“O! How HORRRIABLE IS THE DAY”: weather, climate, and Lewis & Clark

The Corps of Discovery’s “retrograde maneuvers”

Gunshots at Grinder’s Stand: What was the sequence?
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**On the cover**

Michael Haynes’s painting *Northern Lights* shows three members of the Corps of Discovery—Lewis, Clark, and the sergeant of the guard—viewing a display of *Aurora borealis* on the night of November 6, 1804, when the explorers were constructing Fort Mandan. It was the second of three such meteorological light displays they would witness. For more on meteorology and the expedition, see the companion articles by Terrence R. Nathan and Vernon Preston beginning on pages 10 and 19, respectively.
In further praise of the beleaguered Charbonneau

I read with interest H. Carl Camp's piece "Rethinking Toussaint Charbonneau" (Soundings, August 2005). His reappraisal of the Corps of Discovery's interpreter is perceptive. Charbonneau deserves a better reputation than he has been given. Surely he would have been a fellow worthy knowing.

I suspect there were two other factors that diminished him in the records of the expedition:

First, he was a French Catholic, attached to a command of white Anglo-Saxon Protestants who looked down on pretty much everybody else. He could have been praised only with faint damns.

Second, in a trek demanding every last ounce of youthful vigor, Charbonneau was at least twice as old as most of the men. No wonder he sometimes seemed a drag on them. We old cots of the Expedition ought to envy and cheer him. Vive Toussaint!

On a different matter, I enjoyed Robert Archibald's Bicentennial Council column in the same issue about looking for "wildness" on the Lewis and Clark Trail.

I smiled when I read that today's Missouri River has been "damned" and otherwise altered in ways that would make it scarcely recognizable to the captains and their men. I have no doubt that the explorers, in fact, damned it every day as they struggled upstream, fighting its currents, snags, and shoals.

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Vive Toussaint!

Students' model of Fort Clatsop

I also show the students a picture of Clark's drawing of the fort found on the cover of his elk skin journal. This drawing is very similar to the replica at Fort Clatsop today. Usually, the models built by my students resemble this drawing in some way. However, last year I had a group of students who came up with a truly novel interpretation.

On December 13, 1805, Joseph Whitehouse makes the following journal entry: "We had rain & Cloudy weather, during the whole of this day. We raised another line of our Huts. they had 2 Rooms in each hut, & were 16 feet in the clear. We finished raising the huts, & began the foundation of another line of them in the same Manner, of those we had raised. the three lines composed 3 Squares, & the other square we intend picketting in, & to have 2 Gates at the two Corners."

From this information four students concluded that the original fort had three rows of huts, not the two seen in the replica and sketched on Clark's journal cover. They also put the fort's gates at the corners of the front wall of the fort. This too differs from the replica, whose two gates are at the front and the back.

I was extremely pleased by the students' careful reading and interpretation of the journals. Near the end of the class, we took a field trip to Fort Clatsop and the students brought along their models. Comparing the models to the replica provoked lively discussion.

David Ellington
Woodburn, Ore.
Expedition geology

I appreciated reading 'Specimen of the Stone': The Fate of Lewis and Clark's Mineralogical Specimens, by John W. Jengo (WPO, August 2005). Thanks to Jengo, John W. Hoganson and Edward C. Murphy (coauthors of Geology of the Lewis & Clark Trail in North Dakota), and others, we keep getting portions of the geological aspects of the Lewis and Clark story. I too have collected many rock samples along the trail, and I have written about its geology from the Great Falls to the Pacific. My most prized sample is some 'Strater of white earth' (Clark, January 7, 1806), which I found on the lower Columbia with the help of Roger Wendlick. Anyone wishing to share information on trail geology or trade mineral specimens can reach me at jwfisher@starband.net.

JOHN W. FISHER
Julietta, Idaho

Peale, Catlin, and Coues


On another subject, with Christmas approaching, readers might be interested in a photo (above) I took two years ago of the holiday-decorated house at 1726 N Street, N.W., in Washington, D.C., once owned by L&C scholar Elliott Coues.

MARK CHALESLEY
Baltimore, Md.

WPO welcomes letters. We may edit them for length, accuracy, clarity, and civility. Send them to us c/o Editor, WPO, 51 N. Main St., Pennington, NJ 08534 (e-mail: wpo@lewisandclark.org).
Embracing healing circles

I am honored to serve as the foundation’s president for 2005-06 and will perform the duties of the position to the best of my abilities. I thank the Board of Directors for its confidence in me and for its commitment to making a smooth and effective transition into a new era as the Lewis and Clark Bicentennial draws to a close. It will be a year to build on the programs and partnerships created during the bicentennial as we carry on with our historic mission as keepers of the Lewis and Clark story and stewards of the Lewis and Clark Trail.

Those who attended the foundation’s 37th annual meeting, held in August in Portland, Oregon, were treated to a delightful event. Like all of our annual meetings it was a wonderful opportunity to make new friends and visit with old friends. We owe a huge and heartfelt thanks to the Oregon and Washington chapters for a varied agenda of excellent speakers, field trips, music, and food (some of which came from the Lewis and Clark Expedition’s experience to bring all these people to the table—albeit one huge table—and to work with them and with our chapters in such a worthy enterprise. The relationships we have established will be the basis for our ongoing efforts. This year the foundation’s board will be working to find meaningful ways to continue these beneficial partnerships in behalf of generations to come.

—Patti Thomsen
President, LCTHF
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Patterns on the landscape, real and imposed

The late TV news broadcaster Eric Severeid once called his home state of North Dakota an “artificial rectangle.” When you think about it, all of our states, cities, and towns are artificial rectangles, squares, or other such arbitrarily created shapes. Their borders are for the most part man-made invisible lines, not those created by nature such as rivers, lakes, and mountain ranges. Many of these lines were drawn early in our nation’s history by artificial rectangles, squares, or other.

Their trek marked both the beginning of the nation’s trans-Mississippi expansion and the beginning of the end of a way of life for many Indian tribes. Lewis and Clark were themselves captains in the United States Army charged by President Thomas Jefferson with finding a westward water route to the Pacific Ocean. Jefferson instructed them to draw maps based on measurements taken by compass and laid out according to latitude, longitude, mileage, and altitude.

I thought of all this as I flew over the midwestern plains several years ago. Imprinted and visible on the land below me was the idea of measurement, the very core of Jefferson’s Enlightenment approach to understanding the world. The land was divided into thousands of rectangular pieces. Roads that neatly followed section and township lines imposed a pattern on the landscape. The pattern appeared to have fallen from the sky. It repeated itself as far as the eye could see, uninterrupted by rivers and landforms, which it simply ignored. From an airliner at high altitude one sees how the land is sliced into rectangles with little regard for topography and contours, like a roll of chicken wire flattened on the earth. It is a pattern defined by survey lines and coordinates and whose underlying purpose is consumption. It relates directly to our ideas about land ownership, for a precise description of location is a prerequisite for ownership.

The Missouri Historical Society has a yellowed map, stained with the dark greasy carbon circle of a hot kettle, that was drawn for or by William Clark according to instructions provided by a Nez Perce guide. But the Indian map doesn’t include notations of latitude, longitude, compass direction, or mileage. The map is changeable. Time of year is crucial in defining routes from one place to another, especially if there are mountains between the traveler and his destination. There is no point showing a route over the Bitterroots in April, because such a route would be a death march. So the Indian map is chronological, time sensitive. It portrays a storied land, a land imbued with meaning predicated upon interrelationships between land and the people. This map shows a river that is not a river in the conventional sense but a combination of tributaries that when followed lead to a destination. It is a route imbued with stories of what happened there before. The map links land and people. Landscape is a crucible for life, animated by narrative, rather than an assortment of passive resources to be dominated, transformed, and exploited.

In his recent book, Waiting for Lewis and Clark, journalist David Sarasohn chronicles the Lewis and Clark Bicentennial from its beginnings to the present day, with an eye toward the future. Like all of us, he wonders what will come of this years-long effort. The book features profiles of active participants in the commemoration, including Gerard Baker, a Mandan-Hidatsa Indian who serves as superintendent of the Lewis and Clark National Historic Trail and who developed and directs the Corps II traveling exhibition, which has followed the expedition’s path throughout the bicentennial.

Sarasohn writes, “When Gerard Baker grew up on the reservation, on the ranch that could see no other lights at night, his parents told him that he would have to live in two worlds.” They were right, and their advice to Gerard is wisdom we should all heed. In this global world, we will all need to start living in at least two different worlds.

Upcoming signature events

Mark your calendars for November 11-15, 2005, and plan to attend the upcoming National Council of the Lewis and Clark Bicentennial National Heritage Signature Event Destination: The Pacific, on the 200th anniversary of the Corps of Discovery’s arrival at the Pacific. It offers a week of activities commemorating significant events during the corps’ sojourn on the lower Columbia and includes activities from Long Beach, Washington, to Cannon Beach, Oregon.

After that, the next signature event will take place June 14-17, 2006, in Lewiston, Idaho. Among the Nez Perce will commemorate the expedition’s time in Nez Perce country. Venues will include the Clearwater River Resort and Casino and other locations near the Nez Perce reservation. More information on all signature events can be found at www.lewisandclark200.org.

—Robert R. Archibald
President, Bicentennial Council
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Stewardship initiatives look toward L&C tricentennial

"To learn about the history of a place, you have to go there. You have to hike the trails, canoe the rivers, and climb the mountains." Author Stephen E. Ambrose wrote this in the foreword to *The Lewis and Clark Companion*, a book by his daughter, Stephenie Ambrose Tubbs. It is how he learned the history of the expedition and shared it with his family, friends, students, and others.

Jefferson, too, believed this philosophy, and it partially influenced his decision to instruct Meriwether Lewis to travel the Missouri River and other waterways to reach the Pacific Ocean.

This same philosophy has carried many members of the Lewis and Clark Trail Heritage Foundation to the banks of the Missouri, vista points in the Rocky Mountains, and the shores of the Pacific. Many members read the journals along the trail and try to envision the expedition in the same setting. In some places that is easily done, and in others it takes only a little imagination to view the setting as it might have appeared two centuries ago. Will people be able to have the same experiences during the expedition’s tricentennial—to understand what occurred in various settings? I believe they will, but only if we are committed to our role as stewards of the trail and to ensuring there are place to hike, waters to canoe, and vistas to enjoy.

The foundation plans to revitalize its stewardship activities in 2006 by providing opportunities for people with varied interests along the trail. These plans include:

- Development of a volunteer stewardship database. It will provide descriptions of volunteer activities with dates, locations, contact information, and skills and experience required. The foundation will cosponsor a minimum of four volunteer activities in 2006. We will look for nine volunteers in July and September to conduct campsite monitoring and cleanup in cooperation with the U.S. Forest Service on the Lolo Motorway in Idaho. We also will recruit volunteers to participate in joint projects with the Bureau of Land Management along the Missouri River in central Montana. The dates and project details will be confirmed later this year. The database will include activities hosted by state and federal agencies, local communities and chapters. Activities will be promoted on the foundation’s Web site (www.lewisandclark.org) and in *The Orderly Report*.
- Production of a media kit and related materials so the foundation and its chapters can actively support and promote National Trails Day in June and National Public Lands Day in September along the Lewis and Clark National Historic Trail and elsewhere. Projects could include building bridges and trail, improving habitat for wildlife, planting trees, removing invasive plants, and protecting natural, historic, and cultural resources.
- Development of a resource directory for speakers who can make presentations to chapters or conduct training on stewardship issues.
- Publishing *A Guide to Cultural Awareness and Stewardship along the Lewis and Clark National Historic Trail*, which will include contact information for and the mission of each land-management agency along the trail; an explanation of tribal issues along the trail; contact information for federally recognized tribes along the trail; information on the legal aspects of heritage protection and the Sacred Site Protection Act; information on positive stewardship practices and recreating responsibly; and information on existing stewardship programs and how to participate.

The foundation will consider innovation ways to partner with public and private groups that share our interests along the trail. This will allow us to positively impact the trail by leveraging our efforts with those of others and to share the stories of the expedition with new audiences.

We will seek ways to partner with youth groups and encourage children and young families to get healthy by getting outside. We will encourage intergenerational activities on and off the trail. We will embrace our role as stewards so that on next September 23, when the Lewis and Clark Bicentennial officially comes to close, there will be no doubt as to who will remain to care for the legacies of the expedition and the bicentennial.

The foundation will strive to ensure that future generations have the opportunity to hike the trails, canoe the rivers, and climb the mountains to better understand and appreciate the stories of the Lewis and Clark Expedition.

