Notebook 10.

Done.

Ozark Series, 1905-2;

Upper Paleozoic with Purdue, 1906.

A1-A10 1905-2-31

M1-

10

U. S. GEOLOGICAL SURVEY
TRAVERSE BOOK

9-904

E. O. Ulrich

1905. Ozark No 2

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30 ft. above track.
 From this point - the magnesian continues at track level for a while and ^{then} ~~continues~~ down till at least 50 ft. of the overlying dove (quad) rocks have sunk beneath track. About 20 ft more of this dove (Stenslie's quad) rock remains above track when rocks begin to rise again.

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30 ft. above track.
From this point the magnesian continues
at track level for a while and ^{then} ~~ends~~ ^{ends} again till
at least 50 ft. of the overlying ~~dove~~ (dove) rocks
147 have ~~sunken~~ ^{sunken} ~~Chadwick~~ ^{Chadwick} ~~Trunk~~ ^{Trunk}. About 20 ft more
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30 ft. above track.
 From this point the magnesian continues
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20 ft. above track.
 From this point the magnesian continues at track level for a while and ^{then} ~~ends~~ ^{continues} down till at least 50 ft. of the overlying ~~dove~~ ^{dove (Izard)} rocks have ~~sunken beneath track~~ ^{been beneath track}. About 20 ft more of this ~~dove~~ ^{dove (Stenslie-Izard)} rock remains above track when rocks begin to rise again.

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30 ft. above track. From this point the magnesian continues at track level for a while and ends down hill at least 50 ft. of the overlying dove (sand) rocks have similar bluish track. about 20 ft more of this dove (sand) rock remains above track when rocks begin to rise again.

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All Roubidoux to Gasconade and Piney	79, slip XI
Roubidoux beneath Cole Camp ss. may be wanting - this dolomite may be Proctor - Loc. M268 (Ar-lington on Little Piney)	79, slip XI
Roubidoux cherts at Loc. M272	79, slip XII
Upper Roubidoux or Bolin ss. at Loc. M271	79, slip XII
Sacville road, Humansville west to Turkey Creek on, and north on Stockton road to Osceola = Locs. M48-M70	46-48
Sadler Branch = Loc. M49	46
St. Clair at Loc. 251 (Pumpkin Creek, 2 to 3 miles southeast of Penters Bluff)	7
St. Joe ls.:	

bedded
massy
gray
is
about
80 ft.
l. just
over

20 ft. above track.

From this point the magnesian continues at track level for a while and then comes till at least 50 ft. of the overlying dove (sand) rocks have reached the track. About 20 ft more of this dove (St. Louis) rock remains above track when rocks begin to rise again.

St. Joe ls.:

At Loc.A4(north bluff of War Eagle Creek) . . .	14
At Loc.A7(Little Clifty Creek, $\frac{1}{2}$ mile below old Van Winkle mansion and Mill) . . .	18
At Loc.A8 (Carroll-Madison county line south from Little Clifty Creek) . . .	18
At Loc.A13 (road to Mundell after crossing river at Jennings ford) . . .	21
At Loc.A19(in North Clifty Creek) . . .	23
At Loc.A20 (mill near Grindstone Mt.) . . .	23
At Loc.A25 (south end of Basin Springs Park, Eureka Springs) . . .	27
At Loc.A27 (section on property Eureka Stone Co. 6 to 7 miles northwest of Eureka Sprs.)	26
At Locs.A37-A40 (Keener to Zinc) . . .	30
Underlain by Kinderhook at Turkey Creek tunnel (going from Yellville to Aurora) . . .	31
Base of 1 mile south of Roark Tunnel (going from Yellville to Aurora) . . .	31
Ozark rocks separated from by sandstone outcrop at Galena on James River (going from Yellville to Aurora) . . .	31
(St. Joe) Upper Burlington at Gates station on James River - altitude given . . .	35
At Loc.M16 (Bolivar to Buffalo) . . .	39

St. Peter ss.:

More or less friable at Loc.244(hill east of Guion) . . .	3
At Loc.246 ($2\frac{1}{2}$ miles southeast of Guion). . .	3
At Loc.248,249 (Crusher at quarry 4 miles southeast of Guion) . . .	4
At Loc.256(Iowa mine in vicinity of Smithville - Bains's locality) . . .	9
At Loc.A12 (north side of White River in bend $\frac{1}{2}$ mile south of Jennings ford) . . .	20
At Loc.A13 (road to Mundell after crossing river at Jennings ford) . . .	21
At Loc.A19 (North Clifty Creek) . . .	23

30 ft. above track.
 From this point the magnesian continues at track level for a while and then comes down till at least 50 ft. of the overlying dove (hard) rocks have reached the track. About 20 ft more of this dove (Stenslie. 2nd) rock remains above track when rocks begin to rise again.

Sedalia, Mo.:

West 7 to 8 miles from on Muddy Creek, then south to Camp Branch on M.K. & T.R.R., then east and northeast to Sedalia = Locs. M90-M97.

and northeast to Sedalia = Locs.	
M90-M97	54
Sedalia, $1\frac{1}{2}$ miles west of corporation line on	
Main St. road - small quarry in slightly	
tilted rocks forming small dome = Loc.M90 .	54
Sedalia-Stockton - Camp Branch-Cap au Gris	
axes	56
Bluff on south side of Muddy Creek about $7\frac{1}{2}$	
miles west of Sedalia = Loc.M93	55
Seymour-Mansfield locality - fossils at Locs.	
M12-M16 (Bolivar to Buffalo) like	38
Shannon County - fossils collected from Roubidoux	
in vicinity of Boylers Mills should be com-	
pared with some from	70
Shepard, E.M. - stayed at his lodge on James	
River	34
Shumard's Ozark County locality - upper Jefferson	
at Loc.M8 indicates same horizon as (cf.also	
locality north of Decaturville)	36
Smithville:	
3 to 5 miles northwest of in vicinity of	
Graceland mines = Loc.255	9
Iowa mine in vicinity of = Loc.256	9
Springfield embayment, Choteau embayment, Fay-	
etteville bay - Ozark Kinderhook was de-	
posited in	35
Springfield bay, northern border of = Loc.M10 .	36
Spring Valley, Ark. - hill $\frac{1}{2}$ mile west of	
- Loc.A2	13
Spout Spring, old store 3 miles east of = Loc.	
M134.. . . .	62
Spout or Jordan Spring - west of Loc.M136	
(Climax road)	63
Starks Creek - west of Loc.M136(Climax Road). . .	63

2071. above track

30 ft. above track.
From this point the magnesian continues
at track level for a while and ^{then} ends some 10 ft.
at least 50 ft. of the overlying dove (Izard) rocks
have within Hemath track. About 20 ft more
of this dove (Stens Riv. Izard) rock remains above
track when rocks begin to rise again.

Stockton road to Osceola - Humansville west to Turkey Creek on Sacville road, and north on Stockton road to Osceola = Locs.M48-M70	46-48
Stockton and Osceola crossroads = Loc.M56	46
Stockton and Sedalia - Camp Branch-Cap au Gris axes	56
Stones River:	
Upper Izard = Stones River or Lowville at Loc. 244 (hill east of Guion, Ark.)	3
Stones River-Izard at Loc.247 (Guion to Penters Bluff)	3
Stones River-Plattin-Izard rocks - thickness of	4
Stones River age of Izard limestone positively determined on trip to Batesville	7
Stover, Osage River, Rock Island R.R., Versailles, and Warsaw mentioned in description of area between Cole Camp and Buffalo creeks	70
Suspension bridge at Warsaw - east of Loc.M89	51
Sweeney's quarry (M.K.T.R.R.) section given	89
Swan Creek, Chadwick east to = Loc.M1	32
Swan Creek at forks of road 3 miles northeast of = Loc.M2 (Dickey's Swan Creek locality)	32
Sylamore ls.:	
At Loc.250 (Penters Bluff)	6
At Locs.A7,A8 (Little Clifty Creek, $\frac{1}{2}$ mile below old Van Winkle mansion and mill, and Carroll-Madison county line south from Little Clifty Creek)	18
At Loc.A12 (north side White River in bend $\frac{1}{2}$ mile south of Jennings ford)	21
At Loc.A20 (mill near Grindstone Mt.)	23
At Loc.A25 (section south end of Basin Spring Park, Eureka Springs)	27
At Loc.A26 (section 100-200 feet south of Basin Spring Park)	25
At Locs.A33-A36 (Berryville to Green Forest by telephone road, then by rail to Harrison)	29
At Loc.A24 (one-eighth mile north of Basin Spring)	25
Tipton, Mo.:	
$\frac{1}{2}$ miles south of = Loc.M195	72
Tipton = Loc.M196	72

30 ft. above river.
 From this point the magnesian continues at track level for a while and ends near till at least 50 ft. of the overlying dove (Izard) rocks have been beneath track. About 20 ft more of this dove (Stenslie. Izard) rock remains above track when rocks begin to rise again.

