New Hartford 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.

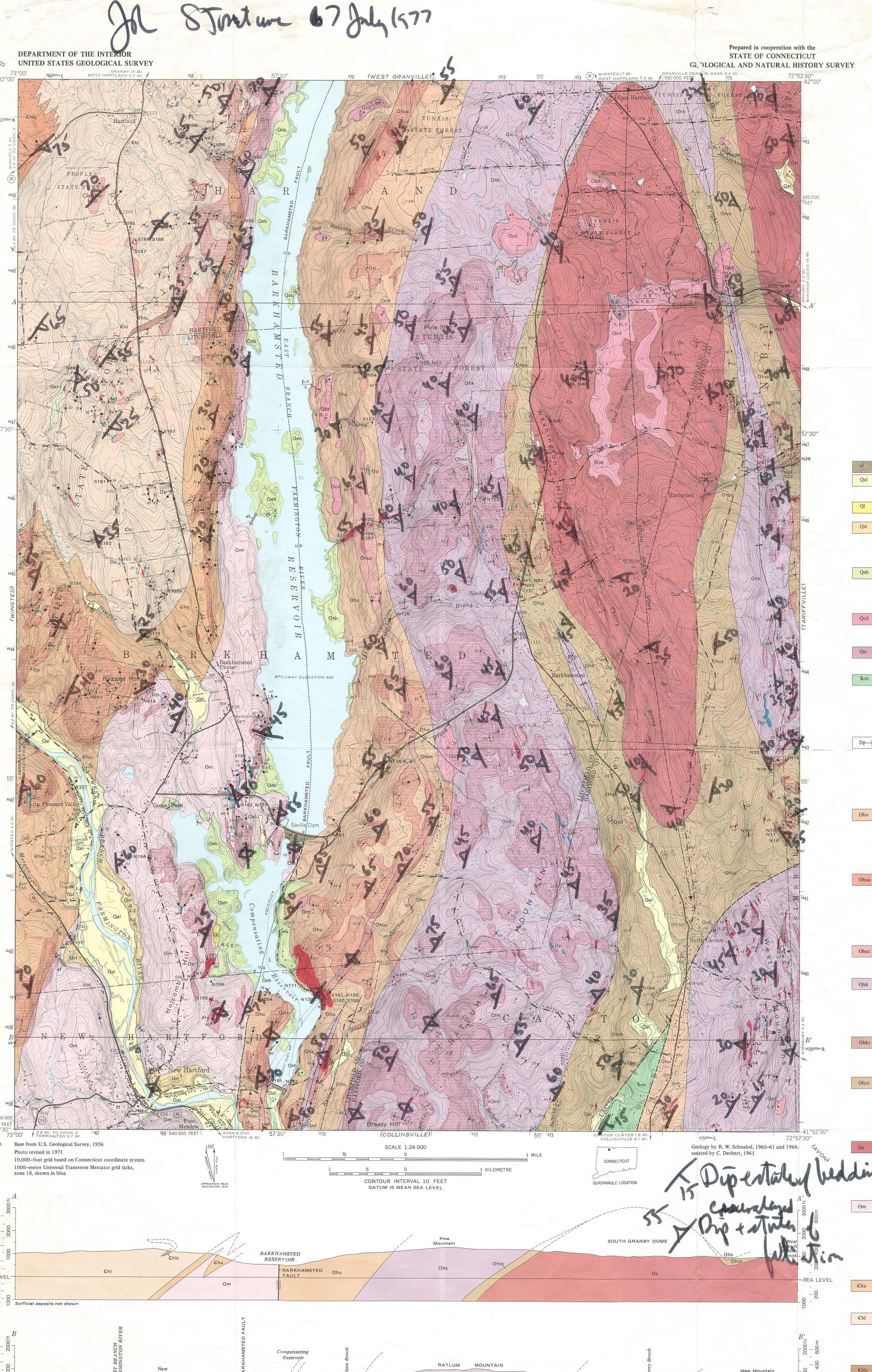
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CORRELATION OF MAP UNITS - QUATERNARY Qcd Qic UNCONFORMITY Tanh UNCONFORMITY DEVONIAN(?) Upper and Middle - ORDOVICIAN Ordovician Om > Middle Ordovician UNCONFORMITY €hu Lower Cambrian CAMBRIAN or older

