

Lewis and Clark Bicentennial – Two Hundred Years of the Historic Trail Through the Ame

This autumn is a closing time of a three year period of commemorative activities in the USA to revive the memory of the times 200 years ago, when two explorers Meriwether Lewis and William Clark leading the Corps of Discovery explored, surveyed and mapped then unknown lands between the Mississippi and the Pacific coast. This is an excellent one-time opportunity for the readers of Geoinformatics to take a short voyage along the trail of this epic story and learn of the influence of a single map on the last two centuries of history of the USA and its nations.

By Joc Triglav



Portraits of Meriwether Lewis (1774-1809) and William Clark (1770-1838) were painted at the peak of their fame by Charles Willson Peale in the years 1807-08 for the portrait gallery of great men of the early republic. (Source: <http://www.lewisandclarkexhibit.org>)

Myths

At the end of the 18th century the western part of North American continent was still a big unknown for the white population of North America. This offered fertile grounds for numerous myths, which largely defined this uncharted West. Among the most widely held myths and hopes was the existence of the so-called Northwest Passage, a river or series of connected rivers that would cross the western mountains and reach the Pacific Ocean, which would have open the wealth of North America and allowed more direct commerce with the nations across the Pacific Ocean.

Thomas Jefferson

Among those who supported the idea of exploration of the western part of the conti-

ment with great perseverance and enthusiasm was Thomas Jefferson, the principal author of the Declaration of Independence in 1776. He took the oath of office as the third President of the United States on March 4, 1801. Becoming a president, Jefferson was finally in position to make his ideas of exploring the West true. With this in mind he employed Captain Meriwether Lewis, his childhood neighbour from Virginia, as his personal secretary.

At that time the American nation counted 5.3 million people within its boundaries of Atlantic Ocean to the east and of the Mississippi river to the west, of the Great Lakes to the north and almost to the Gulf of Mexico in the south. Two thirds of the population then lived within 50 miles of the

Atlantic coast. But Jefferson was convinced that the United States had the potential to become a powerful nation, if it could add the area west of the Mississippi to its territory. At that time, when for instance only four roads crossed the Appalachian Mountains to connect the Atlantic coast and the lands by the Mississippi, it was impossible to get anything from the Mississippi to the Atlantic seaboard in fewer than six weeks. Therefore people were sceptical that one nation could govern an entire continent, seeing several natural and mental barriers to westward



Thomas Jefferson (1743-1826), the third American president in the period of 1801-1809, was the initiator and the inspirational leader of the Lewis and Clark expedition. As the son of an active surveyor, Thomas Jefferson was exposed to the world of mapping and charting at an early age. Although Jefferson chose law as his profession, in 1773 he briefly considered a career as a surveyor. Many of his thoughts were devoted to the American West and the possibilities to extend the US political and economic power to the Pacific coast. (Source: www.lewisandclarkexhibit.org)

Part I

rican Northwest



A silver medal with the president Thomas Jefferson on one side and the motive of peace and friendship on the other side. The medals were made in three sizes and were presented as gifts to the Indian chiefs, based on their importance by the judgement of Lewis and Clark. The medals were often a reason for quarrels and rivalry in and between the tribes, ruining the established hierarchy where it existed or imposing it, where none existed. (Source: www.loc.gov/exhibits/lewisandclark)

economical and political expansion.

Also, many people along the Mississippi felt they had found their own national interests along the water routes, following the Ohio and Mississippi river system as a source of commerce down to the Gulf of Mexico instead of going east to the Atlantic coast. They viewed themselves as the core of an independent nation and thus posed a risk of secession from the United States. Therefore Jefferson was determined to obtain the vital trading port of New Orleans for the United

States, in part to prevent the West from breaking away and in part because there really was the right time to act. Namely, in that time Britain, France and Spain also sought to control the West's destiny but still knew little about the region.

