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Devonian Volcanic and Sedimentary Rocks on the Northwest Flank of the Weeksboro-Lunksoos Lake Anticline

Rankin, Douglas W.

ROAD LOG, TRIP AS1

DEVONIAN VOLCANIC AND SEDIMENTARY ROCKS ON THE NORTHWEST FLANK OF THE WEEKSBORO-LUNKSOOS LAKE ANTICLINE

By Douglas W. Rankin, Leader

Topographic quadrangle maps

15-minute	2-degree
Shin Pond	Presque Isle
Traveler Mountain	

Assemble in front of Shin Pond House, Shin Pond, Maine, ready for departure at 8:00 A.M., Saturday, October 1. Bob Neuman's cautionary words for the Friday trip should be heeded. In addition, this trip includes a 200-foot climb over a steep, rough, trailless slope and a 3-mile walk down a stream. Stout walking shoes are essential. Wet feet are guaranteed.

Mileage

0.0 Shin Pond House, facing northwest. Retrace route of trip AF as far as Bowlin Pond Road.

5.9 Bridge over Seboeis River.

7.1 Beginning of long straight stretch of road with view down road of North Traveler and Bald Mountains underlain by quartz latite.

10.4 Side road right to Hay Lake.

10.7 Side road left to Bowlin Pond.

11.1 T5R8 town line. Gradational contact between Seboomook Formation and Matagamon Sandstone crosses road near here.

11.8 Roadside ledges of Matagamon Sandstone, as are all roadside ledges as far as the shore of Grand Lake Matagamon.

13.1 STOP 1. Overlook and exposures of Matagamon Sandstone. In good weather there is a fine view here of the mountains to the west. To the southwest, Mt. Katahdin is visible between Turner Mountain on the left and Traveler Mountain on the right. The long mass of Traveler Mountain is across the valley of the East Branch. Although The Traveler is only 3,541 feet high, it rises 3,000 feet above the river. The bare conical peak of Bald Mountain is set against North Traveler Mountain. The last mountain to the right, barely visible from here, is Horse Mountain on the shore of Grand Lake Matagamon. In 1861, C. H. Hitchcock referred to this as the mountain with the inelegant name. Turner and Katahdin are composed of quartz monzonite, the rest of quartz latite.

The Matagamon Sandstone here is in a northeast-trending structural basin, the Hay Mountain Basin (Rankin, 1965). These exposures are very nearly on the axis of the basin, and the sandstone dips gently northeast.

14.7 Bridge over East Branch of the Penobscot River, a favorite for white-water canoeists. H. D. Thoreau (1950) extolled the joys of the East Branch after his 1857 trip down it. Road right on west side of bridge leads 0.5 mile upriver to Grand Lake Dam at foot of Grand Lake Matagamon. Good exposures of Matagamon Sandstone form east abutment of dam.

15.7 Baxter State Park Boundary. Largest state park in Maine with an area of nearly 200,000 acres. Six hundred-foot cliffs of quartz latite forming Horse Mountain on left.

15.9 STOP 2. Park as close to the edge of the road as you can. Climb about 200 feet up steep slope to the base of cliffs. Be extremely careful in crossing scree slope. Remember there are others behind you. The lower member of the quartz latite forms the cliffs above. The Matagamon Sandstone underlies the scree slope over which we climb. The contact, defined as the sharp change in lithology from underlying obviously stratified rocks to massive quartz latite above, is more or less exposed at the top of the scree slope and dips 20° to the west. The top 20 feet or so of the Matagamon contain scattered pebbles of felsite and beds of tuffaceous sandstone, indicating that some volcanic activity preceded the massive felsite.

The basal 2 or 4 feet of the massive quartz latite are composed of nonwelded tuff in which devitrified shards are clearly visible (fig. 6). This grades up into welded ash-flow tuff that appears to make up most of the quartz latite of the Horse Mountain cliffs. Fragments of collapsed pumice are visible in the quartz latite a few feet above the base. Deformed and flattened shards are visible in a thin section collected from this locality 5 feet above the base. Columnar joints, another characteristic of ash-flow tuffs, may be seen in the cliff face. These are most obvious in the main part of the cliff to the south and are perhaps most easily seen from the road. Some are as much as 4 feet in diameter and at least 40 feet long.

