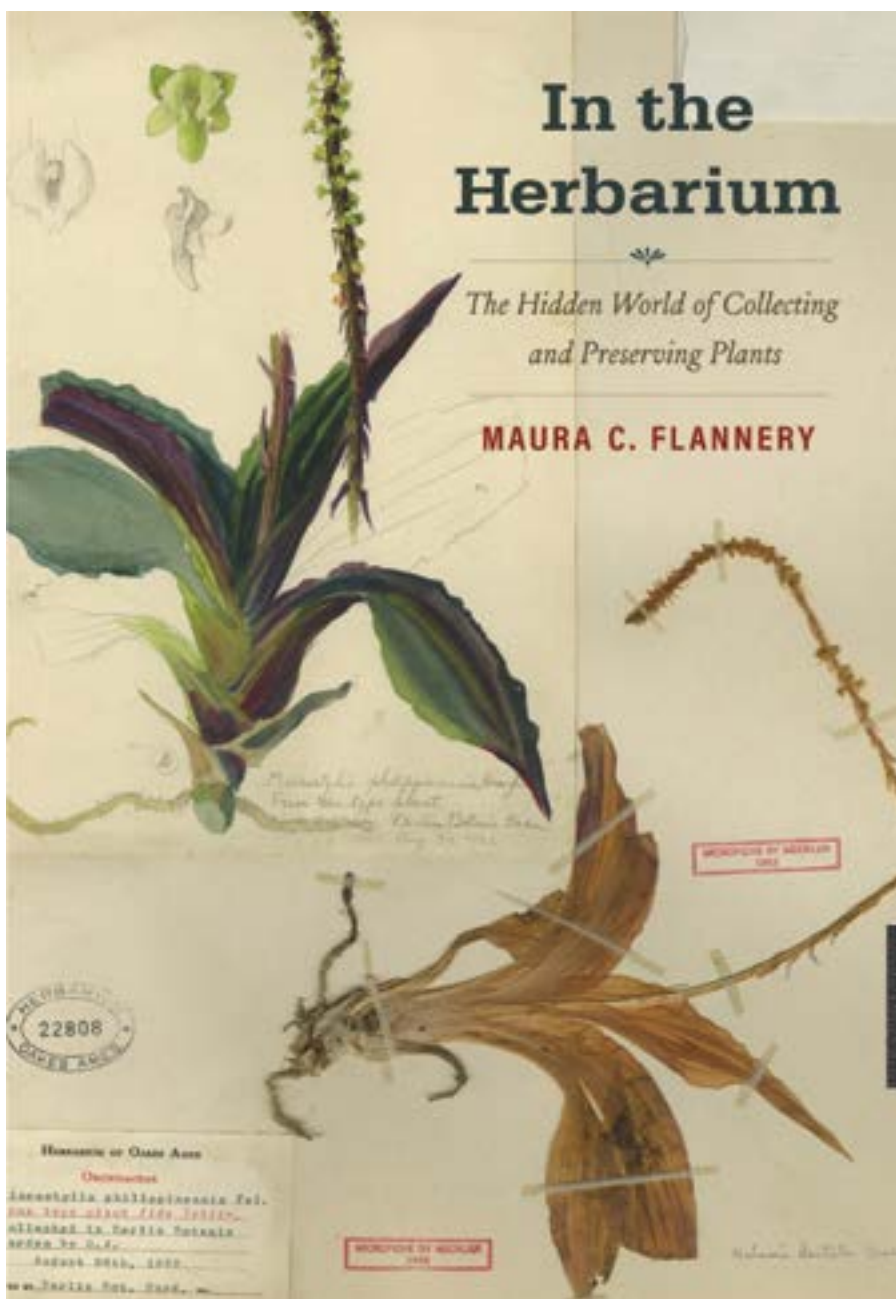
In the Herbarium: The Hidden World of Collecting and Preserving Plants

Author: Maura C. Flannery; Yale University Press, New Haven and London. 336 Pages (6.12 x 9.25 in, 42 b-w illus.) Hardcover: US\$35.00. ISBN 978-0-300-24791-6

Maura C. Flannery's book *In the Herbarium: The Hidden World of Collecting and Preserving Plants* (Fig. 1) follows the history of plant collections from 16th-century Italy all the way to present-day California. Flannery, a Professor Emerita at Saint John's University, presents this book as a one-stop shop for everything from digitization of specimens to metadata, to the archiving of both physical and digital specimens.

Flannery presents information in easy-to-understand language and effortlessly describes the importance of collection maintenance and the continued preservation of pressed specimens. Flannery describes herbaria and their essential role in studying changing climates, preserving historical and ethnobotanical history, and their impacts on molecular biology.

Figure 1: Cover of the book (Specimen of the orchid *Malaxis dentata* Ames, with watercolor done by Blanche Ames of the living plant [00101734, The Orchid Herbarium of Oakes Ames of Harvard University]; provided by Maura C. Flannery)



Flannery's story emphasizes on a call for greater connectivity among the world of herbarium curators, through digitized databases and large-scale biodiversity information networks, and points to the complex challenges surrounding individual herbaria, that often struggle with interoperability among the large databases of herbaria worldwide, complicating scientific research.

Written in a very lucid manner, Flannery's book makes the world of plant collections accessible to everyone, regardless of skill, experience, or education, and is a warm invitation to explore the world of plant biodiversity through the exploration of herbarium collections. The information is made presentable and comprehensible to people at any stage of their plant collections. The book is available on multiple platforms in physical, digital, or audio formats and is a must-read when it comes to life in the herbarium.

