UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Preliminary geologic maps of the Reese Mountain and part of the Hightower SW 7.5 minute quadrangles (Part A) and parts of the Fletcher Park and Johnson Mountain 7.5 minute quadrangles (Part B), Albany and Platte Counties, Wyoming

By

George L. Snyder[1]

Open File Report 86-201

1986

These maps are preliminary and have not been reviewed for conformity with U. S. Geological Survey editorial standards and stratigraphic nomenclature.

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EXPLANATION for

Preliminary geologic maps of the Reese Mountain and part of the Hightower SW 7.5 minute quadrangles (Part A) and parts of the Fletcher Park and Johnson Mountain 7.5 minute quadrangles (Part B), Albany and Platte Counties, Wyoming

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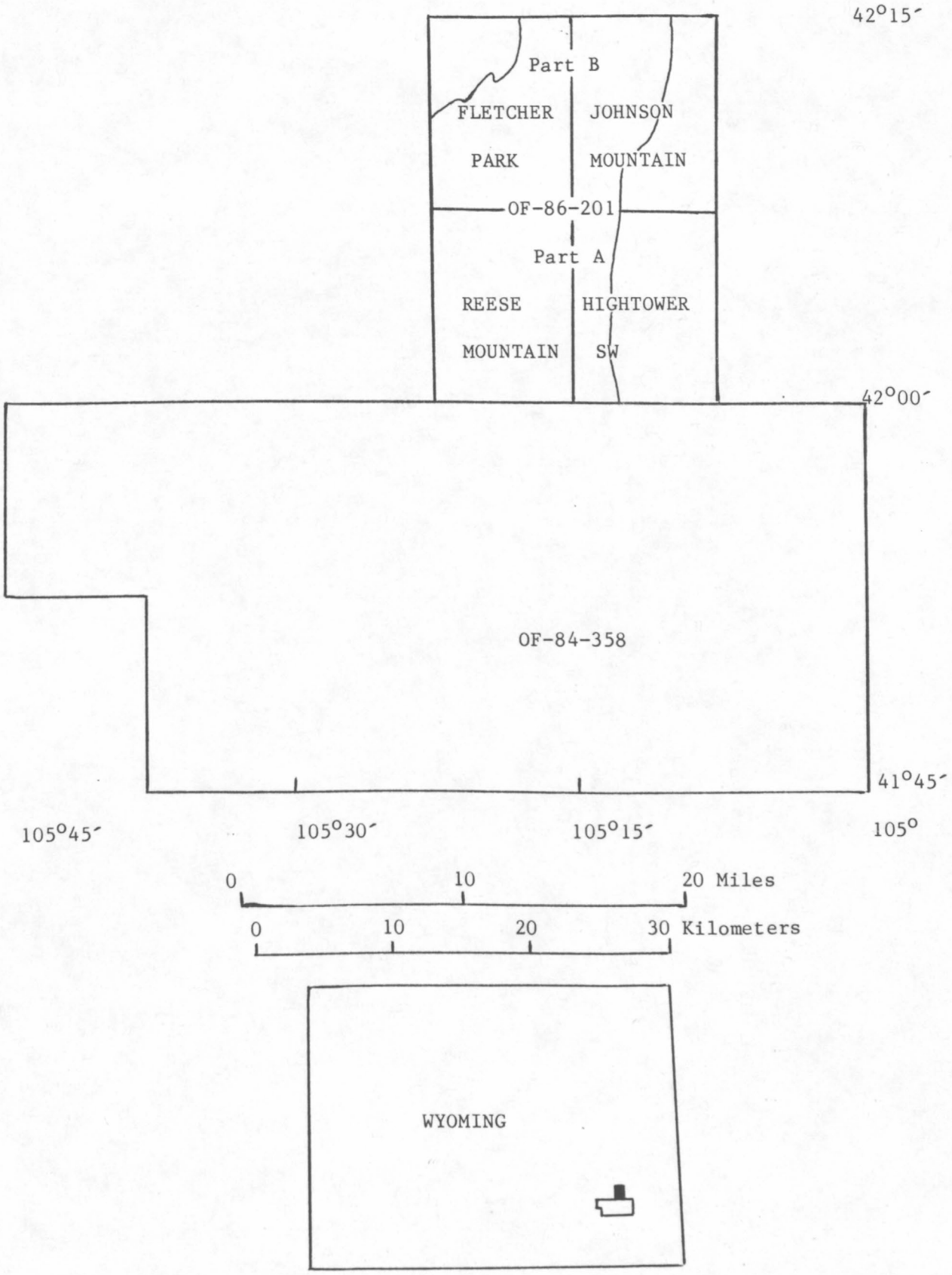
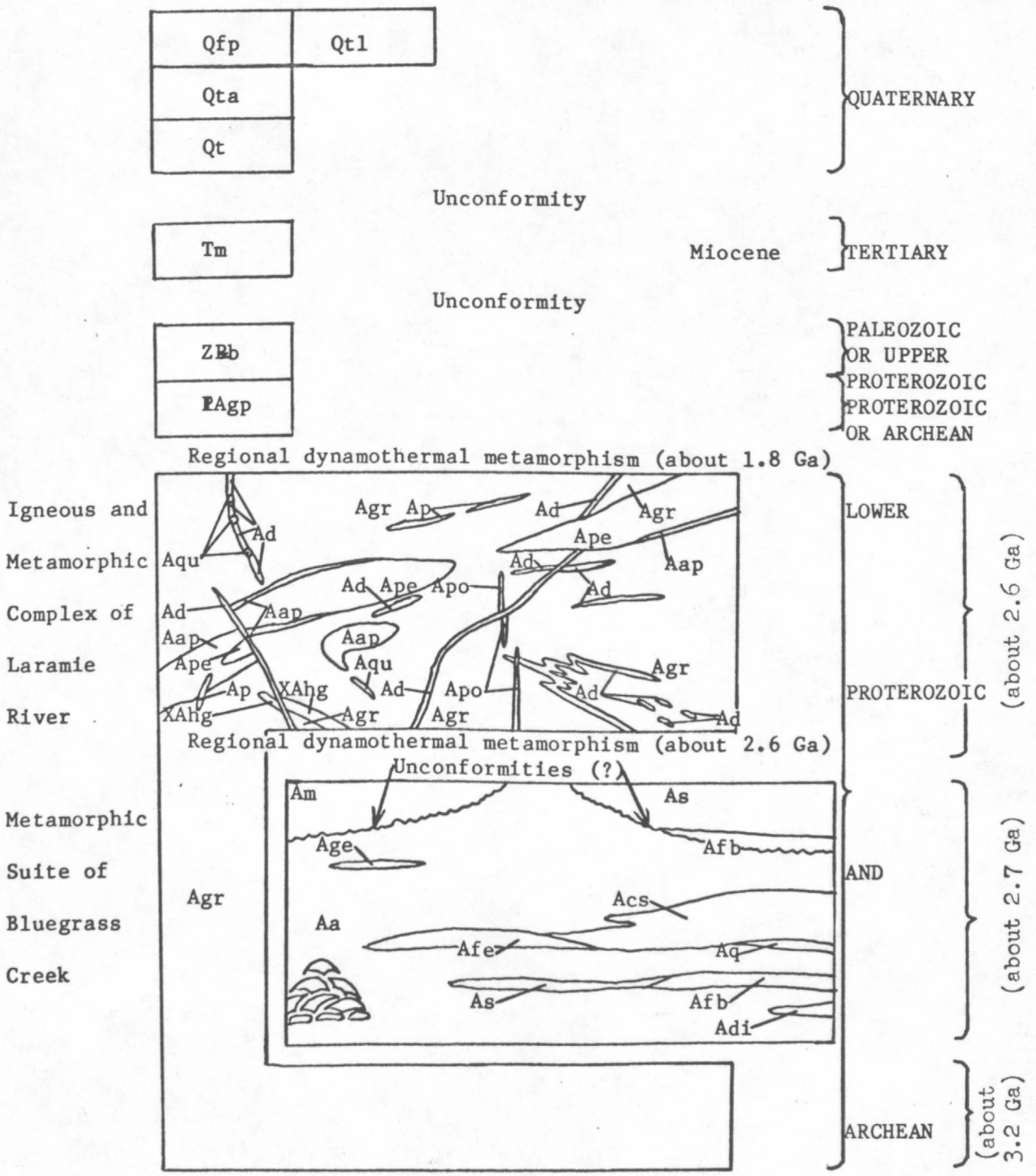
These geologic maps show Precambrian and adjacent Tertiary and Quaternary rocks in four 1:24,000 scale 7.5 minute quadrangles on the east side of the central Laramie Mountains of eastern Wyoming. Although the geologic maps are detailed, this project is still in progress and some parts of the maps may be modified before they are published in color. The explanatory unit descriptions are based on field observations with only cursory examination of thin sections and some chemical analyses; future laboratory work may result in changes in some descriptions.

