

doc 0 III

1915

Pacific Coast.

M. A. C. Grant
Manager of El Tovar Hotel
Grand Canyon, Arizona

Hermit Trail.
Am. N. Co., Box
Grand Canyon, Arizona.

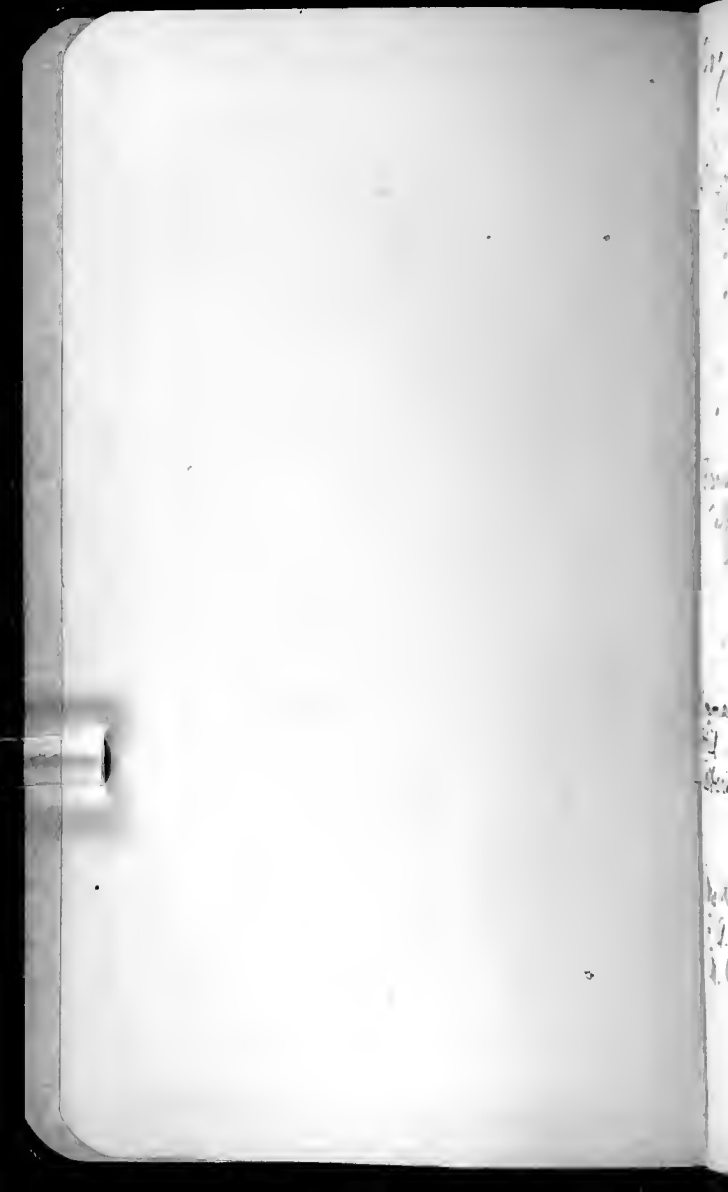


1915
3394 July 25 - Sep. 3 + "Carr's boxes"

3410 Sep 14 - Sep 22 Grand
Canyon

Property of
Charles Shuchert
Yale University
at 79 Wall St.
New Haven, Conn.

Baggage check to New Haven
Los Angeles to N. Haven
"540, 659 realize"
Sep. 3 - 1915



Doggett, Daniel C. Dorchester Terrace
C. Morris Cove, New Haven.

Schucherts Addresses.

Up to Aug 21, Shattuck Hotel, Berkeley
" " " 28' Care Doggett, Los Angeles
" " Sep. 11 Care Hille, Palmyra,
Los Angeles Co, Cal.
" " " 18 San. Hal, Denver
" " " 23 Care Tarant, Feb, Lawrence

Caru Mag Le Vere

Up to Aug. 7 - Museum
" " " 21 - New Haven House,
Block Island, R. I.
" " Sept. 9 - Whiteriver jct., Vt.

Emma Schuchert 1900 Mills Ave, Norwood
Phil Schuchert, 758 Wells St. Price Hill. Cin.
Albert E. Schuchert 809 Broadway or
3937 Rejest Ave, Norwood, Ohio

Mrs Daule, 472 Orange St. New Haven.
E. A. Callahan, Poli Building, " "
M. Corcoran, 19 Hall St. " "



Knauth, Harold & Kühne
New York.

R 21,011-76	—	50	A.F.
77	—	50	A.F.
78	—	50	Jan 1910
79	—	50	to Angeles
80	—	50	to Angeles
81	—	50	hand down
S 4,171	— 11	— 100	} Oct 1915
	12	— 100	
	13	— 100	

R.R. fare Pound trip —	102.34
Sleeper N.Y. to Chicago	5.00
Extra on Polarisine	6.00
Orlando Limited	6.50
Sleeper Chicago to Ogden	8.50
Ogden to Berkeley, Linn	5.00
R.R. Palermo to Mojave	1.00
R.R. Mojave to Redstone	2.75
Sleeper Los Angeles to San Diego	2.00
Sleeper Mojave to Williams	3.00
" Williams to Reno	6.50
" Reno to R.C.	3.50
" Reno City to Chicago	2.00
" Chicago to N.	5.00
Extra fare to Chicago & N.Y.	5.00
	<hr/>
	164.64
R.R. Reno to Grand Canyon and return	7.50
R.R. to " " and return	24.00
	<hr/>
	196.14
Present and miscellaneous	7.50
	<hr/>
	203.64

The above is a list of expenses
made at 600.

July 25-1915

New Haven, Conn. Sunday.

At 1.45 P.M. I am started for the big trip to the California coast. Got to New York at 3.45 and then walked up Fifth Ave. to the Plaza Hotel.

At 5 P.M. I am off in the Wolverine for Chicago where I am expected to arrive at 2 P.M. tomorrow. Sleeper fare on this train is \$5.00 and extra fare of 6.00 to Chicago.

July 26, Chicago, Ill.

Got here on time and in a cool day. After obtaining my ticket and sleeper started to see the Field Museum but got there at 4 P.M. just as they closed.

I saw a little of Chicago and then for the Oakland Hotel that leaves at 7 P.M. The Chicago and Northwestern has a new depot and which large and roomy in by no means the size and the elaboration of the two large depots now in N.Y. City!

See my Paleogeographic maps about the
eastern Cretaceous outcrops, see Bull 612
p. 16-17.

See also in later Cretaceous maps p. 20

See also page 43 Pre-Cambrian granite
" " " 214, 25 " and Eocene etc.
" " " 153, 104.

See if any more of Montana time have
Chickson them! If so should come out.
See Aug 7 - San Paulo beyond.

Tuesday July 27. Omaha.

A light rain is on us as we get to Omaha. It is interesting to see the Loess and the way it stands vertically in cliffs. These loess cliffs are only a few feet high, but are 20 miles out of Omaha.

The country is undulating in about 20 miles and at Elkhorn the Dakota sandstone is thought to be under the cover of the glacial till. From Elkhorn across the country is almost flat but we are in the filled valley of the Platte. It is a broad valley up to 10 or 12 miles wide. On each side is the high land of the Missouri. This shows some fine views from the road and is made up of 20 to 30 feet high.

The region about ^{here} is interesting in showing the first clear cut western limit of glacial ^{glaciation}. This is the shallow valley of the ^{Missouri} river. It is the Ogallala formation west of the ^{Missouri} formation. That is of White River or ^{Missouri} ^{formation} etc. These extend all the way Pine Bluffs on the ^{Missouri} ^{formation} line.

The Kluffs are very picturesque here at Pine Bluffs. Here they stand out as Kluffs and have many small pine trees.

Eden Canyon, North Wall in narrow.

2-1-11

? Plan of Crania
~~Diplocephalic~~ Limostoma
attenuat.

Temp. & temperature like Carhin
in Basal Crania in here.
Laminated limestone like those about
Friedrichsburg Maryland.

~~Fault here~~

Order quartzite

Order of contact.

Order of contact.

Wednesday Ogden, July 28.

Got off of train at 10.40 and started out at once for Ogden Canyon on trolley line. Went to end of line and then walked through canyon and along front of Wasatch plug of heavy str.

The thick Weber quartzite reappears three times and is a clean, rounded sand in more or less heavy beds that are all even bedded. No trace of life. Occasionally there are very light greenish zones of sandy shale, fine mica comes from 0 to several feet thick. Saw no fossils, not even recognizable fusoids or brachiopods. Towards the base it becomes conglomeratic, the pebbles quartz pebbles are well rounded and usually less than $\frac{1}{2}$ inch in diameter, though in places they are up to $1\frac{1}{4}$ inches in diameter.

At the base the quartzite loses its white or greenish white color and becomes colored like serpentine. This is because of the igneous material of the Piedmontian rock and not well sorted.

The contact is practically conformable. In a distance of 100 feet saw no irregularities more than one foot out of the level. The contact is now vertical. Have 2 photos.



The Pennsylvanian has no fossils that I could discern. It is a dark blue-black more or less heavy bedded limestone with ramifying altered spots as if changed in composition that weather out rusty. What they are I do not know. The quarry man in the lime quarry knows of no fossils.

The whole Wasatch Mt. are a series of outcrops to the west. For the structure see Bull. G. S. I. p. 100. According to the book there are five overriding members. I saw four, all but the one lowest one of Alport was visible.

Everywhere in front of the Wasatch Mt. are seen the elevated terraces of the Lake Bonneville. The general level above the lake level

often is 84 feet above the level of Salt Lake and the wide spread general terrace back of the city is somewhere about 200 feet higher. This terrace can be easily followed all the way to Salt Lake City. There are still higher terraces at least 200 feet higher and the debris may be seen in the Canyon. The edge

Left for Salt Lake after an inspiring day at 5.30 P. M. for Salt Lake City



Salt Lake City, July 29 Thursday.

This is the most interesting city ^{largest seen} west of Chicago.

Broad straight streets and the architecture of the city has much to be said. All speaks once for the Mormons. I am in the great and new Hotel Utah. A dinner on the roof is one of the most interesting sights in America. Dots all around and in the far distance is the Lake. Between the Mts, snowed, luxuriant and bare, one is in wonderland. As usual weather alone can enjoy it. All is made possible through labor but in general these things are monopolized by the descendants of the rich and the Jews and the special trusts. In any case it is all worth taking in view of expenses.

Level Salt Lake

Level Flats

Wide farm area

Buts and Terraces of
Miss. Region
Just south of Salt Lake
about 5 miles.
Puro terrace conspicuous 600'
Bonnevile level not so plain
at 975 feet.

In the morning saw about Capital Hill
 now being graded for the grounds about the Capital
 building. Took many photos of the section, some
 exposed in the high terrain. In an alternating
 series of ^{concrete} sand and ^{clay} mud, ^{with some} conglomerate and
 sandy muds like brown ^{but more conglomeratic} are ^(irregularly) flung toward
 the lake and away from the Port. In the muds
 measure on fossils, no salt, no salt deposits,
 only here and there a ^{short and slender} pipe filled with long
 material either some fungus but more likely a
 lot of some plant stems. The muds are often
 rippled and in places the muds are ^{intersected by}
all in all the waters often to have been ^{used and almost devoid}
 storm waves. ^{have many} lots ^{of life.}

In the afternoon took the train out 64 miles
 across the plain to Salt Lake at the amusement
 park at Saltair. Everything is on streets out

Wasatch.

High ground back of Salt Lake City
Probably was as high as Provo level.

At the level I took the picture
this morning, Capitol Hill.

Salt Lake City.

Barren Flats about 10 miles wide

Artificial Salt Pans

Mount Salt-Lake.

Continued on from in
page

in about four feet of water. From the top it
shades imperceptibly into the rocks. In the top all
is green and here and there are small islands of
rocks. Evidently the water is saturated with
water. Cut a little hole and one sees no more
water and that the land is dry as seen from the
little green and the presence of some bushes. One
then goes in about 10 miles before the first ad-
vanced area of salt is seen in the ground. Some
of the vegetation here also only some scanty.

About 5 miles in from the lake one finds a
artificial
canal some miles long, excavated and a salt
deposited. The water is pumped from Daltan
and into pans to dry up the salt. In the
the water is dried and more is pumped in and
when they are all dried, salt is collected
together into great piles. It then goes to the
factory for purification.

