1929

The bitter root (Lewisia rediviva) in science and in history

Genevieve F. Murray

The University of Montana

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THE BITTER ROOT
(Lewisia rediviva)
IN SCIENCE AND IN HISTORY

by
Genevieve F. Allen Murray

Presented in partial fulfillment of the requirement for the degree of Master of Arts.

State University of Montana

1929

(Signed)
THE BITTERROOT
(Lewisia rediviva)
IN SCIENCE AND IN HISTORY
The Bitter Root
Lewisia rediviva.
State Flower of Montana.

F.E. Marshall.
Floral Emblem of the State of Montana, Lewisia redi-viva, the bitter root.

Non-technical description of the bitter root.

The bitter root used as food and medicine by Indians.

The name "Bitter Root" first applied to valley, river, and mountain range.

Early discoveries of the bitter root by botanists and others.

Habitat and range of the bitter root.

Botanical description and classification of the bitter root.

Scientific research in regard to the bitter root.

The bitter root in the Columbian Exposition floral exhibits.

State organization of National Floral Emblem Society of America.

The bitter root legalized as the floral emblem of Montana.

The bitter root displayed in conventionalized designs.

An appropriate floral emblem of Montana - Lewisia redi-viva.
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The Bitter Root (etching).

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Near the Great Cold Spring, "Stil-at-coo".

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Specimen sheet of Lewisia pygmaea.

Specimen sheet of Lewisia minima.

Specimens of Lewisia rediviva (six sheets).

Collected in various localities.

Mrs. Mary Long Alderson, State Chairman, Montana.

National Floral Emblem Society of America.

Voting Blank used in Floral Emblem Campaign.
BIBLIOGRAPHY

Floral Emblems


Constitution of the National Floral Emblem Society of America. Chicago, 1893. (One single page.)

Utility of the Bitter Root


Barnhart, Dr. John H., Bibliographer, New York Botanical Garden, Letter to Genevieve Murray, Sept. 15, 1925.


McDonald, Angus, Hudson's Bay Factor here in 1847. Manuscript. This manuscript was given to Dr. Paul C. Phillips by Duncan McDonald, in April, 1929, stating that the book was written in his father's handwriting, and that it had been in his own possession since his father's death. The book, which is a bound, ledger size volume of 120 pages, about 100 of which are written upon, deals chiefly with Indian hunting tales. On this occasion the writer, accompanied by Dr. Phillips, and Mr. and Mrs. I. T. Haig, had gone to Dixon, Montana, to interview Duncan McDonald in regard to the utility of the bitter root, and other subjects.

Paillieux y Bois, Le Potager d'un Curieux, Paris, 1885. (A letter from the Acad. Nat. Sci. Phil. states that a complete description of Lewisia is given in this book, but there is evidently a confusion. Descriptions are given of Portulaca grandiflora (p. 238) and of Camas (Camassie Comestible, p. 36), but not of Lewisia.


Thwaites, Reuben G., Early Western Travels, 1748-1846, XXVII:281. 32 v. Cleveland, O., 1904-07.

The Name Bitter Root Applied Geographically


Early Discoveries of the Plant


Fogg, John M. Jr., Letter of July 11, 1922, to Genevieve Murray. Mr. Fogg was Ass't. Curator, Dept. of Plants, at the Academy of Natural Sciences of Philadelphia.


Pennell, Dr. Francis, Letter of April 15, 1929, to Genevieve Murray. Dr. Pennell is now Curator, Dept. of Plants, at the Academy of Natural Sciences of Philadelphia.

Safford, W. E., Letter of Aug. 22, 1922, to Genevieve Murray. Mr. Safford was Acting Botanist of the United States Department of Agriculture, Bureau of Plant Industry, Washington, D.C.

Botanical Description of Lewisia rediviva.


Robinson, B., Monograph on genus Lewisia. (This could not be secured for use in preparation of thesis.)

Rydberg, Axel Per, Flora of the Rocky Mountains and Adjacent Plains, N. Y. 1917.

Rydberg, Axel Per, Key to Rocky Mountain Flora, N. Y. 1919.


Severy, J. W., The Enzymes of the Bitter-root. (Unpublished.)

Torrey and Gray, Flora. I:677. (Reference made in letter received from James Jerome Hill Reference Library. This book was not secured.)

Columbian Floral Exhibits

Alderson, Mary Long, "Montana's Floral Emblem - Lewisia rediviva" in Rocky Mountain Magazine, April, 1902. 136-139.

Alderson, Mary Long. Letters to Genevieve Murray dated June 28, 1927; July 2, 1927; April 4, 1929; May 2, 1929; May 3, 1929; May 6, 1929; May 12, 1929.


State Board of World's Fair Managers, Montana, Butte, 1893.

Campaign Resulting in the Choice of Lewisia Rediviva as Montana's Floral Emblem

Alderson, Mary Long. (Mrs. Alderson was State Chairman for Montana of National Floral Emblem Society.) "Montana's Floral Emblem - Lewisia rediviva," in Rocky Mountain Magazine, April, 1902. 136-139.
Letters to Genevieve Murray dated June 28, 1927; July 2, 1927; April 4, 1929; May 2, 1929; May 3, 1929; May 6, 1929; May 12, 1929.


The Bitter Root in Design


Alderson, Mary L., Open letter in the Record-Herald, Sept. 16, 1919.


Ford, Mrs. Travers M. Letter to Genevieve Murray, April 24, 1929, concerning the bitter root design damask linen.
Acknowledgement and expression of appreciation for the assistance received from the following persons on subjects noted:

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Dr. Paul C. Phillips, for the loan of the McDonald manuscript.

Mr. J. W. Severy, the permission to quote from his manuscript, "The Enzymes of the Bitter-root."

Dr. J. W. Howard, interview regarding his research in the chemical analysis of the bitter root.

Dean Charles Mollett, on the medicinal value of the bitter root.

Mrs. Mary Long Alderson, for the many clippings from her bitter root scrap-book, and assistance in many ways.

Dr. J. E. Kirkwood, for the letters and interview relative to this thesis, June, 1928.

Dean A. L. Stone, whose constant assistance and advice has been invaluable.
Many flowers, through their rare beauty, their symbolic attributes, or through their association with cherished memories, have won places of honor and devotion in the legends, songs, and emblems of the lands wherein they grow. The lotus was immortalized in the historic decoration of the ancient Egyptians, and by the Hindus its sacred blossom was used to represent the world, the meru or residence of the gods, and the majestic beauty of womanhood. (1) The rose was placed by Roman statesmen at the entrance of the banquet hall when the things which transpired within were not to be mentioned without. (2) For nearly eight centuries the French nation has revered the "Lily of France", the flower never losing its prestige though the royalty it once symbolized has been swept away. (3) The shamrock, used by Saint Patrick to illustrate the doctrine of the Trinity, has become a national emblem of Ireland. To the thistle, the Scotch give unstinted homage because it pricked the feet of the encroaching Danes so that their cries aroused the nation, and saved the land from invasion. (4) In their religious ceremonies the Incas used the sunflower because of its resemblance to the radiant giver of light, the blossoms being worn by the priestesses on their bosoms, and carried by them in lieu of tapers. (5)

(1) W. H. Gooyear, Grammar of the Lotus (London, 1891)
(2) Hence the word sub rosa.
(3) E. C. Brewer, The Historic Note-book (Phil. 1900)
   "The fleur-de-lis, or the 'Lily of France', was first adopted by Louis VII le Jeune (1120; 1137-1180) as a symbol of the French monarchy. The royal standard was thickly charged with the flower, but Chas. VI (1380-1422) reduced the number to three."
(5) Ibid, 495.
This world-wide old custom found an echo a quarter-century ago, when the various states of the Union selected floral emblems. In the United States a greater number of species of native flowers are to be found than in any equal area in the world. And in Montana, where the climatic conditions and adjoining regions have allowed the sub-alpine, desert, prairie, and western coast floral ranges to overlap, a vast wealth of flowers is presented. Searching among all these for a flower that grew abundantly in Montana, but was comparatively limited in growth elsewhere; that possessed beauty and grace of flower, leaf, and plant; whose blooming season was an outstanding event; which had some utility, and, if possible, some association with the early history, or development of the state; that would be adaptable to conventionalization for decorative purposes; that could be cultivated in beds or borders in the flower garden; and whose suggested moral traits, such as hardihood, usefulness, vigor, brightness, purity, and grandeur might appropriately represent the ideal Montanan character, the bitter root, Lewisia rediviva, was chosen. And most fully are these exacting requirements fulfilled by these eager-faced, fairy-like rose blossoms which startle the sandy wastes of Montana's foothills in the spring.

