U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Preliminary Bedrock Geologic Map of the Chester Quadrangle, Windsor County, Vermont

By
Nicholas M. Ratcliffe[1]

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[1]Reston, Va.

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DESCRIPTION OF MAP UNITS

(major minerals listed in order of increasing abundance)

INTRUSIVE ROCKS OF COVER AND CORE OF DOME

Kd — Mafic dikes (Cretaceous)--Nonfoliated, blocky jointed, medium- to fine-grained camptonite or diabasic dikes

Dp — Pegmatite (Devonian)--Massive, nonfoliated, muscovite-biotite pegmatite, may be shown by symbol only

Dg — Granite (Devonian)--Massive to weakly-foliated, muscovite-biotite-microcline-plagioclase-quartz granite to granodiorite dikes and sills, that cross cut highly foliated country rocks. May be shown by symbol only

Metasedimentary Rocks (cover sequence rocks)

COVER SEQUENCE ROCKS OF THE CHESTER DOME

Waits River Formation (Lower Devonian and Silurian)

DSw — Dark gray to black, fine-grained lustrous, carbonaceous schist and dark-blue gray-, dark punky-brown-weathering limestone and quartz-rich limey schist. Poorly exposed and distinguished from the underlying Northfield by the abundance of punky-weathered limestone and schist

Northfield Formation (Lower Devonian and Silurian)

DSn — Schist member--Dark-gray to black, carbonaceous, fine-grained, muscovite-biotite-plagioclase-quartz schist or phyllite marked by conspicuous small garnets 1 to 2 mm in diameter that form small bumps on the foliation surfaces. Garnets are commonly partially to completed replaced by white plagioclase, or by chlorite

DSng — Grit member--Medium- to dark-gray to steel-gray-weathering, biotite-plagioclase-quartz granofels, impure quartzite and minor quartz-pebble conglomerate, occurs near base of unit interbedded with layers of schist or phyllite; thickness variable from 0 to 10 m

DSnc — Calc-silicate member, light-gray-green- to gray-weathering, medium-grained zoisite-magnetite-phlogopite calc-silicate granofels, locally occurs associated with DSng near base of unit

Cram Hill Formation (Ordovician)

(c denotes coticule in all units)

Ochb — Black quartz-phyllite and ironstone member--Dark-gray- to dull-black-weathering very fine-grained, siliceous phyllite and phyllitic metasiltstone(?), forms thin beds of splintery, highly fractured rock, contains beds of pale gray-green- to steel-gray- weathering sulfidic cummingtonite-magnetite-plagioclase-quartz amphibolite as much as 3 m thick, discontinuous very rusty, manganiferous garnet quartzite and pinkish layers of coticule 1 to 2 cm thick

Ochg / Ochag — Greenstone member--Medium-green to gray-green, highly foliated, hornblende-plagioclase greenstone, marked by distinctive irregular, clots, or indistinct patches of more plagioclase-rich inclusions as much as 3 cm in length set in a more uniform amphibolite matrix, passes into zones of highly ankeritic greenstone; one prominent zone near base, mapped as Ochag, contains lens of buff-gray- to orangish-gray-weathering dolostone, quartzite and coticule. Unit interpreted as basaltic to andesitic tuff breccia and volcaniclastic rock

Ochc — Quartzite and coticule member--Discontinuous beds and zones of gray- to light-gray-weathering quartzite, quartz-pebble conglomerate and well-bedded feldspathic granofels and coticule, as much as 2 m thick, but commonly 0.5- to 1-m-thick interbedded in Ochhg or Ochg at or near their mutual contact

Och:g — Hornblende-plagioclase-quartz granofels member--Light-gray-weathering, medium- to coarse-grained, garnet-biotite-hornblende-plagioclase-quartz granofels, marked by abundant sprays of large hornblende as much as 5 cm in length, interbedded with layers of biotitic amphibolite and hornblende-garnet amphibolite. The coarseness of the hornblende and grain size of

plagioclase in the granofels distinguishes this unit from similar hornblende fasicle granofels and schist in the Moretown Formation; unit is correlated and perhaps identical to the Marlboro member of the Cram Hill Formation of Armstrong (1994)

Ochfg — Feldspathic granofels member--Medium- to dark-gray, well-bedded, biotite-quartz-plagioclase granofels, biotite schist, minor amphibolite and hornblende fasicle schist. Unit gradational with Ochhg through interbedding

