

THE UNITED STATES ARMY AS THE EARLY PATRON OF NATURALISTS IN THE TRANS-MISSISSIPPI WEST, 1803-1820

By Phillip Drennen Thomas*

In the seventeen years between the initiation of the Meriweather Lewis and William Clark Expedition and the completion of the Stephen H. Long Expedition, American penetration of the Trans-Mississippi West began to expose the flora and fauna of this unknown region to the scrutiny of European and American scientists. Many of the naturalists who made collections, recorded their observations and gained an insight into the geological formations of this area were frequently either members of the United States Army or members of government expeditions under army leadership. With considerable difficulty, the biota of this vast area began to be sketched out. The majority of the activities of the early naturalists in the area were ultimately in the realm of taxonomy. Geology, botany and zoology were just beginning their professional growth in this country.

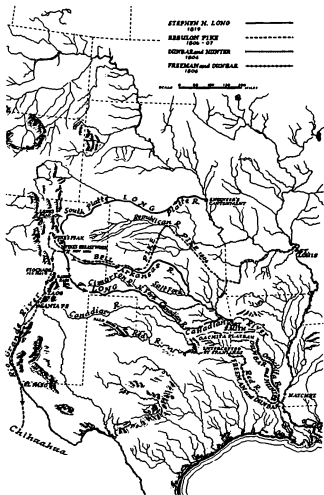
American interest in the lands beyond the Mississippi River had been nourished by the persistently curious Thomas Jefferson. In the two decades prior to his becoming president, Jefferson had sought on at least four occasions to encourage western exploration.¹ One of his more quixotic endeavors in this area was the encouragement he gave to John Ledyard, a Connecticut adventurer. Ledyard, who had served with Captain James Cook during his third circumnavigation of 1776-1779, had sought to cross the North American continent from its western to eastern shores. Ledyard had planned to travel overland from Paris to Siberia. Upon reaching Siberia, he was to join a Russian fur party on its way to Alaska. Once in Alaska, he was going to drop south until he reached what he thought was the latitude of the Missouri River. Then he was planning to walk eastward until he reached American settlements. Unfortunately, after wintering near Kamschataka, Russia, he was captured by the Empress Catherine's troops and returned to western Europe. Eternally adventurous, he then turned his attention to another of the great geographical mysteries of the nineteenth century, the source of the Nile River. He died at Cairo, Egypt, on November 15, 1788, a day before he was to embark on his Nile expedition.

Although Alexander Mackenzie had crossed the continent in the north

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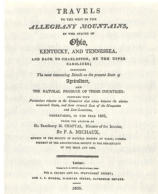
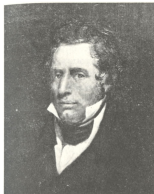
¹ Paul Russell Cutright, *Lewis and Clark: Pioneering Naturalists* (Urbana: University of Illinois Press, 1969), pp. 10-13 and Max Meisel, *A Bibliography of American Natural History* (3 vols: Brooklyn: Premier Publishing Company, 1924-1929), Vol. II, pp. 88-91.

THE CHRONICLES OF OKLAHOMA



Map showing the Long, Pike, Dunbar and Hunter, and Freeman and Dunbar expeditions between 1806-1819

NATURALISTS IN THE TRANS-MISSISSIPPI WEST



In 1803 Andre Michaux, after his botanical explorations in the United States, published *Flora boreali-americana*

in 1793, Americans had yet to perform this feat. This honor fell to Lewis and Clark. Jefferson's instructions to them were explicit. "The object of your mission is to explore the Missouri river, and such principal streams of it, as by its course and communication with the waters of the Pacific Ocean, may offer the most direct and practicable water communications across this continent, for the purposes of commerce."² Yet, it was soon recognized that this expedition would substantially advance American natural history. For as Bernard Lacepede observed to Jefferson in May of 1803, "whatever may be the success of the expedition you are going to make, it will be extremely useful for the progress of industry, the sciences, and especially natural history."³ Neither Lewis nor Clark were either trained or experienced scientists, although Lewis had received some rudimentary instructions in the methods of making scientific observations from the American Philosophical Society.⁴

² Cutright, *Lewis and Clark: Pioneering Naturalist*, p. 3; Donald Jackson, ed., *Letters of the Lewis and Clark Expedition with Related Documents 1783-1854* (Urbana: University of Illinois Press, 1962), p. 61; Reuben Gold Thwaites, ed., *Original Journals of the Lewis and Clark Expedition 1804-1806* (New York: Dodd, Mead and Company, 1904-1905), p. 248.

³ Jackson, *Letters of the Lewis and Clark Expedition with Related Documents 1783-1854*, p. 47.

⁴ *Ibid.*, p. 44.

THE CHRONICLES OF OKLAHOMA

Nevertheless, within their instructions there were strong admonitions to observe "with great pains and accuracy" the flora, fauna, peoples and land through which they passed.⁶

While many of the details and much of the significance of the Lewis and Clark Expedition has been appreciated for at least a century, their contributions as naturalists have been frequently either neglected or denigrated.⁸ Recent studies have indicated that their activities were an important turning point in the development of American natural history.⁷ The year 1803 is significant for it witnessed the beginning of the Lewis and Clark Expedition; the publication in Paris of the first North American flora, Andre Michaux's *Flora borealiamericana*; and the publication of America's initial botanical textbook by Benjamin Smith Barton.⁸ Prior to their expedition, the natural history of this country's plants and animals had been developed by Europeans.⁹ During the colonial era, the new nation's flora and fauna had been described by English and continental scientists with members of the Royal Society of England showing a particular interest in the natural

⁶ *Ibid.*, p. 62; Robert Henry Welker, *Birds and Men* (New York: Atheneum, 1966), p. 30, contends that the failure of any trained scientists to accompany the expedition "was a great loss to science . . . for the burden of recording the flora and fauna of the vast new territory then fell upon the two leaders, neither of them properly qualified (despite instructions from Jefferson himself)."

