Tolleston and Post-Tolleston Beaches and Bars in Lake County, Indiana

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The history of glacial Lake Chicago has been set forth, modified, and reviewed by various authors. The purpose of this paper is to describe and interpret beach and bar deposits of Tolleston and post-Tolleston age in Lake County.[1]

Late in Pleistocene history, stabilization of levels of Lake Chicago at about 20 feet above present lake levels formed a beach line that passes one-half mile south of Tolleston, an early settlement near Tenth Avenue and Garfield Street in Gary. The Tolleston beach, where not obscured by dunes, is represented by a series of sand ridges parallel to the lake shore at the time of deposition. The lake must have stood near the 600 foot level for a long period, as these sand ridges stand about 20 feet higher than the surrounding plain. This type of beach development is in strong contrast to the Calumet beach, which lies to the south and consists of a single main ridge except for the embayment in the Griffith area.

In late Tolleston time the Straits of Makinac cleared of ice and allowed drainage to the east, probably through the Port Huron outlet, which is in glacial till. The lake levels gradually lowered as the outlet eroded forming low parallel beachlines and bars on the level plain in northern Lake County. Earth movements in post-Pleistocene time along with temporary halts in the erosion of the outlet, have complicated the problem of interpreting the history by a study of the ancient shore lines. However, in the main, the evidence shows a slow and steady withdrawal of the water level in post-Tolleston time. Some of the details of the pattern of Tolleston and post-Tolleston beaches and bars are hereinafter set forth.

The Colfax Street embayment—The north-south extent of the Tolleston beach sand ranges between a third of a mile and half a mile. However, between Parrish Avenue and Clark Street in sections 13 and 14, T. 36 N., R. 9 W., the sand area extends southward in a broad arc for 1½ miles from the high beaches. (Pl. II, fig. 1). In this area, which lies south of the main Tolleston beach deposits, low sand ridges probably represent bars or temporary halts in a shallow embayment before the deposition of the main beach sands. The embayment may be a remnant of the sag which formed the bars and spits in the Griffith area during the Calumet stage of Lake Chicago. (Pl. I, fig. 1, 2) Though these ridges are meager and of subdued expression, they present evidence of a gradual retreat from the Calumet to the Tolleston stage. If the ancient Calumet River acted as a sluice over the newly formed

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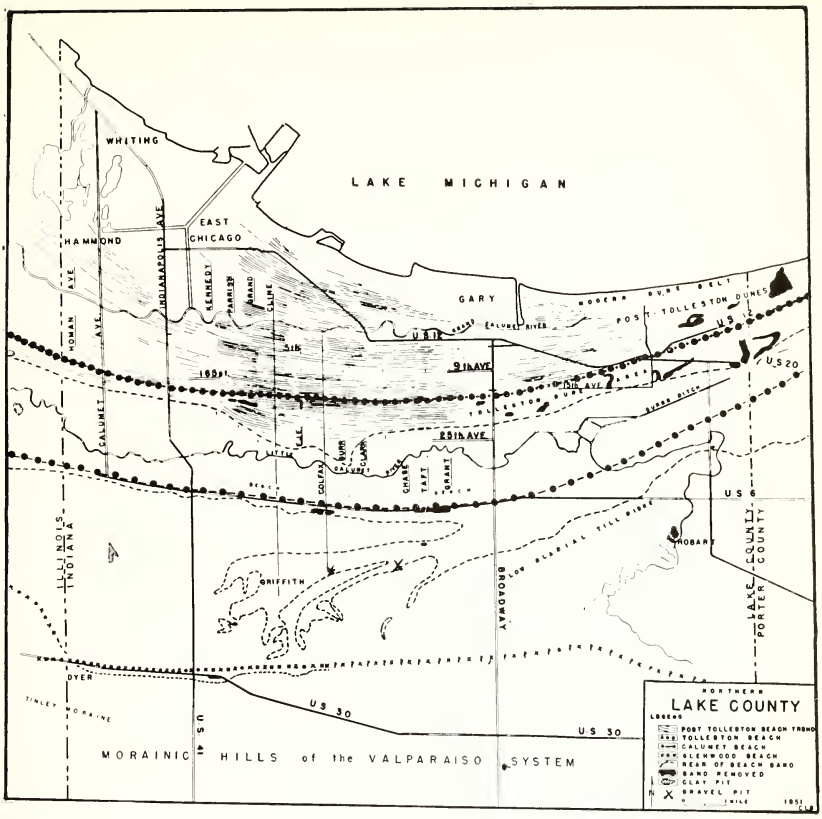


