EXPLANATION

UPPER DEVONIAN — MISSISSIPPIAN

Mds

Reddish conglomerate and siltstone

Soft red, pink, and gray carbonate-and non-carbonate-bearing siltstone and hard gray-green quartzite in angular to rounded pebbles in a red and gray calcareous matrix, and brownish-red siltstone comprise the downfaulted rocks in this quadrangle. The rock is chiefly a "sharpstone-conglomerate" at the outcrop west of Route 1 south of Waite; a glacial boulder of siltstone was found one-half mile southwest of Waite, and a large erratic of conglomerate on the southwest shore of Berry Brook Flowage. Similar rocks are found along continuations of the faults and shear zones, and others of the same general trend northeast in the Kellyland quadrangle and as far southwest as the Nicatous Lake quadrangle (Rand, 1958; Hall, Bradford, written communication, Sept. 21, 1962), where studied by the writer.

DEVONIAN

Dbt

Red granite

This rock, herein informally referred to as Topsfield granite, is a reddish to pinkish facies of a large gray and pink coarse-grained porphyritic quartz monzonite pluton extending southwestward, and which here is informally referred to as the Bottle Lake quartz monzonite. The latter is well-exposed one mile northwest of the lake, along the road from Springfield southerly to Bottle Lake, in the Springfield quadrangle (Rand, 1958; Doyle, Young, and Wing, 1961). The Topsfield granite, well-exposed along Route 1, 2.5 to 3.5 miles north of the village of Topsfield, is chiefly a pinkish red aggregate of microcline, quartz, plagioclase, and a little muscovite, biotite and hornblende. Texture is medium-to coarse-grained, the average size of feldspar crystals being about 1/4 inch. Rapakivi texture has been observed (Forsyth, 1955), as have traces of pyrite. Along the northern boundary of the granite, where crossed by Route 1, the rock is light gray and contains very little mica or hornblende; here the texture is similar to the red granite. The width of this zone or facies is about one-fourth mile. A 6-inch pink aplite dike cuts the red granite along Route 1. The rock is strongly jointed and sheared in a northwesterly direction, and weathering and erosion have penetrated deeply along these planes. A sample of this rock taken along Route 1 contained 0.003 percent eU, and 0.001 percent U (Nelson and Narten, 1951). Age of the rock, as determined on a sample from along Route 1, is 372 million years by the potassium-argon method, or 400 m.y. by the lead-alpha method (Faul, Stern, Thomas, and Elmore, 1963). This granite is quite different from that (Chiputneticook quartz monzonite) in the Danforth, Forest, and Vanceboro quadrangles, and from the main part of the Bottle Lake pluton in Scraggly Lake and adjacent quadrangles to the west. The age of a sample from the major part of the pluton at the Bottle Lake locality is about 342 million years, as determined by the potassium-argon method (Thomas H., Marvin, R., and Elmore, P., analysts, U. S. Geol. Survey, written communication July 2, 1963). The age of another sample of this rock taken from along the road from West Musquash Lake to Upper Oxbow Lake, in the Scraggly Lake quadrangle, is 370 million years by the potassium-argon method, or 380 m.y. by the lead-alpha method (Faul, Stern, Thomas and Elmore, 1963).

Dw

Gray and pink quartz monzonite

This rock, herein informally referred to as the Wabassus Mountain quartz monzonite, is best exposed along the road to Wabassus Lake between Grand Lake Stream village and Grand Lake Brook, and along the east shore of Grand Lake north of the dam at Grand Lake Stream, where it has been mapped by the author. The prominent Wabassus Mountain is made up of this rock (Rand, 1958). The northeastern tip of the pluton extends into the southwest corner of the Waite quadrangle, at Amazon Mountain. The rock is medium to coarse-grained, with one-fourth to one-half inch average grain size and potassic feldspar phenocrysts one-fourth by one inch. The rock commonly is light gray but in places is pink or flesh-colored; dark minerals generally are biotite and hornblende, the latter being more common near inclusions and borders of the pluton.

Dd

Hornblende diorite

This rock was found only in three very small, closely-spaced islands in Berry Brook Flowage near the mouth of Berry Brook. The rock has a typical coarse-grained salt-and pepper appearance. Dark green to black hornblende in crystals averaging one-eighth to three-sixteenth inches long, in places replacing a nearly colorless amphibole containing much magnetite dust, occurs with white plagioclase and orthoclase, and greenish-black biotite, much of which has altered to chlorite. Perhaps one-half of the plagioclase has altered to sericite without regard for fractures, crystal zoning, etc. Some poikilitic feldspar phenocrysts are one-half inch in diameter. The biotite commonly contains zircon. This diorite appears similar to some in the large mass of diorite-gabbro mapped by the author in the Big Lake quadrangle to the south.

SILURIAN

Sd

Daggett Ridge Formation

Quartzite, metaconglomerate, metasiltstone and slate

The Daggett Ridge Formation is named for the ridge on which the rock is best exposed in the Danforth quadrangle, Maine; its type locality is along and south of the Maine Central Railroad. Chloritic argillaceous quartzite, quartzite conglomerate with fractured pebbles and cobbles as large as 8 by 12 inches, gray and gray-green slate and metasiltstone, and thin lenses of magnetite-bearing interbedded black slate and metasiltstone comprise the formation. The slate and metasiltstone unit crops out in the eastern part of the Wytopitlock quadrangle, Maine, and is believed present in other parts of the Danforth and nearby quadrangles on aeromagnetic evidence. Thin green cherty lenses of rhyolitic metatuff occur along Baskhegan Stream near South Bancroft in the Danforth quadrangle. The formation is exposed over a width of about 8,000 feet in the Danforth quadrangle, where quartzite and metaconglomerate form most of the thickness, which is estimated to be several hundreds to one thousand or more feet. Inadequate exposures and isoclinal folding prevent an accurate determination of thickness of the formation or any of its members. The formation is assigned a Silurian age based upon meager paleontological evidence; a single dorsal valve of an orthoid brachiopod with branching costae and an apparent faint concentric ornamentation was found in the conglomerate unit. The formation is indicated as Sq in the [illegible]

SILURIAN (?)

