



No. 16.

Feb. 4 to April 1914
Indexed June 18, 1915

✓ 7/15 1911

300 miles, Jacksonville dept.	1860
Switch & wood rack	1885
Baldwin	{ 1925
	{ 1940
Maxville	{ 1950
	{ 1940

Highland	{ 2030
deep cut just west of dept	{ 2010
Lowrey	2020
Starke	2020
Hampton	{ 2025
	{ 2015
Crossing head water Santa Fe	2010
Waldo	2030

Fairfield	2140
S.A.L. dept. Gainesville	2115
White House	2160

West Alachua Coast line dept	1900
Santa Fe	1935
" " River crossing	1870
Lake Butler	1925
New River	1875
Sampson	1875
Hampton	1870

From Jacksonville to Baldwin the country is very level but with gradual rise inland. The timber was originally long leaf pine, with some pond cypress & gums.

No cuts on the R.R. after passing the S. A. L. shops.

From Baldwin to Mexville the country is level & similar in character to that from Jax to Baldwin. No cuts.

From Mexville to Highland there is a considerable rise in elevation about 100 feet. The country becomes more sandy & less swampy. The few shallow A.R. cut show only white sand or sand slightly tinged with yellow.

Some redish sand is seen at the bottom of the cut just south of the Highland station. This is also the highest point on the road. From here the R.R. runs on a plateau no cuts at all to Hampton. After crossing the headwaters of the Santa Fe the elevation rises a little to Waldo.

Purston sink.

6

About $3\frac{1}{2}$ mi north of Walds.
This sink is near the Santa Fe & is
about 45 or 50 feet lower than
Walds. as shown by the foronate
Walds 1250. Surface of sink 1200.

Section at sink, west side

(1) Surface sand and soil 1 ft.

(2) mottled sand

(a) fine best sand.

(b) 1 ft clay dipping north.

(c) sand like (a) 3 ft.

covered to bottom of sink.

9 ft.

On the north side of the sink
about 10 ft of No 2 is seen the
lower part being streaked & con-
creted. Rounded white siliceous pebbles
occur.

(3) covered abt 10 ft.

(4) Impure limestone 4 ft.

This limestone contains casts of shells
and many black-brown rounded
pebbles. In this respect it is like
the more one of Park St. Orange Co.

Devils Mill Hopper

Feb. 6, '09

at north side or a little west of
north.

(1) sloping and covered abt. 30.

(2) Limestone the upper part
phosphatic and with some
fossils. This limestone is similar
to and apparently the same as
found in Purston sink at Walds.

Of this formation is seen 15 ft.

(3) covered abt 10 or 15 ft.

From the south side of the sink
this is believed to be a blue sand
very similar to the chert pipe as seen
at Alum Bluff but without fossils.

(4) Fullers earth series at least
25 ft.

(5) covered to the bottom abt 25 ft.

From the south side of sink it
is evident that the lower two
ft of (5) is limestone - sandstone -
apparently not vitrified. No fossils.

Springs enter chiefly from the S.E. indicating N.W. dip.

8
Phosphate at Newmansville
The phosphatic rock lies scattered
over a field near a branch. It is
a sandstone with phosphatic
cement. Boulders are similar
to the one from Lake Amoria. Some
were reached by well, or Newmansville.

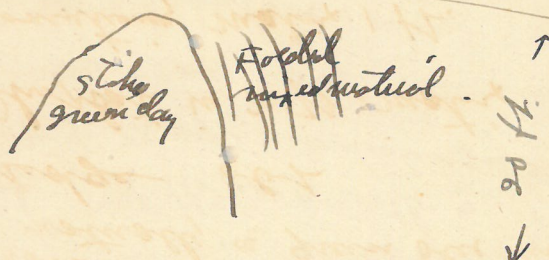
Stevens branch $1\frac{1}{2}$ mi N. of
Alachua. Hill sloping north.
The phosphatic boulders here
seen imbedded in greenish clay.
The relations are the same as
seen at River Junction above
the chert under limestone
mottled clays are seen
here under pale yellow sand.
The mottled clays are used for
wood material.

9
Hodges branch $2\frac{1}{2}$ mi
N. of Alachua. Hill sloping
north. mottled red clays with
phosphatic remnants imbedded.
about 20 ft. passing below
into 10 ft of the phosphatic
sandstone in which are
imbedded phosphate pebbles.

7 miles north of Alachua to
 $\frac{1}{2}$ mi north of Tixel. Some
fossil corals are seen on the
surface, or a lower level
on the hill sloping north is seen
mottled clays undistinguishable
from the clays seen unconformably
under the red sand at Talla.

On the hill opposite (sloping south)
a great many corals are seen to
the top of the hill. This hill
leads up to the residence of Mr. Hill.

Viggo Sink in Sect 18. 110
 8 mi north of Alachua.
 about 20 ft deep. the
 material both in character & in
 manner of occurrence is like
 that in the cut west of Talla.



coals occur on the top of the hill abt. 40 ft higher.

The sink as now seen does not
 correspond at all to the section published
 by Hall.

Alachua town 1760
 at river returns 1760
 Sink 3 mi. East of Buena Vista (near city)
 Brownish on top 1810
 " on ledge 1780
 Ledge & the water 15 ft
 chert reaching at top 1850
 Section of sink
 Ledge with fossils 3 ft
 yellow sand with palm leaves 4 ft
 Ledge 1 ft
 Sand with Phosphate 5 ft
 Ledge 1 ft
 sand weather from but 1 ft
 naturally a green blue mud 4 ft
 Ledge abt 3 ft
 Phosphate in soft matrix 4 ft
 concretizing matrix 1 ft.

Pebble phosphate (black) imbedded
 in a soft matrix. 3 ft or more
 dipping towards the west at the
 west.

{ see section rewritten on following }
 { page }

The barometer reading is the $1\frac{1}{2}$
 same nearly at the Sont. Fr
 River as in the river. It is
 probable that the river water
 & water of the river stand on
 the same level. Both are colored
 the same.

In size this river is probably 150
 acres at water level. It is
 probably 70 or 75 ft from the surface
 to the water.

section of the river

(1) covered

100 or 150

(2) white & uncolored with
 pebbles with corals & shells mostly
 small ones

25 ft.

(3) yellow sand with black
 pebble phosphate

4 ft.

(4) ledge with fossils

3 in

(5) yellow sand with pebbles

4 ft.

(6) concutaneous ledge

1 ft

(7) Sand with phosphate (pebble)

5 ft

(8) ledge concutaneous

1 ft.

(9) Sand with phosphate pebbles

4 ft

(10) ledge abt

2 ft

(11) phosphate in clayey matrix

5 ft

(12) concutaneous ledge

1 ft

(13) pebble phosphate (black)

2 ft.

of east side dipping to water of west.

The water supplying the spring on
 stream comes principally from just under
 No 2, and from under No 9.

This sink is as nearly as can be judged circular. The dip of the strata is to the west. This probably accounts for the fact that the stream fed by springs enters from the east. This stream has cut through to the thick ledge No. 10 of the section making a platform of this ledge and a water fall into the sink. A gentleman of Brooke reported that the water in the sink had been sounded to over 100 ft.

Looking at the sink the strata stood out prominent. Of these Nos. 10, 11, 12 & 13, a total thickness of 15 ft. appear to form a unit. In contrast to this the brown colored sand of 6, 7, 8 & 9 stood out, sloping only a little from the vertical & seen entirely around the sink.

The next two or three of phosphatic sand slope back more from the look of a supporting ledge. The white mud stands vertical except for land slides.

From Alachua to Lake Butler

the most important cut is that near the Washington Spg. depot. In this is seen apparently the broken material, a sand rock with phosphatic cement.

From Lake Butler to Hampton

the country is very level or slopes only a little. The greatest drop is that approaching New River from Hampton Lake Butler alt 500 ft.

There are no cuts between Lake Butler and Hampton. The country is low & boggy with cypress ponds & with swamp growth bordering the streams.

From Hampton the country is swampy crossing the State Fe. but rises gradually approaching Wards. From Wards to Hawthorne according to the barometer the country continues practically on a level.

~~Elastic Kaolin at Edgar.~~

~~4 to 10 ft ^{avg.} of sand ^{var.} lies above the kaolin. This is coarse containing sand grains of varying size up to $\frac{1}{3}$ in across. The larger are usually flattened and all are rounded.~~

- ~~No. 3. Pit & plant from the south
 .. 4. Pit looking east
 .. 5. Dredge & pit on the east side.~~

~~William Louis. Edgar. Fla. one of No. 5.~~

~~dredge work by suction pump now making to a depth of about 20 ft. formerly was able to work to 40 ft. but the blue clay is encountered at this depth. The sand ^{clay} above water is gray in color. The weathered surface is sometimes iron red & dark. The fresh surface however, seems to be always light or gray. The top surface is nearly level. & is the sand-clay is distinctly cross-bedded especially so in the upper 5 ft.~~

This kaolin lies in the lake county, the surroundings being much like those around the St. Louis clay region.

The sand-clay seems to present essentially the characteristics of the Altamaha grit phase of the Grand Gulf.

Remark the fuller earth is a sticky blue clay as previously reported. The mng. Dorr says that after passing through this clay fuller earth is washed and that just below this is a shell rock or rather shells not firmly indurated. These usually were obtained from a well. The well reached at the depth of 80 ft a rock that was very hard and was not penetrated. No definite idea could be given as to the thickness of the strata reached by the well. The shell stratum he believed was as

much as 20 ft. The sand at the top was say 10 ft. The kaolin stratum was at least 30 ft. possibly the blue clay & the fuller earth together amount to 30 to 40 ft.

method of mining.