This open-file report adjoins Open-File Report 84-358, as shown on the attached index map.

Index map


42°15'
Part B
FLETCHER PARK
JOHNSON MOUNTAIN
OF-86-201
Part A
REESE MOUNTAIN
HIGHTOWER SW
42°00'
OF-84-358
41°45'
105°45'
105°30'
105°15'
105°
0 10 20 Miles
0 10 20 30 Kilometers
WYOMING

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

QUATERNARY AND TERTIARY DEPOSITS

Qfp FLOOD PLAIN ALLUVIUM (QUATERNARY)--Alluvial sand and gravel deposits in modern drainages; well-rounded clasts dominated by resistant Precambrian lithologies

Qtl TALUS DEPOSIT (QUATERNARY)--Piles of angular rock fragments beneath cliffs

Qta TRIBUTARY ALLUVIUM (QUATERNARY)--Alluvial sand and gravel deposits in tributaries of some large drainages; commonly separated from flood plain alluvium (Qfp) by an erosional scarp

Qt TERRACE DEPOSITS (QUATERNARY)--Gravel and sand in terrace deposits above modern flood plains; separated into lower and higher terrace deposits locally

Tm OGALLALA AND ARIKAREE FORMATIONS (MIOCENE)--Primarily unconsolidated gray to buff alluvial silt, sand, and gravel; where cemented by calcite, forms cliffs of siltstone or conglomerate. Locally includes Qt gravels as surface veneer

CRYSTALLINE ROCKS (LARGELY PRECAMBRIAN)

ZPb BRECCIA (PALEOZOIC OR UPPER PROTEROZOIC)--Calcite- or iron-oxide-cemented

PAgp VEIN (PROTEROZOIC OR ARCHEAN)--Graphite, calcite, quartz, magnetite, plagioclase, microcline, rutile, chlorite, and/or fluorite (?); locally brecciated. Cross cuts granite folia

IGNEOUS AND METAMORPHIC COMPLEX OF LARAMIE RIVER

(LOWER PROTEROZOIC AND ARCHEAN)

Includes metamorphosed granite, granite gneiss, and other formerly igneous rocks or remobilized igneous rocks, at least in part younger than the metamorphic suite of Bluegrass Creek. Only part of the igneous and metamorphic complex of Laramie River may have intruded the metavolcanic and metasedimentary rocks of Bluegrass Creek (see discussions of Condie, 1969a, b, and Smithson and Hodge, 1969). Part of this unit, the voluminous granite migmatite, was probably the basement on which the metavolcanics and metasediments of the metamorphic suite of Bluegrass Creek were deposited. This migmatite was later remobilized in several regional metamorphisms, giving it the appearance of a primary intrusive. The regional metamorphisms were in the amphibolite and granulite facies; at least one took place during the Archean, another during the Early Proterozoic. Most rocks in this complex are Archean, but the complex also contains several intrusive units that may be partly or entirely of Lower Proterozoic age (see Part B of this open-file report and Part L of OF-84-358)

XAhg HORNBLENDE GRANODIORITE OR MONZOGRANITE--Speckled pink, massive, hornblende-biotite granitic gneiss. Recognized mainly along streams dissecting pediment south of Sheep Mountain (Part B). Unit cross cuts foliation of and contains inclusions of Agr granite and is cut by some Ad amphibolite dikes

Aqu QUARTZ VEIN--White bull quartz in veins, commonly between separated boudins of deformed amphibolite dikes. Although such quartz veins are clearly younger than the amphibolite dikes in this

area, quartz veins have been shown to be older than lithologically similar diabase dikes of a similarly oriented dike swarm west of this area (Harshman, 1968)

Ap PEGMATITE--White to flesh-colored, very coarse grained quartzofeldspathic rock of granitic composition. Locally mined for scrap mica

Ape PERIDOTITE--Dark-gray to black, generally unaltered, medium-grained ultramafic intrusive rock; unit locally consists partly of altered peridotite (Aap), not mapped separately. Constituents include abundant fresh yellow olivine, commonly with corona reaction shells against plagioclase, and enstatite. Some peridotite bodies cut amphibolite dikes, others are cut by amphibolite dikes

Aap ALTERED PERIDOTITE--Dark-green, medium-grained, actinolite-talc-chlorite ultramafic rocks locally containing carbonate. Generally equigranular and massive but locally layered. Some bodies contain local remnant olivine. Most mapped bodies are believed to be altered Ape intrusives

