

CARNEGIE MUSEUM OF NATURAL HISTORY

SECTION OF BOTANY STRATEGIC PLAN 2020-2022

EXECUTIVE SUMMARY

The Section of Botany at Carnegie Museum of Natural History (CMNH) is a major research facility in western Pennsylvania, with a worldwide reach. At our heart is the Carnegie Museum Herbarium, a scientifically and culturally important collection with over 540,000 plant specimens. We are dedicated to documenting and studying plants, advocating their value to diverse audiences, and facilitating the creation and dissemination of botanical knowledge. Since the museum's founding in 1895, the Section has been integral to its development and now has a keystone role in collaboratively defining the museum's exciting future. In 2017-2019, we made notable advances in collections care, curation, research, and outreach. The Section is now at the cusp of a promising new era, with recent museum-wide strategic initiatives and emerging new perspectives in collections-based research. The use of our collection is at an all-time high, sparked by digitization and online public access. The collection is actively growing, as is our research impact and prominence. This strategic plan outlines our history and values, highlights our core activities, and provides an intentional path forward. The first of its kind for the Section, this document serves two main purposes: 1) internally, to define our priorities with clear goals and metrics to evaluate success; and 2) externally, to communicate our vision and facilitate engagement with current and potential partners.

As we enter the Anthropocene, the Section of Botany has likewise entered a new era of enhanced scientific, educational, and societal relevance.

OUR MISSION

To actively steward plant biodiversity knowledge through our collection and expertise, facilitate specimen use and encourage innovation, and advocate for the inherent value, ecological importance, and societal relevance of plants in Western Pennsylvania and beyond.

OUR VISION

A globally relevant hub for understanding plant biodiversity and change in the Anthropocene.

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Strategic Planning Partners. Mason Heberling (Assistant Curator of Botany), Bonnie Isaac (Botany Collection Manager), and Stephen Tonsor (interim CMNH Director).

BACKGROUND

The Section of Botany dates to the founding of the museum. By 1898, the section's first custodian, John Shafer, was appointed to oversee a collection of plant specimens pre-dating the museum. Early staff members of Botany travelled far and wide collecting for the museum, both to enhance the herbarium and to aid with preparation of exhibitions in Botany Hall. Over its influential 125+ year history, the Section of Botany has evolved in its research, expertise, and collections. Today, the Section curates a world-renowned collection used by researchers at the museum and all over the world to make basic scientific discoveries and provide answers to the world's most pressing environmental problems.

The Section of Botany consists of its collection and people. While the physical collection forms the foundation for what we do, none of it would not be possible without staff expertise and people using our resources. Staff botanists (curator, collection manager, curatorial assistants), students, research associates, and volunteers curate the collection, use specimens in their research, and facilitate the use of the collection by researchers worldwide.

We facilitate and promote the use of our collections.

We collect specimens for now and the future.

We advocate and build appreciation for the role of plants in our lives.

We provide expertise to wide audiences.

We conduct high impact research in the areas of Ecology, Evolution, and the Anthropocene.

At our core is the **Carnegie Museum Herbarium (CM)**, a collection of more than 540,000 plant specimens with worldwide taxonomic and geographic scope that spans more than three centuries. Many specimens are not duplicated elsewhere. CM has the largest collection in the Upper Ohio Valley region and ranks among the top 2% of herbaria in North America by size. CM was designated a National Resource Collection in 1974. The collection is the strongest in the world for western Pennsylvania, with greater Pittsburgh area specimens dating to the mid-1800s. Specimens were collected by thousands of people from across the globe, including Pennsylvania (1/3 of collection), other US states/Canada (1/3 of collection), and the rest of the world (1/3 of collection). The oldest specimen dates to 1754 and newly collected specimens are always being added. The herbarium is entirely databased and searchable online at midatlanticherbaria.org.

The Section also curates **Botany Archives**, consisting of ca. seventy thousand 35 mm slides, photographs, correspondences, and field notes that add historical and scientific context to our specimens. We also maintain a **Botany Library** of >6,500 volumes (a part of the CMNH Library) for scientific reference and of historical importance, including a rare book collection dating back to 1700s.

Each specimen has a story to tell.

