IDEALIZED STRATIGRAPHIC COLUMN
Northern Gallatin and Madison Ranges
Montana

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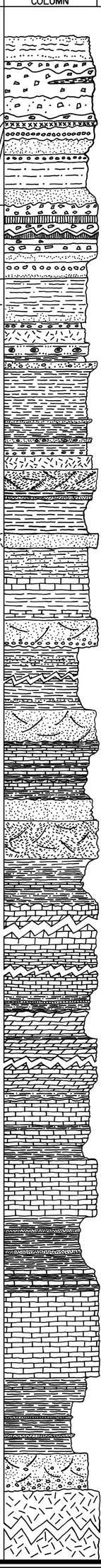
After: Hall, 1961; McMannis and Chadwick, 1964; Witkind, 1969; Kehew, 1971; Montagne, C., 1972; Montagne, J., 1975

TIME UNITS			THICK. (AVG.)	FORMATION	ABBREVIATED LITHOLOGY
ERA	PER.	EPOCH			
CENOZOIC	QUATERNARY	HOLOCENE (RECENT)	0-100'	ALLUVIUM COLLUVIUM MASSWASTING AEOLIAN DEP. NEOGLACIATION	Chaotic debris Loess and sand
		PLEISTOCENE	0-200'	PINEDALE GLACIATION BULL LAKE GLACIATION PRE BULL LAKE GLACIATION HUCKLEBERRY RIDGE TUFF	Till restricted to cirques Lacustrine silts from ice dammed lakes Fresh till Partly weathered till Deeply weathered till Welded rhyolite tuff Streamgravel, unconsolidated
		2 M.Y.B.P. (Million Years Before Present)			
	TERTIARY	PLIOCENE	0-100'	GRAVEL	Assorted conglomerate sandstone, siltstone and shale, mostly light colored, calcareous and tuffaceous
		MIOCENE	0-?	BOZEMAN GROUP	
		OLIGOCENE			
		EOCENE (MIDDLE)	3000'-6000'	GALLATIN-ABSAROKA VOLCANICS	Andesite lava flows, flow breccias and stratified volcanic breccia
		(EARLY)	0-50'	CONGLOMERATE and SILTSTONE	Conglomerate consisting of Precambrian and later boulders and cobbles
		PALEOCENE 70 M.Y.B.P.	100'+	LIVINGSTON GROUP ?	Siltstone, shale, some andesitic sandstone
MESOZOIC	CRETACEOUS	UPPER	1000'+		Sandstone and chert pebble conglomerate Latite or monzonite porphyry sill
		LOWER	440'	ALBINO FORMATION	Gray siliceous shale with interbedded hard, white tuff Well cemented salt and pepper sandstone Black shale with interbedded bentonite seams Pastel colored claystone, mudstone, and shale with interbedded sandstone ? Andesite porphyry sill (local only)
			70'	MUDDY SS	Grayish-green to buff cross-bedded salt and pepper sandstone
			150'	THERMOPOLIS SHALE	Medium to dark gray, fissile carbonaceous shale
			400'	KOOTENAI FORMATION	Well sorted white to hematite stained quartz sandstone Fresh water limestone with overlying variegated red, yellow-brown, and gray mudstone Yellow-brown to maroon mudstone and shale, limy siltstone, and fresh water limestone Gray, thick bedded, cross-bedded coarse grained sandstone. Conglomeratic at base (chert pebble cgl)
		135 M.Y.B.P.			
	JURASSIC	UPPER	350'	MORRISON FORMATION	Variegated red, green, and gray mudstone, shale, and siltstone with thin interbedded yellow to brown very fine grained sandstone or siltstone beds
			100	SWIFT SS	Yellow calcareous, cross-bedded, very fine to medium grained fossiliferous sandstone
		MIDDLE	40'	RIERDON FM.	Gray-brown densely oolitic limestone and calcareous shale
			120'	SAWTOOTH SHALE	Grayish, thin-bedded fine-grained limestone, shaly limestone and calcareous shale, oyster shells
	TRIASSIC	225 M.Y.B.P.	0-100'	DINWOODY FM.	Dark to light brown, thick-bedded sandy limestone and calcareous siltstone
			0-100'	SHEDHORN SS	Dark brown dolomitic sandstone with abundant chert
	PERM.		135'	QUADRANT FORMATION	Pale cream-colored to white clean washed dolomitic sandstone
	PENN.	UPPER	150'	AMSDEN FORMATION	Red shale, gray to cream colored limestone and siltstone. Locally fossiliferous
	MISSISSIPPIAN	LOWER	675'	MISSION CANYON FORMATION	Light gray medium to thick-bedded and massive dolomite, dolomitic limestone and limestone. Abundant chert nodules and stringers. Solution breccia at top
			600'	LODGE POLE FORMATION	Yellow, thin to medium bedded limestone and interbedded argillaceous limestone or calcareous shale. Medium to dark gray, dense, thin-bedded fossiliferous limestone
	DEVONIAN	UPPER	50'	SAPPINGTON FM.	Yellow to brownish calcareous siltstone, mudstone, sandy limestone and sandstone.
			100'	THREE FORKS FORMATION	Medium gray, dense, thin-bedded dolomite or dolomitic limestone. Red, yellow and greenish-orange argillaceous carbonate breccia and massive dolomite.
			400'	JEFFERSON FORMATION	Medium-bedded to massive gray and brown dolomitic limestone, and limestone with interbedded greenish argillaceous dolomite or limestone and solution breccia zones.
		MIDDLE	31'	MAYWOOD FM.	Pale brownish-gray, silty, sandy and pebbly dolomite. Yellow-gray to yellow-orange dolomitic, sandy and cong. siltstn.
PALEOZOIC	CAMBRIAN	UPPER	150'	SNOWY R. FM.: SAGE PEBBLE CGL. MEMBER	Limestone pebble conglomerate, chert nodules and stringers, ribbony algal siltstone and fossil hash
			50'	SNOWY R. FM.: DRY CK SH MEM	Gray-green fissile shale with interbedded yellow-brown fine grained quartz sandstone or siltstone.
			200'	PILGRIM LS.	Green and gray, fossil fragmental glauconitic limestone, oolitic in part with some flat pebble limestone conglomerate. Green-brown, medium, oolitic, massive limestone and dolomite, matted, some mottling
		MIDDLE	180'	PARK SH.	Gray-green and maroon fissile, micaceous shale with interbedded brown, very fine grained quartz sandstone or siltstone, glauconite in upper part
			450'	MEAGHER LS.	Thin bedded dark gray, dense limestone with interbedded green shale, fossiliferous Massive, dense, brittle, dark gray limestone. Some gold and blue mottling Interbedded yellow and gray-green calcareous shale with limestone pebble conglomerate beds
			170'	WOLSEY SH.	Gray-green and maroon fissile micaceous shale with interbedded micaceous sandstone and siltstone
			130'	FLATHEAD FM.	White, yellow brown, and red, medium to coarse-grained, cross-bedded quartz sandstone, locally conglomeratic and arkosic
		550 M.Y.B.P.			
PRE-CAMBRIAN		PRE-BELTIAN (ARCHEAN)	INDEF.	CRYSTALLINE METAMORPHIC ROCKS	Gneiss, schist, amphibolite, pegmatite, and basic dike rocks