doc. 91

Mexico

Gregory mentions Tollman and Seeds of the southwest.

[illegible] Terrell

[illegible] 6147

[illegible] at 9. a.m.

Büsing in Vera Cruz shippers.

dec. 91

2906

Aug. 17 - Sept. 24
1906

Courtesy of
Charles Schuchert
Yale University Museum
New Haven, Conn.

1906.

Exposure time table.

Stops	23 Bays	15	11	7	5	3	1½
4	1/10		1/25		1/50	1/75	1/100
8	1/5		1/10		1/25		1/50
16		1/4	1/5		1/10		1/25
32	3/4	1/2	~~1/6~~	1/4	1/5		1/10
64	1½	1	3/4	1/2	~~1/3~~	1/4	1/5
128	3	2	1½	1	3/4	1/2	

Detached clouds. Bright sunshine at 1

A Bright sunshine brilliant clouds = 2/3

B. " " but sun covered with thin clouds. Makes good pictures 1

C. Same as B but no detached clouds 1½

D. Sun covered by dense cloud with very detached clouds. Makes fair pictures 1½

E. Same as D but no detached clouds 2

F. Entire sky covered with thin clouds but the sun can be seen 2

G. Thicker clouds but the position of sun can be made out 3

H. Distant open scene cut down to 1/2

I " snow or water scene 1/3

K Green and blue 1

L. White ½
M. Red, yellow and dark objects 2

Landscapes.

Close objects, say less than 100 feet, in deep shadow under trees and with 64 stop for a very bright day never give less than 1½ second but to 2 seconds.

Distant views say 2 to several miles away
64 stop ½₂₅ second.
128 " ¼ "

Less distant views say within ¼ to ½ miles
64 stop ¼ second
128 stop ½ "

Near views say within 100 to 300 feet.
64 stop ½ second
128 " 1 "

Instantaneous snaps in the very best light never less than 16 stop. Better take a smaller stop and give a little time.

Geological time.

		years
Pleistocene		725.000
Pliocene		362.500
Miocene	2.900.000	362.500
Oligocene		580.000
Eocene		870.000
Cretaceous		1.810.000
Comanche	7.240.000	1.810.000
Jurassic		1.810.000
Triassic		1.810.000
Permian		2.625.000
Pennsylvanian		2.625.000
Mississippian		1.750.000
Devonian	17.500.000	2.625.000
Silurian		1.750.000
Ordovician		2.625.000
Cambrian		3.500.000
Proterozoic (Huronic and Keewanawic)		17.500.000
Archeozoic (Keewatic and Laurentic		? 10.000.000
years.		55.140.000

Phil Schuchert 1202 Linden Ave, Canton O.
A. E. Schuchert. 119 E. Seventh. Cin. O.
Simon Stutz 1055 Academy Ave. Price Hill.
M. W. Moodley U.S.N.M. Washington, D.C.
R. S. Bassler " " "
E. O. Ulrich U.S.G.S. " "
T. A. Bostwick
Lucy P. Bush.
Margaret Corcoran 59 Wall. New Haven
E. A. Callahan 472 Orange " "
M. H. Moore " "
Mrs Dade " "

[illegible] Bradley
Mr. Geo. R. Bradley 64 Wall New Haven
E. S. Dana, Seal Harbor Maine
H. E. Gregory New Haven Conn.
J. A. Barrell
L. V. Pirsson
S. L. Penfield
H. L. Wells.
R. H. Chittenden
R. S. Lull

Mexican Geology. Geol and Castillo's of Cons. Lat. Tehuantepec and Oaxaca.

Carboniferous (Carb and Permian in Coahuila and Nuevo Leon (Frazer and Hall paper privately printed 1884 Philadelphia. Also on borders of Mexico and Guatemala; in Nicaragua with overlying Permian and underlying Silurian and Devonian (Crawford 1890, Amer. Geol. VI)

Cretaceous. Highest level in Central Mexico 10.000 feet (Dana).

Triassic Upper in Sonora (Newbury 1876, Puebla and Oaxaca (Aguilera-Ordonez 1893). Newberry collected N-Carolina plants.

Jurassic. "Small Jurassic areas are laid down on Castillo's geological map of Mexico, in the States of Sonora, Coahuila, San Luis Potosi, Queretaro, Hidalgo, Puebla, and others near the eastern border of the great central plateau, and also in Colima near the coast. The beds, according to Aguilera and Ordonez (1893), contain Aucellae, and Ammonites of the genus Perisphinctes, and pass conformably into the overlying Cretaceous." (Dana).

Lower Cretaceous. "The Lower Cretaceous, on the map of Castillo (1891), extends nearly to the

the city of Mexico; and it is continued beyond to the southward and westward, in isolated patches. According to Hill (1893), all, except a small portion of the northeast, is a continuation of the Comanche group of Texas, but with less distinct subdivisions; and he concludes further that over Mexico during this time the Atlantic and Pacific oceans were united. He makes the thickness 20,000 feet (Dana).

In Chihuahua and Coahuila Felix and Lenk report in a L.C. fauna of 46 about 37 as European species.

Eocene. Along north Atlantic border.

Geology of Mexico

(Translation of Aguilera and Ordonez (1897) in Jour. Geol., V 1897, p. 384- by Bain).

Archean. A strip from near Mexico City NW and through the capes of Lower California.

Ordovician. Orthis testudinaria in reports found at Cuesta de Santa Teresa in Guerrero. The locality has not been re-

discovered.
Silurian(?) slates are found at Guanajuato, Catorce, and Zacatecas. The Catorce slates are Jurassic.

Devonian. Aguilera looked up the reported Dev. localities but in each case found only pre-Jurassic rocks.

Carboniferous. Are found beneath the Cret. along the Guatemala border. Limestones with P. semireticulatus. Frazer and Haue's Carb. localities are now known to be either Cret. or of unknown age.

Aguilera thinks the Archean ridge continued to persist as islands all through the Pal. and then united into a permanent skeleton ridge at the Perm-Carb. movements.

Upper Triassic. Shallow water deposits along Pi. coast up to 3000 feet. 1800 feet in Sonora. Sandstones and slates. Rest on Archean. No fossils. The strata are not thought to be marine, but mainly are estuarine deposits. Movements throughout and at close of Triassic.

Jurassic. Transgression of the sea. These rocks go with the Cretaceous and are folded with them. Lower and middle Jurassic in southeast Mexico. Upper Jurassic in

Coahuila and Oaxaca.
Lower Cretaceous. Neocomian.
Shales, clays, marls and greensands.

Middle Cret. = Cenomanian, Turonian and some Senonian. [illegible] as a gray li. often mag. but not dolomite. Many fossils, much metamorphosed. Maximum of sea invasion. Mexico an archipelago. General elevation action with Mtn making. Continues into Upper Cret.

Upper Cret. Some Senonian and all Danian. Found only in N.E. Mexico. Yellow sandstones with grayish black shales. Retreating sea.
Sierra Madre of east and [illegible] pushed up at this time. Mexico then had its present outline.

Eocene. More vertical elevation. Increase of territory.

Miocene. Invasion of the sea along east coast. Also W. coast and origin of Lower Cal.

Mar elevation in Atlantic region.

Pliocene. Yucatan emerged. Also Central America.
Tertiary a period of eruptive activity.

American Express Co.

2968980 San Antonio, Texas.
1 Oaxaca.
2 Mexico City Sep. 1-
3 " " " 7
4 " " " 12
5
6
7
8
9
3384274 Mexico City Aug. 27.
5 " " Sep. 1
6 " " " 7
7 " " " 17

New Haven, Aug 10-1906 left for New York on the 8 A.M. Bankers Express and arrived at 9.45. Then called on Miss Coolidge at Whittier's then connected with Chemistry Union.

At 11 we started out for the Brooklyn Bridge, top of Bridge Building, lunch at Post Teller, a walk down Broadway to Pier No 1 where at 2.30 we took the boat for Coney Island. At 7.30 had dinner at the Manhattan, saw the "Girl from Paris" and at 10.45 started back by L to the city. Got to Whittiers Hotel at 12.10 P.M. and to bed at the Grand Union about 1.

New York Aug 11.

Started at 6 A.M. and 8.17 left Jersey City for Washington. Arrived at 2 P.M. Spent the afternoon with Bassler and then met Foerste and Riddles. The evening with Miss Mordey. Stopping at St. James.

For me the Washington temperature is now severe and while I thought the day hot the natives think it only an average day.

Washington Aug. 12 Sunday.
Got up at seven after a warm nights sleep. Saw Bassler at the museum at 8.45 and went to Cumberland on the 11 A.M. train. Arrived at Cumberland at 2.05 with Gordon at the train.

Cumberland Aug 13 Monday.
Spent a part of the morning with Hartley in seeing his latest Oriskany finds. Had a great number of Edriocrinus sacculus large fine ones and smaller ones in clusters of three or more. Also many Spirifer tribulosus and one fine new Spirifer. This horizon is low down in the Upper Oriskany as S. cumberlandiae was common. Much more material can be collected. The locality is near Pattersons Creek on the Western Maryland cutting.
In the afternoon saw a Baseball game.
Returned to Washington at 6.10 and arrived at 10.00. At St. James Hotel.

Washington Aug 14 - Tuesday.

Called at the Survey to see Riger and Hayes. Found that the Washington party would consist of Becker and wife, Davis and son and Wanner, Adams and wife, Bancroft and another person, Miss Finger, Julia and myself. Walcott can not go nor can Hayes. Otis Smith, Weed and Ransom are also to turn up.

Called on Mr. Hege of the B. and O. and found I could get no ticket two earlier than the 15th. Secured my ticket to go with the Washington party. Fare Washington to Mexico City and return 84.90. Sleeper to St. Louis 5.00

Telegraphed to Ordonez to hold excursion as follows. "Excursion rates Washington fifteenth. Arrive Monday. Hold excursion Oaxaca."

Spent the afternoon at the U.S.N.M.

Had to dinner at the Chevy Chase Inn Mrs Coolidge, Miss Moody and Mr. and Mrs. Bauler. Then to the lake and at 11 P.M. to the Metropolitan Hotel.

Washington Aug 15. Wednesday.

Spent the morning and part of afternoon at the U.S. N. M. with Banks, Moody and Knowlton. Also saw Rizer and secured my stop over at Cincinnati. Go to Cincinnati ticket office on my return and deposit ticket. Mr. Hege wrote a letter to local agent.

Departed at 4.05 on the B. & O. R.R. On the train are Mr. & Mrs. Becker; Mr. & Mrs. Adams and Miss Finney (sister of Mrs Adams) Fitzhugh and Bancroft; Mr. [illegible] Pal. of Univ. of Tomsk, Siberia. Prof. Davis and myself.

Saw Gordon at Cumberland for five minutes.

Cincinnati Aug. 16 Thursday.

Arrived on time at Cincinnati a little after 8 A.M. Left at 9. Walked up to Fifth and Vine with Davis.

The day was not hot only somewhat warm.

Arrived at St. Louis at 5.27 P.M. Arranged tickets and sleeper and while having supper in walks Reeds. Chatted with him until 7.40 when he started for Kookuk.

Started for Mexico over the Iron Mt at 8.21, twenty minutes late. Car very warm du

Tx Pintsch lights in cars.

En route to Mexico. Aug 17 - Friday.

Slept fairly well and got up at 6-30. Shortly after we crossed the Arkansas at Little Rock. The river was somewhat in flood and red as I mistook it for the Red River. Later before arriving at Texarkana we crossed the Red River which also was in flood. The water was practically a mud, thick as soup, and a brick red.

In looking at the ground hereabouts (Palestine Texas) the earth is a very brick red for from one to two feet beneath the surface where the color soon changes to the color of the underlying strata. The vegetation is prolific and yet this carbon in no way changes the red color. Becker says that the iron in the ferrous form is only found at the level of permanent water. Here the rocks of a continental deposit are of a green-bluish color. In the upper soil he says are found pyrite and marcasite.

The strata hereabouts are all on end. The country flat to slightly undulating and the forests with considerable long needle firs.

Cotton is much grown with corn about Texarkana.

Iron bearing Lower Cretaceous strata appear S.W. of Texarkana. There is some cross-bedding and the sands give one the idea of Continental deposits.

San Antonia Texas. Saturday Aug. 18.

Arrived on time this morning at 6.30. With Mrs Weed walked up to Mengers Hotel and had breakfast. In front of the square is a Plaza and in the next block to Menger Hotel is the old Alamo. After breakfast walked around and took some pictures returning to the train by 9.30. Wrote cards and these notes and then started at 10.20 for Mexico.

San Antonia is loosely and as a rule badly built but here and there are beautiful buildings facing Plazas and away from the center are some splendid residences. The flora of the town is quite unlike anything north. Bananas, palms, oleanders and other trees and shrubs unlike those of the north. Flowers everywhere.

The population is very mixed. Mexicans and apparently Indians are everywhere. Also a peculiar slender half white type of negroes. Whites of all kinds with many Germans. The latter even reflected in the signs as "Halle der Hermanns-sönne."

