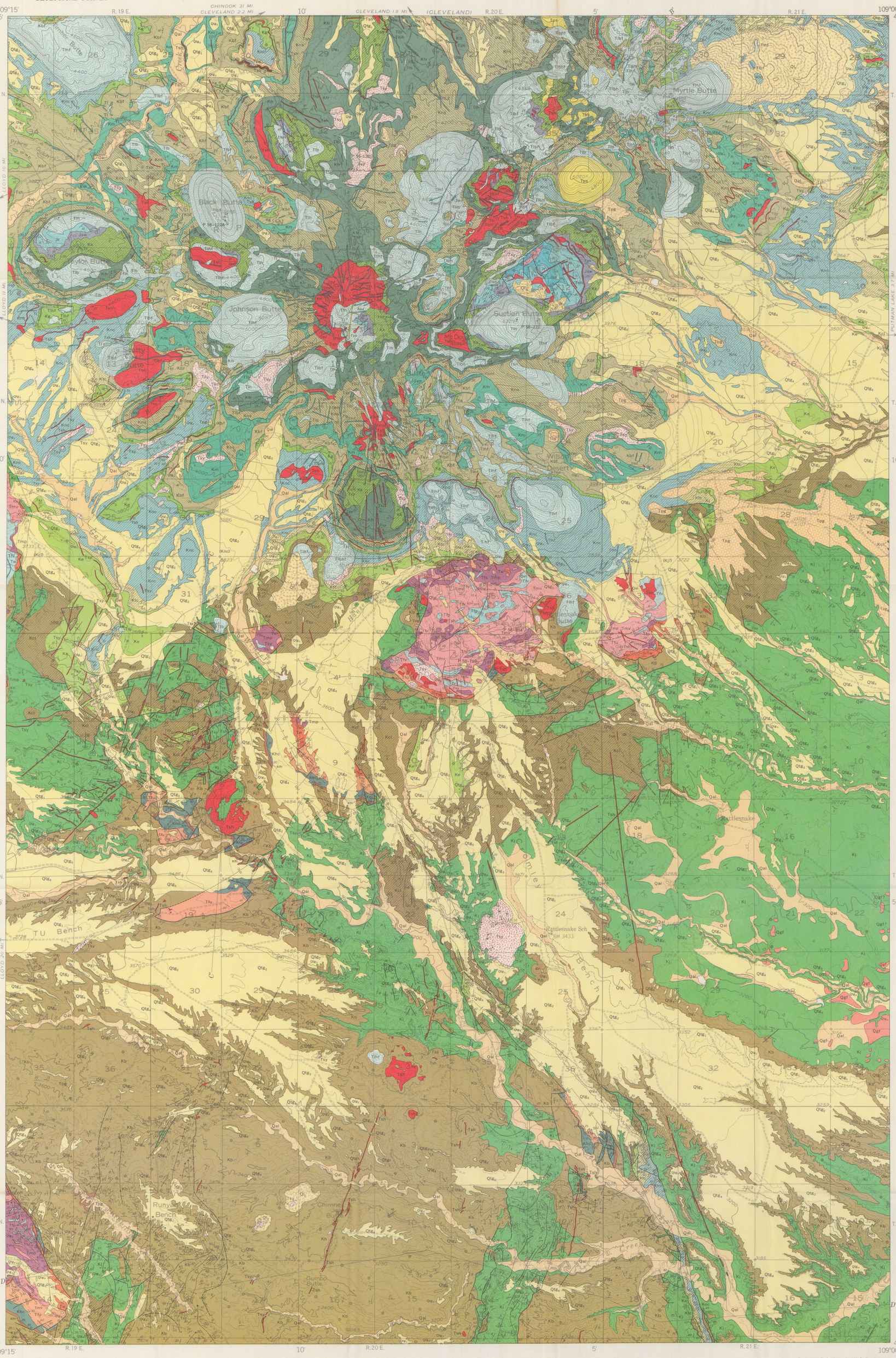


Base by U.S. Geological Survey, 1956

Geology by B. C. Hearn Jr., W. C. Swadley, and W. T. Pecora; assisted by W. G. Ernst, R. A. Sheppard, R. D. Bentley, C. J. Bowser, and N. K. Hagen, 1956–59

