Milford Rodgers Bedrock Compilation Sheet 2 (paper)

Map

NOTICE !

Bedrock quadrangle 1:24,000 scale compilation sheets for the Bedrock Geological Map of Connecticut, John Rodgers, 1985, Connecticut Geological and Natural History Survey, Department of Environmental Protection, Hartford, Connecticut, in Cooperation with the U.S. Geological Survey, 1:125,000 scale, 2 sheets. [minimum 116 paper quad compilations with mylar overlays constituting the master file set for geologic lines and units compiled to the State map, some quads have multiple sheets depicting iterations of mapping]. Compilations drafted by Nancy Davis, Craig Dietsch, and Nat Gibbons under the direction of John Rodgers.

Geologic unit designation table translates earlier map unit nomenclature to the units ultimately used in the State publication.

This map set contains unpublished maps, cross- sections, and related information archived by the State Geological and Natural History Survey of Connecticut as part of the Survey Library Collection.

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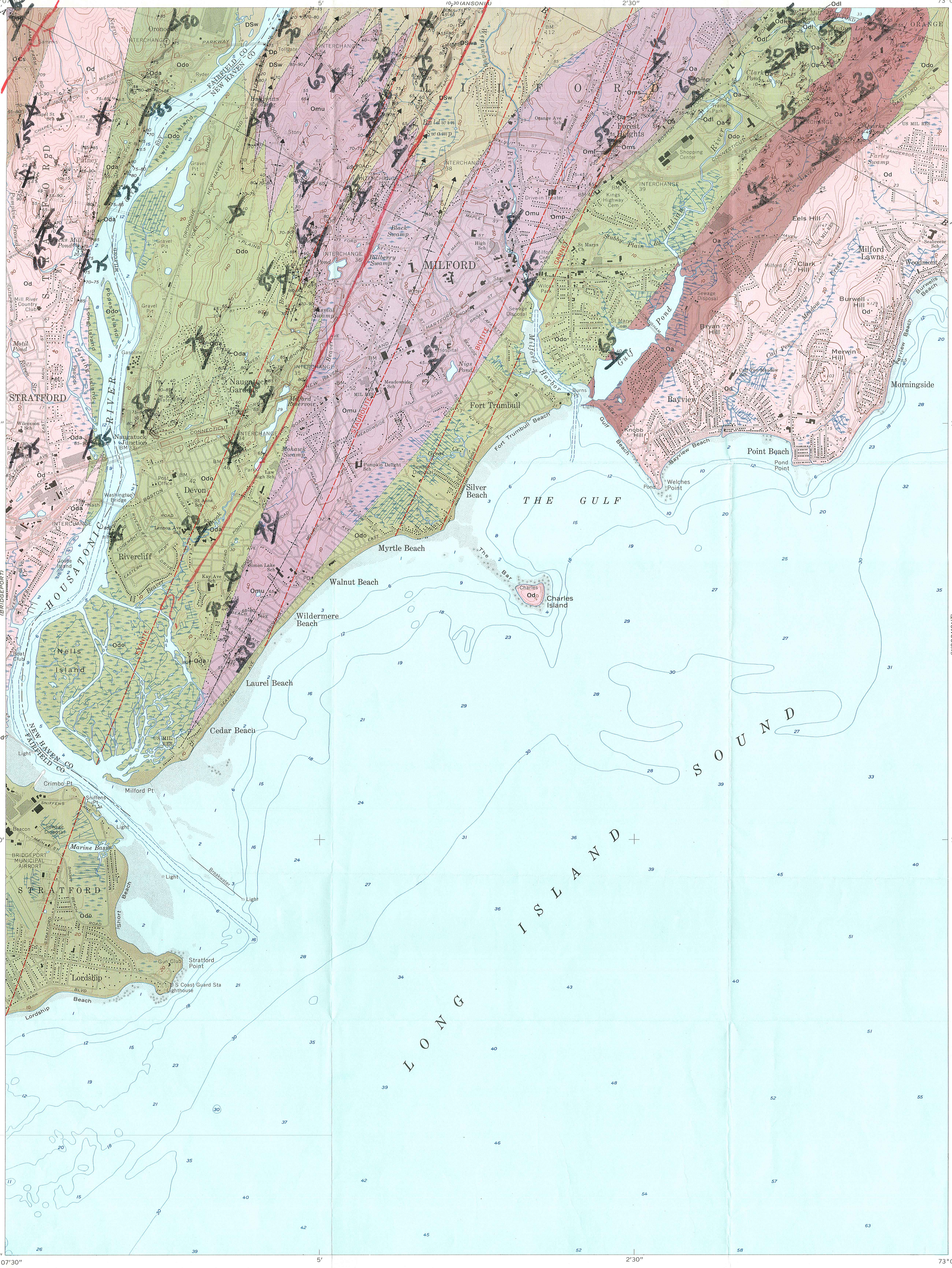
JR 31 May 17 Structure U/D

