EXPLANATION

TACONIC RANGE

Middle Ordovician

Pawlet formation
Silver gray to jet black, locally carbonaceous and pyritiferous, micaceous silty slate, interbedded, at intervals of a few inches to tens of feet, by beds of dark gray rusty weathered graywacke a few inches to 6 feet thick. The graywacke contains angular fragments of chert, quartz, and abundant feldspar and slate fragments, in a gray argillaceous matrix that is locally calcareous.

UNCONFORMITY

Lower Ordovician

Mount Hamilton formation
White weathered black, gray, green, purple, and red hard slates, some interbedded with thin cherty appearing quartzite and ribbon limestones a few inches apart. Locally the slates are interbedded with beds a few inches to several feet thick, locally containing layers of edgewise conglomerate; and a polymict limestone conglomerate. Lithic features vary laterally and are in many places indistinguishable from those of the underlying Hatch Hill and West Castleton formations.

Lower Cambrian

Hatch Hill and West Castleton formations, undifferentiated
The Hatch Hill, a relatively thin formation that succeeds the West Castleton, is characterized by rusty and spongy weathered gray calcareous quartzite traversed by numerous white-quartz veins. The West Castleton is a gray to black, medium-bedded quartzite with thin interbeds of black argillite, paper-thin white sandy laminae. Black slates are common to both formations. A blue-gray weathered black limestone is near the base of the West Castleton in a few places.

CHAMPLAIN AND VERMONT VALLEYS

Trenton group

Hathaway formation
Gray to black argillite and bedded radiolarian chert, with included blocks and fragments of chert, limestone, dolomite, sandstone and graywacke.

Iberville formation
Noncalcareous black shale interbedded with occasional dolomite beds and in the lower part with calcareous shale.

Stony Point formation
Predominantly calcareous black shale that grades upward into argillaceous limestone and rare dolomite beds, in northwestern Vermont.

Cumberland Head formation
Interbedded calcareous black shale and fine-grained homogeneous, dark-gray limestone, shown only in Grand Isle county where it is thick enough and well enough exposed to map.

Glens Falls formation
Thin bedded, dark blue-gray, rather coarsely granular and highly fossiliferous limestone.
Ogl, *Shoreham member: interbedded limestone and shale, contains Cryptolithus tesselatus and Trinucleus orientalis.*
Ogl, *Larrabee member: thin-bedded shaly limestone.*

Black River

Orwell limestone, and Isle La Motte and Lowville limestones
Smooth ledged, sublithographic and lithographic, dove-gray weathering limestone commonly cut by veins of white calcite. The Isle La Motte is a dark, medium-grained cherty calcite. The Lowville is a thin, undifferentiated unit near the base of the Orwell that is characteristically ashen gray and contains abundant Physinopsis tuberculosum. The Isle La Motte is about the equivalent of the Orwell in areas east of Champlain thrust, on Isle La Motte and near South Hero, Highgate, Swanton, and St. Albans; it is underlain by the Lowville, which is too thin to show on the map.
Oor, *Rest Pond quartzite member: massive quartz sandstone, near Rutland and West Haven, that overlies Orwell limestone.*

Chazy group

Hortonville formation
Black, carbonaceous and pyritic slate and phyllite, locally sandy, brown weathering limy beds are common near base. Occurs east of Highgate Springs, Champlain, and Orwell thrusts.

Hortonville, or Cumberland Head, and Glens Falls formations, undifferentiated
Hortonville or Cumberland Head is combined with Glens Falls where the boundary with the Glens Falls is widely covered by surficial deposits, also where the Cumberland Head thins.

Glens Falls and Orwell limestones, undifferentiated
Combined where deformation has made the thin bedded Glens Falls indistinguishable from the thick bedded Orwell; from West Rutland south may contain rocks as low as the Middlebury.

Moreau Line formation
Calcareous and non-calcareous slate; local lenses of thin-bedded limestone, limestone conglomerate, and dolomite, in St. Albans synclinorium.

