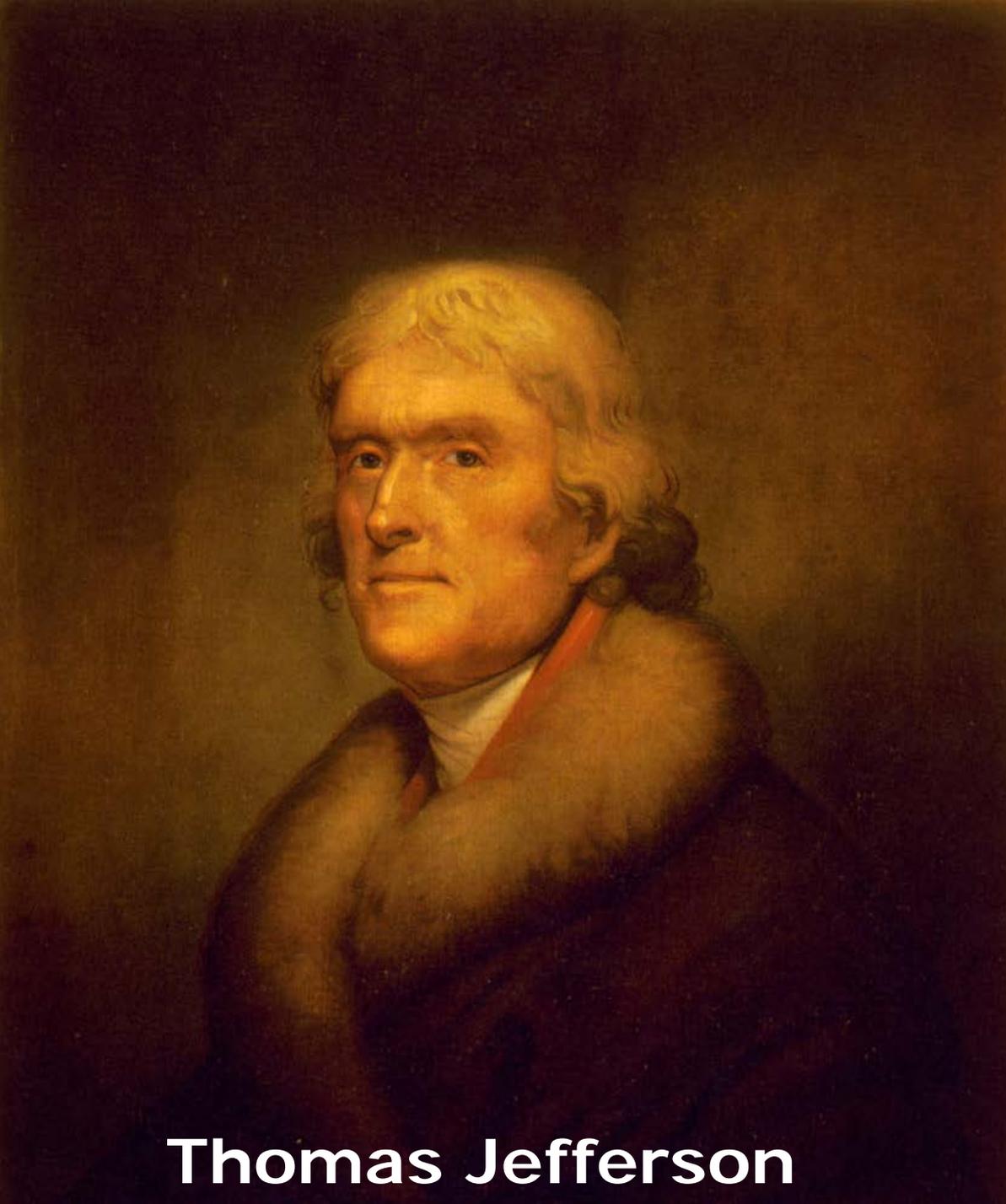


## PARALLELS:

# Lewis and Clark and the United States Coast and Geodetic Survey

Captain Albert E. Theberge, NOAA Corps (ret.)  
NOAA Central Library



**Thomas Jefferson**

**“His vision of the United States stretched from sea to sea – and more than any other individual, he made that happen.”  
Stephen Ambrose**

***“ ...a patient pursuit of facts, and cautious combination and comparison of them, is the drudgery to which man is subjected by his Maker, if he wishes to attain sure knowledge.”***

***Thomas Jefferson, 1785***

**The Lewis and Clark Expedition and the Coast Survey were patient pursuers of facts.**



# Robert Patterson –

Tutor of  
Meriwether  
Lewis – Friend  
of Hassler –  
Early advocate  
of Coast  
Survey -  
Influential  
member of  
American  
Philosophical  
Society

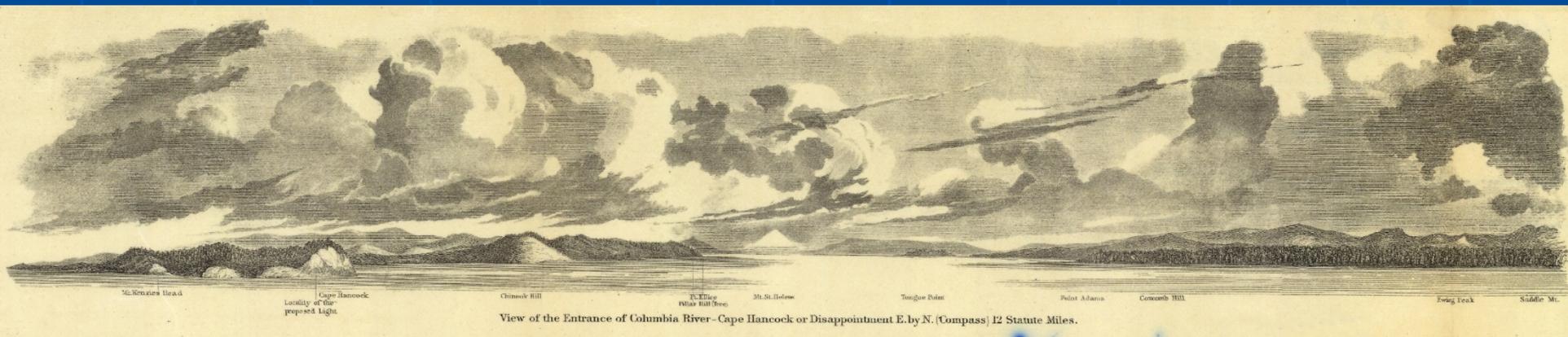
# Maritime Commerce- The Primary Object of the Expedition

*"The object of your mission is single, the direct water communication from sea to sea formed by the bed of the Missouri & perhaps the Oregon." Jefferson to Lewis, October, 1803. According to Stephen Ambrose, "That was the most succinct statement about the purpose of the expedition Jefferson ever wrote."*

*“ ... the President of the United States shall be, and he is hereby authorized and requested, to cause a survey to be taken of the coasts of the United States....” The Act of February 10, 1807*

*“The Rockies were ... only a wretchedly cold obstacle between men and the sea.” Donald Jackson commenting upon Lewis and Clark’s unconcern with mineral wealth of the mountains*

*November 7, 1805 – “Ocian in view!  
O! the joy.” “Great joy in camp we  
are in view of the Ocian, this great  
Pacific Ooctean which we been So  
long anxious to See.” William  
Clark.*



**Columbia River Entrance, Coast Survey  
View 1851**

# Maps – The First Goal

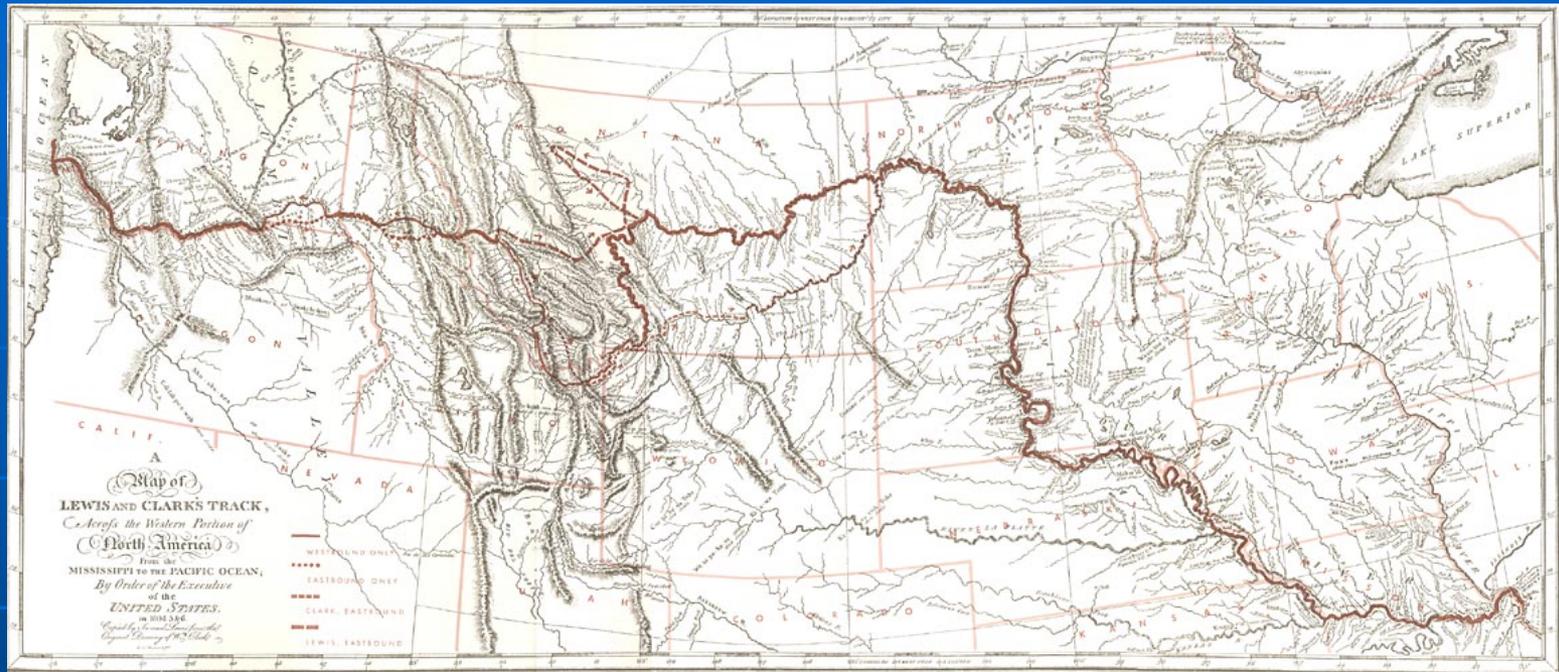
Jefferson's first goal was good maps --- he wanted to know what he had bought. He explained his purpose to naturalist William Dunbar: *"The work we are now doing is, I trust, done for posterity, in such a way that they need not repeat it.... We shall delineate with correctness the great arteries of this great country: those who come after us will extend the ramifications as they become acquainted with them, and fill up the canvas we begin."*

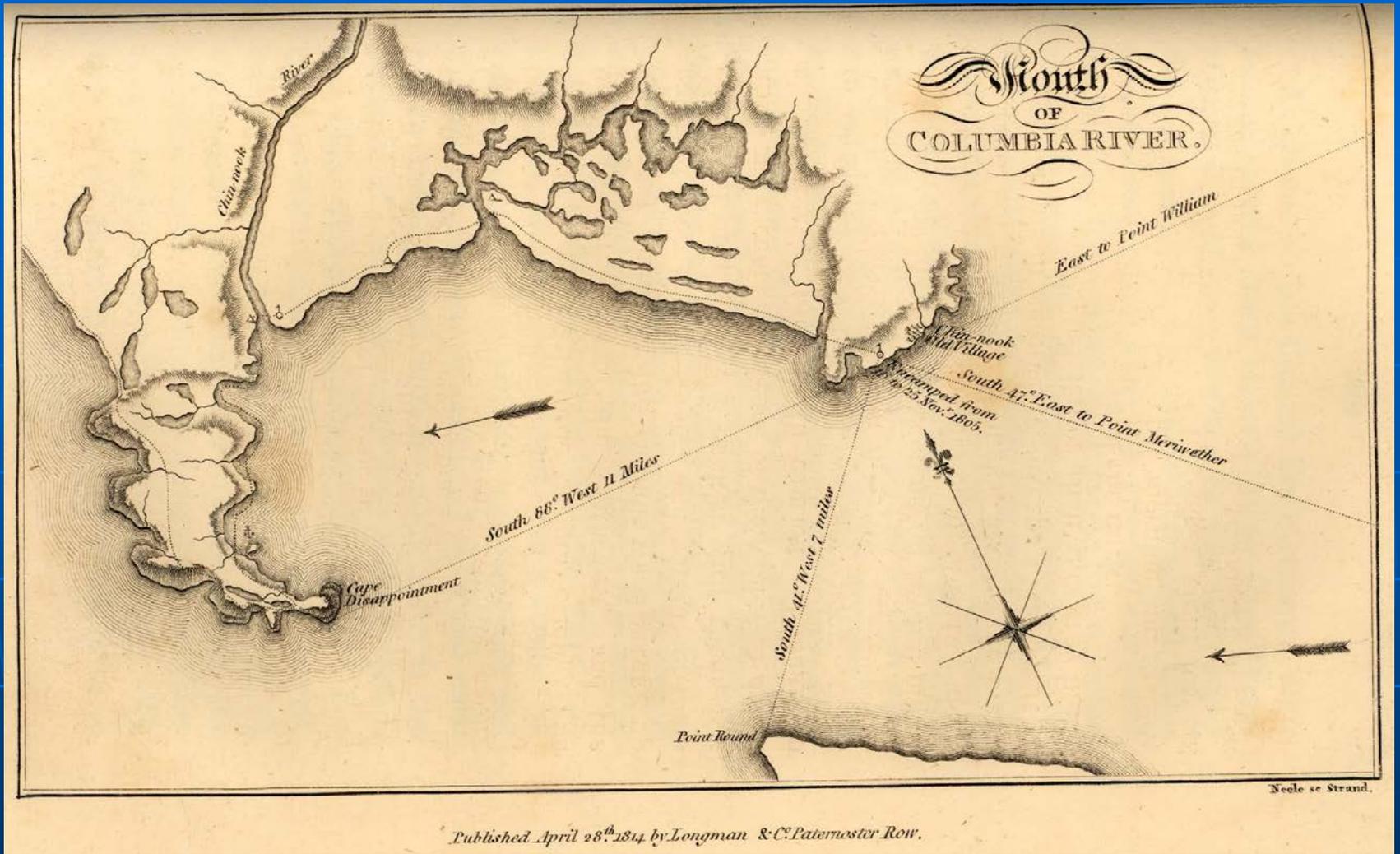
# Lewis the Naturalist – Clark the Cartographer

February 11, 1806 – *“While Lewis described birds, plants, animals, and methods, Clark worked on his map, covering the country from Fort Mandan to Fort Clatsop. On February 11, he finished the work, an invaluable contribution to the world’s knowledge. Together with his previous map of the lower Missouri, it brought the American West together for the first time.”* Stephen Ambrose

Upon meeting of Jefferson and Lewis in 1806:  
*“One fact we do know: they spread the map  
on the floor, got down on hands and knees,  
and examined it.”* Stephen Ambrose







Map of Columbia River Entrance from the Lewis and Clark Expedition



# Extending the Expedition

Astoria Canyon  
1933 as  
surveyed by  
the United  
States Coast  
and Geodetic  
Survey. Dots  
are individual  
soundings.

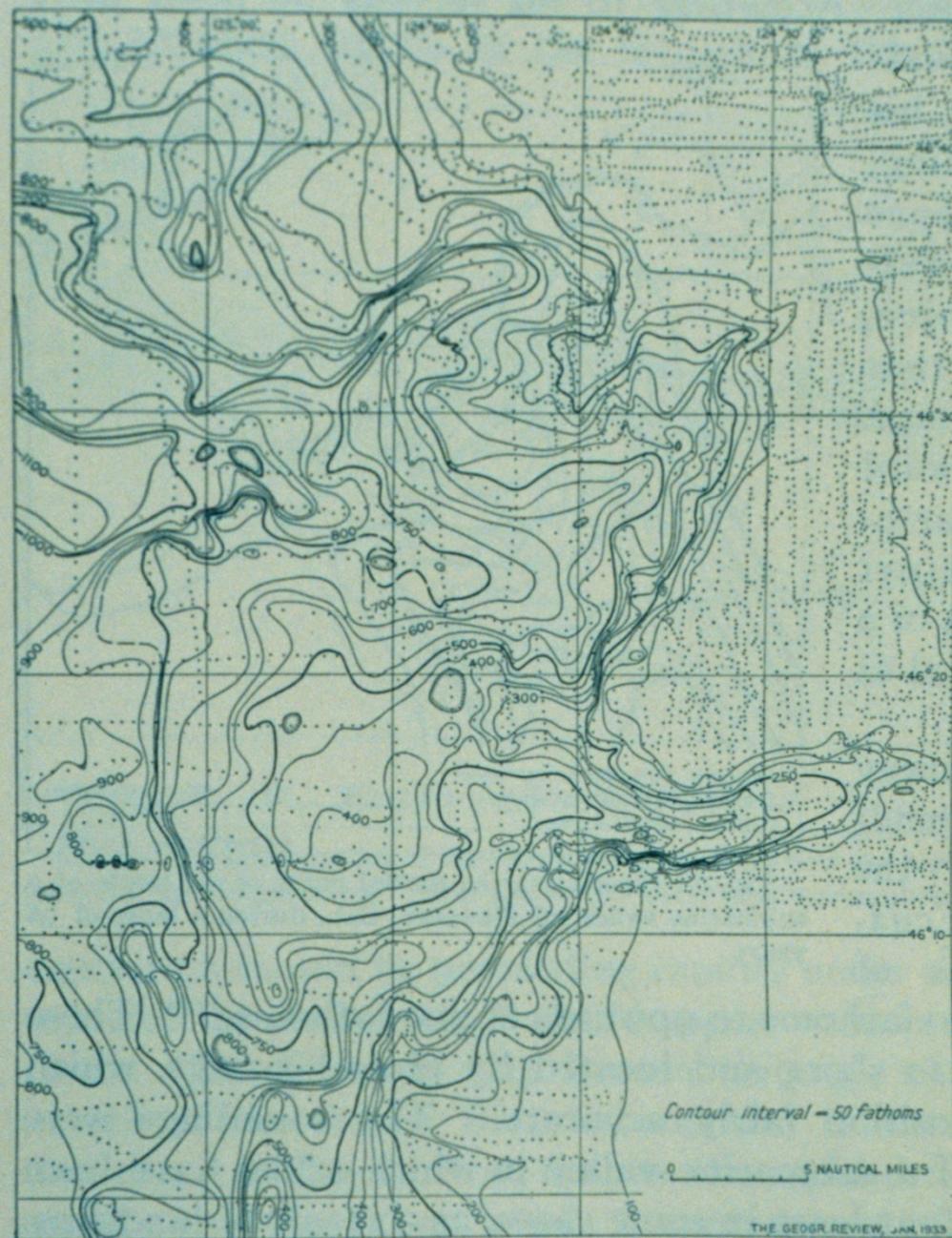
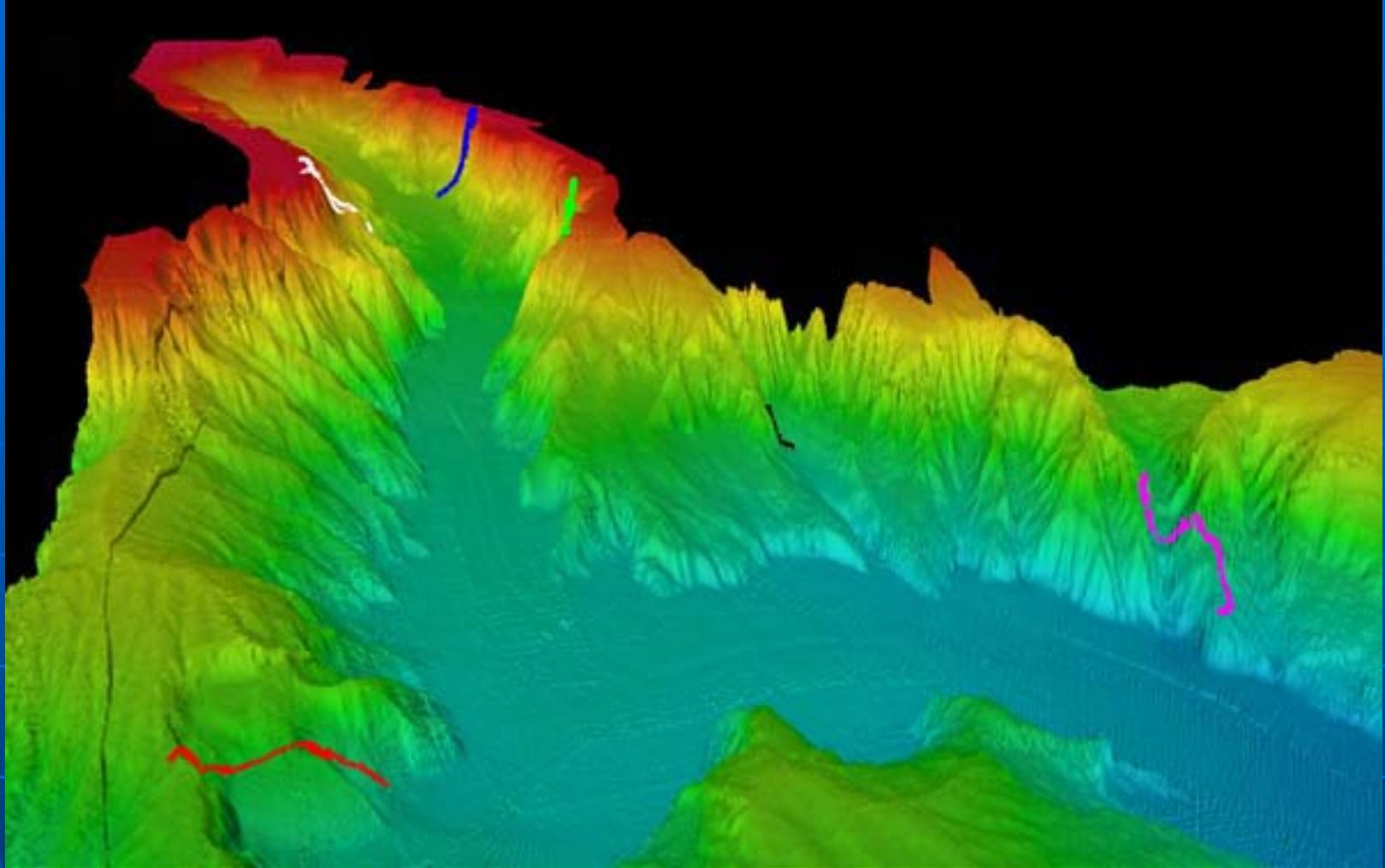


FIG. 7—The series of submarine valleys off the vicinity of the Columbia River, illustrating the hummocks and depressions characteristic of landsliding. Each dot represents a sounding.



**Astoria Canyon – NOAA Office of Ocean Exploration and Research. Continuing the Lewis and Clark Legacy Expedition 2001.**

# Orthography – Names on the Land

## Some that stayed:

*Judith River* for Julia Hancock, Clark's future wife.

*Smith's River* for Robert Smith, Jefferson's secretary of the navy; *Dearborn river* for Henry Dearborn, secretary of war; The "*Gates of the Mountains*";

*Willard's Creek* named for Private Alexander Willard of the Corps of Discovery; "*Gallitin's River, Maddison's River, and Jefferson's River*"; *Colt Killed Creek*, west of the Divide in the Bitterroot Mountains

## Some that passed into oblivion:

*"... called the bold rapid an clear stream Wisdom and the more mild one Philanthropy, in commemoration of those cardinal virtues, which have so eminently marked that deservedly selibrated character (Jefferson) through life."*

## Hassler's Insistence on Proper Orthography for Coast Survey Charts

*"He was quaint in his language, particularly in his orthography, cautioning his assistants always to inquire closely into the derivation and spelling of the names of localities in our surveys. He would never accept the spelling of 'Neversink,' one of the prominent points near Sandy Hook, but insisted upon 'Navesink' as the correct orthography; and upon every name put down by us on the charts he would make his comments." Rear Admiral Benjamin Sands in "From Reefer to Rear Admiral"*

# On Being Expert Boatmen

Navigating the Short Narrows of The Dalles, a quarter-mile-long stretch in which the river was constricted to a mere forty-five yards in width. Clark was appalled by *“the horrid appearance of this agitated gut Swelling, boiling & whirling in every direction....”* The natives, expert canoeists themselves, did not believe Lewis and Clark could do it in their big, heavy dugouts. They gathered by the hundreds to watch the white men drown themselves, and to be ready to help themselves to the abandoned equipment afterward. But, to the astonishment of the Indians, the Americans made the run without incident. Stephen Ambrose

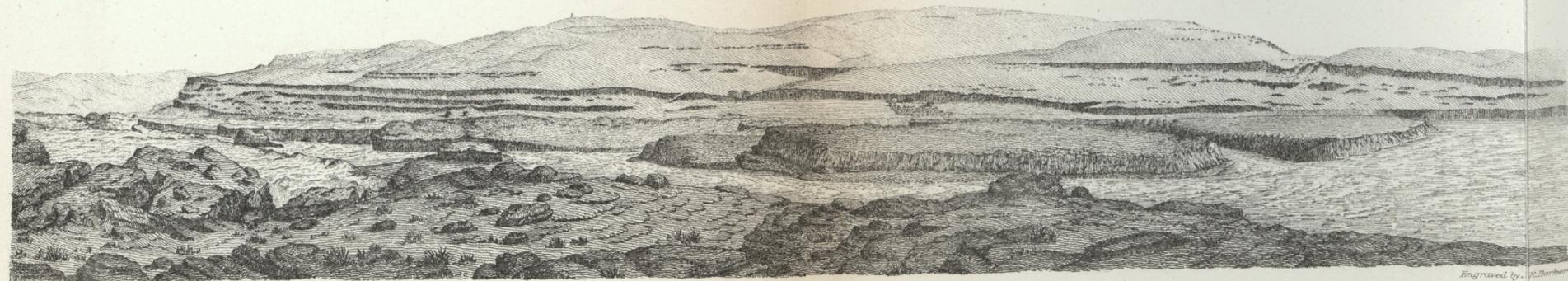


TOPOGRAPHICAL DRAWING

Scale 10 600

By E. Hergesheimer Assistant

*Erosion of Eruptive Rocks, Basaltic Escarpments and River Torrent. (The Dalles, Columbia River)*



Drawn by E. Hergesheimer

Engraved by H. Barber



**Rapids on the Columbia River – 1857 view  
looking downstream by James Madison Alden,  
Coast Survey artist**

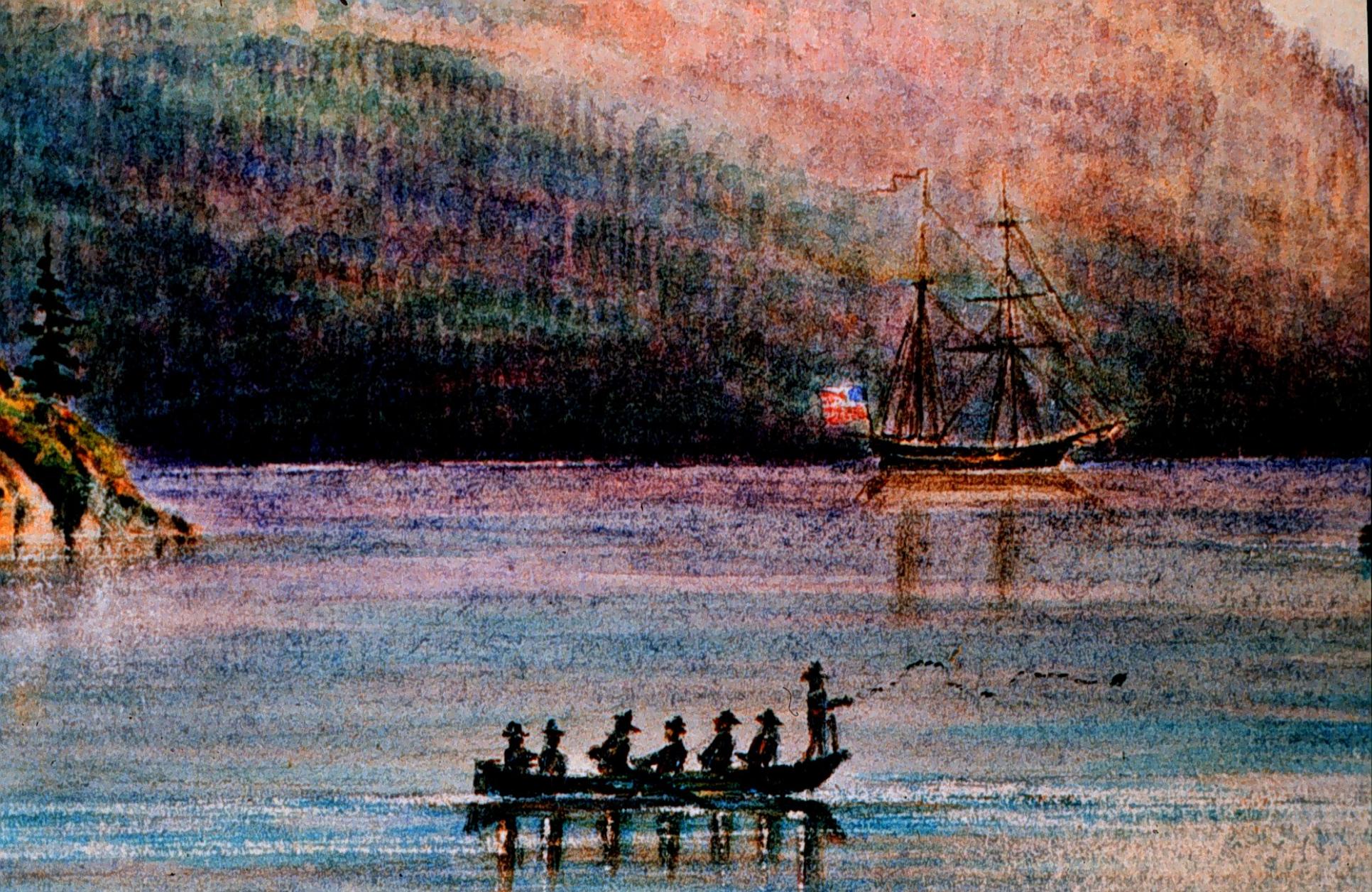
*“the horrid appearance of this agitated  
gut Swelling, boiling & whirling in every  
direction....”*



**Coast Surveyors as expert boatmen –  
Sounding within surf-line. Alaska 1924**



**Salmon River, Idaho. 1945. Custom-made Coast and Geodetic Survey boat.**



1857 Coast Survey Party in Rosario Straits area, Washington Territory. James Madison Alden

# Hydrography and Oceanography

April 1805 – “Private Field came in , to report that the Yellowstone wandered, had a gentle current, many sandbars, and a sand-and-mud bottom. Clark took measurements: the Missouri at the point of junction was 330 yards wide with a deep channel, whereas the Yellowstone was 297 yards wide and 12 feet deep at its deepest channel. ”

“The junction of the Wisdom and Jefferson presented a familiar problem. Which river to follow? Lewis decided on the Jefferson, not because it was bigger (it carried less water than the Wisdom) but because it was warmer, “from which I concluded that it had it’s source at a greater distance in the mountains.”

# On Systematic Surveying and Exploration

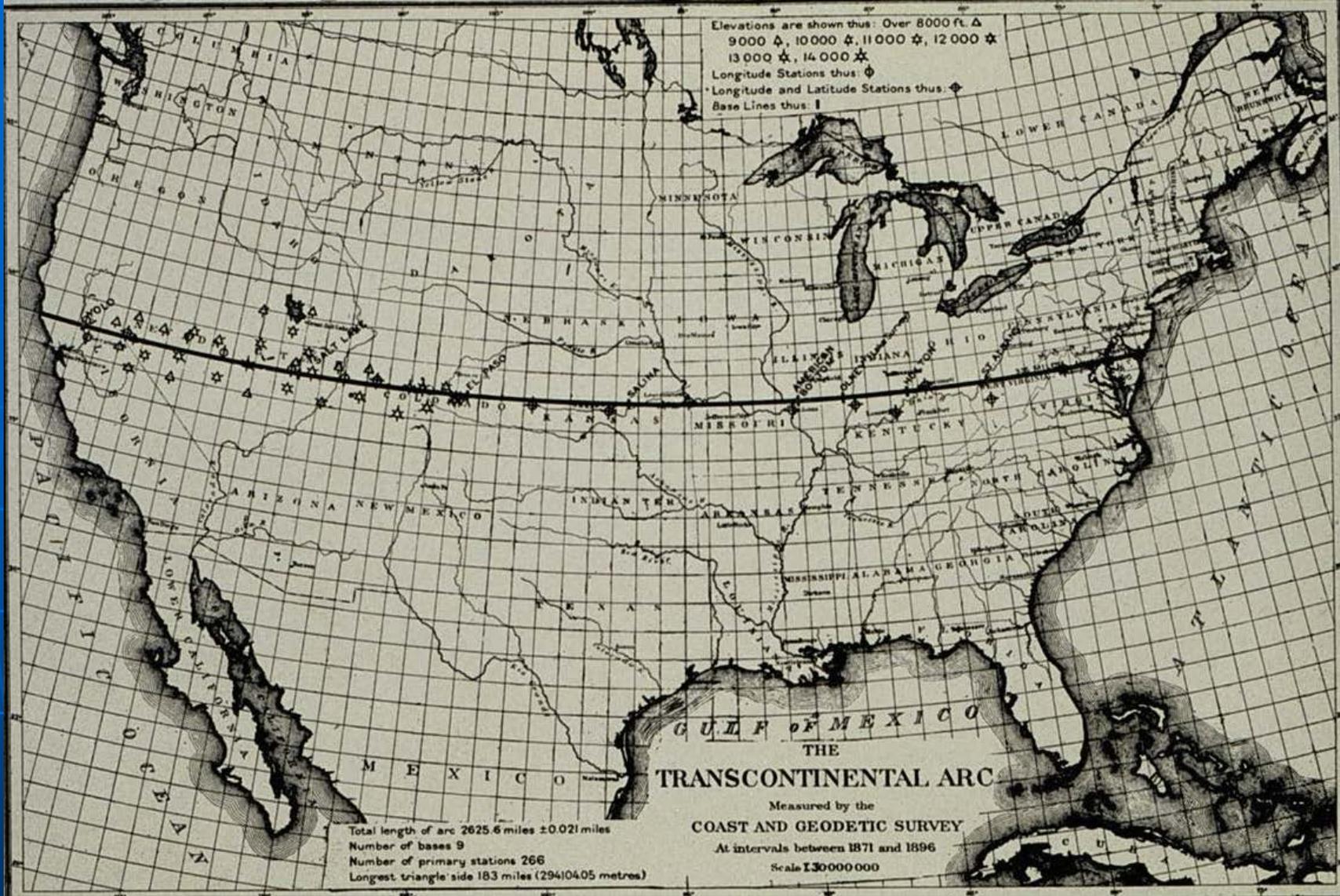
*“He had brought back a treasure of scientific information. His discoveries in the fields of zoology, botany, ethnology, and geography were ‘beyond any value.’ He introduced new approaches to exploration and established a model for future expeditions by systematically recording abundant data on what he had seen, from weather to rocks to people”*

