

air traffic going in and out of each airport. The *Corridors*, *Regions*, and *States* pages are similar organizations of flights based on different spaces. In the *States* page, eight animations are presented for eleven states or pairs of states (states that were combined into one single animation include Colorado and Kansas, Montana and Idaho, Nevada and Utah). Also in the *States* page are two air traffic animations that show two different time frames for Hurricane Katrina along the Gulf Coast. It is interesting to see the pattern of air traffic being affected by the Hurricane.

The technical aspects of animation are very well achieved. The design of the animated maps was thoughtful and effective. Each animation this reviewer saw presented clear visualization of the spatial patterns of the air traffic. Analytical maps from the booklet presented generalized spatial patterns for the red-eye flights, the morning waves, the hub spokes, the hub pulse clusters, the hub commuters, the mail service traffic (and its unique work time schedules), as well as international arrivals. While the animations are effective in showing each spatial scene, it must be remembered that data for each animation were based on flight patterns that were mapped as a one-time (24 hour) instant that may vary from year to year as airline routes are changed by the FAA and/or the airlines themselves. Thus, the contribution of an atlas such as this one should be treated more as an example of good technical production or even a well designed collection of animations that may lead to meaningful visual analytical interpretations rather than the common expectation that an atlas provides complete reference information. Such an expectation may be next to impossible to achieve for an animated atlas. Other than the usefulness that was described above by the pages, there appears to be limited application value. It was also unclear to the reviewer who may be the intended audience. No information was provided to this reviewer regarding any commercial distribution of this atlas, its market price, or how to obtain a copy. Nevertheless, it was a joy to watch the animations, contemplate the spatial patterns that were presented, and learn more about the air traffic industry.

**Wabanaki Homeland and the New State of Maine:
The 1820 Journal and Plans of Survey of Joseph Treat**

Edited with an Introduction by Micah A. Pawling
University of Massachusetts Press

Amherst, Massachusetts, 2007

300 pages, with reproductions of hand drawn maps throughout

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Wabanaki Homeland and the New State of Maine: The 1820 Journal and Plans of Survey of Joseph Treat begins with a detailed Introduction by Micah A. Pawling to the Joseph Treat journal and surveys. Pawling prepared this book while a Ph.D. candidate in history at the University of Maine. His Introduction provides important insight into the driving political and cultural forces that necessitated the Treat expedition in the first place. Pawling also explains the ongoing significance of Treat's documents in historical context.

The Joseph Treat journal itself was created in diary format during the course of a fifty-six-day exploration of northern Maine waterways undertaken in 1820. Treat's detailed surveys of the region are complemented by his journal entries to provide a unique overview of place and time. The original spelling, punctuation, capitalization, and sentence structure used by Treat have been retained in their entirety (as reflected in the passages quoted within this review) and include the Penobscot place names Treat learned along the way from his Wabanaki guide, John Neptune. Helpful footnotes have been added by Pawling as an adjunct to the original text to familiarize readers with the current place names and locations of the areas referenced in the Treat journal and to provide historical commentary or cite related textbooks that further illuminate the journal entries.

As a new state in 1820, Maine was eager to settle northeast boundary disputes with neighboring New Brunswick and other Canadian territories. The Saint Croix River had previously been established as the official boundary between eastern Maine and southwestern New Brunswick, but the northern boundary between Maine and Canada was much less certain. Major Joseph Treat was hired by Maine's Governor King and his executive council to explore and document the lands along the Penobscot and Saint John Rivers, which comprised much of the disputed area. In 1820, this land was largely the province of the Wabanaki people, and little was known about its geography outside the Native American community. (Micah

Pawling explains in his Introduction that for the purposes of this book the term “Wabanaki people” refers to the Mi’kmaq, Maliseets, Passamaquoddies and Penobscots, along with other Abenaki Indian groups.) Both Maine and New Brunswick wanted control of the vast quantities of timber indigenous to the region, but no viable claim could be made by either side until a recognized boundary was established.