The overburden is washed off by water and carried away by suction pump. Ordinarily the sand only has to be moved. In some places two or three feet of the top of the sand-clay has to be discarded. The sand-clay is also washed by suction pump on a floating dredge. The material is pumped & settling basins. From the first settling basin the water runs by gravity through the others. From the last basin the clay is removed by pump and is forced by pump into the compressors. From the compressor it is loaded by hand

onto a revolving belt & 20
carried up stairs. It is then
loaded by hand onto stone
pipes. The exhaust steam
from the boilers passing thru
these pipes dries the clay. From
here it is allowed to drop into
a storage bin below or into the
cars.

About $1\frac{1}{2}$ hours is required
to press the clay.

Brown Riv. Grove Park, Fla. 21
Rock of Hawthorne.

That which was quarried as a
building stone lies on the top of the
hill of Grove Park. This hill rises
possibly 30 to 50 ft above the level of
the creek near which the phosphate rock
was mined. The phosphate rock
consists of pebbles cemented into a
rock, and of pebbles in a sandy
matrix. A light colored lot of
pebbles with sometimes casts of
shells lies probably under this,
a second layer of pebbles is
reported. This layer is said to
have resembled river pebbles.
The marl with siliceous oysters
lies at the creek level still
lower.

In the B.R. cut abt. 1 mi north of
Hawthorne typical sandy mottled
clays are seen. In a pit used
in getting clay for roads, 1 mi north of
Hawthorne clays not distinguishable.

from the blotched calico clays²²
of the section are seen.

23

Kaolin deposits of L. Co. County.

The material seen in the pits of the Richmond kaolin Co. and the Fla. clay co. is evidently a phase of the Altamaha grit. It is a gray sand with a small amount of red in places. The overburden here like that at Edgar is a coarse white sand containing many white silicious pebbles.

This sand rests unconformably upon the sand-clay.

It is said by the Richmond co. that a blue^(moor) material underlies the clay.

The mng. of the Richmond Co. states that he figures that about 20% of the material mined is clay, the remainder being sand.

At the pit of the Fla. Clay Co. at Yalaha mica present in the clay gone trouble. Some mica is found also at the pit now being worked.

The Rich mond Co has at 24
present practically no overburden.
The clay itself is mined by hydraulic
power & by suction pump.

The overburden of the Fla clay Co
is removed by mule and scraper.
The clay is mined by suction pump.
a dredge it is stated will be
put in by this company.
Both plants dry the clay by

air.
Identical material, except
for the fact that it is iron stained.
is seen in the clay pits on the
road from Leesburg to the Koolin
plants.

Brooksville

Barometer at hotel	18 00
Leifoy	17 50
General level of chickachatta	16 75 to 16 50
Bottom of sink	16 50 to 16 25
Top of Coombs hill	17 50
Spring & Koolin level	17 25
Check reading of hotel on return	18 00

In the sink at the south end of
chickachatta prairie is exposed, when the
sink is dry 35 ft of a white
limb-dog formation. This formation
strongly resembles the Chatahoochee
limestone. A few fossils are
found being casts of shells.
Hard compact rounded boulders
occur in the clay, and weather out &
lying in the bottom of the sink.
One of these seemed to contain
a brachiopod, aside from this no evidence
of the Vicksburg was seen.

26
a sand rock lies along the
side of the hill. north of the
sub. The relation of this sand
rock to the clay-limestone was
not determined. altho it doubtless
lies above that formation.

From the top of the clay lime rock
covered to top of hill by barometer
 $\frac{16.50}{50 \text{ ft.}}$

Section of Creams Spring.

From the top of exposure to white
sand-clay from which sample
was taken about 30 ft.

This material is the mottled sand
clay. about $\frac{2}{3}$ way down along
the path it is nearly clear gray.

The white sand clay now changes
into about 2 ft. The spring
issues from the contact line
between the white-sand clay &
the more sandy material above.

27
The cut 3 mi south of Burhamville
on Torta northon. shows 10 ft of
rock similar to that in north of
Chichechoitto prairie.

A cut $\frac{1}{4}$ mi north of above
shows mottled & sandy clays on
this rock & bedding horizontally into

at the cut in Burhamville
this limestone is reached & cut
into a few feet. The top surface
passes almost imperceptibly into
greenish sticky clays. These become
more mottled and sandy toward
the surface. There is no distinct
dividing lines seen in this
cut, between limestone & green
clays. nor between green clays &
the more sandy clays. nor
infrequently boulders of
limestone are found imbedded
in the clay indicating that the
green clay is the result of decay of the
limestone. depth of cut abt 22 ft.

Baldwin to Tallahassee. 28

Baldwin & Am. 1775-1800

H.C.B. Crossing west of Baldwin 1770

Top of cut in sand ridge 1825

This cut is possibly 15 ft deep. The sides have slumped in to such an extent that a full exposure can not be seen. Only grayish sand is exposed.

McChesny 1800

Glen St. Mary 1780

A cut 10 or 15 ft deep just east of Glen St. Mary shows red-sandy clay.

Sonderson 1870

There are no cuts from Glen St. Mary to Lake City. The barometer at Lake City read 18.50 (10 Am.)

From Lake City west there is a drop of 50 ft or so which permits cut exposing the sandy mottled material. This material as seen in these cuts is often gray and usually light colored. The general level rises again to well formed similar cuts.

From Wellborn to Houston the country is nearly level and there are no cuts. 29

From Houston west the drop is again sufficient to make cuts necessary. The red & orange red material is seen in these.

West from Lake City the drop is gradual to the Suwannee River.

Some work has been thrown out from the cut two or three miles west of Lake City, and again from cuts approaching Falmouth.

West from Ellomille deep cuts occur between mile posts 86-93. These show only yellowish loose sand.

At mile post 107 (3 mi east of Madison) clay is included in the cut. This is apparently the only cut in which fullers earth is likely to be found between 117 & 163 (Tallahassee).

At mile post 115 (5 mi. n. of question) the extremely mottled clays are seen but no indication of fullers earth.

at mile post 115 (5 mi. w. of Madison) 30
sand clay similar to no 1 of the Helson
section are seen.

crumbly mottled clay not fullers earth
are seen at mile post 125 (2 mi. west of
Greenmills).

up cuts of the mottled clay are
found thus approaching Lloyd from
the east.

From Lloyd to chairs the country
is level and there are no cuts.

From chairs to Tallahassee
there are several cuts but these do
not seem to reach clay except the
large cut near mile post 163
in which fullers earth is exposed.

Feb. 17, 09

31

From Quincy west level
north. Rich red with iron
concretions. on the hill sloping
west leading down to stream.

headwaters of Rocky Creek
about 2 mi. west of Quincy
the red gives place to a fine yellow.

Part way down hill the highly
phosphatic material is seen.

near the bottom is seen the
clay which occurs in lenses & falls
apart. 1 or 2 ft. much this is
stiff blue grey clay, over 2 ft
sandstone like that above fullers
earth 3 ft. or more to bottom.

This sandstone contains concretionary
seams, like those seen in the fullers
earth.

On the opposite side of the stream,
hill sloping east, yellow fullers
earth is seen near the water's edge. On
this lies about 4 ft. sticky clay. on
this occur the sandy layers lying horizontal
with white sandy partings. This is 2 to
3 ft. to the top of the hill where

is fine place & blue yellow 32
with iron concretions. The top
surface contains yellow with
many & large iron concretions to
near Edward. A further west
fork of Tallogee creek it is again
bright red.

Tallogee creek on the Quincy - Edward
aspaloga road is no flat as to fine
no section

Well 4 S.E. of Greensboro
T. J. Baker Rowan.

4 ft yellow & blue sand
10 ft. mottled blotched clay.

2 ft. coarse yellow sand
struck of fuller earth (?)

Red sand rock

Fuller earth

White sand rock

Total depth 22 ft.

From Quincy to Greensboro 33
one finds long leaf pine mostly.
The streams beyond the Rocky
Comfort creek do not seem to cut
so deep as those further east and
have wide bottoms. The
crossings further down are
progressively wider and there is
less drop in passing to the streams.

Feb 18 - 09

On the Quincy River Junction
road hill to Quincy creek sloping
N.W. about 1/2 way down the hill
a ~~stratum~~ of "fall to piece" clay 2 ft
thick is seen lying horizontal.
Both above & below this is seen the
regular sand-clay red material connected
with fine looking fortifications. At the top of
the hill here the material is rich red.
Below the clay is connected fuller
earth series much like that seen in
the Florence cut. At the base fuller earth.
Below this is seen more of the material with white
sands & another clay stratum 1 ft thick.
No fuller earth (oligocene) on
either side.

A similar section is seen on the steep hill leading down to the small creek about 3 mi west of Quincy on the River Junction road on both slopes. Here we have at the top the blood red clay with iron concretions, blotched & caliche clays, yellowish sand clays with white porphyry & with full to deep clay strata & finally sandy clays with fullers earth lamination. No oligocene fullers earth here.

Brick plant 1 mi N.W. of ^{mt. Pleasant} Summit. Abandoned.

Some bricks were made from the ochre yellow sand with iron concretions. These are friable and are falling to pieces. They turn red.

