

# From Picas to Pixels

## A Look into the Rocky Mountain Herbarium Library Collection and Digital Projects

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"From Picas to Pixels" editor Chad Hutchens takes a look into a herbarium library collection that is quickly being digitized and will be available in the new JSTOR Plants database. Dr. Ronald Hartman, curator of the Rocky Mountain Herbarium, discusses the physical collection of thousands of plants, as well as the scope of the collection. Larry Schmidt, science and engineering reference librarian at the University of Wyoming Libraries, talks about digitization efforts and the development of the Rocky Mountain Herbarium online databases. *Serials Review* 2011; 37:35–37.  
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Chad Hutchens (CH): Dr. Ron Hartman, give me some background information about the Rocky Mountain Herbarium.

Ron Hartman (RH): The Rocky Mountain Herbarium (RM) at the University of Wyoming (UW) has been in existence since 1893. It was designated as part of the University of Wyoming in 1899 after Aven Nelson, the first curator of the herbarium, conducted a botanical exploration of Yellowstone National Park. It is one of the largest collections of plants and fungi housed at an academic institution in North America. If you count our backlog of almost three hundred thousand accessions, we're the tenth largest herbarium in the country and the third largest amongst state universities. Overall, we have approximately one and a quarter million vascular plant accessions.

The collection covers twelve regional states in the greater Rocky Mountain area including Wyoming, Montana, Idaho, Colorado, Utah, New Mexico, Arizona, Nebraska, South Dakota, Kansas, Washington and Oregon. It is the world's largest collection of plants and fungi from the greater Rocky Mountain region.

CH: How does the RM obtain all these plant and fungi specimens?

RH: Staff and associates of RM, as well as students studying floristics at UW, collect the specimens. When the specimens are first collected, they're simply placed in between sheets of newspaper. Identifying notes and pieces of paper are placed in with specimens as they're collected in the field. We've aggressively inventoried the region and will continue to do so. Many of the areas in which we collect specimens are remote and often require ten to twenty-five mile hikes on both public and private land. The overall goal is to document the diversity of plants in the region. This collection is becoming increasingly important due to the changing nature of the region. I'm talking about significant population growth, mineral exploration, and

the effect of invasive flora. It is critical that a baseline inventory is completed soon.

CH: This is not a typical library collection. What do the specimens look like, how are they processed after they're collected in the field, and how are they stored?

RH: After the specimens are collected, they are brought back to a facility where the specimens are pressed and dried. The drier is basically an open box with a screen on top with incandescent light bulbs. The specimens are placed in between sheets of newspaper and then corrugated cardboard is placed on either side. The slats of cardboard are pressed together, so there are many specimens being dried at once. They're placed in the drier with the cardboard oriented vertically to facilitate faster drying. Drying times vary depending upon the size of the plants and relative humidity (figure 1).

Once the plants are dried, they are identified and added to the Rocky Mountain Specimen Database. Currently the RM is collaborating with the University of Wyoming Libraries to image specimens and make them available on the Web. The main Rocky Mountain Herbarium Web site is available at <http://www.rmh.uwyo.edu/> (accessed November 13, 2010). This collaborative effort started with two librarians, Mary Ann Harlow and Larry Schmidt, currently at UW Libraries. Right now, one collection from Grand Teton National Park has been completely imaged and added to the Specimen Database. The other collection currently being imaged is the work of one of my graduate students who collected most of the specimens also in Grand Teton National Park between 2006 and 2007. Larry Schmidt coordinates most of the imaging which takes place at the UW Libraries. Larry is also working to add our type specimen collection in coordination with the Global Plants Initiative funded by the Andrew W. Mellon Foundation. Larry can address the imaging and Web-based database work.

CH: The RM has a Web site and has made many of their plant specimens available online. What is available online now, and what are some of the ongoing and future projects?