Tipton, Mo. cont'd.:	
Versailles to Tipton, to Jefferson City	
= Locs. M190-M198	72
Tipton south to Versailles	74, 75
Trenton ls.:	
Full of fossils at Loc. 247 (southeast of	
Guion)	4
Turkey Creek:	
St. Joe overlain by Kinderhook at Turkey	
Creek tunnel (going from Yellville to	
Aurora)	31
Southeast from Chadwick to Kensington mines	
on Turkey Creek = Locs. M6, M7	33
Turkey and Barbers creeks area - sandstone	
at base of section at Locs. M2 and M3	
wanting entirely	34
Turkey Creek on Sacville road, Humansville	
west to, then north on Stockton road to	
Osceola = Locs. M48-M70	46-48
Hill rising from = Loc. M55	46
Turkey Creek near Rookins P.O. = Loc. M57	46
Hockman east of Turkey Creek = Loc. M104	58
Cross Timbers, east of Turkey Creek	
= Loc. M137	63
Tuseumbia, Mo.:	
Gladstone to Tuseumbia via Rocky Mt. =	
Locs. M222-M239a	79, slips IIIa-V
Tuseumbia = Loc. M239	79, slip IV
Tuseumbia to Ramsay P.O., then south to	
Iberia - Locs. M240-M252	79, slips V, VI
Thin bed of cherty dolomite like Tuseumbia -	
1 1/2 miles south of Dixon	79, slip X
Proctor and Gunter ss. outcrops just south	
of Ramsay P.O., middle of sec. 23, 6 to 7	
miles east of Tuseumbia	note back of book
Van Winkle mansion and mill, Little Clifty	
Creek 1/2 mile below = Loc. A7	18
Versailles, Mo.:	
Versailles, Stover, Osage River, etc. - in de-	
scription of area between Cole Camp and	
Buffalo creeks	70
Boylers Mills to Versailles = Locs. M182-M190,	71
Versailles = Loc. M187	71

20 ft. above track.
 From this point - the magnesian continues
 at track level for a while and then comes down till
 at least 50 ft. of the overlying dove (sand) rocks
 have reached the track. About 20 ft more
 of this dove (Stenslie sand) rock remains above
 track when rocks begin to rise again.

Versailles, Mo.; cont'd.:	
Versailles to Fortuna mine = Locs. M190-M198	72
Versailles to Tipton, to Jefferson City	
= Locs. M190-M198	72
Tipton south to Versailles	74, 75
Versailles south to Gravois Mills, southwest	
to Proctor, east to Gladstone (or Riffletown)	
= Locs. M205, M206	76
War Eagle Creek - Gibson's farm on south bluff	
of = Loc. A3	14
War Eagle Creek, north bluff of = Loc. A4	14
Warsaw, Mo.:	
Osceola to Warsaw via Iconium and Fairfield	
= Locs. M70-M89	49-51
Suspension bridge at Warsaw, east of Loc.	
M89	51
Warsaw southeast to Climax Springs = Locs.	
M98-M113	58-61
Macks Creek to Warsaw via Cross Timbers, then	
back to Loc. M89 (bridge over Osage River	
1 mile east of Warsaw) = Locs. M129-M148	62-64
Warsaw and Cole Camp road = Loc. M164	67
Warsaw, Versailles, Stover, Osage River, etc. -	
in description of area between Cole Camp and	
Buffalo creeks	70
Weaubleau Creek = Loc. M73	49
Well - artesian, above Boylers Mills - line on	
thickness of Proctor is afforded by sandstone	
here should be same as one at base of Gasconade	70
at Decaturville	
Well - Monks Mound, 4 miles northeast of East St.	
Louis - record of	back of book
Wells, artesian, two, at Loc. M230	79, slip IIIa
West Aurora at Loc. M229	79, slip IIIa
White Branch near Locs. M98, M99	58
White River, north side of, in bend $\frac{1}{2}$ mile south	
of Jennings ford = Loc. A12	20
White River Division Mo. & Pac. Ry., from Yellville	
Ark., to Aurora, Mo. - notes on observations	31
along	

across in
 30 ft. above track.
 From this point the magnesian continues
 at track level for a while and ends near till.
 at least 50 ft. of the overlying dove (sand) rocks
 have similar elements track. about 20 ft more
 of this dove (Stenslie. sand) rock remains above
 track when rocks begin to rise again.

Willow Fork = Loc.M197	72
Winslow or Morrow at Loc.A2	13
Yellville ls.:	
Yellville or Everton, may be, at Loc.253	8, 10
Yellville at Locs.A7, A8	18
Yellville at Locs.A9-A12	20
Yellville at Loc.A13	21
Basal Yellville at Loc.A14	21
Basal Yellville at Locs.A15-A17	22
Yellville and Jefferson City - contact between at Loc.A18	22
Yellville at Locs.A19, A20	23
Yellville at Loc.A23	24
Yellville at Loc.A25	27
Yellville at Loc.A26	25
Yellville at Locs.A29-A32	28
Yellville at Locs.A33-A36	29
Yellville outcrops west of Bergman, NE. $\frac{1}{4}$ Harrison quadrangle	31
Contact at base of Yellville from Myrtle to Omaha tunnel (going from Yellville to Aurora)	31
Yellville? at Loc.M1	32
Zinc - Keener to = Locs.A37-A40	30

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(146)
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as abrupt
180 ft.
tail - just

across
20 ft. above track.
From this point - the magnesian continues
at track level for a while and then ends down hill
at least 50 ft. of the overlying dove (hard) rocks
have under them (Stenslie. 2 yard) rock remains above
of this dove (Stenslie. 2 yard) rock remains above
track when rocks begin to rise again.

across in
30 ft. above track.

From this point the magnesian continues
at track level for a while and ^{then} ~~continues~~ down till
at least 50 ft. of the overlying dove (Zand) rocks
have reached Summit Track. About 2 ft more
of this dove (Stens Riv. Zand) rock remains above
track when rocks begin to rise again.

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across the road
30 ft. above track.
From this point the magnesian continues
at track level for a while and ^{then} ends down till
at least 50 ft. of the overlying dove (sand) rocks
have sunk beneath track. About 20 ft more
of this dove (Stenskiö. sand) rock remains above
track when rocks begin to rise again.

Oct. 7th 1905. Guion To Porter's Bluff, Ark.

Loc. 244

530' Mostly dove ls. ^{Upper} 93rd. ^{Lower} 93rd. ^{St. P. Riv.}
 480' 500' Mottled dove & oolitic ls. with a few quartz gr. ^{St. P. Riv.}
 470' 490' Layer full of quartz granules. ^{St. P. Riv.}
 390' ^{St. P. Riv.} ^{St. P. Riv.} ^{St. P. Riv.} ^{St. P. Riv.} ^{St. P. Riv.}
 310' ^{St. P. Riv.} ^{St. P. Riv.} ^{St. P. Riv.} ^{St. P. Riv.} ^{St. P. Riv.}
 300' = 300' what is nearly the base of the ls.

at Creek 1 m. E. of Guion Hor. B. comes down to level
 of R. R. track. Immediately after it begins to rise again.
 Fossils occur in quartzite ls. ^(chiefly pelecypods) ^{1-10 ft. above}
^{1/3 m. farther} B. has, after rising to 20 ft above,
 again descended to track. The dip is gentle
 and continues eastward till the fine gr. dove
 ls. of the 480 ft. level are ^{just east of 3rd track (Loc. 245)} ^{to track} These
 dove ls. prove full of small fossils, 2 brachiopods, fragm.
 of trilob. & particularly an anclonoid like one gotten
 in St. Riv. at Ringgold, Ga. Also *Tetradium* & *Lepidodermis*
 This bed remains at level of track for 1/2 mile then
 rises, the magnesian subgranular rocks coming to
 surface until the St. P. outcrops in 4th draw (= 2
 - 2 1/2 m. S.E. of Guion) = Loc. 246
 These magnesian beds are mainly heavy bedded
 but thinner layers occur, and most of these heavy
 ones being laminated it is likely that they
 would break up under weather and thus
 appear much thinner bedded in less abrupt
 exposures. Their thickness is about 80 ft.
 The St. P. rises in a small anticl. just
 across the draw up to about
 30 ft. above track.
 From this point the magnesian continues
 at track level for a while and ^{then} ^{comes down} till
 at least 50 ft. of the overlying dove (93rd) rocks
 have ^{been} ^{eroded} beneath track. About 20 ft more
 of this dove (St. P. Riv. 93rd) rock remains above
 track when rocks begin to rise again.

Judge thickness of these ~~St. Peter~~ - Platin-Izard rocks to be about 80 ft.

Above them is a white subcryst. ls. full of Trinton fossils and otherwise like the Kimmswick Raf. alternata, ramose bryz. Eury. multipora, etc. were seen but could not load myself, the heat along these bluffs being terrible.

These Kimmswick rocks form a nearly solid mass but cannot yet say how much of the 150 ft or more bluff is of this and how much of the overlying Polk Bayou which also is shown to occur in it by Tallus.

Rising, ~~the~~ with a 5°-10° dip ^{west}, the St. R. & magnesian soon go into air. wherein something near 150 ft. St. P. ss. which goes to top of bluff. ^{Joachim} 248 - forms floor of upland form. ^{NW} In middle of arch a ls. rises to 50 ft. above track. The 170 ft. of St. Peter is divided as follows:

90 - 100 ft.	ss. = up. St. P.	} - St. P.
30 - 40 "	ls. = low. St. P.	
20 ft.	ss. = up. ss.	

In cave (above track a bottom land) In cave beneath lower ss. some thin-bedded or rather laminar magnesian

ls. is shown. Top of this ls. a few feet above track in field north of track.

About 40 ft. above base of magnesian rock above ^{St. P. ss.} (all of which 40 ft. is of darker shade of gray and more solid than upper laminar part of Joachim magnesian form, a few feet of Izard-like loc down ls. This separates the Joachim into two nearly equal parts.

Quarry at Crutcher (3 1/2 - 4 m. S.E. of Union) rising upper Platin, which is here a platy, small ls. with an occasional thin bed of shaly material. works into even layers, brittle and readily crushed. Lower half of Izard beneath quarry more or less fossiliferous.