DESCRIPTION OF MAP UNITS

A thin, discontinuous layer of windblown silt and sand, generally mixed with under lying glacial deposits, is present but not shown over most of the quadrangle. Swamp deposits of Pleistocene to Holocene age are not mapped separately; they are shown by the standard map symbol for swamps on the topographic base map. Small, thin swamp deposits, now dry, were observed in many low-lying areas where the standard symbol is lacking, but they are not shown separately. The swamp deposits are composed of partly to nondecomposed organic matter mixed with varying proportions of sand, silt, and gravel. Locally, they contain minor

amounts of peat. Till deposits of Pleistocene age cover areas not covered by other Pleistocene and Holocene deposits where bedrock is not exposed. The till consists of brown to grayish-brown nonsorted, nonstratified clay, silt, sand, and gravel with proportions of grain sizes varying from place to place. Thickness of till is highly variable; a maximum thickness of 28 metres (90 ft) was observed in cuts along streams flowing westward into the Barkhamsted Reservoir. Hard, compact fissile till was observed in a few places north of Hoyt Hayes Swamp and on Sawmill Brook.

ARTIFICIAL FILL - Material transported and deposited by man. Only very large ALLUVIUM (HOLOCENE) - Stream deposits composed of gravel, sand, silt, clay, and organic debris. Generally light brown to dark yellowish brown. Extremely variable in thickness and lateral extent. Occurs along most valleys; shown only

where thick or laterally extensive LANDSLIDE DEPOSITS (HOLOCENE) - A small deposit composed partly of large angular bedrock fragments and partly of till. Overlies stratified drift deposits (Qeb) west of Compensating Reservoir

STREAM TERRACE DEPOSITS (HOLOCENE) - Gravel, sand, and silt containing minor amounts of clay deposited in terraces along the West Branch of Farmington River and Moosehorn Brook. Generally light brown to grayish orange. Pebble to cobble gravel most common in upper 30 to 60 cm (1-2 ft). Terraces along the West Branch of Farmington River average about 15 metres (50 ft) above the level

of the alluvial surface, and probably represent alluvial deposits graded to an earlier,

ICE-CONTACT STRATIFIED DRIFT DEPOSITS ALONG THE VALLEY OF THE EAST BRANCH OF FARMINGTON RIVER (PLEISTOCENE) – Well-sorted stratified drift deposits displaying abundant collapse structures. Mostly sand and silt, and a few thin gravel layers. Light-grayish-orange to pale-orange kame terrace deposits formed between ice and the valley wall. In general deposits are coarser grained near the north quadrangle boundary and become finer grained to

Qcd ICE-CONTACT STRATIFIED DRIFT (PLEISTOCENE) – Isolated, high-level deposits of stratified sand, silt, and gravel containing minor amounts of clay. Generally light yellowish orange to grayish orange. Many deposits preserve collapse structures. Deposits include kames and kame terraces. Locally, as at Hoyt Hayes Swamp, may overlie glaciolacustrine deposits not shown on map ICE-CHANNEL DEPOSITS (PLEISTOCENE) - Isolated, high-level deposits of gravel,

sand, and silt formed as glaciofluvial deposits in open channels in the ice, or in tunnels in or under the ice. Generally light yellowish orange to grayish orange. Commonly coarse grained with relatively high proportion of pebble gravel NEW HAVEN ARKOSE OF NEWARK GROUP (UPPER TRIASSIC) - Pale-reddishbrown to moderate-reddish-brown arkosic sandstone, siltstone, and conglomerate. Exposed only in the valley of Cherry Brook IGNEOUS AND METAMORPHIC ROCKS

In the following descriptions of bedrock units, minerals are listed in order of decreasing abundance as determined from field observations of many exposures; individual samples within a given unit show differences in abundance from exposure to exposure. Minerals in parentheses are present in some, but not all, exposures of the appropriate rock type Dp—— PEGMATITE (DEVONIAN?) – Light-yellowish-gray, very light-gray and light-

> pinkish-gray, medium- to very coarse-grained quartz-plagioclase-(microcline) (muscovite)-(biotite)-(garnet)-(tourmaline) pegmatite and granitic rocks. Most bodies are white feldspar-quartz-mica rocks; pink feldspar is sparse. Individual bodies range from a few cm (a few inches) to several tens of metres (several hundred feet) in maximum dimension in a given exposure. No attempt was made to correlate bodies across areas of nonexposure. Bodies are highly irregular both in plan and cross section, and are both concordant and discordant. Nearly all bedrock outcrops show one or more pegmatite or granitic bodies; only some of the larger bodies are shown HARTLAND FORMATION (UPPER AND MIDDLE ORDOVICIAN)