EXPLANATION

QUATERNARY — Recent

Qal — Alluvium
Locally derived poorly sorted to well-sorted gravel, sand, and silt

Ql$_5$ — Landslide deposits
Unsorted blocks and fragments derived from gravel deposits and from igneous and sedimentary rocks by slump and rockslide

Qgf — Glaciofluvial deposits
Well-sorted well-rounded cobbles and pebbles and minor silty or clayey sand

Qtg$_{1-5}$ — Terrace gravels
Poorly sorted material of local derivation ranging in size from sand to boulders; on as many as six separate terrace levels; higher numbers indicate successively lower and younger terrace deposits

Ql$_1$ — Myrtle Butte rockslide
Unsorted angular blocks of porphyritic latite, from cobble to extreme boulder size; east of, and derived from, the Myrtle Butte intrusion

Tpg — Pediment gravel
Poorly sorted material of local derivation ranging in size from sand to boulders; on remnants of a high-level erosion surface

ANGULAR UNCONFORMITY

Tfp — Felsic pyroclastic rocks
Chiefly tuff-breccia composed of more than 50 percent fragments of felsic volcanic rocks; contains some blocks as much as 4 feet in diameter

Tfv — Felsic flow rocks
Massive to rubbly flows and flow breccias of green, brown, and gray porphyritic latite and quartz latite; predominantly composed of sanidine, plagioclase, and augite, with varying amounts of quartz; green celadonitic alteration is common

Tmp — Mafic pyroclastic rocks
Chiefly brown to olive tuff-breccia, some agglomerate with blocks as much as 4 feet in diameter, and tuff and waterlaid deposits; predominantly composed of varieties of mafic volcanic rocks

Tmv — Mafic flow rocks
Interlayered massive and rubbly vesicular flows and flow breccias of mafic phonolite, red to dark brown; predominantly composed of sanidine or orthoclase, analcime, olivine, augite, and biotite; zeolitic alteration is common

Tps — Porphyritic syenite
Massive light-gray to light-green porphyritic rocks with characteristic abundant large phenocrysts of sanidine or orthoclase; predominant mafic mineral is aegirine-augite, as phenocrysts and in fine-grained felsic groundmass with minor quartz

Ti — Intrusive porphyritic latite
Massive to sheeted light-gray to tan fine-grained rocks with ubiquitous augite phenocrysts and varying amounts of phenocrysts of sanidine or orthoclase, plagioclase (labradorite to oligoclase), hornblende, and biotite in a fine-grained groundmass of feldspar, augite and quartz; different varieties are distinguished by the abundant and easily seen phenocrysts other than omnipresent augite: b, biotite; h, hornblende; f, feldspar; ib, intrusive breccia

Tsh — Shonkinite
Massive to poorly resistant dark-gray to brown porphyritic and nonporphyritic fine- to coarse-grained rocks containing orthoclase or sanidine, augite, and biotite with or without olivine, nepheline, analcime, or quartz; color index greater than 40

Tsy — Syenite and mafic syenite
Massive fine- to medium-grained light tan to light-gray porphyritic rocks predominantly composed of augite and biotite phenocrysts in a fine-grained groundmass of sanidine or orthoclase, augite, and minor quartz, or analcime with or without nepheline; nontronite (?) is common in vugs; color index less than 40

ANGULAR UNCONFORMITY

Tw — Wasatch Formation
Variegated shale, bentonitic claystone, siltstone, and crossbedded fine- to coarse-grained sandstone, with channel lenses of conglomerate in upper part

Tfu — Fort Union Formation
Light-colored shale, claystone, siltstone, and thin and thick massive sandstones, in part concretionary; carbonaceous shale and coal

Khc — Hell Creek Formation
Light-colored to drab claystones, siltstones and minor massive concretionary sandstone, characteristic dark-gray to black bentonitic clay, and, at the base, a zone of carbonaceous shale and coal

Kfh — Fox Hills Sandstone
Light-tan to yellow thick-bedded sandstone with brown sandstone concretions and minor brownish-gray shale

Kb — Bearpaw Shale
Fissile bentonitic and nonbentonitic gray shale with claystone concretions and minor silty shale; transition beds of alternate thin brown to gray shale, siltstone, and sandstone make up upper 70 to 120 feet; several bentonitic beds near base; Baculites abundant