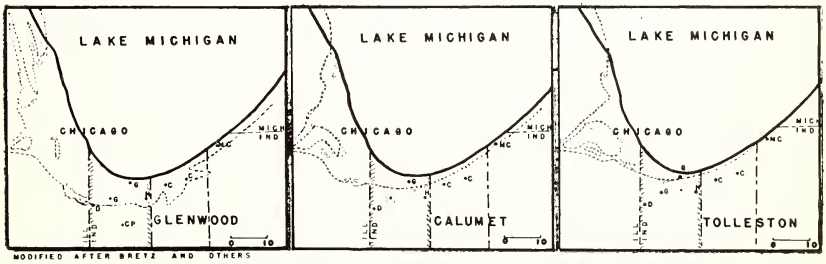
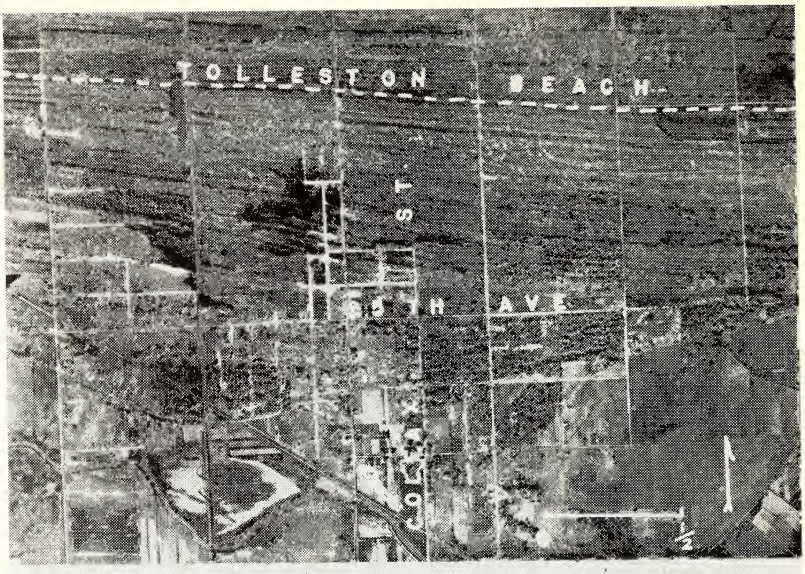


Plate I. Maps of Lake Chicago beaches and bars.

Fig. 1. Map of northern Lake County showing trends of Tolleston and post-Tolleston beaches and bars.

Fig. 2. Beaches of Lake Chicago, represented by dotted lines.



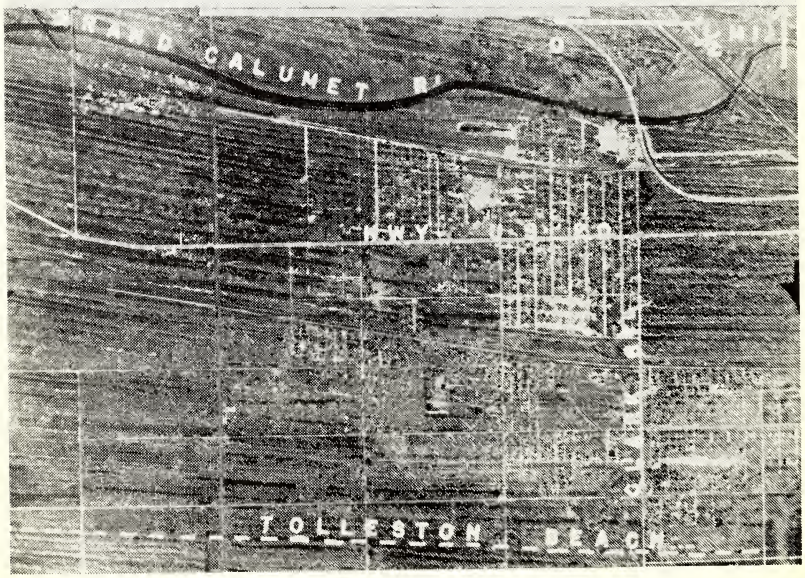


Plate II. Aerial photographs of beach and bar detail.

