1-1-1970

Quaternary History of Northwestern Maine

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The highlands of northwestern Maine, including the Longfellow and Boundary Mountains, were overridden at least twice and perhaps several more times, by continental ice sheets during the Quaternary Period. These episodes are indicated by five, widely separated exposures displaying two-drifts sequences composed of lodgment tills separated by lacustrine and fluvial sediments. The freshness of these drifts suggest that they are probably of Wisconsin age, however this is equivocal as no way has been found to assign absolute ages to them.

Caldwell (1959) reports a two-till sequence at New Sharon, in central Maine, separated by organic materials dated at more than 38,000 years old. A recent C^{14} age determination (Stuiver, personal communication), and an analysis of the wood fragment which shows that the tree was crushed while still green, indicate that the organic material at New Sharon was overridden by ice more than 52,000 years ago. Presently there is no way of determining the relationship of the New Sharon sequence and the undated sequences to the northwest.

The last ice sheet, whose retreating margin stood along the present Maine coast approximately 13,500 years ago (Borns, unpublished), thinned, separated and stagnated over the Longfellow and boundary Mountains of northwestern Maine, a belt 60 miles wide and rising over 3000 ft. above bordering lowlands. Nearly contemporaneous stagnation, throughout and perhaps to the southeast of the mountains, is evidenced by the distribution and volume of ice-contact stratified drift. Coupled with this is the lack of evidence of a receding active ice margin.

The separation of this ice in Maine from the still-active receding ice sheet immediately to the northwest in Quebec, occurred approximately 12,800 years ago and the subsequent dissipation of stagnant ice in the mountains was complete by approximately 12,000 years ago.

The highest glacial cirques in northwestern Maine on Crocker Mtn., with floors at an altitude of approximately 2700 ft., reveal no evidence of glacial reactivation during and subsequent to the dissipation of the last ice sheet.

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* This summary is the result of current research being carried on under National Science Foundation Grant Ga-1563 to the University of Maine. The geological statements in the Road Log are brief and subject to change because the research is still in progress.

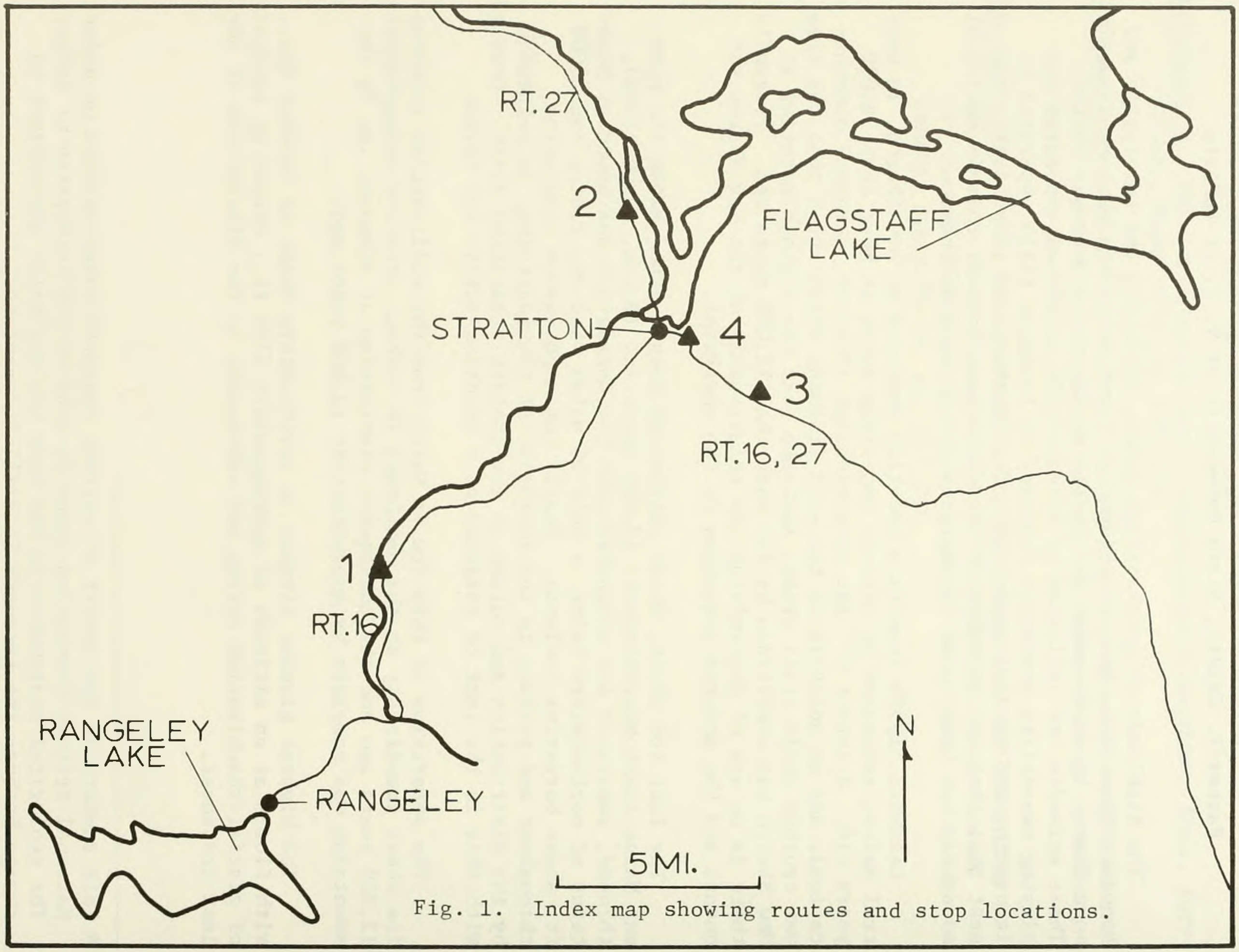

Fig. 1. Index map showing routes and stop locations.