⁷ *Ibid.*, indites the expedition for having failed to publish a formal report of the natural history and Clark, in particular, for limiting his observations of birds to twenty-three pages and for having "so little formal training that he confused a wren with a flycatcher, a bat with the class of birds, a cormorant and a coot with ducks."

⁸ The literature on this subject is growing. Cutright's *Lewis and Clark: Pioneering Naturalists* is a masterful introduction to this subject. It may be complemented by Raymond D. Furrroughs, *The Natural History of the Lewis and Clark Expedition* (East Lansing: Michigan State University, 1961), Elijah H. Criswell, *Lewis and Clark: Linguistic Pioneers*, University of Missouri Studies, Vol. 15, No. 2 and Donald Jackson, "Some Advice for the Next Editor of Lewis and Clark," *Bulletin Missouri Historical Society*, Vol. XXIV, No. 1 (October, 1967).

⁹ For a discussion of Michaux's work, see Joseph Ewan's reprint of Michaux's *Flora boreali-americana* (New York: Classica Botanica Americana, 1973). Barton's *Elements of Botany* (1803) appeared in six editions and played an important role in American botanical education.

⁹ The earliest Spanish travelers in the southwest were careful observers. Clevy Lloyd Strout's "Flora and Fauna Mentioned in the Journals of the Coronado Expedition," *Great Plains Journal*, Vol. II, No. 1 (Fall, 1971), pp. 5-41, provides an excellent survey of the diverse plant and animal forms encountered by the Spanish in the sixteenth century. Joseph Ewan, *Rocky Mountain Naturalists* (Denver: The University of Denver Press, 1950), p. 2, presents the intriguing hypothesis that the livestock of Coronado's army must have been an important disseminator of weeds. "I believe many of the characteristic weeds of New Mexico and the Southwest, including such dooryard immigrants as common mallow, puncture vine, sheep sruel, lamb's quarters, horehound, penny cress (*Thlaspi arvense*), broad-leaved plantain, sow thistle, dandelion, and many grasses such as brome (*Bromus tectorum*), barnyard grass (*Echinochloa crus-galli*), and wild oats, date from this introduction over four centuries ago."

history of this continent.¹⁰ Now this practice gradually began to change. Jefferson acknowledged to the director of the Museum of Natural History in Paris that the Lewis and Clark Expedition would enable this nation's scientists to repay their obligations to the peers abroad. Americans now began to play an active role in the discovery of the botanical, zoological and geological features of the nation, and with the purchase of the Louisiana Territory, the Trans-Mississippi West became the most fertile for investigations in these areas. American science was emerging from its colonial status and its dependency upon European scientists.

The failure to appreciate the significance of the scientific dimensions of the Lewis and Clark Expedition can be partially found in the way the accounts of the expedition were finally published. Lewis' appointment in early 1807 as governor of the Territory of Louisiana, while surely a deserved honor, prevented him nevertheless from having both the necessary leisure and resources to give his full attention to the study and publication of the expedition's accomplishments and journals. There is no question that Lewis intended to devote some of his energies to a delineation of the scientific attainments of their mission. A prospectus prepared in 1807 to announce the forthcoming publication of an account of the expedition, indicated that the second part of that three volume series:¹¹

will be confined exclusively to scientific research, and principally to the natural history of those hitherto unknown regions. It will contain a full dissertation on such subjects as have fallen within the notice of the author, and which may properly be distributed under the heads of Botany, Mineralogy, and Zoology, together with some strictures on the origin of the Prairies, the cause of the muddiness of the Missouri, of volcanic appearances, and other natural phenomena which were met with in the course of this interesting tour. This volume will also contain a comparative view of twenty-three vocabularies of distinct Indian languages, procured by Captains Lewis and Clark on the voyage, and will be ornamented and embellished with a much greater number of plates than will be bestowed on the first part of the work, as it is intended that every subject of natural history which is entirely new, and of which there are a considerable number, shall be accompanied by an appropriate engraving illustrative of it.

Unfortunately, Lewis' tragic, and still inadequately explained, death at Grinder's Tavern on the Natchez Trace in 1809 prevented the fulfillment of his task.

¹⁰ For a detailed discussion of colonial science and its European relationships, see Raymond Phineas Stearns, *Science in the British Colonies of America* (Urbana: University of Illinois Press, 1970).

¹¹ Jackson, *Letters of the Lewis and Clark Expedition with Related Documents 1783-1854*, pp. 395-396.

THE CHRONICLES OF OKLAHOMA



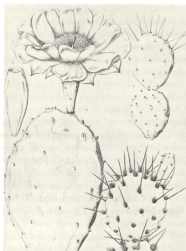
Lewis and Clark during their famous expeditions in the Trans-Mississippi region

Confusion now surrounded the publication of the expedition's records. Ultimately, this responsibility was delegated by Clark to Nicholas Biddle. A lawyer by profession, Biddle's scientific interests were small, and thus the scientific portions of the journal were to be prepared by Benjamin Smith Barton of the University of Pennsylvania. This seemed to be an excellent choice, as Barton had the largest natural history library and herbarium in the nation, but illness prevented him from completing this work. With Barton unable to prepare the scientific sections, Biddle neglected them. Jefferson lamented to Baron Alexander von Humboldt in 1813 that "you will find it inconceivable that Lewis's journey to the Pacific should not yet have appeared; nor is it in my power to tell you the reason. The measures taken by his surviving companion, Clark, for the publication have not answered our wishes in point of dispatch."¹² Jefferson further noted perceptively that "the botanical and zoological discoveries of Lewis will probably experience greater delay, and become known to the world through other channels before the volume will be ready."¹³

¹² *Ibid.*, p. 596.

