63-82



## EXPLANATION

**Dcp**

Gray quartz monzonite

This biotitic, commonly gray quartz monzonite intrusive, herein informally referred to as the Quartz Monzonite of Center Pond, extends north, east, and south from Lincoln, and is foliated where crossed by Route 6 from Lincoln toward Lee. Also, a few bands or lenses of biotite-rich fine-grained granite were noted along the road 3/4 mile southeast of Caribou Pond, where pinkish phenocrysts of feldspar 1/4 inch by 1 inch were observed; commonly, the texture is 1/4 inch or smaller, and near the contacts, 1/8 inch. The biotite-rich bands range from 1/4 to 4 inches thick and from 2 to 12 inches long, are oriented N. 55° E., dip vertically, and are concentrated in an area of 7 by 7 feet. These bands are not quite parallel with foliation. The rather poorly-developed foliation is shown by the alignment of biotite in most outcrops, and in places the feldspars are aligned parallel with the biotite. This foliation is also developed at the eastern contact, with which it is approximately parallel, and north of Ambolassas Pond. Presumably, it is primary, controlled by size and shape of the small intrusive. Most of the contact of this mass has been taken from the work of Doyle, Young, and Wing (1961). The age of a sample from along the Highway south of Center Pond was determined as about 370 million years by the lead-alpha method (Stern, T. W., written communication, March 23, 1962), or 349 m.y. by the potassium-argon method, (Thomas, H., Marvin, R., and Elmore, R., written communication, July 2, 1962). The age of the same sample was determined as 350 m.y. by the rubidium-strontium method, but with a very high (100 m.y.) uncertainty factor because of a large amount of normal relative to radiogenic strontium (Hedge, C. E., and Walthall, F., written communication, July 2, 1962). The hornfels zone of this small intrusive may extend farther north than indicated, as the result of a possible low-angle dip of the contact; topography indicates the possibility of such an extension.

**Db**

Gray and pink quartz monzonite

The main mass of this rock, as exposed in the Springfield and Scraggly Lake quadrangles, and which here is informally referred to as the Quartz Monzonite of Bottle Lake (Db), is a gray and pink coarse-grained (1/4 to 1/2 inch average) biotitic or hornblendic and porphyritic quartz monzonite pluton that extends from the White quadrangle southwestward into and westward across the Scraggly Lake and Springfield quadrangles into the Winn quadrangle (Rand, 1958; Doyle, Young, and Wing, 1961). It is well-exposed one mile northwest of Bottle Lake, along the road from Springfield southerly to that lake. In the Springfield quadrangle, where rounded and euhedral phenocrysts of potassic feldspar as large as 1 1/4 inches by 1 inch have rapakivi textures. Randomly-oriented, rounded gray phenocrysts are present 1/2 mile southeast of Mattakeunk Pond, and east of Porcupine Mt., in the Winn quadrangle. Porphyritic texture is common, and phenocrysts two inches long and 1 inch across are not uncommon. The northern contact of this rock is exposed in a recent cut along the St. Croix Paper Company pulpwood haulage road northwest of West Musquash Lake, in the Scraggly Lake quadrangle. In the Winn quadrangle, the northern contact is exposed southeast of Mattakeunk Pond, and where shown elsewhere is chiefly from the work of Doyle, Young, and Wing (1961). The hornfels zone is unusually wide, probably because the contact dips northward at an angle of less than 45 degrees. The distribution of the pink and gray rock is random rather than systematic. The hornblende content appears largest near inclusions, as along the road between Middle and Upper Chain Lakes, in the Grand Lake quadrangle to the southeast. The age of a sample taken from the Bottle Lake locality is about [illegible] million years, as determined by the lead-alpha method (Stern, T. W., written communication, March 23, 1962), or about 342 million years, as determined by the potassium-argon method (Thomas, H., Marvin, R., and Elmore, R., written communication, July 2, 1962). The age of another sample of this rock taken from along the road from West Musquash Lake to Upper Chain Lake, in the Grand Lake quadrangle, is 370 million years by the lead-alpha method, or 349 m.y. by the lead-[illegible] (Stern, Thomas and Elmore, 1962). [illegible] considerable difference in age of the two samples has not been determined.

