STRUCTURE

The metasedimentary rocks are isoclinally or tightly folded. Folds have a regional northeast trend; fold limbs are overturned in places. The Bottle Lake Quartz Monzonite pluton trend is elongate easterly; the quartz monzonite pluton at Wabassus Lake is elongate northeasterly.

Two northeast-trending faults are inferred in the area to explain the juxtaposition of the Kellyland Formation and rocks of Cambrian or Ordovician age. These faults are believed to predate the intrusion of the Bottle Lake Quartz Monzonite. A more recent, major system of discontinuous faults, later than all intrusives of Devonian age, trends generally northeasterly to east-northeasterly across map and into adjacent quadrangles. This trend is parallel to and on strike with the major Springhill Fault near Fredericton, New Brunswick, and parallel with Fundy and Lubec Faults to southeast. In Kellyland (Larrabee, 1963e), and Waite (Larrabee, 1963a) quadrangles, lenses and blocks of Upper Devonian and Mississippian sedimentary rocks, notably soft, red calcareous conglomerate and siltstone, have been downfaulted into older rocks, and in Nicatous Lake quadrangle (Larrabee, 1963f) many blocks of red and white quartzite conglomerate of Devonian to Pennsylvanian age have been downfaulted. Elsewhere, as in Scraggly Lake, Big Lake, and Wabassus Lake quadrangles, similar faults or continuations of above faults indicated by presence of large boulders of downfaulted rocks.

A third, slightly later fault system, trending west-northwest in Wabassus Lake quadrangle is believed present, accounting in part for the trend of Wabassus and Third Machias lakes.

Generally, shear zones in quadrangles of this area parallel the faults, especially those trending northeasterly. Additional faults and shear zones doubtless present in Wabassus Lake quadrangle but not shown for lack of field work in some areas, and lack of outcrops in others. Some lineaments seen on aerial photographs, but not field checked, might be faults.

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_____1963c, Bedrock reconnaissance map of the Springfield quadrangle, Maine: U. S. Geol. Survey open-file map, scale 1:48,000.
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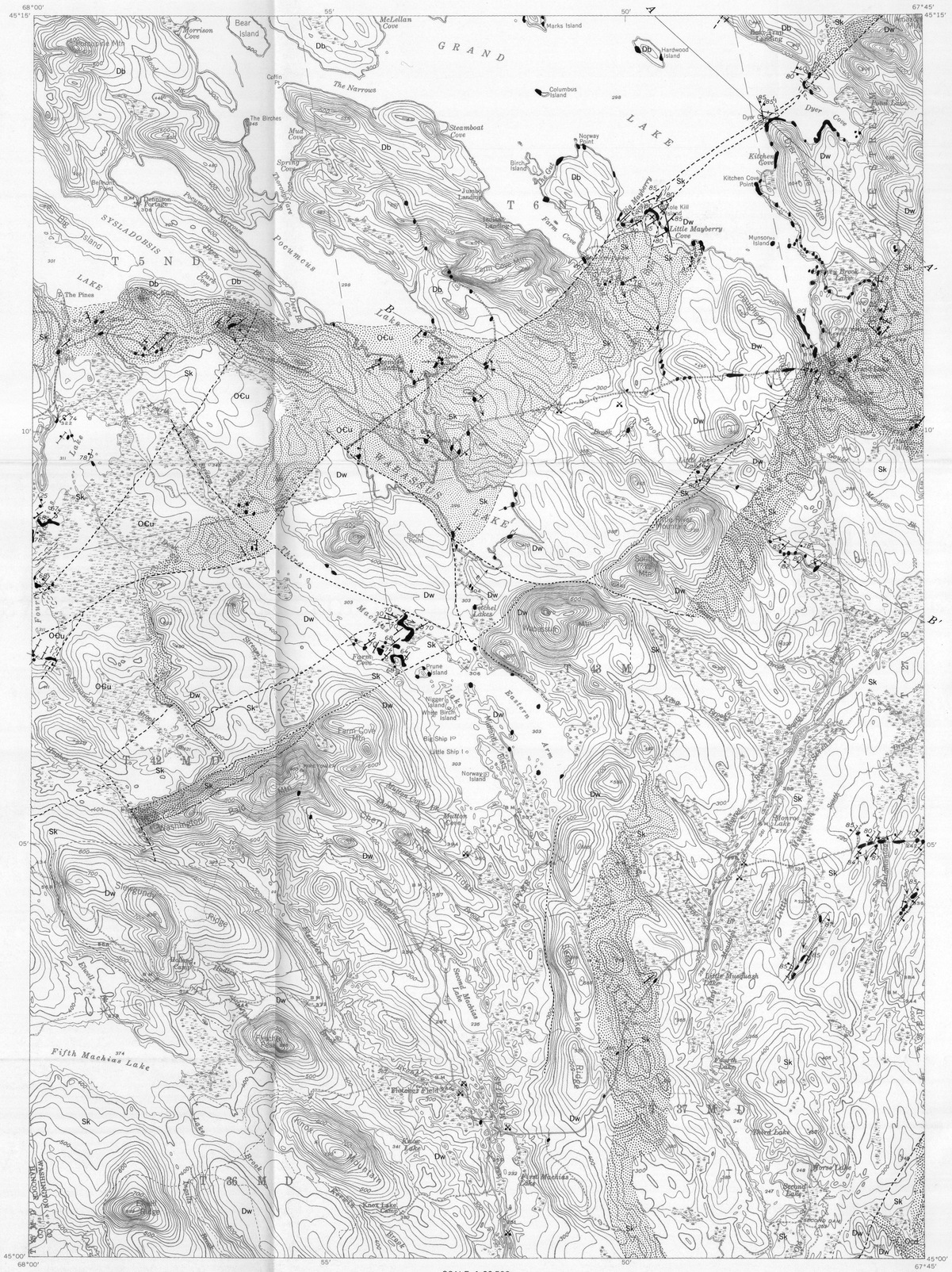


