UNITED STATES
DEPARTMENT OF THE INTERIOR
J. A. KRUG, Secretary
GEOLOGICAL SURVEY
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CIRCULAR 16

LATE PALEOZOIC ROCKS EXPOSED IN THE DUCHESNE RIVER AREA, DUCHESNE COUNTY, UTAH

By

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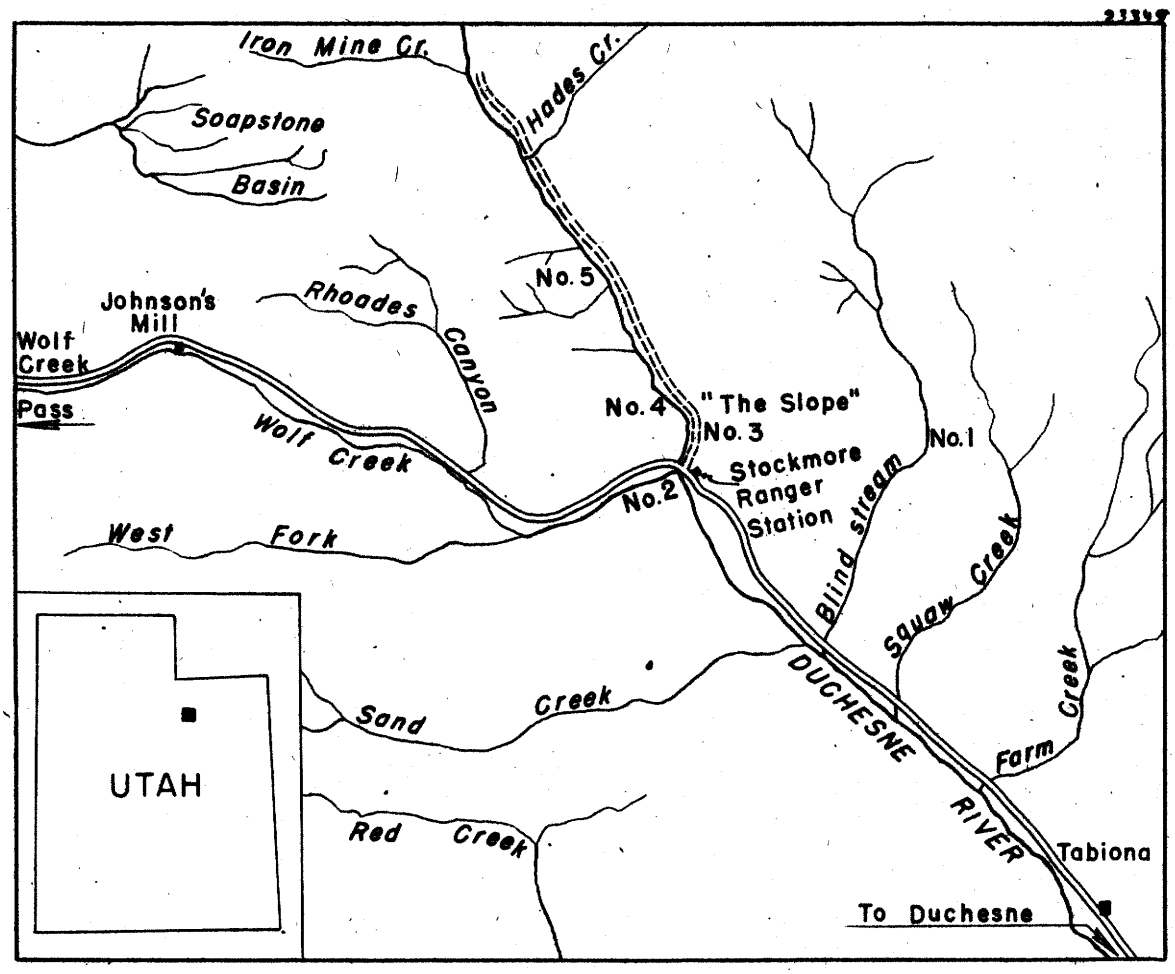
During 1945 two field parties of the U. S. Geological Survey investigated the stratigraphy and structure of the pre-Tertiary rocks on the south slope of the Uinta Mountains in northeastern Utah. The work was undertaken because of the increasing interest in the oil and gas possibilities of the Uinta Basin, which lies south of the Uinta Mountains. Geologic reports on these areas are in preparation but it seems advisable to present at this time a detailed section of the late Paleozoic rocks in the Duchesne River area.

