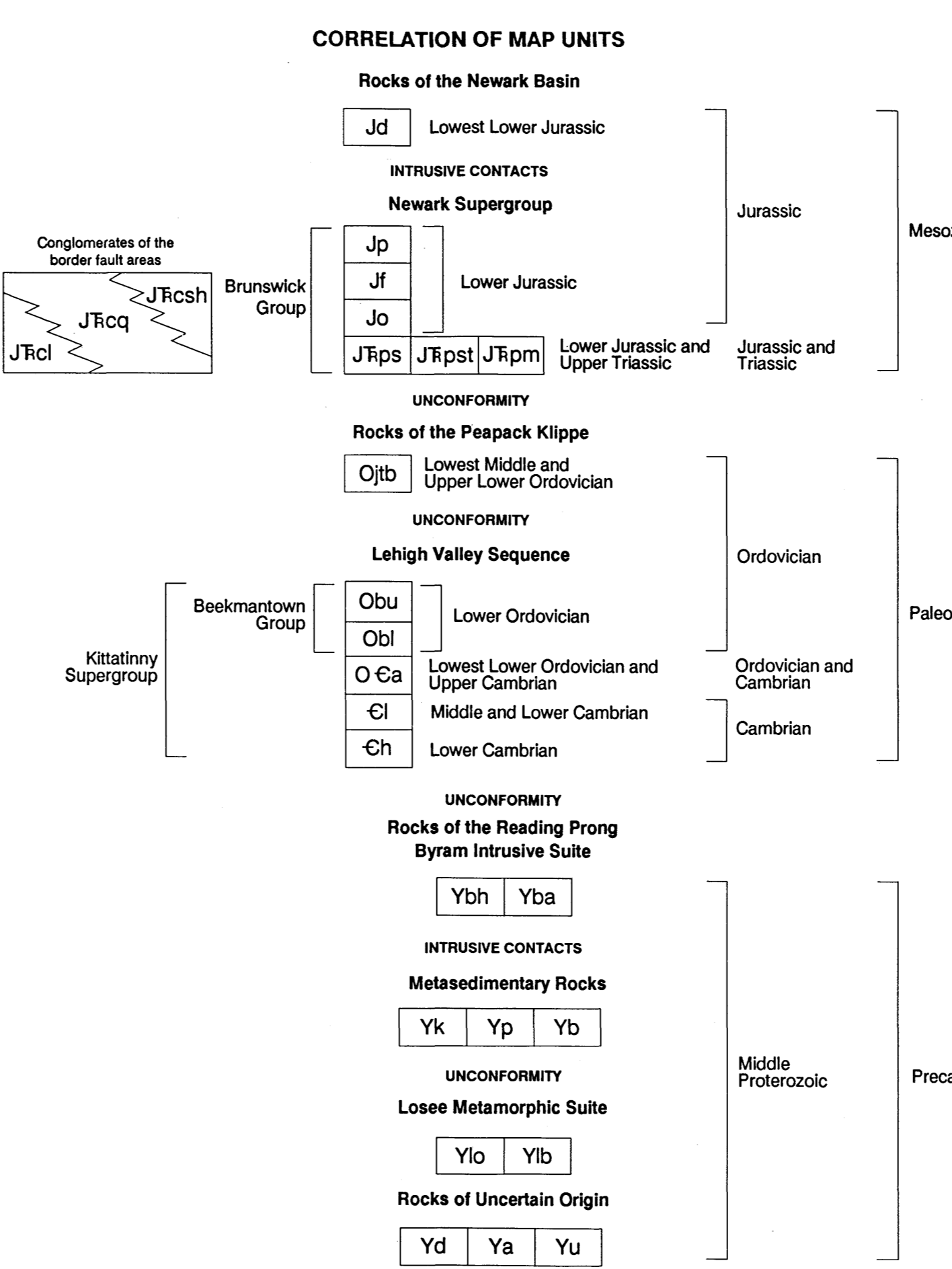


**BEDROCK GEOLOGIC MAP OF THE GLADSTONE QUADRANGLE,  
 MORRIS, HUNTERDON, AND SOMERSET COUNTIES, NEW JERSEY**  
 by  
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### DESCRIPTION OF MAP UNITS