UNCONFORMITY

Middlebury and Chazy limestones, undifferentiated Youngman and Carman formations
Dark blue-gray, somewhat nodular and granular limestone with buff dolomite and shaly interbeds a fraction of an inch thick and 5 to 3 inches apart. The Middlebury, which is east of Champlain and Orwell thrusts, and the Youngman, which is east of Highgate Springs thrust, are, due partly to deformation, more slaty in appearance than the Chazy, which is west of the major thrusts. The Carman is a quartz sandstone with shaly partings that underlies the Youngman. The Chazy contains three members.
Omc, *Valcour member: dark gray calcareous succeeded by medium to light gray, buff-weathered silty, partly crystalline limestone.*
Omd, *Crown Point member: massive, characterized by abundant Maclurites magnus.*
Omd, *Day Point member: calcareous quartz sandstone, and calcareous, orange-weathered dolomitic siltstones are common in eastern areas.*

Beekmantown group

Chipman, Brisport, and Beldens formations: Providence Island dolomite
The Chipman formation in west-central Vermont includes four members.
Ocbr, *Brisport dolomite member: buff to brown weathered, sharply defined and laterally persistent beds chiefly of medium bedded to massive, sorted dolomite; variously designated Brisport formation and Providence Island dolomite in northwestern Vermont.*
Ocbe, *Beldens member: interbedded buff to brown heavily sorted dolomite and white to blue-gray marble and limestone; equivalent to Beldens formation east of Highgate Springs thrust.*
Ocw, *Weybridge member: gray limestone with thin interbeds of sandy limestone 1/2 to 3 inches thick and 1 to 3 inches apart.*
Ocb, *Burlington member: blue-gray limestone with irregular spots of light buff dolomite that give weathered surface a mottled appearance.*

Bascom formation, and undifferentiated Luke Hill, Naylor Ledge and Hastings Creek limestones
Interbedded dolomite, limestone or marble, calcareous sandstone, quartzite, and limestone breccia; irregular dolomitic layers, thin sandy laminae, and slaty or phyllitic partings characterize limestone and marble of lower, middle, and upper parts of the Bascom, respectively, south of West Rutland it includes some of Chipman formation, Brisport, Naylor Ledge, and Hastings Creek, east of Philipsburg thrust, are stratigraphically equivalent to the Bascom.
Obb, *Brownell Mountain phyllite member: calcareous phyllite in upper part of the Bascom formation of east limb of Hinesburg synclinorium.*

Cutting dolomite, and undifferentiated Morgan Corner and Wallace Creek formations
Typical Cutting is a massive, gray weathered, sandsteriod dolomite with a finely laminated calcareous sandstone at base. The combined Morgan Corner and Wallace Creek formations, east of Philipsburg thrust, are stratigraphically equivalent to the Cutting.

Shelburne, Whitehall, and Strites Pond formations
The Shelburne is chiefly a white marble or gray limestone characterized by veined reticulate lines of gray dolomite on the weathered surface; includes Sutherland Falls marble, intermediate dolomite and Columbian marble of the marble quarries. Interbedded massive dolomite increases westward and predominates in the Whitehall formation, west of Champlain and Orwell thrusts. The Strites Pond, which is identical to the Shelburne, is east of Philipsburg thrust.

Highgate formation
Banded blue limestone and calcareous slate; local lenses of limestone conglomerate, on west limb of St. Albans synclinorium.

Clarendon Springs, Tico(nderoga, and Rock River dolomites; Gorge formation
Fairly uniform, massive, smooth weathered gray dolomite characterized by numerous geodes and knobs of white quartz; quartz sandstone and irregular masses of chert are near the top. Called the Ticonderoga west of Orwell thrust, Clarendon Springs east of Orwell thrust, east of Philipsburg thrust. The Gorge is a partly conglomeratic facies on west limb of the St. Albans synclinorium.

