

# LAKE ARKONA-WHITTLESEY AND POST-WARREN RADIOCARBON DATES FROM "RIDGETOWN ISLAND" IN SOUTHWESTERN ONTARIO<sup>1</sup>

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## ABSTRACT

Three radiocarbon dates from raised beaches along the "Ridgetown Island" support the age assignment of 13,000 years B.P. for the beginning of Lake Whittlesey in Ohio, and the termination of Lake Warren before 12,000 years B.P., as concluded from post-Warren data in Ontario.

## INTRODUCTION

A few miles from the north shore of Lake Erie, between the 81°45' and 82°00' longitudes, lies a low morainic ridge with Ridgetown near its middle. The moraine, named Blenheim Moraine by Taylor (1913: 13), is approximately 20 miles long and up to 6 miles wide (fig. 1). Its crest is mainly between 725 and 750 feet A.T., exceeding 750 feet only in a few places, according to topographic maps (Department of National Defense, 1941 and 1948). Chapman and Putnam (1966: 91), however, note that "the contours on the Ridgetown map sheet between Morpeth and Palmyra are in error," and other erroneous contours are possible on these relatively old maps (original survey 1908).

MacLachlan (1938: 49-50) points out that the Blenheim Moraine formed an island in Lake Warren and became surrounded by sharply defined beaches. Chapman and Putnam (1966: 90-92) describe the Warren double beaches and the Arkona gravel bars, capping the moraine, in some detail.

According to MacLachlan (1938), the highest Lake Warren beach rises from slightly below 700 feet elevation A.T. at the southwest end of the "Ridgetown Island" near Blenheim, to 720 feet A.T. near its northeast end, west of Rodney. As the water plane of the highest Lake Warren was 680 feet A.T. in the area of horizontality (table 1), the "Ridgetown Island" has been uplifted and tilted, the

TABLE 1  
*Major proglacial lakes in Lake Erie basin and their levels in  
the area of horizontality, according to  
Hough, 1958, and Forsyth, 1959*

1. Lake Maumee	760-800 feet A.T.
2. Lake Arkona	690-710 feet A.T.
3. Lake Whittlesey	735-738 feet A.T.
4. Lake Warren	665-680 feet A.T.

southwest end by 20 feet and the northeast end by 40 feet, since the Lake Warren time. Considering this uplift, it is obvious that the "island" was submerged by the waters of Lake Maumee and first appeared above water only during Lake Arkona time, when the lake level was only approximately 10-30 feet higher than the highest Warren level (table 1). It became submerged again by Lake Whittlesey waters, and then emerged during Lake Warren time. The "island" finally became joined with the mainland during the post-Warren lowering of lake levels in the Erie basin.

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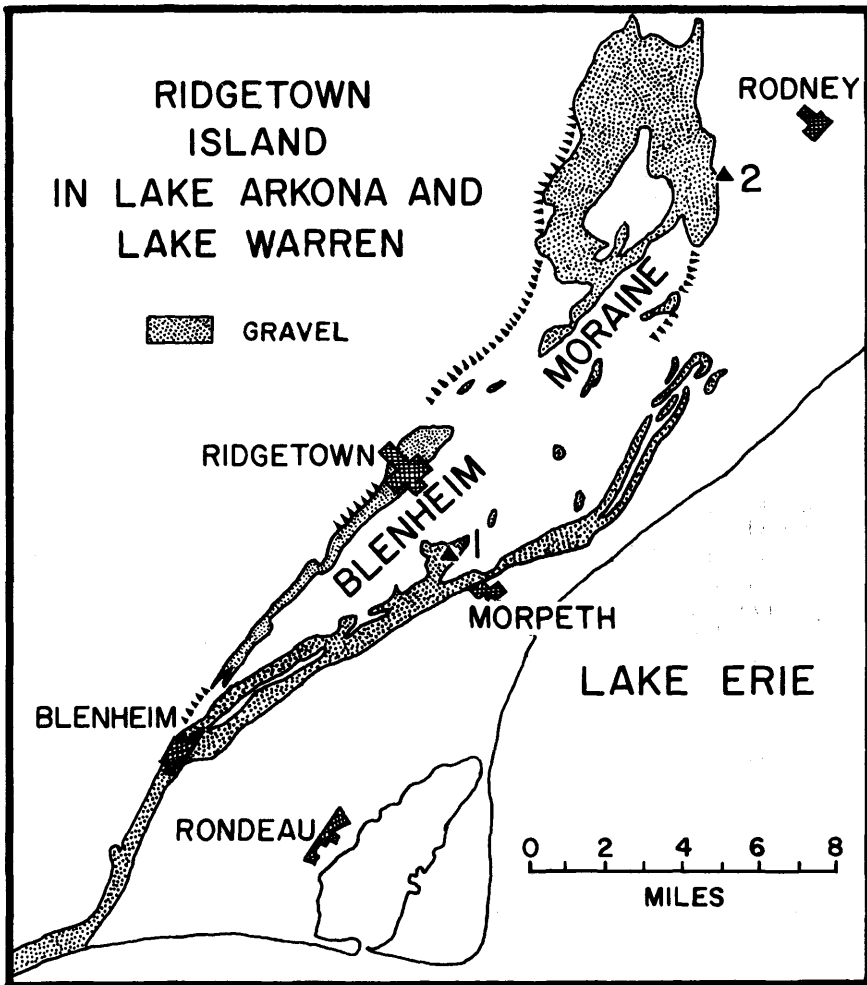


