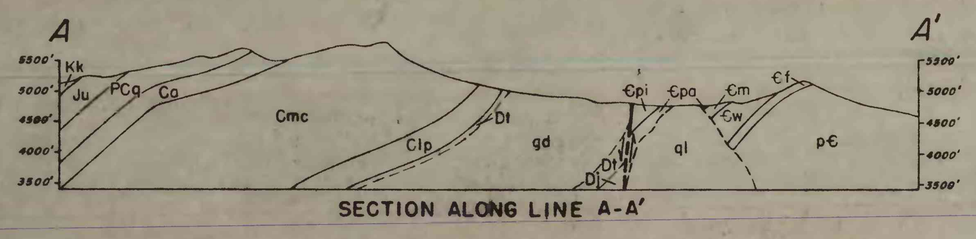
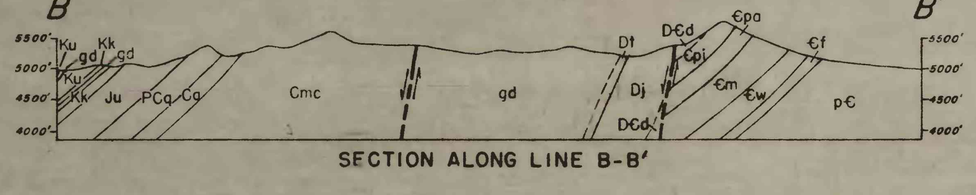
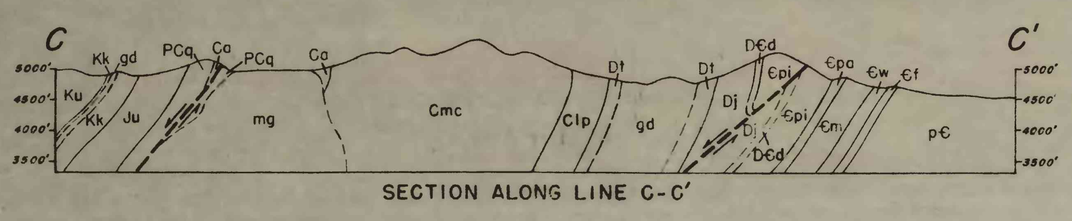
50-14

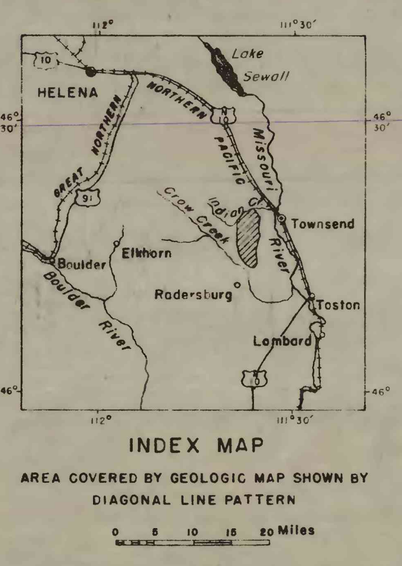
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PRELIMINARY MAP









INDEX MAP

AREA COVERED BY GEOLOGIC MAP SHOWN BY DIAGONAL LINE PATTERN

0 5 10 15 20 Miles

EXPLANATION

Sedimentary Rocks

Oligocene (?) Recent	Qal — Alluvium	QUATERNARY	
	Tac — Volcanic ash underlain by loosely cemented conglomerate	TERTIARY	
	UNCONFORMITY		
Upper (?) Cretaceous	Ku — Sedimentary rocks: undivided. Dark shale with some sandstone and quartzitic sandstone	CRETACEOUS	
Lower Cretaceous	Kk — Kootenai formation. Dark sandstone, red and green shale (ls, gastropod-bearing limestone bed at top)		
Upper Jurassic	Ju — Morrison formation and Swift sandstone. Nonmarine yellow to red shale and lenticular sandstones (Morrison) underlain by fossiliferous marine sandstone (Swift)	JURASSIC	
	UNCONFORMITY		
Pennsylvanian	PCq — Phosphoria and Quadrant formations. Quartzite, in part phosphatic (Phosphoria formation - Permian) underlain by limestone, dolomite, and quartzitic sandstone (Quadrant formation - Pennsylvanian)	CARBONIFEROUS AND PERMIAN	
Mississippian	Ca — Amsden formation. Red shale, siltstone and dolomite with a conspicuous middle unit of light gray dolomite	CARBONIFEROUS	
Madison group	Cmc — Mission Canyon limestone. Light to medium gray, massive limestone		
	Clp — Lodgepole limestone. Dark gray, thin-bedded limestone		
	Dt — Three Forks shale. Dark fissile shale and yellowish calcareous siltstone	DEVONIAN	
	Dj — Jefferson dolomite. Very dark gray fetid dolomite and limestone		
	--- D€d --- UNCONFORMITY(?) Dry Creek(?) shale. Yellowish siltstone and shale of probable Cambrian age overlain by light-colored limestone and dolomite of probable Devonian age	CAMBRIAN (?) AND DEVONIAN (?)	
Upper Cambrian	€pi — Pilgrim limestone. White to dark gray, partly mottled limestone and dolomite	CAMBRIAN	
	€pa — Park shale. Green, fissile shale		
Middle Cambrian	€m — Meagher limestone. Dark gray and tan mottled limestone with middle member of dark gray massive limestone		
	€w — Wolsey shale. Gray, green, and brown, in part calcareous mudstone; limonitic sandstone; and green fissile shale		
	€f — Flathead quartzite. White to pale red quartzitic sandstone		
	UNCONFORMITY		
Belt series	p€ — Spokane(?) formation. Red, fissile to blocky, shale, siltstone, and fine-grained quartzitic sandstone	PRE-CAMBRIAN	

Igneous Rocks

Upper Cretaceous or lower Tertiary	ql — Quartz latite. Stock	CRETACEOUS OR TERTIARY
	mg — Microgabbro. Stock with granite chill zone and outlying porphyritic diorite sills	
	gd — Granodiorite. Predominantly as sills	

Contact, showing dip. Dashed where approximately located

Vertical contact — Overturned contact

Concealed Contact

High-angle fault. Dashed where approximately located; U, upthrown side; D, downthrown side

High-angle fault. Arrows show relative direction of movement

Anticline. Showing trace of axial plane and plunge of axis, dashed where inferred

Syncline. Showing trace of axial plane and plunge of axis, dashed where inferred

Strike and dip of beds

Strike and dip of overturned beds

Strike of vertical beds. Position of 90 indicates top of beds

Prospect

Quarry

Location of measured stratigraphic section. Referred to by number in text

Geology mapped in 1949

Topography by Fairchild Aerial Surveys, Inc.

TRUE NORTH — MAGNETIC NORTH — 21°

APPROXIMATE MEAN DECLINATION, 1949

GEOLOGIC MAP AND SECTIONS OF THE LIMESTONE HILLS, BROADWATER COUNTY, MONTANA

By Edward T. Ruppel

Scale 1:24,000

1 0 1 Mile

1000 0 1000 2000 3000 4000 5000 6000 7000 Feet

Contour interval 40 feet

Datum is mean sea level