Maine Geologic Facts and Localities
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Infilled Kettle Hole, Easton, Aroostook County, Maine

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Introduction

As the last continental glacier melted, streams flowed in tunnels through the ice. The streams carried debris toward the ice margin. Some of the debris, mainly sand and gravel, was deposited in the tunnels. After the ice melted, the tunnel deposit became exposed as a sinuous ridge of gravel, known as an esker. Where the streams exited the tunnels subaerially, gravel plains of outwash deposits were formed. Where the streams exited into a body of water, deltas or subaqueous outwash fans were formed. By studying the gravel deposits that were left behind, the glacial processes and environments can be reconstructed.
Kettle Hole

The topographic map (Figure 1) shows two small, ice-marginal deltas, which were fed by an ice-tunnel stream as evidenced by the esker "tail" on the north side of the deltas. At the time they were deposited, the south edge of the glacier was just where the esker and delta come together. Based on a radiocarbon date on organic material in sediment in a core taken from a nearby pond, this was approximately 12,800 radiocarbon years ago (about 15,000 calendar years). Figure 2 and Figure 3 are from excavations cut into the delta closest to Lindsay Lake.

Figure 1. Topographic map from Easton Center 7.5-minute quadrangle.
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Figure 2 shows the very coarse texture of the ice-marginal deposit, indicative of a nearby source. Figure 2 also shows an exposure of the topset/foreset contact characteristic of deltas. The flat-lying beds at the top of the delta (topsets) are fluvial deposits, similar to those found in modern glacial streams. The beds below (foresets) which are dipping to the right (southerly) are typical of deposits found at glacial lake deltas. The sediment brought to the lake by streams is deposited at the delta and cascades down the delta front slope, represented in the photo by the dipping foreset beds. The contact between the overlying horizontal topsets and underlying dipping foresets is the approximate former lake surface elevation.

Figure 2. Overview of the gravel pit.
Kettle Hole

Blocks of ice detached from the retreating glacier were distributed throughout the region. The Lindsay Lake delta must have formed in a glacial lake dammed to the south. Ice blocks most likely comprised the dam, judging by the very steep south slope of the delta. The delta probably built up against the ice block and then collapsed as the ice block melted. More evidence for ice blocks in the region is found in Figure 3, a close-up of the top of the gravel pit face seen in the upper right of Figure 2.

Figure 3. This photo shows a close-up of the top of the gravel pit face seen in the upper right of Figure 2.
Kettle Hole

Note the topset/foreset contact. To the right of the person, the coarse-gravel topsets of the delta are interrupted by sand and pebbly gravel. Modern bank swallows made the holes in the sandier material, in which they prefer to build their nests. These finer-grained deposits are contorted at their base, and become less deformed up-section. This feature is an infilled kettle-hole, where a melting ice block became covered by the stream deposits. Over time as the ice block melted, the deposits collapsed into the kettlehole and were subsequently covered by more stream outwash, which show more gentle downwarping than the lower material in the kettle, reflecting a smaller but still dwindling ice block. The sequence is mantled by windblown material, which contains frost-heaved stones.

Figure 4. Annotated version of Figure 3.