If one traces the contact along the base of the cliffs it is seen to be an irregular surface with relief up to 15 or 20 feet. This irregularity may be due to scouring by ash flows.

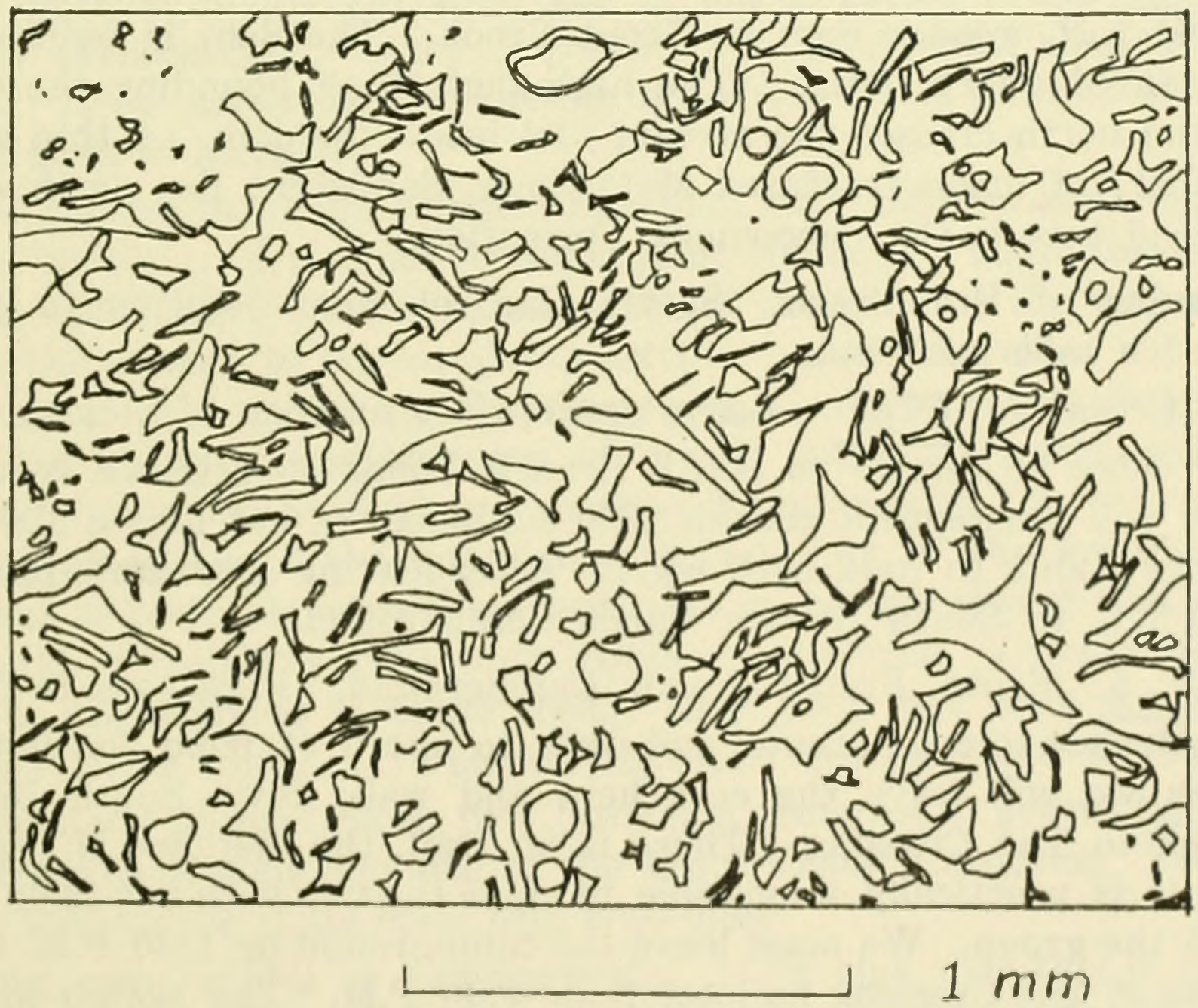

Figure 6. Tracing of photomicrograph of nonwelded tuff from base of lower member of quartz latite on Horse Mountain

