



PLANT SCIENCE BULLETIN

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A PUBLICATION OF THE BOTANICAL SOCIETY OF AMERICA



HOW DO I PREPARE FOR A FACULTY POSITION AT A PRIMARILY UNDERGRADUATE INSTITUTION?



SEE P. 16 FOR THE ANSWERS!

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UNITED NATIONS DECADE ON
**ECOSYSTEM
RESTORATION**
2021-2030

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FROM the EDITOR



Greetings,

As our long-time readers know, the content of *Plant Science Bulletin* reflects the professional interests and concerns of BSA members. In this issue, you will find articles that were developed out of Botany 2022 panel discussions, such as the piece on preparing for a faculty position at a PUI, and from Botany360 workshops, such as those on trauma awareness and becoming a BSA student representative.

As always, we invite articles from BSA members and friends on the issues that matter. You can submit an article directly to me or contact me to discuss your idea!

Sincerely,

Mackenzie



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SOCIETY NEWS

Botanists Needed for UN Decade on Ecosystem Restoration

There is wide interest internationally on improving habitats to sustain biodiversity and supply other ecological services. Climate change has stressed environments worldwide and significant action is needed to add to our natural resources. The United Nations has put together a professional group to encourage and organize initiatives. This includes many partners such as their UN Environment Program, the Food and Agricultural Organization, the International Union for the Conservation of Nature (IUCN), The Nature Conservancy, as well as scientific groups including the Society for Ecological Restoration.

Each project is planned and implemented by local groups and listed in the UN Decade program. More information about the program and its resources can be seen at www.decadeonrestoration.org.

Among the principles that the UN Decade are using are ones important to the mission of BSA: broad public participation; benefits to nature and people; knowledge integration; management of resources; policy integration. Together these goals advance the health and sustainability of botanical resources. The full Principles for Ecosystem Restoration report is available at <https://www.fao.org/documents/card/en/c/CB6591EN>.

Botanists have an important and critical role to improve this international effort. Members of the BSA are experts in different taxonomic groups and their life history needs, as well as plant communities of all types and throughout the world. The UN Decade initiative is a wonderful opportunity to expand the service of our members as advisors to many programs being planned worldwide. Individual members may volunteer their expertise in taxa and in habitat structure and function when asked by UN Decade teams planning each habitat restoration program.

Participation in the UN Decade program offers many benefits:

- Members can use their professional skills to advance environmental conditions, worldwide.
- The value of botany as a scientific discipline can reach new audiences, helping people realize the great value of botanical training for the modern world.
- Participation in this program may encourage others from all backgrounds to consider botany and related science careers as career goals.

There are some simple ways for BSA members to become involved:

- Register in the Alliance of Nature-Positive Universities. This is a global network of individuals associated with higher education to “prompt the prioritization of nature and its restoration within the higher education sector; in their operations and supply chains, on campuses and within the cities where they operate.” Learn more and register at <https://www.decadeonrestoration.org/join-university-challenge>.
- Submit resources to help restoration actions, such as articles and reports, webinars, and videos that would add botanical knowledge. Please submit these and register your expertise at the Restoration Resource Center: www.ser-rrc.org/recourse-database/submit-a-resource.
- Submit a record of a habitat restoration project in which you have participated. Report these at www.ser-rrc.org/submit-a-project.

If you choose to register as an expert, you may be asked to participate at some level in a project. Please let the BSA know if you have registered by writing to the BSA office at hcacanindin@botany.org. In that way, BSA would have a record of members willing to help in this international program. Then we can better explain the value of our organization to the general public.

Thank you for considering participation in this important international program.



UNITED NATIONS DECADE ON
**ECOSYSTEM
RESTORATION**
2021-2030

Trauma Awareness: A Botany360 Recap

Unfortunately, trauma is pervasive in our society. From individual traumas experienced as a child, to traumatic events affecting entire communities, to historical traumas that are passed from generation to generation among marginalized and oppressed groups. And just like other aspects of our personal lives and identities, we bring our traumas with us to our work, school, and interactions with others. On our paths to becoming a more equitable and inclusive Botanical Society of America, we must work to acknowledge, understand, and interrupt trauma.

In December 2022, the BSA offered a free Botany360 webinar to explore this topic, “A Trauma Awareness Workshop,” facilitated by the former BSA Diversity Equity Inclusion and Outreach Programs Coordinator Sarah Sims. It offered a framework for defining trauma, explored five types of traumas; shared data on the prevalence of trauma; investigated how trauma impacts individuals as well as entire communities; and laid out a path to becoming trauma informed. Sarah offers a recap of that

workshop here so that more of our botany community can take steps to better care for ourselves and one another.

This recap article talks about different types of traumas and may be distressing for some readers. Please take breaks or discontinue reading as needed. Your mental health and safety are important. If you are in crisis, you can receive help by calling the National Suicide and Crisis Lifeline: 988.¹

WHAT IS TRAUMA?

What do you think of when you hear the word *trauma*? When I participated in my first trauma awareness training, my answer to this question was decidedly narrow and revealing of my privilege as a person who had not experienced many traumas in their life. I have since come to understand the three Es of trauma: event, experience, effects: a framework that defines trauma as individual.² The first E, event, is quite expansive. It might be an actual traumatic experience of either physical or psychological harm, or it might be the threat of harm. Additionally, and importantly for a more nuanced understanding of trauma, is that the event might also be the lack, withholding, or control of the resources that one needs for their health and development. event, yet due to their personal histories and



By Sarah Sims
Former BSA Diversity Equity Inclusion and
Outreach Programs Coordinator

¹Learn more about the new National Suicide and Crisis Lifeline at <https://988lifeline.org/faq/> and <https://www.samhsa.gov/find-help/988/faqs>.

²https://ncsacw.acf.hhs.gov/userfiles/files/SAMHSA_Trauma.pdf

identities, they will experience it (the second E) differently, and thus it will have different effects (the third E) on them. There are many different types of traumas, which we'll go over in the next section. But what is important to really understand here is that we really can't say what is or isn't, or what should or shouldn't be traumatic for any given person.

TYPES OF TRAUMA

This list of five categories of trauma is in no way meant to be exhaustive or conclusive, but rather is a starting point for understanding the different ways in which trauma works. Individual or private trauma is perhaps what most people think of when they hear the word *trauma*. **Private trauma** is typically person to person, usually happens within the home or family, and is often characterized by secrecy, shame, and even self-blame. **Individual traumas** include different types of abuse, as well as family separation, having an incarcerated parent, a major illness, and other events that negatively impact personal life.

Public traumas are events that happen in the public sphere often directly impacting many people, such as a natural disaster, a mass shooting event, or a pandemic. Because of the large-scale nature of this trauma, it does not typically carry secrecy or shame; however, there is often an "expiration date" placed on the accompanying grief and fear. For example, you may hear people assert "that happened many years ago, so they should be over it by now."

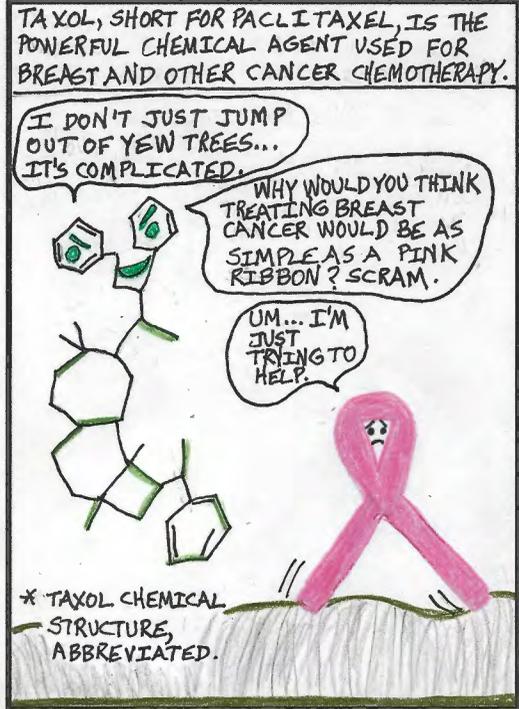
Community and environmental trauma is a collection of experiences or realities that negatively impact an entire community. For example, individuals living in a neighborhood

that has high rates of crime and violence and little access to quality housing and healthy food may experience the impacts of such community trauma. We can also define *community*, not as geographical boundaries, but as people who share an identity. In this example, a public trauma such as a shooting in an LGBTQ night club combines with the historical trauma (discussed below) of anti-LGBTQ hate to engender a community trauma in which many/all LGBTQ people may feel traumatized by such an event (even if they were not present at the time and place of the attack). Another example of environmental trauma intersecting with individual trauma comes from Naomi Volain, BSA member, botany teacher and science cartoonist. She is a breast cancer patient now in remission, and her comic "The Botany of Breast Cancer Awareness" connects conservation issues to the trauma of breast cancer treatment (Figure 1).

Historical trauma is a function and result of systemic oppression, violence, and erasure. It is experienced collectively by those that share one or more oppressed identities. While the term *historical trauma* may indicate events that happened in the past, this type of trauma is in fact adaptive and cumulative. For example, while enslavement may have ended, Black Americans continued to be traumatized throughout our nation's history and into the present via acts of terror such as lynching, discriminatory laws, and the everyday trauma of both overt racism and racial microaggressions present in the systems individuals must operate within (such as the education system, healthcare system, etc.). Historical trauma is felt by individuals but also passed from generation to generation (and is therefore also called *generational trauma*).

Plants Go Global

THE BOTANY OF BREAST CANCER AWARENESS MONTH



Naomi Volain 2021

Figure 1. A comic by Naomi Volain connecting conservation issues to the trauma of breast cancer treatment.

THE TRAUMA RESPONSE

While the previously described types of trauma are very different, they produce the same response in the brains and bodies of individuals: they trigger our automatic stress response system. The stress response system might look different in each individual (some people may respond more actively [fighting or fleeing], whereas others may freeze or fawn). But the important thing to remember is that it is a protective function occurring automatically (without thought) in the lower regions of our brain. Just as we cannot define for others what is or is not traumatizing for them, we also cannot prescribe how they will or should react to a traumatic event.

The automatic stress response happens in the moment for all of us when faced with a traumatic or extremely stressful/scary situation (think of how your body leaps into gear if you are almost sideswiped on the highway). But for people who are currently experiencing, or have experienced, ongoing trauma, their trauma response becomes more of their normal or typical response to situations that might be described by many as only mildly stressful.³ As an outsider, it can be hard to recognize such reactions through the lens of trauma, but we must work to do so in order to break the cycle of re-traumatization.

³ To learn more about the mechanics of the brain and body's response to trauma and how this stress response system can have lasting impacts on cognition, health, and wellness, I recommend *The Body Keeps the Score: Brain, Mind and Body in the Healing of Trauma* by Bessel van der Kolk.

INTERSECTING TRAUMAS: WHAT'S IN THE SOIL

Most of the time, a person's traumas do not exist in a silo. Rather they intersect with other traumas, and the realities of the environments we live, work, and play in and how others in those environments may perceive us. Think of an individual as a tree. The leaves are private/individual traumas they may be experiencing. But every tree exists in soil that further informs how its leaves may grow, and that soil may have nutrients (that help it heal from trauma) as well as toxins (that can trigger past traumas or be a source of new trauma). Individuals may grow in many different soils—their home life, a religious community, a friend group, their professional life, etc.

So, what is in the soil of the botany community? We all bring our own traumas with us to our work, but how does our work setting either resist or engender retraumatization? Many of the workshop participants offered that academic settings are steeped in systemic oppression and reinforce the biases and discrimination that have contributed to the historical traumas of many marginalized communities. Additionally, the fast-paced, competitive, and achievement-focused characteristics of the academic environment may be triggering for colleagues and students who have experienced traumas.

MOVING FROM TRAUMA AWARE TO TRAUMA INFORMED

ABOUT BOTANY360

Botany360 is a series of programming that connects the plant science community throughout the year with professional development, discussion sessions, and networking and social opportunities. If you'd like to see upcoming events or view recordings of past events, visit <https://botany.org/home/resources/botany360.html>.

What can we do? If we know that a majority of people have experienced at least one trauma in their lives,⁴ and we can't go back and erase past traumas, and we likely are not in a position to prevent many present and future traumas, what can we do to interrupt this cycle? The good news is that you don't have to be a therapist to be therapeutic!⁵ To act in a trauma-informed way, remember the four R's. **Realize** the widespread impact of trauma. Naomi's cartoon beautifully illustrates this first R; in Naomi's words, "Simplifying the trauma of breast cancer with Breast Cancer Awareness's pink ribbon doesn't address the real need of cancer patients—for their people to be present for them, and honestly acknowledge the trauma of cancer treatment."

Recognize the signs and symptoms of trauma in yourself and others. **Respond** by fully integrating knowledge about trauma into policies, procedures, and practices. And seek to actively **Resist** retraumatization.⁶



⁴ The first major study on childhood trauma, "The Adverse Childhood Experiences Study," published in 1998 by Kaiser Permanente and the CDC showed that over 50% of American adults had experienced at least one of ten traumatic events as a child; 25% had experienced two or more, 1 in 16 had experienced four or more, and 1 in 22 had experienced six or more. The traumatic events they surveyed were: sexual abuse, physical abuse, verbal abuse, emotional neglect, physical neglect, adults in the home with drug or alcohol use problems, adults in the home with mental health issues, adults in the home who have been incarcerated, domestic violence, and parent separation.

⁵ If you are interested in learning more about various therapies used to address trauma past and present, I recommend *The Body Keeps the Score* by Bessel van der Kolk. This title as well as *What Happened to You?: Conversations on Trauma, Resilience, and Healing* by Oprah Winfrey and Bruce Perry also extrapolate on how those of us who are not therapists can be a support for those who have experienced trauma.

⁶ The Substance Abuse and Mental Health Services Administration (SAMHSA) offers guidance for organizations to move from being "trauma aware" to "trauma informed" by analyzing and reforming practices, culture, policies, and systems: https://ncsacw.acf.hhs.gov/userfiles/files/SAMHSA_Trauma.pdf

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JACQUELYN GILL

BOTANY 2023
PLENARY SPEAKER

SUNDAY, JULY 23 7:30 PM
BOISE CENTER, BOISE, ID

Jacquelyn Gill is an associate professor of paleoecology at the University of Maine's Climate Change Institute. She is a paleoecologist and biogeographer, bringing the perspectives of space and time to bear on questions in ecology and global change science. Her work takes a community ecology approach to help understand how species and their interactions have responded to interacting drivers (like climate change and extinction) through time.

She directs the BEAST Lab, which investigates 1) the legacies "biotic upheavals" like the extinction of Pleistocene megafauna on vegetation, 2) biotic interactions and drivers of landscape change on large spatiotemporal scales, 3) plant range dynamics and vulnerability to climate change, and 4) what paleoecology, Indigenous archaeology, and Traditional Ecological Knowledges can tell us about human-environment interactions in the past.

She is a co-host of the podcast Warm Regards and author of the blog "The Contemplative Mammoth", welcoming conversations and advice on science, early career academia, and diversity in STEM. She is a co-founder of the March for Science and a 2020 recipient of NCSE's Friend of the Planet award.

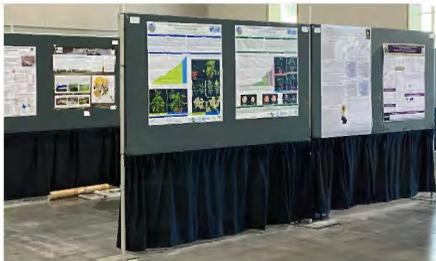
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SPECIAL FEATURE

Preparing for a Faculty Position at a Primarily Undergraduate Institution (PUI)

This article originated from discussions in a workshop held by the Primarily Undergraduate Institution Section of the Botanical Society of America (BSA) at our Botany 2022 meeting in Anchorage. We hope this article will provide some useful ideas and tips for people interested in applying for faculty positions at bachelor's degree granting Primarily Undergraduate Institutions (PUIs). We recognize that our experiences are not universal. While our trajectories toward, and experiences in, our current positions as PUI faculty members may vary, we share

a common passion for undergraduate mentoring and teaching in plant biology. Our perspectives reflect our experiences as botanists within PUI institutions, and while we offer these suggestions in the hopes of fostering more successful academic botanists, much of the content in the article could apply to other subdisciplines within biology. In this article, our intent is to share our collective perspectives to help others explore strategies about how to successfully chart their own path towards a PUI faculty position.