Many of the houses are frame. Brick as a rule

of a light yellow color much like the Comanche rocks of this vicinity. Some substantial houses of the Comanche rock roughly faced. The old missions and the Alamo of undressed Comanche and then covered with mortar.

Barber shops, saloons and cheap stores in great evidence.

The white people are very fair, unsunburnt and evidently not the natives.

The topography here about flat.

As we come south to Laredo the country gets slightly more hilly, the forest trees disappear and are shrubs, much mesquite, the leaf cactus (agave) and almost no grass. The flora is totally different. Water is apparently very scarce and near Laredo one sees irrigation works — water is brought in wooden structures from the hills to the east. All in all the country has a desert appearance only there is too much vegetation. A semi-arid region.

At 5 P.M. we cross the Rio Grande. The water flows at the rate of 3 miles per hour or faster is very thick of a color between Kaki and grey. A color I have not seen in water before. Color much lighter than elsewhere. The depression is hardly more than 50 or 75 feet.

Have a sample of the Rio Grande clay from Nuevo Leon.

While the train was checking baggage I ran down to the river and took 2 more river views.

Northern Mexico. Tuesday Aug. 19.

Got up at 7 and what a transformation is now before our eyes. We are (south of Saltillo) in the midst of low very irregular mountains with basin plains between. The flora is that of a semiarid region — low shrubs and thousands upon thousands of "Spanish daggers" one of the yucca group. As we get to Ventura the basin widens out plant life is somewhat scarcer. Here there some cows are seen but more often from 50 to 100 gray-white goats.

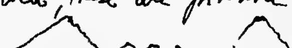
All the morning the clouds are thick, scattering their rains and low broad sun bows.

The cuts north of Catorce to the N. show stratification dipping to the W. If this is true then the ~~[illegible]~~ plain through which the R.R. runs is cut through the apex of the dome.

At Catorce there is a broad intermontane plain some 10 to 15 miles wide. Looks somewhat like Wyoming but there are no sage brushes.

Near the Tropic of Cancer we see several buttes showing to what extent the Mts have been eroded. These still stand up several hundred feet.

On all sides one sees the degrading of the Mts and the grading of the intermontane plains. The conditions here are at hand for the Triassic of Conn. But Unlike there here the ground is greyish white to yellow. There is considerable vegetation and no red soils.

In this region we also see some volcanoes. rising up to 500 feet. They are very recent as they rest on the present topography. Later, these are probably not remnants of degradation  .

The floor of the plain at the surface in places and in others shortly beneath is of the native Cretaceous rock. The mantle is very thin. This is true for the region of Laguna Seca.

Took 12 pictures around San Luis Potosi in a slight rain with some sun. Could see my shadow. One group has Davis and Coleman another Adams and his family and Prof Ries.

South of Potosi the scenery of the north continues. When we get to Obregon there is a very flat valley with grassy ground. trees and...

less cacti. The mountains from Potosi south are all volcanics (of a soft nature) weathering into very fantastic shapes.

Flowers are also more abundant here about Obrajon.

Mexico City [illegible] 20. [illegible]

Arrived on a cloudy and [illegible] morning on time in the [illegible] at 6.30. [illegible] [illegible] Cathedral [illegible] [illegible] [illegible] and at [illegible] we started [illegible] [illegible] [illegible]

[illegible] after leaving Mexico on the Interoceanica at 8 a.m. we see several smaller volcanoes to the South [illegible] [illegible]. All of these volcanoes [illegible] [illegible] lie on a well defined fault line. These volcanoes [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] mostly.

[illegible] [illegible] [illegible] [illegible] X [illegible] [illegible] [illegible] described by Prescott. [illegible]

with [illegible] [illegible]

Malebec [illegible]

[illegible] [illegible] [illegible] in the [illegible]

we see [illegible] [illegible]

[illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible] [illegible]

At a [illegible] [illegible] previous [illegible]

[illegible]

Condition

of a [illegible]

[illegible] [illegible] [illegible] years.

[illegible] tall [illegible] in [illegible] ameter,
[illegible] 2300 meter, [illegible]
[illegible] Ixtacc[illegible]. [illegible]
for the [illegible]
[illegible] in the [illegible] general [illegible] in
every way [illegible] the [illegible] as the Rockies [illegible] among
the [illegible] [illegible] and [illegible]
[illegible] ld [illegible]
[illegible] between [illegible], and
[illegible]

[illegible]

[illegible] and [illegible]

[illegible]

[illegible] Cholula [illegible]
[illegible]
[illegible]

[illegible] 12 P.M.
[illegible]

[illegible] the [illegible] place [illegible]
[illegible] the [illegible]
[illegible] to
[illegible]
[illegible] the [illegible]
[illegible] the [illegible]
[illegible]

[illegible] type. Fine wines are served, [illegible] [illegible] on [illegible].

At 5 we return to the station and start away for ~~[illegible]~~ Tehuacan.

[illegible] missed seeing [illegible]
It is evidently one of the best [illegible]
[illegible] and it [illegible]
[illegible] ^as we drove along in [illegible] windows [illegible]
[illegible]
[illegible] windows and
porch [illegible]
[illegible]
limestone [illegible]
[illegible]
are [illegible]
[illegible]

The scenery seen today has been of the [illegible] type but we are rushing through the [illegible] too fast to [illegible] the meaning [illegible] are [illegible] grandeur. Everywhere we see Maguey [illegible] and [illegible] purposes showing to what extent these [illegible] are [illegible] in Mexico. [illegible] says the yield is about [illegible] 7^{00} [illegible] the labor costs about 1^{00}. It is one of the [illegible]

crops.

After leaving Puebla [illegible] oat and Indian corn covers the valley from there to Tehuacan. It is a surprise [illegible] to see the [illegible] of the plain upon which seem to lie the volcanos.

A great deal of work in the way of drainage and irrigation ditches has been done. The descendants of the Aztecs however lead the simplest of lives.

[illegible] in this [illegible] much larger than any [illegible] seen in Mexico, equal to our western [illegible] cattle.

We are stopping at Hotel [illegible] and [illegible] [illegible]

[illegible] on the [illegible] was interesting because it brought out all the [illegible] classes.

Tehuacan Tuesday August 21.

Had a good night at Hotel [illegible] and was up at 5.30. Had breakfast at 6.30 and left the station in our special train at 7 [illegible]

Tehuacan is one of the [illegible] towns built of [illegible] [illegible] so [illegible] [illegible] the [illegible] [illegible]

Even the mechanics on the street are [illegible]

The valley at Tehuacan is very wide and less flat than that to the north. Looking west from the station one sees again strata apparently horizontal of a yellowish color. The rocks stand out in bold cliffs but the hill outlines are [illegible] unequal and jagged.

Had a talk with Ordoñez and learned the following. The valley of Tehuacan is large and [illegible] nearly horizontal strata (Conglomerate with [illegible] [illegible] [illegible]) [illegible]. The age is not younger than Miocene. [illegible] To the west are the Cretaceous. The valley was produced by faulting, the faults [illegible] rock, In some places the Tertiary rests on the Cretaceous. Upon the Archean normally rests the Cretaceous, In other words at the close of the ? [illegible] the present mountains were [illegible] at the start much higher than [illegible] for they [illegible] meters of [illegible]. The age [illegible] strata [illegible]. [illegible] of this erosion the valley of Tehuacan was formed and eroded down to the Archean. Beginning with the Miocene the valley of Tehuacan [illegible] its eroded material and have again

been [illegible] since then [illegible] present [illegible].
The Tertiary here is a [illegible] deposit. A sandstone.

In this valley we seen some [illegible] [illegible] palms 18 inches thick and 60 feet tall.

[illegible] day [illegible] cloudy and [illegible] cool.

[illegible]

As [illegible] the fault on the east is not clear [illegible] [illegible] the [illegible] in contact. [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] [illegible]

Ordonez interpretation of Tehuacan valley and great western fault.

New cacti appear and agriculturally are as common.

The Archean [illegible] the highest [illegible] Mexico reaching [illegible] of 2000 meters. Above the valley we are at about 900 to 1000 meters. It is [illegible] season now [illegible] tropical plants.

The [illegible] Tertiary are conglomerates and [illegible] are [illegible] ~~[illegible]~~ ~~[illegible]~~ Rio Salado

At kilometer 20 [illegible] Tertiary conglomerates [illegible] of [illegible] age. The conglomerates [illegible] angular [illegible] and the [illegible] the [illegible] is [illegible] and [illegible] the Cret. very [illegible] tonnetrid [illegible] conditions [illegible] . Also conglomerate samples (3)

The Tertiary is composed of [illegible] and the bedding not being [illegible] [illegible]. [illegible] erosion [illegible] [illegible] followed by [illegible] and more rolled [illegible] [illegible] boulders [illegible].

The [illegible] Tertiary [illegible] are mainly sandstones and [illegible] [illegible] [illegible] color. [illegible]

[illegible]

We go down [illegible] [illegible] Rio Salado [illegible] 530 meters above the sea and then rise in another [illegible] the Rio Grande [illegible] [illegible] [illegible]. [illegible] [illegible] [illegible].

"Here is a curious [illegible] [illegible] we have been riding [illegible] [illegible] [illegible] [illegible] the [illegible], the train [illegible] [illegible] a cutting, across a bridge, and [illegible] [illegible] [illegible] but the waters are running [illegible] the north. There are two rivers; the one running south is the Rio Salado, the other, the Rio Grande."

A [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] Grande [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] ridge [illegible] [illegible] [illegible] [illegible] Cretaceous [illegible] [illegible] [illegible] [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] deposits [illegible] [illegible] [illegible] [illegible].

Had a talk with Sidney about the [illegible] of Mexico. He [illegible] that [illegible] are not
[illegible] geologically. The [illegible] of [illegible] was in
long and continuous elevation, [illegible] and [illegible]
elevation. It was a [illegible] of [illegible] [illegible] upon
which the sea [illegible] [illegible] with [illegible]
from his remarks [illegible] [illegible] [illegible] across the
Cit Tecuantepec [illegible] [illegible] [illegible]
but farther north [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] and [illegible]
to the view [illegible] [illegible] [illegible]
North and [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] include
the ~~[illegible]~~ Antilles. The [illegible] of [illegible] is
very suggestive. [illegible] [illegible] [illegible] into
[illegible] [illegible] [illegible] [illegible] Mexican [illegible]
and seen [illegible] [illegible] [illegible] geological [illegible]
[illegible]cally.

A few miles north of [illegible] station a [illegible]
from [illegible] [illegible] [illegible] [illegible] cretaceous are
the [illegible] [illegible] [illegible]. [illegible] [illegible]
[illegible] [illegible]. [illegible] [illegible]
[illegible] [illegible]

[illegible] [illegible] [illegible] [illegible]

General de Lamothe.
A. Offret. Univ. of Lyon. A great collector.
Mrs Bode
J. B. Aguilera, wife and son
E. Ordonez & wife.
M Shepard wife and daughter
Le Conte François Matuschka & wife
José Romero,
C. Reinert of the Oaxaca [illegible]
On the summit [illegible] great
vein of the [illegible] of Oaxaca.
At [illegible] we are received by [illegible]
and [illegible] hundreds of [illegible]
[illegible]
[illegible] They were [illegible] onyx [illegible]
and the [illegible]
Ordonez [illegible] have [illegible]
The Onyx [illegible]
C. Reinert is interested in these mines.
[illegible]
We had [illegible] ourselves [illegible] at
[illegible] Mr. Ames [illegible]
[illegible] Oaxaca
valley is a small narrow one [illegible]
[illegible] as [illegible]

At 6.30 we arrive at Lanaea and are received by a deputation of citizens. After the [illegible] of the band and reception [illegible] we start away from the station in cruise [illegible] [illegible] cars for the [illegible]. Had a shave and then dinner with Kielhack, Niemann and Oxford. Then to the [illegible] to hear the serenade in our honor. While there we see the decoration of two Lanaeans [illegible] for our reception the [illegible] evening.

[illegible] in the last day [illegible] Oxford. We returned to [illegible] the [illegible] [illegible]!

Lanaea Aug 22nd Wednesday.

[illegible] fast with [illegible]. [illegible]

[illegible] and [illegible] [illegible] along [illegible] [illegible]

The [illegible] [illegible] are [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] fine [illegible] teeth. They are very [illegible] natures [illegible] [illegible] and [illegible] but little. [illegible] and [illegible] [illegible] [illegible] [illegible] cents [illegible] [illegible] [illegible].

The better classes can not be seen [illegible] & [illegible] the visitors are afoot with [illegible] [illegible] and make considerable noise. The stores besides the native [illegible] do not [illegible] [illegible] and [illegible] [illegible]. There is nothing here of a very [illegible] nature unless it be the [illegible].

At 9.30 we go to the [illegible] to be [illegible] and [illegible] [illegible] and [illegible] school of Science. Here are shown us a [illegible] collection [illegible] rather [illegible] [illegible].

At 12.30 we start away for [illegible]. We go a short distance by mule car to a narrow gauge road that [illegible] [illegible] [illegible] Tehuantepec. We go [illegible] the car and [illegible] [illegible] at Tule. Here we go into the [illegible] and see the great tree [illegible] [illegible]. On this tree on [illegible] [illegible] part can be seen the great name of [illegible] [illegible] [illegible] have been [illegible] by [illegible] [illegible] [illegible] here. It certainly is the most wonderful tree I have seen. It looks like of several trees [illegible] [illegible] together but it is said to be but one tree.