CARNEGIE MUSEUM HERBARIUM HIGHLIGHTS

- 3,490 “type” specimens—those specifically used to formally describe a species new to science. Type specimens serve as critical reference specimens for taxonomic studies.
- Type collections of special historical and scientific importance: C.G. Pringle (Mexico), H.H. Smith (Columbia); A.D.E. Elmer (Malaysia); E. Palmer (Mexico); M. Bang (Bolivia). Types of *Crataegus* (hawthorn) species from western Pennsylvania described by C.S. Sargent of Harvard University’s Arnold Arboretum.
- Herbarium of the Botanical Society of Western Pennsylvania, one of the oldest organizations of its kind (founded 1886) and still meets monthly at the museum. Their collection was donated to the museum, including some of the earliest specimens for western Pennsylvania.
- Jacob Wolle Herbarium from Jamaica (1837-1847) and eastern Pennsylvania (1827-1875). Wolle was the grandfather of the first director of Carnegie Museum, Rev. Dr. W.J. Holland.
- Specimens from the seminal two-volume work *Wildflowers of Western Pennsylvania and the Upper Ohio Basin* (1952), the culmination of a multi-year art/science collaboration between then Botany curator Otto E. Jennings and artist and then CMNH director Andrey Avinoff. Plants were collected across the region and rushed back to the to the museum by Jennings to be painted by Avinoff, who reportedly dropped everything to do so before plants wilted.
- F.M. Ownbey’s uniform-garden *Allium* (onion relatives) collections, which includes many cytovouchers and types.
- Hannibal and Tyreeca Davis herbarium, which contains 20,000 specimens with a concentration on *Rubus* (Rosaceae) including topotypes, material compared to types, type photographs, and life history specimens with floricanes, primocanes, and other growth stages.
- Selected monocot families from the Catholic University herbarium (LCU), notably Liliaceae.
- The herbarium of St. Vincent College (LAT) in Latrobe, PA has been integrated into CM.
- Extensive Arum family (Araceae) holdings, cited as an important New World collection.
- Monstruosités—an herbarium of French naturalist Michel Adanson, consisting of “odd” specimens collected from 1754-1796.
- Lily family (*Liliaceae*) ‘life-history’ specimens of F.H. Utech, representing life stages not well represented elsewhere.
- Isle of Pines (Isla de Juventud), Cuba collections made in the early 1900s by O.E. Jennings.
- Specimens from collected by E.H. Graham from Guyana for the Flora of the Kartabo Region (1934) and from Utah/Colorado for his Flora of the Uinta Basin (1937).
- Specimens collected by Sgt. D.C. Ralston during the Lady Franklin Bay Expedition (1881-1884), one of the earliest US explorations of the Canadian arctic.



OUR OPERATING CONTEXT

We are situated among 13 other sections in the Department of Science & Research at CMNH.

Our activities directly align with the museum-wide, science-driven mission **to seek inspiration in our collections and advocate for a sustainable future.**

Our priorities advance CMNH's collective vision as the **world's most relevant natural history museum.**

All that we do is necessarily collaborative, serving both lay and scientific audiences. Within CMNH, we work closely with other scientific sections on collections care and research. We regularly participate in activities outside Science & Research that blur disciplinary boundaries towards our shared goals (e.g., with Dept. of Exhibitions, Marketing, Education, Lifelong Learning). As one of four museums of the Carnegie Museums of Pittsburgh (CMP), CMNH has unique perspectives and opportunities. Our building is even physically connected with the Carnegie Museum of Art, which few other natural history museums can boast. Outside of our institutional walls, we routinely interact with scientists and organizations, regionally and around the world. We provide expertise, facilitate the use of our collection, and actively collaborate with partners in research and outreach.

OUR INSTITUTIONAL ALIGNMENT

Our strategic plans purposefully contribute to broader CMNH-wide strategic plans for 2020-2022, which is communicated in two documents – CMNH Collections Plan, which outlines needs and priorities for all of the museum's collections; and CMNH Strategic Plan, which articulates the mission, vision, core values, scientific principles, and goals for the entire museum. The CMNH Strategic Plan identifies three museum-wide goals:

1. TELLING THE BIG STORIES

Leveraging collections and expertise for research and communication in key areas of Evolution (tree of life), Ecology (web of life), and the Anthropocene (future of life)

2. TREAT STAKEHOLDERS AS INDIVIDUALS

Recognizing the unique needs of our community

3. DEMONSTRATE BUSINESS ACUMEN

Maximizing and efficiently using our resources

CMNH-wide scientific principles include human-induced climate change, importance of scientific literacy, evolution, and collections.