Rough sketch of Potters Bluff, with approximate thickness of rocks.

Loc. 250

more natural proportions

Was too tired and reached point too late to

Potters Bluff section

At south end of bluff where top surface gradually turns on north end, the basal part consists of Platin-Izard, lying nearly aflush.

Pontine Bluff section -

Alt. 830' Base of bluff - *Challenger*

690	Top of Pontine chert lens
670	St. Peter's ss. 20-30 ft.
650	St. Peter's ss. 20 ft.
520	Bottom of Ferrisville ls. 100 ft. thick
485	" " Kimmswick ls. 30-45'
345	" " Plattin 100-200 ft. thick
300	" " Joachim ⁴⁰ 100 ft. - thick
260	" " St. Peter's ss. not exposed here.
	Basal chert

See Meade, W. E. Bull. 734 for details of Joachim⁴⁰ in Bentonite region.

Judge thickness of these ~~strata~~ - Plattin - Joachim - rocks to be about 80 ft.

Above them is a white subcryst. ls. full of Tranton fossils and otherwise like the Kimmswick Raf. alternata, ramose bryz. very multiplex, *Stellera* were seen but could not locate myself. The best along these bluffs being terrible.

These Kimmswick rocks form a nearly solid mass but cannot get any how much of the 150 ft or more bluff is of this and how much of the overlying Polk Bayan which also is shown to occur in it by Tallus.

Rising, the with a 5°-10° dip the St. R. & Magnesian soon 8° into air. Whence something near 150 ft. St. P. ss. which goes to top of bluff. 248 - forms floor of upland from NW. In middle of arch a ls. runs to 50 ft. above track. The 170 ft. of St. Peter is divided as follows:

90 - 100 ft.	ss. = up. St. P.	} - St. P.
30 - 40 "	ls. = low. ls.	
20 ft.	ss. = up. ss.	

In cave (above track a bottom land) In cave beneath lower ss. some thin bedded or rather laminar magnesian

ls. is shown. Top of this ls. a few feet above track in field north of track.

About 40 ft. above base of magnesian rock above up. ss. (all of which 40 ft. is of darker shade of gray and more solid than upper laminar part of Joachim magnesian form, a few feet of *Isard*-like low dom. ls. This separates the Joachim into two nearly equal parts.

Quarry at Crasher (3 1/2 - 4 m. S.E. of Union) mining upper Plattin, which is here a platy, small ls. with an occasional thin bed of shaly material. works into even layers, brittle and readily crushed. Lower half of *Isard* beneath quarry more or less fossiliferous.

Was too tired and reached point too late to climb Pontine Bluff. It is a fine sight and must be interesting geologically. At the west (or north) end the basal 15-20' above track consists of the upper part of the sparry lower Joachim of the bed immediately overlying the St. P. is of that age. Above this a 35' + bed corresponding to the upper J. is set off by a bench from bed next above. The Plattin also forms a vertical wall set off from bed next above by a less sharp bench.

Above the Plattin the bluff is sometimes a solid wall to the top - at other points the upper half of this crystalline part of bluff is set back more or less indicating two different formations. The lower part is a white marble, and much harder than Plattin. The upper which is also a decided pink or red and clearly Polk Bayan. The lower white part looks like and probably is Kimmswick, but am not positive on this point. Perhaps the few fossils collected (many more could be found) may aid in deciding question. (Took up Arkansas reports for certain) At south end of bluff where top slopes down more gradually than on north end, the basal part consists of Plattin-Joachim, lying nearly flat.

To the south of this end, about 500 feet across a valley, is another but ^{much} smaller bluff. The upper part of this is pink, the lower white marble. The pink contains, in debris supposed to have fallen from this bluff, Polk Bayan fossils. The white contains Rafinesquina and a few other things that may indicate Kinnisnoh. However this point is still hazy in my mind. That a fault separates the two bluffs is almost certainly indicated by the much lower position of the Polk Bayan in the small bluff than ~~the~~ the observed dip in the large bluff could account for. Some day shall try to spend a day or two at this bluff. It will be worth while.

Oct. 9. 1905

On way to Penters Bluff (drove over from
Batesville) looked at some phosphate and
manganese mines in a small tributary of
Canebrake Creek, 2-3 m. SE of Penters Bluff.

At least two faults are indicated ^{coming} along road between Batesville & Pontus Bluff. Had not time to investigate them. The Casco shale outcrop above noted probably is a normal one though the rocks dip strongly down the draw in which the mines are located. Just

The sketch is a hand-drawn geological profile. It shows a road on the left, labeled 'Road' and 'Jefferson'. A fault line, indicated by a dashed line, is labeled 'Fault'. To the right of the fault is a hill labeled 'Boonville'. A small area on the hill is labeled 'Casco'. At the bottom right, a body of water is labeled 'Pott Bottom'.

before reaching the
mill on Lafferty creek
they rise again to the point of the hill as
well as ^{base of} the hill on or w side of
creek showing at least 50'-60' of Park Canyon
ls. outcropping.

The most important result of the Butteville trip is the positive identification and determination of the ~~Black River~~ ^{St. Peter} ~~age~~ ^{age} of the Gard ls. See if it is desirable to drop ~~Platte~~ in favor of Gard. ^{See also whether original exp. of Gard includes magnesian ls. at base. *}

Another important result is the discovery of a magnesian ls. above the St. Peter that may be correlated with the Jouheim.

A third is the recognition of a white marble beneath typical
Polk Quarry that may be the Kemmerich.

24. 11. 1905

Loc. 253. Section at quarry, $\frac{1}{2}$ m. below R. R. bridge at Black Rock, N.Y.

- ground & sand.
- 12' The uppermost to clay below, with calcareous spots throughout. In three layers
- V 4' Shelly, mass-bedded fine gr. (cf. Strom. with d. Champlain up. Cal. 5m) *graptolites*
- IV 2'-4" Sandstone, shaly, calcareous, with small *graptolites*
- III 9' Upper one foot filled with a small *Girardinella*?
- II 2'-4' Siliceous, calcareous, with small *Girardinella*?
- I 10' Siliceous, calcareous, with small *Girardinella*?

Station on branch R.R.

The rock in this quarry looks very much like a dolomite but expect to find it only slightly magnesian.

Age of formation apparently late *Strom.* *diff. liq.*

?? The *Anthaspidelloid* sponges being noted in chiefly in making this determination. On the whole the fauna is peculiar and in some respects reminds of *Co. Tenn.* Perhaps age is partly *Black River*.

Upper parts of beds I & II and lower $\frac{2}{3}$ of bed III are veritable sponge and bryozoan reefs. The fossils occur chiefly in colonies, being extremely abundant in the lower end of the quarry and few in other parts of quarry. The only way to procure them in good condition is to break them from the partly solid chalky surface of the bordering solution channels. Those entirely freed and now in the residual clay are too coarsely silicified to preserve details of structure, while those in the solid rock are to be seen only in section.

Accretions in the clay - probably aluminous - having unusual specific gravity, may turn out to be *Smithsonite*.

12

St. Peter

Lower (?) up) ss. & quartzite of St. P.
15'
30'
Dip 30'
Dip 30'
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Dip 30'

3-5 miles N.W. of Smithville,
II. 20+
III. 7-10
II. 4-6 ft
40+
Black Rock
Heavy bed
Light bluish gray dol.
Dolomite
Gypsum
Siltstone
Shale - very fine grained
Sandstone - coarse grained
Limestone - massive
Dip 10° S.E.
Gravel pit = large sandstone
g.

8 10 ft. or more. = bed III g.
Grandland mine section.

Loc. 256 Burns' loc. (Iowa mine)

Abundant fossils found in residual clays - chiefly gastropods of the Ft. Cassin types. With these the bryozoan - irregularly obconical - occurring so abundantly at loc. 253. The beds at the latter point probably indicate a slightly higher horizon than remains in the Smithville section, the top of the up. Yell. being eroded and removed there.

~~Loc. 257~~

Loc. 257 = Diggins $\frac{1}{2}$ m. S. of Lava mine.
" 258 = Skiff $\frac{2}{3}$ m. " "
" 259 = Road side and field north
edge of Smithville.

Loc. 2537 Loc. 2538

10

Trans. Bands of H. P. Type

4-0-0

40

?40' Sand slope

Saw
apparently no Eventan here, but
this covered space may represent it. No
congl. chert at base like that found in
vicinity of Smithville.

(See p. 8)

Completed 20.5.

regarded as representing
Myzograptus beds at
Graceland mine.

Prof. Wm. E. 100

You will find good to try of all the
inside the envelope. I will be
try over to to above except 10-15 ft.
Base of quarry section where a heavy
sheet layer or layers 1-2 ft. thick
This probably is the base of the
of Smithville.

20

20 ft. high. Sandy, yellowish, sandy, at base a few ft. looks sandy. The remainder looking in certain respects more like Boone than Goff. Chiefly the latter it must belong beneath upper yellow. Looks fossiliferous. Sent Dr. to the land lot.

Sent Dickey to this point later. See his collection.

End of 1905 season

1906 work in

Arkansas
Missouri

Trip through North Arkansas with
Prof. A. H. Purdue - July 3-12, 1906

1906-A 1.

July 3rd, 1906. Saw some peculiar features
among them a conglomerate, in supposed Pitkin
at Fayetteville. Took photo. of unconformable
contact of presumably basal Morrow (Heli) ls. &
the oolitic ls. supposed to be Pitkin. This outcrop
shows no conglomerate and the beds are most
certainly not the same as those 300 yds. near
University that are so distinctly conglomeratic. The latter
contain numerous fossils the most abundant of which is
the *Michelinia* that is so common in the ls. of the
Morrow. However a couple of specimens of the Pitkin
species of *Archimedes* were observed, for which reason
the bed has been called Pitkin. If not the *Archimedes*
would have to be considered as pebbles.