At Daltan are some good mines in the
south of old bed level. There is a ^{the} ~~mine~~ ^{mine} level
where they are ^{the} ~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the
highest one I judge to be of ^{the} ~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the
~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the
mine. The ^{the} ~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the
the ^{the} ~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the ^{the} ~~mine~~ ^{mine} level of the
connected.

Great salt lake is a valley filled in between
the mountains. Everywhere the land was out of it.

This decomposition of organic matter must
be from the fly larvae and dead shrimp.

The brine shrimp were present in great numbers about the Seltzer buildings. In many places there were millions of little flies - $\frac{1}{16}$ inch long - that have their larval stages in the water. There were also two species of gulls, one the regulation white one, and another spotted brown one. Otherwise we see no life.

The water acts thick, and the waves do not break into foam easily. On the surface there is considerable foam. The water is not altogether transparent but has a slight milky and a shiny look.

As we approach the shore there is a bad rotten odor. What can this decomposed odor come from. The shore looks rocky and shiny though of a whitish color. It is said to have not been there because of the small dip of the bottom. It is a basin filled in between the rocks, just as I saw many others in Mexico, and particularly the lake near Mexico City.

Salt Lake
City.

Salt Lake July 30. Friday.

In the morning visited the University of Utah. There are six main buildings standing on a crescent on one of the main terraces. Above these is a wide descending plain from the mountain apparently the same level level of Ogden. It is something like this.

University

The main bench all along the mountain

A more marked topography

1 1/2 to 2 miles

By trolley north of Emigration Canyon and to Pine Creek. The hotel is in the Wasatch Mts at an elevation of 5280' - 6725'.

A very good hotel lodged in the Mts and away from everything. For a long distance into the Canyon the rocks are all in sand. Everything is now covered by debris or vegetation so that we see but little of the structure. As we get further in the mountains are all made of red conglomerate and the red sandstone, all of the Wasatch - Evens.

Left Salt Lake City at 4:15 and Ogden at 4:40 on the ...



As we pass north I observed that the greatest delta lies in front of Becker Canyon and is the deposit of Becker River. It is the greatest delta of size as far seen. When we are in front of it the train is 5 miles from the mountains and there is still more of the delta to the west of the track. Becker river is deflected widely to the north and we cross it about 2 miles west of Ogden. Therefore some of the delta connects with that of the Ogden canyon. In a rough way I should say that the delta is 6 miles wide at its widest and that it has a length north and south of 10 to 12 miles.

The delta should be clearly kept in mind as we study the wave cut terraces with their fills as another.

One is impressed with the extreme local occurrence in all of the coarser material. It is only the fine sands that is carried far away from their origin.

July 31 - Saturday.

All day on train. Saw all of western

Nevada, the Sierra Nevada, and all across California, South Berkeley at 8 P.M.

Ichthyosaurs in Triassic well developed.
In greatest abundance in Middle Trias.

Mid. Trias has *Mixosaurus*
Cymbospondylus

Up. Trias has *Shastasaurus*, *Meriamia*
Toretocnemus
Helphosaurus.

August 1. Sunday.

Spent all day at the Panama-Pacific Exposition. In architecture the best amongst our exposition of any that have gone before. The work is more done. There is nothing cheap about the buildings from the outside. The inside looks are beauty for all of the looking shows.

August 2. Monday

All day at Exposition.

August 3. Tuesday.

All day at Exposition. ^{of} Polignac is attending the meetings of the ^{of} the ^{of} and the ^{of} school

Thursday conference on Cretaceous.

Stanton pointed out marked ^{contrast} between Pacific and Interior Cretaceous. The only species in common are cosmopolitan forms. One of Merriam's students pointed out the same condition. There must then have been a complete barrier extending down to Central America.

The total maximum thickness for the Lower and Upper Cretaceous is about 6 miles or over 31,000 feet.

Franciscan series has a few plants that Knowlton says are Middle or Upper Jurassic. Lawson says these beds are part Sierra Nevada. Merriam says they are much cut by serpentine and that in all probability they are of Jurassic age. They are much folded while the Knoxville rocks were being upraised.

Mariposa South state is always cut by gold bearing dikes. Knoxville series. The former is Jurassic. The latter is Comanchian. From the South state that the two are now close together.

Knowlton and Northcutt hold that the Lower Knoxville is of Jurassic age. Upper Knoxville is Comanchian.

Wednesday May 4-1915

All day at Palo Alto to see
the Let and Sanford Heris, and
attend the meetings of the S. S. A.
in the evening.

In the evening had dinner at
the Engineers Club where the Ent.
Association dined. Prof. Lawrence
presided.

Thursday May 5-1915

Write letters in the morning. In the
afternoon up at the University of California
in the afternoon.

Friday Aug 6-1915

North of San Francisco at least 40 miles N.W.

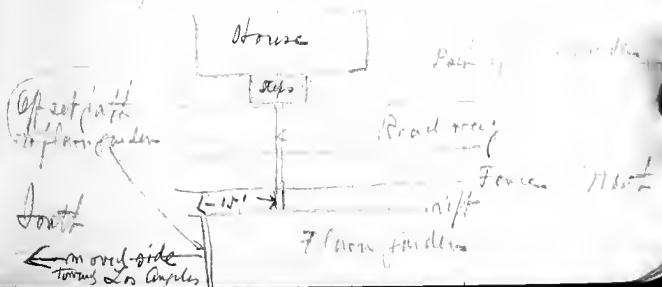
Left Berkeley at 8 A.M. ...
 Andreas Rift which is ...
 only a few miles ...

Left San Francisco by Sausalito ...
 Sausalito where we took the Northwestern Pacific
 R.R. for Point Reyes. From the railway station
 it was but a short distance to the rift valley.

Our original trail was shifted 21 feet ...
 the earthquake of 1906 ...

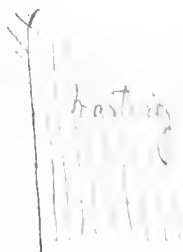
In getting south over the rolling land we
 could trace long ways and then the trace of the
 rift. The ground was ...
 from me to 1/2 ... and the fences ...
 fathoms offset.

At ... ranch we found ...
 on the side that did not move ...
 the trace of the rift was as ...
 could make it when ...
 the earthquake. It was as follows:



All records of (L. rane)
is out here

Chier



hastings

19 months by seeds
see sample

At Selby
P. Q.

Saturday Aug 7 - San Pablo.

Started out with Newman, Stanton, Sil'ards, Gate and others for the section of the San Pablo Syncline described in Guide pamphlet.

We took a Cab and the Southern Pacific for Vallejo Junction.

At Vallejo Junction along Searsville straits we saw a portion of the dark shales and brown sandstones of the Coler. It is a series of massive material of rather fine texture standing at high angle. Due to the pressure of overburden, the strata have been much squeezed into one another. In one place a few of the strata are faulted over unconformably upon another, but farther south we see a more regular fold and then several more of the same kind. It all looks like a typical anticline.

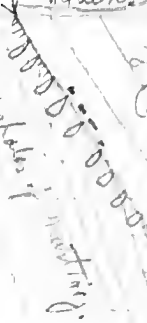
The Coler here is about 3000 feet thick but elsewhere in the same vicinity it is only 500 feet. Stanton tells me that the Chico begins earlier than the Coler and seemingly does not see any of the mountains.

The Chico is brought into contact with the Chert by a fault contact. Between 200 feet and made of ... samples. I have one or two conglomeratic and have a few

Linear from the contact about
15 degrees and some of boring
inclines

See guide rock
for more detail.

Black shales



Light Buff
Monterey shales
and shaly sand-
stones and some
limestones

fault locally.

The filled in material of the lenses
are of the light colored Monterey above
into the dark Monterey below.

Foraminifera. Above follow 500 feet black shales. The basal zone of *Ornatulites* is faulted out.

Back of the Delta Smelting works on sees contact between Martini, below and above the Montrey. The contact is a sharp one for the Martini has a westward dip of about 10° while the Montrey has a dip of about 60°. The latter is light colored while the former is black. At the contact many examples large and small, are seen of a boring mollusc and these cavities are filled with the lighter material of the Montrey although the shells are in the *Ornatulites* black shales. See my specimens. This is an interesting feature (physically) but is also proven by the boring molluscs. The Montrey sea is eroded over the land and the boring molluscs were the first life to appear and completely filled the bottom by cutting where there are *Ornatulites*. Ornatulites are abundant at these conjunctions on this contact.

The San Pablo (Miscare) follows and is unconformable upon the Montrey. It is made up of in the main of soft whitish shales and heavy beds and has a great abundance of *Doutella fabris* (see specimens). Towards the top of the San Pablo occurs a zone of *Proterofallens* type (locality) in the P. R. R. Reports

Elevated Pleistocene terrace.

Ostr. Fed. O. lucida.

Pithe

San Pedro Mirave

Sea cliff
uncollected
fossil mollusks

greatly quarried, a bed 3 to 4 feet thick, that is one
man of these shells (see specimens). They are
dead shells of two species drifted by the waves
into this mass of material.

Then follow the Pierre Tuff an ash bed
with pumice, and sand balls, with Hoekist
material said to be many years old, a central
deposit of rounded siliceous material, rounded
by water and wind. It has scattered and
from bones of various land animals and
Physa

(Pliocene)

Over the Pierre Tuff and Mottos one
sees the marked upper Pleistocene
Pleistocene. At the base of the latter is
in one mass of Botrea (Virginia). This formation
on both sides of San Pablo Bay, reaches elevation
sea level, that is, and covers the older
formation (see plates). The elevation reaches
one of the top about 50-60 feet above sea.

This Pleistocene is the Redwood formation
and all of its species are still living! Elsewhere
have been found remains of mammoths and
all of these are of extinct species.



Sunday August 8. Mt. Tamalpais.

Left Sattuck Hotel at 8 A.M. and got to the top of Mt. Tamalpais at 11.45. The ascent is 2590 feet. The day was not clear, so could not look very far. Saw but little of Pacific ocean and nothing at all of the Great Valley of California or the Sierra Nevada.

Sattuck to San Francisco at 6.30 and then went to the Panama Exposition until 9.40 and got to the hotel to bed at 11 P.M.

Monday August 9. Mt. Diablo.

Left Cal. University at 6 A.M. in motor-car and was back at the hotel by 2 P.M. We had gone 100 miles. We went over to Oakland and then across the Coast Range that runs back of Berkeley and Richmond and then to the top of Mt. Diablo. Then back by way of Walnut Creek, San Ramon, Pleasanton, and Colma. In going to the latter place we passed through several ^{pleasant} ^{valleys} ^{and} ^{then} ^{crossed} the range that divides ^{the} ^{San} ^{Francisco} ^{Bay} ^{from} ^{the} ^{San} ^{Diego} ^{Bay}. Then north ^{to} ^{the} ^{Diablo} ^{Range} ^{to} ^{Hayward} ^{and} ^{Oakland}, and Berkeley.

From top of Berkeley at the base of the High Peaks, and at Oakland and Hayward

The San Andreas fault is parallel with the
 San Andreas fault. It also had a horizontal
 movement along the fault line in 1868.

Cret.
 Miocene
 Pliocene



lies the great Hayward Fault.

On the other side of the range at the front edge of Coon's Head's nose is the great Sunol fault. We saw it again when they were just before going down the valley of the gorge leading into Mills. This fault probably has a dip of 2 miles.

The whole western part of Ont. District has rotational strata so that, we pass up the Ont. we get older strata from young Tertiary to Franciscan. Turner has described Ont. District.

As a rule, these strata are more than 10 miles out of Ont. District have seen the bottom of the dip of some of the mountain valleys.

Lawson showed us an elliptical basalt intruded into the Franciscan - on Broadway of Oakland to Berkeley. Usually an elliptical basalt is a flow but in this case it is not so.

Lawson showed us a lot of cherts and shales in the Franciscan series. They are thin bedded, light of color, the beds thick substituted by red shales. It is largely used as a road metal. Lawson is impressed with the regularity of the alternation. To me

For the succession see Lawson Earthquake
Report published by the Carnegie Institution of
Washington.

the regularity of the alternation, or, more or
apparent. The tendency is for the sheets to be dom-
inant from 1 to 2 1/2 inches separated by shales
from a fraction of an inch to several inches.
The color is red though not as red as
those of the Western.