Ochs
Ochq — Papery thin schist and phyllite member--Pale gray-brown- to whitish tan-weathering, fine-grained, biotite-garnet-muscovite schist and carbonaceous phyllite, unit contains beds rich in tiny 1- to 2-mm-diameter garnets that are similar to garnet-rich phyllites of the Northfield Formation. Passes laterally into a darker gray- to slightly rusty-weathering siliceous phyllite or schist that contains discontinuous layers of steel-gray quartzite. Locally unit contains a distinctive, steel-gray- to yellow-tan-weathering quartzite and quartz-pebble conglomerate as much as 2 m thick (Ochq), that closely resemble conglomerate unit (Ochc) in the upper part of the Cram Hill Formation. Unit Ochs closely resembles phyllite and schist in the Whetstone Hill Member of the Mississquoi Formation of Doll and others (1961). Unit is transitional downwards into Ochv

Ochv — Felsic and mafic volcaniclastic member--A heterogeneous unit consisting of well-layered, light-gray-weathering, felsic biotite-hornblende-quartz plagioclase gneiss intimately interlayered with darker gray-green hornblende-biotite-plagioclase amphibolite and hornblende-plagioclase granofels and gneiss. The proportion of felsic to mafic layers varies greatly and the thickness of the mafic layers which are generally subordinate, ranges from one to several meters. The rusty-weathering-biotite-muscovite-quartz schist, feldspathic granofels and layers of coticule present throughout indicate a collection of volcaniclastic rocks and interbedded metasediment,

for this reason the unit is interpreted as a member of the Cram Hill Formation. Contact relations with underlying units uncertain, may disconformably overlie both the Moretown and metatrondhjemite (Ontr) of the North River Igneous Suite

Intrusive rocks of the North River Igneous Suite of Armstrong (1994)

(Ordovician)

Ontr — Trondhjemite gneiss--Principally, light-gray- to chalky-white-weathering, massive medium-grained, biotite±garnet quartz-plagioclase gneiss, lacks mafic layers present in Ochvc member of the Cram Hill Formation and is interpreted as intrusive into Omgg, Omhg and Oml members of the Moretown Formation

Ont — Tonalite gneiss member--Medium-gray- to gray-green-weathering, medium-grained, hornblende-biotite tonalite, tonalitic gneiss and biotite tonalite, contains distinctive layers or zones of darker colored hornblende-biotite metabasalt, or metabasaltic andesite or mafic dikes that contain irregularly shaped, white weathering segregations of glomeroporphyritic plagioclase. Unit contains ovoidal patches of white-weathering biotite trondhjemite as much as 0.5 m in diameter and more indistinct plagioclase-rich inclusions 0.5 to 1 cm in diameter throughout the tonalite host. The more mafic dikes or enclaves, and the felsic inclusions suggest a comagmatic association of intermediate, mafic and felsic plutonic to subvolcanic rocks. Unit is overall, intrusive into Oml of the Moretown Formation

OZu — Talc and talc-carbonate rock and serpentinite (Ordovician Cambrian or Late Proterozoic)--Confined to two occurrences of blocks of serpentinite and talc 0.5 to 0.1 m in diameter within rusty sulphidic schist and amphibolite Ombs or Omnfs on the narrow ridge 1.5 km southwest of Gassetts, near the western margin of the map. Exposures are poor but rocks appear to be tabular to blocky inclusions within enclosing metasediments, and are interpreted as olistoliths

Moretown Formation (Ordovician)

Omgg
Omfq

Garnet schist and granofels member--Light-gray- to gray-green-weathering, garnet-biotite-chlorite-muscovite-quartz schist and schistose biotite-garnet-plagioclase- quartz granofels, contains discontinuous light-tan-weathering, thinly layered muscovite-biotite-plagioclase quartzite (Omfq) near base

Omd

Hornblende-plagioclase dioritic amphibolite--Medium-grained, black- and white-spotted, dioritic appearing amphibolite consisting of subequal amount of hornblende and plagioclase having a crude diabasic appearing texture that results from growth of metamorphic hornblende, either a dike or recrystallized intermediate volcanic rock