Have instructed Messers to look into this
problem and to collect fossils & rock specimens

Photos - Roll V. exp. 9.

X See Museum

July 4th

or ...

rather sparse, yellow to brownish ss.
Thin, irregularly bedded, fine gr. ss.
Shale, thin ss. interbedded, full of *Lepidodendron*
12-14 inches congl. Pebbles very rounded, 1/2 to 1 inch
in dia, often lenticular, very fine grained, 1/2 to 1 inch
size of chert that has been changed with
limonite, or derived from the limonite
concretions of the underlying Fayetteville shale and
consequently impregnated with silica & iron

1906-A 2

Hill 1/2 m. west

of Spring Valley, Ark.

Enricha Springs quad.

1425' Batesville ss. 0-4 ft.
congl. oolitic Batesville.
Brown chert.

167

Bluff on War Eagle Creek, just below
 July 6th War Eagle P.O. A. G.

very cherty non cherty

1-2' layer running parallel to contact line. It is made up of ls. (very compact, dove) boulders, and nodules in a matrix of calc. shale cement. The boulders are entirely calc. (non cherty) while the similar nodular ls. beneath, from which they were derived, is almost entirely converted to flint. This is accounted for by the supposition that under ground water charged with silica found the contact line a favorable avenue and thence sank into & converted the fine grained ls. beneath. Directly above this part of bluff the overlapping ls. which is a rather solid, mainly light gray and of medium grain is quite non cherty. At the west end of the bluff however the same bed is properly cherty.

- Calc. shale with very fine gr. ls. in nodular layers. The ls. predominates over shale, and is largely replaced by flinty chert. Part ls. & sh. highly fossiliferous, especially in bivalve shell where thin plates are filled with thin sh. bryozoa.
- 0-60' Fairly well bedded, very cherty ls. upper surface uneven, cherty layers, either in nodules or replacing whole layers of ls. ls. fine gr., light dove. Fossils shells - in lower part Favosites.
- 30' Non cherty, grayish blue, medium grained, crinoidal ls. upper half interbedded with a little shale. Fossils etc. as in upper part. Lower half may be Rensselaerian and quite distinct from upper part.

On account of absence of worn material indicating subaerial erosion, this unconformity is regarded as indicating subaqueous erosion. The same is indicated by the character of the supposed boulders in the 1-2 ft. bed at base of overlapping Boone. If erosion had been under land conditions the ~~thin~~ ^{derived from} boulders would almost certainly have been of flinty chert. On the contrary they are of finest ls. with not a sign of chert in layer, while, as described above, the ~~bed~~ limestone from which the boulders were derived is largely replaced by chert.

The overlapping rock is of Boone above the St. Joe, the latter being absent in this region. It contains the black Pythioleptis-like markings. The St. Joe probably wedges in from syncline to west within western extremity of War Eagle P.O. incline.

2
100

48

The ss. is very uniform in character in its lower part, estimated about 18 ft. Immediately above this is a layer full of small chert pebbles and with these a few black, presumably phosphatic pebbles or spots. Just beneath this layer a skeleton bed occurs, and several of these were observed in the overlying yellow brown stained layers. The top layer is irregular and is marked on its upper surface with great numbers of burrow like impressions $\frac{1}{2}$ inch or so in diameter and arranged generally in an irregularly radial manner. The radial spaces vary from 2 to 3 inches in diameter. 2" - 3" jointed stems $\frac{1}{2}$ in. ind. -

A9

Rocks beneath mass of ss. are much contacted, con-
chert in abundance and Cryptogon. A little shale apparently with
same but this may have fallen down from cherty bed above ss.
Top of ss. rounded and in places concave.

3 Photos - Roll VI, 1, 2 & 3. Pictures sitting in foreground of middle
Permian str. 29:04, 0101, photo.

A9

1160
1120 40' St. Peter to top of hill.
with small chert pits in base.

Section at above point = Y of name of
Little Cherty creek in
Eureka Springs area.

A9

1 1/4 mile

A10

A11

Sections of Jeff City & ss. reefs on same.

Sandstone occurred generally or always only on the arches.
This evidently is due to elevation & hardening of ss. while
in submerged position the sand remained unconsolidated
and subject to removal by currents. The latter is in part
at least accounted for by the
lenses of sandstone found in
this vicinity above the basal ls. congl.
of the yellowville.
In the basal congl. the pebbles are
small and white, being apparently
of the light colored shaly yellowville material.

A12

North side White River in bend
1/2 m. S. of Jennings Ford.

From 1150 ft. level determined
by St. Peter (see page 2).

1150

Jennings
Powell

30+-

10'-12'

50'

9'

75'

Brown chert

St. Joe

apparently chert. shale

St. Peter (Photo in pocket)

Large Crypt. small mammillated & columnar
many 2-4 ft dia.
ls. with chert pebbles.
with a network of ss. congl. lenses.

Jeff City chert full of Cryptogon

Rocks dip eastward to White River and then
rise again east of river. Where above section was made
they form a considerable dome that influenced course of river.

A13.

After crossing river at Jennings Ford and then
over mountain on road to Mendell, found
shale interval between St. Joe and underlying ss. to be but
6-10 ft. The ss., which was regarded as St. Peter, is about
10 ft. while the yellowville ranged through 75 ft. of
the rapid descent from the mountain into creek.
The formation dips distinctly eastward, so that doubt
that it is more than 125-130 ft. thick. At its
base and apparently also above base, ss. occurs
in distinct patches. From 50 to 75 ft. of Jeff City
exposed base of section to creek.

A14. Followed creek northward to Mendell.
1/4 m. from this P.O. climbed over hill on east side of
creek. The whole of hill, which is capped with
basal yellowville ss. exposure about 160 ft. of Jeff City.
Somewhere in section a drusy layer, in places
like one near Mansfield. Also, some
blocks of same being observed.

West slope Grindstone Mt.

East slope Grindstone Mt.

Bathville ss. to top 1750
of mt. about 100 ft. thick
No oolite obs. on this side

1788
Bathville ss. 55' 1770
1735 top of Boone ls
1700
1666

A 21

Considerable crinoidal ls. with large tentacles
Platy, columns and brachiozooids

Boone ls. about 300' to 350'

A 20
1270

Top of Sylamore ss at A 20.

(Lower shale of contact of middle Devonian on left. Canadian was loosely attached to A. 24 or 25 and hence lost at misplacement. E. 21. Oct. 1904.

A 22. Oolite in Boone 3-4' up, estimated to reach about 75 ft. beneath top.
Forks of Eureka sp. road about 1 m. N of Pond 27th.

Grindstone Mt.

Structure through Grindstone Mt. from A 20 to A 23 (Eureka Spring)

Eureka Spring A 23.

Have concluded that the "Eureka" shale, except the 1 ft green shale at top, is really Chattanooga & should be so mapped. The black shale is fossiliferous and has more exactly the usual character of the Chattanooga than hitherto believed. It appears to be the remnant of an originally thicker bed, that during Kinderhook time underwent no deposit and was subjected to gentle erosion. This is indicated by a very thin (1/4 - 1/2 inch) layer of very fine green plastic clay that separates the underlying green calc. shale from the fossiliferous black shale below. The fossils doubtless all came from the green shale. The clay even corresponds to congl. shale in shale at A 4 (E. 21).

July 9 P.M.

A 24

1/8 mi. N of Basin Spring

Wp. Jeff. Yellowville 32' crowded with large & small, sp. yell. Cryptogon. 3-4' thin cherty ls lower half wavy; laminated 1/2 - 1 inch 1-2' Basal yell. congl. here ls. parts of Jeff. City no Cryptogon here

For section at south end of Basin Park see p 27.

A 25.

Section 100-200 ft south of Basin Park

A 26

Condition here practically same as at Quarry desc. p. 26

A 24 A 25 A 26 A 27
Basal bed of Jeff. City
1 Sylamore 1' to 4'
2 Top of Jeff. City 0-17'
3 Top of Jeff. City 0-17'

July 9 - 1935. Eureka Springs and vicinity.
(see also bottom page 24 & 25)

26

Section on property of Eureka Stone Co.
(5 mi. in air line) NW of Eureka Springs, Quasigat
A 27

Photo roll 27 Sept 2 weeks in Jeff 20 ft below top

at Pond up from directly east of
Business Hotel 1/2 mile.

Eureka Springs, Ark.

A. 28'

The layer seems to represent residual clay, partly reworked at time of yellowish overlap.

27

July 9 - 1916. Eureka Springs and vicinity.
(see also bottom page 24 & 25)

Section on property of Eureka Stone Co.
(5 mi. in air line)
7 miles NNW of Eureka Springs, Garrettsburg River.
A 9 17

SURVEY OF THE UNITED STATES GEOLOGICAL SURVEY.	
No.	Name: { Field: Determined:
LOCALITY:	
Collector:	Date: Note Book: Page:
Memoranda:

1300'

in the west of the
mouth of the river, and
the

9-161.

SURVEY OF THE UNITED STATES GEOLOGICAL SURVEY.	
No.	Name: { Field: Determined:
LOCALITY:	
Collector:	Date: Note Book: Page:
Memoranda:	

975'

950'

900'

9-161.

A 29

Eureka Springs 3:45 P.M. To Berryville
July 11, 1906. 7 P.M.