Upper Cambrian

Danby and Potsdam formations
The Danby is composed of interbedded quartzite and dolomite, white quartzite beds, more than a foot thick, predominate in the upper part; dolomite in eastern areas increases westward and includes a few beds of white to gray weathered, massively bedded Potsdam quartzite, west of Orwell thrust.

Winooski dolomite
Buff-weathered, pink, buff, and gray dolomite; beds 1/2 inches to 1 foot thick separated by thin, protruding, red, pink, green, and black siliceous partings.

Monkton quartzite
Distinctively red quartzite interbedded with lower buff and white quartzite and relatively thick sections of dolomite like that of the Winooski; the quartzite thins to the east, and they become gray and phyllitic to the east and south.

Dunham dolomite
Buff-weathered siliceous dolomite, pink and cream mottled or buff to gray on fresh surface; lower part is massive and upper part is sandy and resembles the Winooski dolomite.

St. Catherine formation
Purple, gray-green, and variegated slate and phyllite containing minor interbeds of white to green quartzite, locally albitic. Purple and green chloritoid-bearing slate and phyllite is within dashed line in northern Taconic Range, but not separated further south.
Ccb, *Bomoseen graywacke member: green to olive-colored arkose and graywacke that weathers pale red to white; contains mellite flakes of mica and rock fragments.*
Ccz, *Zion Hill quartzite member: white weathered green, siliceous chloritic quartzite and graywacke spotted with limonite.*

Breese formation
Dark gray to black phyllite with beds of blue-gray marble, dark gray dolomite, sandy dolomite, and dolomitic sandstone. The dolomite is characteristically spotted with white as 10 feet thick never locally, and quartzite contains pebbles of blue quartz. Phyllites are locally highly albitic.
Cbrc, *quartzose green phyllite.*

Cambrian quartzite
Very massive, white to faintly pink or buff siliceous quartzite near the top in west-central and southeastern Vermont, predominately a less massive appearing mottled gray weathered phyllitic quartzite, dolomitic sandstone and conglomerate near the base of the formation in west-central Vermont apparently grades southward into the Dalton formation.

Dalton formation
Schistose quartzite containing pebbles of feldspar and blue quartz; impure dolomite containing pebbles of quartz and feldspar occurs locally; conglomerate common near base. Occurs in southeastern Vermont.

Moosalamoo phyllite
Gray to black sericite-quartz phyllite; sericite-quartz-chlorite phyllite occurs locally.

Forestdale marble
Buff to rusty-weathered white, buff, and pink and white mottled dolomite containing local interbeds of dolomitic sandstone, gray-green phyllitic quartzite, and interbedded sandy dolomite.

PROFOUND UNCONFORMITY

Precambrian

Gneiss, quartzite, calc-silicate granulite

GREEN MOUNTAINS

Moriah formation
Gray to black argillite and bedded radiolarian chert, with included blocks and fragments of chert, limestone, dolomite, sandstone and graywacke.

Mississquoi formation
NORTHERN VERMONT
Omc, *Crown Hill member: pale greenish-gray to black phyllite grades locally into gray to black slate, felsic to mafic volcanic rocks.*
Omhb, *Horlons Bridge quartzite member: buff to pale-green quartzite with interbeds of quartz-sericite-chlorite phyllite.*
Omsb, *Coburn Hill volcanic member: actinolite-epidote-chlorite schist, greenstone, and hornblende-albite-epidote amphibolite; locally sericitic.*
Omc, *carbonaceous phyllite and slate, black to light gray (where extensive enough to show on map).*
Omc, *Eastwick Hill member: quartz and slate pebble, phyllitic conglomerate with interbeds of slate and phyllite chiefly quartz-sericite-magnetite-chloritoid rocks.*
SOUTHERN VERMONT
Omc, *Rusty weathering carbonaceous mica schist, quartzite and micaceous quartzite.*
Omc, *Barnard volcanic member: fine to medium-grained biotite gneiss, hornblende gneiss, and amphibolite.*
Omw, *Waterbury Hill member: carbonaceous black to light gray phyllite and schist containing porphyroblasts of biotite and garnet; beds of gray micaceous quartzite, fine-grained biotite gneiss and amphibolite.*
NORTHERN AND SOUTHERN VERMONT
Omm, *Monsoon member: quartzite and quartz plagioclase granulite, in layers 1/2 to several inches thick, separated by "pinstripe" partings that contain muscovite, chlorite, epidote, biotite, and locally garnet; also greenish quartz-sericite-chlorite phyllite and schist, and minor carbonaceous phyllite. Schist and phyllite commonly contain biotite and garnet porphyroblasts in southern Vermont.*