The Franciscan sheets are in 2 or 3 zones
and occur between great thicknesses of sand-
stones. They are the deposits of a shallow sea
laying down fine red muds and red siliceous
muds. They are in no way the equivalent of
a deep sea.

The Franciscan series is 50% sand-
stone. The sands are coarse, not clearly
washed but are more mud indurated and
mud filled. The grain of the sand is ir-
regular and there is a tendency toward
local zones of fine conglomerate. A good
example is in the Tamascal quarry of
Oakland.

Near the town of ... Mr. Bruce
Harris showed us a local conglomerate zone
of sand with boulders up to 18 inches across. These
have glaucous fossils while the matrix is red
with Cutroa fossils. This is a local deposit
of the ... on the deposits of
... See his paper just published.
It is an interesting contact.

Have a number of photos.

Tuesday Aug 10-1910 - Golden Gate.

Spent the day visiting the grand park - Golden Gate Park then along the coast of the Pacific Ocean to the Cliff House where I took a car back to San Francisco.

In the park on the boulevard to the Ocean may be seen to good advantage the Radiolaria chert of the Franciscan.

All along the coast about the Cliff House the land is bold and stands high on each side of the Golden Gate. It is the sandstone of the Franciscan series much injected by the serpentine and some basalts.

Only Tamolias is well seen from the Golden Gate.

Took a number of pictures of plants in the Golden Gate Park.

Left the hotel with Wolff at 9 P. M. for the Pullman at Oakland to go to the Yosemite. The train starts at midnight (11:30)

Mt Lyell 13,090 high above the sea.

Proyers Peak 13,056

Half dome 8,852

Basket dome 7,502

North Dome 7,521

Mount Whitney on the south is the highest
of all Sierran peaks. Over
14,000 feet.

West Valley to the east is more
than 200 feet below sea level.
Seems to be a compensating movement.

Wednesday Aug. 11-1915. Yosemite.

Had breakfast at Merced at El Capitan Hotel. We start at 8. A.M. on the special railway from Merced to El Portal, where we get at 11.30. Then one hour for lunch and then in an auto stage for the hotels at Yosemite Falls.

Had lunch at El Portal Hotel. At one o'clock we got aboard the ~~stage~~ ^{stage} and at 4 o'clock we are at Curry Camp. I am in tent 446.

Thursday Aug 12-1915 - Yosemite.

At 7.30 Mr. and Mrs. Stanton, Mrs. Tappin, Barney and I are off to visit Glacier Point ^{over the ~~El Portal~~ ^{El Portal} ~~stage~~ ^{stage}} to camp ^{at} 4000 feet and one are to go to 7204 feet.

Because of Mrs. Stanton we did not get to the Point until 5.30 P.M.

From the road, the hotel we have a view of the high ridges and across to Mount Lyell at 13,070 feet. Felt the altitude a little.

Quinn was served in the hotel looking east and one could see all of the same set effects until the mountains faded into darkness. A memorable evening though too tired to put about it.

The first impression of the Yosemite valley is its vertical walls towering up 2000 to over 4000 feet, beyond the flat bottom. The valley about one mile wide and three long. In this valley there is little rock debris along the sides of the vertical walls. Third the sides of all streams entering into the valley. While the valley has a mature look all of the streams are decidedly young.

Yosemite and Nevada Falls are not out of their original channels and the same is true of the Illilouette. The two latter look as if de-structed out of their channels only a few years.

If glacial work one sees little. Nevada Falls above runs over glacial ~~scattered rock~~ and not far from Minna Lake ~~the rock is a (mountain)~~ ^(they say it is a canyon)

The gorge of the Merced below the "roquette" valley is decidedly young and V shaped. The river is an enormous rapid and there is little rock debris of an old character. One sees no more elevated terraces until one towards Merced. Here there are terraces at about 2000 feet above the river.

At Merced Falls one is out of the ^{merced} valley and goes to the south one sees terraced ^{terraces} up to at least 300 feet. In a great delta, flat topped and considerably dissected. It is nearly of Tertiary age at the top while the ^{merced} spread (see second page beyond)

Friday Aug 13 - 1915 Yosemite.

Saw the sun rise over the mountains ^(5150 m) and
by 7 A.M. were on the long trail
(11 miles) from Curry Camp. In the way
down the first 6 or 7 miles are not so in-
teresting as the last 3 or 4. From the top of
Vernal Falls down the trail is interesting
and especially from Vernal down. The best
trail below Vernal is the most interesting of
all. Got to Camp at 5:15 P.M. 1

Saturday Aug 14 - 1915 Yosemite.

In the morning visited Mirror Lake 2
miles up the valley from Curry Camp.

Then to the foot of Vernal Falls.

In the afternoon to the foot of Yose-
mite Falls and a visit to the Wash
studies.

Lower terraces of 10 to 30 feet height of Pleistocene
age. It is in these lowest accumulations that
one sees great washing down at once washing
the boulder accumulations.

I could see no evidence of faulting and
sinking of the valley floor. Half Dome shows
no faulting and for one of the best places to
ascertain faulting if there were any. The
Yosemite Terraces are based of the Pleisto-
cene and all of the old road debris was
cleared out by the Pleistocene glaciers into
the valley of the Yosemite flats. In the gorge
of the Merced one sees no glacial evidence.

An interesting note that no large
boulders of granite are seen in the
rocks of the sedimentaries. Small boulders
do occur some miles away from the last
granite exposures but since men on the
Merford ^{formation} mine are to be discerned in the
canon.

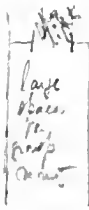
innumerable small boulders are to be seen
in the Merford ^{formation}.

Plenty of light. A section through one of the
 wings is as follows.

~~10 ft~~
 10 ft



Oram Hall
 about 130 by
 60 feet wide.
 Table cases to
 give each of floor.



Each plan for
 15 feet long by 40
 feet wide.

Red Tile septagonal domes.

There is little of a new character that is
 notable. The building was designed by an
 architect with no particular reference to a
 creative work.

Cost of building about 80,000 dollars.
 Two stories high. No base ment.
 Ground plan about as follows.



Monday Aug 16 1915 Berkeley.

Wrote letters all morning. In the afternoon and evening was at the exposition.

Tuesday Aug. 17-1915. Berkeley.

At ten left San Francisco on the Ocean Shore P.R. for Moss Beach 24 miles south along the shores of the Pacific. As a rule the coast is flat with many small sandy coves. It is very interesting to note many indications of an extension in the Franciscan. From near Tiburon, 18 miles out to Moss Beach nearly the whole distance is occupied by a formation that dips down into a point of land in some places but is generally

In general the strata is uninteresting and the rocks are of the ordinary of igneous and unconsolidated.

The Franciscan is badly tilted and is tilted crushed by the folding and intrusions.

In the afternoon called on Arch. Coanman to see the new building of the California Acad. of Sciences in Golden Gate Park. It is a magnificent concrete building with steel frame. The interior in the main part of the rooms is that there are no windows, all in the high and small sky lights at the top. Nevertheless there seemed to be
(see page to left).

Sent two packages to Mrs. Gaven
express prepaid. One of books, and
another of hats.

Wednesday Aug 18 - Berkeley.

Was with Merriam all the morning at the University. In the afternoon packed up. In the evening had dinner at Merriam's home.

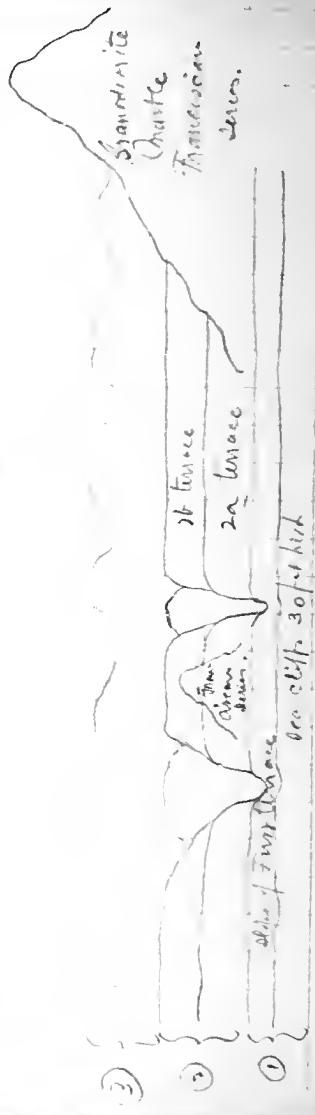
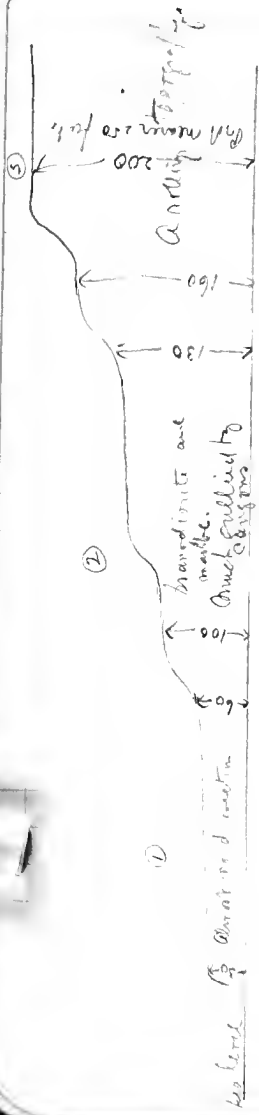
Thursday Aug 19. San Francisco.

Left Berkeley in the morning, stopping my large valise to visit friends, spent the day in San Francisco.

Bought 5 pieces of *St. Louis* wine and one dozen *St. Louis* #36 of the Fat Coy.

Left at 4:10 P.M. for Santa Cruz the end of the line. Will arrive at 7 P.M.

Stopping at a small hotel the Riverside Hotel. Considerable fog my when I arrived and could see nothing of the city.



See of the U.S.G.S. has a photo of this place
 of not ask U.S.G.S. of way of looking

Friday Aug 20 - 1915 Santa Cruz.

Started out to see the elevated beaches in the northwest of Santa Cruz. The cliffs are seen along the first terrace that is about 30 feet above the sea. This is composed of very fine beach ^{material} sand with considerable broken shells but there is or much broken that one sees no recognizable species. Irregularly throughout the cliffs one sees indented gorges and round holes or caverns. In all of the thickness one sees small and large holes of burrowing mollusks. At low tide there is much kelp and a mass of barnacles and shells and here and there starfishes. This lowest terrace is but little dissected.

Terrace (2) includes 2 terraces, 1 one together and that in places seems to go into one. It is much gullied by rather sharp canyons. The mother rock in place is granodiorite and marble.

Terrace (3) is the highest back of Santa Cruz and is greatly worn out into rounded hills of which surface shows in some directions. If my estimates are correct the elevation of this third terrace is about 200 feet above the sea. If anything my estimates are too low.

All these terraces are seen along the ocean front and back of Santa Cruz in the valley of the stream down which the drainage of comes from the Big Trees. The terraces we said in outline of 1 to 200 feet but I saw none today higher than those indicated.

These three terraces are described by R. J. Holway of the University of California as the three major terraces. They are broad, the maximum width of the lowest terrace being one mile. Fifteen to twenty terraces are found in places between Santa Cruz and Davenport, twelve miles to the westward.

In the afternoon was in Leocaga Park to the S.E. of Santa Cruz, that is on the second terrace. Here we see the lower terrace extending only way to Monterey and is considerably more a mile wide. It may be 2 miles wide in places. It is not much faulted.

The second terrace is much faulted and the first terrace is a series of rugged hills.

It is possible the lower terrace that I saw at San Saba may be the same. The second one is also seen in places. It is 80 miles from here to San Saba.

These terraces are only partly developed in the bay, probably caused by abrasion. The sediments of the river deeps are higher than out.

Saturday August 21. Santa Cruz.

Walked out 6 miles up the valley of the San Lorenzo to Big Trees. Was disappointed in the sight of the woods. All are small trees probably 200 feet high and none over 8 feet in diameter above the spreading base. Rodgers of Palo Alto also happened to be here.

Going along the road was struck again by the presence of gneiss and granite at Rincon. The same occurrence was seen yesterday to the west of Santa Cruz. Evidently the Franciscan is much intruded by gneiss.

The presence of granite (and also gneiss in fact) in this area (see sketch) shows that there is more limestone in the Franciscan than one is led by appearance.

