

# The Corps of Botanical Discovery

A DIVERSE MIX OF MONTANA PLANTS BY TIM CADY

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American Philosophical Society



## Lewis and Clark's search for new plants of the West



BY KATHY LLOYD AND DRAKE BARTON

The Lewis and Clark Expedition might be the most famous adventure story in American history. But perhaps because the explorers didn't battle ferocious twin-berry honeysuckle or carve their initials into blanket flowers, their scientific exploits—especially in botany—are less well known than their adventures with wild animals and journeys into unmapped territory. Yet the Corps of Discovery's botanical discoveries are no less important than their escape from grizzly bears and their journey down the Yellowstone River past Pompeys Pillar. Under instructions from President Thomas Jefferson, Captain Meriwether Lewis and other members of the expedition kept a sharp lookout for new plants and discovered at least 85 species never before reported in the United States. The many wondrous plants they found and recorded on the journey not only advanced the scientific study of botany, but also served as food, medicine, and even transportation that ensured the expedition's ultimate success.

### Mission impossible?

President Jefferson had many objectives when he dispatched the Lewis and Clark Expedition westward from the United States to explore the newly acquired Louisiana Purchase. In addition to the obvious commercial and expansionist goals, Jefferson's daunting to-do list included exploring and mapping the Missouri River, finding a water route to the Pacific Ocean, studying the native Indians and their customs, and observing wildlife. The president also instructed the explorers to record the minerals (especially metals) they found, keep climate and weather tables, and maintain journals. What's more, he asked Lewis to note "the soil & face of the country, its growth & vegetable productions, especially those not of the U.S." and to study the phenology of plants—that is, the dates they bloom, put out leaves, or set

seed. And one last thing: Get back safely.

Horticulture and plant study were among the president's personal pleasures. "Botany I rank with the most valuable sciences," Jefferson wrote. Lewis, Jefferson's choice to lead the expedition, possessed an interest in plants and a working knowledge of the eastern United States' flora. In the spring of 1803, Jefferson asked Dr. Benjamin Barton, the leading American botanist of the day, to instruct the captain in botany and the language of technical description. Lewis was a ready pupil and packed several botany books as he embarked on his momentous journey.

### One busy day

North and east of present-day Lincoln, Alice Creek flows below Lewis and Clark Pass through wet meadows of blue camas, elephanthead pedicularis, and willows. A short hike up the trail follows the route taken by Lewis, nine men, and their horses as they ascended the pass over the Continental Divide. This was a route recommended to them by various Native Americans, who called it, as Lewis wrote, the "road to buffalo." The views and flora today are relatively unchanged from 200 years ago, when on July 7, 1806, Lewis described his trip up Alice Creek "through a handsome narrow plain" and crossing the pass as a "low and an easy ascent."

It was a busy 31-mile day for the explorers and, botanically, one of their most productive in Montana. Though undoubtedly consumed with the daily tasks of managing the expedition, Lewis still took time that day to study, collect, and preserve at least seven plants: arrow-leaf balsamroot, blanket flower, common juniper, twin-berry honeysuckle, silvery lupine, silky lupine, and mountain death camas.

Not only did Lewis locate new plants and then learn their characteristics and differences from known species, he also

FROM THE LEWIS AND CLARK EXPEDITION'S COMMON JUNIPER SPECIMEN, LEWIS & CLARK HERBARIUM, ACADEMY OF NATURAL SCIENCES

AMERICAN PHILOSOPHICAL SOCIETY

Moulton 83a  
**LEWIS AND CLARK HERBARIUM**  
 PH-LC 111: *Juniperus communis* L. var. *depressa* Pursh, Fl.  
 Amer. Sept.: 646, Dec (sero) 1813.  
 JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PH) Jun 1998  
 Academy of Natural Sciences  
*Juniperus communis* L.  
 Det: Erica Armstrong Date: 23 May 1994



AMERICAN PHILOSOPHICAL SOCIETY.  
 LEWIS & CLARK, HERBARIUM.  
 FROM THE ATLANTIC TO THE PACIFIC.  
*Juniperus communis* L.  
 Locality: \_\_\_\_\_  
 No. \_\_\_\_\_ Date \_\_\_\_\_