OUR STRATEGY

We leverage our collection, expertise, and partnerships to advance plant science, engage a diverse community, and influence the future of life.

OUR FUNDING MODEL

Our collections stewardship and research activities cannot be sustainably supported through internal museum funds alone. To realistically address our financial needs, we developed a framework for funding. We divide our activities between Collections Stewardship and Research.

COLLECTIONS STEWARDSHIP

Our collections are critical to CMNH's mission and vision. We maintain the herbarium as a public trust. Therefore, the care of the collections is a core priority. It is the museum's responsibility for necessary staff and stewardship resources. We call this Core Collections Stewardship, including specimen curation, risk mitigation, and enabling specimen access. Given the long-term nature of these objectives, success in Core Collections Stewardship cannot be based in external, grant-based funding. Instead, core stewardship is funded internally through operating budget and ideally, endowed funds. We seek endowment for Curator of Botany position to ensure the long-term sustainability of the role. In addition to core stewardship (long-term), additional funds are needed for specific, short-term collections stewardship needs (for example, new herbarium cases, specimen digitization, etc.). Typically lasting 2-4 years, these collections infrastructure projects are funded externally through government grants, private foundations, or individual donors.

RESEARCH

Large-scale research projects are primarily funded through external grants to the museum with botany staff as principle investigators. Staff actively seeks funding through proposal writing. These are primarily through government agencies (federal and state-level). Research projects of special interest may also be funded by private foundations and individual donors.

RECENT SUCCESSES

We have much to be proud of in recent years, positioning us to expand our activities and impact.

STAFFING

Hired a curator to lead the development and implementation of the Section's strategic initiatives and perform research. Hired a full-time curatorial assistant to oversee our digitization projects and a part-time curatorial assistant for specimen preparation. Botany curator and collections manager also now serving as Co-chairs of Collections (museum-wide). *Developing a sustainable fund for the curator position's salary is a very high priority.

RESEARCH FUNDING

Earned more than \$200,000 in government research funding:

- 1) National Science Foundation digitization grant to image and georeferenced specimens from Pennsylvania and surrounding states, joining a network of >10 herbaria in the region.
- 2) Wild Resources Conservation Program grant from the Pennsylvania Department of Conservation and Natural Resources to revisit and sample historic sites of endangered plants in the state.

RESEARCH RESULTS & PUBLICATIONS

13 peer-reviewed scientific articles published by Section staff from 2017-2019 in high-impact journals such as *Ecology Letters*, *BioScience*, *American Journal of Botany*, and *Applications in Plant Science*. Studies resulted in multiple press releases and popular media coverage (including *Boston Globe*, *Atlas Obscura*, *Yale Climate Connections* syndicated podcast, and Pittsburgh's NPR station WESA).

COLLECTION ACCESS AND USE

CM herbarium use was at an all-time high, sending 132 loans worldwide, and hosting 171 visitors to the collection for 241 visitor days (among the highest across all scientific sections at the museum). Currently, 5,601 specimens are out on 76 loans to researchers. The entire collection is now publicly searchable online, greatly increasing the scientific reach and impact of our specimens.



Otto and Grace Jennings in the Carnegie Museum herbarium in 1912. Research from the section was featured on the Oct 2019 issue of the high-impact scientific journal, *BioScience*. Photo from Botany Archives.

OUR STRATEGIC GOALS

For 2020-2022, we identified several high-level goals, each with corresponding objectives. Each objective will be implemented through annual action plans and performance evaluations.

