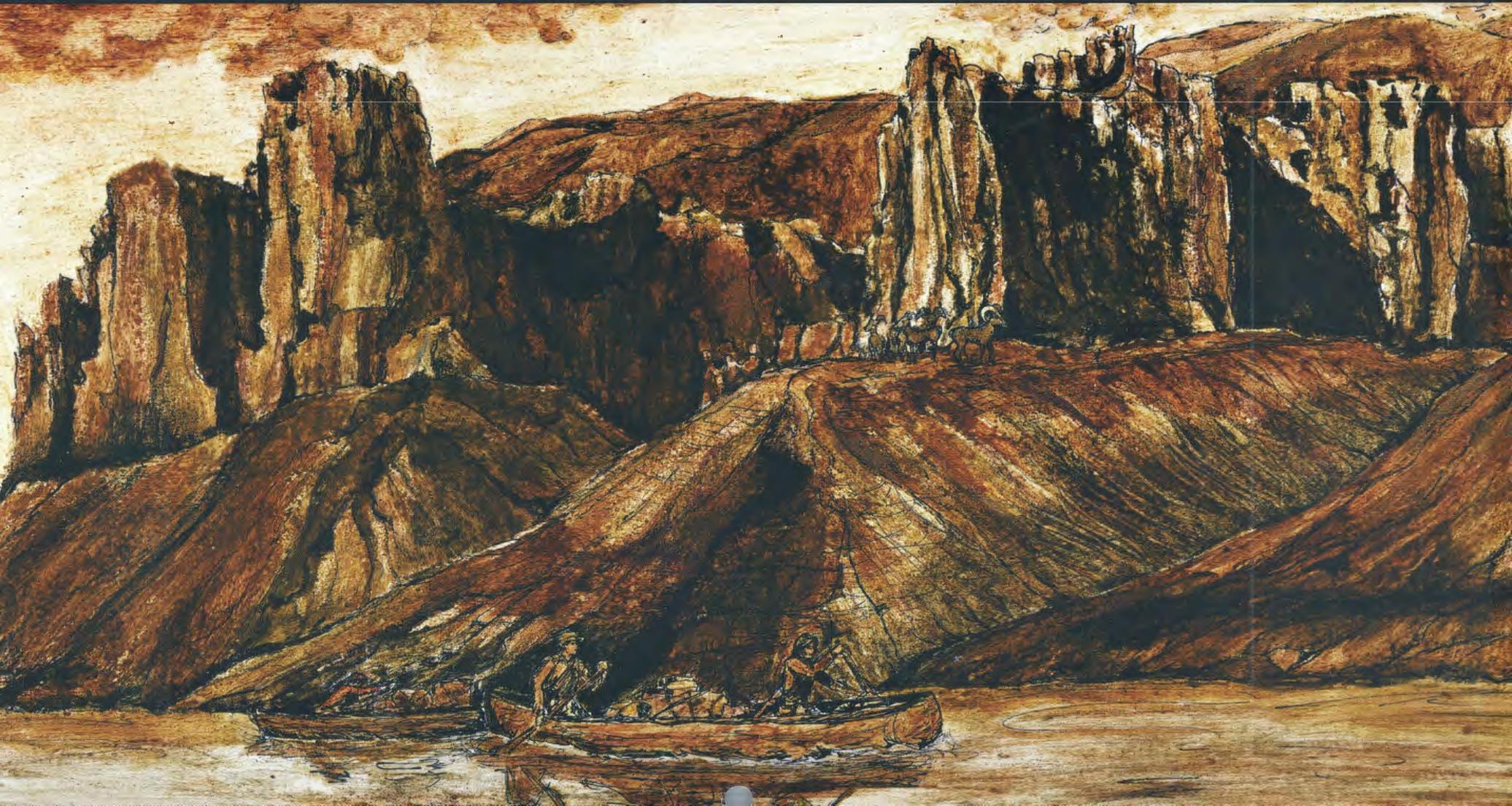


2004 *Soils Planner*

Lewis and Clark Bicentennial: Painting With Soils



Introduction

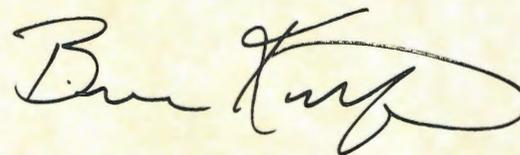
Two hundred years ago, Captains Meriwether Lewis and William Clark and their “Corps of Discovery” set off up the Missouri River into western Montana and to the Pacific Ocean. During the 2003 – 2006 bicentennial observance of this journey, many Americans and others from around the world will retrace the steps of these intrepid explorers and rediscover the wonders they first described. This planner is a celebration of our natural resources, especially our landscapes and soils, in the context of the Lewis and Clark expedition.

Lewis and Clark had specific instructions from President Jefferson to report on factors that would reveal the potential of this vast new land for agricultural purposes. The President wanted the explorers to report on “the soil and face of the country, its growth and vegetable production, especially those not of the United States; the animals of the country generally, and especially those not known in the United States.”

After the first winter, Lewis and Clark sent samples of soil, minerals, and plants and other items back to the President. Their journals contain the first detailed descriptions of the soils, vegetation, and animals native to an area that now spans 18 different states. Several other members of the expedition recorded information on the soils they encountered, including Sergeant Charles Floyd, the only member of the expedition who did not survive the journey. Floyd judged land quality, including soil conditions.

Reports coming out of the Expedition excited Americans. Farmers in New England and the South left rocky or depleted farms to settle large western farms with rich, prairie soil. The Louisiana Territory offered vast amounts of land, much of it fertile and perfect for growing wheat, corn, and cotton.

The Natural Resources Conservation Service is proud to have played a part in the publication of this planning guide. The planner includes some of the contributions that Lewis and Clark made to the documentation of soils and landscapes in the American West. I hope that you will be inspired to take part in the commemoration of the Lewis and Clark bicentennial and learn more about the expedition.



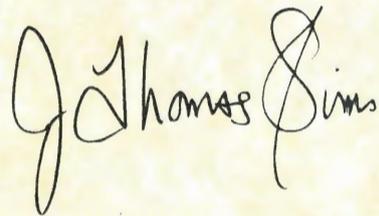
Bruce I. Knight
Chief, Natural Resources Conservation Service

From Our Partners . . .

The Soil Science Society of America (SSSA) is very pleased to participate with the USDA Natural Resources Conservation Service (NRCS) in honoring the historical achievements of Captains Meriwether Lewis and William Clark through publication of the 2004 Soil Planning Guide. The beautiful and truly unique soil paintings in this planner are a wonderful tribute to the courage and curiosity that inspired Lewis and Clark and their "Corps of Discovery" on a visionary journey of exploration from Missouri to the Pacific Northwest.

The Lewis and Clark Expedition provided the first comprehensive view of the breadth and magnificence of the natural resources of the United States. The efforts of Lewis and Clark to systematically describe the properties of soils, their relationship to native vegetation and landscapes, and their potential for agricultural use led to a long-standing national commitment to understand our soils and manage them well.

We celebrate the accomplishments of Lewis and Clark and their "Corps of Discovery" today not only by honoring them during the 2003 – 2006 bicentennial observance but by our continued commitment to preserve, protect, and wisely use our soils. For information on opportunities to become involved in meeting these challenges, please visit the SSSA website www.soils.org.