Fog on morning, some rain in the evening.

Letter with Arnold - refers that all of these
terraces and tracks are of Pleistocene date, in a
general way they probably agree with those of
San Pedro Hill.

Sunday Aug 22 Santa Barbara

Left Santa Cruz at 9:30. Watsonville Junction at 10:50. All the trains are so filled that ^{at} ~~board~~ ^{no} ~~seats~~ ⁱⁿ ~~pullman~~ - or coaches, had to stand or sit on the benches. Arrived at Santa Barbara at 1:30 P.M.

Sat in the "Blue Bus" at the Pullman Hotel and tumbled by mistake into a fashionable sea side hotel, all style and no comfort.

Watsonville lies on a very broad marshy plain. The station is 600 ft. above the sea. The Southern P. R. heads into the inland valley - about ten miles off the Salinas and runs in it for some distance and then crosses the mountains. Then the rail road goes over the mountains through a series of tunnels and then follows down a gentle slope down the mountain and comes out to the "Blue" Ocean. A fine bit of railway engineering.

The Blue Ocean is a winter resort of course by day. It should be a fine study for one who to work out these beaches and to date them.

Stopping at Pullman Hotel the night we were so tired. All by mistake, I am not comfortable.

Section of Cliff and Point
Santa Barbara, California.

Echin Pleione a Pleistocene.

A. S. Cronin
A. S. Plopa



Santa Barbara Aug 23 - 1915 Monday.

Walked around in Santa Barbara and then to see the Old Mission after which the town takes its name.

Then along the ocean front to the west of the Plaza and the Potters Hotel. Here we see the almost vertical Franciscan series overlain by Tertiary deposits. The latter is a yellowish series of conglomerates with well rounded pebbles and boulders up to one foot across, sands and calcareous sands high up. This series also seems like distorted. In the conglomerate a coarse sand, one side, no grit but a fine up when the boulders are fine then is a great profusion of bryozoa and some shells. The bottom of the middle page gives more detail.

Left Santa Barbara at 2:00 and Los Angeles at 12 midnight in a sleeper for San Diego.

Got to San Diego at 6:30 A.M. and later put up at St James Hotel.

Met here Doctor Mac Corder's friend of N.Y. City
here.

All along the way in part of San Diego and
on into Mexico there is an elevated plain opening
with the elevation of Point Loma. Much of the
elevation are the rugged mountains some of which
must go up to 3000 or even more. None are
flat topped, all are sierras, except one moun-
tain in Mexico that may stand at an elevation
of 2000 feet.

San Diego, Aug 24-1915. Tuesday.

All day and evening at San Diego's Panama Exposition.

Wednesday Aug 25. San Diego
Put in the morning at Coronado Beach, Island and Hotel. In the afternoon at the exposition. Met Ulrich and his party.

Thursday Aug 26. San Diego.
Put in the day at Point Loma, the most southwestern point in the U.S.
Great cliffs are exposed here. Below the surface of a fine conglomeratic layer in the beds. Above it is a series of coarse conglomerates with some clays and mud sandstone. Total height of point about 400 feet. What the age I do not know but probably Pleistocene. Saw nothing older and no unconformity, as Professor Wright told me. All is slightly tilted, about 10 degrees.

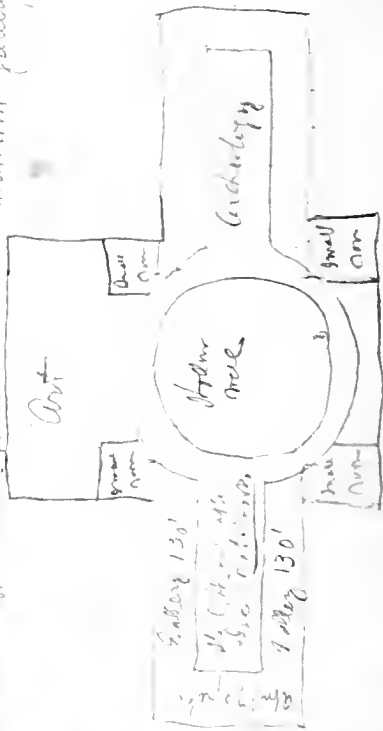
From Point Loma a good view is had of the city and the various islands (bars) that make the haven of San Diego.

Friday Aug 27 Los Angeles.
Left San Diego at 8:00 and got to Los Angeles at 1 P.M. Stopping at Hotel Macdonald.

Los Angeles Saturday Aug 28-1915

General plan of Los Angeles
 Museum (University of California)
 Jan 28, 1915, high. Campbell and party.

200,000 sq. ft. All plants. All cases near below.
 Nat. Hist. falls in 1st thing on 1st.



{ L. E. Hyman
Foreman of Bone & Spine

On exhibition 4 mounted skulls, skulls. Ranch, La Brea
2 horses and 1 camel
4 Lin skulls.

Considerable work in
sites and dorsal processes
Both tanks are made.

1 small Mastodon skeleton
1 13ft Imperat Mammoth skull.
Two fine plaster tanks.
Mounted by E. J. Fisher
1 Dogskin skull
2 Sabre Tooth Tiger and mounted
2 Lion mounted (large & small)
1 Large camel

Birds { Considerable of a skeleton. Deer
and jaw; Teratornis, merriami
California condor
Golden Eagle
Falcon
A group of other bones, 1 Dogskin
& skull, 1 smaller skull
Canis skeleton

{ 1 mounted small skull
{ Anthrotherium gracilissim
{ 1 mounted skull of Wolf
{ Canis dirus.

E. J. Fisher used to be with S. A. B. Nat.
Ice Est.

Elevated

Some
comparative
All carved into
is tan. 10 depress.

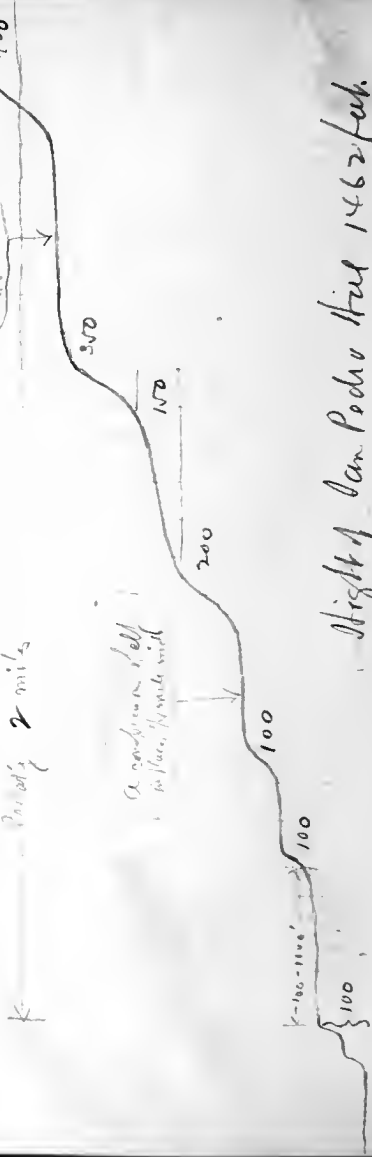
(Probably San Pedro River, 2 miles west of San Pedro,
Terraces at Point of Formation near San Pedro,
is inclined along sea front with a dip

3rd
line

Another condition
observed 2 1/2 miles
west of

Point of 2 miles

A condition of all
in place, 1/2 mile west



Height of San Pedro Hill 1462 feet.

Saturday Aug 28 - 1915 Los Angeles.

Called on Duffet at the Los Angeles Museum and after seeing the *Bandicoot* material was taken out to the dipping of Clarke of the *Bandicoot* in and Mr. Thurston of Louisville a *Bandicoot* of 1885.

All of the bones are from an area less than 10 acres in extent. Nearly everywhere there is a fire pit of red soil. The pipes of bones come to as much as 27 feet. Everywhere one sees pools of oil seeping out of the ground, and out of the sides of the dipping slowly flowing, called *concrete* of asphaltum. Nearly all of the ground there is oil impregnated or is asphaltum.

In the evening had a long talk with Dr. Gilbert. He says that all the bones occur in pipes or tunnels of asphaltum that gradually rise to a point and then out of a hole no larger than a finger where the oil emerges. His idea is that the *Bandicoot* animal from which an animal, one and half the size of the *Bandicoot* was rising out of the ground, was driven in and he had small pools that in the wet season comes over with water. The *Bandicoot* may have been the last animal to be the *Bandicoot* mammals and as soon as one was caught by the *Bandicoot* asphaltum the carnivores were attracted. During the wet season the floods flow mud and sand over the plain and this was also held by the Tar. In the way was built of the

ground around the tar pools.

Wells have been sunk down to 3000 feet in the
Pando, La Brea area, and did not get through the
~~Pleistocene~~. Accordingly, the mammals occur at
the top of the deposit and must therefore be younger
Pleistocene and not latest Pleistocene as I
think.

The hole with the human remains seems to
be a still more modern accumulation.

Druggel and Secman hold to another
method of accumulation. First there is an arch
underneath (I don't know they are going to prove it one
does not see) and through the middle apex of the
anticline there is a star out of gas. The left
more or less large holes and out of the gas vents found
oil that was covered in water. The animals
came to drink and as they stuck their feet into
the water were trapped. The entire theory is too
fantastic to be true and further looks
all geologic wrong.

It is possible that the tar pools at
Pando were shallow pools of water. This attracted
the animals and at some time were trapped into the
tar.

Sunday Aug 29. Los Angeles.

By electric train traveled to San Pedro and
Point Fermin. Here about all the ^{Oriskany} cliffs are made
of a very irregular sorted material. One bed will be
a coarse conglomerate and ^{then} the laminated shales.
Some of the beds are also Storm chert. All of the
strata are tilted less than 10 degrees.

All of high San Pedro Hill is terraced by
elevated sea beaches. See sketch on an earlier
page.

Monday Aug 30. Los Angeles

Took trolley & cousin's "Mission trip" to San
Gabriel, Pasadena and far to the east along
the foot of the mountains.

Called on Arnold before of G.D.M.



Tuesday Aug 31. Los Angeles.

At 8 A.M. took trolley to South Pasadena to meet Arnold. He then took me in his car over a 107 mile automobile trip.

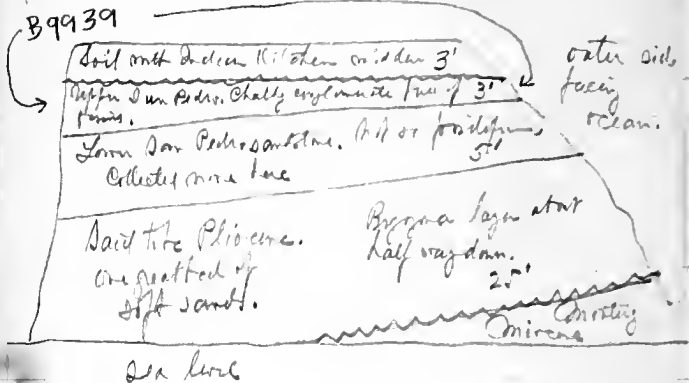
From South Pasadena we went west to Hollywood and then across one of the many mountain ranges through a long valley that has the Los Angeles Basin with a flat down a fan to the sea some 100 miles from the mountains.

The best thing seen was a long section of the Monterey that lay uncomprehensibly in the distance. But no one in the Chicago here a great course very considerable series. It has fossils in local conditions and local conditions.

We then went west along the coast as far as Redondo and on around San Pedro out to San Pedro into Los Angeles.

In the same way a course material, thick formations and washed, uncomprehensible. Then too the coast a much smaller, is major ones of which significance and small local ones.

Arnold gave me the following outline
of the Alcedon Island section.



The break between the Pleistocene and the higher beds, and the Pleistocene and the kitchen middens are plain. Elsewhere I could see no such.

Below is the thick unstratified sandstone that has here and there grows fern bivalves. In the upper third appear here and there irregular and very thin hard indurated masses. Some become some broken and more or less rounded and finally all of the material is composed of numerous indurated sandstone. In the lower part the conglomerate but with many fossils. The boulders are well rounded into the bivalves, large oysters and large Scaphula tubes. Other pieces are white (? these are not) but they are very subrounded.

Wednesday Sep 1 - 1910 Los Angeles.

Called on Arnold in the morning and looked over his photos. Ordered 12 slides to be made.