Orfordville formation
Carbonaceous phyllite; minor quartzite.
Oor, *Sunday Mountain volcanic: greenstone, chloritic schist, felsite, and quartz-feldspar-sericite schist.*
Oop, *Pine Pond volcanic: greenstone and green chloritic schist commonly intermixed with volcanic felsite and quartz-sericite-chlorite schist; also biotite-albite-epidote and biotite-gneiss, all west of Ammonoosuc fault, mainly amphibolite east of the Ammonoosuc fault.*

Gile Mountain formation
Gray quartz-muscovite phyllite or schist, interbedded and interpositional with gray micaceous quartzite (graywacke northeast of Nulhegan River), calcareous mica schist, and, locally, quartzose and micaceous crystalline limestone like that of the Waits River formation. The phyllite and schist commonly contain porphyroblasts of biotite, garnet, or staurolite, and locally kyanite, andalusite, or sillimanite.
Ogm, *Moretown member: highly feldspathic grit, probably graywacke; feldspathic chlorite-muscovite schist and amphibolite; all northeast of Nulhegan River.*
Ogs, *amphibolite: hornblende-quartz-biotite-chlorite rock.*
Ogm, *Mendenhall slate member: chiefly gray slate or phyllite characterized by beds of gray schistose quartzite 1/2 inch to 3 inches thick.*

Waits River formation
Gray quartzose and micaceous crystalline limestone weathered to distinctive brown earthy crust; interbedded and interpositional with gray quartz-muscovite phyllite or schist. Where more metamorphosed the limestones contain actinolite, hornblende, anorite, diopside, wollastonite, and garnet, and the phyllite and schist, biotite, garnet, and staurolite, and locally kyanite, andalusite.
Dwc, *Slaughter Pond volcanic member: hornblende, garnet amphibolite, coarse garnet schist with fantasitic hornblende, and hornblende marble; contains pillow lava near St. Johnsbury and passes eastward into actinolite greenstone and greenstone south of Windsor.*
Dwc, *Crow Hill member: tough gray quartzite near St. Johnsbury; also a quartzose rock (not shown on map) occurs at several other places.*
Dwb, *Barton River member: interbedded siliceous crystalline limestone and sericite-quartz-chlorite phyllite in northern Vermont; diopside limestone and cordierite hornfels at contacts with granitic dikes and sills.*
Dwa, *Ayers Cliff limestone member: siliceous crystalline limestone containing thin beds of slate and phyllite north of the Lamoille River.*

Northfield formation
Dark gray to black quartz-sericite slate or phyllite with fairly widely-spaced interbeds a few inches thick of siliceous and silty crystalline limestone like that of the Waits River formation; calcareous slate north of Lamoille River; phyllite passes into gray quartz-sericite schist containing abundant porphyroblasts of biotite and garnet in southern Vermont.

Shaw Mountain formation
NORTHERN VERMONT
Chiefly tan to brown weathered quartzose limestone and calcareous quartzite characterized by species of Inoceramus after underlie; locally underlain by quartz conglomerate and overlain by blue fossiliferous crystalline limestone; greenstone and quartz-sericite schist.
SOUTHERN VERMONT
Quartzite, quartz conglomerate, cummingtonite schist, amphibolite, and quartz-sericite schist with porphyroblasts of biotite and garnet.