The late Paleozoic rocks in the Duchesne River were first mapped and described by Berkey (1905, pp. 517-530), and his work was followed by the reports of Emmons (1907, pp. 287-302), and Weeks (1907, pp. 427-448), who recognized the same general sequence of rocks as Berkey described but disagreed regarding the thicknesses and correlations given by him. Detailed sections of the Permian and Carboniferous formations in the Duchesne River area are included in two recent articles by J. Stewart Williams (1939, p. 98; 1943, pp. 602-605).

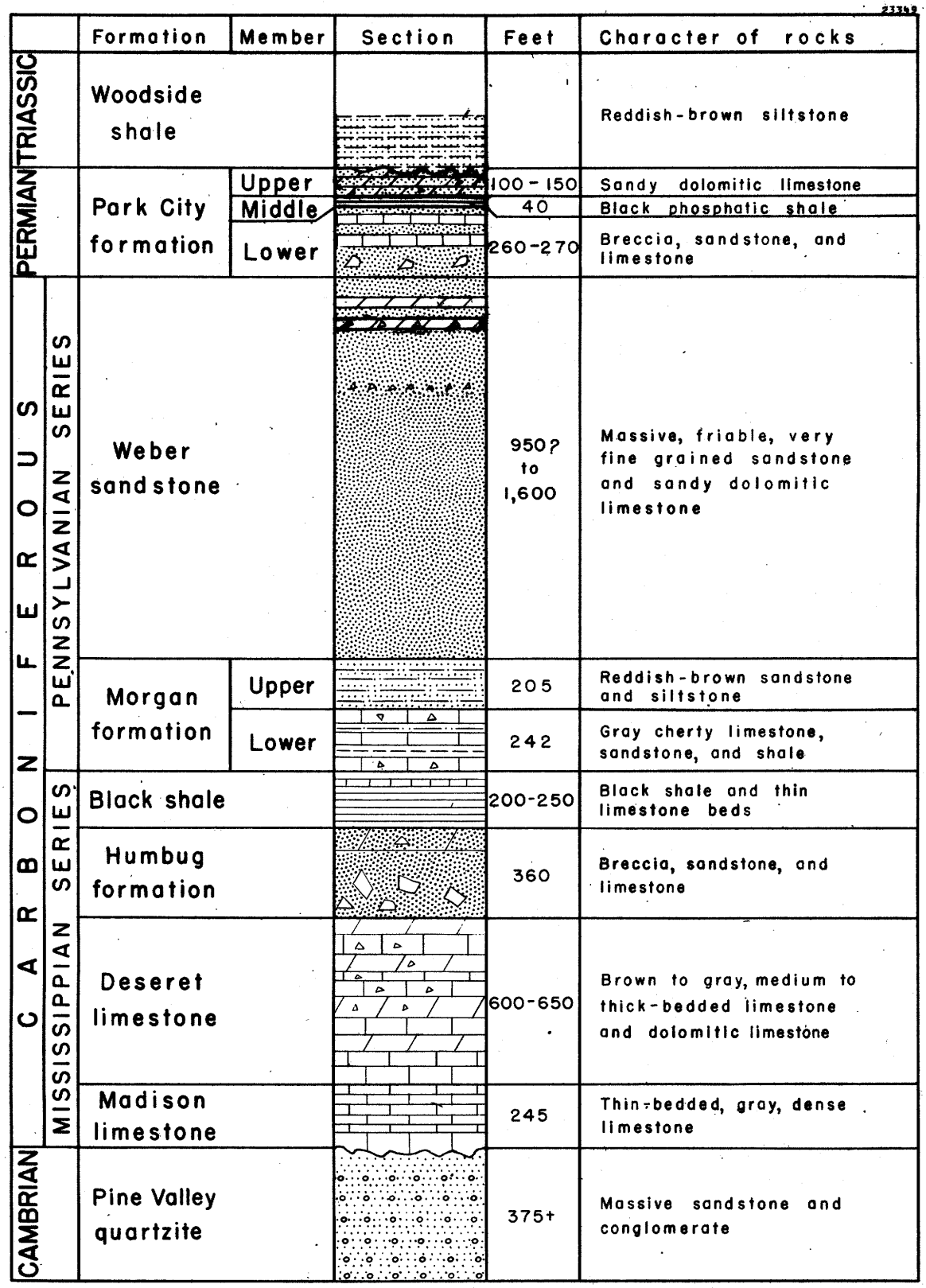
Late Paleozoic rocks are exposed in the canyon walls of Duchesne River and in tributary canyons, but only parts of the sequence are exposed at each place, and the section herein described is a composite of several outcrops. Because of the presence of numerous small faults a few of the thicknesses could not be accurately determined. The inadequate exposures of part of the sequence of rocks and the presence of the small faults probably explain most or all the differences in thickness of certain units between our section and sections previously published by others.

