

*Handwritten notes at the top of the page, including "10" and "12", and a signature "D. S. Dietzgen".*

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**DIETZGEN**

**FIELD BOOK**

**No. 403 P**

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#1 Coppersun Gap

Railroad cut, from N to S  
in section, from oldest to youngest.

- 0-5<sup>20</sup> sand bed 2' thick with thin sh.
- 5-10 sand 1' thick sh also 1'
- 10-15 all Marine ss
- 15-20 ditto T 680 S 30W
- 20-25 thin sh parting 3' ss above,
- 25-30 mostly thin bedded ss, thin sh  
partings 6" thick, flow beds common
- 30-35<sup>7</sup> alt thin ss & sh, none over 2'
- 35-40<sup>8</sup> most ss. upper 2' ss  
3' of ss. & occasional weathering
- 40-45<sup>8</sup> lower 3' ss, upper 2' thin ss & sh  
6" thick.
- 9
- 45-50 lower 2' thin sh & ss, upper 3'  
10 marine ss.
- 50-54<sup>10</sup> 3' of lower marine ss, upper 2' thin  
ss & sh.
- 54-59 mostly bl. sh, with alt, thin beds  
17 of ss & silt, none over 3" thick & 7505.
- 59-69<sup>13</sup> mass. ss 1' to 2' thick each, with  
sh partings 2 to 6" thick.
- 69-80 thin alt. ss & sh, 550 sh, all from 3" to 1'.  
14 Same thin silt parting in sh zone.
- 80-90<sup>15</sup> mass. ss, 2 thin sh partings in  
upper part 4" thick.
- 90-93<sup>16</sup> sh, one ss bed 3" thick.

81

3831

EB1

675

331

93-104. <sup>CG-17</sup> Mass ss, upper part a few thin sh, parting 1/2" thick.  
 104-109 Even. sh, same thin silt, parting, 2 thin ss 2" thick.  
 109-112 Mass. ss.  
 112-116 alt. ss, sh, & silt, none over 6" th.  
 116-124 <sup>CG-17</sup> Mass. ss, 6" of sh in middle.  
 124-127 alt ss-sh none over 4" th.  
 127-138 Mass. ss, no sh partings, much flow rolls & yules weathering in all thin stuff.  
 138-146 all thin ss & sh, some white clay over th. 3", some 1" thick, no black sh, all buff etc.  
 146-162 <sup>CG-25</sup> Mass. ss, 2 thin sh parting 6" much flow rolls.  
 162-164 even. buff silt.  
 164-192 <sup>CG-27</sup> Mass. ss, no sh.  
 192-195 sh, some thin silt parting 3" thick.  
 195-202' alt ss & sh, 60% same ss 1 1/2"  
 202'-209' Mass. ss, no sh.  
 209-214 <sup>CG-31</sup> massive diatom, alt. ss & sh one ss bed 2' thick 70% ss.  
 214-233 <sup>CG-31</sup> Mass. ss, 3 ~~few~~ thin sh. parting 6"  
 233-251 <sup>CG-31</sup> sh, even bl., same buff.  
 251-252 <sup>CG-31</sup> ss. T 80° S 30° E.  
 252-284 <sup>CG-31</sup> even buff silt sh, no ss.  
 284-289 Mass. ss.  
 ↑ CG 36

289-689 covered internal. 400 approx. con.  
 689-694 <sup>CG-37</sup> Mass. ss., upper. no sh.  
 694-716 covered internal.  
 716-726 even. ss, a little sh parting 6" thick.  
 726-735 sh, mostly bl., same silt.  
 735-738 <sup>CG-40</sup> Mass. ss  
 738-740 4) sh. int.  
 740-754 even. mass sh, some thin sh 1' thick. 85% sh.  
 754-767 60% sh, some thin ss 1' thick.  
 767-772 <sup>CG-41</sup> Mass. ss. T 78° S approx.  
 772-781 Int. ss & sh none over 6" th. ↑ CG-45 70% sh.  
 781-786 even. mass. ss.  
 786-791 <sup>CG-47</sup> even sh, partially covered.  
 791-795 Mass. ss.  
 795-800 alt. ss & sh 60% sh. ↑ CG-49 ss 6" thick, sh 1 1/2" thin, usually  
 800-804 even. sh, some bl.  
 804-816 <sup>CG-51</sup> Mass. ss  
 816-876 covered internal  
 876-905 partially covered, grade. 50%. ss, no bed over 2'  
 905-943 covered int.  
 943-973 partially cov. even sh, a few ss beds 1/2" thick. 75% sh.  
 ↑ CG 53

- 975-1253 covered int. 250'
- 1253-1295 sh upper part, mostly red to buff, lower 5' black.
- 1295-1300 num. ss.
- 1300-1303 sh.
- 1303-1420 very very num. ss, 1 sh parting 1" thick. T 650 S 20 E.
- 1420-1423 sh black sly sh
- 1423-1441 <sup>CG-59</sup> num. ss, flow rolls prominent
- 1441-1443 sh, gray to bl.
- 1443-1448 num. ss.
- 1448-1449 <sup>CG-62</sup> bl. sh.
- 1449-1465 <sup>63</sup> very num. ss bed.
- 1465-1479 <sup>64</sup> alt. ss & sh, none over 2'.
- 1479-1506 <sup>65</sup> same lensing out of 1 sh bed 1' thick, num. ss.
- 1506-1508 <sup>66</sup> sh, contorted, unpled & sheared. some bl sh, some buff, some silt.
- 1508-1619 <sup>CG-67</sup> very num. ss, no sh. T 570 S 10° E.
- 1619-1627 alt very thin ss & sh none over 6", sh also varies in color every 1" or so from bl-buff to ss. minor discon at top.
- 1627-1631 num. ss bed.
- 1631-1637 Essen. sh, alt very thin bed silt, ss, & sh, none over 3"
- 1637-1643 num. ss. <sup>CG 71</sup>