¹³ *Ibid.*

OPURTIA RAFINESQUI
was named after the famous
Constantine Samuel
Rafinesque



VIOLA BECKWITHII was
so named after one of the
botanists during one of the
expeditions around the Great
Salt Lake and the Sierra
Nevada

THE CHRONICLES OF OKLAHOMA

An equally neglected question has been the fate of the expedition's specimen collections; because these were the first collections made on the Missouri and Columbia watersheds, this is a question of some importance. The fate of these collections, the naturalists who examined them and the impetus they gave to further scientific study are important themes in tracing the development of the scientific knowledge of the nation's western regions.¹⁴

Many of the zoological and ethnological specimens were exhibited in the Quadruped Room at Peale's Museum in Philadelphia after having been deposited there in December, 1809.¹⁵ Seeking always to increase attendance at his museum, Peale also prepared a wax figure of Captain Lewis resplendently adorned in the ermine mantle of Comeahwait, Chief of the Shoshone.¹⁶ The Lewis and Clark specimens became a popular attraction in the nation's scientific capital. Generally organized along the Linnean system, these specimens could be examined by the country's leading naturalists including Thomas Say, Alexander Wilson, George Ord and Constantine Samuel Rafinesque.¹⁷ They thus became the type specimens for many new western animals.

The first ornithological descriptions of avian species collected by Lewis and Clark appeared in the third volume of Alexander Wilson's *American Ornithology*.¹⁸ Here were portrayed the brilliantly colored Western Tanager (*Piranga ludoviciana*), the pink bellied Lewis's woodpecker (*Asyndesmus lewis*) and the gray bodied Clark's nutcracker (*Nucifraga columbiana*). In a mild debate with Charles Willson Peale over priority in publishing these birds, Wilson stated that "it was the request and particular wish of Captain Lewis, made to me in person, that I should make drawings of such of the feathered tribes as had been preserved, and were new."¹⁹ Wilson's sketches of these birds were engraved by Alexander Lawson, who, after Audubon, was the most important scientific illustrator of the nineteenth century. Utilizing Latin binomials in the designation of these birds, Wilson began to popularize a taxonomic innovation that was soon followed by other naturalists.²⁰

¹⁴ Cutright, *Lewis and Clark: Pioneering Naturalist*, 349.

¹⁵ Charles Coleman Sellers, *Charles Willson Peale* (New York: Charles Scribner's Sons, 1969), 337-344; Walter Faxon, "Relics of Peale's Museum," *Bulletin: Museum of Comparative Zoology*, Vol. LIX (1915), 125.

¹⁶ Sellers, *Charles Willson Peale*, p. 344.

¹⁷ *Ibid.*, 337; Faxon, *Relics*, 125.

¹⁸ Alexander Wilson, *American Ornithology; or, the Natural History of the Birds of the United States*, 9 vols. (Philadelphia: Bradford & Inskip, 1808-1814).

¹⁹ Welker, *Birds and Men*, p. 31.

²⁰ Cutright, *Lewis and Clark: Pioneering Naturalists*, p. 386.

NATURALISTS IN THE TRANS-MISSISSIPPI WEST

The question of priority in science is always a very complex one, and the hazards and rapidity of travel, as well as the inexperience of Lewis and Clark as naturalists, prevented them from preparing the detailed descriptions necessary for clearly identifying all of the new species they encountered. Some plants and animals they examined were known but had not yet been scientifically described. In other cases, the descriptions were so imprecise that it was impossible to identify them with particular species. Taxonomy itself was in a period of rapid evolution, and methods of classification varied dramatically.

Using the criteria of deleting animals that had been formally described by the time Lewis and Clark encountered them, Cutright estimates that Lewis and Clark discovered 122 species and subspecies that were unknown to science.²¹ Sixty-five of these species were found west of the Continental Divide.²² George Ord, Thomas Say, Constantine Rafinesque and Alexander Wilson played a leading role in classifying the fauna observed by Lewis and Clark. Further American interest in these animals was stimulated by the publication of several studies. George Ord's account of vertebrate animals in William Guthrie's *A New Geographical, Historical, and Commercial Grammar; and Present State of the Kingdoms of the World* (2nd American edition, 1815) included descriptions of many of these animals. This work was also one of America's first zoological treatises.²³ While also embracing later accounts, Richard Harlan's *Fauna Americana* (1825) and John D. Godman's *American Natural History* (1826-1828) sustained the interest in the nation's newly found fauna. Godman's work is particularly unique since it was the first illustrated zoological text in America.

Given the ease of both collecting and observing plants over animals, it is not surprising that more plants than animals were discovered. The number of new plants described would have been substantially greater if they had not lost a cache of plants, collected east of the divide, to high water during the winter of 1805-1806.²⁴ Of the 178 plants which were new to science, 140 came from the western side of the Divide and were collected when the expedition had less time for such activities.²⁵ The botanical collections had a varied history. In the hands of the German botanist, Frederick Pursh, seventy-seven species were described with some specimens being taken to England by him. These were utilized by Pursh in the publication of his *Flora*

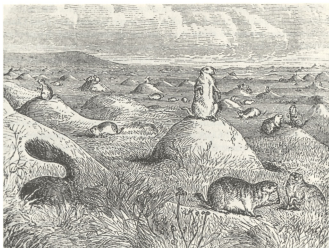
²¹ *Ibid.*, pp. 424, 447.

²² *Ibid.*

²³ *Ibid.*, pp. 382-388.

²⁴ *Ibid.*, p. 423.

²⁵ *Ibid.*



The prairie dog, besides being an interesting specie to study, proved an excellent source of meat during the Pike expedition of 1806

Americae Septentrionalis (1814), the most extensive work on American flora to have yet appeared.