DEVONIAN

**Sk**

Kellyland Formation

Gray metasiltstone, metasandstone, and slate

The Kellyland Formation of Silurian(?) age, named for the village closest to its largest and most representative outcrop at Grand Falls of the St. Croix River, in the Kellyland quadrangle, Maine, where it was mapped by the author and S. S. Severson, is interbedded sericitic pale gray metasiltstone, arenaceous metasiltstone, argillaceous metasandstone and quartzite, and thin beds of darker gray slate. Most beds contain iron carbonates; the metasiltstone and coarser beds contain more carbonate than does the slate. Some of the coarser beds are tuffaceous. Slate commonly occurs in beds from 1 to 8 inches thick and locally from 1/8 inch to 3 or 5 feet thick. In the Winn quadrangle, the metasedimentary rocks have certain features characteristic of the Kellyland; differences are believed to be variations or facies of that formation, and may represent a member not well-exposed in the Kellyland quadrangle. The dark gray slate in places has poorly developed cleavage or is phyllitic, rarely almost schistose. Iron carbonate-bearing metasiltstone and slate are well-exposed along the main road from Lincoln eastward through Lee, and along Route 2 to the north in the Patten-Weskeag quadrangle. The metasiltstone beds commonly range from 1/4 inch to 4 feet in thickness, locally reaching 20 feet. In places, beds of metasiltstone contain thin laminae of light and dark metasandstone, or are interbedded with it in 1/8 to 1/2 inch layers. Thin beds of quartz granule metaconglomerate are associated with metasandstone and quartzite in places, such as along the Penobscot River south of Winn. The metasiltstone beds in many places have good gradation in texture, and cross-bedding. In general, the metasedimentary rocks are thinner-bedded, more marbelly, darker, quartz-rich, and carbonate-rich than rocks of the typical Kellyland; rocks northwest of the Penobscot River, and part of Lee are [illegible]. The average content of clay in the formation typically is about [illegible] percent, and the thickness of the formation has not been ascertained because of the lack of good key beds, continuous outcrops, and much isoclinal folding; however, it appears to exceed 1,000 feet. The Kellyland Formation is the stratigraphic equivalent of at least part of the Pole Argillite Division of the Charlotte Group in New Brunswick (Alcock, 1946), and in the Calais quadrangle, Maine (Chase, 1963), and is believed to be the stratigraphic equivalent of map unit Sss in the Danforth and adjacent quadrangles.

SILURIAN(?)

## References

Alcock, F. J., 1946, Preliminary map, Scoresby: New Brunswick: Canada Geol. Survey Paper 46-3, geologic map with descriptive notes, scale 1 inch = 1 miles.

Chase, D. E., 1963, Petrology and age of plutonic rocks, extreme southeastern Maine: Geol. Soc. Amer. Bull. v. 74, p. 189-194, map scale approx. 1:125,000.

Doyle, R. G., Young, R. S., and Wing, L. A., 1961, A detailed economic investigation of aeromagnetic anomalies in eastern Penobscot County, Maine: Dept. Econ. Devel., Maine Geol. Survey Spec. Econ. Studies Ser. 1, [illegible] p., map scale 1:62,500.

Stern, T. W., Thomas, H. H., and Elmore, P. L. D., 1963, Ages of intrusion and metamorphism in the Northern Appalachians: Am. Jour. Sci., v. 261, p. 1-19, index map, 1 inch = 50 miles.

Rand, J. R., 1958, Aeromagnetic and geologic reconnaissance survey of portions of Penobscot, Hancock and Washington Counties, Maine: Dept. Econ. Devel., Maine Geol. Survey BP and G Survey 3, geologic descriptions and 9 sheets of maps and sections, scale 1:62,500.

Outcrop or group of outcrops

Contact

Solid line where observed, long dashed where approximately located, short dashed where inferred

Approximate limit of hornfels zone

Stippled area has been contact metamorphosed

Shear zone

Crenulated rocks

Direction and plunge of minor fold

Minor folds

Strike and dip of beds

Dot indicates top of beds known from sedimentary textures or structures

Strike of vertical beds

Dot indicates top of beds known from sedimentary textures or structures

Strike and dip of overturned beds

Dot indicates top of beds known from sedimentary textures or structures

Strike and dip of foliation

Strike of vertical foliation

Strike and dip of foliation and beds where parallel. Dot indicates top of bed known from sedimentary textures or structures

Strike and dip of slaty cleavage

Strike of vertical slaty cleavage

Strike and dip of slaty cleavage and beds where parallel. Dot indicates top of bed known from sedimentary textures or structures.

Strike of vertical slaty cleavage and beds where parallel. Dot indicates top of beds known from sedimentary textures or structures

Strike and dip of overturned beds and slaty cleavage where parallel. Dot indicates top of beds known from sedimentary textures or structures

Quarry