The bitter root arises from a very short, apparently stemless sort of trunk, or upright root stalk that is scarcely discernible above the ground. Except in the growing season, the most diligent search will fail to reveal it. It is composed of firm pulp, or flesh, which lasts from year to year, and bears the leaves and flowers in a thickly clustered, irregular rosette three to four inches in diameter.

As soon as the grass begins to show new green in the spring, the leaves, fifteen to forty in number,

and cylindrical in shape, tapering slightly to a blunt
point, grow from the center of the root stalk, and lie
close to the ground. They are less than one-fourth
inch in diameter, and vary from one and one-half to
three inches in length. Their color is richer than
olive green, and they are covered with a fine white
powder of wax, that rubs off like that on a plum. Be­
fore the buds appear the leaves are firm, crisp, and
quite rigid, those in the center standing erect. While
the buds are expanding, the leaves are gradually con­
trasting. They lose their cylindrical form and grow
flat, turning a yellowish-white near the base. A firm
white thread, which runs down the center of the leaf,
seems to grow shorter, while the fleshy part of the
leaf surrounding it shrivels and becomes crepe-like.
By the time the flowers have fully opened the leaves
have practically disappeared.

Directly below the leaves is the fleshy root,
which is irregularly forked into several branches from
four to seven inches long, and varying in thickness
from one half an inch down, tapering abruptly. A few
thin fibers come down from these. The inner part of
the root is snow white, and is covered with a thin
brownish-black layer that is very bitter.

The buds appear in the latter part of May, through
June, and early July. They come and go for a few weeks,
new ones appearing as the first blossoms mature. A
young plant may have but five or six, but an older
plant will be crowned with ten or fifteen. The flower
stalks arise from the center of the cluster of leaves,
each springing to a height of about two inches, or a
little more. In color they are more buff than green.
Midway between the root stalk and the bud, each flower
stalk is jointed. The joints are marked by a circle of
bractlets, five to seven in number, very thin and dry
like old paper, and shaped like tiny awls, tapering
from a broadish base to a sharp point. These bractlet­
marked joints play a peculiar role in the life of the
plant.

The buds are protected with six to eight sepals
that are dull green in color, slightly touched with red. They are broad, rather egg shaped, and unequal in size. Like the bractlets, they are thin and dry, and remain on the maturing fruit. The buds grow quite large, and rest on the ground in a horizontal position until a short time before breaking into bloom.

The blossoms open at dawn, the warm rays of the sun coaxing wide the dew-softened sepals, exposing the rose pink petals which spread to nearly two inches across, saucy, jaunty, exquisite. The petals vary from eight to fourteen in number, and are placed in a rather loose ring. Each petal is oblong, or strap-shaped, much longer than wide, and etched with five deeper rose lines radiating from the flower center. No two are alike, yet all are similar, giving an enchanting individuality to every bitter root flower.

Within the heart of the blossom a host of red stamens surround the pistil, the scarlet tipped anthers being supported by fine filaments more than three times their length. The pistil is deeply divided into six or eight slender lobes that curl slightly in such a manner as to form a miniature swastika design of frosty fabric when viewed from above.

The flower opens each morning, its rose color growing fainter every day until at last the petals become dry, and blow away, the sepals remaining in their open position. The slender lobes of the pistil dry up and disappear, while the lower part of the pistil develops into a tiny capsule, thin shelled, and more spherical than egg-shaped. Within the capsule many small, round, shining, jet-black seeds develop. Then the flower stalk begins to shrivel, and breaks off at the joint where the tiny bractlets are, dropping the top part to the ground, where it resembles a parasol lost by a gnome at play. The wind blows this over the ground with an irregular circular motion. The top of the seed capsule pops off like the lid off a fairy kettle, and the tiny black pearl seeds roll out and are strewn along the way. Freed of its cargo, the parasol conveyance lifts in the wind and disappears like chaff.
Legend nowhere tells the origin of the bitter root, nor how it came to be used. (7) Perhaps it sprang from the water drops Coyote shook from his fur when he was rescued by the wolf from the Missoula River where the dancing ladies had drowned him. Perhaps it came in its beauty to dry the tears shed at this point of sorrow so aptly named Hell Gate by the early trappers and traders. However it came, Coyote, who gave all things good to his dusky children, must have brought the bitter root, and have taught them how to use it.

Lewis and Clark found the Flatheads using it when they came through Montana in 1805. Drewyer, one of the hunters with the expedition, met a small party of Indians who fled, leaving their baggage, which contained, among other things, "a couple of bags woven with the fingers of the bark of the silk-grass containing about a bushel of dried service berries, some chokecherry cakes and about a bushel of roots of three different kinds dried and prepared for use which were folded in as many parchment hides of buffalo.... One species of the root was fusiform about six inches long. Another species was much mutilated, but appeared to be fibrous. The parts were brittle, hard, and of the size of a small quill, cylindric, and white as snow throughout, except some small parts of the hard black rind which they had not separated in the preparation." This the Indians with Lewis informed him were always boiled for use. He made the experiment, found they became perfectly soft by boiling, but had a very bitter taste, which was nauseous to his palate, and he transferred them to the Indians, who ate them heartily.... Lewis asked the Indians to show him the plant of which these roots formed a part, but they informed him that neither of them grew near that place. (8) The expedition was

(7) Duncan McDonald, Dixon, Montana. Mr. McDonald could remember no tale, or legend, nor could he learn of one from his friends among the Salish, or Flathead people.

THE SALISH FAMILY
moves to the
Bitter Root Digging Grounds
now the campus of
THE UNIVERSITY OF MONTANA
traveling at that time on the headwaters of the Salmon River of Idaho, just before they turned back across the mountains to drop into the Bitter Root valley of Montana. Very probably this was the white man's first knowledge of the plant as a food.

Only a few years after this, the first white trader, David Thompson, established posts among these western tribes, and began trading with them for furs and food. The Indians carried the bitter root with them on their journeys, and it soon became well known to his French Canadian hunters and to their officers of the Northwest Company. The Canadians gave it the name "racine amere", (9) which freely translated gave the name "bitter root". The Salish tribes, and the Spokanes, who spoke the same language, called it "spatulum", (10) while the Nez Perces, and others of the Snake nation gave it the name "konah". (11)

Wherever it grew, it was used as food. David Douglas, a botanical explorer who visited this region in 1826 and 1827, found it being used in the Spokane, Flathead, and Salmon River valleys. (12) Father De Smet

(9) a. W. E. Safford, Letter to Genevieve Murray. Mr. Safford is Acting Botanist, Division of Economic and Systematic Botany, Bureau of Plant Industry, United States Department of Agriculture.
   b. Alexander Ross, Fur Hunters of the Far West. (2 vols. London, 1855) II, p. 12. "... we proceeded on our journey up what is called the valley of Raucin au Mer, or Spetlum country".

   b. John M. Fogg, Jr., Asst. Curator, Dept. of Plants, The Academy of Natural Sciences of Philadelphia. Letter to Genevieve Murray. "There seems to be a plentiful supply of Indian names for this plant, chief among which are: Spatulum, Spatulum, Spael Lum, Spaltow."

(12) Hooker, I, 346.
found the Indians digging it along the Palouse River, Washington. (13) Edward Palmer (14), and John Torrey (15) reported the Indians of California making use of it. James Anderson (16) includes it among the foods of the Indians of British Columbia. Geyer (17) and Wyeth (17) also made references to the use of the root as a food. Thomas Drummond (18) sent some small bags of the dried root to William Hooker, relating that "these were collected and dried for food by the natives of the western side of the Rocky Mountains, and which they take with them on their journeys, whence it has become well known to the Canadian hunters, and to the officers of the Hudson's Bay Company." (19)


(17) W. E. Safford, op. cit.

(18) Thomas Drummond, a botanical collector, assistant to Dr. Richardson in Sir John Franklin's second land expedition, which moved westward by Hudson River, Lakes Ontario and Winnipeg to McKenzie River. Drummond left the party at Cumberland House to explore the Rocky Mountains. His plants were described by Sir Wm. Hooker. Died, 1835, at Havana.