1) IMPROVE SPECIMEN ACCESS AND USE THROUGH DIGITIZATION AND DELIBERATE CURATION

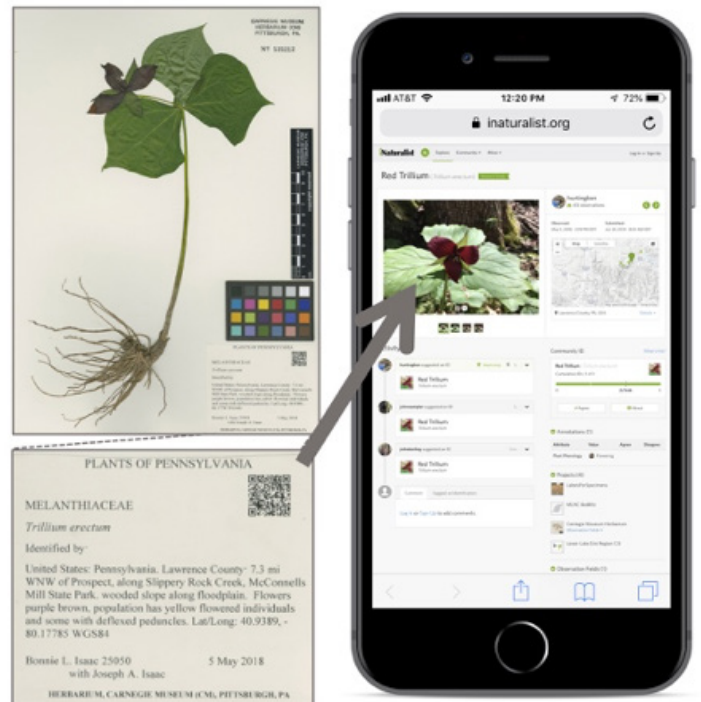
- Image and georeference all specimens from Mid-Atlantic states and make data available online. 2018-2021.
- Develop a long-term plan for hosting high resolution specimen images online in perpetuity and maintaining the associated infrastructure. 2020.
- Image and georeference all remaining specimens outside the Mid-Atlantic. 2021-2025.
- Perform a comprehensive inventory, reorganization and plan for digitization of Section of Botany archives, including field notes, journals, photographs, slides, Botanical Society of Western Pennsylvania archives, and more. 2020-2022.
- Update the comparative (synoptic) collection of specimens representing all species known in Pennsylvania and make digitally available in a convenient and intuitive format for education and research. 2021.
- Summarize the scope and history of the herbarium and disseminate through scientific publication, posters, and infographics to facilitate and encourage wider use of the collection. 2020.
- Maintain digital data on Mid-Atlantic Herbaria Consortium online data portal and maximize visibility and use through biodiversity data aggregators (iDigBio, GBIF). Continuous.
- Continue regular herbarium activities following best practices, including specimen accessioning, database management, and specimen loan processing. Re-evaluate our collections management policies. Continuous.
- Continue reorganizing and updating nomenclature to modern accepted standards. Continuous.
- Regularly correct typographical, geographical, and taxonomic errors in herbarium database to ensure data quality. Continuous.
- Reduce backlog of unmounted specimens, making accessioned specimens and metadata digitally and physically accessible. 2022.
- Advertise Buker Travel Award to increase the diversity of visitors using the herbarium. 2020.
- Enhance the use of our data in invasive species monitoring and management; and continue providing data to PA iMapInvasives program and PA Natural Heritage Program. Continuous.
- Monitor and record specimen use; and refine metrics and methods for effective tracking digital and physical specimen use, including destructive sampling record keeping, resulting publications/datasets, and specimen annotations. Continuous.



The Mid-Atlantic Megalopolis (MAM) Project is a multi-institutional project funded by the National Science Foundation to digitize plant specimens in our region to understand the effect of urbanization on plant life. Nearly 200,000 CM specimens will be digitized by 2022.

2) EXPAND OUR RESEARCH STRENGTHS AND BROADLY COMMUNICATE OUR ACTIVITIES

- Build research capacity and long-term financial sustainability by securing endowment for curator of botany. High priority. *Necessary before 2024.
- Develop new collaborative partnerships with faculty at nearby universities and other external partners, including opportunities for research and education. 2019.
- Publicize, encourage, and facilitate the use of our resources by external researchers, especially graduate students in plant biology, ecology and evolutionary biology at universities in the region. 2020-2021.
- Submit competitive proposals for government funding to enable research on par with university research groups. Ongoing.
- Strengthen our partnership with herbaria in Pennsylvania and surrounding region through the Mid-Atlantic Herbaria Consortium. 2019-2021.
- Establish active communication and collaboration with conservation-minded organizations at local, regional, and state levels, such as land trusts, botanical gardens, nature clubs, and governmental agencies. 2020.
- Continue participation in planning and expansion of the biyearly PA Botany Symposium. Ongoing.
- Develop a research focus on urban plants of Pittsburgh, leveraging our specimens and connecting with other herbaria in the Mid-Atlantic. 2020-2021.
- Explore possibilities for a formal student internship program. 2021.



Botany staff are rethinking how we collect to enhance the research value of specimens for future uses. For example, we pioneered the use of QR codes to connect digital observation records in the popular citizen science platform, iNaturalist, to museum specimens.