Omhg

Hornblende granofels and schist member--Light-gray-green, lustrous, chlorite-biotite-muscovite-quartz schist containing abundant layers of dark-gray garnet-hornblende amphibolite and garnet-biotite-hornblende-plagioclase granofels layers commonly 0.1- to 0.5-m-thick, unit interbedded and gradational into Oml below and Omgg above

Ombs

Black schist member--Dark-gray to silvery-gray, garnet-biotite-muscovite carbonaceous schist, and associated rusty-weathering muscovite-biotite-quartz schist. Unit contains layers rich in small garnet 1-2 mm in diameter, like layers in Ochs which resemble phyllites of the Whetstone Hill member of the Mississquoi Formation of Doll and others (1961)

Oml

Pinstripe granofels member--Light-gray- to pinkish-gray-weathering, pinstriped, biotite-plagioclase-quartz granofels and quartzite. Granofels layers contain abundant fasicles of hornblende, or layers of hornblende-plagioclase granofels 1 to 5 cm thick, where these hornblende fasicles and granofels layers predominate unit passes into Omhg

Omhfs

Hornblende fasicule schist member--Light-gray to gray-green, chlorite-muscovite-biotite-plagioclase-quartz schist and granofels marked by conspicuous sprays of hornblende and

distinctive, large 5 mm to 1 cm porphyroblasts of cross-foliation biotite, abundant irregular layers of coticule 1 to 2 cm in thickness, and abundant layers of pinstriped light-gray biotite-quartz granofels like Oml. Unit is found west of the Athens dome and may be correlative with Omhg and Oml east of the dome

Omrs
Omra

Rusty schist and amphibolite member--Dark-gray- to rusty-brown-weathering, sulfidic, muscovite-biotite-quartz-plagioclase schist and rusty-weathering, slabby, hornblende amphibolite, contains mappable lenses of amphibolite (Omra) having gradational contacts with surrounding Omhg and Omrs; interpreted as lowermost unit of the Moretown Formation exposed in core of tight isoclinal antiform along the eastern margin of the Chester dome. Similar rocks appear as lenses too small to map associated with amphibolite within Omhfs in the southwest corner of the map and in the core of the tightly infolded synform of Moretown Formation along the western border of the map 1 km north of Whitmore Brook, where the unit contains small blocks of talc 10 cm to 1 m in size identified as OZu. The two units mapped as Omrs and Ombs east and west of the dome, although similar, need not be correlative

Oma

Amphibolite member--Varies from dark-green, fine-grained, epidote-knotted well-foliated plagioclase-hornblende amphibolite to a more plagioclase-rich and coarser-grained, spotted amphibolite, both are mapped in the cover sequence west of the Chester dome. Occurs throughout Omhfs and in Omgg, correlation with similar amphibolites in the eastern cover sequence east of the dome is uncertain, but the lowermost amphibolite west of the dome is in the same structural position as amphibolite Oma? east of the dome and the two may be correlative

Moretown Formation(?) (Ordovician)

(refers to units near the base of the cover sequence east of the dome that may be broadly correlative with Oma and Omhfs west of the dome)

Omgs?
≥Omgsa?
c

Green schist and granofels member--Principally light-green to pale-gray-green, lustrous, chlorite-biotite-muscovite-quartz schist and light-gray feldspathic granofels interbedded on a scale of 10 cm, locally contains coarse-grained garnet schist and widespread thin beds as much as 10 cm thick of pinstriped, chlorite-muscovite-plagioclase-quartz schist and granofels identical to Oml, beds of coticule 1-2 cm thick (denoted by a leader and a lower case "c") or layers of dark-green well-foliated amphibolite may be abundant. Distinctive porphyroblasts of cross-foliation biotite occur throughout; these porphyroblasts and the very feldspathic interbeds are regionally characteristic of the Moretown or Stowe Formations and are absent from the Pinney Hollow Formation with which these rocks have been correlated by Thompson and others (1993)

Omfg?

Feldspathic granofels member--Medium- to dark-gray, muscovite-biotite-quartz plagioclase granofels and schist, locally bedded on a scale of 2 to 4 cm or pinstriped and marked by distinctive porphyroblasts of cross-foliation biotite

Oma?

Amphibolite member--Dark-green, highly foliated epidote-biotite-hornblende and hornblende-plagioclase amphibolite, varies from highly foliated and epidote-podded to a more granular rock consisting of approximately 70 percent hornblende and 30 percent plagioclase. Unit is in fault contact with Middle Proterozoic rocks at its base and is bedded with and gradational upwards into Omfg?