While David Douglas was at Spokane valley, he wrote in his journal under the date heading, May 5 -- 1826, "Mr. Jacques Finlay was here, and obligingly undertook to repair the lock of my gun, and on this occasion I felt happy in having it in my power to give him some assistance in provisions. For several days he had had nothing excepting a sort of cake made of Lichen jubatum, Linn., and a few roots of Scilla esculenta, and of Lewisia rediviva." (20) Granville Stuart wrote that he could never eat it unless very hungry, but that many of the mountaineers were very fond of it. (21) So well known did it become that even a Congressional Document contained reference to its usefulness and nutrition. (22)

Though these early pioneers used the bitter root as food, they seldom, if ever, gathered it for themselves, but secured it from the Indians with whom they traded. In May, these Indians would go to the Spatulum, or Konah grounds, where the bitter root could be found in great quantities. Here they would assemble in camps, and while the digging and drying was going on, much time would be spent in visiting, and amusement, races and games always being a feature of the root-gathering encampment.

The bitter root was always dug at this particular season of the year. Between the time that the leaves appear, and the opening of the blossoms, the brownish-black coating of the roots will slip off easily. After the plant has blossomed, this coating fastens itself firmly to the fleshy white part of the root, and cannot be entirely detached. Since the bitter substance is found in this dark coating, it is necessary to prepare the edible portion so as to be as free from it as

(21) Granville Stuart, loc. cit.
The digging, which was not at all difficult, was done by the squaws and children, with long, sharp, slightly curved and flattened, tough sticks. The loose, gravelly soil dropped easily from the plant when it was lifted up, and they were placed in a leather bag or other container to be carried to camp. The plants naturally grew very close together, making it possible to secure the usual supply of one-half to two bushels per family without long journeys from camp.

After the plants were dug, they were stripped of the outer coating. The plant was held in the left hand by the leaf tops while the thumb and first two fingers of the right hand were used to take hold of the root just below the leaves. A pull toward the root tip then slipped the rind off easily, leaving the white cortex clean and glistening, sometimes faintly streaked with pink or orange traces of the bark. This root-bark was thrown away. The white roots were then broken from the caudex, and this leaf-top also was thrown away.

The white roots were then spread out on some clean fabric, and left in the sunlight to dry. They became quite hard and brittle in a short time, and were stored away in bags, and kept dry. Often they were kept a year

(23) Duncan McDonald. Mr. McDonald is a member of the Salish tribe. His father, Angus McDonald, was the Hudson's Bay Factor at Fort Conna. Except as otherwise noted, Mr. McDonald furnished the information concerning the preparation of bitter root as related in this article. G.M.


(25) The author counted thirty-seven bitter root plants in an area of one square yard by side of the public highway near the fair grounds, Missoula, Montana, May 5, 1929.
An Indian Family Encampment
at Bitter root digging time,

Near the foot of Mount Sentinel
where the Natural Science Building
University of Montana, now stands.

June 1, 1917
or two before being used, for the longer they were stored away, the less bitter they became.

Only small portions of the bitter root were prepared for eating at one time. The hard, quill-like fragments were boiled in the manner of cooking dried fruit. Before metal kettles were introduced, the Indians cooked them in water-tight baskets by dropping very hot stones into the water. With little cooking the bitter root will become perfectly soft, and if cooked long will dissolve into a pinkish-white paste. (26) Ordinarily, it is similar to boiled arrow-root when ready to serve. (27)

The cooked root was eaten plain, or, preferably, with a sauce or gravy poured over it. A sauce of huckleberries or service berries was often used, sometimes being cooked with the root. At different times a venison, or other meat gravy was poured over it, or the root might be used to thicken the gravy. After the white traders came the Indians ate it with molasses, or sugar, the sweetening adding much to its flavor, which was characteristic and individual, though not more decided than the flavor of many foods in common use. However, a taste for it had to be acquired.

The bitter root was not eaten every day, but was a luxury offering a pleasing variation in the diet of these mountain tribes, whose staple article was buffalo meat. It held a place relative to the fruit, or salad of the modern menu. It was, however, often carried on trips, because it was light, easy to carry, and highly nutritious. (28) One ounce proved sufficient for a meal, (29) and two or three ounces was enough for a man even under fatigue. (30)

(26) Anderson, op. cit. p. 133.
(28) Ibid, loc. cit.
(29) Palmer, loc. cit.
(30) Hooker, loc. cit.
Ordinarily, the Indians did not use the plant as a medicine, though a tea was sometimes brewed from it for a tonic.\(^{(31)}\) Powell, in his reports to the Bureau of Ethnology on medicines of the Indians,\(^{(32)}\) does not list it, nor does Anderson,\(^{(33)}\) though he includes it among the native foods. An uncompleted series of experiments in research carried out by Dr. J. W. Howard, Professor of Chemistry at the University of Montana, to determine the food values of the bitter root, established fairly definite quantities of starch, fat, ash, and so forth. Dean Mollett, of the School of Pharmacy, University of Montana, states that research conducted in his department up to the present time has revealed no medicinal values in the bitter root other than a bitter property good as a spring tonic. No research has been done to investigate the possibilities of hormones, or vitamins being present. The early Chinese residents of Missoula, however, used it to make a tea, with which they treated their sick for a cough.\(^{(34)}\)

The greatest of all the bitter root digging grounds was in the valley where the city of Missoula, Montana, is now located. There each spring, the Salish Indians came, pitching their camp near the great cold spring, called "Stil-at-oo"o", not far from the present situation of Fort Missoula, on the bank of the Red Willow River, now called the Bitter Root. Kalispell, Pend d'Oreille,

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\(^{(31)}\) a. A. L. Stone, Dean of School of Journalism. From many interviews with Indians of the Salish tribe.

\(^{(32)}\) b. A student attending the University of Montana relates that the Indians used this tea in their treatment of spotted fever, and that many of the early white settlers followed their example. I can find no verification of this fact. . .


\(^{(33)}\) Anderson, op. cit.

\(^{(34)}\) Dr. Morton J. Elrod, Professor of Biology, University of Montana. Dr. Elrod found Chinese digging the bitter root northwest of the campus. They informed him they made a tea of it which they used in treating coughs.
Near the Great Cold Spring, "Stil-at-coo", where the Salish Tribe held their annual Bitter root digging encampment
Spokane, and Nez Perce Indians often visited here at this time, and the plain was the scene of much merry-making. Again, the dreaded Blackfeet, who made three war roads into this valley, would make it the scene of murder, battle, and sorrow. The earliest description of such a camp is found in an old unpublished manuscript of Angus McDonald, the last Hudson's Bay Factor here, who built Fort Connan in 1847 on Post Creek, below Flathead Lake. (35)

"The camp was pitched on the plains of the cold spring, that plain which is on the left of the river of Hell's Gates as it issues out from the defile of that name: that plain where gathered the red men of past age to hold their annual races, horsed and afoot, in short or long heats, to any distance they pleased. The Hell's Gates mountains towered east of and over the plain in solid granites covered with luxuriant grasses and primival forests to a height that overlooked the three valleys of the Bitter Root, Hell's Gates, and the Missoula. On that blue, pineclad top, the enemy was wont for months to set spying any mortal that moved in those beautiful valleys.

"A small camp of Flatheads was pitched by the cold spring of said plain and on the right bank of the Bitter Root River. Women and children were out digging the root on that plain. A little group of men inside told the daring and dire incidents of their

(35) This manuscript was given to Dr. Paul C. Phillips by Duncan McDonald, who identified it as written in his father's hand, and stated that the book had been in his own possession since his father's death. The book is a bound ledger size volume of 120 pages, about 100 of which are filled. The writing, which is in ink, is fine, and legible. About one-fourth of one of the stories, which deal chiefly with Indian hunting tales, is quoted here.
"The plain which is on the left of the river of Hell's Gates as it issues out from the defile of that name: that plain where gathered the red men of past ages to hold their annual races, horsed and afoot, in short or long heats, to any distance they pleased."
lives as they passed their pipe. Another group outside scanned the green and bold mountain steeps in front of them, and now and then looked at Mount Lo Lo, remote and grey, looming like the evening star to their west.

"Four buffalo bulls were observed grazing on the steep of the Hell's Gates mountain. The men were soon off on their best buffalo horses in swift pursuit of the bulls. When they stood where the bulls were they could find no trace of bull or cow. No search could discover them. Other signs were there, and the terrible shape of the human foot in the mountain sand soon told them the meaning of it. Turning to overlook the camp, which in its oblique distance was yet clear below them, they saw the enemy as cleverly slaying the camp. Stung by the deception and the truth of it, they whipped their horses to their swiftest powers down the mountain and over the plain toward their camp. Before they reached it the enemy's work was done, and the camp slain before their eyes.