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WHAT IS A PRIMARILY UNDERGRADUATE INSTITUTION (PUI)?

Primarily Undergraduate Institutions encompass a wide swath of the higher education landscape. The National Science Foundation defines PUIs as “... accredited colleges and universities (including two-year community colleges) that award Associate’s degrees, Bachelor’s degrees, and/or Master’s degrees in NSF-supported fields, but have awarded 20 or fewer Ph.D./D.Sc. degrees in all NSF-supported fields during the combined previous two academic years.” Some PUIs have a very heavy research expectation, whereas others have very little support for research. PUIs include public and private R2 universities, small (often private) liberal arts colleges (SLACs), and community colleges. In some cases, the institution may not fall into the NSF-defined category of PUI, but the specific context of the college or department is best characterized as primarily serving undergraduates.

For many faculty members at PUIs, undergraduate education in the classroom is the central component of their job. The “teacher-scholar model” is typically highly valued at these types of institutions as well. Scholarship within the discipline is considered a valuable component of developing and maintaining excellence in teaching. PUI faculty also engage in service to their institutions and the profession. Expectations for successful job candidates will vary, but one commonality is that all these institutions are *primarily undergraduate*. As you move through your professional training, consider how your professional work (research, teaching, service) can center on involving and supporting undergraduate students.

HOW DO I PREPARE MYSELF AS A RESEARCHER TO BE COMPETITIVE FOR A PUI FACULTY POSITION?

During graduate school, focus on completing your dissertation and publishing your work to prepare for a future successful PUI job application. During grad school and beyond, be strategic about crafting your portfolio to demonstrate the likelihood of continued professional success by publishing papers, applying for and hopefully receiving grant funding, and solidifying a research program that can continue to produce publications with undergraduate students. PUIs commonly expect faculty to develop a research program that is manageable and successful with a solely undergraduate-populated lab. Once employed, it can be more challenging for departmental colleagues to provide specific advice for interesting research directions. Invest in your research trajectory prior to applying for jobs. To earn tenure at a PUI, faculty members typically need to publish papers (often a mixture from projects started before the position and from projects initiated at the institution) and will be encouraged to apply for grants.

Many of us experienced the rewards of mentoring undergraduate research students while we were graduate students in botanical lab and field projects. We built career-long relationships with our undergraduate co-authors and worked with them on presentations, publications, and their own applications for jobs and graduate school. Seek out similar relationships during your graduate school years, because all of these experiences

can be added to your CV and discussed in job application materials, making you a great fit for a PUI job.

Because the number of botanists in any PUI faculty is likely to be small, botanists are often expected to take on service requirements such as managing a greenhouse or curating an herbarium. Applicants with these skills may be favored, so gaining some experience in these areas will likely be beneficial. Utilizing these resources in your research and teaching will be excellent to discuss in job applications.

HOW CAN I GAIN TEACHING EXPERIENCE NECESSARY FOR MY PUI JOB APPLICATION?

Most people pursuing a tenure-track faculty position at a PUI are interested in a balance between teaching and research. Providing evidence that you are developing that balance as a graduate student and postdoc can be beneficial. Aim to gain experience in the types of teaching you wish to continue, including laboratory and field-based courses.

Traditionally, academics get their first teaching opportunities as a teaching assistant, perhaps in a lab section of a larger course overseen by a faculty member. The support or guidance in instructional techniques at this stage varies, so the importance of teacher training is increasingly recognized in graduate programs. If your program offers workshops, classes, or other opportunities to develop teaching skills, take advantage of them. Some faculty offer senior graduate students opportunities to give guest lectures in their courses, which can be a terrific way to learn

how to interact with a large group of students. If you can serve as instructor-of-record on a course as a graduate student, consider doing it, even if it takes time away from other work. Instructor-of-record role indicates a much deeper teaching experience, equivalent to teaching as a professor.

Opportunities to build teaching and mentorship experience continue after completing your PhD. Some institutions will hire recent graduates as instructors of record for a semester or two while they are looking for a postdoc or faculty position. Professional societies, including the BSA, routinely offer workshops and colloquia at annual meetings dedicated to developing teaching strategies and showcasing engaged pedagogy. Ambitious undergraduates are usually eager to contribute to a research project under the mentorship of a postdoc or recent graduate.

You can pursue teaching experiences within a PUI, which can be enlightening as well as helpful for demonstrating interest in permanent faculty positions. Some PUIs offer various forms of teaching postdocs, and some PUI faculty offer research postdoc positions directly. Some of these positions allow postdocs to earn instructor-of-record experience as well. Postdoctoral positions within PUIs are not common, but these provide valuable insight into the circumstances experienced by faculty working at PUIs. Many, if not all, PUIs provide professional development training opportunities associated with teaching or will support early career faculty who express an interest in finding such opportunities. Colleagues within a department can also provide mentorship in teaching methods and strategies for postdocs, visitors, and new faculty members.

Another common opportunity to gain teaching experience within a PUI is through a temporary, non-tenure-track position. Faculty members with these positions may be called Visiting Assistant Professors (VAPs), contingent faculty, or some other title that distinguishes them from permanent faculty. These positions are typically used to replace faculty who are on sabbatical, fill unforeseen vacancies in a department, or assist with unexpected changes in curricular needs. They are usually teaching-heavy and may have few, if any, research expectations or resources. These will likely provide significant opportunities to obtain instructor-of-record teaching experience and may also be a time and space to develop new scholarly collaborations and pursuits. However, finding time and resources to build or maintain a research program while in such positions can be challenging. Using time as a VAP to bring to fruition novel ideas or to continue ongoing collaborations may be a successful strategy, perhaps instead of pursuing a research-focused postdoc position. Some PUIs allow and encourage VAPs to mentor research with students and give their VAPs access to in-house supplies, grants, funds, and professional development opportunities. Ask ample questions to see what is possible if you are considering a VAP, especially if this is instead of a postdoc position. The choice of whether to accept a VAP should depend on the specifics of the position, the relative strengths and gaps in your background, and your overall professional goals.

A VAP may very occasionally convert to a tenure-track position. However, unless a pathway to tenure-track conversion is articulated in official documentation for the position, do not count on this as a guarantee.

Sometimes current VAPs are converted into tenure-track positions without an additional external search, but this is rarely the case. Many institutions have policies discouraging or prohibiting the practice, preferring (or requiring) an open search. As a current VAP, you might be a preferred candidate in an open search, as many PUIs highly value authentic teaching experience with their specific institution or similar. However, it can be emotionally challenging to be present at your VAP institution when other candidates are interviewing for the job you want. This is a topic that you should be sure to discuss with the search and/or department chair.

DO I NEED A POSTDOC POSITION TO BE A SUCCESSFUL PUI JOB CANDIDATE?

A postdoctoral position is a great way to gain a new perspective through an expanded scholarly network, and many successful job candidates have postdoctoral experience. Many permanent PUI jobs require continuing research productivity for tenure and evidence of scholarly engagement in multiple types of questions, methodology, analyses, and study systems can demonstrate flexibility. Postdoctoral experiences can also demonstrate continued productivity, scholarly independence from your dissertation lab group, and a more expansive intellectual contribution. Botany is a dynamic and rapidly changing field, and PUIs need faculty who demonstrate an interest in keeping abreast of changes to effectively train their students.

We found substantial variation in our academic preparations prior to obtaining a faculty position, and similarly, our experiences on search committees varied among our institutions. At some institutions, we have only seen applicants with both postdoctoral and instructor-of-record experience progress in the hiring process. In other cases, applicants were competitive immediately out of graduate school if their record was otherwise strong. If you lack postdoctoral experience but seem otherwise to be an excellent fit for an advertised position, contact the chair of the search committee for clarification about minimum qualifications before applying.

WHEN IN MY EDUCATION/TRAINING JOURNEY SHOULD I START LOOKING FOR A FACULTY JOB AT A PUI?

You may find it helpful to start preparing for a PUI faculty position early in your academic training. Talk with faculty members in positions like those that interest you so you have a better appreciation for what the reality of the job might entail. Attending PUI-specific events through the BSA as well as the American Society of Plant Biologists and other professional organizations can help you meet the community and find mentors. Familiarize yourself with the annual job cycle through the *ecoevoljobs* wiki, compare job ads from various types of institutions, and learn about differences among institution types. Be mindful that preparing the various statements of a full job application is time-consuming, especially the first round. Customizing essays to individual institutions also takes significant time. Applying for jobs that look interesting

before you are likely to be viable (i.e., before your dissertation is complete) may be informative, this may not be the best use of your energies. That said, if you see an amazing PUI job posted that is just what you want, do not assume it will be posted again in future years—go for it!

WHAT INFORMATION SHOULD I FIND IN A PUI JOB AD?

Many PUI jobs are posted in the same places as R1 and other academic jobs: the *Chronicle of Higher Education*, *HigherEdJobs*, *Science*, and *Nature*, as well as the websites of the specific institutions and on social media. Community-sourced anonymous wiki pages conglomerate job postings from these sites and allow people to post anonymous questions and updates on the various searches as they progress. Two of interest to our community are *ecoevojobs.net* and *evoldir*. The BSA webpage (www.botany.org) also lists many relevant jobs.

The ad should state clearly if the position is tenure track or not, the levels at which people can apply (e.g., assistant professor, open to all ranks, PhD required), and what department or program within the institution is hiring. The ad should also indicate the general areas of teaching and research that are expected. The ad may indicate what types of courses an applicant should be prepared to teach, to what extent research productivity is valued, and other major required components of the job. You may need to meet all, or just some, of the criteria to be competitive.

Although job ads are written by faculty committees, some institutions have Human Resources staff that mandate large chunks of the job ad. As a result, there may only be a paragraph or two that the department is able to influence. If the ad seems very broad, it could mean the department is casting a wide net to look for all-around excellent colleagues, and the disciplinary expertise is not as important. It could also signal lack of cohesion among members of the department in what the position would accomplish. There should be a point of contact included in the job ad, often the department chair or another faculty member who is serving as the search committee chair. Contact them if you have questions or need clarification about the position.

received tenure and gauge typical research output. Keep in mind that expectations for scholarly productivity have change over the past decades across academia, at times drastically, and that the standards and expectations of research engagement often change with tenure rank. Pay special attention to the academic record of the assistant professors (i.e., recent hires).

You may be able to gain some insight into the culture of the department by looking at the department website and exploring faculty lab websites or public social media accounts. Are there professors in the department or at the institution that seem like they could be interesting to interact or collaborate with? Also consider the values of the institution, its mission statement, and major initiatives discussed on the website. Does this resonate with you? You should consider location and cost of living, but keep an open mind.

WHAT OTHER THINGS MIGHT I CONSIDER WHEN DECIDING WHETHER TO APPLY?

HOW CAN I PREPARE MY APPLICATION MATERIALS FOR A SPECIFIC PUI JOB?

Most PUI departments are small, and consequently candidates that have broader expertise or perspectives may be perceived as more useful future colleagues. Be prepared to envision yourself in a broader range of PUI jobs; even if your training is primarily in botany, you may be a great fit for a job seeking an ecologist, an evolutionary biologist, a geneticist, or other type of broadly defined biologist. Consider the expectations of the job. Does it seem like the balance of teaching and research is what you would like? What is the teaching load? What are the expectations for tenure and promotion? If current faculty members post their CVs, you may be able to determine their academic records at the time they applied for their jobs and/or when they

Typically, job applications for PUIs require a cover letter, *curriculum vitae* (CV), a teaching statement, a research statement, and some type of Diversity-Equity-Inclusion (DEI) or fit-to-mission statement. Cover letters and statements are typically two pages or so in length. These statements may be combined in various ways, and not all documents may be required in the initial application. Think carefully about how to make these documents as easy to read as possible, with section headings, page numbers, and headers that reinforce whose documents they are. Be sure you seek out mentors who can provide you

examples and can provide feedback on your documents. Keep in mind that customization will require substantial time if you are applying to multiple jobs, but is important for advancing in most searches.

Cover Letter

The cover letter should convey, with specificity and realistic enthusiasm, why you are a great fit for the particular position. Make it clear up front that you understand that this is a PUI. General applications or applications that seem tailored for an R1 job will not do well in the search and are easy to spot. In the letter, address each aspect of the job in their perceived order of importance in the position. Speak to teaching, undergraduate mentorship in research, your own research trajectory, and involvement in the broader community. Any customization to the specific institution, and reference to any major initiatives of the PUI (e.g., DEI initiatives, new or ongoing interdisciplinary programs, community engagement) will benefit you. You may mention if there are affiliate programs or other interdisciplinary initiatives at the institution to which you might contribute as a scholar or teacher, broadening your appeal to the PUI.

In general, departments will be looking for a candidate who can strengthen existing curricular programs, fill a gap in the department, and/or diversify the department. If the job application mentions specific courses or general areas of teaching that are required, be sure you discuss each clearly and potentially early in the letter. For example, if the ad states that the candidate would be expected to contribute to introductory biology, be sure to indicate your willingness and, ideally, excitement to do so. If you have experience as a TA, guest lecturer, or instructor-of-record,

highlight this in your letter with clear and consistent language about your role.

CV

The curriculum vitae (CV) is a comprehensive assembly of your professional achievements and should be thoughtfully organized to highlight the qualities a PUI seeks. There are many ways to format a CV, so look at examples and consistently update yours as you move through your career. Consider moving information about your teaching and mentoring experience toward the beginning of the CV. Highlight the roles of undergraduate mentees in your publications, presentations, etc. You may find it useful to annotate your publications list to include your role on specific papers. The BSA often hosts professional development opportunities at our Botany conference for people to have their CV reviewed by other botanists, so take part if you can!

Research Statement

In your research statement, discuss both your current research progress and future trajectory, making it clear how you plan to develop your research program in the context of the institution. Committees appreciate applicants that make it easy for them to envision a smooth and successful integration into the department. Expectations for undergraduate research should be clear from the job advertisement or from college and/or department mission statements. You should explicitly discuss the role of undergraduates in your proposed research program. Describe how you have (or plan to) recruit research students and how you mentor them through research, keeping DEI considerations central.

Describe ways in which your research might be integrated into your teaching. Highlight any previous outcomes from training and mentoring undergraduates, such as preparing proposals, presentations, and/or publications, and demonstrate how you will continue to integrate your students into the broader scientific community. Identify two or three projects that would be manageable as an undergrad thesis or summer project, and that would be publishable. Elaborate on these in the application materials to show that you have a realistic but ambitious perspective.

Student work will underpin much of your research productivity, but there will be aspects of your scholarship where you are central. Be sure you also speak to contemporary, major projects utilizing and building upon your specific academic background. Identify potential sources of external grant funding you might seek, including the NSF RUIs (Research in Undergraduate Institutions) and ROAs (Research Opportunity Awards).

Clarify what resources you would need to be successful, while keeping in mind that PUIs often have limited start-up budgets and access to equipment. You should demonstrate flexibility and creativity, especially if your research is expensive. Are there nearby collaborators? Would you consider developing local fieldwork? Make it obvious to readers that your work will not only be possible, but also fruitful and meaningful in the context of the institution. Applicants who describe at length their plans for future graduate students and postdocs, require highly specialized, large research facilities, or require extensive fieldwork throughout the year, suggest unfamiliarity with the environment at PUIs, and thus are unlikely to be viewed favorably by hiring committees.

Teaching Statement

The teaching statement should address your general philosophy as an educator, your values when developing courses and in working with students, and specific examples of your pedagogy in practice. What do you value when designing a course, choosing topics, and creating assignments and assessments? How do students interact with you and each other in your classroom? What materials do you bring into the classroom, lab, and field? What skills do your students develop? How is DEI enhanced in your classroom and through student interactions?