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE STATE OF CONNECTICUT
GEOLOGICAL AND NATURAL HISTORY SURVEY

GEOLOGIC QUADRANGLE MAP
BEDROCK GEOLOGY
MILFORD QUADRANGLE, CONNECTICUT
GQ-427



Base by U.S. Geological Survey, 1960

APPROXIMATE MEAN DECLINATION, 1965

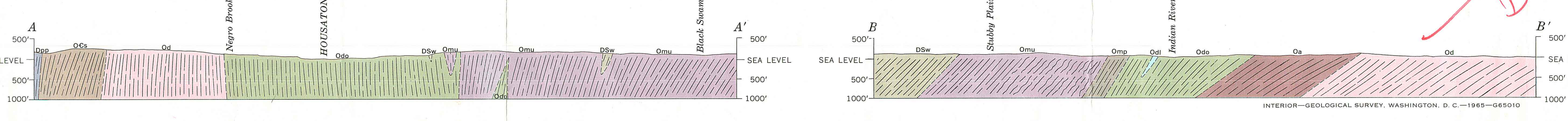
SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE AVERAGE RANGE OF TIDE IS APPROXIMATELY 6.5 FEET

CONNECTICUT
QUADRANGLE LOCATION

Geology by C. E. Fritts, 1962

110



INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1965—G65010

BEDROCK GEOLOGIC MAP OF THE MILFORD QUADRANGLE, FAIRFIELD AND NEW HAVEN COUNTIES, CONNECTICUT

By

Crawford E. Fritts

1965

EXPLANATION

In the descriptions of rocks below, minerals are listed in approximate order of decreasing abundance, unless otherwise noted. Grain sizes are as follows: fine, less than 1 mm; medium, 1-5 mm; coarse, more than 5 mm. Descriptions of rocks do not include randomly distributed minerals formed by retrograde metamorphism after the climax of the latest progressive regional metamorphism. The retrograde metamorphism resulted in slight to complete alteration of minerals as follows: kyanite and staurolite mainly to sericite, biotite to chlorite, garnet to sericite and chlorite, pyrite to hematite, and rutile and ilmenite to leucoxene

DEVONIAN

Dp — **Pegmatite**

Coarse- to medium-grained quartz monzonitic pegmatite composed mainly of albite-oligoclase, quartz, and muscovite

Dq — **Quartz vein**

Dpp — **Prospect Gneiss**

Coarse- to medium-grained, well-foliated, light-gray quartz monzonitic gneiss containing dark-gray biotitic folia. Composed of sodic to intermediate oligoclase, microcline, quartz, muscovite, biotite, and minor sphene, garnet, apatite, zircon, tourmaline, ilmenite, and epidote. Contains white microcline megacrysts as much as 3 inches in diameter. Intrudes and contains xenoliths of Southington Mountain Schist in adjacent Ansonia quadrangle

SILURIAN AND DEVONIAN

DSw, DSwa — **Wepawaug Schist**

DSw, *mainly medium- to fine-grained, interbanded medium light-gray to medium dark-gray phyllitic schist and light-gray to medium dark-gray, quartz-rich paragneiss layers from 1 inch to more than 1 foot thick. Schist is composed of quartz, muscovite, albite-oligoclase, biotite, chlorite, garnet, and, in appropriate metamorphic zones, staurolite and kyanite; accessory minerals are ilmenite, tourmaline, apatite, zircon, rutile, and dustlike carbon. Paragneiss is composed of quartz, muscovite, biotite, albite-oligoclase, garnet, and accessory magnetite or ilmenite, rutile, zircon, tourmaline, and apatite*

DSwa, *medium- to fine-grained, light-gray calc-silicate rock containing streaks and layers of dark greenish-gray to greenish-black actinolitic hornblende and porphyroblasts of grayish-red garnet. Forms bands 1-2 inches thick and pods as much as 1 foot in diameter. Composed of quartz, clinozoisite, oligoclase-andesine, calcite, actinolitic hornblende, zoisite, garnet, and abundant accessory sphene*

UNCONFORMITY

ORDOVICIAN(?)

