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GENERALIZED COLUMNAR SECTION

Exposed
Subsurface

Deepest rocks drilled in Calif. Co. No. 1 Johns Valley.

Pre-Mississippian lithology and thickness inferred. After data by Lessentine (1965) and Munger, Greene, Peace, and Liming (1965)

DESCRIPTION

ALLUVIUM--clay, silt, sand, and gravel; includes coarse poorly sorted flash-flood deposits in narrow canyons and some colluvium and slope wash in broad upland valleys

ALLUVIAL FANS--small alluvial fans in lower Henderson Canyon

TALUS--angular fragments and blocks of latite derived from cliffs of the tuff of Osiris (Miocene?) just outside area boundary

TERRACE GRAVEL--stream gravel of well-rounded pebbles and cobbles of quartzite and chert and subrounded pebbles and cobbles of limestone

VALLEY FILL--coarse alluvium and colluvium in head of Water Canyon

OLDER VALLEY FILL--older alluvium, colluvium, and alluvial-fan deposits; includes remnants of undivided terrace and pediment gravels; mostly colluvium and slope wash in vicinity of Stump Spring in the east and older valley fill of alluvium and colluvium in upper Pine Hollow drainage north of Stump Spring

COLLUVIUM AND SLOPE WASH--deposits composed mostly of poorly sorted subangular to subrounded pebble- to boulder-sized clasts of limestone lying on dip slopes in southern part of area; probably derived from older surficial deposits

LANDSLIDE BLOCKS--mostly large slide or slump blocks of Wasatch limestone near head of Henderson Canyon; configuration of individual blocks partly obscured by slope wash, soil, and forest cover; slump blocks of sandstone in lower Henderson Canyon

COLLUVIUM, SLOPE WASH, LANDSLIDE, AND TALUS, UNDIVIDED--unsorted to poorly sorted clastic debris on moderate to steep slopes at base of Table Cliff Plateau; composed mostly of angular to subangular fragments and blocks of Wasatch limestone; commonly mixed with, and locally composed predominantly of, pebbles and cobbles of quartzite and chert derived from the Canaan Peak Formation on lower slopes; includes some coarse alluvial-fan and flash-flood debris at head of Henderson Canyon

PEDIMENT DEPOSITS UNDIVIDED--mostly poorly sorted and stratified partly cemented material composed of subrounded to subangular pebble- to boulder-sized clasts of Wasatch limestone and lesser amounts of well-rounded pebbles and cobbles of quartzite and chert in a pinkish-tan to pale-pink highly calcareous sand and mud matrix

LOWER COAL BENCH PEDIMENT--moderately sorted and stratified deposit of subrounded pebble- to boulder-sized clasts of limestone and well-rounded pebbles and cobbles of quartzite and chert in a calcareous clay-silt-sand matrix

UPPER COAL BENCH PEDIMENT--poorly sorted poorly stratified partly cemented deposit composed mostly of subrounded to subangular pebble- to boulder-sized clasts of Wasatch limestone and lesser amounts of quartzite and chert pebbles and cobbles in a cream to pinkish-tan clay-silt-sand matrix

WASATCH FORMATION

WHITE LIMESTONE MEMBER--limestone, white to light-gray, very fine granular to microcrystalline; contains thin yellowish-gray mudstone interbeds mostly in middle and lower parts; some beds contain early to middle Eocene fresh-water gastropods. Caps Table Cliff Plateau and forms vertical cliffs or steep forested slopes. About 550 feet. Unmapped remnants of a basal conglomerate of the overlying variegated sandstone member are locally present on the Table Cliff Plateau

PINK LIMESTONE MEMBER--limestone, pink, pale-orange, light-gray, and white, commonly mottled pink or yellow, irregularly bedded to massive, very fine grained to fine-grained, clastic; contains thin gray to red limy mudstone interbeds; locally contains lenticular fine- to coarse-grained calcareous sandstone or calcarenite and thin (1-6 ft) dark-gray microcrystalline limestone beds; overall pink color of member produced by stain from interbedded red units. Forms pink cliffs, columns, and spires or steep forested slopes. 800-900 feet