THE LEWIS AND CLARK EXPEDITION'S GREASEWOOD SPECIMEN, LEWIS & CLARK HERBARIUM, ACADEMY OF NATURAL SCIENCES

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conserved the specimens for transport back to his curious president. Lewis doesn't mention how he pressed his plant specimens, but Dr. Barton likely instructed him in the methods common for the day. Back then, collected plant specimens had to be cared for regularly. Blotting papers were constantly changed to dry the specimens and prevent mold. The Corps of Discovery and its gear often got wet in rivers, creeks, rain, snow, fog, and high humidity. Keeping the baggage dry was an ongoing chore. Lewis probably spent his evening hours—along with his many other scientific duties—studying plants collected during the day, putting them between blotting papers, affixing labels, pressing them between book covers, and recording thoughts and observations in his journal. It took substantial time to collect plants, and keeping the delicate specimens intact over hundreds of miles was an almost impossible task. But Lewis and Clark succeeded. Roughly 230 plant specimens from their expedition still exist.

**Essential plants**

The expedition encountered many plants on the trip to the Pacific and back that were essential to its survival. One of the most valuable plants was not used for food or medicine but rather to actually transport expedition members.

When the Corps of Discovery left St. Louis, it was equipped with a large, modern keelboat, two roughly 40-foot-long craft called pirogues, and a portable iron boat Lewis planned to assemble later. At Fort Mandan, Lewis sent the keelboat back to St. Louis, loaded in part with plant specimens, and constructed six smaller dugout canoes of cottonwood. The canoes and pirogues carried the crew members and their baggage up the Missouri River to the Great Falls, where a lengthy portage was required. The men fashioned wheels from sliced cottonwood trunks to pull their six canoes and baggage around the falls, leaving the heavier pirogues behind. Once past the falls, find-

ing that Lewis's iron boat "would not answer" (it quickly sank due to a lack of evergreen pitch to seal the skins covering the frame), the men constructed two more cottonwood dugouts. The entire flotilla now consisted of eight craft made of native cottonwood trees.

**"Scarcely able to breath"**

Crossing the Bitterroot Mountains and Lolo Pass in September 1805 almost finished the expedition. Clark recounted the hardships and continued to write even though "I have been wet and as cold in every part as I ever was in my life, indeed I was at one time fearfull my feet would freeze in the thin mockersons which I wore." Numb and nearly starving, having already eaten their extra horses, the party staggered from the mountains onto the plains of Weippe Prairie in Idaho.

The Nez Perce Indians treated the bedraggled company with kindness and fed them "a small piece of Buffalow meat, Some dried salmon berries & roots in different States...which they call quamash." Clark, although grateful for the food, cautioned Lewis "of the Consequences of eateing too much &c." Quamash is blue camas, a member of the lily family with an edible bulb. Its gastro-nomic effects were discreetly described by Clark: "Capt Lewis & myself eate a Supper of roots boiled, which Swelled us in Such a manner that we were Scercely able to breath for Several hours."

Lewis and Clark both made extensive journal entries about camas, and Lewis also wrote a lengthy description, including cooking methods. Although camas did not rank as one of the expedition's favorite foods, Lewis was not immune to the beauty of its flower. Describing a field of camas, he wrote, "the quawmash is now in blume and from the colour of its bloom at a short distance it resembles lakes of fine clear water, so complete is this deseption that on first sight I could have sworn it was water."

Native people generously introduced Lewis and Clark to other edible plants. The roots of cous bisquit-root, for example, were pounded and formed into cakes, called chapellet or shapelle, which were dried in the sun. Clark commented, "the noise of their women poinding the cows roots remind me of a nail factory." Both camas and cous bisquit-root were major trade items for tribes in the Columbia River drainage.



*Sarcobatus  
Vermiculatus Torr*

*A small branchy shrub  
from the plains of  
Missouri  
July 20th 1806*

AMERICAN PHILOSOPHICAL SOCIETY.  
LEWIS & CLARK, HERBARIUM.  
FROM THE ATLANTIC TO THE PACIFIC.  
*Sarcobatus Vermiculatus Torr*

*Moulton 157*

**LEWIS AND CLARK HERBARIUM**  
PH-LC 200: *Sarcobatus vermiculatus* (Hook.) Torr. in W. H. Emory, Not. Mil. Recon.: 149, 1848.

JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PH) Jun 1998

Conservation work on this sheet done as part of Save America's Treasures grant to the Academy of Natural Sciences  
Catharine Hawks, Conservator 14 Aug 2000

Academy of Natural Sciences  
*Sarcobatus vermiculatus* (Hook.) Torr.  
var. *vermiculatus*  
Det: Erica Armstrong Date: 18 May 1994

*Dalea (Petalostemon) purpurea*  
purple prairie clover



*Fritillaria pudica*  
yellow bell



*Geum triflorum*  
prairie smoke



*Sarcobatus vermiculatus*  
greasewood  
(Lewis's collection is background of page 10)



*Oenothera cespitosa*  
gumbo evening primrose



*Linum lewisii*  
Lewis's blue flax



*Ribes aureum*  
golden currant

**Montana Discoveries**



The Lewis and Clark Expedition discovered at least 85 plants new to science. Of those, 32 vascular specimens and one nonvascular specimen were collected in today's Montana. Listed below are the plants collected in Montana (now housed in the Lewis & Clark Herbarium at the Academy of Natural Sciences), who collected each one, where, and when:

*Atriplex gardneri* (A. nuttallii)  
**Gardner's saltbush**  
Lewis: Below the forks of the Marias River, Toole County, July 20, 1806

*Balsamorhiza sagittata*  
**arrow-leaf balsamroot**  
Lewis: Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

*Dalea (Petalostemon) purpurea*  
**purple prairie clover**  
Lewis: Camp Disappointment, Cut Bank Creek, Glacier County, July 22, 1806

*Dasiphora (Potentilla) fruticosa*  
**shrubby cinquefoil**  
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 6, 1806

*Elaeagnus commutata*  
**American silverberry**  
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 6, 1806

*Euphorbia marginata*  
**snow-on-the-mountain**  
Clark: Along the Yellowstone River, Rosebud County, July 28, 1806

*Gaillardia aristata*  
**blanket flower**  
Lewis: West of Lewis and Clark Pass, Powell-Lewis and Clark counties, July 7, 1806

*Hesperostipa (Stipa) comata*  
**needle-and-thread grass**  
Lewis: Between the Dearborn and Sun Rivers, Lewis and Clark County; or Clark: Beaverhead River, Beaverhead County, July 8, 1806

*Hordeum jubatum*  
**foxtail barley**  
Lewis: On White Bear Island, Missouri River, Cascade County, July 12, 1806

*Iris missouriensis*  
**Rocky Mountain iris**  
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 5 or 6, 1806

*Juniperus communis* var. *depressa*  
**common juniper**  
Lewis: Lewis and Clark Pass, Lewis and Clark County; or Clark: Gibbons Pass area, border of Ravalli-Beaverhead counties, July 7, 1806

*Lewisia rediviva*  
**bitterroot**  
Lewis: Along Lolo Creek near Travelers' Rest, Missoula County, July 1 or 2, 1806

(continued on page 13)

CLOCKWISE FROM TOP LEFT: NEAL & WJ WISHLER; MICHAEL J. WOLF; DEEA VOGEL; DRAKE BARTON; WARD M. THURMAN; JEFF VAN TINE; DRAKE BARTON

Sacagawea introduced the captains to many native food plants such as wild apple and wild licorice root. She also introduced them to yampah, a member of the parsley family that seemed to alleviate the gas caused by blue camas. Lewis wrote, "Sahcargameah geathered a quantity of the roots of a speceis of fenel which we found very agreeable food, the flavor of this root is not unlike annis seed, and they dispel the wind which the roots called Cows and quawmash are apt to create particularly the latter."

Lewis's introduction to bitterroot came in August 1805, when the expedition was camped with the Shoshone Indians near today's Lemhi Pass. Lewis studied the dried roots and asked how they were prepared. "This the Indians with me informed were always boiled for use," he wrote. "I made the expremtent, found that they became perfectly soft by boiling, but had a very bitter taste, which was naucious to my pallate, and I transferred them to the Indians who had eat them heartily." Lewis collected and pressed a specimen of bitterroot on the return journey while the corps was camped at Travelers' Rest, a few miles south of today's Missoula.