J. Thomas Sims
President, Soil Science Society of America

The incredible journey of Lewis and Clark through western rangelands captivates our imagination on many levels. Members of the Society for Range Management (SRM) are keenly interested in the Corps of Discovery's first-hand accounts of rangeland ecology, because it gives us a frame of reference for the future. Native Americans used fire to improve forage quality—today, fire remains a valuable management tool for the same purposes, in addition to weed control, water yield, and other rangeland improvements. Rangeland managers regulate the grazing of large herbivores using a knowledge base of the same kinds of information Thomas Jefferson charged Meriwether Lewis and William Clark to gather two centuries ago. SRM members seek and share expertise in soil science, plant and wildlife ecology, grassland and shrubland ecology, economics, and social sciences.

The Society for Range Management has identified three core values of our members; we love the pursuit of knowledge, we love the camaraderie of fellow members, and we love the expansive rangelands that the Corps of Discovery witnessed. These images give us pause to reflect on the human uses of rangelands 200 years ago, and they inspire us to focus on how to conserve these magnificent landscapes.

Today, these same impressive rangeland vistas survive threats of urbanization and habitat fragmentation, and function ecologically because they are working landscapes in private, public and tribal ownership. Lewis and Clark gave us a view of the rangeland world two centuries past. Our challenge is to translate that view of the past into a vision for the future. Without question, it must include a love of land, and fellow humans. Let us hope it includes a spirit of adventure and learning, always.



Bob Budd
President, Society for Range Management

A Garden . . . or a Desert?

From 1804 through 1806, Captains Meriwether Lewis and William Clark and their "Corps of Discovery" followed the Missouri River into western Montana and then traveled to the Pacific Ocean and back by horseback, foot, and canoe. At the time, the relatively young United States was growing fast in population. There was concern that the farmland might not be enough to sustain the nation. The new immigrants from Europe were looking to the West and curious as to the value of that land for agriculture. Was the West a garden or a desert? The French explorers from the Northwest described a garden. The Spanish in the Southwest described a desert.

President Jefferson asked Lewis and Clark to report on factors that would reveal the potential of this vast new land for agriculture. The President's letter called for observations on "the soil and face of the country, its growth and vegetable production, especially those not of the United States." The Lewis and Clark Expedition members evaluated the land by soil properties and the number and kinds of plants and animals that the soils supported. Searching through the journals and letters of the Lewis and Clark Expedition, the NRCS soil scientists found descriptions of soil properties and landscapes similar to what they collect today. Spelling aside, the Lewis and Clark descriptions coincided with descriptions of soils that are recorded in our modern soil surveys.

Lewis and Clark's descriptions of good agricultural soils were dark, friable ("mellow") loams, that were not too steep or rocky for cultivation, and were deep or very deep to hard rock (greater than 6 feet or a man's length). The journals described areas best suited to agricultural settlement as extending from Wood River to the Platte River, the area at the junction of the North Fork and main branch of the Clearwater River, and the valley between the Coast and Cascade Ranges. Thomas Jefferson's view of the scarcity of timber on the prairies is indicated in his report to Congress on November 14, 1803: "The land is represented as too rich for the growth of forest trees." Lewis and Clark noted that a scarcity of timber could hinder agricultural settlement, but Lewis indicated that this scarcity was caused by fire (set and

managed by Indian tribes throughout the West) rather than by inferior soil quality. For both Lewis and Clark, the extent and height of the prairie grasses and the population of deer, elk, buffalo, and other wildlife indicated the fertility of the soils in the prairie country.

The worst soils for agriculture were sandy or excessively clayey, rocky, hard, steep and broken, shallow or very shallow, and/or too dry or too wet. The "worst soils" were in the "desert" areas at the Missouri River Breaks; in clayey areas along the Marias River; in a "mere Desert" in southern Cascade County, Montana; in clayey areas on "poor sterile" uplands along the Jefferson River, Gallatin County, Montana; on a "Sandy plain or desert" in Beaverhead County, Montana; and in the "high desert mountains" along the Lolo Trail in Idaho. These areas were described as having little, if any, game.

Jefferson's charge to Lewis and Clark reflected the need of a young nation to know and understand its natural resources. In truth, the reports were that the West was both a desert and a potential garden. By the end of the 1800s, the United States saw the need for a national inventory to document potential productivity of the land. The result was the National Cooperative Soil Survey. The Soil Conservation Service (the predecessor to today's Natural Resources Conservation Service) was created to provide leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. What our land has to offer and how we manage it remains crucial to our economic and environmental well-being, even if we never set foot on a farm or ranch. While much has changed on the landscape since the Lewis and Clark expedition, none of us has lost our dependence on the land and what it has to offer. Communities and local governments work with NRCS State Offices and local USDA Service Centers to help them protect their natural resources. For more information about natural resources and conservation in your own backyard, contact the NRCS at <http://www.nrcs.usda.gov> or volunteer locally by calling 1-888-LANDCARE.

Lewis & Clark Timeline

Late July 1805— The expedition comes across the three forks of the Missouri. Lewis and Clark name them the Gallatin (after the Secretary of the Treasury), the Madison (after the Secretary of State), and the Jefferson. The men continue their journey, traveling up the Jefferson, which is shallow and swift.

September 11, 1805— The men ascend into the Bitterroot Mountains. While in the mountains, the men run short of supplies and experience extreme hunger.

October 17, 1805— The men reach the Columbia River, which is teeming with salmon.

November 18, 1805— The expedition reaches the Pacific Ocean.

March 23, 1806— The expedition sets off for home.

July 3, 1806— The expedition splits off into smaller units for the purpose of exploring the Louisiana Territory.

July 25, 1806— The unit headed by Clark re-enters the Great Plains and runs into a sandstone outcropping (east of Billings, Montana), which Clark names Pompey's Tower, after Sacagawea's son, who has been nicknamed Little Pomp. Clark also inscribes his name and the date on the rock face. The inscription remains to this day.