Tyson Cook, undergraduate researcher
Connor Root, undergraduate researcher
Tilottama Roy, Associate Professor
Missouri Western State University, USA

Early Career Advice

Lúcia G. Lohmann (Fig. 1) is a Professor in the Department of Integrative Biology and the Director of the University and Jepson Herbaria at the University of California at Berkeley, USA.

How have herbaria enriched your research?

All of my research has been collections-based – it's hard to even think about my research without thinking of herbaria! During my undergraduate studies, I conducted research at the SPF Herbarium at the University of São Paulo, Brazil, where I identified specimens, compiled species distribution data, and prepared morphological descriptions for different floristic treatments.

In my third year as an undergrad, I started working on a project in the Brazilian Amazon. During that time, I studied the collections deposited at INPA, the Herbarium of the National Institute for Amazonian Research, in Manaus, Brazil. This research was part of a collaborative project with ca. 100 taxonomists that led to the publication of the Flora of the Ducke Reserve, a field guide that rapidly became an essential reference for Amazonian botany. While my research started by using herbaria in classic taxonomic studies, it subsequently moved into using specimens for phylogenetics, phylogenomics, character evolution, and biogeography, among others.

How have herbaria enriched your teaching?

I have used herbarium specimens in different courses, especially “Systematics and Evolution of Seed Plants,” which I have taught repeatedly for the past 20 years. Toward the end of this course, students participate in a field trip, where they prepare their own herbarium specimens, identify the materials collected, and conduct formal taxonomic descriptions. The samples collected often represent new records and are deposited in various herbaria. Using herbaria in teaching is an excellent way for students to learn basic curatorial activities, get acquainted with classic taxonomic practices, and gain a deeper appreciation for collections-based research. Several students first encounter a herbarium during their undergraduate studies, inspiring them to think about ways to use specimens in their own research projects.

What types of outreach activities do you do for the general public? Where to start?!

As an undergraduate student at the University of São Paulo and a graduate student at the Missouri Botanical Garden, I often conducted herbarium tours. During that time, we would showcase the collection to visitors and



Figure 1: Lúcia Lohmann at the Serra do Imeri, an unexplored mountain range in Northern Brazil (Photo credit: Herton Escobar / USP Images)

discuss its importance. Since then, I have also given presentations to the general public regularly. I usually talk about our research projects, highlighting our field expeditions, lab work, and the importance of herbaria (and natural history museums in general) for research, education, and conservation. I have also provided several interviews to newspapers, magazines, radio stations, and TV shows. More recently, we brought artists, photographers, and documentarists into field expeditions, resulting in two art-science exhibits focused on the Amazonian flora and a documentary, “At the Top of the Amazon: In Search of New Species,” launched last month. These activities were great ways to bring collections-based scientific research to the general public’s attention and help overcome the lack of plant awareness.

What made you first interested in herbaria?

I first became interested in botany during high school when I went on field trips with biologists from a Brazilian non-governmental organization focused on environmental education. During one of those trips, I had an “aha moment” when I realized that I wanted to become a plant systematist, a career I didn’t even know existed up to then! I soon joined an undergraduate program in biology at the University of São Paulo. After taking a fantastic “Plant Systematics” class, I was 100% convinced I wanted to pursue a career in botany. As soon as that course was over, I started an internship on plant systematics under the supervision of Dr. José Rubens Pirani, the course’s instructor – this was when I saw a herbarium for the first time! I will be eternally grateful for this opportunity, which was life-changing for me.

What was your first herbarium-related job?

My first experience with herbarium work was my undergraduate internship with Dr. José Rubens Pirani. During that time, I worked on floristic inventories of multiple Brazilian national parks. This internship was crucial for my botanical education, allowing me to conduct extensive fieldwork (in the Espinhaço Range of Eastern Brazil and Central Amazonia), develop research projects in the herbarium, learn how to conduct classic taxonomic studies, and gain experience in plant identification. Most of my undergraduate work focused on the plant family Bignoniaceae, which includes *Handroanthus serratifolius* (Vahl) S.O.Grose (locally known as “Ipê”), the national flower of Brazil, my home country. I became fascinated with that plant group and have continued to study it until today, 30 years later (Fig. 2)!



Figure 2: *Amphilophium buccinatorium* (DC.) L.G. Lohmann, a member of the plant family Bignoniaceae, Lúcia’s main study group (Photo credit: Lúcia Lohmann)

What was the species of your first herbarium collection, and where did you collect it?

The collection Lohmann #1 was *Callichlamys latifolia* (Rich.) K.Schum., a member of the Bignoniaceae! I collected it at the Ducke Reserve, in Central Amazonia.

What are some herbarium-specific challenges you have faced during your career, and how were you able to overcome them?

The biggest challenge is the need for more infrastructure and support for herbaria, an ongoing problem for natural history collections worldwide. While this is a global problem, it is most severe in the tropics, where research funds are scarce, and the appreciation for collections-based research is limited. Interestingly, these are the most biodiverse regions on the planet, but where biodiversity is less known, and where collections-based research is most needed!

What challenges do early career curators and collection managers face, and how could they be met?

The first challenge is securing funds to ensure natural history collections reach their full potential. The possibilities offered by collections are endless, but the resources are scarce. One way to overcome this challenge is by educating as many people as possible about the importance of biodiversity and the role of natural history collections for research, education, and conservation – I feel we could do a better job at that. Various media channels are good at discussing the struggles associated with biodiversity loss and climate change but often forget to emphasize the beauty and importance of biodiversity for our lives. We need to convey a more optimistic message, which is crucial to spark action and hope. An improved appreciation for natural history museums would help us secure more resources for herbarium curation, allowing us to develop exciting new projects to improve our understanding of the world surrounding us and establish science-based conservation priorities.

What was the best herbarium/career advice that you received?