- 1643-1645 Essen sh, 1556" thick.
- 1645-1651 <sup>CG 73A</sup> num. ss.
- 1651-1655 <sup>CG 73B</sup> sh, ss, silt equal, none over 5"
- 1655-1661 ss rather num, 3 thin sh partings 6' thick, one ss 3' thick
- 1661-1664 sh rather buff, rather contorted <sup>CG-75</sup> slightly faulted more or less a bedding plane fault.
- 1664-1718 Essen ss, very num. at top a few thin sh. partings at top 5570 ss. T 550 S 80 E.
- 1718-1748 Covered int. 2' sh above not same.
- 2048-2058 Essen num ss, 1 1/2 sh in middle
- 2058-2140 sh <sup>CG-78</sup> buff to tan to green, very num. up, contorted ss beds & sly very bent, also ss lenticles formed. bedding plane fault.
- 2140-2150 bedded sand 2" thick separated by sh 1" thick.
- 2150-2154 <sup>40</sup> sh, some silt.
- 2154-2155 <sup>CG 79</sup> ss bed.
- 2155-2250 sh 5590 buff to tan, some gray, very contorted, num. thin ss & silt. beds, lenticles in part, some concretions given
- 2250-2252 num ss bed.
- 2252-2258 sh, bluff even, no or little silt.
- 2258-2261 num. ss bed. T 620 S 12° E
- 2261-2264 sh, rather num. up, <sup>some long</sup>
- <sup>CG-95</sup> lenticles very concretionary possibly bedding plane fault

- 2364 - 2384 alt. thin ss & sh + silt, none over 1", pale, equal, cont.
- 2384 - 2597 Covered lateral
- 2597 - 2607 even sh, blank, some silt & at top some T 58° S 22° E thin ss.
- 2607 - 2612' mass ss, sep by 6" thin sh.
- 2612 - 2615' lent ss & sh, 95% sh none over 1" over 3"
- 2615 - 2623 <sup>CG 100</sup> mass ss.
- 2623 - 2631 mostly ss 1" th, int. shale 6" thick
- 2631 - 2639 very mass. ss.
- 2633 - 2648 ss, weathered, sandy, not too indurated, some silt. 98% ss.
- 2648 - 2657 very mass. ss. T 47° S 55° E
- 2657 - 2667 <sup>105</sup> very dent ss, sh, silt, 60% sh sh, varies in color from bl to buff, ~~not~~ silt, none over 1" thick
- 2667 - 2672 mass. ss.
- 2672 - 2692 <sup>CG 107</sup> mostly ss, not too mass, some thin sh, none over 1", 90% sh.

100 south 100 yds Copp. Gap  
 third fault zone, very boulderiferous  
 & highly contacted in essential  
 shale section 95% sh.  
 Buff to lt ash red.

- #1 petit Jean mtr mass. silt  
 from oldest to youngest.  
 started directly above petit Jean fault  
 0 - 51 shale black splintery, <sup>PG 1</sup> contains many somewhat silty zones at top.
- 99.89% sh., one minor ss 6" near top, channeling or local unconf. at top.
- 51 - 61 thin bedded ss, sh, & silt. <sup>PG 2</sup> even. thin ss, 70% very thin bedded. T 60° N 34° W.
- 61 - 66' <sup>PG 3</sup> even. very flaggy silty sh very minor ss 1" thick
- 66' - 67' <sup>PG 4</sup> 3" ss parting, 1" of gray sh, 2" ss.
- 67 - 74' <sup>PG 5</sup> even. sh, splintery, gray.
- 74 - 96 <sup>PG 6</sup> thin silty ss or silty silt, very thin bedded & flaggy none over 2", traces of shale partings
- 96 - <sup>PG 7</sup> 98' sh, thin, gray
- 98 - <sup>PG 8</sup> 99' - very thin bedded ss 2-4" thick
- 99 - <sup>PG 9</sup> 104' sh thin, splintery, gray.
- 104 - 108' <sup>PG 10</sup> alt. thin ss, sh & silt mostly sh, none over 4"
- 108 - 111' <sup>PG 11</sup> mass. silty sd.
- 111' - 121' <sup>PG 12</sup> very alt. thin ss, silt & sh. none over 6", 60% silty sh, buff.
- 121' - 141' Covered slumped lateral

141-216 <sup>p51B</sup> thin, gray, <sup>brown</sup> silty, platy sh, somewhat  
alt. in color from gray  
to buff regularly, a few  
thin silty beds near  
~~top~~ top.

216-246 covered interval.  
246 <sup>p51A</sup> 301 sh, gray, bc to buff, rather  
some gray silty, not too fissile  
to top of atoka -

<sup>p51B</sup> 301-341 5' minor interval, between  
Hartsline, very non bedded  
relat. dense ss, man  
15' bed at base, becoming  
more thin-bedded as

<sup>p51B</sup> 341-343 thin gr. silt, very sdy. <sup>15° S 72° W</sup>  
343-393 man. ss, lower 25'  
<sup>p51A</sup> very mass., a few thinner  
beds in middle and a  
thicker 15-20' bed at top

T.D.