Fig. 1. Sand ridges showing embayment features in the Colfax Street area.

Fig. 2. Post-Tolleston beaches and bars in the west limits of Gary.

lake plain, the river may have destroyed other ridges of a similar nature. The embayment extends 3 miles east-west and 1 mile north-south.

Ridged nature of the Tolleston beach deposits—In the western half of Lake County from near Grant Street in sections 8 and 17, T. 36 N., R. 8 W., the beach sands lie in ridges that parallel the ancient shore. (Pl. II, fig. 1) These ridges may represent foredunes along the former lake shore. The lake levels did not hold long enough to heap sufficient sand on shore to be modified greatly by wind. Moreover longshore currents transported quantities of the sand eastward toward Porter County.

Seven distinct parallel sand ridges comprise the major part of the beach deposits in the vicinity of Colfax Street and Eighteenth Avenue in the west part of Gary. The north-south distance across the ridged sand is approximately one fourth mile and the highest part of the complex of ridges is 17 feet above the plain to the north. The depth of the sand beneath the beach varies from 25 to 40 feet (2). The marshy flats to the south of the main complex are approximately 6 feet above the flats on the north side of the Tolleston sands.

Westward near the Illinois line the ridges are distinct but are only about 10 feet above the marsh land. The ridged Tolleston beach deposits of west Lake County are here interpreted to indicate a very slight gradual lowering of the lake level during the Tolleston stage.

Eastern Tolleston beach deposits—In sections 9, 10, 11, and 12, T. 36 N., R. 8 W., from Grant Street eastward, in an area of more abundant sand, the straight parallel ridges gradually give way to winding ridges, knolls, and connecting banks of sand. These transitional features between Grant and Georgia Streets in Gary are now mostly destroyed by the growth of the city. From Georgia Street eastward to the Porter County line dunes nearly 50 feet high are developed. Several of the highest of the dunes are being removed by commercial sand companies.

Even though Tolleston waters withdrew slowly, sufficient sand gathered in eastern Lake County so that active dunes developed on the shore sands. Shapes of the dunes indicate strong winds from the northwest, which blew the sand landward. Even more persistent southwest winds transformed the elongate dunes into barchane shapes. Here, even amongst the confusion of dunes, a pattern of rather prominent sand ridges closely parallels the main Tolleston beach line. The ridges are probably modified ancient foredunes.

Post-Tolleston beaches and bars—The Tolleston levels finally dropped more rapidly due to stoppage of the Chicago outlet by bedrock and increased erosion of the Port Huron outlet. Thus the old bars and beaches were abandoned as the lake shore retreated. However, small fluctuations in levels truncated the Tolleston beach dunes of the Aetna-Miller areas in the eastern section of Gary before definite retreat of the shore waters took place. Excellent examples of such dunes are east of Miller near the Porter County line along U. S. Highway 12.

From the Tolleston ridges and dunes northward to the present lake shore low sand ridges alternating with linear swampy areas are the most conspicuous features of the lake plain. (Pl. II, fig. 2) Remainders of 70 such ridges may be counted along Whitcomb Street, 78 along the Elgin, Joliet, and Eastern Railroad, and 68 in the vicinity of Clark Street. Industry along the lake shore and ever-expanding subdivisions have destroyed many of these features. Northward along Colfax Avenue, from the Tolleston beach to the present lake shore, the average width of ridge and swamp together is near 250 feet. Locally ridges may be crowded or scattered.