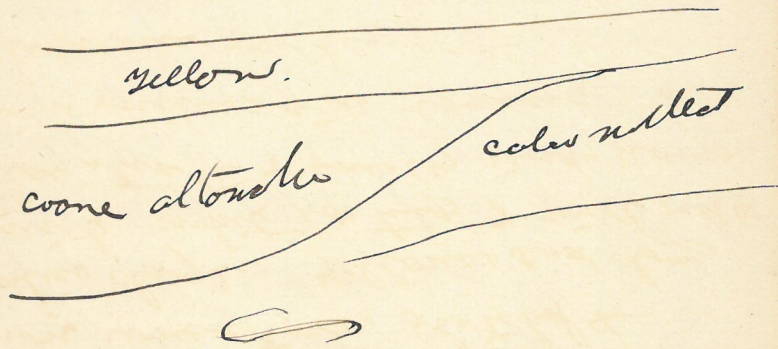
Some bricks made also from the "fossiliferous" clay. These turn gray to light & seem fairly good bricks. This clay resembles that out of the hill here.

Section in BACs 1 mi west of mt. Summit.

The usual section

Ochre yellow with iron concretions 5 ft.
Caliche clays & bottom of cut, old & for a red section in some cut
100 ft full west

yellow sand with iron 5 ft.
coarse coarse bedded sand 5 to 8 ft.
Some clays 8 to 5 ft.



North mosquito creek on the mt.

Pleasant-Foreville road slope gradually & does not show fullers earth. On Quincy-Harrison road no good exposure is seen. At Sykes mill a sandstone & a sticky blue clay is seen. At Ellis mill on River Junction road very flat & only mottled clay. On Florida creek only mottled.

section as old cherted limestone

1. Iron concretions & blood red to pebble stratum.

2. Atlanta gray phase with no iron concretions

(3) mottled purple clays ideal - iron evident.

then then from first steep slope

~

at the River Junction - very good section is seen. The limestone occurs at the water edge & for 50 ft or so up the hill. Near the top is a stratum 3 ft thick with some mammillons & fullers earth. sample taken.

Seven plays lie upon the limestone & on this the usual red sand clay series see previous sections.

Feb. 19, 09.

On the Madison Highway road south from town. Just beyond the city limits the hill sloping south shows yellow-red at top with iron concretions. The usual mottled blotted iron-stratified clay below this. & a light colored clay north bottom some sandy possibly phosphate rock - seen below the blotted clays.

On the Monticello Greenville road 1 1/2 mi from Monticello on a small hill sloping west the feeblely stratified sandy clay with white partings is seen. It has here a decided dip to the west much greater than the slope of the hill, as much as 3 or 4% prob. a little farther up on some hill the partings are horizontal or nearly so. The apparent dip may represent a slump.

On Monticello - Greenwell
 road hill sloping N. E. 1 mi
 yellow with iron concretions
 at the top. below this is the usual
 mottled blotched clays. Over
 bedded sand.
 Under this is fall & pieces of clay
 shaly clays 25 ft. then
 laminated clays 10 to 12 ft.
 under this seems to be yellow
 light coarse sand.

Bar. level. bottom 1740
 top 1760

Hill on Tollohanna - Monticello
 road sloping N. 1 mi from "
 1) yellow clay. unstratified. 2) mottled
 3) ~~sandy~~ ^{concreted} (4) sand clay with
 white partings (5) clay with broken
 web inclusions. Bar. level 1750
 Bar at top 1770.

Below this again is sand clay
 with white partings to 1715

Section of Lake Michigan
 water covered 2 by
 decomposed red material 15 ft
 2. Phosphatic broken stuff 2 1/2 "
 3 Green blue clay 1 ft
 sand & water 2 ft
 No (2) is folded as at west of Tolla.
 This section is very like Nigges web.
 at the hill 2 mi from Michnau
 100 ft above the Lake the material
 with white parting dip north
 at about 45°

Barometer readings.

DuPont	1820
Monticello depot	1855
" hotel in city	1880

Monticello hotel	1820
Pat creek	1650
Oreocline musinus	1350
Upper	1760
Hotel	1780

Michauxia drain sink

2 mi S. E. of Lloyd.

- 1) Super soil & creek 10 ft.
Box road at top 1725
- 2) Greenish sticky clay only partly exposed
about 2 ft.
Fragments of silicified corals
occur in this, also fragments of
siliceous rocks
- 3) Limestone resembling the topso 10 ft.
- 4) a little softer limestone but
ochraceous resembling above 5 ft.
& separated by wavy line from above

The strata must be almost
horizontal for at a distance of
about 1/4 mi up stream the
rock lies at the bottom of the stream.
This limestone weathers to
a sticky blue clay.

Bailly Mill Creek Sink, 1/2 mi S.
of above level abt. same

This sink is fully 25 ft deep
but no rock is seen along its side.
From this it would seem that
the limestone rock dips to the south
thus forming under.

Bar. readings

Hotel at Montuillo	1775
Michauxia drain	1665
Water in Lake Michauxia	1700
Water in Lake Michauxia	1730
Highest hill west of lake	1880
Branch 6 mi N. Lloyd	1760
at foot of Lloyd	1720
Hotel	1730

Hotel 1705
Top of sink 1725

Water in west sink	1695
General surface level at N. E.	1675
	1720

General surface level at east sink 1710
" " " of hotel 1725

42

Tallahassee north.

Six miles north of Tallahassee on the Meridian road one is on the usual plateau. Going south descending to the drain connecting Lake Okechustuck with Lake Jackson the usual section is seen as follows: (1) yellow or red with iron concretions about 5 or 6 ft. (2) mottled and blotched clay undetermined thickness but ~~pro~~ apparently about as usual. (3) structureless red material. This is doubtless the material with white fratings but decayed. (4) The usual red material with phosplastic and disturbed material.

43

Coming on south one crosses the second branch entering Lake Jackson and arrives at the plateau again. On the ascent the section is repeated No. 2 is better exposed a very good section is seen just at the 1st side road turning off to Ronald place (near Tall.).

(No. 2) here seen to lie horizontal or at the Bird place 3 in South of Pine Barren.

Repeatedly on this road is seen the section (1) + 2. No. 3 is seen on the Thomasville road $\frac{1}{2}$ m. N.E. of town.

46

Section at the extreme north
end of Aspalaga Bluff.
measurements by E.H.S. and
B. Bridges, March 3, '89

Bench 6, one chop on west side of pine
15 in in di. This bench is 153 ft. 3 in.
Bench 5 is fine chop on pine 20 in di.
This bench is 141 ft. 7 in above base of bluff.

Bench 4 is on small striking cedar 9 in
di. standing 25 ft to the east of the line of section
Bench facing west, 3 small chops, and (blaze) north.
This bench is 60 feet and 7 in.

Bench mark 3 is on striking cedar tree
12 in di. north side, small chop on east
side of bench and blaze on south side.
This bench is 49 ft and 7 in from base of bluff.

Bench mark 2 is on the side of a
tree (2 chops) 15 in in diameter. This tree has also a
blaze on its south side. This bench is
38 ft, 9 in. above the base of the bluff.

Liquidambar styraciflua

For Bench mark 1, a large tree 3 ft. di.
smallest gum Liquidambar in about 30 yds from bench
(sp. marked) at the edge of the water was
selected. This bench is at the level of the
base of the bluff at this place. It is a
notch in tree next to bluff with nail at
bench level & a blaze facing river.

47

The above section is to pine tree
bench 6 which stand just back from
the first steep slope. To the extreme
top of the hill back near cleared field
is 15 to 25 ft higher. Barometer gives
175 as total height.

The limestone observed by Harris
at 145 has probably become covered
since as it is not now exposed.
Limestone in place was found at 111 ft.
This exposure is near a large oak tree.
This is limestone with numerous small
fossils or casts. Below this level the
limestone is occasionally exposed
to 60 ft. Below this level almost
continuously exposed.

a bench mark which may be
designated as 4 (no nail) was established
by one chop on side of pine 18 in in di.
at the level 112 ft. 4 8 in. This
pine is near the line of section & is
10 yards west of the limestone exposure
referred to.

another bench mark 1, a was
located by chop on striking cedar 6 in
in diameter chop facing east. no nail.
This is the level 28 ft. 4 in and falls

and is given as falling within what
should be ^{Harris} ~~double~~ coralline bed. 26 to 48
32 ft. (= in this section 24 to 30 ft.)
On top of this note the fossil zone mentioned
by Harris at 32 ft. (= 34 ft.) having
many fine small fossils. A notch is
clipped in the limestone at the
level of Bench 1st

Another notch is clipped in the
limestone at the level 19 ft. 3 in.
this is about the top of Harris' sandy
yellow limestone.

A notch is cut also at the level
9 ft from base. This is within Harris
limestone with (white, fine fossils).
It was not observed as conspicuous for fossils.
The place of the grey layer quartzitic
clay was represented by a slope, & it
seemed from slight excavation that
this stratum in our section was
represented by soft impure clay
limestone.

No corals were observed in the
"coralline stratum". The 2nd fossiliferous
stratum that at 32 (= 30 ft.) was
only nodosities, ferruginous when seen.

49
Possibly Hall's section was made
at some part of the bluff other than
the north end. At this point the
space 40 to 60 ft. which Hall's
gives as "Bluish green clayey nats."
is now an almost continuous exposure
of limestone varying as below from soft &
clayey to hard, mottled purplish. Above
this as stated an ^{of limestone} ~~acornoid~~ ex-
posure to 111 ft.

Johnson's section must have been
much generalized. The 60 ft of calc.
clay (40 to 100 ft) contains now no clay
exposures except the greenish clay on
decomposition in situ of the dark limestone.

Photo No. 1. is of this section showing
Nos. 4, 5, 6, and 7.