The success of the Lewis and Clark Expedition was manifestly obvious. Not only had it completed its primary mission of establishing a route to the Pacific, it had also fulfilled Jefferson's ancillary aims of having made significant scientific discoveries. Its botanical, zoological and ethnological collections and findings stimulated other scientists to investigate the resources of the nation's western lands. Congress, which for well defined constitutional reasons had previously avoided supporting scientific exploration, now began to subsidize western scientific exploration indirectly by allocating funds for military expeditions.²⁶ With this support, the army and navy became the principal agents of national scientific exploration and discovery in the first half of the nineteenth century. The Pike and Long expeditions established the principle that exploration was an important military activity.²⁷

²⁶ A. Hunter Dupree, *Science in the Federal Government* (New York: Harper Torchbooks, 1964), p. 26.

²⁷ *Ibid.*, p. 28.

NATURALISTS IN THE TRANS-MISSISSIPPI WEST



Map of Drouillard, one of the expeditionists, with Lewis and Clark during the Fur Trading Activity of 1808

While the Lewis and Clark Expedition had met with unequalled success, expeditions into the Red River valley during the years between 1803 and 1806 were of more limited value. The ill-defined boundaries of the Louisiana Purchase required an immediate assessment of the western tributaries of the Mississippi River. Consequently, the Arkansas and Red rivers were of particular interest during this period. Indeed, Jefferson included an account of Dr. John Sibley's 1803 ascension of the Red River in his report to the Senate on the progress of the Lewis and Clark Expedition.²⁸ Sibley's contributions to the natural history of the area were negligible although he did comment briefly upon the customs and characteristics of the various Indian tribes encountered.

A year later in 1804, Jefferson commissioned William Dunbar and Dr. George Hunter to explore the sources of the Red River, but once more the source was not found and the scientific results were meager.²⁹ Dunbar and Hunter did note the abundance of animal life on the western prairies and offered succinct comments on the bison and antelope. Undaunted by these initial failures in the Louisiana Territory, Jefferson again commissioned a force to proceed up the Red River. In 1806, Captain Thomas Sparks and

²⁸ Meisel, *A Bibliography of American Natural History*, Vol. II, 85-88, provides a brief review of the reports of this expedition.

²⁹ Isaac J. Cox, "The Exploration of the Louisiana Frontier, 1803-1806," *Annual Report of the American Historical Review*, Vol. IX, No. 1 (October, 1904), p. 156.

THE CHRONICLES OF OKLAHOMA

Thomas Freeman led a party 650 miles up the river until they were turned back by the Spanish. Again, little was accomplished.³⁰

Western exploration was continued when the enigmatic Brigadier General James Wilkinson ordered the twenty-seven year old Zebulon Pike to lead an expedition into the Louisiana Territory. Pike had some limited experience in exploration, for in 1805 he had led a small party up the Mississippi River.³¹ The stated purpose of Pike's second expedition was to convey some captive Osages, who had just returned from a visit to Washington, to their lodges at Grand Osage, to secure peace between the Kansa and Osage nations, to establish relations with the Comanches and to observe the headwaters of the Arkansas and Red rivers.³² The unstated objectives of this expedition have long intrigued and puzzled historians. Perhaps in deference to Jefferson, Wilkinson also included instructions for scientific observations:³³

In the course of your tour, you are to remark particularly upon the Geographical structure; the Natural History; and population of the country through which you may pass, taking particular care to collect and preserve, specimens of every thing curious in the mineral or botanical Worlds, which can be preserved and are portable: Let your courses be regulated by your compass, and your Distances by your Watch . . .

Unfortunately for the scientific accomplishments of this expedition, Pike's interests were not attuned to such inquiries. He candidly admitted it and stated:³⁴

With respect to the great acquisitions which might have been made to the science of botany and zoology, I can only observe, that neither my education nor taste led me to the pursuit, and if they had, my mind was too much engrossed in making the arrangements for our subsistence and safety, to give

³⁰ E. W. Gilbert, *The Exploration of Western America, 1800-1850* (Cambridge: Cambridge University Press, 1933), p. 153.

³¹ For an understanding of the events of this journey, see Donald Jackson, *The Journals of Zebulon Montgomery Pike*, 2 vols. (Norman: University of Oklahoma Press, 1966). Vol. I, pp. 3-226.

³² *Ibid.*, Vol. I, p. 286. Any student of Pike's activities in the West should consult Elliott Coues, *The Expeditions of Zebulon M. Pike*, 3 vols. (New York: Francis P. Harper, 1895) for the marvelously detailed footnotes. Nevertheless, the reader should heed well Jackson's warning that "It was Coues' custom to give his readers elaborate lectures on subjects in which he was well versed and to pay less heed to those about which he had little information;" Jackson, *The Journals of Zebulon Montgomery Pike*, Vol. I, 189. For Jackson's comments upon Coues' extravagantly liberal emendation of the Biddle edition of the Lewis and Clark journals, see Jackson, *Letters of The Lewis and Clark Expedition with Related Documents 1783-1854*, 673-676.

³³ Jackson, *Journals of Zebulon Montgomery Pike*, Vol. I, p. 286.

³⁴ *Ibid.*, p. xxiv.

NATURALISTS IN THE TRANS-MISSISSIPPI WEST

time to scrutinize the productions of the countries over which we travelled, with the eye of a Linnaeus or Buffon.

The scientific attainments of Pike's journey would have been considerably enhanced if the ornithologist Alexander Wilson had been allowed to accompany the party as he desired. For reasons that are not clear, Wilson was not granted permission to become a member of the expedition.³⁵ He thus lost the opportunity of becoming the first ornithologist to work in the lands beyond the Mississippi.