UNCONFORMITY

LOCAL UNCONFORMITY

EASTERN VERMONT

DEVONIAN

Littleton formation
Gray slate and phyllite containing interbeds of gray schistose quartzite 1/2 inch to 6 inches thick. West of Guildhall are fuchsite, light to dark gray biotite-garnet phyllite and schist, some slate, and subordinate quartzite and impure quartzite. South of Bellows Falls gray phyllite passes eastward into gray mica schist containing porphyroblasts of biotite, garnet, and staurolite.

SILURIAN

Fitch formation
NORTHEASTERN VERMONT
Bluish-gray, white-weathered, sandy limestone.
SOUTHEASTERN VERMONT
Quartz-plagioclase-biotite granulite; actinolite-diopside granulite; impure limestone and dolomite; mica schist; the carbonate-rich beds are typically an inch or two thick and segmented so as to give the weathered outcrop a characteristic pitted appearance.

Clough formation
NORTHEASTERN VERMONT
Boulders, cobbles, pebbles and angular fragments of quartzite, micaceous quartzite, and gray mica schist in matrix of gray quartz-mica schist; quartzite or quartzite; schist commonly contains porphyroblasts of biotite, less commonly garnet.
SOUTHEASTERN VERMONT
Quartzite, quartz-conglomerate, and mica schist; lenses of fossiliferous calcareous quartzite in upper part.

UNCONFORMITY

ORDOVICIAN

Partridge formation
NORTHEASTERN VERMONT
Dull gray to rusty black carbonaceous slate and phyllite, mostly fissile, but locally massive and tough. Contains a few beds of fault schistose and massive Soda-rhyolite tuff (not shown on map).
SOUTHEASTERN VERMONT
Rusty weathering carbonaceous mica schist locally containing porphyroblasts of biotite, garnet, or staurolite.
Opv, *volcanics: fine-grained biotite gneiss and amphibolite.*

Ammonoosuc volcanics
NORTHEASTERN VERMONT
Soda-rhyolite tuff, breccia, and flows.
SOUTHEASTERN VERMONT
Fine-grained chloritic and biotitic gneiss and greenstone in areas north of Bellows Falls; biotite gneiss and amphibolite south of Bellows Falls.

Albee formation
Massive, gray, white-weathered quartzite and feldspathic quartzite interbedded with greenish-gray slate, phyllite, feldspathic phyllite and quartzose argillaceous phyllite. Micaceous quartzite, quartz-mica schist, mica schist, and gray phyllite are common near base. Staurolite, andalusite, and sillimanite are in the vicinity of granitic plutons. Soda-rhyolite tuff occurs locally. Micaceous quartzite characterized by thin, schistose "pinstripe" partings is common in many areas.

CAMBRIAN

Pinney Hollow, Ottauquechee, and Stowe formations, undifferentiated
Includes quartz-muscovite-garnet-chlorite-biotite schist, rusty carbonaceous schist, amphibolite, and schistose quartzite, schist locally contains porphyroblasts of staurolite and kyanite; on flanks of Chester and Athens domes.

CAMBRIAN (?)

Stowe formation
Quartz-sericite (muscovite-paragonite)-chlorite phyllite and schist; porphyroblasts of albite, garnet, chloritoid, or kyanite are common locally. Includes phyllitic graywacke north of Lamoille River. Schist contains abundant segregations of granular white quartz.
OCsc, *carbonaceous schist and phyllite north of Lamoille River; occurs in several small areas to the south, not shown on map.*
OCsg, *greenstone and amphibolite; epidote-albite-chlorite rocks contain actinolite and hornblende where more metamorphosed.*

