



CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS		INTRUSIVE ROCKS	
Qm	Holocene and Pleistocene	Qm	QUATERNARY
PCe	Triassic(?)	PCe	PERMIAN (?) AND CARBONIFEROUS (?)
Dd	Devonian	Dd	DEVONIAN
DOh	Devonian (?) to Ordovician (?)	DOh	DEVONIAN (?) TO ORDOVICIAN (?)
DOc	Upper Cambrian	DOc	CAMBRIAN
DOm	Middle Cambrian	DOm	MIDDLE CAMBRIAN
DOp	Upper Precambrian	DOp	PRECAMBRIAN

DESCRIPTION OF MAP UNITS

- Qm** MORAINAL DEPOSITS (Holocene and Pleistocene) - Medium to dark-gray non-weathered nonsorted debris comprising ablation moraine. Nearly all rock types in moraine occur in nearby and uplope outcrops; erratics are rare. A thin pebbly to bouldery pavement several centimeters thick at the surface consists of loose stones covering permanently frozen drift of fine and coarse debris. Calcium sulfate efflorescences from crusts on the underside of some surface cobbles. Moraines are associated with an ice level and ice configuration nearly identical to that of the present day. Scattered erratics of older moraine (not mapped) are found on most rock slopes and peaks and indicate an older, higher (Tertiary?) level that was more than 1,000 m above the present-day level.
- PCe** GALLE MUDSTONE (Permian? and Carboniferous?) - Massive dark-gray diamictite (siltite) containing abundant dispersed pebbles, cobbles, and boulders of igneous and sedimentary rocks. A few thin layers of tan silty sandstone and conglomerate separate thick layers of siltite. The top of the underlying Dover Sandstone is greenish, and the tops of several bedded pavements within the Galle mudstone are well treated in a consistent southerly direction that suggests ice movement to the south. Probably several times as thick as a measured 315 m. Top not exposed.
- Dd** DOVER SANDSTONE (Devonian?) - White thick bedded medium-grained quartz sandstone containing conspicuous but widely scattered fluting quartz pebbles; weathers tan. Many beds are orthoquartzite; some beds are coarsely crossbedded. Conglomerate, 0.3-7 m thick, of rounded quartz pebbles at the base contains sparse to locally abundant black pebbles of sedimentary phosphate. No fossils found in map area, but in the Patuxent Range 150 km southwest of the map area, the Dover contains numerous carbonaceous lenses with a Middle Devonian microfauna and a poorly preserved Devonian macrofauna of *Hoplomena?* and "Cyclostoma-type" (Schoff, 1968; Rigby and Schoff, 1969). About 1,200 m thick.
- DOh** NEPTUNE GROUP (Devonian? to Ordovician?) - Includes the Heiser Sandstone, Elbow Formation, Elliott Sandstone, Brown Ridge Conglomerate, and Neith Conglomerate.
- DOh** HEISER SANDSTONE - Well-bedded light-green quartz sandstone that is slightly more silty than the Dover; weathers brown. In places, rhythmically bedded pairs of quartz sandstone and quartzite beds, 0.3-1 m thick, are common. Formation is characterized by many beds containing tubular burrows, 1/4-1 cm in diameter, oriented vertically to bedding. About 320 m thick.
- DOh** ELBOW FORMATION - Interbedded red argillaceous siltstone and light-gray fine-grained quartz-rich sandstone in well-bedded alternating layers, 0.3-2 m thick, that reflect cyclical deposition; beds are well laminated, crossbedding common, and ripple marks sparse. The red beds are commonly mottled light gray. About 300 m thick.
- DOh** ELLIOTT SANDSTONE - Thick-bedded, commonly crossbedded, pink to buff coarse-grained quartz sandstone that is cemented by calcite in many places, especially in lower half. Contains some thin interbeds of buff conglomerate, conglomeratic sandstone, and red siltstone and shale. A basal conglomerate, locally as thick as 3 m, contains abundant volcanic pebbles. Volcanic-derived quartz and volcanic clasts predominate in lower part of formation but decrease in amount gradually upward. Thickness ranges from about 1,400 m near the Gambacorta escarpment center near Gambacorta Peak to zero in the northern Neptune Range.