Pike and his party of twenty-three men began their mission on July 15, 1806. By August 19 they had reached the Osage villages. They then proceeded north to the Pawnee villages on the Republican River, and there they turned south, crossed the Smoky Hill River and marched towards the Big Bend of the Arkansas River. The party now separated. First Lieutenant James B. Wilkinson, the son of General Williamson, led a party of four men down the Arkansas River, while Pike turned west toward the "Stony Mountains." A few natural history observations were made. Pike observed with some interest the black tailed prairie dogs (*Cynomys ludovicianus*), the Wishtonwish of the Plains Indians. He even sought to learn something of their habits and their dens by trying unsuccessfully to drive one from its hole by pouring 140 kettles of water down it.³⁶ At times his party's interest in the prairie dog was more immediate, for Pike records that "we killed great numbers of them with our rifles and found them excellent meat, after they were exposed a night or two to the frost, by which means the rankness acquired by their subterraneous dwelling is corrected."³⁷ His account of the habits and gastronomic excellence of the prairie dog was one of the first published accounts of this animal.³⁸ Although Pike failed to appreciate the prairie dog's role in the prairie ecosystem, his comments upon this animal are among his most significant contributions to the natural history of the West.

Pike's subsequent adventures are well known. On the afternoon of November 15, 1806, Pike's men gained their first view of the front range of the Rocky Mountains and the peak that was to bear their leader's name.³⁹ Killing buffalo and deer for provisions, they proceeded towards the "blue mountain." On November 23, Pike decided to make an ascent on "the high

³⁵ Welker, *Birds and Men*, p. 55; Robert Platte, *Alexander Wilson: Wanderer in the Wilderness* (New York: David McKay Company, Inc., 1966), pp. 91-92.

³⁶ Coues, *The Expeditions of Zebulon M. Pike*, Vol. II, p. 430; Jackson, *Journals*, Vol. I, 338.

³⁷ *Ibid.*, p. 339; Coues, *The Expeditions of Zebulon M. Pike*, Vol. II, p. 30.

³⁸ *Ibid.*, p. 431.

³⁹ *Ibid.*, p. 444.

THE CHRONICLES OF OKLAHOMA



OPUNTIA ANGUSTATA
presumably named after the
geologist Angugust Edward
Jessup



2-3 var **LONGISPINA** was
one of the specie discovered
during the Stephen H. Long
expedition and may have been
so named

NATURALISTS IN THE TRANS-MISSISSIPPI WEST

point of the blue mountain.⁴⁰ After struggling for four days, the attempt was abandoned, and it was to be Dr. Edwin James, botanist of the Long Expedition, who first climbed Pike's Peak. November and December of 1806 saw the party seeking and failing to find the sources of the Arkansas and Red rivers.⁴¹

Pike's ideas on the courses of western rivers are extremely confused.⁴² It is clear that he did not, as his journal indicates that he did, view on January 5, 1807, both the Yellowstone and Arkansas rivers.⁴³ After an arduous crossing of the Sangre de Cristos, Pike struck west until he reached what he contended was the Red River, but which was actually the Rio Grande. After marching down the river for some eighteen miles, they moved up one of its tributaries, the Conejos River, until they reached a suitable site for a stockade. Here, they were arrested on February 26, 1807, by Spanish Dragoons for being in the Territory of New Mexico. Pike and his party were escorted to Santa Fe. While Pike's accounts of his later experiences are important, they do not contribute any important information on southwestern biotas.

Published before the Lewis and Clark narratives appeared, Pike's journals did provide information that was readily available on the nation's newly acquired western lands. While they did not substantially enhance the nation's knowledge of the natural history of the west, they did introduce a significant idea. Contained within an appendix to the 1810 edition of Pike's report was the germ of the idea for the famous debate on the "Great American Desert."⁴⁴ Forbidding in their treeless austerity, Pike viewed the vast plains which he had encountered as becoming as "celebrated as the sandy deserts of Africa."⁴⁵ Yet, in the desolation of the plains, Pike saw some advantages. That inhospitable area might restrict the nation's constant western expansion. "Our citizens being so prone to rambling and extending themselves on the frontiers will, through necessity, be constrained

⁴⁰ *Ibid.*, pp. 445-459.

⁴¹ *Ibid.*, pp. 445-450.

⁴² *Ibid.*, pp. 523-524.

⁴³ *Ibid.*, p. 479; Jackson, *The Journals of Zebulon Montgomery Pike*, Vol. I, pp. 365-366. Pike's journal for that day that he "had acquired the sources of La Platte and Arkansas rivers, with the river to the northwest, supposed to be the Pierre Jaun, which scarcely any person but a madman would ever purposely attempt to trace further than the entrance of those mountains which hitherto secured their sources from the scrutinizing eye of civilized man."

⁴⁴ *Ibid.*, pp. 27, 28. Coues, *Expeditions of Zebulon M. Pike*, Vol. II, pp. 534-535; Terry L. Alford, "The West As a Desert In American Thought Prior to Long's 1819-1820 Expedition," *Journal of the West*, Vol. VIII, No. 4 (October, 1969), pp. 515-526; William H. Goetzmann, *Exploration and Empire* (New York: Alfred A. Knopf, 1967), pp. 50-53; and James C. Malin, *The Grassland of North America, Prolegomena to its History* (Gloucester: Peter Smith, 1967), pp. 173-193.

⁴⁵ Coues, *Expeditions of Zebulon M. Pike*, Vol. II, p. 525.

THE CHRONICLES OF OKLAHOMA

to limit their extent on the west to the borders of the Missouri and Mississippi, while they leave the prairies incapable of cultivation to the wandering and uncivilized aborigines of the country."⁴⁶ Time would modify Pike's, and slightly later Long's, concepts of the barrenness of this region; but Pike's published accounts of the southwest provided the nation with its first introduction to this subject.