At eleven started out for San Pedro to collect in the blackman, Island Pleistocene. Spent the day there until 6:30. Did not get to Los Angeles at 8 P.M.

Thursday Sep 2. Los Angeles.

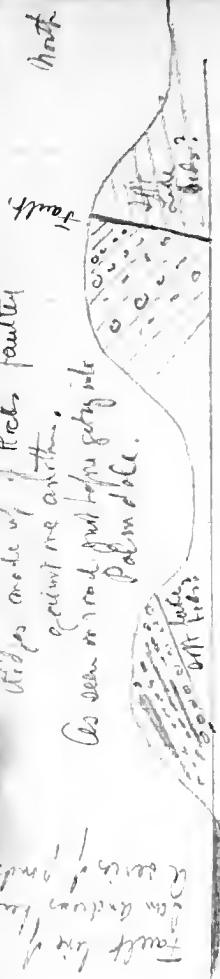
Collected the grade - out of the day at the base of San Pedro Island near the Leuker gulf and again on Blackman Island. D2969

So far as I can see there is but one formation here - the Pleistocene. At the base is the Monterey on the south end of island and this is a thin bedded sand in one thick bed with greenish shales, all of which are still in place at least in part. Toward the north the shales are more massive and full of pebbles. The pebbles are of various sizes and are of the same material as the shales. At the top of the Monterey is the occurrence of red bluffs, which is at the Leuker gulf. The shales predominate in all cases except in the bluffs.

The hygroa occurs probably 10-12 feet above the base.

Fault line of San Andreas line
 a series of ponds.

Ridges made up of blocks faulted
 against one another.
 As seen on road just before getting into
 Palm Dale.



See the photo of film 10 on 4/16
 San Andreas Fault near Palm Dale.

Friday Sep. 3-1915. To Angeles.

Shipped to New Haven my large valise and the box of Pleistocene birds, the former on my ticket as baggage and the latter by express. Arrived at 11:30. Sent check to Miss Coe and Express receipt to mail.

Had Dr. and Mrs. Mittle to lunch.

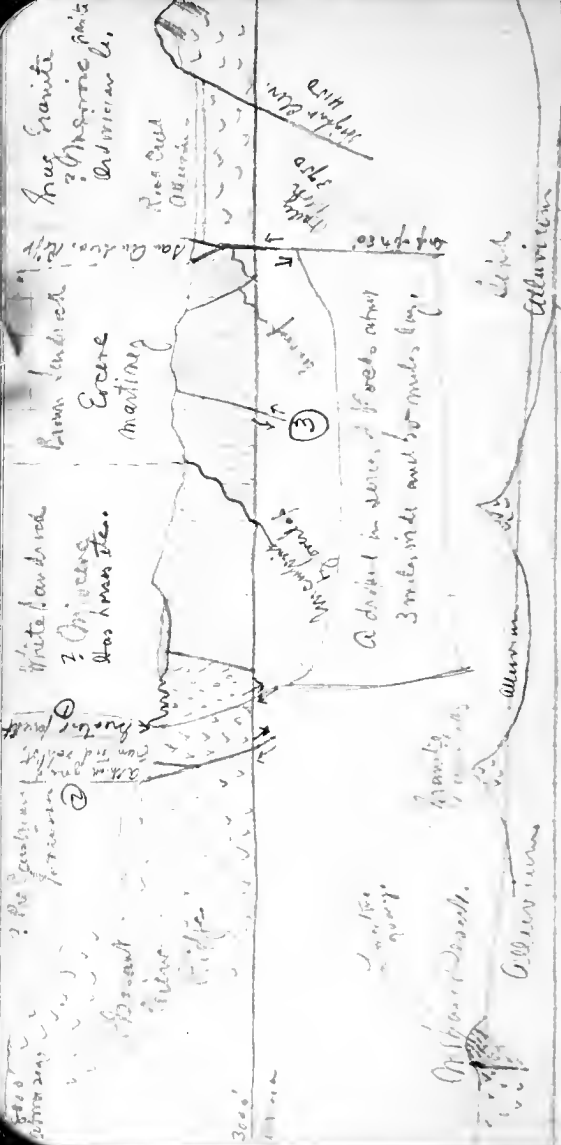
In the afternoon visited the Pacific ocean at Santa Monica and Venice.

In the evening had dinner with the Mittle's at Van Nuys Hotel.

Saturday Sep. 4-1915. Valeramo

Left started in Mittle's car for Valeramo at 8 A.M. It is about 100 miles to the ranch. Got there at 3 P.M.

In going over the low Archaean hills saw the ridges and rift valleys in a row. There are several of these ridges and rifts to the east of the mountains on the western side of the Mohave desert. After seeing some of these rifts and ridges was about there.



① This is the western fault. It starts in at about 1000 feet level of Valgerme and that has a valley to 9389 feet. Base of faulted ¹⁰⁰⁰ ₁₀₀₀ ft. 4000 11000 feet.

② This is a thin line of about 1000 feet.

Sunday Sept 5 - 1910 - Folsom, Cal.

Walked around back a south of Nikes Ranch
across the Eocene and Miocene shunter beds
between the Cystallines.

The Miocene is a thick series of continental
deposits, probably more than 5000 feet down an
extensive coarse conglomerate at the base with boulders
of the Popo or more across. At 1000 feet are pink
sandy shale, and a bit of sand, and then become
lighter in color and more of the shaly type. For
the top 1000 feet, dip is about 2000
feet above base were we over 6 to 8 in the morning.

Over this is a thick layer of sand and gravel.
All the pieces are angular and of large size. It is
a Folsom gravel.

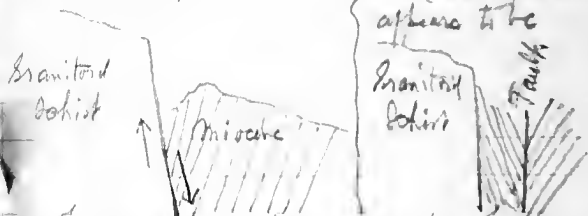
The Anderson fault marked in 1867; not
in 1906.

Monday Sept 6 - 1910 - Folsom, Cal.

Walked to the Nikes house to
see the hills. All that one sees in view
low hills to the west and east. In a broad view they are
all of the same height. In a small valley
I photographed it and one is also published by
Lawson.

Wednesday Sep. 8 1910 Valgermo.

Was in the field all day with Gille and Ransome. Mainly to see the great fault between the crystallines and the Miocene. The hade of the fault is almost vertical or about 90° to the North. It is about as follows:—



The contact is as sharp as can be. The Miocene is not broken but is sharply cut off while the crystallines has for a few feet considerable of the white sand-rock gravel of and it is into the schist that is here of a reddish color.

Learn the locality that furnished like the Miocene large teeth that Sidley has types as Parabellus ^{pl. crinitus} ~~pl. crinitus~~ were more common or teeth and one vertebral that Sidley evidently thinks of no value as Museum ~~pl. crinitus~~ ^{pl. crinitus} ~~pl. crinitus~~. He places them in the upper Miocene and not later than Pliocene.

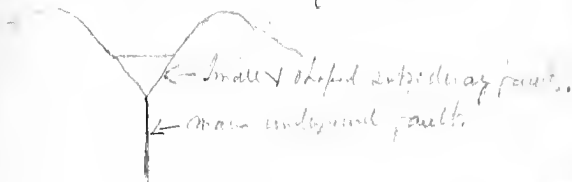
Tuesday Feb 7-1915. Valyermo

Did nothing in the morning.

In the afternoon with Wille and Ransome went back by the sand road gorge to see the Eocene and Miocene, and then climbed to the top of the Eocene ridge near Doctor Evans Ranch. Took 2 photos looking East.

The continental Miocene was deposited over a very rough topography of the Eocene so that in places great blocks of Eocene diposed interfingering with Miocene. The diposition in Eocene time was of considerable magnitude.

Have more of the same kind of structure here than near a 4' shales. They dip down and formed a narrow but long sink.



Thursday Sep. 9-1915 Valgermo.

Spent all day along the San Andreas fault to the east of Brock Creek. Here the elevations are most marked than about Valgermo. In one place there was a lake and in several places water was issuing in the fault line. In other places one could see two movements along the fault line. This place was photographed several times. The escarpment as follows



Friday Sep. 10-1915 Valgermo

Visited the high ridge directly to the north of Miller ranch to see the metamorphosed shales.

In the afternoon took train to the town, with view to the west of Palmdale.

Saturday Sep. 11-1915. Valparaiso

Spent the morning on the limestone ridge
just to the north of Miller Ranch. It is a
thick mass of unbroken limestone lying
on a granite mass and is now changed
into marble. After much searching found
two very fine Hormotoma between
pellucida and facilis. Evidently
the horizon is Proterozoic or about Ordovician. It looks very much as
if great blocks of limestone had fallen into the
granite mass and was heated and
squeezed into marble.

The only way to find fossils is to look
among the cleavage bands and here once in
a while will be found a fossil. The
granite appears to be of Proterozoic age.

Sent the two fossils to Miller.

Sunday Sep. 12-1915. Valparaiso.

Took it easy all day.

In the evening Mr. McFinnell a mining
engineer operating near here called. He is the
graduate of Columbia Mining School, born
in Colorado.

Monday Sep. 13-1910. Mohave.

Mable took me in the machine from July-
cross to Palmdale barn at 9 A.M. Left
Palmdale at 10.47 getting to Mojave at 11.40.

Am. blowing a gale here so strong that the
sand is picked up with violence. In the houses
it is like a. of winter now m. The day is
very hot & cold.

Left Mojave at 1.10 for the Needles.

The elevation of Mojave is 2360 feet

Thought no advice and a late train
missed the 1.10 P.M. train and instead to
wait in the side of a place until 9.20 P.M.
will take the train and instead of going
at the Needles will now go straight to
William's.

Left the 9.20 all right. start 3410

Tuesday Sep 14-1910. Grand Canyon
Left to Williams at 1 P.M.

The day is cloudy with some sun and it
is a cool world.

Left Williams at 1.00 P.M. and got to Grand
Canyon at 4.30 P.M.

Put up at Grand Canyon Hotel.

Learned that Callahan's Baedeker. I found
it is to return to me at New Haven

Wednesday Sep. 15-1915 Grand Canyon
Put on all day on the Bright Angel Trail
down into Cambrian. Got back at 5:30
good and tired.

See notes ^{elsewhere} on fact paper.

Thursday Sep. 16-1915. Grand Canyon
In the morning saw Jim Harvey off on
his mule down the B. A. Trail. Then to
Jayspac Point about 2 miles. ~~was~~
In the afternoon to Juki Point.

Friday Sep. 17-1915. Hermit Trail.
Left the hotel at 9:00 and started down
the trail at 11 A.M. Got to camp below at
about 3500 feet level at 5:00 P.M.

Saturday to Tuesday 18-21, Hermit Trail
Stayed these days at Hermit Trail looking
at the geology along the ~~unimproved~~ old N. Trail
trail. On Thursday morning ~~at~~ got
at 7 A.M. got to the hotel at 3:30 P.M. over
7 miles trail. ~~at~~ Hotel. For
the night ~~at~~ ~~the~~ ~~hotel~~.

Wednesday Sep. 22, Grand Canyon
To the ~~hotel~~ automobile to ~~the~~ ~~view~~.
Back to ~~the~~ ~~hotel~~. Packed up ready to
start east. Left at 5:30 P.M. for Billions and
Dinosaurs ~~the~~ ~~exchange~~ cars.

If you find your health is failing,
And you need a little rest,
A trip to Arizona
I am sure would suit you best.
Just drop the cares of business,
And forget your aches and ills:
Try pure air and lots of sunshine,
As a substitute for pills.

Now, if you're undecided
And don't know where to go,
Just write to Bass, the Canyon
Guide,
Because he's sure to know;
His camps are full of interest,
His trails are built with care,
With rigs or Saddle Animals,
We will safely take you there.

He knows the points of interest,
Up and down on either side,
He has horses, mules and autos,
And you can walk or ride.
You can cross the Colorado
On a cable every day—
The River may be raging,
But it cannot block the way.

Thursday Sep. 23-1915. En route for Denver.

Our sleeper got to Williams when we lay all night. In the morning we were to start at 7.35 for Winslow, but our connections were late. Left Winslow at 9.9 a.m. but got to Albuquerque N. Mexico about on time = 7.0 a.m. I should be in La Junta, Colorado tomorrow morning at 7.00 on time.