Photo no 2. Nos. 1, 2, 3, & 4. are exposed
at 2nd bench from north end of bluff.
(45 feet time 5 m. Hazy day at 4.09 pm)

14. covered slightly with ^{abt. 50 ft.} occasional outcrops
 13. mostly covered, with occasional outcrops
 12. Stratum with many fossils as casts 2 ft. 6 in.
 11. Hard ~~pink~~ white limestone, becoming on exposure coral and a pinkish color. 4 ft.
 10. Mostly covered, occasional outcrops mostly of white limestone often with clay 23 ft. inclusions
 9. Granular limestone with many small fossils as casts 1 ft.
 8. white limestone weathering hard and purplish 2 ft. 6 in.
 7. stratum which weathers rough 2 ft.
 6. limestone weathering hard and slating vertical 6 ft.
 5. Sandy white limestone 2 ft. 9 in.
 4. Calcareous clay false assemblance to fuller's earth 4 ft. 4 in.
 3. Greenish to light calcareous clay. seen at with end & along river 2 ft.
 2. a light colored limestone which weathers rough. It contains many small fossils as casts. 2 ft.
 1. Yellowish sandy limestone weathering smooth as the water well exposed at the water on the 2nd front of the north bluff. 6 ft. This stratum (2) all lime, no phosphate.

51

at the First Branch south-west from the bluff. No. 1 lies from note to 6 ft. above. No. 2 from 6 to 8 ft. above water. No. 3 8 to 10 ft above No. 4 one or 11 ft. above water.

at the 2nd Branch Nos.

1, 2, 3, and 4 are about the same as the not measured exactly. No. 7 the rough layer is 18 ft. 10 in. (Note: This measuring of rough layer not of value as anyone of several layers may weather rough)
 as the third Branch the rough layer is 19 ft. - 7. (note not of value)

at the point of the 2nd section

below the 4th bank. The top of No. 4. fuller like lime clay lies 12 ft. 4 in. above water. This point is 17 in. above the Permian Bone of this section. That is the Permian bone of this section lies 16 or 17 in. below the top of No. 4. & lies on this day nearly 5 ft. 16 ft. above water. Creek in River.

at the landing a bench mark was kept on a tree. mark is 18 ft. above water.

lim. clay
clay
white
yellow

Section of bluff about $\frac{1}{2}$ way between midway the landing & the north end of the bluff.

13. Correl top of bluff.
12. Fossileiferous horizon
base of this at 5 ft. 6
11. Limestone hard 2 ft.
10. Steep slope with accreted limestone
some hard with crystals, some soft
with clay inclusions 21 ft. 6 in
9. white granular limestone with corals 1 ft.
(top of this section 31 ft. above water)
8. Hard limestone, vertical 5 ft. 7 in
7. corall 2 ft.
6. Limestone weathering hard 5 ft.
5. Yellowish soft limestone 3 ft.
4. The upper 3 ft. of No 4 is exposed &
stands vertical
3. The part of the section represents
2. The + 3 is here covered by local shale from
about 8 ft. of dip just west of this 6 ft. 8 in.
1. Yellowish limestone same as no
1. of above section 3 ft. 4 in. exposed.

574
dip of the strata. at Aspaloga.

The strata more conspicuous and distinctive stratata in the Aspaloga section are readily traced through the greater part of the section. ~~the~~

(1) The yellow sandy limestone which at the north end of the bluff rises to a height of about 8 ft. above water at a medium stage of the river is continuously exposed at a medium stage of the water from the north end of the bluff to Aspaloga landing a distance of about 1/2 mi.

(2) Stratum no. 2, is not seen beyond ^{about} the middle of the bluff. To this point it lies above No. 1. and grades into that stratum. The combined height of Nos. 1 + 2 near the north end of the bluff is 8 feet, and ~~at~~ ^{near} the landing as much as ^{far} of the yellow limestone is seen above water.

3. Stratum no. 3.

22

4. The gray-blue line clay of stratum, no. 4., is easily traced throughout the entire section. At the north end of the bluff, the top line of this stratum was 19 feet above the level in the river on March 5 '89.

19.64	3 1/2	14
3 - 11	2 - 9	
15 - 4	23	
3 - 10 1/2	3 - 11	
42 - 2		

In the section made near the middle of the bluff the top line of this stratum was found to lie about the river on the same day, 12 feet or 6 in. It is thus seen that in the distance of 1/2 mi the change of level of the top line of this stratum amounts to six feet, and 6 in. Near the landing the top of this stratum was found to lie at the same date 16 ft + 9 in above water. The direction of the line of exposure in this bluff is from slightly north of east to south of west. The change of level is probably not due solely to dip, or at least the yellow limestone lying at the base does not dip to such an extent.

The stratum found at the north end of the bluff and described as weathering

25

was ~~cut~~ readily tired thro the 56
 section. The base of this stratum
 is the ~~top~~ ^{base} of the section
 at the north end of the bluff lies
 $34 - 10\frac{1}{2} + 19\text{ ft. } 3\text{ in} + \frac{1}{4} - 10 = 28\text{ ft.}$

from the water level. At the second
 station from the north end of the bluff
 it was found to lie 18 ft. above water

At the section midway on the
 bluff this stratum occurs

This stratum, containing ^{coast of fossils}, occurring at 6 ft
 feet above water level at the
 north end of the bluff was found in
 the section near the middle of the bluff
 to lie 55 feet above the level of the
 river. In this stratum there is therefore
 an observed drop of 9 feet in about $\frac{1}{4}$ mi.

The base of the stratum containing
 small fossils which lies in the north section
 at the level $(34 - 10\frac{1}{2} + 28 - 4 + 2 - 0) = 34\text{ ft.}$
 is found in the section at the middle of
 the bluff $(29 - 0 + 11 - 0) =$

Section near south end

57

5. Limestone, vertical 5 ft.
 4. Concret 2 ft 10 in.
 3. White limestone 6 ft.
 2. Light colored sandy lime 2 ft 9 in.
 1. Concret from water level 16 ft.
- This level is top of stratum of
 north section. Base marks of
 this level on cedar 14 in in diam.
 nail marks base.

At the head of a small creek flowing into Flat Creek No. 4 is exposed at an elevation which according to the barometer is about 30 feet above the river at Aspholga landing. This locality is about.

On Flat Creek this stratum lies above the water & by barometer 25 or 30 ft above the landing at Aspholga. This bluff is on the south side of Flat Creek in section 20 just east of the entrance of a small branch from the south. This locality is 3 mi east of N.E. flowing Aspholga as follows.

- (1) Covered from water level 2 ft
 - (2) Sandy limestone with few fossils 2 ft.
 - (3) Fossiliferous limestone 4 ft.
 - (4) conch 4 "
 - (5) Sloping thin limestone ledges 6 "
 6. Base of joint clay 18 ft above water
- Measurements only of approximate.

on south side of Flat Creek 59

Section in Section 20, 1/4 mi east of stream entering flat creek.

- (1) covered from creek. $\frac{4.2}{3.9}$ 6 in
- (2) Limestone sandy some corals 12 ft.
- (3) covered and sloping 4 ft. 11 in.
- (4) actual exposure of joint clay 1 "
- Top of joint clay at 18 ft. 5 in.
- (4) Light colored sandy limest 4 ft. 10 in.

Section of Bluff on south side

of Flat Creek in Section 21.

- (1) covered from water 1 1/2 ft
- (1) water level to 7 + 4.6 11 1/2 ft
- Limestone sandy + few fossils below some fossils as corals above
- (2) clay limestone same as No. 4 of Aspholga Bluff section 6 1/2 ft
- 3 Yellow sandy limestone 4 1/2 ft
- (4) conch 4 ft.
- (5) covered + sloping about 12 1/2 ft

Barometer readings indicate that limestone occupies at least as much as 50 ft of No. 5.

Section on Crooked creek.

2 mi south of Asfaloga Bluff &
 $\frac{1}{8}$ mi west of public bridge south
 bluff

(1) From water covered say 5 ft.

(2) Light colored limestone 11 ft.

3. Sloping with 6.0
 occasional limestone 5.2
 outcrops some of 5.5
 which have crystal 7.4 16.7
 inclusion. 2.5
 26.9

This section resembles the
 section at Asfaloga from the
 top of No 9. to No 11. inclusive.

a stratum of limestone standing
 vertical with some fossils as corals
 occurs ^{top of} at 16.7 in. This may represent
 Nos. 11 & 12 of the bluff section.

Barometer readings

Bines 1910; Crooked creek N. of east
 1930; same place station on

Base of bluff on Flat creek 1910

Top of hill $\frac{1}{2}$ mi south 2075
 limestone on side of hills up to 1900

March 12.

61

Section on Branch entering

crooked creek from the east. Bluff on
 south side of creek about 1 mi from the
 mouth.

(1) Sandstone from water level 1 ft.

(2) Sandy fulline with 1 ft. 3 in

(3) covered 3 ft.

(4) Yellowish gray sand 2 "

5. Gray sand 4 "

(6) covered to top of bluff.

Exp. on south side of same creek
 about $1\frac{1}{2}$ mi from mouth

(1) light colored sand blue on
 unoxidized surface for note 2 ft.

(2) Gray sandstone 10 "

(3) covered to top 2 or 3 ft.

on. or 1811

- Section at old mill site
- (1) ~~covered to top~~ yellowish sand or loess 8 ft.
- (2) ~~concrete~~ at top Gray bluish fuller earth 1 1/2 ft.
- with some sand especially about the middle of the stratum 5 ft.
- (3) Light colored or buff fuller earth 2 ft.
- 3rd grade upper part, lower 2 ft.
- 32 in. incl. becoming sandy
- (4) Gray sandstone 10 "

Farther up stream

Bar 1880 where water falls over top of No. 7. On top of this sandstone is fuller earth 1 ft. 4 in.