Confidential Letter

As the president of the USA, Jefferson sent a confidential letter to Congress on January 18, 1803 with a proposal of a military exploration mission to the lands west of

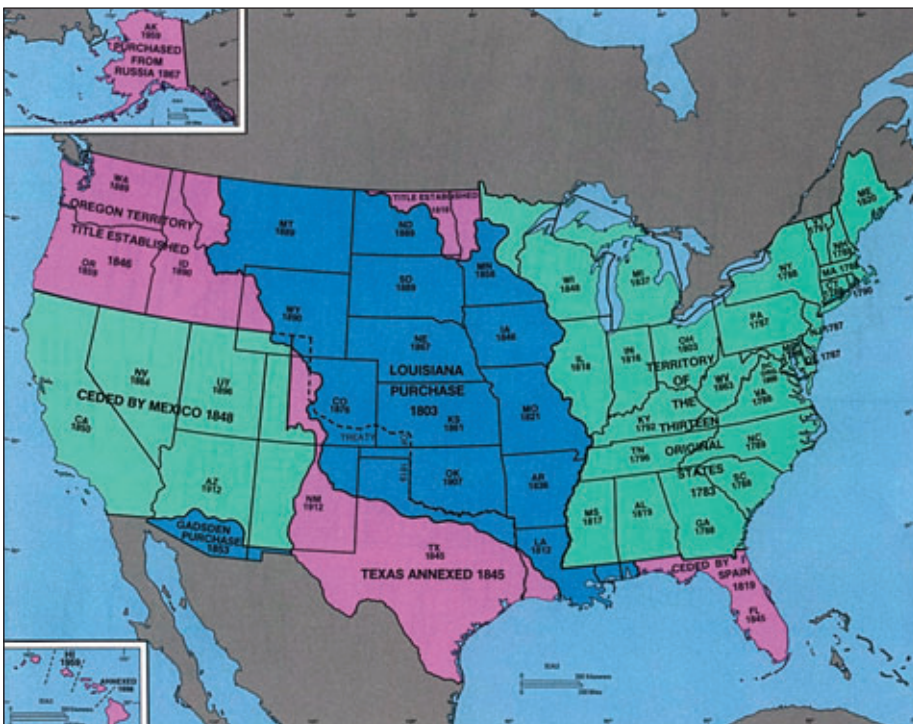
Mississippi, consisting of ten to twelve men lead by an intelligent officer, who "...might explore the whole line, even to the Western Ocean." Of course, Jefferson already had his skilled personal secretary Lewis in mind as the exploration mission leader. The goals of the mission were described as scientific, allowing the fulfilment of economic and political goals at a later stage. Jefferson wrote in his letter that "The river Missouri and the Indians inhabiting it, are not as well known as is rendered desirable by their connection with the Mississippi, and consequently with us..." Jefferson was well known as a scholar, but his plans for the exploration of the great new areas beyond Mississippi were as much commercial and political as they were scientific, because the commercial growth in the west was a key to gain political power in this vast region.

The political situation in that time didn't work in favour of Jefferson's proposal. Unknown lands beyond Mississippi were claimed by France and Britain and the south-west was in Spanish hands. Across the Mississippi was the large Louisiana Territory, which was administered by Spanish officials on behalf of France. Therefore to make his proposal to Congress more convincing Jefferson minimized military risks and emphasized commercial gains. Also to make the temptation even higher he asked Congress for only \$2,500 to fund the expedition (at the end the actual costs were almost 16 times higher). His tactics proved successful and it was no surprise when on February 28, 1803, Congress approved Jefferson's proposal.

Louisiana Purchase

With Congress' approval the important first step to the exploration of the West was made. However, only two months later an agreement with France was made, which totally transformed the purpose of the

Chronological presentation of territorial growth of the USA in the 19th century. In connection to the Lewis and Clark expedition story the territories of Louisiana and Oregon are most important. In blue colour is the Louisiana Territory, which the USA bought from France in 1803. In violet in the northwest is the Oregon Territory, where the USA established its title in 1846. The map also shows the present borders of the federal states and the years of their establishing. (Source: www.lib.utexas.edu/maps)