In your teaching statement, be sure to speak to the specific courses or academic areas that the job is seeking. The ability to teach a specific course can be a make-or-break requirement for a candidate, and the search committee will be looking at your qualifications and interest in teaching what they stated in the ad. If possible, look through the course catalog and highlight existing courses that you would be able to teach beyond those requested. Avoid limiting your discussion of teaching to upper-level courses or seminars. Faculty members at PUI institutions are often expected to teach core curricular courses such as introductory biology, genetics, ecology, or evolutionary biology. Many Biology departments at PUI institutions offer courses to non-majors as well, which can be important for departmental budgets and expanding the reach of STEM instruction. If you are enthusiastic about developing a new course, discuss that in the teaching statement and address other ideas that you have to enhance the student educational experience at the institution. Consider the broader curriculum and possible interdisciplinary or college foundational courses or programs that you might contribute

to, enhancing the overall mission outside of the specific hiring department.

DEI Statement

The DEI or fit-to-mission statement should be personal and authentic, with no pro-forma requirements. Some job ads include a specific prompt to guide your statement. You are not required to disclose any of your identities or backgrounds in this or any part of your job materials, but this could be a great place to do so if you are comfortable sharing. Many institutions are highly interested in recruiting and retaining diverse faculty, and the search committee may not have access to demographic information of candidates. Reflect on your own background, experiences, positionality, and intersectionality, and how you continue to educate yourself. How has your field, and academia in general, built and reinforced power structures and marginalized people? How have you contributed (or could you contribute) to changing structures and systems? How do you approach DEI considerations in your roles as teacher, mentor, scholar, colleague, and community member? Keep in mind that the BSA has many great initiatives you can get involved with to enhance DEI goals within our society, like the BSA PLANTS program and service on our DEI committee.

Letters of Reference

You will be asked to provide the names of three or more professional references. Your references will either be contacted about letters of recommendation if you pass initial screening processes, or the letters may be required at the deadline of your application, usually submitted by your letter writers

themselves. Your most recent employer (chair of your current department or other administrator) may also be contacted about a general background check by HR at some point in the process. You should seek out a deeper conversation with your letter writers about your experiences together, what you hope they emphasize (including contextualization of any potential weak points in your application), your plans for your future, and if they have any concerns. Letter writing and customization is a major time commitment for your mentors and an important outcome of your relationship together. It is critical that you think carefully about who will provide reference letters for you. All the letters together should illustrate your progress and potential as both a scholar and a teacher, but each letter need not speak about every topic. Ask your letter writers explicitly if they can provide a strong or positive letter about you. As members of search committees, we have seen (very rarely) letter writers express misgivings about a job candidate, which impedes their consideration for a job. And remember to give your recommenders sufficient time to craft and submit their letters!

HOW ARE APPLICATION MATERIALS EVALUATED TO DETERMINE WHO PROGRESSES IN THE SEARCH?

The process of evaluating applications varies between institutions. Typically, application materials will be reviewed by the faculty hiring committee, although other members of the department may also have a chance to contribute feedback in this early stage. An initial screen of all applicants may remove those

who do not meet the minimum qualifications or who have incomplete applications. Full reads of all documents are then systematically completed by committee members. Searches may use a rubric to assess candidates' strength in various areas, including enthusiasm for work at this specific PUI, teaching experience and interest, academic record, publication record, previous work with undergraduates, DEI issues, and perceived ability to contribute to the curriculum. Letters of support may be evaluated at this stage. The search committee discusses the applicants, balancing many factors (area of expertise, experience, DEI, etc.).

The strongest applicants are then typically invited for a phone or online interview. For a tenure-track search for one position, 8 to 15 candidates may be invited for the initial interviews, and of those, 2 to 4 may be invited to subsequent in-person interviews. In some cases, the search moves immediately to on-campus interviews. Check in with the *ecoejobs* wiki to see if the community is updating the stage of the search, because some people on this forum share comments when they have cleared a particular stage in the interview process. The interview process, which deserves its own similar space, is not discussed in detail in this article. Please see King-Smith et al. (2021) for further information.

CONCLUSION

Each of us has found great inspiration and satisfaction working at PUIs, even across the wide diversity in institutions and backgrounds represented by the authors. Our undergraduate students are eager partners in our research endeavors and educational journeys, and the unique challenge of building academic scaffolds for these emerging scholars is

satisfying and an endeavor worthy of pursuit. We applaud and encourage others with similar interests and hope that the information herein can be useful for your preparation. PUIs encompass a broad part of the higher education landscape, and every institution and every search process is different. Reach out to others within our BSA community for guidance and support, and ask questions of faculty at schools that are similar to those that you would consider for a future job. Our botanical community thrives when we have our members secured in faculty positions, helping to educate the next generation of scientists and citizens. We hope you may be as professionally and personally fulfilled and happy as we have been in our PUI endeavors.

ACKNOWLEDGEMENTS

Discussions with Nathan Jud, Susana Wadgyamar, and Mike Moore, as well as their contributions to the PUI workshop at Botany 2022, were instrumental in the development of this article. The workshop was supported by NSF Award No. 2218485 "Botany 2022, PUI Section: Careers and Mentorship at Primarily Undergraduate Institutions" awarded to Dr. Nathan A. Jud (William Jewell College), Dr. Jennifer Ison (College of Wooster), Dr. Carrie Wu (University of Richmond), and Dr. Rachel McCoy (St. Norbert College). The authors also thank two anonymous reviewers and M. Jabaily for helpful comments on earlier drafts of this article.

REFERENCES

King-Smith, C., C. Lund Dahlberg, and B. Riggs. 2021. Obtaining a faculty position at a primarily undergraduate institution (PUI). *BMC Proceedings* 15 (Suppl 2): 3. <https://doi.org/10.1186/s12919-021-00207-6>

New from CHICAGO

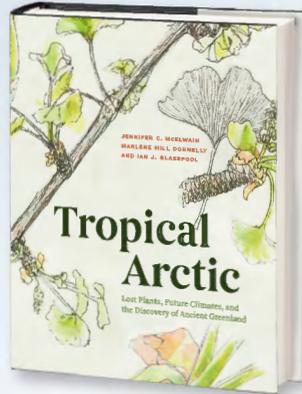
Tropical Arctic

Lost Plants, Future Climates, and the Discovery of Ancient Greenland

Jennifer McElwain,
Marlene Hill Donnelly, and
Ian Glasspool

“The authors warn that current greenhouse-gas emissions are becoming comparable in impact to the volcanic emissions that triggered the collapse of Triassic Greenland’s flora.”—*Nature*

CLOTH \$30.00



Trees and Forests of Tropical Asia

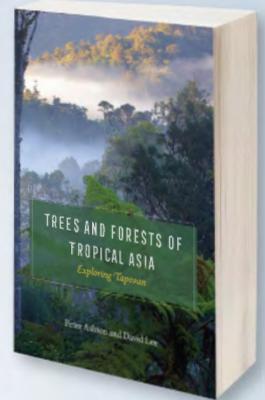
Exploring Tapovan

Peter Ashton and David Lee

“This profoundly inspirational book, a personal deep-dive into the ecology, evolution, biogeography, and conservation of the forests of tropical Asia, is a lyrically written, instant classic, a page-turner natural history saga in the mold of a modern-day Alfred Russel Wallace.”

—Stephen P. Hubbell

PAPER \$45.00



Foundations of Ecology II

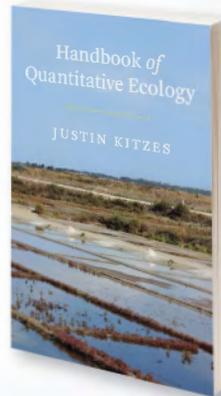
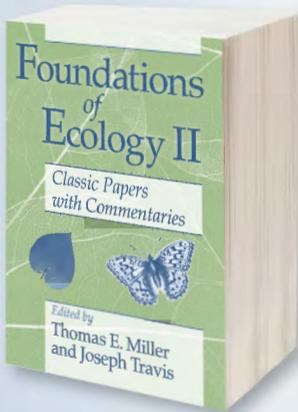
Classic Papers with Commentaries

Edited by Thomas E. Miller
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“Having a compilation of papers that experts consider most significant is highly valuable, particularly for students less familiar with the field. As a whole, *Foundations of Ecology II* is a worthy extension of the now-classic first volume.”

—Judith L. Bronstein, University of Arizona

PAPER \$75.00



Handbook of Quantitative Ecology

Justin Kitzes

“A stroke of genius. Kitzes does an excellent job of translating the properties of biological systems into mathematical models, using basic logic and without any advanced math. His approach is a powerful way to demystify these models and make them intuitive.”

—Corlett Wolfe Wood, University of Pennsylvania

PAPER \$25.00

What Is Regeneration?

Jane Maienschein and
Kate MacCord

“The most thought-provoking and enjoyable book I’ve read in years. I thoroughly recommend it to all who want to exercise their grey matter, to think differently and without horizons.”

—*Marine Biologist*

Convening Science: Discovery at the Marine Biological Laboratory

PAPER \$20.00



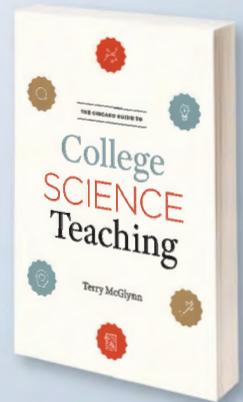
The Chicago Guide to College Science Teaching

Terry McGlynn

“Although the text will be most useful to new instructors—graduate students and early-career faculty—even established professors will likely find refreshing perspectives and ideas.”—*American Entomologist*

“Smart, thoughtful, and practical.”—*Quarterly Review of Biology*

PAPER \$18.00





MEMBERSHIP NEWS

2022 GIFT MEMBERSHIP DRIVE DRAWING WINNER

Thank you to everyone who purchased gift memberships during the 2022 Gift Membership Drive (October–December 2022)! You can purchase one- or three-year gift memberships at any time for both students and developing nations' colleagues. Want to donate a gift membership to students or developing nations' colleagues instead? Simply put your own name and email in the recipient fields. Visit www.crm.botany.org to get started.



Congratulations to **Katelyn Gobbie**, the 2022 Gift Membership Drive winner of the free registration to Botany 2023 – One World!

Katelyn is a graduate student at John Carroll University. Katelyn's primary interests are in plant ecology, botany, conservation, and adaptation to environmental change. Katelyn has a B.S. in Biology from John Carroll University and formerly worked as a Field Botanist Technician with the Cleveland Metroparks. Her thesis work will focus on biological soil crusts, particularly mosses, in gypsum and non-gypsum soils of the Mojave and Chihuahuan deserts.

BOTANY360 UPDATES

Botany360 is a series of programming that connects our botanical community during the 360 days outside of Botany Conferences. The Botany360 event calendar is a tool to highlight those events. The goal of this program is to connect the plant science community throughout the year with professional development, discussion sessions, and networking and social opportunities. To see the calendar visit www.botany.org/calendar. If you want to coordinate a Botany360 event email me at aneely@botany.org.

Botany360 Event Recordings

- **Ace It! - Write a Better Title** (March 2, 2022)
- **Ace It! - Write a Better Abstract** (March 23, 2022)
- **De-mystifying the MS submissions process: Before you submit** (Part 1) (May 11, 2022)
- **De-mystifying the MS submissions process: Before you submit** (Part 2) (May 18, 2022)

By **Amelia Neely**

*BSA Membership & Communications
Manager*

E-mail: ANEely@botany.org



2022)

- **So you want to get involved with section leadership...** (June 5, 2022)
- **Applying to Grad School - A Q&A Session** (September 20, 2022)
- **Utilizing Botany Conference Content in Your Teaching** (November 2, 2022)
- **Intro to Reviews and Meta-Analysis** (November 7, 2022)
- **How to be a Successful BSA Student Representative** (slides only) (January 18, 2023)
- **Prepping for PLANTS: An Informational Webinar about the PLANTS Travel Awards for Underrepresented Undergrads** (March 10, 2023)

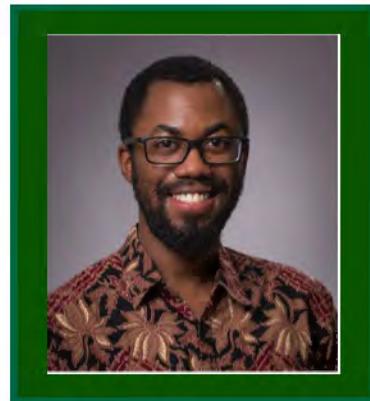
BSA PROFESSIONAL HIGHLIGHTS

New this year, we are including a **BSA Professional Member Highlights** section each month in the *Membership Matters* newsletter. Below you will find the first two highlights of 2023. If you would like to be highlighted, email Amelia Neely at aneely@botany.org.



Dr. Amelia Merced of the USDA-FS International Institute of Tropical Forestry. (Twitter: @AmeliaMerced Website: <https://ameliamerced.weebly.com/>)

Dr. Merced is a botanist interested in evolution, ecology, and conservation of bryophytes. Although trained as a plant anatomist and microscopist, she currently conducts field studies and works with the bryophyte collection at the herbarium of the University of Puerto Rico, Río Piedras. She is interested in the diversity and distribution of bryophytes in Puerto Rico and how they respond to anthropogenic and non-anthropogenic disturbances. An integral part of her work is to communicate science to the community.



Dr. Kadeem Gilbert is an Assistant Professor at Michigan State University (Kellogg Biological Station and Department of Plant Biology). (Twitter: @GilbertKadeem Website: www.kadeemgilbert.com)

Dr. Gilbert studies carnivorous plants (particularly *Nepenthes*) and their interactions with insects and microbes. He also studies symbioses between plants and other organisms more broadly, focusing on the ability of plants to physiologically modify the properties of the microenvironment to which their symbionts are exposed. Dr. Gilbert was a USDA-NIFA Postdoctoral Fellow at Penn State before moving to his new position in 2021.

BSA STUDENT CHAPTER UPDATES

BSA Student Chapters are a great way to network with peers within institutions of learning through engaging activities, as well as take advantage of special BSA discounts—including a \$10 Student Membership and discounted registration to Botany Conferences.