Map **Satellite**

Mid-Atlantic Herbaria Detailed Collection Record Information
 Not Secure | midatlanticherbaria.org/portal/collections/individual/index.php?occid=122331...

Carnegie Museum of Natural History Herbarium
 CM

Catalog #: CM063290
Occurrence ID (GUID): 75697AA5-B09C-4517-8209-7499609F9FCC
Taxon: *Acer rubrum* Wats.
Family: Sapindaceae
ID Remarks: CM filed-as name
Collector: Jennings, O.E. s.n.
Date: 1922-10-21
Verbatim Date: 21 Oct 1922
Locality: United States, Pennsylvania, Westmoreland, Chestnut Ridge, vicinity
Verbatim Coordinates: ,
Reproductive Condition: veg

Specimen Images

Open Medium Image

CM specimens are now searchable online at midatlanticherbaria.org, enabling new use and increasing the impact of the herbarium like never before. Shown here is map from one search of red maple (*Acer rubrum*), with example specimen record.

3) ESTABLISH AS AN INNOVATION HUB FOR NOVEL SPECIMEN USE

- Encourage the use of our specimens to resource conservation professionals, researchers, and graduate students through seminars and direct contacts. 2020.
- Re-evaluate policies for consumptive specimen sampling and update policies and protocols as appropriate. 2020.
- Initiate a consistent method to track herbarium specimen use and develop acknowledgement policy for herbarium data users. 2020.
- Continue research and engagement with burgeoning Anthropocene initiatives at museum, including the planned Center for Anthropocene Studies. Continuous.
- Develop an informative, streamlined protocol and instructions for depositing voucher specimens to ensure data quality and standardization in new accessions and promote voucher deposition. 2021.
- Expand and promote use of iNaturalist as a tool for plant collectors and curators. 2020.
- Seek active participation and representation in discussions on the future of natural history collections in the digital age. Continuous.

4) EXTEND OUR RELEVANCE WITH FORWARD-THINKING, DELIBERATE COLLECTION GROWTH

- Develop a long-term plan for field collections, identifying specific target localities, constructing a decadal timeline for these collections, and acquiring necessary permissions. 2020.
- Continue general collection by Botany staff, focusing on regional collection and filling gaps in our collection. Continuous.
- Promote awareness in regional researchers, amateurs, and students to collect voucher specimens by hosting herbarium tours targeted to potential specimen users and contributors who may be unaware of the practice or of our herbarium. 2020.
- Begin accepting mycological specimens as the voucher repository for the Western PA Mushroom club. 2020.
- Focus on sustainability of our digital and physical specimens to ensure necessary growth, while remaining lean. Continuous.
- Regularly assess curatorial progress and update tactics for implementation as part of the museum-wide 2020-2022 Collections Plan. Yearly.



We are collaborating with CMNH Exhibitions team to update Botany Hall and beyond. Our fieldwork was featured in the recent We Are Nature: Living in the Anthropocene exhibition, tangibly demonstrating the impact of climate change in the Pittsburgh area. Specimens were collected 112 years apart (April 24, 1905; L, and 2017; R).

5) INTEGRATE OUR ACTIVITIES AND VOICE VISIBLY THROUGHOUT THE MUSEUM

- Develop a holistic interpretation plan for renovation of Botany Hall in collaboration with Exhibitions, with special focus on relevance of plants in the Anthropocene. 2020-2021.
- Identify areas throughout the museum where plant-related interpretation is needed or can be improved with more relevant, compelling content. 2021.
- Participate in the formation of the Center for Anthropocene Studies, a planned research hub at CMNH on the future of life in the age of humanity. 2020-2022
- Collaborate with museum's Education Department to instill plant-related themes into their regular school programs and museum interpreter group tours. 2021.
- Develop and articulate a set of core plant-related themes to guide current and future activities throughout museum. 2021.
- Strengthen our connections to Powdermill Nature Reserve, the museum's field station. 2020-2022.
- Maximize the public reach of our collection, research discoveries, and activities in collaboration with museum's Marketing Department through regularly occurring, scientifically accurate, and engaging posts to the museum blog and other social media. 2020-2022.
- Evaluate and refresh our digital presence on the museum's website, with the museum's Marketing Department. 2021.
- Engage with other science sections in collaborative research across collections. 2020-2022.
- Create channels for deeper dialogue with other museums of the Carnegie Museums of Pittsburgh, especially the physically adjacent Carnegie Museum of Art, as well as the Carnegie Science Center and the Andy Warhol Museum. 2020-2022.



