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If found by any one
please forward to

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New Haven
Connecticut

December 1923
January to April
1924.

Texas - Arizona

3654

December 25 – 1923. Tuesday

A fine bright and cool morning, and Doctor Hunter calls for me with his Ford to take me to the depot. Checked my big grip to Washington, had breakfast in the depot, and 8 A.M. I am off for New York City. Got here at 9.45 and at 10 I am at the Pennsylvania Station.

At 10.10 I am off for Washington where I should arrive at 3.20 this afternoon.

[illegible] at the [illegible] Hotel [illegible] [illegible] [illegible] the White House.

[illegible] [illegible] guests [illegible] [illegible] Mr and Mrs [illegible] It was a very enjoyable evening. At [illegible] P.M. retired for the night.

December 26-1923 Wednesday

Started out at 9 A.M. to see the new structures about the White House region, and then went to see the Freer Art Gallery. At 11 A.M. got into the National Museum and at 11.45 saw Stanton, [illegible] and [illegible] Merrill. The latters history of [illegible] geology is now in the press. Pres. Merrill is 70 years old, but looks [illegible] almost as young as when I was a [illegible] in the N.M., 20 years ago.

At 2 P.M. went to the large Interior Dept. building to attend the Council meeting of the G.S.A. [illegible] adjourned at 5 P.M. [illegible] At 8 P.M. [illegible] the Lawson Abstract [illegible]. Council [illegible] in favor of the [illegible] taking the publication of the [illegible] by the [illegible].

[illegible]

[illegible] Type of [illegible]
[illegible] with [illegible]
[illegible] was the [illegible]
[illegible] faults.

[illegible]
[illegible]
[illegible] of distinction.
[illegible]

December 27-1923. Thursday.

Spent the day at the meetings of [illegible] A.S.A. in the [illegible] Building. [illegible] Presidential Address on Criteria of [illegible] Condition appeared to me to [illegible] a lot of sham [illegible] to have the [illegible] [illegible] [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] Economic [illegible] [illegible] [illegible] [illegible] is [illegible]. [illegible] a stated they [illegible] than professors [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] until a [illegible].

[illegible] Presidential Address on [illegible] raised much [illegible], the results of which were to show as well as [illegible] [illegible] [illegible] [illegible] to [illegible] [illegible].

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] make a plan [illegible] [illegible] they [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the local [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] value of [illegible] [illegible] [illegible] [illegible].

the [illegible] area [illegible] are
[illegible] a well [illegible] the
[illegible] determined.

[illegible] carefully [illegible]
[illegible] them, [illegible]
[illegible] [illegible] down [illegible]
[illegible] the species must be [illegible]
[illegible] outside [illegible] inside.
[illegible] bread [illegible] like [illegible]
[illegible] [illegible] [illegible]
[illegible]

[illegible] that
[illegible] the name of the
[illegible]
known and [illegible] by some
[illegible]

[illegible] usually [illegible]
[illegible] [illegible] speculation.

[illegible]
[illegible]

open sea or current conditions. Temperature of the water is of greatest value and the prawns follow cool and cold water conditions into the depth. Tongue in areas of warm temperature these are found in the shallow water while the cool temperature ones in the deeper water waters.

[illegible] are in [illegible] and [illegible] these are known as [illegible] of value in [illegible].

Cushman gave the [illegible] point out that the Murrere has [illegible]. [illegible] they are [illegible] and [illegible] that they [illegible] [illegible] [illegible] [illegible].

Many [illegible] are all [illegible] [illegible] [illegible]. are not long [illegible] as in [illegible] especially in [illegible].

[illegible] [illegible] in [illegible] [illegible] [illegible].

Cushman told me that Costa [illegible] [illegible]

many in [illegible] and at many –
[illegible] the game. They
have now decided [illegible]
[illegible].

[illegible] about by
[illegible] and using the correct form
[illegible] after [illegible].

They [illegible] in college conditions
[illegible] advantage.

[illegible]
[illegible] the
[illegible] system, [illegible] of
[illegible] the [illegible]
[illegible]
[illegible] the [illegible] of the
[illegible] [illegible] [illegible]
[illegible] [illegible] in [illegible]
[illegible] decided.

Washington, D.C. Dec 8 Friday

Attended all day the sessions before the [illegible]. The first was by Emmons telling about the Research Council in [illegible], followed by full account about the Biological Abstracts Journal. I followed it by a resolution endorsing the project and advising [illegible] that [illegible] under the [illegible] [illegible]. It was adopted by the Society.

From [illegible] I knew of [illegible] that the Hell Creek goes into the Lance, this into the Ludlow of the Red River and that the Lance and Ludlow in eastward into the Cannonball marine. Therefore all these things are Cretaceous, and the true Cretaceous-Tertiary boundary lies between the Fort Union and Lance!

In the afternoon [illegible] heard an abstract of Williams' paper on the history of the [illegible]. [illegible] [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible]

[illegible] into the Medit-erranean [illegible] there are [illegible] area [illegible] Tertiary time, and [illegible]

Washington. 10-17-1903. Saturday

[illegible] at the National Museum [illegible] in the [illegible] [illegible]

[illegible]

[illegible]

[illegible] Camberley [illegible]

[illegible]

[illegible] [illegible] extending west the effect [illegible] of the north where the [illegible] [illegible] [illegible] [illegible] of sand sediments. [illegible] [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] with [illegible] [illegible] [illegible] [illegible] that [illegible] is correct.

[illegible] [illegible] [illegible] the [illegible] was a very similar sequence to that of Franklin [illegible], [illegible] [illegible] [illegible] [illegible] north area.

Tampico Area [illegible]. Has here about 3000 feet of shales and marls almost devoid of large fossils. The upper 1000' has an abundance of pelagic forams, while the lower 2000 has bottom forms. The upper series is of the Cret (about Austin chalk) and is called the Velasco. It has 700 forms of forams. The lower series is the well known Papagallos formation. Hand wells are put down to 150 feet and so the forams are collected.

Washington, Dec 30 - 1923 Sunday.

[illegible] with the [illegible], [illegible] [illegible] the first homes of Washington, built here when the [illegible] was a [illegible] [illegible].

Talked geology and [illegible] until midnight.

In the afternoon went to the Union Station and purchased a ticket on B. & O. to Cincinnati, where I will arrive Tuesday morning at 8 o'clock.

[illegible] paper on the Silurian was to the effect that [illegible] of the [illegible] [illegible] and [illegible] is of Clinton time. Some in Alexandrian. Had a fine series of sections worked out in detail, especially valuable in the detail [illegible] the appearance of the [illegible] from west to east.

Washington, D.C. Dec 31 1923. Monday.

Had a cab take me to depot to check my baggage, and then up the Interior Building to see Smith's office. He is at work on a geologic map of Mexico. The top. of it here is the topographic work, as there were none made before. The map is about finished.

Spent the rest of the day in the U.S. Geol. S. library reading the Bul. American Ass. I suppose I will have to subscribe to it. Miss LeVenes translation of Dieners paper is accredited to me.

Looked up this journal mainly to read Dumble on the value of forams in sub-surface correlation. Copied out all I will want.

At 4.35 P.M. I am off for Cincinnati.

Cincinnati, O., Jan 1 1924 Tuesday.

Arrived a half hour late (8.35) because the depot is too small to get the train in and out on time. Albert and his daughter was there to meet me, and in their car to take me to 3937 Regent Ave. Norwood, O. Passed through Eden Park on the very ground where I did my first collecting of fossils.

At 12.30 we were at Emma's and in a family reunion and dinner. Talked, sang, listened to Victrola and Radio. I can make little out of the latter since my hearing is too bad to get a connected whole. Emma's radio besides is faint and the disturbing noises are enough to make difficult for me.

It is the first day of winter and the thermometer is down to 4°.

At 10.30 we are back again to Albert's home and soon we are all retired.

Cincinnati, Jan 2-1924. Wednesday.

Wrote letters in the morning (Evans-LeVere) and at 12:30 met Phil and Albert at the Newall Hotel on Seventh St where we had lunch. Then looked about town and 5 P.M. called for Phil at the Schultze Bottling Co. Then in his car to his home where I stopped over night.

Had my initiation to radio. Did not like it because of much static noise and other noise.

Cincinnati, Jan 3, 1924. Thursday.

At 9 A.M. Phil and I in the former's car got the Battery, then visited the [illegible] Art Gallery, and had lunch with Phil and Al at the Newall Hotel. Then to Al's home at Norwood. At 7.15 Al's daughter takes me in her car to the depot and at 8 P.M. I am off for New Orleans.

On the Way to New Orleans
January 4 – 1924. Friday

At about 7 A.M. we are at Chattanooga near the Tenn. Ala. line. It is deeply cloudy and the land is covered with a white frost. The rain of yesterday has a thin coating of ice.

At 10.15 we are at Birmingham, Ala with a flood of bright sun-light. Frost is also here but less decided.

It is same old world that I saw for the first time nearly 30 years ago. The villages have no beauty and are composed of a lot of [illegible] shanties built on stilts or open beneath. The forests are all of young timber and the farms in the main of corn with some cotton fields. It is a poor country. Chattanooga I did not see, but Birmingham is a great industrial center having back of it the Clinton iron ores and the coals and limestones of the Pennsylvanian.

At [illegible] we are at Tuscaloosa, Ala., a low rolling country with a thick red soil in which are abundantly small light colored pebbles or concretions. These are the Cret. basal sands.

At Akron, Ala. low pen-palms come in showing that these plants may be expected on the edge of climates with winters. Here they are up to 3 feet tall, but the leaves are as full grown as in southern Florida.

For miles to the northeast of Meridian we pass through what appears to be basal Cenozoic, dark-blue clays, some of which are almost black. We are at Meridian at 2.30 P.M. The country is less rolling and more flat.

We arrive at New Orleans on time.

New Orleans, Jan. 5 - 1924. Saturday.

A dark very windy cold day. It is cheerless to be out. Visited the State Museum on Jackson Square; looked for birds and mammals, but was about a failure. Museum no credit to the state, in an old, but historic building never intended for a museum. Had lunch at Jansen's, advertising Creole cooking. As Creole means good I thought I was going to get something fine, but it was only passable. All in all New Orleans has no charms for me. A quaint place, it is true but more or less a slum, or at least shabby, used up. When will the "South" ever pick up and bring itself abreast of the times. Many streets have gardens down the center, but the trolley lines have taken possession of many of them. Even these have no attention, and even trees or palms in [illegible]. The stores in the Old French Quarter are all small and most of them uninteresting and dirty.

Houston, Texas Jan. 6 - 1924.
Sunday.