#3 Siltstone 1/4 mile E of Butte.  
base to top

p.1  
0-15 sh, gr, platy, fissile  
15-18 - 55, <sup>very</sup> fine gr, gr, silty, shaly  
laminae. man. bed T47°N 30°E  
18-40 - silt, thin, fluggy, brown color,  
tr. of fossils. sdy, small  
sh laminae, some flat ste  
40-48 silt ss, <sup>very</sup> fine gr, buff gr, some  
3-5 silt, fairly var. beds.  
48-72 ditto, 18-40. very fluggy.  
some zones fairly fossilif.  
unails and minute organs.  
some siltshales traced by  
few cells? minor tr. of  
lucifer etc in upper part minor man.  
72-824 55 fm to med gr, lt bed, <sup>to buff sh.</sup> some  
3-6 minor silt zones, no bed.  
bed over 8". some minor  
fossil traces. some sh glauca  
in ss 6 mm in size  
84-88 - 55 fm gr, silt in part very  
3-6 fluggy  
88-92 55, fm to med gr, lt man  
some beds dense, thin bedded  
3-6 none over 6". fossil.  
92-943 55, calcareous?, very fossil,  
some large grains, gray color, oolite?

a very fe rich, fossil, fossil, cal.  
zone, dense, med gr, some coarser  
bedding.

93-97 ss, lt br, some thin  
3-10 silt. put to some  
med gr. some large frags &  
end of cut, also small fossils,  
Bryozoa, & Cin.  
possible minor  
cal. nodules  
some possible small  
plant frags.

#4 ~~Saltstone~~ 1/4 mile out  
bridge ~~ganset~~ about  
from ~~the~~ ~~to~~ ~~ganset~~

4-1  
0-12 silt, very platy, finely flossy;  
lt gr br color, thin bedded.  
mic. ~~all show flow slaty~~  
very minor to if fossils?  
debtful.

12-92 silt, flossy, becoming  
more platy in upper part, lt  
gr to lt gr gray. some minor  
very fine gr ss, no beds in  
whole cut over 3" thick.

92-122 covered but, app. same.

122<sup>4-3</sup>-272 - silt, very thin, flossy, platy  
lt gr, gr gr, very indistinct  
in fact, sdy, some some buff sh silt,  
272-322 silt, ~~some~~ ~~zone~~ ~~more~~ ~~resistant~~ ~~than~~  
bedded, flossy but coarse,  
some very fine gr ss.

more resistant  
than previous  
322-362 covered but

262<sup>4-5</sup> 275 - ditto, ad  
175  
537 272-322

silt makes a very  
resistant edge T 60° N 30° E.

end of cut

#5 sh - at NE old ~~from~~ ~~about~~ ~~to~~  
ganset

0-370 sh, lt gr, T 47° N 60° E  
5-1 sh conc, patterns, some of  
br red slaty sh.

370-371 - thin-bedded, fine gr ss, some  
sh. color br.

Some  
laminations  
are highly  
covered with  
thin coating  
of mn.

371 <sup>5-3</sup> - 406 - ditto, as 0 - 370.  
rest of city sh.  
end of cut, covered.

#6 North of Ala youngest to oldest

0-50 alt. thin ss & sh  
inner dip  $\oplus$  west to  $85^\circ$  or  $530^\circ$  W.  
ss very fine gr, 75% sh, none over

6 inches thick. minor silt.

ss lt gr, sh bl to tan.

<sup>no comp.</sup> In upper part more ss.

50-55 fault zone, thrust

from south,

55-88 <sup>sh.</sup> isan, silt, tan, some

<sup>or even</sup> minor dense fine gr ss. ss very  
thin. silt up to 2"

ST.  $515^\circ$  E at base even silt tan ~~sh.~~  
~~fine~~ very thin & platy.

88-94 - 55, minor sh. fairly  
massive. fine gr, lt gr, small  
near  $\ominus$  thrust fault at base

94-100 - sh, black to <sup>dark</sup> ~~tan~~ gr.  
becoming more bl near top.

174 - 774 - Covered interval

774<sup>6-5</sup> - 794 - alt ss & sh, very thin  
bedded, fairly compact, several  
small bedding planes faults.

ss fine gr, gray very dense,

thrust fine north.  $T62^\circ S 15^\circ W$ .

794<sup>C-E</sup> - 840 - ss, thin bedded 98% ss  
no bed over 1/2" thick, minor sh.

usually very dense.  $T47^\circ S 15^\circ W$ .

one 1/2 zone near middle,

var pitted surface, small conc.

zones in ss, some up to 15 cm in dia

at base & 1/2 of base, possible

fine ss. zones in Red sh.

840-850 - silt to fine gr ss, lt gr.

very thin bedded.

850-950 covered interval.

950-970 silt tan, very thin  
bedded.

970-990 covered.

990-1000 ditto, and about 950-970

~~some~~ same thin buff sh in upper part.

1000-1000<sup>6-10</sup> - dense ss, gr. In middle  
20

3 ft of buff sh.  $T63^\circ S 10^\circ E$



~~1010-1020 sh, tan to br, slty,~~

~~1020-1030 ss, dense, gc~~

1020<sup>6-11</sup> - 1040 sh, tan to br, slty,

1040<sup>6-12</sup> - 1041 ss dense, gc.

1041 - 1061<sup>6-13</sup> ditto 1020-1040, to slt.

1061 - 1066<sup>6-14</sup> alt, thin<sup>very</sup> ss, & slt,  
ss dense, gc.

1066 - 1071<sup>6-15</sup> - sh, buff-br, a little  
mud. ss beds 2" thick,

1071 - 1072<sup>6-16</sup> ss, dense, gc

1072 - 1152<sup>6-17</sup> sh, essen, br.

1052 - 1153<sup>6-18</sup> ss, dense, gc.  
T 620 S 120 W.

1053<sup>6-19</sup> - 1063 sh, br, slty.

1063 - 1064<sup>6-20</sup> ss dense, gc

1064 - 1134<sup>6-21</sup> sh br, bl, gc.

