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GEOLOGICAL SURVEY

Measured Sections in the Coal-Bearing Part of the  
Fort Union Formation near Baggs, Carbon County, Wyoming

By

James G. Honey

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This report is preliminary and has not been reviewed for conformity with  
U.S. Geological Survey editorial standards and stratigraphic nomenclature.

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## INTRODUCTION

The Fort Union Formation of Paleocene age is exposed in a roughly north-south strip along the eastern margin of the Washakie Basin, and southeast margin of the Great Divide Basin, Wyoming (see Welder and McGreevey, 1966, for outcrop pattern). South and west of Rawlins, Wyoming, the Fort Union contains two coal zones, one in the upper 600 feet and the other in the lower 1500 to 1900 feet of the formation (Sanders, 1974; 1975; Edson, 1979). These coal-bearing zones are separated by up to 1700 feet of non-coal-bearing rocks. The lower coal zone continues to the south into the Baggs area, but the upper coal zone disappears, probably because of facies changes. Consequently, in the Baggs area, only the lower half of the Fort Union Formation contains coal.

During the 1981 and 1982 field seasons, 43 sections were measured in the coal-bearing part of the Fort Union Formation east of Baggs, Wyoming. The sections were measured during the course of geologic mapping of Upper Cretaceous and Paleogene rocks, and are part of a study of the stratigraphy and coal resources of the Fort Union Formation in the Baggs area. The sections are located in the Peach Orchard Flat, Smiley Draw, and Dixon 7 1/2-minute quadrangles (figs. 1 and 2).

Prior to these investigations, little was known about the lateral extents and thicknesses of coal beds east of Baggs. Early work by Ball (1909) and Ball and Stebinger (1910), provided thicknesses and chemical analyses of four coal beds located northeast of Baggs in the Red Monument area. Swain (1957, unpublished masters thesis), measured two sections through the coal-bearing interval of the Fort Union Formation at Deep Creek and Cherokee Creek. In 1976, Strong (masters thesis in preparation) mapped selected coal outcrops east of Baggs, and measured and correlated four coal-bearing sections of the Fort Union Formation. Strong's data, as well as available subsurface data, were compiled by Dames and Moore (1979a, 1979b, 1979c) in a series of coal resource occurrence and coal development potential maps.

The columnar section (fig. 3) shows the relationship of the Fort Union Formation to overlying and underlying formations, and their approximate thicknesses, in the Baggs area. The total thicknesses of the Lewis Shale and the Cathedral Bluffs Tongue of the Wasatch Formation are not shown. The Upper Cretaceous marine Lewis Shale is overlain by the regressive deposits of the Fox Hills Formation, 160 to 200 feet thick, representing shallow marine, barrier, and beach environments of deposition (Gill, Merewether, and Cobban, 1970). The Upper Cretaceous Lance Formation is 1600 feet thick in True Oil Company, Robbers Gulch Well No. 1, in sec. 31, T. 14 N., R. 91 W. The Lance contains one or two thick coal beds, interpreted to be lagoonal in origin, in the bottom 100 feet of the formation. The upper part of the Lance has been examined at the outcrop in sec. 29, T. 15 N., R. 91 W. It is of fluvial origin and is composed of sandstone, siltstone, mudstone and carbonaceous shale. The top 270 feet of the formation is predominately sandstone and was probably deposited by braided streams.

The Fort Union Formation varies in thickness between 1400 and 1475 feet at the outcrop. The Fort Union is informally divided into a lower coal-bearing member and an upper, non-coal-bearing member. The base of the Fort Union contains a chert-pebble conglomerate, composed of varicolored pebbles up to 1 1/2 inches in diameter. It is 2 feet thick in sec. 29, T. 15 N., R. 91 W. This conglomerate forms a widespread marker unit, and was used as the base for several of the measured sections. The first coal bed occurs

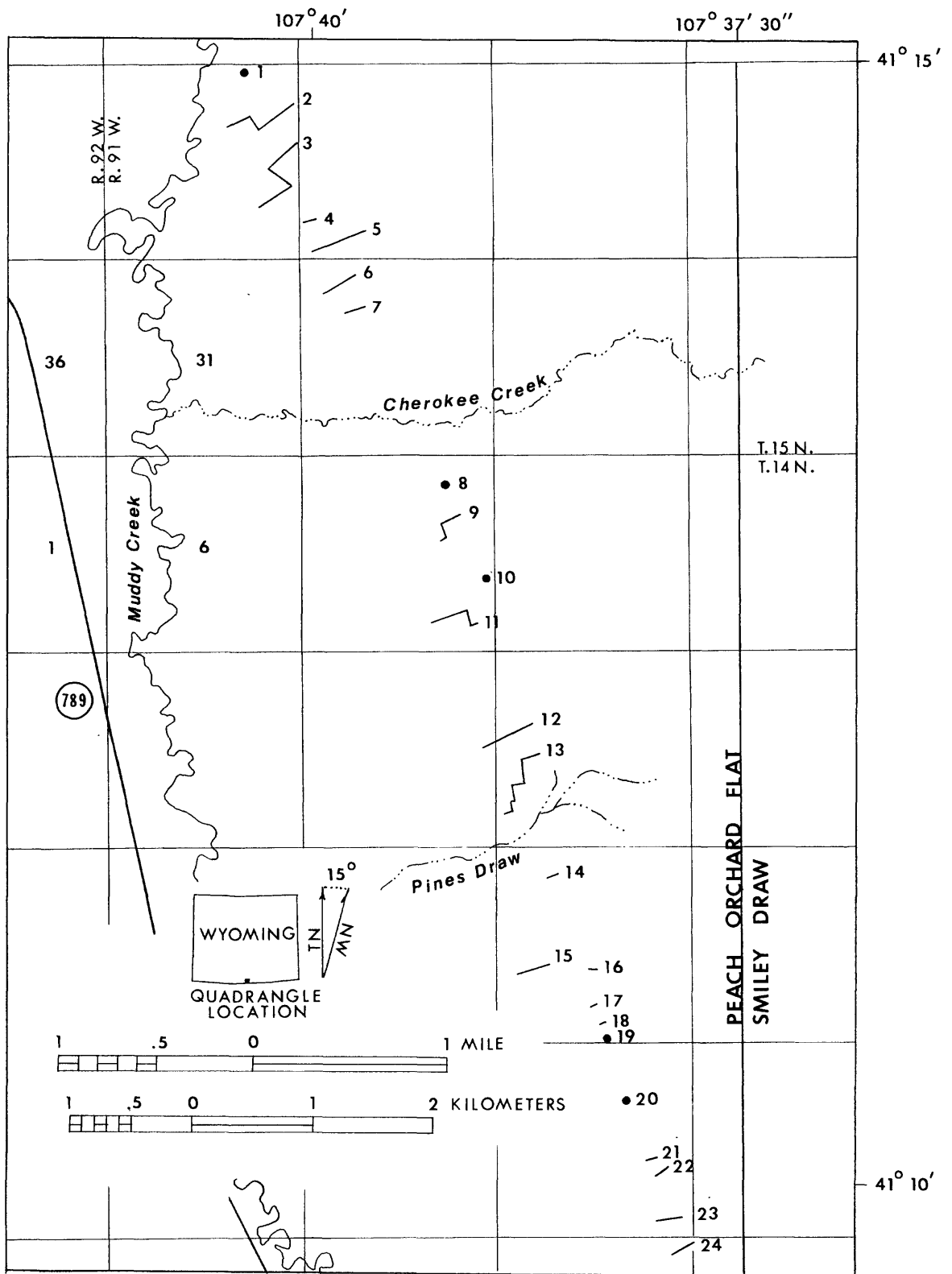


FIG. 1 INDEX MAP SHOWING LOCATIONS OF MEASURED SECTIONS 1 THROUGH 24

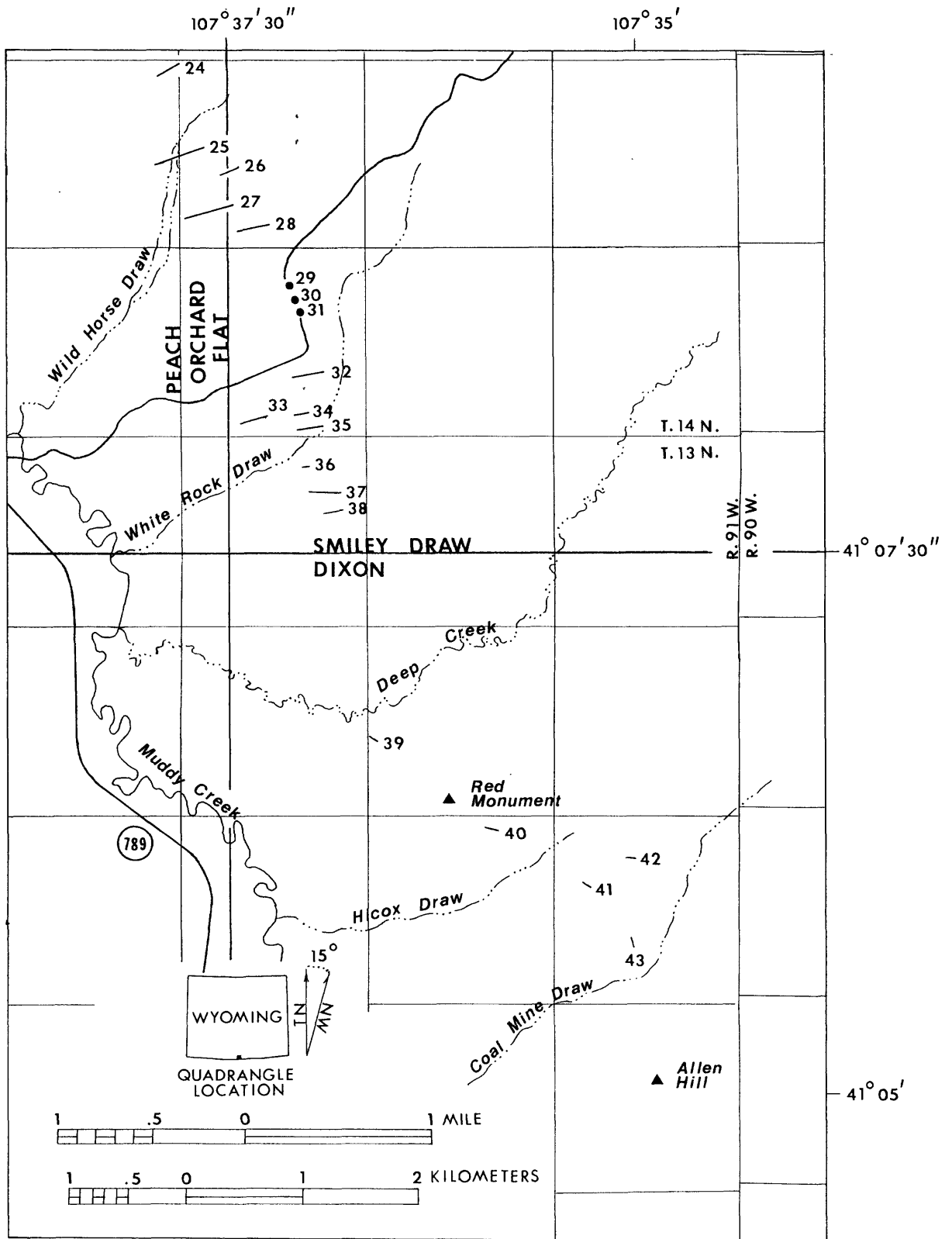
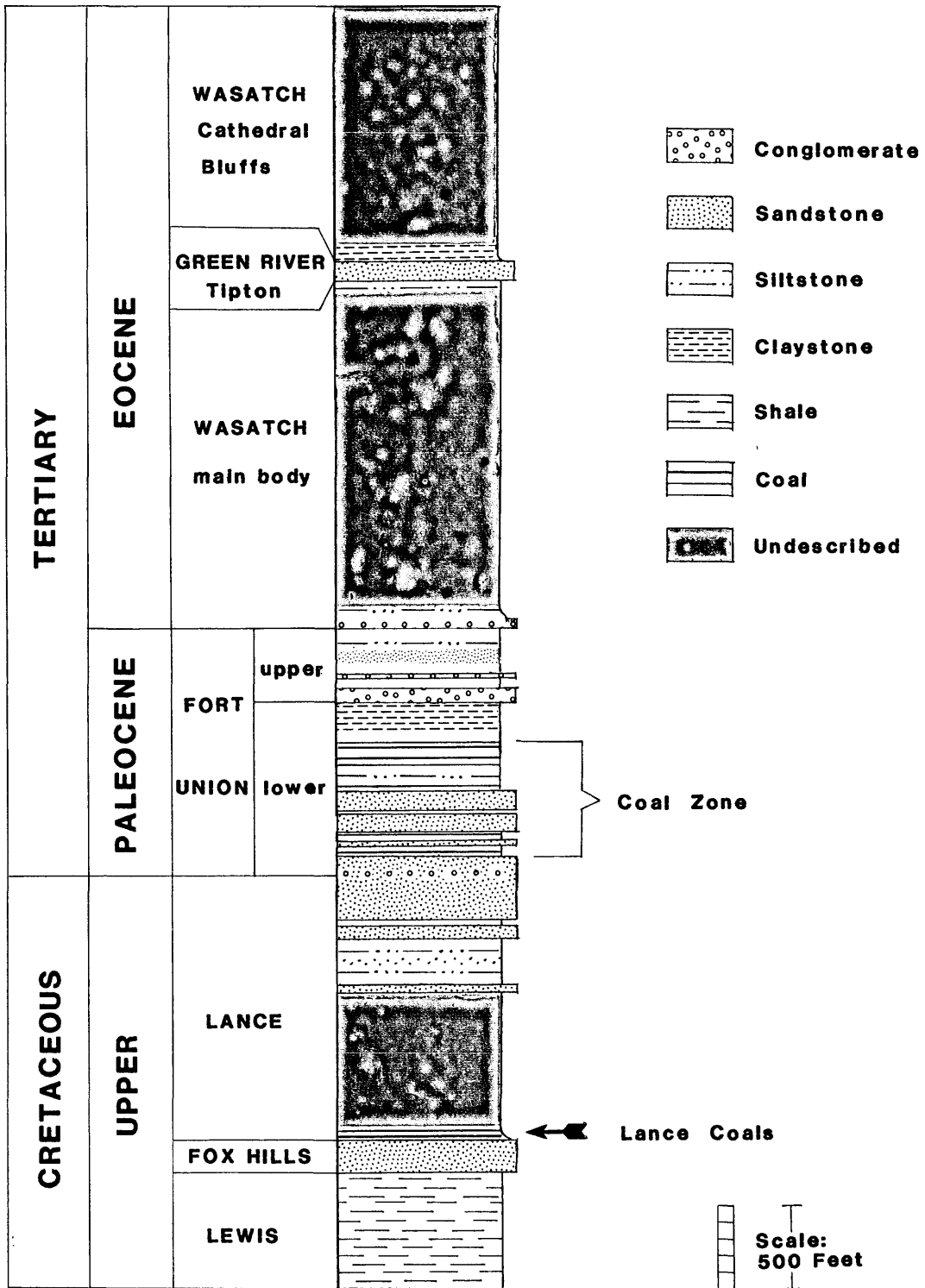


FIG. 2 INDEX MAP SHOWING LOCATIONS OF MEASURED SECTIONS 24 THROUGH 43



**FIG. 3 COLUMNAR SECTION OF SOME CRETACEOUS AND TERTIARY ROCK UNITS, BAGGS AREA, WYOMING**

from 72 to 150 feet above the chert-pebble conglomerate. The intervening sandstone may be in part reworked from sandstone at the top of the Lance Formation.

