OREGON FLORA *Newsletter*

VOLUME 9, NUMBER 2 | OREGON STATE UNIVERSITY | JUNE 2003

Thomas Jefferson Howell (1842-1912): the untutored, impoverished botanist.

(This article is excerpted from a longer essay on Howell by co-authors Arthur R. Kruckeberg of the University of Washington and the late Robert Ornduff of the University of California, Berkeley.)

Thomas Jefferson Howell, Oregon's earliest pioneer botanist, was impoverished and largely self-educated, but nevertheless a man of great determination. He was born in Missouri in 1842, the youngest of five children of Benjamin and Elizabeth Howell. When Thomas was eight years old his family joined a wagon train bound for Oregon where they homesteaded on Sauvie Island west of Portland. Although the father was well educated and trained as a physician he failed to provide an education for his sons.

Thomas' formal instruction consisted of a mere three months at the island's first school; otherwise he and his brothers were self-taught. Early on, the young boy became interested in learning the names of the flowers that grew wild in his neighborhood. As he matured, his interest in botany grew and he began collecting and describing plants. In 1877 he published a 22-page *Catalogue of the Flora of Oregon, Washington and Idaho.*

See Howell, page 12

Photo: OSU Herbarium archives

Thomas Jefferson Howell in old age.

The Lane Community College Herbarium

by Nate L. France and Gail A. Baker, Science Division, Lane Community College

In the spring of 2001, the 2,600+ pressed plant specimens formerly housed in a classroom and hallway at Lane Community College (LCC) in Eugene were moved to a library-herbarium specifically designed to accommodate the collection. This was the result of a remodeling and addition to the Science and Mathematics Building on campus. Our new space houses all the herbarium cabinets and provides counter workspace with full-length windows. We also have file cabinets and shelves for herbarium records, maps, reference works, floras, and a variety of herbarium materials. We are equipped with two computer ports for databasing and Internet access. The room (117A) is conveniently located adjacent to the Plant Sciences classroom. The new space provides increased opportunities for study, reference and research.

The LCC herbarium collection was initiated in the mid-1960s when the college was established. It has been registered in the *Index Herbariorum* at the New York Botanical Garden since 1967 when LCC biology instructor, Jay Marston, was curator. Two prominent LCC botany instructors, Dr. Rhoda Love and Freeman Rowe, have made major contributions to the collection over nearly four decades. Their additions have added diversity to the collection and they were stewards of the collection until their retirements approximately ten years ago. Both continue to be active in the botanical community and in their support and contributions to the herbarium. Various regional botanists and LCC students have also contributed to the collection.

The LCC collection is used predominantly for teaching and is utilized extensively by students in the botany major's course and in introductory spring field botany. The collection has also been an important reference for a variety of research projects and has filled loan requests from botanists working on various plant groups. In 1998, 26 specimens of *Trifolium* were loaned to Michael Vincent, the botanist responsible for the treatment of this genus for the Oregon Flora Project. Specimens of *Corallorhiza* (Orchidaceae), *Salix* (Salicaceae), *Lupinus* (Fabaceae), *Brodiaea (sensu lato)* (Liliaceae), and *Crataegus* (Rosaceae) have been studied and annotated by various botanists. The

See LCC Herbarium, page 10

LCC Herbarium, continued from front page

herbarium has also been an important resource for the newly published *Vascular Plants of Lane County Oregon.*

Despite its 30-year history, the LCC Herbarium's specimens had never been accessioned or completely inventoried. A project to database all sheets in the herbarium, coordinated by Clay Gautier (an Oregon Plant Atlas Project Leader) and assisted by LCC students, was initiated in October 2002; they report that label information for all past collections was successfully entered by June 2003. Clay and the students use software from OSU to record the information for each specimen. Data recorded includes: scientific name, annotations, collector's name, collection date, habitat, phenology (flowering, fruiting), associated species, and locale. Only vascular plants were accessioned, although the herbarium also houses some bryophytes, lichens, and marine algae.