Kj — Judith River Formation
Massive to thin light-colored sandstone, siltstone, claystone, and shale; near the top, a bed or beds rich in oyster shells and several carbonaceous shales and coals; at the base, massive thick-bedded sandstone with brown sandstone concretions

Kcl — Claggett Shale
Fissile gray to brownish-gray shale and bentonitic shale with yellow-brown septarian calcareous claystone concretions; thin sandy and silty zones near the top

Ke — Eagle Sandstone
Upper one-fourth interbedded brown to gray siltstone and shale and light-brown sandstone, in part glauconitic and containing polished chert pebbles; massive thick-bedded yellow to white sandstone with brown sandstone concretions makes up lower three-fourths (Virgelle Sandstone Member)

Kkc — Telegraph Creek Member
Interbedded thin gray to brown shale, siltstone, and sandstone with yellow to gray discoid siltstone and claystone concretions

Knc — Niobrara Shale and Carlile Shale Members
Upper three-fourths (Niobrara Shale Member) dark-gray to brownish-gray shale with minor siltstone beds; contains many beds of bentonite, septarian calcareous claystone concretions, and concretionary limestone lenses; lower one-fourth (Carlile Shale Member) mainly black chippy siliceous shale, with distinctive iron-rich claystone concretions which weather to rusty chips

Kg — Greenhorn Limestone Member
Medium-gray sandy thin-bedded limestone, calcareous and noncalcareous siltstone, and dark shale; imprints of Inoceramus labiatus *abundant*

Kbf — Belle Fourche Shale Member
Black shale, minor sandstone and siltstone; distinctive sandstone bed 80 to 100 feet above the base contains one or more beds of black chert grit; iron- and manganese-rich claystone concretions occur near the base

Km — Mowry Shale Member
Hard fissile finely laminated siliceous shale and fine siltstone which weather light bluish gray; fish-scale imprints abundant; several beds of bentonite near the top

Kns — Newcastle Sandstone and Skull Creek Shale Members
Dark-gray to black shale with abundant beds of drab- to rusty-weathering sandstone, mudstone, and siltstone, and a few beds of concretionary iron-rich claystone

Kfr — Fall River Sandstone Member
Upper 40 to 70 feet irregularly bedded light-gray to tan sandstone with one or more beds of conglomerate of smooth rounded chert pebbles; lower part predominantly black shale with minor thin sandstone and siltstone beds; phosphatic nodules near base

Kk — Kootenai Formation
Upper half variegated shale, mudstone, siltstone, and crossbedded sandstone; lower half interbedded massive crossbedded sandstone and gray to brown siltstone and shale; one massive resistant coarse-grained sandstone (Third Cat Creek Sand) near the base contains lenses of conglomerate

Jsw — Swift Formation
Massive crossbedded sandstone and dark-gray shale in upper part; alternate thin finely bedded brownish-gray sandstone or siltstone and dark shale in medial part; lower part dark-brownish-gray to gray slightly calcareous shale with brown concretionary limestone beds, abundant Gryphaea *and* Belemnites

Jr — Rierdon Formation
Upper third chiefly massive to thin-bedded resistant gray limestone; lower two-thirds gray to yellowish-gray calcareous shale and thin-bedded argillaceous limestone with abundant Gryphaea

Jsa — Sawtooth Formation
Upper third gray thin-bedded and massive sandy oolitic and fossiliferous limestone, minor calcareous sandstone, and, at the top, a thin wavy-bedded layer of algal limestone; lower two-thirds predominantly thick-dark massive limestone with thin shaly beds, and with 4 feet of calcareous siltstone, sandstone, and conglomerate at the base

UNCONFORMITY

Mm — Mission Canyon Limestone
Alternate massive impure light-weathering and pure dark-weathering limestone; abundant nodules and lenses of chert, and crinoidal and coralline fossils

Contact, showing dip
Long dashed where approximately located; short dashed where inferred; dotted where concealed; queried where uncertain

Fault, showing dip
Long dashed where approximately located; short dashed where inferred; dotted where concealed; queried where uncertain. U, upthrown side; D, downthrown side; T on upper plate of thrust faults (dip less than 45°)