**Stephen Ambrose**

# Hassler on the systematic surveys and the discovery of Gedney Channel, an important new channel into New York Harbor

*"That such a valuable discovery, which appeared to lie so near, was not made earlier, is to be attributed simply to the manner in which nautical surveys have generally been made. Without sufficient accurate fixed points on the shore, which the other works of the coast survey furnished, such a discovery was impossible....such discoveries can only be the result of a systematic work, grounded upon full mathematical principles, as applied in our works."*

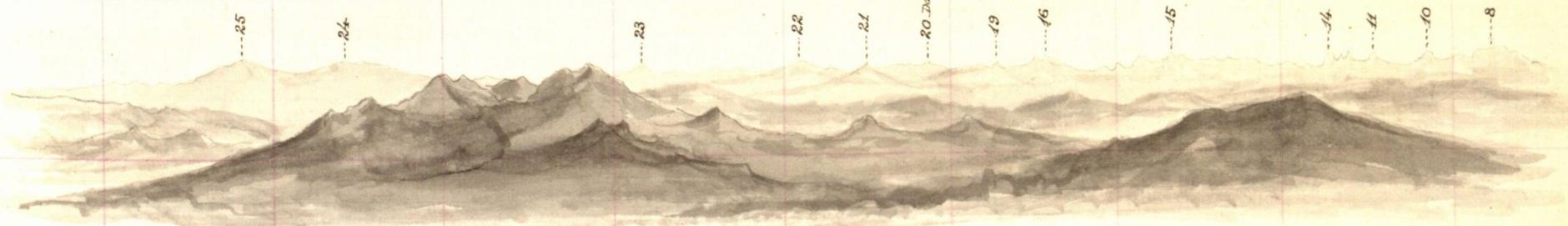
*"... the first American scientific survey on a continental scale...."*  
Stephen Ambrose in reference to the Lewis and Clark Expedition



**The Thirty-ninth Parallel Survey – From Sea to Shining Sea. The longest geodetic survey arc in the world up to that time. 1872-1895.**

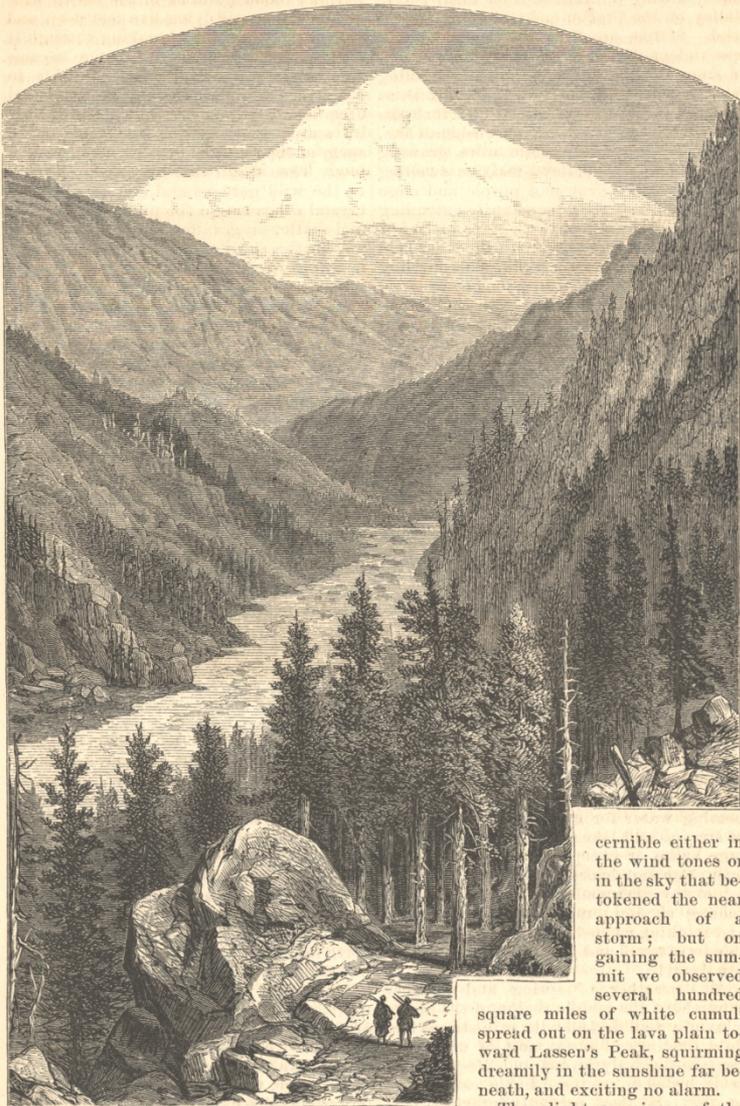
June 1805 -- *“And always in the back of his mind, even as he wrestled with his immediate problems, were those tremendous mountains looming to the west, standing between him and his goal – mountains that he could only just see, but which he already realized were much greater, higher, deeper than anything he had seen in the Blue Ridge, or anywhere else....”* Stephen Ambrose

Sketch from Mt. Diablo round by South, No. 1 to No. 7 of record, as seen from Round Top Monday July 21<sup>st</sup>



Sketch from flat-top, snow-clad peak, No. 8 of record, to No. 25 of record, including all peaks back of Yosemite north-ward, as seen from Round Top, Monday July 21<sup>st</sup> 1879

Field notebook of Louis Sengteller, U.S. Coast and Geodetic Survey showing mountain views in the Sierra Nevada

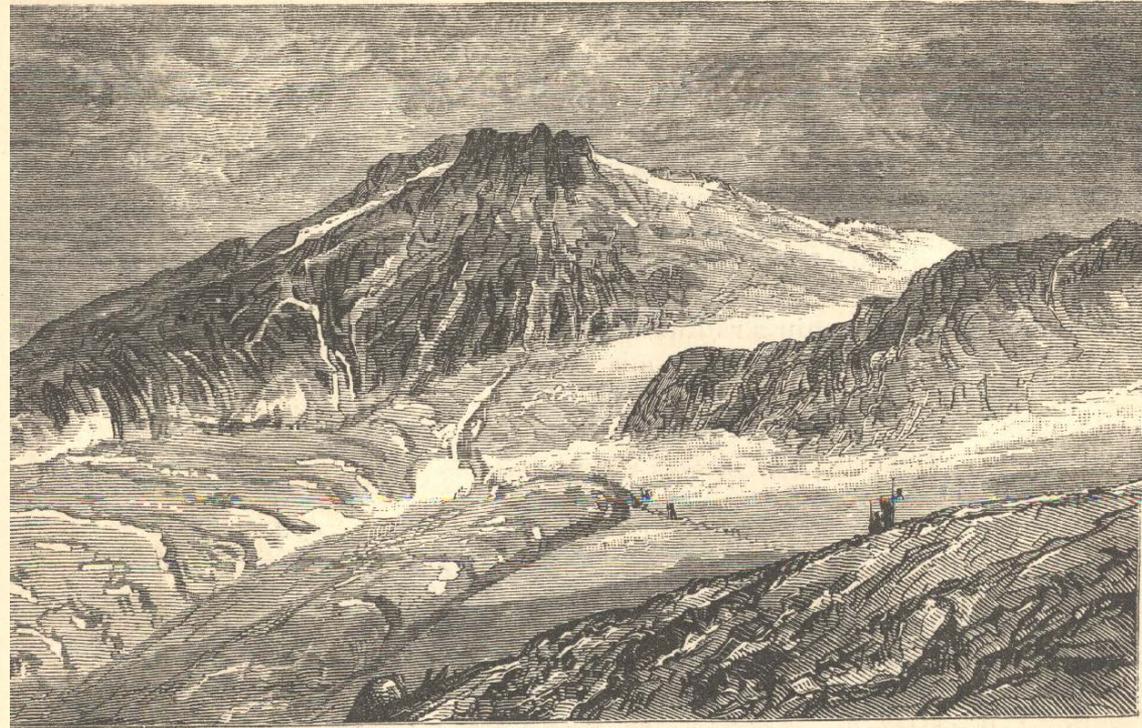


MOUNT SHASTA FROM THE VALLEY OF THE UPPER SACRAMENTO.

cernible either in the wind tones or in the sky that betokened the near approach of a storm; but on gaining the summit we observed several hundred

square miles of white cumuli spread out on the lava plain toward Lassen's Peak, squirming dreamily in the sunshine far beneath, and exciting no alarm.

