

EXPLANATION

**MDs**  
Conglomerate, mudstone, and shale  
Soft red and gray to gray-green conglomerate. Contains well-rounded to subround pebbles and cobbles of calcareous and non-calcareous rocks in red and green, usually calcareous matrix. Red to brownish red and grayish red mudstone, shale, and siltstone

**Sd**  
Daggett Ridge Formation  
Herein named for ridge where best exposed in Danforth and nearby quadrangles; type locality along and south of Maine Central Railroad. Chloritic argillaceous quartzite, quartzite metaconglomerate with fractured pebbles and cobbles as large as 8 by 12 inches, gray and gray-green slate and metasilstone, thin magnetite-bearing interbedded black slate and metasilstone lenses which crop out in eastern Wypitoplock quadrangle and are believed present in parts of Danforth and nearby quadrangles on aeromagnetic evidence (Griscom, Andrews, written communication, April 12, 1961). Thin green cherty lenses of rhyolitic metatuff along Baskahegan Stream near South Bancroft, Danforth quadrangle. Formation exposed over width of 8,000 feet in Danforth quadrangle where quartzite and metaconglomerate form most of thickness, estimated to exceed 1,000 feet. Inadequate exposures and isoclinal folding prevent accurate determination of thickness of formation or any member. Silurian age based on single dorsal valve of orthoid brachiopod with branching cotas and apparent faint conical ornamentation found in metaconglomerate unit (Neuman, R. B., and Cloud, P. E., written communication, November 12, 1957). Formation indicated as quartzite, metaconglomerate, slate and metasilstone in Danforth and adjacent quadrangles

**Sk**  
Kellyland Formation  
Herein named for Kellyland village at Grand Falls, St. Croix River, Kellyland quadrangle, Maine. Interbedded sericitic pale-gray metasilstone, arenaceous metasilstone, argillaceous metasilstone and quartzite, and thin beds of darker gray slate. Thin beds contain iron carbonates; metasilstone and coarser beds contain more carbonate than does slate; some coarser beds tuffaceous. Slate beds range locally from 1/8 inch to 4 feet thick. Metasilstone and metacarbonate beds range from 4 inches to a maximum of 20 feet. Thinly-laminated layers of light and dark metacarbonate are rare. Thin beds of quartz-granule metaconglomerate associated with metacarbonate and quartzite beds in places. The metacarbonate in many places shows graded bedding and crossbedding. Average slate content 20 percent. Thickness of formation not known because of isoclinal folding and lack of continuous outcrop; probably exceeds 1,000 feet. Stratigraphic equivalent of at least part of Pale Argyllite Division of Charlotte Group in New Brunswick (Alcock, 1948); believed to be stratigraphic equivalent of the lower unit of Silurian slate and siltstone in Danforth and adjacent quadrangles

**MDs**  
Chipputnetocok Quartz Monzonite  
Herein named for and best exposed on islands and shores of Chipputnetocok Lakes, International Boundary, Maine-New Brunswick; outcrops most common in Danforth, Forest, Vanceboro quadrangles, Maine. Type locality Greenland Cove, East Grand Lake, Danforth quadrangle (Larrabee and Spencer, 1963). Light gray to gray, coarse-grained, biotitic, porphyritic quartz monzonite to granite; average grain size exceeds 1/4 inch; where porphyritic, euhedral potassic feldspar phenocrysts 1/4 by 1 inch to 1/2 by 2 inches in places show rapakivi texture. Porphyritic texture commonly extends to within few feet of border of pluton. Age determined by K-Ar method about 600 m. y. in Danforth quadrangle (Paul, Stern, Thomas, and Elmore, 1963), and 380 m. y. in Fosterville, N. B., area (Tupper and Hart, 1961). Mass intrudes metasedimentary rocks of Silurian age; stratigraphic equivalent of granite and quartz monzonite in Danforth and adjacent quadrangles