Last year the BSA Student Representatives and the BSA Business Office worked together to revise the requirements for BSA Student Chapters. These included the following requirements:

- Each chapter must have a faculty advisor
- Each chapter must have a President and a Secretary/Treasurer
- The President and Secretary/Treasurer must be current BSA members
- Each chapter must report on 2 chapter activities each year

The BSA Student Chapters were given one year to fulfill these requirements. The following are the **current BSA Student Chapters**:

- Bucknell University - Student Chapter
- L.H. Baileys Botany Bunch - Cornell University - Student Chapter
- IISER Bhopal - Student Chapter
- Northwestern University - Student Chapter
- Oklahoma State University - Student Chapter
- Otterbein University - Student Chapter
- South Dakota State University - Student Chapter
- The Botany Club of Louisiana State University - Student Chapter
- University of Central Florida - Student Chapter

- University of Hawai'i at Mānoa - Student Chapter
- Weber State University - Student Chapter

We are excited to welcome the following new **Student Chapters**:

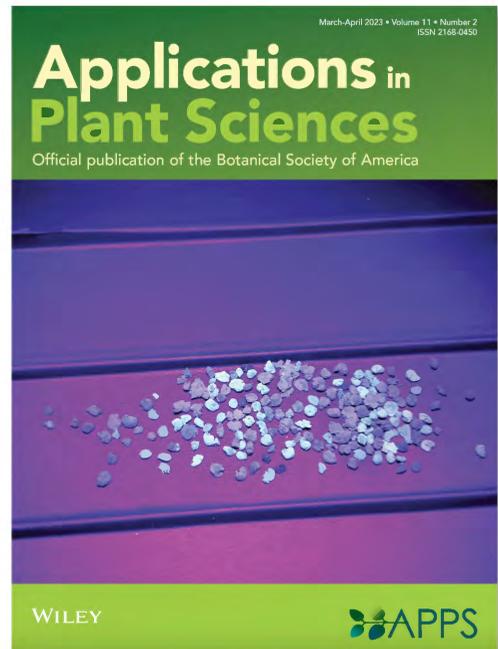
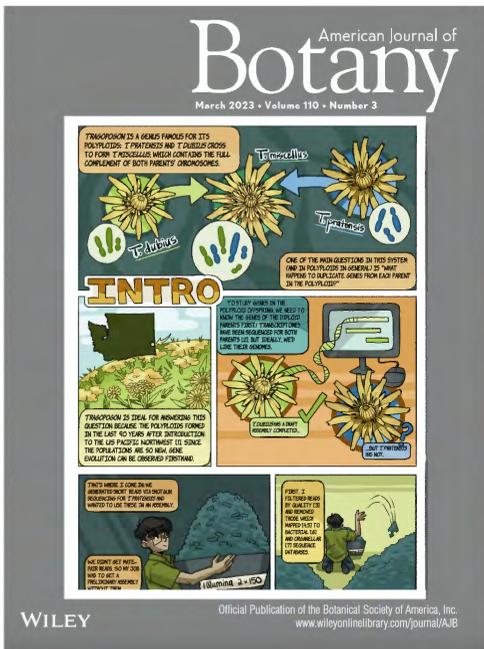
- Bartoo Botanical Society at Tennessee Tech University
- The Gustavus Botanical Society - Student Chapter
- Idaho State University Botany Club - Pocatello - Student Chapter

Below are some fun and exciting events that the Student Chapters organized in 2022:

- **Bioblitzes**
- **Field trips:** visiting a preserve, plant research lap tour, BOOtanical Red Butte Gardens, herbarium tour
- **Going to symposiums and other lectures**
- **Having guest speakers**
- **Hikes**
- **Planting:** erosion prevention, natives, plant swaps
- **Plant sales and fundraisers**
- **Workshops:** Paper making, natural soap making with invasive *Hedera helix*, pottery painting, pumpkin carving/painting, plant ID, Monstera leaf coaster decorating, terrarium making, bioinformatic workshop, seed collection and seed bomb workshop, plant sample mounting: techniques in herbarium

Visit the Student Chapter webpage at <https://botany.org/home/membership/student-chapters.html> to learn more about the program and to see photos. If you want to start a Student Chapter at your institution, fill out the form at <https://bit.ly/3KvNs6Hs> or email Amelia Neely at aneely@botany.org.

You may be able to publish Open Access for free in the *American Journal of Botany* or *Applications in Plant Sciences*!



Find out more at
[https://bit.ly/2FYyZPT!](https://bit.ly/2FYyZPT)



FROM THE *PSB* ARCHIVES

60 years ago

Ira L. Wiggins describes a history of botanical exploration of Baja California, Mexico from 1696 to 1959. “There are areas very difficult of access, where even pack animals cannot be used and one must proceed under his own leg power. Water is always a problem toward the end of the dry season—and in some areas virtually the year around. Local food supplies are scanty or nil. Heat prostration is a common threat. Yet the country holds an appeal that is hard to resist, and botanical rewards are great. It will be a long time before the botanical investigations in Baja California are completed.”

Wiggins, Ira L. 1963. Botanical Investigations in Baja California, Mexico. *PSB* 9(1): 1-6.

50 years ago

“Following the influence of Coulter and Chamberlain at the turn of the century, the teaching of plant morphology in the United States has become almost synonymous with the study of plant life histories in a semi-taxonomic survey of the plant kingdom. As a result, the reproductive aspects of plant structure tend to receive the lion’s share of attention whereas features of general organization and organography are usually relegated to a brief but often inaccurate description of the plant’s ‘habit’. While this outlook may be justified in treatments of algae and fungi where vegetative morphology is simpler and reproductive structures more complex, it seems less defensible in the study of higher plants where the reverse is true. Furthermore, when taught only within the taxonomic framework presently in vogue, morphology emerges simply as a handmaiden of systematics rather than a basic science in its own right.”

Kaplan, Donald R. 1973. The Teaching of Higher Plant Morphology in the United States. *PSB* 19(1): 6-9.

40 years ago

“Information has been received that a project is underway to restore the gravesite of Stephen Hales, the person who did so much to put botany on a scientific basis and who is considered to be the founder of plant physiology. Professor E. T. Pengelley (Univ. of Calif., Riverside) visited the Parish Church of St. Mary in Teddington, Middlesex, England, where Stephen Hales was vicar for 51 years and is buried under the tower of the church (inside the church). The flat tombstone is badly worn after two centuries, and the inscription is completely illegible (although the original inscription is known).

“The American Society of Plant Physiologists has undertaken the restoration project, but the assistance of other societies and individuals will be needed to complete the project. If the Botanical Society of America could raise \$500.00, recognition of the contribution would be indicated on a plaque at the gravesite.”

Gifford E.M. Restoration Of Stephen Hales’ (1677-1761) Gravesite. 1982. *PSB* 28(6): 42.
Note: The 1983 volumes 1-4 are missing from the digital archives.



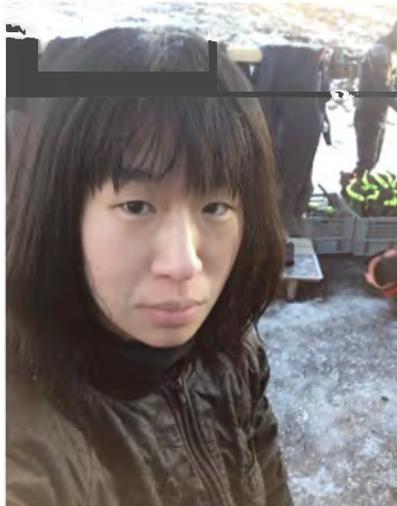
Welcome New PlantingScience Coordinators

The PlantingScience staff has been fortunate to work with some amazing scientists since it began in 2005. In addition to volunteering their time and attention to mentoring our participant student teams, some also step up to serve as liaisons for teachers, monitoring conversations and ensuring that students have messages waiting each time they log in.

And then there are our coordinators! Coordinators are our interns, and during busy sessions we rely on them to help us answer questions, address concerns, and keep the session moving forward. We're so pleased to announce that our 2023 coordinators are and Jin (Ching-Yi) Liao and Shan Wong!

Jin Liao joined PlantingScience in 2019 and served as a liaison in 2020, just as the COVID-19 pandemic was really taking hold. She came to us through the American Society of Plant Biologists, and her favorite themes to mentor are Agronomy Feeds the World, Plants Get Sick, Too!, and the Wonder of Seeds. These themes all closely related to

her research, which focuses on autophagy (the process by which eukaryotic cells break down and recycle old or damaged cellular structures) and hormone signaling in plants when they are under stress.



Jin is also passionate about travel and science communication. She keeps a blog called Jin's LifeRXiv (<https://jinsliferxiv.com/>) where she posts some of her creative efforts to convey complex plant processes and concepts in the form of diagrams, artwork, and even a webcomic featuring an *Arabidopsis* plant named 'Araby'. Her blog also describes handicrafts, such as using popsicle sticks to create wall shelving in the molecular shapes of plant hormones! Jin has recently taken a postdoc position at the University of California - Davis, and we're so pleased she decided to spend some of her time working with us to keep the spring and fall sessions running smoothly!



By **Dr. Catrina Adams**,
Education Director



Jennifer Hartley,
*Education Programs
Supervisor*



PLANTINGSCIENCE UPDATE

We've reached the middle of the Spring 2023 session of PlantingScience! Right now, more than 300 middle school students are spending more time talking about food crops than they likely ever have before. In particular, in Dewitt Middle School in Michigan, the entire 7th grade is working on Wonder of Seeds, and two of their 8th grade classes are studying Agronomy Feeds the World. Many thanks to the mentors and liaisons who are pitching in this session; some of us were able to take part in some Zoom sessions with the students, and they are very excited about their projects! Besides DeWitt, we have participating groups from 12 other schools this season who are studying Brassica genetics, C-fern life cycles, celery plant tissues, and phytopathology.

We are also working with our website provider, HubZero, to make some improvements to our platform. With the help of our current groups and our coordinators, we're begun piloting new approaches to mentor recruitment and building up some of our support options. More exciting changes to come!

Finally, we're also looking ahead to our efficacy research to begin this summer. Over 100 teachers have applied to take part, and we are currently recruiting early career scientists to participate as F2 Fellows. Information about this opportunity can be found on the PlantingScience website (www.plantingscience.org).

Please plan to mentor a
team or two with
PlantingScience in the Fall!

Shan Wong joined PlantingScience in 2021 and served as a liaison and mentor in fall of 2021 and spring of 2022. Shan became involved with orchid conservation while interning at Kadoorie Farm and Botanic Garden in Hong Kong. As an undergraduate, she studied the relationships between native and invasive orchids and their mycorrhizal fungi, and she has gone on to study vanilla orchids at Texas Tech University, where she is preparing to complete her PhD. Shan also studies arthropods, specifically spiders!

Shan's favorite Investigation Theme is The Wonder of Seeds, and one of her favorite PlantingScience memories is of a class that invited her to meet via a video call during their session. She says, "During the meeting, students were excited to show me their seeds treated with different light conditions in the experiment and curious about how I pursued my career in plant science. I was thrilled to help students learn more about plant science and happy to inspire them to consider their career in plant science."

SHARE YOUR PASSION FOR PLANTS

When choosing material to teach biological concepts, teachers report preferring to use animal examples over plant examples.



Plants are boring!!!

They don't DO anything

Who cares about plants?



The majority of new biology teachers have NEVER taken a botany course

SEEKING 100 NEW MENTORS

Become a PlantingScience mentor

Help teams of 3-5 middle or high school students with their plant investigations

Low barriers

- Takes ~1 hour/week to mentor 2 student teams
- All scientists welcome, undergraduate through emeritus
- Mentor from anywhere with an internet connection



High benefits

- Help students understand and value the importance of plants in their lives and the world
- Break down stereotypical views of science and scientists
- Support teachers using plants in their classrooms



LEARN MORE AND SIGN UP:
<http://plantingscience.org>



LIFE DISCOVERY CONFERENCE

The eighth Life Discovery – Doing Science Biology Education Conference was held March 23-25, 2023 at Florida A&M University in Tallahassee, Florida. This small (~100 attendees) stand-alone education conference is co-sponsored by BSA along with the Ecological Society of America and the Society for the Study of Evolution, and includes networking sessions, a share-fair/peer working group format for discussing lesson plans or activities at any stage of development, as well as more traditional hands-on workshop and short presentations.

The theme of this year’s conference was “Variants in Biology Education: What can we learn from pandemics?” with three subthemes: “How have pandemics influenced education and has teaching and learning evolved and/or adapted to meet this challenge?”, “How do we prepare our students for a fast-evolving scientific phenomenon and perhaps and even faster ‘viral’ spread of divergent sources of information that resist the scientific base for evolution and science in general?”, and “Where are the jobs and careers in our field headed over the next 5-10 years, considering reliance on government sources of funding? How are educators preparing our students in an evolving job market?”

On Friday of the conference, Dr. Victor Ibeaenusi, Founder and Director of the EnergyWaterFoodNexus (EWFN) International Summits and Dean School of the Environment at Florida A&M University, delivered a keynote talk about the impact of global climate change on access to safe water, procurement of sustainable energy

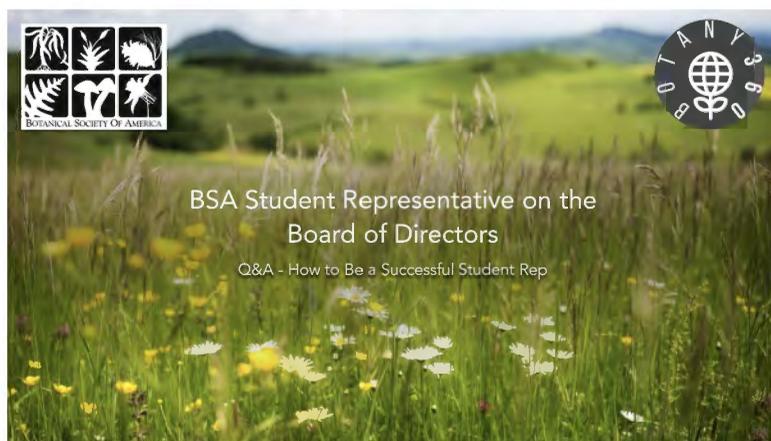
and food security, and how the EWFN open science approach aims at disruptive and accelerated transformations to sustainable development. On Saturday, Dr. Heather Lanthorn, Co-Director of the Mercury Project at the Social Science Research Council, gave a keynote talk on “Science Information amid Misinformation.” A keynote panel featured Dr. Brenda Spencer, Director of the Undergraduate Student Success Center at Florida A&M University, and Dr. Tamara Basham, Professor of Environmental Science at the Collin County Community College Plano Campus. BSA’s Education staff, Catrina Adams and Jennifer Hartley, attended and presented about PlantingScience and our ongoing education research into the program’s efficacy, while highlighting one of PlantingScience’s newest investigation themes: “Tree-mendous Benefits of Trees” module (co-developed with the American Society of Phytopathology).

The Life Discovery conferences are held approximately every 18 months, and the next conference will be in Fall 2024. Please consider attending this conference in the future. There are typically awards for travel and dependent-care support available to encourage community college, tribal college and university, and other minority-serving institution faculty to attend, as well as educators who are from communities underrepresented in the ecological sciences. It’s an excellent place to network with other biology educators, get feedback on teaching materials under development, and present your teaching and outreach efforts! You can read more about the Life Discovery Conferences at: <https://www.esa.org/ldc/travel-awards/>.



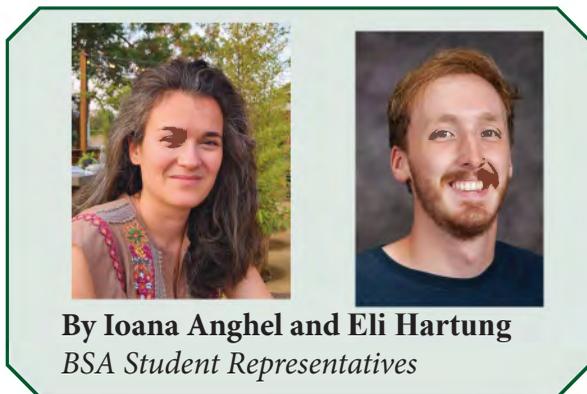
STUDENT SECTION

BOTANY360 WEBINAR: HOW TO BE A SUCCESSFUL BSA STUDENT REPRESENTATIVE



We were excited to lead a Botany360 webinar earlier this year on “How to be a Successful BSA Student Representative.” If you missed it and would like to access the slides from the presentation, go to <https://bit.ly/40IrhdB>, and be sure to email us at ianghel@ucla.edu and elishartung@gmail.com if you have any questions. (For more information on the Botany360 series, see the Membership article in this issue.)

BSA SPOTLIGHT SERIES



By Ioana Anghel and Eli Hartung
BSA Student Representatives

The BSA Spotlight Series highlights **early-career scientists** in the **BSA community** and shares both scientific goals and achievements, as well as personal interests of the botanical scientists, so you can get to know your BSA community better.

Here are the Spotlights since the last *PSB* was published—along with some advice from each member for those starting their botanical journey!



Oluwatoyosi Adaramodu
Graduate Student, Biology
(School of Art and Sciences)
University of Pennsylvania

Stay curious: The field of botany is vast and constantly evolving, so be sure to keep an open mind and a thirst for knowledge. There is always more to learn, so don't be afraid to ask questions and seek out new resources.



Josh Felton
Post-Baccalaureate
Colorado College
Organismal Biology and Ecology

While my journey has similarly just begun, looking back at the past couple of years, I would say I would not feel as connected to the botanical community if I was not following

so many cool botanists on Twitter. It has been a great space to see what botanists are up to in their personal and work lives. Botanical Twitter has also allowed me to get a sneak peek into what graduate students and postdocs are up to that I would not otherwise get to see coming from a liberal arts institution. I also recommend not being afraid to reach out to anybody whose research is interesting to you. It is often the case that whoever you are reaching out to will be joyous to geek out about plants.



