RADIOCARBON DATES FROM ALTONIAN AND TWOCREEKAN DEPOSITS AT SYCAMORE, ILLINOIS

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ABSTRACT.—Two radiocarbon dates have been determined for wood collected from an exposure in a gravel pit in the valley of East Branch Kishwaukee River at the northern edge of Sycamore, Illinois. Wood chips in the lower part of the exposure collected from pinkish gray outwash, part of the youngest drift of the Altonian Substage, were dated as older than 32,000 years B.P. (W-1382). A log near the top of the exposure in a lenticular black organic silt deposited during the Twocreekan Substage was dated at 12,000 ± 400 radiocarbon years B. P. (W-1385).

Excavation of a gravel pit just north of Sycamore, Illinois, examined in 1959, exposed a sequence of Pleistocene deposits that included sand and gravel outwash and organic silt containing wood fragments and logs. Wood found in two of the units was dated by the laboratories of the U. S. Geological Survey, Washington, D. C., and the dates, along with subsurface stratigraphic information on the region, are the basis for the present interpretations.

LOCATION AND GENERAL SETTING

The Larson gravel pit is in DeKalb County, about one-half mile north of Sycamore in the NE¼ NE¼ SW¼ sec. 29, T. 41 N., R. 5 E. (Fig. 1). It is located on the flood plain of the East Branch Kishwaukee River about 200 feet north of the river and west of a north-south township road and an abandoned railroad bed. The valley at this point is about three-fourths of a mile wide, is generally flat, and has a channel about 15 feet deep and 50 feet wide that contains the present stream. Little or no terracing appears to be present. A bedrock valley lies directly under the present valley north of Sycamore and is filled with glacial deposits to a level above that of the bedrock uplands on either side. The surficial deposits in the valley consist of outwash sand and gravel with a locally thick cover of alluvium.

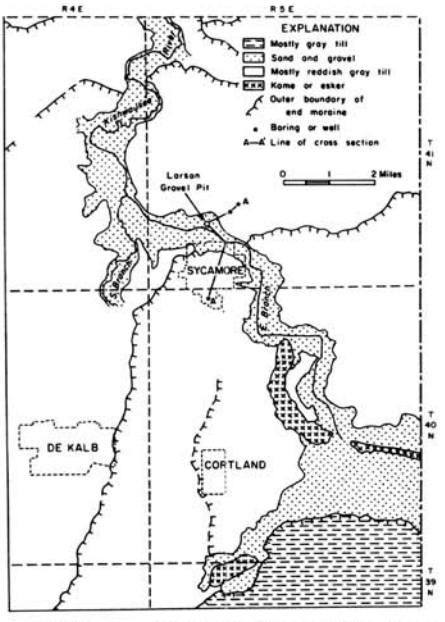


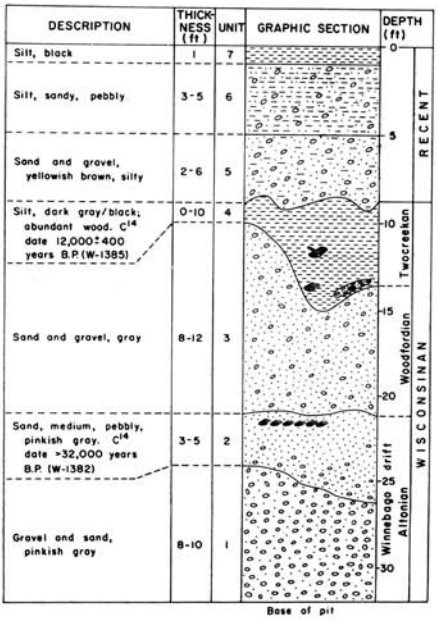
Figure 1.—Surficial map of the Sycamore, Illinois, area (modified from Anderson, 1964) showing position of Larson gravel pit north of Sycamore, nature and distribution of glacial deposits, and position of cross section shown in figure 3.