—Wendy Raney
Director, Field Operations

Missouri D.A.R. wins plaudits

The LCTHF has presented its Meritorious Achievement Award to the Missouri Daughters of the American Revolution, which has marked 14 gravesites of Corps of Discovery members, most recently those of George Shannon and Robert Frazer.

The organization has partnered with the U.S. Geological Survey to place an informative display in the Capitol Plaza Hotel in Jefferson City and with the Missouri Humanities Council and the National Endowment of Humanities on other events.

The group’s recognition of the L&C Bicentennial has also included a statewide ringing of bells. Each of the 117 Missouri D.A.R. chapters has held at least one program related to the expedition. The state D.A.R. has also identified and recognized 19 members who are descendants of expedition members.
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November 2005 We Proceeded On — 9
"O! HOW HORRIABLE IS THE DAY"

Heat, cold, wind, rain, snow, sleet, hail—
Lewis and Clark chronicled them all.
Now science is mining their journals
for insights into climate change

BY TERRENCE R. NATHAN

On June 29, 1805, William Clark was exploring the Great Falls of the Missouri when a menacing thunderhead appeared on the western horizon. Being well familiar with the fury of prairie storms, the captain and his three companions—Toussaint Charbonneau, Sacagawea, and their infant, Pomp—sought shelter under some overhanging rocks in a ravine near the river. Soon the skies opened. As Meriwether Lewis later described the scene, “a most violent torrent of rain descended accompanied with hail; the rain appeared to descend in a body and instantly collected in the rivene and came down in a roling torrent with irrisistable force driving rocks mud and everything before it.”

With the flash flood raging toward them, Charbonneau crawled up the bank and attempted to pull Sacagawea and Pomp up behind him while Clark scrambled and pushed from below. So sudden was the water’s rise, wrote Lewis, that it was up to Clark’s waist before he began his frantic climb, “and he could scarcely ascend faster than it arose till it had obtained the depth of 15 feet with a current tremendous to behold.” A moment longer and they would have been swept into the river and “inevitably perished” in the falls below.

Throughout their 28 months on the trail, Clark and fellow members of the Corps of Discovery experienced many such weather extremes. They endured torrential rain, violent wind, numbing cold, parching heat, and one of the soggiest winters ever recorded in the Pacific Northwest. Lewis and Clark were careful observers of these conditions, which they recorded daily in a weather diary for 33 consecutive months—from January 1, 1804, while in winter quarters at Camp River Dubois, to September 30, 1806, eight days after their return to St. Louis.

In his famous instructions to Lewis, Thomas Jefferson advised him to keep careful note of climate and its effect on flora and fauna—“climate, as characterised by the thermometer, by the proportion of rainy, cloudy & clear days, by lightning, hail, snow, ice, by the access & 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.”

At the time, knowledge about the climate of the trans-Mississippi West was sparse. Even Jefferson, who was arguably the most knowledgeable meteorologist of his day, believed the expedition would traverse a “moderate climate,” an assumption that would prove sharply at odds with reality.

Lewis spent several months in Philadelphia preparing for the expedition. At Jefferson’s behest he was tutored in
the natural and applied sciences by some of the nation's leading authorities at the American Philosophical Society. He learned botany, zoology, mineralogy, medicine, and celestial navigation. There is nothing in the record, however, to suggest that he was instructed in meteorology. At first glance this seems surprising, since Philadelphia at the time was probably the nation's center for weather studies. Many of its citizens kept weather diaries, and Jefferson himself had begun his own daily weather notations in Philadelphia while serving in the Continental Congress (his first entry was dated July 4, 1776).¹ One of the leading medical institutions at the time, Philadelphia's College of Physicians, included in its charter the importance of meteorological observations in linking diseases with weather, a connection already hypothesized by Lewis's medical mentor, Dr. Benjamin Rush.⁶

Meteorology was absent from Lewis's scientific training because it wasn't yet truly a science. It would be many decades before a network of weather stations, linked by telegraph, allowed scientists to collect contemporaneous weather data, which in turn enabled them to develop the laws of atmospheric motion. In Jefferson's era, when the great majority of the population lived on farms, weather was chiefly important for its effect on agriculture. Daily records of wind, temperature, cloud cover, precipitation, and other factors essential to the success or failure of crops served most needs and required no special instruments to collect.⁷

Lewis spent most of May and the early part of June of 1803 in Philadelphia. It was here that he probably obtained the three mercury thermometers carried by the Corps of Discovery.⁸ The mercury thermometer was invented in 1742 by German physicist Gabriel Daniel Fahrenheit, who also gave his name to the familiar temperature scale (still used in the United States, although abandoned for the Celsius scale in most of the rest of the world). Historian Donald Jackson speculates that the expedition's thermometers were similar to those described by Jefferson in a letter to a supplier of scientific instruments: "The kind preferred is that on a lackered plate slid into a mahogany case with a glass sliding cover, these being best on exposure to the weather."⁹

In January of 1804, when the Corps of Discovery was in winter quarters at Camp River Dubois, Lewis con-
ducted an experiment to test the accuracy of what he called his "Farenheit's Thermometer." (This was evidently his preferred thermometer. One assumes that the other two were also marked off on the Fahrenheit scale.) First he mixed water and snow and took the temperature of the mix, which would have been at or just above 32 degrees, the freezing point of water. Then he boiled some water and took its temperature, which should have yielded a reading close to 212 degrees. (Lewis states that the boiling point was marked on the thermometer, and we can assume the same for the freezing point.) He found the thermometer to read 11 degrees lower than it should. This rather surprising result calls into question the accuracy of the few temperatures recorded before the captains began making systematic entries in the weather diary. Lewis doesn't say whether he performed similar tests on the other two thermometers.10

The barometer, invented in Italy in the 1640s, is another instrument we associate with weather. It measures air pressure by the rise and fall of a column of mercury in a vacuum inside a glass tube. Barometers were in wide use by Lewis and Clark's day (Jefferson owned one), and it was well known that atmospheric pressure correlates with altitude and that a dropping barometer signals rain. Lewis could surely have benefited from a device that told him, at least in an approximate way, his elevation above sea level or that a storm might be approaching, yet there is no evidence that he even considered taking one on the expedition. Probably he did not because barometers were even more fragile than thermometers.

Departing Philadelphia, Lewis returned to Washington, D.C., to wrap up his affairs, and by mid-July he was in Pittsburgh overseeing construction of the expedition's keelboat. His expedition journal begins with the launching of the keelboat and its start down the Ohio River on August 31. The next day, September 1, he made his first journal entry about the weather—heavy "fogg"—and on the 2nd he recorded his first thermometer readings, which showed both the air and water temperatures to be 76 degrees. These readings were presumably taken at mid-day, after the morning air had warmed up. By contrast, on the foggy morning of September 3 he noted that the air temperature was 63 degrees and the water temperature 75.11

Lewis astutely observed a connection between the morning fog that so often blanketed the river and the dynamics of air and water temperatures. "The Fog," he wrote, "appears to owe it's origin to the difference of temperature between the air and water," the latter "being much warmer than the former." He also noted that the water retained more of the sun's heat during the night ("the water being heated by the summer's sun dose not undergo so rapid a change from the absence of the sun as the air"). As a consequence, at sunrise, when the air is coolest, "the fogg is thickest and appears to rise from the face of the water like steam from boiling water."12

He was describing what meteorologists today, in fact, call steam or evaporation-mixing fog, which forms when cold air moves over warm water. His statements that water retains heat longer than air and that the difference in temperatures generates fog are both correct. It takes a greater amount of energy to heat a given mass of water than an equivalent mass of air. Conversely, once warmed, water cools more slowly. (Water's slowness to gain and lose heat is known as thermal inertia.) Provided the water is warmer than the unsaturated air above it, water will evaporate into the air. If the water-vapor content of the air increases to the point of saturation, it condenses. The result is fog.

Later in his journey down the Ohio, Lewis stopped in Louisville to pick up his co-commander, William Clark. By December they had completed their recruiting for the expedition and were in winter quarters at Camp River
Dubois, on the Illinois side of the Mississippi River, near St. Louis. On May 14, 1804, they headed up the Missouri. The explorers spent the winter of 1804-05 at Fort Mandan, in present-day North Dakota, and the following spring headed west on the Missouri, bound for its source high in the Rocky Mountains. After crossing the Continental Divide they descended the Columbia River and wintered at Fort Clatsop, on the Pacific coast. In the process they passed through five climate zones.

**CLIMATE ZONES**

Climate classification as we know it was developed about a century after Lewis and Clark. Among the most widely used is the Köppen system, which classifies climate based on temperature, precipitation, and the distribution of vegetation. The illustration on page 12 (opposite) shows the expedition’s outbound route superimposed on a map of climate zones in the Köppen system. The boundaries between zones are transitional in nature, and the demarcation from one zone to another is generally less abrupt than the map might suggest. Due to climate change, today’s boundaries are almost certainly different from those of 1803-06.

The first and second zones traversed by the explorers, Dfa and Dfb, are *humid continental*, a designation that takes in the Missouri River from St. Louis to eastern Montana. These two zones are characterized by severe winters, no dry seasons, and summers either hot (Dfa) or warm (Dfb). Along the Lewis and Clark Trail the boundary between these zones corresponds to the border between South and North Dakota.

The third, BSk, *mid-latitude steppe*, represents the semiarid environment of the High Plains.

The fourth, H, *highland*, is restricted to the more elevated portions of the Rocky Mountains.

The fifth, Cfb, *marine west coast*, is characterized by mild temperatures throughout the year, including a warm (but not hot) summer, and no dry season.

If one thinks of the expedition as starting in Washington, D.C., then we can add a sixth zone: Cfa, *humid subtropical*, defined by hot summers and the lack of a dry season. Lewis’s home state of Virginia and Clark’s of Kentucky fall within this zone, and Philadelphia is on the boundary between it and the Dfa zone (*humid continental*). These two zones would serve as climatic benchmarks as the captains proceeded west into a region that, climatically as well as geographically, was *terra incognita*.

On the cloudy, rainy afternoon of May 14, 1804, the Corps of Discovery left Camp River Dubois and began its ascent of the Missouri River. The party traveled through the heart of the Dfa zone (*humid continental, with hot summers*) during July and August, the months of severest heat. Clark marveled at the sheer amount of sweat that poured out of the men as they rowed, poled, and towed the expedition’s boats against the relentless current—more than he imagined the human body could excrete: “Those men that do not work at all will wet a Shirt in a Few minits,” he wrote, while for “those who work, the Swet will run off in Streams.”

The journals frequently remark on the weather’s capriciousness: oppressive humidity might be followed by dry air carried on northern winds; torrential downpours and high winds by calm; and dense fog by sunshine.

On July 14, Clark described the sky suddenly darkening under “a blak & dismal looking Cloud.” Moments later, a violent wind raced across the plains and struck the keelboat nearly broadside. The keelboat would have been “dashed to peces in an Instant” against an island but for

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**Lewis & Clark’s weather diary, January 1-5, 1805**

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<th>Day of the Month</th>
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<td>8 b</td>
<td>N.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14 b</td>
<td>N.</td>
<td>4 b</td>
<td>S.E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>28 a</td>
<td>W.</td>
<td>4 b</td>
<td>N.W.</td>
<td>r</td>
<td>2 1/2</td>
</tr>
<tr>
<td>5</td>
<td>20 b</td>
<td>N.W.</td>
<td>18 b</td>
<td>N. E.</td>
<td>r</td>
<td>2</td>
</tr>
</tbody>
</table>

The table above shows the first five days of the captains’ weather diary for January 1805, when the expedition was at Fort Mandan. The symbol o denotes sunrise. The letters a and b in the temperature column indicate above and below zero, respectively. Temperature is in degrees Fahrenheit. Lewis and Clark defined their abbreviations at the end of January 1804, when they first began keeping the weather diary: s = sunny, c = cloudy, a = after (c a s means cloudy after sunshine), f = fair. In the river column, r and f indicate the rise or fall of water level in the last 24 hours, measured at sunrise. (Moulton, Vol. 2, pp. 168-169.)
the quick action of the men, who jumped into the water and pushed against the leeward side, holding her steady until the storm passed. 15

On July 29, near the border of present-day Iowa and Nebraska, Lewis noted the destruction caused by an apparent tornado: "passed much fallen timber apparently the ravages of a dreadful haricane which had passed obliquely across the river from N.W. to S.E. about twelve months since." Trees with trunks four feet in diameter "were broken off near the ground." 16

The explorers entered present-day North Dakota in mid-October, and by the end of the month had reached the Mandan and Hidatsa villages. In early November they began construction of Fort Mandan. They were now in climate zone Dfb (humid continental, warm summers), and in a part of it especially notorious for its severe winters. Frigid arctic air masses often descend on North Dakota, producing blizzards and some of the coldest temperatures in the contiguous United States.