On the south flank of the Uinta Mountains the beds of late Paleozoic limestone rest with angular unconformity on beds of quartzite and shale correlated with the Pine Valley quartzite or, where this formation is absent, on the Ophir (?) shale of Cambrian age (Forrester, 1937, p. 638). The Madison limestone of Mississippian age is about 245 feet thick and consists mainly of thin-bedded, dark-gray fossiliferous limestone; the lower part of the formation, 36 feet thick, consists of massive beds of dolomitic and sandy limestone. Typical Madison limestone faunules were identified by James Steele Williams from beds that crop out along the North Fork of Duchesne River. A limestone formation about 600-650 feet thick, immediately overlying the Madison limestone, is herein tentatively correlated with the Deseret limestone of the



SKETCH MAP OF THE DUCHESNE RIVER AREA, UTAH
SHOWING THE LOCATION OF MEASURED SECTIONS

0 1 2 3 4 5 6 Miles



LATE PALEOZOIC ROCKS EXPOSED IN DUCHESNE RIVER AREA, UTAH

Wasatch (Baker, oral communication) and Oquirrh Mountains (Gilluly, 1932, pp. 25-26). These beds in the Duchesne River area were included in the Madison limestone in earlier reports. The formation is distinguished from the Madison limestone by its thicker bedding, brown color, greater number of beds of dolomitic limestones, and by the character of its coral fauna. The contact between the Madison and Deseret limestone, however, is not everywhere easily distinguishable. Fossils collected from the Deseret limestone were examined by James Steele Williams, who reported (personal communication) that though not definitely diagnostic, they probably are of post-Madison age, as is the Deseret.

A sequence of limestone and sandstone breccia about 360 feet thick overlies the Deseret limestone. Though no fossils were found in this formation, it is considered to be equivalent to the Humbug formation of the Wasatch and Oquirrh Mountains on the basis of similar lithologic character and stratigraphic position. The Humbug formation of the Oquirrh Mountains was correlated by Gilluly (1932, pp. 26-29) with part of the Brazer limestone of southeastern Idaho. Overlying the Humbug formation is a black shale unit about 200-250 feet thick, that may be equivalent to part of the Manning Canyon shale of the Wasatch (Baker, oral communication) and Oquirrh Mountains (Gilluly, 1932, pp. 31-34). The formation is partly exposed in mudflows and landslides along Duchesne River Canyon and is better exposed in Soapstone Basin and on the headwaters of Blind Stream. Fossils collected from the black shale and also from a limestone bed near the top of the formation are considered by James Steele Williams (personal communication) and Helen Duncan as of post-Madison Mississippian age, equivalent to part of the Brazer limestone.

The rocks in an interval, about 450 feet thick, immediately above the black shale, are assigned to the Morgan formation of the Pennsylvanian series and are divided into a lower limestone member and an upper sandstone member. The lower member, which is about 220 feet thick, is composed chiefly of limestone. The megafossils collected from the lower member while not diagnostic are considered probably of early Pennsylvanian age by James Steele Williams (personal communication). Thompson (1945, p. 24) also regards them as early Pennsylvanian in age. The upper member of the Morgan formation is about 205 feet thick and consists chiefly of sandstone. It is distinguished by its red-brown color, and the contact with the overlying Weber sandstone is gradational. No fossils were found in the upper member of the Morgan formation, but it is considered early Pennsylvanian in age.

The Weber sandstone was not satisfactorily measured in the Duchesne River area because the uppermost and lowermost parts of

the formation are poorly exposed and the beds are cut by many small faults. The thickness of the formation is probably about 1,500 to 1,600 feet in Rhoades Canyon, which is about 4 miles northwest of Stockmore Ranger Station; about 950 feet immediately west of Stockmore Ranger Station; and about 1,200 feet in the west wall of Duchesne River Canyon about 1½ miles north of Stockmore Ranger Station. The differences in the thickness measured at these places may be real or they may be due to faulting. The formation consists largely of very fine grained sandstone, but includes a few beds of limestone interbedded with the sandstone throughout the formation.