The dividing line between fuller earth & sandstone is very distinct. The face of the fuller earth stratum drops to the N.E. 1 ft. in 40 ft.

This dip seems to be local

up stream Bar 1910 a

Sand rock like the others occurs 2 ft.

Some fuller earth abt. 1 ft. above this Bar. 1875

Sand rock in the channel to 1900

Bar readings March 12.

River 1775, Camp 1800;

Crooked creek on public road south of camp 1790 to 1800.

Mouth of small creek entering crooked creek 1790 to 1810;

1st steep bluff abt. 1 mi from the mouth of above branch 1800 to 1815.

2nd Bluff 1/2 mi up. 1810

at old mill site 1855

at second fuller earth 1890

Sandstone in stream to 1910

Top of plateau 2000

Crooked creek returning 1820

Camp " 1845

Barometer readings March 13

64

camp 1880,
River 1820 - 1840

Crooked creek at big timber foot by N.E. Cor. { 1840-
1835
Extreme top of hill at Sugar mill { 2070-
2015-

Iron connections lie close on the side near
the top of this hill. Cross bedded sandstones
in position at 2010 and as exposed to
Base of same at 2000

Small creek beyond & near Smith house 1855
Flat creek & old bridge 1810

Section on hill sloping east

Below yellow unindurated sand or loam
overlaid by many iron connections 3 ft.
some mottled clay in places.
coarse cross bedded sand typical Alta-
mocha phase. 20 ft

Pink & red with white partings
horizontal to surface
down red with white partings 8 ft. & up
covered to the bottom of hill.

The coarse material undoubtedly
lies in position. The base of this
stratum rests unconformably upon
the next below. The contact line is
distinct & rises as sandstone off in 50 ft
to the east. 65

The change of level in the basal line
amounts to $4\frac{1}{2} + 8\frac{1}{2} = 13$ in in 20 ft
thereby rising to the east.

The change of level in 63 ft same
direction is $16\frac{1}{2}$ in.

The change of level in the base 110 ft
to the south was found to be practi-
cally no change.

Barometer

Line taken on small creek on
Miss Harrison's place 1880

Shinarump like joint clay at 1895 -
1900

Fullers earth at 1960 -
1980

Flat creek south of Fullers earth 1880 -
1860

The Fullers earth lies by levels made
March 12, 102 ft., 4 in above
Flat creek.

Box. Rock on Yon creek with crystals 1900

Sandstone on bank of Yon Creek 1900

3 ft light limestone under the sandstone

Fullers earth on bank of Flat Creek 1920 -
1900

Platinum at Sheep head church 2050 ⁶⁶

" cut from Crooked creek 2060

Crooked creek
camp

1900.
1875
1890

camp 1900

Base of the coarse sand at 2175
or 100 ft. above camp.

Joint clay on small branch at 1950-
1895

Limestone on this branch 1960

Base of coarse on hill

east of creek

2065

about 15 ft of this stratum here

Joint clay on third small
stream from Flat creek 1950-
1925

This stratum is seen
on the bluff just north of
the entrance of a small
stream about $2\frac{1}{2}$ miles
south of the railroad. It lies
there 25 to 30 ft above
the river at some stage or above.

Base at 1st creek from P.D. on
new cut off road. Joint clay
here at the level. 2000 ⁶⁷

Base 3 mi out near old log
school. Iron cone in place 2110

Iron cone in place here seem
to rest in one place on pink
mottled clay. Elsewhere the
sand motion come with flood
which pebbles intrusions. Below
mottled stays blue. at 2100

, reef.

Blue clay 2080

Top of pinkish clay at 2110

white partings cross banded.

are bedded sand with clay
inclusions & above. 2120

calico clay 3 ft

covered with iron 207

at 2nd section abt 5 mi from
R. & 22 ft of core at least
exp.

at top 5 ft up to be
alm yellow with a portion of
iron ore, or instead uncon-
formity is pronounced.

Bar. at camp 1920

March 17.

On this date the river stood
4 ft below the bore near the
landing, that is it was then 4 ft.
below the bore of station (4) joint clay.
In the section at the middle of the
landing, ^{the water was then sufficient to} this station was ~~then~~
~~entirely under water.~~

The reality of a minor syncline
near the middle of the bluff is
thus shown

Rock cut at 11.30.

69

Down the river ^{sloping} from
Aspalaga a good exposure
occurs below the mouth of
creek. This exposure is known
locally as white rock. At this
place there is exposed from abt 10
to 30 ft above the river white
soft clayey material with few fossils.
up this stream $\frac{1}{2}$ mi. or so at the
level abt 30 to 50 ft above
water is found 20 ft. of more
persistent limestone standing
vertical. These two exposures
resemble lithologically the
part of the Aspalaga section
lying between No 9. & 11.

From two miles or so farther
down the lower ~~part~~ a sloping
part of this exposure seems to have
been under the upper more persistent.

limestones being exposed to 70
or nearly to the water of this
stage. — The sand-plaster

concretions occur in the red material here on
the ^{surface} of the ^{river} like those of ^{the} ^{lower} ^{part} of the ^{stage}.
On Rock Creek no limestone
of the usual type is seen. In
one place only does lime rock
occur. This is a shelly yellowish
rock lying out $\frac{1}{2}$ mi from the
mouth of creek and at a level
which the barometer gave as
10 ft above the water on March 17.

at the level given by barometer
as 75 to 80 ft above river (same
stage) the gray sand of the fullers earth
series was first seen.

At the level given as abt. 120 ft
above the river the shell rock with
large pebbles was found. At this level
also & for 10 ft. or so above a more
gray-blue outcrop surface & yellow
on decayed surface was found.
This more resembles the ^{Chippewa}
bed of Alum Bluff. Fuller's ~~earth~~ ^{clay}
~~occurs~~ occurs at the head of this stream.
^{abt. 100 ft. above water.}

March 18. 71

Head waters of Sweetwater
Creek. Spring branch heading
near Rock Bluff P.C.

Fullers earth occurs on this
branch at a level read by the
barometer as 100 ft above
the river. ^{Det.} also at 100 ft.
below the general level at
Rock Bluff P.C. From the
place of their exposure the stream
cuts through full sandstone
and lower this mostly sandstone
about the usual distance
vertically. This stream cut this
the sandstone for the distance
of about a mile. The section is
unusually good. The rock a more
is yellowish on exposed surface but
is blue when not decayed.
The barometer reading should be
reliable as this was a quiet clear day.
The top of the hill 1 mi out from bluff 220 ft.

Section on side of the hill about 72
1 mile out from Rock Bluff landing
Give approximate section

Iron concretions stoned at base 8 ft.
uniformity.

Coarse cross bedded sand 5 ft.
mottled clay

Sand with white partings

Pink and highly plastic clay 5 ft.

Yellowish plastic clay

Blue plastic clays

Total obs.

75

March 19. Begin then at 20 ft.

Section at Rock Bluff 73

Section obtained not at one
point but ~~to~~ near the north end
of the bluff at near by levels.

1. Chatahoochee limestone

2. Sands which at the base are
greenish with resemblance to glau-
conitic sands. passing upward
they become gray or slightly
yellowish and again gray. 33 ft.

~~Sands of this character occur~~
~~to a thickness of~~ The lower 20 ft.
of this sand contains few fossils.

Twenty feet from the base a few
shells were observed and some
porphyritic or sand-line - phosphatic
concretions begin to occur. These
become more abundant and
the sands pass gradually into
3. A lighter colored sand-line-phosphatic
material of which 10 ft. and 8 in
are exposed.

covered to top of hill
about 100 ft.

80 + 6m

9 ft. fuller corals.
1 ft. ledge with shells
5 ft. Gray sand
ledge with fossils 2 ft 6 in.
5 ft. Gray sand with lime inclining
2 ft. covered

62 ft.
21
83

Phosphatic marl supplemented
from section on bluff across
small stream to the north.

chub
some
35-6
to here

8 ft. 6 in light sand. lime-
shale to north

Gray sand with cone & some
lime 11 ft. - 3 in.

chub
21 ft 5 in.
to here

18 ft 9 in Gray sand.
and greenish sand.
1 ft 3 in light sandy limestone
over north.

measured to fuller corals
12-5 Bone on large Elm. 75

10-2
8-2

covered to
Bone 9 Bluff up at 29-9. This
shows sand with lime concretions.
The change to light marl with shells was
here at 29-9 + 2-6 = 32-3.

8-3
12-3
17-6
-6

68 ft - 3 in to bottom of
overlying ledge

38-6
29-9
68-3
8-6
76-9.

15-6
14-7
14-0

Bone or note 1440

Section across north of Rock Bluff 76

1. covered to 27 ft 9 in.
2. Sand with coal, inclinations 32 " 3 "
3. Phosphate sand - mail to 62 ft.
4. covered 2 ft.
5. Gray sand with lime inclusions 5 ft.
6. Fossil ledge (shells) 2 ft 6 in.
7. Gray sand 5 "
8. Ledge with shells 1 "
- Falls east exposure 3 ft.