At Tule we take [illegible] [illegible] carriages and start away over the country road to Mitla

The start is made [illegible] road [illegible] but a short distance out we find the roads very heavy and bad. Before long some [illegible] are broken out again [illegible], while the carriage and the [illegible] ready at [illegible] - [illegible] and Dahnall - walk ~~out the [illegible] out of the [illegible]~~ [illegible] of the rock ~~[illegible]~~ down [illegible] Tlacotula. [illegible] some [illegible] which caused the the [illegible] [illegible] road. [illegible] [illegible] one of the [illegible] rolled out all of the [illegible] and in ~~out~~ the face [illegible] upon [illegible] and for a moment seemed to be crushing the [illegible]. However all came out well. At Tlacotula [illegible] were [illegible] and we depart [illegible].

Arriving at [illegible] at [illegible] in the dark. I slept in the [illegible], Cummins and [illegible]. [illegible] at 10.

On [illegible] the [illegible] man Paul [illegible] of the [illegible] Herald.

Mitla. Tuesday Aug 23d.

Got up at 5.45 and had breakfast at 6.15. Before 7 we start out with Prof. Seler for the ruins of Mitla. What is left shows that the people that built these palaces had [illegible] skill in handling [illegible] sizes up to pieces 20 feet long, 3 feet high and 5 feet across! The ornamentation is one of small cut stones arranged like mosaic. Over the doors [illegible] the wall was covered [illegible] the [illegible]. On [illegible] the inside [illegible] a running line of pictures in outline without shading!

To produce good prints [illegible] much traveled [illegible] by visitors [illegible] they are [illegible] [illegible] one [illegible] like [illegible]

The ornamentation [illegible] to the [illegible]. These monoliths [illegible] 10 to 12 feet long but are [illegible] by the [illegible] stones of the [illegible] walls.

The walls in places must have been 10 or more feet thick. The [illegible] are faced with cut stones between which are laid the [illegible]

stones found loose in the valley with the interstices filled in with adobe apparently also with a binding material.

The first [illegible] was built, the lower courses stones laid [illegible] adobe and at certain levels a new [illegible] was made with [illegible]. Rows of stones and adobe were laid one on the [illegible] are well leveled and straight. They were [illegible] two ways but [illegible] were [illegible].

[illegible] a 'trail' was made of adobe and [illegible] on [illegible]. This is different construction from the other [illegible] walls.

[illegible] building upon one of the fire [illegible] and most of the [illegible] taken out [illegible]. [illegible] coming upon [illegible] church.

[illegible] we have [illegible] all [illegible] in one [illegible] of the [illegible] Table of [illegible] and our [illegible] Grand of [illegible]

The [illegible]

a narrow valley and all [illegible] the village is

bounded by rocks. Through the center runs a small dirty mountain stream.

The workmanship preserved in the ruins show that these little [illegible] had to do things worse. [illegible] thought their tools were of stone and if this is true their art is all the more wonderful. The stone joints are at close but not necessarily regular. On the sides of the large blocks at the bottom are large places [illegible] used [illegible] those [illegible] to move the stone [illegible]. Because of this they needed [illegible] to handle the method one.

In the center of the temples are large rooms bounded by an outer fringe of smaller rooms. All are [illegible] [illegible] the prince. The cross + is present in [illegible] designs.

The [illegible] [illegible] behind and between the open space [illegible] with little [illegible] and [illegible] some [illegible] sand [illegible]. [illegible] is [illegible] the [illegible] cut the stones. The [illegible] walls [illegible] have little scratchings as if the stones had all been rubbed with [illegible]

[illegible] French [illegible] a [illegible] was [illegible]

[illegible]

[illegible] Atena [illegible]

[illegible] after [illegible]

[illegible]

The hotel proprietor is an American and [illegible]

Oaxaca [illegible]

[illegible] to start for [illegible].

Had breakfast [illegible].

[illegible]

[illegible] in the course of time [illegible]

[illegible] little [illegible]

[illegible] churches [illegible]

We arrived [illegible]

[illegible] entertain [illegible]

[illegible]

[illegible]

champagne. See souvenir card
Was told that this dinner last night of the palace of the Governor of Oaxaca cost per plate $35.00.
Arrived at Tehuacan at 3. Had dinner at the Governor's house and left for Zapotitlan at 5.30. Arrived after a long night carriage ride at Zapotitlan [illegible] music and fireworks at 10.30. Had supper from 11.30 to 12.15 a.m. then retired.
[illegible] with Aguilera he told me the valley of Tehuacan had beneath the [illegible] a thick layer of [illegible] and then sandstone [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] Over these [illegible] the [illegible] Tertiary seen [illegible] along both sides of the valley and [illegible] sand [illegible] at least 1000 meters thick. On the west [illegible] [illegible] in the middle [illegible] and on the east [illegible] [illegible]. [illegible] a fault with a throw of about 300 meters.
The Cretaceous [illegible] lies in [illegible] folds.
Against the [illegible] of the Pacific has been [illegible] the [illegible] [illegible] [illegible]. The general [illegible] in Oaxaca is [illegible] of [illegible] [illegible].

Zapotitlan. Saturday Aug 25.

Started [illegible] [illegible] [illegible] in [illegible] San Juan Raya in wagons. [illegible] [illegible] [illegible] [illegible] and then on horse [illegible] three miles [illegible]. Here we collected some [illegible] [illegible] [illegible] beds, and [illegible] [illegible] [illegible] [illegible] [illegible] any of the [illegible] in the Glauconia beds.

[illegible] a [illegible] [illegible] with [illegible] [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] give [illegible] [illegible] [illegible] [illegible] [illegible].

Returned to Zapotitlan [illegible] 2 o.

[illegible] [illegible] [illegible]

The distance between Tehuacan and Zapotitlan is 26½ kilometres. From the latter place to San Juan Raya is [illegible] 8 to 10 kilometres farther.

San Antonio is the place [illegible] [illegible] [illegible] salt is made. Some [illegible] [illegible] [illegible] [illegible] [illegible] not well [illegible]. Aguilera thinks the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] acid [illegible]. [illegible] [illegible] [illegible] [illegible] on this [illegible].

One of the Cretaceous deposits is a salt bearing [illegible] and it is [illegible] [illegible] [illegible] that the [illegible] [illegible] is charged with salt. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

the roads of the natives [illegible] made on the mountain side and [illegible], [illegible] says the most primitive way [illegible] is [illegible] in use. I have a film [illegible] of this [illegible].

Another film is between [illegible] and San Juan [illegible] and [illegible] San [illegible].

Tehuacan Sunday. Aug 26.

Slept exceedingly tired and rose at 6. Started on our journey [illegible] Coxcatlan to Tehuacan at [illegible] and arrived at 11. Took many pictures [illegible] and [illegible] San [illegible].

The [illegible] gave us a [illegible] view of the [illegible]. [illegible] all [illegible] north of the valley. [illegible] much [illegible] [illegible] [illegible] of the [illegible].

Aguilera says the [illegible]

as an anchor was found 150 meters landward from the present shore at ? Santa Cruz while on the Pacific the land is sinking for here in one of the towns the custome house built about 50 years ago is now useless and stands in the sea.

The Peru tree which one sees [illegible] was introduced by one of the missionaries [illegible] the seeds [illegible] the [illegible] as the trees [illegible] the plants are [illegible] generally distributed.

Looking at the tall single cactus stems [illegible] I saw attached to them many parasitic plants if not [illegible] These are nearly always [illegible] of the cactus.

It is astonishing to see an [illegible] to see but a few small [illegible] lose [illegible] on the [illegible] and [illegible] so much water [illegible] the [illegible] the [illegible] even the [illegible] [illegible] their [illegible] [illegible].

Just east of San Antonio we had a fine view of snow top Orizaba. This volcano reminds much in its form of Fuji. Later in

afternoon we had another grand view.

Left Tehuacan on our special train and arrived at Puebla before 5 P.M. We then walked around Puebla, had supper, listened to the band on the Plaza and retired on our sleepers at 10.30.

Mexico Aug. 27. Monday.

Our small party of Mr. Mrs. and young Aguilera, Mrs Shepard and daughter, Dr. Cummins, Keilhack, Belgrand, Schenck, Jaha, Romero, La Magan and myself arrived here at 7 A.M.

Came to Kingman (Guardiola) Hotel and took a room for the remainder of my stay. Then cleaned up, unpacked, and sent films (8) to Phil along with 6 page letter.

After lunch spent most of the afternoon selecting 5x7 photos of Mexican scenery made by C. B. Waite, San Juan de Letran, No 3. He has about 2000 Mexican views at $3 Mex. per doz. I also ordered 20 slides, and one large view of Colima in action.

Then walked around the city for an hour. The new Post Office is first class, well built and up to date. The general plan is American but strongly changed to fit Mexican ideas. Then up to the Cathedral and the Palace over the site of Montezumas Palace and the Theocali.

Brochianites or [illegible]anites, Polyptychites, [illegible], many Beeny [illegible] [illegible],
Zone of Parahoplites = either Aptian or Gault.

Upper Trias of Zacatecas. See Burckhardt Bulletin 21.

San Juan Raya fauna. Eocretaceous. Small . . . oyster Q. aculeicosta most [illegible]
Cryptocrenellia [illegible]
Glauconia bustamanti the small one with [illegible].
The [illegible] other one [illegible] [illegible] C. subimbricata [illegible].
Pseudoveliodema (Diplopodia) [illegible] and galeottei [illegible]
Brongniart. Trigonia plicatocostata [illegible]
& galeottei, Caprinina lawrenciovi [illegible]
the [illegible] [illegible].
The Glauconia will have [illegible] identified [illegible] [illegible].

[illegible] and Coralliochama fauna of Bose in correlation with Lower Cenomanian. From San Luis Potosi, and Tamps. Also has [illegible], [illegible]

Turritella [illegible] [illegible], [illegible] [illegible]
Ostrea. Bryphaea vesicularis,
From the [illegible] [illegible] [illegible]
[illegible] Dall, [illegible] [illegible], [illegible]
[illegible], A. [illegible] [illegible], [illegible]
[illegible] [illegible].

[illegible]

In the [illegible] [illegible]. [illegible]
District de Bearn. = Cenomanian Lutetian.
[illegible] among [illegible] [illegible] [illegible] [illegible],
and a number of other [illegible].
These are all [illegible] [illegible].
[illegible] [illegible] = [illegible].
[illegible] of [illegible] [illegible], [illegible]
of [illegible] [illegible], ~~[illegible]~~

[illegible] [illegible] [illegible] [illegible], [illegible]
[illegible], [illegible], [illegible] [illegible] [illegible]
[illegible] quadribifurcata, [illegible] [illegible] [illegible]
[illegible], [illegible] [illegible]

walked out to the Geological Institute and there met first Dr. Burckhardt, then Aguilera and Dr. Böse. The two younger men took me into the exhibition room of fossils and explained to me the collections.

Dr. Burckhardt showed me the only marine Triassic fauna so far worked out or may be discovered. It consists entirely of Paleconcha, a new genus of pelecypod Cassianella and an ammonite (see the Bulletin to be presented to me). The Cassianella in general form and especially in preservation look like Colony fossils. If it were not for the ammonite one would have called this fauna Devonian. The locality is Jacatecas which we will visit on our northern excursion.

Then I was shown the Upper Jurassic faunas. These go with out break into the Cretaceous. Nearly all the correlations with Europe are based on Ammonites and both Burckhardt and Böse said that unless these fossils are present no reliable correlations can be made.

Then both gentlemen let loose on Stanton's

work and especially Böse in regard to Stanton's so-called ungentlemanly attack this work. The sum and substance of their arguments is this:-

Stanton is not at all acquainted with the European literature and also does not know the actual guide fossils of the various divisions. Then too his species are too lumpy making it impossible for him to discern the smaller divisions. He also follows Hill too closely whose work is not regarded as of much value. Hill and Stanton's Lower Cretaceous is Middle Cretaceous. Cragin's Jurassic contains Jura but mostly Lower Cretaceous. This work they also regard as very poor.

Whitfield's New Jersey work Böse labeled as the work of a crazy man.

Dr. White's work they regarded as the best and said that he knew the European equivalents.

Gabb's work is only fair. Roemer's course includes various things in his correlations.

It is quite evident that the members of the Mexican Survey do not regard our

American Mesozoic work as good and all must be taken with much allowance. This because our men are unfamiliar with the European faunas and are not conversant with the foreign languages. This Böse said was very evident from his criticisms of this work by Stanton.

It seems to me that in the end the work [illegible] will prove to be more correct than now seems possible. The American workers probably pay too little attention to European faunas and as Doctors Böse and Burckhardt are trained European men they see the Mexican fossils too much through german glasses. The actual difficulty however I look for in the more complete Upper Jurassic and older Cretaceous sections of Mexico and the very incomplete ones of the same time in the United States.

