



Further Explorations in the History of Botanizing in Colorado

Tom Schweich
Metro-Denver Chapter
Colorado Native Plant Society
November 13, 2018

Outline

- Beginning of the 19th century
 - Political situation of United States
 - State of botanical science
- Major expeditions
 - Lewis & Clark
 - Lt. Zebulon Pike
 - Major Stephen Long
 - John C. Fremont
 - Dr. Charles C. Parry
- Along the way
 - Carl Linnaeus
 - Antoine de Jussieu
 - Lewis & Clark
 - Thomas Nuttall
 - John Torrey
 - Asa Gray
 - Augustus Fendler
 - Edward Palmer
 - Carl Purpus
 - Alice Eastwood
 - George Engelmann
 - Edward L. Greene

... and I want to weave in a discussion of how a very common plant in the Front Range got its name.



Coll. No. 1063, 17 Sep 2014
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How did it get a name like this?

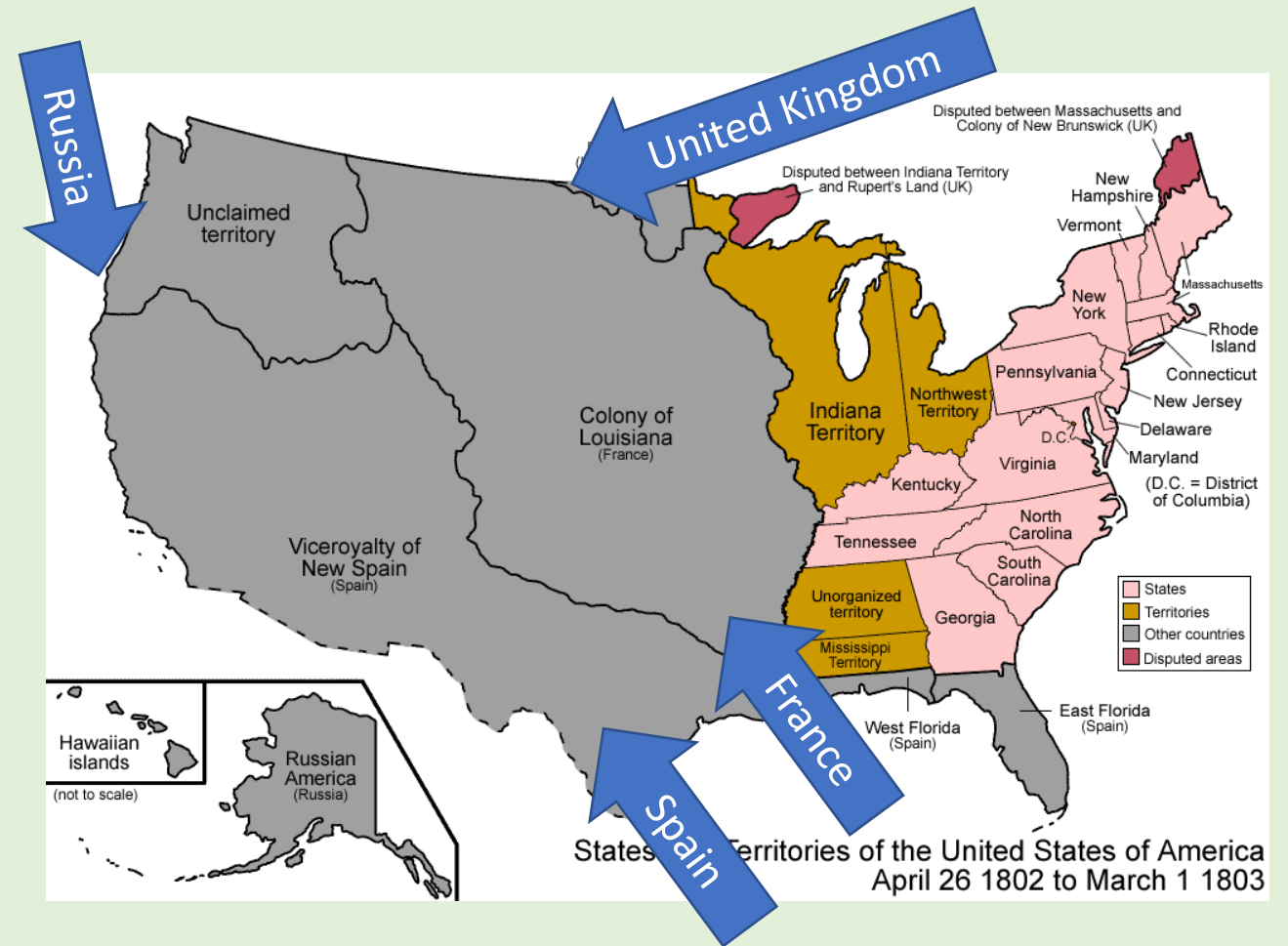
- *Ericameria nauseosa* (Pall. ex Pursh) G.L.Nesom & G.I.Baird var. *graveolens* (Nutt.) Reveal & Schuyler.

And should we call it:

- Rubber Rabbitbrush?
- or
- Bald Goldy-Locks?

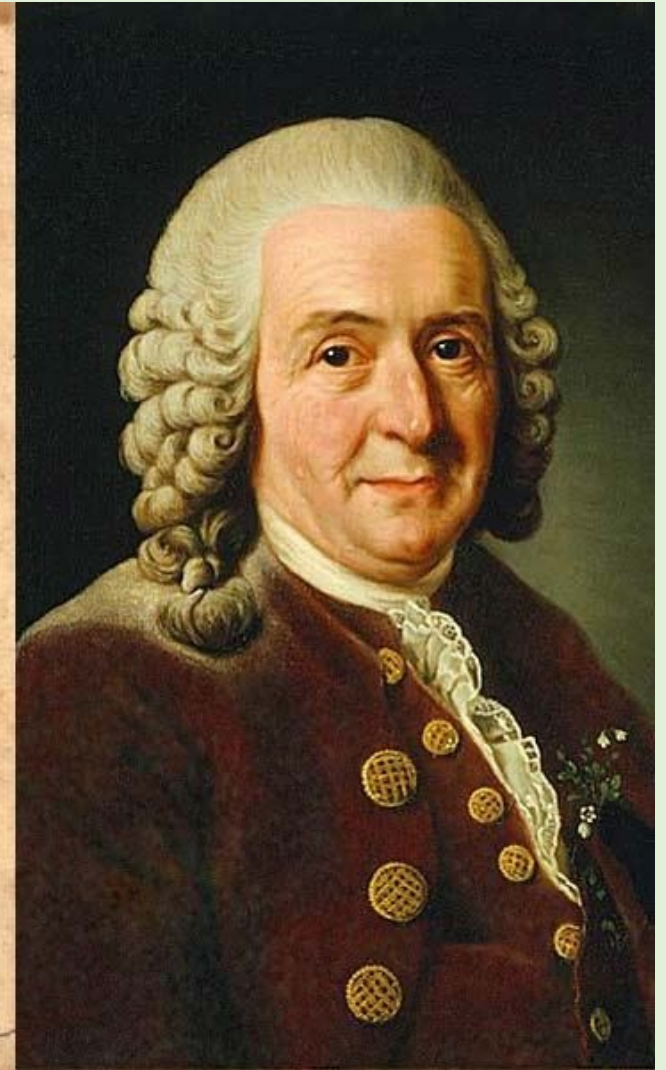
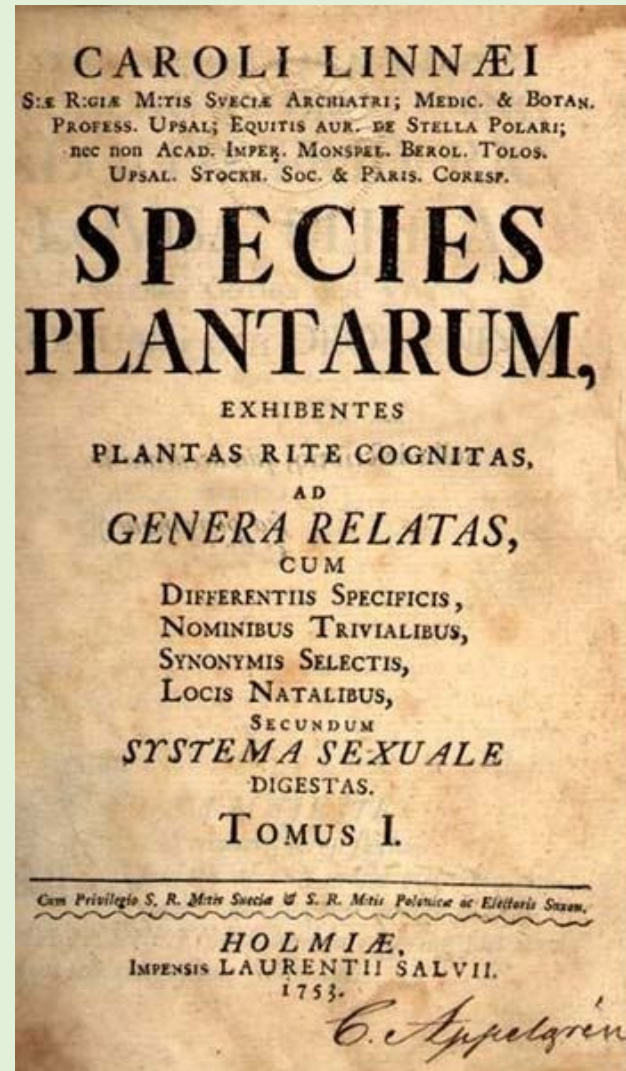
In the opening years of the 19th century ...

- Europe was in turmoil
 - 4th Coalition
- The United States was a young nation – 11 years of age
 - Constitution adopted in 1789
 - George Washington, #1, President inaugurated in 1789
 - #3, Thomas Jefferson, inaugurated in 1800



Botany was in transition also ...

- Carl Linnaeus published *Species Plantarum* in 1753
 - Linnaeus' sexual system was based on the number of stamens.
 - Now acknowledged to be an artificial system
- The Internet moved at the speed of a sailing ship until steamships entered regular Atlantic service in the 1840s.



Botany was in transition also ...

- Antoine de Jussieu's natural classification of flowering plants, 1789
 - Based on and extended unpublished work by his uncle, the botanist Bernard de Jussieu
- Organize the plants into
 - Class
 - Order
 - Family
- Not fully adopted as late as 1824. e.g., Torrey, 1824
- Darwin's "origin of species" would not be published until 1859



LAURENT DE JUSSIEU
D'APRÈS UN PORTRAIT DE JULES BOILLY.



Antoine-Laurent de Jussieu. n.d. Public domain. Published in Pizzetta, J., 1894. *Galeria des Naturalistes: Histoire des Sciences Naturelles*. Paris: A. Hennuyer, 1894.

Many botanists were doctors ...

Trained as a doctor

- Dr. Carl Linnaeus
- Dr. Antoine Laurent de Jussieu
- Dr. John Torrey
- Dr. Edwin James
- Dr. George Engelmann
- Dr. Asa Gray
- Dr. Charles C. Parry
- Dr. Edward Palmer
- Sereno Watson (some training and practice)

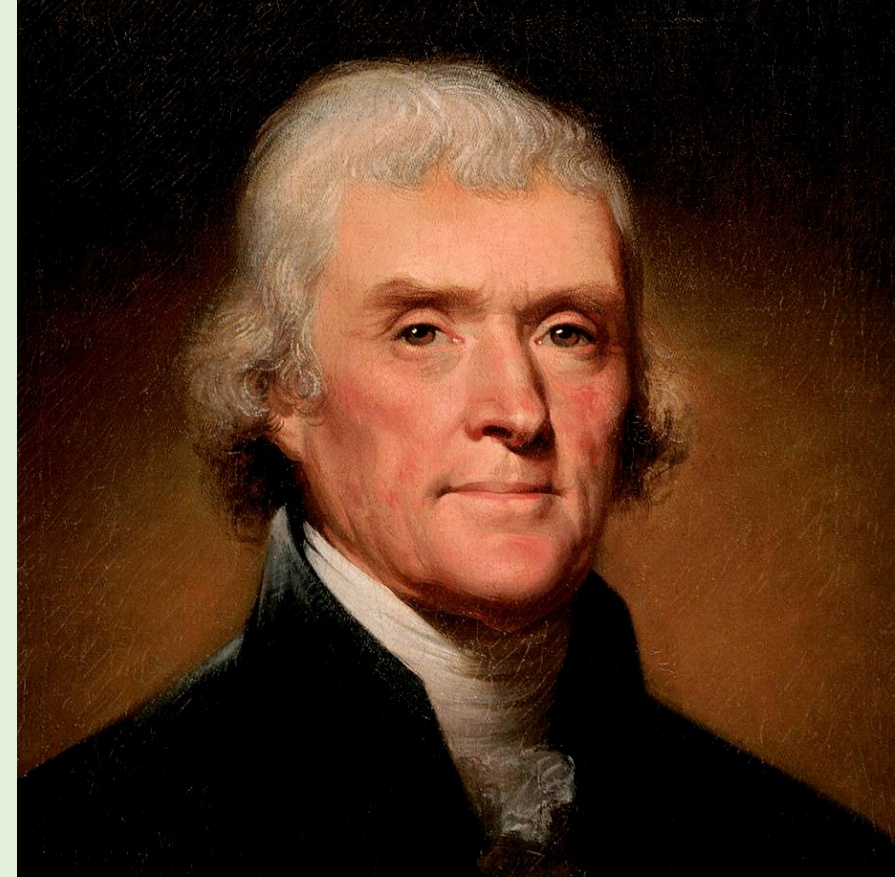
Not trained as a doctor

- Meriwether Lewis (no formal education)
- William Clark (planter, no formal education)
- Thomas Nuttall (printer)
- Frederick Pursh (educated at Dresden Botanical Gardens)
- John C. Frémont (mathematics and natural sciences, expelled for irregular attendance)
- Augustus Fendler (technical high school)
- Carl Purpus (gardener)

Others? ...

Westward Exploration

- Thomas Jefferson
- Twilight of the Enlightenment
- Louisiana Purchase
 - 1803
 - Prospect of renewed warfare with the United Kingdom, prompted Napoleon to sell Louisiana to the United States
- American Philosophical Society
 - Primary United States scientific society
- Westward expansion, Andrew Jackson, and Manifest Destiny, comes later



Thomas Jefferson. 1800. Public Domain.

Jeffersonian explorations

- Lewis & Clark (1804-1806)
 - Spanish made 4 attempts to stop them
- Hunter & Dunbar (1804-1805)
 - Quachita Tributary of the Red, to now Hot Springs National Park, Arkansas
- Pike ... explores the Mississippi (1805-1806)
 - Sent by Wilkerson (Governor-General of Louisiana Territory)
- Freeman & Custis (1806)
 - Stopped by the Spanish near present day Spanish Bluff, Bowie County, Texas
- Pike ... 1806-1807
 - Sent by Wilkerson
 - Jefferson was aware?
- Other plans for expeditions: Platte, Arcansa (Arkansas), and Red Rivers
- Subsequent expeditions had less lofty ideals

Lewis & Clark – 1804-1806

- Why mention Lewis & Clark at all?
 - Roughly same time as Pike
 - Science an important objective
 - Many Colorado plants were first collected by Lewis & Clark
- Sources:
 - Moulton, Gary E. 1999. Herbarium of the Lewis & Clark Expedition. *The Journals of the Lewis & Clark Expedition*. 12. 1999.
 - Earle, A. Scott, and James L. Reveal. 2003. *Lewis and Clark's Green World: The Expedition and its Plants*. Helena, Montana: Farcountry Press, 2003.



Lewis & Clark, Corps of Discovery Expedition, May 1804 to September 1806

- 239 herbarium specimens
- 177 distinct species names



Lewis & Clark – 1804-1806



- Botanical material given to American Philosophical Society by Jefferson
 - Delay in publishing results
 - Some parts taken by Frederick Pursh to England in 1811
 - Some might apply the word “theft” to this action
 - Worked in A. B. Lambert’s herbarium
 - published his *North American Flora* in 1814.
 - (There is also the question of “beer.”)
 - At Lambert’s death, collections scattered to multiple herbaria, some private
 - Most now re-assembled at PH -- Academy of Natural Sciences, Philadelphia.

Pursh, Frederick. 1814. *Flora Americae Septentrionalis* (North American Flora).

