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Title: Maintaining Support for Herbaria in the 21st Century

Author(s): Prather, A.

Source: Prather, A. (2004). Maintaining Support for Herbaria in the 21st Century. *NatSCA News, Issue 2*, 20 - 23.

URL: <http://www.natsca.org/article/326>

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that have Herbaria. I see a trend in the past few decades of suffocating the centrality of Plant Science programs; and when dissolutions and mergers occur, there is a gradual de-emphasis of whole organismal, plant systematics as they become starved of graduate student training opportunities. Herbaria are often part of the demise, and it seems they must be part of a formal Plant Science unit to survive and be functional. My fear is the dissolution of Botany at Tennessee will eventually have a negative ripple effect on the presence and function of the Herbarium.

If you choose to voice your concern, send a letter to:

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Maintaining Support for Herbaria in the 21st Century

- Alan Prather, MSU Dept. of Plant Biology, Michigan State University

A Discussion Section held at the Botany 2003 Meetings in Mobile, AL on 19 July 2003
Co-organizers: L. Alan Prather, Michigan State University and Lynn G. Clark, Iowa State University

At the Botany 2003 Meeting in Mobile, AL in July 2003, a discussion section was held to consider the current challenges facing herbaria. The discussion section was co-sponsored by the American Society of Plant Taxonomists, the American Bryological and Lichenological Society, the American Fern Society, and the Botanical Society of America and co-organized by L. Alan Prather and Lynn G. Clark. Five panelists contributed to the session: Barbara Ertter (University of California, Berkley), Gerald (Stinger) Guala (National Science Foundation, NSF), Aaron Liston (Oregon State University), Muriel Poston (NSF), and Judith Skog (NSF). The program included a panel presentation, followed by a brief question and answer period; break-out sessions focused on narrower topics, and a group discussion at the conclusion. There were an estimated 80 people in attendance, with a smaller number participating in the break-out sessions and final discussion.

Maintaining support for herbaria has long been problematic, but the pressures are increasing in the current environment. In the near future, several herbaria are likely to be closed and many more are likely to have their institutional support reduced. Nearly all curators will be under increased pressure to justify the support that they receive. The panel/discussion section focused on several related issues:

- 1) How do we justify our existence?

- 2) What should our programs be doing to maintain support and demonstrate relevance?
- 3) How do we get the larger systematics community to discuss these issues and to promote collections-based research?

I. Introduction: Alan Prather briefly introduced the topic and provided an overview of specific situations where there are recent or ongoing crises. Lynn Clark introduced the five panelists.

II. Panel Discussion: The first panelist to speak was Barbara Ertter, who presented her ideas about using node-based interactions among regional herbaria as a mechanism to move the floristic inventory of the U.S. forward, while at the same time building community support for herbaria. The impression may be that the flora of the U.S. is well-known but current distributional data are not adequate for informed management decisions and, furthermore, one estimate suggests that 5% of the vascular plant species in the U.S. remain unknown to science. Furthermore, distributional data are woefully incomplete. Herbaria should take the lead role in completing the floristic inventory. Because most discoveries are made at the local level, what is needed is a network to support local activities. Ertter's model of increasing the effectiveness of local floristic efforts is a node-based model, incorporating local and regional herbaria. Local herbaria would provide material and intellectual resources and develop human resources, all directed to focused floristic work at the local level. Regional herbaria would provide coordination among local herbaria and would interface with other regional herbaria to facilitate communication at the national and international level. The structure would be formalized and participating institutions would have to apply to become a member and would be required to meet certain minimum expectations. The node structure would facilitate individual herbaria in presenting their mission and in acquiring support.

The second panelist to speak was Aaron Liston. He spoke about the successful program at the Oregon State University Herbarium, and commented about the lessons they have learned. He pointed out the need for herbaria to remain open and easily accessible. High visibility and the perception of access are a prerequisite for success, as is integration into the department or unit. At universities, the curator should be a tenured professor so that the herbarium has a respected spokesperson. Undergraduates should be integrated into the herbarium to fulfill the educational role of the herbarium and to provide inexpensive labor; NSF funds are available for this. Curators need to take an active role in educating administrators about the importance of collections. Workshops and outreach programs should be developed to keep the local community involved, especially in ways that enhance the herbarium. Local floristic work should be a priority for herbaria because it keeps a local constituency and provides a clearly defined role of the herbarium that administrators will appreciate.