According to counts from the database, the present LCC collection contains specimens from 103 families, 394 genera, and 1,007 species, subspecies and varieties. Of the 2,606 specimens accessioned, 1985 were from Oregon, 158 from Washington, and 110 from California. The remaining specimens include representatives from Mexico, Canada, and some eastern US states such as Tennessee and Rhode Island.

The oldest specimens in the herbarium are two sheets of *Asclepias mexicana*, collected in1936. Other notable specimens include *Lomatium bradshawii* (Bradshaw's desert parsley, collected before it acquired its rare plant status), and *Neviusia cliftonii* (Shasta snow-wreath, collected with a permit from the US Forest Service). Now that the database has been established, all new acquisitions will be entered, and we look forward to participating as a resource for the Flora and Atlas projects.

With its new room and on-going database, the LCC Herbarium has the potential to grow even more as a learning facility and tool for botanical research. The current Herbarium director, Gail Baker, welcomes contributions of specimens and materials. A dedication and celebration of the Herbarium is scheduled for May 2004 in coordination with the 25th annual Mt. Pisgah Arboretum Wildflower Festival.

See also:

Funk, V. 2002. "The importance of herbaria," *The Plant Press* 5(3): 6-7.

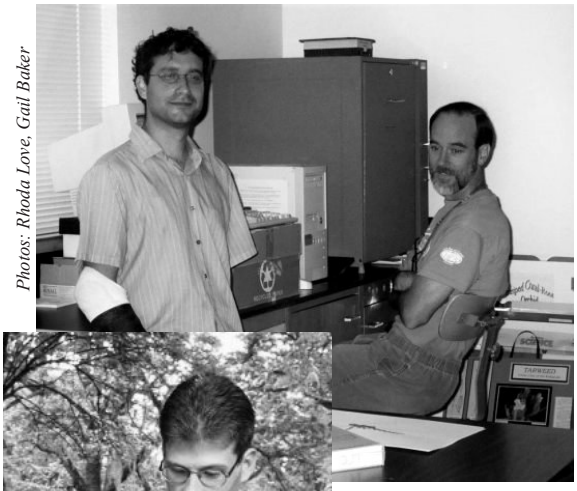
Erythronium oregonum logo and masthead designed by Tanya Harvey.

The Oregon Flora Newsletter is published three times a year by the Oregon Flora Project and the Oregon State University Herbarium. The Editor is Rhoda Love and the Production Assistant is Rena Schlachter.

Address correspondence to:
Scott Sundberg
Department of Botany & Plant Pathology
Oregon State University Cordley Hall 2082
Corvallis, OR 97331-2902
E-mail: sundbers@bcc.orst.edu
(541) 737-4338; FAX (541) 737-3573
http://www.oregonflora.org

Printed on Recycled Paper

Photos: Rhoda Love, Gail Baker



LCC Herbarium databasers Steve Yeager, Clay Gautier (above), and Nate France (left).

Manzanitas – A study in speciation patterns

Part I: Overview of evolution in *Arctostaphylos*

by Kenton L. Chambers

In my recent treatment of the genus *Arctostaphylos* (manzanita) for the OregonVascular Plant Checklist, I recognized 8 species plus two commonly occurring named hybrids. This is hardly a drop in the bucket compared to the 57 species, some with several subspecies, that are recognized for California by P. V. Wells in his 1993 treatment for *The Jepson Manual – Higher Plants of California*. California is certainly the breeding ground for manzanita species, and the farther one goes geographically from that state, the simpler the genus becomes taxonomically. This is true of Oregon, where the northern and eastern regions have a limited number of easily distinguished species of *Arctostaphylos*, whereas the southwestern counties of Curry, Josephine, and Jackson are filled with intergradent and difficult-to-distinguish forms. Since I have had to put names on all the herbarium specimens from that region, I will discuss what I have learned about the evolutionary factors causing taxonomic variation in the genus.