- DOh** RHYOLITE BRECCIA MEMBER - Dark reddish-brown to buff pyroclastic autolithic flow breccia of porphyritic rhyolite; consists of moderately well-sorted, closely packed, subangular lithic fragments commonly 2-8 cm across. Occurs about 30 m above the base of the formation near Wien Peak where it is about 70 m thick. May be genetically related to the Gambacorta Formation (G) and Median Granite (Gm). Rb-Sr whole-rock data from one sample suggest an age similar to that of the Gambacorta Formation (Easton, 1970, p. 87-93, 112).
- DOh** BROWN RIDGE CONGLOMERATE - Poorly bedded to massive, poorly sorted, coarse, dark reddish-brown conglomerate containing a few thin red sandstone beds and lenses. Locally in the lower part the conglomerate is green. Clasts consist of locally derived sedimentary and volcanic rocks that are as much as 1 m in diameter; clasts of plutonic igneous rocks are absent. Conspicuous angular white quartz clasts derived from abundant ventrites in the Patuxent Formation are characteristic. Near the eruptive center of the Gambacorta Formation in the southern Neptune Range, the conglomerate consists chiefly of volcanic detritus; toward the north and west, away from the volcanic center, the volcanic content gradually diminishes to nearly zero. Thickness ranges from zero to more than 800 m.
- DOh** NEITH CONGLOMERATE - Poorly bedded to massive, poorly sorted, coarse, reddish-brown conglomerate interbedded with moderately well-bedded coarse-grained reddish-brown sandstone. Clasts are derived chiefly from underlying sedimentary formations; clasts of plutonic rocks are minor or absent. Gneiss and volcanic clasts are absent; angular white quartz clasts from ventrites in the Patuxent Formation are conspicuous at the base. Basal part locally is dominantly conglomeratic and in places exceedingly thick; the upper part is dominantly sandstone. These rocks, which crop out on Neith Nunatak and are equivalent to the Elliott Sandstone and the Brown Ridge Conglomerate, are here named the Neith Conglomerate. Exact thickness is not established but locally may be as much as 1,000 m.
- DOh** WIENS FORMATION (Upper Cambrian) - Interbedded dark-green and dark reddish-brown thin-bedded shale, siltstone, and fine-grained sandstone containing several beds, 3-10 m thick, of light-gray oolitic limestone. Lower part is interfingered with volcanic sediments of the upper part of the Gambacorta Formation. Nondiagnostic trace fossils occur sporadically on bedding planes. Thickness is less than 300 m in the southern Neptune Range but considerably more in the northern Neptune Range.
- G** GAMBACORTA FORMATION (Upper Cambrian) - Interbedded dark-brown, reddish-brown, and light-green rhyolitic to dacitic volcanic rocks that include ash flows, volcanic breccias, pyroclastic flows, lava flows, and agglomerates. Light-green ash-flow deposits and sandstones of reworked volcanic debris are abundant near top and bottom of formation. The Gambacorta Formation constitutes a volcanic complex that erupted from a center in the southern Neptune Range near Gambacorta Peak, where the formation is probably thicker than 1,500 m; the formation thins away from this center; it is about 160 m thick 40 km to the north. The Gambacorta Formation is divided into six members, of which only the Hawkes Rhyolite Member can be shown at the map scale. Rb-Sr whole-rock data from 10 samples of the Gambacorta Formation, including the Hawkes Rhyolite Member, suggest an isochron age of 510±35 m.y. (Easton, 1970, p. 87-93, 112).
- Gch** Hawkes Rhyolite Member - Dark-green porphyritic rhyolitic welded tuff containing 30 percent coarse broken quartz, potassium feldspar, and plagioclase phenocrysts, as well as abundant inclusions of compressed tuff. Fine-grained groundmass is recrystallized but commonly shows a relic euhedral sharp structure. Rock is locally overlain to reddish-brown tuff. The member, as an intracaldera flow, is locally overlain to reddish-brown tuff. The member, as an intracaldera flow, is locally overlain to reddish-brown tuff. The member, as an intracaldera flow, is locally overlain to reddish-brown tuff.