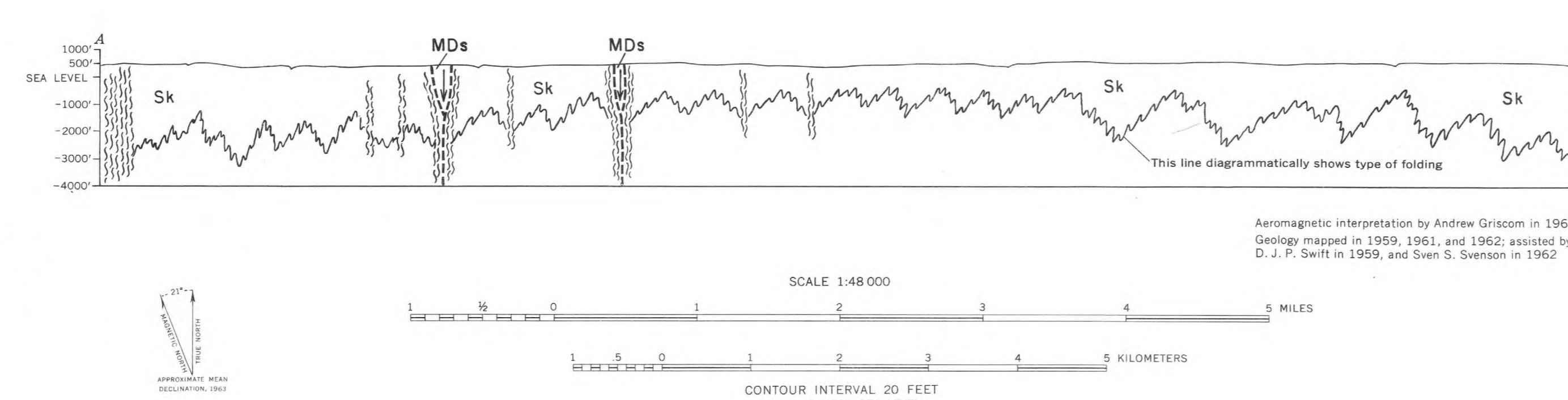
Number refers to descriptive notes. Outcrop pattern shown along St. Croix River is that of the "3-foot" stage of the St. Croix Paper Company as controlled by its dam at Vanceboro, Me.

- Contact
- Located by aeromagnetic survey
- Approximate limit of hornfels zone
- Vertical fault
- Long dashed where approximately located; short dashed where inferred
- Shear zone
- Crenulated rocks
- Direction and plunge of minor fold
- Strike and dip of beds
- Dot indicates top of beds known from sedimentary textures or structures. Slaty cleavage not shown because it generally is parallel to bedding except in troughs and crests of folds
- Strike and dip of overturned beds
- Top of beds known from sedimentary textures or structures
- Strike and dip of vertical beds
- Dot indicates direction of top of beds known from sedimentary textures or structures
- Glacial striae and grooves
- Showing direction of ice movement
- Passable gravelled roads
- Located approximately from aerial photographs, and maps of the St. Croix Paper Company
- DDM
- Diamond drill hole
- References

Alcock, F. J., 1946, Preliminary map, Honeydale, New Brunswick: Canada Geol. Survey Paper 46-3, geologic map with descriptive notes, scale 1 in. = 1 mi.  
Clark, R. K., 1961, McAdam, York and Charlotte Counties: New Brunswick Dept. Lands and Mines, Mines Br., Geol. Notes P. M.  
Paul, Henry, Stern, T. W., Thomas, H. H., and Elmore, P. L. D., 1963, Ages of intrusions in the North York Appalachians: Am. Jour. Sci., v. 261, p. 1-19, index map, 1 inch = 50 mi.  
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.  
Tupper, W. M., and Hart, S. H., 1961, The age of granite complexes in the Central Highlands and western part of the Southern Highlands of New Brunswick: Carleton University Dept. of Geology, Geological Paper 61-1, 9 p. with map, scale 1 in. = 36 mi.