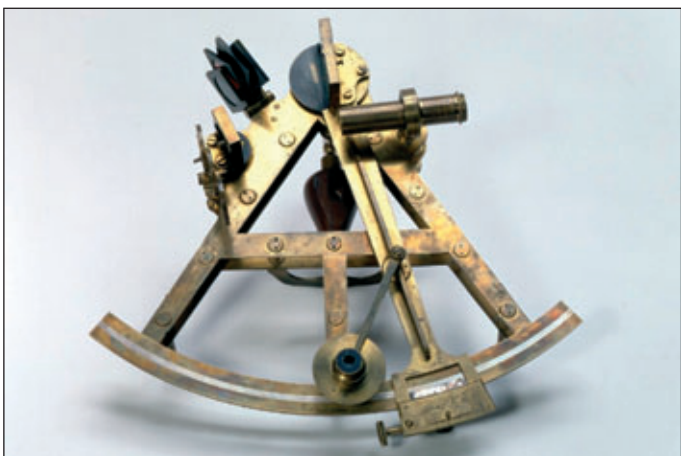


Jefferson was known for his love of precision instruments and Euclidean geometry. He was convinced that measurement and mathematics can reveal the very architecture of the universe and that nature's laws are so regular and reasonable that only rational inquiry and empirical methods were needed to discover them. Following his belief he recommended Lewis to take a theodolite like this, manufactured by the famed English instrument maker Jesse Ramsden. Theodolite measured precisely both horizontal and vertical angles, thus replacing both a surveyor's compass and a sextant in surveying and measuring latitude and longitude. In spite of Jefferson's enthusiasm Lewis decided not to take this delicate instrument to the rough environment of the West. (Source: www.lewisandclarkexhibit.org)

expedition from a mission through foreign territory into a bold survey of American-owned land. Much more importantly, the agreement changed the history of the USA.

It all started with Jefferson's bid to buy New Orleans from France as a vital port and trading centre for the future development of the USA. During the negotiations Napoleon Bonaparte surprised the world with the announcement, offering the USA not only New Orleans but the entire Louisiana Territory measuring 820,000 square miles (2,123,000 square kilometres) for a price of \$ 15 million. Of course, there was more than only generosity in Napoleon's dramatic offer. Though France held title to Louisiana it couldn't enforce it in reality and Napoleon knew that the Americans would take over the area eventually. Also, France and the USA shared England as their common rival.

The treaty of Louisiana Purchase was signed on April 30, 1803 and the size of the USA was doubled. The Louisiana Purchase was publicly announced on July 3, just before Independence Day and also just two days before Meriwether Lewis left Washington, D.C., for Pittsburgh to



The surveyor's compass, also called a circumferentor, was used not only to find north but also to determine horizontal angles by measuring magnetic azimuths. It has also been employed in taking the traverse of the rivers. Invented around 1696, a surveyor's compass differs from a hand compass in two ways. First, it includes a sight—either two bars with narrow slits or a tube—through which the target is observed. A surveyor's compass is mounted on a pole or tripod to provide a steady base. Second, because the reading is taken from the back of the needle (rather than from above, as with a hand compass), the positions of east and west are reversed. (Source: www.lewisandclarkexhibit.org)

Measuring and Mapping the West

During their advancement to the West the captains Lewis and Clark were performing measurements thoroughly and with great professional care, drawing maps and writing journal reports on a daily basis. Every significant natural feature has got its name, which possibly closely reminded of its characteristic. More important places have got their names of the important men of the United States. Of course, many names were given using the names of the expedition members, who have gradually got 'their' rivers, creeks, hills or valleys as well as did many of their beloved relatives back home. Many of these names can still be found on the present-day maps of the USA.

Lewis and Clark used two techniques to map the land along their trail: celestial navigation and dead reckoning. Lewis used celestial navigation to find the expedition's global location of latitude and longitude. He had to measure his position in relation to the sun, moon or stars. Latitude was the arc distance north of the equator and it was the easiest to find. Theoretically, all he had to do was measure the height of the sun at noon and then correct it for the tilt of the earth and other factors. For these measurements, he used a sextant or octant, designed for measuring vertical angles. Longitude was the arc distance west of the prime meridian at Greenwich, England, and it was harder to measure. Timekeeping was the key. Since the Earth rotates at a steady pace, theoretically all he had to do was measure the time difference between Greenwich and his current position to work out the distance. But even with his exquisitely accurate chronometer, Lewis could not be sure of the Greenwich Time unless he observed a celestial event that had been predicted for Greenwich and measured the exact time it took place at his current position. For this purpose Lewis had a book of tables that predicted the Greenwich times for various celestial events.