As they had done since Camp River Dubois, the captains continued to make daily entries in their weather diary, which represents the first long-term, systematic tabulation of weather data west of the Mississippi. The diary included tables similar to ones used by Jefferson for his own weather recordings, with spaces for temperature, wind direction, and state of the river. (See bottom of page 13 for an example.) Temperature and wind direction were recorded twice daily, at sunrise and four o'clock, which Jefferson believed to be the coolest and warmest times of the day. 17

The weather diary reveals the punishing conditions at Fort Mandan. The average temperatures for December, January, and February were 4, 3, and 11 degrees above zero, respectively. The average of all temperature readings (morning and afternoon) during this three-month period was 4 degrees; morning temperatures averaged minus 11. On new year's day the thermometer started out at a relatively moderate 18 above and by 4 P.M. hovered at a balmy 34—the month's only recording of a temperature above freezing. In one ten-day stretch in January the temperature at sunrise averaged 21 degrees below zero. On December 17 the thermometer plunged to minus 45, the coldest temperature recorded on the entire journey.

The late Arlen J. Large compared temperatures recorded at Fort Mandan for January through March with average temperatures at Bismarck (some 45 miles southeast of the corps' encampment) for the same three-month period from 1951 to 1980. He determined that Fort Mandan's temperatures were colder by about 8 degrees. 18 Such comparisons must be viewed with caution, however, owing to differences in the respective microclimates, the unknown manner in which the temperatures were recorded at Fort Mandan, and the possible inaccuracies in the captains' thermometers. Suffice to say it was cold. Frostbite was a frequent problem, and on some subzero nights the guard had to be changed every half hour.

In early April, after the ice had broken up on the Missouri, the explorers loaded their boats and proceeded up the Missouri. They soon entered present-day Montana and the steppe climate (BSk in the Köppen classification) of the Northern Plains, an arid region whose summers are characterized by heat and drenching thunderstorms accompanied by dangerous wind, lightning, and hail. Flash floods like the one that nearly drowned Clark are common. 19

On May 30, as the expedition entered the White Cliffs area of the Missouri, Lewis noted our near approach to a country whose climate differs considerably from that in which we have been for many months. The air of the open country is astonishingly dry as well as pure. I found by several experiments that a table spoon full of water exposed to the air in a saucer would evaporate [evaporate] in 36 hours when the mcurry did not stand higher than the temperate point at the greatest heat of the day; my inkstand so frequently becoming dry put me on this experiment. I also observed the well seasoned case of my sextant shrunk considerably and the joints opened. 20

Any precipitation that did occur came with a vengeance, like the storm on June 27, in the vicinity of the Great Falls. The weather diary records how

A typical winter day at Fort Mandan, with temperatures near zero.
At 1 P.M. a black cloud which arose in the S.W. came on accompanied with a high wind and violent Thunder and Lightning; ... for about 20 minutes during this storm hail fell of an innocuous size driven with violence almost incredible, when they struck the ground they would bound to the height of ten to 12 feet[,] ... after the rain I measured and weighed many of these hail stones and found several weighing 3 ozs. and measuring 7 inches in circumference.20

After completing their portage of the Great Falls the explorers continued upriver. In mid-August they crossed the Continental Divide at Lemhi Pass, located 7,373 feet above sea level in today’s southwestern Montana. They had left the mid-latitude steppe and entered the highland climate zone of the Rockies (Köppen classification H). Here they found the Shoshone Indians, who provided them with the horses needed to complete their journey across the mountains. Led by a Shoshone guide, the explorers crossed the Bitterroot Mountains not once but twice—first at Lost Trail Pass (August 31–September 4) and later at Lolo Pass (September 11–22). Both crossings took their toll. Cold and hungry, they threaded their way along narrow ravines through densely wooded mountains. Horses slipped and fell. While traversing Lost Trail Pass, one mount took a tumble and broke the last of the expedition’s three thermometers—“a great misfortune,” Clark declared.22 The journals are silent on when and how the other two were lost.23

The crossing of Lost Trail Pass was just a taste of what awaited them in the deep snows of the Lolo Trail. On September 16 it began snowing three hours before dawn and continued throughout the day. Clark summed up everyone’s feelings when he declared he had never been so wet and cold “in every part” of his body.24

Emerging at last from the dreadful mountains, the explorers found the friendly Nez Perce Indians harvesting camas roots in an upland prairie in today’s north-central Idaho. Climatically speaking, they had re-entered the mid-latitude steppe, a zone they would remain in while making their way down the Clearwater and Snake rivers in dugout canoes. On October 16 they reached the Columbia River. As they approached the Cascade Mountains, which create a rain barrier to the prevailing moisture-laden westerlies coming off the Pacific, the landscape became notably drier.25

West of the Cascades they entered the marine environment of the Pacific Northwest (Köppen zone Cfb). By early November they had reached the lower estuary of the Columbia River, a region whose late fall and winter climate is noted for rain, fog, and strong moisture-laden winds blowing off the ocean. Throughout the expedition, Clark’s habit was to begin his journal entries with a weather report. Now, for days at a stretch, his opening remarks were a variation on the same dismal theme: “cold wet morning,” “cloudy foggy morning,” “hard rain all the last night,” “tremendous thunder Storm abt. 3 0’Clock this morning,” “Rained last night without intermission.”26 On November 22, “the wind increased to a Storm from the S.S.E. and blew with violence throwing the water of the river with emence waves out of its banks almost overwhelming us in water, O! how horrible is the day.”27

In early December the party established its winter quarters at Fort Clatsop, on the Oregon side of the estuary. From now until the departure for home in late March of 1806 the conditions can be summarized in a single phrase: variable and wet. On January 1, Lewis observed, “the changes of the weather are exceedingly sudden. sometimes tho’ seldom the sun is visible for a few moments the next it hails & rains, then ceases, and remains cloudy the wind blows and it again rains.” This could happen three or more times a day.28

In his weather remarks for January 3 Lewis regretted his inability, due to the lack of a thermometer, to know the exact temperature: “I am confident that the climate is much warmer than in the same parallel of Latitude on the Atlantic Ocean tho’ how many degrees is now out of my power to determine.”

Indeed, Fort Clatsop and Bangor, Maine, are at about the same latitude, yet Fort Clatsop is characterized by mild temperatures throughout the year, while Bangor has a severe winter and a warm summer. At the time of the expedition the link between latitude and climate was well known.29 Less understood was the role of ocean temperatures and currents, prevailing winds, and the contrasting temperatures of land and sea in determining a region’s climate. Water’s thermal inertia means that at a given latitude the temperature of the ocean will be warmer in winter and cooler in summer than the temperature of a contiguous landmass. Ocean temperatures have a moderating effect on coastal land temperatures, particularly when the prevailing wind is off the ocean, as it is in the Pacific Northwest. In the Northeast the prevailing wind comes off the land. The fact that ocean currents in the Pacific Northwest flow from the southwest further mitigates winter temperatures. It was wet at Fort Clatsop but never bitterly cold.

**FORT CLATSO P WINTER: A COMPARATIVE ANALYSIS**

The expedition spent 107 days at Fort Clatsop (December 7–March 23). During that period there were 91 days of precipitation, including 17 when it snowed. Half of the
12 days without rain or snow were cloudy, leaving just 6 days when the sun shone fair.  

Although prolonged periods of rainfall are common for the Pacific Northwest, one wonders to what extent the extreme wetness experienced at Fort Clatsop may have been atypical. A comparison between the captains’ weather observations and modern-day weather data for nearby Astoria, Oregon, sheds light on this question.  

The top graph at right shows the number of days with measurable precipitation and snow for Fort Clatsop and Astoria. The numbers for Astoria are based on a 38-year average, spanning 1961 through 1999. Fort Clatsop averaged 73 days of precipitation between December 8 and March 23. The highest number of precipitation days for this period was 88, which occurred during the winters of 1971-72 and 1974-75. The lowest number of precipitation days was 50, which occurred during the winter of 1984-85. The number of precipitation days measured by Lewis and Clark was 90. By today’s standards, the number of precipitation days for the winter of 1805-06 was abnormally high.  

Lewis and Clark recorded 17 days of snowfall. This is more than five times Astoria’s 3-day average and two days more than its 15-day maximum, which occurred during the winter of 1968-69. So the number of snowy days for the winter of 1805-06 was also abnormal.  

The bottom graph compares wind direction. At Fort Clatsop during December the captains recorded wind direction only once a day, although it’s unclear at what time. From January through their departure in late March they recorded wind direction twice a day, at sunrise and at four o’clock. The location and manner in which they made their observations is unknown. Did they estimate wind direction from within the fort or within the forest canopy? Did they base their estimates on the surface wind, which is often turbulent, particularly within forest canopies, or on the wind direction just above the forest canopy? Despite these uncertainties, two factors provide confidence that Lewis and Clark’s wind direction observations were accurate. First, they made a large number of wind observations, which would reduce random error. Second, because they were extraordinarily accurate in their descriptions of flora and fauna, we can reasonably assume they were equally careful in their weather observations.  

The wind directions recorded by Lewis and Clark were compared with those of Astoria. Lewis and Clark’s observations are based on the eight standard compass headings. (A given compass heading indicates the direction from which the wind is blowing. A southwest wind means the wind is blowing from the southwest.) Astoria’s observations for wind direction, which begin in 1885, are averaged for fourteen years (1885-99) and, consistent with Lewis and Clark’s observations, are assigned the same eight compass headings. To simplify the comparisons, the wind data for both Fort Clatsop and Astoria were grouped E-SE, S-SW, W-NW, and N-NE. The E-SE and S-SW groupings contain the most entries and are therefore deemed the prevailing wind directions.  

The bottom graph shows the two prevailing wind directions, E-SE and S-SW, for Fort Clatsop and present-day Astoria. The differences in the prevailing winds between the winter of 1805-06 and present-day averaged conditions are dramatic. At Astoria the E-SE winds are about a third more frequent than the S-SW winds. In sharp contrast, at Fort Clatsop the S-SW winds were about four times as frequent as the E-SE winds. The persistence of S-SW winds was noted by Lewis on January 1: “the wind blows by squalls most generally and is almost invariably from S. W.”  

An approximate relationship between wind and air pressure was formulated by the 19th-century Dutch me-
teorologist Christoph Buys-Ballot. This relationship is now called Buys-Ballot's law. The law states that in the Northern Hemisphere, if we stand with our backs to the wind, lower pressure will be on our left and higher pressure on our right. Thus, if the wind is from the south, lower pressure will be to the west and higher pressure to the east. Buys-Ballot's law can therefore provide qualitative information about the location and movement of the high- and low-pressure systems that characterize mid-latitude weather. Simply put, Lewis and Clark's wind observations offer clues to the position of the northern Pacific storm track during the winter of 1805-06.

Application of Buys-Ballot's law to the prevailing wind directions, as depicted in the bottom graph, yields three conclusions. First is that during the winter of 1805-06 the low-pressure systems, and by implication the storm track, were predominantly W-NW. Second, the 1805-06 storm track was persistent; low-pressure W-NW systems were about four times more common than S-SW ones. Third, the position of the 1805-06 storm track was dramatically different from its present-day averaged position, which is predominantly S-SW.

Based on comparisons with averaged conditions for present-day Astoria, the winter of 1805-06 at Fort Clatsop was atypical. The frequency of rain and snow and the persistent southwesterly winds were all dramatically different from today. This may be no more than a statistical fluke. The position of the storm track within a given year or between given years can be markedly different from its long-term averaged position. This intraseasonal and interannual variability can result from fluctuations natural to a thermally driven, rotating stratified fluid such as the atmosphere.

One should also bear in mind that the early 19th century was at the tail end of the so-called Little Ice Age, a roughly 350-year period of relatively cool, wet conditions in northern latitudes, and the transition out of it may have been marked by wider year-to-year variations from the climatic norm.3

It is also possible that some external process, such as the anomalous warming or cooling that takes place in the equatorial eastern Pacific during El Niño or La Niña events, may have been at work. Except for the change of seasons, nothing has more impact on global atmospheric circulation. During La Niña, the Pacific storm track is displaced north, resulting in above-normal precipitation and below-normal temperatures for the Pacific Northwest, a situation consistent with the weather at Fort Clatsop.

The author is currently testing the hypothesis that Lewis and Clark’s wet, cold winter may have coincided with a La Niña year.