16.3 STOP 3. Campsite on right opposite Maine Forest Service Camp. Known locally as Eastern Landing. Walk 0.1 mile ahead (north) along road. Roadcut in lower member of quartz latite showing thin anastomosing dikes of sandstone from the underlying Matagamon Sandstone. Thicker clastic dikes have been found at the base of the cliffs on Horse Mountain and on the shore of Grand Lake Matagamon just ahead of us on the point. The largest clastic dike is about 20 feet thick and at least several tens of feet long (as viewed from the bottom of the cliff).

16.8 Road turns left away from lake and crosses ledges of quartz latite (lower member).

17.9 Cross unexposed, high-angle fault between quartz latite and Seboomook Formation.

19.0 Trout Brook Farm, first cleared in 1837. Produced hay for horses used in logging operations. C. H. Hitchock stayed here in 1861. Rough side road, right, passes through farm and continues to Webster Brook at the head of Grand Lake Matagamon, crossing enroute, some well-exposed open folds in the Seboomook Formation.

19.5 Trout Brook on right parallel to road.

20.0 Sharp turn left. Ledges of Seboomook Formation in woods to left. Excellent exposures of the Seboomook Formation just upstream from the adjacent right-angle turn of Trout Brook. Graded bedding, refracted cleavage, and numerous small folds are featured.

20.2 Parking area left for trail to the delightful lakes of the Deadwater Mountains.

20.5 STOP 4. Park along main road and walk 0.1 mile along side road to site of old K.P. wooden dam on Trout Brook. The dam is built on ledges of brecciated quartz latite. The high-angle fault bounding the quartz latite on the north crosses the stream just below the dam. A thin wedge (30 to 40 feet) of much fractured Matagamon Sandstone lies north of the fault. Beyond this is the Seboomook Formation.

22.9 Crossing of Dry Brook. Spectacular columnar jointing in quartz latite about a mile upstream.

23.4 The Crossing. STOP. Leave appropriate number of cars so that drivers may later be ferried to South Branch Ponds to retrieve remaining cars. This will necessitate considerable doubling up, but it is a short drive and no one wants to walk both ways. After leaving some cars, proceed up side road left to South Branch Ponds Campground.

25.6 STOP 5. South Branch Ponds Campground. Park cars in parking area at entrance to campground and walk to shore of pond for lunch. After lunch we will leave the cars here and walk down South Branch Ponds Brook to The Crossing. There is no trail, the distance is nearly 3 miles, and it is practically impossible to make the trip with dry feet. Please stay with the group. We must leave the campground by 1:30 P.M. and we must all be at The Crossing no later than 4:00 P.M. The sketch map is traced from an aerial photograph, so the scale is approximate. The log of the walk is by numbered stations on the map (fig. 7), not distance.

South Branch Ponds Brook Wade.

1. Shore of Lower South Branch Pond.

South Branch Ponds occupy a glacial valley breaching a large anticline in the upper member of the quartz latite of Traveler Mountain. On Black Cat Mountain to the west (right, looking up the lake away from the campground) flows strike northeast and dip moderately northwest. On Traveler Mountain to the east (left), flows strike northwest and dip moderately northeast. The attitude of these flows controls the northwest pattern of ridges on Traveler Mountain. Neither the summit of The Traveler nor North Traveler is visible from the lakeshore. Mt. Katahdin is visible over an end of the Upper Pond from the ridge north of the campground.

Retrace route out of campground past parking area and along road toward The Crossing.

2. Reassemble on road at top of long hill (about 0.6 mile from shore of lake). Turn left down slope through open woods. South Branch Ponds Brook is reached in about 0.2 mile. Turn right and walk downstream.