**Rocks of the Newark Basin**

**Intrusive Rock**

**Jd** Diabase - Discordant, stock-like intrusives. Dark-gray to greenish-black, coarse- to fine-grained diabase composed mostly of calcic plagioclase and augite (calcic clinopyroxene). Very fine grained where chilled in contact with sedimentary rock. Thickness not known. Elliptical diabase body near Peapack has small remnant of pre-Mesozoic rock on south slope, suggesting nearly vertical ascent of magma through basement rocks.

**Newark Supergroup**

**Jp** Preakness Basalt - Dark-greenish-gray to black, very fine-grained, very hard, moderately dense rock composed mostly of intergrown calcic plagioclase and pyroxene. Crystals are generally less than 0.04 inch in diameter. In places the basalt contains large feldspar crystals (0.5 inch or larger), or small spherical to tubular cavities (gas-escape vesicles), some filled with zeolite minerals or calcite. Consists of two thick (more than 475 feet each) sequences of basalt flows with thin (10 to 35 feet) beds of siltstone between them (Fedosh and Smoot, 1968). Siltstone beds have not been observed in map area. The basal 65 feet of the lower flow is commonly highly vesicular or brecciated. Radiating fans mostly 15 to 40 feet across consisting of slender, curved basalt columns (8 to 24 inches wide) are common in the upper flows, less common in lower ones. Thickness of formation in map area is about 1050 feet.

**Jf** Felville Formation - Mostly fine sandstone and coarse siltstone, brownish-red to light grayish-red, moderately well-sorted, commonly cross-laminated; interbedded with brownish-red mudstone, indistinctly laminated; bioturbated, mostly by worm burrows; calcareous in places, with clay and hematite matrix. Sandstone commonly contains more than 15 percent feldspar. A thin bed (0 to 8 feet thick) of black carbonaceous limestone and gray calcareous siltstone occurs near the base. It contains fish and plant fossils, and thermally mature hydrocarbons (Manspeker and Olsen, 1981). Maximum thickness of formation in map area is about 500 feet.

**Jo** Orange Mountain Basalt - Dark-greenish-gray basalt composed mostly of calcic plagioclase and augite; crystals smaller than 0.04 inch. Consists of two major flow sequences, each about 265 feet thick (Fedosh and Smoot, 1968) separated in places by a weathered zone. Lower flow is mostly massive, with wavy, irregular, and conchoidal joints; upper flow contains one or more zones of slender (6 to 12 inches across) columns. Maximum thickness in map area is 530 feet.

**Jfpts** Passaic Formation Sandstone and Siltstone - Medium- and fine-grained sandstone, grayish-red to brownish-red, thick to very thick-bedded (1.5 to 15 feet thick), with some pebble layers or scattered pebbles (mostly quartzite). Interbedded with brownish- to purplish-red coarse siltstone, indistinctly laminated or ripple cross-laminated, irregularly fissile, and calcareous in places. Some siltstone beds contain nodules of desiccation cracks, or root casts, which are characteristic of forest soils. Bedding units consist of thick (6 to 15 feet) fining-upwards cycles of fluvial channel fill and over-bank deposits. Sandstone beds are coarser and thicker in the vicinity of alluvial fan-conglomerate sequences. Maximum thickness exceeds 1000 feet.

**Jfpts** Siltstone and Mudstone - Coarse-grained siltstone to very fine-grained sandstone, brownish- to purplish-red, thin (0.2 to 1 foot) to medium bedded (1 to 3 feet) with irregular planar, trough, and ripple cross-stratification. Siltstone channel-fill deposits are interbedded with silty mudstone beds which are indistinctly bedded, bioturbated, commonly micaceous, and have nodules and calcareous matrix in many places. Maximum thickness exceeds 1500 feet in map area.