"One father was there whose affections were much centered in his three little daughters, having no son. He found them and their mother slaughtered and nude in their blood, and their little skin sacks of bitter roots strewn around them as if to mock their humble industry, and silently, bitterly suggesting some of the terrors that wait the generations of men, and how often in our sweetest labors, we are overwhelmed by some dread unknown."

Though the bitter root grew in such abundance here, and was always gathered here, the Indians did not apply the word to any of the principal features of the land, as is done at the present time. The present Bitter Root River was called by them "In-schu-te-schu", (36) or Red Willow, because the red willows grew

(36) Albert Partoll, an article appearing in the supplement to The Kaimin, University of Montana publication, March 12, 1929.
so thickly along its banks as to be distinctive. Lewis and Clark gave the name "Clark's River", or "Clark's Fork" to this stream, while Patrick Gass, another member of their expedition, spoke of it as the "Flathead River." Father De Smet, the first missionary among these Indians, called it St. Mary's River. The range of mountains now known as the Bitter Root Mountains, were known to the native tribes as "Chi-qual-kane-kane", meaning "the range of the Red Mountain." The singular form of this word, "Chi-qual-kane", was applied to the outstanding peak which now bears the name given it by Father De Smet, "St. Mary's". The name was first applied to the valley by the trappers and hunters, who originally called it the "Racine amere, or Spatulum country", later translating it to "Bitter Root Valley".

When the first surveyors making maps came here, with Governor Isaac I. Stevens, these names were fairly well established. John Mullan spent the winter (1853-54) in the Bitter Root Valley at Cantonment Stevens, and made a number of exploring trips through all the surrounding country. His guides were the mountain men and trappers already familiar with the land, and to him, as to the later surveyors, they told the names which they had become accustomed to applying to the nearby landmarks. These names then went down on official maps, and among those surviving to this day are the Bitter Root River, the Bitter Root Mountains, and the Bitter Root Valley.

The first knowledge of the bitter root plant to reach the scientific field of botany came as a result of President Jefferson's instructions to Captain Lewis to note the food plants of the Indians and the "dates at which particular plants put forth flowers and leaves." A large collection of plants was made

(37) Duncan McDonald.
(38) Alexander Ross, loc. cit.
during the journey westward, but was lost through an unfortunate upsetting of a canoe, and through the moulding of those buried in a cache before crossing the Rockies on the westward journey. A small series was collected by Lewis on the return journey, of which one hundred fifty reached the East in safety. (40) Among these was one specimen of bitter root, gathered by Meriwether Lewis on July 1st, 1806, while the expedition was encamped at the mouth of Lo Lo Creek, called by them the Traveler's Rest Creek, in the Bitter Root Valley. Here the party prepared to divide, Lewis to go up the Blackfoot River and cross the Rocky Mountains, striking the Missouri River not far above the great falls, and Clark to return to the Three Forks of the Missouri and cross over to the Yellowstone River, descending the same to its confluence with the Missouri. While in camp here, Lewis recorded in his journal, "I found several other uncommon plants, specimens of which I preserved." The exact locality where Lewis collected the specimen of bitter root was determined by Doctor Elliott Coues, in 1898, as "at the mouth of Traveler's Rest Creek of L. & C., i.e. of the Lo Lo Fork of the Bitter Root River, some 12 miles south of Missoula, Montana." (41)

On horseback, by boat, and by stagecoach, these blossoms, together with thirty-two other specimens from Montana (42), were carried three thousand tedious

(40) Dr. Francis W. Pennell, Curator of Plants, The Academy of Natural Sciences of Philadelphia, Letter to Genevieve Murray.


(A. L. Stone, Dean of the School of Journalism, University of Montana, accompanied Dr. Coues on his trip determining the site where this type specimen was gathered. )

miles to Philadelphia, where they were delivered to Frederick Pursh, noted botanist, who had just completed a trip to the region of the Great Lakes in search of new species. Pursh, in the preface to his "Flora Americae Septentrionalis", published in London, in 1814, states that Captain Lewis gave him the collection in order to describe and figure those he thought to be new.

For many years it was believed that Pursh took these plants, with the others collected during his stay of several years in this country, to England, where, under the patronage of Mr. A. B. Lambert, Vice-President of the Linnaean Society, he compiled the work cited. Many of Pursh's type specimens were left to Mr. Lambert, whose herbarium was finally distributed, and in some way never revealed, a number of Lewis' plants, marked "from Lambert's Herbarium," became a part of the Herbarium of the Academy of Natural Sciences of Philadelphia. These were only a small portion, however, of the one hundred nineteen Lewis specimens described by Pursh, and in 1896 Professor C. S. Sargent suggested to Thomas Meehan the possibility of some of the material being yet in the custody of the American Philosophical Society. After long search, packages of plants were found stored away in a basement which were identified as those given to Pursh by Lewis. Pursh had evidently studied these before starting to Europe, leaving the duplicates and those too imperfect to recognize, in this collection. Among these was the specimen of bitter root gathered by Lewis on July 1st, 1806, at the mouth of Lo Lo Creek. If Pursh carried another specimen of this plant to England with him, it is not now listed in any of the large herbariums.

This specimen sheet, now in the custody of the Academy of Natural Sciences of Philadelphia, contains six blossoms in various stages of development, two with

   b. Fennell, op. cit. (letter).
no portion of the stem attached, and four with the upper part of the stalk, the lower parts having been broken off at the natural joints. The flowers, of course, have lost their color, and a few petals have dropped, which are preserved in a tiny envelop fastened to the mounting paper. The label is in the handwriting of Pursh, and contains first the copy of the original label written by Lewis: "The Indians eat the root of this. Near Clark's R. July 1st, 1806." Below this is added: "The calyx consists of 6 or 7 leaves, the corolla many petals and stamens... capsule."(45) The type specimen, together with other specimens of the bitter root in the same herbarium, were loaned to the University of Montana in April, 1929. A comparison made with specimens recently gathered from the same locality showed no variation in the species in the one hundred twenty-two years that had elapsed since they first were gathered.

The bitter root, having been acknowledged a hitherto unknown species, was named by Pursh, _Lewisia_, after the valiant Captain Meriwether Lewis. Its specific name was applied later, and was the result of a curious property of the plant. So great is its vitality that it can live for more than a year without water, and can revive even after being dried and pressed under great weight in the herbarium. The plant carried East by Lewis was noticed to be putting forth green shoots, and was planted in the garden of Mr. McMahon, of Philadelphia, where it grew for about a year, and then was lost. This is the reason no root appears on the type specimen sheet. Pursh, in the introduction to the second edition of his work, mentioned this circumstance, which suggested the name "rediviva". Freely translated, this means "living

(45) Meehan, op. cit. p.19. Treatment of plant by Pursh in his "Flora". — "Pursh, Fl. 368. On the banks of Clark's River. July, v.s. in Herb. Lewis." Pursh's notes were probably made from Lewis' original memoranda, which were not always correctly copied.
Original Specimen of

LEWISIA REDIVIVA

Collected by

Captain Lewis

JULY 1, 1806

near

Lo Lo Creek
12 miles south of Missoula, Mont.

Specimen now in custody of
Academy of Natural Sciences of Philadelphia
again", or "restored to life", and the flower is sometimes known as the Resurrection Plant, many herbarium specimens continuing to live and grow for two or three years.(46)

In March, 1827, David Douglas gathered some specimens on the banks of some tributary stream of the Columbia, which were pressed and brought home to his herbarium. They had no flower, and upon some of them showing signs of life, they were planted in the garden of the Horticultural Society, but like that of Lewis, they vegetated a short time and died.(47) Dr. J. E. Kirkwood, Professor of Botany at the University of Montana, potted some plants from the field in sand in the laboratory while the leaves were green. These soon flowered and withered down. The pots were then set away in a warm, dry room, and received no water or other attention. A year later they were discovered growing vigorously, as if in their native sod.(48)

Lewisia rediviva was included by Thomas Nuttal, in his "Genera of North American Plants",(49) but he was never within the bounds of the present state of Montana,(50) having accompanied the second Wyeth expedition (1834-36) which passed south and west of this state. Nor does he appear to have seen the plant, because he adopts Pursh's character and expressed his regret that the author did not give a figure of this very interesting plant.(51)

William Jackson Hooker, the English botanist, made the first figures of the Lewisia rediviva, drawing them from plants that had been dried and carried to England. Of this experience he tells that "on Mr. Drummond's

(46) Fogg. op. cit. (letter)
(47) Hooker. op. cit. p. 345.
(49) Hooker. op. cit. p.344.
(50) Blankinship, loc. cit.
(51) Hooker, op.cit. p.345.
return from his arduous travels among the Rocky Moun-
tains, he brought with him some small bags of a dried
root, white and brittle, which are collected and dried
for food by the natives of the western side of the
Rocky Mountains, and which they take with them on their
journeys, whence it has become well known to the Canad-
ian hunters, and to the officers of the Hudson's Bay
Company. On these roots being shown to Mr. Douglas,
he immediately recognized them as belonging to a plant
which he had gathered on the banks of some of the
tributary streams of the Columbia; and which he con-
sidered to be the Lewisia of Pursh....