Three members of the Park City formation were recognized in the Duchesne River area; they are a lower member of sandstone and limestone breccia, a middle member of black phosphatic shale, and an upper member of dolomitic limestone. All three members are here indicated, for convenience, as Permian, although the lower part of the typical Park City formation is referred to the Pennsylvanian. The lower member is about 270 feet thick and consists largely of sandstone and limestone breccia, but includes some limestone beds. A few poorly preserved fossils that were collected from the lower member in sec. 11, T. 1 N., R. 9 W., about a mile northwest of Johnson's Mill, were considered not certainly diagnostic by James Steele Williams (personal communication), but were thought to resemble the local Permian facies more than any of the local Pennsylvanian facies. On Blind Stream the middle member of black phosphatic shale is 40 feet thick and the upper member of dolomitic limestone is 100-150 feet thick. The upper member is unconformably overlain by the Woodside shale of the Triassic system and variations in the thickness of the upper member appear to be the result of erosion prior to the deposition of the Woodside shale. The limestone, chert, and siltstone sequence, which is questionably referred to the Woodside shale in the section described below, may really belong in the upper member of the Park City formation.

SECTION OF PALEOZOIC ROCKS IN DUCHESNE RIVER AREA

	Thickness (feet)
TRIASSIC(?) SYSTEM	
Woodside shale (?)	
Measured along Forest Service trail up the east wall of Blind stream in sec. 14, T. 1 N., R. 8 W., about 8½ miles northwest of Tabiona, Utah. (Locality No. 1 on sketch map)	
Limestone and chert, loose blocks of gray limestone and sugary white chert capping the ridge	
Siltstone, calcareous, red-brown, laminated and thin bedded; thickness estimated	25.0
PERMIAN SYSTEM	
Park City formation	
Upper member	
Limestone and chert, brown, weathering light-brown; crystalline, sandy limestone containing abundant white and gray, dense, chert nodules and lenses	5.5
Sandstone, light gray, fine grained, calcareous, and thin bedded	1.0
Concealed	4.0
Limestone, dolomitic, light gray, weathering light-buff, thin bedded; contains considerable white chert in large masses.	10.0
Limestone, dolomitic; light gray, weathering light-buff; finely crystalline, thick bedded; contains many small chert nodules and geodes, silicified fossils, especially Ambocoelia and Dielasma which are abundant 5 to 15 feet above the base	39.0
Limestone, dolomitic; light-gray and greenish-gray, weathering buff to light-brown; finely crystalline, porous with calcite vugs; contains light-gray and brown, dense, chert nodules and fragments of phosphatic brachiopods, principally Orbiculoidea; bedding is thin, ranging in thickness from 0.3 to 1.0 foot	39.0

	Thickness (feet)
Siltstone, cherty, light-gray and brown, weathering yellow-brown, slightly calcareous; in thin irregular beds, contains abundant dense gray chert, black phosphatic oolites and pellets in thin beds and lenses	5.7
Total thickness of upper member	104.2
Middle member	
Shale, greenish-gray; contains streaks of black phosphatic pellets and oolites and gray limestone nodules	3.3
Limestone, light greenish-gray, weathering light yellow-brown, dense, thin wavy beds; contains some dense gray chert grading upward into the overlying shale	2.5
Shale, greenish-gray soft clay shale; contains streaks of black phosphatic oolites and a 0.7-foot bed of dense brown dolomitic limestone 3 feet below the top.	7.0
Limestone, dolomitic, cherty, dense; light gray-brown, weathering light-gray; contains very thin irregular beds and many dense gray chert nodules	4.5
Shale, black, hard, breaking to irregular chips, calcareous in part; contains many black geodes with a siliceous rind and calcite-filled cavity	16.5
Black shale and light-brown dense dolomitic limestone; contains some black phosphatic pellets and oolites .	2.5
Sandstone, dark-brown, weathering brown; fine to medium, subangular to subrounded grains, scattered pebbles of quartzite 4 to 8 mm. in diameter in the lower foot and black phosphatic nodules and pellets throughout; calcareous, massive, with numerous calcite vugs in the upper foot	4.5
Total thickness of middle member	40.8
Lower member	

