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Geology of the Stratton Quadrangle, Maine

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TRIP A GEOLOGY OF THE STRATTON QUADRANGLE, MAINE*

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GEOLOGY

The layered rocks of the Stratton quadrangle consist of a thick sequence of metamorphosed lower Paleozoic shales, sandstones, and calcareous sedimentary rocks together with several thousand feet of basaltic volcanic rocks. Large plutons of granite, diorite, and norite intrude and metamorphose the layred rocks.

The pre-Silurian rocks are restricted to the northwest corner of the quadrangle, near Eustis, and are isolated from younger metamorphic rocks by a large granite intrusion. In this area a conformable succession of three units (table 1)will be examined (stops 2, 3, and 4).

Table 1

Pre-Silurian Stratigraphy

Basaltic volcanic rocks, including flows, tuffs, and breccias	
Greenish-gray slate, some purple slate, and scarce thin sandstone beds.	
Massive sandstone, with interbedded gray slate and scarce quartz pebble conglomerate. Upper portion contains beds of felsic tuff up to three feet thick.	

The basalt lies unconformably below Silurian rocks at Jim Pond in the Spencer quadrangle where the southwest end of the Moose River synclinorium is exposed.

Rocks of Silurian and Devonian(?) age underlie the remainder of the Stratton quadrangle. A thin-bedded unit of Silurian (?) age is characterized by layers of calcsilicate minerals and crops out in an anticlinal structure on the south side of Bigelow Mountain (stops 5 and 7). A similar cal-silicate hornfels at Limestone Hill in the northeast corner of the quadrangle contains Silurian fossils. Above these rocks is a thick sequence of gray slates which contain abundant sandstone beds and which often show cyclical bedding (stop 9). The slates are tentatively correlated with the Early Devonian gray slates of the Littleton formation in New Hampshire and those of the Moose River synclinorium in Maine.

A large well-differentiated pluton consisting mostly of norite is present in the southeast portion of the Stratton quadrangle. We shall examine the norite near its upper contact (stop 6) and examine the more mafic layered rocks of the lower part (stop 8). A granite (stop 1) underlies the basin of Flagstaff Lake and is the youngest rock in the quadrangle

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The granite is rimmed by an older diorite intrusive. The diorite also underlies the valley of the South Branch of Dead River. The diorite may be essentially the same age as the norite.

Trip A. Road Log
Leader: Andrew Griscom

Quadrangle maps needed: Rangeley, Kemmebago Lake, Stratton, Little Bigelow Mountain, Kingfield. The stops are in the Stratton and Little Bigelow Mountain quadrangles.

Assembly point: In Rangeley at the junction of Routes 4 and 16. Park on Route 16 headed north.

Time: Meet at 8:45 A.M., Saturday, October 8. This road junction is 43 miles from Rumford.

Mileage

0.0 Junction of Routes 4 and 16. Proceed north on Route 16.

3.7 Dynamited boulders of garnet-bearing gabbro and diorite are abundant along the road for the next five miles. Many bolders contain inclusions of massive bluish-gray cordierite. These hybrid rocks occur near the contacts of the large diorite and gabbro intrusive which underlies the valley of the South Branch of Dead River.

4.8 Bridge across South Branch of Dead River. Road ascends onto an esker and follows it for the next mile. View of Saddleback Mountain to southeast.

16.9 Bridge across Nash Stream. Outcrops of hornblends diorite and porphyritic granite which intrudes the diorite.

17.5 Stop 1: Dynamited bolder of porphyritic granite on north side of road. Note oriented phenocrysts and biotitic schlieren. The porphyroblasts (?) within the schlieren are similarly oriented. Elsewhere good outcrops of the granite show all gradations between angular diorite inclusions and biotite-rich schlieren.

18.6 Outcrops of granite

19.3 Stratton. Junction of Routes 16 and 27. Turn left and head north on Route 27. The next three miles of road after crossing the bridge over the Dead River is on an outwash plain.

23.0 Road junction at the Cathedral Pines. Benedict Arnold and his men passed through here on their march up the wilderness of the Dead River to attack Quebec. Turn left on paved road to Eustis Ridge.

23.7 Road crosses contact of diorite with the sedimentary and volcanic rocks of Eustis Ridge. Contact is thought to lie at the bottom of the hill. The lack of metamorphism higher than chlorite zone in

the sedimentary rocks near the contact suggests that it may be a fault.