Since much of the Maine interior was still largely inhabited by Native Americans, and in particular the Wabanaki people, the Treat expedition required Native American knowledge and insight to facilitate its travels. John Neptune, a prominent Penobscot leader, guided the Treat expedition and greatly influenced the Treat journal.

Joseph Treat was born in Bangor, Maine, in 1775 to a prominent merchant family. He learned surveying through firsthand experience. In the early nineteenth century, Treat’s familiarity with the local geography earned him a respected place in the Penobscot River Valley community. Many of his business dealings are described in Pawling’s Introduction, since they played a small but important role in regional development and politics.

John Neptune was born in 1767. He previously worked with Joseph Treat on a survey of Mount Katahdin and the East Branch of the Penobscot River in 1804. In 1816, Neptune was named lieutenant governor, or second chief of his Penobscot tribe. He was considered a great religious leader among his people.

Prior to statehood in 1820, the District of Maine was part of Massachusetts. During the twenty-five years preceding the Treat expedition, the ownership and rights to lands in the Penobscot River Valley were hotly contested by the governing powers of Massachusetts and the Wabanaki people. For instance, a treaty had been established in 1796 involving islands within the Penobscot River to which both parties felt they were entitled,, depending on which way the treaty was interpreted. The Penobscots felt that all the river islands were interconnected; thus they believed that their defined ownership of even a portion of one of the islands entitled them to ownership of all the islands as well as to the waterways between them. The Massachusetts government felt equally entitled to single out certain of these islands for sale and development by white settlers, including Joseph Treat. The Penobscots became increasingly concerned about the development of mills on the river islands, since mills prevented the free movement of fish to Penobscot fishing grounds upstream and fish was the mainstay of the Penobscot diet at that time.

In July 1820, an alliance was formed by treaty between the new State of Maine and the Penobscot people. In return for recognizing the new state over their previous associations with Massachusetts, the

Penobscots requested protection of their tribal rights, including defined fishing areas. Joseph Treat signed the treaty as a witness.

In September 1820, Treat began preparing for the fifty-six-day expedition that, as initially planned, would lead him along the Penobscot River to the Saint John River by way of Chesuncook Lake and a portion of the Allagash River. Joining him were John Neptune as guide and Captain Jacob Holyoake. They would be traveling by birchbark canoe and on foot, depending on conditions.

The expedition officially began on Tuesday, September 26, 1820. Treat’s journal entries document the geographic landscape of the region seen along the way, as well as what Treat considered the important cultural and economic features of his time:

Marshes Island is seven miles long and contains 5,000 acres of land on which there are many excellent mill seats at Old Town and Stillwater in Orono.—Madamiscontis is a considerable stream, has 2 ponds on which are saw and grist mills.

The copies of the original survey sketches Treat made along the rivers and waterways alternate pages with the corresponding journal entries made at each location. The sketches are very well detailed, particularly considering the conditions under which they must have been made, and include the locations of homesteads along the river as well as the owners’ names. The journal carefully describes the variety and size of the timber growth in each area, since one of the key goals of this expedition was to note whether and where this important resource may have been disturbed to benefit British/Canadian interests:

In this days journey up river we see many stumps of pine trees near the bank which have been cut from one to three years ago—We also see some mill logs and timber on the shore—and presume that timber is cut 30 to 40 miles above where we went which is 15 miles up the River from its junction with the St. John.—

By October 8, the expedition party had reached Mount Katahdin, the highest elevation in Maine. The journal estimated the height of the mountain to be “at least 6,000 feet,” although Katahdin’s highest point is actually closer to 5,267 feet. From Katahdin’s peak, the party took bearings of the surrounding ponds and mountains until mid-afternoon and then returned to their camp at the base of the mountain. A partial listing of the actual bearings noted during the expedition, along with their Penobscot place names, is included in the journal.