Left New Orleans at 9.15 over the Southern Pacific and got to Houston at at 6.05 twenty minutes late. Stopping at The Rice Hotel, a fine one, and the room with toilet but without bath (514) costs $3.00 per day. Not at all expensive. Dining rooms at all prices, from Coffee Room and Caffeteria to Ladies Dining Room.

A little ice stands in the water this morning and the day is cold for this region, the paper says that yesterday was the coldest day in 30 years.

Houston, Jan 7-1924. Monday.

Called on R. T. Baker in the Texas Co. building a little before nine A.M., and was with him and Miss Kniker until 5 P.M. Had a most instructive day looking into the value of foraminifera in subsurface correlations. They are very successful in spotting horizons with them and then well logs, led to an unexpected stratigraphy connected with the salt domes. These are rising domes ever since Jackson time and appear to be still rising. The Jackson and Oligocene strata pinch out against these old lands - islands and headlands in the sea.

The Forams are usually common and well preserved, but [illegible] or wear due to washing them out of the muds.

Houston, Jan 8-1924 Tuesday.

Called on Deussen and his lady woman worker (Miss Lane), and spent in the morning with them.

Then had lunch at the University Club with about a dozen of the Houston geologists. Baker gave the lunch. Present Humble, Deussen, Pratt, Applin and his wife (Miss Richards) Miss Kniker, Miss Ellisor, and several others.

Went to the Southern Pacific R.R Building to see the Pal. Lab. of Rio Bravo Co. Here the Dutch geologist Van der Gracht turned up. He is now connected with the Marland Co. and is of course much interested in Cushman.

In the evening there was a gathering of the clan at Baker's home.

Houston, Jan 9, 1924. Wednesday.

Called on Mr Pratt in the morning and then he explained to me the Goose Creek oil field — a sinking area now partially submerged by the Gulf waters. A few years ago a part of this area stood about 1/2 feet above the sea and is now about 1½ feet beneath the sea. There are faults in two places on either side. The land now sunk belongs to the State of Texas and since it is full of oil is very valuable. If the sinking is due to the [illegible] oil is out and [illegible] the Humble Co. [illegible] ownership. I think the sinking is due to the oil extraction, and [illegible] isostatic [illegible].

Then called on Miss Ellisor and talked [illegible] until noon.

[illegible] gave me a dinner party at the [illegible] Club with Pratt, [illegible], Vander [illegible] and other Humble men.

Then called on Mrs. Applin (married 3 months) and talked [illegible] the [illegible]

Houston, Jan 10-1924, Thursday.

Called on Baker in the morning and he had lunch with me at the Rice Hotel.
Read and drafted work mostly the afternoon.
Visited the Bakers in the evening at 571 Drew Ave
At times the air this morning was full of snow, but none lay on the ground.

Houston, Jan 11-1924. Friday.
Baker brought me the first mail from Minn. since on the trip. Wrote letters to J. M. Clarke, Dee Bolger, Phil, and Le Vere
The Applins and Mr. Baker had lunch with me at the Rice Hotel.
The Pratt trip is off. He has dates that cannot be side-tracked.

that cannot be [illegible]

At 5.30 [illegible] and [illegible] the Southern Pacific R.R. We had dinner [illegible] the depot, and at 10.40 P.M. [illegible] in Tucson. It's the Sunset Route on the Sunset Limited.

Enroute to Tucson, Saturday
January 12 1924.

It was after 4 P.M. when we [illegible] San Antonio. Got up at 7.30 in a bright [illegible] morning. All is a sage brush plain with [illegible] and then [illegible] residual hills but not like mountains. The homes are [illegible] with bunches of cattle here and there. No water in sight but wind pumping wells, are to be seen in places.

[illegible] mile [illegible] the usual rattle of the [illegible] [illegible] [illegible] [illegible]

[illegible] there [illegible] and a town del Rio. Occasionally we see a cotton field in which the dried and dead stalks we hardly [illegible] tell. Outside of cattle raising the other [illegible] making a living is impossible.

West of Del Rio the Comanchian is well exposed along the banks of the Rio Grande and [illegible] river. The strata west lie in almost horizontal [illegible], but gradually become undulating with dips up to five degrees, and locally as high as ten degrees. All is white chalky, muddy limestone. On the plain above the river are scores of residual hills [illegible] in sight.

We cross the Pecos River over a high steel bridge 321 feet above the river. It is an entrenched river in the Comanchian, the lower 200 feet of which is heavy bedded chalky limestone and the rest thin bedded limestone. The river itself is narrow and very dirty yellow. The walls of the limestone are nearly vertical in the heavy bedded limestone, old and dark gray in color with here and there bright places caused by the nearly yellow [illegible].

[illegible] about

It is a [illegible] [illegible] topography [illegible]

above a decidedly undulating in the thin

bedded formation [illegible]. The [illegible] [illegible]

of a semi-arid [illegible] [illegible], [illegible] of grass and

and cacti. The trees [illegible], and [illegible]

[illegible]

[illegible]. The ridges

are [illegible] at the [illegible]

[illegible]

[illegible]

the [illegible] and the shale [illegible]

[illegible] Then [illegible] in the

[illegible], but anyone if [illegible]

[illegible] undulations [illegible]

[illegible] [illegible]

[illegible]

[illegible] [illegible] raining and

[illegible] [illegible]

[illegible] and [illegible]

[illegible]

[illegible]

[illegible]

and the escarpments are getting still higher. From Jenkinson to Emerson there is [illegible] and screes and are, the mesas are about horizontal. Then the whole escarpment is [illegible] shapes and at Jenkinson it is about [illegible] the [illegible] and [illegible]. Evidently the [illegible]
[illegible]

[illegible] arrived west I see sandstone?) [illegible] imbedded in little [illegible]. —

[illegible] are not [illegible] horizontal. If [illegible] recent [illegible] a [illegible] [illegible] [illegible], since all [illegible] [illegible] exposures.

To the east and west of [illegible] are fine exposures. Here the cliffs of [illegible] rise up to 1000 feet above the valley. In places ~~the~~ the aggregation [illegible] dip about 13 degrees. Doubtless [illegible] date, though they appear [illegible] Cliff appears like one [illegible] the series, and [illegible] get [illegible] shatter. A few miles, [illegible]

[illegible] find escarpment [illegible], and [illegible] Plain [illegible]

[illegible] fragments

A [illegible]

great

[illegible]

Comanchian

~~[illegible]~~

[illegible] 71. about 50

Tesnus

then bedded [illegible] series,

[illegible]

Tesnus

[illegible] to the north east

[illegible] Comanchian.

[illegible] fragment and [illegible]

[illegible] ted

Tesnus [illegible]

[illegible] Tesnus – Comanchean unconformity.

[illegible]

[illegible] ledges

[illegible] To the north a few miles [illegible] igneous [illegible] (drawing) [illegible] vertical while farther north [illegible] to the west [illegible] Permian [illegible]

[illegible] it appears to me that [illegible] The Paleozoic Comanchian Series [illegible] from the west [illegible] Old Paleozoic nucleus and [illegible] to the eastward as [illegible] earlier and noted above.

Definitely [illegible] along the ledges [illegible] in clouds that make [illegible] melt away [illegible] They make only the [illegible] light [illegible] illumination.

At [illegible] west [illegible] to the north of the [illegible]

[illegible]

Finally a little farther west the strata appear to dip gently; how can this be correct?

[illegible] the surface, [illegible] these Cretaceous? The newly made auto trail here [illegible] has [illegible] exposed [illegible]

[illegible] at least [illegible]

[illegible]

[illegible] dips. [illegible]

[illegible] or fronting Evidently [illegible] of a young igneous series.

The second [illegible] Red [illegible]

[illegible]

[illegible] No.

[illegible]

seem to be [illegible] flows and volcanic necks. ~~Can [illegible] [illegible]~~ ~~[illegible]~~ ? It is all a [illegible]

[illegible] [illegible] [illegible] rests

It is [illegible] [illegible] [illegible] quite series, [illegible] Cenozoic from the volcanos [illegible] [illegible] [illegible] [illegible].

At [illegible] [illegible] [illegible] [illegible] [illegible].

4692 [illegible] [illegible] [illegible] at 5082 feet. [illegible] [illegible] [illegible] on a wide plain into which the drainage is [illegible] [illegible]. Pop. 3550. [illegible] [illegible] [illegible] [illegible].

[illegible] seem to be lying over Cret. and Cenozoic rocks upon which have been deposited volcanic flows. Some must have been volcanoes, but all are now greatly eroded [illegible] the lava flows [illegible] [illegible].

When the sun set the [illegible] to the north were finely silhouetted and curving to the north [illegible] Bem Then [illegible] [illegible] the

Colors of the [illegible] below leaden gray afar and into a [illegible] blue that verged into purple, the red into yellow that [illegible] into the blue of [illegible] [illegible]. [illegible] Smith [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] all [illegible] [illegible].

Tucson, Ariz. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] we could [illegible] [illegible] [illegible] [illegible] and [illegible] good [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] [illegible] may [illegible] [illegible]

ook [illegible]

[illegible] subtropical plants. All irrigated.

[illegible] and much of Arizona's [illegible] and metal [illegible]. The [illegible] like a Russian. Her father originally came from Holland and settled in Russia [illegible] years [illegible].

After [illegible] Ransome [illegible] the [illegible] nine [illegible] Tucson [illegible], and all of the [illegible] land is [illegible]. The [illegible] an Archeozoic granite, another [illegible] and a third one of probably late Cretaceous age. [illegible] Pinal [illegible].

The Pinal schist is the basement of Arizona and is of the same general age as the Vishnu of the Grand Canyon. It is cut by granites and diorites.

Tuscon, Jan 14-1924 Monday.

Spent the morning at the Univ. [illegible] with Lawrence, Dean Butler, and Stoganow.

To morrow I am to look up rooms to live in.

Met the State [illegible] ist, Dr. Lawson and his assistant Wilson. Also met the entomologist David, born in New Hampshire. And instructor Agnes. The speaker of the [illegible] of the University.

Spent the afternoon reading.

To my surprise Dean Butler put up a dinner party for me at the club. He had [illegible] the Manager of the [illegible] of the U.S. [illegible] who have a station [illegible] and [illegible] in the [illegible] dinner.

Tucson, Jan 15-19[illegible], Tuesday.
6

Last night made an appointment with Dean Butler to meet him at 10 A.M. Waited on him this morning to find out his future for me. At about 11.30 he took me to Astronomy [illegible] to see if [illegible] the room [illegible]. [illegible] room [illegible] (Mrs Douglas' teacher Spanish) would not rent for less than 5 months. So gave up the chance to get into a living place near the University, and then made arrangements to take room 220 in the Santa Rita hotel. Moved in in the early afternoon and unpacked all of my baggage. Then wrote to Jo Vere and Emma.