Take time to examine each specimen that passes through your hand. In other words, take time to read the labels, observe individual characters, and learn about plant distribution while doing any kind of herbarium work. Every material we mount, digitize, image, or file has much to teach us. Taking advantage of every opportunity to learn from specimens makes herbarium work a lot of fun! Herbarium curation is endless, which also means endless learning opportunities!

What advice would you give for early career members to be successful?

Get out in the field! I am very fortunate for all my field experience since my early days as an undergrad. During fieldwork, we see plants in action – this is where our imagination is most active and where our best research ideas emerge (Fig.3).



Figure 3: Lúcia and a colleague pressing plants in the field (Photo credit: Herton Escobar / USP Images).

The more we learn about plants, the more interesting it becomes! Once we learn the main plant groups, clade names, characters, and distribution patterns, it is hard to stop – we just want to learn more and more! Botany leads to discoveries daily – it is impossible not to be fascinated by the beauty and diversity of plants!

How is being an early career curator/collections manager nowadays better than when you began your career?

The new tools and electronic resources available expedite research and curatorial work immensely. I started working in botany in the early 1990s, when there was no Internet, and computers were not broadly available. I typed my first herbarium labels on a typewriter! At the time, we had to use a printed version of the *Index Kewensis* to look for plant names and publications. Scientific papers had to be mailed through inter-library loans. It could take months for a scientific paper to reach our hands through snail mail! No images of plant specimens were available online, and limited literature was available for most Brazilian plants. The only way to identify several Brazilian plants was to travel abroad to examine type specimens deposited in the world's largest herbaria. We now have an incredible amount of plant resources online and a wealth of tools that allow us to study herbarium specimens in more detail, such as high-quality imaging, high-throughput phenotyping, and museomics. The new technologies enable us to quickly collect vast amounts of data, opening up exciting new avenues for plant research and education.

How is being an early career curator/collections manager nowadays more challenging than when you began your career?

While the new data and tools are fantastic resources, it is easy to be overwhelmed by the wealth of information. One of the most significant challenges is to remain focused and have explicit goals. It is easy to get lost in a multitude of projects and tasks. Having a clear vision shared by all members of a herbarium team is crucial to advancing the mission of individual collections.

How can early career members better leverage herbarium sciences into the future?

Through integrative, multi-disciplinary, and collaborative projects that help advance our biodiversity knowledge, while also contributing to solving the global challenges ahead.

What are the important ways herbarium staff can promote and advocate for their collections?

One way to advocate for herbarium collections is by highlighting the jewels and gems of the collection and telling exciting stories about the plants and the people involved. Everyone loves a good story, and herbaria have lots of those to tell. Be creative when showing the collection, and find new ways to relate specimens to different aspects of people's lives. People often forget that plants are crucial for food, clothing, construction, health, and medicine. Collections offer wonderful opportunities to highlight the importance of plants for our own existence!

What are some future challenges you see early career members facing, and how can they rise to meet those challenges?

With habitat destruction increasing exponentially, early-career scientists must work fast and find ways to expedite biodiversity documentation, accelerate taxonomy, and advance species discovery. This information is crucial for biodiversity protection and habitat conservation. Skilled botanists trained in emerging technologies are more likely to make significant contributions. Acquiring solid botanical knowledge and the diverse skills necessary to help overcome the global challenges ahead can be daunting for early-career scientists.

What is the best thing about managing a herbarium collection?

I love studying plants, discovering new morphologies, interpreting distribution patterns, and learning about

their history! I also love the collaborative nature of collections-based work. It is super fun to be in an environment where everyone cares deeply about plants and can share new findings daily. Herbaria are true centers of discovery and innovation.

What is the one most important thing that a herbarium does?

Herbaria are windows into the past. Perhaps the most important thing they do is to allow us to understand how plant morphology, distribution, and genetic structure change over time. Herbaria preserve the history of plants through centuries, including information on extinct populations (Fig. 4).

What is the future of herbarium science?

Even though herbaria are old entities that follow ancient methodologies, herbaria have to adapt to change. The future of herbarium science depends on three main things: (i) our ability to overcome the taxonomic impediment (i.e., the shortage of taxonomists), (ii) our ability to expedite herbarium science through new technologies such as machine learning, high-quality imaging, and genomics, and (iii) an active international community of experts that use collections extensively and contribute to their curation worldwide. Herbaria are as good as the quality of their data. Collections must be constantly updated and used creatively by diverse audiences to address new scientific questions, educate the next generation of botanists, share the value of plants with different communities, and address issues of societal relevance. Essential insights into the global challenges ahead, such as biodiversity loss, adaptation to climate change, and species conservation, can be found in herbaria.

Do you have any closing advice for early career members?

First, take advantage of every opportunity to visit herbaria. Herbaria are found worldwide – try to visit them, learn from their collections, and contribute to their curation everywhere you go! Second, take time to be out in nature botanizing. While herbaria provide crucial information about plants, the knowledge gained by seeing plants in nature is irreplaceable. Third, let your passion, curiosity, and creativity drive your work – this will allow you to think outside the box and ask innovative questions that may lead to real breakthroughs. And last, but not least, be persistent and never give up. Botany is not always an easy career, but dedication and perseverance will allow you to overcome any challenges that you may encounter. The world needs more botanists, and it would certainly be a better place if there were more plant lovers out there!



Figure 4: Lúcia at the University & Jepson Herbaria examining Bignoniaceae specimens (Photo credit: Staci Markos).

Early Career Advice is a regular feature of *The Vasculum*. If you have questions you would like to ask or if there is someone you would like to see interviewed, please contact Nina M. House, current president of the Early Career Section (earlycareer@herbariumcurators.org).