PINE HOLLOW FORMATION--mudstone and claystone, gray and purplish-gray to red. Mudstone is commonly arenaceous and calcareous, locally grading to light-gray or white argillaceous or silty limestone. Claystone is commonly bentonitic, particularly near middle of formation. Contains interbeds of gray, tan, or red fine- to coarse-grained sandstone in lower part and thin conglomerate lenses mostly near base. Overall color is generally pale purplish gray to bright red. Unconformable beneath the Wasatch on east flank of Johns Valley anticline but probably intertongues with the Wasatch northeast of quadrangle. Lower part intertongues with the Canaan Peak Formation but east of area is probably separated from the Canaan Peak by an erosional unconformity. 0-450 feet

CANAAN PEAK FORMATION--sandstone, conglomeratic sandstone, and conglomerate, interbedded; tan, pink, or red in upper part to light-brown or gray in lower part; contains multicolored well-rounded pebbles, cobbles, and small boulders of quartzite, chert, dense to porphyritic acidic igneous rocks, and some gray limestone; boulders locally exceed 12 inches in diameter. Formation thickens abruptly eastward from the area. Lower part includes mudstone interbeds containing Late Cretaceous (Campanian?) palynomorphs; generally poorly exposed and forms steep gravel-covered slopes. The formation, formerly considered to be the basal conglomerate of the Wasatch Formation (Bowers, 1972), is unconformable beneath the Wasatch along the Johns Valley anticline and unconformable on the Kaiparowits Formation throughout the region. 0-600 feet

KAIPAROWITS FORMATION--sandstone, greenish- to brownish-gray, very fine grained to fine-grained, friable, "salt and pepper"; contains subordinate thin light-gray mudstone interbeds and buff to brown moderately resistant lenticular fine- to medium-grained mudstone interbeds; dinosaur bones and fresh-water molluscs common locally; weathers to badland topography in The Blues in the southeastern part of the quadrangle where formation is thickest. Thins northward to less than 1,200 feet near Pine Lake. Base conformable and gradational with Wahweap Formation. 1,200-2,600 feet

WAHWEAP FORMATION--sandstone, in upper 250-500 feet, light-gray to white, medium- to coarse-grained, massive, crossbedded, cliff-forming; contains pebble conglomerate lenses 100-150 feet below the top and thin gray shale interbeds in upper 100 feet; unit grades into Kaiparowits Formation. Sandstone, in lower 750-800 feet, light- to dark-brown, fine- to medium-grained, crossbedded, lenticular; contains interbedded gray mudstone. Base conformable on Straight Cliffs Formation. 1,050-1,250 feet

STRAIGHT CLIFFS FORMATION

UPPER PART--upper 300-400 feet, sandstone, light-gray to white, medium- to coarse-grained, locally conglomeratic, massive, crossbedded, cliff-forming. Lower 800-1,000 feet, sandstone, mudstone, carbonaceous mudstone, and some coal, interbedded. Sandstone is mostly tan to light brown, fine grained to coarse grained, crossbedded. Mudstone is gray to tan. Carbonaceous mudstone is dark gray to black. A persistent coal-bearing interval, the Henderson coal zone, occurs 100-150 feet above the base throughout the region. Local coal beds of limited extent occur above the Henderson zone; thicker local beds occur chiefly in the subsurface in the northern part of the area. The upper massive sandstone is equivalent to the Drip Tank Member; rest of unit is approximately equivalent to the John Henry Member east of the Table Cliff Plateau. 1,100-1,400 feet

LOWER PART--upper part, sandstone, white, medium- to very coarse grained, conglomeratic, massive, crossbedded, cliff-forming; middle part, interbedded sandstone, mudstone, carbonaceous mudstone, and a few very thin impure coal beds; at base, sandstone, tan to light-brown, fine-grained, partly crossbedded, cliff-forming, marine. Middle and upper parts are probably equivalent to the Smoky Hollow Member in the eastern part of the Kaiparowits region; basal marine sandstone is equivalent to the Tibbet Canyon Member south and east of the Table Cliff Plateau. 350-425 feet

TROPIC SHALE--shale, medium- to olive-gray, marine; contains thin tan, yellowish-gray, or light-brown very fine grained to fine-grained sandstone interbeds in upper part. Only upper part is exposed in quadrangle. Lower part south of the area contains thin bentonite beds and limestone concretions that contain marine fossils. 700-900 feet

DAKOTA FORMATION--sandstone, mudstone, carbonaceous mudstone, and small amounts of coal, interbedded. Sandstone is generally light brown, fine to medium grained, moderately resistant, medium to coarse grained; conglomeratic with pebble-cobble conglomerate locally at base. Mudstone is gray to greenish gray; carbonaceous mudstone is dark brown to black. Coal beds are generally lenticular, thin, and impure, grading laterally to carbonaceous mudstone. 200-250 feet