> Upper member - Heterogeneous unit of quartz-plagioclase-muscovite-biotitegarnet-(kyanite)-(sillimanite)-(staurolite)-(graphite) schist and granular schist, hornblende-plagioclase-(garnet)-(quartz) amphibolite and quartz-plagioclase-(clinozoisite)-(calcite)-(epidote)-(sphene) granulite. Most common rock type is medium-grained, light-brown to light-gray, thinly layered friable quartz-plagioclase-muscovite-garnet schist; other rock types occur as thin layers within the schist. Distinguished from underlying units by characteristic friable "sandy" texture in quartzo-feldspathic layers. Basal contact marked by sudden increase in size and abundance of kyanite megacrysts in underlying schist. About 1,520

metres (5,000 ft) thick in quadrangle. Top not exposed Amphibolite zone - Medium-grained very dark-gray to black hornblende-plagioclase-(garnet)-(quartz) amphibolite in layers within schist of upper member (Ohu). Amphibolites are of two types: One type is a "plum pudding" amphibolite in which euhedral moderate-reddish-brown to dark-reddish-brown garnets 6-13 mm (0.25-0.5 inch) in diameter are set in a fine-grained layered matrix of hornblende and plagioclase. The other type is a "salt-and-pepper" amphibolite in which white crystals of plagioclase and quartz 1-2 mm (0.04-0.08 inches) long are set in a finer grained matrix of hornblende crystals. In addition, other grains of plagioclase and quartz are segregated into distinct layers. Mapped as a separate zone only where amphibolite layers occur in more than 50 percent of the outcrops. About 300 metres (1,000 ft) maximum thickness

Coticule zone - Fine-grained, light-pink to light-pinkish-gray quartz-garnet-(muscovite)-(garnet) granofels (coticule) in layers 3-75 mm (0.13-3 inches) thick within schist of upper member (Ohu). Coticule layers found only in this zone and comprise less than 25 percent of zone. About 300 metres (1,000 ft) maximum

Kyanite-sillimanite schist member - Coarse-grained to very coarse-grained, mediumto dark-gray, locally rust-stained quartz-plagioclase-byotite-muscovite-(kyacally contains as much as 30 percent kyanite in blades as much as 30 cm (12) inches) long. Moderate-red to dark-reddish-brown subhedral to euhedral garnets common throughout unit. Indistinct layering marked by local increases in abundance of individual minerals. A very distinctive map unit distinguished from adjoining units by coarse grain size and abundance of megacrysts of kyanite and garnet. Averages about 1,200 metres (4,000 ft) thick

Calc-silicate gneiss - Fine- to medium-grained pale-olive to black diopside-epidoteplagioclase-hornblende-sphene calc-silicate gneiss. Well bedded parallel to layering and schistosity of enclosing kyanite-sillimanite schist (Ohk). Forms two discontinuous lenses at approximately the same stratigraphic position in the enclosing schist. Poorly exposed, mapped between exposures on the basis of abundance of angular fragments in the till. About 15 metres (50 ft) thick

Calc-silicate zone – Dominantly medium-grained brownish-gray to medium-gray quartz-plagioclase-muscovite-(garnet)-(kyanite)-(graphite) schist. Zone characterized by fine- to medium-grained light-greenish-gray quartz-plagioclase-clinozoisite-epidote-microcline-calcite granular calc-silicate rocks and by fine- to medium-grained dark-greenish-gray to black hornblende-biotite-garnet-(plagioclase) amphibolite in thin beds and lenses. Bedding is rarely preserved in schists: calc-silicate rocks and amphibolites are commonly thinly laminated parallel to contacts. Layers of calc-silicate and amphibolite are parallel to schistosity in enclosing schist. Zone thins from about 800 metres (2,500 ft) in southern part

STRAITS SCHIST (UPPER AND MIDDLE ORDOVICIAN) - Medium-grained medium-brownish-gray quartz-plagioclase-muscovite-biotite-garnet-(kyanite)-(sillimanite)-graphite-(tourmaline)-(apatite) schist. Locally contains pods and lenses of garnet-rich and epidote-rich amphibolite. Very similar to schists in overlying Ohcs unit of Hartland Formation but characteristically has coarse lakes of muscovite along planes of schistosity. Also, fine-grained graphite is common along planes of schistosity giving plumbaginous luster. Locally shows well-developed graded beds 25-100 mm (1-4 inches) thick. Upper 860 metres (3,000 ft) present in quadrangle; base not exposed

MORETOWN FORMATION (MIDDLE ORDOVICIAN) - Fine-grained mediumgray to medium-light-gray quartz-plagioclase-biotite-(muscovite)-(garnet) schist containing thin beds of fine-grained light-green and black hornblende-epidoteplagioclase amphibolite. The characteristic feature of this formation is schist containing 3-6 mm (0.13-0.25 inch) layers of granular quartz and feldspar separated by paper-thin laminae of biotite and muscovite; the "pinstripe" texture of Cady (1956). Amphibolites are also delicately laminated with very thin lightgreen epidote-rich layers alternating with black hornblende-rich layers. Basal contact marked by amphibolite that is continuous across quadrangle and rarely exceeds 15 metres (50 ft) in thickness. A maximum of about 1,500 metres (5,000 ft) is exposed