Base by U.S. Geological Survey, 1941

Additional graveled roads located approximately from maps of the St. Croix Paper Company and from aerial photographs, 1962, (in black)

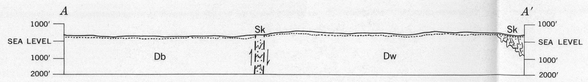
SCALE 1:62 500

1 ½ 0 1 2 3 4 5 MILES

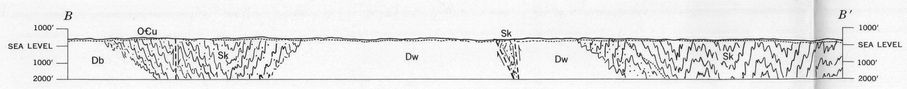
1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Geology mapped in 1962; assisted by Sven S. Svenson



Isoclinal folds shown diagrammatically



Isoclinal folds shown diagrammatically

EXPLANATION

Db

Bottle Lake Quartz Monzonite

Gray and pink porphyritic quartz monzonite, herein named the Bottle Lake Quartz Monzonite, is gray or pink, coarse-grained, biotitic or hornblendic, porphyritic quartz monzonite. Pluton extends from Waite quadrangle southwestward and westward into Scraggly Lake, Springfield, Winn, Wabassus Lake, Nicatous Lake, and Saponac quadrangles (Rand, 1958; Doyle and others, 1961; Larrabee, 1963a-d). Believed of Devonian age. Well-exposed at type locality 1 mile northwest of Bottle Lake, along road from Springfield southerly to that Lake, Springfield quadrangle, where euhedral microcline phenocrysts up to 1 1/4 inches long and 1 inch wide have rapakivi texture, and normal phenocrysts up to 1 inch by 2 inches are common. Distribution of pink and gray biotitic rock random. In Wabassus Lake quadrangle, well-exposed on points and islands in Grand Lake. Is strongly sheared at north end of Grand Lake Brook, where it contains much epidote and clinozoisite. The northeastern tip of the pluton, extending into Waite quadrangle, is referred to as the Topsfield granitic facies, being very different from the main mass. This facies is chiefly a leucocratic pink aggregate of microcline, quartz, plagioclase, with little muscovite, and less biotite or hornblende. Texture is about 1/4 inch. The rock is strongly jointed and sheared in a northwest direction, and weathering and erosion have penetrated deeply along these planes. of weakness. A gradational change from normal quartz monzonite to the pink Topsfield facies may be in the vicinity of Vickery Brook, Scraggly Lake quadrangle. Along the northern edge, where crossed by U. S. Route 1, the rock is gray and leucocratic. Age of sample from Bottle Lake locality is about 342 m.y. determined by potassium-argon method (Thomas, H., Marvin, R., and Elmore, P., written communication, July 2, 1962), or about 410 million years, determined by lead-alpha method (Stern, T. S., written communication, March 23, 1962). Age of sample from road from West Musquash Lake to Upper Oxbrook Lake, Scraggly Lake quadrangle, about 370 m.y. by potassium-argon method, or 380 m.y. by lead-alpha method (Faul and others, 1963). Age of sample from along Route 1, Waite quadrangle, is 372 m.y. by potassium-argon method, or 400 m.y. by lead-alpha method (Faul and others, 1963)

Dw

Wabassus Quartz Monzonite

Gray and pink, medium-grained quartz monzonite, best exposed on eastern shore of Grand Lake between Grand Lake Stream and Dyer Cove Point and in road from Grand Lake Stream village westward to Wabassus Lake, forms Wabassus Mountain, all in Wabassus Lake quadrangle. Believed of Devonian age. Commonly equigranular, particle size ranges from 1/8 to 3/8 inch; where porphyritic, microcline phenocrysts are 1/4 by 1/2 to 1/4 by 1 inch. Gray and leucocratic on Amazon Mountain, rock elsewhere is pink or gray, and biotitic or hornblendic