LEWIS & CLARK’S METEOROLOGICAL LEGACY

More than two hundred years ago, in his Notes on the State of Virginia, Thomas Jefferson commented on the climate change he had noticed in his lifetime. Both heat and cold, he wrote, “are become much more moderate within the memory even of the middle-aged. Snows are less frequent and less deep. The elderly inform me the earth used to be covered about three months in every year.”33

Jefferson’s words, written near the end of the Little Ice Age, resonate today with our concerns about global warming. His evidence for climate change was mainly anecdotal, while ours is based on long-term global observations and sophisticated computer models of the atmosphere. The reliability of such models for predicting future climate change is determined in part by their ability to simulate past climate change. That ability in turn depends on what scientists call “proxy data” derived from tree rings, ice cores, and weather diaries like those kept by Jefferson at Monticello and Lewis and Clark on the trail.

Further analysis of the captains’ weather observations can shed additional light on the underlying reasons for the anomalous conditions they experienced at Fort Mandan and later at Fort Clatsop. Their data have helped show us that the winter at Fort Clatsop was exceptional. But was that due to changes in atmospheric circulation in the closing decades of the Little Ice Age, or was 1805-06 simply a one-year “blip” due to La Niña or some other factor? The answer may lie in the Lewis and Clark journals.36

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NOTES


2 Ibid., Vol. 2, pp. 169 and 171n, and Vol. 8, p. 373.


4 Ibid., p. 12.

5 Dumas Malone, Jefferson and His Time, 6 volumes (Boston: Little, Brown, 1948-1981), Vol. 6, pp. 50-51. Philadelphia’s leading scientist, Benjamin Franklin, kept a weather diary. He also conducted seminal experiments on lightning (determining it to...
be a form of electricity) and planted the intellectual seeds that eventually led to theories on the circulation of coastal storms, the connection between heated air and small-scale vortices such as waterspouts, and equator-to-pole atmospheric circulation;


7 The telegraph came into widespread use in the 1840s. The theory of air masses and weather fronts began to emerge around 1920.

8 Pre-Fahrenheit thermometers relied on the rise and fall of alcohol, rather than mercury, in a column of glass. Thermometers were included in Lewis's list of needed equipment, but they do not appear on any list of items purchased in Philadelphia or elsewhere. Jackson believes they were probably obtained in Philadelphia and is skeptical of a tradition that St. Louis physician Antoine Saugrain supplied them to the Corps of Discovery. Jackson, Vol. 1, pp. 69 and 75n; Moulton, Vol. 2, pp. 146-147n.

9 Jackson, Vol. 1, p. 75n.

10 Moulton, Vol. 2, p. 169. The entry is at the beginning of the weather diary. It reads, "By two experiments made with Farenheit's Thermometer which I used in these observations, I ascertained it's error to be 11° too low or additive + - I tested it with water and snow mixed for the freezing point, and boiling water for - the point marked boiling water."

11 Ibid., pp. 67-70. Lewis made subsequent mention of the air and water temperatures on September 4, 6, 7, and 16.

12 Ibid., p. 67. Entry for September 1, 1803.

13 The system was developed in the early 20th century by the meteorologist and geographer Vladimir Köppen (1846-1940).

14 Moulton, Vol. 2, p. 352. Entry for July 6, 1804, near the present-day Kansas-Missouri border. The first part of the entry reads, "a very warm day [worthy of remark that the water of this river or Some other Cause, I think that the most Probable throws out a greater preposn. [proportion] of Swet than I could Suppose pass thro: [through] the humane body."

15 Ibid., pp. 376-378.

16 Ibid., p. 426.


19 It is also a region where in summer potential evapotranspiration exceeds precipitation. Potential evapotranspiration is defined as the quantity of moisture, if it were available, that would be removed from a given land area by evaporation and transpiration, the process by which water contained in plants is transferred to the atmosphere as water vapor.

20 Moulton, Vol. 4, p. 221. It's not entirely clear what temperature Lewis means by "temperate point," but it's presumably no higher than 80 degrees. The afternoon temperature readings for May 28-30 were 72, 67, and 50 degrees. Clark had conducted a similar experiment on September 23, 1804, when the expedition was in South Dakota. He found that over 36 hours two spoonfuls of water evaporated in a saucer. The corresponding afternoon temperatures were a bit higher—82, 86, and 82 degrees.

21 Ibid., p. 348.

22 Ibid., Vol. 5, p. 186.

23 Clark's lament about the broken thermometer is found in his entry for September 3. This is curious, because the last temperature readings recorded in the weather diary (17 degrees in the morning and 29 degrees in the afternoon) are for September 5. The diary remarks that on the 6th, the thermometer "broke by the Box striking against a tree." (Moulton, Vol. 5, p. 241.) It is possible that Clark wrote his journal entries for this period after the fact and misremembered the date the accident occurred. In his journal entry for the 3rd Clark describes a day that went from snow to rain to bitter sleet. The weather diary records conditions on both the 3rd and the 6th as cold and rainy but makes no mention of snow.


25 The higher elevations of the Cascades fall within the highland (H) climate zone. As the Columbia cuts through the Cascades on its way to the sea its valley transitions directly from steppe to marine zones.

26 Moulton, Vol. 6, pp. 25, 31, 41, 42, and 46. Entries for November 6, 7, 11, 12, and 14.

27 Ibid., p. 79.

28 Lewis's entry says "two three or more times half a day." Clark's nearly identical comments omit the word "half." Ibid., p. 259 and 262n.

29 The ancient Greeks were among the first to note this. The word climate derives from klima, their word for inclination, which in this context means the angle of the sun above the horizon.

30 December 7 and March 23 were partial days.

31 Some caveats are in order. Although Fort Clatsop and Astoria are only five miles apart, differences due to terrain and vegetation may exist in their respective microclimates. It also is unclear if Lewis and Clark's definition of "rain" distinguished between light rainfall and the droplets that condense in the forest canopy and fall to the ground.

32 Trace amounts of rain were excluded from the tally.

33 Moulton, Vol. 6, p. 259.

34 The Little Ice Age began about 1500 and ended about 1850. Portions of the North Atlantic froze and mountain glaciers expanded.

35 Jefferson, p. 80.

36 The author thanks LCTHF members Ludd Trozpek and the late Bob Shatrucco for their encouragement to pursue this work. Thanks also due Laura Concannon, Professor Eugene Cordeiro, Dr. Steve Grattan, and Dan Hodyss for discussions regarding this work.
The keelboat and two pirogues were locked in the Missouri's ice for most of the winter at Fort Mandan.

**FORECAST:**

**VARIABLE**

*A weather sampler on the Lewis and Clark Trail*

**BY VERNON PRESTON**

**APRIL 1, 1804: NORTHERN LIGHTS**

In the early spring of 1804, the Corps of Discovery was nearing the end of its winter at Camp River Dubois before departing for the West. The days were warming and the spicewood was beginning to bloom. It must have been surprising to see, in the late evening of April 1, a display of *Aurora borealis*, a phenomenon associated with cold winter nights and latitudes higher than southern Illinois. Clark noted that these northern lights frequently changed color but in the main were “very red.” The explorers would witness this atmospheric display twice more, both times at Fort Mandan—on November 6, 1804, and August 16, 1806.

**JUNE 30, 1804: THE HOTTEST DAY**

Lewis and Clark experienced many hot days on the Missouri River. Their journals and weather diary record the hottest day of the expedition as June 30, 1804, when the afternoon temperature peaked at 96 degrees. The explorers were approaching the site of present-day Leavenworth, Kansas. Clark noted that
the sun “being hot the men became very feeble.”

**JULY 29, 1804: TORNADO’S AFTERMATH**

North of present-day Omaha, Clark reported “much fallen timber apparently the ravages of a dreadful hurricane which had passed obliquely across the river from N.W. to S.E. about twelve months since. Many trees were broken off near the ground the trunks of which were sound and four feet in diameter.” The devastation most likely resulted from a tornado—or perhaps a Derecho, a severe straight-line windstorm in which tornados are sometimes imbedded.

**DECEMBER 17, 1804: THE COLDEST DAY**

Exposed to frigid air masses blasting down from the Arctic, the North Dakota plains are notorious for their brutally cold winters. On dry, clear nights with no cloud cover to retain the earth’s heat, temperatures can plunge far below freezing. On the morning of December 17, 1804, at Fort Mandan the temperature sank to minus 45, the lowest recorded on the expedition. The cold kept hunters inside the fort and the expedition’s camps when someone had the bright idea of harnessing the wind. Private Joseph Whitehouse noted, “the wind blew steadily from the S. East we hoisted a sail in the largest canoe which helped us much as 4 men hailing at the chord with a harness.” Sergeant John Ordway declared this odd mode of transportation “Saleing on dry land in every Since of the word.”

**JUNE 24, 1805: DRY-LAND SAILING**

Some of the men were struggling to haul one of the dugout canoes overland between the Lower and Upper Portage camps when someone had the bright idea of harnessing the wind. Private Joseph Whitehouse noted, “the wind blew steadily from the S. East we hoisted a sail in the largest canoe which helped us much as 4 men hailing at the chord with a harness.” Sergeant John Ordway declared this odd mode of transportation “Saleing on dry land in every Since of the word.”

**JUNE 27, 1805: BARRAGE OF HAILSTONES**

The portage party was moving canoes and equipment when a severe thunderstorm rolled in. The men were pummeled by hailstones the size of “a pigeon’s egg,” noted Clark. The stones covered the ground to a depth of an inch and a half, and some of the stones bounced 10 feet after hitting. One stone measured seven inches in circumference and weighed three ounces. Men sought shelter under the canoes or covered their heads with anything handy; several wound up bruised and bloodyed. Clark swore that if one of the bigger stones “had stuck a man on the neaked head it would have knocked him down, if not fractured his skull.”

**JUNE 29, 1805: FLASH FLOOD**

One of the scariest episodes of the journey took place during the portage around the Great Falls. On June 29 the party was split: Lewis was touring the big springs, men were hauling canoes on the 18-mile portage route, and Clark was on the north bank of the Missouri just above the falls with Charbonneau, Sacagawea, and their infant son, Jean-Baptiste. When a thunderstorm rolled in they sought shelter in a ravine. “Soon after,” wrote
Clark, “a torrent of rain and hail fell more violent than ever I saw before, the rain fell like one volley of water falling from the heavens and gave us time only to get out of the way of a torrent of water which was Poring down the hill in the rivin with emence force.” Clark and his companions scrambled to high ground just in time as a flash flood “turrouble to behold” filled the ravine to a depth of 15 feet.12

**Clark and the Charbonneaus escape the Missouri's raging waters.**

**SEPTEMBER 16, 1805: BAD DAY IN THE BITTERROOTS**

The 10-day crossing of the rugged Bitterroot Mountains on the Lolo Trail (September 11-20, 1805) pushed the explorers to their limits. Game was scarce and they lacked warm clothing. On September 14 it snowed. Two days later they were hit by a storm that lasted most of the day and dumped an additional six to eight inches, obliterating the trail and reducing visibility to a few hundred feet. Some of the men wrapped their feet in rags to stave off the bitter cold. “I have been wet and as cold in every part as I ever was in my life,” wrote Clark, “indeed I was at one time fearfull my feet would freeze in the thin mockersons which I wore.”13 On the 20th Clark’s advance party reached Weippe Prairie and was befriended by the Nez Perce Indians.

**NOVEMBER 1805—MARCH 1806: WETTEST WINTER**

Lewis and Clark’s winter in the Pacific Northwest was wet and miserable. After their arrival on the Columbia estuary they were pounded by coastal storms that pinned them to the north shore. Clothes rotted in the unremitting rain. Lamented Clark on November 12, “It would be distressing to a feeling person to See our Situation at this time all wet and cold with our bedding &c. also wet, in a Cove Sercely large enough to Contain us, our Baggage in a Small holler about 1/2 mile from us, and Canoes at the mercy of the waves & drift wood.”14 Later they crossed to the south shore and built Fort Clatsop. “Disagreeable weather” became the journals’ most oft-repeated phrase. On April 8, as the explorers were heading back up the Columbia, Patrick Gass ruefully noted that from November 4 through March 25, “there were not more than twelve days in which it did not rain, and of these but six were clear.”15

**JUNE 15-30, 1806: THE BITTERROOTS AGAIN**

The explorers departed Fort Clatsop on March 23, 1806, and by early May were back among the Nez Perces and in sight of the Bitterroots. They waited for more than a month for the snows to melt before attempting a crossing of what Lewis called “that icy barier which seperates me from my friends and Country, from all which makes life esteemable.” Encouraged by the swelling Clearwater River—“no doubt ... attributable to the [melting] snows of the mountains”—they set out on June 15 but were soon defeated by snow up to 18 feet deep.16 On the 17th they retreated to Weippe Prairie. A week later they proceeded on, and with the help of Nez Perce guides successfully traversed the Lolo Trail.