(small)? ~~small~~ <sup>cross road</sup> at wash  
end dip. T 51° N 10° E

to north 100 ft. on end  
even sh, mud, 2"-1/4"  
sand. <sup>North 1/4 mile</sup>  
see # 76

# 7 Slt. Between at Foudre Ridge  
~~Houston~~ - Pennell,

0-5 slt, <sup>same in road</sup> from old to  
frozen, platy, lt grey sand  
T 300 S 250 E.

5-30 - covered interval

30-38 - sh, gc, bl., some slty lenses.

38-45 - slt, br, very thin, platy.  
T 350 S 480 E.

45-80 missing, mostly covered, some  
thin slt zones near.

80-100 slt, lt grey, <sup>three</sup> minor  
7" thin 4-6" thin, slt very flussy,  
and platy.

100-138 covered int, app. slt, flussy

138-148 ss, same 1' thick, fin to med  
7-5 gc, lt br tabs, some fairly  
fossil. T 290 S 60° E

148-178 <sup>covered int</sup> slt, <sup>some</sup> some slty red

178-189 <sup>material</sup> thin bedded, flussy, platy

189-270 - covered int.

270-310 - ? <sup>on road?</sup> small fault at SW end. <sup>lines</sup>  
7-7 <sup>approach</sup> dip 35° N 55° E, possibly <sup>all</sup> <sup>or channels</sup> ~~also~~

Essen <sup>very</sup> thin slt, minor thin lenses  
of fin gr ss, some very minor zones of  
alt slt sh & bl sh near middle about  
3" thick. Slt, br. Dip at N. end  
in about 60° or 20° E.

possibly NW - SE trending  
+ some fault

~~310-500~~ ~~at base of~~ ~~strat.~~

~~For~~ at Bridge, 100 yds north  
8# silt from about to youngest

0-65 silt, thin flags, fairly dense,  
br, very thin bedded.

T 240 S 80° E

65-75 ss, very fine gr, silt, thin bedded  
br, in part silt. 6"

75-300 silt, thin bedded, flags  
platy, br., some small

silt sh partings, some  
minor beds silt, some

1/2 very fine gr ss in  
upper parts.

end of trip. T 32° S 70° E

9# Maunten ganged to about

0-4 sly ss, br, very fine gr  
9-1 T 35° S 28° E.

4-25 sh, lt br, buff

25-33 ss, massive, fine gr.  
T 340 S 30° E.

33-40 silt, platy, small fossils, lt br.

40-60 covered, fossils same as last.

60-85 sh, buff, tan.

85-115 ss, massive. T 55° S 20° E  
9-6 same buff, sh in lower part

115-145 sh, buff, br, sly

10# Mouth of Maunten at bridge

10-1  
0-23 ss, fairly massive, dense, gr  
have one 2' thick. T 45° S 20° E.

Same med gr. over 5' fossil zone  
seen here.

10-2  
23-310' silt, lt br, some sly, some  
23  
287 ss, massive, parallel, some cov. zone  
T 65° S 60° E

Some small internal  
folds & faulting.

small patches of black  
shale being analyzed

cut across ~~str~~ <sup>let to, str sh</sup> buff sh

brown sh, some bl sh,

almost fine, very wavy

thin bedded.

have red spots on weathering

1/4 mile covered mostly sh.

310-1000 covered.

10-3

1000-1035 sh, bl, fine.

1035-1053 ss, dense, fine sh,  
T630 S 20° E  
fine-gr.

1053-1073 sh, bl, fine.

10-5

1073-1077 covered, mostly sh

1077-1310 - str ss, bl sh, fine gr.  
becoming <sup>thin</sup> ~~very~~ fine gr in upper part.

1310-1525 - sh, ~~to~~ to bl, some  
10-7 what covered.

1525-1528 - ss, dense, fine, br  
10-8 fine gr. T680 S 50° E.

wh fine sh in upper part, becoming  
more or less downward and even  
flat bedded.

1528-1583  
essence sh, bl, very fine to of

10-9

shly det zones 1" thick in  
upper part. T590 S 50° E

1583

very splintered bl-gr sh.

1583-1585 - ss, dense, flat-bedded  
10-10 fine gr.

1585-1650 sh, bl-gr, fine.

10-11

1650-1653 ss, dense, fine gr  
10-12 T500 S 20° E

1653-1683 - sh bl some, str sh,  
10-13 some of zone bedded.

1683-1686 - ss, fine gr, dense  
10-14 carb. str.

1686-1694 - str, very thin bedded, sh  
10-15

1694-1708 - sh, bl, fine, coarse  
l. ss, dense dense in  
middle,  
10-17

1708-1718 - ss blk, only, very  
thin bedded.

10-18  
1718-1758 sh, gr to bl, some  
tan sly sh. and  
grading into ST1 in  
upper part.

10-19  
1758-1766 sst, thin bedded.  
lt gr - br.

1766-1772 covered, approx. sh -  
10-20  
1772-1774 ss, dense, fr. gr.

no sand  
1774-1786 sh, poorly exp.

1786-1810 blk, buff. to sly sh,  
10-21  
and minor imp for gr ss.

1810-1811 ss, fr. gr. dense.

1811-1836 ss, br to buff, some  
10-22  
fine, Tr of sst 1" thick.

1836-1886 ss, man., fr, some med  
gr, fairly dense, some zones,  
fairly porous, color on some  
sighs, T6705.

1886-1901 sh, gr to bl, fine,  
splintery, not too well exp.

1901-~~1931~~ 1931 ss, med to blk  
very man. beds, fairly porous some  
are distinct fairly dense.

One Sample  
1931-1952 sh, blk, splintery,  
10-23  
fine.

1952-1953 - clay white, possibly  
porphyritic silt or dirt, and  
fairly hoisted.

1952-1983 sh, blk, fine, splintery.

minor stringers of lt blue calc  
clay. traces of ss beds  
in lower Quad. with small  
harder, a small thrust  
fault at base. overlain  
by 20' imp. & further grand  
splintery sh. ss. Lt.  
becomes more sly sh. to manon sh. Lt.