Oluwatobi Oso
Graduate Student,
Ecology and Evolutionary Biology
Yale University

Botany is not all lab!!! Actively look for opportunities to grow, join a community of people passionate about similar interests, ask questions, and be open to learning. And like every journey, it helps to 'plant-science' one day at a time.



Johan David Reyes
Graduate Student
Bioscience,
Edge Hill University
World Museum Liverpool



Min Ya
Postdoctoral Fellow,
Department of Ecology and Evolutionary
Biology,
University of Connecticut

Never be afraid of contacting someone you admire! It harbours amazing collaboration opportunities. As Gerald Holton once said ‘... we are now uniquely privileged to sit side-by-side with the giants on whose shoulders we stand’. Collaboration and putting yourself out there are important to achieve whatever you envision. In addition, surround yourself with kind people that will help you in your journey, but do not be afraid to move somewhere new if you feel it will lead to great personal and professional growth. At the end, each journey is different.

If it’s possible, take your time to find out what you’re passionate about, and don’t be afraid of exploring unknown fields. Surround yourself with good people. Good mentors, good peer supporting groups, and good communities are about the most important things in your scientific journey. Learn about yourself, recognize signs of burn out and practice self-care. Try your best to always make time for your hobbies.

Would you like to nominate yourself or an early career scientist to be in the Spotlight Series? Fill out this form: <https://forms.gle/vivajCaCaqQrDL648>.



ANNOUNCEMENTS

IN MEMORIAM



CARL JOHN BURK
(1935–2022)

Carl John Burk, a beloved botany professor at Smith College, passed away July 2022 in Northampton, Massachusetts. Generations of Smith students benefited from his warm, enthusiastic, and genuinely caring personality as he introduced them to the fascinating world of plants and their environments. John is remembered by all who knew him as being upbeat, optimistic, and always positive.

John was born in 1935 in Troy, Ohio; “the other Troy” he was fond of saying, referring to the ancient city. He received his B.A. (1957) from Miami University in Ohio and his M.A. (1959) and Ph.D. (1961) at the University of North Carolina-Chapel Hill. His doctoral research was a floristic study of the Outer Banks of North Carolina.

In 1961 John joined the faculty of what was then the Botany Department, and became the Department of Biological Sciences, at Smith

College, starting what would become a long and rich teaching and research career. John served the department for over four decades, retiring in 2009 as Elsie Damon Simonds Professor in the Life Sciences, Emeritus. “Retired from teaching,” he would emphasize. He pursued professional and research activities well into his post-retirement years.

For decades John taught plant systematics and plant ecology in addition to courses in biogeography and conservation. He maintained the college herbarium and was deeply involved in shaping the plant collections in the Lyman Plant House and Botanical Gardens at Smith. Former students recall John as a favorite professor, a teacher who nourished a love for learning, and for walking really fast on field trips.

John’s research areas included the botany, biogeography, and ecology of coastal areas and freshwater wetlands, as well as historical studies including botanical gardens and botanical illustration. Local sites including the Mill River and Arcadia Wildlife Sanctuary in Easthampton (MA) became his laboratory, where he and many of his undergraduate and graduate research students carried out floristic projects and long-term ecological studies. Notably, John never questioned the ability or appropriateness of his primarily female students doing rigorous field work. John was elected as an AAAS Fellow in 1995. In more recent years John worked with German colleagues on comparative studies of plants in New England and in Northern Germany. His most recent paper, published in 2020 in the *Proceedings of the National Academy of*

Sciences, “Forest and woodland replacement patterns following drought-related mortality” is co-authored by 37 scientists from different parts of the world. After retirement, John continued as associate editor of the *Journal of the Torrey Botanical Society*. He enjoyed his editorial duties that helped him stay connected with colleagues and with current research in his field.

Appreciating his own undergraduate liberal arts background, John believed strongly in integrating diverse disciplines within the sciences and with the humanities. He enjoyed interacting and co-teaching with his colleagues in and outside his department, appreciated their expertise in their fields, and valued their friendships. He was an avid bird watcher and led the annual bird walk on campus for many years. Generous with his time, he was always happy to share his rich botanical knowledge with others.

Contributing to the community was important to John. He served on the Sanctuary Committee of Arcadia Wildlife Sanctuary in Easthampton (MA) for many years and oversaw the permanent conservation of family property in Hatfield (MA), now a popular hiking destination for the community. In talks to general audiences, he was capable of making science accessible to non-scientists. In 1987–88, he gave the College’s annual Katharine Asher Engel Lecture, pleased to be talking about his research on the changing landscapes of New England to a wider audience. He was frequently called upon to identify some mystery plant; this he did with great pleasure and enjoyed advising colleagues and friends on botanical questions. John also loved nature at his home, and the appearance of a rabbit around the flower beds did not upset him. His philosophy was “live and let live.” Indoors,

he was proud of his heirloom African violet collection.

John met his wife Lâle in 1962 when she arrived from Istanbul to start graduate studies in chemistry. They got married in 1966 and had two sons, John Seljuk and Nicholas Murat. Lâle eventually became a faculty member in Chemistry at Smith College, and the two of them were mutually supportive of their careers.

John was an informed traveler with a rich knowledge of history. He was grateful for trips to the Amazon and to East Africa before these vulnerable places became more endangered. Later trips included travels to Turkey. An untiring hiker, he walked daily around the periphery of Büyükada, the largest of the Princes’ Islands off of Istanbul where Lâle’s parents summered. His bird watching there contributed to local bird count data and papers on bird migration patterns. Another favorite site in Turkey was near ancient Troy, the ruins on the hill in Assos that overlook the nearby island of Lesbos and home of Theophrastus, “the father of botany.” Other memorable travels were trips to botanical gardens in Hawaii, to English gardens, to tulip fields in the Netherlands, and to many historic gardens in Europe. During his last trip in the fall of 2019, he visited one of the oldest botanic gardens in the world, Hortus Botanicus in Amsterdam.

John had a deep interest in art and in music. He was a constant visitor to the College’s libraries and the local public library, and he visited the College’s art museum frequently. He enjoyed opera trips to New York and to the Hamburg Opera and Ballet. Special also were excursions in the summer to the Clark Art Institute in Williamstown (MA) where he and Lâle went

CHRIS DAVIDSON BOTANIST OF IDAHO, AND THE WHOLE WORLD (1944–2022)

on their first date, and to Tanglewood, where he was delighted by the occasional bird song contributing to the music in the “Shed.” He was funny with a keen sense of humor. He appreciated life’s ironies and could see the big picture, separating what was important from what was not. He will be missed.

[Portions of this article were modified from the family obituary of Carl John Burk, used with permission.]

Christopher Robert Davidson was the proud scion of generations of Idahoans, who applied his passion for plants to the world’s flora. Although Chris considered Idaho the center of the world, he viewed the world as his study site and garden, and the entire vascular flora as his study organisms. He found wonder in all parts of the natural world, in each of its plants, and in all cultivated gardens, and he delighted in biological diversity at any scale and in every bit of time spent in the field.

Chris did leave Idaho (although not the West) for undergrad studies at Whitman College in the adjacent state of Washington, where he aimed to study geology but quickly pivoted to botany. He followed this academic stint with Ph.D. studies at Claremont College in southern California, working with Robert Thorne and Sherwin Carlquist and exploring widely the botany southern California. Here he focused his academic work on the Datisceaceae (Liston et al., 1973), and began his life-long interest in disjunct plant distributions. Chris finished in 1972 and took his shiny new botany doctorate to a curatorial appointment at the Los Angeles Natural History Museum. He spent 1975–1979 there and conducted an active program of tropical botanical exploration. He made a number of field expeditions from there, collecting ~10,700 specimen numbers in Guatemala, Costa Rica, Panama, Bolivia, Brazil, and Peru—at a time when tropical logistics were much less convenient than today, and knowledge of the tropical flora much more limited than now.



Figure 1. Chris Davidson and Sharon Christoph in Charlie's Garden in McCall, Idaho, in 2012. (Photo courtesy of Barbara Ertter.)

In 1980 Chris returned to Boise for his beloved daughter Sara's arrival into his life, to raise the next Davidson generation in the family homeland. Here he also began a new phase of his botanical work focused on living collections in Boise and in McCall, in west-central Idaho. Here during 1980–1985 he also edited part or all of *Madroño* volumes 28–31. In 1984 he started the Idaho Botanical Garden in Boise, assembling a board of local civic leaders, arranging the lease of a plot of land, and overseeing the Garden's development during its early years. Here he met Sharon Christoph (Figure 1), who became his wife and his long-term close botanical collaborator. During that time, Chris also took over managing and significantly developing the family-owned Charlie's Garden in McCall (Figure 1), a green wonderland that was the pet project of his step-father, Charlie Davidson. Chris expanded and developed Charlie's Garden, keeping it open to informal public access, and he also developed an extensive private garden for himself on his family's estate in

Boise. Charlie's Garden is still open to the public and much appreciated locally, and both of these Idaho gardens contain a diverse collection of botanically notable Asian and North American species.

In 2002 Chris began yet another phase of his botanical work when he and Sharon started traveling around the world to find various plant families with limited distributions. This became the formal *Flora of the World.org* project in 2008, with the development of a website registered as <https://floraoftheworld.org/> and the plan formulated for organized botanical exploration and support for capacity development in tropical botany. *Flora of the World.org* aims to document all the flowering plant families and genera, with vouchered photos of living plants in their habitats. To date, this project has more than 230,000 images corresponding to around 13,000 voucher collections. The plants were photographed in the field by Chris, Sharon, and a few colleagues across the world, in collaboration with local botanists worldwide. This project aims to fill a gap in knowledge of the world's plants by systematically documenting with digital images the living morphology of all flowering plant diversity. The project was fully mapped out and well underway toward coverage of all the world's plant families, with the champagne chilled for the completion celebration, when the deeply revised new APG II classification of the flowering plants was published (Angiosperm Phylogeny Group II, 2003) and the finish line was suddenly pushed way, way into the future by the multiplication of plant families: from ~200 to 430. But Chris and Sharon accepted the expanded challenge, flew around the world to 45 countries, drove and walked many a mile, had too many adventures to count, and were only eight families short of completion when he died.

Chris's support for botanical activities also took the form of his personal counsel and support, as well as financial contributions. He funded travel for his colleagues, both when accompanying him and for their own work, as well as infrastructure improvements in many of the places he visited. He also provided critical longer-term support for field exploration programs in some target areas, including the Republic of Georgia, Chiapas in southern Mexico, and the Andes of central Peru, and he helped botanical garden efforts in various countries with advice and support. His attention to all this did not replace attention for his beloved Idaho, though, and he also made his home base at the Snake River Plains Herbarium at Boise State University and explored and collected all across the state. His focus on world plant diversity also did not eclipse his attention to study of his own group of interest, the tropical family Piperaceae, and he collaborated in these studies with various colleagues in several countries. And apart from all these groups, 10 new tropical vascular plant species were named to honor him, based on his specimen collections and/or collaborations (Figure 2).

Chris was a well-loved husband, father, and grandfather, and he was also a very valued colleague and friend to many people around the world. His influences on our botanical field have been quiet and collaborative but no less significant for that. He was North American in having his own animal totem, the hedgehog, and he regarded himself as a correspondingly spiny personality but was nothing like that. He was notable personally for his gentle manner, sly wit, broad botanical knowledge, generosity in all things, and love of both plants and champagne; for being a thoroughly good man; and for his endless, pure sense of wonder.



Figure 2. Left to right, Chris Davidson, Martin Callmender, and Sven Buerki in New Caledonia in 2011, standing in front of the tree from which the type collection was made of *Podonephelium davidsonii* Munzinger, Lowry, Callm. & Buerki (Sapindaceae). (Photo courtesy of Porter P. Lowry, II.)

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–Charlotte M. Taylor¹, Roy E. Gereau¹, W. Douglas Stevens¹, Barbara Ertter², Sven Buerki³, Olga Martha Montiel⁴, and Sharon Christoph²

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DAVID W. LEE (1942–2022)



David and his wife Carol at their home in Crestone, CO, October, 2014. [Photo credit: John Palenchar.]

David W. Lee, a BSA Distinguished Botanist and member of the BSA for more than 40 years, died in Crestone, CO on December 13, 2022. David was a botanist of amazing breadth, excelling in his research and outreach to both professional and lay communities. He grew up in eastern Washington state, studying science and getting his undergraduate degree at Pacific Lutheran University in Tacoma, WA. He took a year off during his undergraduate studies to travel in the south Pacific, which initiated a life-long love for traveling and botany. David earned his MSc and PhD in Botany (1970) at Rutgers University, using electrophoretic techniques to understand cattail (*Typha*) phylogeny under Dr. David

Fairbrothers. After two years in a post-doc at Ohio State University (where he met and married Carol Rotsinger, his life-long wife), he became a lecturer at the University of Malaya for four years (1973–1977), where he grounded himself in tropical botany. He then worked on tree architecture with Dr. Francis Halle in Montpellier, France (1977–78). In 1980 he was hired as the only botanist in the Department of Biological Sciences at Florida International University (FIU), the young and growing public university in Miami, FL.

David spent most of the rest of his professional career at FIU, where he worked to expand botanical research and education, with a special focus on tropical plants. During his career, he published 71 referred articles and 15 book chapters. He did pioneering work on the basis for plant adaption to low-light environments of tropical forests, including discovering the structural basis for blue color in leaves and fruits lacking blue pigments, methods to experimentally simulate the spectral changes of canopy shade, as well as the basis for red color in flushing leaves and during autumn senescence. Early in his time at FIU, he convinced the University that botany is especially important at FIU and in Miami, given its location in a subtropical environment with ready access to the New World tropics. David created a certificate program in tropical commercial botany to serve the nursery and agricultural community and educated journalists like Georgia Tasker about tropical botany. He developed professional relationships with researchers at Fairchild Tropical Botanic Garden (FTBG), which he worked to formalize in a cooperative agreement between the two institutions with the goal of advancing both research and education in tropical botany. Later (2007–2008), he became Director of

the Kampong, part of the National Tropical Botanical Garden, where he helped to lay the groundwork for the International Center for Tropical Botany, a research and education collaboration between FIU and the National Tropical Botanical Garden.

David generously served the FIU Biological Sciences Department and the University. He was on the departmental Graduate Committee, the Faculty Senate, the Faculty Senate Environment Committee, Faculty Senate Strategic Planning Committee and College Tenure and Promotion Committee, to name a few. He also served as the inaugural chair of the Department of Environmental Studies and as Chair of the Department of Biological Sciences. He even chaired the search for the FIU men's basketball coach in 1995. David played basketball as an undergraduate at Pacific Lutheran and continued to play pickup games on campus with team members of FIU men's and women's basketball throughout his time at FIU.

He also worked to expand the botanical faculty at FIU and to develop undergraduate and graduate curricula in plant sciences. Initially he taught Plant Physiology but expanded to Tropical Botany and later developed a non-majors course that became very popular: Introductory Botany. Students in this course would not only grow plants under lights in the lab, but each group had a garden bed where they grew vegetables and herbs, a formative experience for many who would recall that activity as their favorite. He also taught "Functional Ecology of Tropical Plants" to students in the Landscape Architecture program and developed a course called "The Meaning of the Garden" for the FIU Liberal Studies program, in which students would do weekly physical gardening and then learn



David leading a walk looking at Miami street trees, both native and exotic, for a group of Miami artists, March 2016. [Photo credit: Naomi R. Fisher.]

about all the kinds of gardens in Miami and the world. David was deeply involved in graduate training, mentoring five Ph.D. and seven MSc students to completion as major professor. In part for his educational innovations, David received the BSA's Bessey Award for teaching in 2006.

