DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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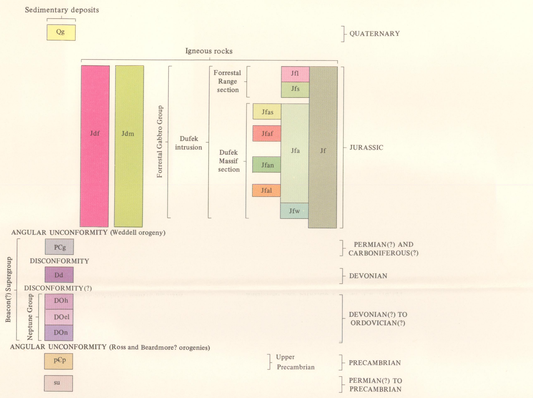
U.S. ANTARCTIC RESEARCH PROGRAM
DAVIS VALLEY QUADRANGLE AND PART OF THE
CORDINER PEAKS QUADRANGLE
ANTARCTIC GEOLOGIC MAP A-10

CORRELATION OF MAP UNITS

Units shown in parentheses where inferred to lie beneath ice



DESCRIPTION OF MAP UNITS

Qg GLACIAL AND TALUS DEPOSITS, UNDIVIDED (Quaternary) – Chiefly non-weathered, nonsorted, unconsolidated talus and morainal materials of apparent local derivation, in some places lying on ice. May include deposits of older moraines on Rosser Ridge, where boulders are slightly weathered and are encrusted with salts (mainly gypsum) on undersides

Jdf FELSIC DIKE ROCK (Jurassic) – Aplite, pegmatite, and less common leucogabbro and alaskite of dikes apparently related to the Dufek intrusion. From 1 cm to several meters thick. Locally zoned

Jdm MAFIC DIKE ROCK (Jurassic) – Basalt and diabase of dikes a few centimeters to several meters thick. Occur only on Rosser Ridge, where they cut rocks as young as Gale Mudstone. Devitrified selvages common. Generally slightly altered. Probably related to Dufek intrusion but may be of slightly different age

FORRESTAL GABBRO GROUP (Jurassic) – Includes, in descending order, Lexington Granophyre, Saratoga Gabbro, Aughenbaugh Gabbro, and Walker Anorthosite. Layered rocks of the Dufek intrusion; chiefly well-laminated mafic cumulates of general gabbroic composition. Modal proportions of settled plagioclase, two pyroxenes, and opaque oxides highly variable. Group includes pyroxene cumulate, plagioclase cumulate, and magnetite cumulate in interlayers a few millimeters to several meters thick, and a capping layer of granophyre. Pyroxenes belong to two coexisting series, augite-ferroaugite and bronzite-inverted pigeonite. The opaque oxides are chiefly composite grains of titaniferous magnetite and ferrian ilmenite. Stratigraphy and rock-stratigraphic nomenclature of group discussed in Ford (1976). Jurassic age assignment based on K-Ar analyses that average 168±3.4 m.y. (R. W. Kistler, unpub. data). Extent of group under cover of ice inferred from geophysical data of Behrendt and others (1973). Group estimated to be 8-9 km thick, of which about 1.8 km is exposed in Dufek Massif and 1.7 km in the Forrestal Range. Upper units of group mainly exposed to south in Saratoga Table quadrangle (Ford and others, 1978)

Jf FORRESTAL GABBRO GROUP, UNDIVIDED – Undivided gabbroic and related rock of the Dufek intrusion. Where shown under cover of ice, inferred from geophysical surveys

Jfl LEXINGTON GRANOPHYRE – Not exposed, but presence indicated in cross section in ice-covered central highland of Forrestal Range. A late-stage differentiate of the tholeiitic Dufek magma. Composition approximates that of iron-rich granodiorite. At least 240 m thick, and probably about 300 m thick

Jfs SARATOGA GABBRO – Generally well layered and laminated, medium- to dark-gray, iron-rich gabbroic cumulates of upper part of the Dufek intrusion. Weathers dark brownish gray. Includes numerous layers of leucocratic plagioclase-rich cumulate (anorthosite and leucogabbro) and common thin dark-gray to black layers of magnetite-rich cumulate. Mineral-graded layering common. Mafic rock is chiefly two pyroxene-plagioclase-magnetite cumulate. Scour channels (trough layering) observed mainly in lower part. Contacts not exposed. Thickness of about 1,400 m measured in Saratoga Table quadrangle

Jfa AUGHENBAUGH GABBRO – Chiefly light- to medium-gray medium-grained mafic cumulate of general gabbroic composition. In places cavernously weathered. Principally a two pyroxene-plagioclase cumulate, with minor cumulus magnetite in upper 200 m. Scour channels (trough layering) locally present about 30 m below Frost Pyroxenite Member. Generally well laminated and layered, but layering less conspicuous in interval between the two pyroxenite members. Basal contact sharp; top not exposed. About 1,600 m thick