**JULY 21, 1806: STORM CHASER’S DREAM**

At Traveler’s Rest the party split up, Lewis to explore the Marias River and Clark to descend the Yellowstone River. Late in the sultry evening of July 21, Clark was near present-day Park City, Montana, when he spotted “a very black Cloud” crackling with thunder and lightning and generating hard, shifting winds.17 Clark’s account may be the first “spotter report” in the West of a wall cloud, a formation that often spawns tornadoes.

**JULY 22-26, 1806: DARK DAYS ON THE MARIAS**

Lewis and his small party, meanwhile, had reached the upper Marias and were encamped west of present-day Cut Bank, Montana. The weather was unseasonably overcast and wet. They spent four days at Camp Disappointment waiting for the fair weather needed to take a celestial fix of their position. In his journal entry for July 25, Lewis wrote, “I remained in camp with R. Fields to avail myself of every opportunity to make my observations should any offer, but it continued to rain and I did not see the sun through the whole course of the day.”18 The next day, with clouds still covering the sky, they gave up and set out for home. They soon encountered a party of hostile Blackfeet Indians on...
today’s Two Medicine River. The resulting skirmish, which left at least one of the Indians dead and the explorers fleeing for their lives across the plains, would probably never have occurred except for the weather-induced delay at Camp Disappointment.

SEPTEMBER 9, 1806: HOT AND HUMID AGAIN

The reunited explorers stopped briefly at the Mandan villages, then made a swift descent of the Missouri. By early September they were just a few weeks from St. Louis and back in the familiar wet, wooded landscape of the lower river. The climate, wrote Clark on September 9, “is every day perceptibly warmer and air more sultry than I have experienced for a long time.”19 The nights were now warm enough for Clark to sleep under a single thin blanket, while just a few days before he had needed two.

Vernon Preston is a meteorologist for the National Weather Service in Pocatello, Idaho. He is working on a book about weather and the expedition.

NOTES

1 Gary E. Moulton, ed., The Journals of the Lewis & Clark Expedition, 13 volumes (Lincoln: University of Nebraska Press, 1983-2001), Vol. 2, p. 208. All quotations or references to journal entries in the ensuing text are from Moulton, by date, unless otherwise indicated.

2 Ibid., p. 168.

3 Ibid., p. 426. This is Clark’s journal entry, but the paragraph quoted appears to be in Lewis’s hand (Ibid., p. 428n).

4 The captains’ weather diary records the temperature at sunrise as minus 43; Clark recorded it as minus 45 in a section of his journal used to back up data entered in the diary. Moulton, Vol. 3, pp. 264 and 266n.


6 Ibid., Vol. 4, p. 65. Entry for April 24, 1805.

7 Ibid., p. 320. Virtually the same passage appears in Lewis’s entry for July 4 (Ibid., p. 346).

8 Information derived from conversations with David Bernhardt, scientific operations officer in the Great Falls, Montana, Office of the National Weather Service, and with LCTHF member Donald Peterson.


10 Ibid., Vol. 9, p. 174.

11 Ibid., Vol. 4, p. 348.

12 Ibid., pp. 342-343. York was also in the party, but he did not go into the ravine.

13 Ibid., Vol. 5, p. 209.

14 Ibid., Vol. 6, p. 42.

15 Ibid., Vol. 10, p. 207.

16 Ibid., Vol. 7, p. 266. Entry for May 17, 1806.


18 Ibid., p. 127.

19 Ibid., p. 354.
THE CORPS OF DISCOVERY'S "RETOGRADE MANEUVERS"

"We proceeded on" may be the journals' most common refrain, but there were days when prudence called for tactical retreat

BY H. CARL CAMP

As a rule, commanders of military expeditions with clearly defined objectives are loath to order a retreat ("retrograde maneuver" in military-speak) unless there are compelling reasons to do so. Captains Meriwether Lewis and William Clark were no exception as they led their expedition across the continent and back. And yet retreat they did from time to time—usually as a consequence of opposing natural forces rather than human adversaries.

In a selection adapted from his book, In Full View, (WPO, May 2005), Rex Ziak cites one such instance when the Corps of Discovery retreated from an advanced, and exposed, position upon its arrival on the Pacific coast. As the travel-weary, but elated, the explorers neared Point Ellice at the mouth of the Columbia River, the waters of the estuary were pitching and churning in the throes of a violent storm. Their heavily laden and cumbersome dugout canoes were no match for the unleashed forces of nature. (Nor was the more seaworthy Indian canoe they had acquired earlier as they descended the river.) Assessing the perils after several unsuccessful attempts to round the point, the captains chose the path of caution. Rather than keep plunging headlong into the maelstrom, they withdrew upriver, about two miles according to Clark, to a less exposed position. In Ziak's words:

Wisely, and for the first time since leaving St. Louis eighteen months before, Lewis and Clark ordered the party to turn around. The men [Sacagawea and Pomp, too] retreated upriver to a small cove they had passed moments earlier. They unloaded the canoes and built large fires. There was nothing to do but wait. The pouring rain underscored the misery of this unexpected setback.

And a setback it was, though only temporary. Another five days were to pass before they caught a break in the weather and were able to round the point. They then established Station Camp on the Washington shore of the estuary.

But, contrary to Ziak's assertion, this was not the "first time" the captains had confronted conditions that resulted in a tactical retreat, a "retrograde maneuver." Nor would it be the last, as we shall presently see.

As one looks further into the record, the plot thickens. There were, in fact, several other occasions when the Corps of Discovery retreated from advanced positions it had attained only after the expenditure of enormous effort and energy. These other incidents occurred both on the westward journey and the return home.

For example, early in the journey the explorers were only a few days out of St. Charles when, according to Clark, they entered a stretch of the Missouri River known as "the Deavels race ground." It was filled with projecting rocks, collapsing riverbanks, uprooted trees, shifting sandbars, and swift currents. The keelboat foundered on a sandbar. The tow rope broke. Then the boat wheeled and turned end-to-end—three times—as it was swept downstream, almost capsizing in the process. Only by the concerted exertions of the entire crew was the vessel finally brought under control. Clark laconically describes the perilous event this way:

We returned to the Island where we [had] Set out .... This place I call the Retragrade bend as we were obliged to fall back 2 miles.

While it is true the keelboat was driven back only a few

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miles, those were hard-won miles. The terminology Clark chose at the time to chronicle this incident reveals that he considered it a setback—a retrograde maneuver forced on the Corps of Discovery by the unruly Missouri.

But a short time later, on June 5, 1804, Clark sparingly describes another incident that suggests a retrograde maneuver as well. In his words:

Passed a Small Creek on L.S. [larboard side] opposit a Verry bad Sand bar of Several ms. [miles] in extent, which we named Sand C[reek] ... we passed up for 2 ms. on the L.S. of this Sand [bar? Creek?] and was obliged to return the water uncertain the quick Sand Moveing.5

This minimalist description is somewhat ambiguous; however, it appears the explorers tried one approach for two miles as they attempted to pass a difficult stretch of water but found the situation untenable. They had to retreat and find a more accommodating channel up the river. Under somewhat different circumstances, the party was once again forced to backtrack about two miles before proceeding on.

This next example is offered not to illustrate a tactical retreat but to document the lengths to which the expedition would go to avoid a retrograde maneuver. Shortly after departing the Arikara villages, Clark made this journal entry on October 6, 1804:

Found the river Shole we made Severl. attempts to find the main Channel between the Sand bars, and was obliged at length to Drag the boat over to Save a league [approximately three miles] which we must return to get into the deepest Channel, we have been obliged to hunt a Chann. for Some time past the river being devided in many places in a great number of Channels.6

Hence, in order to avoid having to retreat three miles or so, the keelboat crew was willing to drag the heavily laden vessel an unspecified distance over sandbars until the main channel was reached. Retreat, it seems, was not an acceptable option in this instance.

The Corps of Discovery next engaged in a retrograde maneuver after it arrived at the Mandan and Hidatsa villages, near the junction of the Knife River with the Missouri. Over a period of several days the captains held councils with chiefs of the various villages. Having arrived last at the location of the lower Hidatsa villages, several miles upriver from the Mandans, they began searching for a suitable place to build their winter quarters. Clark's reconnaissance of the area revealed a shortage of sufficient timber to build the structures needed to survive the Great Plains winter. Lewis describes their next move:

The wind blew so violently during the greater part of the day that we were unable to quit our encampment; in the evening it abated;—we Dropped down...
about seven miles and land[ed] on N.E. side of the river at a large point of Woodland.7

This tactical retreat of seven miles led to the site of the future Fort Mandan, located below and on the opposite side of the Missouri from the lower Mandan village of Minutanka. As in previous examples, this backtracking maneuver was dictated by natural constraints they could not ignore: (1) onset of the harsh Great Plains winter was imminent; (2) the party's survival depended on acquiring quarters more substantial than canvas tents; (3) the advanced position upriver at the Hidatsa villages did not offer sufficient timber to build adequate shelters; and (4) the downriver location had the requisite supply of timber. Generally averse to yielding hard-won miles, the captains and their men saw the wisdom of “giving ground” under the circumstances.

The most graphic example of a retreat by the Corps of Discovery on the westward leg of the journey occurred as the expedition approached the Continental Divide and Shoshone country. Commencing on August 1, 1805, Lewis and several men (George Drouillard, Patrick Gass, and Toussaint Charbonneau) were scouting ahead of the main party in hopes of making contact with Sacagawea's people. The channel of the Jefferson River soon split into several increasingly shallow and swift, icy-cold streams: notably, the Beaverhead and Big Hole rivers. The larger group, bringing up the rear with Clark, was struggling upstream in the dugout canoes.

Lewis, after reconnoitering the area, attempted to give his dejected colleagues useful instructions about which fork they should take. He attached a note to a “green pole” taken from a nearby tree and stuck it in the riverbank at the junction of the two rivers.8 When the main body arrived at that location, there was no pole and no note. (Later it was surmised that an industrious beaver working in the area had spirited away the improvised message totem and incorporated it into its watery domain.) Knowing no differently, Clark chose to go up the Big Hole River, which Lewis's note had warned against. After ascending the Big Hole nine hard and painful miles, Clark’s party met Drouillard, who told them of their grievous mistake. Here is what Clark had to say about that dispiriting moment of truth:

[D]uring ... Brackfast Drewyer Came to me from Capt. Lewis and informed me that they had explored both forks for 30 or 40 miles & that the one we were ascending was impracticably much further up ... accordingly Dropped down to the forks where I met with Capt Lewis & party.9

Set straight by Drouillard, Clark's party had to retrace those nine arduous miles in order to get on the right stream. The men were tired, cold, footsore, and dispirited since they were in the icy water much of the time dragging the waterlogged canoes through swift, rock-strewn shallows. The retreat was no easier than the previous day's ascent. Several of the vessels overturned or were swamped, wetting supplies and trade goods and leading to the loss of several valuable items. One of the heavy canoes, out of control, swept over Joseph Whitehouse, who had lost his footing in the treacherous water. Scraped and bruised, he severely injured a leg but managed to escape with his life.10 This was not your textbook example of an orderly retrograde maneuver. One can understand if Clark wished to forget the incident ever happened; he appeared to do just that, as we shall see in a journal entry from much later in the journey.

Up to this point, the explorers had encountered conditions on four occasions that required them to backtrack from advanced positions. All occurred on the westward journey, before they reached the Pacific coast. The forced retreat at Point Ellice (cited above from Ziak's book) was the fifth such event, not the first. While it is true that Ziak confines his assertion to the first 18 months of the expedition, there would be other retrograde maneuvers before the journey was over—at least two more by my count.

After spending a cold, damp winter at Fort Clatsop, on the south shore of the Columbia River, members of the expedition were eager to be underway on their homeward journey by March of 1806. As they made their way up the river on early April, the captains learned from the natives that a large river they had not detected the previous year entered the Columbia from behind several screening islands some miles below their encampment. The natives called this stream the Multnomah; today it is known as the Willamette River. Although it meant retracing the route they had just traveled, on April 2 Clark “determined to take a Small party and return to this river and examine its Size” and gather additional information about the countryside and its inhabitants. He took a crew of seven men (including York) and an Indian guide in a large canoe. They dropped back down the Columbia about twenty miles before entering the mouth of the Multnomah. They then ascended that river some distance, visiting with natives they encountered along the way, staying overnight, and returning to the main encampment on April 3.11

This retrograde excursion, of course, differs substantially from those cited earlier. It was not forced. It did not have to be made, except for the captains' unstinting dedi-
cation to their mission. And it involved only Clark and a hand-picked contingent of seven men, not the whole corps.