If these surmises are correct it will prove that possibly in Texas there is some Jurassic and that all or nearly all of our Lower Cretaceous is Middle Cretaceous according to the European standard. Accepting these correlations it seems that all of our

Como beds must come up into the Lower Cretaceous of the European standards. These are differences of vast importance and must be carefully looked into. Stanton must do this work soon. A letter from Stanton does not seem to bear to end conclusions.

Böse also thinks that Stantons Texas Knoxville faunas need revision and that his correlations are bad. I tried to show that the Pacific faunas must be held apart from the Interior faunas.

It is right here that I think the Mexican work fails in not distinguishing provincial faunas. I could not learn from either Böse or Burckhardt that the Mexican faunas were other than a jumble of European, Mediterranean and even Asiatic faunas. This must be on the basis of Ammonites. Is it possible that too much value has been given the Ammonites. In this connection I ought to look carefully into the recent work of Boetling on the development of one of the youngest Cretaceous Ammonites.

Mexico City Wednesday Aug 29-1906.

In the National Museum in the Palace is one of the largest collections of monstrosities of sheep, calves etc. A peculiar exhibit to show the public. Also skeletons human beings, two grown together and all other human monstrosities.

The God of Air is illustrated here by many examples of roughly cut and polished examples of the rattle-snake. The scales are usually sculptured as feathers. The Christians often took these emblems and used them for holy water urns. Usually they are a coil in a plane or elevated and rarely standing holding at the top a skull. Some have well carved heads showing the fangs and even the split tongue. Many of these were found in the city of Mexico.

The "Cruz del Palenque" found in Chiapas has standing to the left of the cross a figure that in every way reminds of Egyptian figures.

Some of the smaller statues were painted and even inlaid with precious stones. These are of the Popoloca people.

The great snake monument with dead heads of which a cast is in the U.S. Nat. Mus. is a wonderful piece of stone carving.

The "Obelisca de la ribera sur del ~~Rio~~ Papaloopan" of Vera Cruz again shows Egyptian carving.

The Aztecs were acquainted with the dog or the Coyote or wolf as there are figures of them in the collection.

So often the gods carvings show open hands just as one sees them in Buddhistic gods. This must have a connection with the east.

The great Calendar stone is a wonderful carving and a great stone. It is at least 3' thick and about 18' in diameter. Originally the outer surface was still larger.

The Archeological Collections are grand but poorly shown. This is not so true of the large stones and monoliths but even a better installation is possible. The smaller things are shown in deep cases without any regular order and the glass constantly interferes.

This afternoon I walked from the Hotel to Chapultapec castle and back. This walk was down P.-F. through the "Paseo de la Reforma" one of the widest and some day to be finest of any Avenue. Many new houses of the wealthy (Americans) are now going up on this fine avenue but towards the castle for a long distance there are no houses nor are the sides of the street finished. At the head of the avenue stands a monument of Charles IV, in the first circle one of Cuauhtemoc the Aztec king following Montezuma and who resisted Cortez. In the next circle there is a tall stone shaft but lacking for another monument and then comes the smaller hill with the castle of Chapultapec on top. The parks all around are very fine, trees in such abundance to lead one to believe himself in some other country than elevated Mexico.

The lake at the base of the castle is being extended, the dredging being done in the old primitive way all the dirt being carried away in baskets on the backs of the natives with a strap across the forehead. I have two photos of this. The dirt

in a lake much fortified the former extension of Lake Texcoco.

At the base of the castle there is also a botanical garden but it can hardly be called one. Worthy varieties of pigeons, chickens, dogs and but few of the wild animals. Nor are they in interesting enclosures.

Several times during the afternoon I had splendid views of the two volcanoes. The one nearest in the views is Ixtaccihuatl with its long drawn out horizontally top and further away to the right Popocatepetl. These are majestic mountains and give character to the Paseo de la Reforma as no other avenue has.

All in all the afternoon was a grand one.

Mexico City Aug. 30 Thursday

Got up very tired and felt bad all day. My head is light and occasionally my heart flutters a little. Spent the morning at the National Museum and looked over the Archeological material. The great potters and idol makers seem to have been the Mixtecs people.

The ancient gold ornaments in this museum is almost nil in fact we have from Panama at least three times as much as is here shown.

While the Archeological Collections are good yet one expects a great deal more than is here shown. One wonders what became of all the carved stones in the temples or much of which was thrown by Cortez into the lake. Some has gone into the churches but from the very fact that some of the best things are now turning up in the street digging shows that much more must be recovered when more digging are made about the Plaza de la Constitucion.

Late in the afternoon rode in the cars towards Tacubaya and on the return stopped at the Chapultepec restaurant. While here heard a good National band and observed the fashionable

carriages, the occupants very largely being ladies. Ce fur of the poor natives are armed to see the show. One is impressed here as elsewhere that the wealthy are the only ones to consider as long as things go. The great contrast in Mexico is remarkable and rarely does one see a well dressed native Indian. The middle ground seem to be mixed people - Indian and Spanish.

Outside of the scientific side of Mexico I do not care much for my surroundings. On one side it is abject poverty, dirt, disease and cripples, and on the other in a small minority it is ease and lofty assumption. Oh when will this world look more after the dirty, ignorant masses, the workers and producers of the community. Every I do not care to come into contact with these poor for on so many one sees skin diseases, sore eyes and worse.

Mexico City Aug. 31 Friday

Got up early to go to Popo Ranch near Amecameca at the base of Popocatepetl. In the party in Tietze, Credner, Keilhack, Scherell, Juber, Meijard and myself. Several times along the track we got views of the two Mts and especially of the White Woman.

Shortly after leaving the city we pass through the flat country once Lake Texcoco. Even now in the wet season there is a little of the lake and in places men are netting for fishes.

This lake in Montezumas time must have been a very shallow lake the lowest part of the plain and consistently removed from the volcanic ridges. In looking about one sees an almost flat plain until within the vicinity of the Mts when the ~~ground~~ plain is seen to rise and then latter rapidly into the Mts. In other words the valleys of Mexico are the infillings between the Mts. In one place salt pits could be seen along the shallow margin of the lake.

All along the track to Amecameca to the southeast one sees small and large volcanoes, small isolated ones to those in ridges and finally to the White Woman and Popo.

Our stay at Popo Park did not permit of our seeing clearly the great volcanoes. I could take no pictures. Popo Park is now building as a Summer Resort. Evidently by an American. It is about 8.600 feet high.

Later in the day it rained some and obscured the two peaks and we saw no more of them. All five walked to Amecameca 8 Kil. or 5 miles. We would have done better had we got off at Amecameca and looked around there.

Near Amecameca the railroad cuts through a hill evidently of loess. It stands in the cut vertically and in places has many small pebbles of to 1/4 inch. Evidently an aeolian formation and if not this then in connection with lake conditions.

Mexico City Sep 1. Saturday.

Called at the Geological Institute and met many of the members back from the Jorullo and Colima trip.

In the afternoon with Cleland visited the Chapultapec gardens.

In the evening had dinner at Maison Doré with Mr. and Mrs. Storey, Miss Bascom and Cleland. Then packed up for the Vera Cruz excursion starting tomorrow.

Vera Cruz trip. Sunday Sep. 2.

The [illegible] about 80 persons started away from [illegible] at 8 A.M. All [illegible] volcanoes, cinder cones and [illegible] hills. [illegible] are [illegible] dark [illegible] Malinche, [illegible] volcano [illegible] seen due [illegible] trees, but after [illegible] Malinche are occasionally [illegible] (pieges [illegible]) this [illegible] are [illegible] dunes, the [illegible] [illegible]

By 10 A.M the [illegible] clouds [illegible] it looks much like rain for [illegible] afternoon.

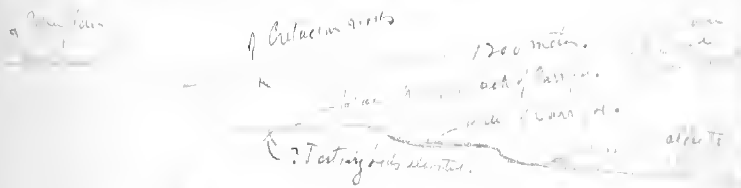
[illegible] many miles one sees the very high [illegible] mountains, some of [illegible] must stand up at least 4000 [illegible] above [illegible] of Carr[illegible] between them [illegible] County.

The [illegible] rising into [illegible] higher ground

[illegible]

for 2 [illegible]

[illegible]



[illegible] on edge. [illegible] Cretaceous [illegible]

[illegible]

At six the train goes to Vera Cruz. Banquet. Leave for Orizaba at midnight.

Orizaba, Tuesday Sep. 4 1906

After breakfast we felt out two small quarries in the Cretaceous limestone. Rocks nearly on end. These are the Escamella quarries. Have two polished slabs and one etched slab. Took a number of pictures looking south to the hills south of Orizaba. All the hills here about are of Orizaba Cretaceous, standing nearly on edge. In these hills ... around the Orizaba valley ... the village ... Nogales ... many ... are ... all ... Orizaba ... the volcanoes ...

faults ... when the ...

... volcanic tuffs ...

... to take ... Orizaba ...

a "little hell" ravine
the time and finally we enter "Infernillo", ^ deep below our train we see the very vertical, folded and crushed Cretaceous strata and shortly after volcanics in the cuts. We pass up this widening valley, keeping to the right and reaching near to its head we turn and rise returning on the other side, constantly rising. Finally we reach the upper level at Esperanza where we have supper.

As Orizaba is 4028 feet and Esperanza at 8,043 (Mexico City is 7,849) we have risen in about two hours the riding of 4000 feet ^ in 29 miles. This may be called the eroded Cretaceous slope over all parts of the sides of valley may be seen volcanic rocks with the ash and apparently and filling up. Beneath this eroded Cretaceous slope lies another the Tertiary eroded slope and then a slow descent to the Carribean.

I was told the grade of the road (standard gauge) is 4.0/0.

See Campbells guide p 283-288.

form. The fossils are mostly European. Plaving of Quartz. The native vegetable material is good so far as it goes but is only the merest beginning. The lectures to students are given in the rooms having the collections.

The Mineria building has settled very much very noticeable on the outside and when walking on the inside one feels constantly like walking down and up hill. In its way it is splendid building but like all the great buildings of Mexico City built of a rather hideous [illegible]. The consequence is that the joints are always sunken, projections break away and are in the course of time re-supplied by stucco or plaster.

Later looked over the Gallery of Fine Arts with Dr. Kramer of St Louis. Nearly all the paintings are religious, some very good and many only "fair" of form. The modern work is also largely religious. There is one piece by Murillo not in good preservation and not very impressive. I think all the painters are Mexican artists.

Remained in the hotel all the afternoon. In the evening took in the dinner at the [illegible] restaurant. Here we paid for our meal. [illegible] [illegible] Drums

Bancroft, Mr. [illegible] [illegible], [illegible] [illegible] Henry, Lawson, and Dr Tressider [illegible] one of [illegible] men to begin work on the [illegible] of [illegible] of Mexico.
I heard that [illegible] [illegible] [illegible] the survey and [illegible] [illegible] [illegible] [illegible] seems an [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] his [illegible] [illegible] [illegible] [illegible] Spanish, indian and negro blood.
Saw Toshimasako at the [illegible] He was [illegible] considerate and [illegible] [illegible] [illegible] as he [illegible] [illegible] [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

Mexico City [illegible] [illegible]
At a little before eleven in the morning I went to the School of Mines to take part in the [illegible] exercises of the Tenth International [illegible] [illegible] held in the "Salon de Actos".
The great square and [illegible] [illegible] was [illegible] [illegible] [illegible] [illegible] and outside [illegible] [illegible] along all the [illegible] [illegible] were [illegible] [illegible] soldiers of the army of Mexico. We took our places [illegible] [illegible] [illegible]

tent and chairs and at about eleven the hall was filled seating probably more than 1500 people.
On the elevated platform to our left were seated the various Ministers of foreign countries while on the right were the officers of Mexico and the Tenth Geological Congress. Directly in the center back in a large table was seated President Diaz in a black frock albert.
At a little after eleven we heard bugle calls and immediately in comes the President. All rise and remain standing. The President walks in first with some one on his left, and bows a few times to the right and left but never a deep bow. As he passes me I see in him a man by no means old and powerful. He has a ruddy face, large head, rather long up and down and square throughout. His eyes are keen, snappy and fierce. His mouth is large and firm with a tremendous lower full lower jaw. On his right and left are seated three gentlemen, one a general in full uniform.
The President looks around but a moment and begins in a golden top bell. He presses the top and at once three entrances to the speaking

full, a sort of cage, the Director de la Escuela Nacional de Ingenieros Don Luis Salazar. His impromptu address in very strong and somewhat nervously delivered. He is followed by a tall handsome man, the Honorary President of the Congress Don Andrés Aldasoro, Subsecretario de Fomento, he reads his address of welcome rather rapidly but well and somewhat long. Then Carlos Emilio Tietze the president of the last Congress, who in a very easy manner delivers off hand in french a short and this said a fitting address. It took unanimously [illegible] applause. Then the first secretary Carl Wiman announced in french a [illegible] when he was followed by the President Aguilera. He read his remarks well but was [illegible] or [illegible]. Then came the handsome man [illegible] described because [illegible] the secretary [illegible] Ordonez. We had not been assigned [illegible] the [illegible] but stood all through the proceedings on the floor leaning against the wall. When the hall was [illegible]

6

the President 6' 2" handsome ~~[illegible]~~ erect and
defiant Ordinez had reached his turn. He
read his speech and, from the stand point
of the orator was the best speaker of the
day. He was all grace and attracted the
attention of the President and some comment
on him was found among those assisting the
President. When finished he received an
applause only second to that of Tietze and
what is more was thought much to be applauding
before he spoke. He deserved it all and
I hope it was a lesson to those that are
kicking him on hand and hope to kick him
out of the [illegible].