Jfas Spear Anorthosite Member – A sequence of three layers, 15-45 m thick, of cream to light-gray plagioclase cumulate, locally with minor cumulus magnetite, and interlayered medium- to dark-gray pyroxene-plagioclase cumulate. Plagioclase cumulates characteristically spotted with coarse postcumulus pyroxene. Basal contact sharp; top not exposed. At least 105 m thick

Jfaf Frost Pyroxenite Member – A conspicuously layered sequence consisting of at least six dark-brownish-gray to black mineral-graded layers of pyroxene-rich cumulate, up to 4 m thick, interlayered with medium- to dark-gray pyroxene-plagioclase cumulate. Darker layers typically poorly laminated plagioclase-bearing two-pyroxene cumulate. Basal contact sharp; upper contact gradational. About 43 m thick

Jfan Neuburg Pyroxenite Member – A conspicuous single mineral-graded layer of dark-brownish-gray plagioclase-bearing two-pyroxene cumulate. About 200 m above base of Aughenbaugh Gabbro. Pyroxenes are augite and inverted pigeonite, characteristically in unusually coarse clusters as much as 5-7 cm across. Basal contact sharp; grades upward, with increasing amounts of cumulus plagioclase, into overlying dark- to medium-gray two pyroxene-plagioclase cumulate. Thickness of about 5 m nearly constant along entire 20-km extent of exposure

Jfal Lower anorthosite member – A locally conspicuous single isomodal layer of cream to light-gray, mainly plagioclase cumulate. About 40 m above base of Aughenbaugh Gabbro. Characteristically spotted with dark, coarsely poikilitic postcumulus pyroxenes. Basal and top contacts sharp. About 12 m thick

Jfw WALKER ANORTHOSITE – White to light-gray, medium-grained, mainly plagioclase cumulate. Generally well laminated. Layering generally indistinct and gradational but locally conspicuous where cumulus pyroxene present in thin interlayers. Characteristically spotted with dark, coarsely poikilitic postcumulus pyroxenes. Sharp top; base not exposed. At least 230 m thick

BEACON(?) SUPERGROUP (Permian? to Ordovician?) – Includes, in descending order, Gale Mudstone, Dover Sandstone, and Neptune Group

PCg GALE MUDSTONE (Permian? and Carboniferous?) – Massive dark-gray diamictite (tillite) containing abundant dispersed pebbles, cobbles, and boulders of diverse lithology generally similar to those in pre-Gale terrane of the Pensacola Mountains. Coarse clasts mainly granite and gneiss and include schist, phyllite, quartzite, limestone, and siltstone. Bedding generally indistinct to absent. Nonfossiliferous. Strongly folded and locally well cleaved. Top not exposed. Basal contact sharp, probably a disconformity, where exposed on Rosser Ridge. Exposed mainly in Schmidt Hills quadrangle where striated boulder pavements are present and where thickness is probably several times a measured 315 m

Dd DOVER SANDSTONE (Devonian) – White, thick and evenly bedded, well-sorted, medium- to coarse-grained quartz sandstone containing conspicuous, widely scattered quartz pebbles; weathers tan. Coarsely crossbedded in places. Quartzite beds common. Nonfossiliferous here, but elsewhere contains flora of Devonian age. Base not exposed. Upper contact probable disconformity. Exposed mainly in Schmidt Hills quadrangle where thickness is about 1,200 m

NEPTUNE GROUP (Devonian? to Ordovician?) – Includes, in descending order, Heiser Sandstone, Elbow Formation, Elliott Sandstone, and Neith Conglomerate. Sequence more than 1,500 m thick. Poorly exposed, but well exposed to south in Schmidt Hills quadrangle (Schmidt and others, 1978; Schmidt and Ford, 1969). Fossils rare, nondiagnostic of age, and known only in the Heiser Sandstone, which is believed to be correlative with a Devonian part of the Beacon Supergroup elsewhere in Antarctica. Separated from Cambrian and older rocks by angular unconformity

DOh HEISER SANDSTONE – Well-bedded light-green quartz sandstone; weathers brown. Slightly more silty than the Dover Sandstone. Characterized by abundant tubular burrows 1 cm or less in diameter oriented normal to bedding. Silty sandstone and quartzite beds, 1 m or less thick, commonly rhythmically interbedded. Base and top not exposed. Thickness of about 320 m measured in Schmidt Hills quadrangle

DOel ELBOW FORMATION – Red argillaceous siltstone interbedded with light-gray fine-grained quartz-rich sandstone, commonly in well-bedded cyclic pairs 0.3-2 m thick. Well laminated, commonly crossbedded, and locally ripple marked. Red beds commonly mottled light gray. Base and top not exposed. Thickness of about 300 m measured in Schmidt Hills quadrangle

ELLIOTT SANDSTONE – Quartz-rich, locally conglomeratic sandstone about 1,400 m in maximum thickness in southern part of Schmidt Hills quadrangle. Not exposed and possibly not present owing to northward thinning from type area