23.9 Outcrop of diabase dikes intruding slates.

24.4 Turn right onto dirt road

25.0 Stop 2: Park at sharp left turn in road. Climb through field to knob three hundred feet east of corner. This knob is at the nose of a very steeply plunging fold cut by diabase dikes which are not folded. The dikes may be offshoots from the diorite pluton. The layered rocks are massive beds of felsic tuff with interbedded gray slates and sandstones. Continue to another knob three hundred feet to the northeast. The view is one of the finest in Maine, a 360-degree panorama of mountains. The rock is a gray slatey tuffaceous siltstone stained brown by the weathering of pyrite. The beds are sheared and folded. Two hundred yards to the north on the north side of the cleared field are outcrops of sandy siltstones and gray slates. To the north the slates predominate over the coarser beds and this sandy, volcanic sequence grades upward into the green slates seen near Eustis. Return to Cathedral Pines.

27.0 Road junction at Cathedral Pines. Turn left (north) on Route 27.

27.9 From here to Eustis the road lies on one of the large eskers so common in Maine river valleys.

28.9 Kettlehold on west side of road.

29.3 Eustis. Outcrops of greenish-gray slate.

29.7 Stop 3: Outcrop of greenish-gray slates. Steeply plunging intersections of bedding and cleavage. This unit underlies the rocks of stop 2.

29.8 Road crosses Tim Brook and ascends on to outwash plain.

31.2 Stop 4: Outcrops of basaltic volcanic rocks. Mineral assemblage is chlorite-epidote-actinolite-albite. There are veins of epidote, calcite and asbestos. Return to Strattton.

43.1 Stratton. Junction of Routes 16 and 27. Turn left (east) on combined Routes 27 and 16.

44.1 Road ascends esker and is on or beside it for three miles. This esker shows clearly on the topographic map and is over seven miles long.

47.7 Stop 5: Bridge across Stoney Brook. Park in clearing on south side of road. Walk south about one hundred yards on dirt road following west bank of brook. First outcrop is beneath a fifteen foot erratic boulder in the brook. This is a typical example of the calc-silicate unit in an area where the siltstone and subgraywacke have been converted to a gneiss and the bedding destroyed, leaving a swirled foliation. Bedded fragments of the calc-silicate layers were more

resistant to this process and are preserved in random attitudes, having the appearance of inclusions.

An amphibolite crops out at the first sharp bend in the stream. Near the cross-cutting granitic pegmatite dikes the hornblende is transformed into biotite. The amphibolite is probably a metamorphosed mafic dike.

47.8 A good view of Bigelow Mountain to the north. The crest of this range is a stillimanite-cordierite hornfels along the south side of the granite intrusive which underlies Flagstaff Lake.

50.9 Bigelow. To the south is the Sugarloaf Mountain ski area on Maine's second highest mountain (4237'). All the mountains in view are composed of norite, the contact of which passes through Bigelow. The skyline peaks are underlain by the more mafic layered rocks in the lower part of the intrusion. For the next nine miles the road lies within the norite and parallels the contact which is on the slopes half a mile to the north.

54.5 Stop 6: Public camp site at bridge crossing stream. Start fifty feet below stream junction and walk south bank of Carrabassett River. Norite contains biotite and hornblende because of proximity to upper contact. At stream junction cross the contact of a muscovite-biotite granite dike. Granite continues for three hundred feet, followed by fifty feet of biotitic norite. The norite then grades rapidly into a biotite diorite which locally contains up to seventy percent garnet. Occasional cordierite inclusions occur. The diorite is a hybrid rock formed at the contact between norite and a sillimanite-cordierite hornfels. More typical norite crops out fifty feet upstream from the diorite.

57.2 Carrabassett. Turn left (north) on dirt road.

57.5 Turn left on dirt road just before passing red barn. As many cars as possible will be left here because it will be difficult for a procession of cars to turn around on the road.

61.0 Stop 7: Town line. Gate on bridge crossing a brook. Park so that cars can pass. Descend stream which contains numerous outcrops of well-bedded calc-silicate unit. Cross a hundred foot wide amphibolite dike with chilled contacts. Small whitish spots in the aluminous beds are andalusite. An anticline one hundred feet beyond the dike has a coarsely rodded appearance at the crest because of incipient boudinage. Below here the stream descends a spectacular series of falls in a gorge cut in an amphibolite intrustion. Granite pegmatite and aplite dikes cut across the amphibolite. The easiest route down is along the east bank. Return to Carrabassett.