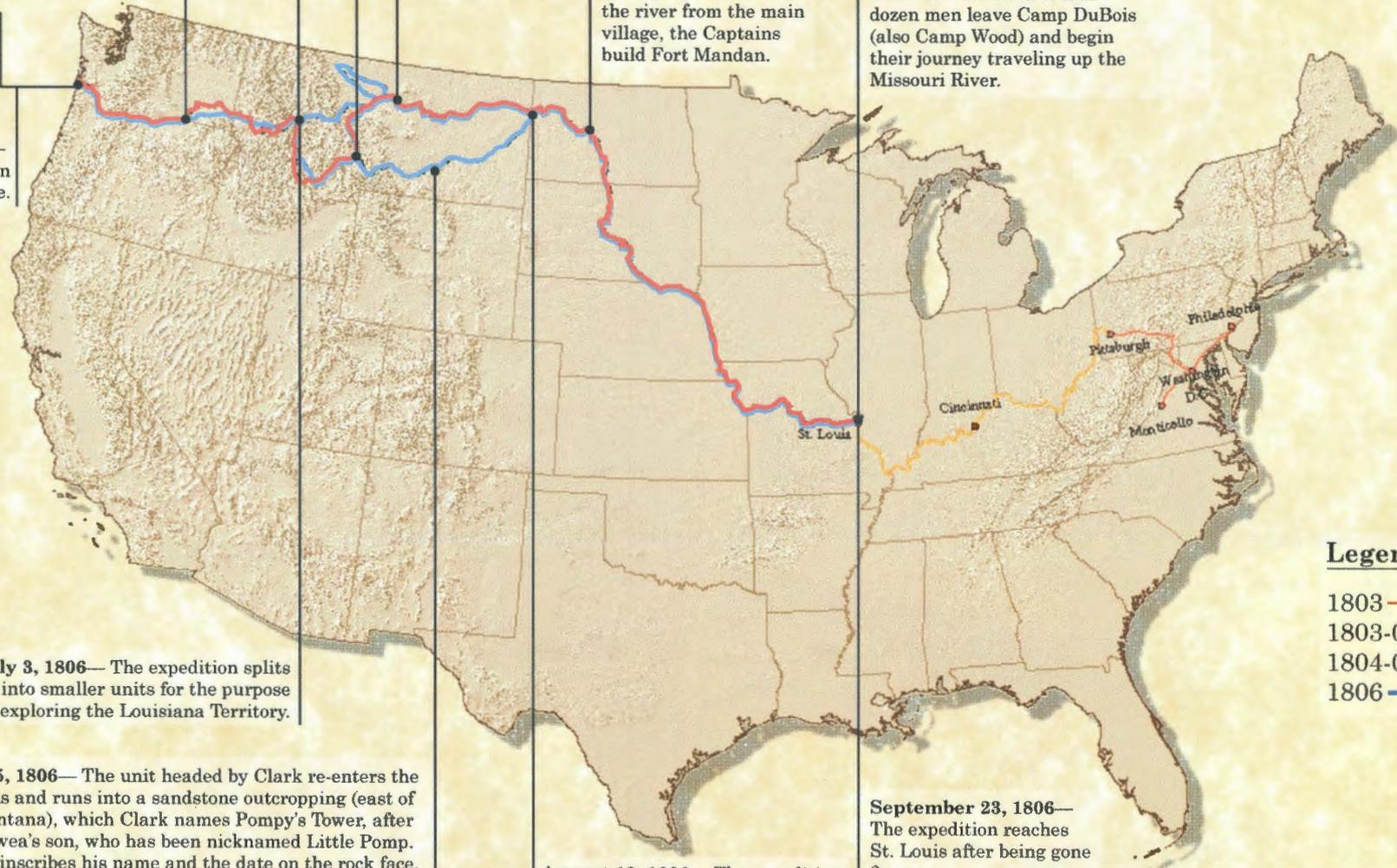
April 31, 1805— The expedition enters the sandstone formations that are now named the White Cliffs of Missouri. To this day, this section of the river is protected by Congress and remains the most unspoiled region of the Lewis and Clark route.

October 24, 1804— The men run into the Mandan's and Hidasta's villages (North of what is now Bismarck, ND) which were inhabited by an estimated 4,500 people. Across the river from the main village, the Captains build Fort Mandan.

May 14, 1804— The expedition begins. Clark and his team of four dozen men leave Camp DuBois (also Camp Wood) and begin their journey traveling up the Missouri River.

September 23, 1806— The expedition reaches St. Louis after being gone 2 years.

August 12, 1806— The expedition is reunited downstream from the mouth of the Yellowstone.



Legend

- 1803 — orange line
- 1803-04 — yellow line
- 1804-05 — red line
- 1806 — blue line

Painting With Soil

Soils are one of our most important natural resources. They also are important for the beauty their many colors add to our landscape. Most of us overlook this natural beauty because we see it every day. Often these colors blend with vegetation, sky, water, etc. Soil colors serve as pigments in bricks, pottery, and artwork.

The color and texture of soil painting is fascinating and a creative opportunity for all ages of students.

Materials:

- Soil (dried in air)
- Hammer/mallet
- Mortar and pestle (rubber-tipped)
- Paper cup (4 oz.)
- Pencils
- Ink pens (black, different tip sizes)
- Paint brushes (different kinds and sizes)
- Artist acrylic (clear gloss medium)
- Sponges and rags
- Water color paper
- Masking tape

Procedure:

Soils

1. Gather many colors of soil.
2. Place dried soil on a piece of paper and crush into pieces with hammer or mallet. (Figure A.)

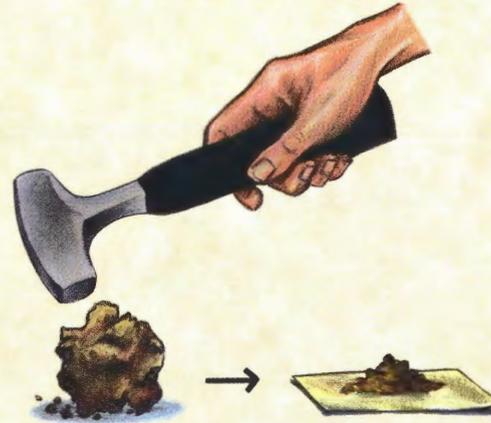


Figure A

3. Place some of the crushed soil into a mortar. Use a rubber-tipped pestle to crush the soil into a fine powder. Repeat to crush all of the different colored soils.



Figure B



Figure C

4. Place some powdered soil in a paper cup. Wrap a knee-high hose over the top 2 or 3 times. Turn cup upside down over a piece of paper and gently shake out finely powdered soil.
5. Place the different soils in paper cups. Notice the colors and textures.

Artwork

1. Lightly sketch artwork on water-color paper with pencil. When satisfied with composition, use ink for permanent lines.
2. With masking tape, carefully tape paper edges to table or board. This is done so that the artwork will dry flat.
3. Pour small amount of artist's clear acrylic paint in small paper cups. Add small amounts of finely powdered soil. You may also want to add a few drops of water to the soil mix.

4. Experiment with depth of color and mixing the different soils.
5. Use different sizes and kinds of paint brushes, sponges, and rags. Experiment and have fun.
6. Layering the colors. When your artwork is dry, you may want to apply another layer of soil paint.
7. You may want to use a black ink pen to make finishing touches on your artwork.