The President then arose and had the
Congress opened in less than twenty words. All
stood while he spoke and as he finished he at
once began [illegible] cheering outside, the [illegible] and
in the distance again sounded the bugle
call.

The ceremony was all over by twelve and
we walked away between the soldiers ~~[illegible]~~
presenting arms.

Porfirio Diaz is the man of iron and

iron. The destiny of Mexico rests lightly on her shoulders.

In the afternoon took an automobile ride with Mr & Mrs Storey, [illegible], Cleland and two gentlemen of the [illegible]. Later called at the [illegible] [illegible], received some mail, invitations and a geological map of North America.

[illegible] attended [illegible] [illegible] [illegible]
[illegible] [illegible]
[illegible] the Congress. [illegible] [illegible]
[illegible] and there was plenty of punch, rum and champagne

Mexico Friday Sep. 7 - 1906
Nothing doing today by the Congress other than sight seeing about the city. Therefore got up late and then packed my box of fossils. Later purchased more drawn work this time to the extent of $31.00.

In the afternoon took the cars to Guadalupe about 30 minutes out from Mexico. The town lies at the base of the volcanic hills. The most interesting places are the large church built of rock and the cemetery back of it on the hills. From here one gets a good idea of the valley of Mexico. In all directions can be seen volcanic hills and volcanoes. Between lies the [illegible] of Mexico and in various places at this time of the year can be seen lakes most of which dry up after the [illegible] season is over.

About five o'clock had a splendid [illegible] view of the great volcanoes to the south east. In the west it was raining but in the east the sun reflected against the [illegible] volcanoes. The snow crowned tops shone out like brilliants [illegible] cumulus clouds. It was a grand sight. I tried to photograph them all though they stood [illegible]

the higher sky yet I could not see them in my camera finder.

Mexico Saturday Sep. 8 - 1906.

Walked out to the Geological Institute. The reading of papers began at 10 and continued to 12.

The ~~first~~ second paper was by Prof. David on the glacial formations of the Cambrian and Permo-Carboniferous. It was very interesting but he consumed entirely too much time.

The Cambrian of Australia is best seen in the region of Adelaide. Here the Permo-Carb. beds rest directly on the Olenellus - Archaeocyathus beds of the Lower Cambrian. Conformably beneath comes in a great tilly series of beds 1000 feet thick. The Cambrian is found in the central region of the north coast extending nearly half way inland but to the S. W. Cambrian area extends north-east from the south central coast and it is here that the glacial formations are found.

On a Mercator map of the world he gave the

distribution of Cambrian glacial deposits. The oldest record is at the top of Norway. The record is 20 years old but because no fossils occur nearby to prove the age certainly, although thought to be Cambrian, little attention has been paid to this record. In South Africa Coleman states to me what appears to be Lower Cambrian glacial deposit has been found. David spoke of W. Willis' record in China is now well known. Probably also in north India. Gregory has given some evidence for an ancient glacial deposit in Iceland or Spitzbergen. Then there is some evidence for Great Britain. All of these records fall into the Lower Cambrian or below.

David showed scratched boulders and several photographs that leave no doubt about the Cambrian glacial till. The boulders are much squeezed and fractured due to the folding of the beds.

David then describes the Permo-Carb. deposits that in Australia extend through 30 degrees from south to north. E. and W. through 300 kilometers (175 miles). Marine deposits of Permo-Carb. age are found all along the east coast and on the north west coast. To the west of the eastern area all the country along the south shore region is scratched. Farther north boulders are

found in the marine deposits. From this David argues that the continent then lay south of Australia that the ground ice came to sea level shortly south of the present southern boundary of present Australia. From this region north the ice bergs floated and dropped their material into the marine deposits.

Scratched surfaces are found up to 34 degrees north. Beyond none.

In the Permo Carb. of Australia there are two glacial horizons. One at the base of the Marine series and the other? on the top of the Upper Marine series. David regards this Permo-Carb. as of Carboniferous age apparently following Tschernyschew, although he has been to India and has seen the Salt Range.

In Africa the ice flowed southward and dropped its boulders into the Permo-Carb. sea.

Tschernyschew also thinks he has evidence for glacial beds in the Permo-Carb. of the Urals.

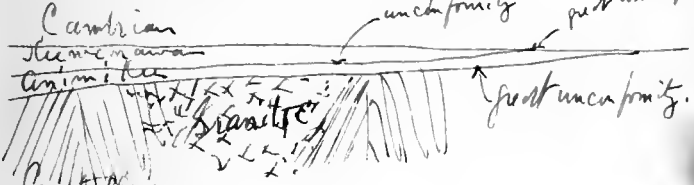
The Permo-Carb. of Argentina also seem to have evidence of glacial or at least cool climatic conditions.

Radiolarian beds in the Permo-Carb. of Australia. Also ripple marked and sun cracked beds many

superposed.

The first paper was by Adams who in the absence of Willis explained how the Geological Map of North America came to be made. He also objected to the Precambrian terminology used, and added that the term Algonkian would never be used in Canada.

Lawson then got up and shared by the terminology of the Survey = Willis would not be used. He illustrated his words as follows.



Animikie = Eoarchean of most.
Keewenawan = Neoarchean of most

The third morning paper was by Frech on Climatic zones. He reviewed the marine and land faunas of the Mesozoic and Tertiary.

The Jurassic and Cretaceous of Mexico was so closely related to Europe that the countries geologically were united in a Congress there.

Neumayrs climatic zones of the Jura he said could not be maintained but his reasons I could not make out.

He said the faunas showed that there was a cooling of the climate not with the special local conditions towards the close of the Upper Cretaceous. He said it was plainly shown in the faunas.

The Hippurites indicated a warm sea.

A warming again took place in the Upper Eocene and Oligocene.

The Llamas of S.A. spread from N.A. over the Antilles to S.A. To Asia by way of Behring St.

The basis for the cooling of the late Cret. and of Tert. is largely based on land animals.

The main cause for the cooling of climate he concluded was due to the loss of Carbon dioxide and water vapor. This loss takes place through the carbonation of rocks and by the storing of carbon

in Coal beds and carbonaceous rocks. He said the first one to point out this was Tyndall in 1861 before the British Association. Later the idea was carried out more by Arrhenius

Freeh thinks the idea of carbon dioxide absorption rather underestimated than overestimated.

Coal period absorbed the carbon dioxide and a low of temperature follows.

The new supply he thinks came from the volcanoes, for the period of great volcanic activity fell in with the cold times. He pointed out the great Jurassic volcanology of the west coast of U.S. reflecting the air and warming again during Jurassic times. The great Tertiary volcanology to reflect the Cretaceous ice and the recent volcanoly to reflect the Quaternary ice.

The land movements he thought inadequate certainly that at the close of the Paleozoic. The great CO_2 absorption by the Carbon was the primary cause.

The great climatic change also the cause for the great change in animal life.

In going to dinner Chamberlin was with us (Lawson, Coleman, Reid, Cleland and Chamberlin 2nd) and he brought out the idea that the ocean is the great balancer. The ocean under proper conditions can absorb 3, atmospheres.

It was particularly noticeable how Fred carefully avoided the name of Chamberlin and that he did not in the least refer to the oceans as an absorbent of CO_2. Nor did he refer to the interglacial conditions a fact not easily got over.

It is very remarkable since Willis has found Cambrian glacial till on the same horizon of weathered and how all geologists are now thinking of geological climates. This great alertness is due in the first place to Chamberlin and next to Tyndall and Arrhenius. It is also remarkable that the Continental geologists either do not know or purposely evade the work of Chamberlin.

The afternoon sessions did not begin until 4 o'clock but the meeting was not called for nearly 20 minutes later.

At a little after 3 P.M. Stanton arrived and together we attended the afternoon sessions.

The first speaker was Burckhardt but as he spoke less than 10 minutes I failed to make out the object of his speaking.

Then Diener discussed the remarks of Frech in the morning. Among other things he said he finds it difficult to explain the equatorial glaciation of the Permo-Carbon.

Neumayr's climatic zones of the Jura he said must be given up but in the Upper Cretaceous climatic zones begin to appear. He thought glaciation should begin at the poles. High altitudes during the Permian could not explain the origin of the Permo-Carb. glaciation. The Onts made at the close of the Paleozoic are inadequate. He seemed to agree with Frech in all points.

Rothpletz then pointed out the former great difficulties in trying to point out geological climates

He pointed out because the greatest Equisitae were found in the tropical regions therefore all Carbon floras must have been tropical. But he thought now that undoubted physical evidences were at hand in the various glacial beds that we were on the road to a final explanation and determining of former glacial causes. However he advised caution and he hoped the pendulum would not swing too far the other way.

Coleman also thought from what he saw in Africa that no high lands existed during the Permo-Carbon glaciation. Furthermore he did not think that high altitude was necessary to ice accumulation as we had a good example in the Antarctic ice cap. At good or snow accumulates in fact it vanishes here faster than accumulates due to evaporation.

He also announced that he had in several state mining reports pointed out that a seemingly tillite had occurred in the Canadian Lower Huronian. It resembled the Dwyka conglomerate of Africa. He could not make this announcement as yet positive as he

had found no scratches because of the post metamorphosis.

He thought the Permo-Carbon glacial climate would vide.

Freed also thought that it was not necessary to assume high altitude for glacial conditions.

Stefanescu's paper related to Dinotherium giganteum.

Anderson's paper on the Antarctic geological results was postponed on account of the lantern not working

Mexico City Monday Sep. 10 - 1906.

In the morning attended the session of the Congress. Some time was devoted to a discussion of geological climates.

Davis was the first speaker as Chamberlin had to leave the city. He offered no particularly new views but indicated the old and new ideas of interpreting geological climates. He thought the old idea of a cooling earth had to be laid one side because of the Cambrian glacial period, and especially because of the intimation that there may be two Precambrian glacial periods.

Last year he had seen the Dwyka conglomerate of S. Africa and it indicated that the Permo-Carb. glacial region had not been laid down in a high country but that the land here had already been reduced to a low land. This region was not far south of equator. A cooling climate he did not think the probable explanation but due to some oscillatory cause. He suggested a cool climate with a summers snow fall.

Becker suggested that as Langley had shown that the sun is a variable star may the glacial climates not be due primarily to this cause.

In the Sierra Nevadas in 1871 the winters snow had been unusual or that much snow was left throughout the summer in which fell the falls new snow. After much search no unusual condition in the atmosphere of the time could be found to explain the appearance of snow fall. If we to day can not ascertain the causes why should we not be all the more cautious in regard to the past. Meteorology alone will not explain these changes but in geology we should embrace all the types of conditions.

David also pointed out the Dryopteris environment was laid down at a low altitude. He suggested a warm monsoon instead of the present rain monsoon. In regard to an increase or decrease of heat during glacial climates he thought it was the latter as in the Permo Carb. of Australia all the ruf ends vanish before the glacial conditions set in. He thought the main cause to be in the meteorology, not in altitude.

Frech spoke along Davis' lines and offered his remarks as in harmony with his views.

Fairchild reported that Chamberlin was not present as he was the greatest authority on geological climate interpretations.

The first paper was by Bain. He thought the deposition of ore was largely due to the Paleogeography. The concentration was due to oil or carbonaceous rocks. The constantly escaping hydrocarbons and sulphides of the oil rocks and black shales would concentrate the widely disseminated ores in the sedimentaries. This of course only refers to the soluble ores as iron, manganese, lead, zinc and copper. That the black shales owed their carbonaceous matter largely to plants was shown by White who had found spores of Algae in the black shales.

Lawson said his examination of the Black Sea during the Russian Congress showed the dredged mud to be filled with hydro-carbons and sulphides. He thought ~~that at times~~ the oceans might have stagnant areas producing sulphides and precipitating the ores in solution.

Reed objected to this strenuously and said no ores could be thus concentrated.

In the evening we attended the reception given to the Congress by the Assistant Secretary Dep. of Fomento Aldasoro. His official quarters in the Mineria had been transformed in living chambers

These were on the third floor around an inner court. Two large rooms were reserved for luncheon and wine. This was as usual an elaborate affair and the custome was to stand at the foot of the table and monopolize it. Some stood there for 30 minutes and had a full meal.

Below in the inner court were two brass bands the mixed Irish Police band and the Artillery band. They played alternately and it was evident that the former was not only the Irish band but that it was also the best one. In the band there were not less than 70 men all young including the leader. Their precision and feeling was grand. As a rule they played light catchy things while the Artillery band took up one of the classics. Finally both played national airs and were showered by flowers taken from the tables. At midnight all were much excited with this rivalry of the bands.