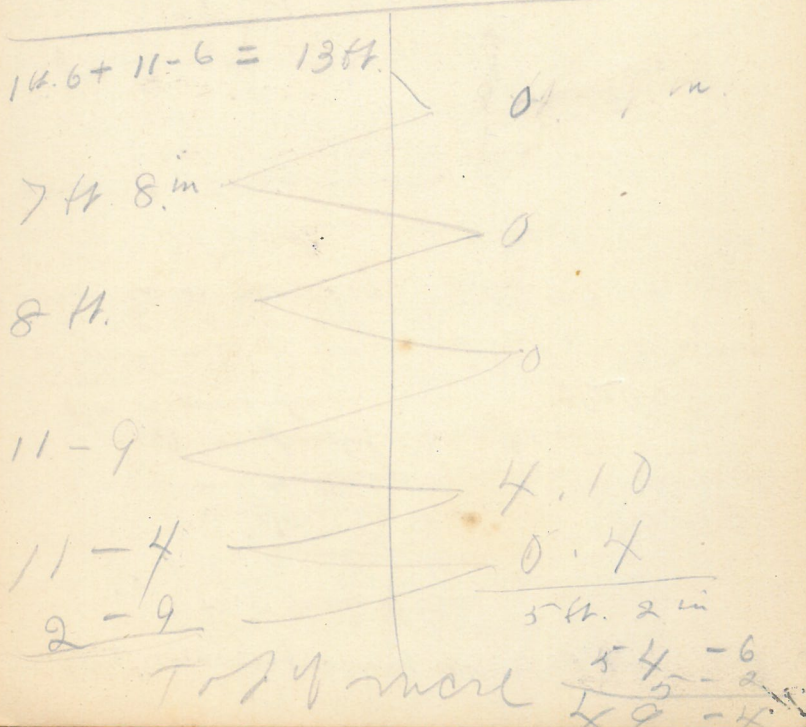
Base of falls east, thin
76 ft 9 in above water.

Chert section at Rock Bluff 77

- Sandy light colored mail. 1 ft 3
- Blue green sand becoming above
yellowish and gray 21 ft 5 in.
- some with lime concretions
and some shells to 33 " 6 "
- passing to gray - light to 49 - 7
- sandy mail

a base was established on side of large
pine tree at the level 60 ft 3 in.
above temporary base of water.

a base is established also on small
tree at the level 35 ft 6 in at the base of
the gray sand phosphate mail.



River 2100
 clay unconformity at 2185 78
 8 ft greenish clay
 2 ft. Sand yellow
 3 " greenish clay
 5 " yellowish sand
 2 " pinkish clay slate
 Bar reading here 2220

2220
 2100
 120

all horizontal or approximately so between
 these two readings. Above this deposit.
 Below Altona, Iowa. & Pleistocene
 run in succession.

Check on same
 Barom at top 2295

2295
 2100
 195

Pleistocene green clay approx horizontal
 1 ft. 3 in. nearly conformable
 medium fine Sand, yellowish 5 ft.
 clay meeting green. & fine 2 " 64
 yellow sand 2 "
 more clayey 5 " 64
 Green clay unconformity 9
 marked bed, alum tops
 Bar here 2275
 2100
 yellow sand 125 6

Not in place below this
 Barom at River 2100

Section 1 mi S.E. of Park Bluff 79
 Landing R. T. S.

The top of the hill at this point
 lies according to ^{the average of several} barometer readings
 200 to 215 ft above the river.

The exposed part of the section which
 lies a little below the crest of the
 hill may be assumed to approximate
 185 ft above the river.

The ground is covered at the top of the
 section by a profusion of iron
 concretions, of irregular shape
 from the size of a pea to
 six inches in diameter the upper part
 of that part of the formation that is
 decayed. Back of the extreme top of
 the hill Pleistocene sand occurs.
 The top part of the exposure upon
 partial decay becomes blotched
 and faded, and so changed in character
 as to seem to be a different formation
 the bottom is limited by a shell layer.
 Since the water penetrates unevenly
 this changed line of decay seems to
 represent an unconformity. This
 line of weathering is 1 to 5 ft.

much interest attaches to the
 iron concretions since the
 question of their formation is in
 doubt. Ordinarily they are found
 only at the surface & a foot or two
 down in the matrix from the surface.
 At one place however in this section
 a stratum of iron concretions is
 seen to reach from the decayed zone
 5 or 6 feet into the undecayed
 zone.

81

$$11.6 + 4 - 6 = 16$$

$$0 - 2$$

$$11 \frac{1}{2}$$

$$0$$

$$15 - 1$$

$$0$$

$$9 - 10$$

Top of ^{sandy} clay. Green strip
 these days are to 11 - 6

$$14 \frac{1}{2} - 8 \text{ m.}$$

2 ft. Pinkish very plastic clay
 from sand

3 ft. yellow sandy - clay

1 ft. yellow sandy clay and
 round elongated white pebbles to
 1 in in length. Rather coarse

$$7 - 6$$

$$6 \text{ m}$$

7 feet of sandy yellow clay

Green clay vertical 3 ft - 2 in
 contains - alum tubes 5 2

82

Top of phosphate marl exp

$$24 + 11 - 6 = 19.6$$

Phosphate marl area to within
5 ft 10 in of this
from marl
3 ft.

New Base
from the top of marl

10 ft 8 in - 9 ft
covered 1 ft 8 in & base of
brown marl sand

11 ft. 7 ft
8 ft - 6

New Base top of sand, exp.

11 ft. 0

$$11 - 6 + 4 - 6 = 1.4$$

6 ft 8 in

9 - 6

2 - 6

83

83

7 ft.

2 ft - 6 in

5 0 2 in

5 - 0

5 - 0

45 ft - 2 in covered.

On Branch of Sweetwater creek on or
 the west side of S. 27. ^{See 2} near Howells
 house ^{but} alluvial soil is seen. Below
 this is found the usual section
 of Blue ^{sand} sand Phosphatic
 sand and Blue sand sand
 again. This section was
 not measured. It seems
 probable however that
 the phosphatic sand is
 not as thick here as in the
 Rock Bluff section. The sand
 seen at Howells may not represent
 other than a shell sand
 the equivalent of which is seen
 near the top of Rock Bluff.
 A gray sand phosphate sand
 occurs lying at or near the
 level of the water on the road
 crossing the east fork of
 Sweetwater below the entrance of
 the branch from Howells place.
 7950 27 ^{cor}
 Sweetwater 2 lower & 3rd lower. All bed rock
 2000 main road.

Boron or Withou on Creek 2000

87

Base of exposure on Butlers place 2040

Phosphate Shalium Sand - lime
 phosphate lying horizontally
 this passes gradually into water. $4\frac{1}{2}$ ft
 Gray sand with lime-phosphate
 inclusions exposed 1 ft

The base of this exposure lies
 about 15 ft. above the level of the
 small stream & by barometer 40 ft
 above Sweetwater or Withou.

It occurs on the east Bluff of a
 small stream tributary to Sweetwater.

Boron or Creek

1950

Top of hill

2115

This exp is on section 5.

Exp. on small stream off 2 m
 south. Gray phosphatic sand
 with shells occurs at 28 ft
 above the level of the stream.

Obs 34. exposed Down here 1995.

To the river from this point is about 1 mi.

This station is therefore abt 30735.

6 ft above this stage the River was 22 ft
 on river 4 ft.

10 min down river a
ridge of unstratified yellow sand
runs 30 ft above the river.

Just beyond creek & at
11 o'clock after

came to top of high bluff

brassy micaceous sand 15 ft
covered 5 ft

green micaceous sand 4 ft

yellowish sand like that
above the fuller earth exposure 5 ft

came to the river 12 ft

Alum Bluff

Bn. rising at the top 2030

Top of mass from top of clay ledge
at angle of 45° 30 ft

clay ledge vertical 7 ft
covered

The sand of the bluff above the ledge
is medium coarse, more or less
siliceous, less so than Altona.

at Alum Bluff the
phosphate sand material
lies near the water at the
extreme north end. At the
south end this material lies
from the water's edge to
8 ft or so above.

The following partial section
was made near the landing

- (1) from water covered 5 ft.
- (2) Sand phosphate stratum 6 1/2 ft.
- (3) Alum Bluff beds with
vegetable remains & with
fuller earth portions of 10 ft
& chert or the more.

Two boxes were made at
Alum Bluff as follows:

- (1) Nail in Southwest corner floor
of warehouse at water's edge
- (2) Nail at water's edge in fore
of the on S.W. side on west side of
road in front of section drawn &
25 ft from water.

Sample for analysis 90
march 24

- # 1. Sand phosphate
rock from Alum Bluff.
p. 25 0.22 Humber.
2. Sand phosphate rock
from Birken place Sect 5
1 note 7 west.
3. Some from clay sand below
the phosphate bed, No phosphate.
4. Phosphatic (?) marl.
from Mr. Jackson place
probably represents chipole beds
5. Phosphatic marl from
Rock Bluff. Sect 17
"Trace of phosphate" Humber
6. Concretions from sand
below phosphatic marl
Trace of phosphate.
7. Station No. 5 of Aspaloga
"No phosphate" Humber.
8. " " " " " " " "
9. Cement rock of River Junction.
"no phosphate" Humber.
= station 5 of Aspaloga
"no phosphate" Humber.

91
Rivers on Gorge at River Junction
Bridge stood on wed. march 17 of '09
10 AM at 20 1/2
Tuesday march 23 at 20
Thursday .. 25 at 20 1/2
all readings at 10 A.M.

Kronmiller and Huger
Brick place near Farmdale
on St. Andrews foy.

Bristol march 26.
From Bristol south a bluff
faces the river swamp a
distance by river of about
3 or 4 miles. (direct line not
more than 2 mi). The bluff is
50 to 70 ft. high.
about 1 1/2 mi below Bristol a decayed
yellow marl is seen in a small
stream near its mouth & not
more than 2 or 3 along the river
line of this date. about at the
end of the bluff pine woods cover it.

a steep head about
 $1\frac{1}{2}$ mi south of Bristol runs
 the following section.

(1) weathered and mottled
 yellow sand clay with iron
 concretions 7 ft.
 sticky blue clay (sandy) 3 ft.
 Pinkish sand & gravel 10 ft
 stream springs below.