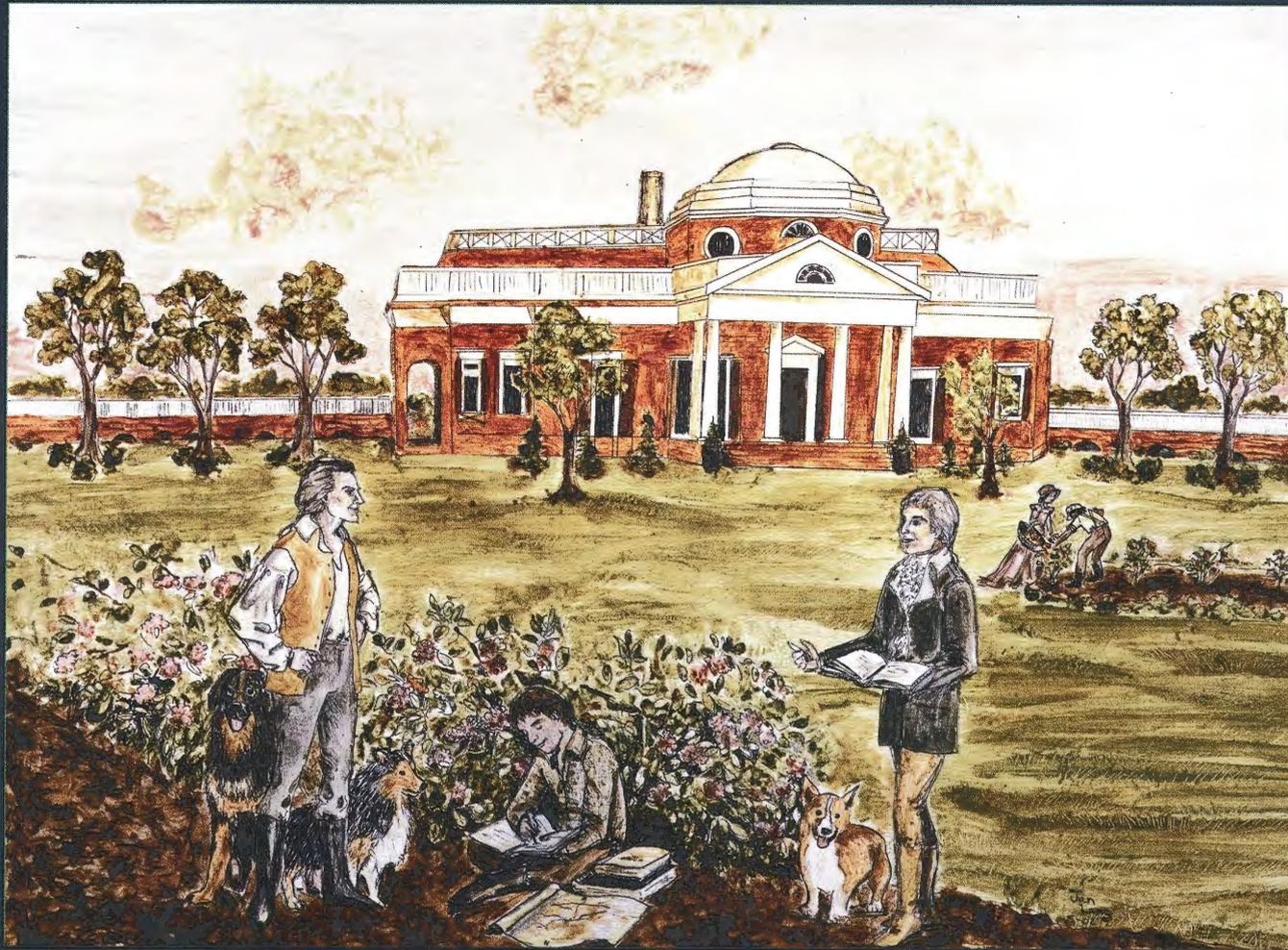
Activity Time:

The estimated time is about 1 or 2 hours.

Janis Lang, the artist who produced the soil paintings featured in this planner, is a Physical Science Technician with the NRCS Soil Survey Laboratory in Lincoln, Nebraska. Janis has based the soil painting activity given above on the techniques she used to produce these paintings.

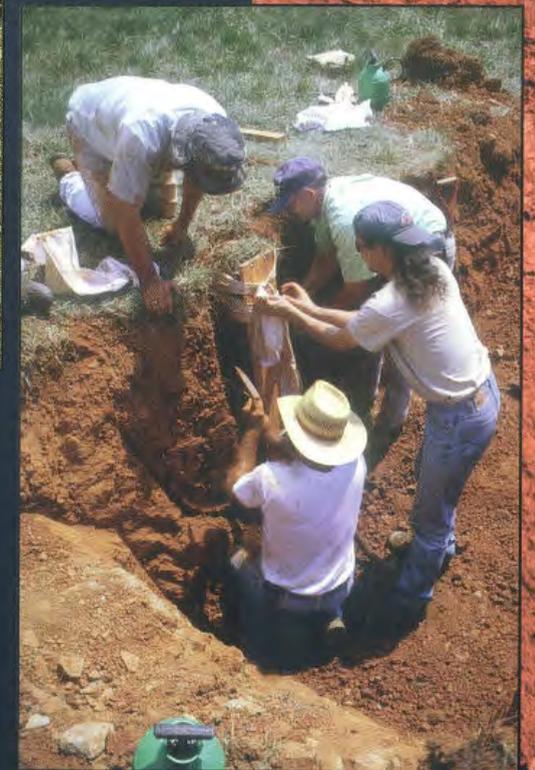
“The trick with painting with landscapes is that it’s normally hard to get the color right. But when I paint with soil, the color comes from nature—and it’s exactly right.”

—Janis Lang



Monticello: Meriwether Lewis with Thomas Jefferson

To celebrate the commencement of the 200th anniversary of the Lewis and Clark expedition, a team of Virginia State NRCS personnel took a profile of the local Piedmont Soil found on the grounds of Monticello, home of President Thomas Jefferson. This entails excavating a trench and carefully cutting out a slab of the trench face, preserving the layers of soil. Jefferson's letter to Captain Lewis, quoted below, shows the interest he took in the soils of the newly acquired territories.



Monticello, VA

January 2004

| December 2003 | | | | | | |
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| February 2004 | | | | | | |
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Quote from Thomas Jefferson to Meriwether Lewis:

"Other objects worthy of notice will be; **The soil and face of the country**, its growth and vegetable productions, especially those not of the United States; The animals of the country generally, and especially those not known in the United States; The remains and accounts of any which may be deemed rare or extinct; The mineral productions of every kind, but more particularly metals, lime-stone, pit-coal, and saltpetre; salines and mineral waters, noting the temperature of the last, and such circumstances as may indicate their character; Volcanic appearances; Climate, as characterized by the thermometer, by the proportion of rainy, cloudy, and clear days; by lightning, hail, snow, ice; by the access and recess of frost; by the winds prevailing at different seasons; the dates at which particular plants put forth, or lose their flower or leaf; times of appearance of particular birds, reptiles or insects.