- Pursh described the new plants found by Lewis & Clark.

Flora Americae Septentrionalis;
OR, A
SYSTEMATIC ARRANGEMENT
AND
DESCRIPTION
OF
THE PLANTS
OF
NORTH AMERICA.

CONTAINING, BESIDES WHAT HAVE BEEN DESCRIBED BY
PRECEDING AUTHORS, MANY NEW AND RARE
SPECIES, COLLECTED DURING TWELVE
YEARS TRAVELS AND RESIDENCE
IN THAT COUNTRY,
BY
FREDERICK PURSH.

IN TWO VOLUMES.

WITH TWENTY-FOUR ENGRAVINGS.

VOL. I.

LONDON:
PRINTED FOR WHITE, COCHRANE, AND CO.,
FLEET STREET.
1814.

MISSOURI
BOTANICAL
GARDEN.

614. CHRYSOCOMA. *Gen. pl.* 1019.

1. *C. foliis radicalibus spathulato-lanceolatis, caulinis linearibus rariter sparsis, caule subnudo, corymbo composito fastigiato, calycibus oblongis 3—4-floris. Mich. fl. amer. 2. p. 101.*

nudata.

In low grounds, in the forests of North and South Carolina. ♀. Aug.—Oct. *v. v.* A plant of singular appearance, the stem almost leafless; the large flat corymbus consists of small flowers, entirely yellow; even the calyx is deeply coloured.

2. *C. glabra; foliis linearibus 3-nervibus punctato-scabris, floribus corymbosis congestis, calycibus laxis 5-floris glabris.—Lam. encycl. 2. p. 192.*

dracunculoides.

C. biflora. Sp. pl. 1178. secundum specimen Pallasianum in Herbario Lambertiano asservatum.

On high cliffs on the banks of the Missouri. *M. Lewis. ♀. Oct. v. s. in Herb. Lewis.* From one to two feet high; flowers large, yellow.

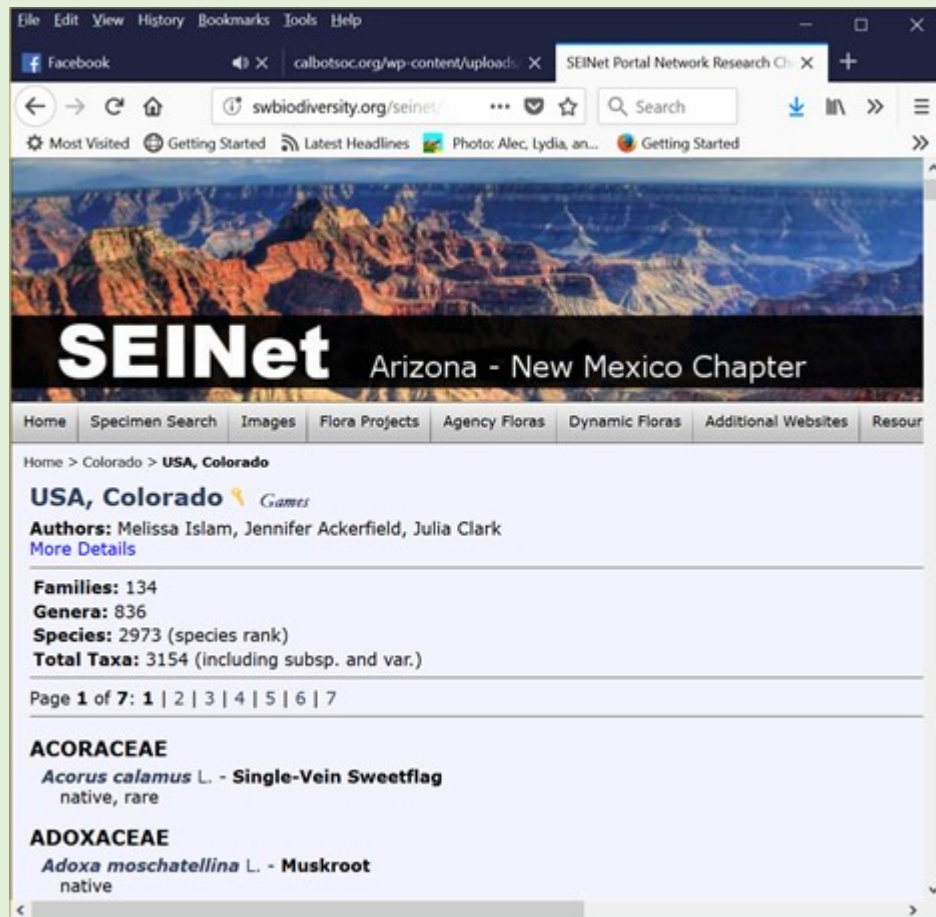
3. *C. calycibus pedunculis foliisque sublanato-pubescentibus; foliis angustissime linearibus, corymbo laxiusculo, calycibus laxis 5 floris: squamis interioribus divaricatis glabris.—Pallas. mss. in Herb. Lambert.*

nauseosa.

On the banks of the Missouri. *M. Lewis. ♀. Oct. v. s. in Herb. Lewis.* Flowers yellow, somewhat smaller than the preceding.

How many of the new plants described by Pursh occur in Colorado?

Fortunately, someone has done our homework for us ...



<http://swbiodiversity.org/seinet/checklists/checklist.php?clid=4172&pid=77&dynclid=0>

Family	ScientificName	Author	CommonName	TaxonId
Gymnosperms				
CUPRESSACEAE	<i>Juniperus communis</i> var. <i>depressa</i>	Pursh	common juniper	13231
Dicots				
AMARANTHACEAE	<i>Atriplex canescens</i>	(Pursh) Nutt.	Four-Wing Saltbush	127
AMARANTHACEAE	<i>Krascheninnikovia lanata</i>	(Pursh) A.D.J. Meeuse & Smit	winterfat	4017
APIACEAE	<i>Cymopterus acaulis</i>	(Pursh) Raf.	Plains Spring-Parsley	2392
APIACEAE	<i>Musineon divaricatum</i>	(Pursh) Raf.	Leafy Wild Parsley	18443
ASTERACEAE	<i>Agoseris glauca</i>	(Pursh) Raf.	Pale Goat-Chicory	2745
ASTERACEAE	<i>Agoseris glauca</i> var. <i>glauca</i>	(Pursh) Raf.	pale agoseris	12002
ASTERACEAE	<i>Arnica fulgens</i>	Pursh	Shining Leopardbane	17896
ASTERACEAE	<i>Artemisia cana</i>	Pursh	Coaltown Sagebrush	1400
ASTERACEAE	<i>Artemisia cana</i> subsp. <i>cana</i>	Pursh		73132
ASTERACEAE	<i>Balsamorhiza sagittata</i>	(Pursh) Nutt.	Arrow-Leaf Balsamroot	2820
ASTERACEAE	<i>Dieteria canescens</i>	(Pursh) Nutt.	Hoar False Tansy-Aster	15020
ASTERACEAE	<i>Erigeron compositus</i>	Pursh	Dwarf Mountain Fleabane	1353
ASTERACEAE	<i>Gaillardia aristata</i>	Pursh	Great Blanket-Flower	3696
ASTERACEAE	<i>Grindelia squarrosa</i>	(Pursh) Dunal	Curly-Cup Gumweed	3741
ASTERACEAE	<i>Gutierrezia sarothrae</i>	(Pursh) Britt. & Rusby	Kindlingweed	3746
ASTERACEAE	<i>Heterotheca villosa</i>	(Pursh) Shinnars	Hairy False Golden-Aster	3826

- 3154 names in Colorado flora
- 95 names published by Pursh occur in Colorado
 - About 3% of Colorado flora
 - All likely first collected by Lewis & Clark

Pursh correctly recognized one specimen as a new species ...

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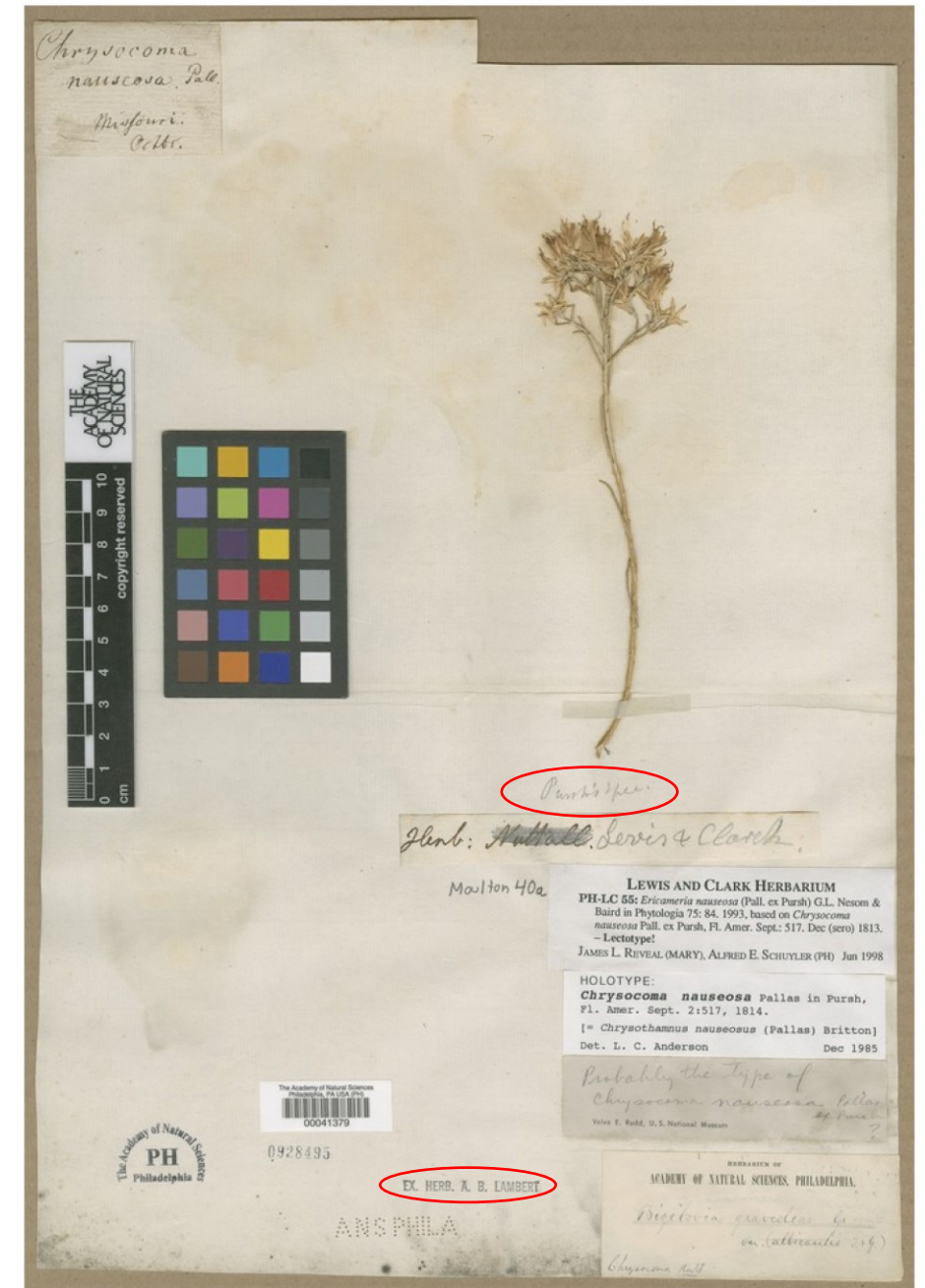
On the banks of the Missouri. *M. Lewis.* *Ÿ.* Oct. *v. s. in Herb. Lewis.* Flowers yellow, somewhat smaller than the preceding.

nudata.

dracunculoides.

nauseosa.

- *Chrysocoma nauseosa* Pursh
- Common name: "Nauseating Goldyllocks."
- Peter (Pyotr) Simon von Pallas (1741 – 8 September 1811) was a Prussian zoologist and botanist who worked in Russia (1767–1810).
- The Jupiter symbol (♃) denotes a perennial.



But misapplied a name to a second specimen

2. *C. glabra*; foliis linearibus 3-nerviis punctato-scabris, floribus corymbosis congestis, calycibus laxis 5-floris glabris.—*Lam. encycl.* 2. p. 192. *dracunculoides*.
C. biflora. *Sp. pl.* 1178. secundum specimen Pallasianum in Herbario Lambertiano asservatum.
On high cliffs on the banks of the Missouri. *M. Lewis*.
4. Oct. *v. s. in Herb. Lewis*. From one to two feet high; flowers large, yellow.

- Pursh applied the name *Chrysocoma dracunculoides* Lam.
 - Common name: “Dragonwort-like Goldy-locks.”
- Unfortunately the name was misapplied.
- Pursh confused this Lewis & Clark collection for a plant occurs in Armenia and Georgia.
 - = *Galatella sedifolia* (L.) Greuter subsp. *dracunculoides* (Lam.) Greuter.

We have to leave our story here ... for now.



Lieutenant Zebulon M. Pike (1779 -1813)

- Two expeditions
 - Mississippi River to its sources (1805-1806)
 - “the the head branches of the Arkansaw and Red Rivers” (1806-1807)
- Both poorly equipped and timed.
 - Poorly clothed
 - Departures in August and July
 - Little science, primarily geographical
- Spying for Gen. Wilkinson (?), Governor-General of Louisiana Territory
 - Wilkinson also accepting payments from the Spanish
 - Distant logical thread to Aaron Burr
 - Hint of country separate from the United States



Zebulon Pike, n.d., copyright unknown

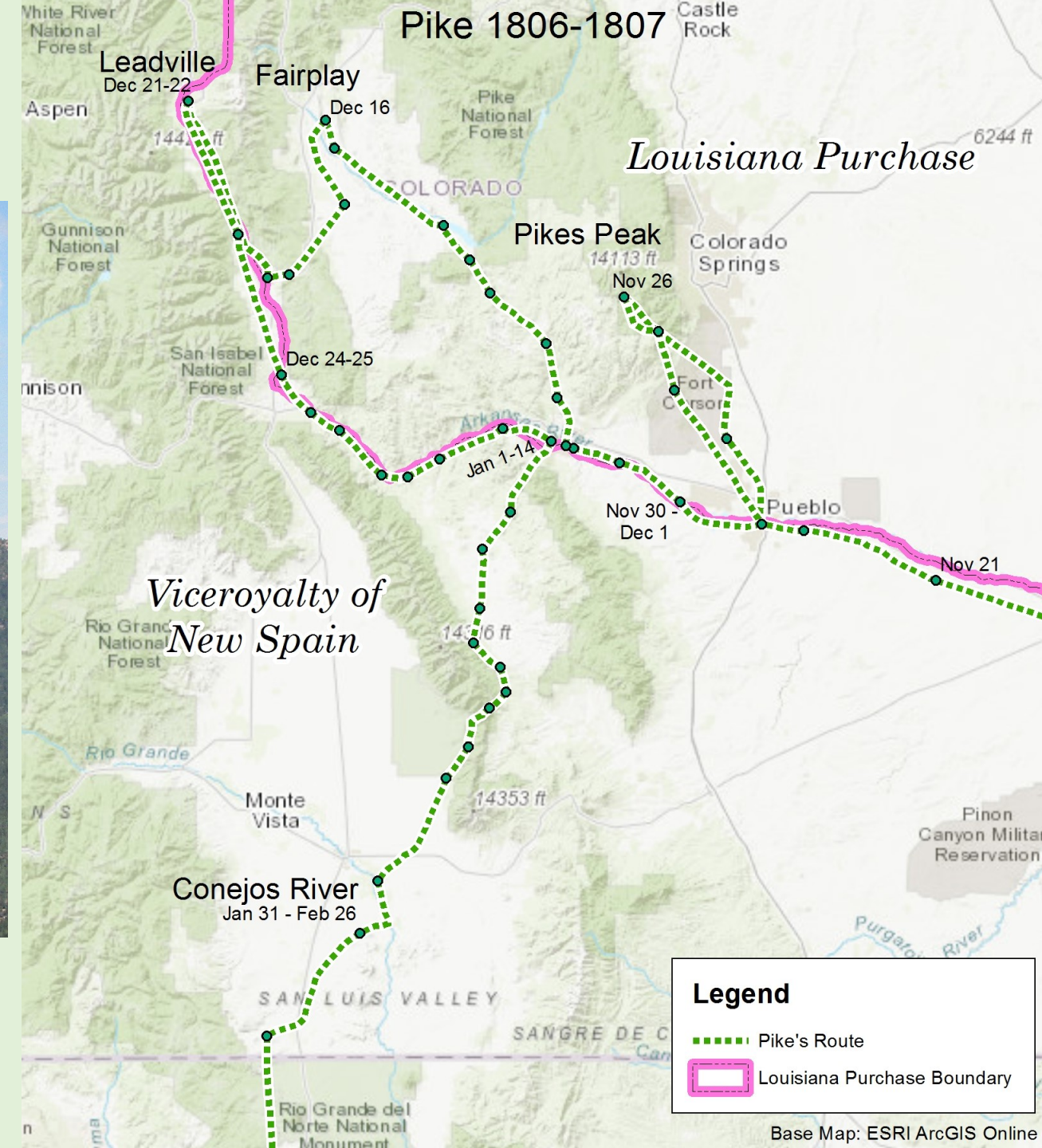
Source: Harris, Matthew L., and Jay H. Buckley, 2012. Zebulon Pike, Thomas Jefferson, and the Opening of the American West. Norman, OK: University of Oklahoma Press.