(2)
 section $\frac{1}{4}$ mi farther south.

Sand decayed & mottled
 & with iron concretions 9 ft.
 sandy clay (& gravel) 5 ft.
 gravel to spring (abt.) 30 ft.
 as seen in near by exposure a part of
 this 30 ft or less consists of pinkish sands.

(3)
 Exp. $\frac{1}{4}$ mi farther south.

Decayed & mottled sand with 2 in or 4 ft.
 sandy clay stratum like that of
 Alum Bluff 6 ft.
 Intensely cross bedded sands 8 ft.
 Pinkish coarse sand (Alumden) 4 ft.
 section is seen to be variable. No one
 lies not more than 20 to 25 ft. above the river.

Section (3) above presents one close 93
 resemblance to the section seen in cut
 west of Oak Pleasant.
 sand here seen not to be so coarse
 as along the river north. Rather variable
 than in central Goddard.

North from Bristol no river
 bluff occurs for about 2 miles
 the east bank sloping gradually.
 Here the south end of Alum Bluff
 is reached. Alum Bluff was followed
 about $1\frac{1}{2}$ miles one exposure of
 Chesapeake marble and of Alumina
 clay being seen. Top of Chesapeake
 thought to be about 20 ft above the
 river. The marl here full of fossils.
 streams have no cliff heads to this
 bluff. Above acrebury & Gunter.

Go to Cohens Bluff about 4 mi. down
 from Baileys ferry. & up to
 see the Look & Tumble to

March 27 '09.

94

Section at Alum Spring.

The section is taken a short distance above the spring.

- (5) Superficial sand and soil 4 ft.
- (4) Red sand, vertical from medium coarse to Altamaha phase + having white silicious pebbles up to $\frac{1}{3}$ in in diam. Cross bedded. One layer of pebbles, 1 pebble thick long bed 14 ft.
- (3) Covered with yellow sandy clay at bottom & with occasional clay exposures & with springs 10 ft.
- (2) Gray blue micaceous clay-sand 15 ft.
- (1) Chesapeake marl to the water (6 ft) 6 ft.
marl seen below the water (1 ft) 1 ft.
Total height of bluff 50 ft.

Section at Darling Slide. 95

- (5) loose medium coarse sand of yellowish color in part vertical in part sloping. resembling top sand of Alum Bluff 11 ft.
- (4) Indurated vertical cross bedded sand, medium coarse to Altamaha phase & with many pebbles in places up to $\frac{3}{4}$ in long. No iron concretions seen. This stratum is less well indurated near the bottom 14 ft.
- (3) Covered, yellow sandy clay at the bottom. seepage water along the sides, forming a bench. 8 ft. 8 in.
- (2) micaceous sand-clay, rosinch 3 ft. 10 in.
- (1) Chesapeake marl 2 ft. 4 in. 10 in.
marl seen to about 1 ft under water 62 ft. - 4 in.

The top of the Chesapeake marl is not entirely even as its top varies as much as 9 in in an exposure of 100 ft. the low margin being up stream.

at Corn Bluff about 1 mile 96
below the Clarksville street
turn bridge a rock lies just
below the water line. A sample
said to be of this rock was found
on the bank. This was a
sand rock with perhaps phosphatic
cement. Found afterwards by test to
be a low grade phosphate probably not
above 20 to 30%.

at the Clarksville Turn Bridge
no exposure was seen altho
some chert nodules were
lying in the edge of the water
having apparently been brought
up in excavating.

at the farm of John McClellan
about 6 ft. of yellow mud partly
concreted was seen.

at the ^{site of the} old bridge, Baileys
farm. about 2 ft of yellow rock
stood above water. This contained
fossils or casts & resembles the
ledge found at 60 ft on
Aspalga Bluff.

April 1

Tallahassee elev. 1-25 2075
Quincy " 2-25 2190
Same to mt. Pleasant 2-44 2140
Junction (?) 2-44 2140
River Junction. 2-44 1990

April 2.

Nail in tree at junction of S.A. &
at stage of $\frac{3}{2}$ ft below
crest line in ~~river~~ river stage of $\frac{3}{17}$
 $\frac{1}{2}$ foot.

Following the A.C. from River
Junction 1 mile N. of N.E. a small
anticline is cut thro. The base of the
"lime-clay" lies in this cut lies 28 ft. &
6 in above the stage of the river $\frac{3}{17}$ &
28-6 + 12-9 above stage of $\frac{3}{15}$ - 40 $\frac{1}{2}$ ft.

The section here is as follows:

- (1) pale yellow sandy limestone 4 ft.
 - (2) calcareous clay 7 "
The dip in this exposure is 2 ft per
100 feet to the north.
- at a small branch $\frac{1}{2}$ mi north of N.E.
the bottom of the syncline is reached.
at this point the lime-clay lies
7-6 in lower than the base of same
above, a depth of 7-6 + 7-4 = 14 $\frac{1}{2}$ ft in all.
21 $\frac{1}{2}$ ft. above nail.

Beyond this point an anteline brings the strata up coming into the cut and 244 steps = $732 \text{ ft.} = \frac{732}{5280} = \frac{1}{8} \text{ mi}$ nearly. The ^{Top} lies 8 ft. above the top in the ravine. The observed rate of rise in this cut is 5 ft in 320 ft = $\frac{320}{5280} = \frac{1}{16} = 9 \text{ on } 100 \text{ ft. per mile}$. The section in this cut is as follows:

(1) "lime clay"

Bottom part $1\frac{1}{2} \text{ ft.}$
 ledge of harder material 1 ft.
 Typical lime clay 4 "

(2) light colored sandy limestone 2 ft.

The actual level of the top of the lime clay in this cut is thus $41\frac{1}{4} + \frac{1}{2} = 41\frac{3}{4}$ feet above river stage of $3\frac{1}{5}$.

at another cut over the small ravine 205 steps = 795 feet = $\frac{1}{8} \text{ mi}$ north the base of the lime clay is 2 ft above the top of the same in last or a rise of $8\frac{1}{2} \text{ ft in } \frac{1}{8} \text{ mi}$. The actual level of the base of the lime clay is here $41\frac{3}{4} + 2 = 43\frac{3}{4}$ ft above stage of $3\frac{1}{5}$.

The section in this cut is
 clayey light colored material 4 ft
 yellow sandy limestone 4 "
 base of lime clay.

Base dipping slightly to the west of N.-W.

The level comes to morquitos creek & the public road coming 1 mile east of Chatahoochee shows the base of the limestone in bed of stream there to lie 2 ft above nail or $1\frac{1}{2} \text{ ft}$ above water stage of $3\frac{1}{5}$ & here

$$\begin{array}{r} 12 - 9 \\ 1 - 6 \\ \hline 14\frac{1}{2} \text{ ft.} \end{array}$$

$14\frac{1}{2}$ feet above stage of creek.

$14\frac{1}{2} \text{ ft.}$

section at this point is as follows.

(1) River to base of this section $14\frac{1}{2} \text{ ft.}$

(2) pale yellow impure sandy limestone 9 ft. 2 in.

(3) sloping & covered 2 ft 10 in.

(4) lime-clay.

Basal part 1 ft 6 in

Hard ledge 2 " 6 "

Typical 3 " 6 "

7 " 6 "

Top of same at 47 $\frac{3}{4}$ ft. above river $3\frac{1}{5}$

(5) Pale yellow impure sandy limestone 4 ft 6 in.

6. covered 1 " 6 "

(7) limestone, harder & rough near the base, lighter colored & containing clay above 15 " 3 "

(8) covered in this section to the top of the hill.

at the S.A. crossing of morquitos creek $\frac{1}{2} \text{ mi}$ N.E. of River Junction there is seen.

(1) Base of section above river of creek 5 - 18 ft 8 in.
 (2) Gray sandstone 2 ft. 10 in (3) pale yellow 5 ft. 4 in.

From Barometer levels on 100
 April 2 the following data on
 the position of the Fuller's cove was
 obtained.

S.A.L. $\frac{1}{2}$ mi. South
 R.R. track of ~~the~~ crossing of ~~the~~ above ~~the~~
 $18 - 6\frac{1}{2} = 11\frac{1}{2}$ feet = ~~16~~ $11\frac{1}{2} + 8 = 19\frac{1}{2}$ feet = ~~16~~ $19\frac{1}{2} - 8 = 11\frac{1}{2}$ feet
 hence above river marks $5 - 16 - 8$ feet.
 $24 - 5$

Bar. reads lost limestone seen on
 mosquito creek, while across at R.R. crossing
~~about~~ about 6 mi. out on S.A.L. track 2000
 or fifty feet higher. = total of ~~75~~ ft.

Bar. reading gives Fuller's cove as
 $75 + 24\frac{1}{2} = 100$ ft.
 above river of March 5, 2028 + $2\frac{1}{2}$ feet

station of Jomerson is given as
 125 above station of River 2. See
 check of April 1. which gives dif. as 150
 Fuller's cove seems to be about 10 below
 Jomerson station.

River stage on gorge at River Junction B
 R.R. Bridge 10 A.M.

December 15, '08	3 $\frac{1}{4}$ ft.
" 16 '08	3 $\frac{1}{4}$ "
" 17 '08	2 $\frac{3}{4}$ "
" 18 '08	2 $\frac{1}{2}$ "
March 5, '09	7 $\frac{1}{2}$ "
" 17, 09	20 $\frac{1}{2}$ "
" 18, 09	20 $\frac{3}{4}$ "
at 4 P.M. High stage	21 " "

March 14	20 " 101
" 22	20 " "
" 25	20 $\frac{1}{4}$ "
" 31	14 $\frac{1}{2}$ "
April 1	13 $\frac{1}{4}$ "
" 2	12 $\frac{1}{4}$ "

" 3 across River line 12 "
 above stage of March 5 - 4 ft. 6

Base of Rock above stage of March 5 -
 96 ft. 10 in + 4 ft. 6 in = $21\frac{1}{3}$ ft.