David's educational efforts extended beyond the university; he wrote books ranging from local plant identification books (*Wayside Trees of Miami*, 2011; *Trees of Gurudev Siddha Peeth, India*, 1985), books about environmental problems (*The Sinking Ark*:

Environmental Problems in Southeast Asia, 1980), historical books (editing *The World as Garden: The Life and Writings of David Fairchild*, 2013), and books making botanical knowledge and research accessible to the public (*Nature's Palette: The Science of Plant Color*, 2007; *Nature's Fabric: Leaves in Science and Culture*, 2017). *Nature's Palette* won the *Best of Biology and Life Sciences Award* from the Association of American Publishers, whereas *Nature's Fabric* won the *Choice Magazine: CHOICE Outstanding Academic Title Award*. Most recently, David worked with Dr. Peter Ashton to take the information on their research and experience in southeast Asian tropical forests and make it accessible to both researchers and the educated public in *Trees and Forests of Tropical Asia: Exploring Tapovan* (2022). In 2019, the BSA recognized David's contributions to the plant sciences by awarding him the Distinguished Fellow Award, which is the highest honor the Society can bestow.

In his retirement, David continued his scientific writing but also set up an art studio at his new home, located at 7900 ft. in Creston, CO. There, he enthusiastically expanded his artistic side by making paper from native plant fibers and dried flowers. His creations sold in a local gallery in Crestone. He greatly enjoyed returning to the temperate environment and plants of his youth, writing articles about the Colorado flora for the local newspaper.

As a person, David was generous, caring, and fundamentally aware of, sensitive to, and a proponent for the spirituality of nature. He could not think poorly of anyone and was always looking for and promoting the positive aspects of people he knew, be they students, faculty, local/national/international colleagues and collaborators, administrators, or laypeople.

Before he died, and as part of the botanical outreach that characterized his life, he left a website that explains how and why he became a botanist, what that entailed and what that enabled, accompanied by illustrations of the plants, people, and places that he cared about. His passion for the wonders of it all comes through: <https://www.davidleebotanist.com/>.

-Jennifer Richards (FIU), Suzanne Koptur (FIU), Steve Oberbauer (FIU), and Jack Fisher (FTBG)



DAVID MICHAEL SPOONER (1949–2022)

Spooner. “Spooner-Dooner,” as we sometimes called him. He was a hard-working student, colleague, friend, and a character. There were many parts of Dave’s personality that one remembers, and all fondly so. He was a kind person, unassuming, ready to laugh, and nearly always smiling. He liked people, manifested by his collaborations with more than 200 colleagues during his career. He was tall and lanky, good-spirited, and always game for more field work in the mountains from Mexico to Argentina and in many other parts of the world.

David Michael Spooner was born on 1 November 1949 in Downey, California, the son of David Spooner and Ann (Jordan) Spooner. He began his academic education at Miami University (Ohio) in 1967, earning a B.A. in 1971. Subsequently he served in the Army, but he took advantage of his geographic posting

to enroll in botany courses at the University of Maryland. In 1974 he entered the graduate program at Ohio University (Athens), working under the supervision of Prof. Robert Lloyd on a reproductive biological study in *Dentaria laciniata* and *D. diphylla* (Spooner, 1984), earning an M.S. in 1976. He took a break from academic studies and began working for the Ohio Department of Natural Resources, investigating rare and endangered species of the state, as well as the influence of the ancient Teays River system on plant distributions in southeastern Ohio. In the Fall of 1982, he entered the Ph.D. program in the Department of Botany at Ohio State University, working in the laboratory of Tod Stuessy, and focusing on evolutionary monography of the genus *Simsia* (Compositae). As this was a Latin American plant group, Dave plunged into learning Spanish to aid his fieldwork (totaling five months). This was the beginning of a long career of plant investigations in Latin America.

After graduation from Ohio State in 1987, Dave took a job at the University of Wisconsin, Madison, in a split position as Assistant Professor in the Department of Horticulture and as Botanist in the Vegetable Crops Research Unit of the USDA on campus. His research interests focused on crop plants, initially on the potato and its wild relatives, and later turning to carrots. This dual-posting arrangement might have seemed intimidating to some academics, but it suited Dave because it provided scheduling flexibility for the field studies that he loved and did so well. The Latin American countries Dave visited over his career included Nicaragua (1986), Mexico (1988, 1997), Chile (1989, 1990), Argentina (1990), Ecuador (1991), Colombia (1992), Venezuela (1992), Bolivia (1993, 1994), Guatemala (1995), Costa Rica (1996), Peru

(1998, 1999), Honduras (2000), and Panama (2000). He also collected in the western U.S. (2010), Nepal (1995), Morocco (2012, 2013), and Spain (2016). In total, he spent 30 months in the field.



Collecting potato germplasm in Peru in 1999 with Alberto Salas (specialist with the International Potato Center, Lima). Photo by Alejandro Balaguer (USDA Image Number K9020-20).

As Dave's research developed, he worked in parallel on systematic monography and molecular phylogenetics and evolution. This is not the place for an in-depth analysis of his research productivity and impact, but by any reckoning it was impressive, encompassing more than 220 articles dealing with systematics, biogeography, genetics, genomics, phylogenetic reconstruction, phylogeography, and crop improvement, among others, and in well-known journals such as *PNAS*, *Nature Genetics*, *American Journal of Botany*, *Systematic Botany*, *Evolution*, *Theoretical and Applied Genetics*, and *Taxon*. His doctoral thesis on *Simsia* appeared in *Systematic Botany Monographs* (1990), but over the years there were four additional monographs in this prestigious monographic series on *Solanum* (Spooner et al., 2004, 2016, 2019; Peralta et al., 2008), plus a comprehensive review (Spooner et al., 2014), totaling 1040 pages! He published 19 papers in the *American Journal of Botany* on potatoes, tomatoes, carrots,

and evolutionary topics (e.g., Hijmans and Spooner, 2001; Peralta and Spooner, 2001; Spooner et al., 1993, 2001), with the article in 1993 of particular significance where he and colleagues demonstrated that potatoes and tomatoes belong more appropriately to the same genus. He authored a paper in *PNAS* showing a single domestication for the potato based on AFLP genotyping (Spooner et al., 2005). His recent research focused on the origin of the cultivated carrot (*Daucus carota*; e.g., Spooner et al., 2017), including participating in assembly of the entire genome (Iorizzo et al., 2016).

Dave was the perfect match for the crop science initiatives within the USDA. He had a strong grounding in botanical monography and experience in fieldwork, which allowed him to address issues relating to species concepts, ecology, and speciation, and he gained proficiency in molecular methods to infer more precise estimates of relationships. With all of this information, he was able to contribute toward improvements of potatoes and carrots. He was a dedicated collaborator, enthusiastic about interactions with people from diverse cultures, especially from the United States, Latin America, and Europe.

He was successful in obtaining substantial grant support for his field and laboratory studies. The field work was often supported from the USDA Plant Genetic Resources System, but he garnered numerous other sources of funding including major support from NSF under the Plant Biotic Inventories on the genus *Solanum* (with Lynn Bohs, Sandra Knapp, and Michael Nee). Other funding came from the USDA National Research Initiative Competitive Grants Program and the University of Wisconsin.

Dave was active in several professional societies: the Society for Economic Botany; the Potato Association of America; and the Botanical Society of America, serving as Secretary (2003–2006), Council Member (2007–2008), Program Director (2009–2011), and Chair of the Economic Botany Section (2002–2008). He was a board member of the William L. Brown Center at the Missouri Botanical Garden and the Calvin Sperling Biodiversity Committee in the Crop Science Society of America. He also served on numerous committees in the Department of Horticulture at Madison, as well as in the USDA.

He received several honors and recognitions: The Edmund H. Fulling Award for the best paper presented at the 1990 Annual Meeting of the Society for Economic Botany; a Centennial Award (2007) from the Botanical Society of America; outstanding paper awards at the Crop Science Society of America (2007, 2009); USDA Midwest Area Senior Scientist of the Year Award (2008); Honorary Fellow of the Scottish Crop Research Institute (Dundee; 2006–2009); and an elected Fellow of the AAAS (2009).

In June of 2019, Dave was diagnosed with a multiple myeloma, a bone/blood cancer that affected the bone marrow and had numerous other adverse effects on his back and liver. Dave accepted this physical setback, and he continued research with an abbreviated schedule. A man of faith, he faced his imminent demise with an open heart and a conviction that something better was awaiting him. He passed away on 7 June 2022 in Janesville, Wisconsin. He is survived by his two children—a daughter, Lisa Spooner Lauren, and a son, Danny Spooner—and seven siblings.

At heart, Dave was a dedicated field biologist, pure and simple. “As a child I almost lived in the woods, and all I ever wanted to be was a botanist. I dreamt of traveling in remote mountainous areas, driving a jeep, collecting plants, and meeting indigenous peoples. I can still recall the unbelievable feeling of adventure and energy of my first field trips in Mexico and Central America, living out a dream I held all my life.” (Spooner, 2011, pp. 30–31). We like to think that our friend and colleague, Spooner-Dooner, is no longer with us because he is just off again on another field trip—extending his dream for eternity.

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- Tod F. Stuessy, Herbarium and Department of Evolution, Ecology, and Organismal Biology, The Ohio State University, Columbus, and the Department of Botany and Biodiversity Research, University of Vienna, Austria*
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- Gregory J. Anderson, Department of Ecology and Evolutionary Biology, University of Connecticut, Storrs.*

EAGLE HILL INSTITUTE'S 2023 VASCULAR PLANT AND RELATED SUMMER SEMINARS

Eagle Hill is right on the coast of Eastern Maine, between Acadia National Park and Petit Manan National Wildlife Refuge (<https://www.eaglehill.us/index.shtml>). We would like to share our Summer Field Seminar Calendar (<https://www.eaglehill.us/programs/sems-weeklong/calendar-weeklong.shtml>) and invite you to explore the many options offered.

For general information, the registration form, seminar flyers, and a complete calendar, see: <https://eaglehill.us/programs/sems-weeklong/calendar-weeklong.shtml>

If you have any questions about the content of the seminar, please reach out to the seminar instructor(s), whose contact info can be found on the seminar flyer. If a seminar you are interested in is full, and you would like to be put on the waitlist, please fill out the application form.

If you have any questions about registering for the seminar, please contact us at office@eaglehill.us.

Selected Highlights

- **July 2-8 - Grasses and Sedges as a Way to Read the Landscape** - Brett Engstrom and Jerry Jenkins
- **July 9-15 - Wetland Identification, Delineation, and Ecology** - Rick Van de Poll and Joseph Homer
- **July 9-15 - Grass Identification: An In-depth Review** - Dennis Magee
- **July 23-29 - Ericaceous Heaths and the Ericaceae** - Paul Manos and José Meireles
- **Jul 30-Aug 5 - Field Botany of the Maine Coast: Learning to Network with the iNaturalist Community** - Robert Wernerehl
- **Aug 6-12 - Submersed and Emergent Aquatic Flowering Plant** - C. Barre Hellquist
- **Aug 27-Sept 2 - Identification of Trees and Woody Plants of the Northern Forest: A Wholistic Approach** - Erika Mitchell



BOOK REVIEWS

Atlas of Perfumed Botany

Elderflora: A Modern History of Ancient Trees.

In the Name of Plants: From Attenborough to Washington, the People behind Plant Names.

Learn to Love Those Latin Names: a straightforward guide to botanical nomenclature

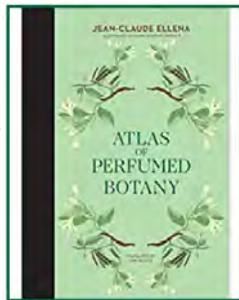
Rescue and Revival: New York Botanical Garden 1989-2018

A Systematic Vademecum to the Vascular Plants of Saba

Trees: from Root to Leaf

Atlas of Perfumed Botany

Jean-Claude Ellena (Karin Doering-Froger, illustrator; Erik Butler, translator)
2022. ISBN: 978-0-262046732
US\$29.95 (Hardcover); 165 pp.
MIT Press, Cambridge MA, London, England



A new volume by Jean-Claude Ellena, a superstar in the world of perfumery for luxury brands Hermès and Bulgari, presents a memoir of his journeys to sources where some of his most valued perfume plants are harvested and processed. Released in French in 2020, this English language translation presents a memoir of his travels, often to fragile conflict areas not in the news. His personal encounters provide insight into the plant ingredients that go into making perfume. He tracks raw materials, reveals the history of their use in perfumes, and tells stories about how he was introduced to these plants.

Ellena, the “nose” of the luxury brand Hermès for 14 years, has been the Creative Director of Fragrance at the perfume house Le Couvent since 2019; he was designated Hermès’ first “perfumeur exclusive” in 2004. He works near Grasse, France, and designs scents at his studio in Cabris. This *Atlas* follows his 2011 book, *Perfume: The Alchemy of Scent*.

These brief accounts about key botanicals used in perfumery could be viewed as encyclopedia entries, presenting well-written highlights. Comprising just one to two pages, the essays are not comprehensive, but instead memorable notes about each species related to his personal experiences, advancing insight into a renowned perfumer’s world.

Author and translator both must be congratulated for the superb writing style, told in a personal, conversational manner, e.g., perfumers as sorcerers (p. 35); “olfactory cathedral” (p. 36); “while landscape tells a story, scent makes a proclamation” (p. 60). Ellena’s references include some titles perhaps not readily accessible to U.S. readers, including one published in French, by Michael Edwards, an author who identifies as a poet, and whose six books about perfume are all out of print.

The title term “Atlas,” a book of maps, was puzzling, because no maps are included. However, further search for information about illustrator Karin Doering-Froger, a faculty member at the Atelier de Sèvres, led to a book series she illustrated, united as ‘Imaginary Cartographies’, meeting a broad definition of the term “Atlas”: “a bound volume of charts, plates, or tables illustrating any subject.” These include *Atlas der Verlorenen Städte*, *Atlas des*

Paradis Perdus (with Gilles Lapouge, to whom the author dedicates this book, “in fond memory of our meeting and the resulting project”), *Atlas des Terres Sauvages*, *Atlas des Contrées Rêves*, and *Atlas des Fortunes du Mer*. Under that loose definition, these illustrations, while attractive and creative, do not always provide a road map to the plant named. Some, with more literal minds, might be disappointed that they provide an impressionistic view of a species instead, reminiscent of the work of Arts and Crafts era British textile designer William Morris, rather than scientific botanical illustrations.

Chapters are arranged thematically by part used: Woods and barks (sandalwood, cinnamon, red cedar, oakmoss); leaves (labdanum, absinthe and artemisia, basil and tarragon, rose geranium, patchouli, violet); flowers (jasmine, lavender, mimosa, narcissus, bitter or bigarade orange, tea olive, Rose, tuberose, ylang-ylang); fruits (bergamot, black currant buds, lemon, sweet orange); gums and resins (benzoin, galbanum, myrrh, frankincense); seeds (ambrette, green cardamom, carrot, nutmeg and mace, peppers, tonka, vanilla); and roots (garden angelica, iris, vetiver).

Ellena views aspects of the industry through an economic lens, e.g., Reunion is the leading producer of rose geranium; whereas “NY buyers seek lowest price, French Parisians follow their noses” (p. 41); decries performance vs. economy – amount yielded (p. 53). Islam prohibits selling scents too dear, and exorbitant prices are prohibited, nor are buyers allowed to haggle; instead, oil-based pure Attars are prepared without alcohol, which is unobtainable (p. 85). Page 80 mentions scent extraction by enfleurage, but omits the innovative use of sesame seeds, whereby rose petals are spread over trays

coated with a layer of fat, or alternatively, a bed of sesame seeds that become saturated with rose essential oils by diffusion (Groom, 1992; Bedigian, 2011; Sharifi-Rad et al., 2017). Depleted petals are replaced repeatedly with fresh ones; those augmented sesame seeds are crushed with mortar and pestle to obtain high-quality concentrates, forming rose absolute.