"Upon searching carefully among the dried roots
collected by Mr. Drummond, many were found to have the
leaves in a tolerable perfect state, and not a few
their scapes and unexpanded flowers; but much injured
in the process of drying, and by having been packed in
bags. Some of the best of them were partially recover-
ed by immersion in hot water; and from these....the
figures have been made."(52) These were nine draw-
ings, showing the full plant—natural size, an unopened
flower—enlarged, the same with all the calyx-segments
removed and the petals except one, a front view of a
stamen, the back view of the same, the pollen grains,
the pistil, the pistil cut open so as to show the posi-
tion of the young seeds, and a portion of a leaf.(53)

Hooker also described the collection of the German
botanist, Charles Geyer, who passed through Montana in
1844, making a collection of plants which he took to
Europe. He visited the Flathead Mission, having travel-
ed up the Columbia and Clark's Fork, following up the
Bitter Root Valley, and crossing over to the Yellowstone.
He later published a description of his travels in the
London Journal of Botany, volumes IV and V, mentioning
the bitter root, and the use made of it.

Previous to this, Nathaniel J. Wyeth, one of the
first men to become interested in emigration to Oregon,

(52) Hooker. op. cit. pp. 344-345.
(53) Ibid, Tab. LXX. opposite p. 344.
ascended the Clark's Fork of the Columbia to the Missoula Valley, traveling on up the Bitter Root, through the Big Hole Basin, and over into the Salmon River region of Idaho. After crossing the Rocky Mountains, he again entered the state by way of the Big Horn River, following down this and the Yellowstone to the Missouri. (54) He also found the bitter root, mentioning it in his journal. His collection was deposited with the Academy of Natural Sciences of Philadelphia, but the herbarium does not appear to have at present a specimen of the bitter root collected by Wyeth.

These botanists all reported finding the bitter root growing in dry, stony soils among gravel and rock. Rydberg (55) adds an altitude of two to three thousand feet, and Irving (56) a well drained, sunny position. The plant spreads very slowly, the seeds being scattered as the dry sepal conveyance is blown over the ground by the wind. From all indications, the plant has spread from a center of distribution in the Sierras of California. (57) Its range is confined to Northwest America (53), and has been reported from eastern Washington, the adjoining valleys of British Columbia, Idaho, Wyoming, scattered sections of California, Utah, Nevada, Arizona, Colorado, Yellowstone Park, and all parts of Montana except the valleys immediately above the confluent

(54) Blankinship, op. cit. p.6.
(57) J. E. Kirkwood, op. cit.
(58) Irving, loc. cit.
ence of the Missouri and Yellowstone rivers. (59)


(59) Resume of habitat and range noted by various botanists and others:

Alderson, *op.cit.*, dry, sandy, gravelly soil; comparatively limited in range to Montana.

Caps. 3 - locularis, polysperma. Semina nitida. It is a plant with a fusiform, branched, and blood-colored root, bearing radical, linear, and somewhat fleshy leaves; a single or two flowered scape; the pedicel jointed at the base. Calyx colored, scarios, from 7-9 leaved, patent; leaflets ovate, acute, concave, the interior ones narrower. Petals 14-20. Filaments 14-13, shorter than the calyx. Anthers erect, oblong. Style filiform, trifid above. Stigmas 3, bifid. Capsule oblong, 3-celled, the cells 2-seeded. Seeds lenticular, shining, black.

(60) From the specimens recovered from Thomas Drummond's collection of dried roots, William Hooker gave the second description, which, compared with the first, shows little variation. As was customary with European botanists, this description was also written in Latin terms. (61) Thomas Nuttall adopted Pursh's description. A typical modern descrip-


(61) Hooker, op. cit. p. 345.
tion is given by Julia W. Henshaw, in "Wild Flowers of the North American Mountains".

"Lewisia rediviva. Purslane Family.

"Stems: scape short, jointed, bracteolate near the middle. Leaves: linear-oblong, subterete, smooth, glaucous. Flowers: sepals six to eight, distinct, broadly ovate, unequal, partly scarious, petals eight to sixteen, narrowly oblong. Fruit: capsule circumsessile at the base, then bursting irregularly, seeds numerous, black, shining.

"The large showy rose-pink flowers of this Lewisia are lovely. The oblong, narrow leaves, which are crowded at the crown of the thick caudex, are smooth and covered with a whitish bloom; while from a fleshy root grow the one-flowered buff-coloured scapes that are jointed and have buff bractlets near the middle."(62)

Systematically, the bitter root falls between the four o'clocks and the pinks.(63) Nuttal, in writing of it in 1834, said: "This curious plant constitutes a very distinct natural order," and describing the flower as "very large, wholly like that of the cactus, rose-red"; he decided that it was most nearly related to the cactus family.(64) Hooker, however, -- and the later botanists have agreed with him -- ranked it in the natural order Portulaceae, very near Talinum,(65) having compared it with some species of Talinum gathered


(64) Grosvenor, op.cit. p.490.

(65) Hooker, op.cit. p.346.
LEWISIA REDIVIVA

Division: Spermatophytes. Sub-division: Angiosperms. Class: Dicotyledons. Calyx and Corolla both present; Corolla of separate petals; Stamens numerous; Calyx free and separate from the pistils; Pistils one as to ovary; Ovary free from the calyx, compound, one-celled, central placentae; Capsule circumscissile near base; seeds many; Styles and Stigmas 8, style branches slender; Stamens 5-40; Petals 16-20; Sepals large 6-7; bractlets 5-7.
1. *Lewisia rediviva* showing early leaf growth before the buds have appeared.

2. Joint of stem, showing bractlets, and sepals, which dry in open position and aid in seed distribution.

3. Upper view of mature fruit, showing capsule before it opens.

4. Small section of tip of leaf, showing the central thread-shaped tough bundle of fibers, or vessels.
5. Floral Diagram
6. Face view of open blossom.
7. Bud (enlarged) (after Hooker)
8. Bud with outer sepals and petals removed.
9. Enlarged view of pistil, showing slender styles.
10. Pistil opened, showing position of seeds.
11. Enlarged stamens, front and back views.
12. Enlarged pollen grains, (after Hooker)
by Dr. Gillies in South America. Irving states that it is closely allied to Calindrinia, several species of the genus Lewisia having been formerly included in that of Calindrinia. (66) Other related forms are Claytonia, popularly known as spring beauty, Montia, Calypteridium, Spraguea, and Portulaca, or purslane, more often called "pusley", a common weed. Among the cultivated plants, related forms are the Portulaca, or moss rose, and the Calandrinias. (67)

The genus Lewisia, though small, containing only twelve species, includes other very interesting plants besides rediviva, which Mr. B. Robinson considers in a monograph. (68) They are all low-growing perennial herbs, mostly with fleshy root-stocks and leaves,

(66) Irving, op. cit. p. 295.
(67) Kirkwood, loc. cit.
(68) I was unable to secure a copy of Robinson's monograph, but from Irving, op. cit., Piper, op. cit., and Coulter and Nelson, op. cit., I prepared the following list, which lacks but one of the twelve species listed by Robinson in the genus Lewisia.
1. L. Rediviva, Pursh.
2. L. Columbiana, Robinson (Calandrinia Columbiana, Watson).
3. L. Cotyledon, Robinson (Calandrinia Cotyledon, Watson).
4. L. Leana, Robinson (Calandrinia Leana, Porter).
5. L. Oppositifolia, Robinson (Calandrinia oppositifolia, Watson).
6. L. Pygmaea, Robinson (Calandrinia pygmaea, Gray).
7. L. Tweedyi, Robinson (Calandrinia Tweedyi, Gray).
8. L. Brachyca lys.
9. L. Nevadensis, Robinson (Calandrinia nevadensis, Gray).
11. L. Triphylla, Robinson (Claytonia triphylla, Watson).
PLANTS OF WYOMING
No. 2719.
Genus: 
Species: 
Locality: M. miles west of Big Horn, Sublette County.
Collector: 
Date: July 12, 1922.
though only a few have large and attractive flowers. Nine of these have been in cultivation at the botanical garden at Kew, England: (69) L. Columbiana, introduced by Mr. A. K. Bulley, of Neston, from Oregon; L. Cotyledon, from northern California; L. Leana, introduced by Mr. Bulley, from Siskiyou Mountains, in northern California; L. Oppositifolia, from Oregon and California, raised from seed at Kew in 1838; L. Pygmaea, from alpine regions of the Rocky Mountains; L. Tweedyi, introduced by Mr. A. J. Johnson, of Columbia Nursery, Astoria, Oregon, in 1898; L. Brachycalyx, from the Sierra Nevada Mountains in 1875; L. Nevadensis, from same locality in 1880; and L. Rediviva.