# 11 Danville North  
at bridge called to gorge

0-30 <sup>11-1</sup> alt, very thin bedded, shaly  
It goes to 250 N 50° W

at railroad crossing,  
North' down about 100'

30-~~125~~ <sup>125</sup> 150 covered, but  
125-150 sh, bl, minor TR. set beds. <sup>mountain</sup> <sup>cont.</sup>

(50-175) alt, It goes to be thin, shaly  
platy, T 170 N 75° W

fine gr 2' thick ss at base

sw 175

12# 1 mile North  
Maroon sh

12-1

0-35 alt. maroon sh, dense

17' ss, some sh is actually  
alt, very faulted &  
complex zone.

over. T about 60° N.

some wh, coating  
on surface.

35-250 covered, but  
prob. mostly sh

250-270 very thin bedded in ss

12-2 in ss, some sst, & very  
minor sh bed, some  
caliche being on last.

T essentially vertical or declined  
to South slightly,

12-3

270-350 - sh, bl, some lu & stb, only  
minor tr. of ss, lu approx  
part about 30 ft of maroon  
sh. maroon sh has stb, dense  
in it as last. some part  
bl. to go sh.

350-475 covered prob. sh.

475-485 - sh, thin bedded

12-4 some thin bedded  
sh, none over 6", mostly ss

485-550 - sh, or to go, stb, to  
of thin ss. sh, thin bedded  
fossil.

550 <sup>12-5</sup> / 640 covered, cut  
640 - 650 - ~~sh, bl, green ss~~  
very thin, plat, ~~sh~~

650-850 - Covered cut,  
prob. mostly sh.

850-860 sh, no samp.

880-970 sh, very thin bedded.

12-6  
sh, bl, green ss  
upper part. Thin  
high angle fault  
in ss.

870-880 fault zone

880-940 sh, bl, green ss

12-7  
sh, bl, green ss  
dip  $T 25^{\circ} N$ .

another fault at end of  
cut.

1/2 mile north main profile

# 13

0-8 Sls ~~ss~~ green, with brown  
ss, med gr, fairly coarse

med gr. in same bed  
mainly vertical,  $E 5^{\circ} N$

11-60 sh, bl

# 14 1/2 mile farther

0 <sup>10-1</sup> / 10 shale black

10 <sup>11-18</sup> / <sub>2</sub> very thin bedded ss, in part  
sh, bl, green ss

18 <sup>14-3</sup> / 35

25 <sup>14-50</sup> / 50 2x very thin bedded sh, bl

45 <sup>11-5</sup> / 50 ss, med gr, coarse, fossiliferous  
mainly vertical,  $E 3^{\circ} N$

50-60 sh, bl, green ss very thin bedded  
alt. Fe carb.

60 <sup>11-1</sup> / 125 sh, bl, splintery fossils

123 <sup>146</sup> / 150 very thin bedded

14-17 very fine gr. <sup>green</sup> ss &

sh.  $T 74^{\circ} N 50^{\circ} W$

General thin to moderate

450 - 475 covered with

450 - 475 - Sh, M, Sump

460 - 600 covered with

600 <sup>14-9</sup> - 50, very thin

640 ~~14-10~~ 670

90%

many plant fragments

1750 N 14° W

670 - 1150 Sh, M, thin, pink

14-11

1/2 mile from quarry

~~8/15~~

750 - 950 mostly covered, some thin grey

11-12

950 - 1050 Sh, very thin, platy, and flaky, some thin shale fragments, to fine ss.

1/2 mile to quarry

~~14-11 plant~~

1/3 inches

1050 - 1750 covered

1750 - 1790 Sh, thin in large

1770 - 1790 <sup>CO</sup> ss, dense, some to 1 1/2 inches, some of families, 110° N 77° W.

200 yds from quarry 2.

10 - 1992

14-15

1980 - 2000 lity on sh plant  
united. 1/2 ft  
elt near point fossil.

2000 - 2012 ss. to toward

14-16

to white surface  
large print  
united. 1/2 ft

2012 - 2037 sh, to top

14-17

sh, to top  
plant united

2037 - 2043 ss. to base

of Hartshorn. on  
existing ledge.

14-18

2043 - 2048 ss. thin bedded.

#15 West petit Jean at yell-conway

15-1

0-65 set, thin, flaggy, slaty.

65 - covered Int.



# 16  $\frac{1}{2}$  mile south of Antelope

0-35 SS, <sup>thin</sup>  $T 85^{\circ} N 15^{\circ} W$   
16-1

35-100 sh, bl, <sup>fine</sup> ~~fine~~, ~~sh~~  
16-2  
Can be north.

# 17  $\frac{1}{4}$  mile from road  
2 mi south of Antelope

0-~~25~~ sh, bl, mic. congl.  
25-60  
Fossiliferous.  $T 20^{\circ} N 20^{\circ} W$

# 18 at 155 Junction of  
ridge and area

0-4 sh, bl, <sup>with bits</sup> ~~sh~~, early clay ~~sh~~

4-5 ~~10-15~~ ~~sh~~ 8" of coal  
of carbonaceous material, ~~sh~~

5-8 sh, bl, ~~sh~~, ~~sh~~

# 19 Durdanella Sam.

0 - 100' 1st ss  
upper 30' ...  
and high ...  
and all ...  
lower ...  
and ...

100 - ~~25~~ 30' sh. bl. & platy,  
at base ...

T 340 N  
150 W

# 20 N from Pattonville

0 - 40' Harts, ss, minor  
minor ...  
base. Takant 1° N

100 - 200' sh. lly sh. T 50 N 150 E  
met ...  
is ...

200-201 - sh-bl waly shale.  
20-3

201-240 5' ...  
~~20-3~~ (No sample)

240-241 coal, ...

20-4 Lenses out to ...  
pink ...  
T 80 ~~20 N~~

241-360 sh. bl. ...  
20-5 to top of ...

T 100 N 160 E W

Good  
met level of ...  
100 ft. west end of ...

21 Pattonville Pond Pit.  
sample

#22 Fossil E of Muirhead ark.  
about to go out

0-120 sh, bl to br, silty; in  
part thin zones of silty  
alt; to of very fine ss.

120-160 ss, very micaceous, some  
thin bedded ~~12~~ ft thick, very highly  
jointed <sup>in 13</sup> T 43° S 12° E  
about <sup>13</sup> way of Piquette fossil.  
in a coarse ss, gritty, partially  
cg, 3 ft zone ? cal.  
upper ss med to a ss,  
has sh. g.

In part qtz grit up to 5 mm,  
also some fossil in ss,  
cg, fossil water channel?

at actually <sup>12</sup> ~~12~~ ft non.  
ss below a ss <sup>very fine</sup>  
7 ft of sh ss to white to red, <sup>layers</sup>  
above a small amount of  
loose detritus. then 6"-2"  
fine. gritty, cg, ss, above  
is 15 ft <sup>large</sup> med. ss, then  
about 5 ft, thin bedded  
med ss.

# 23 1 Mile land on line  
about 4 years old  
0-23 55, fr ss, fairly even  
23-1 up to 3 ft, 17 gr, top of  
sh clunkers.  
T 320 S 350 E.

23-113 54, <sup>bl</sup> sh to be, trace  
of white, sometimes,  
23-2 trace of very thin  
slt, bed.

113-136 55, fr to fr med gr, 4  
23-3 gr, coarse, some pebbles  
out of bed. very minor  
T 400 S 350 E, ~~fr med~~  
with <sup>thin</sup> one about 2 1/2 ft

136-178 54, bl, fine, reg  
23-4 splintery, blocky.

178-195 55, fr ss; den<sup>o</sup>, 6 gr.  
23-5 T 340 S 300 E.  
thin bed about 5 feet  
in middle.  
~~covered by all~~

195-210 54, bl, fine, in upper  
23-6 part a low thin fr ss bed,  
up to 21" thick. <sup>slty. be.</sup>  
covered by all fall.  
To 1/2 miles of upline

# 24 N. of Appello  
at Damp  
21-14 54 bl platy, slty  
21-1 T 40 S 150 E

14-21 55, thin bedded, fr gr, 5 to 10 ft  
24-2  
at Damp

24-3 Pole of a road neck.  
meningite. very horizontal  
with sh, non-weathered  
outcrop for 35 feet, can't  
tell under just little  
knobs sticking up, approx.  
not it under them <sup>on</sup>  
1/2 feet exposed

at Slope trends S 80° W

been cut out up through  
shale on east end of  
cut.

covered in mud, plaster  
so can't tell for sure  
what am.

Large Biotite flakes  
up to 1 mm.

on south side of dump.  
little resistant blocks  
sticking up.

at least ~~10~~ <sup>25</sup> feet by  
~~25~~ feet of vol. rock,  
40 with clumps of shale  
remaining in place  
covering it.

1 vol. rock

24-2 54 <sup>bl</sup> with thin, 2-3 55 inches  
3 3-5 inches thick

21-55 T 2-3° S 12° E  
possibly a silt and silt sh.  
very flaky & platy.

covered above

#25 1/2 mile north east  
cut and back from road  
~~added to point~~  
begin at side of pit.

25-1

0-205 sh, very, silt, gy,  
✓ some zones consisting some  
shale dices in shale pit,  
- you a silt.

25-2 T 45° S 45° E

005-220 just red of grade into thin  
bedded silt, ls ss., none over

611

25-3

220-240 - silt, thin flages

240-260 - silt, and thin ss

75' ~~6"~~ thick. near same as  
but slightly thinner

260-345 ss, some lenses, up to

75' 2 ft thick, minor silt.  
aver. thickness of ss  
about 3/8 in.  
Even, all ss. some  
silty ss.

345-370 ss & silt, thin flossy

75' even, ss, some lenses  
3 inches.

370-415 ss, even, up to 2 ft thick,

75' even. 1 foot plus.

415-422 thin flossy ~~ss~~ silt & ss

75' ~~ss~~, can show 2" thick  
T 45° S 20° E

422 ~~ss~~ ss, fairly thin bedded, and

45' 3 10" even 4 inches

75' upper 10' part thin flossy  
fine ss

453-463 sh, ss to red silt.  
25-10

463-469 ss, thin bedded, about  
25-10 3-4" silt.

T 45° S 17° E.

469-~~549~~ thin platy silt, shaly, to be

75-19 <sup>549</sup> appears to be silty sh or  
shaly silt. very thin.

in upper 10 feet grades into  
a lot of fine ss, flossy ss.

no desc.

549-550 ss, coarse. T 43° S 15° E.

75-13, <sup>25-14</sup> ~~610~~ ~~ss~~ ~~to~~ ~~ss~~

25-14 silt, thin flossy, fine ss  
15 thin flossy <sup>10'</sup> <sub>10'</sub>

Covered to above

#26 Hardshire N. of Casa  
brought to light

8-25 ss, fairly heavy, arg.  
fairly dense  
same level ~~Hard~~  
channeling ~~at~~  
T 7° N 10° W

no bed over 6' thick.

number uncor at base

25-~~4~~ In places coal directly  
29 below in places sh,  
coal about 8-10"

Essen carbon. sh +  
red underlay for 2 feet.

29-89 probably, essen. Be, clayey  
shy shale.

89-299 covered distant, under  
plant. small leaves  
of sh, 2e, shales.