DEVONIAN

Sk

Kellyland Formation

Medium-gray, carbonate-bearing, slightly metamorphosed siltstone, silty sandstone, sandstone, quartzite, and darker gray slate of Silurian (?) age (Larrabee, 1963e). Iron carbonate is abundant in most beds other than quartzite. Some tuffaceous beds occur. Slate layers from 1 to 8 inches thick, locally 1/8 inch to 4 feet. Metasiltstone and slightly metamorphosed argillaceous sandstone from 4 inches to 4 feet thick, locally 20 feet. Rarely, thinly laminated light and dark sandstone layers occur in metasiltstone. Thin beds of slightly metamorphosed quartz granule conglomerate associated with sandstone and quartzite beds in places. Metasiltstone commonly has good graded bedding and cross-bedding. Folds are small and tight; bedding tops reversed within short distance. Most wells in this unit yield hard water. Hornfels near contact with granitic rocks contains biotite, scattered magnetite, pyrite, and cordierite retrograded to sericite, chlorite, and quartz aggregates that weather out, leaving pits; these increase in size toward contact, where in places they are size and shape of rice grains. Thickness of formation not ascertained because of lack of outcrops and key beds, and also because of isoclinal folding. No identifiable fossils unquestionably from this formation have been reported

SILURIAN (?)

Ocd

Dark Argillite Division of Charlotte Group of Alcock (1946)

Includes dark-gray to black phyllite and schist, gray argillaceous, slightly metamorphosed sandstone and dark-gray siltstone, quartzite, thin gray slate, and graptolite-bearing black carbonaceous slate of Early Ordovician age (Cumming, L. M., Neuman, R. S., and Walmsley, V. G., written communication, October 2, 1962). In contrast to the Kellyland Formation (Pale Argillite Division of Charlotte Group of Alcock, 1946) these rocks do not contain notable carbonate and are generally more folded. Presence in southeastern corner of quadrangle is inferred extension of similar rocks from Big Lake quadrangle adjacent to east (Larrabee, 1964)

ORDOVICIAN

OCu

Metamorphic rocks, undifferentiated

Argillaceous and chloritic quartzite, sandy metasiltstone, thin beds of green slate, and rarely thin beds and lenses of red and purplish slate comprise rocks of unknown but presumably Cambrian or Ordovician age; remote possibility of Early Silurian age, as indicated in southeastern corner Danforth quadrangle (Larrabee and Spencer, 1963; Griscom and Larrabee, 1963). Quartzite and sandy metasiltstone, commonly in 1/4 to 1/2 inch beds separated by paper-thin laminae of green slate, minutely crumpled by slippage along slate laminae, and minute folds later folded and foliated. This predominately impure quartzite unit contains green slate beds and lenses from few inches to 2 or 3 feet thick, and occasional lenses of red to purplish slate 1 to 6 inches thick and commonly less than 100 feet long. At Knownothing Cove in Baskahegan Lake, sparse 1/8-inch hematite nodules replaced by silica occur in red slate. Rarely, thin pinkish quartz and feldspar granule metaconglomerate is present. Rocks also well-exposed along Baskahegan Lake in Scraggly Lake quadrangle. Outcrops lacking over wide areas where needed for determination of structural and stratigraphic relations. Several chloritic argillaceous-quartzite outcrops occurring southwest of Pocumcus Lake and on southeast shore Fourth Machias Lake, Wabassus Lake quadrangle, believed to be part of this unit

CAMBRIAN OR ORDOVICIAN

Outcrop or group of outcrops

Contact

Solid line where observed, long dashed where approximately located, short dashed where inferred. In places determined from glacial float

Contact

Inferred from lineament on aerial photographs

Thermally metamorphosed zone showing approximate limit. In places determined from topography and glacial float

Fault

Long dashed where approximately located; short dashed where inferred

Lineament, possibly a fault

Observed on aerial photographs

Shear zone showing direction of relative movement and dip where known

Crenulated rocks

Minor folds

Strike and dip of beds

Dot indicates top of beds determined from sedimentary textures or structures

Strike and dip of overturned beds

Dot indicates top of beds determined from sedimentary textures or structures

Strike of vertical beds

Dot indicates direction of top of beds known from sedimentary textures or structures

Strike and dip of slaty cleavage and beds where parallel

Dot indicates top of beds known from sedimentary textures or structures

Strike of vertical slaty cleavage and beds where parallel

Dot indicates direction of top of beds known from sedimentary textures or structures

Strike and dip of slaty cleavage and overturned beds where parallel

Direction of lineation measured on elongated minerals in quartz monzonite

Strike and dip of joint

Strike of vertical joint

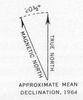
Gravel pit

Water well

Used where bedrock information was obtained

Glacial striae and grooves, showing direction of ice movement

Glacial erratics of Upper Devonian and Mississippian rocks; boulders, 3 to 7 feet in diameter, of reddish calcareous conglomerate or siltstone commonly at or near fault



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RECONNAISSANCE BEDROCK GEOLOGY OF THE WABASSUS LAKE QUADRANGLE, WASHINGTON COUNTY, MAINE

By
David M. Larrabee

1964

For sale by U.S. Geological Survey, price 50 cents