Upper member - Fine- to medium-grained light- to medium-gray (light-brown to moderate-red on weathered surface) quartz-biotite-plagioclase-muscovite-(garnet) schist. Characterized by muscovite flakes about 3 mm (0.13 inch) in diameter oriented at diverse angles to the foliation. Commonly finely laminated. Ranges from 0 to about 900 metres (0 to about 3,000 ft) in thickness Lower member - Fine- to medium-grained light- to medium-gray (pale-yellowishbrown to grayish-orange on weathered surfaces) quartz-biotite-plagioclase-muscovite-(garnet) schist. Characteristic rind of brownish-weathered rock 12-25 mm (0.5-1 inch) thick on most natural exposures. Many beds contain porphyroblasts of plagioclase feldspar as much as 6 mm (0.25 inch) in diameter. Locally contains beds of rock with large mica flakes similar to upper member (£hu). Contact between units is gradational and difficult to define. Maximum of about 1,800 metres (6,000 ft) is exposed

HOOSAC FORMATION (LOWER CAMBRIAN OR OLDER)

Calc-silicate gneiss unit - Fine- to medium-grained light- to medium-greenish gray quartz-plagioclase-diopside-clinozoisite-epidote-microcline-opaque minerals-garnetsphene calc-silicate gneiss. 0-60 metres (0-200 ft) thick Gneiss and granular schist unit – Fine- to medium-grained, medium- to very lightgray quartz-plagioclase-biotite-(garnet)-(muscovite)-(microcline)-(kyanite)-(sillimanite)-(staurolite)-(tourmaline)-opaque minerals-(apatite) gneiss and granular schist. Locally plagioclase forms abundant porphyroblasts about 3 mm (0.13 inch) in dia-

BEDROCK EXPOSURES - Solid areas denote continuous or nearly continuous exposures; ruled pattern denotes areas of abundant closely spaced small exposures — CONTACT - Gradational or approximately located; dotted where concealed FAULT - Dashed where approximately located; dotted where concealed. U, upthrown side; D, downthrown side SMALL FAULT OBSERVED IN OUTCROP - Showing dip _____ Vertical FOLDS - Showing approximate trace of axial surface Anticline, showing plunge

Syncline

Overturned anticline

Overturned syncline

TREND OF CRUMPLED BEDS

PLANAR AND LINEAR FEATURES Where two symbols for planar or linear features are combined, their intersection marks the point of observation. Where three or more are combined, the point of observation is the intersection of symbols for planar features

STRIKE AND DIP OF BEDS - Ball on symbol indicates top of bed known from sedimentary features. Position of 90 on vertical bed symbol indicates direction of known(?) top Vertical Overturned

STRIKE AND DIP OF ESSENTIALLY PARALLEL BEDDING AND SCHISTO-

SITY – Ball on symbol indicates top of bed known from sedimentary features.

Position of 90 on vertical bed with ball indicates top Vertical Overturned

STRIKE AND DIP OF SCHISTOSITY - Relation to bedding not apparent in out-Vertical

TREND OF CRUMPLED SCHISTOSITY

Inclined Vertical AXIAL PLANE OF INCLINED FOLIATION - Schistosity developed parallel to axial planes of small folds

Inclined Vertical BEARING AND PLUNGE OF AXIS OF SMALL FOLD OR CRINKLE.

 $\quad \blacktriangleleft \quad \rightarrow \quad$ Horizontal • N3 ROCK SAMPLE LOCALITY – Showing number. Symbol in conjunction with

attitude symbol indicates sample was taken at locality of attitude

ABANDONED QUARRY PITS Letter symbol indicates type of material obtained from pit; superposed symbols indicate superposition of material in pit g – gravel of mixed sizes

p – pebbles s – sand T – compact fissile till WEATHERED BEDROCK

INTRODUCTION

The New Hartford quad angle is in northern Connecticut about 50 km (30 mi) east of the New York State line. Bedrock in the quadrangle consists of consolidated metamorphic, igneous, and sedimentary rocks ranging from Cambrian to Triassic in age. Surficial deposits are represented by a relatively thin mantle of unconsolidated material of Pleistocene and Holocene age. BEDROCK GEOLOGY