The room is to cost $50. per month, otherwise 2.50 per day.

Tuscon, Jan. 16-1924. Wednesday.

Wrote all morning on the Foram paper. In the afternoon walked out to the Univ., and at 1 P.M. we are off in a Univ. car 15 miles N.-W. on the Silver Bell road, and then through a gap about 2 to 3 miles W. to a mountain (= Picacho de la Calera) having at the base mica schist = Archeozoic, on which lies a thick series of Cambrian quartzite. Then follows 100 to 200 feet of thin and thick bedded limestones with some sandy li. and apparently some shale partings between the li. Some of these li. are dense like lithographic stone but mostly it is more or less granular. These granular layers are replete with comminuted trilobites, small Lingulellas, and Acrotreta. I would not be surprised if a fauna of [illegible] exists here, but it will take [illegible] to identify the specimens. Much of the trilobite parts are the thick ones like the [illegible] free cheeks and the [illegible], Olenellus, free cheeks and tails are [illegible]. [illegible] appear [illegible] much worm burrows. Some of the smooth surfaced slabs [illegible] current markings.

The contact [illegible] limestone [illegible] [illegible] [illegible] [illegible] [illegible] between the lower and upper I was within 3 feet of actual contact, and yet there is not the slightest evidence to separate the two series (Later, I do not think this is Ransome's idea).

The Cambrian limestone looks to me very much like the [illegible] that I worked up in Nevada about 30 years ago. It is therefore all [illegible] Cambrian, and is all unmistakably the same sequence I saw a few years ago in the Grand Canyon = the Tonto series (Tapeats ss, Bright Angel shale, Muav li.).

The Cambrian appears to end with reddish sandy limestones that also abound in trilobite fragments.

Then follows either a thin quartzite or the [illegible] in thick-bedded magnesian [illegible] magnesian

limestones. I soon had a loose piece of Li with a cup tetracoral and crystalline stem that may have been Cridiphyllum. From Mr Wetter, the student with us, picked up a good but small Atrypa reticularis missouriensis, and later we got the [illegible] in the [illegible], and Spirifer whitneyi. This then made it clear that we have [illegible] rocks around [illegible] [illegible] magnesian limestone [illegible] [illegible] [illegible].

We followed a vertical wall of the limestone that I suspect is the Madison limestone. All but [illegible] [illegible] were too small [illegible] [illegible] [illegible]phyllum; [illegible] [illegible] [illegible] dumbella. [illegible] by [illegible] the [illegible] with their [illegible] [illegible], I [illegible] at the time [illegible] that [illegible] [illegible] to lie above the Devonian.

All [illegible] [illegible] stand vertical, and all was folded [illegible] [illegible], necessarily this must be close [illegible] [illegible] the Cretaceous.

Tucson, Jan. 17 - 1924. Thursday

Worked all day on the foram paper. Wrote a letter home and to Vere with enclosures.

Jan. 18 - 1924. Friday.

Worked all morning on the foram paper. In the afternoon walked out to the Univ. and called on Ransome and [illegible]. Then wrote letters to Vere, David White, King, and Baker.

Jan. 19 - 1924. Saturday.

After noon spent about 1½ hours in South Tucson, in the vicinity of the Catholic Mission on South Sixth St. All about here the streets are graded through a few feet of Caliche. Gathered several samples to show the nature.

Here the caliche is essentially [illegible] an earthy, cavernous limestone deposited

[illegible] essentially [illegible]
an earthy porous limestone deposited
with some irregular horizontal layers, partly stalagmitic. On vertical
exposures one sees a general vertical stria-
tion of the rock due to the crowded vertical
canals the large of which are from 2/8 to
3/8 inch in diameter. It is probably down these
channels [illegible] the water [illegible] the
[illegible] goes, while through the granular caliche
passes up through capillarity the ground water. In
places the rock takes on a bedded nature
with smooth layers some of which take
on the vertical tube structure seen in stalag-
mites. If the water descends [illegible] a mass
of loose material or rock rubble [illegible]
the whole [illegible] cemented [illegible]. Caliche
is [illegible] in many places in the
[illegible] granular and earthy [illegible] vertical
channels and horizontal layers [illegible]
[illegible] are never wide
[illegible] a few inches and
[illegible]; in the [illegible]
[illegible]
[illegible]

In the afternoon Dr. [illegible] took me about 13 miles [illegible] of Tucson to [illegible] [illegible] to the south side of the Ajo Road. The place is an [illegible] of limestone [illegible]. [illegible] is in Upper Pennsylvanian, and [illegible] 200-300 feet of [illegible] dark-blue limestones are seen. The [illegible] are [illegible] of this [illegible]. While these surfaces [illegible] or lateritic soil they must have [illegible] along which the [illegible] and collecting [illegible]. The place has been [illegible] or that all [illegible] had been taken away. [illegible] small [illegible] and *[illegible]* are the common forms. Several species of *[illegible]* occur, and they are the real guides to the horizon. In the higher beds a large [illegible] *Euomphalus* is common, and beds 2 to 3 feet thick are made up of Fenestellids standing as they grew. In places Archaeocidaris spines are common. I saw no Fusulinas, but some [illegible], all small, are exceedingly rare. [illegible] are [illegible]. Probably there is considerable of a fauna here, but was not chance to get them as [illegible] others. This horizon must be in the Permian, possibly the Huecoan.

I was much interested in the weathering of these limestones. Due to the intense heat of summer they break in a peculiar manner and into these joints [illegible] and weathers [illegible] manner. See the [illegible] samples taken. The [illegible] are pitted and filled with solution cavities as in humid climates. [illegible] since the rainfall is very slight. [illegible] with [illegible]. The whole region is [illegible] of interesting [illegible] the [illegible] distinctly in detail [illegible] worked out with the [illegible].

[illegible]

one sees that the dip [illegible] of the
[illegible]
[illegible] and
[illegible] in the limestone on the
[illegible] in many slopes.
[illegible] beds.
[illegible] in all
directions, for such is a [illegible]
[illegible] as such
[illegible] much [illegible] deposits
[illegible]. Probably as they go down
the talus as they loosen by channeling.
We then [illegible] after
east on the [illegible] near to the western
side of the Tucson Mts and in [illegible]
the [illegible] in the Comanchean deposits.
The strata appear to be in the main
dirty sandstones or sandy shales of a
brownish color on the surface. Here
occurs an agatized tree about 30"

[illegible]

in diameter and 15 to 20 feet is exposed. Todd [illegible] of it. Near this log are laminated and brecciated limestones in their [illegible]. A [illegible] [illegible] [illegible] very fine and [illegible] [illegible] [illegible] proved to be a quartzite! Of all these things I took samples. We were [illegible] [illegible] [illegible] Horace [illegible] [illegible]. We looked for marine fossils but [illegible] [illegible] any leaves, or wood [illegible]. [illegible] [illegible] [illegible] [illegible].

The Carmelian must be very thick since we saw it across the [illegible] for more than two miles. The strike is about N-S, and [illegible] [illegible] E, about 25 to 35 degrees.

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] becoming [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] and the sheet washing.

Jan 20 1924, Tucson, Sunday.
Wrote letters to Betty, Lawsons and
[illegible]

[illegible] mild on small historical [illegible]
[illegible] had [illegible]
[illegible] 8 P.M.

[illegible], Sunday, Tucson,
[illegible] ms of Aram Yapa to [illegible].
[illegible], no 10500 U.S. Pat. [illegible]
[illegible] on [illegible] up to
4 P.M. Then walked west to the Tumamoc
[illegible] black basalt
[illegible] age. The
[illegible] specimens of lava are from the [illegible]
[illegible] quarry, [illegible] climbed to the
[illegible] with the great letter A on
it, built by the students of Univ. of Ariz.
[illegible]

1

[illegible]

till, the city of Tucson and the city wide [illegible] Hillgrove [illegible] in front of the Santa Catalina mountains.

Jan 22-1924. Tuesday. Tucson.
Worked all morning on Dict. Ed.
In the afternoon, walked out to Univ. Saw Ransome, Lawson and Brown. It is arranged that I go with them on Thursday to the [illegible].
[illegible] called in [illegible] and arranged the lantern slides he has. Telegraphed Huntington to send me all lantern slides [illegible] of mine at New Haven, [illegible] from Huntington the [illegible] lantern slides.

[illegible]-1924, Wednesday. Tucson.
Worked all morning [illegible]. Finished [illegible] chapter. After dinner walked [illegible] not, [illegible] around all the buildings

seem on me.

The station is on the side of one of the smaller hills, but is made up of ? Quaternary formation. As I walked over the slope I saw that all the larger boulders are subrounded to rounded [illegible] by [illegible] [illegible] in several hundred feet. The smaller stones are more or less angular. A little below the surface all the detritus is cemented together by the [illegible] caliche, & that this material makes as well on the sides of lava hills as on the mesa. [illegible] the lime is to be deposited by the rain waters and not from subsurface [illegible] waters.

The [illegible] grey-lava in weathering often breaks up into thin slices, 1/2 to 3/4 inch thick, and then looks like bedded sedimentaries. It breaks horizontally across the lava

January 24-1924, Thursday.

This is to be a great day. Lausen and Wilson of the State Bureau of Mines are to take me to the [illegible] Mts, about 50 miles north west of Tucson, or about 10 miles N.W. of [illegible]. At 8.45 A.M. we start from the Santa Rita hotel in two cars. In one wagon - Fred Lausen and I go, and the [illegible] Wilson, Ransome, Steg-mann, and a [illegible] [illegible] came out here because of his wife's health. [illegible] [illegible] he discovers that [illegible] [illegible] infected with consumption.

We go via the [illegible] road [illegible] out of Tucson. We had [illegible] [illegible] [illegible] over the city wide [illegible] [illegible] the western Tucson Mts and [illegible] the [illegible] [illegible], and [illegible] [illegible] [illegible]. Much of it is covered with a coarse growth of grass, brush and a few desert trees. In other places without any apparent change the plants are mostly of the Karoo varieties. Nearly everywhere [illegible] the general [illegible] Caliche is [illegible] exist, and certainly from the [illegible] road it looks the same.

When we set to Vial, 21 miles, S.E. the road to then passes through a series of a sort of hard layers [illegible] but with the [illegible] more rounded. These are [illegible] slightly deformed, either late Pliocene or early Pleistocene continental deposits that are distinctly bedded, giving the first information that the climate was more humid than now. These are unconformably overlain by very recent continental deposits.