Oa — **Allingtown Metadiabase**

Mainly medium- to fine-grained, dark greenish-gray to dark-gray, intrusive metadiabase in chlorite zone (east of garnet isograd) and equivalent medium- to fine-grained, grayish-green to dark greenish-gray amphibolite in zones of higher grade metamorphism. Porphyritic in many places; numerous yellowish-gray to light greenish-gray, saussuritized plagioclase phenocrysts 2-8 mm in diameter. Metadiabase is composed of actinolitic hornblende, altered plagioclase, epidote, chlorite, muscovite (mainly sericitic), and accessory magnetite or ilmenite, sphene, apatite, and calcite. Amphibolite is composed mainly of hornblende, sodic andesine, epidote, chlorite, and abundant accessory sphene. Boundaries generalized. Near Connecticut Turnpike contains numerous inclusions of Oronoque Member of Derby Hill Schist 1-5 feet thick interlayered with sill-like and gently inclined dikelike bodies of metadiabase 1-8 feet thick. Not known to intrude Wepawaug Schist

Oml, Oms, Omu, Omp — **Maltby Lakes Volcanics**

Omu, *mainly undivided, medium- to fine-grained metavolcanic rocks of mafic to intermediate composition and low to moderately high metamorphic grade; minor metasedimentary rocks and intrusive metadiabase similar to Allingtown Metadiabase. East of Wepawaug River, greenish-gray to dark greenish-gray greenschist and low-grade amphibolite predominate; probably represents marine tuff and (or) lava; composed of epidote; actinolitic hornblende, chlorite, sodic plagioclase, and quartz in various proportions, and small quantities of calcite, sericite, sphene, and magnetite or ilmenite; in some places, also contains saussuritized plagioclase clasts and (or) phenocrysts similar to phenocrysts in Allingtown Metadiabase. West of Wepawaug River, dark-gray to grayish-black amphibolite predominates; composed of hornblende, sodic andesine, quartz, epidote, and accessory sphene, ilmenite, rutile, apatite, and pyrite; black hornblende prisms rather randomly arranged on foliation planes in many places. Moderate greenish-yellow streaks, lenses, and knots from less than 1 mm to more than 1 inch thick characteristic regardless of metamorphic grade; composed largely of epidote and quartz*

Oml, *medium- to fine-grained, well-foliated, medium light-gray impure crystalline limestone approximately 3 feet thick; composed of calcite, quartz, chlorite, muscovite, and minor biotite, sphene, apatite, clinozoisite, and tourmaline*

Oms, *medium- to fine-grained, thinly layered metasedimentary rocks similar to Derby Hill Schist*

Omp, *pyroclastic schist, meta-agglomerate or metatuff characterized by ellipsoidal greenish-gray to very dark greenish-gray chloritic metabasalt fragments as much as 1 inch thick and 5 inches long rather evenly distributed in a medium- to fine-grained matrix of light to dark greenish-gray schist composed of sodic plagioclase, quartz, muscovite, chlorite, and minor garnet, biotite, magnetite or ilmenite, tourmaline, rutile, epidote, and sphene; contains numerous veins, lenses, and pods of secondary quartz; metabasalt fragments comprise 10-25 percent of rock volume, but decrease in size toward southwest and near eastern edge of adjacent Ansonia quadrangle*

Odl, Odo, Od, Oda — **Derby Hill Schist**

Od, *mainly medium- to fine-grained, thinly laminated, greenish-gray to medium dark-gray chloritic muscovite schist west of Milford and phyllite to east; composed mainly of quartz, muscovite, chlorite, sodic plagioclase, and accessory ilmenite, rutile, tourmaline, zircon, and dustlike carbon; contains staurolite, garnet, minor biotite, and accessory magnetite northeast of Pecks Mill Pond in Stratford. Alternate quartz-rich and muscovite-rich laminae generally less than 5 mm thick. Also contains minor bands of quartz-rich paragneiss as much as 1 foot thick similar to predominant rocks of Oronoque Member; boundary generalized between units*