FIGURE 1. "Ridgetown Island": Blenheim moraine, surrounded by gravel bars and erosional terraces (hatched) formed by Lake Warren; gravels on the island are mostly of Arkona or Whittlesey age. Radiocarbon date localities: 1.—12,660±440 (S-31), 2.—12,000±500 (S-30) and 11,400±450 (S-29). The gravels and beaches are plotted after Experimental Farms Branch, 1936, and Chapman and Putnam, 1966.

DRIFTWOOD IN LAKE ARKONA-WHITTLESEY BAR

Strongest gravel beaches were formed along the southeast side of "Ridgetown Island." They were built mainly during the Arkona and Warren stages, when the "island" was above water, though some accumulation and redeposition of gravels must have occurred also during the rise of lake level from the Late or Lowest Arkona to the Whittlesey level, when lake waters encroached upon the "island," gradually reducing it and turning into a shoal. South of Ridgetown the gravel bar rises up to 745 feet A.T. (determined by aneroid barometer). This elevation, at least 40 feet higher than highest Warren, is between the highest Arkona and Whittlesey levels. In this area on con. 12, lot 7 of Howard township, (fig. 1: No. 1) Mr. Arthur Wade, while digging a test pit for gravel in September 1954,

found a waterworn larch log (*Larix* sp., identified by E. Perem, Forest Products Laboratory, Ottawa, Canada) 2.5 feet long and 2.5 inches in diameter. Because this log was brought up by an excavating machine from underneath the ground-water table, it might have derived from the gravels at any depth between 32 and 42 feet below the surface of the bar (table 2), or at 703–713 feet A. T. As the highest Lake Warren beach is at an elevation of 705 feet A.T. (MacLachlan, 1938: 50) approximately one mile to the southeast (fig. 1), Wade's pit gravels must be older than Lake Warren: either of Early Arkona age or from the transition from Late Arkona to Early Whittlesey.

TABLE 2  
*Geological section in Mr. A. Wade's gravel pit, con. 12, lot 7,  
Howard township, Kent county, Ontario*

32 feet	beach gravel; ground water table 22 feet below surface.
1 foot +	Port Stanley till.

The log was kept in a water barrel by its finder for a couple of weeks, where it became covered by green algae. In order to reduce the contamination caused by the recent algae, the outside portion of the log was cut off, before sending the sample to the Saskatchewan Radiocarbon Laboratory for dating. However, some algae may have remained in crevasses or pores, thus reducing the radiocarbon date on wood. The radiocarbon date of 12,660±440 B.P. (McCallum, 1955: S-31\*) is indeed slightly younger than the other published dates on Early Lake Whittlesey or the transition from Lake Arkona to Lake Whittlesey (table 3;

TABLE 3  
*Published radiocarbon dates on the transition from Lake Arkona to Lake Whittlesey,  
or on Early Lake Whittlesey*

Location	Radiocarbon date	Lab. code	Reference
Cleveland, Ohio	13,600±500 B.P.	W-33	Suess, 1954
Parkerstown, Ohio	12,920±400 B.P.	W-430	Rubin and Alexander, 1958
Bellevue, Ohio	12,800±250 B.P.	Y-240	Barendsen <i>et al.</i> , 1957
Ridgetown, Ontario	12,660±440 B.P.	S-31	McCallum, 1955

see Goldthwait, 1958: 218, for descriptions of Ohio sites). However, if the date's standard error of 440 is added to 12,660 and the similar error, 500, is subtracted from the oldest date 13,600, both results coincide at 13,100 B.P. This figure is in good agreement with the average date for the beginning of Lake Whittlesey at about 13,000 years B.P. (see also Goldthwait, 1958: 218).