After going through these hills for about 8 miles we came out upon a Pre Cambrian granite of very wide extent. This large crystal, pink granite, weathers up readily into an area of low and rounded hills.

an arkose of low and rounded hills.

Nowhere does the granite weather out, into boulders, as in the common occurrence, into great rounded boulder masses, but because of the large and easily [illegible] crystals breaks down into an angular and gullied arkose. Here the ground is bright red in color due to the [illegible] feldspars of the granite. Where the granite is [illegible] at the surface it is seen that it grits [illegible] [illegible] [illegible]. In places the ground has much white vein quartz out of pegmatite veins. In other places and [illegible] the granite takes on a very small eq[illegible] [illegible] [illegible] breaks, [illegible] freely.

We go [illegible] [illegible] 20 miles [illegible] [illegible] granite [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] [illegible] as Sandstone and here [illegible] [illegible] [illegible] and [illegible] to the [illegible] [illegible] Mts. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] that goes like [illegible], [illegible] regulation [illegible] in evidence, [illegible] [illegible] [illegible]. [illegible] up the slopes come in small live oaks and junipers. This at about 4000 feet above the sea. The thorny oachalias are still here, but [illegible] in size, & no thorny are [illegible] [illegible] [illegible]. Echinocactus or Carnegieas to be seen.

Over the [illegible] planed granite comes in a [illegible] mottled red and white and [illegible] of masses of quartz and mineralized vein- [illegible] [illegible] up to the [illegible] of [illegible], mica is present and [illegible] some felspar. For it is an arkose directly derived from the [illegible], [illegible] [illegible] [illegible] (see the specimen). Then comes [illegible] quartzite, [illegible], followed by [illegible] [illegible] [illegible]. It is all distinct bedded, marked by narrow zones of [illegible], cross bedding, and is often laminatedly varying dark and pink yellows. Here and there are zones of small well rounded pebble conglomerate.

The [illegible] through something like 300 be seen through something like 700

feet of this Cambrian quartzite, when it gradually [illegible] into [illegible] [illegible] of [illegible] [illegible]. In the sandstone surfaces are large fucoid casts and [illegible] holes, but these are not [illegible]. These [illegible] also occur in the [illegible] [illegible] more [illegible]. These shales are some hundreds of feet thick (? 300 to 400).

Then comes in a thick series of thin [illegible] and pure limestone. This zone is also some hundreds of feet thick. [illegible] [illegible] but are well developed & [illegible] [illegible] trilobites [illegible]

fossil

[illegible] middle and [illegible] [illegible] are [illegible] in [illegible].

All in the [illegible] and the rock [illegible] [illegible] [illegible] [illegible] [illegible] of the Siluri[illegible] [illegible] of [illegible] [illegible] [illegible] [illegible] Silurian rocks, & [illegible] [illegible] [illegible] [illegible] [illegible] Ozarkian [illegible] were in the [illegible] [illegible] could be [illegible] a [illegible] collection, and in the [illegible] of [illegible] specimens.

Near the base of the shale, glauconite is common in the [illegible] green [illegible]

[illegible] [illegible] the [illegible] Upper Cambrian [illegible], are dark blue magnesian limestones. These are marked by an abundance of [illegible] altered [illegible] Stromatoporas (small heads) Cladoporas (stems not thick), Atrypa reticularis, and other things that may be bryozoans or small Cladoporas. Clearly these are Devonian in age. Higher appear commonly beds of Atrypa [illegible]-

[illegible] numerous beds of [illegible] in [illegible]

[illegible] with one Streptelasma and a little of crinoidal matter.

Over the [illegible] comes in a thick series of [illegible], but the contact [illegible] was not made out in any good exposure. [illegible]

common (a [illegible] 7 or 8 inches long was seen), and large [illegible] like [illegible] are not rare. Also small [illegible] like [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

specimens
Here is [illegible]

[illegible]

[illegible] make up the [illegible]. The best guide fossil well on [illegible] siliceous walling [illegible] [illegible] [illegible] [illegible]. We [illegible] lay in the [illegible] [illegible] and also [illegible] [illegible] [illegible] the true [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] another, and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] silicified. Later

we got silicified ones on Feb 15 1926.

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] or more.

Beyond and at lower levels [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] cliffs. Davis measured about 1600 feet here [illegible] [illegible]. The [illegible] thrust faulting [illegible] [illegible] true thickness may be [illegible] 5000 feet. Allen told me he saw many "oyster like shells". Can these be Gryphaeas?

Can these be [illegible]?

The Cambrian sea came in as a sand flat of very shallow water, and it so continued into the shales, and the limestones. In the latter occurred zones of intraformational conglomerates, the pebbles were flat up to ½ inch thick and in length up to 3 inches. All the edges were rounded. Also several zones in which the pebbles are well rounded and black (see the two specimens) and at first of mottled stone in all face, these may be bottom rolled pebbles like those of Saratoga. Then the sediments and especially the conglomerates, along with the comminuted nature of the fossils go to prove that these sea bottoms were often churned up and rolled into the flat pebbles and intraformational conglomerates. These waters were hardly over 100 feet in depth. We are here dealing and as well also in the Grand Canyon region with shallow water of a flat sea bottom. The land everywhere appears to lie to the east and north. The southern and western shores must lie far away.

January 25–26. Friday – Saturday
& Worked on the [illegible] hill. C

Jan. 27, 1924, Sunday.
Worked all morning on the [illegible]

Had to dinner Dr and Mrs [illegible] and [illegible] evening. From the [illegible] are [illegible] southern base, the Santa Catalina Mts just north of the University. Going north from the Tucson Plain [illegible] rises to a certain level [illegible] have gone down to the Rillito bed. [illegible] is [illegible] dry [illegible] Rillito bed. [illegible] rises out of it and then the gravel-boulder-sand topography is everywhere much dissected and much overgrown by the great display of the giant Suhuaro cactus. The rocks are here all ancient gneisses, granites and schists from the Mts. There is no caliche here. Yesterday on the [illegible] just out of Tucson I saw the same kinds of rocks but in much smaller sizes. To me it is plain [illegible] there was no Rillito Creek and [illegible] the Sabino [illegible] regularly to Tucson and in this way the gneisses of the Santa Catalina [illegible] to north Tucson. The climate must then have been drier with no outflow into the Santa Cruz, and [illegible] [illegible], there was no Santa Cruz river. Recently the climate has become moister and the streams we now see are cutting thru the [illegible] [illegible] the Sabino, [illegible] the [illegible] the [illegible] into the Rillito [illegible]. [illegible] some interesting physiography [illegible].

[illegible] are [illegible],

[illegible] and which

[illegible] not [illegible] intended for [illegible]

[illegible]

Jan 28-1924 Monday. Tucson.

Worked all day on the [illegible]. In the afternoon walked out to the south-west [illegible] Tucson among the adobe houses of the Mexicans and Indians. We [illegible] the best caliche cut [illegible] the place visited Jan. 19. This cut is a street [illegible] being a grocery store! [illegible] tubes are due to [illegible] and it omits some of these tubes. [illegible] back to the place and get a sample of it since it is the best I have seen.

I did get a [illegible] on Jan 31 and the [illegible] in the [illegible] tubes [illegible] no plant. [illegible] Blake is [illegible] in saying that the caliche is nearly always capped by a dense layer. It is here from 12 to 18 inches thick. On the [illegible], the reddish soil

[illegible]
the reddish soil

Jan. 29 - 1924. Tuesday. Oracle.

Stoyanow in a Ford called for me at 8:30 a.m. and we are off for the day to see the Cambrian on the north east side of the Santa Catalina Mts. We go north on the Florence road to Walnut Tree Ranch, 20 miles north of Tucson, and then east to Oracle (37 miles n.e. of Tucson) and east of Oracle [illegible] miles farther. Here we visit a part of "Pepper-Sauce" Canyon. Here the Upper Cambrian is a series of quartzites mainly in thick beds, many of which are clean and white quartzites. [illegible] are [illegible] less decidedly cross-bedded. Finally towards the top the [illegible] 200-300 feet are [illegible] and are [illegible] muddy [illegible], dirty [illegible] quartzites that have [illegible]. [illegible] saw fragments [illegible] [illegible] [illegible] Later he told me he also had Cambrian. [illegible] the quartzite series [illegible] 1500 feet thick. [illegible] below [illegible] is [illegible] of a simple ery coarse conglomerate, many of the pebbles are from 2 to 6 inches long and all are well rounded, Pebbles and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible], [illegible] rocks and shale [illegible] [illegible] conglomerate, etc), and there is [illegible] granite or [illegible] [illegible]. The basal three feet is a coarse sand with occasional pebbles but above that the whole mass is a [illegible]. [illegible] it is distinctly bedded and [illegible] [illegible] beds are [illegible] [illegible] [illegible] [illegible], [illegible] there are several [illegible] [illegible] [illegible] [illegible] its total thickness. It marks the base of the Cambrian [illegible].

Directly on the Cambrian rests the dark blue magnesian limestone of the [illegible] [illegible]. Less than 3 feet above the base we have an abundance of Eridophyllum, some small cup corals, Schizophoria striatula, Atrypa reticularis and possibly [illegible] woodmani. [illegible] was not determined but seems to be some hundreds of feet thick.

Higher comes in the [illegible] [illegible] in [illegible] of Cyclonema &c. We also saw [illegible] [illegible] and [illegible] [illegible].

There is [illegible] [illegible] of [illegible] here

[illegible]

Below all is a vast area of coarse [illegible] [illegible] "Pre-Cambrian" in age, probably Archeozoic. [illegible] many miles [illegible], Oracle [illegible] [illegible] in [illegible] [illegible] [illegible] miles. It is the same Pre-Cambrian granite [illegible] [illegible].

[illegible] all along [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible]

[illegible] [illegible] [illegible] a sample [illegible] material, [illegible] Oracle [illegible].

Showed samples of the big conglomerate and the slate beneath it to Ransome. He did not know what to make of it but said it would be either the equivalent of the basal Cambrian conglomerate seen in the Whetstone Mts, or another conglomerate that is underlain by slate and quartzite which Ransome calls Barnes congl., pre-C, but which Darton refers to the Paleozoic. I rather think Ransome is correct. In any event we intend to return to the Pepper-sauce Canyon with Ransome and work the thing out.

Jan. 30 – Feb 4 1924.
Worked most of the time on the text-book.