Featured Herbarium

The Auckland War Memorial Museum/Tamaki Paenga Hira herbarium (AK), Auckland, New Zealand

The Auckland Museum Herbarium (AK) is housed within the Auckland War Memorial Museum/Tamaki Paenga Hira, which is located on a prominent hilltop in central Auckland with extensive views across the harbour of the largest New Zealand city (Fig. 1). It is funded mostly by the ratepayers of Auckland and is one of the three largest New Zealand herbaria.

The herbarium contains specimens from around the world but specialises in indigenous and exotic wild plants of the New Zealand region and the South Pacific.

Scope and size of the collections

The Herbarium contains comprehensive collections of all plant groups, algae, and lichens, with an emphasis on northern New Zealand and its offshore islands. The secondary emphasis is on the whole of the New Zealand region, stretching from the Kermadec Islands in the north (29°16'S), to the subantarctic islands in the south, including Campbell Island, the most southern of the New Zealand region (52°37'S). The third priority is the southwest Pacific. The Herbarium was founded in 1874 based on the collections of the Museum's first fulltime director and botanist, Thomas F. Cheeseman (1845–1923, Fig. 2; see also Table 1), and his exchanges both within New Zealand and with northern hemisphere herbaria (see Goulding 1974, 1975).

Figure 1 (Top right): The present Auckland Museum building, opened in 1929 in the Auckland Domain, central Auckland, housing the herbarium (AK) (Photo credit: Auckland Museum); Figure 2 (Bottom right): Thomas F. Cheeseman FLS FZS FNZInst. (1845–1923) botanist and Director of the Auckland Museum (1874–1923) (Photo credit: Auckland Museum)



Cheeseman described many New Zealand (Fig. 3) and Rarotongan species, and authored floras of both New Zealand and Rarotonga (Cheeseman 1903, 1906, 1914, 1925). In recent years the exchange programmes have been scaled down because of the modern aggregation of data and images on shared websites.

The Herbarium was in storage with limited access after Cheeseman's death, until Lucy M. Cranwell (1907–2000) began her career at the Auckland Museum in 1929. Part of her job was to collect for new displays (Fig. 4) for the new building. She went on to become an internationally renowned botanist and palynologist. After marrying the American S. Watson Smith in 1943, she moved permanently to America as a war bride where she continued her work on Gondwanan pollen and Hawaiian peat until her death at Tucson, Arizona (Cameron 2000). She began her life-long studies on Hawaiian montane bogs in 1938 under the direction of Carl Skottsberg of Sweden. Over 400 duplicate specimens of their resulting joint angiosperm collections are housed in AK (Fig. 5).

Databasing the collection started in 1989 and since then completing the databasing has been a major focus for the herbarium staff. Of the incorporated specimens, it is estimated that only 23,000 foreign dicotyledon specimens (as of October 2023) remain undatabased. The total collection numbers some 334,000 specimens, 76% of these collected within the New Zealand region (see Table 2). The angiosperms are the largest group, totalling nearly 60% of the collection, and the other groups all less than 10% each (Table 2). Specimens from New Zealand number over 254,000, with 79% of these being wild indigenous, 14.6% wild exotic and only 6.4% cultivated (see Table 3).

Important collections

The herbarium contains the main collections of the following (numbers are predominantly of seed versus no-seed plant collections are identified): J. Adams (N.Z., 1766 specimens), J.E. Attwood (N.Z., 1568), [M.] Ball (N.Z., 549), J.K. Bartlett (N.Z., Cook Is., W. Samoa mainly lichens & bryophytes, 14075), J.E. Braggins (N.Z., Sri Lanka, ferns & bryophytes, 17270), E.K. Cameron (N.Z., various SW Pacific, 17866), T.F. Cheeseman



Figure 3. Syntype of *Celmisia major* Cheeseman (Asteraceae), AK 9903, cliffs Manukau Heads, west of Auckland, collected by T.F. Cheeseman in December 1882 and described in 1925 (Photo credit: Auckland Museum)

(N.Z. & Rarotonga, 7549), R.C. Cooper (N.Z., 5341), E. Craig (N.Z. & worldwide, ferns, 51), L.M. Cranwell (N.Z., includes algae, 3918), P.J. de Lange (N.Z., Australia, Cook Is., 18368), R.O. Gardner (N.Z., Fiji, Niue, New Guinea, 7795), E.D. Hatch (N.Z., orchids, 612), B.W. & G.C. Hayward (N.Z., lichens, 7756), P. Hynes (N.Z., 5944), V.W. Lindauer (N.Z., algae, 13925), H.B. Matthews (N.Z., 2992), F. Shakespear (N.Z., 323), J.H. Simmonds (N.Z. & Australia, eucalypts, 522), A.P.W. Thomas (N.Z., 444), E. Phillips Turner (N.Z., 863), A.E. Wright (N.Z., Cook Is., Tonga, 18353).

The herbarium also contains duplicate collections made by the following botanists whose main collections are held by other herbaria:

a. Collections mainly from New Zealand include: B.C. Aston (446 specimens), J. Banks & D.C. Solander (545), G.T.S. Baylis (285), T.W.N. Beckett (mosses, 101), J.E. Beever (mosses, 4432), S. Berggren (bryophytes & algae, 538), R. Brown (36), J. Buchanan (82), H. Carse (1632), L. Cockayne (1200), W. Colenso (321), T. Kirk (1630), R.M. Laing (mainly algae, 213), J.T. Linzey (mosses, 189), B.E.G. Molesworth (1123), L.B. Moore (2276), W.R.B. Oliver (150), B.S. Parris (mainly ferns, N.Z., 1856), D. Petrie (1519), G.O.K. Sainsbury (mosses, 310), W.W. Smith (21), W.L. Townson (1486), H.H. Travers (60).