Frederick Pursh, a German botanist who reviewed some of Lewis's plant collection, later named bitterroot *Lewisia rediviva* in the captain's honor. The small, attractive plant with rose-colored petals and a "very bitter" root is now Montana's state flower.

Expedition members also ate currants, chokecherries, serviceberries, and gooseberries. During the lean times with the Shoshone, wrote Lewis, "the Chief informed us that they had nothing but berries to eat and gave us some cakes of serviceberries and Choke cherries which had been dried in the sun; of these I made a hearty meal." While in season, these fresh fruits provided vitamin C that may have helped prevent scurvy among expedition members.

Eating wild food was generally beneficial, but it could be dangerous. In addition to the gastronomically disruptive camas, other species were to be avoided. Lewis noted, "there are several speceis of hemlock which are so much like the cows [cous bisquit-root] that it is difficult to discriminate them from the cows and we are afraid that they [the men] might poison themselves."

### Plant pharmacy

Occasionally, expedition members used native plants medicinally, although they usually relied on medicine they brought from the East. Lewis used chokecherry as an effective remedy when he suffered from "disentary." He recounted boiling small twigs to make a strong decoction that he drank in two doses. The captain

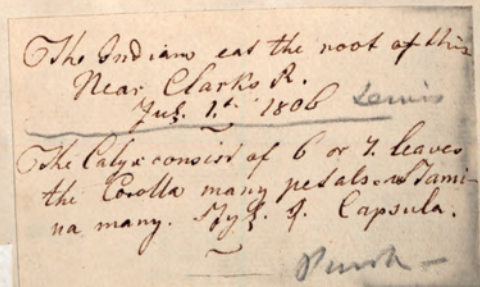
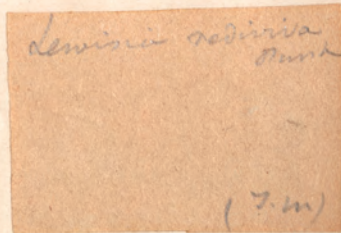
wrote that "by 10 in the evening I was entirely releived from pain and in fact every symptom of the disorder forsook me; my fever abated, a gentle perspiration was produced and I had a comfortable and refreshing nights rest."

Jean Baptiste ("Pompy") Charbonneau, Sacagawea's child, was treated with hot, wild onion poultices for a

swelling on his neck. Private John Potts accidentally cut his own leg with a knife, and the wound grew painful and inflamed. It was treated, Clark wrote, with "a poltice of the root of Cowes," and later Lewis added, "we applied the pounded roots and leaves of the wild ginger & from which he found great relief."

### Botanical discoveries

Lewis and Clark achieved many of the goals on Jefferson's to-do list during their arduous trek from St. Louis to the Pacific Coast and back. Not least were their



LEWIS AND CLARK HERBARIUM  
PH-LC 119: *Lewisia rediviva* Pursh, Fl. Amer. Sept.: 368. Dec (sero) 1813. - Lectotype!

JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PH) Jun 1998

TYPE COLLECTION

Academy of Natural Sciences  
*Lewisia rediviva* Pursh  
Det: Erica Armstrong Date: 17 May 1994

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AMERICAN PHILOSOPHICAL SOCIETY.  
LEWIS & CLARK, HERBARIUM.  
FROM THE ATLANTIC TO THE PACIFIC.

*Lewisia rediviva* Pursh

Locality, \_\_\_\_\_  
No. \_\_\_\_\_ Date \_\_\_\_\_



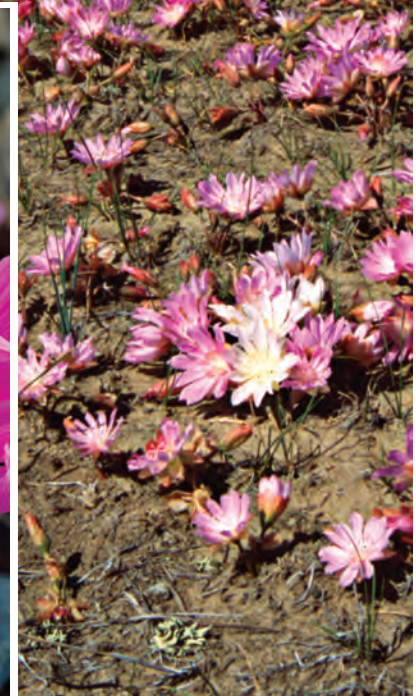
*Lewisia rediviva*  
bitterroot  
(Lewis's collection is background of page 12)