Ad DIABASIC AMPHIBOLITE DIKE--Speckled greenish-black mafic dikes ranging from granular hornblende-plagioclase-quartz amphibolite to clinopyroxene-hornblende-plagioclase diabase. Small grains of metamorphic garnet are commonly present between hornblende and plagioclase grains. Some Ad dikes cut or contain inclusions of plagioclase porphyry amphibolite dikes (Apo); rarely some Apo dikes cut Ad dikes (as in the southern part of sec. 19, T. 25 N., R. 70 W.). Ad dikes were probably intruded over a long span of geologic time; foliated garnet amphibolites are oldest and

relatively unmetamorphosed pyroxene diabases are youngest. Ad dikes cut Aa unit but generally not mapped within Aa unit

Apo PLAGIOCLASE-PORPHYRY AMPHIBOLITE DIKE--Dark-greenish-black hornblende-plagioclase-quartz amphibolite dikes containing 15-25 percent plagioclase phenocrysts (1-5 cm); scapolite and garnet are common minor constituents. Plagioclase phenocrysts are commonly deformed to augen. Border zones of dikes commonly, but not invariably, nonporphyritic

Agr GRANITE--Pink, medium- to coarse-grained, uniformly massive to extensively layered granite, monzogranite, alaskite, and related gneisses. Biotite is generally prominent but muscovite is locally conspicuous. Massive portions of this unit are equigranular, coarse to fine grained, and occur in bodies meters to kilometers long. Migmatitic gneiss portions of the unit may have very subtle foliation defined by feldspars, quartz or biotite, or subtle to prominent felsic or mafic compositional layers, or 1-2 cm thick interlayered pegmatitic layers and relatively uniform granite layers. Local differences in layering can be shown to be due to: 1) intrusive igneous or metamorphic flowage; 2) metamorphic recrystallization of formerly extrusive flow layers or of bedding in arkose; 3) progressive tectonic disruption of former diabase dikes; 4) metamorphic segregation of leucosomal first melts; or 5) lit par lit injection of leucosomal first melts from nearby rocks. Different lithologies were observed in either sharp or gradational contact with each other, and to maintain their identity as distinct units over distances of ranging from meters to kilometers. Rb-Sr isochron dates for

the Agr unit are 2,490±50 Ma (Hills and Armstrong, 1974, recalculated) and 2,580±20 Ma (Z. E. Peterman, written comm., 1983). U-Pb data for zircons from the granite gneiss of Squaw Mountain indicate an age of about 2,595 Ma (Z. E. Peterman, written comm., 1982). Rb-Sr models imply some older history ranging from 2,740 to 3,210 Ma in the Richeau Hills and Cooney Hills (Z. E. Peterman, written comm., 1983; Snyder, 1984, Parts F, G, L)

METAMORPHIC SUITE OF BLUEGRASS CREEK

(ARCHEAN)

Includes all (generally layered) metasedimentary or metavolcanic rocks in the area, best exposed along Bluegrass Creek, (Snyder, 1984). This incorporates all contiguous rocks in the Elmers Rock greenstone belt structure of Graff and others (1982) as well as all metamorphic rocks in isolated areas outside of this belt.

These rocks are older than about 2,600 Ma as shown by isotopically dated bodies that intrude them. One layered, originally water-laid, felsic metarhyolite gneiss in Reed Creek contains a single population of zircons dated at 2,637±10 Ma by U-Pb methods (K. R. Ludwig, oral comm., 4/8/85). This is the first internal date on the type metamorphic suite of Bluegrass Creek and confirms its Archean age. The age is similar to one on a metarhyolite (unlayered porphyritic felsic gneiss) exposed on the northwest flank of Sellers Mountain in the Garrett 7.5 minute quadrangle (felsic schist of Langstaff, 1984, p. 99-103); this has been dated by the U-Pb zircon method at 2,729±62 Ma (Z. E. Peterman, written comm., 1984)

Am MARBLE--Buff-weathering, white to dark-brown, fine-grained to very coarse grained marble. Includes the white dolomite and tremolite dolomite at the Wheatland Marble Quarry (Hightower SW 7.5 minute quad.)

