— The 'Pacific coast tide tables' for 1887 have been received from the printer by the coast survey. It is a curious fact that these are the most perfect ever yet received, and close examination thus far reveals not a single error or misprint in the entire edition. The 'Atlantic coast tide tables' will be given to the public in about a week. Section xvi. of the topographical survey of the District of Columbia is in the hands of the photo-lithographer. This beautiful sheet covers the country in the vicinity of the picturesque village of Tenallytown, near which the summer house of President Cleveland is located. The chart of Puget Sound, the Gulf of Georgia, Straits of Fuca, etc., in one sheet, will probably be placed in the hands of agents within two weeks. This chart will supply a long felt want to the people of Washington Territory, covering, as it does, all the inland waters from Gray's Harbor, on the Pacific coast, to the Nanaimo coal fields, in British Columbia. Assistant Schott is well advanced with the computation of magnetic observations of the Greely party in the Arctic regions; the computations of Arctic tides from observations made by the same explorer are also well under way.

— The annual exportation of ivory from Africa has of late years been nearly four hundred thousand pounds, about two-thirds of which is obtained from the eastern part of the continent. These figures represent a sum of about four million dollars, and the death of sixty-five thousand elephants.

— The fiftieth anniversary of the founding of South Australia in December, 1836, will be celebrated by an international exposition to be opened on the twentieth of June next at Adelaide. The population of the colony now numbers three hundred and thirteen thousand, but at present it is decreasing rather than increasing.

— Computations from statistics show about one million as the number of blind persons throughout the world, which, estimating the population of the globe at 1,400,000,000, gives about one blind person to every fourteen hundred. In Austria there is one to every 1,785 inhabitants; in Sweden, one to every 1,418; in France one to every 1,191; in Prussia, one to every 1,111; in England, one to every 1,037, etc. The greatest proportion of blind persons is in Egypt, where, in Cairo, there is one among every twenty inhabitants. Australia shows the greatest variation; in New Zealand there is only one to every 3,550 inhabitants, while in Tasmania there is one to every 625. The nation possessing the greatest number of institutes for the blind is Germany with thirty-five; next comes England with sixteen; France with thirteen; Austria-Hungary with ten; Italy with nine; Belgium with six; while according to our authority, the *Deutsche rundschau für geographie und statistik*, America, Asia, and Africa together possess only six. There are two in Australia.

— There are twenty-one cities in the German empire containing each more than one hundred thousand inhabitants.

— The population of New South Wales, according to the census recently taken, is very nearly one million, which is of interest as showing the very rapid growth, forty per cent increase, during the last ten years.

— According to Dr. Tipton of Alabama, in the *Medical journal*, the negroes before the war in the south never had phthisis, but now it is the greatest scourge among them. He also says that the negro is rarely if ever near-sighted.

## LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

### The source of the Mississippi.

IN June, 1884, the *New York Herald* announced that recent explorations had revealed the true source of the Mississippi River to be, not the lake discovered by Schoolcraft in 1832 and named by him Itasca, but a tributary lake to the south of it, discovered and first explored by a Capt. Willard Glazier in 1881.

In commenting upon this alleged discovery, *Science* says (May 15, 1885): "To this lake he (Glazier) gives his own name, that the fame of his achievement may be perpetuated. It is perhaps unfortunate that, as this whole region was sectionized by the general land office several years previously, lines having been run at every mile, a prior claim to this great discovery may arise."

This comment was thought to be sufficient to impress upon all the absurdity of a claim to have discovered, at this late day, a lake of any considerable size in the region referred to; but as one of our popular school geographies[1] has indorsed the genuineness of this discovery (?) by adopting 'Glazier Lake' as the source of the Mississippi, and as the makers of our school geographies have a bad habit of blindly following each other's lead, it will be well, perhaps, to examine a little more closely Mr. Glazier's claim to such recognition.

In 1806 Lieut. Zebulon Pike, and in 1820 Governor Lewis Cass, penetrated to Red Cedar or Cass Lake; but there is no record of definite explorations beyond this lake earlier than those of Henry R. Schoolcraft, who in 1832, under authority of the war department, led a well-equipped expedition through this region. In his brief official report, dated at Sault Ste. Marie, Sept. 1, 1832, Schoolcraft states that Lieutenant Allen accompanied him as topographer, and that he carefully collected material for maps and plans of the entire route. Upon his return to Detroit, Schoolcraft wrote, in 1833, a full narrative of the expedi-

[1] '*Barnes's complete geography*'. By JAMES MONTEITH. New York and Chicago, *A. S. Barnes & Co.* Copyright 1885.

tion, which was published by Harpers in 1834, and is accompanied by a map of the region, compiled by Lieutenant Allen. A reduced fac-simile of a portion of this map is here reproduced. From Lac

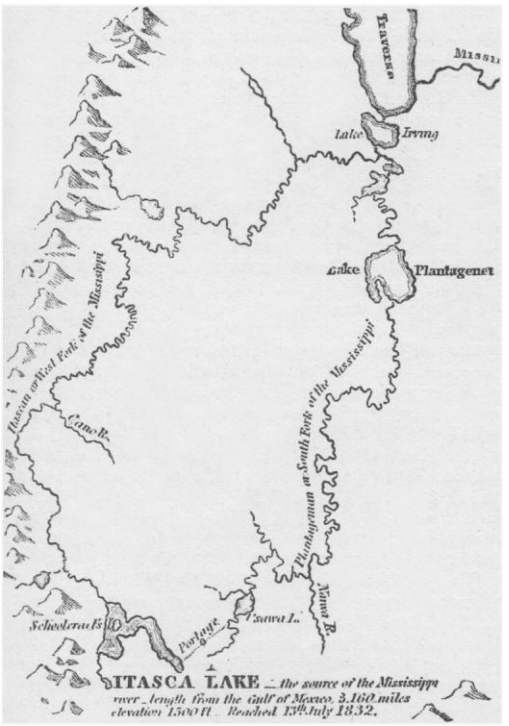


FIG. 1. — SCHOOLCRAFT'S MAP. — 1832.

Travers (Bunidji Lake) the expedition ascended the Plantagenian Fork, 'carried' over a six-mile portage to Lake Owashkos (Elk), which Schoolcraft named *Itasca*, and descended the Itascan Fork, having spent three days in making the circuit.

That Schoolcraft knew of an inlet to Lake Itasca is evident from his map, on which an inlet leading from a smaller lake to the south is indicated, but in addition to this he says on p. 58 of his 'Narrative:' "The outlet of Itasca Lake is perhaps ten to twelve feet broad, with an apparent depth of twelve to eighteen inches. The discharge of water appears to be copious, *compared to its inlet.*"

It may be asserted that Schoolcraft knew of an inlet only from visiting its mouth, but that he neglected to ascend and explore it, and that his knowledge of the existence of the small lake from which it leads was gathered from his Indian guide—or was entirely hypothetical. Although this is unlikely, owing to the object of the expedition and to the fact that the map does not show other and larger lakes which were not visited, still, as no mention of this small lake is made in the narrative, let this view of the case be conceded, and let us pass to the next explorer.

Four years later, in 1836, Mr. J. N. Nicollet visited and made an instrumental exploration of this region. The results of his explorations he incorporated in a report and map published by the U. S. bureau of topographical engineers, as 'Senate document No. 237, 26th congress, 2nd session, 1843.' A reduced fac-simile of a portion of this map is here reproduced.

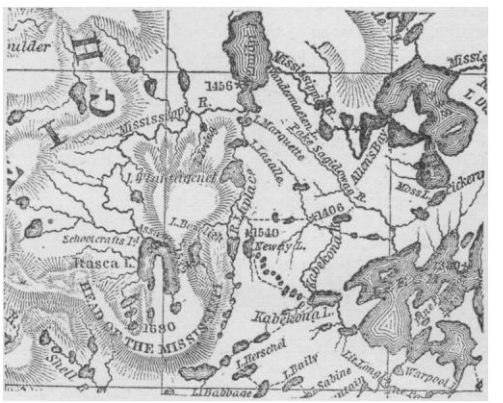


FIG. 2. — NICOLLET'S MAP. — 1843.

From his report we learn that Nicollet approached Itasca via Leech Lake and Kabekona lake and river; his route joining Schoolcraft's near the mouth of the Naiwa River — on the Plantagenian Fork, which Nicollet named La Place River. Arrived at Itasca, his report proceeds (pp. 57-59): "The Mississippi holds its own from its very origin; for it is not necessary to suppose . . . that Lake Itasca may be supplied with invisible sources. . . . There are five creeks that fall into it, formed by innumerable streamlets oozing from the clay beds at the bases of the hills . . . known here by the name of 'heights of land.' South of Lake Itasca, they (the heights of land) form a semicircular region with a boggy bottom, extending to the south-west a distance of several miles. . . . The waters supplied by the north flank of these heights of land . . . give origin to the five creeks of which I have spoken above. These are the waters which I consider to be the utmost sources of the Mississippi.