Pike in Central Colorado

- Saw Pike's Peak from Mount Rosa



- “Captured” by the Spanish on the Conejos River, February 26, 1807
- Published results from memory



Thomas Nuttall (1786 – 1859)

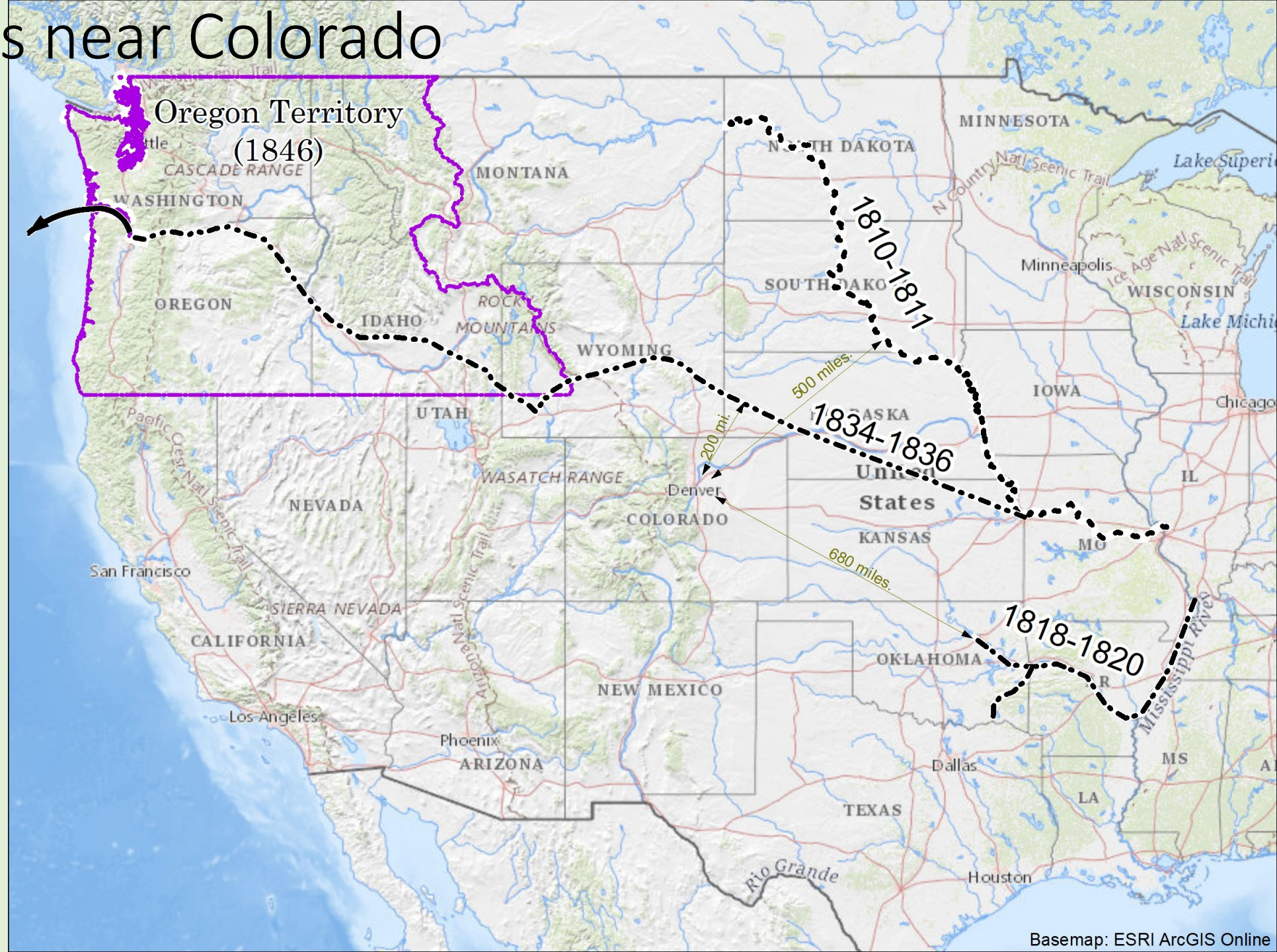
- Never was in Colorado
- Many of our common Colorado Front Range plants were named from Nuttall's collections

Source: Graustein, Jeannette E. 1967. Thomas Nuttall, Naturalist: Explorations in America. Cambridge, MA: Harvard University Press, 1967.



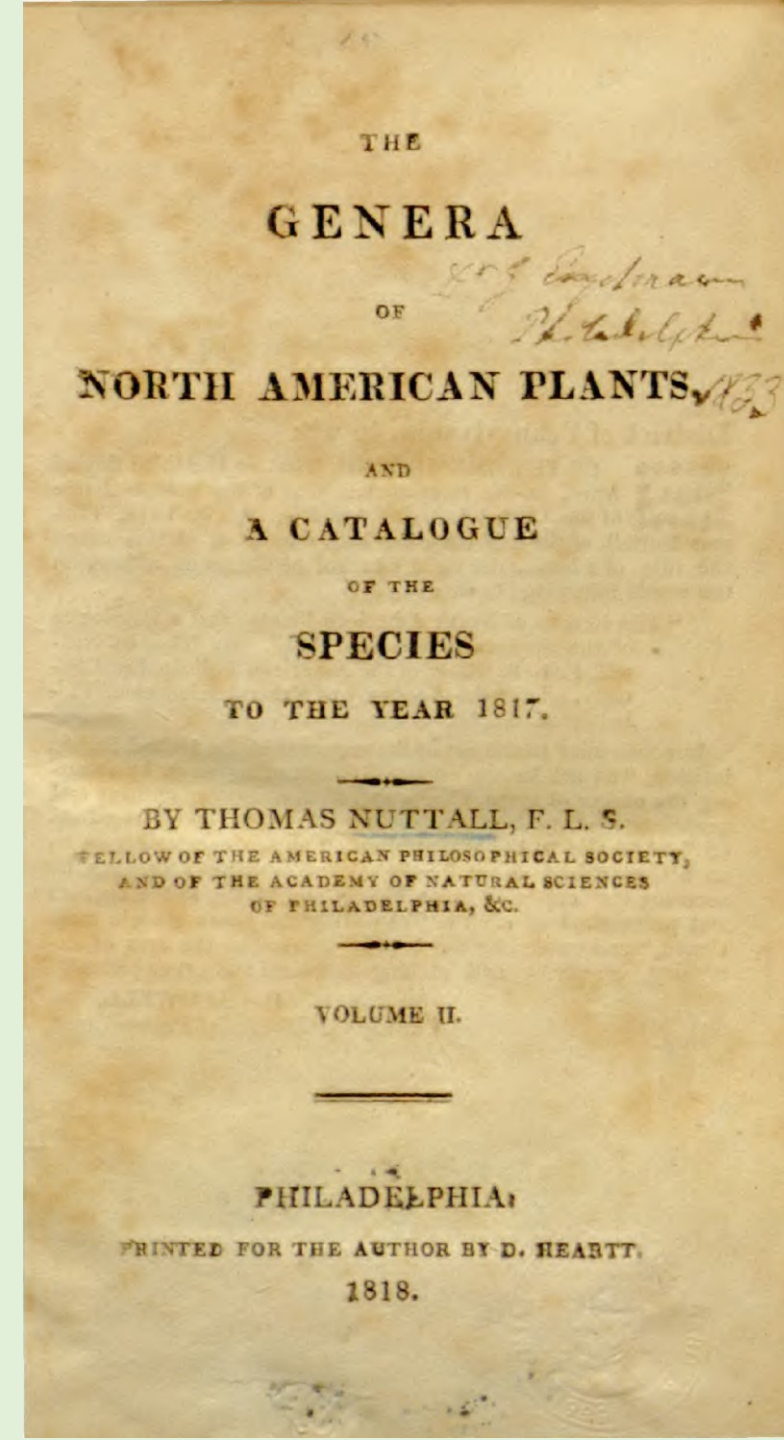
Nuttall's 3 trips near Colorado

- 1810-1811:
retraced part of
Lewis & Clark's
route up the
Missouri River
 - Perhaps as far as
the Yellowstone
River.
- 1818-1820:
Arkansas River
- 1834-1836:
Oregon Territory



About 251 names of Colorado flora were published by Nuttall

- 3154 names in Colorado flora.
- 251 names authored by Nuttall
 - About 8% of Colorado flora names authored by Nuttall
- Nuttall, Thomas. 1818. The Genera of North American Plants and a catalogue of the species to the year 1817. 2 Vols.. Philadelphia: 1818.
- Nuttall, Thomas. 1834. Collections towards a Flora of the Territory of Arkansa. Transactions of the American Philosophical Society. Volume 5. New Series. 1837. pp. 139-203. Read before the American Philosophical Society April 4, 1834.
- Nuttall, Thomas. 1840-1841. Descriptions of new Species and Genera of Plants. Transactions of the American Philosophical Society. II(7):400.



A few Nuttall types that are common in Colorado – Asteraceae

- *Agoseris parviflora* (Nutt.) D. Dietr.
- *Ambrosia tomentosa* Nutt.
- *Artemisia ludoviciana* Nutt. Silver Wormwood.
- *Cirsium undulatum* (Nutt.) Spreng. Wavy Leaved Thistle.
- *Coreopsis tinctoria* Nutt. Golden Tickseed.
- *Crepis occidentalis* Nutt. Largeflower Hawksbeard.
- *Erigeron pumilis* Nutt. Shaggy Fleabane.
- *Helianthus pumilus* Nutt. Little Sunflower.
- *Heliomeris multiflora* Nutt. Showy Golden Eye
- *Packera plattensis* (Nuttall) W. A. Weber & Á. Löve. Prairie Groundsel.
- *Ratibida columnifera* (Nutt.) Woot. & Standl. (Syn: *Rudbeckia columnifera* Nutt.) Upright Prairie Coneflower.
- *Senecio integerrimus* Nutt. Columbia Ragwort.
- *Solidago missouriensis* Nutt. Missouri Goldenrod.
- *Solidago nana* Nutt. Baby Goldenrod.
- *Solidago speciosa* Nutt. Showy Goldenrod.



A few Nuttall types that are common in Colorado – Poaceae

- *Aristida purpurea* Nutt. Purple Threeawn.
- *Buchloë dactyloides* (Nutt.) Engelm.
- *Hordeum pusillum* Nutt. Little Barley.
- *Muhlenbergia montana* (Nutt.) Hitchc. Mountain Muhly.
- *Munroa squarrosa* (Nutt.) Torr. False Buffalograss.
- *Schedonnardus paniculatus* (Nutt.) Trel. Tumblegrass.

Three collections, all from North Table Mountain, Jefferson County.



Coll. No. 1551, 1 Sep 2016
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Coll. No. 1453, 22 Jun 2016
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Coll. No. 1140, 9 Jun 2015
©2015 Tom Schweich

One of the new names that Nuttall published was *Chrysocoma graveolens* Nutt.

544. CHRYSOCOMA. L. (Goldy-locks.)

Calix imbricated, oblong or hemispherical. *Style* scarcely exerted. *Receptacle* naked. *Pappus* pilose, scabrous, rays crowded and unequal. *Seed* pubescent.

Shrubby or herbaceous; leaves alternate and entire, often narrow; flowers mostly corymbose and terminal, yellow, rarely purple; calix 3 or 4, 5, or more than 20-flowered, in *C. Linosyris*, &c. hemispherical, in all the North American species oblong, small, and attenuated at the base, the scales are likewise rigid and carinate. Notwithstanding this diversity of aspect, the genus appears to be perfectly natural, and presents gradations from one extreme to the other.

SPECIES. 1. *C. graveolens*. Shrubby; leaves linear, 3-nerved, smooth and impunctate; branches whitish, pulverulently tomentose; flowers corymbosely fastigate and crowded; calix angular and smooth, 5-flowered. **HAB.** On the banks of the Missouri in denudated soils; common.

C. dracunculoides. **PH.** 2. p. 517. **Obs.** stem shrubby and much branched, from 6 to 8 feet high. Leaves narrow and numerous, about 2 or 3 inches long, only 1 or 2 lines wide. Flowers numerous, in terminal, flattish clusters, of a brilliant yellow. Scales of the calix rigid, and obtusely carinate. Style bifid and pubescent, exerted. Seed villous. The scent of the whole plant strong and disagreeable somewhat like that of Rue.

2. *nauseosa*. Pallas. Herbaceous; leaves narrow, linear, and as well as the calix subtomentose; corymb loose; calix 5-flowered. **HAB.** On the banks of the Missouri; rare.

3. *nudata*. Herbaceous; every where smooth, radical leaves spatulate-lanceolate, 3-nerved; cauline scarcely any linear stem nearly naked, much branched, flowers



Major Stephen H. Long Expedition – 1820

- Long, Army Engineer, for 5 years
- Promoted scientific exploration in the West to President James Monroe and Secretary of War John Calhoun
- More scientifically oriented and better staffed ... than any previous expedition
 - Dr. Edwin James, M.D., a 23 year old Vermonter, botanist
 - Titian Peale, 21 years, naturalist
 - Thomas Say, 33 years, Philadelphian, charter member of the Academy of Natural Sciences of Philadelphia, as zoologist



Dr. Edwin James, botanist

Source: Goodman, George J., and Cheryl A. Lawson. 1995. Retracing Major Stephen H. Long's 1820 Expedition. Norman, OK: University of Oklahoma Press, 1995.