By mid-October the expedition reached Chesuncook Lake despite some minor delays caused by bad weather and water levels too low in some areas of the river to make safe canoe passage possible. In fact, the low water levels were such a concern that Treat at this point had to change the original expedition route:

My intention was, and agreeably to my instructions, to have gone up the West branch to its source, but finding the water very low in the River, had yesterday concluded to go up the river as far as the Portage to Moose head, return to Cheesuncook, thence to St. Johns, but the season being late, the water so very low, and having lost considerable time by stormy windy weather, and from information of the Indians camped here that it will take 4 days to go and return from Moose Lake—also that the water is very low in the St. John and we cannot make much progress on our route—I this day concluded to go as fast as possible to Madawaska which the Indians say in the present state of the streams will take 10 to 12 days—I am however in hopes that the last rains will raise the streams through which we have to pass—

Once on the Saint John River, the expedition party encountered many French settlers along the shore. Treat used the opportunity to replenish his party's bread supply, which had gotten low due to the extra days of travel caused by bad weather and low water levels. The expedition party was also out of candles at this point, so many of the survey sketches and journal entries were being done by firelight. On October 23, Treat estimated 150 families were living along the Saint John River near what is now Madawaska, Maine. He described the farming practices among these families:

The Madaweskiens raise good wheat, rye, oats, barley and peas and excellent potatoes—the land produces excellent grass—they keep many cows and oxen of a small hardy breed—very fat also and small Canadian or Pony horses—which are very serviceable—a small proportion of their cleared land is tilled compared with the quantity of grass or meadow land.—

On October 25, in snowy weather, Treat noted "spottings" on the trees along the river that he believed marked the eastern boundary line between Maine and New Brunswick. He felt it was particularly important to note the locations of houses and other settlement in that area in case a future war with England should break out.

With snow and cold increasingly an issue, Treat was forced on October 28 to alter his route once again. Rather than risking the ice-covered streams that Neptune anticipated by continuing up the Aroostook River to the east branch of the Penobscot River and thence homeward, the expedition party decided to return to the larger Saint John River after a brief exploration of the Aroostook:

It commenced snowing last evening at nine o'clock, and snowed a little during the night—very cold weather—Here we conclude to go one days journey up the Aroostick and return to the St. John and home by Madawamkeag—

By November 16, ice was making travel very treacherous. If the ice on the river was thin enough, the expedition party would break through with poles and continue slowly along the river by canoe. If the ice was thicker, the party had to carry the canoe or build sleds along the way to drag it across the ice. Travel was necessarily slow, and only enough rations remained for two more days. There had been no settlers along the shore for quite a distance, which meant there was no opportunity for Treat to replenish their supplies:

We have no provisions except two quarts of Indian meal and 1/3 a pound of Pork—a small quantity of ginger and some sugar—We make our meal into hasty pudding and eat half of that and the pork for supper—and hope to arrive tomorrow night at the Passadumkee where we can replenish our stock of Provisions—

The news was better two days later:

We resume our journey and travel on the ice to the foot of Ma,da,na,cook dead water, thence on land and ice to Mr. Nolen's near Passadunkee, where we procure refreshment, and remain this night having travelled this day about twenty miles—

On the evening of Monday, November 20, 1820, the Treat expedition finally returned to Bangor, where Treat would submit his report to Governor King. The journey and the journal end here.

Minutes of the 1820 treaty negotiations between the Penobscot Indian Nation and the State of Maine are provided as an Appendix to *Wabanaki Homeland and the New State of Maine: The 1820 Journal and Plans of Survey of Joseph Treat*. The text of the treaty itself is also included, followed by a detailed index that completes the volume.

I must admit that I have a lifelong fondness for the State of Maine, I have always appreciated good maps, I am an avid reader of biographical material, and I work in the civil engineering and survey industry, so I was predisposed to enjoy this book on a variety of levels. I found the similarities between the style of Treat's hand-drawn survey work and its modern computer-aided equivalent to be quite striking at times. Even with the state-of-the-art equipment currently available, I am sure that many of today's surveyors can relate to the hazards of surveying remote locations in order to document the critical points of reference needed by the population at large.