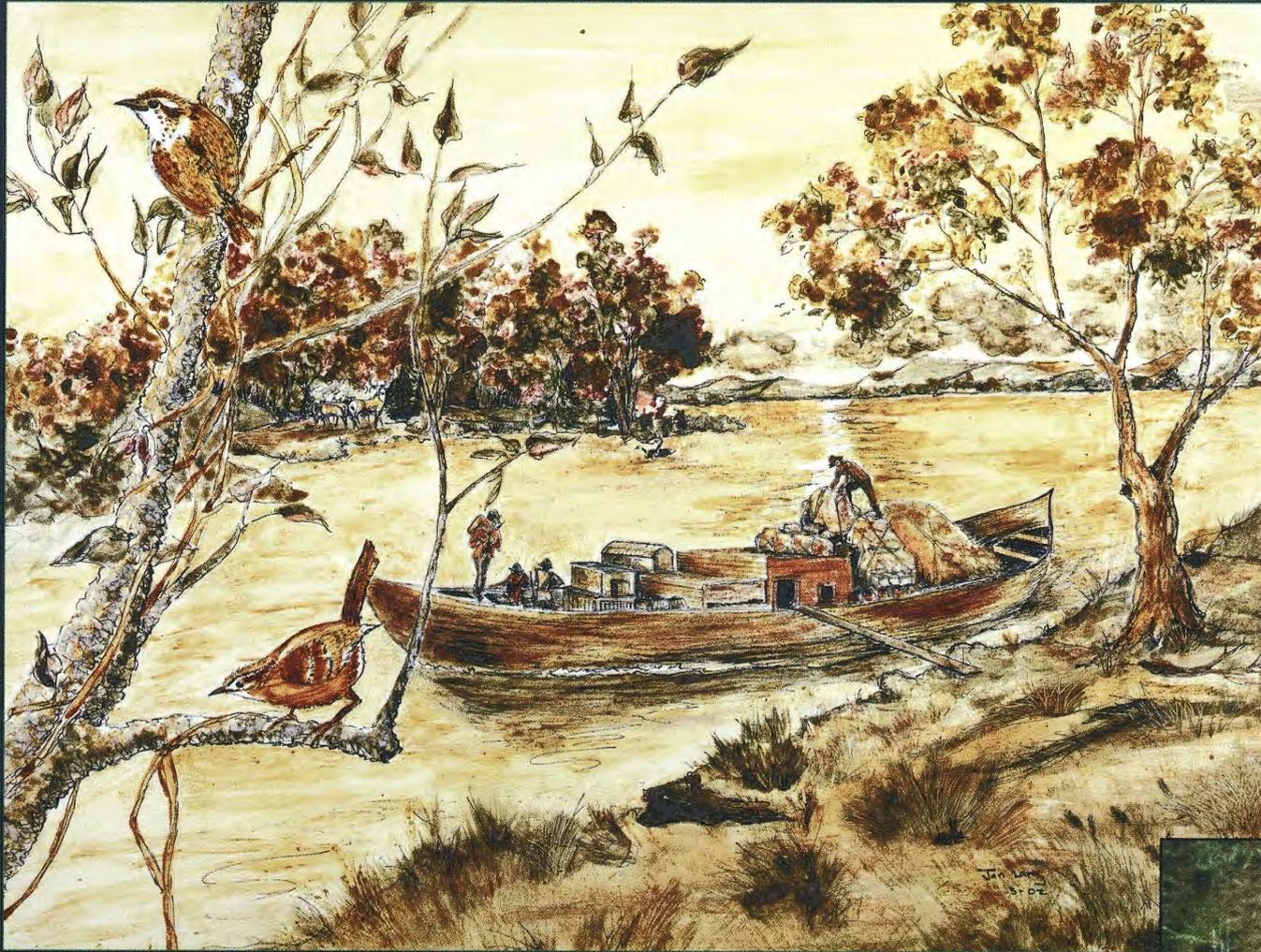
Given under my hand at the city of Washington, this twentieth day of June, 1803.

Thomas Jefferson, President of the United States America"

Events

25-30
Society for Range Management Annual Meetings
 Salt Lake City, UT

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|--|---------|-----------|-------------------------|--------|----------|
|  |  | | | 1 New Year's Day | 2 | 3 |
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| 18 | 19 Martin Luther King, Jr.'s Birthday <i>(Observed)</i> | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |



Keel Boat & Bird

Then and Now— At far right is an early 19th century theodolite, an instrument used in land surveying, along with a compass in its carrying case. Behind them is a list of the “mathematical instruments” purchased for the expedition. This equipment is similar to what our soil scientists used to survey at the beginning of the 20th century. Today, NRCS personnel use the descendants of many of these tools in their everyday work. At right, an NRCS soil scientist conducts a soil survey. The instrument in her backpack is a global positioning system (GPS). The GPS tracks her exact position by satellite signal.



Near St. Louis, MO

February 2004

| January 2004 | | | | | | |
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| March 2004 | | | | | | |
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The Platte County area was noted in Clark's journal, dated Wednesday, July 4, 1804. It contains mention of Gosling Lake, the naming of Independence Creek across the river in Atchison, Kansas, as well as a good example of how awestruck the Captain was by the area's beauty:

"...Set out early passed the mouth of a Beyeu [bayou] leading from a Lake on the S.S. this Lake is large and was once the bend of the River, it reaches Parrelel for Several miles, Came to on the L.S. to Dine & rest a Short time, a Snake bit Jo: Fields on the Side of his foot which Swelled much, apply Barks to the wound, pass a Creek on the L.S. about 15 yards wide cuming out of an extensive Prarie as this Creek has no name, and this day is the 4th of July, we name this Independence us. [U.S.] Creek ...We Camped in the plain one of the most butifull Plains, I ever Saw, open & butifully diversified with hills & valies all presenting themselves to the river covered with grass and a few scattering trees a handsom Creek meandering thro at this place the Kansaw Inds. formerly lived and had a very large Town passed a Creek I observed Spring braking out of the bank, a good Situation for a fort on a hill at the upper part..."

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
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| 15 | 16 President's Day | 17 | 18 | 19 | 20 | 21 |
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29



Today, the Missouri River separates agriculture from the city life as it flows past the Missouri State Captiol in Jefferson City.

Events

1-5
NACD - National Association of Conservation Districts Annual Meeting
Hilo, HI



Volcano Hill, Nebraska

Geologic investigations suggest that the bluffs along the south side of the Missouri River are rocks in the Cretaceous Carlile Formation (Simpson, 1960). The slope profile at top right shows the probable distribution of rock layers in Volcano Hill. It appears the Missouri River was eroding the contact zone between the lowest member of the Carlile Formation, the Fairport chalky shale, and the next higher layer, the Blue Hill shale. The Fairport chalky shale contained the iron sulfide whose oxidation upon exposure to the river water produced the steam noted by Lewis and Clark. Below right is a view from the top of Volcano Hill as it appears today.



Volcano Hill Slope Profile



Volcano Hill, NE

March 2004

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Clark's description of the "Ionia Volcano" (Dixon County, Nebraska), August 24, 1804: "Commencement of a blue Clay Bluff of 180 or 190 feet high on the L. S. Those Bluffs appear to have been laterly on fire, and at this time is too hot for a man to bear his hand in the earth at any debth..." (Moulton, vol. 2, p. 505).

In 1804, "Volcano Hill" along the south bluff of the Missouri River in northeast Nebraska, did have a sulfuric smell and steam rising like a volcano. At that time the river flowed at the base of the bluff.

Today the river is about a mile north of the bluff. There is now cropland in the floodplain between the bluff and the river.