PRE-TRIASSIC ROCKS

In the New Hartford quadrangle, the pre-Triassic rocks consist of high-grade metasedimentary and metavolcanic rocks that have been intruded by numerous small dikes and sills of pegmatite and granite of Devonian(?) age. Correlation of these rocks with rocks exposed to the north in Massachusetts and to the south in Connecticut is based in part on direct mapping, in part on lithologic similarities, and in part on interpretive extrapolations, and is summarized on

the correlation diagram. Unmetamorphosed intrusive pegmatites and granites are the youngest pre-Triassic rocks in the quadrangle. Absolute age determinations are not available for these rocks, but on the basis of determinations on similar rocks elsewhere in New England they are probably Devonian in age, although some may be as young as Permian (Zartman and others, 1970). Correlation of the stratigraphic units mapped west of the Barkhamsted fault is reasonably straightforward with units papped to the north in Massachusetts (Hatch, 1969), and the nomenclature used here follows that of Massachusetts. Correlation of the units east of the fault is reasonably straightforward with units mapped to the south in Connecticut, and the nomenclature here used for major units essentially follows that of Connecticut (see, for example, Stanley, 1964). The rocks on either side of the fault appear to be lithologically dissimilar; they

are not believed to be correlative with each other. West of the Barkhamsted fault the Hoosac Formation has been mapped directly into rocks defined as Hoosac in the Blandford quadrangle (Hatch and Stanley, 1973), through the West Granville quadrangle (Schnabel, unpub. data). The Moretown Formation is identified mainly on the basis of lithologic similarity to rocks described as Moretown in Massachusetts and Vermont (Osberg and others, 1971; Cady, 1956), principally the "pinstripe" texture described by Cady. The contact between the Moretown and Hoosac Formations is marked along its entire length in the New Hartford quadrangle by a delicately laminated hornblende-epidote amphibolite that rarely exceeds 15 in (50 ft) in thickness. Although this amphibolite rarely crops out, its presence is easily detected by large angular blocks in talus along the east-facing slopes above the Barkhamsted Reservoir and west of New Hartford. This amphibolite has been traced to near the northern boundary of the West Granville quadrangle where it occupies a position between the Rowe Schist and he Hoosac Formation. The amphibolite thus may represent what

is left of the Rowe Schist in the New Hartford area. For the most part, correlations of the rocks east of the Barkhamsted fault with units in Connecticut are based on di ect mapping. The differences in nomenclature between that used in the Collinsville quadrangle (Stanley, 1964) and that used here (see correlation diagram) reflect more of a difference in philosophy than in recognition of rock types. Although the Straits Schist of the Collinsville quadrangle is not continuous with the Straits Schist of the New Hartford quadrangle, the two units are lithologically similar and occupy the same stratigraphic posi-

The proposed age relationships of the rocks across the Barkhamsted fault are based on the assumption that the rocks surrounding the Collinsville and Bristol domes (Stanley, 1964) are right side up (an interpretation that Stanley (1968) and Hatch and Stanley (1970) do not now follow), and that these rocks are correlative with rocks surrounding the North Granby dome (Schnabel and Eric, 1965; Schnabel, 1974a). Rocks exposed in the core of the Collinsville and Bristol domes are lithologically identical to rocks of the Moretown Formation (Hatch and Stanley, 1970, have correlated the rocks in the core of the Bristol dome with the Moretown). On the assumption that this correlation is valid, the Collinsville Formation of Stanley (1964) and at least part of the Straits Schist are correlatives of the Hawley Formation. The Hartland Formation may include rocks that are correlative with the Hawley Formation, but it probably is mostly stratigraphically above the Hawley Formation to the north.

TRIASSIC ROCKS In the Valley of Cherry Frook in the southeast corner of the quadrangle, and also at and south of the quadrangle boundary are a series of small outcrops of red to medium-reddishbrown sandstone, conglome ate, and siltstone. These rocks were first reported by Platt (1957). They are presumably equivalent to similar rocks exposed about 3 km (2 mi) to the east in the Triassic lowland (Schnabel, 1960; Schnabel and Eric, 1965). The Triassic sedimentary rocks are caught in a downdropped fault block and represent a remnant of a formerly more widespread blanket of New Haven Arkose.