Feb 5-1924. Tuesday, Tucson,

Today at 11.40 A. M. gave my first lecture to about 20 Mining Engineers. Had to do with Inorganic and Organic Matter. The young men were much interested and I had their attention to the end. Stoyanow said to me "It is evident that I shall learn much from your course of Hist. Geology." Besides I had one of the Instructors in Geol. Mr Ayres and an old prospector. Also Lawyer Eastman.

Worked all afternoon on the book.

Will lecture each Tuesday and Thursday at 11.40 A.M. and Wednesday at 8 A.M. for the next 5 or 6 weeks.

Feb 6-7-8.
Worked on Text-book.

Feb 9 - 1924. Saturday. Tucson.

At 8 A.M. I am at the University and join Stoyanow with about 15 of his students to go in a open truck to Picacho de la Calera where I was on Jan. 16.

First examined the supposedly Pennsylvanian lis, and after hunting for fossils in two horizons failed to see a single diagnostic good one. Saw Productus semireticulatus, and a large Spirifer that may be S. cameratus. The fossils weather out very poorly as pseudomorphs. Some of the lis. are entirely crinoidal. Saw a thickness of several hundred feet.

Then went to the bottom of the section first through the Cambrian quartzite that terminated in about 75 feet of a fine conglomerate having pieces of jasper like the one in Pepper-sauce Canyon. It rests on the Pinal schist a very ancient rolling material that is cut by granite.

It is also cut by late Cenozoic dikes. I would not be surprised if this old stuff turns out to be Archeozoic.

The Cambrian quartzite was laid down in shallow water and shows crossbedding and much banding of layers 1/8 inch thick. In places this quartzite was folded and overthrust, and elsewhere was a breccia. As this was done before it became a quartzite, the deformation must be due to slipping of the sea bottom. I did not appreciate this conclusion at the time otherwise I would have studied it closer and taken samples. Evidently there are Proterozoic sediments of quartzite and jasper in this vicinity that furnished the pebbles for the conglomerate. In other words we have here the Grand Canyon succession in complete development.

Got back to the hotel at 5 P.M.

Feb 10-11-1924. Tucson.
Worked on book.

Feb 12-13, 1924, Tucson
Lectured and worked on book. Lausen asked to take me tomorrow to Globe, Arizona to see the section there, and especially to collect Devonian fossils. Good ones occur here. Professor Stoyanow is also to go.

Feb 14 1924 Thursday. Globe
With Lausen and Stoyanow left Tucson in a car for Globe. Went north via the Phoenix road to Florence and then northeast to [illegible] Superior where we had lunch. At Florence going to Superior one has a fine long distance view of Late Cenozoic lava flows and great thickness of it that made high mountains.

[illegible]

As we get to Superior we begin to see the Paleozoic strata and the mines, all of which is deeply overlain by the [illegible] Cenozoic lavas. At Superior we enter Queens Gulch and here the first strata are the quartzites of the Apache series. This is the Troy quartzite about 1200 feet. It is a clean white rusty stained fine grained quartzite in thick beds. It is disconformably overlain by the Devonian limestone. The first portion of the Devonian consists of the reworked Troy sands bound together by lime and then comes the heavy bedded Devonian limestone. Rarely the latter has a quartzite zone. Fossils are scarce here, but one sees most of them towards the top. Here the Dev. is more or less magnesian but towards the top the li. are purer and peculiarly replete with crinoid columnals. Saw nothing of special interest.

Then came a most interesting ride through the mountains to Miami. We soon pass through the Carb. strata and then it is up and up through the lavas and ash, first up Queens Gulch and then the Devils gulch. Finally we enter a white mt. mass of monzonite porphyritic granite of late Cretaceous intrusion. This was the mass that mineralized the entire area with copper, silver, iron and gold. It probably was this intrusion that block faulted the Globe area so badly, and as described by Ransome in the Globe Folio. I have two samples of this granite.

We finally get through the granite and diorite area and then down through the Cenozoic lavas to Miami. At Miami we turn north several miles and then east into a little stream to see some fault block of Devonian. Here is the best place for Dev. fossils so far seen. This the regulation Spirifer hungerfordi fauna I may have 10 species nearly all brachs. Then we motored to Globe some 8 or then we motored to Globe some 5 or

more miles and put up the Dominion Hotel at 6.30 P.M.

Around Miami and Globe the country is very rugged and one is struck by the mottled checkered nature of the hills due to the faulting, the whitish spots are limestones and the reddish ones are of the Apache quartzite, while the green areas are of intruded lavas see Ransome statement of it. All is due to fault blocks and the country hereabouts is fearfully chopped up. In many places one sees quartzite or better quartzitic mineralized breccias of the fault planes. The hot waters moved along the fault planes and deposited vertical masses of brecciated pure quartz rock.

Feb 15 - 1924. Friday. Olive area

Started [illegible] of Olive and after going 20 miles [illegible] — we are in the [illegible] where the Pioneer [illegible] [illegible] are well exposed.

Over the Pinal schist with its granite and diorite [illegible] the [illegible]. [illegible] in the [illegible] conglomerate. [illegible] see. It is very much like the Barnes conglomerate in the [illegible] [illegible] is variable in [illegible]. It [illegible] conglomerate but with [illegible] of Pinal schist and appears like [illegible]. It [illegible] into quartzite and into the Pioneer shale.

I saw much of the Pioneer sandy shale. It is a "dark reddish-brown, more or less arenaceous shale composed largely of fine arkosic detritus with little or no calcareous material." Where more sandy it is distinctly but irregularly laminated.

is distinctly but irregularly laminated.

In places it is sun-cracked and rain-pitted. Also saw some small ripples. See my specimens. [illegible] the [illegible] of mud flats [illegible] evidence of wave action [illegible] [illegible]. [illegible] is around 300 feet.

[illegible] Barnes [illegible] of [illegible] in the [illegible] samples. [illegible] feet. All [illegible]

[illegible] and [illegible] S. H. [illegible] and [illegible] [illegible] a fine [illegible] white.

[illegible] was intruded [illegible] period. It is [illegible] in deposit[illegible], is good [illegible] uniform [illegible] not within the [illegible] deposit[illegible] the [illegible] did not see these [illegible] but [illegible] certain [illegible] deposit. [illegible] about 30 feet.

[illegible] limestone is [illegible] a [illegible] that any other [illegible] rock. [illegible] was about [illegible]. It looks like an unmistakable [illegible], and [illegible] is [illegible] in an erosion surface above it.

Then another depositional cycle start, in which the Troy quartzite having an average thickness of 1200 feet. It begins with a little of conglomerate like the with a little of [illegible] [illegible]

Barren but with [illegible] [illegible] [illegible].
[illegible] [illegible] [illegible] [illegible] and
very much [illegible]. Some surfaces
are smooth and very [illegible] lined
[illegible] [illegible] [illegible] [illegible].
[illegible] [illegible] are [illegible]
[illegible] [illegible] [illegible] [illegible] and [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] and [illegible]
[illegible]. [illegible] [illegible] ripples in [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
looked like this

[illegible] [illegible]

[illegible] mistakable marine deposit
but practically a marine flat with little
of water depth The ripples are all of the
current type.

The Devonian limestone is dolomitic in heavy beds, and I saw almost no fossils until near the top where shales and thin limestone come in. Here Atrypa (coarsely plicate) are common. See the small lot of fossils.

Lawson wants to put all the Apache series into the Cambrian; the Troy quartzite into the Upper Cambrian, and the rest into the Middle and Lower Cambrian. To me the Troy, Mescal and Dripping Spring are unmistakably marine and of Upper Cambrian age. I would put all of the Apache into the Upper Cambrian and I have no doubt more fossils will be found to prove this.

The quartzite pebbles of the various conglomerates Ransome and Lawson says come from Proterozoic formations and good outcrops of them can be seen about 100 miles to the north of the Globe-Ray area. Here they lie unconformably beneath the horizontal Cambrian. There they go under the Plateau

Have they lie unconformably beneath the Tonto [illegible]
Ray area. Are they or under the Plateau

County, and probably connect with the Unkar and Chuar of the Grand Canyon gorge.

The jasper is associated with greenstone of the Pinal schist series. Ransome also reports this rock.

The Apache series in the Globe-Ray area is clearly of three deposition cycles. First the Scanlan congl. into the Pioneer shale. Break. Second the Barnes conglomerate, Barnes shale not unlike the Pioneer, into the Dripping Spring Quartzite and finally the Mescal limestone and post Mescal basalt. Break. Third the Troy conglomeratic-quartzite, the only distinctly cross-bedded series.

In the Whetstone Mts there is about 1070 feet of Upper Cambrian, and here in the Ray-Globe area about 1400 feet. To me the Apache series is the shore phase of the Whetstone Cambrian, and the three deposition cycles of the Ray area do not mean much.

We then rode a long distance over deeply dissected bolson deposits. There are three planes here, and the streams are slowly cutting to a still lower level. Back in the Pleistocene or better in the Pliocene the climate must have been very dry, and much drier than now, or that mountain debris was all preserved in the bolsons filling in all between the mts. In the center of the bolson occur then beds of gypsum and diatom deposits sometimes 10 or more feet thick.

Finally we passed Christmas and Mammoth and came out into the valley of the Gila river. It had considerable water.

At three miles from Winkleman's, where the San Pedro river joins the Gila, we are in the Pennsylvanian series. Lawson said we were high in the Pennsylvanian. Here we saw fossils common. Composita than we saw fossils common: *Composita*

subtilita, *Spirifer cameratus* (large and typical) *S. rockymontanus* (rare), *Productus cora*, *P. semireticulatus*, *P. ivesi*, *P. nebraskensis* P. (lobed form), *Derbyia crassa*, *Hustedia mormoni*, *Chaetetes radicans*, *Zaphrentis* sp. This is the typical middle Pennsylvanian assemblage.

Then a 30 mile drive up the San Pedro valley through deeply dissected bolsons, with the Santa Catalina Mts. to the east. Finally to Oracle and Tucson. The granite all about Oracle is not post-Carboniferous but is pre-Cambrian. Rising out of the San Pedro valley we are in the granitic arkoses of the granites seen all about Oracle. Miles and miles of arkose gravels are to be seen here.

In this connection study the Globe Folio (111), (Ray Folio 192x now out), and Ransome Prof. Paper 98 K (1916) "Some Pal. Sections in Arizona and Their Correlation".

Feb 19-1924 - Tuesday, Tucson.
[illegible] for [illegible] and [illegible] on
[illegible]

Feb 20-1924, Wednesday.
[illegible] then worked
on [illegible] and finished the condensation, Wrote a letter to [illegible]
and sent the [illegible] and letter to Miss
de Vere, [illegible], cost $1.68.
[illegible] the letter to de Vere.