The slight weariness of the ascent was soon rested away.



VIEW OF THE WHITNEY GLACIER NEAR THE HEAD.

From John Muir's article:  
*Snowstorm on Mt. Shasta.*  
 Muir worked for the Coast Survey as a guide and this occurred during reconnaissance on Mt. Shasta.

U.S. GEODETIC RECONNAISSANCE

C. P. Patterson, Superintendent.

DIAGRAM

showing proposed connection  
between

# SIERRA NEVADA AND WAHSATCH MTS

See VI

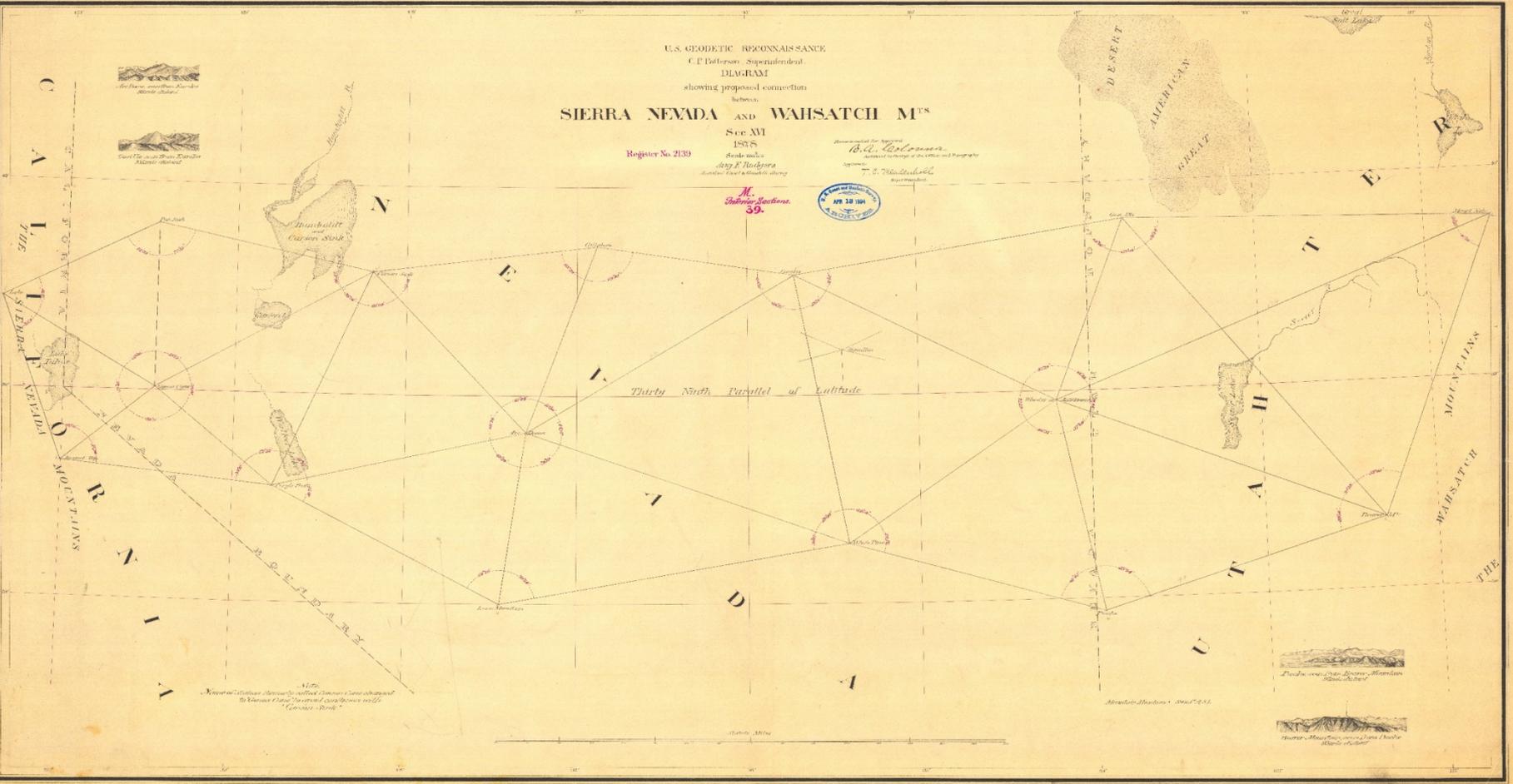
1858

Register No. 2139

Approved by the  
Secretary of War  
April 13 1858

Approved for Signature  
*B. L. Colonna*  
Assistant Secretary of the Office and Topographer  
Approved  
*T. C. Wheeler*  
Superintendent

*M. Schrieber*  
39.



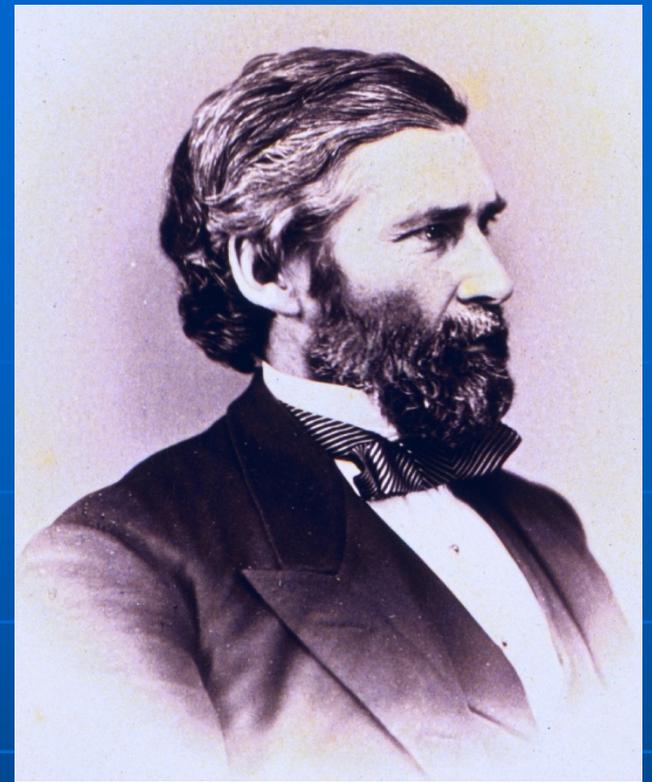
1858  
"Notes on the Survey of the Sierra Nevada and Wahsatch Mountains, made by C. P. Patterson, Superintendent, and T. C. Wheeler, Assistant Superintendent, in 1857 and 1858." (Copied from the original)

Abstract of the Survey of 1857-58

Scale, 10000



**William Eimbeck**  
Scientist, Surveyor,  
Engineer. Pushed  
the 39th Parallel  
Survey across  
Great Basin and  
the Rockies



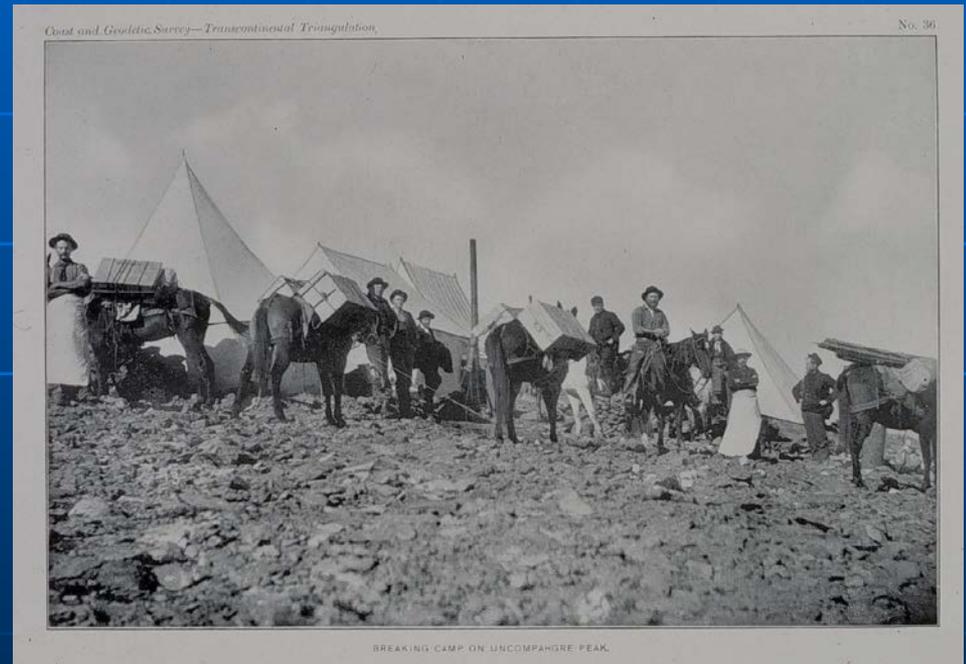
**George Davidson**  
Pioneer West Coast  
Coast Surveyor –  
Surveyed the frontier  
Coast, began 39th  
Parallel survey