	Thickness (feet)
Measured on the point southwest of Stockmore Ranger station at the junction of West Fork with the Duchesne River (Stockmore Ranger station is in the southeast corner of sec. 19, T. 1 N., R. 8 W.) (Locality No. 2 on sketch map)	
Sandstone, weathering buff, very fine grained, massive, calcareous, porous, with 10 feet of breccia at the base	33.0
Sandstone, white, weathering buff, very fine grained, calcareous, porous, thin bedded; contains dense white chert nodules and quartz geodes.	22.0
Limestone, cherty, light-gray, weathering medium-gray; dense to finely crystalline; silty and sandy in thin beds 0.2 to 0.5 foot thick; nodules and lenses of dense gray and white chert form about 30 percent of the rock	15.0
Limestone, sandy in the lower part; light-gray to dark-gray; dense, in beds less than 1 foot thick . .	10.0
Sandstone, gray, weathering brown, very fine grained, well cemented with calcite, thin bedded, breaking into blocks on weathering	27.5
Limestone, light-gray, coarsely crystalline at the base, becoming dense above; thin to medium beds, 1 to 3 feet thick, containing lenses and fingers of yellow-weathering sandstone breccia.	19.0
Sandstone breccia, weathering buff, very fine grained, porous; contains nets of calcite veins that weather in relief	9.0
Limestone, dolomitic, dark-gray and brown, dense; in beds 0.1 to 0.5 foot thick, and interbedded with buff-weathering sandstone	12.5
Sandstone, weathering buff, very fine grained, massive, with silty and calcareous lenses.	13.0
Siltstone and silty limestone, light-gray and dove-gray, weathering gray; dense to finely granular, medium bedded	8.0

	Thickness (feet)
Sandstone, gray, weathering buff; very fine, sub-rounded to rounded grains; brecciated in part, calcareous, massive. Weathering produces irregular rounded cavities	18.5
Limestone, dolomitic, medium- to dark-gray, weathering light-gray; dense, brecciated in places in beds 0.5 to 3 feet thick, containing lenses of gray to black dense chert.	11.0
Breccia, light yellow-buff; matrix silt and very fine sand containing scattered rounded medium grains and fragments of sandstone and gray blocks of limestone ranging from 0.1 to 3.0 feet in diameter; massive, calcareous, weathering produces irregular rounded cavities, arches and windows	27.0
Sandstone, light-yellow, weathering light-buff; very fine to medium grained, calcareous, porous and weak, massive with strong cross-bedding in places.	40.0
Sandstone breccia, weathering buff; silty, calcareous; contains fragments of sandstone and limestone averaging about 4 mm. in diameter. In sharp contact with underlying massive Weber sandstone and probably disconformable	3.0
Total thickness of lower member	268.5
Total thickness of Park City formation.	413.5

CARBONIFEROUS SYSTEM

Pennsylvanian series

Weber sandstone

Sandstone, gray to white, weathering gray; very fine grained, calcareous, massive, cross-bedded in the upper part with some dead oil in the pores	118.0
Limestone, slightly dolomitic, light-gray, weathering yellowish-gray; fine to medium grained, in thin beds 0.03 to 1.0 foot thick, silty in the upper part with abundant dense, gray chert nodules	14.0

	Thickness (feet)
Sandstone, light-gray, weathering gray; very fine grained with considerable dolomitic matrix, massive beds	22.5
Limestone, dolomitic, and sandy; light gray-brown, weathering gray; dense to finely granular, containing many very fine sand grains, abundant nodules of yellow, brown-weathering chert with a nucleus of dense gray chert in some nodules; in thin beds 0.3 to 2.0 feet thick	32.0
Sandstone, light-gray, weathering buff and gray; very fine grained, calcareous, silty in beds 1 to 3 feet thick; contains many joints; forms a slope	35.0
Sandstone, buff and white, weathering gray and buff; very fine grained; grains are mainly clear quartz with scattered pink and dark-colored grains; silty, slightly calcareous in massive beds 6 to 10 feet thick, thin breccia zone at the base in places and several small fracture zones; forms cliff	57.0
Sandstone, medium-gray, weathering buff; very fine grained, silty and calcareous; abundant elongate, dense gray chert nodules or lenses; the unit is massive with obscure thin to medium beds; unit is weak and forms a notch in the sandstone cliff. Contact with the overlying sandstone is sharp and wavy . . .	22.5
Sandstone, light-buff, weathering gray and buff; very fine grained, silty, slightly calcareous; in massive beds 6 to 10 feet thick, with small-scale cross-bedding, widely spaced joints; forms cliff	117.0
Sandstone, mainly light-gray to buff, weathering buff; very fine grained with silty beds; is principally friable sandstone, in part calcareous with few quartzose beds, massive, with considerable small-scale cross-bedding; contains some dolomitic limestone beds, and near the base reddish-brown sandstone, siltstone, and shale are interbedded with the buff sandstone. A detailed section of this unit was not measured . . .	1100.0±
Total thickness of Weber sandstone.	1500.0±