Feb 21-22-1924. Tucson.
Read on Arizona and then on Marathon geology.

Feb 23-1924. Saturday. Tucson.

With Stoyanow and his students went out to Picacho de Calera about 18 miles N.W. of Tucson. Was there twice before. Spent the morning climbing around the mountain with the basal Upper C. quartzite, some hundreds of feet thick. Wanted to make sure that the beds had slumped during their deposition. There can be no doubt about it at all. The slumping is in the laminated beds, either in connection with the conglomerate or without such. The slumping is very local and of varying intensity. In places it is also brecciated the pieces being very angular. In other places there are local foresetting, but as a rule there is no cross bedding.

Worm trailings are but seldom seen.

The conglomerate is of the Archeozoic schist below with some granite pebbles. There ~~is~~ are vein quartz pebbles but no Proterozoic quartzite pebbles.

Webber measured the Upper Cambrian quartzite limestones and makes them 300 feet thick. The underlying Bolsa quartzites are several hundred feet thick. They rest on the Pinal schist, a good deal of which I saw, but not the actual contact.

The down faulted region to the S.E. of this Bolsa quartzite mountain begins with a little of this quartzite followed by about 35 feet of C. li. Then comes Mississippian li that lie almost horizontal. Both are down faulted blocks. The Miss is dropped about 1000 feet and the C is farther block dropped at least 300 to 2600 feet. It cuts out 300 feet of the C. li., and all of the Devonian. In the Miss, the commonest fossils are corals and chiefly Menophyllum. Saw also Spirifer more abundantly plicate also species more abundantly [illegible]

than *S. centronatus*. Also saw *Syringothyris plenus*, fine *Syringopora*.

All of the fossils show up as pseudomorphs.

Learned nothing new today.

Feb 24-26 Tucson.

Lectured three days, walked around and read Dawson's Ariens in Allemagne and Strahl; [illegible] von Europa.

Feb 27, [illegible]. Tucson, Friday

Spent the afternoon walking with the [illegible] of Tucson [illegible] the city and the University. [illegible] Tucson is clearly made up of the [illegible] of the Santa Catalina [illegible] Archaean gneiss [illegible] a little [illegible] schist and Cenozoic dike rock. [illegible]

[illegible]

[illegible]
[illegible] ejected [illegible]
[illegible]
[illegible] ended [illegible]
[illegible] and
[illegible]
[illegible]
[illegible] and
[illegible]
[illegible] just a little
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible] The [illegible]
[illegible] surface dust is usually a yellowish brown. When cut into it is grayish a dirty white of the caliche.

Bisbee Folio (No 112) 1904. Ransome.

Pinal schist at base = Archeozoic.

Upper Cambrian. Best seen in Escabrosa Ridge w. of Bisbee

<u>Bolsa Quartzite</u> at base 430'

Crossbedded, arkosic grits with basal congl. (1 foot).

No fossils.

<u>Abrigo limestone</u>, 770'

Thin bedded with some cal. sh., sandy at top.

At top a white quartzite-like rock. Is it Devonian.

Fossils Walcott says are "Middle Cambrian of Texas".

Devonian

Martin limestone 340 feet. Has some shale.

Has an abundance of fossils.

On Mount Martin the Mid D. pink shales have many fossils.

Mississippian

Escabrosa limestone, 700 feet.

Thickbedded, granular li., rich in crinoidal matter.

No dolomite, no sands or muds.

Has fossils in part

= Kinderhook – Osage.

Pennsylvanian – Permian

Naco limestone, 3000 feet or more.

Has some shale. Abundance of fossils.

Li. compact, conchoidally fracturing. Gray li.

Typical Pennsylvanian below,

Higher has Aubrey and Hueco faunas.

Bisbee Folio ②

Comanchian
Bisbee Group.
Cintura formation above, 1800'
Red nodular shales and sandstones with some li.
Corr. = Edwards of Fredericksburg (Texas).
Mural limestone, 650' Fossiliferous
Orbitolina texana common.
= Glen Rose of Trinity (Texas).
Morita formation, 1800
Red ss. and sh. with li. toward top.
Rarely has an oolite.
Glance conglomerate 25-500 and more to 3000'
Rocks of all older formations. No far transportation.

①

General Geology of Arizona

Bisbee Folio of Ransome 1904

N.E. Arizona is the Plateau Region of horizontal strata

Central region (running from N.W. to S.E.) is the Mountain Region of sierras with filled in valleys between. The region is from 50 to 150 miles and all of the strata are folded. Their trend is "nearly north-west and southeast, but near the Mexican line it becomes more nearly north and south, and the mountain zone as a whole coalesces with a belt of north-south ranges which extends northward through New Mexico and borders the Plateau Region on the east. The northwestern belt of Arizona is described by Gilbert as continuous with the Basin Range system of Nevada and Utah, and is considered by him as exhibiting the same prevailing type of orographic structure. He states that his examinations "are demonstrative of no anticlinal structures, except as minor features. The usual structure is monoclinal, demonstrably due to faulting in the Chiricahua and Pinal ranges, and presumably so in all others." With this conclusion the later observations embodied in the present folio accord." (1).

The strata are Paleozoic, "resting with marked unconformity upon pre-Cambrian schists and granites." Both series "are cut by various eruptives, and partly covered by flows of volcanic rock"(1).

The I. R. area is called the desert region, since the mts trend like those of the "mountain region" but have wider desert plains of late Cenozoic age or are of granitic lowlands.

Pinal schist much (cut by) granite at the base. Looks to me like old basement rocks = Archeozoic.
Then above is an unconformity, peneplaned the Apache group of shales, congl. and quartzites 500 to 1000 feet thick. No fossils. Either Tonto or Algonkian.
Globe limestone 400' (800') = Dev (Carb) and Pennsylvanian 500
The contact with the Apache group is obscured by Mesozoic faulting and diabase intrusions.
Next are the dacite eruptions of [illegible] Tertiary age. Up to 1000' thick
Then the greatest time of faulting, making the present structure. Throw in places up to 6000'. This faulting is placed at the end of Pliocene time.
Gila congl. = ? Pleistocene. Probably more than 1000' thick.

Whitetail continental dep. = Eocene

Pinal schist originally a shale and quartzose rock probably an arkose from granite. A banded arenaceous sandstone and at times a conglomerate. Has been metamorphosed by diorite intrusions and [illegible] by the later granite intrusions. Ransome thinks may =

15	Jardin
200	Pioneer
50	Barum
400	Duffy Mig
200	Mercel
400	Troy
1365	

<u>Pinal schist</u> – Archeozoic of Grand Canyon.
Folding pressure N.W–S.E.

Apache Group best seen in Barnes Peak. Usually but a part of the group is present due to the great faulting. Lithology highly variable from place to place. In the Globe quadrangle the group is Kaleidoscopic in nature from place to place due to the extreme faulting.

Barnes Peak 5028' high, has granite at base, & the Apache group extends to the top.

Over the granite is the <u>Scanlan congl.</u> 1-6' thick. A sea deposit derived from granite.

<u>Pioneer shale</u> 200' Dark reddish-brown arenaceous shale. At the base has much granitic feldspar, but some occurs throughout. Has occasional beds of quartzite up to 18" thick.

<u>Barnes congl.</u> 10-60' thick. Pebbles well rounded. Has red jasper pebbles, Pink quartzite pebbles, 3 to 4" across. Lie in an arkose cement.

<u>Dripping Spring quartzite</u>, 400' thick. Often a laminated series of pink quartzites.

Ransome leans toward the Cambrian age, rather than Algonkian.

Post Pennsylvanian faulting (normal). Strike of faults generally N.W–S.E and N.E–S.W.

Following the faulting or accompanying it came intrusions of diabase. Came in quantity in the stratified rocks. As sills and into the faults shoving aside the strata.

Ma

Ransome 1916

Plateau Region to Mountain Region, there is usually a drop of 2000 feet.

Ray - Globe area.

Pinal schist with batholiths of granite and diorite.
Also has a little of greenstone = igneous metamorphosed.

Is the Barnes conglomerate the base of the Є?
All below them might be older Є or Algonkian.
Probably the whole of the Apache is Є - Alg.

Apache Group.
Scanlan congl. up to 30'
Upper Pioneer shale 200
Camb. Barnes congl. 10-15 Has jasper.
Dripping Spring quartzite 400'-500'
Mescal ls. 200'
Camb? Troy quartzite 360'-400'
Dev. Is said to grade into the Devonian
Martin ls (= lower Globe ls). Devonian 300'-500'

Tornado ls (= upper " "). 1000' more or less.
Carb. Has Mississippian below
" Pennsylvanian above.

Folio 111. ⑤

There is "considerable lithological variation of the Apache beds within the bounds of the quadrangle, whereby conglomerates and quartzites not always distinguishable from those in the type section appear at unexpected places in the stratigraphical column (3).

The following is the Barnes Peak sequence.

Scanlan congl. 1-6 feet. Rests on [illegible] the weathered granite. Arkose. Sometimes [illegible] absent.

Pioneer shale 200'. The Scanlan passes into 20 feet [illegible] sandy shale. Some quartzite throughout. Locally the lower 200 feet may become quartzite.

Barnes congl. 10-15

Dripping Spring Quartzite 400'

Troy quartzite near Troy much mud cracked.

Towards the N.E. of the Quadrangle the Pioneer shale is a quartzite. Probably [illegible] near the shore.

Ransome thinks there may have been hollows on the pre-Cambrian floor as deep as 200 feet. Into these hollows was formed arkosic quartzite. Elsewhere the 200 feet are the Pioneer shale. It seems less like hollows than one of arkose deposit (12).

Pioneer shale and the lower quartzite that replaces it is much sun cracked. Certainly I saw the sun cracks in the shale and rain pitted.

Barnes congl. [illegible] in strange [illegible], those of the [illegible]. Formed no break, [illegible] this sudden influx. [illegible] rivers are now bringing in their stuff from the north.

Roosevelt Dam. ⑥ Ransome's paper 1916

Archeozoic makes base. Granite

Apache series. 1285 feet thick.

Scanlan congl. 30' Has jasper, quartzite and vein quartz.
Says it looks more like Barnes. than Scanlan.

Pioneer formation. 275'
Fine arkosic sandstone. 35'
Sandstone and shale 140'
Diabase sill 700'-800'
Typical slabby maroon Pioneer shale. 100'

Barnes congl. 15'-20'

Dripping Spring Quartzite 500'-600'

Mescal ls. 300'
Hard dolomite - chert ls.
Basalt flow 40-60'

Troy sandstone 160'

Devonian 300'

Mississippian

30
275
20
500
300
160
1285

March 1-1924. Tucson. Saturday.