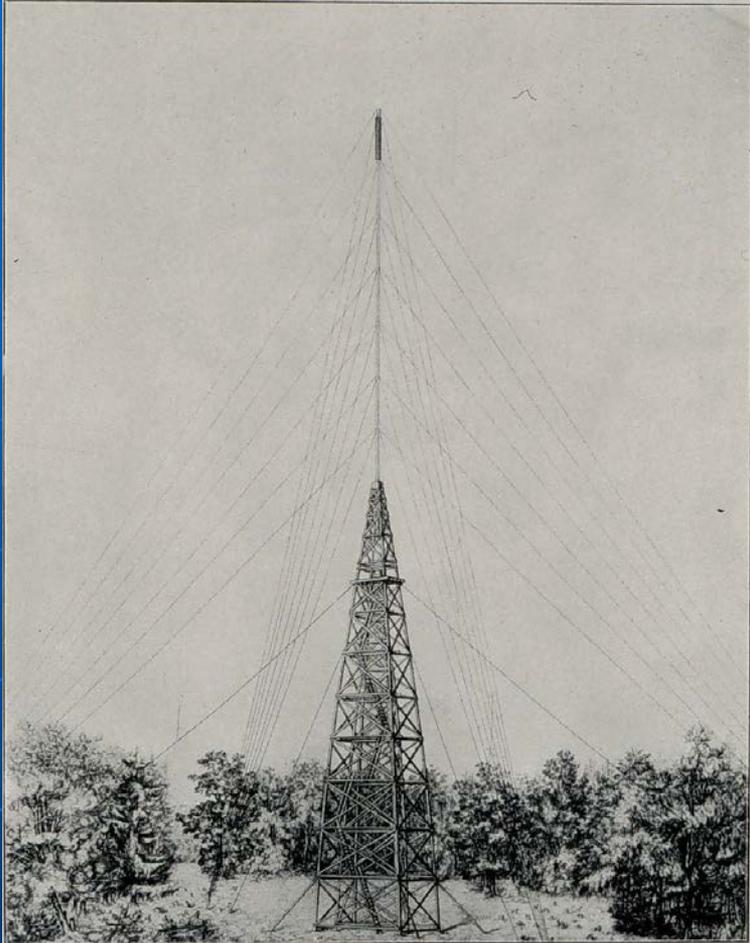


SUMMIT OF ROUND TOP, CALIFORNIA, PRINCIPAL TRIANGULATION STATION ON THE SIERRA NEVADA.

Altitude, 3,165 meters or 10,386 feet.

# Eimbeck's crew on 14000-ft + Mt. Uncompaghre, Colorado. 1895.

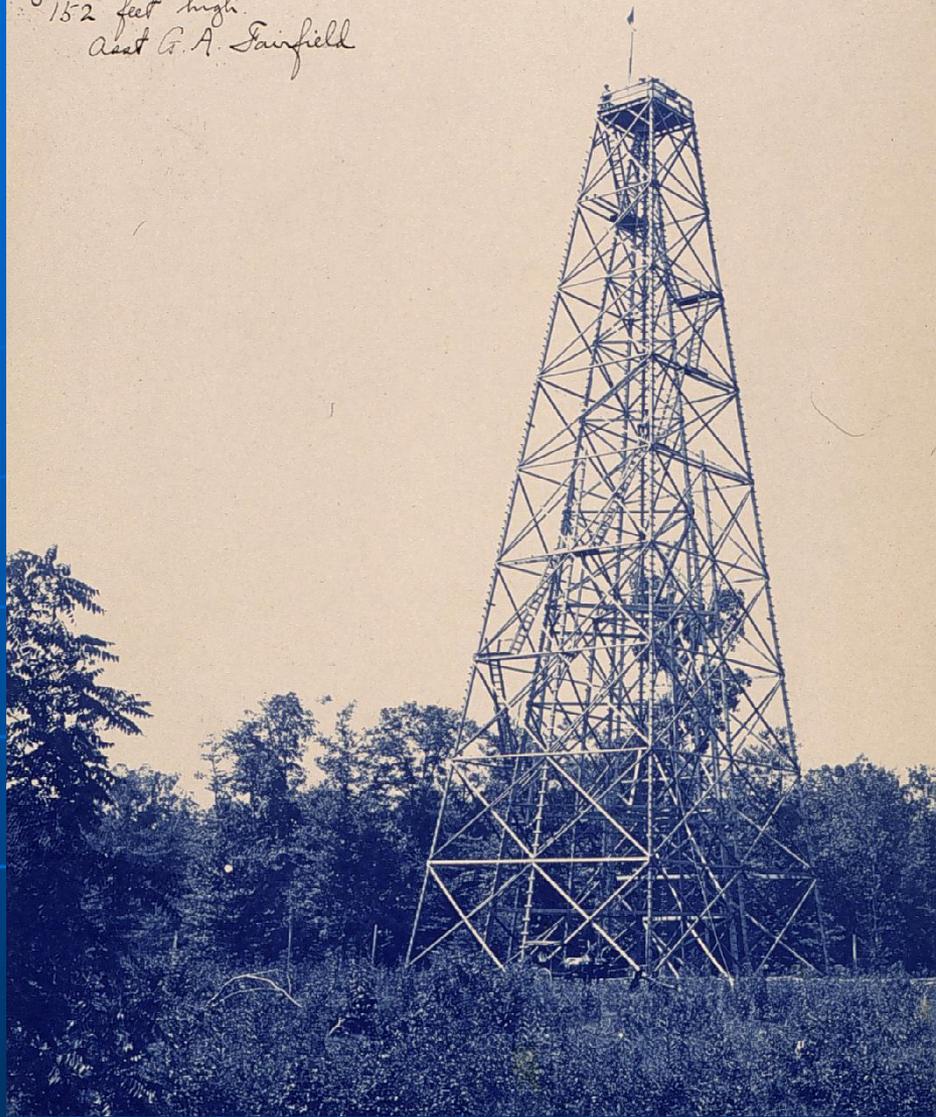


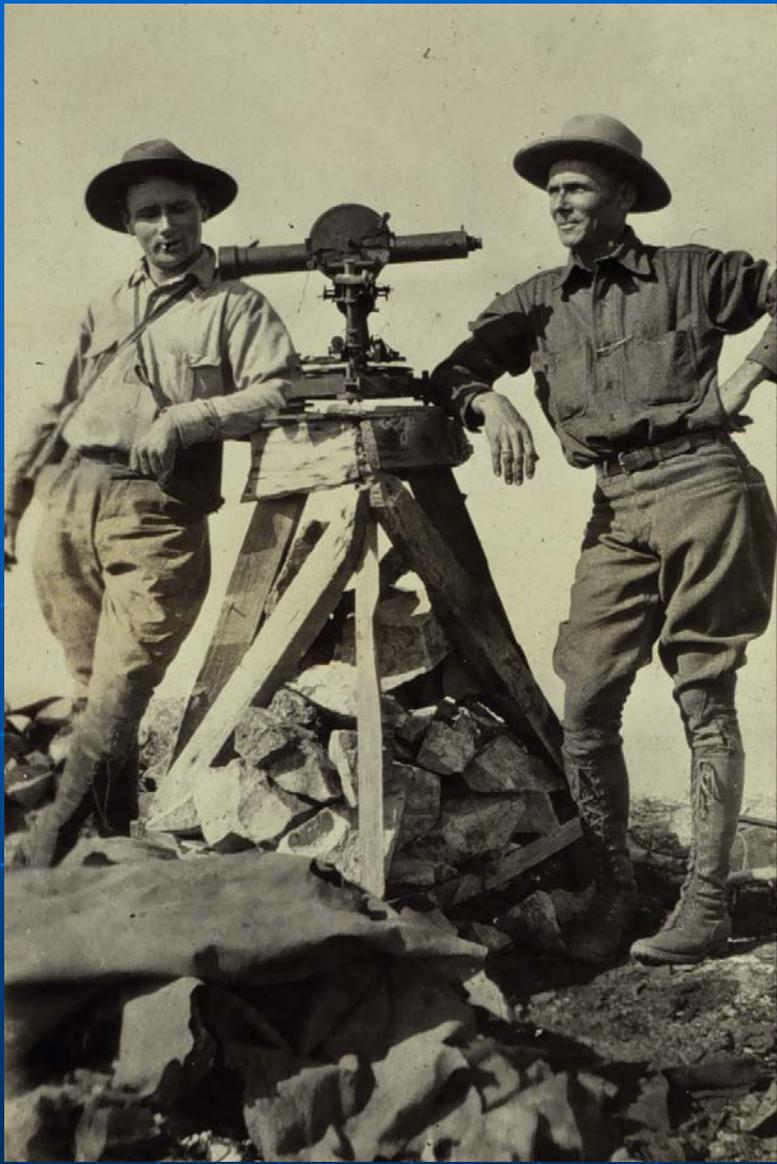


OBSERVING STATION, STILLPOND, MD.