Stratigraphy

The stratigraphic sequence exposed in the west face of the gravel pit is illustrated in Figure 2. The deposits, from the base upward, consist of sand and gravel, gray with a pinkish cast and containing a few wood chips near the top (Units 1 and 2); gray sand and gravel with a distinct unconformity at the top (Unit 3); dark brownish gray to black organic silt containing abundant logs, twigs, leaf imprints, and lenses of sand and gravel (Unit 4); and yellowish brown sand and gravel (Unit 5) with numerous clam shells, becoming pebbly sandy silt (Unit 6), with black silt (surface soil) (Unit 7) at the top. The materials in the upper 5 feet of the section do not effervesce in hydrochloric acid, and the black organic silt reacts very weakly.

The distinct pinkish gray hue of Units 1 and 2, in contrast to the decided gray of Unit 3, clearly distinguishes them in the field. A handful of wood chips collected along a bedding plane in the upper foot of Unit 2 was reported as older than 32,000 radiocarbon years B.P. (W-1382). Although no pronounced unconformity was noted at the top of Unit 2, the bedding did appear to be truncated by the sand and gravel of Unit 3. Unit 3, as viewed in the north face of the pit, appears distinctly cross-bedded with the general dip westward. The top of Unit 3 exhibits the most pronounced unconformity within the sequence, with a maximum of about 10 feet of relief around the pit and obviously truncated bedding.

Figure 2.—Stratigraphic section exposed in the Larson gravel pit.



The black organic silt (Unit 4) is traceable in nearly all exposed faces of the pit but in many places thins to a few inches, or locally to a film. It was best developed along the west face of the pit, where it attained a maximum thickness of about 10 feet. The logs were found only in the lower half of the thick parts of the silt and in the rusty yellow sand and gravel lenses near the base of the unit. All of the logs more than about 6 inches in diameter were decidedly oval in cross section and appeared to have been flattened. To one or two of them, short lengths of branches were still attached. Numerous leaf imprints, twigs, and small woody fibers were discovered in the silt. One of the logs, about 6 inches in diameter, was collected and a portion submitted for radiocarbon dating. This wood was found to be 12,000 ± 400 radiocarbon years old (W-1385).

At the top of the silt a marked erosional unconformity has as much as 2 or 3 feet of relief. The sand and gravel directly above the organic silt contains numerous small clam shells that are neither worn nor broken. Unit 6 appears to be gradational from Unit 5, although the gravel is restricted to Unit 5.

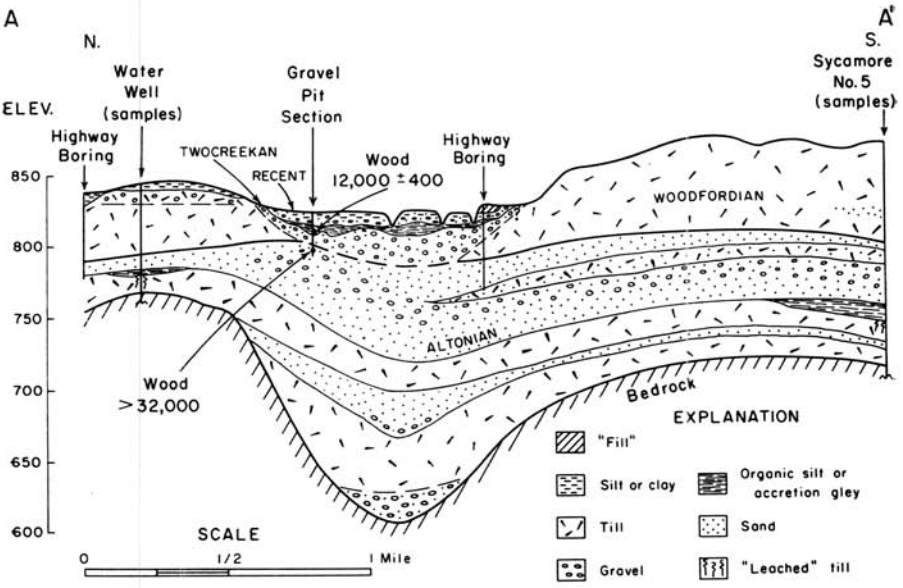
Age and History of Deposits

Radiocarbon dates obtained from the wood collected from Units 2 and 4 are useful in relating the deposits in the gravel pit to sequences elsewhere in the region. A distinct division between glacial and postglacial deposits is also established by the dates. Units 1, 2, and 3 are of definite glacial origin, but Units 4, 5, 6, and 7 were deposited after the continental glaciers had receded from the region.