Specific botanical studies of *Lewisia rediviva* have been carried on over a number of years in the laboratories of the Department of Botany of the University of Montana. Dr. J. E. Kirkwood made rather an elaborate research in an effort to determine the food values to be found in the root, and the changes that took place in the plant during its growing season and long dormant period. A manuscript containing the results of his experiments was being prepared at the time of his death. (70) Mr. J. W. Severy, Assistant Professor of Botany, having become interested in the supposition that the heavy blooming of the bitter root after the vegetative period was over might indicate a very high rate of metabolism during the reproductive period, made an extensive investigation of the enzymes active in the root. Without doubt, this is the most exacting research as regards the bitter root that has been carried out to date. (71) With Mr. Severy's permission, the summary of his research, which he has

(69) Irving, loc. cit.
(70) Dr. J. E. Kirkwood died at Yellow Bay, University of Montana Biological Station, August 15, 1928.
Letter: no one here knows of any investigations of the bitter root that have been, or are being carried out anywhere.
given in detail in a manuscript not yet published, is herein quoted.

"Using standard methods for the extraction and identification of enzymes, an investigation has been made of the enzymes of the root of *Lewisia rediviva* at the time of maximum metabolic activity of this member; that is, during the time of flowering and fruiting of the plant.

"Of the oxidases; peroxidase, oxygenase, reductase, and catalase were shown to be present, while under the conditions of the work, negative results were obtained for tyrosinase and carboxylase.

"Lipases, working on the neutral fats, as typified by olive oil, could not be identified, but positive results were obtained for the esterases hydrolyzing such esters of the lower fatty acids as methyl acetate and ethyl acetate.

"The presence of both tryp tic and ereptic-proteinases was indicated, using casein, albumen, fibrin, and peptone, as substrates.

"Among the carbohydrates, strong evidence was obtained for the presence of diastase, dextrinase, maltase, invertase or sucrase, emulsin, and oytase. There was strong indication of the presence of raffinase and lactase, providing the substrates were pure. Very slow pectinase activity was indicated. Cellulase and inulinase were not demonstrated.

"There was no indication of pectinase activity.

"No evidence was found for the presence of urease.

"On the whole it would seem to the author that the metabolic state of the root of the bitter root at the reproductive period might better be compared with that to be found in germinating seed, rather than to the metabolic states of the roots of most other plants."(72)

(72) J. W. Severy, Enzymes of the Bitter Root, pp.27-28, (manuscript).
When the Indians dug the bitter root, just before its blooming time, they were wiser than they realized, or perhaps it was the infinite wisdom of Coyote, who slew the dragon that invaded the Salish land, thus liberating all the animals, and who taught them to make flint arrowheads with which to hunt, and who gave them all things good. But then -- they could not have dug it, very well, after the blooming period was over, for almost immediately every trace of the plant disappears from the surface of the ground, and even the highly trained eyes of the Indians would have great difficulty in discovering the resting roots.

Specimens of *Lewisia rediviva* have been collected over all parts of the Northwest by numerous botanists, and have been placed in herbariums, both private and institutional, all over the world. Of the ten collections of plants made in this region before 1862, four were carried to Europe.\(^{(73)}\) The others, as well as many of the later collections, found their way into the herbariums of the eastern part of the United States. Scattered in such manner, it is impossible to list all the specimens of the bitter root that have been preserved, the few lists and descriptions that have been published being very incomplete.\(^{(74)}\)

\(^{(73)}\) Blankinship, op.cit. p.3.

\(^{(74)}\) Partial list of specimens of *Lewisia rediviva* with names of the collectors and localities. Those starred are shown in illustrations. Lewis, 7/1, 1806, near mouth of Lo Lo Creek, twelve miles south of Missoula, Montana*; Dr. J.M. Bigelow, 1853-54, with Lieut. A. Whipple's exploration, 35th parallel, Calif.*; Joe L., Fort Bridger, Wyo.*; Hayden, 1871, Yellowstone Park; T.S. Brandegee, June, 1882, Cascade Mountains, Yakima, Wash.*; Mrs. Ross Lemers, Washoe Valley, Nevada*; Dr. Sereno Watson, 1880, Bannock City, Montana; William Canby, 1883, Bozeman, Montana; F. Lamson Scribner, 1883, Jefferson River, Montana,* and also in Yellowstone Park;

(Footnote continued on next page)
PLANTS OF WYOMING

No. 4326

Scleria rediana Pursh
Stony hillsides near Cora
Sublette County, at 7600 ft.

Collected: Henry H. Corwin

July 10, 1898

ANS PHILA 629310
Among the outstanding collections made in this region, more particularly in Montana, was that of F. D. Kelsey, a Congregational minister at Helena, who took up botany as a recreation, collecting within the state from 1885 to 1892. It was under his direction that the Montana contribution to the scientific floral exhibit displayed at the Columbian Exposition, Chicago, 1893, was made. (75) This collec-

(74 cont'd.) Mary Compton, 1883, Mammoth Hot Springs, Yellowstone Park; Frank Tweedy, 1885, Mammoth Hot Springs, Yellowstone Park; Suksdorf, 5/4, 1886, Major Creek, West Klickitat Co. Wash.*; Tweedy, 1888, Beaverhead County, Montana; Vasey, 1889, Spokane locality; Flett, Atanum River, specimen 1293; Whited, Wenatchee Valley, Wash., specimen 1089; F. D. Kelsey, 1891, Helena, Montana; Mrs. Tucker, Spokane County, 1892; Henderson, 5, 1892, North Yakima, Wash.; Mrs. Casper, Silver Bow County, Montana; Mrs. Moore, Silver Bow County, Montana; Charles Piper, 1896, Spokane, 1897, Ellensburg, Wash.; Sandberg and Leiberg, Rock Creek; Rydberg and Bessey, June 22, 1897, Spanish Basin, Montana, specimen number 3954, June 26, 1897, Spanish Basin, Montana, 4259, and July 22, 1897, Near Indian Creek, Montana; Morton J. Elrod, Missoula, Montana*; J. E. Kirkwood, Missoula, Montana (specimens sent to many herbariums); J. W. Conudon, 1903, Mariposa Valley, Calif.*; E. and L. Payson, July 10, 1925, Sublette Co. Wyoming*. Etc.

(75) Blankinship, op. cit. p. 11.
tion, to which Mrs. Alderson and others also contributed, contained several specimens of *Lewisia rediviva*. Though displayed at the Women's Building, this collection formed no part of the Montana Women's World's Fair Collection.

This latter collection contained four hundred sixteen specimens, and was arranged by Mrs. Jennie Moore (Mrs. Clinton H. Moore) of Butte. The pressed flowers were mounted on large sheets of cardboard, which were arranged back to back, and placed in frames with glass on each side. The frames were hinged to a pillar to facilitate display. The flowers of this collection were gathered by women all over the state, those taking a more prominent part being Mrs. Jennie Moore, who collected in the vicinity of Butte; Mrs. McNulty, Madison County; Mrs. E. Muth, Lewis and Clark County; Mrs. J. E. Light, Custer County; Mrs. Mary Long Alderson, Bozeman; Mrs. Irene Kennedy, Flathead region; Mrs. G. R. Finlay, Bozeman; Mrs. Laura A. Fitch, Sheridan and Virginia City; Mrs. Scheuber (Miss Emma Ware) in Deer Lodge County, and along the Big Blackfoot, also Philipsburg, Beartown, and Granite; Mrs. Ida Christy,

(76) Montana....Exhibit at the World's Fair and a Description of the Various Resources of the State, Mining, Agriculture, and Stock Growing. (Butte, 1893) p.56. "Scientific exhibit of flora of state, about seven hundred specimens, in the Women's Building, the work of Mrs. Lydia Fitch, of Sheridan". This seems to be in error. I could not learn the number of specimens in the Kelsey collection, which composed the scientific exhibit. Blankinship says this is now in the possession of the State College of Montana. My letters to the department of botany there have been unanswered. Mrs. Alderson, Helena, says that the two exhibits were separate, and that she contributed to each of them, the women's collection containing 416 specimens.