**Jrcsh** Conglomerates of the Border Fault Area Limestone-clast - Pebble to boulder conglomerate with mostly subangular clasts of dolomitic limestone in a matrix of brownish- to purplish-red sandstone to mudstone. Near fault zones the matrix is commonly light-gray to white. Bedding is thick to massive (1.5 to 15 or more feet thick). Clast orientation is mostly indistinct, as in debris flows. Well exposed in abandoned quarries 1000 feet near the border fault.

**Jrcsq** Quartzite-clast - Pebble to boulder conglomerate with mostly subrounded quartzite and quartz clasts in matrix of light-red sand to brownish-red silt. Bedding is thick (2 to 6 feet) to very thick (6 to 15 feet). Imbrication and bedding-plane orientation are weak, especially in coarser beds. Quartzite conglomerate occurs adjacent to the border fault northwest of Gladstone, and forms part of a composite alluvial fan sequence south of Potterville. The conglomerate is coarsest and most thickly bedded adjacent to the border fault, corresponding to the position of alluvial fan apexes. Maximum clast size decreases with distance from the border fault and interbeds of coarse- to fine-grained red sandstone become thicker and more abundant. Maximum thickness probably exceeds 500 feet.

**Jrcsh** Shale-clast - Pebble conglomerate with green, gray, and purplish-red shale clasts mostly 0.5 to 3 inches long, in a matrix of shale chips and clay. Clasts are mostly flat, elongated, and have rounded edges and corners. Clasts are commonly imbricated at low angles to bedding, dipping in the upstream direction of paleoflow. Thickness probably exceeds 1000 feet.

**Ojtb** Jutland klippe upper unit B (Perisoratit and others, 1979; Lytle and Epstein, 1987; Drake and others, 1988) - Heterogeneous sequence of interbedded red and green shale, interbedded fine-grained graywacke siltstone and shale, and yellow, red, green, tan, and gray shale. Much of the rock is an autoclastic melange in a scaly-cleaved matrix. Some shale beds contain conodonts (Ethington and others, 1959) and sparse graptolite and brachiopod fragments. Contains conodonts of the North Atlantic Province fauna High E to 2, of late Ibeaxian to early Whiteoceanian (Arenigian) age (Drake and others, 1988). These are deep-water clastic and carbonate rocks transported westward over the Laurentian carbonate shelf sequence during the Taconic orogeny. Most of the shale is strongly weathered to a depth of 10 feet or more. Thickness is approximately 1500 feet.

**Obi** Beekmantown Group, lower part - Interbedded dolomite and minor limestone, very thin- to thick-bedded. Upper laminated, fine- to medium-grained dolomite is very thin- to thick-bedded, light-olive-gray to dark gray, and weathers dark yellowish-orange in places. Middle sequence is fine-grained dolomite with silty dolomite laminae, and thin- to medium-bedded, fine-grained limestone. Lower sequence consists of aphanitic to coarse-grained, thinly laminated to thick-bedded, field dolomite with quartz sand laminae and locally very thin to thin black chert beds. Corresponds to the Stonehenge Formation of Drake and Lytle (1985) and to the Epler Formation and Rickenbach Formation of Markewicz and Dalton (1977). Thickness is approximately 250 feet in the map area.

**Oca** Allentown Dolomite - Light- to dark-gray rhythmically bedded dolomitic mudstone, oolitic grainstone, siltal laminate, and stromatolitic dolomite. Mudcrack brecciation common in upper part of cycles (Markewicz and Dalton, 1980). Weathers yellowish-tan to brownish-gray, commonly in alternating layers 2 to 8 inches thick. Red hematite stain common in dolomite adjacent to the Mesozoic unconformity. Thickness is about 400 feet in map area.