Topographic 15 minute Quadrangle Maps:

Kennebago Lake
Rangeley
Stratton

Purpose of the trip: To examine some evidence of (1) multiple glaciation and (2) the mode of dissipation of the last ice sheet in northwestern Maine.

Road log. Mileage from Rangeley Center.

Time 7:45 A.M., Sunday, October 4.

0 miles Leave Rangeley Center. Travel toward Stratton on Rt. 16.

4.5 Travel on crest of esker for 1 mile.

5.5 Descend from Esker

7.5 (1 hour) STOP 1. The 50 foot high cut bank on the east bank of the South Branch of the Dead River exposes a stratigraphic section composed of till at the base overlain successively by glaciolacustrine silts and sands, fluvial gravels and a second till. This sequence represents two glacial episodes separated by a nonglacial episode.

17.5 Stratton; travel north towards Eustis on Rt. 27.

21.0 Turn left into Cathedral Pines Camp Ground and stop at public beach.

21.5 (45 min.) STOP 2. A discussion of the lake history of the "Flagstaff Lake - South Branch" basin. Flagstaff Lake occupies a part of the basin that formerly held the slightly larger Glacial Lake Bigelow (Leavett and Perkins, 1935). Recent study has revealed a complex glacial lake history for this basin which not only contains Flagstaff Lake, but which extends southwestward approximately 10 miles, to STOP 1. The South Branch of the Dead River presently flows along the axis of this section of the basin. As deglaciation progressed, large ice masses were left stagnating in this as well as in many other basins of the region. Evidence, primarily in the form of deltas, for former lake levels up to 400' above the maximum level of Flagstaff Lake is present in the basin. These lake levels were controlled by ice blockage and by the successive uncovering of lower spillways as the stagnant ice mass or masses dissipated. Lake water was derived from meltwater draining from adjacent basins primarily by way of the Kennebago Lake basin and the North Branch of the Dead River as well as from melting of the ice within the basin.

Glacial Lake Bigelow , the last glacial lake known to occupy the basin, filled it to a present altitude of approximately 1200 ft., roughly 40 ft. above the present maximum level of man-made Flagstaff Lake. This glacial lake was completely drained into the Kennebec River via the Dead River when it overflowed and cut away a threshold of till at the site of Long Falls Dam on the northeast end of Flagstaff Lake. This event occurred some time after approximately 12,800 years ago (Borns and Hagar, 1965; Borns and Stuiver, unpublished).

Cathedral Pines Camp Ground rests upon a delta built into Glacial Lake Bigelow by meltwater from the North Branch of the Dead River. At that time ice masses still occupied the valley of the North Branch as indicated by the numerous kettle holes present in the upstream equivalent of the delta sands. Subsequently Glacial Lake Bigelow was drained and the delta was dissected by both the North and South Branches of the Dead River.

22.0 Rt. 27: travel south to Stratton on the dissected Glacial Lake Bigelow delta.

25.5 Stratton; travel south on Rt. 16 and 27 on delta surface for 1 mile and parallel to an esker for 2 miles.

28.5 (30 min.) STOP 3. A pit in the "Stratton Esker". A discussion of the significance of eskers in this region.

Several recent borrow pits in this esker have exposed excellent examples of grain-size distribution, stratification and ice-contact collapse structures typical of "classic eskers".

Considering the internal structures, the segmentation, the relationship of the esker to the regional topography and the provenance of the sediments it is concluded that this esker was formed at the base of stagnant ice, probably during the late nunatak stage, and that meltwater was channeled in the ice along the present course of the North Branch of the Dead River, across the Flagstaff Lake basin and along the trend of the Stratton esker into the Carrabassett basin.

It can be demonstrated that in this region esker channels carried meltwater from ice mass to ice mass across nunataks proving that valley-filling ice masses existed contemporaneously throughout the region. Therefore the mode of dissipation of the last ice sheet was thinning, separation and stagnation on a broad scale within this mountainous belt.

28.5 Leave STOP 3. Travel towards Stratton on Rt. 16 and 27.

30.8 Cross stream.

31.0 Right on 1st road past stream.

31.2 (25 min.) STOP 4. A pit in the "Stratton Esker".

At this location, as well as at several others nearby, deltaic sand overlies the "Stratton Esker". This evidence coupled with the presence of a few kettle holes in the delta and in the fluvial sands in the North Branch of the Dead River which are the upstream equivalent of the delta sands, suggests that at the time of Glacial Lake Bigelow residual ice was still present in very minor amounts. The major part of regional deglaciation has been accomplished.

31.2 Return to Rangeley via Stratton on Rt. 16.

49.7 Rangeley

References Cited

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