The thickness of the coal-bearing member, including the chert-pebble conglomerate and overlying sandstones, varies from 985 to 1050 feet. The upper 270 to 360 feet of the coal-bearing member lacks coal, but was probably deposited in the same depositional environment, associated with a meandering stream, as were the coals below. The upper non-coal-bearing member of the Fort Union Formation is from 415 to 465 feet thick, and is marked at the base by the appearance of chert-pebble conglomerate. This member is dominated by sandstones and siltstones, and was probably deposited by braided streams.

The Fort Union is overlain by the fluvial main body of the Wasatch Formation, which is approximately 2100 feet thick in True Oil Company, Robbers Gulch No. 1. The main body of the Wasatch is composed of variegated sandstones, siltstones and mudstones, and is locally conglomeratic in the lower part. The overlying Tipton Tongue of the Green River Formation is approximately 115 feet thick near Robbers Gulch No. 1. The Tipton Tongue is lacustrine in origin and is composed of sandstone and oil shale. Overlying the Tipton is the Cathedral Bluffs Tongue of the Wasatch Formation, of which only the lower part is exposed in the Peach Orchard Flat quadrangle. It is composed of light-gray sandstone and purple to red mudstone and siltstone.

Being on the eastern margin of the Washakie Basin, the rocks in the Baggs area all dip to the west. The steepest dips are found in the Fort Union Formation, and are between 20° and 40° in the Peach Orchard Flat and Smiley Draw quadrangles. Consequently, the Fort Union forms a narrow northwest to southeast trending outcrop pattern in these quadrangles. Only one east-west fault, of minor displacement, was observed to cut the Fort Union Formation in these two quadrangles. In the Dixon quadrangle the rocks of the Fort Union flatten out somewhat, but the structure is considerably complicated by east-west folding and high-angle faulting. South of Allen Hill, probable faulting displaces the coal-bearing member of the Fort Union to the east, where it is covered by Neogene and Quaternary deposits. The next outcrops of the coal-bearing member of the Fort Union are found south of the Little Snake River, near the Colorado state line.

The sections described herein were measured using a Jacobs staff and tape. In the field, measurements were taken in feet and inches. For the purposes of this report, these measurements were converted to feet and decimal fractions of a foot, and from that were converted to the metric system. The grain size of the sandstones was determined by visual inspection in the field, using a chart with the following subdivisions: lower and upper very fine grained, lower and upper fine grained, lower and upper medium grained, lower and upper coarse grained, and lower and upper very coarse grained. Where possible, specific coals and sandstones were traced laterally between outcrops, both on the ground and through the use of aerial photographs. The rock exposures are of variable quality, being much better in the Peach Orchard Flat and Smiley Draw quadrangles than in the Dixon quadrangle, where exposures are generally poor due to extensive cover by sage and grass. Consequently, coal sections are few and of relatively short length in this quadrangle. The thick coals in the Dixon quadrangle are also more extensively burned than their correlatives in the quadrangles to the north.

Coal beds in the study area appear to correlate with coals in drill holes and in sections measured by R. D. Hettinger, USGS, to the north in the Blue Gap 7 1/2-minute quadrangle. Hettinger's correlations were published by Dames and Moore (1979d). The coal bed nomenclature used by Dames and Moore (1979d)

in the Blue Gap (formerly Doty Mountain SW) quadrangle was proposed by Edson (1979) for coals found in the Seaverson Reservoir 7 1/2-minute quadrangle, 17 miles north of the Peach Orchard Flat quadrangle. Pending review of the coal correlations and nomenclature in the Blue Gap quadrangle, Edson's nomenclature is not used in this report, except in a few cases to clarify correlations with stratigraphic sections in the Blue Gap quadrangle.



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Section 1.--Section measured on west-facing slope of hill above Muddy Creek,  
Carbon Co, Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[NE1/4NW1/4NE1/4 sec. 30, T. 15 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
6. Sandstone, orange-brown, medium- to coarse-grained, locally concretionary; top of measured section-----	0.46	1.50
5. Mudstone, olive-gray to brown-----	0.75	2.46
4. Coal, sooty, banded-----	0.71	2.33
3. Mudstone, carbonaceous, dusky brown-----	0.36	1.17
2. Coal, banded; the coals of units 2 and 4 appear to correlate with the upper two coal beds of the Olson Draw coal zone in Urangesellschaft drill hole Cow 8-1 (Dames and Moore, 1979d, pl. 3)-----	0.75	2.46
1. Mudstone, carbonaceous, pale-brown; base of section; not measured-----	---	---
Total measured section---	<u>3.03</u>	<u>9.92</u>

Section 2.--Section measured on south side of hill, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[NE1/4 sec. 30, T. 15 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

42.	Covered interval; coal present in top several feet; coal correlates with unit 16 of section no. 3; top of measured section-----	4.94	16.20
41.	Sandstone, light-gray, fine-grained; top 0.5 to 1 ft forms resistant ledge-----	1.84	6.04
40.	Mudstone, carbonaceous, shaly, olive-brown-----	0.17	0.57
39.	Coal, attrital, banded, hard, with clay on some cleats and banding; correlates with the Muddy Creek coal bed in Urangesellschaft drill hole Cow 8-1 (Dames and Moore, 1979d, pl. 3)-----	0.45	1.48
38.	Mudstone, olive-gray to olive-brown; carbonaceous at top-----	3.68	12.08
37.	Interbedded yellowish-gray, fine-grained sandstone and medium-gray siltstone-----	8.35	27.40
36.	Covered interval; top 25 ft mainly sandstone-----	18.52	60.75
35.	Sandstone, light-gray, lower medium grained; in places forms concretions 10 ft long and 4 ft high; vertebrate fossil locality 80H1 at 15 to 20 ft above base-----	9.88	32.4
34.	Coal, attrital, sooty; highly weathered in top 1 ft; sharp irregular upper contact-----	0.77	2.53
33.	Mudstone, carbonaceous in part, olive-brown; 5 to 6 in. pale-brown clay at top-----	2.38	7.80
32.	Coal, attrital-----	0.14	0.47
31.	Mudstone, olive-brown to olive-gray; gradational top-----	0.94	3.07
30.	Coal, attrital, hard; impure in lowest 0.5 ft; units 30, 32, and 34 correlate with the Separation Creek coal bed in drill hole DM-9 (Dames and Moore, 1979d, pl. 3)-----	0.44	1.45
29.	Mudstone, olive-gray to brown; carbonaceous at top-----	4.61	15.11
28.	Sandstone, light-gray, fine-grained; locally forms prominent cliffs, where some sets of wedge planar cross-bedding seen; orange-brown calcareous concretions, 10 to 15 ft long and 2 to 3 ft high, locally weather out of sandstone; siltstone interbeds present in lowest 15 ft-----	34.14	112.0
27.	Mudstone, olive-brown; carbonaceous in part-----	1.23	4.05
26.	Interbedded siltstone and very fine grained sandstone, light- to medium-gray; 0.5 ft carbonaceous mudstone at base-----	4.69	15.39

Section 2.--Section measured on south side of hill, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

25.	Sandstone, orange-gray; lower fine to lower medium grained, locally calcareous; locally, concretions weather out which are 10 to 15 ft long and 3 to 4 ft high; concretions near the base of the unit are 2 to 3 ft in diameter-----	40.48	132.8
24.	Mudstone, olive-gray; oxidized in basal 0.5 ft-----	0.08	0.27
23.	Coal, sooty, highly weathered-----	0.37	1.22
22.	Mudstone, carbonaceous, dusky-brown-----	0.23	0.74
21.	Coal, attrital, sooty; highly weathered at top; units 21 and 23 correlate with units 2 and 4 of measured section 1-----	0.72	2.36
20.	Mudstone, carbonaceous, gray-brown to dusky-brown, hard-----	0.44	1.45
19.	Mudstone, olive-gray; dark-gray and shaly in lowest 0.5 ft-----	1.62	5.30
18.	Interbedded coaly carbonaceous mudstone and impure coal-----	0.27	0.88
17.	Interbedded siltstone and mudstone, olive-gray-----	2.88	9.44
16.	Interbedded impure coal and coaly carbonaceous mudstone-----	0.12	0.41
15.	Siltstone, medium-gray to olive-brown, grading up to mudstone-----	0.55	1.79
14.	Sandstone, silty, light-gray, fine-grained-----	0.25	0.81
13.	Interbedded mudstone and siltstone, olive-gray to pale-brown-----	0.39	1.28
12.	Sandstone, light-gray, fine-grained; sharp, irregular lower contact-----	0.23	0.74
11.	Coal, grading up to dusky-brown, carbonaceous mudstone in top 2 in.-----	0.12	0.41
10.	Mudstone, olive-gray to olive-brown; top 1 in. is carbonaceous-----	5.99	19.64
9.	Sandstone, light-gray, lower to upper medium grained, soft and poorly exposed; bottom 0.75 ft forms orange-brown resistant ledge-----	13.11	43.0
8.	Coal, attrital, sooty-----	0.55	1.82
7.	Mudstone, olive-gray to olive-brown; top few in. are shaly-----	1.03	3.38
6.	Sandstone, light-gray, very fine grained, silty and carbonaceous in part; scattered interbedded mudstone; base sharp and irregular-----	3.07	10.06
5.	Mudstone, carbonaceous, olive-brown to olive-gray-----	0.54	1.76

Section 2.--Section measured on south side of hill, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

4. Coal, attrital, sooty with sparse resin and vitrain; some clay on cleats and banding; correlates with Red Rim bed of Urangesellschaft drill hole Cow 8-1 (Dames and Moore, 1979d, pl. 3)-----	1.84	6.04
3. Mudstone, olive-brown and sandy in lower part, grading up to dusky-brown and carbonaceous in top 5 in.-----	0.62	2.03
2. Sandstone, silty, very fine grained; fines upward-----	0.74	2.43
1. Sandstone, light-gray; medium to lower coarse grained near top; sand is fine-grained in top 0.5 ft; section starts on top of chert-pebble conglomerate at base of Fort Union Formation; base of measured section-----	41.97	137.7
Total measured section---	<u>215.38</u>	<u>706.56</u>

Section 3.--Section measured across NW - SE trending series of ridges and valleys and from 1000 to 1700 ft SE of section no. 2, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[SE1/4NE1/4 and NE1/4SE1/4 sec. 30, T. 15 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
30. Sandstone, light-gray, with chert pebbles; not measured; top of measured section-----	---	---
29. Interval not described-----	81.38	267.0
28. Ironstone, concretionary, reddish-purple; calcite fracture fillings-----	0.23	0.75
27. Mudstone, olive-brown to medium-gray-----	0.97	3.17
26. Coal, banded, hard, with more abundant vitrain in upper 1.5 ft; impure in lower part; correlates with upper split of Fillmore Ranch bed in drill hole DM-9 (Dames and Moore, 1979d, pl. 3)-----	1.04	3.42
25. Interbedded mudstone, siltstone, and very fine grained sandstone; light- to medium-gray-----	1.14	3.75
24. Sandstone, orange-gray, fine-grained; forms ledge-----	0.30	1.0
23. Mudstone, olive-brown to medium-gray; dark-gray and carbonaceous in basal 0.33 ft-----	1.24	4.08
22. Coal, banded, sooty; some fusain present; luster increases toward base; correlates with lower split of Fillmore Ranch bed in drill hole DM-9 (Dames and Moore, 1979d, pl. 3)-----	2.57	8.42
21. Mudstone, gray to brown, sandy at top-----	1.73	5.67
20. Covered interval; mudstone in part-----	9.14	30.0
19. Sandstone, light-orange-gray, fine-to medium-grained; includes concretions as much as 10 ft long and 2 ft high-----	10.36	34.0
18. Mudstone, olive-brown-----	1.09	3.58
17. Sandstone, yellow-gray, medium-grained-----	0.30	1.0
16. Coal, banded, sooty; some fusain present; irregular upper contact; correlates with upper two beds of the Muddy Creek coal zone in drill hole DM-9 (Dames and Moore, 1979d, pl. 3)-----	2.36	7.75
15. Mudstone, olive-brown, carbonaceous in part-----	2.34	7.67
14. Sandstone, yellow-gray, fine-grained-----	1.23	4.05
13. Mudstone, olive-brown, carbonaceous, shaly-----	0.16	0.54
12. Coal, banded, hard; resin present; correlates with unit 39 of section no. 2-----	0.35	1.15
11. Mudstone, olive-gray; sandy in top 2 ft with 0.5 ft of fine-grained, dusky-brown carbonaceous sandstone at top-----	6.12	20.08

Section 3.--Section measured across NW - SE trending series of ridges and valleys and from 1000 to 1700 ft SE of section no. 2, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)--Continued

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation--continued		
10. Interbedded olive-gray mudstone and claystone and greenish-gray siltstone; 0.25 ft reddish-purple siltstone ledge at top; fossil turtle noted about 9 ft above base-----	5.27	17.28
9. Sandstone, light-gray, medium-grained; vertebrate fossils found 50 ft above base-----	22.22	72.9
8. Coal, highly weathered, soil-like-----	0.32	1.04
7. Mudstone, olive-gray to brown-----	2.10	6.89
6. Sandstone, light-gray, upper fine grained; exhibits ripple lamination and carbonaceous trash; silty laminae in top 1 ft-----	1.23	4.05
5. Interbedded carbonaceous mudstone and carbonaceous claystone; coaly in top 0.5 ft; olive-brown to dark-gray-----	0.49	1.62
4. Coal, banded, hard; units 4 through 8 correlate with units 30 through 34 of section no. 2-----	0.28	0.91
3. Mudstone, olive-gray to brown-----	5.08	16.67
2. Covered interval-----	7.41	24.3
1. Sandstone, not measured; base of measured section-----	---	---
Total measured section---	<u>168.45</u>	<u>552.74</u>

Section 4.--Section measured on west side of mesa and approximately 750 ft  
NW of section no. 5, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute  
quadrangle)

[NW1/4SW1/4SW1/4 sec. 29, T. 15 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
15. Sandstone; not measured; top of measured section-----	---	---
14. Interbedded pale-brown carbonaceous claystone and highly weathered coal; irregular upper contact---	0.61	2.0
13. Interbedded olive-gray to brown mudstone and yellowish-gray siltstone-----	3.40	11.17
12. Sandstone, orange-gray, very fine grained, resistant---	0.25	0.83
11. Mudstone, olive-gray to brown, grading upward to light- to medium-gray siltstone-----	2.13	7.0
10. Coal, banded, sooty; correlates with unit 22 of section no. 3-----	1.65	5.42
9. Partly covered interval; mostly olive-gray to brown mudstone with some tan siltstones near base-----	7.06	23.17
8. Sandstone, light-gray, fine-grained, friable; forms rounded slopes-----	13.4	44.0
7. Mudstone, dusky-brown, carbonaceous-----	0.05	0.17
6. Coal, banded, sooty; correlates with unit 16 of section no. 3-----	2.34	7.67
5. Claystone, olive-brown; carbonaceous at top-----	3.56	11.67
4. Interbedded siltstone and very fine grained sandstone; light-gray to yellow-orange-----	0.74	2.42
3. Mudstone, dusky-brown, carbonaceous-----	0.15	0.5
2. Coal, banded; correlates with unit 12 of section no. 3-----	0.71	2.33
1. Mudstone, olive-gray to olive-brown; base of measured section-----	2.62	8.58
Total measured section---	<u>38.67</u>	<u>126.93</u>