The Jeff. east of Kings river is very cherty in parts yet there is much, only moderately hilly, good farming land between the Osage and Berryville. On the whole the beds rise eastward from the Osage; and they include a number of thin calc. red and cross-bedded ss. layers usually less than a foot thick. There seems also to be considerable cherty congl. toward top. Most of the chert however is of the laminar sort occurring in blocks & slabs from one to 8 inches thick. Some looked highly suggestive of *Frang. fossilifera*. If I had time would certainly have looked them over. The Jeff. Crypt. was claimed but it is not very abundant here. East of Berryville some ss. in upper part. Somewhat to my surprise found undoubted evidence of Yellville but to the west and the east of Kings River, but I have no idea as to its thickness. Sandstone and congl. was observed at horizon supposed to be near contact. The Yellville horizon seems to be absent ^{along road} east of the supposed patch at A 32. Possibly the 1250+ hill east of that locality is capped with Yell.

Some of the Jeff. reminded strongly of 2nd ss. especially of those outcrops between Mansfield & Ava, Mo.

July 12, 1906. Berryville to Green Forest.
Thence by rail to Harrison
along telephone road.

Decided dip eastward at A 35. Thickness of Yellville not determined at either A 34 or A 35.

Sylamore ss. accumulation in eroded top of Jeff. city ls. anticline. Probably a reef during late D.W. times. Ls. congl. & heavy masses of chert beneath ss. Also bosses of Jeff. ls. project into base of ss. The latter nearly 40 ft. in thickness.

Short distance ^{east} ($\frac{1}{2}$ m.) Batesville ss. on level of Jeff. chert indicates faulting with down throw to east side. The Batesville forms surface along R.R. for several miles east of Green Forest, when descent of road (and rise of rocks) brings up Boone. Another broad Batesville area occurs east of Boone belt which continues to point where road begins its descent to Harrison some (? 5 miles) west of that point.

Found Camp, with Mesler, Austin & Luker about 2 $\frac{1}{2}$ m. west of Green Forest. Raining all day. Went with M. & A. in rain to A. 36 which proved an interesting point. Doubt if there is any Yellville east of Jennings Gap. However, it probably occurs east of fault in basin which is believed to extend eastward beyond Harrison into Yellville quad.

Kerner to Zinc along R.R.

From Myrtle to Omaha tunnel a good example of contact congl. at base of ^{Powell} yellow, with chiefly chert boulders of size up to 8 or 10 inches in diameter, is frequently and well exposed in numerous cuts. The bed varies apparently between 2' & 10' in thickness. At North end of tunnel ^{base of} St. Joe descends to beneath track level - Apparently due to anticlinal structure of area. At east, ^{or south} end of tunnel contact congl. shown in cuts with approximately 40 ft. of ^{Powell} yellow above it to base of St. Joe. Below chert

July 1950 - in Missouri
July 17. 3 - 7 P.M.
Chadwick Mo. east to
Swan Creek.

Rocks dip rather strongly toward creek. Beds
therefore are considerably thinner than the
barometer indicates them to be at this outcrop
along road. Part of this thinning ^{and apparent dip} is due to near-surface
solution and slumping of beds at the outcrops.

Hot walk of 8 miles - (4 miles there & 4 back.)

July 18th Swan Creek, at forks of road 3 m. NE of
Chadwick, and ^{on map} just about figure 2 in B.M. 1023.
= Ditch's Swan Creek locality of last year.

Between level of creek and 1125' is total of about ⁸⁰ 80 ft. of Jeff. ls. Whether any of this or any beds above belong to Yellville could not be determined on account of lack of exposures. The fossils indicate well up in Jeff. and of Fort Cassin types - therefore indicating that at least part of the Jeff. may belong to Ordovician if Fort Cassin is basal Ordovician.

P.M. of July 17 - SE from Chadwick to Kensington mines
on Turkey Creek.

Coming up Turkey Creek the ls. congl. which is a rough, pitted gray & slightly porous dol. often containing Galena, was first seen about 960' and continued to rise to with creek bed to about 1125 at mine (M7). Here a series of parallel fissures have been mined at close interval over a space of 600 ft. or more in length. Mining operations resulting in several hundred thousand pounds of lead. In mine itself the fissures are one of which a shaft has been sunk to 130 ft. (on another to 97 ft.) the fissure opens and pinches at intervals between the extremes of 0 and 3' 6". The ore in these "swells" consists of from 10-25% of fine grained galena and galena, in nearly equal amounts, filling interstices between fragments of country rock - in the cans seen a fine grained, light bluish, argill. dol. In the open pits galena only is found in residual clay and chert. The last contains a few fossils, principally the small *L. bigranosa* and an *Hormotoma* (W) (W) presumably the same as the small form collected in upper Jeff. in Wright & Vash Counties. These beds are..

believed to belong beneath the Swan Creek fossil horizon - hence that the fissures containing the ore parallel a small fault. 1

The fissures strike about N 15-20 W.

It is worth mentioning that the ss. observed at base of section at M2 to M3 is wanting entirely in the lower Barbours and Turkey Creeks area.

That Swan Creek flows southward in a {folded} pitching trough is very evident. It is certain that at Garrison - 875' - the section does not expose beds 20 ft - if any - beneath those at McGee's house M2 = 1023' - despite the fall of nearly 150 ft.

Secured a barrel of pretty fair material at M2.

Am going northward on train toward Springfield, met E. M. Shepard who has a lodge on James River and insisted on detaining me for a day. Enjoyed stay with his family and spent time profitably in talk & study of Mo. reports. Contemplated trips to outcrops in vicinity however could not be made on account of crops and continuous rain.

At lodge they have several large springs which issue, as is usual ^{in SW. Mo.} north of White River, ^{usually in contact} between his lower & upper Burlington. The former is a dense, highly cherty ls. that strikes me as of Kinderhook rather than Osage age. The Kinderhook in the Springfield embayment (Shepard's town) therefore includes more divisions than can be distinguished & perhaps are present elsewhere. 1)

The limestone above the spring horizon is a crinoidal, ^{sparsely cherty} and slightly shaly one, with *Euomph.*, *crinoids* & *brachiopods* extremely like true Burlington. The *Junco* is somewhat different yet these basal beds of the "Up. Burl." are commonly exposed (not wholly because underlying beds are quickly removed) and in other reports are so much like the St. Joe that I am strongly inclined to correlate them. Still the Springfield embayment was in existence at the time and caused certain differences between Burlington deposits north and south of White River. Those north are more ^{homogeneous lithologically} than those south. See Shepard's disc. in *Geol. Co. report*, Vol. 12, p. 116.

Base of up. Burlington (St. Joe) at Gates station on James River at 1180'. James River at this point about 1130'. Station, town of Ozark 1145'.

Beneath this "Low. Burl." Kinderhook in the valley of the James, at Ozark, there is a calc. shale filled with mainly diminutive fossils (a lot of which were collected by Dr. Girty) that should throw some light upon age. *Taonurus*, Dr. Shepard tells me occurs in the Hannibal ss. and in the base of the "Low Burl." In Boone county, according to Broadhead this fossil occurs in a thin ss. at base of Chautau. This fossil probably will prove important in correlating the ~~different~~ various pre St. Joe ^{localities} in Mo. & Ark. affording it. From observations already made the typical Chautau would appear to represent beds above the *Taonurus* horizon (indicating slow deposition or hiatus at Eureka Springs) and to correspond to Shepard's ^(? Chautau & "Low. Burl.") in Springfield embay, the cherty above the *Taonurus* & beneath St. Joe on War Eagle and to pre St. J. Miss. beds at Suffer Springs, Ark. [Compare also section near Table Rock.]

It appears further that the Ozark Kinderhook was deposited in at least 3 more or less distinct embayments:

- 1, the Fayetteville Bay - including War Eagle on east & Suffer Springs (also Table Rock) on west - this bay ^{opening to south or SW.}
- 2, the Springfield embayment, extending eastward to Decaturville and opening westward;
- 3, the typical Chautau embayment (or other type of ^{coastal} body) occurring on NW. & N shores of Ozarkia and extending eastward to or beyond Jeff. City and opening westward and? northward.

? This certainly before accepting

July 21. ^d Bolivian south to Morrisville, ~~and~~
~~to~~ ~~Wichita~~ and north to Bolivian

M 8 - 3-miles S. of Bolivian.

30' { Chert nodules
 Crinoidal Boone - ? = St. Joe
 8-4' SS. with vermicular and Taomurus
 10' clay stone, finely speckled (? magnesian) with abundant Jeff. crypto. & other
 0-2' Vermicular, 0-20 inch. sand of coarse ss. often congl. with angular
 15' rounded chert pebbles. This rests unconformably upon and fills
 Details at (levels) strongly eroded Jeff. ls. surface. The top of the latter
 M 8. and occasionally imbedded in the overlying ss. is locally covered
 with very fossiliferous chert, the fossils indicating upper Jeff.
 of same horizon as Shumard's Ozark Co. loc. (cf. also loc.
 N. of Decaturville. The ss. & foss. chert is wanting on west ascent.
 The Jeff. is a gray, medium grained, dolo. with chert
 in plates rather than in nodules. Rocks dip down
 hill. 15 ft. or less of Jeff. exposed to bottom of
 draw

View of surface

Shows eroded top of Jeff. & basal carb. ss. filling irregularities of surface.

Photograph - Roll VII, exp. 1.

About 50 lbs of fossils - many in good condition

M 9. South side of valley between two hills - here the Vermicular
 ss. rises some 25 or 30 ft. higher than on S. side - that is nearly to summit.
 From top southward, the rocks dip rapidly so that the hills to the Spring
 (5 mi. S. of Bolivian) are covered with the Boone ls. while the lower part
 at top of which spring issues, is at 1220'. Apparently M 8 & M 9 are

about the northern limit of the Springfield embayment.