Although ongoing development has changed even the northernmost part of Maine, the area documented in Treat's journal will still be recognizable to anyone interested in Maine's geography or history. Pawling's extensive Introduction provides the perfect preamble to the journal itself. I came away with a greater appreciation of the Treat expedition by first understanding the circumstances surrounding it than I would have by simply reading the journal by itself.

What struck me most about the journal were the references Treat made to sharing a meal and spending a night with many of the settlers he met along the way. He uses words like “politely” and “very politely” to describe the treatment he and his party received from people who were essentially total strangers. It is hard to envision taking any kind of trip in today’s society and relying solely on the kindness of strangers for occasional food and lodging. The dangers it would present to parties on both sides would simply be too great for such a journey to be feasible.

Pawling’s Introduction includes details about the 1842 Webster-Ashburton Treaty that eventually determined Maine’s northern boundary, but little information about the later lives of Joseph Treat, John Neptune, or Jacob Holyoake. I suppose this is in keeping with today’s cruise ship mentality, where people travel closely together for a set length of time and may even form attachments, but ultimately go their separate ways and lose contact once their home port is reached. Even so, after vicariously joining the Treat expedition and traveling in harsh conditions with these men for nearly two months, I would like to have learned more about what happened to them, both personally and professionally, after the expedition was over. References are made in the footnotes, however, to other textbooks that might provide this information.

That being said, I would still highly recommend this book for anyone with an interest in surveying, biographies, American history, American geography, Native American culture, or Maine in particular. *Wabanaki Homeland and the New State of Maine: The 1820 Journal and Plans of Survey of Joseph Treat* provides a multi-faceted look at the complexities of human relations in the burgeoning United States and the important role that cartography played in both documenting and influencing historical events.

Cartographic Science: A Compendium of Map Projections, with Derivations

Donald Fenna

CRC Press, Boca Raton. 2007.

ISBN 0-8493-8169-X, hardbound, alkaline paper. 491 numbered pages; hundreds of diagrams, tables, and illustrations.

Reviewed by daan Strebe

Reviewer’s Note: The author used software (Geocart) I wrote to illustrate much of the text, cites Geocart and me in the acknowledgments, and illustrates three projections I developed. I did not edit, review, or contribute to the text in any way; nor did I know of Dr. Fenna or his enterprise until it was effectively finished. My contact with Dr. Fenna was largely in the form of Geocart technical support.

The last quarter of the twentieth century saw publication of many English language encyclopedic works on small-scale map projections. D.H. Maling published the seminal *Coordinate Systems and Map Projections* in 1973, significantly revising and expanding it for a 1992 edition. The prolific John P. Snyder led out the 80s with *Map Projections Used by the US Geological Survey* in 1982 and expanded it into 1987’s *Map Projections — A Working Manual*. His 1989 *An Album of Map Projections* presents a wide array of projections in a standardized format, along with generating formulæ in the appendix. He cemented his credentials as a historian of map projections with 1993’s *Flattening the Earth — Two Thousand Years of Map Projections*, describing hundreds of projections, many with formulæ. Frederick Pearson II issued *Map Projection Methods* in 1984, polishing and expanding it in 1990’s *Map Projections: Theory and Application*. Canters and Declair systematically catalogued many dozens of world map projections in a highly regular format in their 1989 *The World in Perspective: A Directory of World Map Projections*.

Someone interested in map projections would have muddled through a very lonely hobby in 1972. Formulae for simply generating a wide variety of projections were not to be found consolidated in any source. While plenty of texts were published on the topic, they tended to be monotonous repetitions of the basics of cylindrical, conic, and azimuthal themes. If you wanted to know how to construct a van der Grinten projection—long the mainstay of National Geographic’s world maps—you might likely have needed to refer directly to van der Grinten’s original patent. Yet less than twenty fecund years later, one could choose to drown oneself in projections both celebrated and obscure for the price of a text or two — and rather well-written ones at that. One might suppose the needs have been sated.

Against that history, Dr. Fenna sets an ambitious agenda. Yes, his *Compendium* is yet another catalogue