The accomplishments of the Lewis and Clark and Pike expeditions nourished American interest in the West, but the War of 1812 interrupted government exploration in the area. The Englishmen John Bradbury and Thomas Nuttall became the first professional botanists to work in the West when in 1811 they joined a Pacific Fur Company expedition up the Missouri River. Of the two, Nuttall made the most significant contributions. A meticulous fieldworker, Nuttall's taxonomy was weakened by his classification of plants by the Linnean system. Nuttall published the results of his investigations of plants obtained on his journey up the Missouri in *The Genera of North American Plants, and a Catalogue of Species, to the Year 1817* (1818). Although Nuttall used the Linnean system, he nevertheless discussed the natural relationships between genera. As the first on comprehensive American flora, this work established Nuttall's reputation as a botanist, and his discussion of natural relationships provided American naturalists with a practical introduction to the merits of A. L. de Jussieu's system of classification.

Nuttall also collected along the Arkansas River from 1818-1820.⁴⁷ His 1820 paper to the Academy of Natural Sciences of Philadelphia on the geology and fossils of the Mississippi Valley anticipated modern geological techniques of stratigraphical correlations. Joining Nathaniel Jarvis Wyeth's second expedition to Oregon, along with the ornithologist John Kirk Townsend, he became the first botanist to cross the continent collecting plants.

It was not until 1818 that the government made plans to once more send an expedition into the West. Seeking to restrict British influence in the western fur trade, Secretary of War John C. Calhoun ordered Colonel Henry Atkinson to establish a series of forts on the upper Missouri. Unique in its organization, the expedition sought to wed American technology, military prowess and scientific discovery by utilizing six steamboats to convey the troops to their destination. As Calhoun's plans expanded, the Yellowstone Expedition evolved into three components: the Missouri Expedition, the

⁴⁶ *Ibid.*

⁴⁷ For the details of Nuttall's life, see Jeannette E. Graustein, *Thomas Nuttall, Naturalist* (Cambridge: Harvard University Press, 1967)

NATURALISTS IN THE TRANS-MISSISSIPPI WEST

Mississippi Expedition and a scientific expedition under Major Stephen H. Long.⁴⁸

This latter expedition was the first government sponsored expedition in the American West to include trained scientists. Calhoun's instructions to Long were in the spirit of those given to Lewis and Clark and Long was encouraged to avail himself of the "valuable suggestions of Mr. Jefferson to Capt. Lewis."⁴⁹ While Long's party was the most scientifically able group to have yet entered the lands beyond the Mississippi, the government was not generous in its support of the expedition's naturalists. John Torrey, who rejected an opportunity to participate, explained to a mentor, Amos Eaton, "that the naturalists will be provided with board and receive protection—the papers, drawings &c are to be given up to [the] government, who are to have the entire disposal of them—the naturalists to furnish themselves at their own expence . . . No compensation will be allowed the naturalists."⁵⁰

Regardless of meager governmental support, the scientific contingent included some rather accomplished individuals. Dr. William Baldwin served as surgeon and naturalist, Thomas Say as zoologist, August Edward Jessup as geologist, Titian Ramsay Peale as assistant naturalist and Samuel Seymour as painter. A graduate of Dartmouth, Long had gained frontier experience in 1817-1818 in a journey into eastern Oklahoma and in the establishment of Fort Smith in the Arkansas territory.⁵¹

Little was accomplished in the first year of the expedition. After leaving St. Louis on board the sixty-five foot steamboat *Western Engineer*, they proceeded up the Missouri. Baldwin's thoughts on the use of the steamboat for scientific exploration were less than sanguine. In a letter to a fellow botanist, Baldwin commented upon the first steamboat to ply the Missouri River:⁵²

I have at last the mortification to inform you without hesitation, that a steam boat is not calculated for exploring . . . Slow as has been the progress of this boat, since our entrance into this river, little opportunity has been afforded to the Naturalists, to do any thing. There has been no stopping, except to take in wood and water and to repair . . . Not one moment has been granted

⁴⁸ Reuben Gold Thwaites, ed., Edwin James' *Account of an Expedition from Pittsburgh to the Rocky Mountains, performed in the Years 1819, 1820 . . . under the Command of Maj. S. H. Long in Early Western Travels* (Cleveland: The Arthur H. Clark Company, 1905), Vols. XIV-XVII, hereinafter cited as Thwaites, *James*; William H. Goetzmann, *Army Exploration in the American West, 1802-1863* (New Haven: Yale University Press, 1959), 39-44.

⁴⁹ Thwaites, *James*, Vol. XIV, 38.

⁵⁰ Torrey to William Darlington, quoted in Andrew Denny Rodgers III, *John Torrey* (New York: Hafner Publishing Company, 1965), p. 47.

⁵¹ For Long's career, see Richard G. Wood, *Stephen Harriman Long, 1784-1864* (Glendale: The Arthur H. Clark Company, 1966).

⁵² Baldwin to William Darlington, quoted in Susan Delan McKelvey, *Botanical Exploration of the Trans-Mississippi West, 1790-1850* (Boston: Arnold Arboretum of Harvard University, 1955), p. 197.

THE CHRONICLES OF OKLAHOMA



A romanticised version of a man during an encounter with grizzly bears at the headwaters of the Arkansas River

to the Naturalists, to explore, that could be avoided; and the most productive situations have all been passed by . . . No mode of travelling is so poorly calculated for Naturalists; and besides, it is the most expensive to the government—the least expeditious, and safe, of any mode of travelling.