Dr. Philip V. Wells, one of the principal authorities on manzanita taxonomy, has written a very useful, if idiosyncratic, book entitled *Manzanitas of California* (2000). The book has keys and descriptions for 61 species, some of which include several subspecies, along with discussions of morphological features, subgeneric groups, nomenclatural history, endemism, edaphic specialization, and hybrid evolution in the genus. Included are 149 diagrams, maps, and illustrations of varying quality and usefulness. In a sense, this work is only one authority's view of the taxonomy of this difficult genus, but I used it as a guide because I agree with much of what Wells says about the evolutionary processes that probably have influenced its patterns of variation and speciation. In particular, I agree with him that hybridization has been—and continues to be—an overriding factor for species formation in *Arctostaphylos*. This process is certainly going on in Oregon, and it is currently forming distinct populations that may themselves be an incipient species (see discussion of *A.* ×*cinerea* in Part II).

Arctostaphylos columbiana*, common along the Oregon Coast and in the western Cascades. Note its bristly twigs. Illustration by Jeanne R. Janish from Hitchcock, et al.,* Vascular Plants of the Pacific Northwest. *Courtesy of University of Washington Press.*

The Oregon species fall into three patterns of variability and geographic range: (1) widespread and relatively uniform, (2) restricted in range but relatively uniform, and (3) restricted in range, variable, and intergradent with co-occurring species. They also differ in habit, two of them being prostrate or essentially so, and the rest being erect and shrubby to almost arborescent. The two prostrate species—*A. uva-ursi* and *A. nevadensis*—form occasional hybrids with two of the shrubby species, *A. columbiana* and *A. patula*, to give low-growing plants with decumbent, upward curving branches. Two of our species *A. patula* (in part) and *A. glandulosa*—develop what is called a burl, a knobby enlargement of the base of the stem. This structure resists being burned in chaparral fires, even when the plant's stem and branches are killed, and it resprouts new stems in the year following the fire. All our other species, including *A. patula* in part of its range, are killed by fire and must regenerate from seeds present in the soil. On herbarium specimens, collectors practically never note whether a burl is present, although this sometimes can be the deciding key feature, e.g. of *A. glandulosa* in Oregon. I urge that in the future, if you are collecting specimens of manzanita in southern Oregon, you always note on your label the habit of the plant (height and whether erect or prostrate) and the presence or absence of a burl. Species determination, in that region of the state and in adjacent California, is often not possible without this information.

The fact that such a large number of species of *Arctostaphylos*—57—are presently recognized in California, while numerous others have been described in the past but are placed in synonymy, suggests that quite powerful forces favoring rapid speciation have been at work in that state. Manzanitas are all very similar in their flower morphology and have a similar pollination syndrome, the differences between species being mainly in the vegetative parts of the plant. Hence speciation has usually involved changes in vegetative and physiological adaptations. Related species, particularly ones that are localized in distribution, very often occupy separate habitats with unique soil types. We noted this with *A. canescens* and *A. viscida* in Josephine County, Oregon, but it occurs much more frequently in California. Speciation there often involves genetic recombination leading to ecological specialization. If the specialization is to a geographically localized substrate, such as an isolated occurrence of a peculiar type of soil, the resulting species population will itself be local and rare. On page 122 of his book *The Manzanitas of California*, Philip Wells gives a map of nine taxa (eight species, one with two subspecies) in the vicinity of San Luis Obispo, occupying different substrates: one on granite, one on sandstone, three on Pleistocene sands, one on serpentinite, and three on Monterey shale. Still another localized endemic species is found nearby on an area of volcanic dacite.