Near the Illinois line along Detroit Street a typical ridge measures 4½ feet high and 70 feet wide. The inter-swamp area south of the ridge is 70 feet wide. In the SW¼ sec. 4, T. 36 N., R. 9 W., along 165th Street in Hammond, several ridges average 6 feet above the swamp level. They measure 90 feet from crest to crest while the swampy areas between average 50 feet across. In the SE¼ sec. 33, T. 37 N., R. 9 W., along Michigan Street, the height of the ridges above the swamp is 6 feet, the width 40 feet, and the width of the swamp 50 feet. Along Chicago Avenue in Gary in the SW¼ sec. 26, T. 37 N., R. 9 W. the sand ridges average but 2 feet in height and 100 feet from crest to crest. Along Clark Street in Gary in the SE¼ sec. 25, T. 37 N., R. 9 W. the ridges are from 5½ to 7 feet above the swamps. Width of the ridges average 40 feet and the swampy areas between average 45 feet.

The beach and bar lines are essentially parallel to one another and nearly parallel to the present lake shore. However in the East Chicago-Whiting district where the extreme flats of the former outlet exist, the ridges are farther apart. On the other hand, east of Broadway Street in Gary and north of Fifteenth Avenue the ridges converge because of the narrower and more steeply graded lake plain.

Increase in quantity of sand toward the lake head has built up higher ridges in the central and east part of the county. These crowded higher ridges have condensed the sand area so that wind work has confused the pattern and produced sizeable dunes. Eastward from Gary Municipal Beach in the Miller district prominent dunes are formed, some of which take crescent shapes. Many of these dunes are large enough for commercial exploitation.

Evidence for Nipissing and Algoma beaches—One and one-fourth miles north of the northernmost Tolleston ridge in the vicinity of the E.J.E.R.R. in the NW¼ sec. 2, T. 36 N., R. 9 W. is a series of sand ridges slightly more prominent than the adjacent ones, although not as high nor as conspicuous as the Tolleston sand ridges. (Pl. II, fig. 2) They probably represent a slowing in the erosion of the northeast lake outlets, or perhaps slight uplifts of the land to the north. These ridges may correlate with the Nipissing stage, whose beaches are prominent farther north in Michigan **(4)**.

The Grand Calumet River has located its valley where the beach bars are lower and more closely spaced. One mile north of the Grand Calumet River along Clark Street another set of more prominent ridges

is located in the NE¼ sec. 36, T. 37 N., R. 9 W. These may correlate with the Algoma beaches of Michigan. Northeast of Gary in sections 32 and 33, T. 37 N., R. 7 W where these two sets of ridges merge on the narrowed lake plain, wind has blown the beach sands into high dunes.

Generally, however, evidence for halts in the regression of the lake level is meager. The sand ridges indicate a slowly retreating lake shore which has continued since Tolleston time right down to the past few hundred years. Evidence is lacking for any major readvance of the lake levels after the final retreat from the Tolleston levels began. Present recorded levels of Lake Michigan show fluctuation of little more than 3 feet in the past 75 years.

Age of the sands—Recent studies by the radiocarbon method have dated wood found between glacial drift sheets in Wisconsin (3). The relationship of the beaches to the drift sheets (1) indicates that the Tolleston beach sand may be 5000 to 7000 years old. If this estimate is fairly accurate, the post-Tolleston sand ridges of probable Nipissing age south of the Grand Calumet River may be from 3000 to 5000 years old, and those northward from the river are less than 3000 years old becoming increasingly younger toward the lake shore. If major readvances of the lake have not occurred since Tolleston time, and 7000 years have elapsed while the water receded from the Tolleston beach to the present shore, the lake water along Clark Street in Gary has receded an average of about 2.4 feet per year since Tolleston time. On the whole, the sand ridges where undisturbed by man appear to have been deposited very recently. The ridges are covered with vegetation, but the sand is little affected by weathering.

Conclusions—Sand ridges that show on aerial photographs in northern Lake County represent a slowly receding lake shore in post-Tolleston time. The ridged complexity of the Tolleston beach sand indicates a retreating shore, even at the time the main beach sands were accumulating. An embayment may account for the sand accumulation in the Colfax Street area near 25th Avenue. As interpreted from radiocarbon studies, the Tolleston beach sand is from 5000 to 7000 years old. Little evidence for Nipissing and Algoman beaches exists, although some series of ridges are more prominent than others.

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