Pinnacle formation Cp
Schistose graywacke, gray to buff, commonly striped, quartz-albite-sericite-biotite-chlorite rock predominates, quartz-cobble and boulder conglomerate is common, chiefly near base.
Cpt, *Tibbit Hill volcanic member: albite-actinolite-chlorite-epidote greenstone, locally pillowed and vesicular.*

Underhill formation Cu
Silvery, gray-green, quartz-sericite-albite-chlorite-biotite schist containing abundant lenticular segregations of granular white quartz; locally quartz-sericite-albite-chlorite phyllite; porphyroblasts of albite, garnet, and magnetite are common and locally very abundant in gneissic facies in axial anticlines of the Green Mountain anticlinorium.
Cuf, *Fairfield Pond member: greenish quartzitic schist (quartz-sericite-albite-chlorite-biotite); sericite-quartz-chlorite phyllite, locally purple or red, common in lower part.*
Cug, *greenstone: varied composition including albite-chlorite-epidote-calcite and sericite-magnetite-chlorite-actinolite rocks.*
Cuc, *carbonaceous quartz-sericite-albite-chlorite schist and phyllite.*
Cuw, *White Brook member: chiefly brown-weathered whitish, tan and gray sandy dolomite, locally only a hematite zone; includes carbonaceous crystalline limestone in Cambridge syncline.*
Cuf, *Forestdale member: buff to rusty weathered sandy dolomite and limestone.*
Cug, *Gulf Brook member: pale, olive-green, quartz-sericite-chlorite-albite schist, locally quartzitic.*
Cuf, *Fort Brook member: sericite (muscovite-paragonite)-quartz-chlorite-chloritoid schist, minor carbonaceous interbeds.*
Cum, *Mount Abraham schist member: light gray sericite (muscovite-paragonite)-quartz-chlorite rock with silvery sheen, porphyroblasts of magnetite are common and porphyroblasts of chlorite, chloritoid, garnet, and kyanite occur locally.*
Cub, *Buttolph member: carbonaceous sericite-quartz-albite-chlorite schist and schistose quartzite, also carbonaceous phyllite and carbonaceous limestone; quartz-sericite-chlorite-albite schist.*
Cu, *Peaked Mountain member, greenstone.*

Hazens Notch formation Ch
Interbedded carbonaceous and noncarbonaceous quartz-sericite-albite-chlorite schist; grades to quartzite and gneiss.
Chb, *Belmont Mountain amphibolite member: coarse- to fine-grained hornblende-epidote-albite rock, grades to epidote-chlorite-actinolite-albite greenstone where less metamorphosed.*
Chm, *sericite-quartz-chlorite-albite-magnetite schist, near Hyde Park.*
Chg, *chiefly albite-actinolite-chlorite-epidote greenstone; locally hornblende-epidote-chlorite-albite amphibolite.*

Hoosac formation Chs
Quartz-sericite-albite-biotite-chlorite schist characterized by albite porphyroblasts—biotite and garnet porphyroblasts common southward, locally carbonaceous.
Chsq, *Plymouth member: quartzite, schistose quartzite, dolomite quartzite, carbonaceous phyllite; buff to dark gray dolomite with partings locally of carbonaceous phyllite; quartz-sericite-chlorite-albite schist; carbonaceous albite schist.*
Chs, *Turkey Mountain member: amphibolite and actinolite greenstone characterized by small, 1/8 to 1/4 inch spots, chiefly of epidote.*
Chsg, *amphibolite and actinolite greenstone.*

