

AGE OF THE KATAHDIN GRANITE*

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ABSTRACT. The contact of the Katahdin granite with Silurian strata is exposed opposite the new power house just below Ripogenus Dam, Piscataquis County, Maine. The granite is intrusive into the Silurian strata but has had very little effect upon them. It is probable that the granite is of post-Early Devonian age because its relatively fresh condition indicates that it was emplaced subsequent to the Acadian orogeny, which in this area folded beds as young as late Early Devonian.

INTRODUCTION

The age of the numerous bodies of granitic rock exposed in the northern Appalachians is a major problem in the geology of that region. Only in a few places have the contacts between these granitic bodies and the adjacent stratified rocks been observed. In still fewer places have fossils been found in the stratified rocks adjacent to these contacts. It is the purpose of this note to describe the nature of the contact between the Katahdin granite and the strata it intrudes, as observed on the West Branch of the Penobscot River below Ripogenus Dam (fig. 1, loc. 2) in central Maine.

The Katahdin granite¹ below Ripogenus Dam is probably of post middle Silurian age as shown by its intrusive relationships with beds underlying those that contain middle Silurian fossils. It possibly postdates the regional deformation, as indicated by the unaltered appearance of the granite and the presence near the contact of veinlets containing fresh stilbite crystals. The youngest deformed strata in the region are of Early Devonian age.

Formal names for seemingly new stratigraphic units are not here proposed because field work has not been sufficient to establish the validity and lateral relationships of these units.

STRATIGRAPHIC RELATIONSHIPS NEAR THE CONTACT OF THE KATAHDIN GRANITE

It is pertinent first to consider the stratigraphy of the adjacent stratified rocks. A well-exposed section of these strata is present in the vicinity of Ripogenus Dam (fig. 1, loc. 1).

The oldest stratum, exposed on the west side of Ripogenus Dam, is basalt. Fisher (in Willard, 1945, p. 67), suggested that the term "Ripogenus volcanics" be applied to the basalt, but the name Ripogenus is preoccupied by Toppan's Ripogenus [Ripogenus] series (Toppan, 1932, p. 71). Basalt of similar appearance is present in that portion of Piscataquis County bordering Ripogenus Lake and extending to the southwest in the direction of Kokadjo. The top of the basalt is well exposed in the gorge of the Penobscot River below the dam, but the base has not been observed. The total thickness, therefore, cannot be determined. Examination of exposures and of drill cores taken from the vicinity of a new power development in Ripogenus Gorge shows that the basalt is at least a few hundred feet thick. It consists of several separate flows, most of them less than a few tens of feet thick where studied in the vicinity of Ripogenus Dam. To the northwest on Chesuncook Lake (fig. 1,

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¹ Katahdin granite of Toppan (1932, p. 69).

loc. 3) coarse agglomerates and boulder breccia are present, and their lithologic similarity to the basalt at Ripogenus Dam suggests that they are correlative with it.

Overlying the basalt below Ripogenus Dam is a discontinuous band of specular hematite that is about half an inch thick. This layer of hematite may be a dehydrated and much compressed remnant of limonitic weathering products derived from the underlying basalt prior to the deposition of the overlying conglomerate.

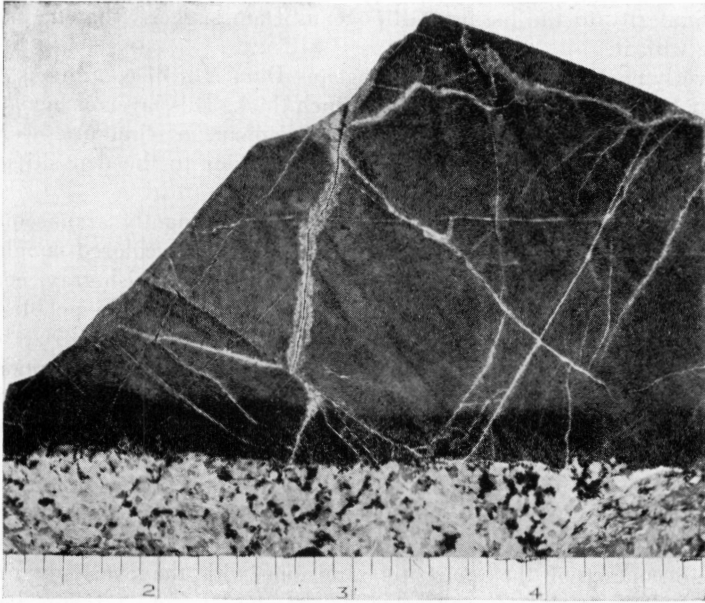
The specular hematite is overlain by predominantly arenaceous beds, which consist of about 10 to 15 feet of a basal, dark-colored conglomerate that grades up into about 20 to 30 feet of buff to greenish-gray, coarse- to medium-grained, massive quartzitic sandstone. Most of the pebbles in the conglomerate consist of white and hematite-stained vein quartz, have an average diameter of about an inch, and are moderately well rounded. The argillaceous material surrounding the pebbles is hematiferous, as indicated by its red streak. No fossils have been recovered from the conglomerate or the quartzitic sandstone. The age of the hematite, as well as that of the underlying basalt, is thought to be either early or middle Silurian because it is no more deformed than the overlying Chesuncook limestone of Fisher (in Willard, 1945, p. 67), which contains a fauna of middle Silurian (Niagaran) age. The contact of the quartzitic sandstone with the overlying limestone (Willard, 1945, p. 67) is characterized by several feet of relief. The basal portion of the limestone contains sand grains similar to those in the underlying quartzitic sandstone.