M 11.

Jeff. dips SW
 Vermicular ss.
 greenish gray soft clay shale. 20+
 5' yellowish to bluish clayey & perhaps magn. ls.
 upper 2 ft. with considerable pyrite.
 Middle & lower parts full of crinoid
 fragments and contains Dept. chert nodules
 Dolo. ls. congl. with some chert pebbles and considerable
 quartz grains in streaks and spots. May. ls. matrix
 extremely like underlying pitted coarse to fine gr.
 dol. chert pebbles & blocks in and immediately above
 this layer contain fossils of M 8 and others the
 Jeff. - big grained, showing that different layers
 underlying Jeff. were under Trichter
 by more or less sandstone track thin layer is represented
 faster than the congl. ss. or pure ss. and thus being several
 feet in contact with carb. ss. and congl. layers
 part of which is thin enough to be called shaly others in
 chert while other layers are massive shaly others in
 sandstone smoother & white other nodular and dark.

ser. 7 Bolivian about 1860

700

Nearly all the ss. in this area is red, much of it through the bed, other layers or parts only deeply stained.

Part 1. undetermined
doublets due to structure
and produce dropping in
underlying h^+ . That
of δ domain, due to
structure which is deeper
downwards.

[illegible]

July 22nd Bolivar to Buffalo.

Appears that lower and lower Jiff is coming to surface in going eastward to Buffalo. Probably, they will descend from there to Niagara River.

Massive chert blocks, most of them covered in soil and broken with small sized, so laminar chert. Occasional a druse mass. As a whole these rocks are regarded as lower than any seen today west of Sandy Creek. Cryptogon mass common here as in most of the other Jiff seen today.

July 23 - Buffalo (M26) east to Niagara River.

Especially near or at base of chert formation, fossils at M27, occur in various kinds of chert but they are always rounded masses and many of Cryptogon while others are there are fine chert conglomerates. How the latter became rounded is an enigma. As the horizon contains simple & congl. while it is possible that the rounded masses of congl. were boulders. A few trilobites (at least 2 sp. of *Dolichonotus*) not very different from those in *Shannock* occur with *Eurytemora*? Small, narrow whorled non granulated *Diopira*, long artimisia-like *Hormotoma*, and many other sp. - a *Concordia* - chert is common. It differs some from that at M8.

Same foss. chert as at M27. Whether this is to be accounted for by solution of underlying beds or dropping down of residual chert or by dip of beds toward creek is undecided.

An interesting fact is that, especially at M27, an occasional piece of the chert is of the Boone.

July 24. Buffalo, north to Louisville then SW to Bolivar

Most of distance from Buffalo to Louisville altitude varies between 1200 & 1100. The rocks are about same as at Buffalo - with *Cryptogon* frequent. Near Louisville - both S.W. & S.E. - some ss occurs with chert. Now about 3 m. S.W. of Louisville. Over these 3 m. the chert is massive where exposed and consists mainly of a granular quartzitic type with no fossils. No *Cryptogon* observed with these types. Am not certain as to position of this chert but am inclined to regard it as lower than foss. chert at M27 & M26. It may then be Ronbideau. On the other hand it is extremely like the massive chert between Bolivar and 10 miles north. If notes mention absence of *Platystrophia* in these outcrops would correlate them. A mile or two further (4 1/2 to 5 m. SW of Louis.) at a lower horizon (about 1040) *Cryptogon* is abundant. It is hard almost impossible to decide whether it is a higher or a lower bed than 2 m. N.E. Am inclined to regard it as a lower one.

On west side of Sandy Creek considerable ss. occurs interbedded with cotton rock and chert beneath the *Cryptogon* bed which outcrops about 100 ft. above creek on highest ground.

Took dinner at Goodson Hotel, Goodson. Mo. a fine meal.

M32 About 4 miles SW of Goodson after crossing two rivers, the other undoubtedly containing basal Mississippian saw. sufficiently exposed beds to indicate character

of contact bet. Jeff. & Miss. It occurs about
M25'

M32 cont

20' chert with bryozoa & chonetes
15' shale with a little Ver. ss. above
about 2' ss. dol. a few feet
Jeff. full of Cryptozoa & small gastropods

The Hannibal shale apparently rests directly upon eroded
Jeff., the top of which is represented solely by abundant
chert consisting largely of Cryptozoa. With the latter are
occasional rather rotten chert containing small gastropods
on with revolving lines. A complete layer of solid chert
about 3 ft. beneath top. (a small bag of the family)

The Miss. chert is brown on outside and thus
is readily distinguished from the most of the
Oreos. chert which is nearly white; the latter also
generally more dense & brittle, the former though
tough & subgranular.

Between M32 & M33 there are several points affording
fairly good exposures of the Hannibal shale. The
Ver. ss. is always less than 1 ft. while the shale
included 1' to 4' ^{soft} yellowish earthy dol. The whole may
be as much as 40 ft. thick but on account of
dip down from high points on which Miss. remains
it is difficult to get exact thickness. As a
rule no ss. intervenes between base of shale
and underlying Jeff. Within 1 1/2 miles of river
where the contact descends to 1030 ft. level, a
sandstone comes in at contact, which may
have a maximum thickness of 6-10 ft. at Pomme
de Terre river.

The Hannibal with debris of overlying chert
constitutes basis of much comparatively level
land between M32 & 33. The contact with
the underlying Jeff. is scarcely distinguishable.

As usual bluffs along river show very little
chert, but it is important to note that on west side of
river also, where the slope is gentle, the ss. rests on
chertless cotton rock. Either the Jeff. is here terminated
above by a different bed than usual or the fact that
much ss. overlies it is responsible for its non segregation.

The ^{bed} ss. bed is not over 25' thick - probably less than 20' -
despite the fact that it is the surface rock from 1000 ft. level to
over 1100 ft. level. It simply forms an undulating mantle.

inclination due to structure and to underlying
solution allowing it to drop. Note of springs at contact.

44.

July 27, 1906 cont'd

51

00

80
28.

M81

184

1154

M86

M 82

M 88

M 84

M 89.

The anticline at M 89 doubtless induced the sharp N bend of Ogage River above Warsaw.

July 28-31
 Sedalia, Mo. Arrived here via rail from Warsaw at near 4 P.M. Secured large bunch of mail and spent all of the 29, 30 & 31 on same and in writing report and getting out accounts for month. Also revised plans for remainder of Ozark work. Extremely busy.

Aug. 1. M90 - M97. From Sedalia west 7-8 miles on Muddy Creek, thence S. to Camp Branch on M.K. & T. R.R., thence east & NE to Sedalia. Extremely hot.

M90. $1\frac{1}{2}$ m. west of Sedalia exposure line on Main St. road, a small quarry in slightly tilted rocks forming a small dome.

Bed c
 Bed b 6'
 Bed a 4'

Chert debris with *Michelinia*.
 Sandy yellowish-green shale with cup corals & *Michelinia* in upper part. A lens of ls. 1 ft. above base.
 Dark to brownish earthy, in part cherty, may. ls. with colonies of crinoid stems, a few brachiopods & numerous small, 3-angled-like cup corals in upper 1 ft.

Rocks dip north. 2° - 5° degrees
 Not measured

The fauna throughout this exposure is one though in part distinct in the different beds. The large *Michelinia* seen in the cherty upper Kinderhook occurs in all three divisions. The cup corals though in part having a Devonian aspect are doubtless of later date, as indicated by a composite *Lithostrotion* and a *Leptopora* (? type). I take it to be all Kinderhook, though perhaps early K. This Kinderhook, or Cheonan, is not closely connected with the Kinderhook of the Springfield & Fayetteville embayments. That area north of Osceola, in all parts of which the *Michelinia* characterizes the cherty beds near or at base of Miss., doubtless constituted a separate basin, differing from the more southern embayments both in fauna & perhaps less in lithology.

The Kinderhook chert bed is well displayed (as debris only, however) on all the middle heights between M90 and M93. What is over it I could not decide. Judging from character of soil and topography it must be an earthy - possibly shaly bed. The upland is nearly flat and the sub-soil apparently entirely without chert. The chert bed cannot exceed 20 ft. in thickness & may not be over 10 ft. The chert itself occurs often in large pieces, occasionally as much as 2-3 ft. across. It resembles some of the Jeff. chert horizons rather

closely in general aspect (as seen from bluff) but on closer comparison is readily distinguished, first by the crinoid stems & other fossils with which many of the pieces are filled, second by the absence of oolitic and quartzitic pieces (commonly found in the Jeff.) - also of *Cryptozoa*, and of coniferous chert, all of which are in a careful search of the K. chert would, I believe result in a considerable fauna. Made no attempt to collect its fossils.

M93. At M93, a bluff on S side of Muddy creek, about $\frac{1}{2}$ m. west of Sedalia, affords a fair exposure of the same beds seen at M90. Here however, the pure crinoidal ls. in upper part of bed a is more persistent and thicker, about 2 ft. of the bed being mainly composed of it.

10' Soil without chert 10' - 20'
 Chert bed - 10' +
 No exp. probably shale - 10-15 ft.
 Occasionally a few inches (2-3) of red ss.
 2' mainly crinoidal ls., mottled with brownish earthy ls.
 About 6 ft. brownish, cherty, porous, & probably may. ls.
 No exposure light.
 Fine gr., greenish-blue ls. - reminding of Louisiana - not certainly in place.
 No exposure. About 15 ft. to creek. Probably upper Jeff.