Hoosac Formation (Late Proterozoic and Cambrian)

ϵZh? Light-gray to medium dark-gray biotite-rich plagioclase-quartz granofels and fine-grained gray, slabby, biotite quartzite containing layers of hornblende amphibolite west of the Chester dome. East of the Chester dome a very narrow belt of similar plagioclase-rich granofels and interbedded amphibolite occurs beneath Oma?, near the contact with Ybh and Ybg. The base of the unit is highly mylonitic and the fault contact is drawn at the last recognizable enclave of porphyroclastic gneiss within the mylonite. Excellent outcrops showing the tectonic laminations in a plagioclase-rich granofels derived from the Bull Hill Gneiss are exposed in the bed of the Williams River 2 km south of the quadrangle border on strike with the projected contact between ϵZh? and Ybh; these exposures suggest that all or part of the rocks mapped east of the dome, as Hoosac Formation? and along this fault may have been derived from Middle Proterozoic basement by mylonitization

Hoosac Formation (Late Proterozoic and Lower Cambrian)

ϵZh
ϵZhtm Light-gray- to medium-gray, biotite-plagioclase-quartz schist, granofels and rusty weathering muscovitic-biotite-plagioclase-quartz schist. Contain layers of plagioclase-epidote-hornblende amphibolite mapped as Turkey Mountain Member ϵZhtm. Exposed in southwestern corner of the map

CORE ROCKS OF THE CHESTER DOME INCLUDING THE MOUNT HOLLY COMPLEX AND BULL HILL GNEISS MEMBER OF THE CARDINAL BROOK INTRUSIVE SUITE

Ybh Bull Hill Gneiss Member of the Cardinal Brook Intrusive Suite (Middle Proterozoic)--Light-pinkish gray to gray, coarse-grained to medium-grained, mylonitic, biotite-plagioclase-microcline augen gneiss, distinguished by distinctive partially recrystallized augen of microcline set in a much finer grained biotitic and epidotic mylonitic matrix. Where less

deformed, contains rectangular to ovoidal relict phenocrysts of microcline that make up more than 50 percent of the rock. This coarse relict texture may be seen in exposures on the west slopes of Bond Hill; is continuous with the type area of Bull Hill Gneiss exposed 12 km south in the Saxtons River quadrangle. Mylonitic augen gneiss is well exposed in the outcrops just north of route 11 in Springfield, near the eastern margin of the map, and along the complex fault system on the western limb of the Chester dome. The narrow 2 km-wide belt of Ybh shown west of Gassetts is highly mylonitic and may be deformed pegmatite (Yp) or granitic gneiss of the Mount Holly (Ygg) rather than Bull Hill Gneiss; correlation of this belt with the type Bull Hill Gneiss is uncertain. The unit is intrusive into rocks of the Mount Holly Complex over broad areas to the south of the quadrangle, but here is confined to the eastern and western margins of the core of the Chester dome

MOUNT HOLLY COMPLEX (MIDDLE PROTEROZOIC)

Intrusive Rocks of the Mount Holly Complex

Yp — Pegmatite--Highly deformed, well-foliated, light-gray to pinkish-gray, biotite-hornblende(?)-muscovite pegmatite commonly altered to chlorite, epidote, albite and sericite and containing large plates of ilmenite and locally diopside crystals as long as 30 cm. Forms small 1- to 2-meter-thick pods to masses as much as 1 km long, most abundant in or near rusty weathering schist and quartzite units (Yrg, Yrs, Yrq) and in the Cavendish Formation. Occurs as thin nonmappable pods, stringers or layers in all units of the Mount Holly Complex

Ygg — Granitic and migmatitic gneiss--Light-gray to pinkish-tan weathering, fine-grained, ropy-structured to well foliated, biotite-quartz-microcline-plagioclase granite gneiss, commonly having indistinct layers and or augen of microcline and intergrown plagioclase as much as 2 cm in diameter. Unit resembles Ygp but contains abundant fine-grained 1-2 mm, grains of

microcline subequal in abundance to plagioclase, which commonly forms larger 3-5 mm diameter grains. Accessory metamorphic muscovite and coarse epidote common. Finer-grained varieties may contain abundant scattered magnetite. Unit interpreted as original feldspathic volcanic rock migmitized in the Middle Proterozoic. Unit may correlate with Yfg unit of the Mount Holly complex, as mapped in the Mount Holly area (Ratcliffe, 1992)