The relationships of some of the rock units on Chesuncook Lake suggest that relative degree of deformation may be a valid criterion for discriminating between strata laid down before and those laid down after the Taconic revolution in this area. At location 5 (fig. 1), on the southeast shore of Chesuncook Lake, highly deformed, olive-drab, phyllitic slate (possibly of Cambrian and Ordovician age) interbedded with much-fractured gray quartzite appears to underlie less-deformed, fossiliferous beds that are lithologically similar to Fisher's Chesuncook limestone. The actual contact has not been observed at location 5 (fig. 1), as the shore in that locality is covered by glacial debris. It is notable that the basalt and probably the quartzitic sandstone, both of which are present at Ripogenus Dam, are not present beneath the fossiliferous limestone at location 5. This hiatus is inferred to be due to an unconformity, of at least local significance, at the base of Fisher's Chesuncook limestone that possibly cut out the quartzitic sandstone and the basalt. Alternate explanations are that the units involved are highly variable in thickness or that the junction is a fault rather than a sedimentary contact.

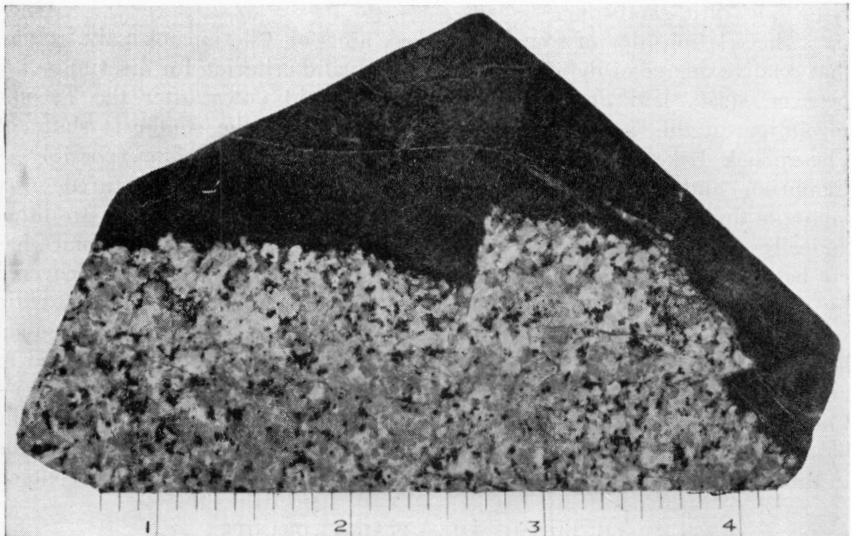
CONTACT OF THE KATAHDIN GRANITE

The contact of the Katahdin granite with the above-described sedimentary units is about a quarter of a mile downstream from the dam, in the vicinity of the new powerhouse. Just to the south of the powerhouse, on the west side of the Penobscot River, the granite cuts across the basalt (pl. 1). Xenoliths of basalt up to 8 feet in diameter are present in the granite adjacent to the

PLATE 1



A. Contact of Katahdin granite and quartzitic sandstone (note the narrow band of discolored quartzite).



B. Contact of the Katahdin granite and basalt that underlies the quartzitic sandstone. Scales show inches and tenths of inches.

contact. Granite also intrudes the basalt to the north, in the tunnel that carries water from the dam to the powerhouse (oral communication, Irving Crosby, 1952). On the east bank of the river, opposite the powerhouse, layers of