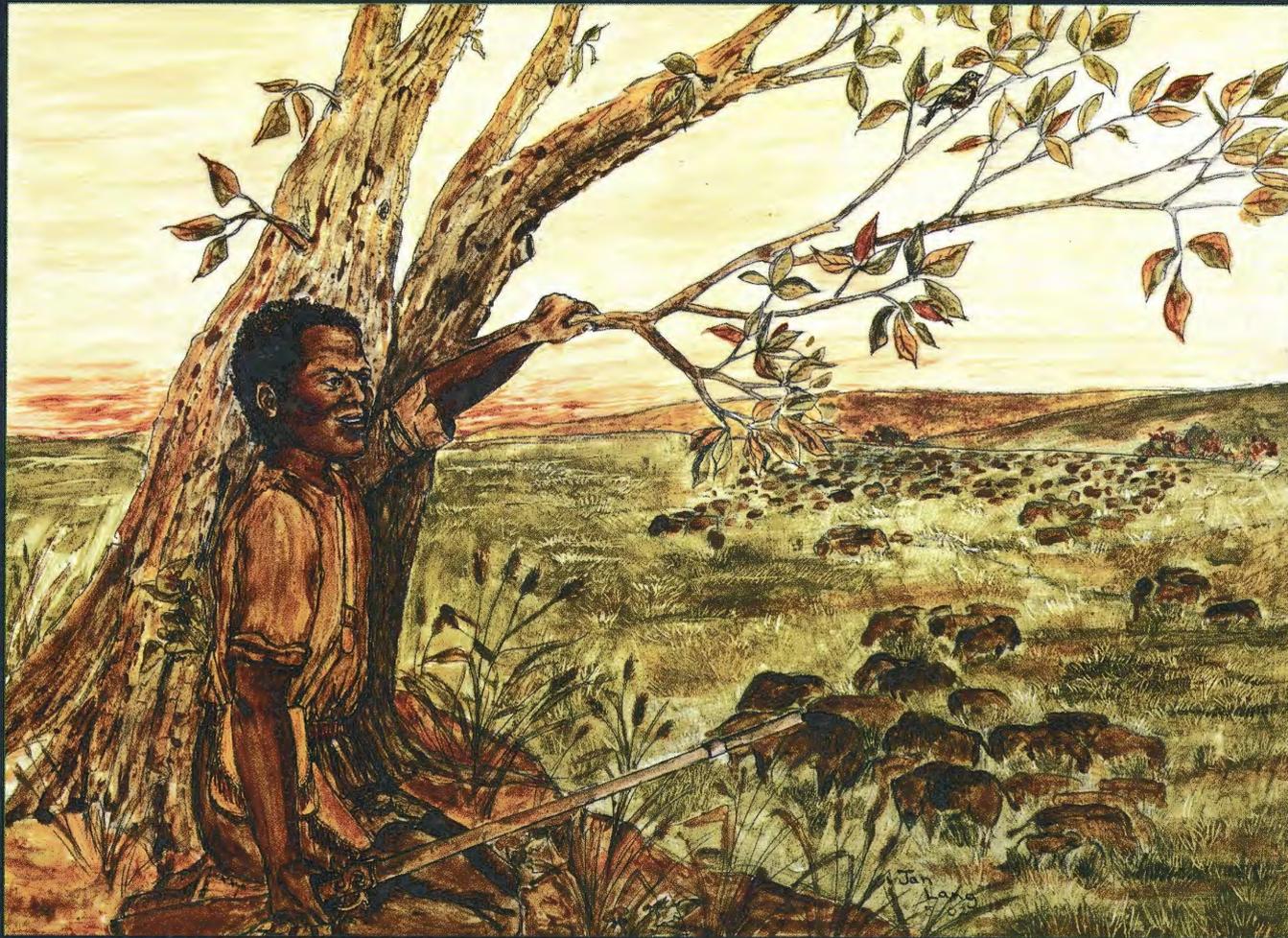
Clark's entry in his journal recorded the awe felt by the expedition members at the smoking bluffs, which appeared to be on fire. On closer inspection, they found them to be very hot with rock that looked like coal or cobalt.

Investigators some 150 years later concluded that the "smoke" from "Volcano Hill" was steam formed when the Missouri River was high and water could enter the bank through joints in the rocks. Riverbank erosion kept exposing fresh layers of rock to oxygen. Heat and steam were generated as iron sulfides were oxidized.

Events

12-14
Three Flags Ceremony
St. Louis, MO

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| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 |  | | The Missouri River seen from the top of Volcano Hill. The river once flowed at the base of this hill. |



York Hunting Buffalo, South Dakota

August 25, 1804, was a stifling hot day when members of the Lewis and Clark Corps of Discovery visited Spirit Mound. They came to the site because they had heard that little people with big heads inhabited the mound. It was rumored that the little people, whom some called "little devils," could kill people with their arrows at great distances. At the mound the expedition did not find any little people, but did find a "most butifull landscape."

Above, Spirit Mound as it appears today. The soils comprising the Mounds of southwestern South Dakota are Ethan-Betts for the most part.

Ethan soils (seen in profile at right) are well drained and are on side slopes and in the less steep areas. Slopes range from 15 to 25 percent. Typically, the surface layer is dark grayish brown, calcareous loam. The subsoil is grayish brown and pale brown, friable, calcareous loam. The underlying material is pale brown and very pale brown, mottled, calcareous clay loam.



South Dakota

April 2004

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...the shortness and virtu[e] of grass gave the plain the appearance throughout its whole extent of beautiful bowling-green in fine order...this scenery already rich pleasing and beautiful was still farther heightened by immense herds of Buffalo, deer Elk and Antelopes which we saw in every direction feeding on the hills and plains. I do not think I exaggerate when I estimate the number of Buffalo which could be comprehended at one view to amount to 3000.

—Captain Lewis
September 17, 1804

Jefferson on the scarcity of trees on the prairies: "That part of Upper Louisiana which borders on North Mexico is one immense prairie. It produces nothing but grass. It is filled with buffalo, deer, and other kinds of game. The land is represented as too rich for the growth of forest trees"

(Description of Louisiana, 8th Congress, 1st Session, November 14, 1803, *American State Papers*, Class X, Miscellaneous, vol. 1, p. 346).

Events

1-4
National Science Teachers Association (NSTA) National Meeting
Atlanta, GA

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| 18 | 19 | 20 | 21 | 22 Earth Day | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 National Arbor Day |  |



People of the Plains (Indian Burning the Plains)

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| June 2004 | | | | | | |
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May 2004

Fort Mandan, ND

Lewis to his mother, from Fort Mandan, March 31, 1805, writing about the scarcity of timber north of the Platte River:

"This want of timber is by no means attributable to a deficiency in the soil to produce it, but owes its origin to the ravages of the fires, which the natives kindle in these plains at all seasons of the year" (Jackson, vol. 1. p. 224).

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| 23/30 | 24/31 | 25 | 26 | 27 | 28 | 29 |
| | Memorial Day | | | | | |

Events

13-16
Expedition's Departure
Hartford, IL

14-23
St. Charles - Lewis and
Clark Celebration
St. Charles, MO



Mother & Child (Traveling Tribal Village)

June 2004

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| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

Our party now consisted of the following individuals:

Sergeants: John Ordway, Nathaniel Pryor, Patrick Gass
Privates: William Bratton, John Colter, Reuben Fields, Joseph Fields, John Shields, George Gibson, George Shannon, John Potts, John Collins, Joseph Whitehouse, Richard Windsor, Alexander Willard, Hugh Hall, Silas Goodrich, Robert Frazer, Peter Cruzat, John Baptiste Lepage, Francis Labiche, Hugh McNeil, William Warner, Thomas P. Howard, Peter Wiser, John B. Thompson

Interpreters: George Drouilliard and Toussaint Charbonneau; also a black man by the name of York, servant to Captain Clark; an Indian woman, wife to Charbonneau, with a young child; and a Mandan man who had promised us to accompany us as far as the Snake Indians...The party are in excellent health and spirits, zealously attached to the enterprise, and anxious to proceed.