"Now, of the five creeks that empty into Itasca Lake, . . . one empties into the east bay of the lake, the four others into the west bay. I *visited the whole of them;* and among the latter there is one remarkable above the others, inasmuch as its course is longer, and its waters more abundant; so that, in obedience to the geographical rule 'that the sources of a river are those which are most distant from its mouth,' this creek is truly the infant Mississippi. . . . The day on which I explored this principal creek (August 29th, 1836) I judged that, at its entrance into Itasca Lake, its bed was from 15 to 20 feet wide, and the depth of water from 2 to 3 feet. . . . As a further description of these head-waters, I may add that they unite at a small distance from the hills wherein they originate, and form a small lake from which the Mississippi flows with a breadth of a foot and a half and a depth of one foot. At no great distance, however, this rivulet . . . supplies a second minor lake. . . . From this lake issues a rivulet . . . into the basin of a third lake somewhat larger than the two preceding. Having here acquired renewed vigor, and tried its consequence

upon an additional length of two or three miles, it finally empties into Lake Itasca. . . . After having devoted three days to an exploration of the sources of the Mississippi, and spent portions of the nights in making astronomical observations, I took leave of Itasca Lake, to the examination of which the expedition that preceded me by four years had devoted but a short time. . . .

"The honor of having first explored the sources of the Mississippi and of introducing a knowledge of them into physical geography, belongs to Mr. Schoolcraft and Lieutenant Allen. I come only after these gentlemen; but I may be permitted to claim some merit for having completed what was wanting for a full geographical account of these sources. Moreover, I am, I believe, the first traveller who has carried with him astronomical instruments, and put them to profitable account along the whole course of the Mississippi from its mouth to its sources."

In the table on pp. 124 and 125 are to be found Nicollet's determination of the geodetic position and elevation of this region — among others Lake Itasca (Schoolcraft's Island) 47° 13′ 35″ north latitude, 95° 2′ west longitude, and 1,575 feet above the Gulf of Mexico — and the "utmost sources of the Mississippi, at the summit of the height of land, six miles south of Lake Itasca — elevation 1,680 feet above the Gulf."

Nicollet, therefore, fully explored, recorded, and mapped all the inlets to Lake Itasca, found that these inlets, or some of them, came from lakes or lakelets; and, recognizing that the source of a river is the one most distant from its mouth, considered none of the tributary lakelets he had explored as sufficiently important to even merit a name. In addition to this he distinctly states that "the honor of first exploring the sources of the Mississippi belongs to Messrs. Schoolcraft and Allen."

But it may be urged, that opinions may differ as to the relative importance of the Itascan lakes; that the smaller tributary lake, though discovered and explored in 1836, was not then named; and as it is nearer than Lake Itasca to the ultimate head spring of the Mississippi, it was fair game for the traveller who should reach it and affix a name to it. This,

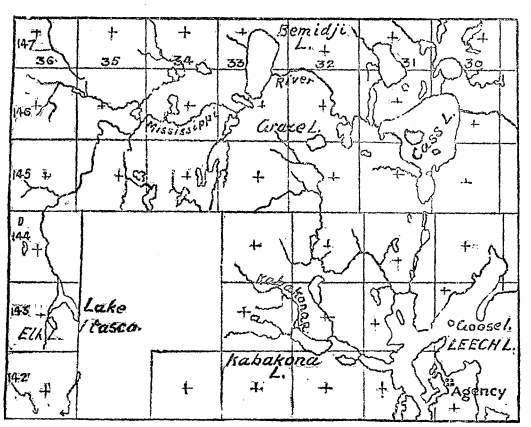


FIG. 3. — LAND-OFFICE MAP. — 1879.

though again an extreme view, may be again conceded.