255-302 sh, very sh, be, clayey  
26-1

302-316 covered out, prob. shale

316-323 ss, sh, thin bedded

26-5 up to 1' sh part  
flossy, for ss

contains some small  
plant fragments, shaly partings  
T 17° N 14° W  
hard, dense, trace of sh

323-331 covered out,

26-6  
331-342 sh, sh, platy, very  
thinly flossy.  
T 14° W 16° W

342-352 sh, sh, sh, sh.

at crossroad  
covered below  
approx 1/2 mile

# 27 at beds

27-1

0-~~25~~ thin to shaly sh  
20 shale

with interbedded thin ss (slty)

now are 1 1/2' thick, some  
slty, some plant fossils.

<sup>27</sup> 20-35 alt ss, fine dense & thin  
foss slty ss. now are  
3 1 ft.

<sup>27</sup> 35-43 ss fairly massive bed  
2 1/2' thin sh. green.  
some large plant fossils  
some small concent. tubule

~~43~~ 43-178 covered bed, ~~slty~~

178-~~43~~ - sh, isotropic, some  
~~27~~ <sup>27</sup> 43-58 real coloring, splinter  
a few iron tub. sandy  
some gone up to 3 1/2" thick.

some be to red, cotton.

diely bed of bones can  
well

approx dip: T44° N 21° E

466-580 covered out. pale some

580-7~~00~~<sup>50</sup> sh, br, gr, some gr  
<sup>27-5</sup> ~~very~~ some from section.

some shaly some with

st. w 10° N.  
Talent 60°.

<sup>27</sup> In upper 50 feet, a few dense  
750-~~751~~ thin ss beds. One bed  
751 known for tub. & coal.  
a few fossils, one large lion coal.

<sup>27</sup> 750-780 - be shly sh to some thin  
dense 1/2 bed at middle

<sup>27</sup> 780-781 1/2 - ss, med gr iron rich  
fairly compact, iron rich.

<sup>27</sup> 781 1/2 - ~~8015~~<sup>8015</sup> sh, be in lower part some  
be slty.

<sup>27</sup> 815<sup>2</sup> - 825. Some coal, except  
some carb. shale & a  
few thin coal stringers  
up to 1 inch thick.



825 - 840 sh, bl black. home  
27-11

~~very thin sh~~  
some small  
are fossils

27-12  
840 - 848 2 1/2" ss shly.  $T 65^{\circ} N 15^{\circ} W$   
6-8"

840 - 848 2 1/2" upper 5" ss coal  
below ~~the~~ feet of black  
coaly clay, with red spots  
in it.

~~27-13~~  
821/2 - 1092 covered Interned  
prob. shal.

27-13 sh, gr to bl, some br, thin,  
fines, only shly in part.

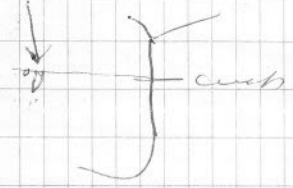
1092 - 1295 partially covered in upper  
part.

approx  $T 68^{\circ} N 27^{\circ} W$

1295 - 1600 covered Interned.

27-14  
1600 - 1850 in part covered.  
sh, gr to bl, splintered  
about some dip as last  
in part weathered be?

#25 on creek - bridge



0-55 sh, gr to bl, shly, some  
concl. under zones.  
 $T 24^{\circ} N 10^{\circ} E$

1850 - 2300 Covered Interned.

27-15  
2300 - 2380 sh, bl some br shly.  
about 5/8 - 6" thin, 2/3 by  
1/2 in shly ss.

$T 87-89^{\circ} N 10^{\circ} W$

with a few up to 2"

Some containing some possible  
small fossils

27-16  
2380 - 2650 sh, bl in part shly in  
upper part  
partially covered

2650-2677 55, fr to med zone  
on gr. very fossil,  
27-107 other nat, may be  
newly nat. etc, some contain quartz,  
out to 8070 & of shale partially  
N. about 8070 four in lower 15 feet.  
like N 140 W

2677-3080 Error sh, bl, white  
27-18 some covered.

Stretch east 1/3 mile in  
N-S creek. approx  
same zone.

8-10 55, thin bedded, up to 6"  
very massive.  
T 78° S 23° E.

fault at east end  
shale all covering  
dip-slip zone.

10-65 sh red to bl, highly  
fractured, faulted, dip-slip  
all sheared etc

65-75 covered

75-120 ditto color slly sh  
10-65 partially covered  
some small plant frags.  
200 yds. distant  
covered area

~~75-120~~ 200 yds. south  
hazy area fault  
between

27-1 added to zone

0-12? 55, non, up to 5 1/2 feet  
15 thick, partially covered  
approx dip  
T 55° N 25° W

12-140 covered.

140-150 55, gr, dense, quartz

dip vertical at E 180° N

partially covered  
one bed 2' thick or less.

110) Iron Deposit

about 2" thick at road  
increasing to about 2 1/2 -  
3 ft to meet 90 yds.

27% Fe (Hema) in cr.

g: 55, apparently  
pinned out to east,

200 ft zone - 6 ft thick  
or so, red in color  
with Fe at top of lower thin  
possibly a small fault  
on left side of roadcut.

$\angle 66^\circ$  approx  $\searrow$   
 $\nearrow N 63^\circ W$

Some reversal at small fault

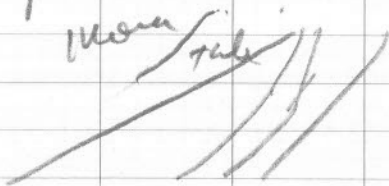
~~1089~~ around road 100 yds.  
3 little dikes 1-3' thick,

~~200 yards~~ white - brown.

at  $N 10^\circ E$ . They dip  
about  $60^\circ NW$ .