The Corps of Discovery's last retrograde maneuver, and arguably its most spectacular, was occasioned by the forces of nature. The explorers arrived back in Nez Perce country in May of 1806. They recovered the horses left the previous year with the Nez Percé for safekeeping and traded for more. But snow still lay impassably deep in the Bitterroots, so they halted and made camp for several weeks. This was the Long Camp, or Camp Chopunnish, as it was to be called later. They waited impatiently for the snow to melt off the higher elevations. Members of the party were eager to cross those "horrible" mountains and be on the last leg of their journey. Finally, against the advice of their Nez Perce neighbors, the explorers started into the mountains from the Quawmash Prairie on June 15, 1806—without the Indian guides who had promised to accompany them but who declined to start out so early in the season.12

As the expedition ascended the heights, the trail became increasingly treacherous and the snowdrifts deeper, blotting out the already faint markings of the route. The explorers had advanced only about fifty grueling miles by June 17 when the captains decided the deteriorating conditions were too hazardous to continue. After describing the meticulous reasoning that guided their decision to retreat, Clark went on to say:

Our baggage being laid on Scaffolds and well covered [among the trees], we began our retractive march at 1 p.m. .... the party were a good deal dejected, tho' not as much So as I had apprehended they would have been. [T]his is the first time since we have been on this long tour that we have ever been compelled to retreat or make a retractive march.13

So, this was a real retrograde march. A "biggie," in Clark's mind. His description of the retreat from the snowy Bitterroots as "the first time ... we have ever been compelled to retreat" contradicts Ziak's accurate account of the corps' earlier experience with conditions at Point Ellice, near the mouth of the Columbia. Clark likewise dismisses, or ignores, the other four previously cited instances of retrograde maneuvers on the outward journey, at least one of which he denominated as having occurred at the "Retagrade Bend" on the Missouri early in the journey. Either the captain was in denial, had forgotten the earlier incidents due to the pressures of intervening events, or had a different set of criteria in mind when he spoke of "retagrade" maneuvers engaged in by the Corps of Discovery.

On final analysis, the Lewis and Clark Expedition could not, and did not, always maintain its forward progress. With one notable exception, however, the few retrograde maneuvers during its 28-month excursion across the continent and back were momentary setbacks of short duration and involved modest distances. The real story, of course, is the courage, grit, and determination displayed by the co-captains and their intrepid band as they pushed on to accomplish the daunting mission assigned them by Thomas Jefferson. Against all odds, they compiled an astonishing record of success.

Foundation member Carl Camp is an emeritus professor of political science at the University of Nebraska at Omaha. He is a founding member of the foundation's Mouth of the Platte Chapter and lives in Omaha.

NOTES
1 Rex Ziak, In Full View: A True and Accurate Account of Lewis and Clark's Arrival at the Pacific Ocean, and Their Search for a Winter Camp Along the Lower Columbia River (Astoria, Ore.: Moffitt House Press, 2002).
3 For a full account of this incident, see Gary E. Moulton, ed., The Journals of the Lewis & Clark Expedition, 13 volumes (Lincoln: University of Nebraska Press, 1983-2001), e.g. Vol. 6, pp. 38-50 (November 10-15, 1805). All quotations or references to journal entries in the ensuing text are from Moulton, by date, unless otherwise indicated.
4 Moulton, Vol. 2, p. 251 (May 24, 1804). In the index to this volume, Moulton lists the location of the event as "Retagrade [sic] bend." Interestingly, Ordway and Floyd stated in their journals that "nothing remarkable" happened on this date. Moulton, Vol. 9, p. 7 and p. 275, respectively. Gass noted the current was swift and the keelboat "nearly upset." Moulton, Vol. 10, p. 9. Whitehouse said only that the river was "swift." Moulton, Vol. 11, p. 12.
6 Ibid., Vol. 3, p. 147 (October 6, 1804). Emphasis added.
7 Ibid., pp. 224-225 (November 1, 1804). Emphasis added.
8 Ibid., Vol. 5, pp. 24-42 (August 1-6, 1805). Emphasis added.
9 Ibid., pp. 54-55 (August 6, 1805).
10 Ibid.
12 Ibid., Vol. 8, pp. 25-26 (June 15, 1806).
13 Ibid., pp. 31-34 (June 17, 1806). Emphasis added.
Let the spirit of Lewis and Clark guide you to St. Joseph, Missouri

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In the sixth season of Harry Potter, any enterprising author of young reader's fiction looking for shelf space needs a bit of wizardry himself. Allan Wolf's telling of the more than twice-told tale of the Lewis and Clark Expedition in verse form may work its magic for youngsters who get their hands on this innovative drama. Wolf gives us an adventure saga along the lines of Longfellow's "Song of Hiawatha," which entertained many of us in our "tweens," ages 10 and up, to which his treatment is directed.

Wolf is a member of Poetry Alive!, a touring company. One hopes that he already has converted this book into several performance scripts. Readable enough as a narrative, New Found Land cries out to be recited. Its interior monologues would work perfectly for the stage as soliloquies by the major players. The work possesses some New Age sensibility, channeling, and telepathy but not enough to really annoy those children of the Enlightenment who prefer to stick to the facts. Wolf, despite his rich, feeling tone, takes care to get his facts straight.

Like Brian Hall's novel I Should Be Extremely Happy in Your Company (War, May 2003), Wolf's saga opens like a good western with the shattering ambush of Sacagawea's food-gathering party by Hidatsa warriors. This not only gets our attention, it places us where the expedition is going rather than where it originated. His lyrical descriptions of expedition geography—the Missouri headwaters, the Gates of the Mountains, the Great Falls—will ring true for those who have been there.

Wolf assigns epithets to the Corps of Discovery: Pierre Cruzatte, the fiddler; Hugh Hall, the drinker; John Colter, the hunter; York, the slave. The danger is that types can become stereotypes. Every person is more than his status. The thoughts of such diverse personae naturally diverge, but a common thread is a tendency to snipe at Meriwether Lewis for his outwardly astringent approach to things. Lewis looks at the North American biosphere, not in the mystical Indian way but with the clinical detachment of a museum curator.

Lewis's dissecting knife strips the life from one specimen after another. But there is a flip side. Lewis's penetrating curiosity never sleeps. His mind is a sentinel that remains on duty through drought, blizzard, fatigue, and starvation. Despite his shortcoming, he remains the most fascinating member of the expedition.

In Wolf's book, Lewis's penetrating curiosity never sleeps. His mind is a sentinel that remains on duty through drought, blizzard, fatigue, and starvation. Like many other works, Wolf's exposes Lewis's shortcomings only to bolster the ineradicable reality that he was the most fascinating member of the expedition.

Another intriguing characterization is that of Drouillard, the half-Shawnee woodsman. Drouillard's consciousness tilts sharply toward his native ancestry and, while not quite cynical, contains a strong dose of skepticism. Bonding with his fellows and pulling his weight, Wolf's Drouillard never subscribes to the geopolitical and cultural imperatives that drive the great journey.

The role of narrator is assigned to Seaman, dubbed "Oolum." This is an inventive but unfortunate idea that gratefully every time it is used. (The narrative segments are themselves accurate and well crafted.) Having a minor character narrate is a well-worn convention but another (two-legged) choice would have served better. I would have nominated Patrick Gass, pigeonholed by Wolf as "the carpenter," who opines throughout the poem about trees and lumber. In a postscript Wolf explains that "Oolum" was the name of Leif Ericson's "bear dog," a possible progenitor of the Newfound-land breed.

Oolum proves to be a font of insight that stretches credibility past the breaking point. He calculates river miles, refers to navigational instruments, renders Indian names into their English equivalents, foreshadows thoughts and decisions of the captains, and even refers to the Enlightenment. After one piece of historical discourse too many, one begins to think one is hearing John Logan Allen or James Ronda disguised in a glossy-black fur coat.

For one thing, Seaman has been the subject of books informed by knowledge of canine biology written for children and established readers (e.g., The Captain's Dog, by Roland Smith, and
Essays present Lewis & Clark in broader context

No great enterprise, nor that which follows in it wake, takes place in a vacuum. This is certainly true in the case of the Lewis and Clark Expedition, since the mission of the Corps of Discovery and the actions of its members and benefactors were inevitably influenced by the social, political, and cultural forces that helped to define and guide the early American experience.

With this in mind, Robert S. Cox, head of special collections at the University of Massachusetts, Amherst, and a team of scholars have written six essays to "grop[e] in different ways with the complex of motives underlying the Corp of Discovery" and its impact on American culture. The essays are based on papers delivered at the Bicentennial Conference on Lewis and Clark, held in Philadelphia in 2003.

A major question for many scholars is what motivated Lewis and Clark to act in the manner so carefully chronicled in their journals. And how does one explain the successes and failures of this great adventure, including all that happened in the aftermath of the expedition? Further, why, throughout much of the 19th century, did the Corps of Discovery fail to receive the attention and credit its great achievement deserved? This collection seeks to tease out some answers to these and other questions.

Its success is in large part due to the caliper and reputation of its authors. In addition to writings by Robert Cox (a former librarian at the American Philosophical Society) the book features essays by Domenic Vitiello, an urban planner and historian, who teaches urban studies at the University of Pennsylvania; S.D. Kimmel, a research associate in the history of medicine at the University of Michigan; John W. Jengo, a geologist with an environmental consulting firm; Brett Mizelle, an assistant professor of history and director of American Studies

Lewis and Clark in Washington State

A largely overlooked part of the Lewis and Clark saga is explored in Ocean in View! O! the joy: Lewis & Clark in Washington State (Washington State Historical Society, 156 pages, $27.95 paper).

The format of this handsome volume consists of facing pages of text and artwork devoted to noteworthy events, from trading with local tribes to weathering fierce Pacific storms. The 78 watercolors by Roger Cooke are a splendid addition to the remarkable body of bicentennial-related Lewis and Clark art. The introduction by David L. Nicandri notes the tendency of L&C historians (and therefore artists) to ignore the Snake and Columbia River passages in favor of the expedition's Missouri River portion. He attributes this oversight to the absence of Lewis journal entries for these periods, leaving them dependent on Clark's incate if colorful prose.

The text by historian Robert C. Carriker is succinct and incisive. Those who have followed the debate regarding the "vote" at Chinook Point on where to establish a winter camp will welcome the writer's even-handed take on this controversy:

Carriker states that Clark recorded the "voiced preference" of each person. "In a manner of speaking," he adds, "the members of the expedition had voted. More accurately, they had been consulted in a non-binding opinion poll."

--J.M.
at California State University, Long Beach; and Andrew J. Lewis, an assistant professor of history at American University.

In the first essay, Vitiello documents the eminence of Philadelphia's scientific leaders and the technological advances they sparked in the period immediately prior to the expedition. In 1823, Lewis visited Philadelphia, where members of the American Philosophical Society schooled him well in the fields of science and technology.

Kimmel suggests that philanthropy, with its wide range of activities to promote democracy and human well-being, and its role in the era's political economy were underlying factors in the successes and failures of the Corps of Discovery. Readers may find his presentation at times difficult to follow, but his essay nonetheless presents interesting scholarship.

Another fascinating essay, written by Cox, could well be called "Politics, Naturalism, and Seedsmanship." The author weaves an intriguing and insightful story of what happened to the seeds Lewis brought back from the West. While the essay focuses on the role of an immigrant horticulturist named Bernard McMahon, the story is truly amazing for the cast of characters involved, including Thomas Jefferson, the botanists Benjamin Smith Barton and Frederick Pursh, and the gentleman horticulturist William Hamilton.

Some scholars think that Lewis and Clark failed to fulfill Jefferson's charge to discover the West's "mineral productions of every kind." After scouring the journals in detail and noting in particular Lewis's observations, John Jengo shows that geology and mineral resources in fact received more attention than has been assumed. He contends that Lewis's observations cannot be seen as deficient when viewed in the context of the embryonic state of geological knowledge in the late 1700s and the limited knowledge Lewis had in the geological sciences. As I remember from my personal reading of the journals, Lewis covered many topics of geology, some so well that even the great American geologist Nevin Fenneman would have benefited from reading the journals when writing his seminal books on physiography in the 1930s.

The essay by Brett Mizelle examines the impact of public exhibitions of western fauna in early Philadelphia. Mizelle demonstrates that specimens brought from the West by Lewis and Clark were treasured additions to Charles Willson Peale's famous Philadelphia museum; somewhat surprisingly, he finds little evidence of much public interest in Lewis's live specimens, a prairie dog and a magpie.

In the final essay, Andrew Lewis discusses possible reasons why Lewis and Clark and their achievements were largely ignored for much of the 19th century. He argues that they were overlooked in part because their "natural history contributions were not particularly notable for the period." A kind of Lewis and Clark renaissance began at the end of the century with the publication, in 1893, of a new edition of the journals edited by Elliott Coues. This was actually a heavily annotated version of Nicholas Biddle's 1814 paraphrase of the journals.