I am unable to give the exact date at which the township including the immediate vicinage of Lake Itasca was surveyed and subdivided into one-mile sections; but it is marked, by the little cross, as having been so subdivided, on the land office map of Minnesota, issued in 1879 — or two years before Mr. Glazier's trip. A tracing from this map is reproduced here, and on it is shown not only a small lake south of and tributary to Lake Itasca, but a name, 'Elk Lake,' is affixed to this lake. Probably the surveyors in sectionizing this region, remembering the old Indian name, 'Owoshkos,' of the lake which Schoolcraft called Itasca, thought to preserve it by affixing its English equivalent to the small tributary lake to the south. A further inspection of the land-office map proves the integrity of its makers. East of Lake Itasca is an area not crossed by township lines; it had not been surveyed by the land-office at the time this map was made, and consequently all topographical features, streams, and lakes, were omitted. Thus only part of the east, or Plantagenian, branch of the Mississippi is shown, though the existence and course of the river was well known; and on other government maps, as, for instance, the post route maps for 1876 — the whole course of this branch is indicated. And now, having seen that the small lake south of and tributary to Lake Itasca was mapped by Schoolcraft in 1832; fully explored and mapped by Nicollet in 1836; and surveyed, mapped, and named by the land office prior to 1879 — what remains to justify Mr. Glazier's claim to discovery in 1881?

His own detailed account of his trip entitled the 'Recent discovery of the true source of the Mississippi, By Captain Willard Glazier,' was published in vol. 1 of the *American meteorological journal* (Detroit, 1884), and was illustrated by a map of the region 'drawn from delineations by his Indian guide.' A

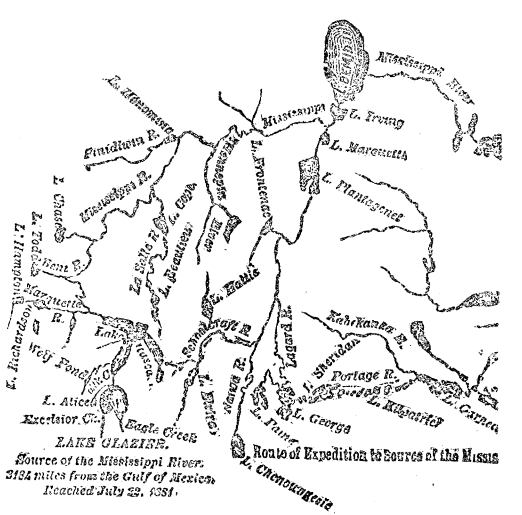


FIG. 4. — GLAZIER'S MAP. — 1881.

portion of this map is here reproduced for comparison with the others.

Certain passages of Glazier's account reveal a striking similarity in observation, incident, and phraseology when placed in parallel columns and compared with passages from Schoolcraft's 'Narrative' (editions of 1834 and 1855):

| *Schoolcraft*, 1832. | *Glazier*, 1881. |
|---|---|
| Naiwa River. | Naiwa River. |
| (p. 238.) "On questioning Ozawindeb (the guide) of the Naiwa River, he informed me that . . . it originated in a lake . . . infested with the copperhead snake; hence the name." | (p. 258.) "Che-no-wa-ge-sic explained that Naiwa was a stream . . . having its origin in a lake . . . infested with snakes, to which its name has reference." |
| Assawa Lake | Assawa Lake (Elvira). |
| (p. 239.) "We were just twenty minutes in passing through it. . . . our course . . . was directly south. Ozawindeb entered an inlet, but had not ascended it far when he rested on his paddles and exclaimed 'Oomah-mekunnah,' here is the path, or portage. . . . The water was tepid. After wading about fifty yards the footing became more firm, and we soon began to ascend a slight elevation . . . where vestiges of the bones of birds and old camp poles indicated the prior encampment of Indians. The next morning a dense fog prevailed. . . . It was five o'clock before we could proceed." | (p. 259.) "We were twenty minutes in passing through the lake. On reaching its southern end we entered one of the brooks. . . . Che-no-wa-ge-sic soon pushed his canoe into the rushes and exclaimed 'Oma-mikunna,' here is the portage. We stepped into rather warm pond water . . . After wading about a hundred yards or more the soil became firm, and we began to ascend a slight elevation . . . Remains of former fires, the bones of birds, and scattered camp poles proved it to be a spot which had previously been occupied by the Indians. . . . A dense fog . . . prevented our getting upon the trail until seven o'clock in the morning." |
| Lake Itasca | Lake Glazier (!) |
| (p. 241.) "Soon out went him on the trail, and got the first glimpse of the glittering nymph we had been pursuing." | (p. 265.) "In their eagerness to get a first glimpse of the glittering nymph we had been pursuing." |