Friday Sep. 24-1915. Denver.

Train on time on La Junta at 7.10 and 7.45 was off for Denver, arriving here at 2.15 P.M. Put up at Oxford Hotel.

Saturday Sep 25-1915. Denver.

A steady rain all morning. Lay around hotel.

Left Denver at 1.00 P.M. for Lawrence Kansas to see Towerhoped. If I am on time will be there at 8.03 A.M. Sunday morning.

Sunday Sep 26-1915. Lawrence.

Arrived at Lawrence at 8.03 with Towerhoped at the depot. Stopping at his new home.

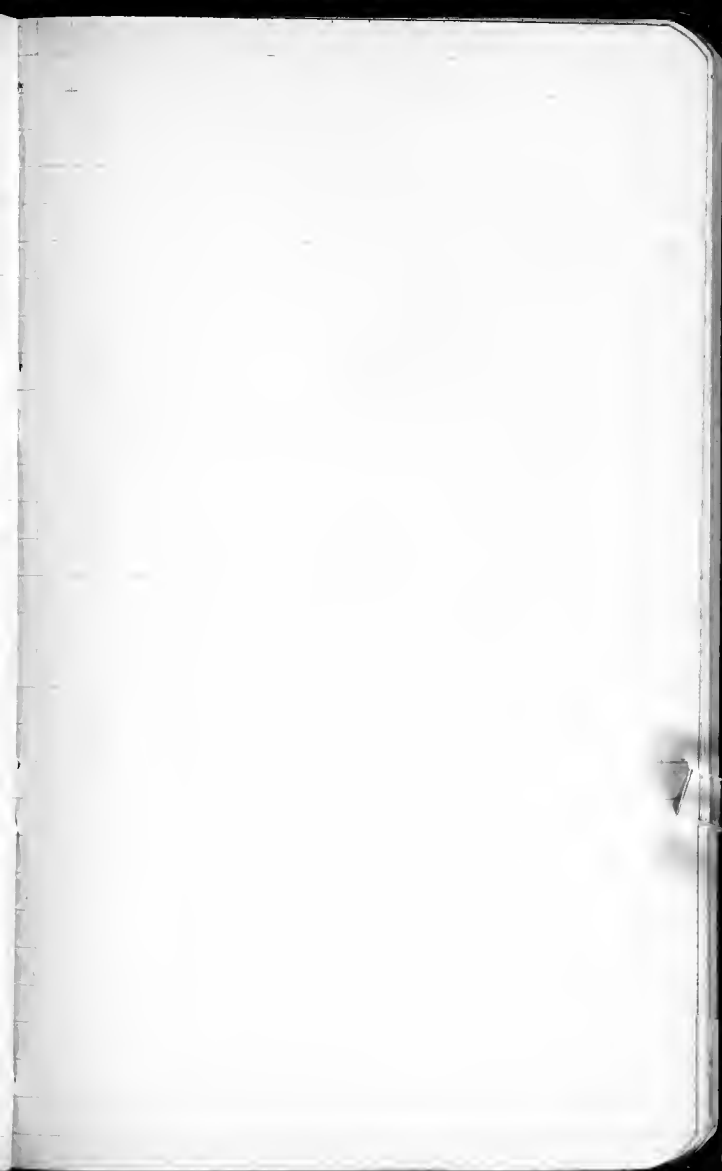


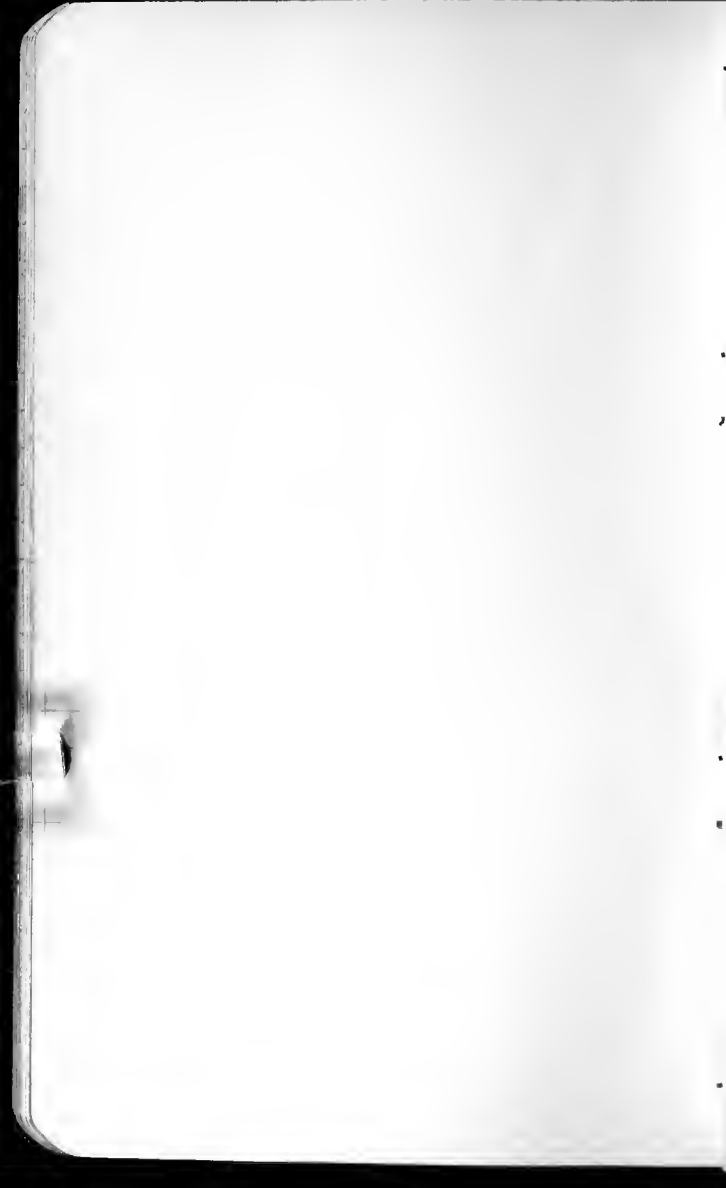
Monday Sep. 27 - 1910 Lawrence.
Was with Thompson until 3:47 P.M. when
I started for Kansas City arriving at 5 P.M.
At 7 left for Chicago.
Saw the N. H. Museum, Billings (on
visit), Martin and others. Called on Charles
Strong and Dean Tompkins. There are
among the instructors about 20 pale men.

Tuesday Sep 28 - 1910 Chicago
The party left there was a half hour late
going to Chicago about 8:30.
Then visited the Art Museum,
later the Field Columbian Museum.
Also the Hancock Acad. Sci.
Left Chicago on the Lake Shore Limited
at 5:30 P.M. Had 1st class \$10.00 extra
to get aboard it (1st sleepers 2.00) and
five more was my excursion ticket.

Wednesday Sep 29 - 1910 Chicago - New Haven
A cool forenoon, though the sun out.
Got to N. Y. City at 5:10 P.M.
Took the 6 o'clock train for New Haven. Got there
at 8 P.M. and some after a very long
evening.









The highest back track of Gorden on Observation Peak
at 13,103' feet. Film 2-8

10 Ds. of Antelope Island.

Film I

1. Same Ogden Canyon. Farther in better rock.
3. Ogden Canyon. Looking down stream to show more a page.
4. " " - looking up stream to far of mt. in E.
5. " " - down a typical of water
~~and from Pine Hill to the east of old bridge.~~
- 6-7. Portions of north side of Canyon. Good length.
~~Probably better than any other.~~
8. Same as 7. Better quartzite. Note river } Third
 9-10. Same further west but looking more east. } best
 11. Second crest from west. Maybe the better beta quartzite
 12. Ordovician and beta quartzite now it.

Film 2 Ogden Canyon

1. Beta quartzite contact at Colgan below at 6 ft
2. base of reef
3. Hyd terraces in front of Ogden Canyon. Very much
- 5-6. Horizontal part looking west are terraced. Best of
- 8-10. " " " east and south } Ogden
 East and south views show terraces 200 ft. higher
 than those noticed on this 200 feet high terrace
 Ogden

1-12. Late beds on Capitol grounds. Irregular bedding,
 (flat table) ripple. Loam like under of. ? Well fine plant matter,
 Film III. Salt Lake City

1. Lake beds. Sea water. Sand and gravel. Capitol b.
 - 2-4. " " " " " " " " " "
 - 7-9. At Salt Lake " " " " " " " " " "
 10. " " " " " " " " " "
- All in Salt Lake the only deposit of Salt Lake
 18 miles from Salt Lake City.

Film 6

- ~~9. Golden Gate Park, San Francisco~~
- ~~10. Pacific coast from Cliff House, San Francisco~~
- ~~11. Near Cliff House looking toward San Francisco Bay~~
- ~~12. " " " " "~~

Film 7

- ~~1-2 From train of descent to Twin Peaks~~
- ~~3 - Mt. Diabolo Mariposa~~
- ~~4 Another gold workings~~
- ~~5 Different runs of the valley~~

Failure

Film 8

- 1-2 Along down the valley to Glacier Point Trail
- 3 El Capitan north and ^{Cathedral Rock} south of L.P. trail
- 4 Yosemite Falls from S.P. trail. Falls in front
- 5 " Valley " " " to valley
- 6 " Valley up stream past North Dome
- 7-8 " " " " at the Red Rock of Camp Curry
- 9 From Glacier Point looking east " " "
- 10 " " " " " "
- 11 Down trail Half Dome and trees, Aug. 13-1915
- 12 " " " " " "

Film 9

- 1-2 Half Dome from Mt. Diabolo, the Falls, San Francisco
- 3 " " " " " "
- 6-7 Each view a trail view Nevada Falls
- 8 con. Nevada and Mineral Falls to Glacier Point
- 8-11 Down the trail past Nevada and Mineral Falls.

Film 10

- 1 ~~Exposure of ... at Point ...~~
- 2 Sea beach at Point Fernan San Pedro. See sketch of rocks, describe.
- 3 Same from higher ground.
- 4 San Andreas fault near Palm dale, thickness about 25 feet above Port ... fault
- 5 Same more from side and at 35 feet.
- 6 " View from ... fault along ridge and ...

Film 11

- 1-2 Miocene ss. back of Miller House. In good fault line. Fracture N 45° E dip.
3. Branching cactus *Halimolobos*. At 10 feet ...
4. " " " " At 40 " "
- 5 " " " " No 4 strata.
- 6 " " " " At 50 feet.

Film 12.

- 1 ... Little Rock. Fault ...
- 2 Large ... *Halimolobos*. 2 feet
- 3 ... Creek ...
- 4 ... Creek ...
- 5 ...
- 6 ... *Halimolobos*

Film 13.

- 1 Conglomerate and ss. in ... Canyon. At 40 feet.
- 2-3 White Miocene ss. from east of ... Point ...

- 3 Jucca at 20 feet. Five feet tall 8-20 stop
- 4 Opuntia also * 9.15 A.M. 3 1/2 feet tall 8-20
- 5 Agave at 20 feet. 10 A.M. Ten feet tall 8-20
- 6 West side of Michanc Point looking E. 11 A.M. 16-50
Shows Algonkian face, west side of fault.
- 7 Same place as 6 looking North. Same time and exp.
- 8 Just east of Cape Sattle, looking W. at River, Moon.
- 9 Contact of Onaway and Padstane along "Log Gap"
8.30 A.M. Shade 63 x 25.
- 10-12 Views at Grand View 13 miles E. of Grand C.
Among them great Portuguese station.