Wells devotes a chapter of his book to "Reticulate Evolution in *Arctostaphylos*," with a section headed "Speciation Via Hybridization at the Diploid Level." He gives examples of how various rare species like these will combine the morphological characteristics of particular pairs of species growing in nearby regions. These parental species may themselves be either rare or widespread. One rare species, *A. mewukka* of the Sierra Nevada, is cited as a probable tetraploid,

Manzanitas, continued on page 12

Manzanitas, continued from page 11

alloploid hybrid between the two common species *A. patula* and *A. viscida*. In a list of 46 restricted endemic species, he suggests for 36 of them the particular parental species combination that produced that one through hybridization. In a separate list of 15 wide-ranging species—seven of which are in Oregon—only *A. nevadensis* is suggested to have had a hybrid origin (*A. uva-ursi* X *A. patula*), and interestingly, a chromosome count of *A. nevadensis* shows 2n=52, the tetraploid number and hence a possible allopolyploid, hybrid condition.

New species continue to be discovered and described in California and Baja California. How long it will take to find and name all these odd products of hybrid evolution is uncertain, but taxonomists seem to enjoy the challenge provided by this genetically plastic genus. In Oregon, our challenge is different: to make accurate and well-documented field observations on our manzanita flora, identifying the occurrence of hybrids and of unusual burl-producing species such as *A. glandulosa*. We who work with herbarium specimens need all the help we can get from active field-oriented researchers, willing to make good collections with accurate and complete field labels.

I will close with a quote from Ledyard Stebbins, one of the best known students of plant evolution of the 20th Century: "Hybrid swarms…are particularly favorable gene pools from which new adaptive gene complexes may be constructed. In this way, climatic and edaphic diversity, occurring on ecotones or border regions between different biotic provinces are factors which most actively promote the evolution and differentiation of species of higher plants." (G. L. Stebbins and J. Major 1965).

References:

Stebbins, G. L., and J. Major. 1965. "Endemism and specation in the California flora," *Ecol. Monogr*. 35: 1-35.

Wells, P. V. 2000. *The Manzanitas of California*. 151 pp. Privately published. Lawrence, Kansas.

(Part II: Summary of the Oregon taxa of Arctostaphylos *will appear in the February, 2004 issue of OFN.)*

Howell, continued from front page

Rather than working on the Sauvie Island farm with his brothers, Howell began to travel widely throughout the Northwest collecting plants that he pressed and sold as a source of income. He advertised his specimens via lists which he sent to prospective customers, the price varying from four to ten cents per sheet. Because of the lack of accessible references for identification, he was obliged to send his specimens to botanists elsewhere for naming. His early coterie of identifiers included Asa Gray, George Vasey, Liberty Hyde Bailey, and Sereno Watson.

Howell's field notebooks have not survived, but his specimens reveal many of his collecting localities: the Columbia River, Mount Hood, John Day Valley, Steens Mountain, Harney Valley, Southwest Oregon, Tillamook, The Dalles, Mount Adams, Northwest California, Wasco County, and Southeast Alaska. Early in his career Howell made two significant discoveries. The first was a small aquatic plant collected jointly with his brother Joseph on Sauvie Island and described in 1879 as *Howellia aquatilis* by Asa Gray who dedicated the new genus to its "discoverers who are assiduous collectors and acute observers and who have already much increased the knowledge of the botany of Oregon."

His second major discovery was made in 1884 when he collected a new species of spruce at Happy Camp, California. The following year the tree was described by Sereno Watson—however it was not named *Picea howelliana* but rather *P. breweriana*, after William Brewer, co-author with Watson of the *Botany of California*. Ironically, twenty years earlier, Brewer had visited Happy Camp where he almost certainly encountered, but did not recognize as new, the spruce that was later to be named for him rather than for Howell, its true discoverer.

Howell was one of the first western botanists to recognize the importance of edaphic factors in plant distribution. Writing to Willis L. Jepson in 1895 he described the habitat of *Darlingtonia californica*: "The geological formation is a peculiar kind of serpentine and much of the lower part of the mountain is well supplied with springs that run clear water all year round." Howell had earlier touted the significance of geology for plant distribution in *Popular Science Monthly* in 1883 when he pioneered the idea that land forms and rock outcrops fashion the distribution and particular habitats of plants.