Significant in the entry about benzoin (p. 108) is its attention to Papier d’Arménie™, a room deodorizer made of sheets of paper coated with the dried sap of styrax trees sourced from Laos. While on a 19th-century trip to Armenia, chemist Auguste Ponsot discovered the resin’s disinfecting qualities (Grigoryan, 2010) and determined to introduce it to France. Renowned since ancient times for its antiseptic, healing, and expectorant properties, benzoin balm has been traditionally applied externally to treat asthma, coughs, and hoarseness. Ponsot adapted a technique, assisted by pharmacist Henri Rivier, whereby benzoin resin was dissolved in alcohol, then infused onto a blotting paper support to deliver a lasting fragrance. Papier d’Arménie became a huge success with the emerging importance of hygiene circa 1888-1889 and has been steadily produced in Montrouge, France since 1885. A Papier d’Arménie booklet contains detachable strips of brown perfumed paper. Typically, a strip is torn from the booklet, folded accordion-style, and placed on a heat-resistant support. The strip is lit and blown on gently, until the paper begins to glow, to slowly release scent. Environmentally friendly, Papier d’Arménie does not use any propellants and causes no harm to the ozone layer. The absorbent paper used to manufacture Papier d’Arménie is certified by the Forest Stewardship Council, an independent international organization to promote the responsible management of the world’s forests.

MIT Press is commended for preparing a carefully edited volume; I spotted just one typographical error: spelling the Latin binomial as *Rose damascene* (p. 81). This would be an excellent addition to public and school libraries, for a joyful respite, and as a vastly informative book. Readers seeking academic, in-depth coverage about the chemical constituents of perfume plants as well as their ethnobotany may explore the superb review by Sharifi-Rad et al. (2017).

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–Dorothea Bedigian, Research Associate, Missouri Botanical Garden, St. Louis, Missouri, USA

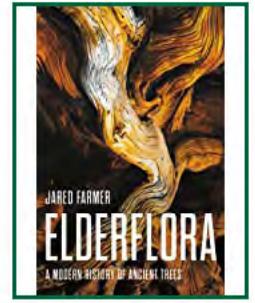
Elderflora: A Modern History of Ancient Trees

Jared Farmer

2022. ISBN 9780465097845 (hardback), 9780465097852 (epub)

US\$35.00; 432 pp.

Basic Books, Hachette Book Group, New York



Farmer, an environmental historian at the University of Pennsylvania, presents a complex interweaving of culture, history, and biology in relating the interactions between humans and trees. He succinctly summarizes this 400+-page volume in two sentences on the first page of the introduction. “People cherish big trees, old trees, and especially big old trees. Except for when they don’t.”

Farmer documents the importance of ancient trees through the myths and writings associated with most religions and civilizations throughout history, and he describes the impact of science and capitalism on changing human values regarding old growth forests. Originally age and size were relational—for instance, oldest, older than, and bigger than—and they were often related to a particular place. For instance, the “Oak of Mamre” (“Abraham’s Oak”) was revered by the three Abrahamic religions as growing since creation, in multiple Palestinian locations, for over 4000 years. Only in 1706 did John Evelyn’s concept of “solar revolutions, or circles” inscribed in the trunk of a tree give rise to the concept of “cambial age” allowing a direct quantification of tree age. From that point on, with colonial expansion well underway, it was now possible to evaluate local myths and compare rival claims about ancient and giant trees from around the world.

Through eight chapters, based on common themes, Farmer relates the stories of some

20 notable elderflora species, discussing their biological, geographical, historical, and cultural details. Appropriately, he begins with some of the most familiar venerable species, long-lived trees that were objects of reverence in local cultures. These include: Cedar of Lebanon, Olive, Ginkgo, Pipal (*Ficus religiosa*), and Baobab. Farmer's story of Cedar begins with "The Epic of Gilgamesh," originally an oral poem like the *Iliad* and the *Odyssey*, which serves as a parable for the entire book. The king wants to make a monument to himself at the summit of the Cedar Mountains, the home of the gods. The trees are thick and fragrant with resin, but to achieve the king's goal, the forest is laid waste to provide the needed timber. The gods are angry; Gilgamesh is punished; but no trees are left. Similar stories are repeated for many of the other elderflora: the Montezuma Cypress (*Taxodium*) in Mexico, the Kauri (*Agathis*) in New Zealand, the Alerce (*Fitzroya*) in Chile, the redwoods and sequoias of California, and Japanese and Taiwanese cedars. In each location forests of giant trees are first venerated, then subject to colonial exploitation and eventual destruction. In each case, Farmer explains the ecological adaptations, and limitations, that promote old, and often large, growth for a particular species and then provides historical details of the exploitation that not only decreased potential seed stock but modified the environment, making regeneration difficult or impossible in the original native range.

Ironically, as European colonial empires expanded abroad, concerns about the loss of native tree species and sustainability in England, France, and Germany gave rise to the development of scientific silviculture and horticulture. Plantation forestry in France, and especially Germany, promoted managed plantings of non-native species, optimized for fast growth and sustained-yield rotations.

At the same time, "remarkable trees" were set aside as "monuments of nature." The growth drill (Zuwachsbohrer) designed in Dresden became an essential tool for German forest engineers. (According to Farmer, Americans know this tool as a Swedish increment borer because a Swedish manufacturer captured the American market.) In England, private gardens and arboreta graced the properties of private landowners, including the crown, displaying exotic trees imported from around the world.

Chapter 6, "The Oldest Known," focuses primarily on Bristlecone Pine, its role in the development of the field of dendrochronology, and the use of the increment borer in tree ring analysis. Farmer provides a brief biographical background to Andrew Douglas and Edmund Schulman emphasizing their complex mentor/mentee relationship which led to the establishment of the renowned University of Arizona Laboratory of Tree-Ring Research (LTRR) and ultimately identification of the "Methuselah" tree. Successive LTRR researchers, and contemporary forest service policy makers, fill out this intriguing chapter. Farmer summarizes: "Whereas Edmund Schulman drove up the mountain without local prohibitions or premodern fears about felling elderflora, visitors in his tracks bring global anxieties" (p. 266).

In the penultimate chapter, Farmer comes back around to what it means to be the oldest and how to become oldest. "In a biosphere dominated by *Homo sapiens*, a fire-starting and a tree-felling species, elderflora achieve longest life by being as remote as possible from the depredations of people, or as close as possible to their care ... preadapted to long living and also fortunate in time and place (p. 268)." Life-extending sites include: adjacency to shrines or temples (Yew or Ginkgo);

submarginal sites (Bristlecones and Pinyons); productive environments dominated by old growth (Mexican and Bald Cypress); productive environments where dominant young growth overshadows subdominant old growth (black gum); or *in situ* semi-domestication (Brazil nut in the Amazon). A few, like the *Ginkgo*, are also monotypic living fossils (*Metasequoia* and *Wollemia*). The final considerations in this chapter explain clonal organisms, such as the so-called Huon pine of Tasmania and the clonal aspens, like “Pando,” in North America. These require a new definition of “an organism.”

The final chapter, “Time to Mourn,” adds the environmental factor of climate change to longevity of many of the elderflora species discussed in the text. In the end, Farmer is hopeful: “They [elderflora] have a firmer grasp on earthly time than *Homo sapiens*.” (p. 347).

In the “Prologue: WPN-114,” Farmer recalls that as a teenager he climbed Wheeler Peak in Great Basin National Park and signed the notebook at the summit. Twenty years later, he returned to the park while researching this book, but his interest was now in the Bristlecone pines. “Prior to drafting a manuscript on ancient trees, I wanted to pay respects” (p. 1). But, he didn’t go searching for “the stump”; he was a professional historian and “the stump” was simply a “cultural fetish.” Nevertheless, a year later, while writing the manuscript, he returned to Wheeler Peak to see and touch the remains of WPN-114. My marginal annotation on page 2 is, “Wasn’t this Currey’s stump?”

Three hundred fifty pages later, I had my answer in the Epilogue. Here is the most complete account I have read about the circumstances surrounding the felling, and disposition, of WPN-114, the “Promethius” tree, by Graduate Student Donald Currey in 1964. With a ring

count of 4844, it remains the oldest living tree yet discovered. Unfortunately, with all of his increment borers now broken, Curry had permission to cut down the tree to make this determination from the cut stump.

I thoroughly enjoyed the challenge of reading this book, both because of the author’s breadth of treatment and his command of the English language. It is a scholarly treatise of environmental history with a detailed bibliography of relevant books and articles for every main topic of each chapter as well as extensive end notes organized by chapter. He includes a taxonomic index. This was quite a challenge not only because of historical taxonomic revisions but also because it includes multiple translations of endemic ethnic and common names for each the species examined. The main index is complete, with bold font for entries of names included in the taxonomic Index.

Elderflora would be a good book for an upper-division undergraduate/graduate reading seminar. I would also consider it for my (former) introductory honors biology course where some of my best students came from economics, English, and history, as well as biology and chemistry. It would also be a good read for any sophisticated reader with an interest in trees.

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In the Name of Plants: From Attenborough to Washington, the People behind Plant Names

Sandra Knapp

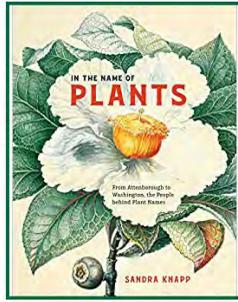
2022; ISBN 13: 978-0-226-

82430-7 (cloth) ISBN 13: 978-0-

226-82431-4 (e-book)

US\$25.00, 192 pp.

The University of Chicago Press



During the pandemic I had the opportunity to watch and listen to Sandy on a near-monthly basis in her Presidential role of welcoming attendees to streamed Linnean Society lectures and presentations. Somewhere in this introduction, she would usually say, “Did you know...” This was the signal that we were in for some botanical treat: an anecdote, an event, or some personal stories about the topic or presenter we were about to enjoy. This small, handsomely illustrated book is peppered with “did you knows” about 30 vascular plant genera, named after individuals, with a chapter devoted to each. Sandy has targeted a very broad audience—anyone with an interest in plants—and she has hit the mark.

The chapters are arranged alphabetically by genus, beginning with *Adansonia* and moving through *Wuacanthus*. In every chapter, Knapp includes a clearly written explanation of some major botanical concept or characteristic of doing botany associated with that genus and goes on to provide some relevant history leading to the name. It may be to incorporate a mini-biography of the person being honored or some historical incidents associated with the discovery of the plant or the naming process. Virtually every chapter included some interesting tidbits I did not know but was happy to learn.

She begins the first chapter with an introduction to Willi Hennig’s concept of cladistics, where lineages are defined by shared derived characters, not simply by similarities. Michael Adenson, a student of Bernard de Jussieu, was the first European to see and describe the Baobab in nature, and for this Linnaeus named the genus after him. Unlike many of his contemporaries, Adenson believed that many characters should be used in classification, but that some characters are better than others even in natural families. He saw only the African species, *Adansonia digitata*, which had peculiar flowers with the filaments of stamens fused to form a short tube through which the style and stigma of the pistil protruded. Later it was discovered that two of the six Madagascar species shared this character, but the staminal tubes of the other three island species were much longer and more similar to those of the Australian species. It seemed like two natural groupings. Today, applying molecular evidence, we know that the Madagascar species are most closely related to each other with independent evolution of the shorter tube in the originally described African species.

The concepts of polyphyly and monophyly and lumping and splitting are illustrated in several additional genera. A common character relates to red flower coloration, typically due to anthocyanin pigments. However, in *Bougainvillia* and *Esterhuysenia* (both Caryophyllales), the red/pink is due to betalains, and in *Streletsia* and *Takhtajania* it is bilirubins. But what about personal histories? Louis Antoine Comte de Bougainville had quite a career. Aide-de-camp to General Montcalm during the French and Indian War, he later led a French circumnavigation for which he convinced the king to pay for a professional naturalist, Philibert de

Commerson, to accompany the expedition (later copied by other European monarchs). It was not until they arrived in Tahiti that Commerson's cabin boy assistant, Jean Baret, was discovered to be a woman (and Commerson's lover). The two had collected *Bougainvillea* in Brazil, and Baret apparently suggested naming it after Bougainville, but the deed was not done until later when Antoine de Jussieu formalized the name.

Esterhuysenia's namesake is Elsie Esterhuysen, a South African botanist who in the 1930s was kept from collecting because "in those days the very prospect of a female doing botanical survey work in the remoter parts of the South African bush was unthinkable!" Luckily, she connected with Louisa Bolus, who managed the Bolus Herbarium (for her husband) in Cape Town and worked through the herbarium for most of her career. According to Knapp, Bolus "...holds the record for being the woman who has described the most plant species ever." She recognized that some of "*Mesembryanthemum*" collections made by Esterhuysen were distinct and named them *Esterhuysenia* in the original description. Knapp says Esterhuysen's nearly 40,000 collected specimens ranks her as "the most prolific collector for the Cape floristic region, and in the top three for South Africa overall...."

Strelitzia, another genus native to South Africa, was first collected by Francis Masson, "Kew's first plant hunter," in 1773. Living plants were sent back to England where the one in Joseph Banks' garden bloomed and was first illustrated in 1777. Ten years later Banks commissioned another illustration of his plant by botanical illustrator James Sowerby, from which an engraving was made to produce colored prints that Banks could distribute. The name on the print was *Strelitzia reginae*,

"unusually making this privately circulated illustration the place of publication of the generic name!" Banks named the plant in honor of Queen Charlotte (of Mecklenberg-Strelitz), wife of George III, "...herself a keen botanist and great supporter of the gardens at Kew...."

Armen Takhtajan, the namesake of the monotypic red-flowered *Takhtajania perrieri*, was born in the disputed region between Armenia and Azerbaijan. In 2021 the region gained independence as Artsakh, and Takhtajan and a sprig of *Takhtajania* are commemorated on one of their first postage stamps. A member of the Winteraceae, and considered a 'living fossil,' Knapp uses its distribution to describe plate tectonics and its role in explaining vicariance biogeography. Red pigmentation has a role in each of the four previous examples.

The "winning" chapter for most botanical concepts introduced goes to *Rafflesia*, which includes the world's largest flower, *R. arnoldii*. From specimens sent back by Thomas Raffles, Robert Brown was able to determine that *Rafflesia* was unisexual (staminate). A decade later a pistillate plant was discovered. He also realized that the plant is a parasite on the roots of its host plant, the woody vine *Tetrastigma rafflesia*. Knapp goes on to explain that technically *Raphlisia* is a holoparasite and its host is obligate. This relationship leads to the concept of horizontal gene transfer and the genomes of mitochondria and chloroplasts. Many of *Raphlisia*'s nuclear genes, and a third of its mitochondrial genes, originated in *Tetrastigma*.

Some of the other interesting tidbits I found most interesting were in the chapters *Victoria*, *Megacorax*, *Vickia*, and *Gaga*. *Victoria regia* was first described in letters and sketches

from explorer Robert Schomburgk from southern British Guyana in 1837. The name went viral in the British botanical press for 10 years before it was realized that another giant water lily growing in Brazil was already described by a German as *Euryale amazonica*. A bit of national pride was involved with German, French, and British botanists all having their champions in the naming war. Final resolution came in the mid 20th century. *Euryale* is a monotypic Indian genus, most closely related to *Victoria*, so the queen's genus can be retained, but *amazonica* has priority over *regia*.

“The name *Megacorum* does not immediately call to mind an individual, but it is indeed named for a person.” *Megacorum* is Greek for great raven, honoring Peter Raven. It is a monotypic member of the Onagraceae (the focus of much of Peter's botanical work) and was immediately recognized as unique when it was collected. Found so far in just two small populations, it is an appropriate species to recognize Raven's conservation efforts and commitment to link science and sustainability. Here Knapp notes that today about a quarter of new species are described based on herbarium collections made 50 or more years ago—hence the excitement over this field discovery.

The classic example of the role of herbaria in naming new species is another monotypic genus, *Vickia*, named after the synantherologist Vicki Funk (“Synantherologist” is one who studies plants with fused anthers [the composites]; this was new to me). The species was first described as *Gochnatia rotundifolia* in the 1800s. Recent work on the family demonstrated that genera in subfamily Gochnatioideae were not monophyletic and “*Gochnatia* in particular was a mess.”

