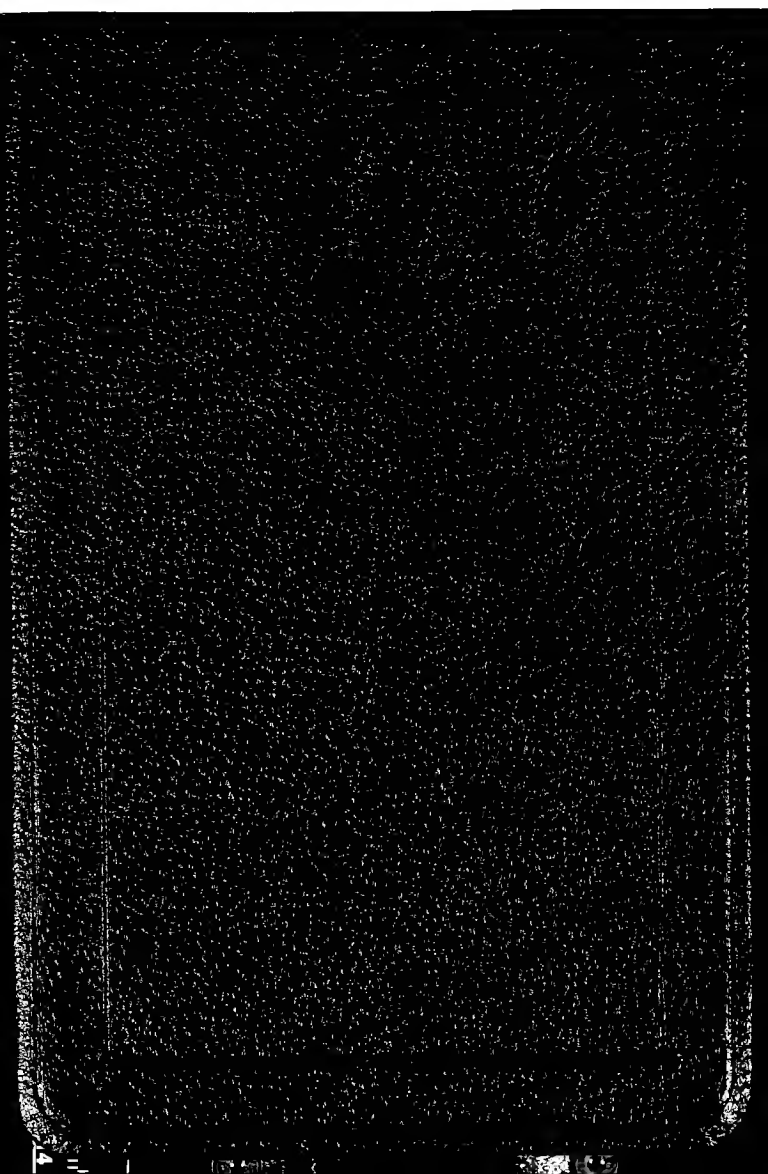

| | |
|---|---|
| Eastland to Fort Worth | 120 miles |
| Fort Worth to Ardmore | 106 miles |
| Ardmore to Ada | 70 " |
| Ada to Tulsa (? 4.50) | 125 " |
| Tulsa to Bartlesville (? $1.25) | 50 " |
| Bartlesville to St. Louis (20.25) | 397 " |
| St. Louis to Cincinnati (12.50) | 350 " |
| Cincinnati to N.Y. (28.25) | 650 " |
| N.Y. to New Haven | 75 " |
| Total | 1920 " |

R.R. fare going and Pullman $76.00

" " back " " $78.00

doc. 120

To Oklahoma and Texas.

Professor Charles Schuchert

Yale University

New Haven

Conn.

March 6-1922 — April 10, 1922.

3506

doc. 120

SEVENTH ANNUAL MEETING

# AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS

MARCH 9, 10, 11, 1922

HUCKINS HOTEL
OKLAHOMA CITY, OKLAHOMA

## PROGRAM

ELKS' CLUB AUDITORIUM
(Main Street East of Huckins Hotel)

### THURSDAY MORNING, 10:00-12:00

President George C. Matson, Chairman

Greetings—Charles E. Hall, Manager of Chamber of Commerce.

Greetings—Irving Perrine, President, Oklahoma City Geological Society.

Response—George C. Matson, President American Association of Petroleum Geologists.

1. C. W. Shannon—Pre-Pennsylvanian Rocks Encountered in Wells in Oklahoma. (10 minutes)
2. C. W. Shannon—A Geologic Map of Oklahoma. (10 minutes)
3. Besse Mills—Percentage of Square Mile Production in Oklahoma. (10 minutes)
4. C. M. Bennett—A New Geological Survey. (10 minutes)
5. E. Bloesch—Remarks on Sub-Surface Contouring. (10 minutes)
6. H. Fukuda—The Relative Role of Strike, Streak and Faults in Determining the Long Axis of the Osage Pool. (Introduced by R. H. Johnson( (10 minutes)
7. B. Hartley—Relation of Structure to Oil and Gas Accumulation in Northeastern Osage, Oklahoma. (10 minutes)
8. R. S. McFarland—Structure of the Burbank Pool, Osage County, Oklahoma. (15 minutes)

University of Oklahoma Luncheon, Mack's Dining Room, 12:15.

## THURSDAY AFTERNOON, 2:00-5:30

Visiting Ladies—Auto Drive from Huckins Hotel, 2:30.