Clark used an older method to find his location in relation to where he had been the day before, which was less high-tech than celestial navigation. The method is called dead reckoning, where the key is good record keeping. Each day as he travelled, Clark wrote down when they changed direction and how far they travelled on each bearing, using no more than a compass and a watch. To find the speed of the boat, he used a log line and reel. After a few days, he would transfer his readings onto a gridwork map on which each square line represented a set distance. A journal notation of "3 miles N 30° W" became a line on the map, laid out with a protractor and ruler. During the winters, Clark assembled all his route maps and transferred the information onto a master map, reducing the scale with his drafting instruments.

The three maps of the West Clark made from 1805 to 1814 show his evolving perceptions of the West. The changes in his maps did not just show geographical knowledge—they also had political messages. His first map was a blend of Indian information and his own observations. But in his later maps, the Indian habitation of the land was gradually left out and Euro-American information took its place.



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begin purchasing supplies and hiring men for the expedition.

Preparing for the Expedition

In 1803, the void on the maps of the lands west of Mississippi was almost complete and was often filled with the details equally fictitious as were the myths of the West. One thing was sure though. Not even the best minds in the world could fill the void without previously walking the vast lands, taking measurements and putting as many as possible details regarding the topography, people, flora and fauna on the map.

Obviously, an expedition with such goals was facing an enormous task. Therefore, Albert Gallatin, Jefferson's secretary of finance and a known map collector, was ordered to make a special map of North America with all then known data between the Mississippi and the Pacific coast. The map included various data sources like those from Andrew Ellicot for the waters of Ohio, from James Cook and George Vancouver for the Pacific coast, from Aaron Arrowsmith and Alexander

Mackenzie for the Missouri river up to its Great Bend to the west.

The map was made in March 1803 by a military cartographer Nicholas King. On the entire map were only three details with the exactly known location – geographical position of the mouth of the Columbia, of St. Louis and some details of the lower part of the Missouri river. The map included a thin estimation of the Rockies and the approximate course of the Columbia.

To lead such an expedition it was essential to get all available knowledge. For this reason Jefferson sent Lewis to Philadelphia to the leading scientists of that time to learn about celestial navigation, botany, zoology and medicine. There Lewis purchased also the measurement equipment for the expedition, comprising of surveyor's compass, hand compass, quadrants, telescope, thermometers, two sextants, a set of plotting instruments and a precise chronometer. Lewis invited his former army comrade Captain William Clark to join him in the expedition

as a co-leader and Clark accepted his invitation.

Jefferson gave Lewis several pages of specific instructions about what information to collect during the expedition. Of special interest to Jefferson were answers to questions like what were the Indians like and what were their languages, customs and medical habits? Also the details of the plant and animal life, the minerals and the mountains were very important to observe and report. Another important matter was information on the possibilities for trade. Jefferson also gave recommendations on the procedure of communicating with Indians and underlined the high importance of protecting lives. Lewis also received from Jefferson his signed letter of confidence, stating that the USA would reimburse anyone for any goods or services that the expedition needed.

In the autumn of 1803 the men of the expedition gathered on the east bank of Mississippi, upstream from St. Louis and established Camp Wood, or Camp Dubois in French. Over the winter the men were trained for their tasks. In March 1804 they attended the official ceremonies in St. Louis of the transfer of Louisiana Territory from France to the United States. In May 1804 the expedition was ready to set off to the unknown west and to chart its trails for the next generations.

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Part II of this article will appear in a later issue of *GeoInformatics*.



The surveyor's chain was the usual tool of surveyors to measure land. The men stretched the chain taut between two poles or rods. The chain comprised of 100 links, which equaled 66 feet, ie. approximately 20 m. Lewis used it often to measure the widths of the rivers. (Source: www.lewisandclarkexhibit.org)



Such a refracting terrestrial telescope with an achromatic objective from 1800 was used by Lewis for his daily observations. (Source: www.lewisandclarkexhibit.org)