b. Collections mainly from outside New Zealand include: F.M. Bailey (Australia, 118 specimens), A. Bennett (England, 106), R. Brown (Australia, 153), W.M. Canby (USA, 187), L.M. Cranwell, O.H. Selling & C. Skottsberg (Hawai'i, 416), I. & O. Degener (Hawai'i, 407), F.R. Fosberg (mainly Hawai'i & French Polynesia, 27), I.C. Martindale herb. (USA, 411), W.H. Harvey (mainly Australia, algae, 529), J.H. Maiden (Australia, 22), J.D. McComish (Lord Howe & Norfolk I., 65), B.E.G. Molesworth (Malaysia, 136), F. von Mueller (Australia, 43), B.S. Parris (mainly ferns, non-N.Z., 992), R.A. Philippi (Chile, 183; see Gardner 2019), F.J.K. Vaupel (Samoa, 242), W.A. Whistler (SW Pacific, esp. Samoa, 1084), H.B.S. Womersley (South Australian algae, 813).



Figure 4: Syntype of *Stenogyne cranwelliae* Sherff (Lamiaceae), AK 25253, from an upland bog, Kohala Mountains, Hawai'i, collected by: L.M. Cranwell and C. Skottsberg, 9 September 1938. Hawaiian Bog Survey 1938; no. 3185 (Photo credit: Auckland Museum)

Two gifted registered herbaria have been incorporated into AK: Plant Protection Centre, Levin Herbarium (LEV) of 5040 sheets in 1998; and the University of Auckland Herbarium (AKU) of 54,000 sheets and packets in 2002. The University collection included the historically important New Zealand macroalgae collection of Victor W. Lindauer (1888–1964) containing nearly 14,000 sheets. Also, several unregistered herbaria have been donated, including the Auckland Regional Authority collection of 2475 vascular plants in 1986; the Eastwoodhill Arboretum collection of 1700 cultivated woody exotic species mainly from the northern hemisphere in 2018 (see Cameron 2022); and many smaller private herbaria.

Type material

Some 2,350 specimens of primary types are held, 85% from the New Zealand region. The foreign types are mainly historical exchanges from Australia, U.S.A. including Hawai'i, and Cheeseman's Rarotongan collections made in 1899. All type material has been imaged, along with 66,000 general collections, and all the images are available online from the Museum website and JSTOR Global Plants (types only). New Zealand vascular plant type material has been documented by Goulding (1978, 1980), Wright (1980), and Herrick & Cameron (1994). Some 63% of the types come from the herbaria of T.F. Cheeseman (1252 sheets, Figure 3) and V.W. Lindauer (218 sheets, Figure 6).

For over three decades, herbarium guidance and management has benefitted from the direct involvement with the New Zealand National Herbarium Network (NZNHN, since 1982), the Council of Heads of Australasian Herbaria (CHAH, since 1984) and the Managers of Australasian Herbarium Collections (MAHC, since 2009).



Figure 5 (Top right): Vegetable sheep, *Raoulia eximia* Hook.f. (Asteraceae), AK 209589, originally collected by Lucy M. Cranwell et al. for a Museum display, 5 January 1931. A compacted pale-coloured, alpine cushion plant to 1 m across resembling a sheep from a distance. Endemic to the mountains of the South Island of N.Z. (Photo credit: Auckland Museum); Figure 6 (Bottom right): Holotype of the brown seaweed *Hecatonerma stewartensis* V.J.Chapm., AK 295761, collected by E.A. Willa, at Port Pegasus, Stewart Island, New Zealand on 10 April 1948, ex Herb. V.W. Lindauer. The Auckland Museum herbarium contains nearly 14,000 macroalgae specimens from Lindauer, including his personal herbarium and several of his exsiccatae sets that were distributed around the world (see Nelson 1996) (Credit: Auckland Museum)



All databased specimen label data is available from: the Auckland Museum website (<https://www.auckland-museum.com/discover/collections>); GBIF (<https://www.gbif.org/>); AVH (<https://avh.chah.org.au/>); and, for types only, JSTOR (<https://plants.jstor.org/>). Data information requests should be sent to: Dhahara Ranatunga (dranatunga@aucklandmuseum.com).

Staff and Research

Curator: Dan J. Blanchon (N.Z. lichens, vascular plants), dblanchon@aucklandmuseum.com

Associate Curator: Yumiko Baba (Elaeocarpus in N.Z. and Fiji, and tropical plant taxonomy), ybaba@aucklandmuseum.com

Collection Manager: Dhahara Ranatunga, dranatunga@aucklandmuseum.com

Part-time technicians: Frances Duff, Darryl S. Jeffries

Honorary Research Associates: John E. Braggins (N.Z. liverworts & ferns), Ewen K. Cameron (N.Z. native and adventive vascular flora, offshore island floristics and ecology), Rhys O. Gardner (N.Z. and SW Pacific vascular plant taxonomy), Peter J. de Lange (plant ecology, conservation management and biosystematics), Wendy A. Nelson (N.Z. marine macroalgae), Matt A.M. Renner (bryophyte morphological and phylogenetic diversity), Mike D. Wilcox (N.Z. cultivated vascular plants incl. forestry species, marine macroalgae).

Volunteers: 12–14 volunteers, many long-serving (Figure 7), provide approximately 40 hours assistance of general curation each week.

Acknowledgements

The author would like to thank the following Museum staff: Martin Collett and Pia Gahagan (Documentary Heritage) for information; Dan Blanchon, Yumiko Baba and Dhahara Ranatunga (Botany staff) and Joshua Salter (Botany volunteer) for feedback on an earlier draft.