Howell's most remarkable achievement was the writing of his *Flora of Northwest America*. For years he gathered information for a compendium of the flora of our region, and began writing it in 1882 when he was 40 years old. Portland printers apparently were unwilling to cope with the author's technical terminology and his often-illegible handwriting, so Howell himself set the type and delivered it to the printer. His scanty formal education was reflected in his idiosyncratic and inconsistent spelling—he was more accurate with technical terms than with ordinary English. Portland botanist Martin W. Gorman corrected proofs, but numerous errors slipped by him. In March 1897, the first fascicle appeared, consisting of 112 pages and priced at 50 cents.

Jepson reviewed this fascicle noting that the work was "cyclopedic" and that "no other botanist knows so well the plants of these states." Despite this praise, neither the sale of plant specimens nor of his book was sufficient to support Howell financially. He married at the age of 50 and struggled the rest of his life to support his wife and two sons. On Sauvie Island he worked as a postmaster, and at various times ran grocery stores and a laundry. At one point he manufactured mittens on a sewing machine earning seven cents a pair. In 1903 Howell donated his personal collection of approximately 10,000 specimens to the new University of Oregon Herbarium; in payment he received $500 for curating the sheets.

Subsequent fascicles of Howell's *Flora* appeared at irregular intervals, with the seventh and last published in August 1903, nine years before his death. One thousand copies were printed; the few that remain are now collector's items. The *Flora* consists of 792 pages and describes 3,150 species of which 89 were newly described by Howell. The combined volume was priced at five dollars and was a financial failure for Howell. Nevertheless, while state floras for our region were issued in subsequent years, Thomas Jefferson Howell's remarkable regional flora was not superseded until the 1955 appearance of the first volume of *Vascular Plants of the Pacific Northwest* by C. Leo Hitchcock, Arthur Cronquist, Marion Ownbey and J. W. Thompson.

Project news and the 80,000th specimen databased!

By Scott Sundberg

We are getting ready to go public with the Oregon Plant Atlas and the Oregon Flora Photo Gallery. This means that we have reached the stage of "beta testing," "usability engineering," "quality control," "website design" or whatever names you'd like to use to describe the final stages of preparation. These projects are as active as ever, thanks to the efforts of Thea Cook and Ann Willyard, who have been supervising most of the dozen students and volunteers now working on these tasks; and to Sherry Pittam, Wilson Mbugua and others at the Northwestern Alliance for Computational Science and Engineering who have been working on Digital Field Guide design. The online Atlas has undergone review by project leaders and will be modified based on their comments. Review by other selected people is also under way. Along with the review we are seeking signed consent forms for using species lists in the Atlas. So far, over 130 people have responded to our request.

Databasing celebration, July 27th. Clockwise from lower left: Thea Cook, Ken Chambers, Richard Halse, Aaron Liston, Glenn Halliday, Ann Willyard and Diana Wageman. Center: Barbara Wilson and Don Roberts. Photos by Rhoda Love.

The OSU Herbarium is busy for other reasons as well. Aaron Liston and Scott Sundberg received a 3-year grant from the National Science Foundation to enter specimen label data from all remaining Oregon specimens of vascular plants in the herbarium. We estimated that this would include about 156,500 specimens, 50,000 of which were databased for earlier projects. In late July we reached the half-way point of databasing the collections and celebrated the databasing of the 80,000th specimen with many volunteers and friends. The databasing project also involves adding latitude and longitude coordinates for all specimens, which will allow us to include these records in the online Atlas.

Thanks

Would you like to make a donation?

Tax-deductible donations can be made to the Oregon Flora Project by sending a check made out to the Oregon State University Foundation to Scott Sundberg at the address on this page. Please note on the check that it is for the Oregon Flora Project. Your donations go primarily toward newsletter expenses and student wages.