Major Stephen H. Long Expedition in Central Colorado - 1820

- Jefferson County
 - Clear Creek, Sheep Mountain above the South Platte River
- Douglas County
- El Paso County
 - Palmer Lake
 - Monument Creek
 - Pike's Peak, July 14th
- James kept a good diary
 - Locations can be estimated for many of his collections



Dr. John Torrey (1796-1873)

- John Torrey identified the plants
- Results known long before those of Lewis & Clark
- Published in four articles ...
 - Alpine plants
 - Torrey, John. 1824a. Description of some new or rare plants from the Rocky Mountains, collected in July, 1820, by Dr. E. James. *Annals of the Lyceum of Natural History of New York*. 1: 30-36.
 - Grasses
 - Torrey, John. 1824b. Description of some new grasses, collected by Dr. E. James, during the expedition of Major Long to the Rocky Mountains, in 1819-1820. *Annals of the Lyceum of Natural History of New York*. 1: 148-156.
 - New plants described by James
 - James, Edwin. 1823. *Account of a Expedition from Pittsburgh to the Rocky Mountains performed in the Years 1819, 1820*. London: Longman, Hurst, Rees, Orme, and Brown, 1823.
 - Additional catalog
 - Torrey, John G. 1827. Some account of a Collection of Plants made during a journey to and from the Rocky Mountains in the summer of 1820, by Edwin P. James, M. D. Assistant Surgeon U. S. Army. Read December 11, 1826.. *Annals of the Lyceum of Natural History of New York*. 2: 241.
 - Careful not to describe plants previously collected by Nuttall on the Arkansas River in 1819, but not yet described.
- Osterhout (1920) first (nearly) comprehensive list of plants collected on the James expedition
- Collections were added to the Torrey Herbarium
 - Later donated to the New York Botanic Garden (NY)



John Torrey, 1869. Public Domain

Collections made before arriving at Pikes Peak

- Common everyday Front Range Plants – Sheep Mountain, Jefferson County
 - *Eriogonum umbellatum* Torrey “Sulphur Flower”
 - *Physocarpus monogynus* (Torrey) Coulter “Mountain Ninebark”
 - *Acer glabrum* Torrey “Rocky Mountain Maple”
 - *Cercocarpus montanus* Raf. “Alder Leaf Mountain Mahogany”



Physocarpus monogynus (Torrey)
Coulter “Mountain Ninebark”



Eriogonum umbellatum
Torrey “Sulphur Flower”



Cercocarpus montanus Raf. “Alder
Leaf Mountain Mahogany”



Acer glabrum Torrey
“Rocky Mountain Maple”

Aquilegia coerulea James “Colorado Blue Columbine”

- Colorado State Flower
- Collected July 10, 1820, on Monument Creek near the base of Elephant Rock (near Palmer Lake)

July 11th. From our encampment we travelled nearly south, and crossing a small ridge dividing the waters of the Platte from those of the Arkansa, we halted to dine on a tributary of the latter river. In an excursion from this place, we collected a large species of columbine, somewhat resembling the common one of the gardens. It is heretofore unknown to the flora of the United States, to which it forms a splendid acquisition. If it should appear not to have been described, it may receive the name of *aquilegia cœrulea*. [21] Our road during the morning lay for about twelve miles close along the foot of

Source: James, 1823, p. 204



©Max Lichter, SEINet

Pike's Peak described by Edwin James

- “A little above the point where the timber disappears entirely, commences ***a region of astonishing beauty***, and of great interest on account of its productions the intervals of soils are sometimes extensive, and are covered with a carpet of low but brilliantly flowering alpine plants.”
- A second ascent of Pike's Peak by a botanist would not be made until 1862 by Dr. Charles Parry





deCandolle, 1836

- Swiss botanist, chair of natural history in Geneva canton.
- Separated the American *Chrysocoma* into *Bigelowia*.
- Note separation into the “genuine” and the “spurious.”
- “*An certe congeneres?*” = “Or at least the same genus?”
- Candolle, Agustin Pyramus de. 1824-1873. *Prodromus Systematis Naturalis Regni Vegetabilis*. 17 vols.. (Available from the Royal Botanical Garden, Madrid, <http://bibdigital.rjb.csic.es/-ing/Libro.php?Libro=6155>)

CLXXXII. BIGELOWIA DC. non Spreng. nec Smith nec Raf. (r). — Chrysocomae Americanae auct.

Capitulum 3-5-florum homogamum aut ligulâ unicâ foemineâ heterogamum. Recept. angustum squamam setaceam basi latiusculam achænia æquantem inter flores centram gerens. Invol. oblongum, squamis paucis imbricatis erectis. Achænia oblonga subangulosa pubescenti-villosa. Pappus pilosus 1-serialis rigidus scaber. — Herbæ Boreali-Americanæ perennes. Folia alterna integra, caulina oblonga aut linearia. Capitula in corymbum disposita. Cor. luteæ. — Genus differt à Linosyride pappo 1-seriali, à Chrysocomâ invol. squamis non foliaceis, ab utrâque capitulis pauci- nec multifloris, achæniis teretiussculis nec compressis, pappo rigido, recept. subsquamigero, etc. A Chrysocomâ separatam dicavi cl. J. Bigelow qui floræ Americanæ auream coronam florâ Bostoniensi et medicâ addidit.

§. 1. Genuinæ, *glaberrimæ*, capitulis 3-4-floris.

1. B. NUDATA, herbacea glaberrima, foliis radicalibus spathulato-lanceolatis obtusis tenuiter 3-nerviis, caulinis distantibus linearibus, corymbo composito fastigiato, capitulis 3-4-floris. \mathcal{L} ad paludum margines à Virginiâ ad Floridam. *Chrysocoma nudata* Michx. fl. bor. am. 11. p. 101. Nutt. gen. 2. p. 137. Ell. sketch 2. p. 309. (v. s.)
2. B. VIRGATA, herbacea glaberrima, foliis angustis linearibus enerviis, caule virgato ramoso, ramis corymbiferis fastigiatis, capitulis oblongis 3-4-floris, involucri squamis glutinosis adpressis. \mathcal{L} ad paludum margines in Novâ-Cæsareâ (Nutt.) et in Floridâ prope Savannah (h. Dub.). *Chrysocoma virgata* Nutt. gen. am. 2. p. 137. (v. s.)

§. 2. Spuriæ, *pubescenti-tomentosæ*, capitulis 5-floris. — *An certe congeneres?*

3. B. MISSOURIENSIS, herbacea tomentoso-pubescentis, foliis angustis linearibus, corymbo laxiusculo, invol. 5-floris, squamis glabris, exter. patulis. \mathcal{L} ad ripas fluminis Missouri. *Chrysocoma nauseosa* Pursh fl. bor. am. 2. p. 517. Nutt. gen. am. 2. p. 137.
4. B. DRACUNCULOIDES, suffruticosa, ramis albidis pulverulento-tomentosis, foliis linearibus 3-nerviis impunctatis, corymbo fastigiato, capitulis 5-floris, invol. angulato lævi. \mathcal{J} in locis denudatis ad ripas flum. Missouri. *Chrysocoma dracunculoides* Pursh fl. 2. p. 517 non Lam. *Chrysocoma graveolens* Nutt. gen. am. 2. p. 136. Odor rutaceus.

Nuttall published the name Ericameria in 1840



Ericameria nana Nutt. (iNaturalist)

- Results of Nuttall's 1834-36 Trip to Oregon Territory, by way of South Pass, Wyoming, and return by sea.
- *Ericameria microphylla* Nutt. (= *Ericameria ericoides* (Less.) Nutt. ex Jeps.)
- *Ericameria nana* Nutt. – Accepted name
- *Ericameria resinosa* Nutt. – Accepted name
- Nuttall, Thomas. 1840-1841. Descriptions of new Species and Genera of Plants in the natural Order of the Compositae, collected in a Tour across the Continent to the Pacific, a Residence in Oregon, and a Visit to the Sandwich Islands and Upper California, during the Years 1834 and 1835. Transactions of the American Philosophical Society. II(7):400.

* ERICAMERIA.

Capitulum few-flowered, heterogamous; rays feminine, three to six, short and oblong, three-toothed, sometimes bilabiate; discal florets about seven to nine, campanulate, five-cleft. Stigmas very long and slender, acuminate, pubescent, in the ray smooth. Receptacle naked, alveolate, dentate. Involucrum imbricate, the inner scales membranaceous on the margin, below passing insensibly into the minute leaves of the branchlet. Achenium smooth, or somewhat hirsute, linear, angular and striate. Pappus pilose, scabrous, simple, unequal. Flowers wholly yellow?—Dwarf, often resinous shrubs, resembling heaths, exceedingly branched, branches very leafy; leaves minute and subcylindric, acerose and semipervirent, crowded; flowers small, in a contracted, leafy corymb, or solitary and terminal.—(So named from a resemblance to the genus *Erica* in the minute sempervirent leaves.)

Ericameria **microphylla*; not viscid, leaves terete, distichally imbricated in the axils; rays three or four; achenium smooth; scales of the involucre obtuse. *Aplopappus ericoides*, DECAND., Vol. V., p. 346.

HAB. On rocks in a mountainous situation, near St. Barbara, Upper California. Six to eight inches high, much branched from the base. Leaves three to six lines long, half a line wide, nearly cylindrical, obtuse and rigid, at first, as well as the young branches, tomentose, at length smooth. Flowers crowded into an unequal corymb, the branchlets one-flowered, full of leaves to the summit; scales of the involucre in about three series, the outer leafy and acute, the inner obtuse. This cannot be, in any respect, a congener with *Aplopappus ciliatus*, or the genuine Chilean species.

Ericameria **nana*; smooth and somewhat glutinous, densely branched; leaves linear acerose, acute, channelled; branchlets one to three-flowered; flowers terminal, fastigiate; scales of the involucre similar; rays about four; achenium subhirsute.

HAB. On shelving rocks on the Blue Mountains of Oregon. A shrub scarcely a span high, exceedingly branched and very brittle, somewhat resinous from exudation. Leaves no thicker than those of the pine, half an inch to an inch in length, somewhat narrower at base, sessile. Discal florets about eight, not deeply toothed, and, as well as the rays, yellow. Achenium nearly the length of the brownish pappus, linear, somewhat oblong, slightly hirsute when mature, somewhat angular and compressed.

Ericameria **resinosa*; every where glutinous, smooth; branches numerous, slender, corymbose; flowers pedicellate; scales of the involucre acute, the base microphyllous and squarrose; leaves subulate, acute; rays about six, often bilabiate! discal florets about twelve, all ochroleucous, five-cleft.

Nuttall (1840) also published *Chrysothamnus*, a new name for western *Bigelowia*.



Chrysothamnus viscidiflorus (Hook.) Nutt. ©2005 C. Christie

“Named for their affinity to *Chrysocoma*, and brilliant golden yellow flowers.”

- *Chrysothamnus pumilus* Nutt. (= *Chrysothamnus viscidiflorus* (Hook.) Nutt.)
- *Chrysothamnus speciosus* Nutt. (= *Ericameria nauseosa* var. *speciosa* (Nutt.) G.L.Nesom & G.I.Baird)
- *Chrysothamnus dracunculoides* (DC.) Nutt. (= *Ericameria nauseosa* var. *graveolens* (Nutt.) Reveal & Schuyler)
 - Why not *Chrysothamnus graveolens* Nutt. ?
- *Chrysothamnus viscidiflorus* (Hook.) Nutt.
- *Chrysothamnus lanceolatus* Nutt. (= *Chrysothamnus viscidiflorus* subsp. *lanceolatus* (Nutt.) H.M.Hall & Clem.)

BIGELOWIA, but with the receptaculum naked. Capitulum five to eight-flowered; branches of the stigma filiform, cylindrical, exserted, acute, pubescent nearly their whole length.—Very branching shrubs of the western interior and Rocky Mountain plains, with entire, equal, linear leaves, and fastigiate clustered flowers. Most of the species more or less resinous, and with a heavy aromatic odour.—(Named from their affinity to *Chrysocoma*, and brilliant golden yellow flowers.)

*Chrysothamnus *pumilus*; shrubby, dwarf, smooth or pulverulently pubescent; leaves narrow linear, acute, partly three-nerved; involucre about five-flowered.

HAB. On the borders of Lewis' River and the Rocky Mountain plains. A low shrub, much branched from below, about six inches high; flowers in terminal, fastigate clusters. Involucre smooth or glutinous. 3. **Euthamioides*; involucre ovate, the scales ovate and short. Perhaps a distinct species.

*Chrysothamnus *speciosus*; shrubby and virgately branched; leaves narrow, linear, acute, more or less tomentose; capituli in dense, conglomerate, terminal clusters, five-flowered; style hirsute, elongated; pappus copious, scarcely scabrous.

HAB. In the Rocky Mountain plains, near Lewis' River, common: Flowering in August. β. **albicaulis*; stem densely and whitely tomentose; perhaps a distinct species. Showy shrubs, three or four feet high, with numerous virgate branches, like the common Broom. Leaves one-nerved, scarcely half a line wide, one and a half to two inches long. Flowers abundant, brilliant yellow.

Chrysothamnus dracunculoides. *Bigelowia dracunculoides*, DECAND., Vol. V. p. 329.

HAB. Rocky Mountain plains, near the banks of the Platte and Missouri. A shrub three to five feet high, with a heavy, unpleasant, though somewhat aromatic odour.

Chrysothamnus viscidiflorus. *Crinitaria viscidiflora*, Hook. Flor. Bor. Am., Vol. II., p. 24. With this plant I am unacquainted, but it agrees well with the present genus.

† Capitulum six to eight-flowered; stigma ligulate.

Chrysothamnus lanceolatus; shrubby, nearly smooth; leaves linear-lanceolate, acute, three-nerved, somewhat glutinous; capituli corymbosely clustered, six to eight-flowered; stigma ligulate, pubescent at the apex.

HAB. In the Rocky Mountains, toward the sources of the Platte, and on the banks of Lewis' River of the Oregon. A moderate-sized shrub, with broader leaves than usual, one to one and a half inches long, by three to four lines wide, slightly puberulous. Involucre of about four series of ovate, concave, acute scales. Stigma exserted, flat, with an ovate puberulous apex, something like that of the true *Bigelovias*. Pappus white, not abundant, scabrous. Florets pale yellow.

John C. Frémont (1830 – 1890)

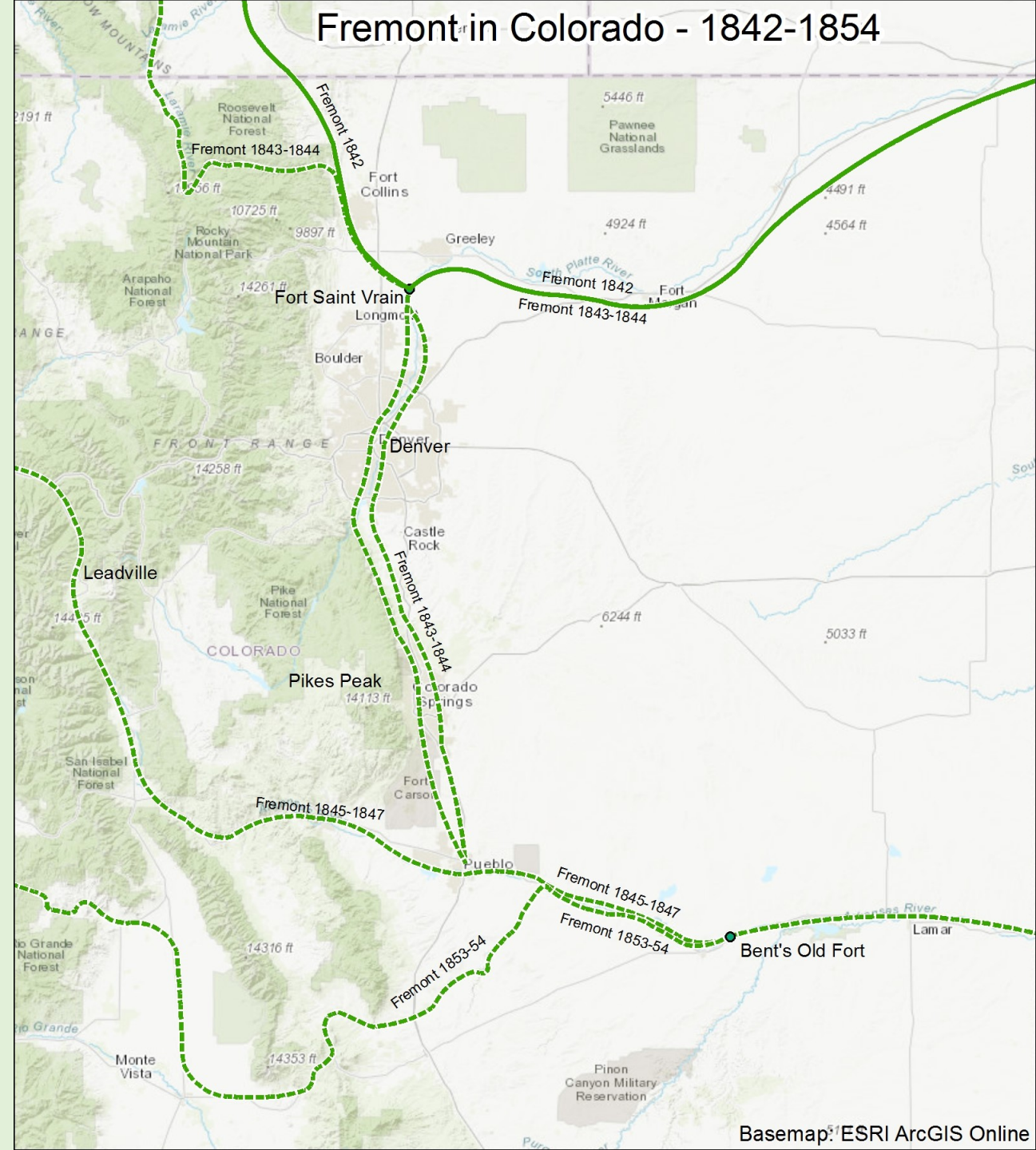
- Three expeditions to or through Colorado, mostly on his way to California
 - 1842, Colorado and Wyoming
 - 1843-1844, Great Basin and California, by way of Cache La Poudre River
 - 1845-1847, California, by way of the Arkansas River
- Two more expeditions, little botanical interest
 - 1848-1849
 - 1853-1854

Source: Welsh, Stanley L. 1998. John Charles Fremont, Botanical Explorer. Saint Louis: Missouri Botanical Garden Press, 1998.