Figure 7: The longest-serving botany volunteer, Meryl Wright (1931–2019), mounted specimens for 5 hours each week for over 39 years, mounting >60,000 specimens during that period. Volunteers carry out most of the mounting of new specimens, imaging, and much of the filing (Photo credit: Auckland Museum, August 2013)

Literature cited

- Cameron, E.K. 2000. Obituary. Lucy May Cranwell, MA, DSc, DSc(Hon), FLS(Lond.), FRSNZ, 1907-2000. *New Zealand Journal of Botany* 38: 527–535.
- Cameron, E.K. 2022. Eastwoodhill Herbarium now available online. *Friends of Eastwoodhill Newsletter Autumn/Winter*: 10–11.
- Cheeseman, T.F. 1903. The Flora of Rarotonga, the chief island of the Cook group. *Transactions of the Linnean Society of London. Series 2. Botany* 6: 261–313.
- Cheeseman, T.F. 1906. *Manual of the New Zealand Flora*. Government Printer, Wellington, New Zealand.
- Cheeseman, T.F. 1914. *Illustrations of the New Zealand Flora*. 2 volumes. Government Printer, Wellington, New Zealand.
- Cheeseman, T.F. 1925. *Manual of the New Zealand Flora*. 2nd ed. Government Printer, Wellington, New Zealand.
- Gardner, R.O. 2019. A historical collection of Chilean plants in AK (Auckland War Memorial Museum herbarium). *New Zealand Botanical Society Newsletter* 138: 13–17.
- Goulding, J. 1974. Notes on the Cheeseman herbarium. Part 1. Exchange with USA herbaria before 1900. *Records of the Auckland Institute and Museum* 11: 105–117.
- Goulding, J. 1975. Notes on the Cheeseman herbarium. Part 2. Exchange with European herbaria before 1900. *Records of the Auckland Institute and Museum* 12: 95–120.
- Goulding, J. 1978. Annotated checklist of type specimens of New Zealand plants in the Auckland Museum herbarium. Part 1 & 2, Pteridophyta and Gymnospermae. *Records of the Auckland Institute and Museum* 15: 37–44.
- Goulding, J. 1980. Annotated checklist of type specimens of New Zealand plants in the Auckland Museum herbarium. Part 4, Monocotyledons except Gramineae. *Records of the Auckland Institute and Museum* 16: 87–104.
- Herrick, J.F. and E.K. Cameron 1994. Annotated checklist of type specimens of New Zealand plants in the Auckland Museum herbarium (AK). Part 5, Dicotyledons. *Records of the Auckland Institute and Museum* 31: 89–175.
- Nelson, W.A. 1996: The Lindauer Legacy – current names for the *Algae Nova-Zelandicae Exsiccatae*. *New Zealand Journal of Botany* 34: 553–582.
- Stead, O. (ed.) 2001. *150 Treasures*. David Bateman Ltd. Auckland, New Zealand. 195p.
- Wright, A.E. 1980. Annotated checklist of type specimens of New Zealand plants in the Auckland Museum herbarium. Part 3, Monocotyledons - Gramineae. *Records of the Auckland Institute and Museum* 15: 45–53.

Table 1. Herbarium Curators of AK herbarium in chronological order and years in office. Note – the Museum opened in 1852, and the herbarium started 1874

Botany Curator	Years in office	Total years
Thomas F. Cheeseman	1874–1923	49
No curator from Cheeseman's death until the new building opened with the new Curator		
Lucy M. Cranwell (later Cranwell Smith)	1929–1944	15
Betty E.G. Molesworth (later Molesworth Allen)	1944–1947	3
Robert (Bob) C. Cooper	1948–1971	23
Jeanne H. Goulding (acting)	1971–1972	1
Anthony (Tony) E. Orchard	1972–1978	6
Jeanne H. Goulding	1978–1980	2
Anthony E. Wright	1980–1991	11
Ewen K. Cameron	1991–2023	32
Dan J. Blanchon	2023–	

Table 2. AK herbarium totals in the different plant groups, collected within the New Zealand region or from outside of New Zealand ('Foreign')

Plant group	N.Z. region	Foreign	Totals	% of total
Macroalgae	21,685	5,847	27,532	8.2
Liverworts & Hornworts	18,152	2,101	20,253	6.1
Mosses	22,067	4,943	27,010	8.1
Lichens	27,021	3,608	30,629	9.2
Ferns & Lycophytes	22,587	9,682	32,269	9.7
Gymnosperms	3,865	761	4,626	1.4
Angiosperms	138,915	29,892 [+ 23,000*]	168,807 [+23,000*]	57.4
Totals	254,292	79,834 (incl. non-databased)	334,126 (incl. non-databased)	

*= an estimation of the number of foreign dicot specimens incorporated in the collection, but yet to be data-based

Table 3. AK herbarium totals for specimens from the New Zealand region

Plant group	Wild indigenous	Wild exotic	Cultivated indigenous	Cultivated exotic	Totals
Macroalgae	21,468	216	1	-	21,685
Liverworts & Hornworts	18,004	146	1	1	18,152
Mosses	21,711	355	1	-	22,067
Lichens	27,020	-	1	-	27,021
Ferns & Lycophytes	21,670	636	120	161	22,587
Gymnosperms	2,045	271	101	1,448	3,865
Angiosperms	88,854	35,582	2,365	12,114	138,915
Totals	200,772	37,206	2,590	13,724	254,292

Ewen K. Cameron
 Ecameron@aucklandmuseum.com
 Hon. Research Associate (recently retired Curator of Botany)
 Auckland War Memorial Museum/Tamaki Paenga Hira,
 New Zealand

Society of Herbarium Curators Worldwide

Preserving the Paranaense forest from

Misiones, Argentina

Welcome to the column where we highlight various projects accomplished by SHC members from across the globe. We are thankful to Manuel Luján at the Royal Botanic Gardens, Kew (UK) for arranging this article compiled by his colleagues from Argentina.