9. R. H. Johnson—A Standard Persistence Index and Coefficient of Persistence for Oil Well Decline Curves. (15 minutes)

10. R. H. Johnson and W. H. Osgood—The Mechanical Error in Constructing Decline Curves on Logarithmic Paper. (10 minutes)

11. P. Reudemann—Some Graphic Methods of Appraising Oil Wells. (15 Minutes)

12. P. Reudemann and I. I. Gardescu—Estimating Reserves of Natural Gas Wells by Relationship of Production to Closed Pressure. (10 minutes)

13. F. A. Edson—Diamond Drilling for Production. (15 minutes)

14. R. D. Longyear—The Diamond Drill in Oil Exploration. (15 minutes)

15. Professional Ethics in Petroleum Geology. Discussion led by:

| | | |
|---|---|---|
| E. B. Hopkins | F. G. Clapp | F. W. DeWolf |
| R. A. Conkling | K. C. Heald | Max Ball |
| Ralph Arnold | C. M. Bennett | C. T. Kirk |
| C. W. Washburne | D. W. Ohern | Carl Beal |
| W. A. Williams | E. DeGolyer | |

Wisconsin Luncheon, Skirvin Hotel, 6:00.

## THURSDAY EVENING

Public Illustrated Lecture, Christian Church, Robinson and Tenth Streets, 7:30

16. Dr. Charles Schuchert—The General Geology of South America.

Visiting Ladies—Line Party at Theatre, 8:45.

SMOKER, 8:45, Chamber of Commerce, 321½ West Main Street. (Admission by ticket)

## FRIDAY MORNING, 9:00-12:00

17. F. L. Aurin and G. C. Clark—The Lower Permian of Northern Oklahoma. (20 minutes)

18. S. Powers—Age of the Oil-Bearing Sands of Southern Oklahoma. (10 minutes)

19. R. D. Reed—Some Suggestions in Regard to Pennsylvanian Paleogeography in the Henryetta District. (By Permission of the Oklahoma Geological Survey) (10 minutes)

20. J. V. Howell—Some Notes on the Lithology of the Pre-Permian Paleozoics of the Wichita Mountain Region, Oklahoma. (10 minutes.

21. L. English, A. Meyer, and R. Denison—Robberson Oil Field. 10 minutes)

22. C. T. Lupton, W. Lee, and B. R. Van Burgh—Oil Possibilities of Western Kansas. (20 minutes)

23. E. F. Shea—Water Conditions in the Urchel Pool, Kansas. (10 minutes)

## BUSINESS MEETING, 10:30-12:00

Annual Reports
President
Secretary-Treasurer
Editor
Committees—Program and Editorial, Constitution, Ways and Means, Membership, Ethics, Legislative, Map, Publication, Cooperative, International Relations, Special Committees.

New Business
Nomination of Officers and Appointment of Committees.

University of Chicago Luncheon, Skirvin Hotel, 12:15.

## FRIDAY AFTERNOON, 2:00-5:30

Visiting Ladies—Musicale at the home of Mrs. Frank Buttram (601 West Fourteenth Street) 3:00-5:00.

24. A. C. Trowbridge—Tertiary Stratigraphy in the Lower Rio Grande Region of Southwest Texas. (By permission of Director of United States Geological Survey. (20 minutes)

25. J. Y. Snyder—Three Unmapped Salt Domes in the Black Lake Area of Red River, Natchitoches and Winn Parishes, Louisiana. (15 minutes)

26. J. P. D. Hull, L. P. Teas, and W. C. Spooner—Status of Development of Oil and Gas Pools in North Louisiana Territory. (15 minutes)

27. A. F. Crider—The Eldorado, Arkansas, Structure and its Relation to Producing Areas in Northern Louisiana. (15 minutes)

28. H. D. Easton—The Possibilities of Mississippi as an Oil Producing State. (15 minutes)

29. R. C. Moore—Stratigraphy of a Part of Southern Utah. (20 minutes)

30. M. W. Ball—The Oil Possibilities of the Tertiary of Utah. (20 minutes)

31. R. A. Wilson—The Relation of Geologic Features of South Dakota to Petroleum Possibilities. (Extracted 5 minutes)

32. E. M. Spieker—Petroleum Geology of a Part of Western Pease River District, British Columbia. (Introduced by K. C. Heald) (20 minutes)

33. G. C. Martin—Natural Coal Tar Mistaken for Oil Residue. (Introduced by David White) (15 minutes)

34. A. R. Castile—A Recent Fissure near Terrill, Texas. (Introduced by Sidney Powers) (5 minutes)

## FRIDAY EVENING

**ANNUAL INFORMAL DINNER, HUCKINS HOTEL, 6:30**
**D. W. Ohern, Toastmaster**

## SATURDAY MORNING

Business Meeting—Concluded, 9:00-10:30.
Reports of Committees
Unfinished Business
Election of Officers
Program Resumed, 10:30-12:30

35. F. G. Clapp—Oil Possibilities in China. (Lantern Slides, 30 minutes)

36. J. H. Gardner—Epiclinal Distortion. (Lantern Slides, 25 minutes)

37. J. W. Bostick—The Importance of Microscopic Work on Well-Cuttings. (Lantern Slides, 10 minutes)

38. V. V. Waite—Microscopic Study as an Aid to Shooting Dry Holes into Production. (10 minutes)

39. L. G. Huntley—Geological Features Illustrated by Models. (10 minutes)

40. B. K. Stroud—The Necessity for Engineering in Developing Oil and Gas Properties. (10 minutes)

41. M. J. Mann—Restatement of the Hydraulic Theory of Oil and Gas Accumulation. (10 minutes)

42. W. R. Jillson—Depletion of Kentucky Crude Oils. (10 minutes)

43. V. E. Monnett—Topographical Criteria for Oil Structures. (Extracted, 5 minutes)

44. L. Franklin—A Preliminary Study on the Recovery of Oil by Sinking Shafts and Driving Galleries. (Extracted, 5 minutes)

45. W. C. Thompson—The Midway Limestone of Northeast Texas. (Read by Title)

46. S. Weidman—Source of the Red Color of the Permo-Carboniferous Red Beds. (Read by Title)

47. J. L. Ferguson—The Oil Boom at Spokane, Washington. (Read by Title)

48. J. D. Haseman—The Humic Acid Origin of Asphalt. (Published in Volume V)

49. D. W. Williams—Correlation of Producing Sands in Southeastern Kansas and Northeastern Oklahoma. (Published in Volume V)

50. J. L. Rich—A Probable Buried Mountain Range of Early Permian Age East of the Present Rocky Mountains in New Mexico and Colorado. (Published in Volume V)

(Received after Program was in press.)

51. W. T. Thom, Jr.—The Relation of Deep-seated Faults to Surface Structural Features of Central Montana. (Introduced by K. C. Heald) (By permission of Director of United States Geological Survey) (Read by Title)

Sigma Gamma Epsilon Luncheon, Huckins Hotel, 12:45.

## SATURDAY AFTERNOON

Completion of Unfinished Papers, 2:15.
Adjournment.

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VISITORS ARE WELCOME TO ALL REGULAR SESSIONS.

March 17-1922 Shipped me trx by express
from Oriental Hotel at Dallas.
March 24-1922. Rec'd the trxes
by express from Graham, Texas.
About 3 shipped 3 trxes from Ada.

Seven trxes in all.

Monday March 6 1922

Before the Governing Board of the Sheffield Scientific School presented at 4.15 P.M. the promotion of Alan Mark Bateman Assistant Professor elect of Geology at a full professorship. Ford, Matthewson, F. J. Smith and Whittemore indorsed him. Even President Farnell came out with the flat footed statement that he fully believed in the Associate Professorship and that not only this should go through this grade. It is my opinion that at least will get a short appointment as Associate Professor say for two years at $3000 per annum.

Rushed from the meeting to my rooms and grabbed my bag & coat & taxi to the 6.09 train in the Penn. station at New York City. Got here at 8.15. Then write letters to Bateman, Ford and Lull.

Sat into the evening & supper at 10 P. M. The train is to start at 2 A. M.

Tuesday March 7-1922

Sat to Harrisburg at 7.30 A. M. had breakfast and left for Pittsburg. Was dark this morning and raining. The Susquehanna and the Juniata are in flood and very yellow. A little snow lies on the mountain tops. Was raining more and more and before getting to the top of the Horseshoe Curve it is snowing very wet. So it does all the way to Pittsburg. Here it is damp and cold, colder than at Fort Wayne. Sat to Pittsburg 10 min. late or at 3 P. M. Had dinner and a shave, and then at 5 P. M. I was off for St. Louis, Mo.

Leaving Pittsburg it begins to clear

of some, the country looks far better west of Pittsburg than east of it. A coal country is always a neglected unkempt country.

The night closes in, the Pullman is very full, all pleasant and I go to bed at 9:30 P.M.

Wednesday March 8, 1922.

Fine and bright this morning and the land is covered with a white frost. We are 10 minutes late, and make it up & more before we get into the St Louis station. I wait for a Frisco connection & find out that the train is 3 minutes. Evidently the Frisco are not a [illegible] Penn System.

On enquiry I find there are no letters for mails for the 6:30 P.M. Frisco. The Pullman Co will return my ticket and I have sent it on to the Pullman Company at Chicago.

Breakfast at St Louis all [illegible] and

and put in 3½ hours at the city library reading. Conditions good here & Weather and Environment.

At 6.30 P.M. I am off on the Frisco "Meteor" for Oklahoma City where I am due at 11.20 tomorrow. The distance is 548 miles. From here here to Oklahoma City it must be 1600 miles or more.

Thursday March 4- 1922

I woke up in the Kansas rain storm over near me in Oklahoma, and here it rains with lightning with lots thunder. We arrive at Tulsa in torrents and in flood. Crossing the dark and dismal Texas world is. We are on time at Tulsa. Get to Oklahoma City on Time at 11.30. It rained all day.

Attended the meetings in the afternoon of the Amer. Assoc. of Petroleum Geologists. In the evening gave a lecture on Outlines of South American Geology at the Christian Church at 7:30. The lantern worked so badly and the screen so that I could not show the large part of the slides that my lecture did not at all go smoothly. Hey ho things frosty here in Oklahoma!

Ken attended the smoker mostly an entertainment. Not a mixing affair.

Friday March 10 1922

Attended full day the meetings of A.A.P.G. In the evening the banquet & "Ball" & organized the Great Founders of American Geology. The dinner was good, the crowd out for a great time, singing college songs, and later the speaking was led by Doctor O'Hearn. The A.A.P.G. paid my traveling expenses $150 and hotel bill & dinner.

Saturday March 11 1922

A bright, warm day.

Attended the morning meeting of the A.A.

Dr. Bradley was elected President of the Council for the ensuing year. Had lunch.

At 2 P.M. Dean Ayres read his selection of after dinner pieces. Dr. Samuel Smith. Detail in small book.

At 7 P.M. in Dr. Bradley to Oklahoma City and after supper wrote letters to McCoy, Norman and Le Roy. Dear a night letter to Dr. Williams.

Then saw Dean and talked with him about the Dean's job. Dean willing if nothing interferes to take me to Durham and Dean visit. Would let him know a day or two ahead as to the exact arrangements. Said I might be finished with Notes on or by Wednesday or Thursday.

Sunday

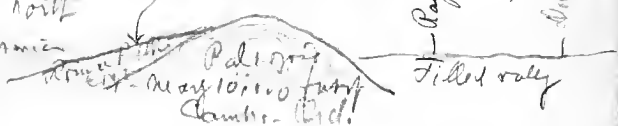
Sunday March 12, 1922

Left camp and at 8.25 am Down on the Santa Fe for Fort Worth and then to Holly to Wallace. The day is bright and cool.

The Canadian river at Amarillo is a very wide (½ or 1 mile wide) and very shallow (probably less than 1 foot) few muddy sand flats. Sands mostly dried by water and wind. Some of the islands made up of inches of water are irregular hexagonal affairs with diameter of 1 to 2 miles, suggesting some sort of crystallization. The Canadian river reminded me of the Yellowstone or the Platte.

About 2 miles south of Cadiz on the Santa Fe one begins to enter the Cretaceous and the north sides of the hills appear covered by small cattle. Cadiz are said to be Fredericksburg limestone. Cretaceous dipping to the north. Some dinosaurs found here in the Paluxy sands - though an old clay pit in a hill flat valley, south of Rayford, in this same area all the strata are Cretaceous.

The section would be like this




Fine exposures all about Croesbeck. To the east Pal. Ord. but Cretaceous limestone. Cret is Cadwician, about 1000 feet of Camb. and 9000 of Ord. Fine exposures to the south of Croesbeck railway and Washita river.

Left for Fort Worth on time at 4.30. Then by Interurban Tardy got in and down to Dallas.

Stopped at the Oriental Hotel.

In the evening at 8 called to see Heath Robinson at the Jefferson Hotel but he is not in. Out all day.

Dorsey Hager chatted with me near an hour about what I said in criticism of Oklahoma City about Mon

conclusions in Utah. I said that the Raibat had Triassic fossils, what I should have said was that the Xanch had such. Hayes thinks it easy to carry the correlations from Utah to Glacier in the basis of lithologic likeness. Is he correct. Says Peterson Gregory is way off in his correlations about Rockville. He is in conflict also with Walcott. Will send me a copy of his correlation table and that I may show it to Gregory.

Says he also visited the desert and in his recollection.

Regards the Khiarsarp as a desert flora. All that he cared little for.

Also agrees with me in regard to a southern land (Permian) and a northern one (like of Carboniferous). Thinks Kansas also in southern lands.

Is going to publish a second volume to it with his final geology, on fossil fossils. Send them to me.

Monday, Dallas, Texas
March 13-1922

Raining today.

At 10 o'clock called in Dr. Fitch and found him intensely busy. Dr. Smith, Dr. Price and E.B. Stiles inspected the sulphur free laboratory equipment very closely for foramin. Opera work, has time assistant in getting notes recorded. Some Tracings are marked out and others are filled in sections. All in all like it to be expected since there is time for scientific work. Expect definite results as quick as asked, and the men have not time to get acquainted with the data which is accumulating there.

Price has not got back time to get into the field and study the Devonian outcrops. If they do not know the characters of the outcrops how will they ever know the underground ones.

Asked all about the conditions of the Eocene and Upper Cretaceous but no one has any actual observations on even thereto as to probable bands. Near the Cretaceous goes under the Eocene it appears that a short distance to the east all the Cretaceous are true, the main rock still schist and the granite still granite.

Peria (pronounced Pearce) Field.
Production took into the Peria Co. about 120,000 barrels per day. Now [illegible] daily yield about 80,000 barrels. The structure is said to be like this.

[illegible] with Mr. R. E. Whitehead of the Atlantic [illegible] it is clear that the [illegible] Cretaceous and Tertiary seas of Texas [illegible] between Post Texas and [illegible] are distinct [illegible] the Cretaceous does not [illegible] much into Louisiana and is likely to be [illegible] and northward the Tertiary [illegible] Tertiary does not [illegible] to be [illegible] Kaufman Co. and [illegible] Mexia. He said [illegible] of coal [illegible] about the [illegible] Cretaceous coast line.

One curious thing I learned from Mr. Whitehead was that many a dry hole in the Hazel Bend limestone has been made a good oil well by shooting into as much as 400 quarts of nitroglycerine. The theory is that the bituminous material in the Bend limestone

a solid condition and the Rangeley
heavier gravities start it to flowing
Condition. The wells are cracked in 1500
feet, the wells drilled later to three thousand
are dry holes even after shooting. Either
this or the interbedded shale gives
gas pressure from oil horizons.
The wells when shot usually gush within
five to ten hours after shooting, and then
gush decidedly for days. Oil and gas
rise to the surface and then
the oil.

Whitehead thinks there are many
heavy oil in the Tertiary Region
of the Mississippi valley and all
over the Coast. Also in Mexico and
Colombia and Venezuela.

He [illegible] would like to see
the scientific side of oil problems and
make use of the knowledge now at the disposal.

Cheria, Texas
Tuesday March 14-1922

A fine bright cool morning and at 9:15 A.M. Jimmie with Heath & Brown in Austin. We arrived via Texas Junction at 12:15. Had lunch at the Lumberjack Camping and one P.M. we are off in our Cadillac for the oil fields. In twenty miles see large blue print map.

Mart Jean Cheria was a place of about 5000 and now it has probably 15000 temporary 5000 more people are scattered over the oil territory. All appears like pandemonium, all is new, paint is fresh & painted, and most buildings still [illegible] for a few years at most. Here wooden [illegible] housing humanity; many many tent houses, wooden below, with a tent on the top. Rent terrible and insanitation no words days. Here are place for a civilized man, only for the strong tent in the almighty

dollar.

Near Mexia is an old Reunion Camp Place of [illegible] soldiers, Campings & Trans-Army [illegible] is a reservoir one [illegible] feet, [illegible] on each side of it.

The dam was started in last November or (1920), and the Humphreys Company has leased a track of land on the [illegible] and along this track lies the abutments of the structural arch and dam. The [illegible] for about a mile is an old road, [illegible] the Old Indian Trace. On the road with these Trace about the old Confederate Trace crossed, land and for about 300 yards stand on each side of this road. The objects [illegible] and all land by reason of the land of these companies, [illegible] ground they are not yet [illegible].

The Humphreys Co has about forty rod

oil wells, about 600 drilling and derricks
for many more. Today they are testing at
about [illegible] feet, [illegible] they
have the oil in as much as 60,000 barrels.
The well has been up to about 150,000 b
per day.

The oil is black, about 37° gravity and
[illegible] water [illegible] the base. The initial
well [illegible] 13,000 barrels, but [illegible] of
30,000 barrels oil per day. It is the
first [illegible] large wells ever
brought in in Louisiana. Folks estimate 90
million barrels of oil available.

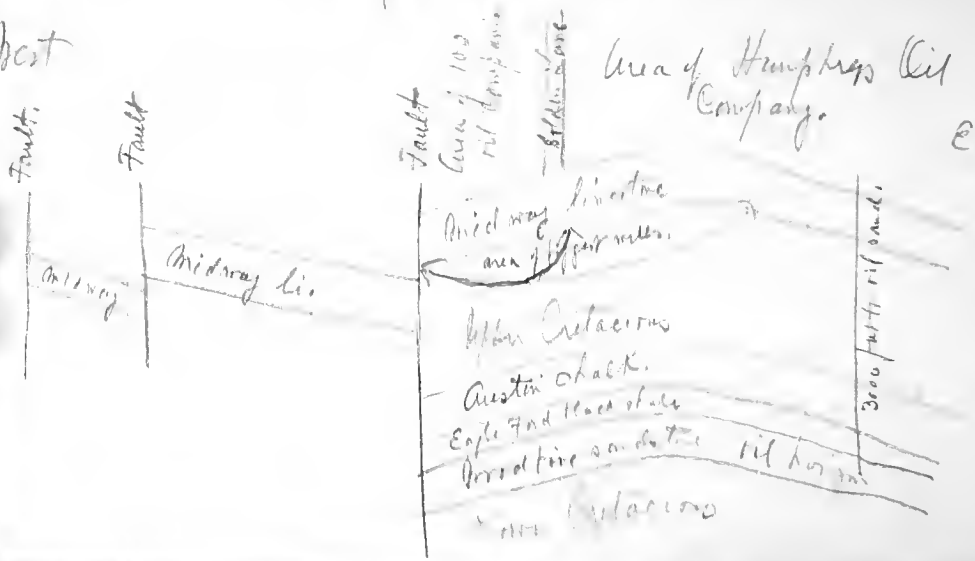
The oil is at the base of the Miocene Cre-
taceous & the Breadtree sandstone. The
sand is exceedingly fine like that of
Miami Beach Florida. Overlying the sand
is the Eagle Ford black shale and it is
probably the source of the oil. Salt water is
present under great pressure. The Breadtree
is reached at about 3000 feet.

and then more

It costs about $30,000 to drill a well and as there are already 300 in, this means an investment of nine million dollars. The Humphreys Co is getting $1.50 for barrel, and others about $1.20. If the Humphreys Co gets 40,000 barrels each day for one year the value will be about 26 million dollars for 14,760,000 barrels.

The oil rock is the Bartlesville limestone lying at depths of about 1700 feet. The upper Cretaceous. This limestone in the oil fields is cracked, broken and worn. It has run into the fractures more than once. The cracking was done by the uplift of the Cretaceous into the Midway. As the oil is sitting in the cracks of rock the question is, will the water, from outside sources, force the oil from the Bartlesville sand. The wells are bailed down to sand and raised to the rock. The structure is shown on the next page.

Structure of Navia Oil Field.



North of Cheyra about 12 miles at Caine I saw oil well coming in. The oil here is Hotchkiss. Here is a dome here and about 12 wells are drilling; there are 3 producing. All report a little oil here, and hence all are cautious, but the formation looks encouraging.

Still further the Humphrey, Lane Thomas structure & Kaufman county and the show of others. Evidently there are vast quantities of oil to come in in this region, and the gulf coast for many hundreds of miles.

The Midway as I saw it is a little [illegible] limestone with almost no sand in it. In some the limestone is sandy & the sand is [illegible], and in other cases more or less [illegible], or by complete change into [illegible].

Dallas Texas

[illegible]

At eleven A. M. started out with Frank and E. S. Giles and Mr. Price to see the various interesting [illegible] in and around Dallas. Did not get started until one o'clock, Frank left us at dinner.

Passing over Trinity Valley, struck Fort Worth first Jan on the Austin chalk about 400 feet thick, and then [illegible] cretaceous across the Eagle Ford dark shales. Then on a sandy country of the Woodbine sandstone this is the last, is Upper Cretaceous. Then comes in the Nagoon shales, the Comanchean and east of Fort Worth the country rise again on the Fort Worth limestone.

In the Nagoon we get a few fossils mostly oysters. In the Lower Fort Worth a few fossils only a hard chalk

and in a pack in earth work F. M. in the Light F. M. sometimes a few earthworks. The earthworks are here very common but no dam beyond are now present since all were filled up to make ornamental flat work in a Lawn Jack. In nearly every case the ridge work - Fire Chamber is pulled away, otherwise the specimens would be about 20 inches or even more in diameter. Some of about one fifth Emis.

The hard the sand the appears like the great steppes the limestone fire grained indurated mud at the F. M. & in some sand with broken shells, fine limestone make up of shells. Thin a clay bedded fine sand with green & black clay that [illegible] full of plant prepares, some [illegible] Dinks [illegible] calcareous, but rare 2 or 3, near the top, the bone bed then in concretionary time with some bones. The whole swallowed down in a large wave that washes away leaving the surface around

with thin shelly pieces (darkened) Travertine. Often the nitrate makes a reddish stain (stately) stal giving a marbled appearance. All of these travertine always have due to redeposition of calcium carbonate, leaching out the lime and depositing it with more or less clay. The sand in China, as fine as Illinois Florida sand, but at times somewhat coarser. It expresses it appears to me consolidated

In the loess of the Gobi Desert saw them enormous lagoons that have filled with sand and lime. Also a small percentage of salts. Here shales [illegible] into yellow clayey stiff red shales.

The Austin chalk is heavy bedded, white to flint white, and under the weather fractures by exfoliation and cracking. Under cover it dissolves but also under the latter rain fall solution is very slow. The drillers find it hard.

slow. the drillers find it hard.

As there is the dark Eagle Ford shale above the Woodbine, the Woodbine itself has dark beds and lignites, and the Grayson shale may also have dark shales on account of the Woodbine has or much oil when the descending waters bring it.

The fresh Caddell Sand Rock may be from the Main Strut the slot is probably from the Main Strut limestone.

Dallas Texas.
March 16-1902

Britt Heath Pittman entered into Kaufman county, east and south east of Dallas. The county rises over the Austin chalk a light gray nearly flat clay with hard chalk lines and flat ex. reaches about 5 miles east of it. An abundance here of Exogyra Ponderosa fragments; shells may also be here but not seen. Our Inoceramus Barabini, Ostrea carinata, Ammonites nothing of value.

Ten miles east of Dallas and some good villa farms in the very thick Navarro, commencing about 2300 ft thick. Five miles south of Kaufman on the road side saw a very fossiliferous sandstone thought to be the Nigaltet sandstone with fossils, Baculites Ives, Exogyra costata, Ostrea Mayi, Inoceramus and many other Pierre forms. See the list collected. This sandstone is about 1600 to 400 ft up in the Navarro.

Eight miles east of Kaufman near

Chief we saw Hedonal Midway
Sinatine, Hypnone, Amytal, Seconal, Nembutal
base. Luminal is beautiful as Humphreys well.
The Midway Sinatine forms as a guanidine
barbituric acid test forms and it seems
absurd to me that Sinatine that is
used almost solely diagnostically. Its
white ppt. with picric reagent forms, the
Luminal is just as stable, and Barbi-
tal. as the test forms.

Ten days or two weeks before dose
of College Hall of Science time is another
Emblings well. This dose shows
total time, and we can have the
recorded dip on next side very well.
Count 3/4 mile away the dose stands
on my.

Faith walked at Elmer Hall
with dose, and Humphreys well.

Col A. E. Humphreys is the
orator of the occasion.

Had lunch at Kempner's, and
supper at Tyrrell. Drove back to
Dallas in the dark, and got to the
hotel at 10 P.M.

A very interesting day.

Humphreys is for Denver, and
has failed 2 or 3 times. An intense
prohibitionist. Has stirred his natural
host of Mexicans and expects to make
millions, but he will save for missionary
work. Has my sick calf for grass a year
and says if he sells will agree that
all the money he makes he should give
to missions.

Dallas Texas
Friday; March 17-1972.

Packed a little toy, but could not get all into it. Had the Hotel ship the toy by Express collect. Sent the a stamped envelope to enclose for receipt.

Then called on Pittmans and Fitz and said good-bye and thanks.

At 11.30 A.M. and Mrs Pittman ran me to the Fort Worth where I arrived at 12.30 Called on Mr. H C Rea, 1307 Seaggmen Building, Fort Worth, and he arranged to take me to Graham at once. Started at 2.05. Had supper at Strawn and at 7.30 in the dark we got to Eastland via Ranger.

Stopping at the Harley Hotel, a rooming house. All the stores in the small town are running owners. Restaurants where I can eat are few. The Lights are [illegible] town.