	Thickness (feet)
Morgan formation	
Upper member	
Measured at "The Slope" in the east wall of Duchesne River Canyon about one mile north of Stockmore Ranger Station. (Locality No. 3 on sketch map)	
Siltstone and very fine grained, cross-laminated sandstone, reddish-brown, weathering blocky	13.0
Sandstone, white, weathering yellow-buff; very fine grained, silty; ranges from laminae to massive beds 6 to 10 feet thick, one bed of red-brown, calcareous, silty mudstone 2.5 feet thick occurs 6 feet below the top	30.5
Mudstone, red-brown, calcareous, silty, weathering blocky	4.0
Siltstone and very fine grained sandstone; red-brown, yellow-brown and purple; calcareous with limestone nodules in places; massive, cliff forming, laminated in places with three prominent beds	25.0
Shale, red and gray with interbedded red-brown siltstone and limestone nodules; calcareous, thin beds 0.1 to 2.0 feet thick, slope forming, about 20 percent concealed	17.0
Siltstone and very fine grained sandstone, white, weathering light yellow-buff and reddish toward the top, calcareous with limestone nodules in the upper part, laminae to massive beds forming a cliff	25.0
Mudstone, red-brown, calcareous, blocky, about 50 percent concealed	8.4
Sandstone, conglomeratic, light-gray, weathering red and purple; very fine grained with small pebbles of limestone near the middle; contains dense gray and red chert stringers	4.5
Concealed, probably soft red shale	10.0
Sandstone, light-gray and brown, weathering red-brown and purple; very fine grained, very calcareous, massive, cross-bedded	7.0

	Thickness (feet)
90 percent concealed, red and gray shales with light-purple calcareous siltstone 3.6 feet thick 14 feet above the base	41.0
Limestone, gray, stained reddish-brown; dense, with wavy bands of silt	3.0
Sandstone, conglomeratic, gray, weathering red-brown; very fine grained, containing angular pebbles of limestone and red siltstone averaging 5 mm. in diameter near the top, quartzose and irregularly laminated	2.0
Mudstone and siltstone, dark to light purplish-red mudstones, weathering blocky, and purplish-red and brown mottled calcareous nodular siltstones	11.6
Sandstone, mottled brown and purple, very fine grained and quartzose	2.0
Total thickness of upper member	204.0
Lower member	
Limestone, light-gray, weathering gray, dense, massive, containing 15 percent dense vitreous red and white chert. Contact with overlying sandstone sharp, uneven, with 1 to 2 feet relief in horizontal distance of 4 feet produced by large masses of chert extending into the overlying sandstone, possibly disconformable . .	6.8
Eighty percent concealed; probably mainly white calcareous shale or marl containing limestone nodules near the top	13.0
Limestone, light-gray, weathering gray; medium crystalline; shaly in upper part, sandy in the basal 1 foot with 3 to 10 mm. limestone pebbles; massive; forms the top of the limestone cliff; contains fossils including: Spirifer, Composita, and fragments of other fossils .	5.6
Siltstone and very fine grained sandstone; gray and brown in the lower part, reddish-purple in the upper 2 feet; very calcareous; contains stringers of brown and white chert	5.2

	Thickness (feet)
Limestone, light-gray and brown, weathering gray; dense to finely crystalline, containing pseudo-oolites and fossil fragments in lower 10 feet; upper part massive, irregularly bedded with lenses of laminated siltstone and dense red and brown chert nodules . . .	17.0
Limestone, light-gray, weathering white; dense, partly brecciated, massive, weak, generally concealed . . .	8.3
Limestone, light-brown, weathering gray; dense, pseudo-oolitic; nodules and masses of dense, vitreous, brown and white chert parallel to bedding make up 10 to 20 percent of the rock. A green, very calcareous siltstone, 0.8 foot thick, occurs 3.5 feet above the base	7.5
Limestone, light-gray and brown, weathering gray; dense, sandy at the base; in beds 3 to 6 feet thick; forms scarp.	18.0
Sandstone and sandy limestone, gray and white, weathering gray and greenish-gray; very fine grained to silty; contains scattered white chert nodules near the base; beds 1 to 4 feet thick in the lower half of the unit, massive above. Chert brecciated in part and the top of the unit includes limestone fragments averaging 10 mm. in diameter and scattered large sand grains . . .	23.0
Limestone, light-gray below, becoming dark-gray above, weathering medium-gray; dense to finely crystalline, sandy near the base; massive; contains scattered fossils; and near the top scattered dense white chert nodules. The upper part has a slight petroliferous odor	9.4
Sandstone, white, weathering brown; very fine grained, calcareous, grading laterally into sandy limestone. .	6.5
Limestone, white to light-gray and brown, weathering gray; dense to finely crystalline, argillaceous in the upper and lower parts; in thin to thick beds containing a zone of brown and white dense chert nodules and masses near the top of a 6-foot bed; contains many fossils, including Derbya, Linoproductus, Dictyoclostus and Composita	13.3