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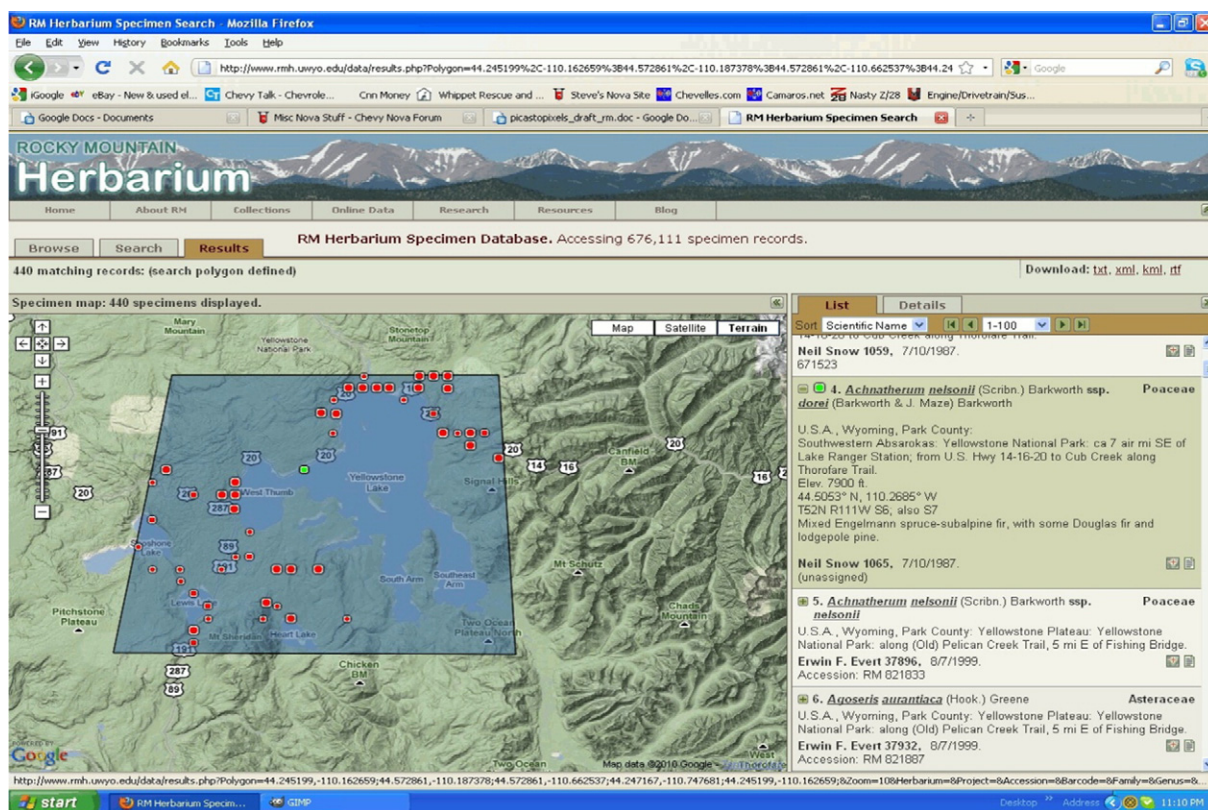
**Figure 1.** Ron Hartman (left) and Larry Schmidt (right) in the Rocky Mountain Herbarium displaying the State of Wyoming's flower, Indian Paintbrush.

Larry Schmidt (LS): Currently available online at <http://www.rmh.uwyo.edu/data/search.php> (accessed November 13, 2010) is the RM Specimen Database which includes information about the nearly seven-hundred thousand accessioned plants at the RM. There is a backlog of almost three-hundred thousand plants that are not in the database yet. Additionally, some of the plants in the database have been imaged. The Web interface is a result of the work done by Ben Legler, one of the Botany Department's graduate students. Users can limit results to plant specimens that have been imaged using a simple checkbox. The plants are browsable by name also, but that is mostly for users who have a command of Latin scientific plant names. For other users, plants are browsable

by common name. I think the best feature of this database (and the others as well) is that we have geolocated most of the specimens whether or not they have an image associated with the record. A user can go into the database, search or browse for a specimen, and see where it was found on a map. We are using Google Maps' API to do this. A user may also limit their search by creating a polygon on the map. When they run their search, it will pull results only from that region highlighted by the polygon. If a plant specimen record has an image associated with it, a user may click on the thumbnail in the record and it will display a high resolution version of the plant (figures 2 and 3).