East Land, Texas
Saturday, March 18, 1922

Left up at 6.30 and at 8 A.M. were at the cuttings for the Sunnyside localities. Left Sunnyside at 11 A.M. and drove to Texas. Fine day. Cloudy, but the day was very windy and dust.

All the collecting today was in the Cisco Series.

Locality (2) on Plummer - Morris map. It is 7 miles N.E. of Cisco, and 7 miles N.W. of Eastland. The locality is just east of Cisco and North Western R.R., near the two stars beside railroad on map. Section is between Sunnyside and Breckenridge limestones, in Thrifty formation. Fossiliferous is marked by large Derbya crassa and Productus semireticulatus.

Locality (1) on P.-M. map. The largest bit of 4 miles. One mile S. of Sunnyside and 1½

miles E. of Leray (= Liberty on map), Texas.
Dr Hue at age. Just above Bumpstead limestone.
The horizon is based on Paleum shales.
Fine Devonian fauna of gastropods and bivalves.
See our publication.

Seen in arroyo west part Leray and south to Ciser. At 8 miles N. of Ciser in Upper Buckhorn ridge limestone beds an abundance of Devonian fossils. Kirby also. Have a piece of the limestone.

Locality (3) on P. - M. maps, just below Buckhorn ridge limestone, 3½ miles N.-E. of Ciser. Small fauna of no particular value.

Locality (4) on P. - M. maps. About 10 feet beneath Upper Buckhorn ridge limestone, about 6 miles N.-E. of Ciser, Texas. Fossils of little value.

Fossils collected at localities (2) and (1).
Had lunch at Leray and a good supper at Ciser.
Left Eastland at 4 P. M.

Section in one mile south of Lemsipk.

| | |
|---|---|
| Axis parallel to | 15 feet. |
| Graham formation | |
| Boulder & Lake Pebbles | 65 " |
| " " sand | 5 " |
| " Limestone, concretionary | 1 " |
| " Dark Lignitic Limestone (The Formation of my collections) | 10 " |
| Lemsipk Limestone | 2½ " |
| " Shale | 7 " |
| " Sandstone | 2 " |
| " Shale | 11 " |
| " Limestone (Lemsipk Limestone) | 2 " |
| Drift, Sand & Shale (mixed with sand | 40 " |
| Surface | 3 " |

(See Moore and Plummer, p. 657).

Eastland, Texas.

Sunday March 19, 1922

A fine night but cold morning. Left started for Graham at 9. A.M.

Locality (5) on map. Cisco, just below Lumsight Junction. Beside railway 2½ miles S.E. of Lumsight, Tarr shale.

Locality (6) on map. Cisco, 30 feet below Bunger limestone just west of Wichita Falls, Ranger and Fort Worth R.R., 2½ miles west of Lacasa, Stephens Co., Texas. Here occur a great abundance of fossils mainly Myalina subquadrata, Derbya crassa Pinnatostriata, P. Nebrascensis, Composita Argentea, &c. Fossils, known, are much broken or squeezed in the shales. The main abundance of fossils occurs in a few feet of thickness.

Left for Graham at 6.30 P.M. Evening at Graham Hotel.

Graham, Young Co., Texas.
Monday, March 20—1922.

Another cool but bright nice day.

Before starting called on M. S. Cheney, the local oil geologist. He says he has a number and will not know for sure. Says they are oil sand, but are rather limited to thin zones.

Then with Dean went 8 miles S.E. of Graham on North Mineral Wells Road. Collected here in the Caddo Lime, Jacksboro Limestone, and Cheney says 130' above the Canyon Series. The species are different here but did not get as large a list as noted at Fragments of the productus. Chaetetes group seen in dicotyledon stems 2 feet from.

Then a mile collected from 1/2 mile N.W. of Graham. One small area that has been picked over. The town in the Brazos River.

Brahem, Texas.
Tuesday March 21- 1922.
A bright morning.
Started out alone on foot for the places in the Boyd and Hale to the south west of town about 1½ miles. Found no fossils at either of the two places in the vicinity.
Then worked up the A. B. Scott property on the west side of Salt Creek at the dam of the first and greater ponds. The fossiliferous Boyd and Hale is here high up on the west side and is likely as far as I could almost see fossils. This is mostly due to taking out the soil when building the dam. At least one we will have to make a good collection here. This at present equal to the one collected from Graham.
At the top of the Bunger Limestone is a very muddy limestone - one hardly can call it a limestone - in that the lime is not well and most alone it is. Fossils occur in the fossils.
Above the shale is a very thick and fine

[illegible] the Arisaig sandstone the basal
member of the Lias formation
and conglomerate (here 2 small beds) that
is driven under much more of it lies unconformably on the Bayland, and cuts into
it [illegible] very irregularly. The pebbles of the
conglomerate have not come far. The sandstone is much cross-bedded, and the whole
is an irregularly bedded formation that cuts into
the Bayland strata.

At the [illegible] we see in as follows

| | |
|---|---|
| [illegible] sandstone - [illegible] | 15 to 20 feet |
| Arenaceous limestone | |
| Bayland shale (from 3 feet) | 10 " |
| Limestone line me. Dry impure | 1 " |
| " shale (Knitting-Hawk) | 60 " |
| " Limestone in creek | 10 " |

At 3 PM called in Mr. Chenoweth to see
his fossils. Had me Smithsonian ammonite
but more on the Triassic of the Bayland. The
limestone, however, was a slot with fine
fine crinoid heads. I hope I may get it,
but he wants to give it to his alma mater
Cornell. It has 2 species. The longer

in Bengal direction. Came to see the locality tomorrow, and as well Barn Mountain.