Frémont's 1st expedition – 1842

- Just barely into Colorado
- Plant collections sent to John Torrey without prior agreement
 - But, it worked out; Torrey and Gray were eager to receive plants from the West
- Collections:
 - New York Botanic Garden (NY)
 - Gray Herbarium (GH) Harvard
 - Missouri Botanic Garden (MO)
 - Others, few collections



Two collections we might recognize from Frémont's 1st expedition ...

Senecio spartioides Torr. & Gray, Fl. N. Amer. 2:438. 1843. "Broom-like Ragwort." Sweetwater River near Jeffrey City, Fremont County, Wyoming. 21 August 1842.



Penstemon strictus Benth. in DC. (1846). "Rocky Mountain Penstemon." Wind River Mountains, near South Pass, Fremont County, Wyoming. 8 August 1842.



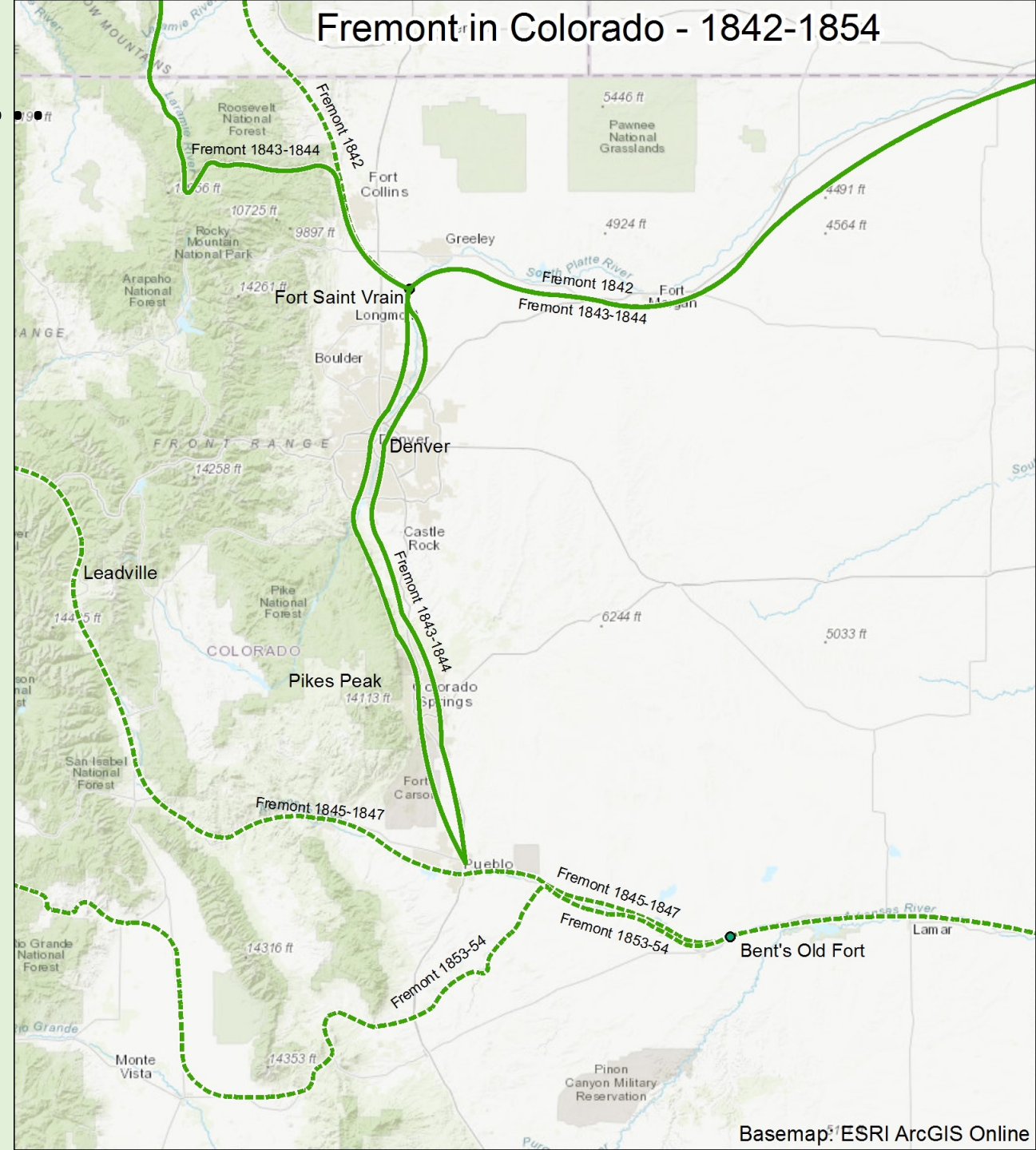
Fremont wrote about and popularized the overland route through South Pass, Wyoming



- “Discovered” by Jedediah Smith in March 1824.
- This route was replaced in 1858 by the Lander Cut-off that ran slightly north of South Pass.

Frémont's 2nd expedition

- South Platte River to Fort St. Vrain
- South along Fountain Creek to the Arkansas River
 - Monument Creek?
- Into Wyoming by way of the Cache La Poudre and Laramie Rivers.



Two collections we might recognize from Frémont's 2nd expedition ...

Lithospermum multiflorum Torr. ex Gray
(1875) Near the head of Fountain Creek,
El Paso County, Colorado, 29 July 1843



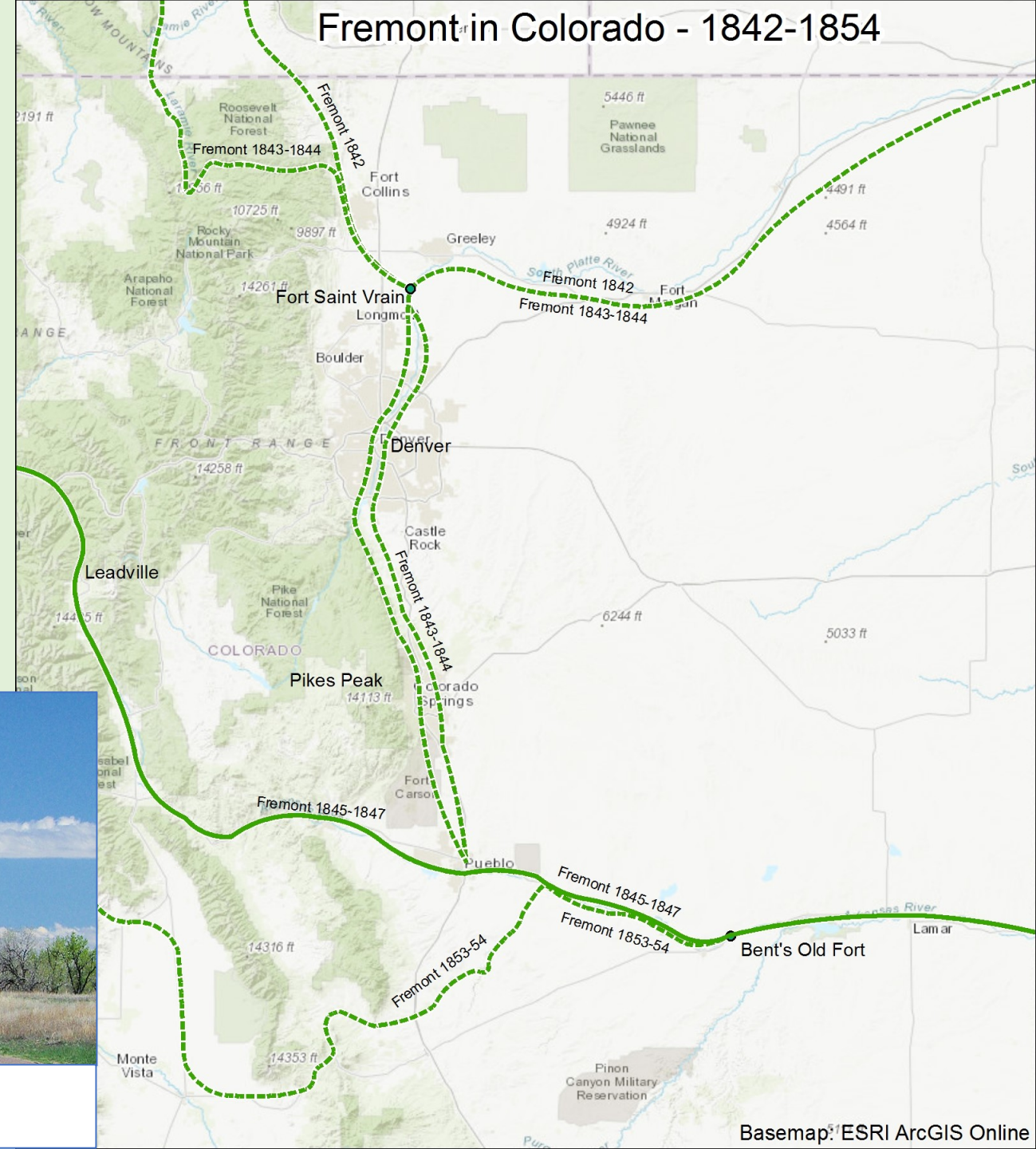
Penstemon secundiflorus Benth. in DC.
(1846). In the Rocky Mountains, n.d. 1844



Frémont's 3rd expedition 1845-1847

- Two weeks at Bent's Old Fort

Fremont in Colorado - 1842-1854



Bent's Old Fort, April 27, 2016

Two collections from Frémont's 3rd expedition ...

Lepidium alyssoides A. Gray (1849) "Mesa Pepperwort." Otero County, Colorado

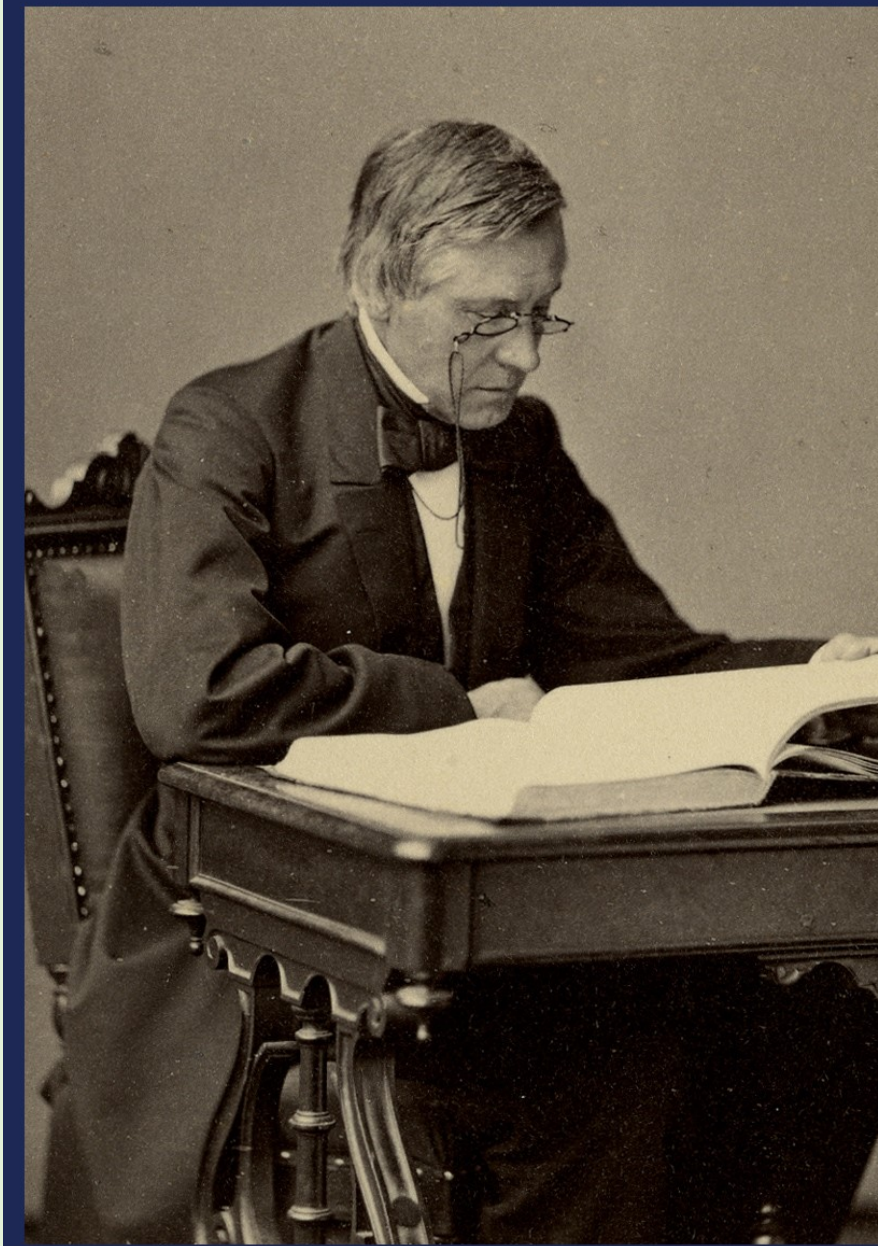


Pedicularis procera A. Gray (1862) "Giant Lousewort." Otero County, Colorado



John C. Frémont's collections

- In all made 2,129 collections (Welsh, 1998)
 - A few can be seen at NY (from the Torrey Herbarium)
 - 39 taxa named for Frémont
- Collections split between Torrey and Asa Gray
 - Asa Gray identified the Compositae and gamopetalae (united petals)
 - John Torrey identified all others
- Good topographer, but did not keep a good journal
 - Most collection locations are known only as to state
 - Not often cited on monographs or regional floras



Asa Gray. 1868. Copyright 2010 by the President and Fellows of Harvard College

Asa Gray in Torrey and Gray (1842) ...

- Section written by A. Gray.
- *Linosyris graveolens* (Nutt.) Torr. & A.Gray
 - *Chrysocoma nauseosa* Pursh was treated as an unnamed variant.
- *Linosyris* is an European and Asian genus.
 - Linnaeus placed *Linosyris* in synonymy with *Chrysocoma*.
- Something that E. L. Greene was still incensed about 35 years later.

Who the heck was Fendler?

Ferns

PTERIDACEAE

Argyrochosma fendleri (Kunze) Windham

Cheilanthes fendleri Hook.

Dicots

APIACEAE

Cymopterus fendleri Gray

Oxypolis fendleri (A. Gray) Heller

ASTERACEAE

Hieracium fendleri Schultz-Bip.

Packera fendleri (Gray) W.A. Weber & A. Löve

Symphyotrichum fendleri (Gray) Nesom

Townsendia fendleri Gray

BERBERIDACEAE

Berberis fendleri Gray

BORAGINACEAE

Cryptantha fendleri (A. Gray) Greene

Hydrophyllum fendleri var. *fendleri* (A. Gray)

A. Heller

BRASSICACEAE

Boechera fendleri (S. Wats.) W.A. Weber

Noccaea fendleri subsp. *glauca* (A. Nelson)
Al-Shehbaz & M. Koch

Physaria fendleri (A. Gray) O'Kane & Al-Shehbaz

CACTACEAE

Echinocereus fendleri (Engelm.) Sencke ex
J.N. Haage

CARYOPHYLLACEAE

Eremogone fendleri (Gray) S. Ikonnikov

EUPHORBIACEAE

Chamaesyce fendleri (Torr. & A. Gray) Small

HYDRANGEACEAE

Fendlera rupicola A. Gray

Fendlerella utahensis (S. Wats.) Heller

MALVACEAE

Sphaeralcea fendleri A. Gray

RANUNCULACEAE

Thalictrum fendleri Engelm. ex A. Gray

RHAMNACEAE

Ceanothus fendleri A. Gray

SOLANACEAE

Physalis fendleri Gray

Monocots

CYPERACEAE

Cyperus fendlerianus Boeckl.

POACEAE

Aristida purpurea var. *fendleriana* (Steud.)
Vasey

Poa fendleriana (Steud.) Vasey

Poa fendleriana subsp. *fendleriana*

Poa fendleriana subsp. *longiligula* (Scribn. &
Williams) Soreng

➤ 28 names, almost 1% of Colorado flora

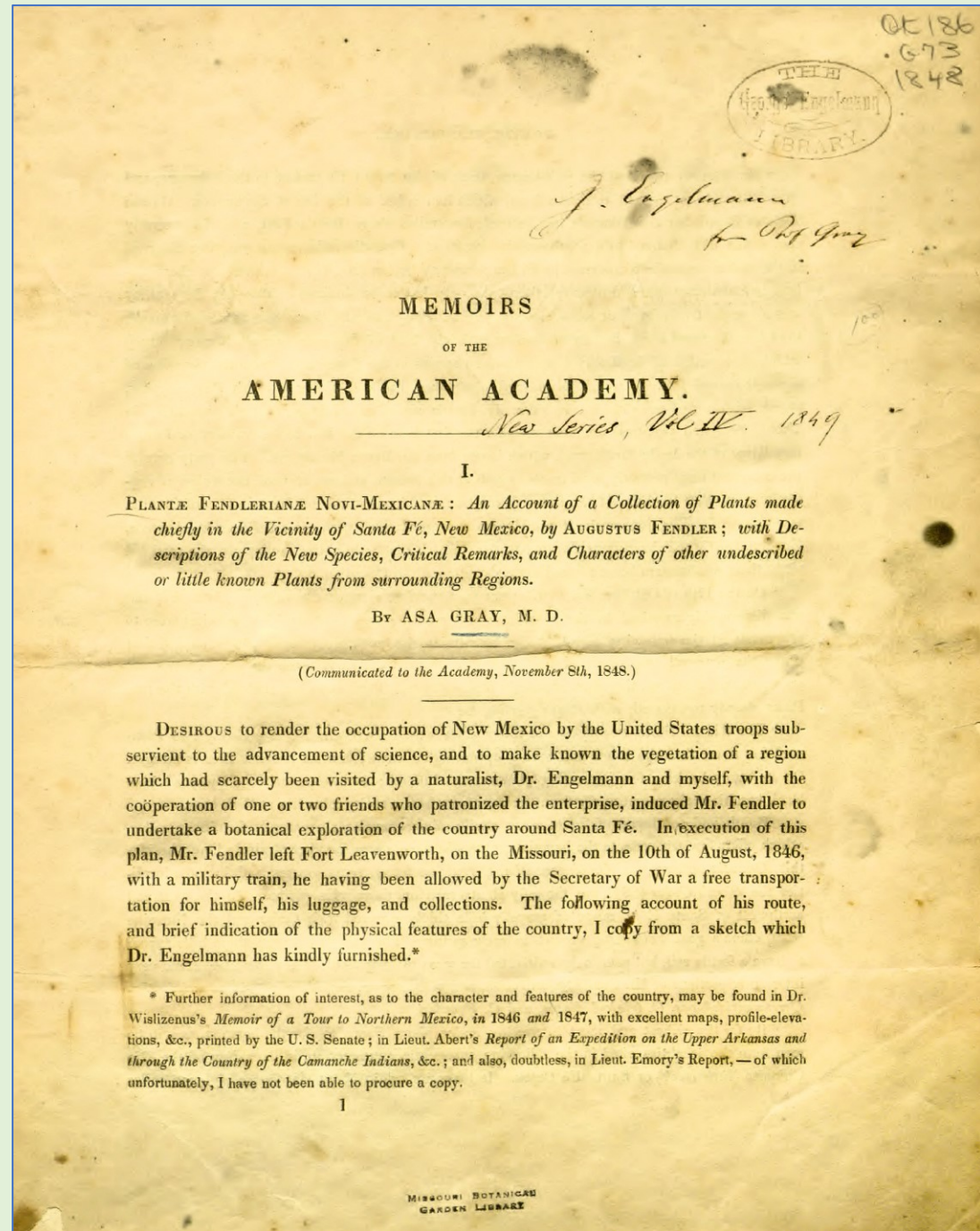
Fendler (1813–1883)

- A natural history collector
- Born in Prussia; one year at the technical school in Berlin.
- In 1836 he emigrated to Baltimore, and for the next eight years found irregular employment in trades in Philadelphia, New York, St. Louis, and New Orleans.
- Tried homesteading in Texas in 1839 and lived as a hermit on a Missouri River island in the winter of 1841-1842.
- A trip to Prussia in 1844 and a visit to Ernst Meyer, Professor of Botany at the University at Königsberg, awakened him to the commercial possibilities of collecting botanical specimens.
- At first collecting in the Mississippi River valley, Fendler collaborated with botanist George Engelmann of St. Louis in identifying specimens.

Camera Shy

Fendler's trip to New Mexico, 1846-1847

- At the outbreak of the Mexican War, through the help of Asa Gray and George Engelmann, he was provided with free transportation with United States troops to Santa Fe, where he collected during the years 1846-1847.
 - Usual route up the Arkansas River to Bent's Fort, then southwest through the Raton Mountains.
- Gray's (1849) incomplete 116 page account lists 463 Fendler specimens from which Gray described 48 new species.
- Gray's descriptions of these plants are classics in the field, and the Smithsonian purchased a set of his specimens.
- Only one collection of our Goldy-locks, at Bent's Fort. Gray was still calling it *Linosyris*.



Fendler after New Mexico

- In 1849 Fendler attempted an unsuccessful expedition to the Great American Basin.
- Later collecting trips were to Panama, Arkansas, and Venezuela, where he lived for five years in the late 1850s.
 - amassed a great collection of flora and became a meteorological correspondent of the Smithsonian.
- His travels continued in his later life as well, including Missouri, Prussia, Delaware (where he wrote *The Mechanism of the Universe*), and Trinidad, where he continued his botanical collecting until his death

THE
E. C. Seaman
MECHANISM OF THE UNIVERSE,

AND ITS

PRIMARY EFFORT-EXERTING POWERS.

The nature of FORCES and the constitution of MATTER; with
remarks on the essence and attributes of
the All-Intelligent.

TWENTY-FOUR PROPOSITIONS ON GRAVITATION.

ILLUSTRATED BY
FIVE LITHOGRAPHIC PLATES.

By AUGUSTUS FENDLER,
*Corresponding Member of the Academies of Natural Sciences of
Philadelphia and St. Louis.*

WILMINGTON, DEL.:
PRINTED BY THE "COMMERCIAL PRINTING COMPANY."
1874.

Charles C. Parry (1823-1890)

- Brief medical career in Davenport, Iowa (1846-1849)
- Mexican Boundary Survey (1849-1852)
- 1861 Expedition:
 - Upper Clear Creek
 - In direction of Pike's Peak
 - No detailed itinerary available.
- Applied name of prominent botanists to peaks in the Upper Clear Creek area:
 - Torrey and Gray Peaks south of Georgetown
 - Engelmann, Parry, and James Peaks north of Georgetown

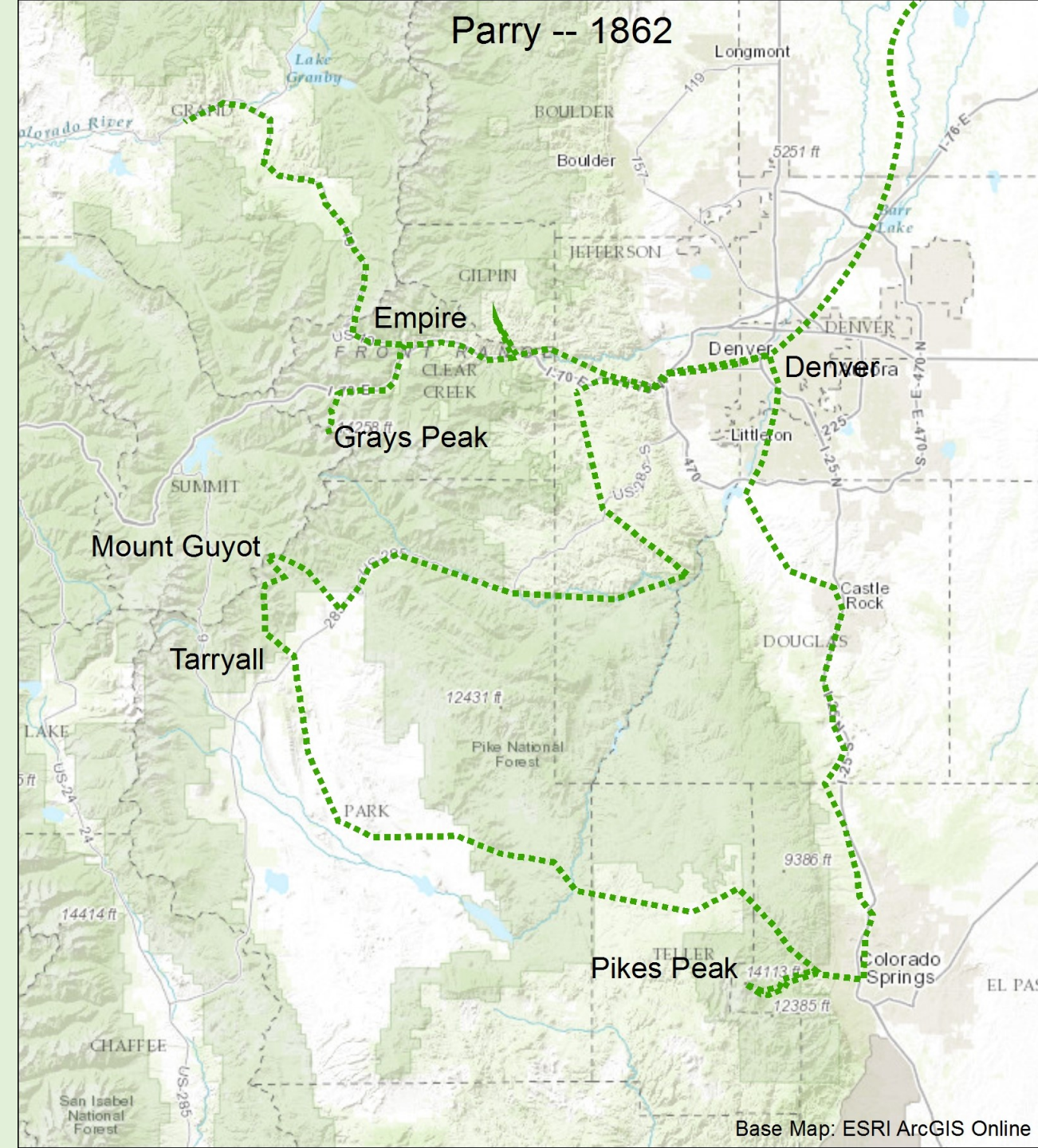
Source: Weber, William A. 1997. King of Colorado Botany: Charles Christopher Parry, 1823-1890. Niwot: University Press of Colorado.



Charles C. Parry, 1865. Public Domain

Parry - 1862

- Accompanied by Elihu Hall and J. P. Harbour
 - Hall was a surveyor from Illinois
 - Harbour may have been Hall's cousin
 - Mostly interested in collecting for sale
- Covered much of Douglas, Jefferson, and Park Counties before arriving at Manitou Springs



Pike's Peak – July 1, 1862

- Same route as that used by Edwin James
- Wrote an extensive account, in a letter addressed to Torrey
- Accompanied by a local guide
 - M. S. Beach, of Colorado City, his third ascent.
- "... and even *ladies*, have ventured to this snow-crowned summit."
- First botanist to have collected on Pike's Peak since Edwin James in 1820

Source: Parry, Charles C. 1862. Ascent of Pike's Peak, July 1st, 1862. Transactions of the Academy of Science Saint Louis. 2(1):120-133.

ASCENT OF PIKE'S PEAK, *July 1st, 1862, by* DR. C. C. PARRY. *From a Letter addressed to Prof. TORREY, and communicated by him.*

Prof. J. TORREY, M.D.

DEAR SIR: In accordance with frequent suggestions from you, recommending the examination of the memorable botanical locality known as James', or Pike's Peak, I feel gratified in being able to furnish you with a brief sketch of the results of such an exploration, accomplished on the 1st of July, 1862.

Since Dr. Edwin James, of Col. Long's expedition, first visited this alpine summit forty-two years ago, on the 14th day of July, 1820, there is no record of any professed botanist having made the ascent. For this long period, its peculiar vegetation has bloomed unheeded, and the meagre collection of plants made by Dr. James has not been duplicated in scientific herbaria.

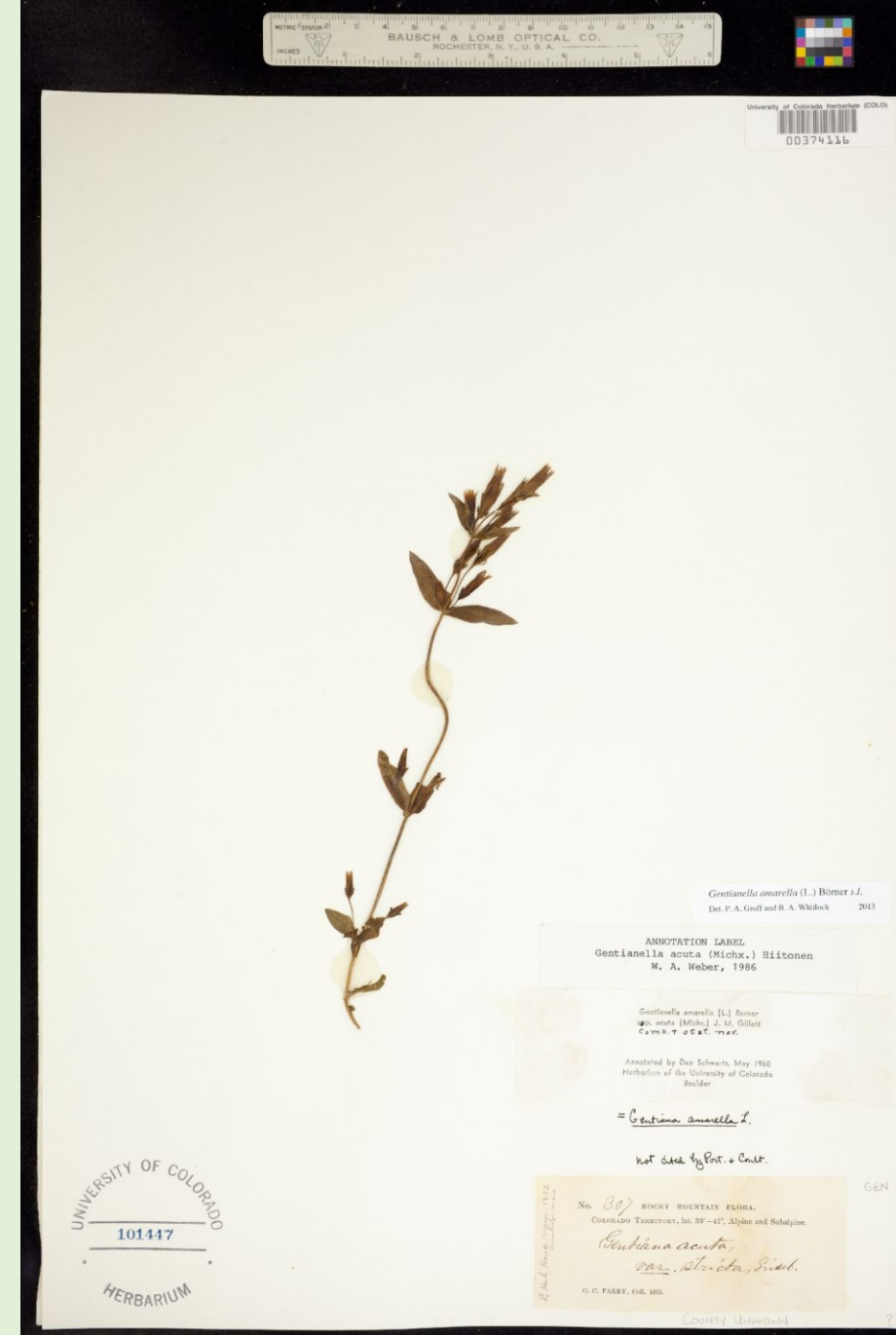
It is true, indeed, that of late years, since the rapid settlement of the adjoining region, popularly known as Pike's Peak, various pleasure parties, intent on sight-seeing, and even *ladies*, have ventured to this snow-crowned summit, and Mr. M. S. Beach, of Colorado City, our guide on this last occasion, counted it as his third ascent; but by all these its floral treasures were only casually observed, and in no instance that I can learn have botanical collections been made.

The truthful and graphic account given by Dr. James, in Long's Expedition, of the ascent of this "*highest peak*," shows that the route then taken was substantially the same as that followed by us, and is no doubt the one most accessible, at least from the northern slope.

That remarkable and interesting stream, known by the expressive French name of *Fontaine-qui-bouit*,* which circles round the gigantic mass of rocks comprising the main peak,

Collections from the 1862 expedition ...

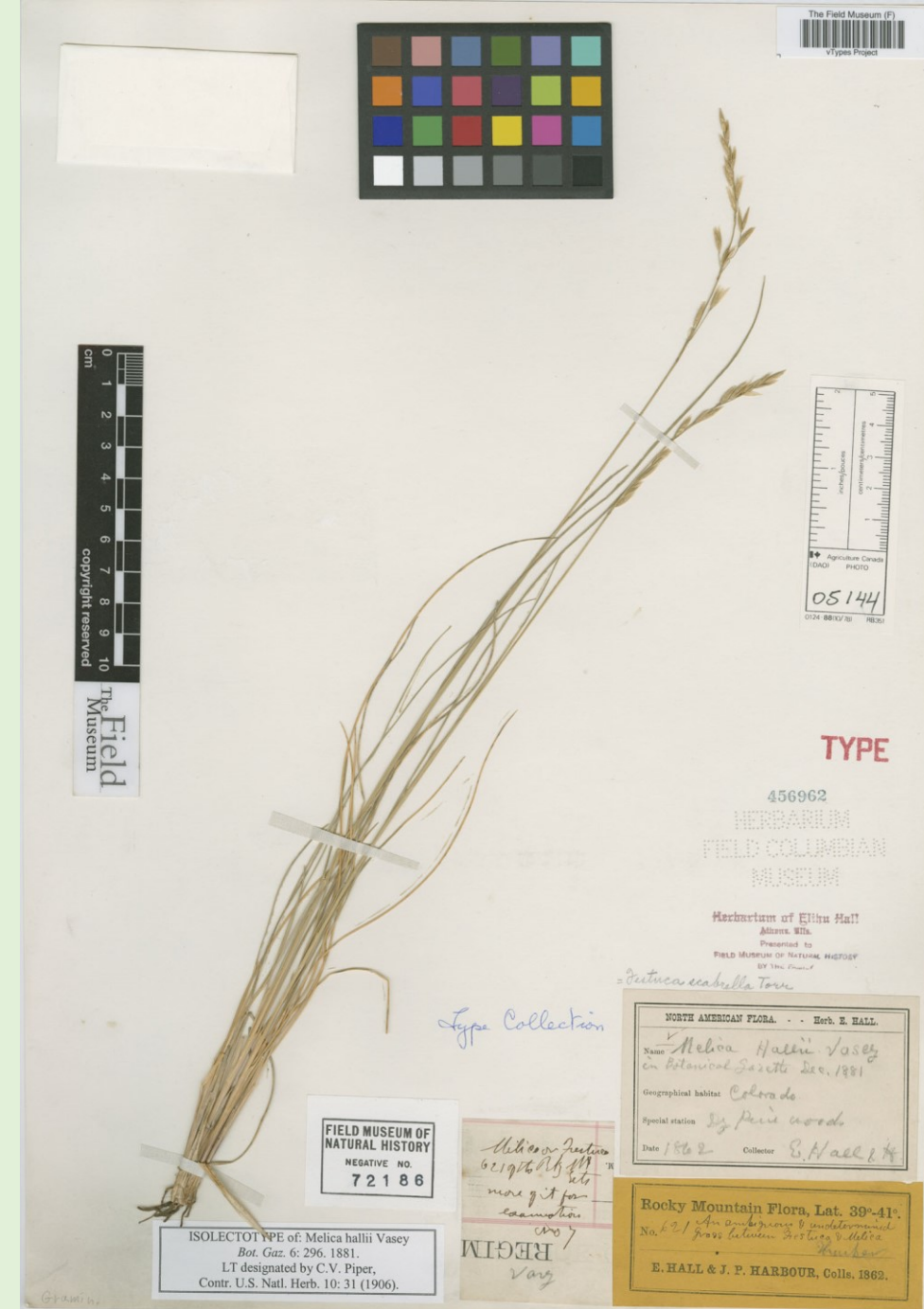
- Parry, Hall, and Harbour assembled an extraordinary collection
 - Largest and most important collections gathered in Colorado between the time of Edwin James and the 20th century
 - Largest yet made in Colorado in a single season
 - Almost 700 numbers
 - As many as ten or more duplicate sets (7,000 specimens!)
 - “Hall & Harbour” Colorado collections of 1862
- Unfortunately ... many collection locations are unknown, or poorly known



Gentianella acuta (Michaux) Hiitonen. Image: COLO via SEINet

Elihu Hall (1822-1882)

- Native of Patrick County, Virginia
- Surveyor, farmer and botanist, in Athens, Illinois
- First collections in 1862
 - Collected until death in 1882
- Species from over 20 plant genera have been named after him
- *Melica hallii* Vasey, = *Festuca hallii* (Vasey) Piper “Plains Rough Fescue”
 - “An ambiguous and undetermined grass between *Festuca* & *Melica*.”
 - No record of a Parry collection of this grass



Voucher Image: F via SEINet

J. P. Harbour

47. HARBOURIA.—Glabrous perennials, with 1 to 3 leaves which are ternately decompose and with narrowly linear or filiform segments, involucre and involucels of few subulate bracts, and long-peduncled umbels (mostly in pairs) of yellow flowers.

First collected by *Hall & Harbour*, to the latter of whom it is dedicated, as the name *Hallia* is preoccupied.

✓ 1. *H. trachypleura*. A foot or more high: leaf-segments mucronulate: umbels (mostly 2 long-peduncled ones) 15 to 25-rayed; rays an inch long; pedicels 2 to 3 lines long: fruit 2 lines long. (Fig. 146.)—*Thaspium trachypleurum* Gray, Proc. Acad. Philad. 1863, 63. *Cicuta* (?) *trachypleura* Watson, Bibl. Index. Polypet. 417.

In the foot-hills of the mountains of Central Colorado (*Hall & Harbour* 215, *Parry* 159, etc., etc.) to New Mexico (*Fendler* 277). Fl. May to July.

- Seems to have collected only in 1862 with E. Hall and C. C. Parry.
 - Otherwise obscure, possibly a cousin of Elihu Hall
- Genus *Harbouria* proposed by Coulter & Rose (1888)
 - Example: collected by Alice Eastwood, 1891, at Seven Lakes, Teller County, about 4 miles south of Pike's Peak, now: Mason Reservoir, and McReynolds Reservoir
- Also, *Penstemon harbouri* A. Gray



Voucher image: COLO via SEINet

1867 – First code for botanical nomenclature adopted.

- Alphonse Pyramus de Candolle (1868). *Laws of Botanical Nomenclature* adopted by the International Botanical Congress held at Paris in August 1867; together with an Historical Introduction and Commentary by Alphonse de Candolle, Translated from the French. translated by Hugh Algernon Weddell. London: L. Reeve and Co.
- Nicolson, D.H. (1991). "A History of Botanical Nomenclature". *Annals of the Missouri Botanical Garden*. 78 (1): 33–56

Year of adoption	Informal name
1867	<i>Laws of botanical nomenclature</i>
1905	<i>Vienna Rules</i> (2nd ed., 1912)
1935	<i>Cambridge Rules</i>
1952	<i>Stockholm Code</i>
1969	<i>Seattle Code</i>
1975	<i>Leningrad Code</i>
1981	<i>Sydney Code</i>
1987	<i>Berlin Code</i>
1993	<i>Tokyo Code</i>
1999	<i>St Louis Code, The Black Code</i>
2005	<i>Vienna Code</i>
2011	<i>Melbourne Code</i>
2017	<i>Shenzhen Code</i> (current, blue cover)

Dr. Charles Parry and Dr. Edward Palmer

- *Frasera albomarginata* S. Watson was first collected by Dr. Edward Palmer in 1870, at Mokaac Pass, south of St. George, Utah
- Collections sent to Charles Parry at Department of Agriculture
 - “I do not find much of interest in Palmer’s last set, the Alpine plants are very meagre.”
- Parry dismissed from US Department of Agriculture in 1871 – failure to do anything but maintain the herbarium
 - Dismissal vigorously protested by Gray, Torrey, Brewer, and Eaton.
 - Replaced by George Vasey who lacked the experience to identify and distribute Palmer’s collections
 - Sereno Watson (GH) describes *Frasera albomarginata* S. Watson in “United States Geological Exploration of the Fortieth Parallel. Botany.” Washington, DC [Sep-Dec 1871]
- Parry collected with Palmer in Utah (1874, 1875) and Mexico (1878)
- 1891 -- Parry’s personal herbarium of 18,000 specimens, donated to Ada Hayden Herbarium (ISC) of Iowa State University
 - While ISC is online via the Consortium of Northern Great Plains Herbaria, it just does not look like any of his collections are available online.



Voucher Image: NY via SEINet

Carl Purpus, Colorado in 1892-1893

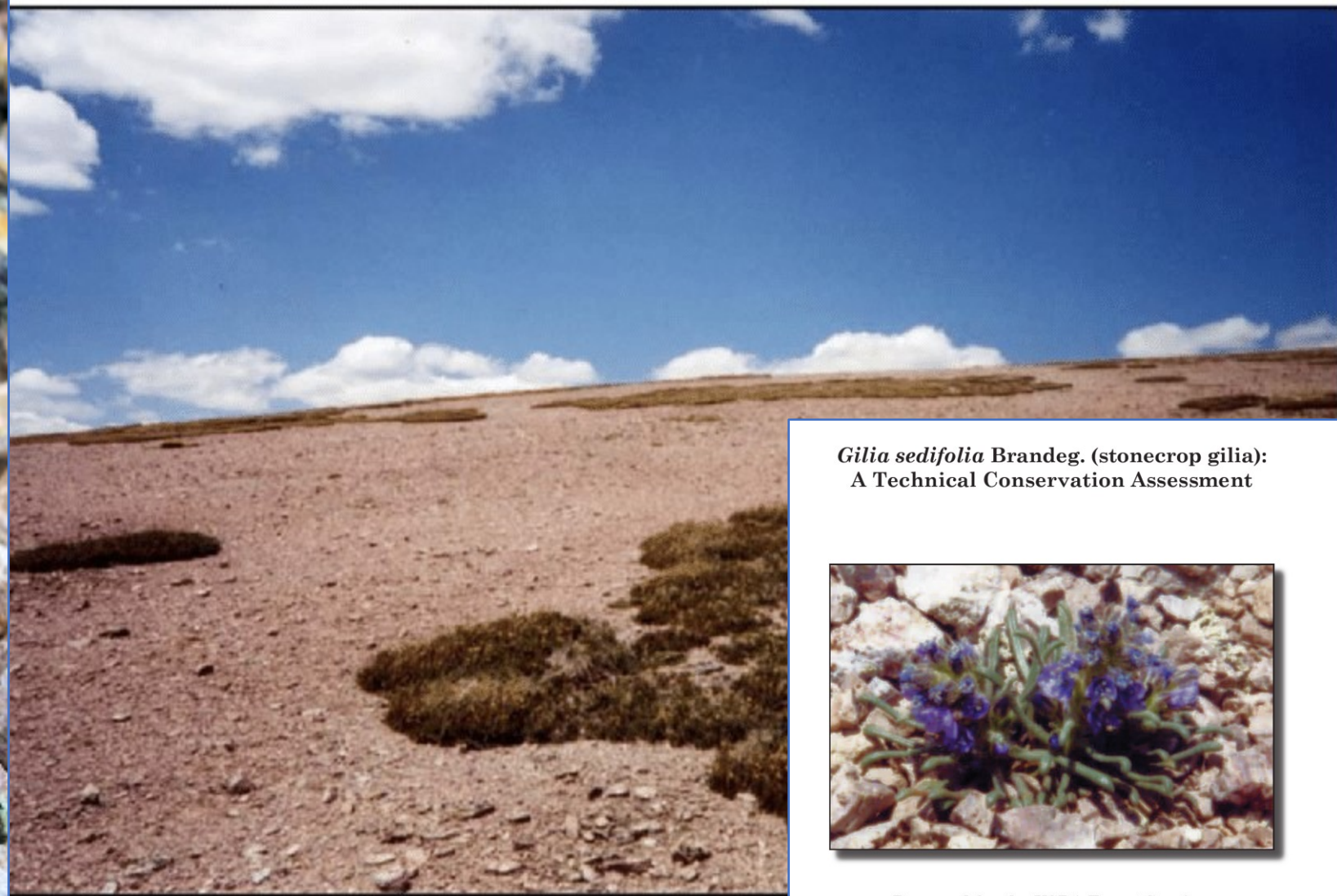
- From Bavaria, son of a forester.
- April-August 1892, Cedaredge along Surface Creek to Grand Mesa.
 - Labels with Germanic habitat description, elevation, collector and date.
- August-September, 1893, the San Juan Mountains of southwestern Colorado (Rose's Cabin).
 - *Gilia sedifolia* T. S. Brandege, Bot. Gaz. 27: 451. 1899. Uncompahgre Range, Colorado. #697 Jul, 1893. (Holotype: UC.)
- 1894-1897: California, Nevada, and a little bit of Utah.
- 1897-1925: Mexico
- Source: Carl Albert Purpus, Plant Collector in Western North America (<http://ucjeps.berkeley.edu/Purpus/index.html>)



Gilia sedifolia, n. sp.— Glandular-pubescent except the lower leaves: stem simple, thick and fleshy from a stout biennial root: leaves crowded near the base, fleshy, linear-spatulate, obtuse, sessile, entire, 1^{cm} long, the upper ones becoming smaller and bract-like: peduncles 12^{mm} long or less, rarely two-flowered, solitary from the axils of the lower leaves or crowded in those of the bracts from the middle of the stem upwards: calyx 4^{mm} long, its triangular-acuminate lobes equaling the violet corolla: tube of the corolla as long as its ovate not spreading lobes: stamens inserted in the sinuses, shorter than the corolla lobes: style 3^{mm} long: capsule as long as the calyx, about fifteen-seeded: seeds not developing spiracles when wetted, decidedly wing-margined.

Uncompahgre range, Colorado, at 12,000 ft. altitude, Dr. C. A. Purpus, no. 697.

An abundance of old leaves persists about the base of the stem, giving it the appearance of a perennial, although it can only be a biennial. Flowers are borne sparingly in the axils of the lower leaves, but are crowded throughout the upper half, completely hiding the small bracts. The thick fleshy leaves recall those of some sedums.



Photographs: U. S. Forest Service

- Known from only 2 locations, one which has not been seen since 1892.
- “critically imperiled,” rarity G1/S1.

***Gilia sedifolia* Brandeg. (stonecrop gilia):
A Technical Conservation Assessment**



Prepared for the USDA Forest Service,
Rocky Mountain Region,
Species Conservation Project

August 9, 2004

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Greene (1895) put *graveolens* into *Chrysothamnus*.

- *Chrysothamnus graveolens* (Nutt.) Greene. Erythea 3: 108. 1895
- In 1895, Greene expressed some doubt that the Sect. *nauseosi* belonged in *Chrysothamnus*.
- Eastern establishment botanists, such as Asa Gray, tended to be more herbarium-bound (“closet-botany”).
- Western botanists (Edward Greene, Aven Nelson, and Marcus E. Jones) tended to be more field-oriented. and therefore more familiar with the plants when they were fresh.
- Greene used plant odor, such as terpenes derived from plant chemistry, as a distinguishing character, perhaps because he had smelled a field rabbitbrush.
- OTOH, Gray never used odor as a character, perhaps because because most of the specimens he worked with were dry and the odoriferous compounds had evaporated.

The terpenes are one line of evidence that our rabbitbrush should be moved out of *Chrysothamnus* ...
... but into what?

“I have long thought that the establishment of the genus *Chrysothamnus* as one of Nuttall's happiest propositions ... and Gray, ... in the face of Nuttall's greatly superior knowledge of botany in general, and of these plants in particular, to dispose all the *Chrysothamni* under the Old-World herbaceous genus *Linosyris*. This course, entered upon in much ignorance as to the real characteristics both of the foreign *Linosyris*, and of to him almost equally foreign shrubs of western plains and mountains, he held to for more than thirty years.”

Britton & Brown 1898 placed *nauseosa* into *Chrysothamnus*.

- *Chrysothamnus nauseosus* (Pallas ex Pursh) Britt. in Britton & Brown , Illustrated Flora 3:326



Nathaniel Lord Britton, New York Botanic Garden



Addison Brown, Wikipedia, Harvard University Archives

- Britton & Brown's (1898) first edition of *An Illustrated Flora of the Northern United States, Canada, and the British Possessions* incorrectly equated *Chrysocoma nauseosa* Pursh and *C. graveolens* Nuttall. This was corrected in their second edition (1913).



Piper, 1906, made *graveolens* a variety of *nauseosus*.

- *Chrysothamnus nauseosus* var. *graveolens* (Nutt.) Piper. Contr. U. S. Nat. Herb., vol 11, p. 559, 1906

Charles Vancouver Piper believed he needed to classify the flora and fauna of the PNW so other scientists could better understand the uniqueness of area. He published *Flora of the Palouse Region* (1901), *Flora of the State of Washington* (1906), *Insect Pests of the Garden, Farm, and Orchard* (1895), and many other books, including works on hay, soybeans, and other crops.

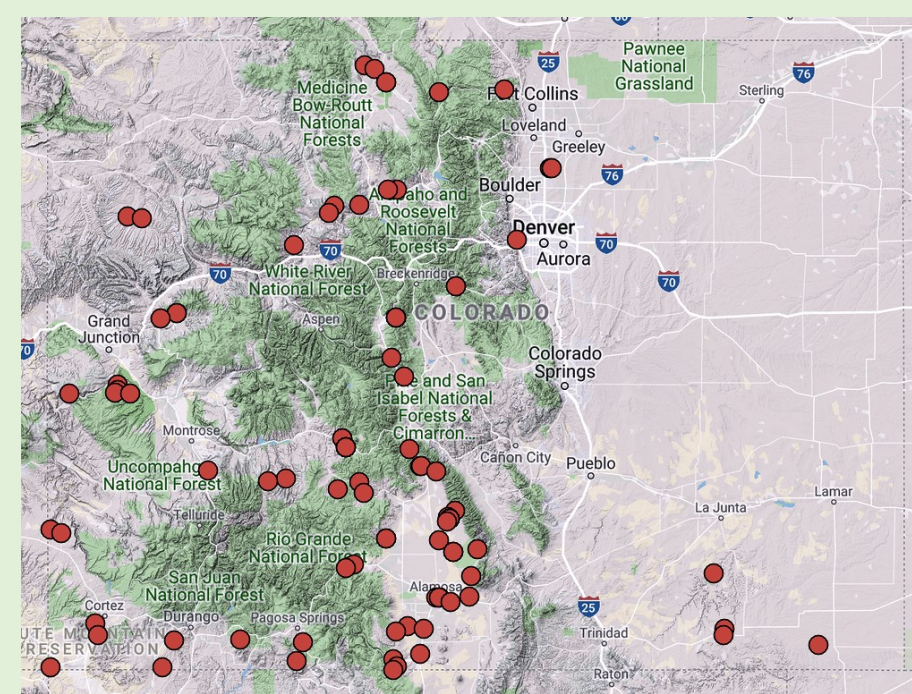
-- Washington State University, Timeline



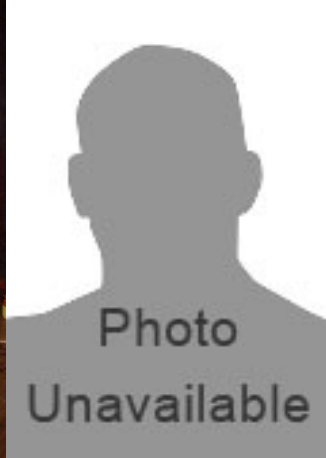
Hall and Goodspeed, 1916

- World War I
- A Rubber Plant Survey of Western North America
 - *Chrysothamnus nauseosus* and its varieties
 - Divides *C. nauseosus* into gray forms and green forms.
 - *C. nauseosus* var. *graveolens* is a green form, but Nesom & Baird (1993) list it as a gray form.
 - Chrysil, a New Rubber from *Chrysothamnus nauseosus*
 - Rubber was found in all varieties.
 - Individual plants may be devoid of rubber.
 - The best varieties were those which inhabit alkaline soils.
 - The Occurrence of Rubber in Certain West American Shrubs
 - *Haplopappus ericoides* and *H. nanus*.

Harvey Munroe Hall, Wikipedia



Variety	Average Rubber Content	Comments
<i>hololeucus</i>	2.83%	
<i>pinifolius</i>	2.69%	now = <i>E. nauseosa</i> var. <i>oreophila</i>
<i>viridulus</i>	2.52%	now = <i>E. nauseosa</i> var. unnamed.
<i>consimilis</i>	1.97%	now = <i>E. nauseosa</i> var. <i>oreophila</i>



Nesom & Baird 1993 moved our *Chrysothamnus* to *Ericameria*

Guy L. Nesom, UT Austin

Gary Baird, BYU

- Evidence from DNA, latex, phenolics, and other compounds
- *Ericameria* in two subspecies, i.e., the gray and green forms

6. *Ericameria nauseosa* (Pallas ex Pursh) Nesom & Baird var. *glabrata* (A. Gray) Nesom & Baird, *comb. nov.* BASIONYM: *Bigelovia graveolens* Nutt. var. *glabrata* A. Gray, Proc. Amer. Acad. Arts 8:645. 1873.

Chrysothamnus nauseosus (Pallas ex Pursh) Britt. subsp. *graveolens* (Nutt.) Hall & Clements, Carnegie Inst. Washington Publ. 326:214. 1923.

COMPLETION OF *ERICAMERIA* (ASTERACEAE: ASTEREAEE), DIMINUTION OF *CHRYSOTHAMNUS*

Guy L. Nesom

and

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ABSTRACT

Two pairs of species previously treated as *Chrysothamnus* are transferred to *Ericameria*: *C. paniculatus* and *C. teretifolius* to sect. *Ericameria*, and *C. nauseosus* and *C. parryi* to sect. *Macronema*. New combinations are provided for *C. nauseosus* and *C. parryi* as well as numerous infraspecific taxa associated with each of them. Removal of these four species leaves *Chrysothamnus* a monophyletic group (but not holophyletic) inextricably related to the species centered around *Petradoria*.

KEY WORDS: *Ericameria*, *Chrysothamnus*, Astereae, Asteraceae

In the recent consolidation and overview of *Ericameria* Nutt., Nesom (1990) accepted the addition of sect. *Stenotopsis* (Urbatsch & Wussow 1979) to *Ericameria* and formally added two species groups previously treated by most previous taxonomists within *Haplopappus* DC.: sect. *Asiris* and sect. *Macronema* (see Table 1). *Ericameria*, when treated as a separate genus, has most commonly included only the species of sect. *Ericameria*, but Nesom (1990) presented a rationale for circumscribing the genus in an expanded sense. Brown & Keil (1993) have also taken the latter view for the California species.

Chrysothamnus Nutt. has often been noted as closely related to *Ericameria* (or to portions of it, see below). In attempts to clarify the definitions of these and peripheral genera, we have become convinced that *Chrysothamnus* as currently construed (Table 1; e.g., Anderson 1986a, 1993; Welsh 1987) includes four species that should be placed in *Ericameria*. There are three species

There is a certain logic to using forms of “glabrous” to describe our Goldy-locks.

- *Glabrata* and *glabratus* make some sense given the glabrate nature of the inflorescence.
 - Glabrate = Becoming smooth (as if with age)
- But who first used a form of “glabrous” to name our Goldy-locks?
 - *Chrysothamnus nauseosus* var. *glabratus* (A.Gray) Cronquist. Vasc. Pl. Pacific NorthW. 5
 - *Bigelowia graveolens* var. *glabrata* A.Gray
 - *Linosyris graveolens* var. *glabrata* Engelm.
- Regardless, while it may be a little more descriptive of our plant, it violates the code (ICBN)



The Lewis and Clark collections of vascular plants: Names, types, and comments

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Dedicated to the memory of Thomas Meehan (1826-1901) whose work on the Lewis and Clark Herbarium has lasted a century

ABSTRACT — In his 1813 book *Flora Americae Septentrionalis*, Frederick Pursh accounted for 132 vascular plant taxa found by Meriwether Lewis and William Clark on their 1803-1806 trans-continental expedition to the Pacific Ocean. He proposed 94 new names based, at least in part, upon their specimens or what has been assumed to be their specimens. He also mentioned Lewis and Clark specimens under 40 already published names. Considering what is mentioned by Pursh in 1813 and what is known from herbaria, we can account for 202 different kinds of plants collected by Lewis and Clark—199 vascular and three non-vascular. The non-vascular plants are not treated here; none is the basis of a new scientific name. Some 238 herbarium sheets harbor actual or purported Lewis and Clark specimens. Our research suggests that four of these sheets represent material gathered by Thomas Nuttall in 1811, one sheet is garden material grown from seeds obtained by Nuttall, and a sixth is a cultivated specimen grown from seeds collected by the explorers. All of the extant specimens are identified and assigned modern names. NEOTYPES are designated for various Pursh and Nuttall names: *Astragalus tenellus*, *Krascheninnikovia lanata* (based on *Diotis lanata*), *Lathyrus decaphyllus*, *Lilium andinum*, *Lilium umbellatum*, *Potentilla pennsylvanica* var. *strigosa*, and *Xylosteum ciliatum* var. *album*. Numerous LECTOTYPES are selected to augment those established by others, most notably Paul Cutright (1969) and Joseph Ewan (1979): *Acer circinatum*, *Acer macrophyllum*, *Actinella lanata*, *Amorpha nana*, *Artemisia lewisii*, *Bartonia decapetala*, *Berberis aquifolium*, *Caprifolium ciliosum*, *Cerastium elongatum*, *Cleome serrulata*, *Dentaria tenella*, *Donia squarrosa*, *Erythronium grandiflorum*, *Gaultheria shallon*, *Geum ciliatum*, *Geum triflorum*, *Hippophae argentea*, *Juniperus communis* var. *depressa*, *Juniperus sabina* var. *procumbens*, *Lilium pudicum*, *Lupinaster macrocephalus*, *Mimulus lewisii*, *Phacelia heterophylla*, *Philadelphus lewisii*, *Rhamnus alnifolius*, *Ribes aureum*, *Ribes aureum* var. *villosum*, *Rubus spectabilis*, *Salvia trichostemmoides*, *Santolina suaveolens*, *Spiraea capitata*, *Spiraea discolor*, *Symphoricarpos albus* var. *laevigatus*, *Trifolium microcephalum*, and *Vaccinium ovatum*. In all instances we have maintained the current nomenclature and traditional circumscription of each name.

COMBINATIONES NOVAE: *Amsinckia menziesii* var. *retrorsa* (Suksd.) Reveal & Schuyler, *Ericameria nauseosa* var. *graveolens* (Nutt.) Reveal & Schuyler.

Introduction

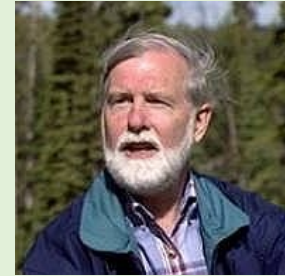
As the herbarium volume of *The Journals of the Lewis & Clark Expedition* (Moulton, in press) was nearing completion, we were stimulated to review the identity of the botanical specimens made by Meriwether Lewis and William Clark during their 1803-1806 expedition across the North American continent (Ambrose, 1996, 1998; Duncan & Burns, 1997). We do not review the events surrounding the collection,

An index to genus and species names appears on pp. 61-64.

identification or naming of the specimens, list all of the details as to where each was gathered, the information on each sheet, or the observations made by Lewis and Clark upon the plants they saw. The full story of the botany of the expedition appears in Moulton's upcoming volume and updates significantly that given by McKelvey (1955). Readers should use this paper in concert with Moulton's book. To aid readers in reconciling our numbering system with the illustrations of the specimens in his volume, we provide cross-references to his numbers.

Reveal and Schuyler examined each specimen taking

Reveal, Moulton, and Schuyler, 1999



Ericameria nauseosa (Pall. ex Pursh) G.L.Nesom & G.I.Baird var. *graveolens* (Nutt.) Reveal & Schuyler.

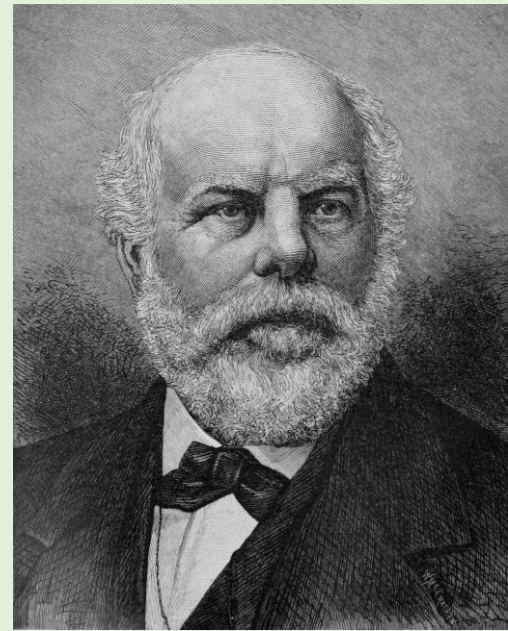
Bald Goldy-locks



“Nesom & Baird incorrected (*sic*) proposed *E. nauseosa* var. *glabrata* (A. Gray) G. L. Nesom & Baird (in *Phytologia* 75: 86. 1993) for the above taxon. They corrected one of their nomenclatural errors subsequently (in *Phytologia* 78: 61-65. 1995), but they failed to correct the above name as now required by the International Code of Botanical Nomenclature (Greuter et al., 1994).”

Who have we overlooked ...

- George Engelmann, St. Louis
 - Correspondent with Asa Gray and others.
 - Encouraging to Fendler
 - Helpful to Charles Parry, saw Parry's field notes from 1862
 - Instrumental in founding the Missouri Botanical Garden



- Alice Eastwood, Denver and San Francisco
 - Collection dates suggest at least five visits to Pike's Peak: 1885, 1887, 1892, 1893, and 1897

... and, of course, the guys from Wyoming.

Questions?



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Removed Slides

Thomas Nuttall (1786 – 1859)

- 1819 perilous try for the Rockies
 - As far west as central Oklahoma on the Cimarron River
 - Torrey would refrain from describing some of Edwin James' 1820 collections in favor of those made by Nuttall

Source: Graustein, Jeannette E. 1967. Thomas Nuttall, Naturalist: Explorations in America. Cambridge, MA: Harvard University Press, 1967.



Eriogonum umbellatum Torr "Flower"

- Holotype at NY
 - Image available through SEINet



Coll. No. 1445.2, 22 Jun 2016
©2016 Tom Schweich



HOLOTYPE OF:
ERIOGONUM UMBELLATUM Torr., non Benth.
Ann. Lyc. 2: 241, 1828
detr. James L. Reveal 1965

NEW YORK
BOTANICAL
GARDEN

IMAGEN

NEW YORK BOTANICAL GARDEN
00323618

colo

Eriogonum umbellatum Torr. n. sp.
E. aculeis foliis ovatis spatulatis, subtus
(scapulis pedunculatis) albo tomentosis, supra glabris
nervulis, florum fasciculis terminalibus, umbellatis,
longe pedunculatis; umbella involucrata, calycis
lobis ovatis, basi angustatis, glaberrimis.

E. umbellatum Benth. in Linn. Trans.
17, p. 6, 18, f. 2, scam. Bot. very diff.
from this plant. Torr.

TORREY
HERBARIUM.

Physocarpus monogynus (Torrey) Coulter "Mountain Ninebark"

- Holotype from Torrey Herbarium at New York Botanic Garden
 - Image available through SEINet



easterncoloradowildflowers.org