With Stoyanow and his students went out to the isolated hills near Picacho de Calera.

The hill is a syncline pitching about 20° to the N. about 20° W. It is an on isolated mass separated from the two hills that make up the Picacho by bolsons. All is limestone with a few zones of hardened sandy shales or even by greenish shales. The li. are thick bedded from 2 to 20 feet a mass. Total thickness seen 400 or more feet; 300 measured. The fossils are common though few good ones weather out as pseudomorphs.

All is regulation Pennsylvanian with _Spirifer cameratus_, _S. rockymontanus_, _S._ sp. _striatus_, _Productus semireticulatus_, _P. punctatus_, _P. scabriculus_ or rather _nebrascensis_, _Marginifera longispina_ ?, _Martinia perplexa_, _Ambocoelia planoconvexa_, _Composita subtilita_, _Campophyllum torquium_, _Chaetetes milleporaceus_, _Stenopora_ sp., _Archaeocidaris_ spines and plates, thick spinous plates of crinoids, _Rhipidomella pecosi_

It was interesting in places to see the li. weathering into well rounded balls from 1 to 4 inches, the rounding being due not to rolling, but all due to weathering.

The limestones have much chert but all of it is due to weathering. Weathering rills exceedingly common. The weathered tiny joints that mark so much of the li., is soon removed and this criterion probably gets but little into the bolsons.

On all sides from this li. mt there is a sharp bahajada of chert, small fractured pieces of li immersed in a brownish soft soil. It is all very loose so that ones foot steps are depressed an inch or so. This soil must be dust but more especially residual clay from the li. Everywhere the surface below the bahajada is a flat surface and the pebbles show sheet wash. Of actual washes there are but few and the bolson is here remarkably flat. Probably there is no water flowing out of this bolson. The bolson is very wide and extensive, and I saw but little of it.

March 2 1922. [illegible] [illegible]

March 2-1924. Tucson. Sunday.

Today is a windy and gusty day. The air is grey and the air is full of dust. The wind maybe blowing 35 to 40 miles per hour. It's from the southwest. Now I can see that much dust is blown about, and even the sand will move today. However there can be few days like today since the pebbles of the bolson show but little wind blasting a polishing.

Everywhere on the bolson the bushes stand on a little hillocks almost a foot above the general level. Some of this is due to the bushes holding material, but in the main it must be due to sheet-washing removing material of the bolson. If this is true the bolsons must be losing material at the present time.

Cancel 3-1924. [illegible]
[illegible] delivered - [illegible]

An illustrated lecture on "Features of Desert Vegetation of the World," will be given by Doctor Daniel Trembly MacDougal, director of the department of botanical research, Carnegie Institution of Washington, and head of the Desert Laboratory, near Tucson, and the coastal laboratory, at Carmel, Calif., at a meeting of the Tucson Natural History society Monday evening, March 3.

Dr. MacDougal was in 1890 a special agent in botanical exploration for the United States department of agriculture. Later he became a member of a commission for the establishment of a botanical laboratory in the American tropics. For 10 years he was editor of the Journal of the New York Botanical Garden. Previous to becoming head of the department of botanical research of the Carnegie institution he was a university teacher and at one time director of the New York Botanical garden. In his travels and studies of the world's deserts, Doctor MacDougal has gathered more than a thousand slides illustrative of the peculiar and interesting desert plants found in the Old and New worlds. A selection from this collection will be shown Monday night.

A short business meeting of the society will be held in the auditorium the same night at 7:30 p. m. The following items of business will come up: Tucson Natural History society recommendations regarding the proposed revised game code for Arizona; constitutional amendment changing time of election of officers from January to May; recommendations regarding Public Shooting Grounds Game Refuge Bill.

The attention of all who are members of the Tucson Game Protective association is called to the fact that an adjourned meeting of that organization will be held in the district court room, county court house, at 7:30 p. m., Thursday, March 6.

Emeritus Professor of Geology

Emeritus Professor of Geology Will Lecture at University Tuesday Evening.

Dr. Charles Schuchert, emeritus professor of geology at Yale university, will deliver the first of a series of two illutrated lectures in room 208, Mines and Engineering building, at the University of Arizona Tuesday evening, March 4, it was announced yesterday by Dean G. M. Butler.

The subject selected is "Marine Sediments and Their Bedding, and Disconformities or Breaks in the Geologic Record." While this lecture is intended primarily for the students of geology and mining engineering at the University, it is open to all who may be interested, the dean stated.

Dr. Schuchert holds the degree of A. M. from Yale university and LL.D. from New York university. He has been connected with Yale since 1904, and since that time has held the positions of professor of paleontology at Yale, professor of historical geology at the Sheffield Scientific school and curator of the geological collections of Peabody museum. He has written very extensively, and his text books have been widely adopted. He is lecturing this spring in historical geology in the University of Arizona. The time and the title of his second public lecture will be announced later.

Send [illegible] to students and geologists

March 5-9-1924 Tucson.
Did all the regular things as to heretofore, but nothing out of the different.

March 10-1924. Tucson.
Packed the rocks collected during the morning. Three boxes that will go by [illegible]. Wrote some letters. Got the R.R ticket for Marathon, Texas for Friday night!

March 12-1924. Tucson. Wednesday
Shipped by Express the three boxes pre-paid $13.50 Weight 116 pounds.
In the evening gave a lecture on the Dates and Nature of the N. American Geosynclines. Had an audience of about 30 men. The lecture went off well.

March 13-1924. Tucson. Thursday.

March 13-1924. Tucson, Thursday, at 11.40 A.M. gave my last lecture on Hist. Geol. It was on the Devonian, and was the 18th lecture. In addition gave two evening lectures. I never lectured more easily & more naturally than here in Arizona.

Then packed up the two boxes of slides received from Yale. Will be shipped Exp. prepaid.

Opened the third box of slides just received from Denver. It has the negatives for paleontologic charts, that I will leave for Stoyanow to have charts made of. Later on he will return the negatives to me.

Gave Stoyanow a copy of the sec. ed. of my Text-Book as a present.

Mr. Eastman, a lawyer of Grand Rapids, Mich., took in all of my lectures. Also an old mine prospector. Also Mr. Ayers who will copy my lecture notes.

Left the entire set of Hist. Geol.

lecture notes with Stoyanow, who will copy them and then return the set to me.

Spent the evening with Dr. Frederick E. Clements discussing biologic taxonomy that he presents so well in his book "An Ecologic View of the Species Conception" (being Pub. No. 326 of the Carnegie Institution of Washington). His views are the correct ones, and I will adopt them in my Handbook of Brachiopod Genera.

March 14 [illegible] Tucson Friday

March 14-1924. Tucson. Friday.

Packed up during the morning and adjusted final matters for my departure for Marathon, Texas, late tonight.

Then had farewell lunch with Professor Stoyanow and his family. Got back to the Santa Rita by 3.30. Spent rest of afternoon reading.

Spent the evening at dinner with Dr. Clements and his wife. The other guests were Dr. Ransome, Dr. Merriam and Dr. Butler. Had an interesting evening.

Mrs Clements paints very well wild flowers and has long been out with her husband with a book on wild flowers of the Rocky Mts. Published in New York. It is in two forms, Plates, with but few pages of text, and another with more text. The next book is to be by herself on Wild Flowers of the Pacific Coast.

March 15 – 1924. Saturday

Got up at 6:30 A.M. at Deming, New Mexico. We are still in the bolson country, but the mountains of eruptives are usually not as high here, but the plains are higher – about 4000 feet. The desert is here sandy and covered with very small dunes, some tufts of grass, but mostly small grease-wood, sage and stunted yuccas. In places there are barren plains far away from the mts.

About 10 miles west of El Paso we pass through railroad cuts cut through the bolson deposits. We are approaching the valley of the Rio Grande. All is soft muddy yellowish sand well bedded and replete with granular grains of caliche. More than 100 feet of depth may be seen and all of it has grains of caliche. The caliche weathers white. The bedding in places is irregular and in this given that it must be playa deposits. As we approach El Paso we appear to go through of the basalt, but it is bluish white color

and is overlaid by sand material.

and is worked for road metal.

El Paso is a brick city with many tall buildings. We begin to get the architecture of the eastern states. All the workers along the railway are in the main of Spanish people. Outside of the city it is as much the desert here as at Tucson.

It is a cool morning and the traveling public wear overcoats, but the natives appear to be lightly clad and some are in shirt sleeves.

Mile after mile to the east of El Paso the R.R. runs along the valley of the Rio Grande [illegible] to the upper desert plain. One traveller has a good view of the shallow valley and the wider flood plain. Much irrigated lands on the higher flood plains seen here and cotton and fruit appear to be the main crops. To the south of the river for about 20 miles one has high (Laramie) points and the plains dip south into Mexico. Is this due to fault blocks? Evidently are of cretaceous.

At about 50 miles east we leave the river valley and now run over Laramie points to the north of the river.

In the region of Torcer (Arroyo Cannon) we ran through a series of much folded strata I see a twisted syncline overturned to the north or N.E. Are these Comanchean strata?

Whence did this great mass of sediment come from? All appear to be soft stuff, muds. There must once have been some elevation in this general area to have furnished this debris. Where was the land? To the S.W.?

Above the great mass of mudstone come in thick zones of impure limestone. The dips are usually low, but in places are nearly vertical,

At Sierra Blanca the R.R. crosses an area with low dips of the Cret. This is a little town and one could get hotel here. Altitude 4512 feet

All low dipping Cret. to Lobo (3943 elevation) with local sharp dips. Between the mts are small bolsons, partly from no great thickness of strata.

All the way to Valentine it is Cret. plain with outcrops in low mts beyond. Elevation 4424'

It is plains country all the way to Marfa

(= Fort Davis). Marfa altitude 4695 feet. Looks like Cuz, grand all the way. This is grass land with sparse cattle upon it. See last pages of January 12-1904.

Igneous rock begins to appear a little east of Summit.

Got to [illegible] on time at 2.13 P.M. Put up at a family "hotel" opposite the station.

Then walked [illegible] the [illegible] about [illegible] miles and a little [illegible] the [illegible] Ordovician [illegible] the [illegible] "Chert." [illegible] [illegible] [illegible] considerable [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] thick. [illegible] [illegible] [illegible]

Marathon, March 16 1924. Sunday

Spent all day walking 4½ miles west on S.P. R.R. to study the Tesnus formation. See other book for detail.

March 17 1924. Monday.

Too tired to make an all day trip. So looked for a Ford car and man to take me tomorrow to go over the Leonard Mt section. Will charge eight dollars per day.