Odo, *Oronoque Member; mainly slabby to thinly laminated, medium- to fine-grained, greenish-gray to medium dark-gray quartz-rich and albitic paragneiss with schistose to phyllitic partings and layers containing abundant muscovite and chlorite; in some places in western part of area contains green or brown biotite and a little garnet; at least one schistose band north of Devon also contains staurolite and kyanite, but these minerals not characteristic; accessory minerals are ilmenite, magnetite, rutile, sphene, apatite, tourmaline, zircon, pyrite, and dustlike carbon. Quartz-rich layers from 1 mm to several feet thick are much more abundant than in underlying unit, especially in western half of quadrangle. Upper part of member also contains minor unmapped epidote-rich greenschists and amphibolites similar to those characteristic of undivided Maltby Lakes Volcanics*

Odl, *fine-grained, light- to medium-gray crystalline limestone containing streaks, lenses, pods, and bands of moderate yellowish-green to dusky yellow-green serpentine and abundant accessory magnetite*

Oda, *amphibolite mineralogically similar to that characteristic of Maltby Lakes Volcanics in staurolite and kyanite zones*

CAMBRIAN(?) AND ORDOVICIAN(?)

O€s — **Southington Mountain Schist**

Mainly interlayered medium- to fine-grained silvery-gray to medium-gray muscovite schist and slabby medium light-gray to dark-gray paragneiss. Schist composed of quartz, muscovite, chlorite, sodic oligoclase, biotite, garnet, and accessory ilmenite and tourmaline. Paragneiss composed of quartz, muscovite, biotite, garnet, oligoclase, clinozoisite, hornblende, chlorite, and accessory sphene, apatite, and zircon. Poorly exposed in this area but characterized by ribbonlike banding in type area in Southington quadrangle

Outcrop or outcrop area

Generalized in many places, and may include some places where bedrock merely close to surface. Shows distribution of most but not all outcrops in map area

65 15 Strike + dip of foliation; plunge of lineation

Contact

Dashed where approximately located; short dashed where indefinite or inferred; queried where location, extent, or nature of contact uncertain

Inferred syncline

Showing trace of axial plane, and bearing and plunge of axis

PLANAR AND LINEAR FEATURES IN METAMORPHIC ROCKS

Symbols may be combined

Vertical — Inclined (40)

Foliation or flow cleavage

Formed by parallel alinement of minerals, such as mica in schist or gneiss. Generally about parallel to banding or relic bedding in banded metasedimentary rocks, although foliation crosses contacts of pyroclastic schist, Omp, *and boundaries between Maltby Lakes Volcanics and adjacent formations west of Wepawaug River where rocks have been tightly folded. Number indicates measured dip; queried where uncertain. Symbol for inclined foliation without number indicates direction of dip inferred. Symbol accompanied by ± indicates dip locally greater or less than that recorded*

60

Fracture cleavage

Formed by parallel or nearly parallel arrangement of axial planes of symmetrical crenulations or by alinement of long limbs of asymmetrical crenulations in schist. Number indicates measured dip

Crumpled or contorted foliation and (or) banding

Direction of long line indicates generalized strike

FA — C

Horizontal — Inclined

Lineation

Mineral lineation unless designated otherwise; C, *crenulation axis;* FA, *fold axis*

GARNET

Isograd

Denotes approximate eastern limit of zone in which mineral named (kyanite, staurolite, biotite, or garnet) is highest grade macroscopic index mineral in metamorphosed pelitic rocks. Position based in part on known positions of isograds in Wepawaug Schist in adjacent Ansonia quadrangle. Minor microscopic biotite and garnet of uncertain composition present in some rocks of the Maltby Lakes Volcanics and in a few places in the underlying Derby Hill Schist in the northeast corner of the map area, especially near the Allingtown Metadiabase, but generally not recognized in the field