Where examined basal part of bluff was obscured by talus. Am inclined to believe however that Jeff. is concealed beneath talus. Stream too nasty & stagnant and heat too great to encourage search for better exposure.

Crinoidal ls. with float chert above & beneath it shown along main road 1 & 2 m. east of M93. Alt. of crin. ls. about 810'

The 5 miles between Main St. road & Camp Branch station on M.K. & T. nearly level land with chert only along drainage lines.

At Camp Branch turned eastward. In draw

M94. 2-2 $\frac{1}{2}$ miles east of station met first unequivocal

outcrop of Jeff. chert. This was close to the 850 contour. A few unquestionable masses of Cryptozoon, of the 2 inch mammal variety, were observed. Chert very abundant but not of large size (1"-12") with some oolite and a little quartz ss. Several other draws before reaching the stream Camp Branch ^{afforded} similar exposures of chert. In descending hill to stream some 50 ft. of Jeff is passed over, mostly chert, with Cryptozoon present but not very abundant, a few very imperfect shells of usual types, some blocks of ss., others of oolite and congl. At base of hill a small bluff lines creek on S side. This consists of an overhanging mass ^{12-15 ft.} of porous gray dolo. with solution cavities - or rather channels - through it. At bottom an irregular line separates gray dolo. from thinner beds of mixed cotton & gray rock.

Above the bluff, 5 to 15 ft., other beds mainly of gray dolo., some of it brecciated, others apparently congl. are exposed. One of these, containing a little barite with small specks of galena, seems to have been dug into many years ago at intervals along its outcrops.

Two other draws between Camp Branch and Sedalia are 2 1/2 m. The second only a mile SW of Sedalia, expose Jeff. chert. In both cases its top is but little beneath the 850 line. None of these expose fresh chert, all of it seeming to have been subjected to long continued ^{near} surface anodipication (? solution).

It is a significant fact that between Camp Branch station and Sedalia the Kinderhook chert bed is either very insignificant or quite absent. The soil on ^{lands} above the Jeff. ^{formation} contains very little chert and that in pieces less than 1 inch - a condition strikingly different from that observed in the area adjacent to Muddy creek. This fact is regarded as ~~supporting~~ ^{indicating} that evidence of altitude of top of Jeff. which indicates that the intersection of the 200' & N 5' axes is located in the vicinity of Camp Branch. Here the Jeff rises to 850 while on Muddy it is at least 75 and probably 100 ft lower.

+ Camp Branch - Cap Anson line
* Sedalia - Stockton line.

At 1196 several masses of ss 3-6' in diameter were noted at top of Jeff. These are so rounded in the Sedalia region as to suggest very sand on a subsidiary fold to the north of Camp Branch intermediate.

Thursday, Aug. 2, 1906. *Eudalia* by train to Warsaw.
In P. M. made up notes for preceding days work.

M98-113.

Friday Aug 3, 1906. Drove Warsaw ^{S.E.} to Clinat (Springs)
Rapid buggy trip - no fossils taken - few seen. About 26 miles

Aug. 4th 1906. Climax, 12 m. east on Line Creek road, then 6 miles south to Nonesuch and Corlinda, then 12 miles south and east through Roach to Lebanon road ford on Niagara River. Then back to Roach & from there SW to Mack's Creek - 12 miles.

M113 To M129.

Gunter ss not seen after ^{first} crossing Prairie Hollow branch, but character of beds to either side and especially just south of 122 lead me to believe that it is not deeply buried and probably forms flat floor of valley.

92

64

65

99

Thursday, Aug. 9th 1906.

The ^{high} area between Cole Camp & Buffalo Crk. is clearly anticlinal, the anticline ^{NNE} pitching ^{on the whole} southwardly from the line of the Rock Island R.R. Most likely this anticline is but a member of an anticlinorium extending from the ^{meridian} longitude of Warsaw on the west to the longitude of Versailles on the east. This would make its crest fall about on a line connecting the High prairie ~~between~~ S.E. of Stover and the North end of the Osage. Furthermore, this high prairie must be one of the intersection domes.

In the vicinity of Boyler's Mills, where we were held up till afternoon by accident to our hack, spent several hours looking at section and collecting fossils. The fossils are clearly ^{from Gasconade} Roubidoux, coming from the chert - and should be compared with some found in Shannon county. The cherts consist largely of the loose-mammulated Crypt. & honey combed stony types. Often latter there is the common coarse form of Hahatonka and a smaller less ^{abundant} ^{common} form. Much of it is of a flat pebbly congl. type, now appearing as a spongy, light mass, the pebbles removed by solution. The fossils occur principally in the lower parts of the formation to which the cherts described are almost confined. Higher in Roubidoux smaller, angular and agglomerated cherts prevail.

Apparently not over 30 ft of Proctor ls. is exposed in bluffs of Big Buffalo. This would bring top of that formation between 181 & 182 down to 750 ft. line. The Roubidoux, according to my judgment, dips toward the creek sufficiently to reduce ^{apparent} difference in altitude thickness from 300 to not over 250 ft. This estimate includes everything between the Proctor ls. and the ^{top} ^{of} ^{the} ^{colitic} bed overlying the Cole Camp ss.

It is a significant fact that the granite ss. is either entirely absent here or very poorly represented. A line on thickness of Proctor in valley 200.

afforded by a small artesian well, ²⁵⁰ ^{ft} ^{of} ^{chert} ^{at} ^{the} ^{base} ^{of} ^{the} ^{Proctor} ^{ls.} distance above Boyler's Mills. This is in ¹³⁰ ^{ft} ^{of} ^{chert} ^{at} ^{the} ^{base} ^{of} ^{the} ^{Proctor} ^{ls.} soft granular dolo (Proctor - Gasconade) 120 ft. and 30 ft. in soft friable ss. at bottom affording water. This ss. should be the one at base of Gasconade at Dicaturville.

185 to 190 (Versailles) undulating prairie. all save the rise at 186 is, so far as I can now see, Roubidoux. (Depth of soil on these prairies apparently due to long continued decay and slight wash.) 186

Aug. 10th 1906.

R.R. Versailles to Tipton, Tipton to Jeff. City.

Had hoped to reach Jeff. City at noon and return to Versailles, via Eldon next morning. Train however was so late leaving Versailles that I failed to make connection at Tipton. Employed 3 hours at Tipton by driving a very necessary trip S.E. to the Fortuna mines region. Caught 5:55 P.M. train arriving at Jeff. City about 7 P.M., just too late to find P.O. open - which means that I am delayed just one day.

On train Versailles to Tipton made following observations:

From Tipton drove rapidly southeast to Fortuna mine returning by a more northerly road:

On return from mine noted an outcrop of typical Crypt. Jeff., with Boone chert over it on S. side of hill and 2 ft. blocks of ss. at contact on N.W. side of hill, at 850'-860'; and about 2 m. N. of mine.

About 3 m. SE of Tipton one of the canal coal deposits was observed. Noted that ls. was disturbed in vicinity (steeply dipping toward coal), and believe I recognized Jeff. in immediate vicinity. Would have liked to look more closely into one of these peculiar sinkhole deposits but time was lacking.

Jeff. City, Mo. Aug. 11th 1906 - (Saturday)

Having a couple of hours time before train leaves for Tipton (having to wait for opening of P.O. could not return to Ver. via Eldon) spent them along Mo. River bluffs above town.

The Jeff. ls. undoubtedly is the formation studied by me under that name elsewhere in the Ozarks. As seen in the bluffs it is less cherty than one might imagine from its ordinary hill side surface outcrops. This is, as I have elsewhere pointed out, in part due to the comparative small degree in which chert is segregated in the rapidly eroded bluffs; but it is due also to the shrinkage in volume brought about by surface decomposition of the dol. and the consequent larger proportion of the resistant cherts in the residual matter.

Chert nodules and plates are common in certain layers in the bluff - more especially in the types called 'gray dol.'. These are more or less porous and have (1) water bearers and (2) favorable to segregation of cherts. In part these gray layers are intraformational congl., and where water circulation was obviously the most pronounced there the pebbles have been converted into chert. It is interesting to note that ~~Cottontail~~ ^{Cottontail} how generally the underground waters took ~~advantage~~ ^{advantage} of slight troughs. Where these occur the tops of the gray dol. at the center of the trough is often solved out and commonly the walls of the cavity appear brecciated; the pebbles of the original rock being either merely hardened or turned to chert. A few of the chert nodes in the rock were recognized as Cryptogen but as usual these are not easily distinguished in bluffs.

It was interesting to note that the contact between the ^{alternately bedded} cotton rock and the gray dol.

are in several instances clearly unconformable. Regret that I had no camera will try to take pictures - a later visit.

The top of the gray in such cases is irregular - clearly eroded - the cotton rock filling the depressions sometimes beginning with an inch or more of greenish shale containing pebbles. The depressions are all filled and the surface leveled before the regular or continuous layers of cotton rock are laid down.

The rock is highly quarried, after Jeff. City use in sidewalks steps and curbing in the stringy, networked or honey combed variety observed. elsewhere on the W. side of Ozarks. This rock is more silicified but otherwise looks ^{also} is essentially the same as the "stringy-honey combed chert" of the Roubidoux. Of course in the Jeff. rock the "strings" show only on the surface the interstices being filled with dol. Occasionally some siliceous concretions appear in rock but the network is never silicified and freed from the matrix as in the Roubidoux variety.