Botany curatorial assistant Sarah Williams sharing her plant love with summer camp elementary students. Here, holding world's largest seed.

6) UPDATE OUR PHYSICAL SPACE TO MAXIMIZE RESEARCH, EDUCATION, INSPIRATION AND INNOVATION

- Beautify our space and create signage that embraces our history, highlights our activities, and provides visual summary of the collection to increase visitor experience and facilitate effective behind-the-scenes tours. 2020.
- Establish a redesigned dedicated functional workspace for visitors with necessary equipment, including new microscopes. 2021.
- Assess infrastructural needs for physical upgrades to herbarium cabinets and compactors for averting risk, increasing functionality and expanding our activities. 2020.
- Inventory and organize all non-accessioned material, assessing their potential scientific value and method of storage. By 2021.
- Establish standardized, core content to provide captivating and informative herbarium tours by Botany staff, tailored for specific audiences. 2022.



Bonnie Isaac collecting Appalachian violet (*Viola appalachiensis*) in Somerset County. As part of our long-term plan to build the collection, we are retracing the footsteps of past botanists, resurveying historic sites across the state and collecting specimens to measure change over time.

ENVIRONMENTAL SCAN

What we do well. And what we can do better.

STRENGTHS

Our unique, scientifically valuable >0.5 million specimen herbarium with diverse taxonomic, geographic, and temporal coverage, and the most comprehensive for western PA

Dedicated team of staff, research associates, volunteers, and students, with strong expertise and interest in improving the collection

Our collection is well curated both physically and digitally, with database that is entirely searchable online

Specimen use is high and increasing;

Close relationships with regional conservation organizations and research partners; and

Pioneering innovative uses of specimens and specimen collection methods.

WEAKNESSES

Small staff size, especially relative to size of collection

Reputation and name recognition limited to direct contacts

Cabinet space for collection growth will be reached within ten years

Limited new engagements with local organizations

Current collecting efforts are mostly regional

Research in plant systematics lacking in current staff

Lack in-house cyberinfrastructure for serving specimen images online

Lack quarantine area for incoming specimens

Collection limited to vascular plants only; no frozen tissues, DNA samples, or genetic collections.

OPPORTUNITIES

New CMNH-wide Anthropocene initiatives with clear synergy with our activities and ripe for our participation

Recently hired scientific staff throughout museum open avenues for cross-disciplinary collaborations and conversations

Distinct, new era for collections-based research, with wider appreciation for extended specimen uses

Federal and state funding agencies are increasingly interested in specimen-based research, with next wave of funding initiatives forthcoming

High-impact foundations in our region interested in environment, sustainability, and community building

Mid-Atlantic Megalopolis Project, which CM recently joined, enables new connections with herbaria in the region

Nearby universities are full of new opportunities for collaboration, collections use and student engagement;

Many like-minded organizations in Pgh area developing active programs for outreach and research relevant to our research and collections; and renewed enthusiasm for our science, research, and collections by CMP and CMNH leadership.

THREATS

We rely on external partners to serve our digital images online

Physical space for collection and herbarium-based activities is at risk of consolidation or loss for other uses

Financial priorities within larger organization and beyond are subject to change. Staff funding is currently not perceived as sustainable through operating budget alone

Physical threats to specimens, such as pest and water damage are always a risk.

Nº 538233



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PLANTS OF PENNSYLVANIA

APOCYNACEAE

Asclepias exaltata

Identified by: B.L. Isaac 2019

United States: Pennsylvania: Blair County: Tussey Mountain,
State Game Lands 118B, ca 3.9 km SSW of Alexandria.



SUSTAINABILITY

Responding to our needs to ensure our relevance

MAINTAINING OUR STRENGTHS

With over half a million specimens, the herbarium is at the heart of our mission. The Section is the major botanical resource for the Upper Ohio Valley region with historically important and taxonomically diverse international holdings, ranking among the top 2% of herbaria in North America by size. Beyond the collection's impressive scope and rich history, the collection's realized importance results from the expert curation and direct care by staff and associates. It is our careful curation that allow for diverse specimen use from researchers, educators, and students from across the world. Entirely databased and publicly searchable online, our specimens are becoming increasingly accessible and being used in diverse and exciting ways, both physically and digitally. The herbarium can only remain relevant if collection activities continue. We will develop a long-term collection plan for the Section of Botany to ensure our collection growth is sustainable and goal-oriented, with a special focus on regularly documenting plant biodiversity at regional sites that were historically well collected. We will expand the use of iNaturalist and related citizen science platforms in specimen collection and contribute towards novel collection practices. We will seek external grant funding to expand our research in critical areas of Ecology, Evolution, and the Anthropocene. Effectively leveraging our existing strengths will deepen our understanding and appreciation of plants and support core research while pioneering innovation.