**Cl** Leithville Formation - Interbedded light- to medium-gray fine- to coarse-grained dolomitic limestone and calcitic limestone, thin-bedded light-gray to tan phyllite, and thin beds of dolomitic sandstone. Upper part (about 350 feet thick) is mostly fine- to medium-grained crystalline dolomite with irregular, intracrystalline, and bracketed texture; weathers dark gray, commonly with nodular or lumpy surface. Middle part (about 100 feet thick in map area) is light-tan to medium-gray silty to sandy yellowish-calcareous phyllite purple to green siliceous or cherty dolomite, thin-bedded shale, quartzite, and dolomite. Small-scale folds are common in staly beds of the middle Leithville Formation. Lower part (about 80 to 90 feet thick) consists mostly of dark to medium-gray, thick-bedded, medium- to fine-grained dolomitic limestone with abundant stylolites and calcite-filled brecciation cracks. Large-scale solution features including sinkholes and bedrock pinnacles are common in places near the top of the lower part, 70 to 100 feet stratigraphically above base of the formation. Contact with underlying Hardyston Quartzite is gradational. Thickness of the formation is about 550 feet.

**Ch** Hardyston Quartzite - Pinkish-tan to white, medium- to very coarse-grained quartzose sandstone, conglomeratic in part, with 10 to 20 percent feldspar, mostly microcline (Aaron, 1969). Framework grains are moderately well sorted, mostly subangular (quartz) to angular (feldspar), and tightly cemented with silica. Weathers tan to yellowish-brown, with blocky parting and fracture. Weathered surfaces are usually pitted due to dissolution of feldspar grains. Highly resistant to erosion; forms a conspicuous topographic bench in many areas with 10 to 20 feet of relief. Thickness is about 40 to 60 feet in map area.

**Ybh** Hornblende granite - Medium- to coarse-grained, pink to buff, gneissoid to indistinctly foliated granite composed principally of microcline microperthite, quartz, oligoclase, and hornblende. Locally includes small bodies of pegmatite and amphibolite not shown on map.

**Yba** Microperthite alkasite - Medium- to coarse-grained, pink to buff, gneissoid to indistinctly foliated granite composed principally of microcline microperthite, quartz, and oligoclase. Locally includes bodies of amphibolite not shown on map.

**Yk** Potassic feldspar gneiss - Medium-fine- to medium-grained, light pinkish-gray or buff, indistinctly foliated gneiss containing quartz, potassic feldspar, oligoclase, minor biotite, and opaque minerals. Contains thin amphibolite layers in some places.

**Yp** Pyroxene gneiss - Medium-fine- to medium-grained, greenish-gray, white to tan-weathering, well-layered gneiss composed of oligoclase, clinopyroxene, variable amounts of quartz, and trace amounts of opaque minerals and sphene.

**Yb** Biotite-quartz-feldspar gneiss - Medium-grained, gray to tan, locally rusty-weathering, well-layered and foliated gneiss, variable in texture and composition. Composed of oligoclase, quartz, biotite, and lesser microcline microperthite. Locally contains garnet, graphite, and sillimanite. Amphibolite layers are common.

**Ylo** Quartz-oligoclase gneiss - Medium- to coarse-grained, white to light greenish-gray, poorly foliated granofels to moderately layered and foliated gneiss composed of quartz, oligoclase, or andesine, and sparse to moderate amounts of hornblende and/or clinopyroxene. Locally contains amphibolite layers.