	Thickness (feet)
Sandstone, calcareous, gray and brown, weathering a darker gray and brown; contains fine to very fine rounded quartz grains; gray beds, massive, knotty, containing much cement; brown beds 0.5 to 1.5 feet thick, very calcareous, but break across the grains .	10.0
Limestone, light-gray and brown, weathering gray and yellow-gray; dense to finely crystalline, argillaceous in the upper part; contains crinoid stems and other fossils. This limestone forms the base of the limestone cliff	20.0
Shale, about 20 percent concealed, gray with streaks of red; very calcareous; contains interbedded limestone and sandstone and zones of limestone nodules; many molds of ostracods occur in a zone near the top. Coarsely crystalline limestone 3.5 feet thick, 16 feet above the base contains many fossils including Derbya, Spirifer, Punctospirifer, and Composita . . .	47.0
Limestone and shale. Limestone, light-gray to brown, weathering gray to yellowish-gray; in beds 1 to 10 feet thick; dense to coarsely crystalline; contains many fossil fragments in places. Shale, light-gray to white, with streaks of red; very calcareous, in beds 0.5 to 3 feet thick, is a minor part of the unit	32.0
Total thickness lower member	242.6
Total thickness of Morgan formation	446.6

Mississippian series

Black shale unit

Concealed, due to slumping in Duchesne River Canyon. In the Blind Stream area and in Soapstone Basin this unit is exposed and includes 200 to 250 feet of soft black shale containing beds of fossiliferous limestone. Fossils from these beds were examined by Helen Duncan and James Steele Williams (personal communication) who consider them to be Brazer (Mississippian) in age	200.0+

	Thickness (feet)
Humbug formation	
Section measured in a gully on the west side of Duchesne River, about 1 mile north of the junction of North Fork with West Fork. (Locality No. 4 on sketch map)	
Sandstone, siltstone, and interbedded limestone. Very fine grained, calcareous, white sandstone, weathering yellow and grading upward into greenish-gray, shaly sandstone and siltstone. Thin beds of dense gray limestone in the basal 5 feet	17.0
Limestone, light to dark gray-brown; dense, brecciated, fractured, and cut by numerous calcite veins; in thin beds 0.1 to 2 feet thick. Grades into the overlying sandstone	30.0
Sandstone, white, weathering yellow; contains chiefly fine subrounded grains, very calcareous	2.5
Limestone, medium-gray, weathering dark-gray; dense to finely crystalline, brecciated in the lower part and silty in the upper part; contains numerous calcite veins; fractures into irregular blocks	6.6
Sandstone and limestone breccia, weak, friable white sandstone, weathering yellow; contains fine subrounded quartz grains and pink chert (?) grains; is mainly thin bedded but contains two 6-foot beds of sandstone, the upper one of which is cross-bedded. Thin beds of limestone and limestone breccias are interbedded with the sandstone and are most common in the upper part. The sandstone contains mealy white chert locally . .	46.0
Concealed	28.0
Limestone breccia, large blocks of massive limestone breccia slumped somewhat but probably nearly in place	22.0
Concealed	30.0
Limestone breccia, light gray-brown, weathering light-gray; matrix dense to finely crystalline limestone, with blocks of brown and gray limestone averaging about	

	Thickness (feet)
3 cm. in diameter; contains scattered fine to coarse rounded sand grains. The more sandy parts of the unit tend to weather yellow and calcite vugs are common .	100.0
Limestone, light-gray to gray-brown, weathering gray-brown; finely crystalline, sandy and brecciated in part, mainly in thin beds 0.2 to 0.4 foot thick, in part laminated, but one bed is 6 feet thick. The basal bed contains coarse rounded grains of dense limestone and quartz, and chert pebbles. Calcite vugs are common. The limestone grades laterally into very sandy breccia having limestone blocks 3 to 5 cm. in length. This unit forms a cliff in places but is concealed elsewhere. The contact with the underlying Deseret limestone apparently is disconformable . . .	77.0
Total thickness of Humbug formation	359.0

Deseret limestone

Section measured in the west wall of Duchesne River and in a canyon tributary to North Fork about 3 miles north of the junction with West Fork. (Locality No. 5 on sketch map)