Silver Bow County; Mrs. Hodgeman, and many others. (78)
The bitter root was very prominent in the collection, which attracted much attention. The flower was also prominently displayed in the design on the beautiful shield sent by Silver Bow County. This collection of flowers, in their original frames, was presented to the Montana State College, Bozeman, Montana, where it was for years one of the show features. The glass finally became broken, the hinges and frames loose, and the flowers were taken out and distributed in the general herbarium. (79)

The scientific floral exhibit, and the displays prepared by the women of the various states stimulated much discussion of flowers and floral emblems. A register was opened at the Women's Building, and everyone was urged to vote for a national emblem, the only choice offered being maize, or corn. "Some earnest thinking women," Mrs. Alderson relates, "thinking the drift of the matter decidedly unfair, organized the National Floral Emblem Society to give everyone the right to vote for his or her own candidate." (80)

Immediately after its organization, the following constitution was drawn up, printed, and distributed, during the fall of 1893, to prospective members throughout the United States.

OBJECTS and AIMS of the NATIONAL FLORAL EMBLEM SOCIETY of AMERICA.

Article I. This Society shall be called "The National Floral Emblem Society of America."
Article II. The objects of this society shall be as follows: First -- To consider the claims of all flowers presented as candidates for a National Floral Emblem. Second -- To devise and raise a means of reaching States and Territories, and of urging all such as have not al-

(79) Mrs. Alderson. Letter.
ready selected a State flower to make such a selection. Third — To hold a floral festival upon the coming Fourth of July for purpose of considering a fitting National Floral Emblem to be held in every city, town and hamlet in America. Fourth — To study the natural flora of the United States, and after selecting the State and National flowers, to introduce and cultivate the same in each State and Territory.

Article III. Qualification. Any person interested in the naming of a National flower or emblem shall be qualified to become a member of the "National Floral Emblem Society". Membership may be obtained upon the presentation of name by a member of the Society and by the payment of Fifty Cents.

Method of Procedure. The Board of Management of "The National Floral Emblem Society" shall appoint one member from each State and Territory, and she shall appoint one member from each Congressional district of that State or Territory (exclusive of that district which she herself represents) to aid her as a committee in carrying out the objects and aims of the Society. She shall be Chairman of this committee. These Chairmen, throughout the States and Territories, together with the Committee of Management, shall constitute an Advisory Board. Members of this Advisory Board shall be empowered to direct floral festivals, at which all the floral candidates shall be presented, and full and open claims made for each and every one, to aid in educating public opinion. This organization has been formed with but one object in view — which is, that all the States and Territories may be reached, and that we, as a Nation, may be informed that we may deliberate upon the matter, and thus obtain a genuine expression of the will of the people.

The candidates for each State flower should be such as are particularly peculiar to that State, and familiar to the people of that State. It is preferred that the candidates for the "National Floral Emblem" should be such as are native to America. They may represent: First, sentiment; second, utility; third, utility and sentiment combined; fourth, a combination of flowers.

Ella Sterling Cummins, President.
Nora Gridley-Gridley, Secretary.
No. 61 University Place, Chicago.
Before the creation of the National Floral Emblem Society with its State and Territorial units, Oklahoma and Minnesota had chosen emblematic flowers by legislative action, Oklahoma adopting the Mistletoe in January, 1893, and Minnesota the Moccasin Flower, in February of the same year. In each case the selection was made at the request of the women who were preparing the exhibits for the Columbian Exposition. Vermont followed with the Red Clover in 1894, the bill being introduced into the state legislature on October 19, and amended on November 8. The fourth state in the Union to designate a floral emblem was the State of Montana.

The state units of the National Floral Emblem Society were ready to begin their campaign by January 1, 1934. Mrs. Mary Long (Matt J.) Alderson was appointed State Chairman for Montana. The campaign was opened by a circular letter to the newspapers throughout Montana, which donated their columns with a generosity unparalleled in any other state. Under the caption "Everyone is Requested to Help Select Montana's Floral Emblem", this first letter, after explaining the objects and aims of the National Floral Emblem Society, outlined the plan of the State Floral Emblem Society, which was designed to create in all parts of the state, among the old and young, such interest in the state floral emblem as would lead the people to deliberate upon the merits of candidate flowers, and to intelligently vote for their choice.

(81) Grosvenor, op. cit. p. 483. Mr. Grosvenor, in his article, "Our State Flowers", places Montana sixth, an error easily checked in his own paper. The fourth state, he writes, was Nebraska, the state legislature adopting the Goldenrod in March, 1895. The legislature of Delaware approved the Peach blossom, May 5, 1895. Montana, however, preceded both these states, the bill creating Montana's floral emblem having been approved on February 27, 1895.


(83) Mrs. Alderson, Open letter in the Record-Herald, Sept. 16, 1919.
Co-workers were secured in nearly all the counties, among whom were: Mr. Frank Eliel, of Beaverhead; Mrs. J. J. Kennedy, of Flathead; Mrs. J. E. Light, of Custer; Mrs. L. A. King, of Deer Lodge; Mrs. D. L. Shafer, of Fergus; Mrs. S. A. Robertson, of Jefferson; Mrs. E. Starz, of Lewis and Clark; Mr. Wm. J. Oliver, of Madison; Mrs. D. E. Folsom, of Meagher; Miss Harriet Hord, of Missoula; Mrs. F. A. Scheuber, of Park; Mrs. Clinton H. Moore, of Silver Bow; Mrs. John D. Ruff, of Ravalli; and Mrs. U. E. Frizelle, of Yellowstone. The movement was also largely aided by Mrs. Lydia A. Fitch, Mrs. C. T. Busha, Mrs. Jessie C. Knox, Mrs. V. A. Cockrill, Rev. F. D. Kelsey, Mrs. Laura E. Howey, Hon. Granville Stuart, Mr. J. B. King and Mrs. F. B. Sanborn, and many others. (84)

To these co-workers were sent the following suggestions:

"Each co-worker may have entire charge in the county he or she represents of every thing relating to the work of the State Floral Emblem Society in that county - the presentation of names of floral candidates; discussions of their characteristics and adaptability to cultivation; their claims, from a utilitarian or sentimental point of view, to the honor of state floral emblem; the awakening of public interest in the subject; the enrolling of members in the state society and the voting for candidates.

"Each co-worker may organize the county he or she represents in that manner which it is considered will best advance the aim of the society.

"Each co-worker may obtain as members as many persons as possible who are intelligently interested in the state floral emblem. All members of county organizations will be members of the State Floral Emblem Society, the county organization being in no wise subordinate to the state society, but a division of it, the state society being composed of the various county organizations - their members united forming the state society.

"Suggestions in regard to the floral festival will be offered later, when information is received from the secretary of the national society.

"It might be well for each co-worker to appoint a subordinate helper in such districts of the county as the co-worker cannot personally reach or superintend.

"In the endeavor to interest people in the State Floral Emblem Society - in presenting floral candidates and discussing merits of such, it would help to have floral candidates talked of in the W.C.T.U. organizations, in the schools and in all clubs, organizations, orders, church societies and other gatherings where the subject would properly be a theme of conversation.

"Let each co-worker obtain expressions of choice of floral candidates from every one in the county known to be interested in its wild flowers. Have such opinions circulated. The newspapers will undoubtedly be willing to give space to the subject.

"Interview persons who have had success in cultivating wild flowers of the state and circulate information obtained.

"Some persons who will not write any long article on a favorite flower may name their choice, giving some reason for the preference. The circulation of such opinion with the name of the person giving it, will undoubtedly lead to a similar expression from some one else and create greater interest in the subject.

"At the time of the meeting of the Montana Dairy Association, which will be held in Bozeman sometime between the middle of February and the middle of March, it is planned to gather together as many as possible of those interested in the State Floral Emblem Society and perfect its organization.

"It is also proposed to organize a state Botanical
society at the same time, and it is hoped that many of the co-workers of the Floral Emblem Society will become members of the Botanical society.

"Those who come to Bozeman to attend the meeting of either of these societies will be accorded the advantage of the reduced railroad and hotel rates made to members of the Dairy association. The time of meeting, reduced rates, etc., will be furnished when ascertained.