Ygp — Felchville Trondhjemite gneiss--Light-gray to whitish-gray weathering, medium- to medium-coarse-grained, magnetite-biotite-microcline-quartz-plagioclase gneiss, having indistinct layering near contacts with adjacent units but massive elsewhere. Large conspicuous augen of well twinned plagioclase, as much as 1 cm in diameter are common, whereas matrix feldspar is less than 1 mm in diameter, and consists of sparing amounts of microcline to as much as 25 percent. Overall unit is granodiorite to trondhjemite. Unit is intrusive into all units of Mount Holly including the Cavendish Formation. Preliminary U-Pb zircon data suggest a minimum intrusive age of approximately 1.3 Ga (John Aleinikoff, personal comm., 1994). May be correlative with Yt and Yta below

Yap — Aplitic gneiss facies of the Felchville gneiss--White-weathering fine-grained equivalent of Ygp consisting of magnetite, quartz, plagioclase; only trace amounts of microcline; unit contains xenoliths of more biotitic gneiss and amphibolite and is commonly associated with contact zones of Ygp against calc-silicate gneiss (Ycs), amphibolite (Ya) or marbles (Ycm) associated with the Cavendish Formation. Both the Ygp unit and Yap resemble similar rocks mapped as Yph and Yap in the Mount Holly quadrangle (Ratcliffe, 1992) where they intrude lustrous schists and rusty quartzose gneiss of the Mount Holly Complex

Yt — Baileys Mills Tonalitic Gneiss--Coarse-biotite-flecked, light-gray to whitish-gray-weathering, medium-grained, biotite-quartz-plagioclase gneiss, having a distinctive non-gneissic, igneous appearing texture, in less sheared rocks. Rock closely resembles tonalitic and trondhjemitic gneisses within the core of the Green Mountain massif, dated at 1.3 Ga (Ratcliffe and others, 1992). Contains numerous inclusions of coarse biotite amphibolite mapped as Ya that may be, in part, comagmatic dikes of metagabbro. Passes into lighter gray, more leucocratic, biotite trondhjemite gneiss

Yta — Augen gneiss facies of the Baileys Mills Tonalite Gneiss--Very-well foliated, mylonitic, biotite gneiss containing porphyroclastic eyes of plagioclase as much as 5 mm long set in a mylonitic matrix rich in biotite; rock gradually passes into mylonite gneiss or schist (Ytm) that may be equivalent to much of the dark biotitic feldspathic schist in the feldspathic member of the Cavendish (Ycfs) on Hawks Mountain and on Pine Hill

Layered paragneiss and metavolcanics? of the Mount Holly Complex

Cavendish Formation (Middle Proterozoic)

Ycg — Gassetts Schist Member of the Cavendish Formation--Yellowish-green to gray-green rusty-weathering, lustrous, large-garnet, chlorite-biotite-muscovite-(paragonite)-quartz±plagioclase schist, marked by large irregular sprays, clots and patches of iron-rich chlorite and large irregular shredded plates of muscovite. May contain large conspicuous grains of black staurolite as much as 4 cm long, and smaller, 1 cm grains of faintly blue-gray kyanite. Deep-reddish-brown garnet, as much as 2 cm in diameter, commonly is highly altered to chlorite, whereas small 2 to 3 mm garnets in the matrix are unaltered. Unit passes into gray-green, more feldspathic schist lacking abundance silky muscovite but still containing small garnets and abundant sprays, clots and patches of chlorite. This variant is mapped within Ycg

Ycfs — Feldspathic schist or granofels member--Either a rusty-weathering, light- to medium-dark-gray, white-plagioclase-spotted, biotite-quartz granofels or a biotite-rich porphyroclastic schist having isolated augen of plagioclase, as much as 1 cm in diameter set in a phyllonitic matrix of biotite, muscovite, epidote, and quartz. The latter variety is widely distributed on Hawks Mountain and on Pine Hill in the adjacent Cavendish Quadrangle. Contact with underlying tonalitic and trondhjemitic gneisses (Yt, Yta) is interpreted as a sheared and faulted, originally intrusive contact. On the east side of Duttonsville Gulf Ycfs occurs at or near the contact with paragneiss or intrusive units of the Mount Holly Complex