Acs CALC-SILICATE ROCK--White to greenish-gray calc-silicate rock containing minor carbonate; locally grades to marble (Am). Massive ledges, especially near northern and southern margins of Owen Creek greenstone belt (Fletcher Park 7.5 minute quad.), consist of light-colored aggregates of tremolite, chlorite, talc, anthophyllite, and minor carbonate. Smaller bodies elsewhere consist of green diopside, white aluminous epidote or clinozoisite, brown phlogopite, orange garnet, white scapolite, and white to green clinoamphibole

As PELITIC SCHIST--Layered silvery-gray metashales, generally containing excess alumina, constitute the bulk of the stratigraphic sequence in upper and lower parts of the metamorphic suite Generally contains more micas, especially muscovite, than granular minerals, but quartz is nearly ubiquitous. Sillimanite, kyanite, plagioclase, cordierite, pink garnet, potassium feldspar, fuchsite, chlorite, corundum, and relict staurolite occur in this general order of abundance. Sillimanite is the most characteristic aluminum silicate mineral; it occurs as clear prisms and fibrolitic aggregates, and pseudomorphic pinite is a common retrogressive alteration product. Kyanite is commonly unnoticed in hand specimens where it is armored by other minerals. A schist containing porphyroblasts of blue to white kyanite (2.5-7.5 cm), light-purple cordierite (2.5 cm), and pink corundum (1 cm) has been quarried as a mineralogical curiosity on

both sides of Grizzly Creek a mile northwest of the Bookout Ranch in the Reese Mountain 7.5 minute quadrangle. Map unit includes rare faserkiesel gneisses

Afb FELSIC BIOTITE GNEISS--Speckled gray, feldspar-quartz-biotite gneiss and granular schist in places containing garnet. Associated with pelitic schist (As) in both the upper and lower parts of the section. The rocks of this unit were probably originally subgraywacke-type silts, sands, and gravels, and, rarely, water-laid ash beds. A layered leucocratic metarhyolite gneiss high in the stratigraphic section at Reed Creek (NE 1/4 SE 1/4 NE 1/4 sec. 9, T. 23 N., R. 70 W., Squaw Rock 7.5 minute quad.; just south of Part A of this report) contains a single suite of zircons dated at 2,637±10 Ma (K. R. Ludwig, oral comm., 4/8/85)

Age GEDRITE SCHIST--Brown, green, or gray orthoamphibole schist is interlayered with or gradational to either pelitic schist or amphibolite; this unit apparently either is an excess-magnesia variety of pelitic schist or an excess-alumina variety of amphibolite. The rocks of this unit contain prominent gedrite or anthophyllite, commonly in splayed aggregates resembling turkey tracks, plus lesser amounts of cordierite, chlorite, staurolite, garnet, and rare kyanite or andalusite

Aa AMPHIBOLITE--Medium-grained, green to black, layered, massive or pillowed, granular hornblende-plagioclase amphibolite, commonly interlayered with calc-silicate rock or containing calc-silicate pods 1/2 cm to 1 m in diameter. Uniformly layered amphibolite and layered or podded calc-silicate amphibolite are present throughout the metamorphic suite in all isolated areas of unit

Aa. The layered amphibolite probably represents water-laid basaltic ash, and the interlayered calc-silicate rock may represent calcareous marine sedimentary rocks. If so, CO_2 has been removed from most calc-silicate rocks during subsequent metamorphisms. Massive and pillowed amphibolites are present at several localities in and east of Brandel Creek, Fletcher Park 7.5 minute quad. Dark actinolitic chloritic metaperidotite (not mapped separately) is gradationally interlayered repeatedly with feldspathic amphibolite at many localities in the Owen Creek greenstone belt; these ultramafic actinolitites probably represent former komatiitic flow bases underlying more differentiated tholeiitic flow tops

Aq QUARTZITE--Minor layers of massive white, greenish-white or brown quartzite. The quartzite is composed of more than 90 percent quartz and contains minor feldspar, muscovite or fuchsite, and local swarms of sillimanite

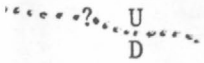
Afe BANDED IRON FORMATION--Layered gray quartz-magnetite granofels (more than 30 percent magnetite), quartz-grunerite-magnetite schist, and quartz-grunerite-garnet-magnetite lean iron formation (less than 4 percent magnetite)

Adi DIORITE--Massive, dark-green, coarse-grained amphibolite of dioritic composition, mapped only along the Laramie River in the southeast portion of Part A, where it apparently occurs in a tight syncline. Although this amphibolitic diorite is massive and without recognized volcanic structures, it may well represent a thick lava flow, perhaps equivalent to one or more of the pillowed flows in the Aa unit elsewhere

DESCRIPTION OF MAP LINES AND SYMBOLS

LINES

CONTACT--Showing dip. Dotted where concealed; queried where location uncertain. Triangle indicates good exposure