3. Exposures of upper member of the quartz latite of Traveler Mountain. Note pattern of concentric joints in outcrop on corner at stream level. Actually there is more than one center about which joints are concentric, giving rise to a pattern of intersecting curving joints. Well-developed columnar joints of small diameter occur above the stream on east bank. Above this and slightly downstream is another flow unit with columnar joints of larger diameter. Note the foliation in this unit brought out by the presence of very thin lenticular bodies (lenticules).

4. First of a series of joint surfaces across which the stream flows. Close examination will show that these are dip surfaces of flows. Banding (foliation) is roughly parallel to the surfaces, and in places rather crude columnar joints are roughly perpendicular to the surfaces. The flows strike about N. 70° E. and dip 30° N. Local areas of crosscutting breccia are also present in this outcrop on the left bank of stream.

5. Last of the series of dip slopes. Excellent swimming holes at bottom of falls. Banding is visible on a number of steep joint surfaces. Those familiar with felsic volcanic rocks will note the resemblance of the banding in exposures we have seen along the stream to the eutaxitic texture typical of welded tuffs. This is a sticky problem. My conclusion that these are lava flows comes from an accumulation of data from the whole area of quartz latite. Briefly, this particular type of banding made evident on weathered surfaces by the presence of lenticules is characteristic of the upper member and not of the lower member. In thin sections of rocks showing these lenticules, microtextures of lava are common; microtextures of ash-flow tuffs have not been observed. Growth aggregates of phenocrysts are common in these rocks; they have not been found in welded tuffs of the lower member. Photomicrographs are available for inspection.

6. In streambed on east bank just upstream from steep gravel bank at corner. Lowest exposure of conglomerate of the Trout Valley Formation. You, too, might call this a Pleistocene tillite upon first encounter.

7. Jointing cuts cobbles in conglomerate. First clue that this is not a Pleistocene tillite. Some cobbles are offset along the joints. Note that clasts (pebbles, cobbles, and boulders) are well rounded and that all of them are felsite. The

clasts are so weathered that many of them can be broken apart by hand. The weathering may date from the Devonian Period. The conglomerate is crossbedded and dips gently north, away from the volcanic rocks.