When first introduced to Lewis and Clark, most readers likely focus on the popular presentations, such as Undaunted Courage, by Stephen E. Ambrose, or perhaps a primary source such as the abridged one-volume Journals of Lewis and Clark, edited by Bernard DeVoto. Soon, however, many want to probe deeper into the character of the American nation in the years leading up to, and immediately following, the expedition. This collection of essays does a wonderful job of providing that context.

—John H. Sandy

The reviewer is a librarian at the University of Alabama.
book is richly illustrated with contemporary and historical art and photography. Much of it is devoted to Salish oral accounts of the encounter with the Lewis and Clark Expedition, but as the introduction makes plain, its purpose is to explore “the historical meaning of Lewis and Clark within the context of Salish culture and history,” from the Ice Age to the present.

The authors convey this deeper history in part through a discussion of places in the Bitterroot Valley important as camping, hunting, or fishing grounds for thousands of years and still known by their tribal names. To the Salish, the meadow where they met Lewis and Clark isn’t Ross’s Hole but (as rendered in the International Phonetic Alphabet) K’i:i: PupM1, pronounced something like Cutl-kkh-poohm. It means Coming Out into a Big Open Space, which is exactly as it must have appeared to the captains on that day 200 years ago.

—J.M.

La Charrette: forgotten village on the L&C Trail

When Lewis and Clark were looking for a place to spend the winter of 1803-04 in preparation for their journey to the Pacific Ocean, they initially thought of La Charrette, a village on the Missouri River a few miles upstream from St. Louis. Because La Charrette was located in what was still nominally French territory (the U.S. had purchased Louisiana but had yet to take possession of it), they decided instead to winter at Camp River Dubois, in Illinois.

Despite that missed historic opportunity, La Charrette still figures in the story of westward expansion. Zebulon Pike stopped there on his way to explore what is now Colorado. Other visitors included the explorer Stephen H. Long, trapper Jim Bridger, and Paul Wilhelm of Württemberg, a German duke who employed Toussaint Charbonneau as his interpreter on an excursion up the Missouri in 1823.

Lowell M. Shake describes these and other adventurers figuring in the town’s colorful history in La Charrette: Village Gateway to the American West (self-published; $19.95, paper; order from www.iuniverse.com). Among those who settled in or near La Charrette were Daniel Boone and his son-in-law Flanders Callaway, Corps of Discovery member-turned mountain man John Colter, and an illusive hunter and guide named Charles “Indian” Phillips. As a fourth great-grandson of John Colter (who died in La Charrette in 1812), I especially enjoyed reading about his home on Little Boef Creek, where he lived with his wife, Sarah, and their children, Hiram and Evelina. Indian Phillips was a neighbor.

Osage Indians were the original residents of the land where Charrette Creek joins the Missouri. The first white settlers of Charrette Bottom were probably French-Canadians who ar-
rived there in the 1760s. They were followed in turn by Anglos, African-Americans, and German immigrants in what Shake calls a “continuing process of cultural assimilation.” The author links the microcosm of village life to nation-shaping events such as the Louisiana Purchase, the War of 1812, and the forced removal of Eastern Indians on the Trail of Tears.

—Timothy Forrest Coulter

In Brief: River journey; “L&C Review”

On April 20, 1998, Chris Bechtold of Choteau, Montana, departed the reconstructed Camp River Dubois in Illinois. He set off down the Mississippi and then up the Missouri in a 14-foot jon boat (named Teddy, after Theodore Roosevelt) powered by a 9.9-horsepower outboard engine. At his mother’s insistence he carried a cell phone. His purpose, as stated in A Current Adventure: In the Wake of Lewis and Clark (self-published; $14.95, paper; order from www.aricaventures.com) was to retrace most of the outbound river route of the Corps of Discovery 194 years before. The writer’s traveling companion—his erstwhile Seaman—was Herschel (shown above with the author), a mutt rescued from the animal shelter in Missoula, Montana. From time to time they were joined by Bechtold’s dad and a family friend who rendezvoused with them at various spots along the route. By November 7 Bechtold had reached Toston Dam, south of Helena. He was still short of the Three Forks and hundreds of miles from the upper Beaverhead River, where the explorers had left their canoes to cross overland to the Salmon River, but he had gone about as far on the river as today would be considered navigable. A year later he put in at Orofino, Idaho, near where Lewis and Clark built dugout canoes for their run to the Pacific. Once again Hershel manned watch in the bow. Six weeks later, after battling driving wind and fearsome waves on the lower Columbia, he reached Fort Clatsop.

For the most part not a great deal happened along the way, and in the end Bechtold faults himself for not taking more time to have “walked the banks of the river more, seen more of the country and visited with more of the people.” Still, the author manages to tell an engaging if understated story, and for anyone wishing to repeat his journey he offers several pages of advice.

Written and edited by Patrick Lee, Mosquitoes, Gnats & Prickly Pear Cactus: The Lewis & Clark Review (self-published; $18.95, paper; order from www.patricklee.com) is a brisk one-volume narrative of the Lewis and Clark Expedition. Lee, a professional interpreter of historic figures—his stage personas are William Clark, Thomas Jefferson, and Daniel Boone—devotes the first six of his 43 chapters to Jefferson’s vision and preparations for the expedition. After that, his text consists of brief excerpts from the L&C journals, along with occasional short commentary.

The last three chapters are devoted to the explorers’ post-expeditionary lives and their legacy. Lee avoids grandiose statements about the expedition’s geopolitical importance or politically au courant claims regarding its impact on the environment and Native-American cultures (for good or ill, it’s hard to imagine the history of westward expansion being significantly different had Lewis and Clark stayed home). Instead he holds to the more credible notion that their greatest contribution was the account they left describing what they did and saw. It is the journals themselves, he declares, that “have made it possible for the rest of us to share in this extraordinary American adventure.”
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Meriwether Lewis and William Clark singled out the Field brothers of Kentucky as among the most valuable members of the Corps of Discovery. The captains invariably spelled the younger Field's name as "Reubin," and this is the spelling one most often finds in accounts of the expedition published over the last quarter century. It is also the spelling used by Gary E. Moulton in his authoritative, 13-volume Journals of the Lewis & Clark Expedition. But is it correct?

This magazine's style sheet, which I continually update, has flip-flopped on the spelling. Until recently I had been using "Reubin," as per Moulton. This is how his name was spelled in an article I was preparing last winter for publication in the May 2005 issue when my proofreader Carl Camp pointed out that the name should be spelled with an e. As if to reinforce his point, when I spelled the name with an i in an e-mail message, my spell checker flagged it as incorrect. Next, I went to the dictionary and could find no entry for "Reubin." I did find one for "Reuben," however. It told me that Reuben was the oldest son of Jacob in the Bible; "the Reuben," I also learned, is an annual award for cartoonists and a sandwich named for the Manhattan eatery where it originated.

The article that spawned this inquiry concerned Cape Girardeau, Missouri, where the younger Field and several other expedition members settled after their return to St. Louis. The article's illustrations include a photocopy of a document with Field's signature. Taking a closer look at the signature, I saw that the first name was spelled "Reubin." The spelling is unambiguous—the upper part of the second e appears as an oval, not as an undotted i. The first e is written this way, too.


The documents reprinted in Donald Jackson's Letters of the Lewis and Clark Expedition with Related Documents, 1783-1854 (1968 and 1978) include, on page 379, a petition signed by seven members of the Corps of Discovery; one of the signers was the younger Field, whose name Jackson rendered with an e. In his editorial commentary Jackson also spelled it "Reuben," although later, in Among the Sleeping Giants (1987), he spelled it "Reubin."

The Reubin spelling, I discovered, appears to originate with an article by Roy E. Appleman published in the Filson Club Quarterly 49, no. 1, pp. 5-36 (1975), titled "Joseph and Reubin Field, Kentucky Frontiersmen of the Lewis and Clark Expedition and Their Father, Abraham."

When I discussed the Reubin/Reubin question via e-mail with James Holmberg, a prominent Lewis and Clark scholar at the Louisville institution now known as the Filson Historical Society, he checked an 1807 document in the society's archives bearing Field's signature. Holmberg found that this signature was also written with an e. He noted as well that on both the Cape Girardeau and Filson signatures the i in Field is dotted, making it unlikely that the signer wrote his Christian name with an undotted i.

Holgberg also pointed out that spelling was "still pretty flexible" in those days and that members of Field's family, as well as Reuben himself, at least on occasion may have spelled his name with an i. Based on the signatures on the Cape Girardeau and Filson documents, however, he too concluded that "Reuben" was probably correct. Holmberg added, "Now, if we can only determine when he died and where he is buried and how and where his brother Joseph died."

—J.I. Merritt
Editor, WPO
Fire destroys Fort Clatsop replica; Thomsen, others elected; Bud Clark honored

On the night of October 3 a fire of unknown origin destroyed most of Fort Clatsop, the reconstructed log home of the Corps of Discovery during its winter on the Pacific coast. By the time firefighters responded to the blaze and got it under control the fort was a total loss. About half the fort was destroyed outright and the other half gutted. The only part left unharmed was the front gate.

Fortunately, there were no injuries, and most of the fort’s interpretive items and supplies had been removed for winter storage. Officials of the National Park Service, which administers the historic site, immediately announced plans to rebuild the 50-year-old replica in a way that will reflect recent scholarship about the fort’s layout.

Investigators have at least tentatively concluded that the fire did not result from arson. It’s possible that fireplace embers may have sparked the blaze. According to The Daily Astorian, two of the fort’s fireplaces had fires going that afternoon, although they were presumably extinguished by the time the fort closed for the evening. A fireplace fire slightly damaged the fort in 2002. Fireproofing was added when the fireplaces and chimneys were reconstructed last year.

The fire occurred two months after participants of the LCTHF’s annual meeting in Portland toured the site and just a month before Destination: The Pacific, the L&C Bicentennial signature event scheduled for November 11-15 in Astoria.

The replica, which is located near a tidal creek about six miles south of Astoria, was built by local volunteers in the 1950s in time for the 150th anniversary of the Lewis and Clark Expedition’s arrival at the Pacific. The National Park Service took over the site in 1958. Since last year it has been part of the new Lewis and Clark National Historical Park, which comprises L&C sites on both the Oregon and Washington sides of the Columbia estuary.

Tax-deductible donations for the rebuilding can be sent to the Fort Clatsop Historical Association, 92343 Fort Clatsop Road, Astoria, OR 97103.


Thomsen and other new officers

Patti Thomsen of Oconomowoc, Wisconsin, was elected president of the Lewis and Clark Trail Heritage Foundation at its annual meeting, held August 7-10 in Portland, Oregon.

Other officers elected were Jim Gramentine of Mequon, Wisconsin (president-elect); Ron Laycock of Benson, Minnesota (vice president); Phyllis Yeager of Floyd Knobs, Indiana, (secretary); and Charles H. Holland, Jr., of Mesa, Arizona (treasurer). Gordon Julich of Lee’s Summit, Missouri, will serve as immediate past president.

Thomsen, whose one-year term coincides with the last year of the three-year-long Lewis and Clark Bicentennial, joined the foundation in 1984 and attended her first annual meeting later that year. A member of its board of directors for eight years, she will oversee development of an updated strategic plan and the foundation’s Third Century Endowment Fund. Additional goals include expansion of the foundation’s trail stewardship efforts and cultural diversity education.

Three others were elected to serve three-year terms on the board of directors:

James Brooke of Colorado Springs, Colorado, begins his first term on the board, and Stephanie Ambrose Tubbs of Helena, Montana, begins her first full term. She served six months on the board in 2005, filling the remainder of Chuck Cook’s term when he retired. Karen Seaberg of Atchison, Kansas, was also elected to her first full term on the board. She served the remaining two years of a vacated position in 2004 and 2005.

Brooke completed 20 years of service as a Navy pilot in 1991, and since that time has worked in the aerospace industry overseeing engineering programs both in the United States and abroad. He currently serves as senior director of Space and Strategic Operations for ARINC Engineering Services, LLC, overseeing the program performance, finances, and operations for 150 people in 13 locations throughout the western United States.

Ambrose Tubbs is coauthor of The Lewis and Clark Companion: An Encyclopedic Guide to the Voyage of Discovery. She lectures nationally about her experiences and observations on the Lewis and Clark National Historic Trail, which she first followed in 1976 with her father, author Stephen E. Ambrose. She holds two degrees in history from the University of Montana and serves on the boards of the Great Falls L&C Interpretive Center and the American Prairie Foundation.

Seaberg is a travel consultant and co-owner of a restaurant in Atchison. She has served on the Atchison Lewis and Clark Bicentennial Committee and the
Kansas Coalition for the Lewis and Clark Bicentennial. She is chairwoman of the Governor’s Kansas Lewis and Clark Bicentennial Commission and served on the executive committee of “Heart of America: A Journey Fourth,” a L&C Bicentennial signature event.