Ycm — Marble member--Consists of a variety marbles intimately associated with calc-silicate gneiss and or beds of actinolitic quartzite, including, whitish-gray weathering, medium- to coarse-grained, phlogopite-calcite-dolomite and quartz-knotted marble; greenish actinolite-rich dolomitic marble; fine-grained yellow-gray weathering, highly foliated phlogopite-talc(?)-tremolite-dolomite marble. The purer varieties of the marble were quarried 0.7 km east of Perkinsville at the northern border of the map. The highly foliated variety occurs as a 0.5 m-thick lens at the contact between Ycg and Ycfs in the large road cuts 1 km east of Gassetts where noted by a leader and a symbol Ycm without any color designation

Other layered gneiss of the Mount Holly Complex

Ybg — Biotite-quartz-plagioclase gneiss--A heterogeneous assemblage of dark- to medium-gray, nonrusty-weathering, quartz-rich biotitic gneisses, all characterized by having abundant plagioclase and epidote and little or no microcline. Distinctive other rock types include: light-gray-weathering, magnetite-muscovite-biotite-plagioclase-quartz gneiss containing thin layers of hornblende-spotted gneiss; a very dark-gray, biotite-rich plagioclase-quartz gneiss commonly associated with epidotic quartzite, and medium- to dark-gray, white-albite-spotted-

biotite-quartz gneiss. Muscovite is a common accessory in most rocks and small garnet may be present as well. The biotite-quartz-plagioclase gneiss unit contains numerous layers of other distinctive rocks interlayered throughout; where thick enough to map, these units, listed below, are mapped separately

Ya — Amphibolite--Dark-green- to dull-gray-weathering, fine- to coarse-grained, biotite-hornblende and hornblende-garnet-plagioclase amphibolite, commonly associated with Yrs or Ycs

Yrgt — Garnet biotite gneiss--Dark-gray- to rusty-gray-brown weathering, sulfidic, muscovite-biotite-magnetite gneiss or schist, marked by abundant small garnets, biotite and fine laminae of quartz and plagioclase. Unit occurs interbedded with other rusty schists and gneiss units (Yrs and Yrg) and is commonly associated with thin belts of rusty-weathering amphibolite and thin beds of calc-silicate gneiss too thin to map

Yrs — Rusty muscovite-chlorite schist--Light-silvery- to greenish-gray, rusty-weathering, lustrous, biotite-muscovite-chlorite-quartz schist, marked by irregular plates and clots of chlorite, and locally contains garnet. Unit is spatially related to contact of pegmatites with other rusty gneiss units, Yrg or Yrgt. Yrs resembles closely either the aluminous schist of the Cavendish Gassetts Member (Ycg) or the more feldspathic Cavendish Member (Ycfs)

Yrg — Rusty muscovite-biotite-plagioclase-quartz gneiss--Dark-brown to gray, rusty weathering, gneiss and schist containing abundant layers of schistose quartzite, biotite-garnet quartzite, and rusty sulfidic amphibolite. The distinction between Yrg and Yrs is difficult make, but generally Yrg is less muscovitic, more gneissic and more uniformly biotitic, but it passes laterally into Yrs and locally contains lenses of Yrs too small to map

Ycs — Calc-silicate gneiss--Commonly coarse-grained, hornblende-plagioclase-calcite ± diopside ± actinolite calc-silicate knotted rock, as pods, stringers or lenses in other rock types, interlayered with beds of coarse- grained calcite, calcite-diopside-actinolite marble or amphibolite. Many bands of calc-silicate gneiss occur with the Ybg unit west of Duttonsville Gulf, as far south as Gassetts near the western contact between the Cavendish Formation and along the contact with Yrq and Ybg both in the southeastern and northwestern part of the map. Talc-chlorite-calcite-serpentine rock quarried as soapstone at Quarry Pond in Ybg appears to be an altered calc-silicate rock, quite similar to other occurrences of soapstone previously quarried in the Saxtons River quadrangle or Quarry Road in Chester and in Athens