Section 5.--Section measured along south side of mesa, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)

[SE1/4SW1/4 and SW1/4SW1/4 sec. 29, T. 15 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

49.	Sandstone, reddish-brown, fine-grained, calcareous; top of measured section-----	0.30	1.0
48.	Interbedded olive-gray mudstone, light-gray siltstone and silty sandstone, and yellowish-gray very fine grained sandstone; local reddish-purple ironstone concretions-----	6.55	21.5
47.	Sandstone, light-gray, very fine to fine-grained; in part silty; lower 19 ft more silty, with a few sandy siltstone and mudstone interbeds 1 to 2 in. thick; upper 28 ft massive-----	14.47	47.46
46.	Claystone, olive to dusky-brown; carbonaceous, shaly---	0.80	2.63
45.	Mudstone, olive-gray, with minor siltstone; contains 2 to 3 in. ironstone layer 2.75 ft above base-----	2.26	7.42
44.	Sandstone, light-gray, fine-grained; calcareous in part; local cannonball concretions up to 5 ft in diameter; contains some mudstone in upper 5 ft-----	10.67	35.0
43.	Mudstone and siltstone; olive-gray; top 0.5 ft is dark-gray with abundant finely disseminated detrital coal-----	1.37	4.5
42.	Sandstone, light-gray to yellowish-orange, very fine grained; locally with 0.33 ft thick calcareous sandstone ledges; contains interbeds of siltstone and olive-gray mudstone -----	2.73	8.96
41.	Mudstone, olive-gray to brown-----	1.41	4.63
40.	Coal, banded, sooty; correlates with unit 10 of section no. 4-----	1.96	6.42
39.	Interbedded siltstone and very fine grained sandstone; light-gray; carbonaceous sandstone at top-----	0.90	2.96
38.	Mudstone, olive-gray to brown-----	2.51	8.25
37.	Ironstone, dusky-reddish-purple-----	0.20	0.67
36.	Interbedded sandstone, siltstone and mudstone; light- to olive-gray-----	3.20	10.5
35.	Sandstone, light-gray, medium-grained, friable; local concretionary masses 10 ft in diameter and 3 to 4 ft high; basal 1 ft contains 1 to 2 mm long mudstone clasts and coal clasts up to 5 cm long-----	9.68	31.75
34.	Coal, banded, sooty, contains some fusain; upper contact sharp and irregular; correlates with unit 6 of section no. 4-----	1.59	5.21
33.	Mudstone, olive-gray to brown; carbonaceous at top-----	1.14	3.75
32.	Interbedded mudstone and siltstone; yellowish-orange to olive-brown-----	3.93	12.88
31.	Interbedded siltstone and very fine grained sandstone; light-gray to yellowish-orange-----	0.20	0.67

Section 5.--Section measured along south side of mesa, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)--Continued

	Thickness (equivalents)	
	Meters	Feet
Fort Union Formation--continued		
30. Mudstone, carbonaceous, olive-brown, grading up to light-gray siltstone at top; leaf imprints at base of unit-----	0.30	1.0
29. Coal, banded, sooty, with scattered fusain; correlates with unit 2 of section no. 4-----	0.63	2.08
28. Sandstone, carbonaceous, pale-brown, fine-grained-----	0.19	0.63
27. Mudstone, olive-gray to olive-brown; silty at base; contains fossil plant roots parallel to bedding at top of unit-----	2.34	7.67
26. Sandstone, light-gray, fine-to medium-grained; local calcareous concretions up to 10 ft long and 2 ft high; locally with mud clasts 0.25 in. in diameter; vertebrate fossils locally present 20 ft above base of unit (crocodile, turtle, garpike, mammal; fossil site 80H2)-----	27.13	89.0
25. Mudstone, olive-brown to olive-gray; 1 ft thick light-gray, fine-grained sandstone 4 ft above base; 0.83 ft of highly weathered coal at top-----	3.91	12.83
24. Coal, banded, sooty; units 24 and 25 correlate with units 4 through 8 of section no. 3-----	0.56	1.83
23. Interbedded carbonaceous claystone and mudstone; olive-gray to dusky-brown-----	2.16	7.08
22. Mudstone, yellowish-orange-----	1.07	3.5
21. Claystone, olive-brown-----	3.76	12.33
20. Siltstone, hard, orange-brown-----	0.43	1.42
19. Mudstone, olive-brown to olive-gray-----	1.30	4.25
18. Sandstone, light-gray, fine-to medium-grained, locally calcareous, friable; local concretionary masses, up to 15 ft long and 3 ft high, calcareous, with penecontemporaneous deformation structures; local thin layers of olive-gray mudstone; vertebrate fossils (garpike, turtle, crocodile), present 40 to 50 ft above base-----	64.77	212.5
17. Coal, banded, sooty; irregular upper contact-----	0.66	2.17
16. Mudstone, olive-brown, carbonaceous; root impressions present-----	0.20	0.67
15. Coal, banded, sooty; units 15 through 17 correlate with units 21 through 23 of section no. 2-----	0.76	2.5
14. Siltstone, light-gray, grading up to olive-brown mudstone; abundant horizontal and inclined rootlets-----	0.71	2.33
13. Sandstone, light-gray, very fine grained, in part silty-----	1.52	5.0
12. Partly covered interval; some sandstone present-----	3.76	12.33

Section 5.--Section measured along south side of mesa, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)--Continued

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
<b>Fort Union Formation--continued</b>		
11. Sandstone, dark-reddish-brown, very fine grained-----	0.30	1.0
10. Interbedded siltstone and fine-grained silty sandstone; light- to olive-gray-----	1.22	4.0
9. Mudstone, pale-brown to dark-gray; carbonaceous in part-----	1.18	3.88
8. Interbedded siltstone and fine-grained sandstone; olive-to medium-gray-----	1.37	4.5
7. Mudstone, olive-gray; olive-to dusky-brown and carbonaceous in top 3.5 ft-----	8.48	27.83
6. Interbedded olive-gray mudstone and siltstone, and light-gray, fine-grained sandstone-----	3.99	13.08
5. Sandstone, light-gray, medium-grained; poorly sorted with some coarse grains in basal 2 ft; upper fine to lower medium grained at top-----	7.14	23.42
4. Claystone and mudstone; olive-gray-----	3.90	12.79
3. Coal, banded, sooty, weathered; irregular upper contact; correlates with unit 4 of section no. 2-----	1.01	3.33
2. Mudstone, gray to brown-----	4.57	15.0
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>215.19</u>	<u>706.11</u>

Section 6.--Section measured along top of east-west ridge and approximately  
1050 ft SE of section no. 5, Carbon Co., Wyoming (Peach  
Orchard Flat 7 1/2-minute quadrangle)

[NW1/4NW1/4 sec. 32, T. 15 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

25.	Interbedded very fine grained sandstone and siltstone; yellowish-gray; 2-4 in. reddish-purple ironstone ledge at top, underlain by 0.5 ft mudstone; forms dip slope; top of measured section-----	1.52	5.0
24.	Mudstone and claystone; olive-brown-----	3.05	10.0
23.	Siltstone, medium- to olive-gray, grading up to olive-brown mudstone; 0.5 ft ironstone layer at top-----	4.46	14.63
22.	Sandstone, light-gray, fine- to medium-grained; local lenses of mud pebbles, with clasts up to 2 in. diameter-----	22.40	73.5
21.	Covered interval; contains sandstone-----	6.10	20.0
20.	Sandstone, light-gray, fine- to medium-grained-----	9.14	30.0
19.	Mudstone, olive-brown; carbonaceous in basal 0.25 ft and coaly in top 1.17 ft-----	2.67	8.75
18.	Coal, banded, sooty, with clay on some cleats; correlates with unit 40 of section no. 5-----	2.57	8.42
17.	Interlaminated pale-brown carbonaceous sandstone and dusky-brown carbonaceous mudstone-----	0.10	0.33
16.	Siltstone, medium-gray, grading up to light gray fine- to medium-grained sandstone-----	0.79	2.58
15.	Interbedded olive-gray to olive-brown mudstone and medium-gray siltstone-----	3.05	10.0
14.	Sandstone, medium-gray, very fine-grained; silty in part; reddish-purple ironstone concretions, 1 ft in diameter, 9 ft above base-----	3.51	11.5
13.	Sandstone, light-gray, fine- to medium-grained, contains some trough cross-bedding-----	16.00	52.5
12.	Claystone, olive-gray; irregular upper contact-----	0.32	1.04
11.	Coal, banded, sooty; 0.5 in. sandstone parting 1.17 ft from top; correlates with unit 34 of section no. 5-----	1.58	5.17
10.	Claystone and mudstone; olive-gray to olive-brown; carbonaceous at top-----	4.14	13.58
9.	Coal, banded, sooty; contains some fusain and resin and sparse clay impurities; correlates with unit 29 of section no. 5-----	0.65	2.13
8.	Mudstone, olive-gray, with 1 ft of medium-gray siltstone and very fine grained sandstone 2 ft below top; root casts at top of unit in mudstone-----	1.88	6.17

Section 6.--Section measured along top of east-west ridge and approximately  
1050 ft SE of section no. 5, Carbon Co., Wyoming (Peach Orchard  
Flat 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

7. Interbedded sandy siltstone and very fine grained silty sandstone; medium-gray to yellowish-orange-----	2.05	6.71
6. Sandstone, light-gray, fine-grained; local large calcareous concretions present-----	27.18	89.17
5. Coal, banded, sooty; weathered in top 0.5 ft; irregular upper contact-----	0.84	2.75
4. Interbedded claystone and mudstone; olive-gray to olive-brown-----	2.69	8.83
3. Coal, banded, sooty, with mud on some cleats and impure in top 0.33 ft; units 3 through 5 correlate with units 24 and 25 of section no. 5-----	0.95	3.13
2. Mudstone, gray to brown, with some interbedded light-gray siltstone and sandstone in lowest 5.0 ft; coaly carbonaceous claystone in top 0.17 ft-----	4.40	14.42
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>122.04</u>	<u>400.31</u>

Section 7.--Section measured along top of east-west ridge and approximately  
850 feet SE of section no. 6, Carbon County, Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)

[NE 1/4 NW 1/4 and SW 1/4 NW 1/4 sec. 32, T. 15 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
16. Sandstone, light-gray; not measured; top of measured section-----	---	---
15. Mudstone, gray to brown; carbonaceous in top 2.25 ft---	4.42	14.5
14. Coal, banded, sooty; correlates with unit 18 of section no. 6-----	2.51	8.25
13. Interbedded mudstone and sandstone; carbonaceous sandstone at top-----	6.71	22.0
12. Sandstone, light-gray-----	14.33	47.0
11. Coal, sooty; sharp upper contact; correlates with unit 11 of section no. 6-----	1.54	5.04
10. Mudstone, olive-gray to brown; carbonaceous at top----	2.95	9.67
9. Coal, banded, sooty; sharp upper contact; correlates with unit 9 of section no. 6-----	0.71	2.33
8. Interbedded mudstone, siltstone and very fine grained sandstone; gray to brown; carbonaceous mudstone with plant fragments at top of unit-----	3.42	11.21
7. Sandstone, light-gray-----	22.48	73.75
6. Interbedded mudstone and claystone; carbonaceous in part; dark-gray to olive-brown-----	3.05	10.0
5. Coal, banded, sooty; correlates with unit 5 of section no. 6-----	1.37	4.5
4. Interbedded mudstone, siltstone, and medium- grained sandstone; gray to brown-----	3.51	11.5
3. Coal; correlates with unit 3 of section no. 6-----	0.59	1.92
2. Mudstone, gray to brown; sandy at base-----	4.98	16.33
1. Sandstone; not measured; base of measured section-----	---	---
Total measured section---	<u>72.57</u>	<u>238.0</u>

Section 8.--Section measured on west side of ridge near top, Carbon County, Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[SE1/4NW1/4NE1/4 sec. 5, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation (in part):

8. Sandstone; not measured; top of measured section-----	---	---
7. Shale, carbonaceous, olive-brown-----	0.18	0.58
6. Coal; impure-----	0.08	0.25
5. Shale, carbonaceous, olive-brown-----	0.10	0.33
4. Coal, soft-----	0.56	1.83
3. Coal, impure, and coaly carbonaceous mudstone-----	0.41	1.33
2. Coal; units 2 through 6 probably correlate with units 15 through 17 of section no. 5-----	0.81	2.67
1. Mudstone, carbonaceous, olive-brown; not measured; base of measured section-----	---	---
Total measured section---	<u>2.14</u>	<u>6.99</u>

Section 9.--Section measured on west-facing slope of ridge above north-south gully, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[NW1/4SE1/4NE1/4 and NE1/4SW1/4NE1/4 sec. 5, T. 14 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
32. Sandstone, yellowish-gray; not measured; top of measured section-----	---	---
31. Interbedded medium-to olive-gray claystone and mudstone; mudstone in part shaly-----	0.74	2.42
30. Claystone, silty, greenish-gray, with reddish-purple ironstone concretions-----	0.61	2.0
29. Interbedded medium-gray mudstone and olive-brown carbonaceous shale-----	1.37	4.5
28. Coal-----	0.79	2.58
27. Interbedded olive-brown carbonaceous mudstone and carbonaceous sandstone, with abundant fossil leaves--	1.37	4.5
26. Coal, impure in top 0.67 ft; units 26 through 28 probably correlate with units 3 through 5 of section no. 7-----	0.71	2.33
25. Mudstone, medium-gray; carbonaceous near top-----	1.52	5.0
24. Sandstone, yellow, fine-grained-----	8.23	27.0
23. Interbedded medium-to olive-gray mudstone and carbonaceous shale-----	0.71	2.33
22. Coal and carbonaceous shale-----	0.18	0.58
21. Mudstone, medium-gray, with olive-brown carbonaceous shale at top-----	0.81	2.67
20. Partly covered interval; appears to be dominantly sandstone-----	42.0	137.0
19. Sandstone, orange-gray; erosional base-----	0.13	0.42
18. Coal, soft; as much as 2 ft additional coal may have been eroded from top of unit by overlying sandstone; correlates with units 2 through 6 of section no. 8-----	1.24	4.08
17. Mudstone, carbonaceous, coaly-----	0.46	1.5
16. Coal, impure-----	0.23	0.75
15. Mudstone, carbonaceous, medium-gray; very clayey in top 1 ft-----	0.99	3.25
14. Sandstone, light-gray, in part silty-----	0.79	2.58
13. Mudstone, medium-gray-----	2.29	7.5
12. Ironstone, sandy-----	0.76	2.5
11. Mudstone, medium-gray-----	9.14	30.0
10. Sandstone, light-gray; erosional base-----	2.62	8.58
9. Claystone, carbonaceous, olive-brown-----	0.20	0.67
8. Coal-----	0.84	2.75
7. Interbedded medium-to olive-gray claystone and mudstone-----	1.32	4.33
6. Coal-----	0.43	1.42



Section 9.—Section measured on west-facing slope of ridge above north-south gully, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)—Continued

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
<b>Fort Union Formation--continued</b>		
5. Mudstone, medium-gray; olive-brown claystone at top----	1.65	5.42
4. Sandstone, light-gray; erosional base-----	0.81	2.67
3. Coal, impure; units 3 through 8 probably correlate with unit 3 of section no. 5-----	0.51	1.67
2. Mudstone, olive-brown-----	1.04	3.42
1. Sandstone, light-gray, mainly medium-grained; interval partly covered; base of measured section at top of chert-pebble conglomerate at base of Fort Union Formation; base of measured section----	26.5	87.0
Total measured section----	<u>111.99</u>	<u>363.42</u>

Section 10.--Section measured on east side of ridge near top, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[SE1/4NE1/4SE1/4 sec. 5, T. 14 N., R. 91 W.]

<u>Thickness</u>	
<u>(equivalents)</u>	
<u>Meters</u>	<u>Feet</u>

Fort Union Formation (in part):

6. Siltstone, medium-gray; gradational contact with unit 5; not measured; top measured section-----	---	---
5. Shale, carbonaceous, coaly, contains plant fragments---	0.18	0.58
4. Coal, soft; correlates with units 3 through 6 of section no. 9-----	0.84	2.75
3. Mudstone, olive-brown, carbonaceous; sandy in part; plant fragments and roots in upper part-----	0.61	2.0
2. Interbedded claystone, mudstone, and very fine grained sandstone-----	0.91	3.0
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>2.54</u>	<u>8.33</u>

Section 11.--Section measured along the north side of gully, Carbon County,  
Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[NW1/4SE1/4SE1/4 and NE1/4SW1/4SE1/4 sec. 5, T. 14 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
9. Sandstone, light-gray, fine-to medium-grained, contains chert pebbles and granules; not measured; top of measured section-----	---	---
8. Interval not described; measured from approximate base of covered coal bed-----	96.0	315.0
7. Interval not described; measured from base of covered coal laterally equivalent to unit 26 of section no. 9-----	75.0	245.0
6. Interval not described; sandstone at base-----	26.0	85.0
5. Coal, sooty-----	0.43	1.42
4. Mudstone, carbonaceous, olive-gray to olive-brown-----	0.56	1.83
3. Coal, sooty, and coaly carbonaceous mudstone-----	0.38	1.25
2. Mudstone, olive-gray-----	0.43	1.42
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>199.0</u>	<u>651.0</u>

Section 12.--Section measured along south side of hill, Carbon Co., Wyoming,  
(Peach Orchard Flat 7 1/2-minute quadrangle)

[SW1/4NW1/4 sec. 9, and SE1/4NE1/4 sec. 8, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

20. Mudstone, brown, sandy, carbonaceous; not measured; top of measured section-----	---	---
19. Coal, banded, sooty in part; correlates with unit 14 of section no. 7-----	1.69	5.54
18. Interval mostly covered; not described-----	83.82	275.0
17. Sandstone, light-gray-----	5.61	18.42
16. Coal, impure, highly weathered-----	0.48	1.58
15. Mudstone, olive-brown-----	0.61	2.0
14. Interval covered; appears to be mostly sandstone-----	14.63	48.0
13. Interbedded mudstone and fine-grained sandstone; weathers medium-gray-----	7.62	25.0
12. Covered interval; sandy in top 50 ft-----	32.61	107.0
11. Interbedded olive-gray mudstone and siltstone-----	4.37	14.33
10. Interbedded siltstone and fine-grained sandstone; light-gray-----	2.19	7.17
9. Mudstone, olive-brown to gray, grading up to siltstone-----	0.80	2.63
8. Coal, banded, sooty; 1 in. thick carbonaceous mudstone parting in middle-----	0.61	2.0
7. Mudstone, olive-gray to brown; carbonaceous at top-----	4.08	13.38
6. Sandstone, light-gray, upper fine to medium-grained; forms small knobs-----	7.44	24.42
5. Covered interval-----	15.24	50.0
4. Interval partly covered; appears to be mostly gray to brown mudstone, carbonaceous in basal 2 to 3 ft---	4.22	13.83
3. Coal, banded, sooty, with clay on some cleats and banding; probably correlates with units 6 through 8 of section no. 9-----	0.56	1.83
2. Mudstone, olive-gray to brown-----	3.90	12.79
1. Sandstone, light-gray; base of section on top of chert-pebble conglomerate at base of Fort Union Formation -----	<u>32.87</u>	<u>107.83</u>
Total measured section----	<u>223.35</u>	<u>732.75</u>

Section 13.--Section measured across a series of north-south trending ridges  
and gullies immediately north of Pines Draw, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)

[NW1/4SW1/4 and SW1/4SW1/4 sec. 9, T. 14 N., R. 91 W.]

	<u>Thickness</u> (equivalents)	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
25. Siltstone, dusky-purple, calcareous, forms dip slope; top of measured section-----	0.15	0.5
24. Mudstone, olive to dusky-brown; carbonaceous in part in bottom 9 ft; olive-to dark-gray in top 13 ft-----	6.73	22.08
23. Interbedded light-gray, fine-grained sandstone and olive-gray to brown mudstone and shaly mudstone-----	3.05	10.0
22. Limestone, dark-yellowish-orange-----	0.08	0.25
21. Interbedded siltstone and mudstone; shaly in top 7 ft-----	9.14	30.0
20. Sandstone, light-gray, fine-grained-----	0.30	1.0
19. Mudstone, carbonaceous in part, silty at top-----	1.07	3.5
18. Coal, banded, sooty, impure in top 1 ft; probably correlates with units 26 through 28 of section no. 9-----	0.88	2.88
17. Mudstone, olive-gray to brown-----	1.27	4.17
16. Interval covered-----	6.10	20.0
15. Sandstone, light-gray, fine-to medium-grained-----	12.80	42.0
14. Mudstone, olive to dusky-brown; carbonaceous in part, sandy at top-----	2.34	7.67
13. Covered interval; probably mostly sandstone-----	31.39	103.0
12. Partly covered interval; appears to be all sandstone, light-gray, medium-grained-----	18.29	60.0
11. Sandstone, orangish-gray, fine-grained-----	0.61	2.0
10. Mudstone, carbonaceous, olive-brown-----	1.83	6.0
9. Coal, sooty; probably correlates with unit 18 of section no. 9-----	3.05	10.0
8. Mudstone, gray to brown; 1 ft layer of reddish-brown ironstone concretions, 1 in. in diameter, 13 ft above base of unit-----	9.87	32.38
7. Sandstone, light-gray-----	1.83	6.0
6. Covered interval-----	7.81	25.63
5. Sandstone, light-gray, medium-grained; contains scattered mudstone clasts as much as 2 in. diameter; basal 20 ft forms flaggy dip slope-----	22.86	75.0
4. Mudstone, carbonaceous, dusky-brown, grading up to olive-gray siltstone-----	1.26	4.13
3. Coal, sooty, banded; correlates with unit 3 of section no. 12-----	0.71	2.33
2. Mudstone, gray to brown; carbonaceous at top-----	3.35	11.0
1. Sandstone, light gray; section starts at top of chert-pebble conglomerate at base of Fort Union Formation-----	32.0	105.0
Total measured section---	<u>178.77</u>	<u>586.52</u>

Section 14.--Section measured across north-south trending ridges and gullies  
on the south side of Pines Draw, Carbon Co., Wyoming (Peach  
Orchard Flat 7 1/2-minute quadrangle)

[SE1/4NW1/4NW1/4 and NW1/4SW1/4NW1/4 sec. 16, T. 14 N., R. 91 W.]

<u>Thickness</u>	
<u>(equivalents)</u>	
<u>Meters</u>	<u>Feet</u>

Fort Union Formation (in part):

6. Sandstone; not measured; top of measured section-----	---	---
5. Interbedded brown carbonaceous mudstone and carbonaceous shale-----	1.32	4.33
4. Coal, sooty, with carbonized wood fragments-----	2.41	7.92
3. Mudstone, carbonaceous-----	0.08	0.25
2. Coal, sooty, impure in part, with some fusain streaks present; units 2 through 4 correlate with unit 9 of section no. 13-----	0.97	3.17
1. Interval not described; section starts on top of light-gray sandstone-----	<u>24.89</u>	<u>81.67</u>
Total measured section---	<u>29.67</u>	<u>97.34</u>

Section 15.--Section measured in east-west gully, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)

[NW1/4NE1/4SW1/4 and NE1/4NW1/4SW1/4 sec. 16, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

8. Sandstone, light-gray, medium-to coarse-grained, contains granules of chert and feldspar; not measured; top of measured section-----	---	---
7. Interval not described-----	±85.0	±280.0
6. Coal, weathered; exact thickness uncertain; rests on olive-brown coaly carbonaceous shale at top of unit 5-----	1.04+	3.4+
5. Interval not described-----	45.4	149.0
4. Coal, sooty; overlain by light-gray, fine-grained silty sandstone at base of unit 5-----	0.18	0.58
3. Shale, carbonaceous, and coaly claystone-----	0.13	0.42
2. Coal, impure-----	0.13	0.42
1. Claystone, gray; not measured; base of measured section-----	---	---
Total measured section---	<u>±132</u>	<u>±434</u>

Section 16.--Section measured on east-facing slope of ridge, Carbon County Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[NE1/4NE1/4SW1/4 and NW1/4NW1/4SE1/4 sec. 16, T. 14 N., R. 91 W.]

	Thickness (equivalents)	
	Meters	Feet
17. Sandy soil covers outcrop to top of hill; top of measured section-----	4.57	15.0
Fort Union Formation (in part):		
16. Coal, attrital, sooty, with some woody texture; covered at top by slump, resulting in an incomplete thickness-----	2.86+	9.38+
15. Mudstone, carbonaceous, coaly, dusky-brown-----	0.53	1.75
14. Coal, attrital, sooty; abundant fusain in lowest 1 ft; impure in top 6 to 8 in.; units 14 through 16 correlate with units 2 through 4 of section no. 14---	1.01	3.33
13. Sandstone, light-gray, lower to upper fine grained; basal 0.5 ft and top 0.25 ft reddish-brown and resistant; ripple laminated in part; scattered carbonaceous siltstone laminae-----	5.51	18.08
12. Mudstone, olive-gray to olive-brown; carbonaceous and shaly at base-----	1.22	4.0
11. Coal, attrital, sooty, with clay on cleats; impure in basal 1.5 ft; probably correlates with unit 6 of section no. 18-----	1.52	5.0
10. Interval mostly covered; appears to be gray to brown mudstone; dark-gray shaly carbonaceous mudstone at base-----	4.33	14.21
9. Interbedded impure coal and coaly carbonaceous mudstone; correlates with units 9 and 10 of section no. 17-----	0.81	2.66
8. Interval partly covered; appears to be gray to brown mudstone with a 1 ft sandstone bed about 5 ft above base of unit-----	4.10	13.46
7. Coal, attrital, sooty-----	0.36	1.17
6. Mudstone, olive-gray to olive-brown; carbonaceous at top-----	1.31	4.29
5. Sandstone, reddish-brown, fine-grained, forms ledge----	0.30	1.0
4. Claystone and mudstone; olive-gray-----	1.58	5.17
3. Coal, attrital, sooty, contains fusain; clay on banding and cleats; 1.5 in. white clay parting 1 ft above base; correlates with unit 3 of section no. 17, and probably with unit 3 of section no. 13-----	0.99	3.25
2. Mudstone, olive-gray to dusky-brown; top 0.66 to 1.0 ft very carbonaceous-----	3.22	10.58
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>34.22±</u>	<u>112.33±</u>



Section 17.--Section measured on east-facing slope of ridge and approximately  
1000 ft south of section no. 16, Carbon Co., Wyoming (Peach  
Orchard Flat 7 1/2-minute quadrangle)

[NW1/4SW1/4SE1/4 and NE1/4SE1/4SW1/4 sec. 16, T. 14 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
11. Mudstone, olive-brown to olive-gray; carbonaceous in lowest 2.33 ft; top of measured section-----	3.05	10.0
10. Coal, attrital, sooty, with clay on some cleats and banding; gradational upper boundary-----	0.28	0.92
9. Interbedded coal and carbonaceous mudstone; units 9 and 10 correlate with unit 9 of section no. 16----	0.25	0.83
8. Mudstone, gray to brown; carbonaceous at base-----	3.63	11.92
7. Coal, attrital, sooty, with clay on some banding-----	0.47	1.54
6. Mudstone, olive-brown; carbonaceous at top-----	0.88	2.88
5. Interbedded olive-brown mudstone and reddish-brown sandstone; sandstone is fine-grained in part; 1 ft of sandstone, ripple laminated, forms ledge at top of interval-----	1.44	4.71
4. Mudstone, olive-gray to olive-brown; very carbonaceous in top 2 in.-----	2.26	7.42
3. Coal, attrital, sooty; scattered clay laminae up to 1 mm thick most abundant in basal 1 ft; correlates with unit 3 of section no. 16-----	0.99	3.25
2. Mudstone, carbonaceous, olive-gray to olive-brown; top 2 to 3 in. coaly-----	2.57	8.42
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	15.82	51.89

Section 18.--Section measured on east-facing slope of ridge and approximately 550 ft SE of section no. 17, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[SW1/4SW1/4SE1/4 sec. 16, T. 14 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
8. Covered interval; weathered coal in soil; not measured; top of measured section-----	---	---
7. Mudstone, carbonaceous, olive-brown-----	1.65	5.42
6. Coal, attrital, sooty; bottom 2 to 3 in. impure; probably correlates with unit 11 of section no. 16---	0.65	2.13
5. Claystone, carbonaceous, olive-brown-----	0.29	0.96
4. Coal, attrital, sooty; correlates with units 9 and 10 of section no. 17-----	0.67	2.21
3. Sandstone, olive-gray, grading up to brown mudstone----	3.61	11.83
2. Coal, attrital, sooty; correlates with unit 7 of section no. 17-----	0.51	1.66
1. Interval not described; starts on top of light-gray sandstone; base of measured section-----	<u>12.62</u>	<u>41.42</u>
Total measured section---	<u>20.00</u>	<u>65.63</u>

Section 19.--Section measured on east-facing slope of ridge and approximately  
300 ft SE of section 18, Carbon Co., Wyoming, (Peach Orchard Flat  
7 1/2-minute quadrangle)

[SW1/4SW1/4SE1/4 sec. 16, T. 14 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
15. Covered interval; includes coal and clinker; the coal correlates with units 14 through 16 of section no. 16; interval not measured; top of measured section-----	---	---
14. Mudstone, olive-gray to olive-brown-----	1.52	5.0
13. Coal, attrital, sooty; soil-like in part; correlates with unit 4 of section no. 18-----	0.56	1.83
12. Mudstone, carbonaceous, olive-gray to olive-brown; yellowish-brown and clayey at top-----	2.44	8.0
11. Sandstone, reddish-brown, fine-grained, concretionary-----	0.61	2.0
10. Mudstone, olive-gray to olive-brown-----	0.99	3.25
9. Coal, attrital, sooty; sharp upper contact; probably correlates with unit 2 of section no. 18-----	0.19	0.63
8. Mudstone, brown, sandy at base, carbonaceous at top-----	0.10	0.33
7. Sandstone, light-gray, fine-grained-----	0.66	2.17
6. Mudstone, olive-gray-----	3.33	10.92
5. Coal, attrital, banded, contains mud laminae up to 1 mm, increasing in abundance toward top of unit; gradational at top-----	0.30	1.0
4. Mudstone, carbonaceous, dusky-brown-----	0.05	0.17
3. Coal, attrital, with clay on some banding; units 3 through 5 correlate with unit 3 of section no. 17----	0.90	2.96
2. Siltstone, sandy, medium-gray, grading up to olive-gray mudstone-----	5.25	17.21
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section----	<u>16.90</u>	<u>55.47</u>