Gochnatia rotundifolia, which has only been collected 23 times, all from an area around Sao Paulo, now Brazil's largest city. The most recent collection was in 1965 and, despite extensive searching, it has not been seen since. “It is ironic in a way that the genus named for Vicki, a person so full of life, is probably already extinct.”

Finally, there is *Gaga*—yes, named after the innovative and showy pop diva. Knapp quotes the naming taxonomists' expansive justification for their choice (you'll have to get the book to read it), but the last sentence includes a unique “GAGA” sequence in the matK gene. *Gaga* is a fern genus, so Knapp uses the opportunity to provide a lot of fern biology, including alternation of generations and asexual apogamy. About half of the 18 species of *Gaga* are apogamous. I was most surprised by the last sentence in the chapter, which suggests the pop star has learned quite a bit about her namesake genus. In a 2014 online Reddit session, she was asked about having a fern genus named after her. Lady Gaga replied “It's pretty cool, especially since it's [an] asexual fern; there are 19 species contained within the genus. All sexless, judgeless. How cool. How I wish to be.”

Every chapter was a delightful, and educational, read, and it's written at a level both accessible to high school students and informative to professional and academic botanists. Well done!

-Marshall D. Sundberg, Roe R. Cross Professor of Biology, Emeritus, Emporia State University, Kansas; email: marshalldsundberg@gmail.com

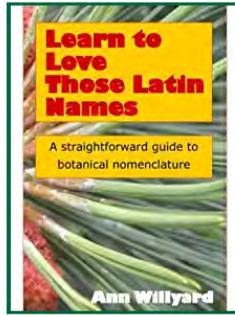
Learn to Love Those Latin Names: a Straightforward Guide to Botanical Nomenclature

Ann Willyard

2022. ISBN 979-8417817434.

US\$12.95 (Paperback), 73 pp.

Independently published



The scientific naming process can be intimidating to beginners, amateurs, or casual enthusiasts, yet an understanding of these names can lend a greater context for all of these individuals to understand the breadth and diversity of plants. “*Learn to Love Those Latin Names: A Straightforward Guide to Botanical Nomenclature*” by Ann Willyard guides readers through the entire process of naming plants. Willyard is an associate professor at Hendrix College in Arkansas, where she teaches a wide variety of courses in botany and plant systematics, with a research focus on the phylogeography of ponderosa pine. This book is divided into 20 very brief chapters (just a handful of pages each) touching on many aspects of botanical nomenclature, from why, to what, how, who, and how.

The first three chapters cover information about common versus scientific names, for instance detailing why we should learn names and the difficulties of common names versus the benefits of using scientific names. Each of these points is demonstrated with figures, photographs, and useful examples. Chapters 4 through 11 detail the different components of scientific names, from the binomial nomenclature, to epithets, infraspecific ranks, authors, pronunciations, and interesting cases, like hybrids. The author then dives into the history of botanical nomenclature and places taxonomy into an evolutionary context and levels of organization above the species in Chapters 12 through 15. Chapters 16 and

17 discuss the naming of new species and the changing of scientific names. Finally, the book addresses interesting cases, like cultivated plants and weeds in Chapters 18 and 19, ending with a brief summary on the number and breakdown of vascular plants. The back of the book also includes additional resources (books and websites) as well as a glossary of useful terms.

This short guide (73 pages) does an excellent job of walking readers through the important components of botanical nomenclature. Willyard writes in a way that is very clear and informative. The figures, pictures, and examples illustrate the information beautifully and aid the reader’s comprehension. The modern take on additional resources (mostly websites) is also very useful for accessing up-to-date tools, especially in regard to plants found in North America.

This book presents information in a very accessible way and is thus perfect for those who are interested in plants and want to understand more. This is also a great resource for anyone teaching plant taxonomy or plant systematics, as Willyard explains many very useful examples that can be incorporated into course materials. Overall, this book is a great way to understand and contextualize botanical nomenclature both in the broader context of systematics and in emphasizing concepts using specific and helpful examples.

-Nora Mitchell, Department of Biology, University of Wisconsin – Eau Claire, Eau Claire, Wisconsin, USA

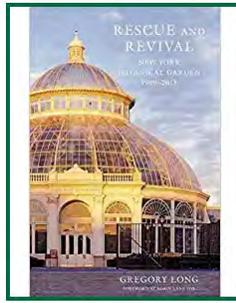
Rescue and Revival: New York Botanical Garden 1989-2018

Gregory Long

2022; ISBN: 978-1-952620-37-9

US \$28.00 (Cloth). 208 pp.

Library of American Landscape History, Amherst, MA



The subtle artistry woven through Mr. Gregory Long's career memoir, *Rescue and Revival: New York Botanical Garden 1989-2018*, is its defining feature. Though Long's language is expressive, and his stories filled with brilliant detail, the artistry to which I refer is that of observing the master at work, commanding his medium with a familiarity and deftness that is inseparable from the final piece. In this case, the masterwork is the reimagining and modernization of a New York City cultural institution, and the medium is the social fabric into which Long interlaces the Garden's past, present, and near future using the warm colors of human relationships and aspirations. Without this not-quite-visible tapestry supporting the entire endeavor, there would not be the more apparent features for which the Garden is treasured: Haupt Conservatory, Edible Academy, Thain Family Forest, and so much more.

Long bounds his memoir by the years he spent as President and CEO of the New York Botanical Garden (NYBG) and describes in great detail the elements of his position as they relate to the task for which he was hired, "to breathe new life and meaning into an organization that in some important respects had lost its way and was misunderstood by most of the people of New York City." It also provides a valuable addition to the landscape history of NYBG, the sociopolitical history of the city, and America's ongoing conversation about civic responsibility. Yet this beautiful

little book—with 50 glossy photographs of the people, plants, and architecture of NYBG, a helpful list of further reading, and an appendix titled "Our Planning Process"—is largely intended as practical guidance. Long's message is primarily directed toward "people who care ... volunteers, philanthropists, and professionals of all stripes" in hopes that "they will benefit not only from the lessons embedded in these chapters but also from the enthusiasm for a seemingly impossible task accomplished against all odds."

Though I am certainly one who cares about great places such as NYBG, I also fit another demographic that is present throughout Long's memoir but only indirectly addressed: the researchers and conservation scientists who daily utilize herbariums, arboretums, botanical gardens, and specialized libraries to study the plants of the world. Most of us are not the staff scientists who contributed to Long's planning process but are deeply appreciative users of the materials and publications that his organization produces and disseminates. A hidden strength of *Rescue and Revival* is the appreciation it generates for the donors, managers, and operations staff who orchestrate the enormous financial resources and visionary management tasks that complement the work of scientists and educators and, in fact, fuel our career aspirations by demonstrating the reach of botanical art and science. Long gracefully achieves his purpose by writing not so much as a strategist but as a wholehearted participant. "[W]e were all fairly young and wildly determined," he recalls, and through friendships and perseverance, galas and golf cart tours, "[w]e restored the spirit and dignity of the place."

Rescue and Revival is arranged chronologically and somewhat thematically. The threads

of institutional planning from which Long weaves a backdrop for the infrastructural and horticultural changes needed to modernize NYBG are initially presented in a colorful jumble that does not resemble a practical handbook. But, through stories about events such as hiring head of security Bob Heinisch to teach visitors how to behave, crossing a raging river in Belize with ethnobotanist Michael Balick, and arranging a symposium with Tom Lovejoy and E.O. Wilson to try to prevent the secession of the Cary Arboretum (now Cary Institute of Ecosystem Studies), we gain a sense of Long's priorities and challenges.

By the middle of the book, Long's experiences begin to coalesce into a professional journey characterized by relationship-building, revisioning of organizational identity, and a deep historical sensitivity. It becomes clear that friendships with figures such as philanthropist Enid Annenberg Haupt and Royal Horticultural Society leaders Robin Herbert and Philip Browse, festivities featuring the talents of opera diva Jessye Norman and actress Sigourney Weaver, and meetings with Governor George Pataki and Congressman Ritchie Torres are not incidental to Long's success. His social grace and ability to understand his donors' values and interests is central to the process of democratizing a formerly elite cultural institution that remains proud of its history and influence. Thus, the appeal of NYBG could be broadened while its founding mission—"to study the plants of the world and to share our knowledge with the public"—remained intact.

The image of strategic planning that Long ultimately evokes is not so much a series of steps or a procedure to imitate but rather, a thoughtful and inspiring reflection placed beautifully into an historical context. *Rescue and Revival* links America's Gilded Age to the

present and provides a glimpse of what civic philanthropy can do. It describes how public-private partnerships function at their best and highlights the importance of horticulture to urban landscapes. It suggests that motivated curators and directors can transform their own organizations through energized fundraising and programmatic change. In the book's final chapter, Long reviews his accomplishments and, importantly, explains why an outgoing leader might want to leave the final phase of a strategic plan for his successor to complete.

Long's memoir uniquely achieves its explicit purpose of incorporating practical insights into the narrative of his journey at the helm of the New York Botanical Garden. For the reader who was hoping for a diagram or schematic, Long includes an appendix outlining the "exhilarating" bottom-up process that he invented with his mentors Vartar Gregorian and Mrs. Brooke Astor at the New York Public Library and later repeated at NYBG. The details of financial planning, renovation timelines, and personnel requirements, however, must be gleaned from the stories themselves. I highly suggest reading the material in the order presented, savoring Long's artistry as he brings his intended image into focus. The reader can thus journey with him, imagining herself as likewise capable of integrating a fresh perspective into an existing fabric with poise and panache rather than disruption.

-Andrea G. Kornbluh

A Systematic Vademecum to the Vascular Plants of Saba

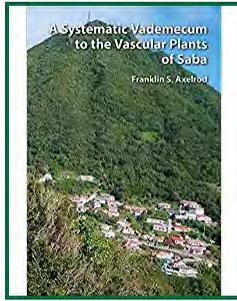
Franklin Axelrod

2020. ISBN-13: 978-1-889878-58-40

US\$25.00 US (soft cover);

122 pp.

Botanical Research Institute of Texas Press, Fort Worth, Texas 76107, USA



The book *A Systematic Vademecum to the Vascular Plants of Saba* by Franklin Axelrod, Curator of the University of Puerto Rico-Rio Piedras herbarium, is a welcome addition to floristic works of the Caribbean. A rocky volcanic island located between the British Virgin Islands and Saint Eustatius, Saba is politically part of the Netherlands and has around 2000 full-time inhabitants. A synoptic flora, the book includes two topographical maps, a list of villages, special collecting areas, descriptions of principal trails, and a detailed review of historical collections made on the island by various collectors (principally Urban, Boldingh, Stoffer, and Howard). The checklist itself is based on both a review by Axelrod of collections from Saba located at multiple herbaria (National Herbarium of the Netherlands, Gray Herbarium of Harvard University, and the New York Botanical Garden herbarium) and a recent set of collections of over 1000 specimens made by Dr. Axelrod over a six-year period (2013-2019). Comprising only 13 square kilometers, the vascular flora is diverse with 772 species. Both native (554 species) and persistent introduced flora (218) are included in the *Vademecum*.

The list is broken down by “Fern Allies,” “Ferns,” and “Vascular Plants.” One endemic species, the fern *Amauropelta sabaensis* F.S. Axelrod and A.R. Sm, is described and the

impact of introduced invasive species is noted on the remaining native vegetation where the fern occurs. Each species in the *Vademecum* has a list of synonyms, the plant growth habit, geographic localities, altitude or altitude range, phenology, citation of specimens and herbarium codes, broader geographic distribution, and English names. An index of scientific names is also provided for all past and present names used for the Saba flora. For some families, there are three sections at the end that provide additional information: (1) taxa not recently collected (post 1965) are noted if relevant, which may be useful for future studies of the Saba flora, (2) taxa collected only under cultivation, and (3) taxa of dubious status or occurrence. For example, in the Fabaceae-Caesalpinioidea (Leguminosae-Caesalpinioidea), nine species are listed as currently occurring on Saba, including four native and five introduced. Three taxa have not been recently collected (three native), one introduced taxa is found under cultivation, and two taxa (both native) are of dubious status or occurrence.

The *Vademecum* will be very useful for botanical and ecological studies of Saba, adjacent Caribbean islands, or for the botanically oriented tourist. It is not a field guide, however, and another text will be needed to key out species. Axelrod provides a list of online sources for images of taxa that could be used in conjunction with the *Vademecum* to assist with identification.

-John B. Pascarella, Department of Biological Sciences, Sam Houston State University, Huntsville, Texas USA 77381; email: jbpascarella@shsu.edu

Trees: from Root to Leaf

Paul Smith

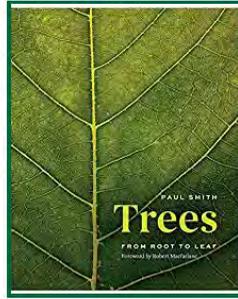
2022;

ISBN 13: 978-0-226-82417-8

(cloth)

US\$49.95. 319 pp.

University of Chicago Press,
Chicago



This is a beautiful art book, combined with informative yet succinct descriptions, that I will display in my library. This is exactly the kind of book I would expect from the Secretary General of Botanic Gardens Conservation International, a group dedicated to promoting public education about plants. There are nine chapters covering seeds, leaves, form, bark, wood, flowers, fruits, symbiosis, and economic importance. Each chapter begins with an 8- to 10-page introductory essay that explains the basic botany of that character with interesting asides. For instance, the fire brigade soaking of the British Natural History Museum, following an incendiary bombing during the WWII Blitz of London, stimulated seeds on 170-year-old *Nelumbo* herbarium sheets to germinate. This leads to a description of 2000-year-old date seeds germinating from a 1963 archaeological excavation from Masada (Israel) and 32,000-year-old Siberian *Silene* seeds germinating after recovery from permafrost in 2011.

Following the introduction in each chapter are eight well-illustrated sections highlighting specific themes related to the chapter topic. Art and Architecture are common themes found in every chapter, with many full-page high-quality photos and artistic illustrations. The latter are particularly effective for illustrating size and scale, as well as geometric patterns. Some of the most striking photos are of the Durian fruit-inspired Esplanade Theatres and tree-inspired cooling towers in the Gardens

by the Bay, both in Singapore, and the Palm-inspired solar panel/misters of the Oasys public space in Abu Dhabi. The room-size plywood sculptures of Henrique Oliveira in the Galerie Vallois and Palais de Tokyo, both in Paris, are room-size sculptures resembling reinforced concrete posts and spans that suddenly transform into giant twisted vines or tangled thickets of branches.

Another common theme, found in all but one chapter, is Economic Use. Food, shelter, and medicine are the most obvious uses, but Smith provides interesting additions to what is commonly known (or taught). For instance, the 750 species of figs are eaten by more different species of birds and mammals than any other genus of fruits. The book graphically illustrates the surprising dominance of bananas and watermelons, in terms of production, coming in at 117 and 100 million metric tons, respectively (25% and 13% more than apples, the third-most abundantly produced fruit). Smith also explains the loss of genetic, and flavor, diversity with breeding and selection primarily for production and post-harvest characteristics.

The third most common theme is special adaptations—those structural, ecological, and evolutionary modifications that are the natural “hooks” for capturing public interest (and for teachers to attract student interest!). Here again, excellent illustrations, graphics, and photos catch the eye and reinforce descriptions. My favorites are a succession of four two-page graphics in the Form chapter. The first illustrates tree crown mapping and its use in landscape planting. The second compares seven notable “elderflora” (Farmer, 2022), which dramatically counter the common misconception that the biggest trees are the oldest trees. The third illustrates

12 common forms of Bonsai, and finally, a schematic comparison of root and shoot architecture of 12 species from different habitats.

Who should have this book? Everyone should have access to it. Recommend it to your school public libraries! (Over most of my professional career I had forgotten and ignored the role of the public library in the community, but I now realize they appreciate purchase recommendations, and this is a great way to promote plants to the public.) Put it on your list of possible gifts for 2023. The recipients will appreciate it. It will go a long way in expanding “fur and feather” lovers into plant lovers and is an excellent prescription for curing plant blindness.

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-*Marshall D. Sundberg, Professor Emeritus, Emporia State University.*



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