Even those parties of naturalists which traveled overland encountered difficulties. Say had his horses and equipment stolen by a Pawnee war party.⁵³ On August 31, 1819, the forty year old Baldwin died, "the first American with botanical training to collect plants westward of the Mississippi River."⁵⁴ Two and a half weeks later, the expedition entered winter quarters near Council Bluff. During the winter encampment, Say, with the aid of Peale, prepared some of the earliest ethnographical studies of the Pawnee, Otto, Iowa, Kansa, Missouri and Omaha Indians. Although lacking the internal cohesiveness of modern anthropological investigations, as contemporary records they provide an invaluable insight into the life of the Plains Indians. James' account includes Say's abundant descriptions of the manners, customs, medical problems, sexual mores, hunting practices, languages and religious beliefs of the tribes the expedition met.⁵⁵

Say was apparently the most active scientist during the winter of 1819-1820. He collected marine fossils from limestone formations near the camp

⁵³ Thwaites, *James*, Vol. XIV, pp. 199-210.

⁵⁴ McKelvey, *Botanical Exploration of the Trans-Mississippi West, 1790-1850*, p. 189.

⁵⁵ Thwaites, *James*, Vol. XIV, pp. 199-288, and Vol. XV, pp. 11-115.



General Randolph B. Marcy was responsible for developing further on the mesquite trees found in the Rocky Mountain Areas

and studied, whenever possible, the local coyote and wolf populations. Seeking to gain a specimen of *Canis laterans* (coyote) for detailed examination, Say encountered the persistent western problem of trapping one of those wily animals.⁶⁶ Before the winter camp was abandoned in June of 1820, Say had the opportunity of observing the great spring migration of geese, swans, ducks and cranes through the area noting five new species in the process.⁶⁷

During the winter, the nature of the expedition changed. The lack of immediate success, a declining economy and a penurious Congress abridged the original plans. Further progress up the Missouri was abandoned, and Long was ordered to proceed "by land to the source of the river Platte, and thence by way of the Arkansas and Red rivers to the Mississippi."⁶⁸ The

⁶⁶ *Ibid.*, Vol. XIV, pp. 250-258.

⁶⁷ George E. Osterhout, "Concerning the Ornithology of the Long Expedition of 1820," *The Oologist*, Vol. XXXVII (October, 1929), pp. 118-120.

⁶⁸ Thwaites, *James*, Vol. XV, p. 189.

THE CHRONICLES OF OKLAHOMA

death of Baldwin and the withdrawal of Jessup had also created vacancies in the scientific staff. Their positions were combined and filled by Dr. Edwin James. James was an excellent selection for he played a major role in the expedition serving not only as surgeon but also as botanist, geologist and chronicler.⁵⁹ Say was to continue his investigations of "the manners, customs, and traditions of the various savage tribes" which they might encounter.⁶⁰

After members of the party purchased sixteen horses at their own expense, the expedition abandoned winter camp. Long had been provided, as had Lewis and Clark earlier, with small pox vaccine.⁶¹ It had been intended for the Pawnees who had been seriously ravaged by the disease a few years earlier. Unfortunately, the keelboat carrying it had been wrecked on the Missouri, and the vaccine was drenched. Unsure of its quality, Long did not persist in inoculating the unwilling Pawnees.⁶² Moving westward towards the Rockies, Dr. James and Thomas Say were now in an area that had not been explored by scientists, and as the footnotes in James' account indicates they found many new floral and faunal specimens to collect and describe. In Colorado alone they discovered approximately seventy-three new species of flora.⁶³ After finding it difficult to travel through extensive patches of prickly pear, they at last sighted the Rocky Mountains on June 30.⁶⁴ On the same day they saw what they believed was Pike's Peak, but it was actually the peak that was to later bear Long's name, Long's Peak. Turning south, the party proceeded towards the Arkansas River, discovering on July 11 the beautiful blue columbine, *Aquilegia coerulea*.⁶⁵ They increasingly encountered the "great shrubby cactus which forms so conspicuous a feature in the vegetable physiognomy of the plains of the Arkansas."⁶⁶

After correctly identifying Pike's Peak, James set forth with four men on July 13 to climb that summit.⁶⁷ Leaving two men at the base of the moun-

⁵⁹ After beginning a promising career in science, James abandoned this field believing that he could not make his mark upon the age. For James' thoughts on this subject, see Ewan, *Rocky Mountain Naturalists*, pp. 18-19.

⁶⁰ Thwaites, *James*, Vol. XV, p. 189; For Thomas Say, see Harry B. Weiss and Grace M. Ziegler, *Thomas Say* (Springfield: Charles C. Thomas Publisher, 1931).

⁶¹ Thwaites, *James*, Vol. XV, p. 202; Cutright, *Lewis and Clark, Pioneering Naturalists*, p. 69; and Jackson, *Letters of the Lewis and Clark Expedition with Related Documents 1783-1854*, p. 35, 64, 130.

⁶² Thwaites, *James*, Vol. XV, p. 208.

⁶³ George E. Osterhout, "Rocky Mountain Botany and the Long Expedition of 1820," *Bulletin of the Torrey Botanical Club*, Vol. XLVII, No. 12 (December, 1920), pp. 560-562.

⁶⁴ Thwaites, *James*, Vol. XV, p. 264.

⁶⁵ *Ibid.*, p. 305.

⁶⁶ *Ibid.*, p. 311. This cactus may have been one of the common chollas, perhaps, *Apuntia Imbricata*.

⁶⁷ *Ibid.*, Vol. XVI, p. 11.