ADDRESSING OUR WEAKNESSES

A significant limitation of the Section of Botany stems from unpredictable, long-term personnel capacity for expanding our research, building institutional collaborations, and engaging the community. Addressing herbarium staffing needs has been identified as a priority in the 2020-2022 Collection Plan, including securing sustainable funding for a curator position. Recent external grant funding will provide personnel support and resources to image all specimens from the region (>1/3 of collection) by 2021, which will enable new specimen use and facilitate new opportunities within and beyond the museum. Highlighting our strengths to the broader scientific and public communities will effectively communicate our relevance as a major botanical facility. Our digitization activities will encourage a new wave of specimen data use by researchers and foster closer collaborations with faculty and students at Pittsburgh-area universities. These collaborations will extend our current expertise and knowledge into new areas. We will promote the herbarium as a public resource for voucher specimens to faculty, students, and botanists in the region. We will engage new partners and citizen scientists in our field research and collections-based activities. Digitization of specimens requires an additional layer of curation – digital curation. The Section needs to gain expertise and resources to be maximally effective stewards of digital data, on par with our stewardship of the physical specimens. The development of a financially sustainable long-term plan for serving specimen images online in perpetuity is a clear priority. We will also expand the scope of our current collection beyond vascular plants, including representative fungal specimens through collaboration with Western PA Mushroom Club. Successfully addressing our weaknesses will be accomplished not only through improving herbarium data accessibility, but also through active community engagement, maximizing data usability and awareness of our valuable expertise and collection.

CAPITALIZING ON OUR OPPORTUNITIES

As we enter the Anthropocene, the Section of Botany has likewise entered a new era with enhanced relevance. The herbarium is a data-rich collection for documenting biodiversity and understanding biodiversity change. Internally within the museum, we are well-poised to be critical players in the museum-wide Anthropocene initiative, a new cross-cutting major theme centered on the concept that humans have a pervasive impact on the earth's systems. These interdisciplinary initiatives will culminate in a Center for Anthropocene Studies, with which the Section of Botany will actively engage. We will form new collaborations with staff at the museum, including the newly hired Curator of the Anthropocene, and external research partners to pioneer the use of herbarium specimens to understand global change. Over the next two years, we will work with Exhibitions staff to renovate the entry wall to Botany Hall, initiating a broader discussion for refreshing plant-related interpretation in Botany Hall and throughout the museum, as well as engaging with the Education Department. Beyond the museum walls, Western Pennsylvania has a unique environmental history worthy of celebration, widely recognized as an urbanized area that was transformed from an industrial powerhouse to an emerging center for sustainability and technological innovation today. Our collection and expertise is ripe for integration into this vibrant landscape, including a strong and growing faculty in ecology and evolutionary biology at University of Pittsburgh, leaders in computer science and robotics at Carnegie Mellon University, conservation-minded activities at the Western PA Conservancy and local land trusts, as well as plant-based institutions, such as Phipps Conservatory and Botanical Gardens, Pittsburgh Botanic Garden, and the Hunt Institute for Botanical Documentation. Integrating our mission into these like-minded organizations through conversation and collaboration will provide a new synergy towards achieving our vision as a botanical hub of local and global relevance.

MITIGATING OUR THREATS

We recognize that our strengths rely upon the curatorial, research, and outreach activities of dedicated Section staff. Our ability to recruit world-class scientists is limited without a long-term strategy for staff positions, both for collections management and research. Administrative enthusiasm for science and research, especially in the context of the Anthropocene initiative, provides an opportunity to prioritize securing a dedicated endowment for a curator position for Botany in perpetuity. This need for external support, in conjunction with developing Center for Anthropocene Studies, provide an opportunity to renew existing community relationships and develop new regional partnerships.



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ONE OF THE FOUR CARNEGIE MUSEUMS OF PITTSBURGH