*Cornus canadensis*  
bunchberry



*Juniperus communis* var. *depressa*  
common juniper



*Rubus parviflorus*  
thimbleberry

*Linum lewisii*  
**Lewis's blue flax**  
Lewis: Vicinity of the Sun River, Lewis and Clark-Cascade counties; or Clark: Camp Fortunate, Beaverhead County, July 9, 1806

*Lonicera involucrata*  
**twin-berry honeysuckle**  
Lewis: Along the Blackfoot River, Lewis and Clark County, or Clark: Big Hole Valley, Beaverhead County, July 7, 1806

*Lupinus argenteus*  
**silvery lupine**  
Lewis: Along the Blackfoot River to Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

*Lupinus sericeus*  
**silky lupine**  
Lewis: Possibly along the Blackfoot River west of Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

*Mimulus guttatus*  
**common monkeyflower**  
Lewis: Blackfoot River, Missoula County, July 4, 1806

*Oenothera cespitosa*  
**gumbo evening primrose**  
Lewis: Great Falls area, Cascade County, July 17, 1806

*Orthocarpus tenuifolius*  
**thin-leaved owl clover**  
Lewis: Bitterroot Valley near Travelers' Rest, Missoula County, July 1 or 2, 1806

*Oxytropis besseyi*  
**Bessey's locoweed**  
Lewis: Along the Blackfoot River, Powell County, July 6, 1806

*Pedicularis cystopteridifolia*  
**fern-leaf lousewort**  
Lewis: Along the Blackfoot River, Powell County, July 6, 1806

*Pedicularis groenlandica*  
**elephanthead pedicularis**  
Lewis: Along the Blackfoot River, Powell County, July 6, 1806

*Philadelphus lewisii*  
**Lewis's mockorange (syringa)**  
Lewis: Along the Clark Fork River, Missoula County, July 4, 1806

*Poa secunda* (housed in Kew, England)  
**Sandberg's bluegrass**  
Lewis: Possibly near the mouth of Crow Coulee, Chouteau County, July 28, 1806

*Populus balsamifera* ssp. *trichocarpa*  
**black cottonwood**  
Lewis: Bitterroot River near Travelers' Rest, Missoula County, July 1 or 2, 1806

*Purshia tridentata*  
**bitterbrush**  
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 6, 1806

*Ribes aureum*  
**golden currant**  
Lewis: Vicinity of Three Forks, Gallatin County, July 29, 1805

*Sarcobatus vermiculatus*  
**greasewood**  
Lewis: Probably along the Marias River, Toole County, July 20, 1806

(continued on page 15)

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botanical discoveries. Pursh, the German botanist, was the first to publish botanical information about the new plants collected by Lewis and Clark. He mentioned 132 plant specimens from Lewis's collection in his 1813 volume *Flora Americae Septentrionalis*. Today, the vast majority of the specimens collected by the explorers are housed in the Lewis & Clark Herbarium at the Academy of Natural Sciences in Philadelphia. These specimens provide a look at the flora of North America as it was 200 years ago, before exotic plants invaded the West and native plant communities were vastly changed by human activities. The specimens also are being used to compare the greenhouse gas carbon dioxide in modern plants with that in plants from two centuries ago.

It's remarkable, considering the hardships Lewis faced, that any plant specimens survived at all. But it is certain that many more plants were collected than are accounted for today. When the captain reached the Great Falls cache in July 1806, for example, he noted in his journal that every single specimen collected between Fort Mandan and the Great Falls had been destroyed. In typical understatement of what was no doubt a severe disappointment, he wrote, "had the cash [cache] opened...the river having risen so high that the water had penetrated. all my specimens of plants also lost."