NATURALISTS IN THE TRANS-MISSISSIPPI WEST

tain to watch their horses, James and two companions set forth. After spending the night on the mountain, they passed through the timberline of Pike's Peak on July 14. This was the first time that a botanist had passed through the delicate alpine flora of the Rocky Mountains. For James, it was a "region of astonishing beauty, and of great interest on account of its productions."⁶⁸ Gathering plants slowed their progress for as James remarked "we met, as we proceeded, such numbers of unknown and interesting plants, as to occasion much delay in collecting; and were under the mortifying necessity of passing by numbers we saw in situations difficult of access."⁶⁹ But at last around 4:00 P.M., James and his companions reached the summit, the first white man to ascend a 14,000 foot summit in North America and the first naturalist to examine the fragile alpine ecosystems of the Rocky Mountains. July 14, 1820, was a signal day in American botany, for James discovered fourteen and possibly sixteen new plant species.⁷⁰ The principal scientific accomplishments of the expedition were now over. After a cursory attempt to reach the headwaters of the Arkansas River and after an exciting encounter with a grizzly, the party turned south. On July 21, the majority of the party, including Say and Seymour, began a descent of the Arkansas River to Fort Smith. During this trip, three deserters stole the horses and saddle bags of the party. After an arduous trip, Say had lost five collections of his field notes including:⁷¹

one book of observations on the manners and habits of the Mountain Indians, and their history, so far as it could be obtained from interpreters; one book of notes on the manners and habits of animals, and descriptions of species; one book containing a journal; two books containing vocabularies of the languages of the Mountain Indians.

James chastized the "worthless, indolent, and pusillanimous" deserters for having stolen these journals since "all these, being utterly useless to the wretches who now possessed them, were probably thrown away upon the ocean of prairie, and consequently the labour of months was consigned to oblivion by these uneducated vandals."⁷²

Long, James, Peale and seven enlisted men, then crossed the Arkansas River and marched south in a confused search for the sources of the Red River. Probably mistaking the Canadian for the Red River, they thought they had accomplished their task. Long's party then wandered eastward

⁶⁸ *Ibid.*, p. 16.

⁶⁹ *Ibid.*, pp. 18-19. On their ascent they recorded some of the earliest comments on pikas.

⁷⁰ Ewan, *Rocky Mountain Naturalists*, 15-16; and Osterhout, "Rocky Mountain Botany and the Long Expedition," *Bulletin of the Torrey Botanical Club*, Vol. XLVIII, pp. 556-558.

⁷¹ Thwaites, *James*, Vol. XVI, p. 263 and Vol. XVII, p. 101.

⁷² *Ibid.*, Vol. XVI, p. 264.

THE CHRONICLES OF OKLAHOMA

until they found themselves on the Arkansas. Arriving at Fort Smith, Arkansas, they rendezvoused with the balance of their party in September, 1820. At a cost of \$20,348.17½, the Long Expedition was over.⁷³

Government support for the publication of the results of the expedition was parsimonious. Say and James were allocated \$2.00 per diem while they worked on the reports; Peale and Say were granted \$1.50 per diem and ration while they worked on the specimens collected.⁷⁴ They had collected "more than sixty prepared skins of new or rare animals"; "several thousand insects," of which they thought seven or eight hundred were new to science; "four or five hundred species of plants new to the Flora of the United States, and many of them supposed to be undescribed;" a collection of minerals, terrestrial and "fluviatile" shells and one hundred and twenty sketches by Peale and one hundred and fifty landscapes by Seymour.⁷⁵

The botanical collections were prepared by John Torrey and appeared in the *Annals of the Lyceum of Natural History* in 1823, 1824 and 1826. A distinguished student of American botanical history salutes John Torrey's 1826 paper, *Some Account of a Collection of Plants made during a journey to and from the Rocky Mountains in the summer of 1820*, by Edwin P. James, M.D. as being historically notable for "constituting the first paper in America drawn up along the lines of the then emergent 'natural system' of plant classification!"⁷⁶ James' remarks on trees were particularly valuable, and his comment upon the mesquite tree in particular were later utilized by R. B. Marcy in his reports of that region.⁷⁷

The geology of the expedition was tinged with Wernerian biases. James accurately contended that in the arid lands west of the Ozark mountains it might be possible to gain water by drilling bore holes into the secondary formations, an early suggestion of artesian wells in the west.⁷⁸ Noting the presence of coal and lead deposits in the Ozark region, he optimistically predicted that the "Ozark mountains exhibit evidence of metallic riches far exceeding any thing that appears in the Rocky Mountains."⁷⁹ James was equally incorrect in his pessimistic assessment of the lands adjacent to the Rocky Mountains. "In regard to this extensive section of country, I do not

⁷³ Wood, *Stephen Harriman Long*, p. 111.

⁷⁴ *Ibid.*, p. 112.

⁷⁵ Thwaites, *James*, Vol. XVII, p. 93. In view of Thomas Say's important work on entomology, *American Entomology*, 3 vols. (1824-1828), it is paradoxical to note that James' account contains very little information on insects. James did include Say's lengthy comments upon the Indian tribes encountered.

⁷⁶ Ewan, *Rocky Mountain Naturalists*, p. 14; Rodgers, *John Torrey*, p. 53.

⁷⁷ Malin, *The Grasslands of North America, Prolegomena to its History*, 449-461.

⁷⁸ George P. Merrill, "Contributions to the History of American Geology," in the *Annual Report of the U.S. National Museum* (Washington: Government Printing Office, 1906), p. 247.

⁷⁹ Thwaites, *James*, Vol. XVII, p. 231.

NATURALISTS IN THE TRANS-MISSISSIPPI WEST

hesitate in giving the opinion, that it is almost wholly unfit for cultivation, and of course uninhabitable [sic] by a people depending upon agriculture for their subsistence."⁸⁰ It was a "peculiarly adapted as a range for buffaloes, wild goats and other wild game."⁸¹

The Lewis and Clark, Pike and Long expeditions played a crucial role in the initial delineation of the natural history of the West. Handicapped by the dimensions of the regions they were seeking to investigate, the limitations of time and space prevented these expeditions from more than merely observing the most obvious floral and faunal forms. More detailed, sustained investigations came later. Nevertheless, the momentum of western exploration had begun, and an examination of the region's biota became an important component of future expeditions.

⁸⁰ *Ibid.*, p. 147.

⁸¹ *Ibid.*, p. 148