NOTES ON GEOLOGY OF OUTCROPS

- 1 Drill core from 50 ft downstream from dam. Interbedded medium light-gray (6) sericitic quartzite, soft iron carbonate-rich metasilstone, and darker gray slate. Shear zone dips 80° to 85° in undetermined direction. Many quartz-carbonate veinlets at high angles to core, which is much broken; recovery was poor.
- 2 Below Windgam Rips and east of Windgam Island. Poor exposure of medium gray (5) massive carbonate-rich sericitic metasilstone with little darker gray slate.
- 3 East of large clearing on west side of river. Medium gray (5) carbonate-rich, sericitic silty quartzite or quartzite metasilstone in 12-in. beds, much jointed; nearby downstream is small outcrop of interlayered 1-in. beds of metasilstone and gray slate; carbonate-bearing tuffaceous metasilstone and silty quartzite crop out 50 ft farther downstream.
- 4 At International Boundary marker No. 136 (Hereafter abbreviated to I. B. marker), head of Mile Rips. Medium gray (5) interbedded carbonate-bearing, sericitic and feldspathic sandy and silty metasilstone, and silty quartzite.
- 5 In Mile Rips. Medium gray (5) carbonate-rich, sericitic, and silty quartzite that is massive, fine to medium grained, and much jointed. One 1/2-in. darker gray slate bed at downstream end of outcrop.
- 6 At head of Tunnel Rips. Medium gray (5) carbonate-rich finely laminated sericitic slate and schistose sandy metasilstone; fine striae on bedding trend N. 50° E. and dip 20° SE.; upper beds having moved down dip.
- 7 In Tunnel Rips. Medium gray (5) silty metasilstone similar to that at 6.
- 8a On small island at head of Little Falls. Medium (5) to medium light (6) gray silty sandy metasilstone, now chiefly carbonate-rich chert, much orange stained from decomposed iron carbonates; strongly jointed, and sheared. Alternating of shear planes: N. 30° E., 75° SE.; N. 55° E., 55° SE.; N. 80° E., 75° SE. Strong fault strikes N. 45° E. and dips 80° SE.; on its southeast side is 2 ft of soft gray gouge of minus 1/8-in. fragments and mud. The N. 50° W. and dip 10° NE. are chloritized or black, and filled with 1/2-in. quartz-carbonate veinlets, some of which follow bedding planes. Slickensides indicate movement down dip; the shear planes are 4- to 10-in. apart and transect a chloritized set that strikes N. 5° W. and dips vertically.
- 8b At the head of Little Falls on U. S. side of river. Medium gray (5) massive carbonate-bearing and noncarbonate-bearing sericitic quartzose metasilstone and quartzite in 2-ft beds, and 2-in. darker gray slate layers. Much iron carbonate in films and veinlets along fractures.
- 8c In Little Falls, on Canadian side of river. Well-bedded medium light (6)- and medium-gray (5) slate in 4- to 8-ft beds interlayered with 4- to 8-ft massive, much-jointed carbonate-bearing sericitic metasilstone, and non-carbonate-bearing silty quartzite. Shear planes strike N. 50° W. and dip 10° NE. are chloritized or black, and filled with 1/2-in. quartz-carbonate veinlets, some of which follow bedding planes. Slickensides indicate movement down dip; the shear planes are 4- to 10-in. apart and transect a chloritized set that strikes N. 5° W. and dips vertically.
- 9 At end of road on U. S. side of river. Well-bedded medium light (6)- and medium (5) gray finely laminated, carbonate-bearing metasilstone and silty quartzite in 1/4- to 1/2-in. beds; schistose in places; grades into slate. Invaded by many 1/2- to 4-in. quartz veinlets chloritized in center, chiefly parallel to beds but in places crosscutting. Some noncarbonate-bearing beds of medium gray (5) silty and sericitic quartzite.
- 10 In road at hilltop. Medium gray (5), (light-gray-weathered) carbonate-bearing tuffaceous sericitic metasilstone and silty quartzite in 4-in. beds, with few darker gray, thinner slate beds. The metasilstone in places contains small flat paper-thin pebbles of slate 1/4-in. in diameter. Much crumpled in some places; in others is schistose.