SURFICIAL GEOLOGY Surficial materials cover about 95 percent of the quadrangle in known thicknesses ranging

from a featheredge to about 27 m (90 ft). By far the greatest volume of this material is glacial till; lesser quantities of stratified drift, stream terrace deposits, swamp deposits, and alluvium form relatively small isolated deposits in the uplands and relatively thick and extensive deposits along the East and West Branches of the Farmington River. Windblown sand and silt form a layer of variable thickness but generally less than 1 m (3 ft) on the Pleistocene deposits; this layer is absent from the younger deposits. Deposition of the glacial deposits began with the formation of the till, first as a hard com-

pact mass under the advancing ice, and later as loose debris from the melting ice. As the ice melted, both downward and northward, successively lower parts of the land surface became exposed. Meltwater streams flowing from the ice over these surface deposited successively lower accumulations of stratified drift. During this period, windblown sand and silt were deposited over the surficial deposis, and as the drainage became stablized, stream terraces formed along some of the larger streams in the quadrangle; swamp deposits began to accumulate and vial deposits began to form in the valleys. The swamp and alluvial depos form and be modified today. Thus, the boundary between the Pleistocene and Holocene is indefinitely marked within the New Hartford quadrangle.

 2 Correlations shown represent modification of original report based on more recent investigations

STRUCTURAL GEOLOGY

The major structural features of the New Hartford quadrangle are the Barkhamsted fault, which follows the valley of the East Branch of the Farmington River; two faults that form the east and west boundaries of the Triassic rocks; and an elongate dome, or doubly plunging anticline, in the northeast part of the quadrangle, the South Granby dome (Rodgers and others,

The Barkhamsted fault follows the steeply incised valley of the East Branch of the Farmington River, which is now occupied by the Barkhamsted and Compensating Reservoirs. Direct evidence for the existence of this fault is not present in the New Hartford quadrangle, but does exist in the form of a breccia zone exposed to the north in the West Granville quadrangle (Schnabel, unpub. data). For want of other data, it is shown on the cross sections as a vertical fault. Displacement cannot be determined directly; if the correlation of the Moretown Formation with rocks below the North Granby dome is correct, and if the thickness of the units is constant, the minimum displacement must be of the order of magnitude of 4,500 m (15,000 ft). The faults in the southeast part of the quadrangle, that in part follow the valley of Cherry Brook, are postulated on the assumption that the Triassic rocks in that valley had to be down-

dropped into their present position. An additional major fault might exist between the Moretown and Hoosac Formations. To the north, in Massachusetts, the Rowe Schist normally occupies this intermediate position, and to juxtapose the two formations requires the nondeposition or erosion of a significant amount of material, or the removal of that material by faulting. Because there is no evidence for faulting

along the contact between the Hoosac and the Moretown, I believe that the contact represents a very low angle unconformity, with the thinly laminated epidote-hornblende amphibolite the only rock remains from deposition during Rowe time. Small faults, most of them normal and having minimal displacement, are relatively common

in roadcuts and other manmade exposures throughout the quadrangle; they are only rarely seen Moderately strong northwest-trending topographic lineaments are expressed by Beaver Brook, the northwest arm of the Compensating Reservoir and part of the valley of the West Branch of the Farmington River, and by valleys on Ratlum Mountain parallel to Barbour Brook in the southern part of the quadrangle. In most of these places it cannot be demonstrated that the lineaments are related to faulting. However, at the south end of Ratlum Mountain and

south of Beech Rock the bedrock is highly contorted by nonsymmetrical folds, which suggest

that the rocks may have been distorted during a late tectonic event. Folding large enough to affect the map pattern was observed only around the South Granby dome and along the contact between the Moretown and Hoosac Formations. Minor folds with amplitudes ranging from a few centimetres to about one metre (a few inches to a few feet) were observed in many outcrops throughout the quadrangle. Most of these minor folds have the tabular minerals "shingled" around the nose of the fold, indicating that the schistosity had formed prior to the folding. Where bedding is visible, the schistosity is parallel to bedding. In a few outcrops, some of the minor folds have a foliation parallel to their axial planes. Commonly only one or two of the folds in an outcrop show such a foliation; in most outcrops no axial-plane foliation is visible at all. Because such foliation seemed to be a minor feature, it was not recorded or plotted on the map. Stanley (1972) described four fold generations in parts of Connecticut and Massachusetts, but I have not recognized the tectonic sequence he described. I believe most of the minor structures can be explained as a product of the tectonic activity

that produced the South Granby dome; the other structures seem to be related to faulting that

METAMORPHISM

may have been essentially synchronous with the doming

All of the metamorphic rocks in the quadrangle appear to be in the sillimanite zone of regional metamorphism; all rocks of appropriate composition contain at least trace amounts of sillimanite. None of the rocks, however, appear to have reached sillimanite-potassium feldspar grade. Typical mineral assemblages are given in Schnabel (1974b). Retrograde metamorphic effects are not well developed in any of the rocks, the only noticeable effect being the altera-

tion of very small parts of some biotite crystals to chlorite. AEROMAGNETIC CORRELATIONS