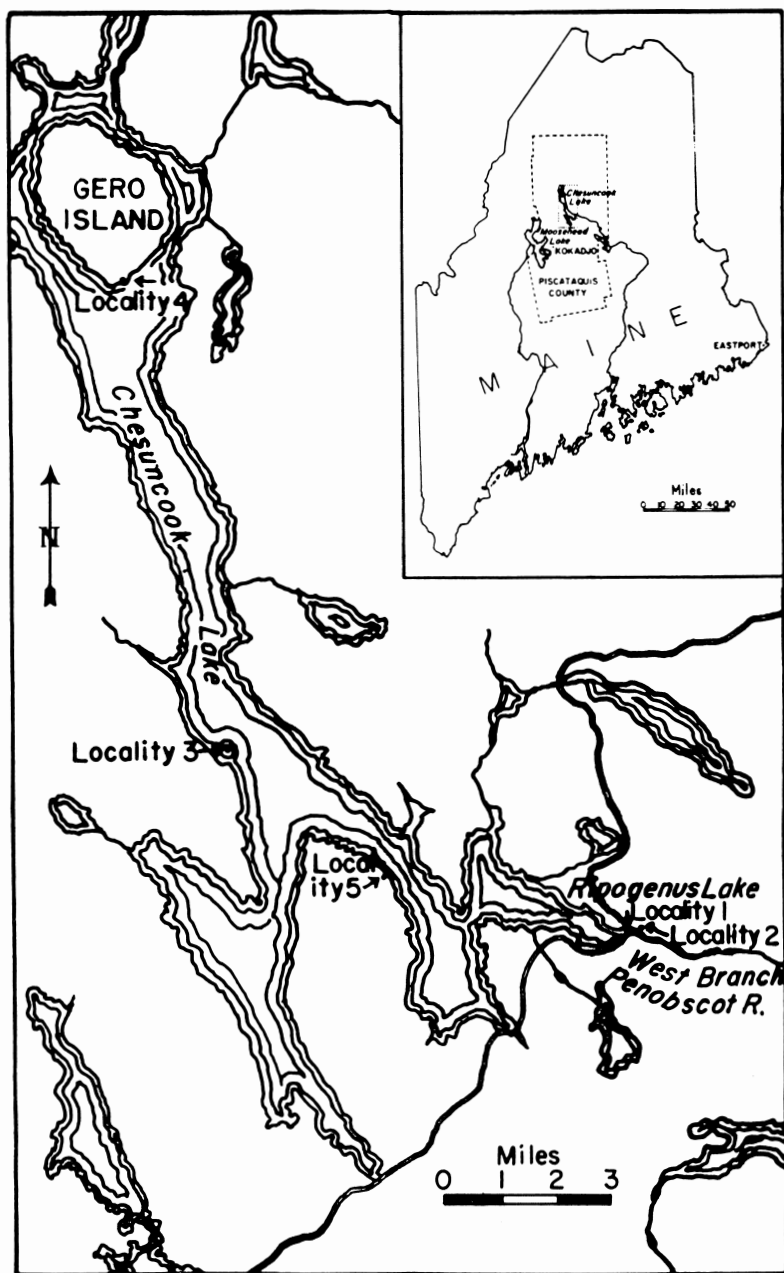


Fig. 1. Chesuncook-Ripogenus Lake area, Piscataquis County, Maine.

granite up to a foot thick are in lit-par-lit relationship with the quartzitic sandstone. The granite has not altered the intruded strata at this locality, with the exception of a discolored rim a few inches wide (thin sections of this rim contain shreds of biotite not present in the adjacent sandstone). Some of the joints in the sandstone near the contact are coated with 1-mm crystals of stilbite. These layers of granite may be traced to the south directly into the main body of granite that abruptly cuts off the quartzitic sandstone strata and the basalt. Elsewhere in the vicinity irregular-shaped bodies of granite crosscut the quartzitic sandstone.

According to Toppan (1932, p. 72), "the Katahdin granite is intrusive into this series [his Ripogenous series] as it cuts the quartzites about midway of the Ripogenous Gorge." At the locality to which he refers (loc. 2 on fig. 1) the granite cuts the quartzitic sandstone (his "coarse grit") rather than "the quartzites" (which he reports as overlying what Fisher later (1941) called the Chesuncook limestone). Toppan undoubtedly observed the relationships of his Katahdin granite and the quartzitic sandstone at this locality but his report is not clear on this point.

The contact of Fisher's Chesuncook limestone and the granite is not exposed at this locality. It seems likely that the relationship between the limestone and the granite is intrusive, i.e., like that between the granite and the strata that underlie the limestone.

To the north of Ripogenus Lake on the southern end of Gero Island (loc. 4, fig. 1) in Chesuncook Lake is exposed a gray slate, similar in its lithology to the Seboomook slate (of Perkins, 1925, p. 375). This slate is reported by Perkins to be of Silurian age. The slate on Gero Island, however, has yielded a fauna of Oriskany age that includes the following fossils: *Platyceras* sp., *Beachia thunii*, *Follmanella mainensis*, *Leptocoelia flabellites*, pelmatozoan columnals, an unidentified orthoceracone, an unidentified encrusting bryozoan, *Meristella* sp., *Isorthis?* n. sp., *Dalmanites*, or *Odontochile* (identification by A. R. Palmer). This slate is deformed to no less a degree than the strata of Silurian age in this part of Piscataquis County. It seems likely, therefore, that both the Silurian and the Lower Devonian strata in this part of northern Maine were deformed simultaneously. The unaltered condition of the Katahdin granite seems to preclude the possibility that the granite had been intruded into the strata exposed on the West Branch prior to the deformation that affected the adjacent strata of Lower Devonian age, and that it was possibly intruded subsequent to the folding that affected both the Silurian and the Lower Devonian strata of this region. The time of this folding is thought to be Middle Devonian, although no direct evidence is available in Piscataquis County. The nearest area in which Acadian folding has been demonstrated is the vicinity of Eastport, Maine (Bastin and Williams, 1914).

REFERENCES

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