- 11 At head of Fork Rips. Medium gray (5) massive carbonate-rich, sericitic, sandy, 10- to 12-in. metasilstone beds alternating with few 6-in. darker gray slate beds; strongly jointed.
- 12 Medium gray (5) (light-gray-weathered) sericitic quartzite metasilstone or silty quartzite with thin slate partings similar to rock at 10. Sheared along slaty layers and at 1/4-in. intervals in more massive rock.
- 13 On small island near U. S. side of river. Same medium gray (5) silty quartzite and slate as at 12; much jointed and sheared at closely spaced intervals, and slightly contorted. Axes of minor folds strike N. 25° W. and plunge 65° SE.
- 14 Medium gray massive carbonate-bearing sericitic sandy metasilstone with 2-in. darker gray slate beds, similar to that at 13. Shear planes strike N. 35° E. and dip vertically; much jointed.
- 15 Similar to rock at 14.
- 16 Medium gray (5) well-bedded, laminated carbonate-rich sericitic silty metasilstone in 1- to 6-in. beds alternating with 1/2-in. darker gray slate beds. Much carbonate has been removed from cavities 1/4- to 1/2-in. to 4- by 6-in., indicating that the original sediment contained lenslike masses of carbonate-rich silt; these lens-like masses are definitely not cobbles in a metaconglomerate. Minor fold axes trend west and plunge 90° in that direction; beds to south moved east.
- 17 Similar to rock at 16.
- 18 Medium gray (5) carbonate-rich sericitic metasilstone in 1/2- to 1-in. beds, with a few thin darker gray slate beds.
- 19 Similar to rock at 18.
- 20 At and downstream from I. B. marker. Medium gray (5) carbonate-rich massive sericitic metasilstone, quartzose in places. Many carbonate veinlets.
- 21 Similar to rock at 20.
- 22 At mouth of Scott Brook. Medium gray (5) carbonate-bearing massive sericitic quartzose metasilstone or silty quartzite with a 4-in. slate bed. Slightly curved shear planes at 1/2-in. intervals. Rock strongly jointed and sheared. Thin quartz veinlets trend N. 10° W. and dip vertically; in places these are mere threads 1/4-in. apart over a 2-ft. width.
- 23 Above Allen Rips. Medium gray (5) carbonate-bearing, sericitic slightly sandy metasilstone; very little darker gray slate. Good bedding-plane partings.
- 24 Medium gray (5) massive 18-in. sericitic quartzose metasilstone and 2-in. darker gray slate beds.
- 25 Medium gray (5) massive 3-ft. sericitic metasilstone beds and 2- to 4-in. darker gray slate beds.
- 26 At The Growler, head of Rocky Rips. Medium gray (5) carbonate-bearing sericitic sandy metasilstone downstream from darker gray phyllitic slate; bedding contorted and shattered.
- 27 Medium gray (5) and light gray (7) thin beds of laminated carbonate-bearing sericitic metasilstone.
- 28 Medium gray (5) phyllitic slate and carbonate-rich sericitic metasilstone; few quartz veinlets along bedding. Sheared and crumpled in a northeasterly direction; dip of shear planes ranges from vertical to 40° SE.; direction of relative movement undetermined.
- 29 Soft red and gray-green conglomerate; chiefly well rounded 2- by 4-in. pebbles and cobbles as large as 4- by 8 in.; some are calcareous. Outcrop low and 75 feet across strike. This downfaulted mass is about on fault strike with the large Upper Devonian and Mississippian (Clark, 1961) conglomerate outcrop on Route 27 south of McAdam, New Brunswick.
- 30 West of Hog Island. Beds of medium gray (5) slate 4 in. thick, and lighter gray carbonate-rich sericitic metasilstone; sheared along beds.
- 31 Medium light gray (6) carbonate-bearing sericitic metasilstone in 2- to 3-in. beds interlayered with 1/4-in. beds of medium gray (5) slate.
- 32 In Meetinghouse Rips upstream from I. B. marker and mouth of Little Simsquish Brook. Medium light gray (6) massive carbonate-rich, sericitic and sandy metasilstone, much jointed at 1/4- to 1/2-in. intervals; trends S. 70° W. and dips vertically. Slickensides on joints plunge 30° SW.