Section 20.--Section measured on east-facing slope of ridge, approximately  
400 ft west of pond, Carbon Co., Wyoming (Peach Orchard Flat  
7 1/2-minute quadrangle)

[NE1/4SW1/4NE1/4 sec. 21, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

7. Coal, attrital, sooty; covered by slump at top; probably correlates with unit 15 of section no. 19; top of measured section-----	0.91+	3.0+
6. Mudstone, olive-gray; plant fragments in top 0.5 ft----	1.75	5.75
5. Coal, attrital, sooty; impure in top 1 ft; correlates with unit 13 of section no. 19-----	1.52	5.0
4. Mudstone, olive-gray to olive-brown-----	1.88	6.17
3. Partly covered interval; contains sandstone in part; 1 ft thick sandstone ledge at top-----	5.46	17.92
2. Coal, attrital, sooty; correlates with units 3 through 5 of section no. 19-----	0.59	1.92
1. Mudstone, gray to brown; base of section on top of light-gray sandstone-----	2.96	9.71
Total measured section---	<u>15.07±</u>	<u>49.47±</u>

Section 21.--Section measured along north side of hill and approximately  
450 feet NW of section no. 22, Carbon Co., Wyoming (Peach  
Orchard Flat 7 1/2-minute quadrangle)

[NW1/4NE1/4SE1/4 sec. 21, T. 14 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
11. Sandstone, reddish-brown, concretionary; forms dip slope; top of measured section-----	0.15	0.5
10. Mudstone, olive-brown to olive-gray-----	1.44	4.71
9. Interbedded coal and coaly carbonaceous mudstone-----	0.33	1.08
8. Interval partly covered; olive-brown carbonaceous mudstone in upper part-----	2.16	7.08
7. Sandstone, reddish-brown, concretionary-----	0.30	1.0
6. Mudstone, brownish-gray to olive-brown, grading up to siltstone-----	1.07	3.5
5. Coal, banded, sooty, with clay on some cleats; top 1 in. impure-----	0.28	0.92
4. Mudstone, olive-gray to olive-brown; 0.25 ft of fine-grained sandstone 2.75 ft above base-----	1.12	3.67
3. Coal, banded, sooty; units 3 through 5 correlate with unit 2 of section no. 20-----	0.56	1.83
2. Mudstone, gray to brown-----	2.22	7.29
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>9.63</u>	<u>31.58</u>

Section 22.--Section measured along top of hill east of gully, Carbon Co.,  
Wyoming, (Peach Orchard Flat 7 1/2-minute quadrangle)

[SW1/4NE1/4SE1/4 sec. 21, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation (in part):

10. Mudstone, medium-gray; locally the mudstone is tan and hard or oxidized orange-red and soil-like in texture; sandstone ledge caps interval; top of measured section-----	3.05	10.0
9. Impure coal and coaly carbonaceous mudstone; clay on cleats and banding; top 4 to 6 in. soil-like and oxidized-----	0.61	2.0
8. Claystone, olive-brown-----	0.12	0.38
7. Coal, banded, attrital, soft; sparse clay; units 7 through 9 probably correlate with units 5 through 7 of section no. 20-----	0.77	2.54
6. Mudstone, olive-gray to olive-brown-----	1.91	6.25
5. Covered interval-----	5.55	18.21
4. Interbedded gray to brown mudstone and light-gray sandstone; 0.5 ft sandstone ledge at top; carbonaceous mudstone at base-----	2.13	7.0
3. Coal, attrital, banded; probably correlates with units 3 through 5 of section no. 21-----	0.43	1.42
2. Mudstone, gray to brown; carbonaceous at top-----	2.55	8.38
1. Sandstone, light-gray; section starts on chert-pebble conglomerate at base of Fort Union Formation-----	31.57	103.58
Total measured section---	<u>48.69</u>	<u>159.76</u>

Section 23.--Section measured along east-west ridge, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)

[SE1/4SE1/4SE1/4 and SW1/4SE1/4SE1/4 sec. 21, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation (in part):

38.	Sandstone, light-gray; forms dip slope; top of measured section-----	0.91	3.0
37.	Mudstone, olive-brown to gray; carbonaceous in lowest 27.5 ft; 0.5 ft dusky-reddish-purple concretion zone 27.5 ft above base; 0.5 ft coal about 15 ft below top-----	17.98	59.0
36.	Coal, attrital, sooty; contains some fusain; clay on cleats-----	0.56	1.83
35.	Mudstone, olive-gray to olive-brown-----	3.40	11.17
34.	Coal, attrital, impure-----	0.25	0.83
33.	Mudstone, carbonaceous, shaly, olive-brown-----	0.42	1.37
32.	Interbedded olive-gray to olive-brown mudstone and sandstone-----	2.11	6.92
31.	Sandstone, reddish-brown, calcareous, fine-grained, concretionary-----	1.07	3.5
30.	Mudstone, carbonaceous, dusky to olive-brown-----	0.46	1.5
29.	Coal, attrital, sooty-----	0.46	1.5
28.	Mudstone, olive-gray to olive-brown-----	3.66	12.0
27.	Sandstone, light-gray, lower fine grained; channels into underlying claystone-----	0.95	3.13
26.	Claystone, carbonaceous, shaly, olive-brown-----	0.20	0.67
25.	Coal, attrital, sooty, with some fusain; correlates with unit 32 of section no. 24-----	0.56	1.83
24.	Mudstone, carbonaceous; olive-brown to dusky-brown at top-----	0.86	2.83
23.	Sandstone, light-gray; upper fine to lower medium grained; generally soft and forms rounded slopes; locally forms concretionary masses up to 4 ft diameter and 1 ft thick; local concentrations of light-yellowish-gray spherical concretions up to 4 in. diameter-----	22.10	72.5
22.	Coal, attrital, sooty; probably correlates with unit 16 of section no. 16-----	2.63	8.63
21.	Mudstone, carbonaceous, coaly, dusky-brown-----	0.23	0.75
20.	Coal, attrital, sooty; impure in part; probably correlates with unit 14 of section no. 16-----	0.89	2.92
19.	Interbedded light-gray sandstone and olive-brown mudstone; base of unit is sandstone; top of unit is brown carbonaceous mudstone-----	7.35	24.13
18.	Coal, attrital, sooty; impure in basal 1 ft-----	2.67	8.75
17.	Interbedded olive-brown mudstone and light-gray carbonaceous sandstone; lower 3 ft of interval is mainly sandstone with sharp basal contact-----	1.45	4.75

Section 23.--Section measured along east-west ridge, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

16. Coal; 1 to 2 in. dark-gray carbonaceous mudstone parting in middle; units 16 through 18 correlate with units 15 through 19 of section no. 24-----	0.99	3.25
15. Mudstone, olive-gray to olive-brown-----	1.88	6.17
14. Sandstone, light-gray, fine-grained; dusky-reddish-brown concretions in top 8 to 10 in.-----	1.24	4.08
13. Mudstone, olive-gray to olive-brown-----	1.00	3.29
12. Coal, attrital-----	0.25	0.83
11. Mudstone, olive-gray grading up to light-brown-----	0.25	0.83
10. Sandstone, light-gray, fine-grained-----	1.16	3.79
9. Partly covered interval; appears to be mostly sandstone-----	1.52	5.0
8. Mudstone, olive-gray to olive-brown-----	0.79	2.58
7. Coal, attrital, banded-----	0.16	0.54
6. Mudstone, olive-gray to olive-brown-----	0.57	1.88
5. Sandstone, silty, light-gray, fine-grained-----	0.66	2.17
4. Mudstone, olive-gray to olive-brown-----	0.46	1.5
3. Coal, attrital, sooty, banded; correlates with unit 3 of section no. 22-----	0.48	1.58
2. Mudstone, olive-brown; carbonaceous in top several inches-----	0.88	2.88
1. Partly covered dip slope of sandstone; base of measured section-----	1.52	5.0
Total measured section---	<u>84.98</u>	<u>278.88</u>



Section 24.--Section measured across top of hill, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)

[NE1/4NE1/4NE1/4 sec. 28, T. 14 N. R. 91 W.]

Thickness  
(equivalents)  
Meters Feet

Fort Union Formation (in part):

35. Shale, carbonaceous, olive-brown; top of measured section-----	0.15	0.5
34. Coal, impure-----	0.23	0.75
33. Interval not described-----	16.76±	55.0±
32. Coal, soft, weathered; more impure at base; correlates with unit 25 of section no. 23; may correlate with unit 3 of section no. 25-----	0.56	1.83
31. Interval not described-----	3.35	11.0
30. Coaly mudstone and coaly carbonaceous shale-----	0.25	0.83
29. Interval not described-----	3.66	12.0
28. Coal; impure in part-----	0.53	1.75
27. Interval not described-----	3.86	12.67
26. Coal, sooty; impure at base-----	0.56	1.83
25. Interval not described-----	23.47±	77.0±
24. Sandstone, light-gray, lower fine grained, ripple laminated; caps ridge-----	1.01	3.33
23. Mudstone, carbonaceous, dusky-brown to dark-gray, shaly in part-----	0.53	1.75
22. Mudstone, orange, oxidized, soft and soil-like-----	0.51	1.67
21. Siltstone, greenish-gray, grading to light-gray, fine-grained sandstone in top 8 ft-----	4.50	14.77
20. Mudstone, yellowish-gray, hard; 0.5 ft reddish-brown concretion zone at top-----	0.71	2.33
19. Coal, attrital, sooty, burned in part; 2 to 3 in. reddish zone at top-----	0.95	3.13
18. Mudstone, olive-gray to olive-brown-----	0.88	2.88
17. Coal, attrital, with mud on cleats; some fusain-----	0.73	2.38
16. Mudstone, carbonaceous, coaly, dark-gray-----	0.36	1.17
15. Coal, attrital, sooty; mud on cleats and very impure in lowest 2 to 3 in.; units 15 through 19 probably correlate with units 16 through 18 of section no. 23-----	0.43	1.42
14. Mudstone, olive-gray to olive-brown-----	1.51	4.96
13. Sandstone, light-gray; 3 to 4 in. dusky- reddish-brown concretion zone at top-----	0.91	3.0
12. Mudstone, olive-brown grading up to olive-gray; upper contact with sandstone gradational-----	1.65	5.42
11. Coal, attrital, with mud on cleats-----	0.23	0.75
10. Mudstone, olive-brown-----	0.15	0.5
9. Sandstone, light-gray, lower medium grained; grades into overlying mudstone-----	1.93	6.33
8. Mudstone, olive-gray; silty in top 0.5 ft-----	1.30	4.25

Section 24.—Section measured across top of hill, Carbon Co., Wyoming  
(Peach Orchard Flat 7 1/2-minute quadrangle)—Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

7. Coal, attrital, sooty, with woody texture; clay on cleats-----	0.28	0.92
6. Siltstone, light-gray, grading up to olive-gray to olive-brown mudstone-----	1.38	4.54
5. Sandstone, light-gray, very fine grained; reddish-brown concretions in top 0.5 ft-----	0.61	2.0
4. Mudstone and siltstone, olive-gray-----	0.73	2.38
3. Coal, attrital, sooty; some vitrain near base; impure in top 0.33 ft; correlates with unit 3 of section no. 23-----	0.65	2.13
2. Mudstone, olive-brown; top 0.5 ft is dusky-brown, carbonaceous and very hard-----	3.15	10.33
1. Sandstone, light-gray; section starts where a few chert pebbles seen at surface of ground-----	<u>18.90</u>	<u>62.0</u>
Total measured section---	<u>97.37±</u>	<u>319.5±</u>

Section 25.—Section measured on west-facing slope of hill and across Wild Horse Draw, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)

[SW1/4SW1/4NW1/4 sec. 27, and NE1/4NE1/4SE1/4 sec. 28, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

32.	Sandstone, light-gray, medium-to coarse-grained, contains granules of chert and feldspar; not measured; top of measured section-----	---	---
31.	Mostly covered interval in valley floor-----	163.1	535.0
30.	Sandstone, orange-gray, calcareous, fine-grained, ripple laminated; forms ledges 1 to 4 ft thick, which are separated by softer sandstone; forms dip slope which is last outcrop before valley-----	7.62	25.0
29.	Claystone, carbonaceous, shaly, olive-brown; very resistant in top 1 ft-----	0.86	2.83
28.	Mostly covered interval; appears to be mostly gray to brown mudstone-----	5.23	17.17
27.	Ironstone, dusky-reddish-purple, concretionary, grades laterally into orange-gray sandstone-----	0.30	1.0
26.	Claystone, carbonaceous, olive-gray to olive-brown-----	1.68	5.5
25.	Mostly covered interval; weathering patterns indicate mudstone and claystone in part; 0.25 ft dusky-reddish-purple concretion layer present 10 ft above base-----	17.37	57.0
24.	Sandstone, orange-gray, calcareous, fine-grained-----	0.91	3.0
23.	Mudstone, carbonaceous, olive-brown; shaly in upper 2 to 3 ft-----	4.06	13.33
22.	Coal, attrital, sooty in part, with scattered fusain clasts; clay on cleats-----	0.51	1.67
21.	Mudstone, olive-gray to olive-brown; carbonaceous and dusky-brown at top; 0.5 ft thick dusky-reddish-purple concretion layer at about 7 ft above base-----	6.93	22.75
20.	Sandstone, light-gray, fine-grained-----	0.91	3.0
19.	Coal, attrital, sooty; probably correlates with units 2 through 6 of section no. 27-----	0.83	2.71
18.	Mudstone, carbonaceous, olive-brown to dark-gray-----	0.56	1.83
17.	Interbedded siltstone and mudstone, olive-gray-----	0.30	1.0
16.	Sandstone, light-gray, fine-grained-----	0.76	2.5
15.	Interbedded siltstone and mudstone, olive-gray-----	0.20	0.67
14.	Mudstone, shaly, olive-brown to olive-gray-----	0.23	0.75
13.	Coal, attrital, sooty-----	0.19	0.63
12.	Mudstone, olive-gray to olive-brown; carbonaceous in top 1.0 ft-----	2.23	7.33
11.	Mudstone, carbonaceous; dusky-brown to black in lower 1 ft; reddish-brown in upper 1 ft-----	0.61	2.0
10.	Mudstone, pale-brown-----	0.20	0.66

Section 25.--Section measured on west-facing slope of hill and across Wild Horse Draw, Carbon Co., Wyoming (Peach Orchard Flat 7 1/2-minute quadrangle)--Continued

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation--continued		
9. Sandstone, light-gray, upper fine grained; becomes pale-brown and silty in upper part-----	0.61	2.0
8. Mudstone, carbonaceous, olive-gray-----	0.41	1.33
7. Coal, attrital, sooty, with clay on cleats; some resin blebs-----	0.81	2.66
6. Mudstone, olive-gray to olive-brown; carbonaceous in top 0.66 ft-----	0.61	2.0
5. Sandstone, weathers orange, lower fine grained; forms ledge-----	0.30	1.0
4. Mudstone, carbonaceous, olive-gray to olive-brown; 0.42 ft resistant ledge 1.5 ft below top-----	1.47	4.83
3. Coal, attrital, sooty; probably correlates with unit 32 of section no. 24-----	0.61	2.0
2. Mostly covered interval; sandstone present in lower half of interval and mudstone present in upper half-----	5.64	18.5
1. Sandstone, light-gray; lower medium to upper medium grained; base of measured section-----	<u>4.11</u>	<u>13.5</u>
Total measured section---	<u>230.16</u>	<u>755.15</u>

Section 26.--Section measured on south-facing slope of hill north of  
east-west gully, Carbon Co., Wyoming (Smiley Draw  
and Peach Orchard Flat 7 1/2-minute quadrangles)

[NW1/4NE1/4SW1/4 and NE1/4NW1/4SW1/4 sec. 27, T. 14 N., R. 91 W.]

	<u>Thickness</u>	
	<u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>

Fort Union Formation (in part):

37. Sandstone, light-gray, lower medium to upper medium grained, exhibits penecontemporaneous deformation structures; top 10 ft forms cliff; top of measured section-----	14.40	47.25
36. Coal, soft-----	0.10	0.33
35. Claystone, carbonaceous, pale-brown-----	0.46	1.50
34. Coal, attrital, sooty; horizontal, mud-filled burrows(?) approximately 1 mm in width present-----	0.24	0.79
33. Claystone, carbonaceous, pale-brown; contains fragments of plants and coal up to 1 mm thick-----	0.37	1.21
32. Coal, attrital, sooty; contains fusain-----	0.89	2.92
31. Coal, impure, and coaly carbonaceous mudstone-----	0.28	0.92
30. Sandstone, silty, pale-brown, very fine grained, hard; weathers as white, flaggy ledge-----	0.53	1.75
29. Mudstone, olive-brown-----	1.37	4.5
28. Sandstone, light-gray, lower fine grained; channels into coal-----	0.99	3.25
27. Coal, attrital, sooty; units 27 through 32 probably correlate with units 20 through 22 of section no. 23-----	0.59	1.92
26. Mudstone, carbonaceous, olive to dusky-brown; coaly in top 1 ft-----	1.35	4.42
25. Sandstone, light-gray, very fine grained; forms ledge in lower 2 ft-----	1.52	5.0
24. Siltstone, sandy in part, olive-gray-----	3.05	10.0
23. Coal, attrital-----	0.23	0.75
22. Mudstone, carbonaceous, olive-gray to olive-brown-----	3.75	12.29
21. Coal, attrital, sooty; resin blebs present near base; partly covered; probably correlates with units 15 through 19 of section no. 24-----	1.80	5.92
20. Interbedded sandstone and light-gray siltstone-----	1.98	6.5
19. Sandstone; forms ledge-----	0.30	1.0
18. Mudstone, carbonaceous, dusky-brown; coaly in top 0.5 ft-----	2.07	6.8
17. Sandstone, light-gray, medium-grained-----	2.83	9.29
16. Mudstone, carbonaceous, dark-gray-----	0.30	1.0
15. Coal, attrital, impure; gradational contact at top with overlying carbonaceous mudstone-----	0.61	2.0
14. Mudstone, carbonaceous, coaly, dusky-brown-----	0.22	0.71

Section 26.--Section measured on south-facing slope of hill north of  
east-west gully, Carbon Co., Wyoming (Smiley Draw and Peach  
Orchard Flat 7 1/2-minute quadrangles)--Continued

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
<b>Fort Union Formation--continued</b>		
13. Interbedded siltstone and sandy mudstone, pale- to olive-brown-----	1.68	5.5
12. Sandstone, yellowish-gray, lower fine grained; some leaf impressions on bedding; laterally becomes concretionary in part, forming 1.5 ft diameter dusky-reddish-purple concretions-----	2.01	6.58
11. Mudstone, carbonaceous, olive-to pale-brown-----	0.76	2.5
10. Claystone, carbonaceous, dusky-brown, slickensided-----	0.15	0.5
9. Coal, attrital-----	0.15	0.5
8. Mudstone, carbonaceous, olive-to pale-brown-----	5.18	17.0
7. Sandstone, reddish-brown, fine-grained-----	0.20	0.67
6. Mudstone, carbonaceous, dark-gray-----	0.13	0.42
5. Coal, impure, attrital; contains mudstone laminae up to 1 mm-----	0.36	1.17
4. Mudstone, carbonaceous, olive-to pale-brown-----	1.62	5.33
3. Coal, attrital, sooty, with clay on cleats; probably correlates with unit 3 of section no. 24-----	0.63	2.08
2. Mudstone, olive-gray to olive-brown-----	6.07	19.92
1. Sandstone, light-gray; section starts on chert- pebble conglomerate-----	<u>28.29</u>	<u>92.83</u>
Total measured section---	<u>87.46</u>	<u>287.02</u>

Section 27.--Section measured along the south slope of a ridge, Carbon Co., Wyoming (Peach Orchard Flat and Smiley Draw 7 1/2-minute quadrangles)

[SW1/4SW1/4 sec. 27, T. 14 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
11. Sandstone, light-gray, fine-grained; top of measured section-----	0.46	1.5
10. Siltstone, olive-gray; contains leaf impressions-----	0.11	0.38
9. Shale, pale-brown, carbonaceous; contains abundant leaf impressions-----	0.13	0.42
8. Coal, banded, with occasional vitrain laminae and some fusain; hard near base; mud on some cleats; interlaminated coal and carbonaceous shale in top 0.5 in.; probably correlates with unit 19 of section no. 12-----	2.44	8.0
7. Interval not described-----	73.76	242.0
6. Coal-----	0.56	1.83
5. Claystone, olive-brown, carbonaceous-----	0.53	1.75
4. Coal-----	1.24	4.08
3. Claystone, olive-gray to olive-brown; contains carbonaceous shale in top 6 in.-----	1.03	3.38
2. Coal; units 2 through 6 correlate with units 48 through 52 of section no. 28-----	1.59	5.21
1. Mudstone, not measured; base of measured section-----	---	---
Total measured section---	<u>81.85</u>	<u>268.55</u>

Section 28.--Section measured along the south slope of a hill above a prominent east-west gully, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[SE1/4SW1/4 sec. 27, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

61.	Mudstone and silty shale; contains plant fragments; not measured; top of measured section-----	---	---
60.	Siltstone, medium-gray-----	0.91	3.0
59.	Covered interval; appears to consist of interbedded sandstone, mudstone and claystone, medium gray-----	6.71	22.0
58.	Sandstone, brown, very fine grained, concretionary-----	1.07	3.5
57.	Partly covered interval; claystone and shale, olive-gray to olive-brown, in lower part of unit; siltstone, medium-gray, in upper part of unit-----	5.72	18.75
56.	Sandstone, dusky-red-purple, calcareous, lower very fine grained; forms concretions 1 ft high and 6 ft long; caps ridge-----	0.30	1.0
55.	Siltstone and claystone, medium-to olive-gray-----	2.23	7.33
54.	Sandstone, light-gray, upper very fine grained, lenticular-----	0.81	2.67
53.	Claystone and shale, carbonaceous, olive-brown; 2 in. coaly carbonaceous shale in middle of unit; topmost 1.5 ft consists of medium-gray silty claystone; irregular contact with overlying sandstone-----	2.74	9.0
52.	Coal, sooty; impure in top 2 in. and grades into overlying carbonaceous shale; correlates with unit 6 of section no. 27-----	0.51	1.67
51.	Mudstone, carbonaceous, olive-brown; locally with coal particles-----	0.56	1.83
50.	Coal, attrital; contains local thin fusain layers and 0.5 in. thick vitrain layer at top; mud present on vertical cleats; correlates with unit 4 of section no. 27-----	1.52	5.0
49.	Shale, carbonaceous, and coal; shale is olive-brown; forms resistant ledge-----	0.38	1.25
48.	Coal, attrital; contains local thin fusain layers; mud present on vertical cleats, especially near base of unit; correlates with unit 2 of section no. 27-----	1.93	6.33
47.	Mudstone, sandy, pale-brown; contains plant fragments; sharp contact with overlying coal-----	0.30	1.0
46.	Claystone, carbonaceous, olive-brown-----	0.15	0.5
45.	Covered interval; forms dip slope-----	3.05	10.0
44.	Sandstone and sandy siltstone, light-gray; sandstone very fine grained; unit contains very dusky-reddish-purple ironstone concretions-----	1.52	5.0



Section 28.--Section measured along the south slope of a hill above a prominent east-west gully, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation--continued

43.	Mudstone and carbonaceous shale, olive-brown to olive-gray-----	1.47	4.83
42.	Sandstone and siltstone, light-gray; sandstone very fine grained-----	0.81	2.67
41.	Shale, carbonaceous, with coaly laminae-----	0.02	0.08
40.	Coal, attrital, sooty; mud present on vertical cleats and bedding; irregular upper contact; probably correlates with unit 7 of section no. 25----	0.97	3.17
39.	Sandstone, fine-grained; forms ledge in lowest 0.5 ft; contains plant fragments-----	0.56	1.83
38.	Mudstone, olive-gray to olive-brown; 0.5 ft carbonaceous shale in middle and at top of unit-----	2.67	8.75
37.	Coal, attrital, with some vitrain and fusain; in lowest 1 ft unit contains thin mud laminae and grades into underlying carbonaceous shale; probably correlates with unit 3 of section no. 25----	0.91	3.0
36.	Mudstone and silty shale, olive-to pale-brown; contains plant fragments; 0.33 ft olive-brown carbonaceous shale at top-----	1.42	4.67
35.	Sandstone, silty, olive-gray; grades upward into olive-brown sandy siltstone-----	3.73	12.25
34.	Sandstone, orange-brown, lower to upper medium grained; locally contains mudclasts up to .1 in.; locally trough cross-bedded or with slump structures-----	13.72	45.0
33.	Coal, attrital, sooty, with some vitrain lenses; clay on some vertical cleats or bedding; occasional mud laminae up to .04 in.; sharp, irregular upper contact-----	0.66	2.17
32.	Shale, carbonaceous, pale-brown; plant fragments and coal fragments on some laminae-----	0.61	2.0
31.	Coal, impure, and coaly carbonaceous mudstone-----	0.69	2.25
30.	Mudstone, carbonaceous, olive-gray to olive-brown; top 2 ft are coaly-----	2.13	7.0
29.	Mudstone, carbonaceous, coaly, dusky-brown-----	0.30	1.0
28.	Mudstone, olive-gray to olive-brown-----	7.62	25.0
27.	Sandstone, light-gray, upper fine grained; concretionary in part-----	0.3	1.0
26.	Mudstone and carbonaceous claystone, black; some carbonaceous stringers near top; upper contact sharp and irregular-----	0.53	1.75
25.	Coal, attrital, with scattered vitrain stringers-----	0.46	1.5

Section 28.—Section measured along the south slope of a hill above a prominent east-west gully, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)—Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

24.	Mudstone, olive-gray to olive-brown, with some interbedded claystone; dusky-brown claystone in top .17 ft-----	2.44	8.0
23.	Coal and coaly carbonaceous mudstone-----	0.25	0.83
22.	Coal, attrital, with some vitrain laminae up to .04 in.; correlates with unit 21 of section no. 26---	2.54	8.33
21.	Claystone and silty mudstone, olive-brown to olive-gray; carbonaceous shale grading up to coaly claystone in top 2 ft-----	2.13	7.0
20.	Covered interval-----	3.05	10.0
19.	Partly covered interval; appears to be mostly sandstone, light-gray, fine-grained; 1 ft thick sandstone ledge at top-----	6.10	20.0
18.	Shale, carbonaceous, pale-brown; grades up to olive-gray, silty mudstone, containing plant fragments; gradational upper contact-----	0.18	0.58
17.	Coal and coaly carbonaceous mudstone; abundant clay laminae at base; gradational lower contact-----	0.08	0.25
16.	Coal, attrital, with some fusain; clayey at base-----	0.24	0.79
15.	Sandstone, light-gray, fine-grained; grades upward into pale-brown, sandy mudstone, with root casts in top few inches-----	1.35	4.42
14.	Mudstone, silty, yellowish-gray; sandy in top 1 ft-----	1.52	5.0
13.	Siltstone, dusky-reddish-purple, concretionary; forms dip slope-----	0.30	1.0
12.	Claystone, olive-gray-----	1.68	5.5
11.	Coal, attrital, with scattered vitrain laminae; top 1 in. contains mud laminae-----	0.33	1.08
10.	Sandstone, light-gray, upper very fine grained; becomes silty with plant roots in top 0.5 ft-----	0.74	2.42
9.	Mudstone, olive-gray-----	0.15	0.5
8.	Coal, impure, and coaly carbonaceous mudstone-----	0.05	0.17
7.	Mudstone, carbonaceous, olive-gray; sandy at base and with coaly fragments; grades upward to pale-brown carbonaceous claystone, with plant fragments-----	0.61	2.0
6.	Coal, attrital, with some fusain; clay on some bedding; units 6 through 11 correlate with units 3 through 5 of section no. 26-----	0.81	2.66
5.	Mudstone, olive-gray, becoming olive- to dusky-brown in top 2.5 ft-----	1.31	4.3
4.	Sandstone, light-gray, friable, lower fine grained; at base is a 0.5 to 1 ft brownish-red, silty sandstone ledge with leaf impressions-----	1.43	4.7

Section 28.--Section measured along the south slope of a hill above a prominent east-west gully, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

3. Claystone; carbonaceous, and carbonaceous shale, dusky-brown; grades upward to olive-gray to olive-brown claystone in top 2.5 ft; plant fragments in bottom 1 ft-----	1.83	6.0
2. Mudstone, olive-gray to olive-brown; sandy in bottom 2.5 ft-----	3.81	12.5
1. Interval partly covered; composed mainly of sandstone, white, upper medium to lower coarse grained, friable; contains scattered grains of chert about 4 mm in diameter; section starts at level of chert-pebble conglomerate, present as float on slopes-----	37.5±	123.0±
Total measured section---	140.42±	460.78±

Section 29.--Section measured on east slope of ridge and below road,  
Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[SW1/4NW1/4NE1/4 sec. 34, T. 14 N., R. 91 W.]

	Thickness (equivalents)	
	Meters	Feet
Fort Union Formation (in part):		
25. Mudstone, medium-gray; not measured; top of measured section-----	---	---
24. Sandstone, orange-gray, fine-grained; channels into underlying coal-----	0.99	3.25
23. Coal; probably correlates with unit 22 of section no. 28-----	2.49	8.17
22. Mudstone, sandy, olive-to medium-gray; grades into brown carbonaceous shale in top few in.-----	1.42	4.67
21. Shale, carbonaceous; sandy in basal 0.92 ft-----	0.38	1.25
20. Sandstone, light-gray, silty, very fine grained-----	0.69	2.25
19. Interbedded medium-gray, sandy siltstone and olive-gray, carbonaceous sandstone-----	1.24	4.08
18. Sandstone, light-gray, fine-grained; channels into underlying coal-----	0.61	2.0
17. Coal, impure-----	1.04	3.42
16. Interbedded olive-brown, carbonaceous shale and olive- to light-gray, sandy siltstone-----	2.49	8.17
15. Interlaminated impure coal and carbonaceous mudstone---	0.25	0.83
14. Mudstone, carbonaceous, olive-brown-----	0.18	0.58
13. Interbedded medium-gray, silty claystone, and light- to olive-gray, silty sandstone-----	1.17	3.83
12. Sandstone, medium- to olive-gray, muddy-----	1.12	3.67
11. Interbedded light-gray, silty sandstone and siltstone; local reddish-purple ironstone concretions-----	0.61	2.0
10. Interbedded light- to medium-gray, silty sandstone and medium-gray mudstone-----	1.30	4.25
9. Coal, sooty-----	0.13	0.42
8. Mudstone, sandy, light- to medium-gray-----	0.86	2.83
7. Coal, impure-----	0.05	0.17
6. Interbedded olive-brown to medium-gray, carbonaceous shale and silty claystone-----	0.48	1.58
5. Coal; units 5 through 9 probably correlate with units 6 through 11 of section no. 28-----	0.43	1.42
4. Mudstone, sandy, medium-gray-----	2.39	7.83
3. Ironstone, reddish-purple, concretionary-----	0.51	1.67
2. Mudstone, olive-gray to olive-brown-----	5.13	16.83
1. Sandstone, light-gray, fine-grained; forms prominent ledge; not measured; base of measured section-----	---	---
Total measured section---	<u>25.96</u>	<u>85.17</u>

Section 30.--Section measured on east slope of ridge and below road,  
approximately 350 ft SE of section no. 29, Carbon Co.,  
Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[NW1/4SW1/4NE1/4 sec. 34, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

12. Sandstone; not measured; top of measured section-----	---	---
11. Shale, carbonaceous, dark-gray-----	0.25	0.83
10. Coal-----	0.41	1.33
9. Mudstone, medium-to olive-gray-----	1.78	5.83
8. Coal; bottom 1 ft impure-----	0.94	3.08
7. Claystone, olive-gray-----	0.25	0.83
6. Coal; units 6 through 8 stratigraphically equivalent with unit 19 and probably the lower part of unit 20 of section no. 31-----	0.46	1.5
5. Shale, carbonaceous, coaly-----	0.38	1.25
4. Partly covered interval; appears to be mostly mudstone-----	2.51	8.25
3. Interval not described-----	2.92	9.58
2. Coal; correlates with unit 23 of section no. 29-----	3.05	10.0
1. Mudstone; not measured; base of measured section-----	---	---
Total measured section---	<u>12.95</u>	<u>42.48</u>

Section 31.--Section measured on east slope of ridge and below road,  
approximately 350 ft SE of section no. 30, Carbon Co.,  
Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[NE1/4SW1/4NE1/4 sec. 34, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

20.	Interval partially covered; consists of sandstone and mudstone; top of interval at base of coal underlying road; top of measured section-----	4.27	14.0
19.	Coal, impure; correlates with unit 6 and possibly units 7 and 8 of section no. 30-----	0.20	0.67
18.	Mudstone, sandy in part, light- to medium-gray-----	2.87	9.42
17.	Sandstone, light-gray, fine-grained-----	1.83	6.0
16.	Interval partly covered; appears to be mostly gray mudstone-----	5.74	18.83
15.	Coal, sooty-----	0.13	0.42
14.	Interbedded carbonaceous mudstone and carbonaceous sandstone-----	0.61	2.0
13.	Coal, sooty; impure in top 0.75 ft; correlates with at least the lower part of unit 2 of section no. 30-----	0.74	2.42
12.	Shale, carbonaceous, brown-----	0.30	1.0
11.	Interlaminated impure coal and carbonaceous mudstone---	0.20	0.67
10.	Interbedded brown carbonaceous mudstone and carbonaceous shale-----	0.43	1.42
9.	Interbedded gray to brown mudstone and sandy mudstone, and light-gray, silty sandstone-----	1.68	5.5
8.	Shale, carbonaceous, coaly-----	0.10	0.33
7.	Coal, impure-----	0.23	0.75
6.	Mudstone, sandy, light- to olive-gray, grading up to olive-brown carbonaceous shale in top few inches-----	0.66	2.17
5.	Sandstone, light-gray, fine-grained-----	1.88	6.17
4.	Partly covered interval apparently consisting mostly of light- to medium-gray mudstone-----	7.21	23.67
3.	Carbonaceous shale and impure coal-----	0.20	0.67
2.	Mudstone and carbonaceous shale, olive-brown; probably correlates with unit 5 of section no. 29----	0.61	2.0
1.	Interval covered; starts on top of light-gray sandstone; base of measured section-----	8.23	27.0
	Total measured section---	<u>38.12</u>	<u>125.11</u>

Section 32. Section measured up east slope and down west side of ridge and below road, and approximately 1100 ft north of section no. 34, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[SE1/4NW1/4SE1/4 sec. 34, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation (in part):

51. Sandstone, orange-gray, calcareous, lower fine grained, ripple laminated; contains locally abundant leaf impressions; forms ledge; top of measured section-----	0.76	2.5
50. Mudstone, carbonaceous, dusky-brown grading up to dark-gray-----	0.53	1.75
49. Mudstone, olive-gray; contains brown plant fragments----	0.91	3.0
48. Mudstone, coaly, shaly, dusky-brown; irregular lower contact-----	0.10	0.33
47. Coal, attrital, sooty; interspersed vitrain laminae up to 0.04 in., with some fusain and sparse resin blebs; interspersed mud laminae up to 0.04 in. in top 1.5 ft-----	3.00	9.83
46. Mudstone, carbonaceous, light-brown; contains plant debris-----	0.46	1.5
45. Coal, attrital, soft-----	0.28	0.92
44. Interbedded siltstone, claystone, and carbonaceous claystone, medium-to olive-gray-----	2.80	9.17
43. Mudstone, carbonaceous, olive-to dusky-brown, locally coaly-----	2.13	7.0
42. Coal, attrital, with clay on cleats; 1.5 in. parting present 9 in. below top of coal-----	0.51	1.66
41. Mudstone, carbonaceous, olive-brown; contains coal laminae in basal 4 in.-----	0.71	2.33
40. Coal, attrital, sooty in part; clay on vertical cleats; crumbly in lowest 2 ft; upper contact irregular; units 40 through 42 probably correlate with units 48 through 52 of section no. 28; about 60 ft to north, this coal is only 4 ft thick, and is overlain by 3.08 ft of carbonaceous claystone and mudstone; these mudstones are channeled into by a very fine-grained sandstone not present to the south-----	2.86	9.38
39. Mudstone, carbonaceous, dark-gray-----	0.65	2.13
38. Coal, attrital, soft-----	0.86	2.83
37. Interval mostly covered; dark-gray, carbonaceous mudstone in upper part-----	3.80	12.47
36. Sandstone, orange-brown, fine-grained, ripple laminated; contains some wood impressions; forms ledge-----	0.46	1.5
35. Claystone, olive-gray to olive-brown, carbonaceous in part-----	5.21	17.08

Section 32.--Section measured up east slope and down west side of ridge and below road, and approximately 1,100 ft north of section no. 34, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation--continued

34.	Sandstone, silty, calcareous, orange-brown, very fine grained, concretionary-----	0.48	1.58
33.	Claystone, olive-gray, grading up to olive-gray, sandy mudstone-----	1.37	4.5
32.	Coal, attrital, sooty in part with fusain clasts; resin blebs at base; blocky in top 0.66 ft; possibly correlates with unit 40 of section no. 28---	1.03	3.38
31.	Interbedded olive-gray mudstone and pale-brown, fine-grained carbonaceous sandstone; top 0.42 ft is pale-brown, shaly carbonaceous mudstone-----	3.68	12.08
30.	Sandstone, reddish-purple, concretionary, with calcite fracture fillings-----	0.38	1.25
29.	Claystone, olive-gray-----	0.64	2.09
28.	Coal-----	0.20	0.66
27.	Sandstone, carbonaceous, brown, very fine grained-----	0.30	1.0
26.	Claystone, olive-gray-----	2.67	8.75
25.	Mudstone, carbonaceous, shaly, pale-brown-----	0.16	0.54
24.	Coal, attrital, sooty, with clay on vertical cleats; probably correlates with unit 37 of section no. 28---	0.53	1.75
23.	Coal and coaly carbonaceous mudstone-----	0.48	1.58
22.	Mudstone, carbonaceous, shaly, pale-brown-----	0.38	1.25
21.	Mudstone, carbonaceous, shaly, dusky-brown to dark-gray-----	0.33	1.08
20.	Interbedded pale-brown, carbonaceous, fine-grained sandstone and carbonaceous siltstone-----	0.38	1.25
19.	Coal, attrital, fairly hard, with mud on cleats; upper contact irregular-----	0.22	0.71
18.	Claystone, olive-gray to olive-brown-----	1.24	4.08
17.	Partly covered interval on dip slope; flaggy sandstone covers slope-----	3.05	10.0
16.	Partly covered interval consisting mostly of sandstone; dusky-reddish-purple sandstone concretions at top of interval-----	3.71	12.17
15.	Covered interval-----	6.10	20.0
14.	Partly covered interval; consists mostly of olive- to light-gray sandstone, siltstone, and mudstone-----	9.14	30.0
13.	Coal, sooty, soft; contains much fusain; overlain by 0.17 ft pale brown carbonaceous shale with plant fragments-----	0.94	3.08
12.	Mudstone, coaly, pale-brown; contains plant fragments in lowest 0.08 ft-----	0.22	0.71
11.	Coal, sooty, soft, with much fusain; mud on cleats; units 11 through 13 possibly correlate with units 31 through 33 of section no. 28-----	0.73	2.38



Section 32.--Section measured up east slope and down west side of ridge and below road, and approximately 1,100 ft north of section no. 34, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)--Continued

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation--continued		
10. Covered interval; light-gray siltstone at top of interval-----	9.24	30.33
9. Coal, attrital, sooty, with interspersed vitrain laminae up to 0.5 in.; probably correlates with unit 13 of section no. 31-----	2.27	7.46
8. Mudstone, olive-gray to olive-brown-----	2.34	7.67
7. Coal, attrital, partly burned; approximate thickness; possibly correlates with unit 7 of section no. 31-----	0.81	2.66
6. Mudstone, olive-gray to olive-brown-----	3.35	11.0
5. Sandstone, light-gray, lower fine to lower medium grained-----	2.83	9.29
4. Covered interval; probably mostly mudstone-----	5.18	17.0
3. Coal, attrital, sooty, with clay on cleats; probably correlates with unit 7 of section no. 35-----	0.39	1.29
2. Mudstone and carbonaceous mudstone, olive-gray to olive-brown; dusky-brown, coaly mudstone at top-----	2.88	9.46
1. Sandstone, light-gray; top 15 ft of sandstone is fine-grained with penecontemporaneous deformation structures, and forms cliff; section starts in a chert-pebble conglomerate; base of measured section-----	32.77	107.5
Total measured section---	<u>126.45</u>	<u>414.91</u>

Section 33.--Section measured along south-facing scarp below road, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[SE1/4SW1/4 sec. 34, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation (in part):

14.	Sandstone, light-gray, contains chert pebbles; not measured; top of measured section-----	---	---
13.	Interbedded claystone and siltstone, medium-to olive-gray; grades up into sandstone-----	19.81±	65.0±
12.	Sandstone, light-orange-gray, fine-grained, ripple laminated, calcareous; forms resistant ledge-----	0.76	2.5
11.	Mudstone, sandy, light-greenish-gray-----	19.51	64.0
10.	Sandstone, light-gray, medium-grained, calcareous, thinly laminated-----	0.76	2.5
9.	Interbedded greenish-gray, silty claystone and very fine grained sandstone-----	15.24±	50.0±
8.	Interval not described-----	53.34	175.0
7.	Coal, banded, sooty-----	1.12	3.67
6.	Mudstone, carbonaceous, coaly, dusky-brown-----	0.06	0.21
5.	Coal, banded, sooty-----	0.30	1.0
4.	Claystone, carbonaceous, dusky-brown-----	0.06	0.21
3.	Coal, banded, sooty-----	0.29	0.96
2.	Claystone, carbonaceous, dusky-brown, with coaly laminae-----	0.05	0.17
1.	Coal, impure, banded, with some interlaminated carbonaceous mudstone; units 1 through 7 correlate with unit 8 of section no. 27; base of measured section-----	0.38	1.25
	Total measured section----	<u>111.68±</u>	<u>366.47</u>

Section 34.--Section measured approximately 400 ft north of section no. 35,  
Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[SE1/4SW1/4SE1/4 sec. 34, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters Feet

Fort Union Formation (in part):

26.	Sandstone, orange weathering, lower to upper fine grained; forms ledge; top of measured section-----	0.46	1.5
25.	Interbedded medium-gray siltstone and olive-gray mudstone; irregular upper contact-----	3.66	12.0
24.	Shale, carbonaceous, dark-gray-----	0.20	0.66
23.	Siltstone, medium-gray-----	1.22	4.0
22.	Shale, carbonaceous, dusky-brown; gradational upper contact-----	0.10	0.33
21.	Coal, attrital, with clay on cleats; probably correlates with unit 42 of section no. 32-----	0.37	1.21
20.	Shale, carbonaceous, dusky-brown-----	0.09	0.29
19.	Mudstone, carbonaceous, dark-gray-----	0.56	1.83
18.	Mudstone, carbonaceous, with coal stringers-----	0.08	0.25
17.	Coal, attrital, in part sooty; interspersed vitrain laminae up to 0.25 in., and some fusain clasts; clay on cleats; irregular upper contact; correlates with unit 40 of section no. 32-----	2.62	8.58
16.	Interbedded gray to black mudstone, carbonaceous mudstone, and carbonaceous shale; carbonaceous shale at top-----	0.47	1.54
15.	Sandstone, light-gray, grading upward to olive-gray siltstone-----	0.61	2.0
14.	Sandstone, orange weathering, upper fine grained; forms ledge-----	0.61	2.0
13.	Mudstone, olive-gray-----	1.98	6.5
12.	Sandstone, orange weathering, calcareous, very fine grained; forms ledge-----	0.46	1.5
11.	Partly covered interval; appears to be mostly olive-gray to olive-brown mudstone; base locally contains coal clasts-----	5.33	17.5
10.	Coal, attrital, sooty, with interspersed vitrain laminae up to 0.25 in.; impure in lowest 1 ft; top contact irregular; probably correlates with unit 32 of section no. 32-----	1.50	4.92
9.	Partly covered interval; appears to be mostly olive-brown to olive-gray mudstone-----	2.57	8.42
8.	Sandstone, light-gray; lower fine grained; silty in bottom 0.5 ft; top 0.33 ft forms ledge on dip slope-----	0.61	2.0
7.	Claystone, silty in part, olive-gray to olive-brown----	2.11	6.92

Section 34.--Section measured approximately 400 ft north of section no. 35,  
Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation--continued

6. Ironstone, silty, dusky-reddish-brown to reddish-purple, concretionary-----	0.46	1.5
5. Claystone; coal in basal 0.25 in.-----	0.53	1.75
4. Coal, attrital, sooty, with clay on cleats; probably correlates with unit 24 of section no. 32-----	1.07	3.5
3. Claystone, olive-brown; carbonaceous in upper 0.58 ft; gradational upper contact-----	0.61	2.0
2. Partly covered interval; mostly olive-gray siltstone grading up to mudstone-----	1.07	3.5
1. Covered dip slope; surface covered by flaggy sandstone; base of measured section-----	<u>4.57</u>	<u>15.0</u>
Total measured section---	<u>33.92</u>	<u>111.20</u>