ENTRADA SANDSTONE--upper 100-200 feet, sandstone, fine- to coarse-grained, white to yellowish-brown, massive, high-angle crossbedded. Middle 200-300 feet, sandstone, fine-grained, white to light-gray, low-angle cross-stratified; locally has red bands. Lower 200-300 feet, sandstone, fine-grained, reddish-brown, low-angle cross-stratified to high-angle cross-stratified. Sample logs from Johns Valley drill holes suggest the presence of more silty and shaly interbeds in the formation than are present in exposures south of the quadrangle. About 700 feet

CARMEL FORMATION--upper part, siltstone, mudstone, anhydrite, and thin-bedded limestone; middle part, mostly sandstone containing shaly interbeds; lower part, predominantly limestone containing anhydrite, shale, and sandstone interbeds. Siltstone and mudstone are reddish brown, red, or greenish gray; sandstone is red, pink, pale orange, or white, and fine grained; limestone is generally greenish gray, tan, or light brown. About 900 feet

NAVAJO SANDSTONE--sandstone, white to pale-orange-gray, massive, large-scale high-angle crossbedded. 1,550-1,700 feet

KAYENTA FORMATION--sandstone, siltstone, and shale, interbedded; reddish-brown to pale-red. 250-400 feet

WINGATE SANDSTONE--sandstone, pale-orange, fine- to medium-grained, well-rounded, crossbedded. 100-200 feet

CHINLE FORMATION--upper part: shale and claystone, red, silty, in upper part; sandstone and siltstone interbeds in middle part; thin interbeds of limestone and chert in lower part. 480-560 feet

SHINARUMP MEMBER--sandstone, white to light-brown, fine- to coarse-grained; conglomeratic near base. 70-100 feet

MOENKOPI FORMATION--upper part: siltstone and shale, red to reddish-brown, micaceous and calcareous; contains a few very thin interbeds of pink to cream dolomite or limestone; sandy in lower part. About 1,000 feet

TIMPOWEAP MEMBER--dolomite and limestone, gray, cream, or tan, oolitic and crinoidal, in upper part; sandstone, medium- to coarse-grained, conglomeratic, in lower part; formation commonly shows brown oil stain. About 150-220 feet

KAIBAB LIMESTONE--dolomite, tan to light-brown, cherty, oil-stained. 120-230 feet

WHITE RIM SANDSTONE MEMBER OF CUTLER FORMATION--sandstone, white, fine- to medium-grained; contains thin interbeds of tan dolomite. 150-200 feet

TOROWEAP FORMATION--dolomite, anhydrite, and sandstone, interbedded; sandstone is gray to light brown and fine to medium grained; dolomite is light brown. 450 feet

CUTLER FORMATION

ORGAN ROCK MEMBER--sandstone and siltstone interbedded, light-gray to light-green. 45 feet

CEDAR MESA SANDSTONE MEMBER--sandstone, light-gray to tan, fine- to medium-grained; interbedded red siltstone in upper 250 feet. About 900 feet

HALGAITO TONGUE--dolomite and limestone, cream to tan, and white fine- to medium-grained sandstone, interbedded; limestone and dolomite contain algal structures. 345 feet

HERMOSA FORMATION--limestone, dolomite, and chert, white, cream, or tan; interbedded with gray to tan sandstone and siltstone and red and green shale. About 460 feet

MOLAS FORMATION--siltstone and shale, pink to red, calcareous; red medium- to coarse-grained sandstone at base. About 65 feet

REDWALL LIMESTONE--limestone and dolomite, white, cream, or light-gray; lowest formation penetrated by drilling in the area. About 900 feet

OURAY LIMESTONE--dolomite and limestone, light-brown and light-gray; possibly contains thin shale beds. About 150 feet

ELBERT FORMATION--dolomite and limestone, light-brown; may include thin shale and sandstone. About 300 feet

MUAV LIMESTONE--dolomite and limestone, gray to brown; may include shaly interbeds. About 900 feet

BRIGHT ANGEL SHALE--shale and siltstone, red, green, or gray; may include thin beds of limestone or dolomite. About 600 feet

TAPEATS SANDSTONE--sandstone, medium- to coarse-grained, feldspathic, probably conglomeratic. About 300 feet

~~Utah (Pine Lake quad). Geol. 1:24,000. 1972.~~
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