When Clark uncovered the cache at Camp Fortunate in July 1806, near today's Dillon, he reported, "I found every article Safe, except a little damp." It is not clear if the specimens from that cache molded and were thrown out, or if they were later lost, but only one plant specimen collected between Great Falls and Camp Fortunate survived: golden currant. In fact, as far as we know, golden currant is the only specimen taken in Montana in 1805 that still exists; all other specimens were collected in 1806. Numerous other plant species were described or mentioned in the journals, and many specimens were likely collected but have since been lost. Nevertheless, what was saved and carried back to the United States resulted in the first major scientific accounting of western plant species. The delicate specimens that remain are testament to the thorough scientific investigation conducted by the expedition's undaunted naturalist, Captain Meriwether Lewis. 🐼

Botanists and scholars have known that specimens of 31 vascular plants from Montana existed. But another plant specimen collected here, Sandberg's bluegrass, was recently discovered in storage at the herbarium of the Royal Botanic Gardens in Kew, England. According to the specimen's label, it was collected by Lewis on July 28, 1806. For a detailed look at all the vascular plant specimens from Montana (except Sandberg's bluegrass), visit the FWP website, [fwp.mt.gov/parks/lewisclark/plants](http://fwp.mt.gov/parks/lewisclark/plants), or the Montana Native Plant Society, [umt.edu/mnps](http://umt.edu/mnps).

Moulton 138

LEWIS AND CLARK HERBARIUM  
PH-LC 175: *Populus balsamifera* L. subsp. *trichocarpa* (Torr. & A. Gray ex Hook.) Brayshaw in Canad. Field-Naturalist 79: 95, 1965.  
JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PH) Jun 1998

Academy of Natural Sciences  
*Populus balsamifera* L. ssp. *trichocarpa* (Torr. & Gray) Brayshaw  
Det: Erica Armstrong Date: 17 May 1994

AMERICAN PHILOSOPHICAL SOCIETY,  
LEWIS & CLARK, HERBARIUM.  
FROM THE ATLANTIC TO THE PACIFIC.

*Populus trichocarpa* Torr. & Gray

Locality, \_\_\_\_\_  
No. \_\_\_\_\_ Date \_\_\_\_\_



*Populus trichocarpa*, Torr. & Gray  
(Greenman)

Cotton tree of the Columbia River.  
Jun: 1806.

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*Prunus virginiana*  
chokecherry



*Hordeum jubatum*  
foxtail barley



*Calypso bulbosa*  
fairy slipper



*Balsamorhiza sagittata*  
arrow-leaf balsamroot

*Sedum stenopetalum*  
yellow stonecrop

Lewis: Vicinity of Travelers' Rest, Missoula County, July 1 or 2, 1806

*Sphaeralcea coccinea*  
scarlet globemallow

Lewis: Along the Marias River, Toole County, July 20, 1806

*Trifolium microcephalum*  
littlehead clover

Lewis: Bitterroot Valley near Travelers' Rest, Missoula County, July 1 or 2, 1806

*Zigadenus elegans*  
mountain death camas

Lewis: Blackfoot River west of Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

■ For several species, various possible collection places are listed. This is done when there is no entry about who collected the species, but modern botanists know the plant grew where both Lewis and Clark were on the date it was recorded as collected. Lewis probably collected most of the species, but Clark also did some collecting, and snow-on-the-mountain was certainly collected by him, since it does not grow where Lewis was at the time.

■ The dates "July 1 or 2" are listed because Lewis wrote that he pressed these specimens on July 2, though his labels say July 1.

■ Only vascular plants are listed. It is fairly certain that a liverwort was collected in the state, but its identity is still under discussion.

Lewis and Clark probably collected these plants in Montana, but the specimens have been lost:

*Allium textile*  
textile onion

Upper Missouri River, date unknown

*Angelica* sp., probably *A. dawsonii*  
Dawson's angelica

The label is extant; flowering material gathered on Lost Trail Pass on the Idaho-Montana border, Missoula County, September 3, 1805

*Mimulus lewisii*  
Lewis's monkeyflower

Probably on Trail Creek ascending Lemhi Pass, Beaverhead County, August 12, 1805

*Phyllodoce empetriformis*  
red mountain heather

Mountains of Idaho or in the Bitterroot Mountains, Montana, date unknown

*Symphoricarpos albus* var. *laevigatus*  
common snowberry

Journals remark on the fruit; may have collected seeds or specimen (or Lewis, Missouri River), maybe August 13, 1805; or July 1806

*Symphoricarpos occidentalis*  
western snowberry

Between the Mussellshell River and South Dakota-Nebraska line, maybe August 1806