Section 35.--Section measured along south-facing slope of hill above White  
Rock Draw, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle

[SE1/4SW1/4SE1/4 sec. 34, T. 14 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

33. Partly covered interval; probably mostly olive-gray mudstone; at top of interval is 1 ft sandstone, yellowish-brown, very fine grained, calcareous, ripple laminated; forms ledge; top of measured section-----	4.57	15.0
32. Mudstone, carbonaceous, olive-brown to olive-gray; at top of interval is 0.5 ft dusky reddish-purple concretionary ironstone with calcite fracture fillings-----	2.81	9.21
31. Sandstone, silty, light-gray, fine-grained, contains clasts of underlying coal; irregular lower contact----	0.18	0.58
30. Coal, attrital, sooty, with clay on some cleats; more impure at base; gradational lower contact; correlates with unit 4 of section 34-----	1.04	3.42
29. Mudstone and claystone, olive-gray to olive-brown; carbonaceous at top-----	2.82	9.25
28. Partly covered interval; appears to be interbedded light-gray sandstone and olive to olive-brown mudstone-----	5.59	18.33
27. Sandstone, light-gray, lower fine grained, ripple laminated; forms ledge-----	0.91	3.0
26. Covered interval; lowest part consists of red, burned mudstone-----	14.1	46.25
25. Coal; probably correlates with units 11 through 13 of measured section 32-----	1.07	3.5
24. Sandstone, silty, grayish-brown, lower very fine grained, vuggy, contains carbonized root fragments; top 0.5 ft forms resistant ledge with numerous randomly oriented root traces-----	0.38	1.25
23. Siltstone, sandy, light-gray-----	0.79	2.58
22. Sandstone, silty, light-gray, fine-grained; irregular lower contact-----	0.48	1.58
21. Claystone and mudstone, medium-gray-----	1.38	4.54
20. Shale, carbonaceous, brown-----	0.18	0.58
19. Partly covered interval; greenish-gray silty claystone grading up to brown claystone at top of interval-----	1.59	5.22
18. Sandstone and claystone, interbedded; sandstone is light-gray, lower fine-grained, soft; claystone is silty, olive-gray-----	3.25	10.67
17. Siltstone, dusky-reddish-brown to orange-brown; forms concretions 1.5 ft in length-----	0.10	0.33

Section 35.--Section measured along south-facing slope of hill above  
White Rock Draw, Carbon Co., Wyoming (Smiley Draw  
7 1/2-minute quadrangle)--Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

16.	Sandstone and claystone-----	1.22	4.0
15.	Claystone, silty, olive-gray; forms scattered concretions 1 ft high and 2 ft long-----	1.52	5.0
14.	Shale, coaly, dark-gray-----	0.08	0.25
13.	Coal, attrital, sooty, with interspersed fusain lenses; clay on some cleats; interspered mud laminae up to .2 in.; probably correlates with unit 9 of section no. 32-----	2.03	6.66
12.	Covered interval; dusky-brown carbonaceous mudstone at top-----	7.57	24.84
11.	Sandstone, light-gray, lower medium-grained; some medium-gray siltstone interbeds, up to 1 ft thick, near base-----	4.57±	15.0±
10.	Siltstone, carbonaceous, pale-brown; 0.25 in. coal lamina near top-----	0.59	1.92
9.	Coal and coaly carbonaceous shale-----	0.19	0.63
8.	Mudstone and carbonaceous shale, pale-brown-----	0.22	0.75
7.	Coal, attrital, sooty in part; probably correlates with unit 3 of section no. 32-----	0.51	1.66
6.	Siltstone, carbonaceous, olive-brown-----	0.13	0.42
5.	Mudstone, silty, olive-gray to olive-brown-----	3.96	13.0
4.	Sandstone, light-gray, very fine grained-----	3.20	10.5
3.	Covered interval-----	15.24	50.0
2.	Interval partly covered; appears to be mainly white sandstone-----	6.10	20.0
1.	Sandstone, white, medium-grained, locally coarse-grained; section starts at level of a chert-pebble conglomerate, with pebbles up to 1 in. in diameter-----	7.62	25.0
Total measured section---		<u>95.99</u>	<u>314.92</u>

Section 36.--Section measured on north-facing slope above White Rock  
Draw, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[SE1/4NW1/4NE1/4 sec. 3, T. 13 N., R. 91 W.]

	<u>Thickness</u> <u>(equivalents)</u>	
	<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):		
8. Mudstone, carbonaceous, dark-gray to olive-brown; top of measured section-----	0.69	2.25
7. Coal; correlates with unit 17 of section no. 34-----	1.88	6.17
6. Partly covered interval, consisting of interbedded olive-gray to brown mudstone and light-gray sandstone-----	1.60	5.25
5. Sandstone, fine-grained, weathers yellowish-gray; forms ledge-----	0.91	3.0
4. Interval not described-----	2.74	9.0
3. Partly covered interval; mostly gray mudstone-----	4.57	15.0
2. Coal; probably correlates with unit 30 of section no. 35-----	0.86	2.83
1. Mudstone, carbonaceous; not measured; base of measured section-----	---	---
Total measured section---	<u>13.25</u>	<u>43.5</u>

Section 37.—Section measured on south-facing slope above gully, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[NW1/4SE1/4NE1/4 and NE1/4SW1/4NE1/4 sec. 3, T. 13 N., R. 91 W.]

Thickness  
(equivalents)  
Meters   Feet

Fort Union Formation (in part):

22.	Partly covered interval; appears to be mainly mudstone; top of hill mantled by clinker; top of measured section-----	7.62	25.0
21.	Sandstone, light-gray; forms ledge-----	0.61	2.0
20.	Partly covered interval; appears to be mainly mudstone, carbonaceous at base-----	3.96	13.0
19.	Coal, attrital, banded, hard, with interspersed fusain; clay on cleats and banding; correlates with unit 7 of section no. 36-----	2.49	8.17
18.	Sandstone, light-gray, fine-grained; pale-brown in top 3 ft and grades to carbonaceous mudstone in top 5 in.-----	2.92	9.58
17.	Mudstone, carbonaceous, dusky-brown-----	0.05	0.17
16.	Coal, banded, attrital, with clay on cleats and banding-----	0.29	0.96
15.	Partly covered interval; contains mudstone, olive-gray to olive-brown; 2 to 3 in. dusky-reddish-brown ironstone present 15 ft up from base of unit-----	8.92	29.25
14.	Sandstone, light-gray, fine-grained; forms ledge-----	0.30	1.0
13.	Mudstone, carbonaceous in part, olive-gray to brown-----	4.57	15.0
12.	Coal, banded, attrital, soft, with some fusain; clay on cleats and banding-----	0.95	3.13
11.	Mudstone, olive-gray to olive-brown; carbonaceous and shaly at top-----	1.83	6.0
10.	Covered interval-----	3.65	11.96
9.	Coal, banded, attrital, soft, with clay on banding and cleats; incomplete thickness; top not exposed-----	0.50	1.63
8.	Interbedded siltstone and very fine grained sandstone; olive-gray; olive-brown carbonaceous mudstone in top 0.5 ft-----	3.48	11.42
7.	Mudstone, gray to brown; ironstone ledge 0.5 to 1 ft thick at top-----	5.49	18.0
6.	Coal; correlates with unit 25 of section no. 35; because of cover, base of coal could not be dug out-----	2.74+	9.0+
5.	Covered interval; contains at least one covered coal which is probably equivalent to unit 6 of section no. 38-----	21.03	69.0
4.	Partly covered interval; appears to be mostly sandstone-----	9.81	32.17
3.	Coal, attrital, banded, hard, with clay on cleats-----	0.36	1.17



Section 37.—Section measured on south-facing slope above gully, Carbon Co.,  
Wyoming (Smiley Draw 7 1/2-minute quadrangle)—Continued

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation--continued

2. Mudstone, gray to brown; thin sandstone in middle of unit-----	4.11	13.5
1. Covered interval; section starts on top of light-gray sandstone-----	7.62	25.0
Total measured section---	<u>93.30</u>	<u>306.11</u>

Section 38.--Section measured in gully and on east face of hill just north of road, Carbon Co., Wyoming (Smiley Draw 7 1/2-minute quadrangle)

[SW1/4SE1/4NE1/4 sec. 3, T. 13 N., R. 91 W.]

	Thickness (equivalents)	
	Meters	Feet
Fort Union Formation (in part):		
13. Interval not described; clinker at top; top of measured section-----	4.57	15.0
12. Coal, sooty, weathered; correlates with unit 19 of section no. 37-----	2.84	9.33
11. Interval not described-----	19.8	65.0
10. Coal, attrital, sooty, with clay on cleats and banding; correlates with unit 6 of section no. 37----	5.36	17.58
9. Mudstone, olive-gray to brown-----	3.61	11.83
8. Partly covered interval; dip slope mantled by sandstone-----	1.52	5.0
7. Mudstone, olive-gray to olive-brown; some thin layers of dark-gray carbonaceous shale present-----	2.01	6.58
6. Coal, banded, attrital, sooty, with scattered fusain and vitrain bands up to 1 mm-----	2.01	6.58
5. Mudstone, olive-gray to brown; plant fragments at top-----	0.52	1.71
4. Sandstone, light-gray, very fine grained-----	0.61	2.0
3. Mudstone, olive-gray to brown; claystone at base-----	2.15	7.04
2. Coal, banded, attrital, hard, with clay on banding and cleats; units 2 through 6 probably correlate with unit 13 of section no. 35-----	2.06	6.75
1. Covered interval; section starts on top of light-gray sandstone-----	26.19	85.92
Total measured section----	<u>73.25</u>	<u>240.32</u>

Section 39.--Section measured on west side of spur on south side of Deep  
 Creek, Carbon Co., Wyoming (Dixon 7 1/2-minute quadrangle)

[NW1/4NW1/4SW1/4 sec. 11, T. 13 N., R. 91 W.]

	Thickness (equivalents)	
	Meters	Feet
6. Gravel, caps slope; not measured; top of measured section-----	---	---
Fort Union Formation (in part):		
5. Coal, weathered, disappears under gravel; correlates with unit 10 of section no. 38-----	5.2+	17.0+
4. Interbedded sandstone, carbonaceous shale, and mudstone; claystone at top-----	3.05	10.0
3. Coal; correlates with units 2 through 6 of section no. 38-----	5.46	17.92
2. Covered interval; olive-brown claystone at top-----	20.4	67.0
1. Sandstone, mostly covered; not measured; base of measured section-----	---	---
Total measured section---	<u>34.11</u>	<u>111.92</u>

Section 40.--Section measured on east-facing scarp on SE flank of Red Monument, Carbon Co., Wyoming (Dixon 7 1/2-minute quadrangle)

[NE1/4NW1/4NE1/4 and NW1/4NW1/4NE1/4 sec. 14, T. 13 N., R. 91 W.]

		<u>Thickness</u> <u>(equivalents)</u>	
		<u>Meters</u>	<u>Feet</u>
Fort Union Formation (in part):			
22.	Clinker to top of ridge; probably correlates with units 3 through 5 of section no. 39; top of measured section-----	7.62	25.0
21.	Sandstone and mudstone; oxidized in part-----	6.1	20.0
20.	Sandstone, reddish-brown, fine-grained; forms ledge-----	0.20	0.67
19.	Mudstone, medium-gray-----	0.76	2.5
18.	Sandstone, orange-brown, fine-grained, ripple-laminated-----	0.23	0.75
17.	Interbedded siltstone and mudstone; medium-gray; contains plant fragments-----	1.83	6.0
16.	Coal, sooty-----	0.13	0.42
15.	Interbedded light-gray, muddy sandstone and sandy mudstone-----	0.56	1.83
14.	Shale, carbonaceous, olive-brown-----	0.10	0.33
13.	Mudstone, sandy, medium-gray-----	0.99	3.25
12.	Coal, sooty-----	0.28	0.92
11.	Mudstone, medium-gray; olive-brown and carbonaceous in top 2 in.-----	0.97	3.17
10.	Coal, sooty-----	0.15	0.5
9.	Mudstone, olive-brown; carbonaceous near top-----	1.07	3.5
8.	Claystone and shale; carbonaceous; brown-----	0.08	0.25
7.	Mudstone, olive-brown to olive-gray; plant roots at top-----	1.27	4.17
6.	Sandstone, reddish-purple, fine-grained, concretionary; forms ledge-----	0.23	0.75
5.	Sandstone, silty, very fine to fine-grained; 1 ft lenticular ledge at base-----	2.74	9.0
4.	Mudstone, sandy, medium-to light-gray-----	1.07	3.5
3.	Shale, carbonaceous-----	0.51	1.67
2.	Interbedded medium-gray siltstone and mudstone, grading up to fine-grained sandstone-----	3.05	10.0
1.	Interval not described; mostly sandstone; interval starts at chert-pebble conglomerate; base of measured section-----	27.4	90.0
Total measured section---		<u>57.34</u>	<u>188.18</u>

Section 41.—Section measured on NW flank of hill, Carbon Co., Wyoming  
 (Dixon 7 1/2-minute quadrangle)

[SE1/4SW1/4NW1/4 sec. 13, T. 13 N., R. 91 W.]

Thickness  
 (equivalents)  
Meters   Feet

Fort Union Formation (in part):

11. Mudstone, not measured; top of measured section-----	---	---
10. Coal-----	0.30	1.0
9. Mudstone-----	0.53	1.75
8. Coal-----	0.91	3.0
7. Mudstone, carbonaceous in part-----	0.56	1.83
6. Coal, contains thin mudstone stringers; units 6 through 10 probably correlate with the basal part of unit 22 of section no. 40-----	0.99	3.25
5. Interval not described; mostly medium-gray mudstone-----	17.37	57.0
4. Carbonaceous shale and claystone-----	1.32	4.33
3. Coal; probably correlates with unit 3 of section no. 42-----	0.56	1.83
2. Interbedded medium-to light-gray mudstone and sandstone-----	14.83	48.67
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>37.37</u>	<u>122.66</u>

Section 42.--Section measured on north flank of hill and approximately 1300 ft  
NE of section no. 41, Carbon Co., Wyoming (Dixon 7 1/2-minute quadrangle)

[NE1/4NW1/4 sec. 13, T. 13 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

5. Clinker; probably correlates at base with units 6 through 10 of section no. 41; top of measured section-----	8.0±	25.0±
4. Interval not described-----	12.0±	41.0±
3. Coal; probably correlates with unit 3 of section no. 41-----	2.26	7.42
2. Partly covered interval consisting mainly of light-gray mudstone and sandstone-----	19.05	62.5
1. Sandstone, light-gray; not measured; base of measured section-----	---	---
Total measured section---	<u>41.0±</u>	<u>136.0±</u>

Section 43.--Section measured on south flank of hill, Carbon Co., Wyoming  
(Dixon 7 1/2-minute quadrangle)

[SE1/4NE1/4SW1/4 sec. 13, T. 13 N., R. 91 W.]

Thickness  
(equivalents)  
Meters    Feet

Fort Union Formation (in part):

3. Carbonaceous claystone and carbonaceous shale; not measured; top of measured section-----	---	---
2. Coal; soft in bottom 3 ft; bottom 20 ft with less distinct bedding; probably correlates with unit 5 of section no. 42-----	12.0±	40.0±
1. Interval not described; base of measured section-----	21.0±	70.0±
Total measured section---	<u>33.0±</u>	<u>110.0±</u>