One of the peculiar features of these bands is that both had two bass violins.

Mexico City Tuesday Sep 11-1906.

Got up at 6 to make a start for the official excursion to the pyramids at San Juan Teotihuacan. We left at 8 A.M. in 6 or 7 cars. As we go out we get a fine view of Guadalupe. In an hour we arrive at the station and as the pyramids are 3 kil. distance several hundred cavalry horses are there and many wagons for the ladies. I concluded to walk and join Tietze and Tschermyscher. We arrive at the Pyramids before the party arrives due to our going direct across the fields.

The great pyramid of the sun is now being reworked and modernized and the temple base opposite has been cleaned out. There are rumors that this work is being badly done but how true this is one cannot say.

Upon arrival table are found set ready for breakfast. Then an inspection of the pyramids and finally Ransome, Kemmel, Daly and I walk over to the small or Mound of the Moon and climb to its top.

It is astonishing what an amount of labor has been done here by these ancient peoples. The great or sun

The one of the "moon" is 107' high

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mound is a large hill [illegible] feet high. a

At 12.30 we go to the grotto in a lava bed formed by an eroding a underground stream. The cave had been decorated with palms, mosses, lichens and some flowers and was the most remarkable place possible for a banquet. Every one was pleased, the dinner was fine and wine flowed in superabundance. The outcome was that many felt called upon to make speeches in which English was the commonest language. The german notability spoke Matuschka and Von John. Their speeches did not give satisfaction to the germans at our table, Weigand, Keilhack, Guenther, Juter, Eckert. I was sitting with Stanton, Hayes, Davis and Calvin. Not far away was Ruedemann. Our table was a side one near the Cave entrance while nearly all sat in the pit in the deepest part of the cave.

Walked to the station by a very round about road due to the guidance of some Mexicans and on the way was run down by Sunday rider but fortunately for me was not hurt. Daly was also run down and the stepped on by another horse. A doctor had to be called for him and later

Goodwin with his head in bandages.
Purchased many Aztec souvenirs.
In the evening saw one act Operetta with Stanton.

Mexico City Wednesday Sept. 12 1906

Spent the morning at the Geological Institute but did not hear any of the speakers. Talked with various members.

Being tired from the day before Stanton and I did nothing in the afternoon until evening. Then dressed to go to the reception and dinner given in our honor by the President of the Republic.

At 4:15 we started away to meet the members of the Congress at the head of the Paseo de la Reforma. Here we were taken in open carriages to the palace. The drive down the Paseo and around the base of the Castle Chapultepec was fine. There were four Mrs. and Miss Kümmel, Stanton and I. Our carriages drove up to the top of the roof and after checking our coats and hats we

were soon introduced to the President and his wife. In shaking hands with him I would not have guessed his age at 76 his birthday coming on the 15th. His wife is much younger and does not appear to me to be of typical Spanish stock. Ojeda introduced us and the President receiving us cordially. He mixed with us throughout the evening and his wife constantly looked after the ladies.

The view of the valley of Mexico from the castle is very fine. In all directions are the volcanic mountains and off in the south east are the two great volcanoes! At 5.30 both came out clear all the clouds vanishing. We walked around the grounds and shared in the great sight and all admitted that a more ideal palace could not be found. The gardens outside of the palace and within were very tasty. Outside Araucarias (pines) and tamarinds surrounded by walks covered with a burnt red earth attracted much attention. Inside were an abundance of flowers and vines lighted by colored electric lights.

From 6 to 7 we listened to various musical

articles and promptly at seven we descended one flight to the dining room. Here we were treated to a splendid banquet; there were probably 300 plates set. Mostly small tables with a few large ones in between.

We elected a small table for four and I sat down with Davis, Ries and Stanton. When the champagne was served the President arose and in an address of welcome spoke about five minutes. He thanked us for the knowledge we had added. Aguilera responded and spoke of the President as the Patron of Science in Mexico.

Leaving the castle we looked down upon the city now in darkness but beset with large and small sparkling electric lights. Our carriages awaited us and we arrived at the Hotel before ten.

All the Ministers of foreign countries were there and many notable Mexican ladies and gentlemen.

I should never have dreamed that I should dine with the President of the Mexican Republic and on the anniversary day when the Americans stormed Chapultepec.

Mexico City Thursday Sep 13-1906

Visited the National Museum and the Fine Arts Museum with Stanton.

Had a Mexican 8 course dinner with Stanton which cost each of us 38 cents Mex.

Late in the afternoon walked down the great Paseo to Chapultepec restaurant. In the evening saw a Mexican rendition of the Geisha Girl. From our standpoint it was amateurish and a burlesque.

Mexico City Friday. Sep. 14-1906

Attended the Congress and the Council meeting. Elected Fritz Frech as President of the Palaeontologia Universalis. Added Neumann to the American Com. Also added Böse and Burckhardt as members from Mexico.

Lawson, Dalton and Storey read their papers.

In the afternoon escorted Miss Bascom to Guadalupe.

The last session of the Congress was held at the Institute in the afternoon.

In the evening we had our farewell banquet at the Sylvain restaurant.

Before retiring had a chat with Stanton in regard to the broader results of his Mesozoic work. The Jurassic of Wyoming and the Black Hills comes in from the north — the Arctic — but seemingly is connected with the north Pacific.

The Jurassic of the south (Texas) seems to go with Mexico which then seems to be a third province along the Pacific border.

The Comanche contains more than the Lower

Cretaceous of Europe and in of the Atlantic region.

The Comanche beds are separated by an unconformity from the Wahsatch beds of Wyoming. Farther south the Comanche beds rest on the Triassic and even the Red beds of the Permian. The marine Jurassic on which the Comanche beds of Wyoming rest is of Upper Jurassic but not the Lister Jurassic. Therefore it is not yet proven that the Comanche beds are of Cretaceous age but may eventually be proven to be such.

Have concluded not to go on the northern excursion.

Mexico City Sept. 15th Saturday.

Called at the Institute and attended to some of my baggage. In the afternoon looked about town and at 9.30 P.M. saw Stanton off on the northern excursion.

At 10.30 walked up to the Zocalo and at eleven saw the declaration of El Grito (= Liberty) by the President in front of the Palace and the Cathedral.

During the last days I often heard about the dangers to which foreigners and especially Americans would be exposed on Sep. 16th if seen on the Zocalo. Since my visit to Mexico I have not seen the slightest sign of any ill feeling towards me and therefore I thought I would venture out and see the festivities on the great square.

All classes of Mexicans could be seen in the square but mainly the native indians. It is said that 70.000 people had crowded into the square. and I found as many women there with their babies as men. The younger single men were making gay tooting horns and shouting Viva Mexico. The tumult was no more, even less than one have at home on a Fourth of July. Every one was waiting for eleven o'clock when the Cry of El Grito was to be given by the President.

A few minutes before eleven I heard the factory whistles in the far distance a blowing and promptly at eleven the President on the central balcony of the Palace waved a flag and exclaimed El Grito. With that the cry was taken up by the mass of people assembled, the old liberty bell above the President's balcony was rung

when all the bells of the Cathedral were set going. They tolled for ten minutes. Also the entire church front was lighted electrically and there was shot into the sky two great masses of screaming rockets. Then a number of detonating bombs were fired and some colored bombs.

In about ten minutes after the cry of El Grito the crowd began to disperse and all went home as orderly as any great mass of people can. I did not see the least sign of disorder nor of drunkeness.

This is President Diaz's birthday.

Mexico City Sunday Sept. 16th.

The Fourth of July of Mexico.

Long before light we heard the crowd and soldiers out on the street getting ready for the litest parade. All is on the move but there is no disorder nor no shooting of fire crackers.

At about eleven A.M. the President, his cabinet and the Foreign Ministers pass in carriages by the Hotel on their way to the Palace. Behind some of the carriages many young men shouting Viva Mexico. As the

President's carriage had a large escort on horse. There were not so many running here as with some of the other carriages. The President was dressed in Military dress.

After a half hours pause the regular procession began to pass and it continued to pass for nearly two hours. It was entirely a military parade and one of the highest type. The Cadets came first, then the infantry, artillery, cavalry and the rurales.

The parade was a picture and in every way does credit to Mexico.

In the afternoon walked around the [illegible] and then to the hotel.

Mexico City Monday Sep. 17-1906

Had my return ticket adjusted and secured a round trip ticket from San Luis Potosi to Tampico. (13.00 Mex.).

Packed up my box and had Klinjman ship it via Vera Cruz and Ward Line. It is addressed "Yale University, Geological Department, New Haven, Conn., United States, via Vera Cruz and Ward Line. Minerals and rocks." Later he will send me the freight receipt.

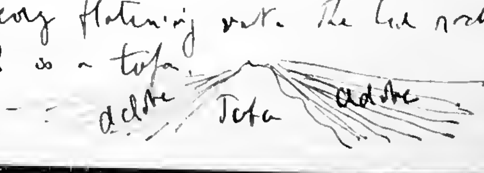
Wrote up my account of the Congress and packed up.

Paid my hotel room rent 10 days @ $5 and 7 days @ 3.00 = $71 mexican.

Mexico City Tuesday Sep. 18.

Left at 7.45 A.M. for Gonzales.

In a railroad cut and tunnel near Barrientos one sees how the flat valleys are made. Here the adobe is laid down just on the inclination of the hill evenly flattening out. The hard rock in the tunnel is a tufa.



The same also North of Endo

The superficial streams in the Valley of Mexico now running are very muddy and discharge into temporary lakes. Thus are valleys made here in Mexico.

At 9.30 we pass through a lava flow and in the cut one sees the lava resting on the adobe floor.

At Apasco we are in Cretaceous hills. Many lime quarries here. The broken rubble rolls down hill and is recemented by the calcareous waters. Have a picture of it. Also of a lime kiln. They seem to use ~~[illegible]~~ mainly the surface tufa. The Cretaceous hills all about here are as usual serrated and nowhere is there a sky line. Between them is a flat valley and a top of it rests a small volcano. Have a picture of it.

The ~~[illegible]~~ Tula river lies below the ground surface about 70 feet. This is north of the station Teocalco and hereabouts there are considerable volcanic mountains.

Where the Cretaceous is present then the adobe also has irregular interbedded layers of calcareous tufa.

From Encho it is a constant rise from one valley (the Encho) into the Lagula. On the left beyond Lagula there is a great lava flow with a sharp

point and finally at Escandon we have risen above this long lava flow. In several of the cuts one sees the lava lying above a leveled floor of calcareous tufa of Cretaceous material. This a long flow of many miles from higher ground on the left of the train as we go north.

At Nopala to the left of the track is a temporary lake, very narrow but a mile or two in length. Showing how all the depression have regularly bedded deposits. This lake is produced by a dam of about 6 to 8 feet high.

We descend from Nopalo in a succession of horse shoe curves.

At Francisco we are still on the down grade and for miles we have come through a vast lava field which in places in strongly palisaded and especially in the banks of a stream. I snapped the camera coming over a small canyon. Between Francisco and Bernal it is all down through the soft lava fields. The country is very rugged and covered with nopal. Far away to the right are high mountains glistening white in the sun. Probably Cretaceous.

Queretaro Tuesday Sep. 18-

Arrived here nearly at 5 P.M. our train about two hours late. Walked around the town for an hour. The city of 35.000 people is the most typical Mexican town I have seen. It is very primitive, has a large Alemeda, and a great many churches. The stores have nothing other than the ordinary things of commerce. It is a clean and quiet place.

This city is said to be an opal town and several men showed me their outfit. They had the ordinary things seen in abundance in Mexico City. Of one man I purchased a number at 25¢ and 50 cents each. Mexicans opals have little fire but a great variety of color. Later purchased three good ones for $12.00

Stopping at the Grand Hotel. Bed full of bugs. Met young man Enrique Montes, a student here. Speaks English. Will come to American University

Queretero — San Luis Potosi Wednesday Sep. 19.

Got up at 3.30 to take the 4.40 train for Saint Louis Potosi. Had breakfast at Gonzales.

South of San Miguel we pass through the red deep canyon of the Laja. As usual the water is very dirty, often the walls are vertical and

the canyon has all the appearance of a young stream. In places the stream is dammed for irrigation and dries up in the winter.

Most of San Miguel one sees in the valley of the Laja on upper level above the present stream bed say 50 feet. The stream has cut down through this upper valley very recently.

At Chirimoya we have again out of the valley of the Laja and are on a great mesa bounded on the east by mountains and on the west by low hills of lava. Here and there on this mesa are shallow pools of water. This mesa is as flat to the eye as a table. Here also is placed an dam to hold water for irrigation.

At the station Villa Reyes, to the west, an high hill (1000') of foliated lava. The columns stand out well. Took three pictures.

Arrived a little late about 12 noon at San Luis Potosi. Spent the afternoon looking about town and also visited the silver smelting works at Morelos. This very large concern is to the west of the city and just below flows. From here one gets a fine view of San Luis Potosi.