Anticline
Showing crest line and plunge of axis. Dashed where approximately located; dotted where concealed; queried where uncertain

Syncline
Showing trough line and plunge of axis. Dashed where approximately located; dotted where concealed; queried where uncertain

Strike and dip of beds

Strike and dip of overturned beds

Strike of vertical beds

Horizontal beds

Strike and dip of lava flows
Symbol without number is an approximate attitude

Strike and dip of foliation
Symbol without number is an approximate attitude

Strike of vertical foliation

Horizontal foliation

(Knc)
Bedrock formation concealed by surficial deposits, queried where uncertain

Coal prospect

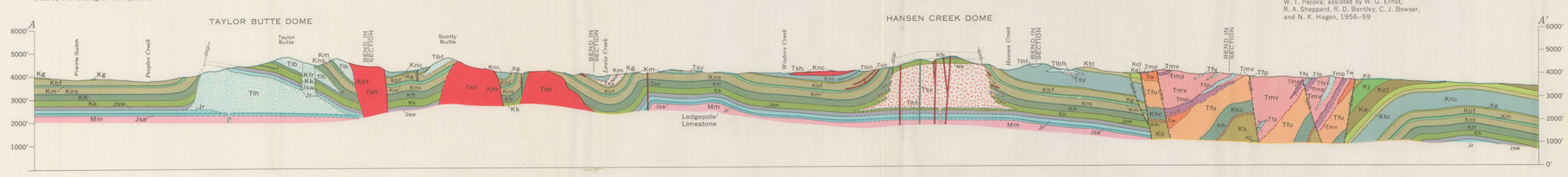
Small prospect pit

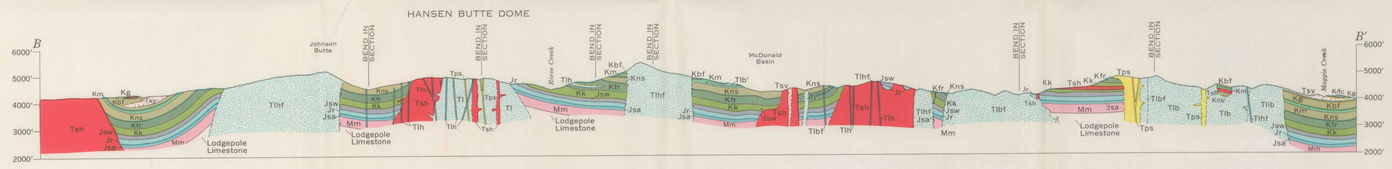
Dry hole

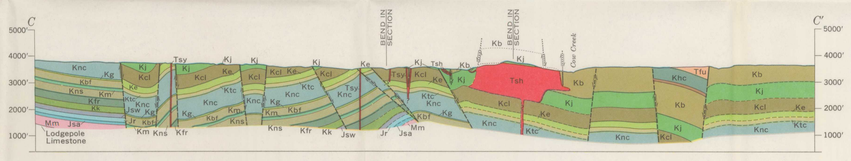
Spring

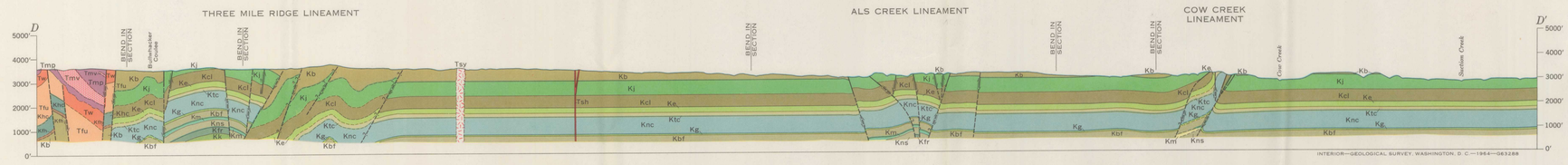
P 58-121
Specimen for chemical analysis

APPROXIMATE MEAN DECLINATION, 1964









INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1964—G63288

GEOLOGIC MAP AND SECTIONS OF THE RATTLESNAKE QUADRANGLE, BLAINE COUNTY, MONTANA

SCALE 1:31 680

1 ½ 0 1 2 MILES

1 .5 0 1 2 KILOMETERS

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL