DIGITIZING ENGELMANN'S LEGACY

When Dr. George Engelmann moved from Germany to the frontier town of St. Louis in the 1830s, the physician brought with him a lifelong love of botany. Settled on the edge of a largely unexplored wilderness, Engelmann spent a great deal of his life, particularly his later years, studying and describing the flora of western North America.

In 1856, Henry Shaw sought out Dr. George Engelmann, a respected botanist and founder of the St. Louis Academy of Sciences, for advice and assistance on planning his botanical garden in St. Louis, particularly the scientific components.

After his death in 1884, Engelmann's botanical collection of about 100,000 specimens was given to the Missouri Botanical Garden. Now, thanks to a $146,600 grant from the federal Institute of Museum and Library Services (IMLS), the Garden will digitize and create an online public display of some of the plant specimens from the Engelmann Herbarium.

The approximately 8,000 specimens to be digitized were gathered during pioneering expeditions into the American West following those of Lewis and Clark. They are among the first scientific records of the plants growing in the vast wilderness west of the Mississippi River. The collection forms some of the earliest verifiable documentation of species occurrences in that pristine region, before the rapid migration west permanently altered the landscape through human introduction of non-native invasive species. These specimens will provide a historic complement to the 3.7 million specimens already accessible through Tropicos at www.tropicos.org.

"These specimens are incredibly important because they are among the first scientific documentation of plant species in the American West and Mexico," said Chris Freeland, director of the Garden's Center for Biodiversity Informatics. "These specimens provide a baseline understanding of the species diversity within the United States and can be used to guide conservation practices and land use management policies today. And, through generous funding from the IMLS, we're now able to prioritize their digitization and free online publication for a global audience of scholars, students, and citizen scientists."

In many cases these specimens document the first collection of species new to science and illustrate their historical distribution in what is now the United States and Mexico.

The specimens have been part of the Garden's herbarium since Engelmann's death but are only now being digitized. Since the early 1980s, as new specimens have been collected—primarily from the tropics and other biodiversity hot spots like southeast Madagascar and southeast Asia—they have been immediately added to Tropicos. These undigitized "legacy" specimens represent collections made before the Garden's streamlined data entry process. The time required to locate them among the Garden's collection of more than six million objects has made the cost of finding and digitizing them prohibitively

expensive. The funds from IMLS have helped to offset this endeavor.

Freeland says that once the specimens are digitized, it will be interesting to see what conclusions can be drawn by comparing historic distributions to contemporary ones, as well as other applications that may currently be unforeseen. "While we may not have all the answers, by making them available we can engage other scientists and historians who can include them in their own research and expand upon this 'grunt work' that we've completed through IMLS funding."

Digitization of the collection is under way and should be completed by October 2010.

Agave wislizeni, *one of the 8,000 specimens in the Engelmann Herbarium currently being digitized.*

Heuchera sangiunea *from the Engelmann Herbarium.*

A Sample from the Engelmann Herbarium:

CORAL BELLS

Coral bells (*Heuchera sanguinea*) are a popular ground cover in St. Louis gardens. These crimson flowers, native to the western United States and Mexico, were first collected and described by F.A. Wislizenus, an amateur botanist who also happened to be George Engelmann's colleague in his medical practice. On a collecting expedition to Mexico in 1846, Wislizenus reported seeing this plant growing in "mountains, rocks, at Llanos near Cosiquiriachi" and sent it back to Engelmann in Missouri, who used the specimen in 1848 to describe the plant. The Engelmann Herbarium specimen represents the first scholarly identification of this species.

ABOUT THE CENTER FOR BIODIVERSITY INFORMATICS

Digitizing Engelmann's Legacy is one of several projects by the Missouri Botanical Garden's new Center for Biodiversity Informatics, which works to make biodiversity information available to science scholars around the world.

A new field, biodiversity informatics is the creation, integration, analysis, and understanding of information regarding biological diversity. The establishment of this new center recognizes the Garden's growing role as a pioneer in life science information systems, which began in the 1980s with Tropicos, the world's largest database of plant information. The center has been funded by $3.9 million in grants and contracts from federal agencies and private foundations.

Chris Freeland, director of the Center for Biodiversity Informatics, is also global technical director for the Biodiversity Heritage Library, a consortium of natural science libraries worldwide working to digitize the world's biodiversity literature and provide open access to it over the Internet.