PROBABLE CONCEALED FAULT--Queried where existence uncertain. U, upthrown side; D, downthrown side

FOLD TRACE

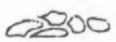
Trough of upright syncline

Trough of overturned syncline

PRIMARY FEATURES

Arrow points toward top of bed. Feature without arrow indicates observation of described feature with no geopetal direction determined

Truncation of channel crossbeds in layered metasediments



Lava pillows in extrusive amphibolite

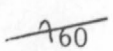
PLANAR FEATURES

STRIKE AND DIP OF BEDS

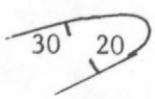
Inclined

Horizontal

Vertical



Overturned



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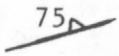
STRIKE AND DIP OF METAMORPHIC SCHISTOSITY OR IGNEOUS FOLIATION--May be combined with bedding data



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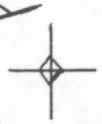
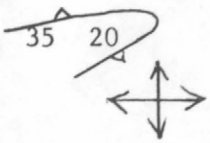


Horizontal

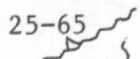
Vertical



Folded

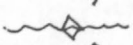
Quaquaversal

GENERAL STRIKE AND RANGE OF DIP OF GENTLY FOLDED SCHISTOSITY OR FOLIATION

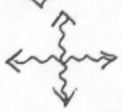


Inclined

Horizontal

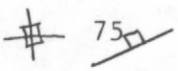


Vertical

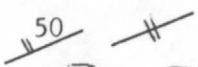


Quaquaversal

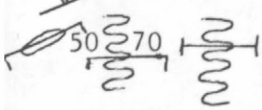
OTHER PLANAR FEATURES



Inclined or horizontal joint set



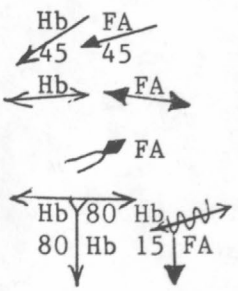
Inclined or vertical shear plane



Inclined or vertical axial plane of one fold, or multiple folds

LINEAR FEATURES

BEARING AND PLUNGE OF LINEATION--May be combined with planar features. Point of observation at tail of inclined arrow or center of horizontal arrow. Abbreviations indicate nature of lineation: Bi, elongate biotite grains; Bi-Bi, biotite trains; FA, minor fold axis; F-AUG, feldspar augen; FSP, feldspar; Hb, hornblende; Hb-Bi, hornblende-biotite pods; K, potassium feldspar; Ky, kyanite; MC, mafic clots; Q, quartz; Si, sillimanite; St, staurolite; TREM, tremolite



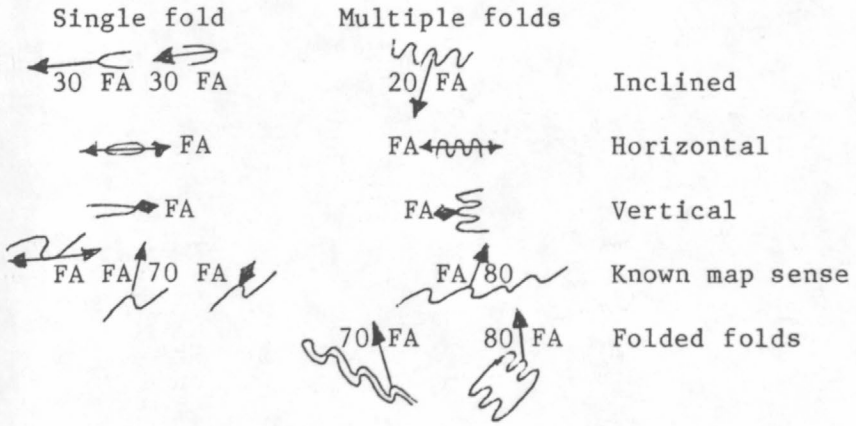
Inclined

Horizontal

Vertical

Multiple

BEARING AND PLUNGE OF AXES OF MINOR FOLDS



Inclined

Horizontal

Vertical

Known map sense

Folded folds

WORKS OF MAN

Borrow pit

Quarry

*Al Prospect pit. Letter symbols shown where known: A, asbestos; Al, corundum; Cu, copper; F, fluorite; Fe, iron; Ky, kyanite; U, uranium

Abandoned adit

Abandoned mine shaft

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POCKET CONTAINS
4 ITEMS.