April 26. $\frac{20}{10.5} = 9.6$
 $\frac{9.6}{7.6} = 2.7$

Section of Old Chatahochee 102

- (1) from river, ^{street & marsh} to base of section, along line
 river swamp covered $2\frac{1}{4}$ ft.
 alt. $\frac{1}{2}$ mi.
- (2) white, ^{soft} clayey limestone with
 ledges of hard limestone. This
 limestone contains some shells as
 corals and occasional ribs of fossils
 mounted. 12 ft 33-3.
- (3) clayey limestone with inclusions
 of greenish calc. carb. crystals.
 $1\frac{1}{2}$ " 34-9
 1 " 34-3
- (4) Lime clay strata similar to that
 of Aspaloga as follows
 basal part clayey. 3 ft 4 in. 4 ft
 Harder ledge 2 ft 2 in
 More clayey 1 " - 4 =
 7-4 40-7

Top of No. 4 measured thru a distance of
 45 ft. & found to lie exactly level.

- (4) Clayey limestone, alternating
 ledges of harder material. clay
 layers resemble the lime-clay 50-8
 16 ft - 3 - ~~25 ft - 2 in~~ = ~~58-6~~

5. Lime clay stratum 3 ft - 10 in. 103
 above river. ~~5 ft - 6 in~~
~~6 - 2 - 4 in~~

Top measured & found exactly level.
 yellowish

6. Sandy limestone 4 ft. 58-6

7. light colored clayey limestone
 clay inclusion toward top

26 ft 5 in = 84 - 11 above river.

8. Covered 14 - 3 = 99-2

9. mostly lime-clay $4\frac{1}{2}$ ft - 3 in = 103-5

10. Covered ~~33 - 1~~
~~42 - 4~~ = 145-9

11. Pinkish Sandy clay 8 - 6 = 154-3

12. Rich red with abundance of
 siliceous pebbles white or iron
 stained brown. layer of
 iron concretions 15 ft from the top.
 feeble stratification, coarser
 toward bottom less coars but
 otherwise essentially similar
 toward top. No zone of weathered
 material in this section.

28 - 24 in = 182 ft 7 in

at the top of the hill where the exposure
 is N. E. to S. W. the dip to the N. E. is 1 ft in 30 ft

The marl (9) lies 450 feet east of the top of the hill, the dip being $1\frac{1}{4}^{\circ}$ in 30 amounts to 15 ft. The road in the road therefore lies at about $\frac{103-5}{15} = 115$ ft.

Analysis of Samples from 105
 Apalachicola River by Bridges & Gutter.
 No. 1. Sand-lime rock of Alamo Bluff.
 at level 5 or 6 ft above water stage of mark 19.

SiO ₂	53.02%
Al ₂ O ₃ + Fe ₂ O ₃	3.96
	21.60
CaO	0.88
MgO	0.22
P ₂ O ₅	Trace
S O _x	1.60
H ₂ O (at 100°)	

CaCO ₃ cal.	38.57
MgCO ₃ ..	1.84

Total 99.21%

The rock is therefore a sand-lime marl.

No. 2. From exposure on Branch 7/106
 Smetwater on Rubens place in
 Sect 6: T. 1 north R 7. west. coll
 by E.H.S. & H.S.

Si O ₂	34.03 %
Al ₂ O ₃ + Fe ₂ O ₃	3.20
Ca O	19.80
Mg O	12.38
P ₂ O ₅	trace
S O ₂	trace
H ₂ O (at 100°)	1.32

CO ₂ Cal	35.35
Mg CO ₃ "	26.00

Total 98.98

This is therefore a sandy lime marl.

No. 3.

107

Qualitative test

~~limestone with some~~
~~concretion from Rubens place.~~
~~sand & clay impurities. No~~
~~phosphate.~~

No. 4. Marl from H.S.

Jacksons place.

phosphate trace not
 above 1/10 of 1 %

No. 5: From lime-sand marl
station of Rock Bluff. 108

SiO ₂	48.44
CaO	21.60
MgO	0.80
Fe ₂ O ₃ + Al ₂ O ₃	2.88
P ₂ O ₅	trace
S O _x	trace
H ₂ O (at 100°)	1.37

CaCO ₃	38.57
MgCO ₃	1.68

92.94

total

This is therefore a sand-lime
marl.

No 1. Connection from Sand
below ~~the~~ ~~limestone~~ ~~at~~ ~~Rock Bluff~~
Rivers place a ~~Sampled~~
plot plot trace

No 7. Shattuck No. 2 of 110
Aspaloga Bluff. Sample from
north top of the Shattuck.

SiO ₂	39.08
CaO	12.00
MgO	8.86
Fe ₂ O ₃ + Al ₂ O ₃	11.60
P ₂ O ₅	none
SO ₂	none
H ₂ O (at 100°)	1.00

CaCO ₃	21.80
MgCO ₃	18.48

92.46

This is ^{partly} therefore a calcareous
clay.

No 8. Shattuck from
No 3 of Aspaloga section
phosphate none

No 9. Sample from same 2 111
similar Shattuck 2 mi N. E of
River Junction No 7 section.

SiO ₂	39.08
CaO	12.00
CaCO ₃	63.32
SiO ₂	2.63
CaO 1.47 = CaCO ₃ 2.63	10.90
MgO 5.20 = MgCO ₃	11.64
Fe ₂ O ₃ + Al ₂ O ₃	none
P ₂ O ₅	none
SO ₂	6.22
H ₂ O (at 100°)	98.70
total	

This is a calcareous clay.

Heavy refits fulls with
between mileage post 1724
173, south side of Tuckin
shallow cut. May 16, 09.

Expense		40
Land at R. 2		25
Hack at Teller		2.00
Team to Ashtab (R. 20)		25
Bgg to R. 2		25
Hack at Teller		25
16 th Hack at Teller		25
Bgg to the Rich Bluff		25
Cont out for to R.B.P.O.		1.00
2 day eggs @ 15¢		30
moving cont to R.B.		1.00
2 day eggs @ 15¢		30
Cumms 25.8 R.B. 65		90
Sund. march 21(?) moving (R. 10.)		1.50
Sum.		2.00
march 22 moving		2.25
" 23		2.00
march 25 Hab 25. Mileage 25		8
Price 2 to landing 10, Boat to		
Bristol 81.50, Hack at Bristol 25		
march 26. Hotel at Bristol 81.50,		
moving to Bristol landing 81.00, moving to		
Blountstown landing 1.75, moving to		
wharf at Blountstown 25, moving		
50, Groceries 1.60		
march. Livery Hire R.R. No 11. 60		
Tide 86, Hab 25. Hays 25		

Hill sloping north of Flat Creek (14)
 is very sloping & has no (1) fissures.
 Only a narrow ridge between Pine
 bluff & the tributaries of Flat creek.

The slope to Flat creek is graded
 the across it is now steep.

On a two feet of yellowish
 limestone is seen near the
 water level. no other exposure.

Iron concretions are seen
 on the top of hills on both
 sides of the creek. A small
 clay exposure occurs on hill
 north of Flat creek.

On hill $3\frac{1}{2}$ mi. from P. 9. is
 exp. iron conc. at top remains of
 weathered clay 1 ft. sand weathering
 smooth 10 ft. Sand with pebbles 5 ft.
 yellow sandy limestone here 3 ft. (19 in. to
 the fall to Pine Creek & a shale
 4-7 above base the clay is seen on hill 2 mi.

Below this for $2\frac{1}{2}$ ft vertical blue clay
 rock & a bench to as low as 4 ft. Then
 as water as white mud blue greenish.
 (See above of Harris Grove)

115

Assuming that the layers of Coats
 level of Bench No 4 or 1 ft above
 rock. = 44 ft. above Permian base = 53 ft
 above water level on No. 4.

A whitish limestone with clay, inclining
 at 41 to 31 ft. = $\begin{cases} 31.7 \\ 8.10 \end{cases}$ Rose level
 3 to Base level $\begin{cases} 40.5 \end{cases}$ No 2.

At Base level No 2 ^(39 ft) should occur
 the "fine small fossils" and beneath
 this the "madrepore" bed. This rough
 weathering stratum should be 6 or 7
 feet below No. 2. or 13 or 14 ft above
 the Permian base. The yellow sandy
 limestone should be from 7 ft
 above Permian base to Permian base or
 nearly so. Below this should be white
 limestone with small fossils & water.

19 ft. 3"
 8' 11"
 15' 4"
 1' 4"

1-2
 2-9
 3-11

9 ft
 2 1/2

Yellow color of phos. 122

D. M. McKey, Engineer. ✓

Plant city 344

Prof. F. T. Ellis, Blochman 344

Henry Howell

see also Ellis. see Ellis mill near road.

Fall

Follow Hatch 4 2 1/2 mi or 3

Turn to left. just beyond Sylvania creek.

Cross mountain creek in 5 mi of Ellis.

stay on south side at 3 mi 2nd corner of hill.

M. J. Taylor, Glory, Fla.

send app. on fuller south.

see at Sykes mill. 1 1/2 mi for by,

Old Mon^{ey} Edwards place.

main road to church take left road to
Chate & Dry road. 1/2 mi. from turn 2nd fork.

50 ft from edge 12

yellow

I am in station at 2 mi
west of mill post 8. Plant City