Glazier states (p. 327) that Lake Glazier is in latitude 47° 13′ 25″ north; is 1,578 feet above sea level; and distant from the sea 3,184 miles. Schoolcraft states in his first edition (1834, p. 58) that Lake Itasca is 3,160 miles from the sea, and in his revised edition (1855, pp. 243 and 245) he inserts Nicollet's determinations of its latitude, 47° 13′ 35″ North, and its elevation, 1,575 feet. With the exception of the figures, Glazier's language is word for word that of Schoolcraft.

On p. 328 of Glazier's account is found an *addendum* entitled 'Meteorological observations at the head-waters of the Mississippi,' consisting of a record of daily temperature from July 17 to Aug. 2 (July 17 is the date at which Glazier says, p. 252, he started from Leech Lake). Now reference to p. 423 of Schoolcraft's 'Narrative' (edition of 1855) reveals the fact that this meteorological table is an exact copy, word for word and figure for figure, of observations taken between the days named, in the year 1820, by Schoolcraft in the vicinity of Cass Lake!

This liberal use of the statistical information gathered by others; i.e., a subtraction of ten seconds from Nicollet's observation of the latitude, and an addition of three feet to his barometrical determination of the elevation of Lake Itasca; and the exact copy of Schoolcraft's meteorological observations at Cass Lake, — afford strong evidence, in the absence of any direct statement to the contrary, that Mr. Glazier took no scientific instruments with him, such as thermometer, barometer, and sextant or solar-compass, and that he simply made a guess at the latitude and elevation of the lake with which he desires to associate his name. That his guess was a grossly inaccurate one is curiously proved by his own account. He says (p. 262): "Itasca is . . . between five and six miles in length, and from one-fourth to three-fourths of a mile in width. It has three arms, — one to the south-east, three miles long; one extending south-west from the island; and one reaching northwards to the outlet, two and one-half miles."

Now Nicollet's determination of the latitude of Itasca is of *the island* in the lake (Schoolcraft's Island), and is 47° 13′ 35″; while Glazier says (p. 327) that Glazier Lake (exact locality not noted) is in latitude 47° 13′ 25″, or just ten seconds of arc south of Schoolcraft's Island. The degree of latitude between 46° 30′ and 47° 30′ is 69.079 miles long (Coast survey report, 1884). As ten seconds is $\frac{1}{360}$th part of this distance, or 1,013¼ feet, the position of Glazier Lake, as given by Mr. Glazier, is actually *within* Lake Itasca.

RUSSELL HINMAN.

## Copper River, Alaska, glacial action.

For the study of the action of water in its relation to geological changes, American students have always found an ample field at home; not so, however, with respect to glacial action, for we find our most exhaustive treatise on this subject (Shaler's) confined almost exclusively to the Alps glaciers. Let specialists in the future seek fields in our own province, where the system is probably more extensive than in any other country south of the arctic circle. I refer to that portion of the territory from Chilcat inlet up to Cook's inlet, and in especial to that portion drained by the Copper River.

How far glacial action has been concerned in the determination of the topography will long be a subject for study.

My observations were such as to cause a belief in an ice sheet that one time extended from the Alaskan Mountains to the coast; as to how much farther from the north it came I have nothing to say. It may at first be considered at variance with the theory of contemporary upheaval of this part of the territory with the ranges of the western part of the United States. If the glacial period be considered long subsequent to the upheaval, there need be no difficulty in reconciling the above. It was the ice sea, which, by its steady motion to the south, has largely assisted in giving the country its present configuration.

From Yakutat Bay to the mouth of Copper River is an unbroken face of ice extending a distance of fifty miles. How far this reaches to the interior through the gorges of the coast is unknown, though it may be safe to consider the distance equal to that of the glaciers of Copper River from its mouth. These latter may be considered an extension of the ice fronting the coast, — including the above-mentioned fifty miles, — which has been cut through by the river. There is every reason to believe that Miles's and Child's glaciers were formerly one and the same, — an opinion that is in some way strengthened by the traditions of the natives. The most southerly point of the former on the left is one mile or less from the most northerly point of the latter on the right bank; while in the river bed between are well-worn bowlders eight to twelve feet in diameter.