#### RODNEY MASTODON SITE BELOW THE WARREN BEACH

At the northeastern end of "Ridgetown Island," 12 miles northeast of Wade's gravel pit (fig. 1: No. 2), Russell (1948, and 1965: 2–3) reported a discovery of mastodon remains on Mr. D. Campbell's farm, con. 7, lot 27, Aldborough township, 3 miles west-south west of Rodney. The mastodon bones, tusks, and teeth were found at the base of a muck layer two to three feet thick, resting unconformably on sand and gravel. Russell (1948) first considered the gravel, including

\*Because of a misprint (S-25, instead of S-31) in Table I of Dreimanis, 1957, the incorrect laboratory number, S-25, has been quoted also in Goldthwait *et al.*, 1965, p. 93 and 95.

the 739-foot-high (A.T.) beach bar to the west, to be of Whittlesey age, and muck with the mastodon remains as post-Nipissing. In McCallum and Dyck's report (1960: 74) of the radiocarbon dates, they comment that "the underlying sand belongs to Lake Warren I." It could even be of Mid-Warren age, because, according to Russell (1948, p. 59), the mastodon site is at 713 feet elevation A.T., located about 700 feet downslope of a gravelly terrace which appears to be the 720-foot (A.T.) highest Lake Warren beach mentioned by MacLachlan (1939: 50). The Warren shoreline is formed against the east side of "Ridgetown Island," here capped by a gravel bar, 739 feet high (A.T.). This gravel bar, being approximately 20 feet higher than the highest Warren beach, could have been formed either during Lake Arkona or during the rise from the Arkona to the Whittlesey levels, similarly to the 735-foot-high (A.T.) gravel bar south of Ridgetown, where the larch log previously described, was found. Because the muck containing the mastodon bones at its base overlies the Warren offshore or beach sands, it must be younger than this lake stage. The radiocarbon dates on the muck,  $12,000 \pm 500$  years B.P. (S-30), and on the wood associated with the mastodon skeleton,  $11,400 \pm 450$  years B.P. (S-29), substantiate this age assignment. They appear to be slightly younger than Lake Warren, but not post-Nipissing, as assumed at the time of their excavation. The radiocarbon dates are in good agreement with other post-Warren dates from the areas close to Lake Erie (table 4).

TABLE 4  
*Radiocarbon dates from post-Lake Warren lake stages in areas  
adjoining the Lake Erie basin.*

<i>Radiocarbon date</i>	<i>Laboratory code</i>	<i>Reference</i>
a) Early Lake St. Clair, northwest of Lake Erie (Dreimanis, 1964); the date (S-172) is on fine plant detritus at the top of layer (c), and (GSC-211) for plants which grew in place on the same layer: $12,000 \pm 200$ B.P.	S-172	McCallum and Wittenberg, 1965
$11,860 \pm 170$ B.P.	GSC-211	Dyck et al., 1966
b) Lake Iroquois, northeast of Lake Erie (Karrow et al., 1961): $12,660 \pm 400$ B.P.	W-861	Rubin and Alexander, 1960
$12,080 \pm 300$ B.P.	W-883	Rubin and Berthold, 1961
$11,570 \pm 260$ B.P.	Y-391*	Stuiver et al., 1960

\*This date is listed as Y-691:  $11,510 \pm 240$  B.P., in Karrow et al., 1961, and Goldthwait et al., 1965.

They disagree, however, with the so-called lowest Warren date of  $9,640 \pm 250$  (W-199, Rubin and Suess, 1955: 483). Doubts about this sample's stratigraphic assignment to Lake Warren have been expressed before (Hough, 1958: 277, and 1966: 66; Dreimanis, 1964: 248).

#### CONCLUSIONS

The radiocarbon date of  $12,660 \pm 440$  years B.P. (S-31) on wood from Early Arkona or Arkona-Whittlesey transition gravels at Ridgetown is in good agreement with the average age of 13,000 B.P. for the Lake Arkona-Whittlesey transition in Ohio, in spite of the possible slight contamination of the Ridgetown wood by recent algae. The radiocarbon dates of  $12,000 \pm 500$  B.P. (S-30) and  $11,400 \pm 450$  B.P. (S-29) from the mastodon site at Rodney, which is slightly younger than Lake Warren, substantiate the conclusion derived from both the Early Lake St. Clair (Dreimanis, 1964) and the Lake Iroquois (Karrow et al., 1961) areas, that Lake Warren terminated before 12,000 B.P.

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