In a general way, the configuration of the contours on the aeromagnetic map (U.S. Geol. Survey, 1969) agrees with the distribution of the rocks as shown on the geologic map. In particular, a magnetic high coincides with the upper part of the kyanite schist member of the Hartland Formation, which in many places contains visible magnetite. A magnetic low is approximately coincident with the lower part of the kyanite schist member and the calc-silicate zone of the Hartland Formation, and with the upper part of the Straits Schist. Two relatively lowamplitude magnetic highs over the South Granby dome probably reflect magnetic effects from

rocks underlying the Straits Schist. In the northwest corner of the quadrangle, the increase in magnetic intensity reflects the presence of the gneiss in the lower part of the Hoosac Formation. Elsewhere in the western part of the quadrangle, the Hoosac and Moretown Formations produce relatively flat magnetic patterns. An exception are the two highs at Barkhamsted Center and south of Ragged Mountain. An "area of soapstone and associated rocks" was reported by Rice and Gregory (1906, p. 113) as being "one mile north of Pleasant Valley." This area was not found during the current investigation, but should one or more ultramafic bodies be present, although covered by till, they would explain the magnetic highs near Barkhamsted Center.

The most important economic resources of the New Hartford quadrangle are the deposits of sand and gravel in the water-laid glacial deposits. About 38 million m³ (42 million yd³) of sand and gravel are contained in 70 separate deposits that range in volume from about 1,350 m³ (1,500 yd³) to nearly 4.5 million m³ (5 million yd³). In addition, about 4.7 million m³ (5.2 million yd³) of sand and gravel are contained in 11 deposits of alluvium that range in volume from about 4,500 m³ (5,000 yd³) to about 4.5 million m³ (5 million yd³). The largest deposit of alluvium is along the West Branch of the Farmington River. In addition, extensive sand and gravel deposits may underlie both the Compensating Reservoir and the Barkhamsted Reservoir, as continuations of the sequence of sand and gravel deposits along their shorelines; indeed all of the islands that are accessible during low water are composed of sand and gravel. Exploitation of the sand and gravel deposits depends upon their size, composition, and potential uses, in addition to economic and ecological factors. Any such exploitation should be preceded by careful examination of a particular deposit to determine the suitability of the deposit for the purpose intended. Most of the loose till, which forms an extensive blanket over the quadrangle, is well graded

material can probably be obtained within a very short distance of where it is needed. The swamp deposits that are scattered about the quadrangle are a potential source of organicrich material for lawn dressing and similar applications, but with the exception of Hoyt Hayes swamp none seems large enough for commercial exploitation. If Hoyt Hayes swamp was the site of a glacial lake, it is possible that there are deposits of fine-grained sediments suitable for brick making and possibly also for light-weight aggregate. A drilling program would be needed to explore this possibility.

and thus can be used whereever well-graded fill is needed. The supply is so enormous that this

Bedrock formations have limited potential for economic exploitation. Perhaps the most important potential mineral resource in the bedrock formations is the kyanite contained in the kyanite schist member of the Hartland Formation. Millions of tons of rock containing as much as 30 percent kyanite are available from near-surface exposures. Exploitability of this material is a function mainly of economic considerations. Small amounts of feldspar and quartz might be obtained from some of the larger pegmatites

in the quadrangle. No pegmatites containing large books of mica were seen. Building stone can be obtained from many of the bedrock units in the quadrangle. The quarrying of building stone, however, depends upon potential uses, esthetic factors, and economic considerations. The small quarry on the west side, near the south end of the Barkhamsted Reservoir, furnished some of the dimension stone and most of the riprap used in the construction

No metallic mineral resources were found during this investigation.

REFERENCES

Cady, W. M., 1956, Bedrock geology of the Montpelier quadrangle, Vermont: U.S. Geol. Survey Geol. Quad. Map GQ-79. Hatch, N. L., Jr., 1969, Geologic map of the Worthington quadrangle, Hampshire and Berkshire Counties, Massachusetts: U.S. Geol. Survey Geol. Quad. Map GQ-857 [1970]. Hatch, N. L., Jr., and Stanley, R. S., 1970, Stratigraphic continuity and facies changes in formations of early Paleozoic age in western Massachusetts and tentative correlations with Connecticut: Geol. Soc. America Abs. with Programs, v. 2, no. 1, p. 23-24.

shire Counties, Massachusetts: U.S. Geol. Survey open-file map. Osberg, P. H., Hatch, N. L., Jr., and Norton, S. A., 1971, Geologic map of the Plainfield quadrangle, Franklin, Hampshire, and Berkshire Counties, Massachusetts: U.S. Geol. Survey Geol. Ouad. Map GO-877. Platt, J. N., Jr., 1957, Sedimentary rocks of the Newark group in the Cherry Brook valley, Canton Center, Connecticut: Am. Jour. Sci., v. 255, no. 7, p. 517-522. Rice, W. N., and Gregory, H. E., 1906, Manual of the geology of Connecticut: Connecticut