Figure 3 shows the stratigraphic setting of the glacial deposits. The subsurface information from the immediate vicinity of the gravel pit and extension of other subsurface data and radiocarbon dates in the region show that four tills are present, the three lower tills Altonian in age. A date of 38,000± 3000 radiocarbon years B.P. (I-847) was obtained from peat sampled in a boring made about 16 miles to the northeast (Kempton and Hackett, 1963). This peat is at the same stratigraphic position—above the two lower tills —as the organic silt and accretion-gley penetrated by the two water wells shown on Figure 3. The thin reddish brown till and its related outwash, which are above the organic deposits, are therefore less than 38,000 years old. The reddish brown till and associated outwash were previously considered early Woodfordian in age (Kempton, 1963). Units 1 and 2 of the gravel pit section are considered to be Altonian outwash and are included in the Winnebago drift on the basis of the subsurface stratigraphy (Fig. 3) and the radiocarbon date of greater than 32,000 years B.P. that was obtained from the wood chips collected from Unit 2.

The earliest Woodfordian glacier covered the entire area shown in Figure 1 and deposited as much as 80 feet of reddish gray till. At the gravel pit the Woodfordian till was probably entirely eroded before the deposition of the younger outwash. As a later Woodfordian glacier advanced to the position of the morainic ridges south and southeast of Cortland (Fig. 1), which are correlated with the Cropsey Moraines in central Illinois, outwash from this glacier deposited a valley train along East Branch (Anderson, 1964). Bor-

Figure 3.—North-south cross section showing relation of subsurface sequence to gravel pit section. Wood dates are expressed in radiocarbon years before present.



ing samples and exposures of the till in the morainic ridges and in the ground moraine southeast of these ridges show a gray to brownish gray drift overlying the reddish gray drift of the earlier Woodfordian advance. The gray sand and gravel (Unit 3) exposed in the gravel pit was derived from the later Woodfordian glacier.

The age of the Woodfordian advances is not precisely known, as datable organic material directly related to these advances has not yet been found in this area. The earliest advance probably reached this area sometime after the Mississippi River was diverted into its present course, about 21,000 radiocarbon years B.P. (Glass, Frye, and Willman, 1964). The later advance to the moraine southeast of Cortland occurred after the earlier Woodfordian moraines were built but before the end of the Woodfordian, about 12,500 years ago (Frye and Willman, 1960).

Erosion of the outwash valley train by East Branch during the later part of the Woodfordian is shown by the highly irregular upper surface of Unit 3. Erosion of the sand and gravel must have been completed shortly before deposition of the overlying organic silt as no indication of weathering of Unit 3 was noted.

A period of relatively dense vegetation growth probably began along East Branch with the climatic change at the end of the Woodfordian (12,500 years B.P.) and continued during the Twocreekan Substage. During flood times East Branch deposited organic silt, logs, and vegetal materials (Unit 4) over the eroded surface of the valley train. The date of 12,000± 400 radiocarbon years B.P. from one of the logs establishes a Twocreekan age for the deposit, the first Twocreekan date determined for deposits in Illinois. In Wisconsin the Two Creeks forest bed was flooded by Lake Chicago 11,840 radiocarbon years B.P. when the Valderan glacier crossed the Straits of Mackinac (Broecker and Farrand, 1963).

The deposits overlying the organic silt (Units 5, 6, and 7) are alluvium deposited during the Recent Stage, which began about 5,000 radiocarbon years ago. The upper three units in the vicinity of the gravel pit apparently form the nearly level floor of the present valley.

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