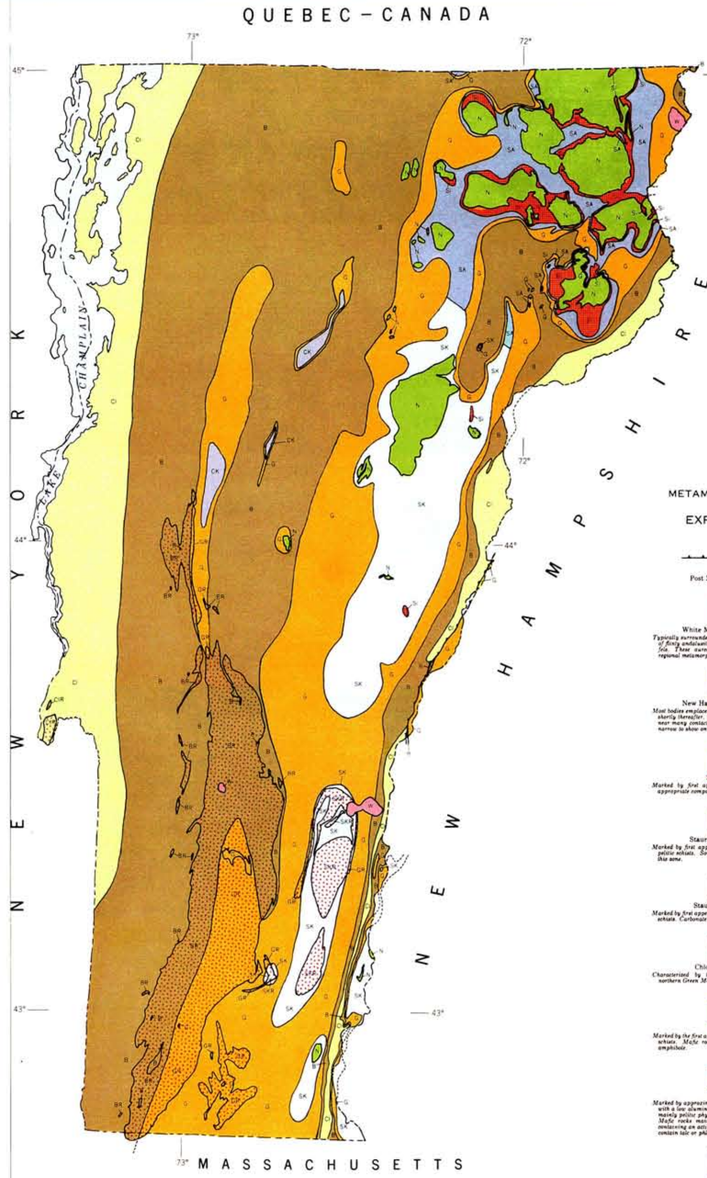
Tyson formation Ct
Feldspathic quartz-mica schist containing biotite, chlorite, and carbonate; many beds contain pebbles of quartz and feldspar; cobble or boulder conglomerate commonly at base; thin beds of quartzite, carbonaceous phyllite, and schistose dolomite in upper part, contact at top by massive buff dolomite as much as 20 feet thick.

PROFOUND UNCONFORMITY

PRECAMBRIAN

Mount Holly complex
Mainly fine- to medium-grained biotite gneiss, locally muscovitic, and in western areas chloritic; massive and granoblastic in some localities, fine-grained or schistose and compositionally layered in others; also abundant amphibolite and hornblende gneiss, and minor beds of mica schist, quartzite and calc-silicate granulite; includes numerous small bodies of peridotite and serpentinite.
pCqs, *quartzite, locally as massive beds as much as 20 feet thick, micaceous quartzite, and quartz-mica schist that are locally rusty weathered and contain conspicuous flakes of graphite; also includes amphibolite and minor hornblende gneiss, biotite gneiss, and pegmatite.*
pCm, *calcite and dolomite marbles, locally coarse grained; commonly contain phlogopite, actinolite, and diopside, and are interbedded with medium- to coarse-grained calc-silicate granulite; includes minor amounts of other types of Precambrian rock.*

QUEBEC – CANADA


NEW YORK
NEW HAMPSHIRE
MASSACHUSETTS
LAKE CHAMPLAIN
SK
CK
BR
Ch
Ci
Ca
Cc
Cu
Cg
Cp
Ch
Ci
Ca
Cc
Cu
Cg
Cp
Ch
Ci
Ca
Cc
Cu
Cg
Cp