- 33 Medium light gray (6) carbonate-rich sericitic sandy and slightly schistose 2-ft metasilstone and silty quartzite beds, thinly laminated in places, and 2-in. medium gray (5) phyllitic slate beds; sheared and brecciated; 12-in. quartz vein and 1/4-in. quartz-carbonate veinlets along shear planes parallel with beds. Strongly jointed.
- 34 Outcrop 150 feet downstream from mouth of Ellen Brook. Interlayered 1/2-in. medium light gray (6) carbonate-rich, sericitic and slightly schistose sandy metasilstone beds and 2-in. medium gray (5) slate beds; contorted and sheared.
- 35 Medium gray (5) massive carbonate-bearing sericitic silty metasilstone in 1-ft. beds interlayered with 1/4-in. to 1-in. darker gray slate layers, rarely 2-in. layers.
- 36 Medium gray (5) thin-bedded carbonate-bearing sericitic silty metasilstone, finely laminated in places, and thin beds of slightly phyllitic darker gray slate; 1/8-in. quartz-carbonate veinlets along bedding.
- 37 Medium gray (5) carbonate-bearing sericitic sandy metasilstone, and darker gray slate with poor cleavage.
- 38 At head of Haycock Rips. Medium light gray (6) carbonate-rich, sericitic, coarse-grained, tuffaceous silty and schistose sandy metasilstone, and 2-in. medium gray (5) slate beds.
- 39 In Haycock Rips. Medium light gray (6) carbonate-rich, sericitic, finely laminated 16-in. beds of slightly schistose metasilstone alternating with 2-in. medium gray (5) slate beds.
- 40 Medium light gray (6) carbonate-rich sericitic massive metasilstone, sandy in places.
- 41 Medium light gray (6) carbonate-rich sericitic sandy hard massive metasilstone with little medium gray (5) slate.
- 42 Similar to rock at 41, with minute limonite specks, and 3 ft. of medium gray (5) slate under water.
- 43 In Canosee Ledges. Two-thirds medium gray (6) massive carbonate-bearing sericitic quartzose metasilstone and one-third darker gray slate.
- 44 In Canosee Rips. Medium light gray (6) carbonate-rich massive sericitic and feldspathic metasilstone, silty quartzite and thin beds of medium gray (5) slate.
- 45 Medium light gray (6) carbonate-bearing massive sericitic, feldspathic and quartzose metasilstone, and a little slate. Some metasilstone is slightly schistose.
- 46 On three islands in Dog Falls. Medium light gray (6) carbonate-bearing sericitic massive sandy, slightly schistose metasilstone and thin beds of slate.
- 47 In rips below Dog Falls. Medium light gray (5) massive carbonate-bearing sericitic sandy metasilstone and thin medium gray (5) slate. Quartz veinlets 1 to 2 in. thick along bedding.
- 48 At north end of Dog Islands. Medium light gray (6) hard massive carbonate-bearing sericitic and slightly schistose limonite-speckled sandy metasilstone, silty quartzite, and 1- to 2-ft. beds of medium gray (5) slate under water.
- 49 On small island. Medium light gray (6) massive carbonate-bearing sericitic metasilstone, silty quartzite and medium gray (5) slate in 1- to 2-in. beds.
- 50 Chiefly medium light gray (6) carbonate-rich sericitic hard and sandy 3-ft. beds of schistose pyritic metasilstone, and silty quartzite, alternating with 3-ft. medium gray (5) slate beds.
- 51 On small island. Medium light gray (6) hard massive carbonate-rich sericitic sandy metasilstone and silty quartzite containing a few scattered 1/16-in. pyrite cubes.
- 52 Similar to rock at 51.
- 53 Medium light gray (6) massive carbonate-rich sericitic and slightly schistose quartzose metasilstone and silty quartzite 10 ft thick containing a few 1-in. medium gray (5) slate beds.
- 54 At Kindric Rips. Interbedded medium gray (5) carbonate-bearing sericitic metasilstone and thinner darker gray slate beds.
- 55 Chiefly medium light gray (6) carbonate-rich sericitic, feldspathic, sandy and schistose metasilstone with minor medium gray (5) slate.
- 56 In rips at and west of Egg Point. Chiefly medium light gray (6) carbonate-rich sericitic tuffaceous schistose metasilstone and silty quartzite with little medium gray (5) slate.
- 57 At southwest end of island. Medium light gray (6) massive carbonate-bearing, sericitic and slightly sandy metasilstone.