It must be admitted that the Jeff. rock in the type locality is often exposed and much less covered by a heavy residue than is the case to the west and south. This may indicate a less siliceous character of the formation in the vicinity of Jeff. City, but is inclined to ^{regard} the comparative flatness of the rocks there as the predominating responsible factor. This flatness retards underground water circulation and hence reduces the amount to which silica is ^{aggregated} ^{and hence} ^{retards also surface decomposition - or rather lessens it in amount while it augments its thoroughness.}

P.M.

Drove south from Tipton to Versailles.

On road just east of 195 (about 2 1/4 m. S. of Tipton) saw remnants of the basal carb ss. and beneath it - undoubtedly lower Jeff. It is therefore certain that at least basal Jeff. intervenes here between Roubidoux and overlapping Kinderhook.

Patches of Kinderhook chert cap high points about to Fortuna, but did not recognize Jeff. south of 195 to 1 m. S. of Fortuna. At the latter point road begins descent to Morran creek or River, descending from about 980' at Fortuna. To about 830' at creek. (Loc. M. 200.) In valley of Morran, several prospects

are located close to road - none of them appearing very promising. The important feature is that they are in practically the same beds noted at the Fortuna mine (Loc. 198). The creek bed exposes a stringy layer or two like those quarried at Jeff. City - described on p. 74. Rock taken out of shaft is precisely like that at Fortuna mine. Hence we have Jeff. ls. in Morran valley due south of Fortuna station. If I am right in denying presence of this formation on the higher ground to the north, also that the base of the Jeff. on Tipton-Versailles road rises southwardly to 1000 ft. + more, then this Morran valley patch must lie in a deep syncline probably pitching eastwardly with the drainage. That it is a syncline is convincingly shown by an artesian well in the bottomland just south of creek.

As it seems to me this Jeff. area forms a tongue extending westerly ^{up the Morran} into the Roubidoux anticlinal area from the main Jeff. area to the east.

The Roubidoux area anticline is an extension of one noted in describing conditions in vicinity of Boylers mills. It strikes from the N. end of the Osage there mentioned in a NNE direction through the vicinities of Estlin, Skinsville and Tipton.

The relations of the Gravois creek drainage (almost directly SE from the very top of the anticline) is not decided.

M At 201, about 8 1/2 m. NNE of Versailles, after seeming to have been 201 about from road a short distance, the Jeff. reappears when the road has risen to the 1000 ft. contour.

The Jeff. continues to rise till the top of the Roubi. appears at about 1070. 202 and continues to crown divide for a mile or more. At 202, a ss., presumably Cole Camp, outcrops and over it Jeff. Crypt. wash.

at 203, 4 1/2 m. NE of Versailles, Jeff. again crowns divide.

203 It dips rather rapidly southward (beginning of Gravois drainage) so that at 204 (1 1/2 m. NE of Vrs.) the road crosses the Cole Camp ss.

204 at perhaps 15 ft. beneath 1000 ft. contour.

Between 204 and town, Jeff. city wash, mainly small and rather deeply buried, form surface of road. The rocks dip eastward so that the Jeff. descends to lower contours in that direction. That this descent is rapid is indicated by fact that on one N. & S. street wells reach a waterbearing ss. at only 50 ft. while on the street just east they must be driven to about 100 ft. to reach the same stratum. Artesian wells are common in low lands of this vicinity.

Monday
Aug. 13, 1906. Versailles south to Gravois Mills, S.W.
to Proctor, then east to Gladstone (or Riffletown).

Localities 2055-206
repeated on p. 88.
The Stations then are given in
reverse order with no. 274 on
p. 78 and St. 222 and 211
on p. 88. (begin with
St. 221 on p. 88.)

五

252

Theresa

920

Aug. 16th 1906 - A.M. Iberia to Bolinas Creek.

The Bolin ss. corresponds in large part to the "pebbly drusy" bed. Where the ss. is thickest the pebbly drusy rocks are least in evidence. Where ss. is thin or wanting the "pebbly drusy" volcanic Congl. is usually very abundant. (See 252 and many other localities)

Aug. 15 - 2

Probably belongs
at base of Jeff. or in Roubidoux

Aug. 13, 1906. -
Vernalis to Gladstone. -
Bore with Jeff. Sailed at 10:00 AM. at San Jose, Cal. -

24

Wilmington City - part 4. 1891

Choutan ls

import
Primm, Nevada
residual
No distinct bands
but in places suggests
the sh.

6"-12" calc ss.
sandy shale - dr. - fine cotton rock
2'-3' blue zone with
chest. black & W. sh. & chert
1' of gray zone crypt. appearance
shale & decaying boulders
residual with thin
bands of sand and
pebbles of coal, sand &
rather fine gr. yellowish gray
chest. dol. chert black
stratified as above

Sweeney's (M, R, & T. R.R.) quarry

about 32 7/8. Crinoidal ls.

2H. suberect, ls. with *Phylloporina* ^{large and}
 12"-16" chaly bed
 about 9' Buff argill. ls. with one chert
 band lower part of carbon bed
 about 8' very cherty bed, ch. white & brown
 outside, black inside (coral) fragments.
 - More or less argill. ls., dull fracture
 often close banded with black, the
 latter color bands particularly prominent
 "inconspicuous" in lower 3rd. Most of the
 "shorter" species from this bed. One or
 two chert nod bands in upper 3rd.
 Thin bedded
 Similar to underlying bed but a grosser very
 great ~~very~~ ^{very} ~~bed~~ ^{bed}
 6'-16' }
 14" massive dove ls. with calc. v. small & sparse
 chert & sand congl.
 Cass a ch. con.
 18' Buff. ls. with better than

7

Miller Co.
Proctor ls & Smith ss. outcrops
just S. of Ramsey P.O. middle sec 23
6-7 m. NE. of Tuscarora

1135 top of Krummhorn

- 1225 - 1230. Gray to clay.
 1230 - 1250 = clay with black fragments still undecomposed.
 1250 - 1255 = clay - mostly black.
 1255 - 1275 = light gray sand to, upper 1/2 in sharp steps.
 1275 - 1280 = do - pyrite nodules.
 1280 - 1285 = do - no pyrite.
 1285 - 1315 = white to.
 1315 - 1325 = clay, in remainder green some gray and yellow.
 1325 - 1335 = clay - but without the gray.
 1335 - 1380 = greenish gray shale almost non-soluble. (Blunt horn)
 1380 - 1490 = dark gray or greenish gray argill. to. or id.
 1490 - 1510 = greenish white, probably siliceous to.
 1510 - 1520 = much white to.
 1520 - 1650 = clay, with large nodules of dark gray clay.
 1650 - 1680 = same as above.
 1680 - 1700 = clay to.
 1700 - 1775 = argill. yellow to.
 1775 - 1945 = brown gray to - shaly to fine sand. (Good horn)
 1945 - 2100 = St. Peter quartz sand.

1335
 1335
 200

1213-1225 same - common very fine
 1205-1210 same - common very fine
 1195-1205 greenish gray to purple
 1170-1195 gray to brownish - fine gully
 1135-1170 green (silt) to light (74% K. minerals)
 1125-1135 also but harder with gully & not calc.
 1105-1125 fragment thin calc. fragments
 1095-1105 Dark blue clay, slightly calc. (2.5% Mg. carbonate)
 1081-1095 similar to preceding but more gray to
 1078-1081 like from piece with large rounded green grains
 1075-1078 quantity to - but has much calc. (very)
 1070-1075 also but in thin pieces
 1052-1070 light colored, hard to
 1052-1055 light green, plastic clay
 1015-1050 from thin - much chert - to
 780-1015 very cherty to - about many nodules
 318-780 Warsaw - largely shale - 90% limestone
 205-718 St. Louis - Springfield (unusually)
 150-205 St. Louis - probably East M. (? Bismarck)
 0-150 Run gravel & sand
 Mounds mound, 4 in NE of East St. Louis
 well starts at 30 ft above flood plain
 450' alt.
 10-12 in. m. w. of 9 ft. clay, 5-8 ft. brown, with
 some in lower part, this kind in 9 ft.
 At Cambridge - Brown Co. - on R.R. near 9 ft. clay, 5-8 ft. g
 2 in. Co. in upper part coarse, and 1 ft. lowest of clay
 with 2 in. of brownish greenish brown. The chert lies
 under with a 1 in. of brownish greenish brown.

Shipments of fossils after Sep. 12th 1905.

✓ From Chadwick, Mo.	Sep. 14	1 or 2 barrels by Dickey
✓ " Mansfield "	" 17	2 boxes "
✓ " Greenville, Ark.	Oct 3	2 or 3 barrels "
✓ " " "	" 7	1 box by son.
✓ " Lutesville, Mo.	" 7 or 8	1 chest by Dickey
✓ " Batesville, Ark.	" 10	1 grain sack by son.
✓ " Black Rock "	" 13	1 " " "
" Plattville, Mo.	" 19	1 " " "
✓ " Boscorb "	" 24	1 grain sack "

1906.

✓ 1 lot from Arkansas to be forwarded by Purdue		
✓ From Chicopee, Mo.	July 14 or 15 by Dickey	1 keg.
" Chadwick Mo.	"	1 bbl.
✓ " Bolivar Mo.	"	1 bbl.
x " Sedalia "	by mail Aug 1	1 package.
✓ " Warsaw "	Aug.	1 box
" Cole Camp "	"	1 box
✓ " Versailles Mo.	Aug. 11	1 box
" Dixon, Mo	Aug. 17	1 box
" Stedville	" 23	1 barrel
" Potosi	" 26	1 "
" Cole "		
" Dickey Black Rock Smithville collector.		

From Northwest: Dixon Savannah (mail) Mineral Point, Clermont, Elsbury & Winfield.