— Captain Lewis,
 Fort Mandan, 7 April 1805

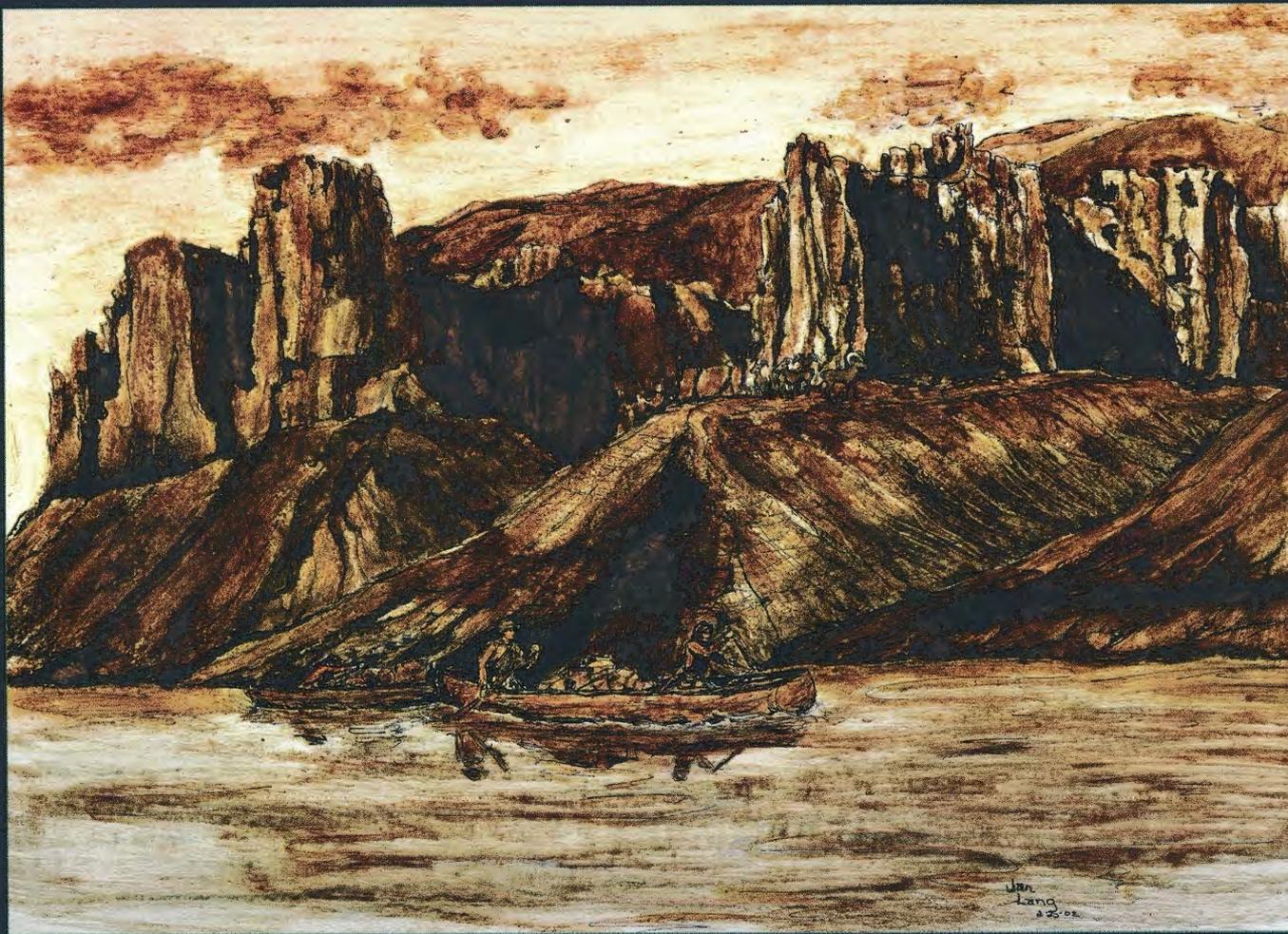
Events

6-9
 National Cooperative Soil Survey (NCSS) - West Regional Work Planning Conference
 Jackson, WY

7-11
 NCSS - South Regional Work Planning Conference
 Biloxi, MS

20-24
 NCSS - Northeast Regional Work Planning Conference
 Davis, WV

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--|--------|---------|-----------|---|--------|----------|
| Ryan soil profile near Fargo, ND. It is a Vertisol, with a high salt content, causing columns to form in the natric horizon seen at the bottom of the picture.  | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 |  NRCS employees taking a soil profile of Ryan soil, near Fargo, ND. See description above. | | |



White Cliffs of the Missouri River, Montana

The rock formations seen by Lewis and Clark at the White Cliffs area of the Missouri Breaks in May of 1805 were made up of Virgelle Sandstone. At right are the White Cliffs as they appear today. The elloam soil profile seen at far right is typical of the plains along the Marias River, Valley County, Montana. Lewis described these soils on July 17 and 18, 1806: "The plains are more broken than they were yesterday and have become more inferior in point of soil small gravel is every where distributed over the surface the soil is generally a white or bluish clay, this where it has been trodden by the buffaloe when wet has now become as firm as brickbat..." (Moulton, vol. 8, p. 118).



Montana

July 2004

| June 2004 | | | | | | |
|-----------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | | | |

| August 2004 | | | | | | |
|-------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

Lewis on the White Cliffs area of the Missouri River Breaks, Chouteau County, Montana, May 31, 1805:

“The hills and river Clifts which we passed today exhibit a most romantic appearance. The bluffs of the river rise to a height of from 2 to 300 feet and in most places nearly perpendicular; they are formed of a remarkable white sandstone which is sufficiently soft to give way readily to the impression of water...the earth on the top of these Clifts is a dark rich loam, which forming a gradually ascending plain extends back from 1/2 a mile to a mile where the hills commence and rise abruptly to a hight of about 300 feet more” (Moulton, vol. 4, p. 225).

Events

3-4
Heart of America
Kansas

12-16
NCSS - North Central
Regional Work Conference
Indianapolis, IN

24-28
Soil and Water Conservation
Society Annual Meeting
St. Paul, MN

25-August 3
Boy Scouts National
Jamboree
Fort A. P. Hill, VA

31-August 3
First Tribal Council
Nebraska, NE

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--|--------|---------|-----------|----------|--------|----------|
| <p>Buffalo grazing on the glaciated till plains of Montana.</p>  | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Independence Day | | | | | | |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| | | | | | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | | | | | | |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| | | | | | | |



Idaho Prairie

The painting above illustrates short grass prairie in Idaho. The photographs at right show the mixture of plants found in the long grass prairie of Iowa. Purple prairie cornflower, seen at far right, is among the plants and forbs featured in a reconstructed prairie planting in central Iowa.



The Great Prairie

August 2004

| July 2004 | | | | | | |
|-----------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

| September 2004 | | | | | | |
|----------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

From Nicholas Biddle's notes taken during an interview with Clark, April 1810: "The Prairie are not as one would suppose from the name, meadows or bottoms but a sort of high plain or rolling colline—without timber—some high forests retain timber—but generally along margins of creeks & rivers most timber—caused by waters stopping fire..." (Jackson, vol. 2, p. 507).

Ordway on Weippe Prairie, Clearwater County, Idaho, June 10, 1806: "this level consists of about 2000 ackers of level Smooth prarie on which is not a tree or Shreub, but the lowest parts is covred with commass...a fine timbred country all around this rich land the Soil is deep black & verry rich & easy for cultervation" (Moulton, vol. 9, p. 321).

Events

July 25-August 3
Boy Scouts National Jamboree
 Fort A. P. Hill, VA

July 31-August 3
First Tribal Council
 Nebraska City, NE

27-September 26
Oceti Experience
 Tribal lands, SD

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|---|----------|--------|----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 |  | | | |



Sacagawea Guiding the Expedition

Eastern Montana

The Indian woman recognizes the country and assures us that this is the river on which her relations live, and that the Three Forks are at no great distance. This piece of information has cheered the spirits of the party, who now begin to console themselves with the anticipation of shortly seeing the head of the Missouri, yet unknown to the civilized world. The large creek which we passed on starboard, 15 yards, we call White Earth Creek from the circumstance of the natives procuring a white paint on this creek.