"Information in regard to method of balloting will be furnished later. The aim now is to create an interest in the matter, so that floral candidates will be proposed and discussed that people in general may be able to vote intelligently when the time of voting comes.

"The state chairman will be pleased to receive copies of newspapers containing any matter relating to the state floral emblem.

"The State Floral Emblem Society will necessarily be a temporary organization, but the attention it will draw to our native flowers and the interest it will create in them will have a permanently wholesome and uplifting influence upon many lives; moreover, the choice of a floral emblem which shall typify our glorious commonwealth through the coming years, is a matter of moment in itself, calling for a wise consideration of the characteristics of our wild flowers.

Sincerely yours,

Mary Long Alderson.
Chairman for Montana of National Floral Emblem Society.

Feb. 1, 1894.

This was soon followed by another letter, detailing the plan of balloting:

"... Open, as soon as you wish, registration books in as many parts of your county as you can secure re-
presentatives of the floral emblem society. Allow all, men or women, young or old, intelligently interested in what the state floral emblem shall be, to record their names and choice for state floral emblem, any time before September 1st or on that day. Have all votes from different parts of your county sent you on September 2nd and forward them at once to the state chairman. Inform people in your county, through newspapers and in any other way you can, that any who wish may send votes direct to you or to any of your helpers. Secure as many votes as possible on the floral emblem.

"Secure the aid of the newspapers of your county in acquainting people with the object of the floral emblem society, the progress of the work, etc.

"Place pressed and fresh specimens of floral candidates on exhibition with names attached, when you can do so, in order to acquaint people with the correct names of the flowers.

"To stimulate an interest in wild flowers, offer prizes of intrinsic or sentimental value for exhibits of wild flowers on July 4th.

"Some county co-workers are going to have some floral exercises on July 4th, and will then take votes on the state floral emblem candidates.

"Obtain votes of members of W.C.T.U. organizations, all clubs and societies, schools, etc.

"On Memorial Day, Fourth of July, or any other day when people have assembled, inform them where those who wish may record their choice.

"The votes, of course, may be received any time before September 2nd.

"Considerably over 100 were recorded in Missoula county several weeks ago. It is to be hoped several thousand votes will be received from each county, as
it is desired to have the vote representative and complete.

"The above are simply suggestions to co-workers. They may adopt only as many as they can or think best to. Nothing is obligatory except to obtain as many votes as they can.

"Please send monthly report of work in your county to State Chairman.

Mary Long Alderson,
Chairman Floral Emblem Society."

Under Mrs. Alderson's leadership a most enthusiastic campaign was carried on for nine months, January, 1894 to September, 1894. There were no membership dues, no assessment or voting fees, no contributions to any fund. Everything during the entire campaign, from the postage stamps used and the columns of matter printed to the expenses of the trips made by the volunteer workers, was freely, lavishly given. Botanical societies for the scientific study of the flowers were formed in Anaconda, Columbia Falls, Livingston, and other places. A state botanical society was organized at Bozeman with Peter Koch as president. (35) The balloting was done on printed slips, but the name of a flower accompanied by the name of the voter was accepted on any slip of paper.

As soon as all the ballots were received by the state chairman, Mrs. F. W. Traphagen, W. T. Shaw, and P. C. Waite, of Bozeman, were appointed as a committee to canvass the votes. Thirty-two different flowers were voted upon, though several received but one vote each. Of the 5857 votes received, 3621 were for Lewisia rediviva, the bitter root; 737 for the evening primrose; 668 for the wild rose; white

Mrs. Mary Long Alderson

State Chairman for Montana

National Floral Emblem Society of America
clematis, 163; cactus, 98; goldenrod, 36; and mariposa lily, 48.(36) No other received as many as forty votes.(37)

(36) Mrs. Alderson, Chairman for Montana of National Floral Emblem Society, Letter "The Bitter Root for Montana's Floral Emblem", addressed to members of the Fourth Legislative Assembly of the State of Montana. (Dated, Bozeman, Mont., Jan. 28, 1895.)

<table>
<thead>
<tr>
<th>County (1895)</th>
<th>Bitter Root</th>
<th>Evening Primrose</th>
<th>Wild Rose</th>
<th>Scattering Votes</th>
<th>Total Vote</th>
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<tbody>
<tr>
<td>Beaverhead</td>
<td>23</td>
<td>96</td>
<td>1</td>
<td>7</td>
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<td>Custer</td>
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<td>37</td>
<td>101</td>
<td>57</td>
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<td>153</td>
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<td>432</td>
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<td>1</td>
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<td>63</td>
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<td>644</td>
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<td>Yellowstone</td>
<td>35</td>
<td>.</td>
<td>2</td>
<td>11</td>
<td>48</td>
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Totals 3621 737 668 781 5857

(37) Ibid, column 3.
A bill to make *Lewisia rediviva* the official floral emblem of Montana was introduced at the next session of the State Legislature by Hon. Walter Cooper, of Gallatin, a Democrat, the Republican support being promised by Mr. W. W. Alderson, of Bozeman. When the bill was introduced, Mr. Matt W. Alderson placed on the desk of each legislator of the Fourth Legislative Assembly, a copy of a letter prepared by the State Chairman of the National Floral Emblem Committee, reviewing the campaign, and summarizing the result of the popular vote. Without a dissenting voice, this bill, which read, "The flower known as Lewisia rediviva (bitter root) shall be the floral emblem of the state of Montana", was passed, and was approved by Governor John E. Rickards on February 27, 1895, becoming section 3232, of the Codes of Montana, 1895. It was re-enacted as section 2097, of the Revised Codes of Montana, 1907, and is now section 530 of the Revised Codes of Montana, 1921.

So great was the interest and admiration of the bitter root that it became immediately popular. Case, Gravelle, and Ervin Co., of Butte, sent pressed specimens of the flower to artists in the east, who made competitive designs of the flower, the chosen one being lithographed on the stationery of the firm. Another design of the bitter root, by Frank D. Jones, of Helena, was placed on the souvenir medals presented by the Helena Lodge of Ancient Arabic Order Nobles Mystic Shrine to the members of the Imperial Honolulu Pilgrimage as they passed through Helena upon their return. It has been used on souvenirs, and pictured on calendars. It has been carved on the desk ends in the senate chambers of the state capitol at Helena.

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originated the idea of having William Lidell and Co., of Belfast, Ireland, make a special round thread, double damask table linen in bitter root design. Taking specimens and sketches with him, Mr. Ford went to Ireland, where he consulted with their special designer. Two qualities were woven, one having life size bitter root figures in the center with a border of bitter roots and goldenrod enlarged, the other woven entirely by hand, having a plain center with a double border of bitter roots in an exceptionally beautiful array. (91) The car load order of these fine linens was shipped directly from Belfast to Butte, and were sold in many parts of the state, being counted today among the heirlooms of many of the old families of Montana. (92)

In 1919, throughout the state, there was some discussion of the advisibility of changing the state flower to some blossom more commonly seen, the kinnikinnick receiving favorable comment. However, its extensive range, from Pennsylvania to California, and southern Canada to New Mexico, prevented it being distinctively Montanan, and all discussions came to naught.

*Lewisia rediviva*, while found occasionally in the other mountainous states of the West, grows nowhere so abundantly as in Montana. It was dug here by the Indians in great quantities for uncounted centuries, yet it was never diminished. It was first discovered by the pioneer explorer of this state and by him introduced for the first time to the scientific realm. It is more highly nutritious than any other root of equal size. No amount of drouth can

(91) Mrs. Travers M. Ford, Letter to Genevieve Murray, April 24, 1929. Mrs. Ford now resides at 396 62nd St., Oakland, California.

(92) Mr. W. B. Trenerry. Mr. Trenerry was working for Case, Gravelle, Ervin and Co., and the bitter root linen was sold from his department. Mr. Trenerry now resides in Missoula.
kill it. Dried, pressed under great weight and stored in herbariums, it refuses to die -- truly symbolic of this state that has achieved prosperity in spite of comparative disasters. It is easily adaptable to conventional designs of unusual beauty. Its utility in earlier times and the charm of its dawn-rose blossoms recommended the application of its name to the noble range of mountains, the sheltered, dew-filled valley, and willow-edged river called Bitter Root. These things all tend to make Lewisia rediviva peculiarly "Montana's own flower".

-30-
For Montana's Floral Emblem.

Flower ____________________________

Name of Voter ____________________________

Address ____________________________