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. Svenson, is interbedded sericitic pale gray metasiltstone, arenaceous metasiltstone, argillaceous metasandstone and quartzite, and thin beds of darker gray slate. In general, outcrops of this formation in Waite appear to be slightly darker than in the Kellyland quadrangle. Many 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 6 inches thick and locally from 1/8 inch to 3 or 4 feet thick. The metasiltstone and metasandstone beds commonly range from 4 inches to 4 feet in thickness, ranging locally to 20 feet. Rarely, beds of metasiltstone contain thinly laminated layers of light and dark metasandstone. Thin beds of quartz granule metaconglomerate are associated wtih metasandstone and quartzite beds in places. The metasiltstone beds in many places show good gradation in texture and cross-bedding. The average content of slate in the formation is about 20 percent, and the thickness of the formation has not been ascertained because of the lack of continuous outcrops and isoclinal folding. However, it appears to exceed 1,000 feet. The Kellyland Formation is the stratigraphic equivalent of at least part of the Pale Argillite Division of the Charlotte Group in New Brunswick (Alcock, 1946), and is believed to be the stratigraphic equivalent of map unit Sss in the Danforth and adjacent quadrangles.

CAMBRIAN — ORDOVICIAN

O€u

Cambrian or Ordovician, undifferentiated

Chloritic quartzite, and green and red slates

A considerable thickness of greenish argillaceous and chloritic quartzite, sandy metasiltstone, thin beds of green slate, and rarely thin beds and lenses of red and purplish slates comprise the rocks of unknown but presumably Ordovician or Cambrian age: there is a remote possibility of a Lower Silurian age, as was indicated more positively on the Danforth geologic quadrangle map by Larrabee and Spencer (1963). The quartzite and sandy metasiltstone, commonly in 1/4 to 1/2 inch beds separated by paper-thin laminae of green slate, have been minutely crumpled by slippage along the slate laminae, and the foliation developed was later folded. This predominantly impure quartzite unit contains beds and lenses of green slate from a few inches to 2 or 3 feet thick, and occasional lenses of red to purplish slate from 1 to 6 inches thick and commonly less than 100 feet long. Rarely, a thin pinkish quartz and feldspar granule metaconglomerate is present. These rocks are best exposed along the southeast shore of Baskahegan Lake, and the purplish-gray slate, locally much thicker, is exposed along Route 1, in the southeastern corner of the Danforth quadrangle. These rocks are well-exposed along the south shore of Baskahegan Lake in the Scraggly Lake quadrangle. The rocks extend northeastward into the Forest quadrangle, where they are well-exposed on islands in and on the east shore of Drake Lake. All except the red slate crop out along the Maine Central Railroad between Forest and Tomah stations, also in the Forest quadrangle. Although outcrops are lacking over wide areas where needed for determination of structural and stratigraphic relations with rocks of other ages, the rocks of Ordovician or Cambrian age are thought to have been faulted up into the area. A well was fruitlessly drilled for oil in these rocks at Brookton in the Danforth quadrangle, in the 1950's. Well cuttings were chloritic quartzite, and red and green slates. The well was approximately 250 feet deep when measured in 1959.

Outcrop or group of outcrops

Number refers to descriptive notes

Contact

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

Contact

Located by aeromagnetic survey

Approximate limit of bedrock area

Stippled area has been mapped reconnaissance

Vertical fault

Long dashed where approximately located; short dashed where inferred

Fault

Showing dip where known. Long dashed where approximately located; short dashed where inferred

Shear zone

Direction and plunge of minor fold

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 of vertical slaty cleavage

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

Strike and dip of layering in mafic intrusive

Strike and dip of joint

Strike of vertical joint

Glacial striae and grooves

Showing direction of ice movement

Glacial erratics

Boulders, 3 to 7 feet in diameter, of Upper Devonian-Mississippian reddish conglomerate or siltstone commonly are at or near a source fault

Paved or gravel roads

Located approximately from maps of the St. Croix Paper Company and aerial photographs

References

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

Doyle, H. A., Young, F. E., and Wing, M. R., 1961, A detailed economic investigation of aeromagnetic anomalies in eastern Penobscot County, Maine: Dept. Econ. Devel., Maine Geol. Survey Spec. Econ. Studies Ser. 1, 69 p., map scale 1:62,500.

Faul, Henry, 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.

Forsyth, W. E., 1955, Airborne magnetometer investigation in eastern Maine: Maine State Geologist Rept. for 1953-54, p. 34-35, Geologic map of the Forest City area, scale 1 inch = 4 miles.

Larrabee, D. M., and Spencer, C. W., 1963, Bedrock geology of the Danforth quadrangle, Maine: U. S. Geol. Survey GQ-221, map scale 1:62,500 (in press).

Nelson, J. M., and Narten, P. F., 1951, Reconnaissance of radioactive rocks of Maine: U. S. Geol. Survey Rare Elements Inv. Rept. 68, p. 38, 42; map, scale 1 inch = 8 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 GP and G Survey 2, geologic descriptions and 5 sheets of maps and sections, scale 1:62,500.