In the afternoon walked north of Marathon about 1½ miles to study the Paleozoic rocks as exposed along the road cuttings and in the fields to the east of the road. Got enough points to show me that I am in the Trentonian series. See other note book for detail.

March 18-1924. Tuesday. Marathon

It is a cold, overcast and foggy morning with a little snow and rain in the air. Under these circumstances will not go into the field unless it clears up. The wind from N.E. did not change and it was miserable all day. A long tiresome day sitting around and reading.

March 19-1924. Wednesday. Marathon.

A dark morning and lo it has been snowing during the night. The mountains are all in clouds and at eight o'clock they are to be seen all covered with snow. By 8.30 the sun is out at times and it now looks as if the storm is over and that it will clear up. Talked over the situation with the Garage man and he advised me to delay until tomorrow when the snow would be out of the roads. Another long day of waiting ahead.

Finally decided to get a car and man to take me to Haymond. After running 3 ½ miles the Buick broke something and we had to walk back to Marathon. The walk was in the teeth of a cold stiff wind. So it goes in western Texas.

Marathon, March 20-1924, Thursday.

[illegible] and a [illegible] a few [illegible] [illegible] the [illegible], [illegible] [illegible] Branding [illegible], [illegible] 40 and [illegible]. [illegible] associated [illegible] me like Cider.

[illegible] [illegible] [illegible],

Marathon, March 21-1924. Friday

[illegible] Ford went about 15 miles [illegible] to the junction of the Reed Canyon into the Sullivans Canyon. [illegible] went to [illegible] Ammonites. Got one hundred or more. All are poor specimens, and [illegible] had no better [illegible].

Packed after supper Two boxes of

[illegible], and get ready [illegible] in the morning for [illegible].

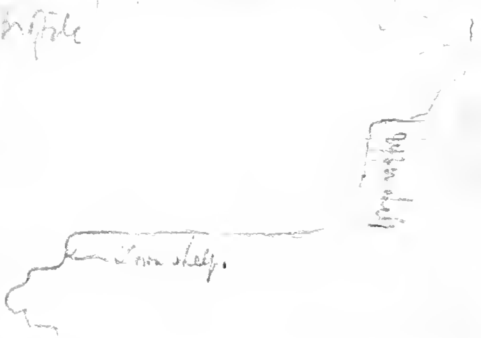
[illegible] March 15 - 1997, Saturday

Got up at [illegible] A.M., and shipped [illegible] by Express, [illegible] [illegible] [illegible] for [illegible].

Looking [illegible] out, one [illegible] a wonderful view of the [illegible] state, cliffs, sandstones and shales all around, the place upon or over which the [illegible] are [illegible] view. They [illegible] three [illegible]

At 10:00 [illegible] I came [illegible], the water today is deep green, [illegible], clear water

[illegible] [illegible] [illegible], [illegible] [illegible], due to its
[illegible] [illegible] [illegible] [illegible] directions.
It is a long [illegible] canon, and the present [illegible]
[illegible] [illegible] [illegible] [illegible] hole, one
3 [illegible] high. [illegible] [illegible]
[illegible] [illegible]



We [illegible] [illegible] [illegible] at 2.00 P.M.
It is a smaller stream than the Rio Pecos
but like it the water is clear and clean.
[illegible] in the valley of the Devils River now
looks like [illegible] [illegible]. Much vegetation here
and the fields are [illegible] [illegible] flowered or as
green as the Emerald Isle. Of course it looks
[illegible] [illegible] [illegible] [illegible] out of the semi-arid

[illegible] out of the [illegible]

County. In [illegible] [illegible] here, but in the area [illegible] of [illegible], like an oasis in the [illegible]-desert. Elevation [illegible].

Time [illegible] in [illegible] more and more [illegible] [illegible], and then all [illegible] [illegible] [illegible] [illegible] and gave [illegible] [illegible]. Nine and nine [illegible], [illegible] [illegible], but all are small [illegible] [illegible] [illegible], with the [illegible] [illegible] of [illegible]

We get in line ([illegible]) [illegible] and [illegible] a [illegible] [illegible] Hotel [illegible] the [illegible]. All [illegible] well and I am [illegible], and [illegible] [illegible] [illegible] in the

San Antonio, Texas [illegible] 23. Sunday.

Fine, bright warm day. I visited [illegible] the city, called on [illegible] the city, said to be [illegible] in Texas, [illegible] and [illegible] beautiful. I am [illegible] when on my way to [illegible] I remembered the Alamo, but all has [illegible] in the last 15 years that [illegible] land mark.

At 10.30 I am off in a Studebaker new car for Austin. It is the Red Ball line every hour, and there are other auto lines to Austin. We go through the German settlement of New Braunfels where my [illegible] settled in [illegible] The signs on the stores show German names, and we [illegible] are Germans. It is a town of [illegible] people. The [illegible] pike was fine all the way.

[illegible]

[illegible]

We next went through [illegible], a [illegible], and a little [illegible] town. [illegible] the road [illegible] and but [illegible] got over it at the rate of 30 [illegible] an hour. We passed [illegible] at the [illegible] village and [illegible] [illegible] [illegible] [illegible]

At [illegible] [illegible] met me [illegible]. [illegible] [illegible] [illegible] at 12 [illegible]. A [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible].

[illegible] the Cabil [illegible] [illegible] [illegible] all [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] meet the [illegible] [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] [illegible].

"[illegible] of man
for [illegible]
[illegible] declare their rights, [illegible]
[illegible] the Federal Congress in 1861. The
[illegible] the South, against
[illegible] and [illegible], [illegible]
[illegible] the war, there were
[illegible] engage-
ment; [illegible] and eighty-two of
[illegible] took part.
Number of men enlisted: Confederate armies,
600,000; Federal armies, 2,859,132.
Losses from all causes: Confederate,
437,000; Federal, 485,216."

[illegible] of a monument to
[illegible] in 1901,
by state governments [illegible]
S.C.; Miss.; Fla.; Ala.; Virginia; La.; Texas;
Ga.; Ark.; N.C.; Tenn.; Mo.; Ky.

[illegible] and his wife are in
[illegible], and [illegible] went riding with them
for a time. On one evening [illegible] dinner

[illegible]

[illegible] at the Marine Restaurant,

Austin, [illegible] October 24. Monday.
Called on [illegible] Waults [illegible] and talked with him for an hour. Then talked Marathon golf [illegible] [illegible], but [illegible] see that [illegible] him in an several [illegible] [illegible].

He [illegible] Astronomical amities from the [illegible] [illegible] to me to be each of mind. Certainly [illegible] no [illegible], [illegible] [illegible] frontier [illegible] [illegible] [illegible] Texas. [illegible] [illegible] had [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

He [illegible] [illegible] his [illegible] [illegible] [illegible] and [illegible] [illegible] a [illegible] a [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible].
[illegible] [illegible] [illegible] [illegible] [illegible] mind

The [illegible]

[illegible]

[illegible] date,

[illegible]

[illegible]

are usually [illegible]

10th/12 [illegible] the

[illegible]

[illegible] as due

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] dust and

[illegible] material. [illegible]

[illegible]

[illegible] like each,

[illegible] the [illegible] much [illegible]

[illegible]

[illegible]

Shale and in it has been found [illegible] these several specimens of [illegible] and am-cormite, from this specimen.

Hidden [illegible] the age of this [illegible] in [illegible] [illegible] is [illegible] [illegible] [illegible] dolomite.

The locality of the diamond areas here is 90 miles N.W. of [illegible].

It is a very interesting [illegible] [illegible] [illegible] [illegible] [illegible] would come only [illegible]. The [illegible] was dry and apparently [illegible] half winter; [illegible] the winter [illegible] [illegible] was [illegible] [illegible];

[illegible] [illegible] persons [illegible] prepared [illegible] [illegible].

Had dinner at Willards house, and [illegible] [illegible] called.

[illegible]

[illegible]

Austin March 20, 1894. Tuesday.

[illegible]

[illegible] at 10 and [illegible] the [illegible]
[illegible]
[illegible] Maxwell [illegible]
attended. [illegible] and
as well [illegible] Simpson. [illegible]
[illegible]

Austin [illegible] 26-1925, Saturday.
Packed up and left Austin [illegible]
[illegible] Houston at
[illegible] 20th
[illegible]

Houston, [illegible]
[illegible] the [illegible]
[illegible] name
[illegible] Value
[illegible]
[illegible] C.
[illegible]
[illegible] constantly [illegible]

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] a
[illegible] [illegible] [illegible] [illegible] [illegible],
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible]

[illegible] Aug. 27. Friday.

[illegible] [illegible] [illegible] [illegible] had [illegible] much [illegible]
[illegible] [illegible] [illegible] [illegible].
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] to the [illegible] [illegible] [illegible].
[illegible] [illegible].
[illegible] [illegible] [illegible] [illegible] [illegible].
[illegible] [illegible] to [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]. [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] much
[illegible]

[illegible]

Had originally investigated [illegible] [illegible], and he said [illegible] nothing especially to [illegible] [illegible] [illegible].

[illegible] Salt [illegible].

[illegible]

[illegible] Salt [illegible]

[illegible] I [illegible]

[illegible]

[illegible]

[illegible] and

[illegible] climate was rather

[illegible]

[illegible]

[illegible] The

[illegible]

[illegible] like in

[illegible] they are

be wondered. In the arid

[illegible] is always [illegible]

[illegible] cold [illegible]

[illegible] My

[illegible] Baker.

Houston March 30. Sunday.

Left at 9.25 A.M. for New Orleans. All day running over the flat coastal plain of Texas and Louisiana, nowhere is the land over 30 feet above the sea and mainly it lies between 10 and 30 feet. Swamps and bayous are common with cypresses covered with Spanish moss. About 8 P.M. we are in New Orleans. Find at [illegible] [illegible] for the Depot on the Louisville [illegible] [illegible] [illegible] little, [illegible] and [illegible] [illegible]. A fine sunny day.

[illegible] time March 31. Monday

[illegible] [illegible] at 5.20 A.M. [illegible] [illegible] [illegible] Cotton and [illegible] [illegible] [illegible]. At Cullman we are in [illegible] [illegible].

[illegible] [illegible] [illegible]

[illegible] and [illegible] [illegible] I see the [illegible] [illegible].

[illegible]
[illegible] and [illegible]
[illegible]
[illegible]
[illegible]
[illegible] start [illegible]
[illegible]
[illegible]
[illegible] and [illegible]
[illegible] W.C. At the
[illegible] W.C. [illegible]
[illegible] P.M.

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