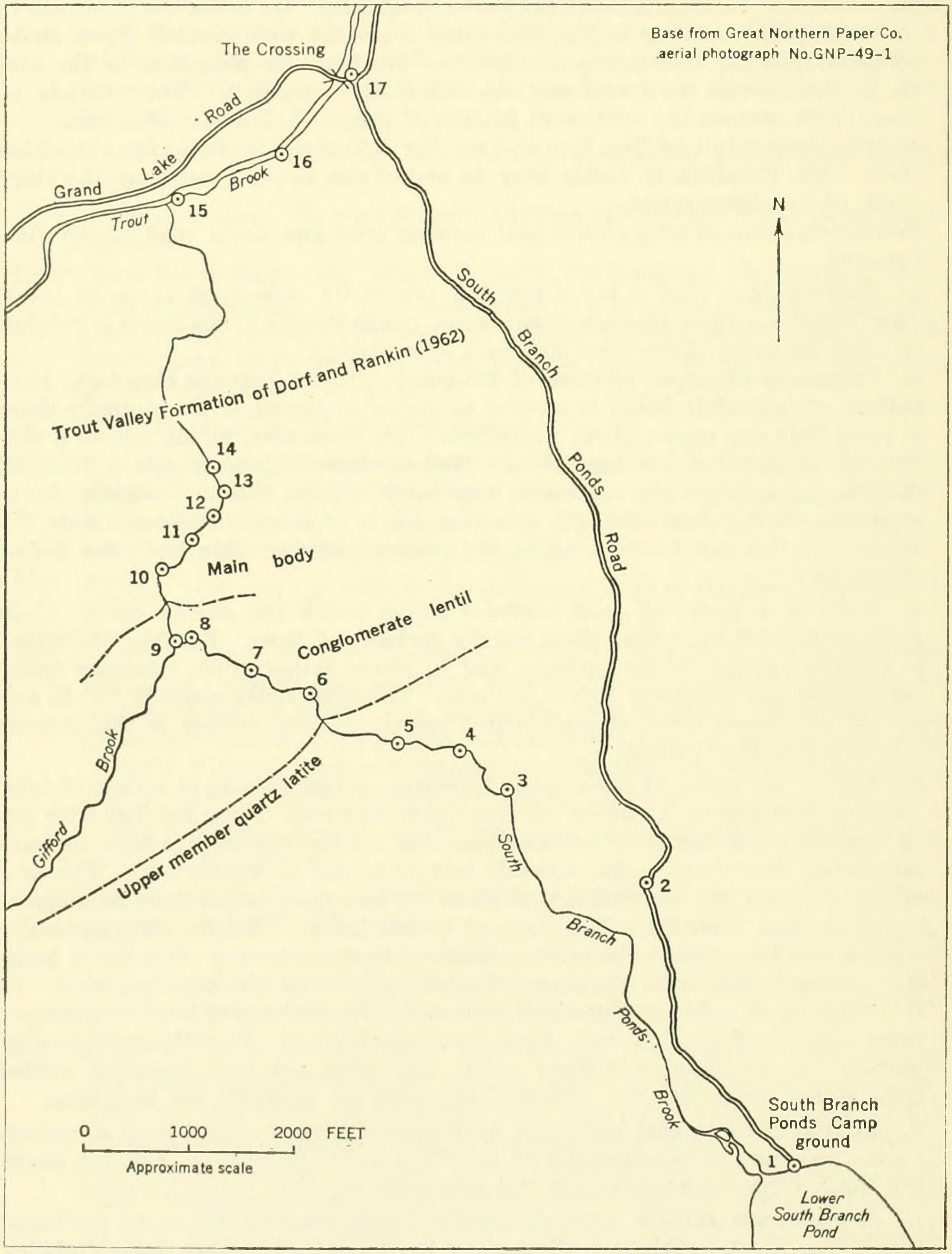

Figure 7. Sketch map of South Branch Ponds Brook

8. About 35 feet of conglomerate exposed in the canyon wall. Where is the contact with the overlying till? Note sandstone bed in the conglomerate near top of exposure and lenses of black sandy carbonaceous shale near bottom.

9. Junction with Gifford Brook.

10. Large exposure at curve of stream on left bank. Coarse conglomerate no longer dominant. We are now above the basal conglomerate lentil and in the main body of the Trout Valley Formation of Dorf and Rankin (1962). Numerous black chert lenses are visible and some have a vague internal structure. Professor E. S. Barghoorn, of Harvard University has identified one of these as *Prototaxites*, which is generally regarded as of algal affinities. Also present are siderite concretions and thin beds of sideritic ironstone.

11. Upstream: sill of intermediate rock and a 6-inch bed of ironstone. Downstream: lens of carbonaceous black shale from which plant fossils were collected in July 1955.

12. Light gray-green fine-grained intermediate dike about 3 feet thick. Trends N. 30° W. and dips 40° N. Note chilled contact against the sedimentary rocks.

13. This is "locality 4" of Dorf and Rankin (1962), from which the best specimens of flattened spiny stems of *Psilophyton* were collected.

14. Gently dipping sill of intermediate rock about 10 feet thick. Plant remains can be found in nearly every outcrop of sedimentary rocks. Reassemble here for half-mile walk out to Trout Brook. It is important to stay together as a group from this point on. If time is running short, we will not follow the stream.

15. Junction of South Branch Ponds Brook and Trout Brook. Turn right (downstream) and follow semi-trail along right (south) bank of Trout Brook.

16. "Locality 1" of Dorf and Rankin (1962). Long outcrop of gently dipping interbedded sandstone and shale of the Trout Valley Formation. Sandstone is calcareous and current bedded. Rather well preserved plant fossils have been recovered from some of the fine-grained sandstones. The erupterid scales also came from this outcrop. A fault of unknown magnitude cuts the southwest end of the exposure.

17. The Crossing. Poorly preserved but large plant fossils occur in the bridge abutment. Drivers will be ferried to South Branch Ponds to recover cars.

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