Bud Clark honored
Also at the Portland meeting, the LCTHF honored Peyton “Bud” Clark, a descendant of Captain William Clark, with its 2005 Distinguished Service Award, given for contributions that further the foundation’s objectives.

Clark worked tirelessly to refurbish the St. Louis gravesite of William Clark. It was through his leadership that other Clark descendants joined in raising funds for the restoration and participated in a ceremony to rededicate the monument.

He has shared his significant collection of historical weapons and artifacts from the Lewis and Clark era. Items from the collection have been displayed at the Filson Historical Society, the Jefferson National Expansion Memorial, the Gerald Ford Museum, and the Lyndon Johnson Presidential Library, as well as at the foundation’s annual meetings and at firearms conventions.

Clark has portrayed his famous ancestor with the Discovery Expedition of St. Charles, Missouri, along the Lewis and Clark Trail from Monticello to Fort Clatsop and has spoken at bicentennial signature events and other venues along the trail.

Passages: Lucie Huger
Lucie Furstenberg Huger, a longtime member of the LCTHF, author, and activist in behalf of Lewis and Clark, died on September 7 in St. Louis, five days short of her 89th birthday.

Born and raised in St. Louis, Huger for 28 years lived in the Missouri River community of St. Albans. The Corps of Discovery stopped in the vicinity on May 23, 1804, and examined a cave in the cliffs above the river. Some of the cave’s graffiti may include an inscription by John Ordway. When Lewis was exploring the cliff he almost fell to his death. Through the efforts of Huger and the Missouri D.A.R., a marker commemorating Lewis and Clark’s visit was placed at the site in 1971.

More recently, she was active in fund-raising for a statue, expected to be unveiled next year in St. Louis, commemorating the expedition’s return.

Huger was the author of St. Albans: History and Folklore of a Missouri River Town (reviewed in the May 2002 WPO). She majored in history at Marymount College, where she wrote a senior thesis on Wild Bill Hickok. Hopi Indians made her an honorary member of their tribe for her work in behalf of the American Indian Cultural Center, in St. Louis.
Members throng to annual LCTHF meeting in Portland

Some 400 people gathered in Portland, Oregon, August 7-10 to take part in "Gateway to the Pacific," the 37th annual meeting of the Lewis and Clark Trail Heritage Foundation. The five-day total immersion in all things Lewis and Clark featured marathon bus tours of key Corps of Discovery sites on the lower Columbia River, a battery of speakers addressing a staggeringly broad range of subjects, and "Camp Pomp," a youth camp for Lewis and Clark novitiates. The meeting was held, appropriately, at Lewis and Clark College, whose library boasts what may be the world’s best collection of Lewis and Clark books. Participants could sample talks on Lewis and Clark's impact on the environment and Native American cultures in the Pacific Northwest; Clark's controversial claim about first seeing the Pacific ("Ocean in view!") from a distance of 26 miles; York and other black explorers of the West; Sacagawea in fact and fiction; Lewis and Clark's literary legacy; and one man's struggle with Lewis and Clark bibliomania. Other sessions addressed salmon, rock art, weather, weapons, medicine, wildflowers, and music, among other Lewis and Clark-related topics.

Next year's annual meeting will be held September 18-20 in St. Louis.

—J.I.M.

Clockwise from above:
• A visit to the National Park Service reconstruction of Fort Clatsop, two months before it was destroyed by fire.
• At Cape Disappointment, where the Columbia River meets the Pacific Ocean.
• Statue of Sacagawea on the Lewis and Clark College campus.
• A stop at Prescott Beach, Oregon, site of the L&C campsite of November 5, 1805.
In the spring of 1806, following a cold, wet, miserable winter on the Pacific coast, the members of the Corps of Volunteers for North Western Discovery started home. Part of the first phase of their route took them from the mouth of the Walla Walla River overland to the mouth of the Kooskia or Clearwater River. The explorers were on this section of the trail on May 2 when they reached the confluence of the Touchet River and Patit Creek, in today's eastern Washington. After sharing a snack of cow parsnip with their Walla Walla native guides, they continued up Patit Creek a few miles and "encamped on the N. side in a little bottom," according to the journals. They ate dog meat for dinner, then bedded down under a cold rain that later turned to snow. The next day they continued east.

The campsite, next to a county road near Dayton, Washington, remained remote and mostly forgotten for many years. But as the bicentennial of the explorers' stay at the camp approached, residents wondered how they might commemorate this small part of the Lewis and Clark story. Led by a former Columbia County commissioner, George Touchette, they came up with the idea of placing life-sized steel silhouettes at the campsite.

The owners of the surrounding property, the Broughton Land Company, donated seven and a half acres for the project. In 2000, as an initial step, several basalt monoliths were placed on the site along with a plaque explaining its significance.

Touchette, meanwhile, raised more than $100,000 from the Washington State Historical Society and the Washington State Bicentennial Advisory Committee to pay for the silhouettes, interpretive signs, and the site's landscaping with native plants. He also enlisted the help of local and state historians to determine what the campsite would have looked like when it was occupied by the explorers.

An actual camp was then set up at the site, complete with tents, horses, dogs, and volunteers—some dressed as explorers and others as the Walla Wallas who accompanied them. The organizers took care to ensure the historical accuracy of clothing, weapons, supplies, and tack. Photographs were taken, and figures and objects were then cut from the photos and transferred to pasteboards. The cutouts were used by the firm of NW Art Casting of Umapine, Oregon, as models for the 78 full-size silhouettes. Arranged in a tabletop mockup, the cutouts also guided placement of the silhouettes at the site. The silhouettes were set into concrete bases at the site earlier this year. A dedication took place on July 15.

Visitors can drive to the site by turning east off U.S. 12 in Dayton and continuing two and a half miles along Patit Creek Road. It's especially nice to arrive there on a spring or summer evening and see the explorers going about their chores in the orange glow of a Northwestern sunset.

—Gary Lentz

**Foundation honors four for furthering L&C legacy**

At its recent annual meeting in Portland, Oregon, the LCTHF honored four people with appreciation awards in recognition of their efforts to preserve the legacy of Lewis and Clark:

David Hendee, a staff writer for the *Omaha World-Herald*, for his leadership in planning and executing his paper's coverage of the 200th anniversary of the L&C Expedition.

Darrel Draper, re-enactor and co-founder of the foundation's Mouth of the Platte Chapter, for his interpretation of hunter George Drouillard, which he has delivered at countless schools and other venues in Nebraska. Helen Markwell, a re-enactor who portrays Patrick Gass, one of the expedition's sergeants, for her presentations at schools, many in remote areas and with limited resources, throughout her native West Virginia.

Jim Sergeant of Bozeman, Montana, for founding "200 Birthday Parties for Pomp," a worldwide effort to honor Sacagawea's son. It has resulted in more than 450 celebrations in Canada, England, Mexico, the Cayman Islands, Jamaica, Thailand, France, Kenya, Germany, Zambia, Zimbabwe, Turkey, and the U.S. More than 16,000 people have attended the festivities.

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—Gary Lentz
argument that he would not fire a gun at his own head and nearly miss. Vardis Fisher viewed skeptically the proponents of the suicide theory: "They ask us to believe that a man familiar with firearms from childhood, the use of which for him must have been almost second nature, aimed at his head with a pistol (not a rifle), evidently intending to shoot through his brain, and only grazed his skull." Fisher's skepticism has been echoed in recent years by murder theorists who have asked that Lewis's remains be exhumed.

But an argument for murder that is based in part on the belief that Lewis would not fire at his head so ineffectively is weakened by reversing the accepted order of the shots. The idea that Lewis could almost miss becomes far more plausible if we think of his shot to the head as the second shot, fired while he was physically and mentally shocked by an earlier shot to his body.

My primary intent, however, is not to make a case for reversing the sequence of the shots but to make a case that the accepted sequence is presumed rather than known and that a reversed sequence is at least as plausible—whether the act was murder or suicide. For those pondering the mystery of Meriwether Lewis's death, one more uncertainty is added to an already long list.

Foundation member Ann Rogers lives in St. Louis. She is the author of Lewis and Clark in Missouri (University of Missouri Press, third edition, 2003).

Notes
2 I read the Brahan quotations in Vardis Fisher, Suicide or Murder? The Strange Death of Governor Meriwether Lewis (Chicago: Swallow Press, 1962), pp. 140–41. I thank Thomas Danisi, who has just completed a biography of Meriwether Lewis, for providing the full citations for the letters. Library of Congress, Thomas Jefferson Papers, John Brahan to Thomas Jefferson, 18 October 1809, document 33520-21, series 1, roll 44; National Archives. Records of the Office of the Secretary of War, RG 107, John Brahan to William Eustis, B-589, 18 October 1809, microfilm M221, roll 18, frame 5632.
3 Fisher, p. 142.

2006 signature events
I would rather photograph sunlit landscapes along the Lewis and Clark Trail than move through the metaphorical darkness of Grinder’s Stand, but one element in the mystery of Meriwether Lewis’s death intrigues me: the presumed sequence of the fatal shots.

The traditionally accepted sequence began with the slightest implication, turned quickly to hearsay, and was then stated as fact.

Lewis, while en route from St. Louis to Washington, D.C., stopped at Grinder’s Stand, intending to spend a night at this remote way station on the Natchez Trace in Tennessee. During the early hours of October 11, 1809, he died from gunshot wounds. He had been traveling from Chickasaw Bluffs (present-day Memphis) with James Neelly, agent to the Chickasaws, but Neelly said later that searching for strayed horses had delayed his arrival at Grinder’s Stand until some hours after Lewis’s death.

Neelly continued to Nashville where, on October 18, he wrote to Thomas Jefferson, the former president, then in retirement at Monticello. Describing the manner in which Lewis had died a week earlier, Neelly reported: “He had shot himself in the head with one pistol & a little below the Breast with the other.” No sequence is stated and none is implied, beyond simply mentioning the head first.

On the same day that Neelly wrote to Jefferson, Captain John Brahan, 2nd U.S. Infantry, wrote three letters from Nashville concerning Lewis’s death, which he had learned about from Neelly. The recipients were Jefferson, Secretary of War William Eustis, and Lewis’s friend and Army colleague Captain Amos Stoddard.

In his letter to Jefferson, Brahan writes of Lewis: “He had shot himself first it was thought in the head. the ball did not take effect. the other shot was a little below his breast.” In his letter to Eustis, he says that Lewis “shot himself with two pistols: the first ball it is said wounded him in the head the other entered a little below his breast.”

It’s not known why Neelly, in speaking to Brahan, would offer a sequence for the shots, something he had not done in his letter to Jefferson. According to Neelly’s account, no one acknowledged witnessing the shooting, and neither of Lewis’s wounds was immediately fatal. Brahan’s use of the qualifying phrases “it was thought” and “it is said” in his letters to Jefferson and Eustis may indicate he questioned the worth of Neelly’s proposed sequence.

In his letter to Stoddard, Brahan forgoes speculation and states simply that Lewis “had shot himself in the head and just below his breast.”

Brahan had chosen his words carefully, but Neelly’s scenario was on its way to being accepted as reality. Neelly’s information regarding Lewis’s death apparently provided the foundation for an account given by Captain Gilbert Russell, who was the post commander at Fort Pickering, near Chickasaw Bluffs, when Lewis stayed there en route to Grinder’s Stand. On November 26, 1811, Russell stated, in what has become an often-quoted letter, that Lewis “discharged one [pistol] against his forehead without much effect—the ball not penetrating the skull but only making a furrow over it. He then discharged the other against his breast where the ball entered and passing downward thro’ his body came out low down near his back bone.” With the addition of the word “then,” the sequence that is barely implied in Neelly’s letter to Jefferson and reported as hearsay by Brahan is elevated to the level of fact in the Russell document. It has since become common to speak or write of the shot to the head as the “first shot” and the shot to the body as the “second shot,” as though the sequence could be known.

Throughout the long debate on whether Lewis’s death was suicide or murder, those who have rejected Neelly’s report that Lewis killed himself have not challenged Neelly’s proposed sequence for the fatal shots. In a 1991 article, E.G. Chuiard used the traditionally accepted sequence when he constructed a scenario that had Neelly enter Lewis’s room and graze his skull with the first shot as Lewis woke and began to rise up. “The second shot entered the chest and went downward to exit in the low back, a course explained by the fact that Lewis was in the semi-upright position.” If Chuiard’s reconstruction is correct, we can view Neelly as a murderer who tipped his hand when he told Brahan the sequence of the shots; but if he did not fire the shots, the sequence Neelly offered can be no better than a guess.

Those who believe Lewis was murdered often use the argument that assumptions about their sequence can lead investigators astray.
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