Judith Skog then provided a NSF-wide overview of opportunities for natural history collections. She encouraged everyone to visit the NSF website and educate themselves about the myriad of programs that could provide support to collections. Crosscutting programs, that are sometimes overlooked, include Major Research Instrumentation (MRI) for equipment and Science and Technology Centers (STC) to enhance intellectual and physical infrastructures within and between disciplines. Within the Directorate for Biological Sciences (BIO), Frontiers in Integrative Biological Research (FIBR) provides awards to support integrative research which addresses major questions in biology, and Research Coor-

dination Networks (RCN) in Biological Sciences was established to encourage and foster communications and collaborations among scientists with common goals and interests. Both of these programs are potential sources of funds that could benefit natural history collections. Within the Division of Environmental Biology (DEB), several programs are of direct relevance: Partnerships for Enhancing Expertise in Taxonomy (PEET), Biodiversity Surveys and Inventories Program (BS&I), and Systematic Biology. One upcoming opportunity to keep watch for is a potential new program, National Ecological Observatory Network, or NEON. Dr. Skog also stressed the need to include support for collections in research proposals, especially those requiring voucher specimens (e.g., Tree of Life).

Muriel Poston discussed the role and importance of the Biological Research Collections (BRC) program. This program provides support for biological collection *enhancement*, computerization of specimen-related data, and research into methods for specimen curation and collection management. This is the program that most directly supports herbaria, but the many other programs mentioned above should not be overlooked. Stinger Guala followed Dr. Poston and discussed the Biological Databases and Informatics program, which encourages new approaches to the management, analysis, and dissemination of biological knowledge. He commented that he receives few proposals from botanists, but that digitization and imaging are critical aspects of collection enhancement. The emphasis should be on high-throughput data capture. Participants in the discussion were encouraged to learn more about all of these programs.

III. Break-out Sessions and Follow-up Discussion: Two break-out groups discussed the themes of 1) node-based interactions among herbaria and 2) educating administrators. For the first theme, the following points emerged in that group: many regional networks are already developing; formalization of networks by certification might provide some leverage for support; all sizes of herbaria should be involved; compilation of existing records is important but targets also need to be established (e.g., species distributions); and obtaining funds for a workshop might be a way to get this started. For the second theme, the following points emerged: a herbarium is no different from any other academic unit, all are under scrutiny; it is important to talk to administrators about grants and outreach activities; administrative structures vary in terms of the level to which the herbarium reports directly; it is important to work with native plant societies; and an obvious common characteristic is that herbaria take up a lot of space.

In the general discussion that followed the reports from the two groups, the following points were made:

- Judy Skog noted that the node-based network is similar to the NEON model, and that a natural history museum could be distributed regionally and continentally. She also suggested that herbarium directors consider inviting congressperson staff to visit.
- Barbara Ertter noted that there is a public expectation that mapping should be completed already; the public in general does not have an understanding of the work that remains to be done.
- Robert Gropp, representing AIBS, suggested that talking with NSCA would be a good idea, and that he is interested in exploring ways to do a workshop, get information out, etc. Tim Lowrey agreed that NSCA would be a logical place to start.

Other comments and suggestions (without attribution) were:

- Organization: does museum structure or independent existence provide more safety?
- Many regional groups are developing already, though not necessarily for floristic inventories. Other ways networks can work besides floristic approaches?
- Is certification of herbaria a good idea?
- Is there some forum (e.g., SPNHC) that we can use or build to track herbaria?
- What are ways that information can be shared, and how can societies help?

How can resources be distributed more effectively? A LISTSERVE was suggested as a good starting point for discussion, and Aaron Liston volunteered to set this up. As a post-script, the new list serve has already been established by Aaron and is being served from Oregon State. As of this writing, there are over 260 subscribers, and there have been many lively discussions. To subscribe, or to learn more about the list, visit <http://scarab.science.oregonstate.edu/mailman/listinfo/herbaria>

Publicity suggestions included making friends with your local science reporter, and getting articles into your institution's alumni magazine.

Use collections to get information on collectors as a development database.

Property rights issues must be taken into account in creating databases; working with landowner-oriented groups is worthwhile. We need to fully understand and document what remains to be done. Having a coherent mission, and being able to articulate it well, is important, especially when the herbarium is under scrutiny. A good example is the herbarium at the University of Arkansas, where their mission to complete the Flora of Arkansas helped them survive closure, while other parts of the former Museum did not survive. Sharing our experiences and ideas should help us come to a broader understanding of these issues and should be beneficial to all of us, even those of us not directly threatened in this present environment.

Acknowledgments: We would like to thank the five panelists who agreed to discuss their thoughts and experiences: Barbara Ertter, Gerald (Stinger) Guala, Aaron Liston, Muriel Poston, and Judith Skog. We also thank the supporting societies, and Jeff Osborn, the Program Director for the meeting. Barbara Ertter supplied us with a CD-ROM version of her presentation and Dick Jensen and Anna Monfils gave us their notes, so that the summary might be as accurate as possible.