They run along small  
fracture & fault planes.

about 20 ft, as in  
Mesa, & a 20 ft zone  
of some talus, then  
enter Mesa again  
possibly a thrust  
fault



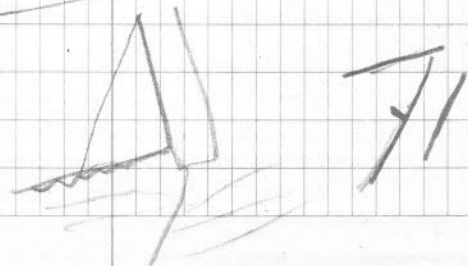
Mesa. highly fractured, contains  
some manganese patches.

small concav. <sup>above</sup> fault  
at east end. of part.

108 at east end <sup>900 yards</sup> of Faledopant  
in face below Mesa.  
thin beds.

Dipent 125' long  
& 15 ft wide exposed,  
and about 50 ft of  
strat. interval.

$T 190 N 80^\circ W$

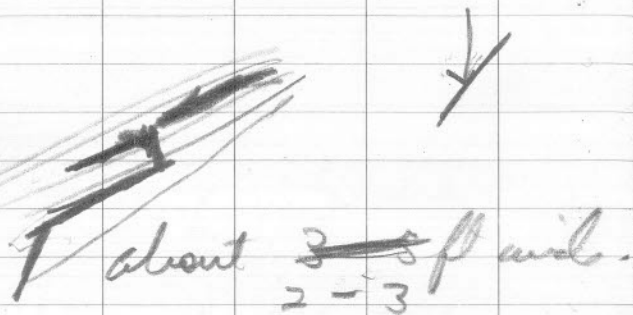


106) Sill <sup>to base</sup> <sub>at base</sub> 90 yds up road.

clay wh.

FM T 34° N 27° W.

Sill to dip about same  
St. N 40° E

  
about 3-5 ft wide.

107) 300 yds. up road, at  
large curve

vertical pipe cutting  
H.R. Mass. clay  
purple-white H 70° ab.  
vert, S N 15° W, 4 ft wide to  
on both sides of road

Mass. T 27° N 60° W

104) 100 yds up road,

2 dikes 100 ft apart.

1st. 3 ft wide, clay white  
mass. blue. water.

H N 55° W

dip SW about 80°.

fm T 57° N 47° W.

2 mt. 6' wide, St. N 70° W

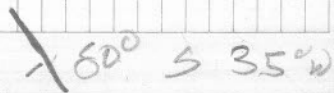
about 70° SW.

white, clayey.

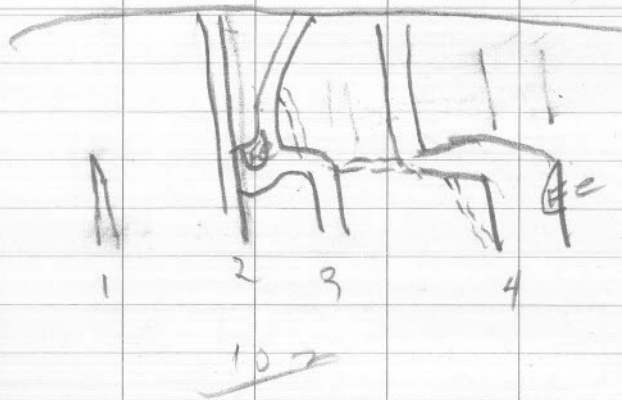
105) 100 yds up road

dike, vert. 4 ft wide,  
clay wh.

St. N 78° W.

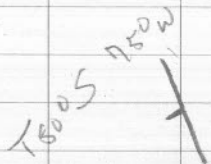
  
60° S 35° W

same very large size. Buckle  
up to 2" in size, the 2  
dikes were on east side  
or less coherence upward.



103 ~~no samp.~~

up road 200 yds,  
small dike  $\pm 80^{\circ}-70^{\circ}$   
st. N  $15^{\circ}$  W, 6" wide.  
white clay.



101 Dike, vertical, 2 ft  
wide, along a ~~unterminated~~  
fold of Bigfork chert.  
white & clayey  
Strike N  $30^{\circ}$  W



100 yds ~~unterminated~~

102. 4 dike with 100 ft., largest  
20 ft wide, <sup>at base white</sup> all clayified, in  
early before chert, smallest  
6" ~~unterminated~~, st. N  $47^{\circ}$  W.

Some Iron Mineralization,  
adj. to dike, none over  
2' thick.

13 100 yds from county line

14 150 yds farther  
like 40 ft. area.

100 2.3 miles from boundary  
cut off

Dike 5-10 ft wide, carb.

5.5 at base, very clayey -  
wh to brown, pyrite  
present.

Dip usually vertical

Strike  $580^{\circ}$  W.

Tight vertical folds

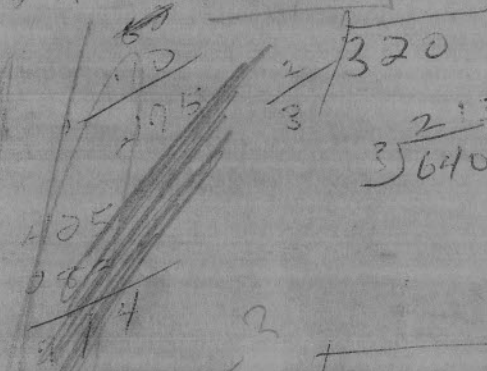
Some brownish  
material also visible.

Trace of iron, some  
red color.



6475

121



$\frac{2}{3} \overline{) 320}$

$\frac{2}{3} \overline{) 640}$

$\frac{3}{2} \overline{) 500}$

$\frac{7}{3} \overline{) 3100}$

3 59 44

97 95

78  
72  
150