Name _____

Address _____

_____

_____

Phone and/or e-mail _____

Mail to:

Scott Sundberg
Oregon Flora Project
Dept. of Botany & Plant Pathology
Oregon State University
2082 Cordley Hall
Corvallis, OR 97331-2902

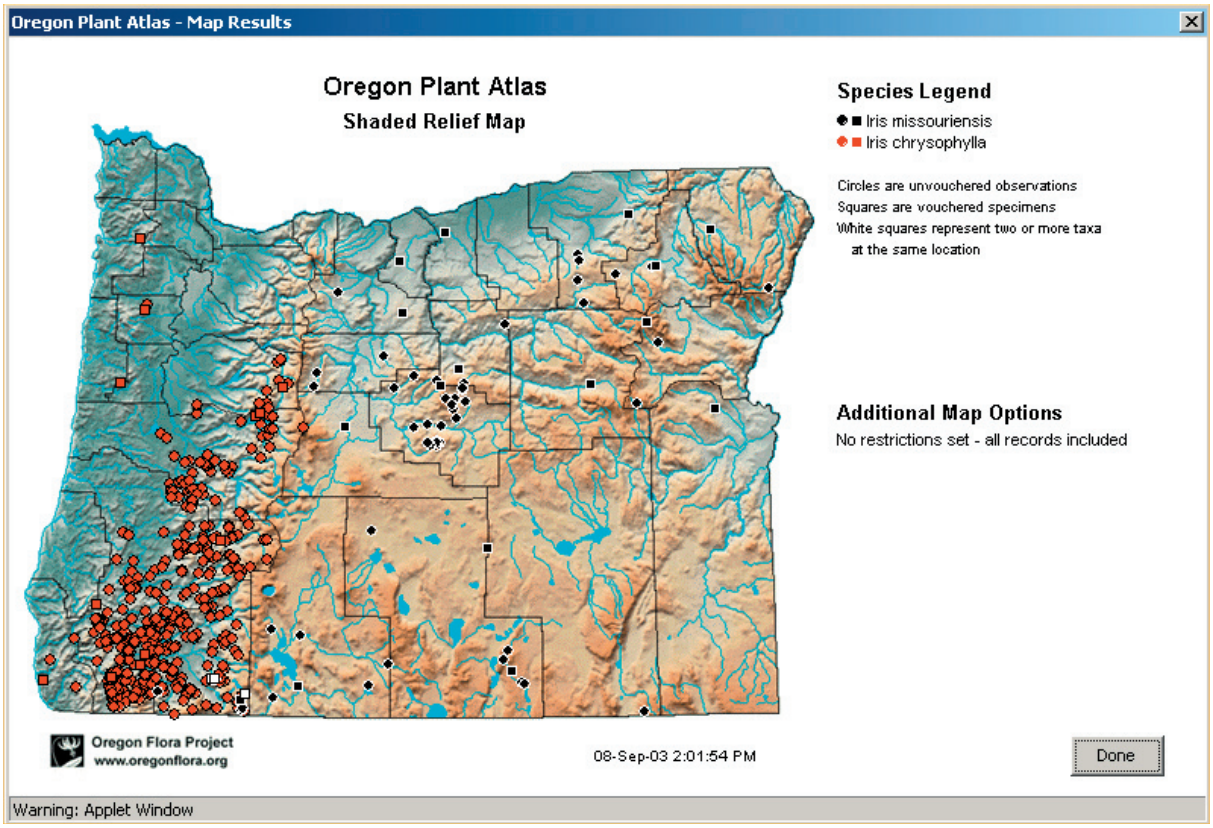
☐ Please check here if you do not wish to have your name listed in our "Thanks" column or on our Internet website.

☐ Please put me on the *Oregon Flora Newsletter* mailing list.

Oregon Flora Project
Dept. of Botany & Plant Pathology
Oregon State University
2082 Cordley Hall
Corvallis, OR 97331-2902

Return Service Requested

TIME DATED MAIL



Example of a page from the upcoming online Oregon Plant Atlas (see p. 13). Online version is in color.