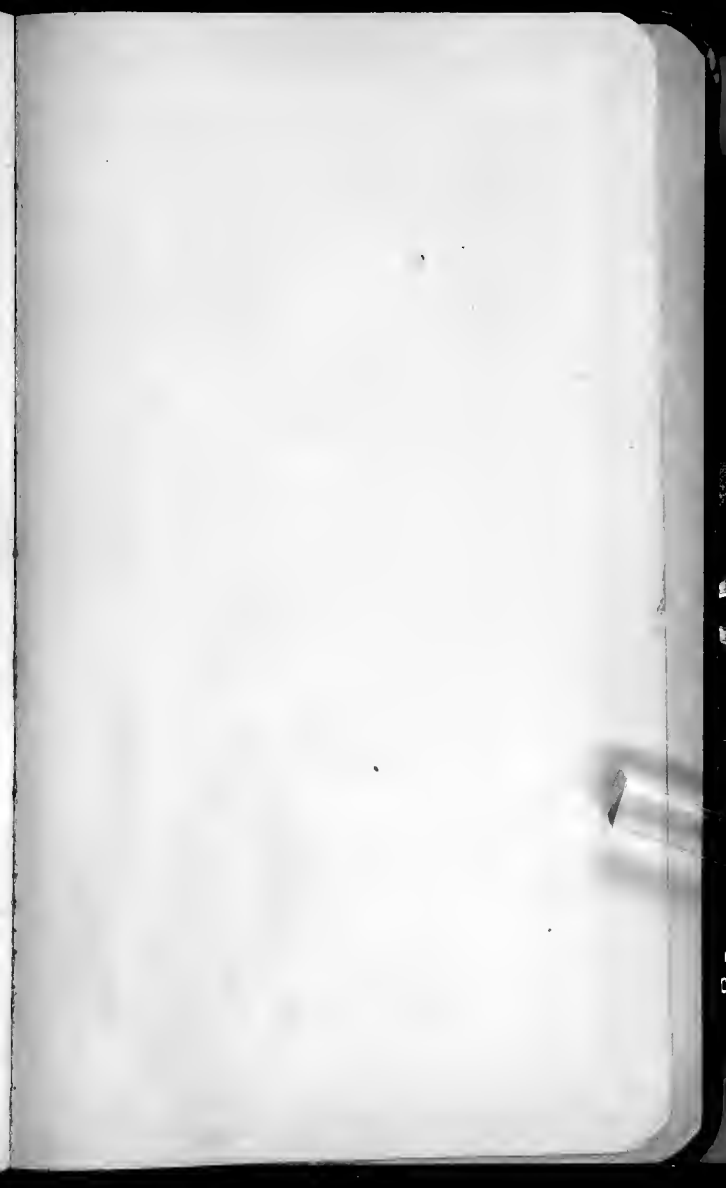
Film 17

- 1 Also at Grand View. All 10.30 A.M. 16-50.

Lion skull and a few bones	\$ 200
Amelodon skeleton	150
Wolf skeleton	140
Canis skeleton (not perfect)	
and 3 other skulls	300
Other specimens	100

~~\$800~~

The bones of Dr. Gilbert Grant's pits,
Rancho La Brea mammals.
Saturday Aug 28-1945, Hotel Hayward.



For Beginners Using Compound Shutter

<i>Rec. May 3-1915</i>	Set Shutter	Set Lens
Early Morning Late Afternoon Cloudy Days Portrait in shade Rainy Days	25	F 6.3
Fair Light or Sun in Cloud For all average Views	50 25	F 8 11
Bright Light all average and Distant Views	50 25-50	F 16 16
Marine Views White Objects Snow Clouds Bright Light	100 50	F 16 32
Weak Light	50	16

Moving Objects	Set Shutter	Set Lens
Bright Light	250 or 200	F 6.3

Fair Light—100-F 6.3

Poor Light—50-F 6.3

Time Exposures

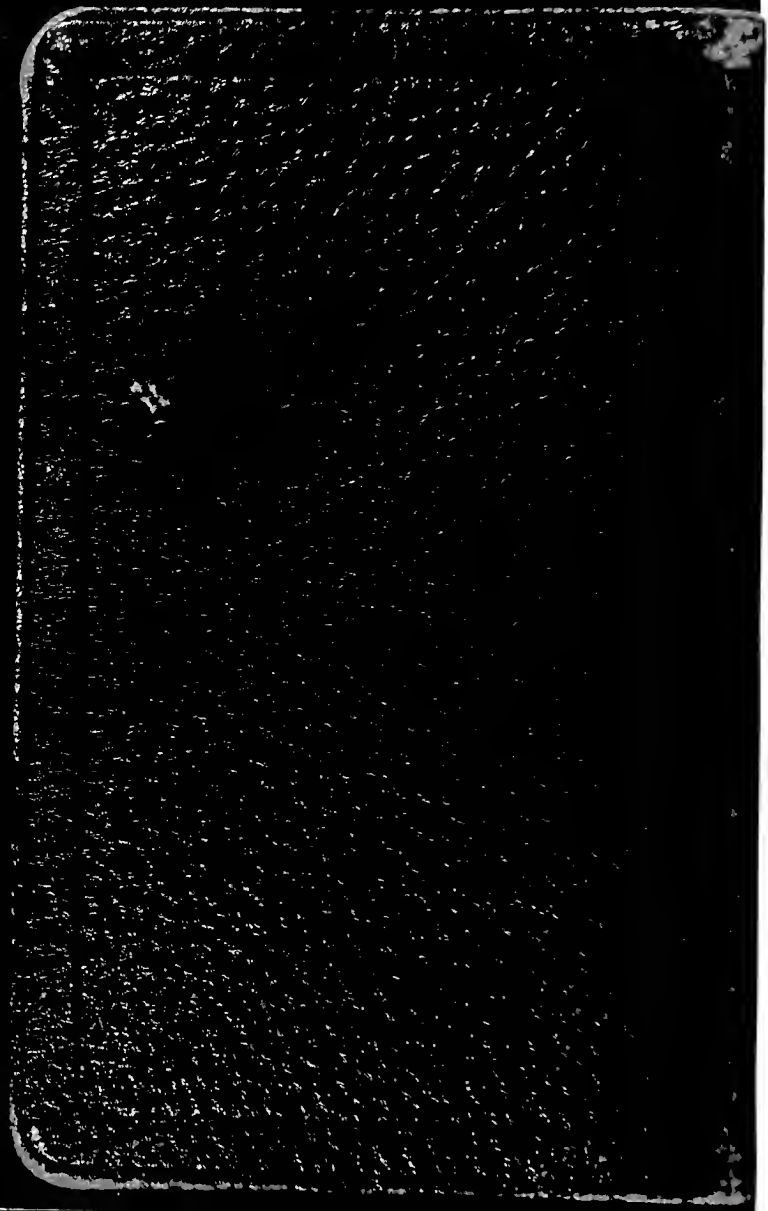
Portrait indoor	Set Shutter	Set Lens
Strong Light	$\frac{1}{5}$	F 6.3
Portrait indoor	on T	F 6.3
Average Light		

Time 1 to 8 seconds

Interiors	Set Shutter	Set Lens
	T	F 16

Time 1 to 15 minutes

All exposures under $\frac{1}{25}$ must be on a tripod.



(1)

Grand Canyon Wednesday Sep 15-1915

Started down the canyon in the morning the Bright Angel trail to see the rock section.

The elevation at the top of the trail is 6866 feet. The horizon is in the Kaibab limestone which as a rule is a dolomite.

At Bench mark 6750 or 291 feet beneath the top of the Kaibab limestone is the Murray series. This is the horizon first made known by Derby and here I saw Productus irisi, but a few other species of Productus and the large Mesobolus littoralis. This horizon is full of bands and nodules of clinkstone which are spongy and porous. The Kaibab is given a name to be full.

As we descend from the trail there is a transition zone fading from the Kaibab into the lower sandstone.

The lower sandstone is an interesting formation with a thickness of 350 feet. It is a clearly washed yellowish-grey fine grained

sandstone. It must have a cement of lime for otherwise it would not be so remarkable a cliff maker for everywhere the face is one vertical cliff. It is cross bedded throughout and remarkably so. When weathered the cross bedding comes out very conspicuously, but even in the weathered surface of cross bedding is seen even far away. The dip ^{of the fine bedded} is near 25° and will continue across zones that are fifty feet thick or more. The dip is to the south indicating that all of this sand came from a great distance to the north. The dip is about 10° to 15° to the north, and the bedding is seen, and becomes more and more vertical. Goble says it is not more marked than on a great fallen block of sand and says that the rare marks probably not over 3/8 in deep and about five inches across from west to east. Other observations are like smooth like the beach sandstone of a wide

Throughout the Grand Canyon region the
 Coconino sandstone is a constant member
 and even ^{though} no fossils have been found in
 it yet it is evident that it must be a
 marine deposit. Rivers ^{of considerable length} came in from the
 north bringing great quantities of worn
 angular sand that were laid down in a
 "tip set" manner. As it was loose and
 uncompact some of it slid down the
 slopes and in this way other dips than the
 prevailing one came to be. Because of
 its loose nature little animal life is
 in it.

Below the Coconino is the ...
 is as sharp as can be. So far as can
 see in distant views the contact is an
 absolutely sharp line. Above are the con-
 bedded almost white sandstones while
 below are the deep red or maroon shales

of the Supai. As geologists are not in a position
 is possible, and so we are left with the
 must have great significance. ^{1. 2. 3. 4. 5.}
 Supai was for a time a land surface
 and that the Coconino sea invaded the
 land from the south.

that the open joints of the Supai are
 filled with the sands of the Coconino.
 It will be recalled that the Coconino
 and the Kaitat will be referred to the
 Permian while the Supai alone is of
 Pennsylvanian age.

Below the Supai, ^{1. 2. 3. 4. 5.}
 are ^{1. 2. 3. 4. 5.}
 thick beds of ^{1. 2. 3. 4. 5.}
 thick-bedded series of sandy shales and
 cross-bedded sandstones, ^{1. 2. 3. 4. 5.}
 bedding in towards the south. At places

... weather down

0 100'

200'

with that

beginning sandstone

beginning in upper 200 feet.

500

Chalk with sandstone.
Most sandstone here

150 sandstone

200

50 sandstone

100

150 sandstone

Foot wall, 1000'

2100'

2100'

200

Foot wall ... The foot cliff makes.

Thickness are estimated
at a long distance.

Cambrian relations.

At Bench Mark 5361 is in decidedly cross bedded red ^{and whitest} sandstone, the Dupas.

At Bench Mark 5702 is again in cross bedded sandstone. This horizon appears to be thinning down the thickness. Just below this sandstone again is a thin layer of ^{and} it is here that I saw the oolite. The other oolite beds ^{with interposition of any limestone} occur about half the thickness down.

At about 4600 feet, or about 3000 feet beneath Bench Mark 5702 is the base of the Dupas.

There is no marking and tracing of any of the strata in the dupas in the area of the contact between the dupas and the oolite horizon.

Could not get close enough to see out the character of the contact between

the Dupai and the Redwall. I expect it will turn out like a disconformity with a long break between - all of the Tennesseeian absent.

The Redwall of blue-gray limestone (all the way down to the top like the Dupai due to wash from above) is 550 feet thick. One sees very little bedding and in general appears to be a very dense heavy bedded, very hard and brittle limestone. Section 4610 is about half a mile long and is about 1/2 mile wide. It is about 1/2 mile from the contact and near to or on the contact.

Fidelity of ... to see all of the ...

(380 feet thick) and one third of the Bigot
 Angle shale (total thickness 320 feet). I scrambled
 over it. I got out one hour but all I could
 make out of the fossils were fragments
 trilobites and corals. I saw
 some small shells.

I say that all of the fossils is one - Cambrian
 and probably see after Cambrian as
 Walcott now uses this term. I don't see
 that is any Cambrian and certainly
 that is not Ordovician nor Silurian
 here.

Grand Canyon, Thursday Sep. 16 1915

Spent the morning photographing and studying the canyon about Yavapai Point, two miles east of El Tovar Hotel.

In the afternoon did the same about the same point west of El Tovar Hotel.

Paid particular attention to the contacts between the Paleozoic and the older rocks. In general one can say that the contact is a fairly even one with some irregularities and an occasional roadward sticking well up into the younger strata.

The contact between the Paleozoic and the older rocks is somewhat irregular due to the presence of these old rocks. The difference in level between the two series of the Tertiary sandstone is about 100 feet. The contact is in places marked by a thin stratum

stick well above the red line...
considerate into the dip...
this elevation is must be...

The contact between the...
the Union of the...
or less jagged. In one place...
side of... and about 5 ft...
sharp peak that sticks...
under but also well up into the...

Contact. The red clay underneath the Coconino is undoubtedly a continental deposit. It is a stiff deep red ~~red~~ fine sandy clay. It appears to be so through a thickness of about 100 feet when thin zones of sandstone are introduced. The rock cliffs mainly sandstone of the Lower Permian. It is a real mud when we get down to the base of Red Top which is about 3000 feet above the Coconino, or about 1400 feet beneath the rim.