- 58 At I. B. marker. Chiefly medium light gray (6) carbonate-bearing sericitic metasilstone with little medium gray (5) slate.
- 59 In cove not shown on map. Medium light gray (6) massive carbonate-bearing sericitic metasilstone with a little medium gray (5) slate.
- 60 At Grand Falls. Very large outcrop in which there is considerable range in thickness of medium light gray (6) to medium gray (5) sericitic metasilstone, sandy metasilstone, and slaty metasilstone, with variable carbonate content, and phyllitic medium gray (5) slate. Some thin lenses of black pyriticiferous slate. Isoclinal folds characteristic in area well exposed. No single strike and dip, or indication of top of bed is representative except in most general way, but strike commonly is northeasterly and dips steeply northwest. A measured strip 35 ft across strike indicates range in thickness of metasilstone from 2 in. to 6 ft., and of slate from 1/2 to 2 1/2 in. In this short strip are 46 alternating beds, of which metasilstone generally are slightly thicker. River below Grand Falls not investigated.
- 61-68 Gray coarse-grained biotitic porphyritic quartz monzonite.
- 69 Poor outcrop. Black thin-bedded 1/8 in. to 1/4 in.) hornfels containing biotite, sericite, magnetite, and retrograde cordierite. Probably originally interbedded quartzite, metasilstone, and slate.
- 70 Medium gray (5) carbonate-rich sericitic schistose sandy metasilstone in 6-in. to 10-in. beds, grading into 2-in. to 4-in. beds of darker gray slate.
- 71 Similar to rock at 70.
- 72 Much-fractured interbedded soft red carbonate-rich sericitic and feldspathic sandy siltstone, mudstone, and shaly siltstone. A typical sequence of beds follows: 5 in. mudstone, 12 in. shaly siltstone, 5 in. massive siltstone, 12 in. shaly siltstone, 10 in. siltstone, 5 in. shaly siltstone, and 5 in. siltstone, poorly graded; tops of beds appear SE. Rock much broken, and sheared N. 40° E. West along the outcrop two pebbles of about 1 in. diameter of hard red siltstone occur in the mudstone, and a strong fault striking N. 40° E., dips vertically. The fault plane curves eastward to N. 75° E. and dips 85° NW., where bedding is parallel; a 6 in. zone of carbonate-rich gray gouge is south of this fault. Farther west, where top of bedding is NW., a 5-ft waterfall is caused by massive, hard, red carbonate-rich sandy siltstone containing scarce 6-in. slaty beds. The rocks gradually become grayish red (10 R 4/2) and brownish red. These rocks are considered to be a down-faulted lens-like mass associated with the Upper Devonian and Mississippian conglomerate, on Route 27 in New Brunswick and cropping out along the river below Gravel Island.
- 73 Medium gray (5) noncarbonate-bearing sericitic silty metasilstone, schistose in places.
- 74 Medium gray (5) hard carbonate-bearing slaty, sericitic and sandy metasilstone in small rapids.
- 75 Medium light gray (6) sericitic metasilstone with and without carbonate interbedded with thinner medium gray (5) slate layers; chiefly slate to north and metasilstone to south.
- 76 Medium gray (5) massive carbonate-rich sericitic metasilstone and thin beds of darker gray slate. Glacial grooves 24 in. wide and 3 in. deep.
- 77 Thick light-gray (7) carbonate-rich sericitic finely laminated crossbedded metasilstone and 1/2 in. medium gray (5) slate beds.
- 78 Medium light gray (6) massive carbonate-bearing sericitic and sandy medium-grained metasilstone.
- 79 Chiefly light gray (7) carbonate-bearing cross-bedded metasilstone in 2-in. to 4-in. beds alternating with 1/2 in. medium gray (5) slate.
- 80 Medium gray (5) noncarbonate-bearing hard massive sericitic and sandy metasilstone and silty quartzite.
- 81 Similar to rock at 80.
- 82 Similar to rock at 80.



GEOLOGIC MAP AND SECTION OF KELLYLAND AND VANCEBORO QUADRANGLES, MAINE

By  
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1963

Maine (Kellyland and Vanceboro quadr.) Geol. 1:48,000. 1963.  
M(200)  
MF 269  
CI