Misiones is a province located in northeast Argentina, bordering with Paraguay and Brazil. It has nearly 1.3 million inhabitants and is home of one of the Seven Natural Wonders of the World: The Iguazu Falls. The province shelters all of the Atlantic forest found in Argentina, the Paranaense forest (Selva Paranaense) (Fig. 1), which is one of the largest pristine forests left in the world. The Paranaense forest harbours 52% of Argentina's biodiversity with more than 150 species of mammals, including jaguars; 564 species of birds; 260 species of fish; 116 species

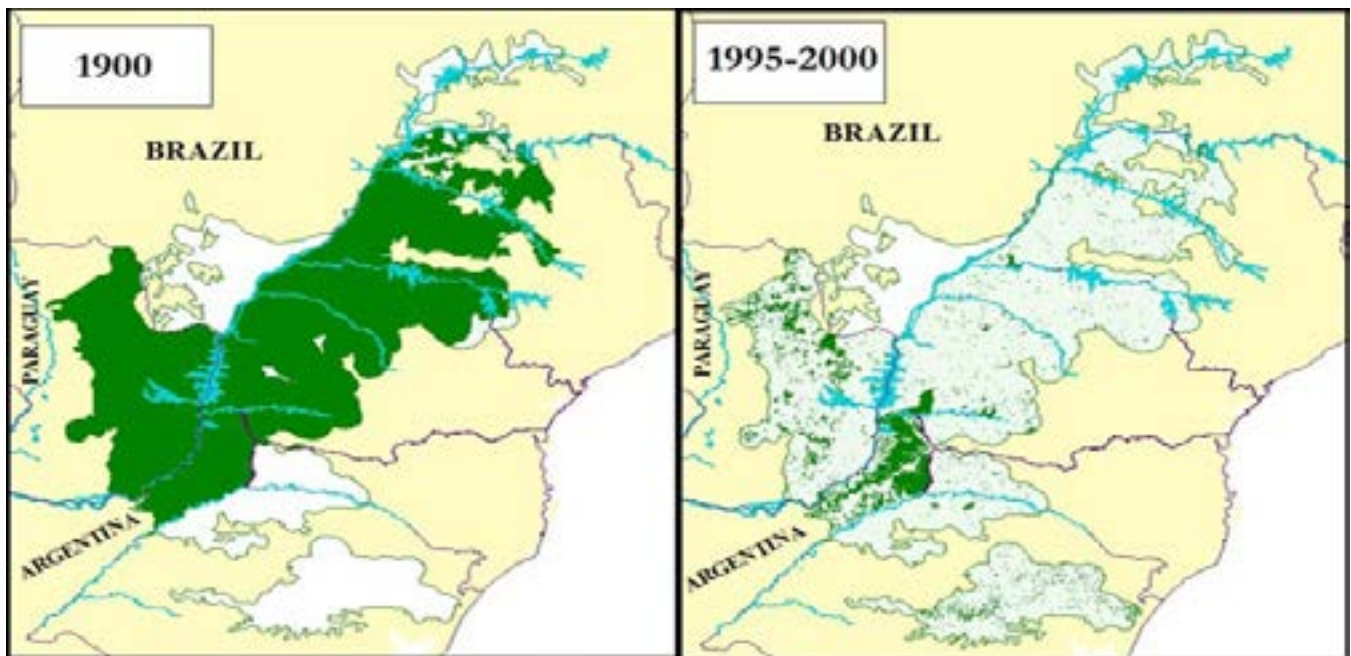


Figure 1: Map of the Paranaense forest showing the degradation over 120 years. The largest forested (green) area is located in the Province of Misiones, Argentina (Modified from Holz & Placci, 2003)

of reptiles; 68 species of amphibians; and thousands of plants and fungal species. Due to the high levels of biological diversity and its many endemic species—ones that are specific to this region—it is classified as a Biodiversity Hotspot.

Research has shown that pristine forests have incredible significance for climate change mitigation and adaptation, biodiversity preservation, watershed management, and indigenous cultures and livelihoods. The Paranaense forest area faces serious threats of deforestation from agricultural expansion and encroachment. In the past 120 years, 95% of the Paranaense forest has been lost. Out of the remaining 5% of forest still standing, 97% is in Misiones Province. The loss of forest has critical impacts on flora, fauna, and fungi in the area. From over 1000 species and subspecies of amphibians, reptiles, birds, and mammals in the Argentine Atlantic forest, 20% are classified nationally as threatened or almost endangered. Neither the fish nor the plants in Argentina have been completely categorized and there is a need for more data on the regional fauna and fungi in order to understand the full impacts on these species. Despite laws to protect specific endangered species, which face destruction and alteration of their habitats, like orchids—one of the most well-represented families in the province—the forest also requires protection and sustainable management at a larger scale (Fig. 2).



Figure 2. Sunrise in stream Urugua-Í (Misiones, Argentina) home to many endemic fish (Photo credit: E M Grassi)

The Paranaense forest covers the southern end of the Atlantic forest biome and the beginning of a transition to other biogeographical formations, such as savannas and grasslands, from the Pampean phytogeographical province, a place where many endemic species live like *Hedeoma teyucuaensis* H.A.Keller & Tressens (Lamiaceae). These borderline forests, known as ecotones, have many tropical species with valuable genetics because they have evolved to resist more extreme climatic conditions. Therefore, the Paranaense forest, in the southern limit of the Atlantic forest, is an important refuge for many endangered species.