DOn NEITH CONGLOMERATE – Poorly bedded to massive, poorly sorted, coarse, reddish-brown conglomerate interlayered with moderately well bedded coarse-grained reddish-brown sandstone. Clasts derived chiefly from underlying sedimentary formations. Basal part dominantly conglomeratic, locally very thick; upper part dominantly sandstone and possibly correlative with Elliott Sandstone. Base and top not exposed. Thickness may be as much as 1,000 m in Schmidt Hills quadrangle

pЄp PATUXENT FORMATION (Upper Precambrian) – Well-bedded medium- to dark-grayish-green medium-grained argillaceous metasandstone (metagraywacke) generally rhythmically interlayered with dark-gray slate and minor graphitic schist. Locally conglomeratic. Poorly exposed. Mainly exposed in Schmidt Hills quadrangle where felsic and mafic volcanic units also occur. Regionally metamorphosed to greenschist facies; intensely folded and generally well cleaved. Fossils rare and nondiagnostic of age. Unconformably underlies Cambrian limestone in Schmidt Hills quadrangle. Thickness estimated to exceed 10,000 m

su SEDIMENTARY ROCKS, UNDIVIDED (Permian? to Precambrian?) – Sedimentary rock of unknown correlation, mainly inferred beneath cover of ice

Contact – Dotted where concealed; queried where highly uncertain

High-angle fault – U, upthrown side; D, downthrown side. Dotted where concealed; queried where highly uncertain

Trough-layered structure (scour channel) in cumulates

Anticline – Showing plunge. Dotted where concealed; queried where highly uncertain

Syncline – Showing plunge. Dotted where concealed; queried where highly uncertain

Strike and dip of beds in sedimentary rocks and of layers and lamination in igneous cumulates

Inclined

Horizontal

Strike and dip of cleavage in sedimentary rocks and of microshear joints in igneous rocks

Inclined

Vertical

Strike and dip of joints

Inclined

Horizontal

Vertical

Strike and dip of dikes

Inclined

Vertical

Area of geophysical anomaly

Bedrock outcrop

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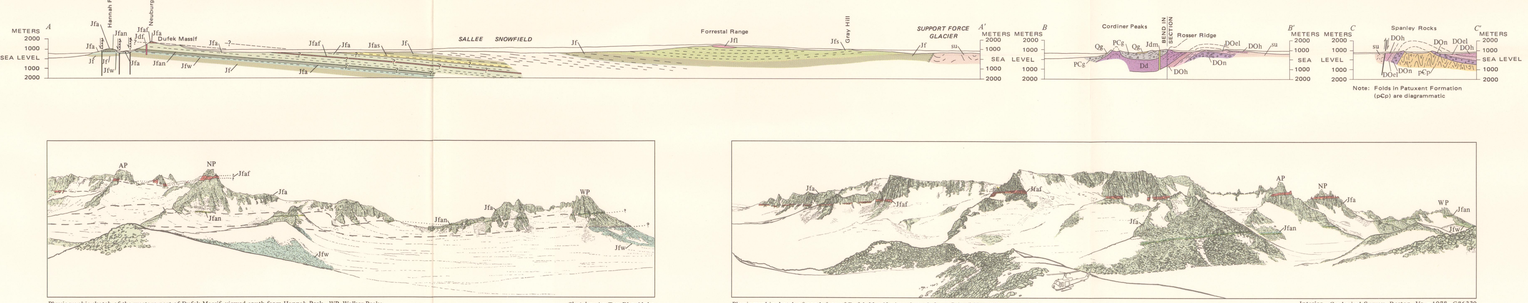
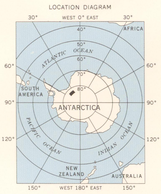


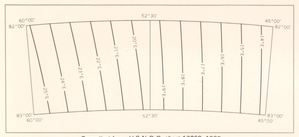
Physiographic sketch of the western part of Dufek Massif, viewed south from Hannah Peak. WP, Walker Peak; NP, Neuburg Peak; AP, Aughenbaugh Peak. Horizontal distance seen is about 10 km.

Sketches by Tau Rho Alpha

Physiographic sketch of north face of Dufek Massif, viewed south from Cairn Ridge. WP, Walker Peak; NP, Neuburg Peak; AP, Aughenbaugh Peak. Horizontal distance seen is about 18 km.

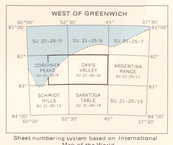
Interior—Geological Survey, Reston, Va.—1978—G76339





Compiled from U.S.N.O.O. chart 17065, 1965

ISOGONIC LINE DIAGRAM



Sheet numbering system based on International Map of the World

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GEOLOGIC MAP OF THE DAVIS VALLEY QUADRANGLE AND PART OF THE CORDINER PEAKS QUADRANGLE, PENSACOLA MOUNTAINS, ANTARCTICA

By
Arthur B. Ford, Dwight L. Schmidt, and Walter W. Boyd, Jr.

1978

For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202 and Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225

Explanatory pamphlet accompanies map