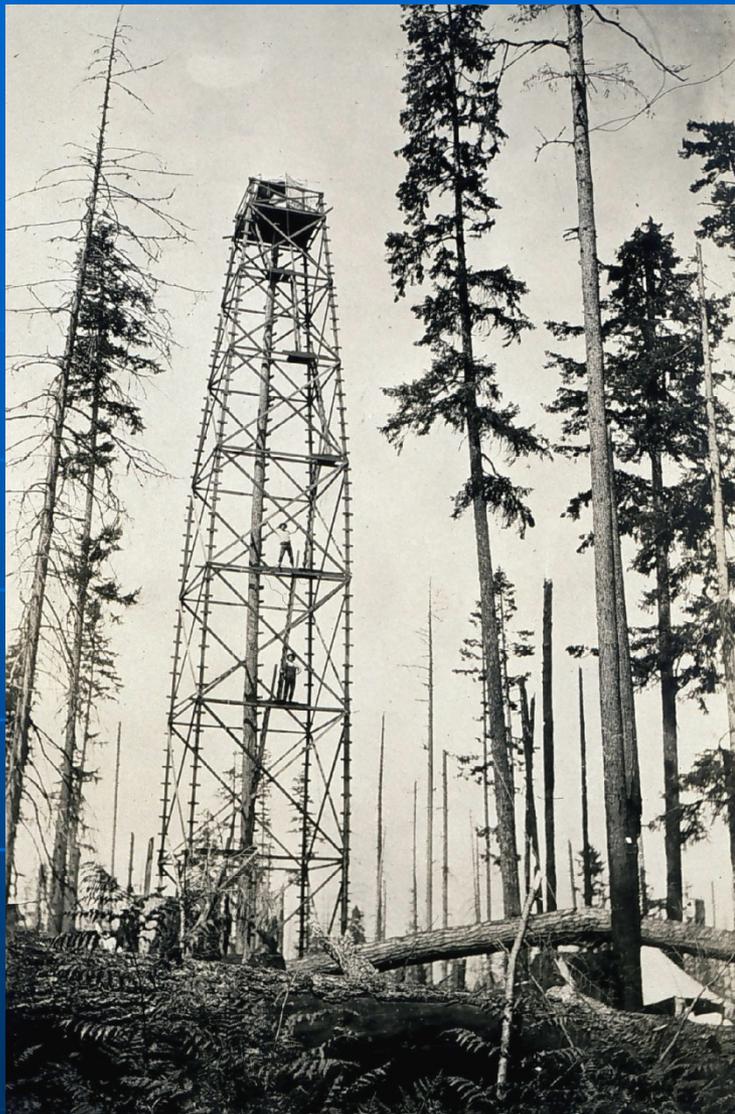
Elevation of instrument above ground, 36½ meters or 120 feet. Elevation of target, 84 meters or 275 feet.

Signal at Green  $\Delta$  - 30th Parallel Sn.  
152 feet high.  
Asst G. A. Fairfield





**Montana 1922, Before and after lightning strike. Mt. Gallatin.**



1906, Washington, Olympic Peninsula



1914

CROW'S NEST 215 FEET ABOVE GROUND  
FOR U.S. COAST & GEODETIC SURVEY  
MOCLIPS, WASH. Dale O. Northrup  
© 1914

“It took men of uncommon nerve to do this work.”

# Horses, Timber, and Trails

June 15, 1806, Lolo Pass area – *“Through the afternoon, they marched. The going was difficult, because of fallen timber crisscrossing the trail and the slippery pathway, caused by the rain....”* Stephen Ambrose. At one steep hillside, Lewis’s horse slipped *“with both his hinder feet out of the road and fell.”* Lewis fell off backward and slid forty feet before he could grab a branch to stop himself. *“The horse was near falling on me”* as he slid, he wrote, *“but fortunately recovers and we both escaped unhurt.”*



**Coast and Geodetic Survey crew  
heading to survey point in  
Lolo Pass area - 1934**



Coast Survey, Mt.  
Gallatin 1922

**September 3, 1806 – In the Bitterroots: “We passed over emence hills and Some of the worst roade that ever horses passed our horses frequently fell.”**



# ETHNOGRAPHY

– “As he habitually did with previously unknown Indians, Lewis made a vocabulary of the Salish language....” Stephen Ambrose

One of the Supporting posts  
of the roof of the Grand Council  
house of Kohklux, Chief  
of the Chilkahuts,  
N.E. corner.

YEGH = Crow

Mak-ta-Kum-ee-Kan-nee-yep



crow

(Mt. sheep?)

George Davidson's field notebook recording both Tlingit language and appearance of totems in house of Chief Kohklux. Davidson was instrumental in the purchase of Alaska and conducted first scientific studies for U.S. in 1867

# Sacagawea and the Whale

January 10, 1806 – *“The Indian woman was very impotunate to be permitted to go, and was therefore indulged; she observed that she had traveled a long way with us to see the great waters, and that now that monstrous fish was to be seen, she thought it very hard she could not be permitted to see either....”* Lewis describing an episode when eleven of the party went to find a whale that had washed ashore south of Fort Clatsop.



## A Little Humor - Lewis's Joke

Upon receiving a few gallons of whale oil and three hundred pounds of blubber, Lewis remarked:

"Small as the store is, we prize it highly, and thank the hand of providence for directing the whale to us, and think him much more kind to us than he was to jonah, having sent the monster to be swallowed by us in stead of swallowing of us as jona's did."

# Hassler's Joke

On one occasion, one of Hassler's countrymen was visiting one of these stations and walked to the edge of a precipice and exclaimed "Eh, Monsieur, vous vivez ici, haut comme les anges!" [Oh, Monsieur, here where you are living is as high as the angels!] Hassler's quick retort was "Oui, Monsieur, haut comme les singes!" [Yes, Monsieur, we are at least as high as the monkeys!] Sands reported that his eyes twinkled "at the baldness of his pun."

# Relationships with Women- Lewis

**"I am now a perfect widower with respect to love.... I feel all that restlessness, that inquietude, that certain indiscribable something common to old bachelors, which I cannot avoid thinking my dear fellow, proceeds , from that void in our hearts, which might, or ought to be better filled. Whence it comes, I know not, but certain it is, that I never felt less like a heroe than at the present moment. What may be my next adventure god knows, but on this I am determined, to get a wife."**

# Relationships with Women - Hassler

Hassler's wife left him in 1823 after bearing nine children and apparently never saw him again.

In a poignant letter to a friend, Hassler described his working style while also betraying both his hurt at being abandoned by his wife and a tinge of homesickness for his native land. "I work deep into the night with my music box by my side, for I have no friendly wife to sing me a cheering song while I work; I wish, however, that my box would regale me, not with foreign tunes, but with Swiss melodies

....

**Lewis, Clark, and Hassler –**

**What sort of men were  
they?**

**Eulogies**

*“Of courage undaunted, possessing a firmness & perseverance of purpose which nothing but impossibilities could divert from it’s direction...” Thomas Jefferson eulogizing Meriwether Lewis.*

*“He was undaunted, diligent, patient, self-reliant; no man feared an adversary less, or loved friends more .... He was essentially a man of truth ....” J. H. Alexander eulogizing Ferdinand Hassler*

*"If excessive toil and Peril, and a life of Laborious Servitude spent in the service of his country entitle a man to honours, there are none more deserving than Gen. Clark."* Diary entry of Henry Miller, a young citizen of St. Louis, on the occasion of William Clark's death in 1838. Clark's biographer, William Foley thought this came closest to capturing the true measure of Clark's greatness.

**IN MEMORY OF FERDINAND RUDOLPH HASSLER  
BORN AT AARAU IN THE CANTON OF ARGOVIE, SWITZERLAND  
OCTOBER 6, 1770. HAVING FILLED WITH HONOR BOTH IN  
HIS NATIVE AND ADOPTED COUNTRY OFFICES OF HIGH  
TRUST AND RESPONSIBILITY DIED IN PHILADELPHIA  
NOV. 20, 1843 IN THE MIDST OF HIS LABORS AS  
SUPERINTENDENT OF THE UNITED STATES COAST SURVEY  
AND STANDARDS OF WEIGHTS AND MEASURES  
BOTH GREAT NATIONAL WORKS FROM THEIR ORIGIN  
ENTRUSTED TO AND CONDUCTED BY HIM WITH  
DISTINGUISHED REPUTATION AND SUCCESS. STRICT  
INTEGRITY AND LOVE OF TRUTH, WITH STRENGTH AND  
ACTIVITY OF INTELLECT, CHARACTERIZED HIM AS A MAN,  
WHILST HIS VARIOUS SCIENTIFIC WRITINGS AS WELL AS  
THE TWO NATIONAL WORKS PROJECTED BY HIM ARE ALIKE  
MEMORIAL OF HIS LABORIOUS LIFE AND OF HIS  
CONTRIBUTION AS A MAN OF SCIENCE TO THE  
INSTRUCTION AND IMPROVEMENT OF HIS FELLOW MEN.**