64.8 Carrabassett. Turn left (southeast on Routes 27 and 16.

65.9 Stop 8: Spring Farm. Norite outcrops in the river under the bridge show compositional layering, including thin layers of anorthosite. Some layers contain poikilitic hypersthene crystals up to two inches

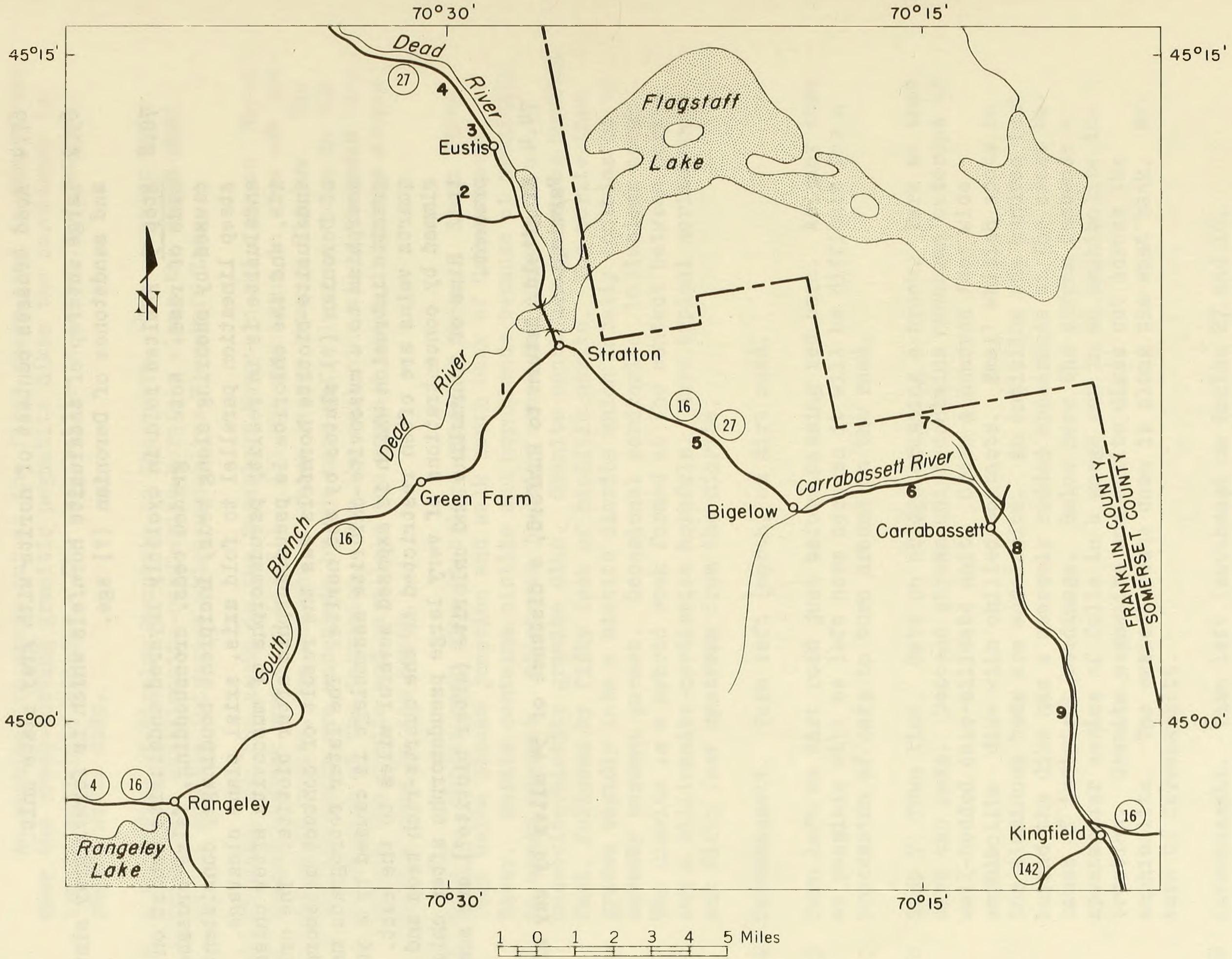
long. Note the alteration to green chlorite-actinolite-albite assemblages adjacent to thin veins.

67.4 Road crosses contact of norite with gray slate unit.

69.2 Large outcrop of andalusite hornfels which is former gray slates and sandstones of Deronian (?) age.

70.8 Stop 9: Faulted fold in cyclicly layered andalusite schist on west side of road. Note: graded beds, crossbedding, false crossbedding caused by shearing along beds, incipient boudinage, consistent steep lineation parallel to fold axis, axial plane cleavage. The andalusite is in reality pseudomorphs of muscovite after chiastolite, and the chlorite is pseudomorphic after biotite. The original andalusite-biotite hornfels was the result of contact metamorphism of Deronian (?) slates by the norite. The later retrograde metamorphism to a muscovite-chlorite assemblage is caused by a younger granite intrusion which is exposed several miles to the east. The quartz veins are often restricted to the quartz-rich beds and are rimmed by concentrations of very large pseudomorphs after chiastolite. Rims of tourmaline and chlorite (after biotite?) are sometimes present.

74.4 Kingfield. Return to Rumford, a distance of 54 miles by way of Farmington.



ROAD MAP FOR TRIP A

Note: Numbers indicate stops