- Cm** NELSON LIMESTONE (Middle Cambrian) - Dark-gray thick-bedded massive limestone, commonly bleached light gray, constitutes the principal middle part of the formation. Above and below are thin-bedded light gray algal(?) limestone and argillaceous limestone as well as thin irregular beds of yellow limy siltstone; some limestone is oolitic, pisolitic, or nodular. A basal dark reddish-brown conglomerate, several centimeters to 30 cm thick, is locally overlain by red-brown sandstone as much as 20 m thick; the clasts are derived from the Patuxent Formation and characteristically contain conspicuous pebbles of white vein quartz. Thickness is 200-300 m. A Middle Cambrian age is indicated by trilobites found about 4 km south of Nelson Peak (Palmer and Gathouse, 1972).
- pCp** PATUXENT FORMATION (Upper Precambrian) - Well-bedded, generally rhythmically interbedded, medium to dark-gray silty-green medium-grained argillaceous metasediments (metasiltstone) and shale; a few gneiss and interformational pebble and shale-pebble conglomerates form discontinuous beds and lenses. Channel fillings, graded bedding, crossbedding, laminated bedding, and sole markings are locally well preserved. This entirely clastic section of Patuxent Formation is mapped in the Neptune Range east of the fault of Roderick Valley. To the west in the Schmidt and Williams Hills three volcanic members, the Goretzki, Williams, and Pillow Knob Members, are intercalated with clastic rocks similar to those of the Patuxent Formation east of the fault of Roderick Valley. The stratigraphic positions of the three members within the Patuxent Formation are not understood because of intensive folding and faulting prior to extensive erosion beneath the Cambrian angular unconformity and because the base of the Patuxent Formation has not been observed. The age of the formation is probably late Precambrian based on an isochron date of the Goretzki Felsite Member in the Schmidt and Williams Hills (Easton, 1970, p. 100-101). The entire formation is regionally metamorphosed to the greenschist facies and is moderately well to well sorted. Deformation and absence of distinctive marker beds of regional extent within the formation preclude accurate determination of thickness, but a minimum exposed structural relief of about 1,000 m in the Patuxent Range and widespread distribution throughout the Pensacola Mountains suggest a thickness of more than 10,000 m.
- pGm** Goretzki Felsite Member - Light to medium-gray porphyritic felsic tuffs and flow breccias, 2-100 m thick, are sparsely intercalated with sandstone and siltstone in the Schmidt and Williams Hills. Some tuffs exhibit well-developed euhedral shard structure suggesting an ash-flow origin. Chemical composition of the rocks ranges from dacite to rhyolite. The Goretzki Felsite Member is here named for Mount Goretzki, where its type section is located. Rb-Sr whole-rock data from four samples suggest an isochron age of 4,180±76 m.y., but four other samples give a reset date of 488±5 m.y. (Easton, 1970, p. 101-103). The aggregate thickness of exposed felsite is probably less than several hundred meters. Flows are shown schematically on map.
- pWb** Williams Basalt Member - Dark-gray to dark-green basalt flows intercalated with sandstone and siltstone in the Williams Hills. Flows are 2-30 m thick and constitute about 15 percent of the exposed rock in the Williams Hills; aggregate thickness of basalt may be 1,000 m. In places flows may be erroneously mapped as diabase of Schmidt Hills (pCb). Most flows are shown schematically on the map. The Williams Basalt Member is here named for the Williams Hills, where its type section is located.
- pPk** Pillow Knob Basalt Member - Dark-gray to dark-green massive pillow basalt in the Schmidt and Williams Hills. Pillows range from 5 cm to 1 m across and are set in an argillaceous or locally calcareous matrix. Layering is poorly defined. The total thickness may be several hundred meters. The Pillow Knob Basalt Member is here named for Pillow Knob, where its type section is located.
- pCp** Patuxent Formation and diabase of Schmidt Hills, undivided (Upper Precambrian) - Unit is mapped in Schmidt and Williams Hills where outcrop was not field checked and in areas concealed by snow.

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GEOLOGIC MAP OF THE SCHMIDT HILLS QUADRANGLE AND PART OF THE GAMBACORTA PEAK QUADRANGLE, PENSACOLA MOUNTAINS, ANTARCTICA

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