To my surprise again, ^(or any of the beds in water from our diggings) I find a number of amphibian tracks, at least two kinds on the trail just at and below the same level Red Top along the trail. A large slab lies on the hill side about 100 feet up the trail from the first. The fossil bearing beds ^{the fossiliferous sandstones} are here flaggy in their beds with ^(the strata are small) more or less bedded sandstone. Most all are sun-cracked, and often well pitted with rain drops. Leaves of a ^{large} ^{kind} of fern and leaves of a ^{kind} of tree are also found. White fossils are also found in the Permian zone.

The large slab has two rows of tracks about 7 to 8 inches apart and with a stride of about 5 inches.

These amphibian footprints are at Red Top just above the heavy bedded sandstones and occur in between the first two heavy beds at the top. There are some ^(clastic fragments of) bedded sandstones maybe 200 feet ^{thick} and all show decided cross bedding. The base of the series is at the starting station of Hermit Trail.

At 100 feet beneath the rim there is another zone of these large red sandstones but with only polished surfaces. Here there is a decided upward ^{of} rain prints. In the sandstone ^{is} a ^{series} of ^{beds} which are massive and a slight ^{of} ^{beds} that ^{is} ^{not} ^{at} ^{all} ^{like} ^{the} ^{other} ^{beds} ^{of} ^{the} ^{series}.

The trail runs for nearly two miles across the divide between 1600 and 1700 feet ^{at} ^{the} ^{rim}.

At about 1500 feet occur the first thin
 layers. These appear to be diagenetic lime
 concretions - calcareous debris - in a maroon
 sandy mud. These layers or bands rather
 of ^{the} ~~thin~~ ^{thin} ~~beds~~ ^{beds} ~~are~~ ^{are}
 indistinctly ~~the~~ ^{the} ~~diagenetic~~ ^{diagenetic} ~~beds~~ ^{beds}.

Down 100 feet ~~more~~ ^{more} of the same
 "Red Zigzag" ~~is~~ ^{is} ~~found~~ ^{found} ~~and~~ ^{and}
~~is~~ ^{is} ~~made~~ ^{made} ~~of~~ ^{of} ~~bedded~~ ^{bedded} ~~strata~~ ^{strata}.
 These ~~continue~~ ^{continue} ~~down~~ ^{down} ~~to~~ ^{to} ~~2000~~ ²⁰⁰⁰ ~~feet~~ ^{feet} ~~below~~ ^{below}
 the rim and make the second ^{main} ~~one~~ ^{one} ~~of~~ ^{of} ~~cliffs~~ ^{cliffs}
 in the Lubain.

At 2000 feet occur ~~the~~ ^{the} ~~second~~ ^{second} ~~one~~ ^{one} ~~of~~ ^{of} ~~cliffs~~ ^{cliffs}
 limestone with considerable ~~is~~ ^{is} ~~weathering~~ ^{weathering},
 red to gaspary chert ~~is~~ ^{is} ~~found~~ ^{found} ~~in~~ ⁱⁿ ~~the~~ ^{the} ~~zone~~ ^{zone} ~~of~~ ^{of}
 they ~~are~~ ^{are} ~~the~~ ^{the} ~~bedded~~ ^{bedded} ~~is~~ ^{is} ~~clay~~ ^{clay} ~~and~~ ^{and}
 shales and these ~~are~~ ^{are} ~~the~~ ^{the} ~~main~~ ^{main} ~~beds~~ ^{beds}.
 The ~~main~~ ^{main} ~~beds~~ ^{beds} ~~are~~ ^{are} ~~the~~ ^{the} ~~main~~ ^{main} ~~beds~~ ^{beds}.
 They ~~are~~ ^{are} ~~the~~ ^{the} ~~main~~ ^{main} ~~beds~~ ^{beds}.

45
but rather fresh water ones under a hot
climate.

"Four Mile Canyon" is also known as "Point
Hudson" and appears to be 150 feet above
the level of the Supai. "Four Mile Point" is
on the embankment between Redwall and
Supai. It is 2300 feet from the river.

I now get the impression that all of
the Supai is a delta deposit under the
complete influence of fresh water. I saw
nothing of a marine fossil and what is more
significant the deposits have the appearance
of a continental deposit not much unlike
the lower series of the Colorado.

As it is 5:30 P.M. and I have five or six
miles down the trail to camp did no more
geology.

Hermit Camp is a fine place to be in
and without any reach of the trail and
Redwall.

~~Cathedral stairs~~ start at the top of the base of the Luperon. ~~is in a line with the faulting and striking of the Luperon. But not if the spring is in the line of the Relliance.~~

Antimony
(In the mountains)

is a small hill. It is a small metamorphic series of sandstones and conglomerates. Partly also shales that are now full of nodules of a very glaucous silvery and golden mica. All ^{the strata} are shot through by igneous masses that have much jaspery red feldspars. The whole is now a schist, much folded and faulted, and a brownish sand, much as before. The colors are maroon and light red with ^{the latter} some blue.

The surface of the rocks is found to be an ^{are very slightly undulating} almost level surface. In a distance of several hundred feet the difference is not over three feet.

The basal layer ^{is a sandstone} is the first few inches thick, on ^{the surface} the nodules ^{are characteristic}. The nodules immediately beneath showing that the material has not been moved; or, otherwise it is a ^{crude} conglomerate of atoms, one foot in

turnons (see specimens) and about 100000 years to
 another formation, found that is locally made up
 of drifted and broken Obolus shells (see specimens)
 This is evidently the zone from which Salter
 got most of his fossils and is Miller's Obolus
 layer. These fossils are mostly small, as the Obolus
 specimens from the locality of Whitfield.

The Obolus and Obolus it is seen to be a
 sandy contact. The latter is red to the extent
 while the former is yellow-greenish - a marked
 color difference that can be well seen in
 long distances.

In many of the sandy layers of the Obolus
 Angle shale there is glauconite. The greatest amount
 as far seen is in the sandstone zone
 the Obolus beds.

There is no doubt in my mind that all
 of the Obolus is Upper Cambrian - do not say much
 of any of the Obolus well known - anything of Obolus
 affinities.

In the afternoon I examined the hill near
 to the east of Obolus up to the top near the
 Railroad. The only fossils were one Obolus

The same worm borings and their excursions, and here and there the narrow fragment of an Arctid or Lingulid shell. Saw nothing that will identify the beds and yet the evidence is all in favor of placing all of the ^{series} into the upper Cambrian. ^{my} Hollow water deposits, and a scale of and of subit deposition.

From the middle or somewhat above occurs a ^{my} thin limestone. This all had by worm tubes that are filled with sand giving the rock a peculiar checkered appearance. see sample.

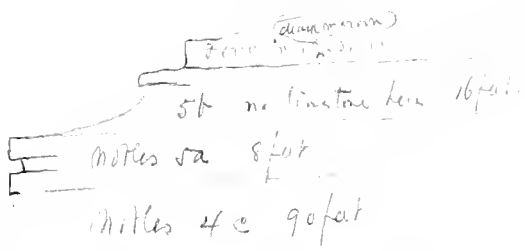
Sunday Sep. 19-1915. Grand Canyon.

Started out to see the Cambrian along the Hermit Trail. First examined the isolated hill of the Bright Angel shale just to the west of the wall having ^{the same appearance as the trail.} Here the section is ^{the same as the trail.} ^{the same as the trail.}

The middle lump of
 Cryptogel shale.

cliff
 cliff
 8
 to now

another can sample
 100 ft



set
 2000

21
fines shrate than J. centromata. It is in this zone
that I did get the latter species shown me at Valegrove
and I saw one drift ^{specimens} earlier in ^{the} day.

Then tried to find the base of the Kinderhook
but failed. More dense dolomites come in below
the ^{zone} and then white very fine grained
argillaceous dolomites. These dolomites appear
to be ^{the} same as the sandstones. Saw no fossils of
any kind and with a ^{few} ^{specimens} ^{of} the
Cambrian. As a Devonian ^{trough} occurs here
it may be that occurs in this series but I
failed to find contact between the Devonian
and Kinderhook. As the heat was intense
decided to give it up.

Later sitting on the Tiro Trail and looking
back at the Butte I could not make out where
the contact was. Where I had supposed it was
was above the layers that I concluded had more
to do with the Redoubt than with the
Devon. It should be below in view of the
Devon.

The ^{Redoubt} ^{series} is more dolomitic
than the ^{Devon} and the ^{Devon} has in ^{the} ^{lower} ^{part}

diagenetic change in a series of
of calcite, face showing a length
length of ten inches in thickness
three inches. The stone is also
genetic but most of it is due to weathering. It is
curious that fossils are ^{the} more common in the chert
than elsewhere in the limestone and dolomite.

The Redwall is a fine
formation to weather. The limestones are in thin
series, dense and exceedingly hard. The diagenesis
has ruined most of the fossils. The old surfaces
are either etched by the weathering into rounded
pits of about 1/2 inch in diameter and between
these are ridges or sharp as to cut hands
and shoes, and otherwise the surface is
gray and calcareous white due to the ex-
solving water that does not in the Redwall.
These conditions do not occur with the other
formations that weather down or break away
more rapidly.

Ask Noble if it can be that fossils 20 and
198, 19a, and 19c are better preserved in the Redwall
than to the Toronto? These fossils are common in the

But I did not see a creosote bush in Cape Butte
 along the trail. Very dry. I could not make it
 out. The ground here was either Redwood or
 Torti.

Monday Sep 20 - 1915 Hermit Camp.

Went back along the Tonto Trail to the farther
 north part east of Carmel Creek. About 4 to 5 miles.

The Tonto sandstone sandy shale zones show that
 some of the narrower members also have considerable
 glauconite. This mineral seems to me occurs
 in all horizons of the Bright Angel shale and
 especially in the beds of iron sandstones and less

in the shales. There is probably
 also some in the thin part of the Muav.

Learned little today.

Went back to camp at 9:40. The day is fearfully
 hot and I laid up this afternoon. Packed all
 the things so that they could be taken away from
 here to the next camp.

Tuesday Sep. 11-1900 - 1880, 1900

7 mile - at about 1/2 mile from top of ...

M. Grant met ...
in good ...
Wants some of my ...

old trail starts ...
This is about 1/2 mile ...
part of the trail. The ...
at 3400 feet below ...

3100 feet ...
... latter ...
middle thickness of the ...
in the Muav series.

The ...
interformational ...
are more marked.

climbed up the mountain ...
found the ...
and the ...
Muav ...
but saw ...
rule it a ...

Small ... could not get up
 ... contact at the
 ... with layers
 ... Ton bed is
 about 1 foot thick and it is followed by a
 yellowish white sandstone of about 4 feet thick
 and then another even more delicate layer
 ... have a lot of it
 ... saw loose a Syringopora
 that I take some from this contact dolomite.
 Have taken it along. This contact zone
 is 2750 feet below Rim.

Interbedded with the heavy Redwood there is
 a dolomite zone ... east of ...
 ... this ...

Cup corals and sponges come in at once above
 ... dense lithographic lime,
 ... a limestone that has
 ... = stylolites

... in the
 ... limestone

Then appears to be
with peculiar depth
Holes. Then a hole
is more or less
has some short.

Actual
be made out on the level
along the fault.

Just beneath the
maybe the contact between
Dupai. If so I would include the
(12 to 20 water beds) in the Redwall. The Dupai
at the top part is of a characteristic

The Dupai
shales and mudstones
the main part.

At Buzz
River canyon. This
just beyond
down to
a brilliant red
beds. This maybe the

... some of the nodules, but belong
... some in the narrow
... nodules. Some
... like a normal
...

... the trail from Boney Point
... and contact between
... and a red cliff above and the
... the road appears in
... bed with nodules.
... may be 200 feet.
... that the section
...

"Lone Pine Spring" is a lone spring
... and tracks collected
... canyon. They
... the top of the first
...

... the
... They seem
... and
...

Some of these seem to be
the trail of a long
at an angle of 30 to 45 degrees
on half the ^{side} of the ^{main} ^{deposit}
What is the significance of this? A fine
water deposit laid down on a delta? It
has much the appearance of a marine
deposit in the case
and the present nature of the ^{deposit}.

Left to the head of the trail road
and tired at 3.30 P.M. Then a seven
mile drive with my plunder to the
Bright Angel Hotel.

doc 111

Carroll Canyon