Limestone, about 50 percent concealed, light to medium-brown, weathering gray-brown; finely crystalline, silty and dolomitic in some beds; beds, 0.3 to 3 feet thick, calcite vugs and a few gray and white banded chert nodules are present in the lower part and dark-gray chert nodules are present in the upper part . .	90.0
Limestone; lower half light to medium brown, weathering gray-brown; finely crystalline, with stringers and nodules of white, weathering gray, banded chert; upper half dark-gray, weathering gray, with yellow-brown chert nodules; mainly medium bedded, but beds up to 8 feet thick are present; scattered fossils are present throughout, including many partly silicified cup and colonial corals	100.0
Limestone, dark-gray and brown, weathering gray; dense to finely crystalline; contains a few fossils and in the upper 10 feet white and yellow-brown mealy chert intergrown with limestone	60.0
Limestone, light-gray to brown, weathering gray-brown; crinoidal in places; finely crystalline, sugary and	

	Thickness (feet)
porous; contains numerous large calcite vugs, and gray and white dense or mealy chert; mainly thin bedded, 0.3 to 1.0 foot thick, with an 11-foot bed at the top	40.0
Limestone, thin bedded, cherty; light- to dark-gray and brown, weathering gray; finely to coarsely crystalline, depending on the fossil content; some beds emit a petroliferous odor; chert abundant, making up 30 percent of the rock in the lower 20 to 30 feet and about 10 percent in the upper part, occurring in beds and irregular nodules cutting across the beds, mainly dense gray chert weathering gray, but some mealy chert is present in the upper 20 feet. Fossils common, including Spirifer, Linoproductus, and others	64.0
Limestone, cherty, dark-gray; finely crystalline; in thin beds less than 1 foot thick. Chert makes up about 15 percent of the rock and is mainly earthy, but black dense chert is present	18.0
Chert and limestone; about 75 percent of the rock is mealy white and gray chert intergrown with limestone and weathering white or light yellow-brown; limestone, dark-gray, silty, weathering brownish-gray, in thin beds ranging from 0.1 to 0.3 foot in thickness . . .	22.0
Limestone, light-gray to white, weathering gray; massive, coarsely crystalline; contains many fossils, including Spirifer	12.0
Limestone, dolomitic, light-brown, weathering medium-brown; massive, finely crystalline, porous; contains a few fossil molds	27.0
Limestone, light-gray; oolitic and fossiliferous . .	6.5
Limestone, dark-gray, weathering gray and brown; finely crystalline, contains coarsely crystalline lenses with fossils; in medium-thick beds 1 to 3 feet thick . . .	30.0
Limestone, dolomitic, light to medium brown, weathering gray to brown; finely crystalline, sugary, porous; contains calcite vugs; weathered surfaces show laminations due to variations in color and grain size; lower 60 feet is about 50 percent concealed and the beds are 1 to 4 feet thick; upper part is massive and forms a cliff. Colonial corals are common at several horizons	110.0

	Thickness (feet)
Limestone, light-gray or brown to dark-gray, weathering light-gray; finely to coarsely crystalline; in beds ranging from 1 to 3 feet thick; contains scattered nodules of mealy chert weathering white to buff and many colonial and cup corals that are partly silicified	25.0
Limestone, light- to dark-gray and brown; dense to coarsely crystalline varying with the fossil content; in beds averaging about 1 foot thick, but the unit appears massive in many outcrops, forming a prominent ledge and waterfall in the canyon in which this section was measured. Cup corals are numerous in the upper part of the unit	27.0
Total thickness of Deseret limestone	631.5

Madison limestone

Limestone, dark-gray and brown, weathering light-gray; dense to finely crystalline; contains lenses of coarsely crystalline limestone with an abundance of fossils; has scattered dense black chert nodules in the upper 20 feet; beds are thin, averaging about 0.3 foot in thickness, separated by yellow-weathering shaly partings and shale beds in the lower part; some of the beds have a petroliferous odor	210.0
Limestone, dark-gray to brown, weathering light-gray; coarsely crystalline; cross-bedded; grading to dense above; contains fossil fragments at the base; massive; forms a prominent ledge	26.0
Limestone, dolomitic, light-gray, weathering the same color; finely crystalline, massive; weathers back by vertical spalling and forms a notch beneath the overlying cliff-forming limestone	8.0
Limestone, dolomitic, light-gray, weathering gray-brown; finely crystalline, very sandy, mainly coarse; angular to rounded grains of quartz occur in laminae and scattered through the limestone. Grades into the overlying limestone	2.5
Total thickness of Madison limestone	246.5

Thickness
(feet)

CAMBRIAN(?) SYSTEM

Pine Valley quartzite

Sandstone, gray, greenish-gray and brown, weathering brown and red-brown; massive and cross-bedded in the lower part, thin bedded and silty in the upper part. Base concealed . . . . . 375.0+

0

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