Took 8 pictures of street scenes and market scenes.

Stopping at the [illegible] Internacional.

San Luis Potosi, Thursday Sep. 20.
Was to leave at 6.40 for Tampico but the train is two hours and 40 minutes late.
The S. L. P. plain is one mass of nopal until we got near the Mts where grass and shrubs come in. Arriving at Alonso 17 Kil. E. of S. L. P. there is Cretaceous and lime kilns. In one of these quarries is shown a fine Tufa deposit. 

The road rises rapidly for several kilos. to Villar and then descends. Cret. all about here. ~~From Vil~~ From Villar to San Lazaro it is rapid dip down through a narrow gorge that gradually widens into a long narrow valley. From San Lazaro to Cerritos it is slower dip down a farmed valley and from here at the station as I look back I can see a second of these narrow valleys leading into the one we are in. This is the first dip from the upper mesa through the Cretaceous of turned rocks. The general dip of the Cret. seems is probably not more than 20 to 40 degrees. Nearly all the cuts show limestone.
The plain keeps an evenness and is flat a nearly or

all the way Las Tablas. San Bartolo is in the flat where I turn a fielding to the north, where hills closely at on the bedding.

As we get towards Las Tablas we again approach the Cret. hills and here one sees a number of small outliers or mamatoids in the plain.

The plain is very dusty, the train gets of much dust. Practically a desert towards the eastern end of the plain. All the water is in the western end. Apparently hardly anyone lives in this region.

There is slow up grade from Las Tablas to Cardenas in between two ranges of low hills running parallel. One sees no water anywhere even at this time of year. The local rains today hug the hills showing where the erosion is strongest. All the upper parts of the hills have no soil all of which is washed into the lower levels and where the tuffs is also laid.

The valleys on this upper level appear to be of the amphitheater type with small outlets eastward into other valleys or down the great slope.

Had dinner at Cardenas.

Arrived at Tampico at 8 P.M. Stopping at the Southern formerly the Hidalgo, now run by an American.

The air here is not so hot as at Vera Cruz and yet it is warm enough. The mosquitoes are plenty, small, insinuating fellows that get to work immediately on alighting.

Tampico, Friday Sep. 21.
Got up at 5 A.M. and left at 6.
Of the trip today back to San Luis Potosi I have written an account elsewhere which I shall copy into the following book.
Returned to San Luis at 7 P.M.
Made the acquaintance of the Mexican Central conductor Mr. John W. Long, San Luis Potosi. Wants picture of the Tamasopo. This man may come to Yale.
San Luis Potosi. Saturday Sep. 22.
Wrote on my yesterday's trip and left for Saltillo at 11.45. On the train met Dr. Adams and his wife.
Got off at Saltillo to take the early morning train so that I may see the drop between here and Monterey and then the long float to Laredo.
Stopped at La Plaza Hotel.

Saltillo, Sunday Sept. 23-1906

Got up at 5.30 to catch the 6.00 train for Laredo. It had rained much during the night and all the day it threatened and the clouds hung low. Consequently saw little of the hills and secured but 2 pictures and these with low no great value.

Five miles south of Saltillo is the Buena Vista battle field. While I did not see it last night it is evident this morning that the "Bad Lands" scenery is due to dissecting of one of the modern adobe mesas. This down grade from and farther south than Buena Vista to Saltillo.

The down grade continues from Saltillo through a rolling country - a small valley - bounded by low hills in which the Cretaceous rocks all lie at low dips. As we approach Ramos Arizpe (9 miles N. of Saltillo) the hills become more and more pronounced and the railway descends through narrower valleys. Down the valley material of region to be dissected and the [illegible] runs through a constantly narrowing gorge. In other words the material

for the Cret. hills of the intermediate space for a time only to have removed by subsequent stream action. We pass through a series of these descending valleys and eventually through gorges cut down through the tilted Cretaceous rocks.

The dips of the Cretaceous here is usually low from 10 to 20 degrees, but in places rises up to nearly vertical, at least up to 60 degrees. Most of the material is soft, shales with some beds of limestone. Erosion very rapid with much loose material in the valley courses.

In the region of Santa Maria we are in the narrowest gorges and at Garcia they again widen out to say here about 3 miles across.

At Santa Catarina volcanoes all of lava flows and deeply dissected begin to appear and continue to some distance beyond Monterey. Here are a number of these isolated volcanoes all showing the flows one after another down

the very steep sides of the volcanoes. In places between the volcanoes one sees low hills of Cretaceous shale - that the volcanoes burst through a very regular stratography.

In these volcanic hills are situated the silver mines.

From a distance the volcanic hills look white or that one thinks of Cretaceous rocks but on first picture the lava is seen to be a dark blue.

Monterrey is surrounded by these volcanoes and is a very active mining center.

The last volcanoes are in the region of Salome Botello and at Lampazos back of the station one sees the first flat topped hills. It stands here about 700 feet above the level of town and is evidently comparable to the upper level of the Tertiary seen on the Tampico trip. Another one more dissected and an outlier is seen a few miles further north and then no more. The railroad for most, over the undulating plain of the Tertiary. In several cuts one sees the thin bedded rocks, also in the lower part of the

Rio Grande here at Laredo. In this city it is often used as pavement stone just as at Cincinnati. Laredo is 446 feet above the sea. Saltillo is 5,337 and Monterey is 1624 feet above the sea. In other words in 67 miles the road descends 3713 feet and in the next 168 miles descends 1164 feet.

The Tertiary undulating slope is covered with the Spanish bayonet yuccas, small nopals, bushes, annuals and some grass. One sees no farms in it for it is only a poor grazing land.

Laredo Monday Sept 24–1916

Stopped over night at the Ross Hotel run by Charlie Ross otherwise known as "One arm and the Old Woman" A good second grade hotel.

Left Laredo at 7.40 A.M. As we ride along the same Tertiary plain continues as the one seen yesterday afternoon. It is here as in Mexico covered with mesquite bushes, some sage, some grass and many annual bunches of nopal cactus. Here as in Mexico it is semi-arid and agriculture

depends on irrigation. Mostly a grazing land.
Took to the Pullman at Palestine Tex. and remained in it to St Louis.

St. Louis Tuesday Sept. 25-1906
In the cars all day en route from Texarkana to St. Louis where arrived at 8 P.M. Then left over the B.&O. at 9.29 P.M.

Cincinnati Wednesday Sept. 26-1906
Arrived here at 7.30. Called on Semon and had lunch with Albert and Semon at the Business Mens Club.

Cincinnati Thursday Sept 27.
Visiting with Albert in the afternoon and evening.

Cincinnati Friday. Sept. 28
Visited with Semon and Rosie.
Left on the B. & O. at 6.35 P.M.

Washington Saturday Sept. 29.
Arrived at 12.40 P.M. Stopping at the Metropolitan.
Called on Barsler and then on Ulrich. Spent the evening at the latters house.

Washington Sunday Sept. 30
Called on Ulrich and Barsler at the house and spent the morning there. The afternoon and evening at Merills and Moodys.

New Haven Monday Oct 1 1906
Left Washington at 7.40 this morning and arrived at New Haven at 4.30 P.M.
My great Mexican trip is at end.

1916

Aug 9 - R.R. New Haven to Washington	9.20
" 12 Washington to Cumberland and return	8.23
" 14 Wash. to Mexico and return	84.90
" 14 Sleeper to St. Louis	5.00
" 14 Telegram to Ordway	1.75
" 15 Sleeper St. Louis	3.11

Davis recommends my reading Lapparent on ancient uneroded lands like the Cen. Island, in Compte Rendu of the Berlin Congress 1899.

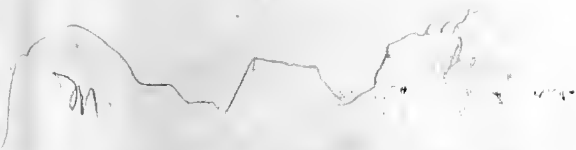
Read Romero's book on Mexico

Emil Rasche [illegible]

San Serna [illegible] Playa

Pdorpa = Popo. tepetl

Biron, Malinche



(1)

H. H. WALES.
LADO SUR DE LA ALAMEDA.
CALLE DE LA ARTILLERIA No. 6.
Hotel Internacional
S. L. P.

San Luis Potosí, ... de 190

This evening I returned from a round trip on the Mexican Central to Tampico. What two grand days have been today and yesterday. The latter day was one of surprises but to day one of more understanding therefore I will begin an account of the scenery and the geology from Tampico towards San Luis Potosí.

The little sea port town of Tampico is situated on a low hill probably about fifty feet above the sea level. Our train starts away on the lower or sea level at six in the morning. The day is warm and clear and the least exertion brings on perspiration, though the air from the sea gives one the feeling of some coolness. Certainly Tampico is not by far so hot as Vera Cruz and then too the town is cleaner and has a better class of people. As we proceed we have water on each side of the track, the one on our left being a navigable river. Our train soon rises out of the sea level on to the gradually rising one on which Tampico is built and which I will for the present call the "Pleistocene plain." On this low plain the vegetation is dense — a jungle — but not a tropical jungle such as I have read of. It is a mass of shrubs without any abundance of tall trees (I was told that all are cut out along the rail road), many vines, and parasitic plants but little of the epiphyte or hanging mosses. One sees no ferns, no palms, but a few cacti are present, one like the nopal and another a sort of anastomosing finger form. In this jungle deer and turkeys are said to be present. This is also the cattle raising country of Mexico.

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This Pleistocene plain did not have time enough to erode to sea level. It is an undulating plain with ridges on it up to 100 feet high. At Chijol 44 kilom. from Tampico we are on the Pleistocene plain. It is a rolling undulating plain and where the jungle has been removed for stock raising produces considerable tuft grass. Occasionally on the telegraph wires we see long pendant birds nests, and here and there a hawk or a carrion bird. At Ebano (58 Kil. from Tampico) on this same plain we see the newly discovered oil wells – an oil for burning and now being used on some of the engines of Mexican Central. It is a heavy oil and is not distilled for other purposes. The company controlling these wells and much of the land is a California oil syndicate having invested more than one million dollars in gold. As yet but four tanks are built and I could learn nothing about the oil yield but one well is said to flow very strongly. These wells were discovered through the presence of asphalt – "asphalt lakes" on the surface.

Arriving at Velasco (75 Kil. from Tampico) after the first Indian corn appears but constantly on a low up grade on the Pleistocene plain we begin to discern in the far distance the high, faint which looks like a wall of what I shall the "Tertiary plain." Its top is perfectly horizontal and for many miles to the right or north there are no gaps cut down through it. At Coco (94 Kil.) ~~size~~ the Tertiary wall ~~looms out better~~ and clouds are making in front of it and ~~float~~ rise over it. At Rodriguez (or Las Palmas) and which have a station sign at Las Palmas (110 Kil.) (104 Kil.) we are at the base of the plain, where I took two views of the wall. It is here seen to be a nearly flat top level without

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dissecting having a slope of 45 degrees down into the Pleistocene plain. I should estimate this scale to have a vertical height of between 300 to 2600 feet.

In some shallow cuts along the Pleistocene plain I noticed outcrops of light colored shale (weathered but I think dark colored within) somewhat disturbed by upheaval. At the base of the Tertiary plain the lithology changes and a heavy bedded ~~rock~~ thick mass appears that I take to be sandstone. Above it comes in thin and heavy bedded ~~limestones~~ equal even textured limestones with layers having interbedded shales. The weathered surfaces of these limestones remind much of the Trenton outcrops of Kentucky. Above the limestones is a considerable thickness of soft blue greenish shales. All the strata of the Tertiary plain are tilted with dips up to 15 degrees but averaging between 5 to 10 degrees. I should think the entire Tertiary to be not less than ~~2800~~ elevation 2600 feet in ~~all~~.

At Las Palmas the train diverges to the left and makes for a dry stream gorge, but climbing at once up alongside the steep escarpment. When we are up about 200 feet and before we are truly in the gorge we pass over a small bridge that seemingly has not need to be here. But about 200 feet below there issues from a cave a spring-a river as large as the Little Miami near Cincinnati - which rushes away over the Pleistocene plain. The train continues to climb and soon we pass into the dry and narrow gorge, a cleft in the Tertiary wall. As we pass up there are on both sides vertical walls of the sandstone best seen at El Abra (125 Kil.) and which I photographed yesterday on the southern side.

How do the Pleistocene rocks rest against the Tert.
How do the Tert. rocks rest against the Cret.

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The Tertiary wall must have ~~then~~ an elevation of nearly 4000 feet and the train seemingly rises fully another 400 feet before encountering the first Cretaceous wall.

After we have risen onto the Tertiary plain one sees no farms, habitations or streams. But as we proceed west over the undulating plain and near to the Cretaceous wall, i.e. about 3 kilometers west of Valles (142 Kil.) we pass over a dirty stream having two low vertical cliffs of 100 or 200 in height. These rocks dip as much as 10 degrees. These also are portions of Tertiary as they do not have the steep or vertical dips of the Cretaceous. Further west rising into these soft Tertiary rocks the country is much broken. The water along the western side of the Tertiary plain must sink through these rocks and issue as great springs at the base of the Tertiary as was actually seen in one case and described above.