_____1973, Preliminary geologic map of the Blandford quadrangle, Hampden and Hamp-

Geol. and Nat. History Survey Bull. 6, 273 p. Rodgers, John, Gates, R. M., Cameron, E. N., and Ross, R. J., Jr., 1956, Preliminary geological map of Connecticut: Connecticut Geol. and Nat. History Survey. Schnabel, R. W., 1960, Bedrock geology of the Avon quadrangle, Connecticut: U.S. Geol. Survey Geol. Quad. Map GO-134. __1974a, Bedrock geologic map of the Southwick quadrangle, Massachusetts and Connecticut: U.S. Geol. Survey Geol. Quad. Map GQ-1170. _____1974b, Modal analyses of selected samples from the New Hartford quadrangle, Con-

Schnabel, R. W., and Eric, J. H., 1965, Bedrock geologic map of the Tariffville quadrangle, Hartford County, Connecticut, and Hampden County, Massachusetts: U.S. Geol. Survey Geol. Quad. Map GO-370. Stanley, R. S., 1964, The bedrock geology of the Collinsville quadrangle, with map: Connecticut Geol. and Nat. History Survey Quad. Rept. 16, 99 p. 1968, Bedrock geology of western Connecticut, Connecticut Geol. and Nat. History Survey Guidebook 2, in New England Intercollegiate Geol. Conf., 60th Ann. Mtg., 1968,

necticut: U.S. Geol. Survey open-file report, 1 sheet.

Guidebook for field trips in Connecticut: 5 p. _____1972, Time and space relationships of structures associated with the domes of southwestern Massachusetts and western Connecticut: Geol. Soc. America, Abs. with Programs, U.S. Geological Survey, 1969, Aeromagnetic map of the New Hartford quadrangle and parts of the Collinsville and West Granville quadrangles, Litchfield and Hartford Counties, Connecti-

cut: U.S. Geol. Survey Geophysical Inv. Map GP-644. Zartman, R. E., Hurley, P. M., Krueger, H. W., and Giletti, B. J., 1970, A Permian of K-Ar radiometric ages in New England, its occurrence and cause: Geol. Soc. America Bull., v. 81, no. 11, p. 3359-3374.

REGIONAL CORRELATION OF BEDROCK UNITS IN THE NEW HARTFORD QUADRANGLE

	WEST-CENTRAL MASSACHUSETTS	NEW HARTFORD QUADRANGLE (THIS REPORT)		NORTHWEST CONNECTICUT				
SYSTEM	OSBE3G AND OTHERS (1971); HATCH (1969)			-	STANLEY (1	SCHNABEL AND ERI (1965) ²		
TRIASSIC		New Haven Arkose		New Haven Arkose; dolorite			Newark Group	
DEVONIAN(?)	Granite, pegmatite, and quartz	Pegmatite		Granitic rocks			Pegmatite	
DEVONIAN TO SILURIAN	Goshen Formation							
ORDOVICIAN	Ultramafic rocks			Ultramafic rocks				
		Upper member	roup	Rusty schist member of the Slasher's Ledges Formation; part of the Ratlum Mountain Member of the Satan's Kingdom Formation; part of the upper member of the Rattlesnake Hill Formation				
		Kyanite-sillimantic schist	Hartland Gro	Breezy Hill Member of the Satan's Kingdom Formation; kyanite schist member of the Slasher's Ledges Formation		Unit a		
	Hawley Formation	Calc-silicate zone		Part of the upper member of the Rattlesnake Hill Formation; part of the Ratlum Mountain Member of the Satan's Kingdom Formation		Upper part of unit b and unit b 1		
		Straits Schist		The Straits Schist		Lower part of unit b, and unit c		
		group		ollinsville	Sweetheart Mountain Member		Unit d	
				Collir	Bristol Member		Unit e	
	Moretown Formation		Lower gro	Mountain	Whigville Member	Rocks on Jones and Yellow		
		Moretown Formation		e Mou ormati	Scranton Mountain Member	Mountains part of the upper member of the Rattlesnake Hills Formation		
				Taine	Wildcat Member			
ORDOVICIAN AND CAMBRIAN	Rowe Schist							
CAMBRIAN OR OLDER	Hoosac Formation	Hoosac Formation						

GEOLOGIC MAP OF THE NEW HARTFORD QUADRANGLE, NORTHWESTERN CONNECTICUT

Interior-Geological Survey, Reston, Va.-1975