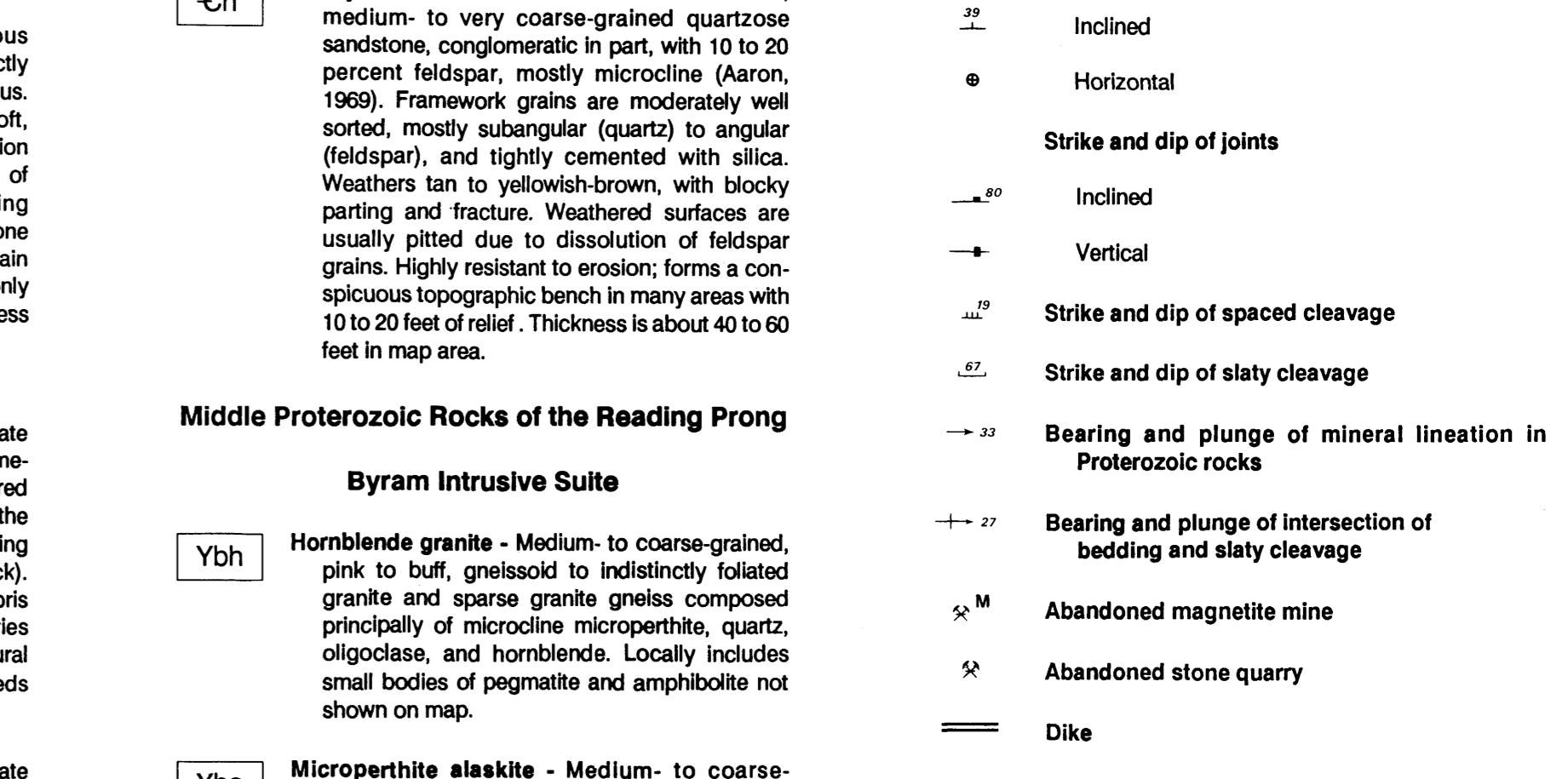
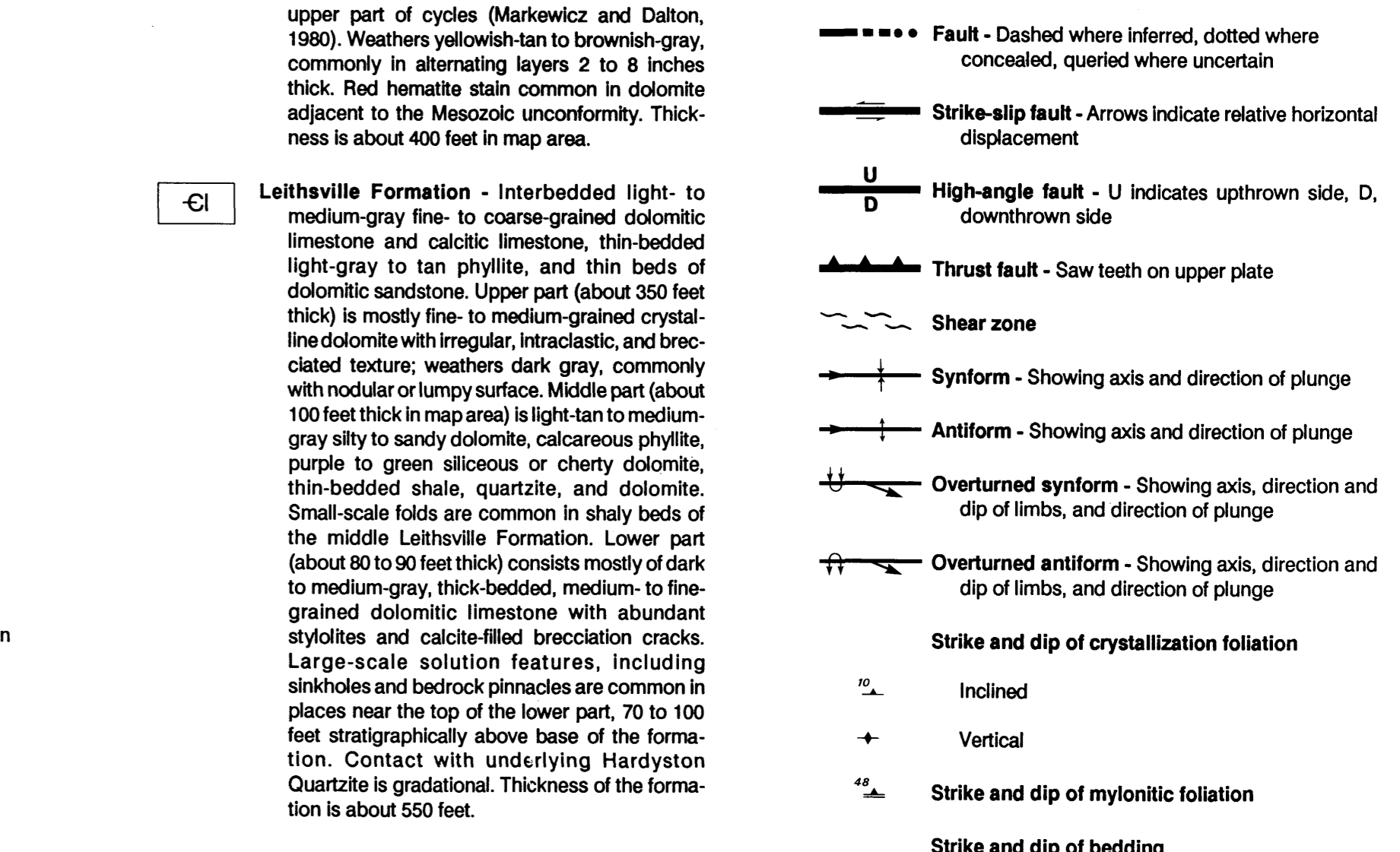
**Ylb** Biotite-quartz-oligoclase gneiss - Medium-fine- to medium coarse-grained, light- to medium-gray or light greenish-gray, massive, moderately layered and foliated gneiss containing oligoclase or andesine, quartz, biotite, and locally garnet. Commonly interlayered with amphibolite.

**Yd** Diorite - Medium- to coarse-grained, greenish-gray to brownish-gray, greasy-lustered, massive to moderately layered and foliated diorite to quartz diorite composed of andesine or oligoclase, clinopyroxene, hornblende, hypersthene, sparse biotite, and variable amounts of quartz. Amphibolite and mafic-rich quartz-plagioclase gneiss layers are common.

**Ya** Amphibolite - Medium-grained, gray to greenish-black gneiss composed of hornblende and andesine. Locally contains biotite and/or clinopyroxene. Associated with almost all units of Middle Proterozoic age in the map area.

**Yu** Potterville Mylonite - Heterogeneous sequence of gray, light-green, or whitish-tan altered and retrogressively metamorphosed gneiss with mylonitic to ultramylonitic fabric. Interpreted to have been mafic-poor and mafic-rich varieties of quartz-plagioclase gneiss, amphibolite, and lesser hornblende granite and microperthite alkasite.

### MAP SYMBOLS



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