Just before we arrive at Valles (139 Kil. west of Tampico) we get our first view, to the left, of the first Cretaceous wall. It is entirely unlike the Tertiary one being very much dissected, discontinuous and having nowhere the least sign of a flat top. # A little east of Micos (164 Kil.) we begin to rise over the Cretaceous through the first and rapidly falling rapids of Micos. They are to our right a series of four stepped falls and rapids. The Cretaceous rocks here all stand on end or so nearly vertical as to appear so and on our right, the opposite side of Micos Falls stand in cliffs of 1000 feet. Took a picture of the falls and have sent to Mr. Brewer.

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Beyond Micos the country is rugged with narrow irregular vallies. We pass through a series of these constantly rising rapidly all the way to San Dieguito and then more slowly through wide vallies ~~all the way~~ to Tamasopo a distance of 41 kilometers. Five or 20 kilometers west of Micos we begin to get on the upper side our first glimpses of the next – the greatest – Cretaceous rise. Between San Dieguito and Tamasopo we pass several times over a somewhat dirty stream as big as the Little Miami and finally arriving at Tamasopo we have before us the great Cretaceous cliff or dissected wall. Have a picture of it from the Tamasopo eating station. In other words we have now risen over the first or lower Cretaceous wall and are now soon to undertake the ride over the second and by far the higher wall. Standing at Tamasopo station and looking at the high wall in fact opens and the cliff to the right one is puzzled to trace the track along this wall. A great puzzle it must have been to engineers and one of the grandest pieces of railway engineering in the world. Have a picture of this wall from Tamasopo station. This great wall must be 2000 feet high while the cliff to the right of the canyon may rise to 5000' nearly the altitude of the upper mesas on which we are to rise (See Campbell and folder for data).

Just as soon as we begin to rise out of the Pleistocene plain onto the ~~and get on the~~ Tertiary rise the flora begin to change. The jungle drops out and ~~its place is taken~~ is replaced by the forests of tree palms and palmettos. We pass through these forests up to Tamasopo and a little into the canyon when they too drop out. Bananas appear on the high Tertiary level. These tree palms have in their leaf pockets many ferns (3 species), orchids and other flowers. No ferns on the ground are seen in fact on none of the lower slopes – to me a remarkable fact. Coffee is raised on the great Cretaceous rise and on the higher Tertiary levels.

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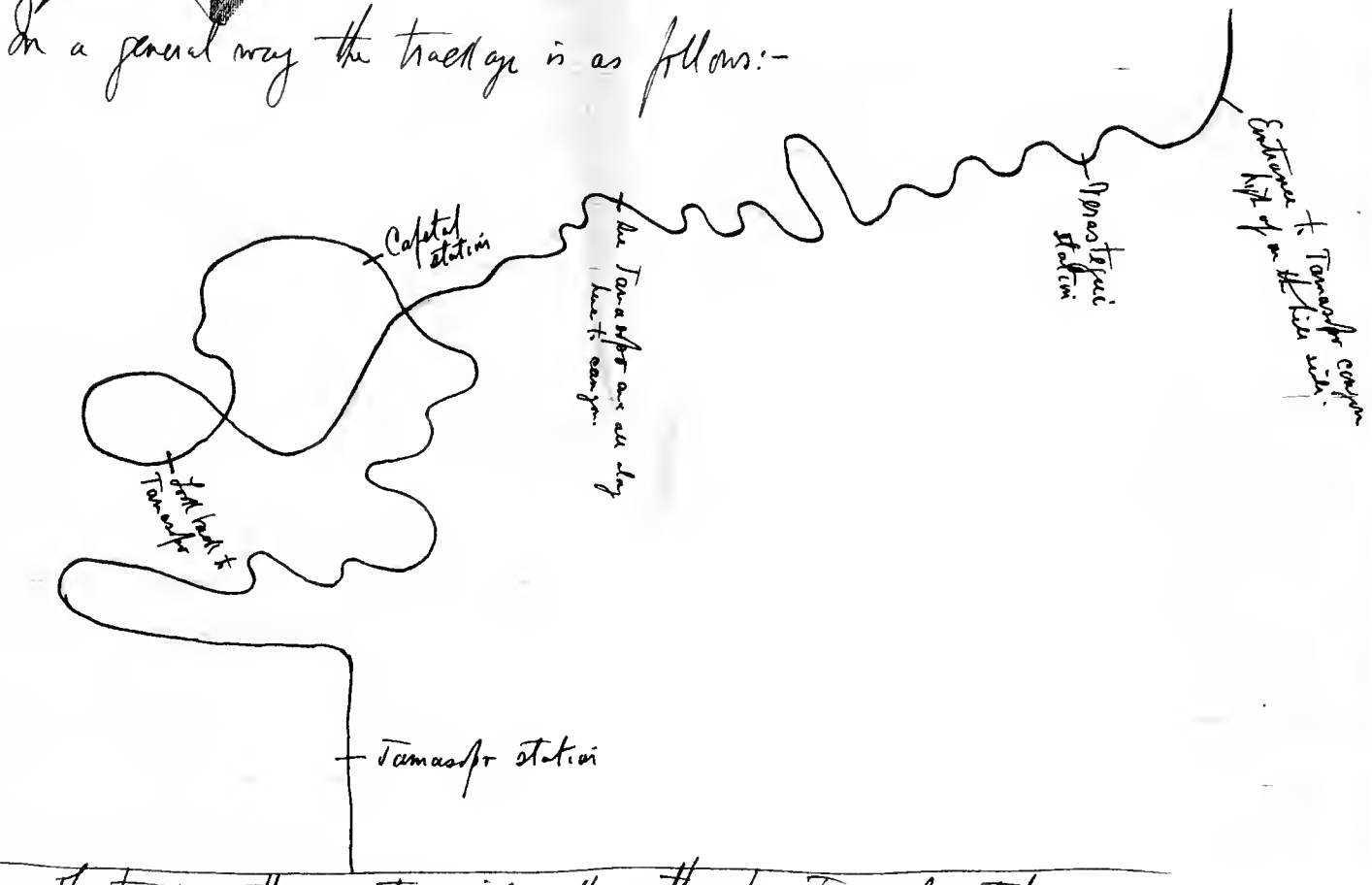
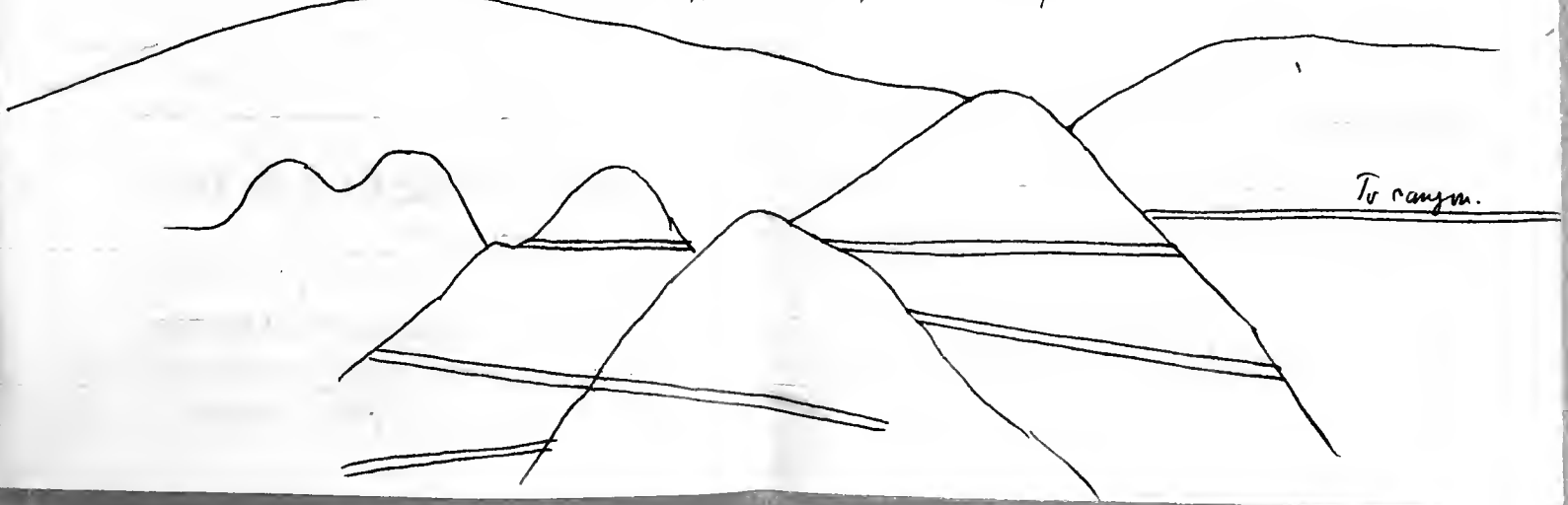
In a general way the traellge is as follows:-



The tracks on the mountain side appear thus from Tamasopo station



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Looking back to Tamasopo station from the station Verastegui left of on the Cretaceous wall what a sea of hills and mountains are to the eastward! A grand sight and a wonder how the railroad has picked its way through all this labyrinth of hills and very grassy valleys. But by following the windings of the little mountain stream rising through the Tamasopo canyon and again over the Micos falls the puzzle is solved. Turning around the point just a little up grade and beyond Verastegui we enter the Tamasopo canyon and remain in it nearly to Las Canoas, the canoe shaped (rather saucer shaped) valley, a distance of 12 kilometers. From Las Canoas to Tamasopo station on the lower level it is 27 kilometers and throughout this entire distance the grade is about 4%, or a difference in elevation of feet.

The Tamasopo canyon is not a simple cleft but a winding cleft with hills and mountains in it left by the rapidly cutting stream. One cone like a volcanic one is left standing in it and around was an island around all sides of which the water rushed by. I have a picture of it. Throughout this canyon the Cretaceous limestone stand vertically and at one tunnel entrance there is a flat sided wall the edges of the limestone serrated giving the idea of a Devils Back Bone or slide. One of my pictures taken further up the canyon may show this but if not there is another wall with a tunnel entrance. Here much of the mountain side had to be made of rock to hold up the track.

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On this upper wall the flora again changes. All the palms and palmettos drop out. Shrubs and trees with the largest trees deep down in the canyon where the railroad ties are secured and dragged by a zigzag road up the mountain side to the railroad at or near Espinazo.

Just before rising to Las Canoas one sees a pretty series of water falls dropping 100 to 200 feet. This is the beginning of the Tamasopo canyon and on it rushes sometimes over falls and then as rapids to Verastegui but where it is probably 1000 feet below the station. It still rushes and drops on to the lower level, a small valley in which is situated the station of Tamasopo. Above the first falls near Las Canoas, in the ranch shaped valley in the hole in the ground. This is ground filled in by rain wash and now a small stream leading into the Tamasopo is cutting it away. Here there is a drop of from 100 to probably more than 200 feet before it joins the larger stream apparently coming in from the sides. I have at least two pictures of this preliminary drop into the great Tamasopo drop.

On the north side of the canyon the mountain rises above Las Canoas probably 2000 feet higher. The South wall is very less high.

All along from Tamasopo station to Cardenas one sees the Cretaceous in vertical rocks. It is a series of closely appressed anticlines and synclines, one of the synclines is seen in the hill to the right of the station La Labor. Arriving here the air again is cool and we are in the Tierra fria.

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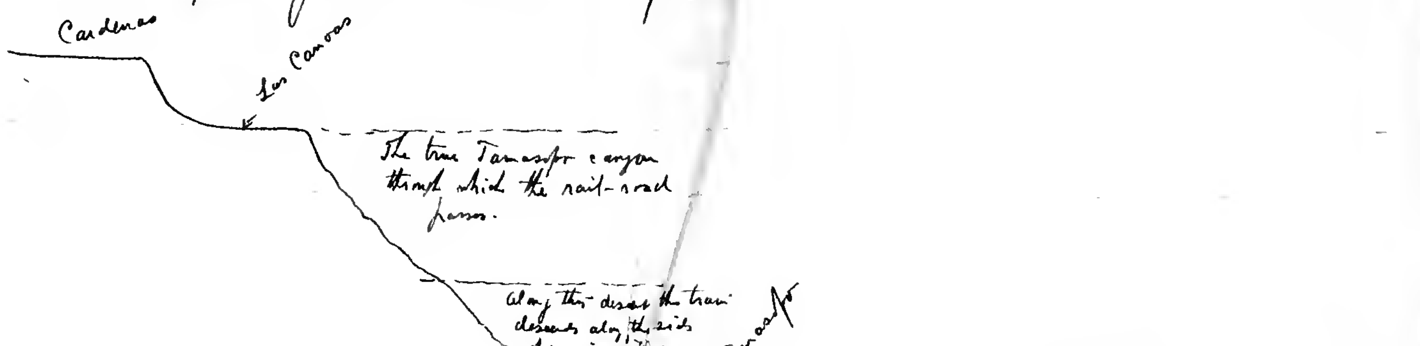
The dips may be illustrated as follows:-



For balance of rises work it out from my note book, also the folder of railroad and Campbells guide.

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