— Captain Lewis, 22 July 1805

Events

August 27-September 26
Oceti Experience
Tribal lands, SD

September 2004

| August 2004 | | | | | | |
|-------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

| October 2004 | | | | | | |
|--------------|----|----|----|----|----|-----|
| S | M | T | W | T | F | S |
| | | | | | | 1 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24/31 | 25 | 26 | 27 | 28 | 29 | 30 |

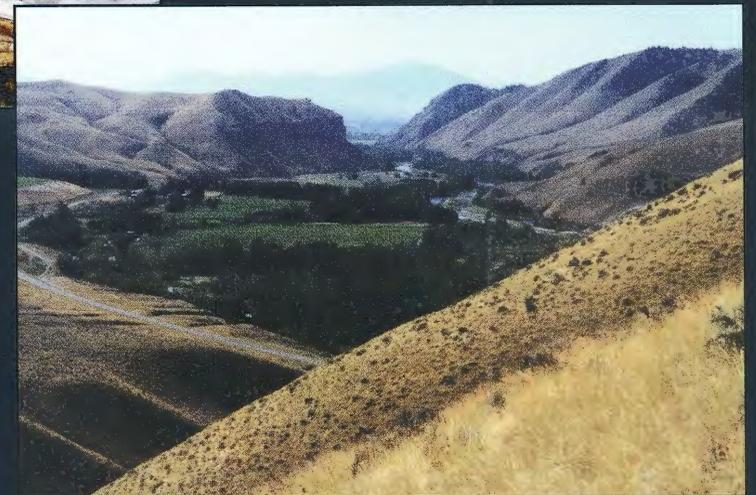
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--|----------------|---------|-----------|----------|---|----------|
|  | | | 1 | 2 | 3 | 4 |
| 5 | 6 Labor Day | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 |  | |



Bitterroot Mountains, Idaho

Above, the crossing of the Bitterroot Mountains in early September 1805.

The photo at top right shows a marker commemorating the encampment of the Corps at the foot of the Lemhi Pass on August 12, 1805. At right below is a view of the Salmon River canyon. On their approach to the Bitterroot Mountains, the expedition camped on August 21, 1805, at the foot of the jutting Tower Rock, seen at left in the photo.



Western Montana and Idaho

October 2004

| September 2004 | | | | | | |
|----------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

| November 2004 | | | | | | |
|---------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

Lewis on the soil in the Bitterroot Valley, near Travelers' Rest, September 9, 1805:

"the land through which we passed is but indifferent...white gravelly soil" (Moulton, vol. 5, p. 192).

Clark further described the terrain in the Bitterroot Mountains in a note of September 16, 1805:

"It began to snow three hours before dawn and continued all day, piling up as high as six to eight inches." Clark walked in front to find the trail and found "great Dificuelty in keeping it" because of the snow. "I have been wet and as cold in every part as I ever was in my life...passing emince Difficuelst Knobs Stones much falling timber and emencely Steep."

Events

22-31
Circle of Cultures
Bismarck, ND

27-30
Future Farmers of America
(FFA) 2004 National
Meeting
Louisville, KY

31-November 4
ASA, CSSA, SSSA Annual
Meeting
Seattle, WA

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|--------------------|---------|-----------|----------|--------|----------|
|  | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 Columbus Day | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24/31 | 25 | 26 | 27 | 28 | 29 | 30 |



View of the Sea

At right is a view of the Pacific from the Oregon coast, such as greeted Lewis and Clark upon their arrival at the Columbia River Estuary.

Clark estimates that they have traveled 4,162 miles from the mouth of the Missouri to the Pacific.

This estimate turns out to be within 40 miles of the actual distance.



Oregon Coast

November 2004

| October 2004 | | | | | | |
|--------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24/31 | 25 | 26 | 27 | 28 | 29 | 30 |

| December 2004 | | | | | | |
|---------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

Thinking he sees the end of land in the distance, Clark writes his most famous journal entry on November 7, 1805: "Ocian in view! O! the joy." [His spelling] But they're actually only at the eastern end of Gray's Bay, still 20 miles from sea. Fierce Pacific storms, rolling waters, and high winds pin them down for nearly three weeks, "the most disagreeable time I have experienced," according to Clark.

Events

11-13
American Indian Science and Engineering Society (AISES) Annual Meeting Anchorage, AK

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|---|------------------------|---|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 Veterans Day | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 Thanksgiving Day | 26 | 27 |
| 28 | 29 | 30 |  | | View of the Oregon coast and Tillamook Bay. | |



Ft. Clatsop, Oregon

The choice of location in which to winter was decided by a majority vote among the Corps of Discovery. Significantly, those voting included both Captain Lewis' black slave York and the Indian woman, Sacagawea. This was 60 years before the emancipation and enfranchisement of slaves, and more than a century before women or Indians were granted full rights of citizenship. A 1955 community-built replica of the explorers' 50x50 foot Fort Clatsop is the focus of a 125-acre park. The fort, historic canoe landing, and spring are nestled in the coastal forests and wetlands of the Coast Range as it merges with the Columbia River Estuary.



December 2004

| November 2004 | | | | | | |
|---------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

| January 2005 | | | | | | |
|--------------|-------|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23/30 | 24/31 | 25 | 26 | 27 | 28 | 29 |

Ft. Clatsop, Oregon

"The year commenced with a wet day; but the weather still continues warm; and the ticks, flies and other insects are in abundance, which appears to us very extraordinary at this season of the year, in a latitude so far north. ... We gave our Fortification the name of Fort Clatsop."

— Patrick Gass
January 1, 1806

"we now discover that we have found the most practicable and navigable passage across the Continent of North America; it is that which we traveled with the exception of that part of our rout from the neighbourhood of the entrance of Dearborn's River untill we arrived on the Flat-head (Clarks) river at the entrance of Travelers rest creek; the distance between those two points would be traveled more advantageously by land as the navigation of the Missouri above the river Dearborn is laborious...the best and most Practicable rout across the Continent is by way of the Missouri (falls of Missouri) to the entrance of Dearborn's river or near that place; from thence to flathead (Clarks) river (by land to) at the entrance of Traveller's rest Creek, from thence up Traveller's rest creek to the forks, from whence you puruse a range of mounttains which divides the waters of the two forks of this creek, and which still continuing it's Westwardly course divides the waters of the two forks of the Kooskooske river to their junction; from thence to decend this river by water to the S.E. branch of the Columbia, thence down that river to the Columbia and with the latter to the Pacific Ocean."

— Captain Lewis
February 14, 1806

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|--------|---------|-----------|----------|--------|-----------|
|  | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | Christmas |

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January

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February

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March

Patrick B. McGrane, NRCS

April

NRCS Staff, South Dakota State Office

July

Figures 1. and 2. Mike Crosby and Terry Whittier, BLM, Idaho
Figure 3. Chuck Gordon, NRCS

October

Steven Wright, BLM, Idaho

November

NRCS Staff, Oregon State Office

December

NRCS Staff, Oregon State Office

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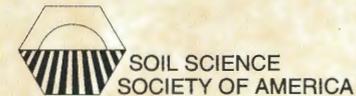
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The PBS Lewis and Clark Archives available at: <http://www.pbs.org/lewisandclark/>

For more information about natural resources and conservation in your own backyard, contact the NRCS at <http://www.nrcs.usda.gov> or volunteer locally by calling 1-888-LANDCARE.



View of the Rocky Mountains



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