K S

Macroscopic-mineral localities

K, *kyanite;* S, *staurolite*

Abandoned quarry — Type locality

NOTES ON GEOLOGY

Stratigraphy, structure, and regional metamorphism. The Southington Mountain and Derby Hill Schists, the Maltby Lakes Volcanics, and the Wepawaug Schist form part of a sequence of metasedimentary and metavolcanic rocks of Paleozoic age, which in Middle to Late Devonian time was tightly folded, intruded by the Prospect Gneiss, and subjected to progressive regional metamorphism ranging from chlorite to kyanite grade (Fritts, 1962a, 1962b, in press). The principal structure formed in this area at that time is a complex major syncline, the trough of which is occupied by the Wepawaug Schist. This fold, known as the Wepawaug syncline, plunges north-northeastward and also underlies parts of the Woodmont, Ansonia, New Haven, Naugatuck, and Mount Carmel quadrangles. The disappearance of the Maltby Lakes Volcanics along the western limb of the Wepawaug syncline in the northern part of the Milford quadrangle is interpreted as evidence that this formation had an eastward or southeastward dip at the time the Wepawaug Schist was deposited unconformably above it. Although the intrusive Allingtown Metadiabase also appears to be confined mainly to the eastern limb of the Wepawaug syncline, some of the small bodies of amphibolite in the Derby Hill Schist on the western limb of the syncline may be related to the metadiabase.

A gradual westward increase in metamorphic grade of the rocks in this area coincides with a westward increase in the complexity of geologic structure. In the eastern part of the quadrangle, the metamorphic grade of the rocks is low and geologic structure is rather simple. Phyllitic rocks, greenschists, and low-grade metadiabase predominate. In general, foliation in metasedimentary rocks there is parallel or nearly parallel to bedding. However, small tight folds are found in outcrops of even the least metamorphosed rocks at Morningside, and field relations in the adjacent Ansonia quadrangle indicate that foliation is not necessarily parallel to the boundaries of metavolcanic rocks such as the pyroclastic schist of the Maltby Lakes Volcanics. West of Milford, the metamorphic grade of the rocks is higher, and mica schists, paragneisses, and amphibolites predominate. Geologic structure there also is more complex. Tongues of Wepawaug Schist, for example, projecting southward into the Maltby Lakes Volcanics apparently are in the troughs of minor nearly isoclinal synclines in a zone of intense folding near or west of the axial plane of the main (Wepawaug) syncline. Foliation obviously crosses stratigraphic boundaries near the axial planes of these folds. The author believes that the large tongue of Maltby Lakes Volcanics projecting southward almost to Long Island Sound at Laurel also represents a tight, north-plunging syncline along or near the axial plane of the Wepawaug syncline. This interpretation was facilitated by the recent discovery of seven outcrops of the Maltby Lakes Volcanics near Fort Trumbull and along the Wepawaug River at Milford by John Rodgers and J. E. Sanders (John Rogers, written commun. 1964). The location of the contact between the Wepawaug Schist and the Maltby Lakes Volcanics east and south of Baldwin Swamp, however, is uncertain because of a lack of outcrops. Thus it is possible that the Wepawaug Schist in the trough of this fold projects as far southward as the U.S. Military Reservation near Meadowside School.

There is no indisputable evidence of large-scale faulting in this area, but it is possible that faults of Triassic age mapped in adjacent quadrangles extend into this one. The Mixville fault, for example, which forms the western boundary of the Newark Group of Late Triassic age in the Southington and Mount Carmel quadrangles, apparently extends south-southwestward into the Ansonia quadrangle and may continue into the Milford quadrangle, perhaps somewhere in the drift-filled valley of the Wepawaug River. The fault has not been inferred here, however, because geologic structure in this area can be explained without it. The throw on the Mixville fault is not known to be more than a few hundred feet, and a horizontal component of displacement has not been proved. Furthermore, all faults must hinge out somewhere, and there is no conclusive evidence that this fault extends south of the town of Orange in the Ansonia quadrangle. On the other hand, it is more likely that the Great Fault, which forms the eastern boundary of the Newark Group in central Connecticut and swings southwestward toward Morris Cove in the New Haven quadrangle, continues southwestward into the Milford quadrangle somewhere beneath Long Island Sound.

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U D Normal fault (± Jurassic)
U - Upthrown side
D - Downthrown side

T Reverse or thrust fault (± Devonian)
T - On thrust side

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