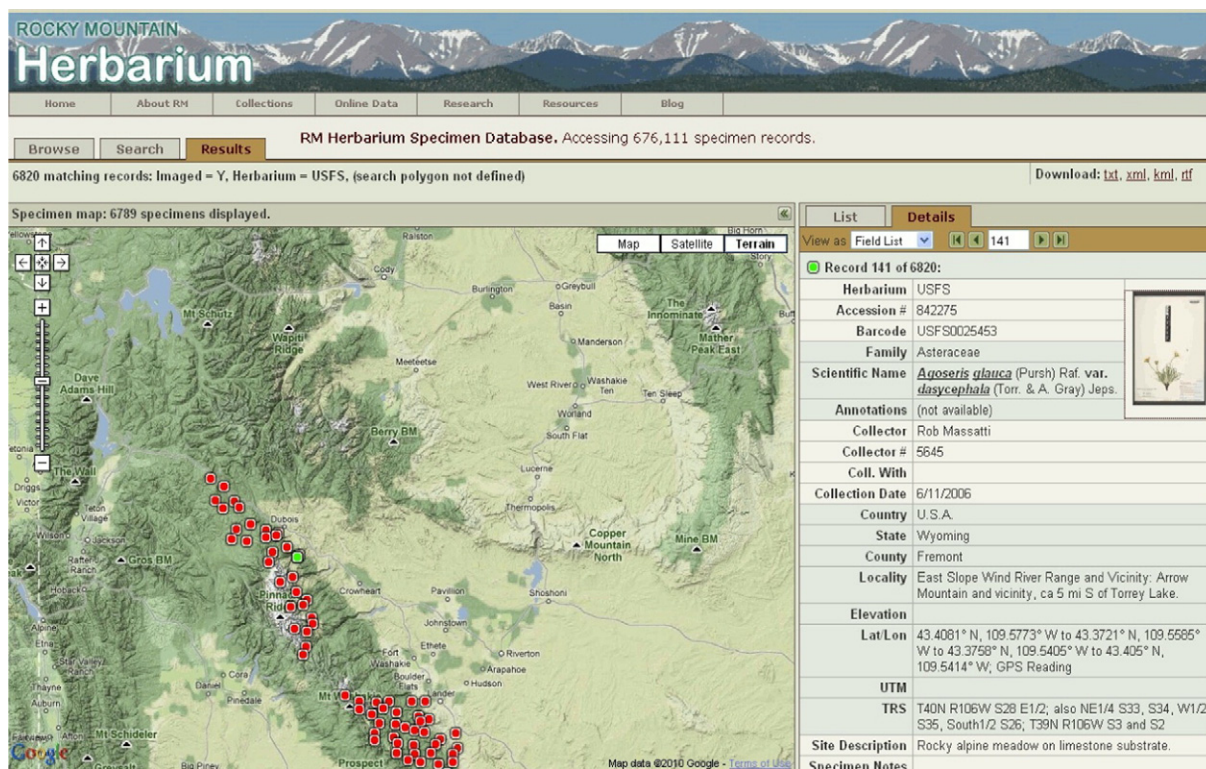
Another database that is available online and one that has images for all plants is the Grand Teton National Park Digital Collection. The work done to bring this collection online and to image the plants was a collaborative effort between the RM, UW Libraries, and Grand Teton National Park. The database includes information about and images of approximately six thousand plants collected in and around the park. This collection will grow over time as we add specimens collected in 2006 and 2007 also in and around Grand Teton National Park. Funds for this project were secured from a UW and National Park Service grant.

For this project and all projects that are underway, specimens are transported from the RM facility on the UW campus over to the main UW Library, Coe Library. Coe Library has an imaging lab dedicated to digital initiatives of all kinds. To image plant specimens in this collection we have a special camera set up. We are employing three undergraduate students to help with the imaging of Grand Teton National Park Digital Collection (figure 4).



**Figure 2.** Screenshot of the Rocky Mountain Herbarium Specimen Database. Notice the polygon which has limited results to the area around Yellowstone Lake.





**Figure 3.** Screenshot of the Rocky Mountain Herbarium Specimen Database. This record is not only geolocated on the map (at left, indicated by a green dot), but it also has an image associated with it (upper right). Clicking on the thumbnail image brings up a high resolution version of the specimen.

The other ongoing project involves imaging and cleaning up the Type Specimens in the RM database. This collection is a subset of the RM Specimen Database. There is a difference between just a regular plant specimen and a type specimen. A type specimen is a specimen selected to serve as a reference point when a plant is first named. So the online availability of these images is of considerable importance to botanists. To image these type specimens, we are using an Epson Expression Model 10000 XL scanner supplied by the Andrew W. Mellon Foundation. This scanner creates six hundred dpi high resolution images in twenty-four bit color. It takes about seven minutes to scan one type specimen. Ultimately, these plant type specimens will be available in JSTOR Plant Science. I don't have any concrete details

about when that will happen and whether or not JSTOR will offer JSTOR Plant Science for a fee.

CH: So tell me about future projects.

LS: We're working on digitizing the field books of prominent botanists in the Rocky Mountain Region, including Aven Nelson, the original curator of the RM. We have images of type specimens that are mentioned in Aven Nelson's field books. We're trying to tie together the actual images and records in the databases with Aven Nelson's field book entries. So when a user is looking at an image of a plant specimen, they can link directly to a field book entry about that plant. We also have a grant to image a collection of plants at Bandelier National Monument. The real challenge at this moment is securing funding to image and scan all of the plants the RM has. We are making great progress though, and we are excited about what has already been accomplished.



**Figure 4.** The imaging lab for processing Rocky Mountain Herbarium plant specimens. On the far left is the Epson Expression Model 10000 XL scanner. On the right a student employee prepares a specimen for imaging.

As a librarian with an undergraduate B.S. in Botany it has been a pleasure to work with Dr. Hartman at such a prominent herbarium. And to add to that, I grew up just north of Yellowstone National Park in Bozeman, Montana, so the scope of the RM is something with which I can really connect on a personal level. Many librarians choose this discipline as a second career, and I'm no exception to that rule. It is not very often that a librarian gets to truly utilize his or her subject-specific education in everyday work, but the digitization we've been doing with the RM has let me do just that. While funding and personnel to support the RM online databases and the digitization has been somewhat challenging, we are fully staffed right now and our grant funding is at a very healthy level. I mentioned this before, but we're really looking forward to seeing our specimens in JSTOR Plants in the near future as well. Now we just need to keep moving forward and get more of it online.