Ym — Marble--Small pods and lenses of very coarse-grained, white, calcite-phlogopite marble and gray, medium-grained, calcite-dolomite marble resembling the marble in the Cavendish Formation. Occurs west of Duttonsville Gulf within Ycs on the southern slopes of Hawks Mountain in Yt northwest of Baltimore and along the contact between Yrg and Ybg 0.7 km southwest of the Black River near the eastern border of the map

EXPLANATION OF MAP SYMBOLS

Contact--Solid accurately located; dashed where approximately located; dotted where concealed by water

Major Faults--Solid accurately located; dashed where approximately located; dotted where concealed by water

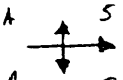
Thrust fault--Teeth on upper plate

Mylonite zone

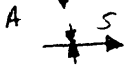
FOLDS

(Axial trace of major folds--arrow shows approximate direction of plunge where known. Relative age identified by color and subscript; the greater the subscript number, the younger the fold)

Upright Acadian fold (shown in red, or by A)

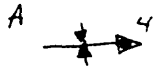


F_5 antiform

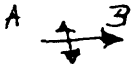


F_5 synform

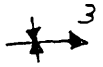
F_4 antiform



F_4 synform

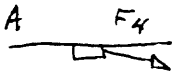


F_3 antiform



F_3 synform

Inclined Acadian fold--Barb shows dip direction of axial surface. Arrow shows approximate plunge where known. Generation shown by subscript where known (shown in red)



Inclined

Taconian fold--Barb shows dip direction of axial surface. Arrow shows approximate plunge direction where known (shown in black, or by T)

F_2 inclined

Middle Proterozoic fold; approximate axial trace only, dip of axial surface uncertain

PLANAR STRUCTURES

(May be combined; joint at point of observation)

Strike and dip of compositional layering or gneissosity of probable Middle Proterozoic age

Inclined

Vertical

Strike and dip of Paleozoic foliation or schistosity (Taconian) or foliation of uncertain age, possibly Acadian (shown in black)

Inclined

Vertical

Strike and dip of foliation or schistosity of Paleozoic age and parallel bedding formed in early generation of Paleozoic deformation (Taconian)

Inclined

Vertical

Strike and dip of mylonitic foliation spatially associated with thrust faults or ductile deformation zones of Paleozoic F_2 structures (Taconian); a second generation foliation commonly developed in zones of highly plicated schistosity

Inclined

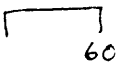
General strike and dip of highly plicated foliation or schistosity

Inclined

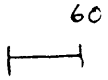
Strike and dip of foliation and parallel bedding in Silurian or younger rocks, the first Acadian foliation

Inclined

Strike and dip of Acadian crenulation cleavage not distinguished by relative age

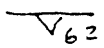


Inclined



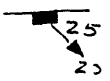
Vertical

Acadian schistosity developed in Silurian or younger rocks



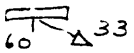
Inclined

Strike and dip of axial surface of Taconian(?) minor fold of second (F2) generation--Commonly associated with thrust faults and zones of mylonite. Where shown, arrow indicates direction and amount of plunge of fold axis

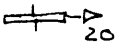


Inclined--Open semicircular arrow shows rotation sense of asymmetric fold as viewed down plunge. Where lineations having two senses of rotation are shown on the same axial surface, the bisectrix of the two plunge directions approximates the azimuth of the slip direction of the faults

Strike and dip of axial surface of Acadian minor fold. Closed arrow shows direction and amount of plunge of fold axis. Open semicircular arrow shows sense of rotation of aysmmetric minor fold viewed down plunge. Double plunge arrows indicate nonplunging fold



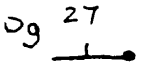
Inclined



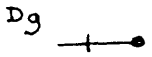
Vertical

Strike and dip of dike--Dike is too narrow to map at scale

Dg indicates Devonian granite, Kd indicates Cretaceous dike



Inclined



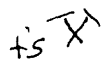
Vertical

LINEAR FEATURES

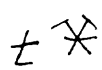
(May be combined with planar structures)

Bearing and plunge of prominent mullion structure, smear lination, or quartz rodding in mylonitic rocks--Indicates transport direction (shown in black), arcs show sense of rotation of minor folds

Quarries--sp, soapstone; g, granite; m, marble; fs, flagstone ; t, t+/c



Active



Inactive

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Chester Quadrangle

Correlation of map units