In addition to providing essential support for biodiversity, the forest also provides food and livelihood to the more than 100 communities who call this forest home. In Misiones, over 4000 hectares of land belongs to indigenous peoples and local communities. In addition, more than 25 million people pass through this region every year, to visit the Iguazu Falls.

With the aim of conserving this valuable region, Misiones promotes the conservation of native forests and regulations on sustainable forest management through various provincial laws. Misiones classifies three categories of forest management: Category I, red: areas of strict conservation; Category II, yellow: native forest that cannot be converted to other uses, but where sustainable use is possible; and Category III, green: forest that can be replaced.

The province is improving its sustainable management forest practices through better management of timber production. Local timber companies have adopted practices to allow cutting cycles of about 30 years, managing natural regeneration with post-extraction techniques, scarifying the soil, and actively planting native species of high commercial value. They have also learned that these sustainable management strategies and the use of resources from wild populations should be considered at different scales, and productive actions should be planned with the goal of conserving the native forest. For example, agroforestry practices in native forests enrich the growth and productivity of fruit trees, the forest provides natural control of pests and a friendlier environment for native fruit trees.

Instituto Misionero de biodiversidad (IMiBio)

IMiBio was created as a unique autonomous entity financed by the provincial government and therefore dedicated to local and regional matters. In helping safeguard and restore the Paranaense forest, it is expected to contribute solutions to similar problems throughout the world. IMiBio is advantageously located in the Paranaense forest and has incorporated UN's Sustainable Development Goals as an integral part of its objectives which evolve along four strategic axes that focus on science, health, civil society, and protection of genetic resources through management of the Nagoya Protocol.

IMiBio investigates the biodiversity in the Paranaense forest, its dependence on the local climate, its restoration for future generations and the potential to promote sustainable development. These studies will generate knowledge in biodiversity mapping and wildlife conservation, sustainability and regeneration of forests, environmentally adapted and sustainable food productions systems and freshwater surveillance.

The “Moises Santiago Bertoni” Herbarium

Founded in 2019 and housed within IMiBio, the Herbarium and Fungarium (SLP), which acronym makes reference to the Paranaense forest (Selva Paranaense), is a very new and small collection of approximately 600 fungal specimens and 500 plants specimens limited to the Paranaense forest. Bertoni refers to a well-known Naturalist of the region, who carried out extensive botanical expeditions, collecting a wide variety of plant species. He discovered and described numerous species new to science, and his work was fundamental to the study and preservation of the flora of the region.

Sample collecting expeditions to areas of interest are organised and supervised by on-site experts. Upon finalising the collection process, samples are appropriately transported back to the IMiBio in Puerto Iguazu for further handling. Once samples arrive they are processed for storage.

Description of the samples is not limited to visual characteristics leading to a taxonomic classification, but also includes genetic taxonomy and any other scientific procedure or analysis such as genome sequencing, microscopic evaluation, or chemical and biochemical analysis as examples.

Storage and long-term conservation of living biological samples, genetic material, and other biological products, can be attained through careful freezing of suitably prepared samples at ultra-low temperatures (i.e. -80°C or -196°C).

The ultra-cold equipment is specifically designed for long-term conservation and constitutes what is called a “biobank” when assembled appropriately. A well-designed biobank guarantees safe and controlled long-term storage for several decades of samples for future usage, which could include analysis and/or being a source for regeneration of nature (Fig. 3).



Figure 3: Top left- A field trip, collecting plants and fungi to strengthen the SLP Herbarium and Fungarium; Top right- IMiBio General Director Emanuel Grassi and Victoria Vignale, a fungal researcher and Ad-honorem curator of the Fungarium; Bottom left- Studying the ferns as part of a project focusing on inventorying fern communities of the municipal park “Selva Yriapu”; Bottom right- Working in a project of The International Barcoding of Life collecting flying insects in a malaise trap ((Photo credit: IMiBio)

If you would like to be interviewed for a future column, please get in touch with us via membership@herbariumcurators.org.

SHC MEMBERSHIP DRIVE & ANNUAL RENEWAL

Uniting the world's herbarium professionals in discussion, training, action, and support for the benefit of herbaria, science, and society.

Together, it is our hope that we grow, diversify, and further promote the importance and preservation of the world's herbaria!

Join or Renew your membership today! Our growing Society currently has over 475 members from more than 55 countries. We also offer complimentary membership for colleagues in developing countries; this initiative supports inclusivity and broadens the international diversity of our membership.

We also encourage our members to donate to The Society to support our General Fund, our Student Research Grant Fund, or our nascent Endowment. As we grow our student research funding, it is our goal to increase award amounts, the number of awards granted, and to diversify grantees, all while supporting innovative research that benefits herbaria.



Anemopaegma album Mart. ex DC. (Photo provided by Early Career Section President Nina M. House)



SOCIETY OFFICERS AND EDITORIAL COMMITTEE

Anna K. Monfils, President

Central Michigan University

E-mail: monfilak@cmich.edu

Erin A. Tripp, Past President

University of Colorado–Boulder

E-mail: erin.tripp@colorado.edu

Abigail Moore, Secretary

University of Oklahoma

E-mail: abigail.j.moore@ou.edu

Maribeth Latvis, Treasurer

University of Arkansas

E-mail: mlatvis@uark.edu

Tilottama Roy, Vasculum Editor

Missouri Western State University

E-mail: troy1@missouriwestern.edu

Abigail Moore, Associate Editor

University of Oklahoma

E-mail: abigail.j.moore@ou.edu

Harlan T. Svoboda, Associate Editor

U.S. National Arboretum

E-mail: harlan.svoboda@usda.gov

Michael Thomas, Webmaster

University of Rwanda

E-mail: michael.thomas@hawaii.edu