Cheney arrived me to supper at his house, and that he would call for me at 6.30 P.M. I waited until 7 P.M. and he did not call me send word. In going out in supper I noticed lights in his office and I found him telling to two gold subjects who had been not very pleasant to me. He found an occasion to go and I very often in those two hours of waiting and left his office.

Cheney was absorbed in making some statistical tables. This is a sad comment to make about a college professor. His invitation was of his own making, and he attempted to take me captive in my own. All of this is now known as up!

Graham, Texas,
Wednesday, March 22-1922

A bright day. At 9:15 A.M. started south in the Wichita Falls and Southern R. for Devil's Bend. Ten miles to Devil's Bend. Still rain at 10 A.M. mixed hail. Then started 2½ miles N.E. for an outlier known as Bear Mountain. Here the rocks of the Devil's Bend series is covered 3 to 5 feet but very scarce. Did not get specimen of any value. Then started back to Devil's Bend. Got a few fossils but nothing good. Dan Stone explored the interior and it is here occurs the first fine section of the Comanche series. See report.

A noble day in little heaven.

Returned to Graham at 2 P.M. mixed rain.

Devil's Bend is ironic, for a building is the highest object for many miles. The fine would run it off and the fine mesne would save it. It's a dismal place.

Plummer and Marcou both say that
there is a band the Burgen limestone, 1 and 2 ft.
thick in the 110 foot bluff at Alton
The Burgen limestone is well exposed in the Rock Island
R.R. cut just below the Illinois Bridge.
At Bain Mountain the limestone is well exposed on the Illinois River side, at the base
of the mountain. All is the shale to the top
where there is a thick sandstone.

Above the Burgen limestone is probably 100
feet of Hamilton shales and sandstone.
I will call all of my fossils from the upper
part of these shales. Also fossils from
middle darker shales. The species are the
same; they are free from the darker
shales.

Look up Plummer's report more

Jacksboro, Texas,
Thursday March 23 1922
Left Fordham at 6.47 A.M. for Jacksboro and got here at 8 A.M. Then walked 3½ miles eastward on Rock Island Railway to a deep cut capped by Jacksboro limestone, followed beneath by nodulijerous yellow weathering shale for about 10 feet, and then a blue sticky clay with concretionary nodules and test prints that these are Comanchean rocks. More than ⅔ of the forms gotten came from the lower 3 feet of the eastern end of cut. The species all the forms are different from the Comanchean Is it? Marginifera texasensis is more common above, with Productus and Rhipidomella pecosi, but several pounds of concretions from the lower 3 feet in one section in this, the horizon is in the Middle Jacksboro. Spirifer cristatus. The limestone rests on pale yellow sandy shale. Directions the whole limestone is made of them. from Cooperia Allen organisms. They are Nid known from the Carboniferous. Above the limestone is a bed of blue sticky clay, and near the railway station here is a third one of limestone. Stop day not to go back.
Did not have to open pit. Have collected over 2 dozen of 3 species from 45 forms.

Left back to Lockstrow at 2 P.M. and had to wait around the dead town until 9 P.M. It was most tiresome.

Left back to Scalan at 10.30 P.M. in a heavy thunder shower.

Graham, Texas
Friday March 24-1922
The alkaline water of this place make, one sick and depressed that life is not worth living. Cannot eat anything, even the fish, a taste with the alkalies.

Packed all the rock gathered by the Pennsylvanian into three paper trays and shipped by Express, Fort a receipt. Each box weighs 27 pounds.

Left on the Fort Island R.R. at 4.30 P.M. for Fort Worth, where I arrived promptly at 9 P.M. Put up at the Terminal Hotel.

Fort Worth, Texas,
Saturday March 25—1922

At 9.30 called on Mr. H. C. Beam of the Empire Co., and over with him until 1.45. Called in Lem again at 3.15 Talked over underground geology of the Bend series, and of the Cretaceous outcrops.

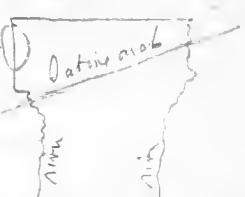
The Bend Arch is most decided in the Lim Dal a anticlinal axis and then dips and flattens out to the north. In the south outcrops the Bend has a thickness of about 600 feet of which about 400 is limestone. On a line to the west of Fort Worth the thickness is about 1600 feet, the section consisting of which a Hoodoo shale limit is still well the limestone is present in the lower part of the series. The limestone is most persistent to the west becoming shaly in a shale towards the east. In the northeast the [illegible] are added showing [illegible] to the E & N.E.

[illegible] the [illegible] of [illegible] Co. the [illegible] Delta [illegible] underground [illegible] sea in [illegible] of the wells. [illegible] are dry [illegible]. These [illegible] from the [illegible] Delta [illegible] from the eastern land.

[illegible] the Bend [illegible] and [illegible], and so some sand is introduced [illegible] Big [illegible] it would [illegible] as if the Bend [illegible] (but [illegible] mostly [illegible] towards the N.E. This would also [illegible] the different general [illegible] of the Bend compared with the [illegible]. This would mean a north-west south-east wrinkle in a [illegible] landbarrier. To the north of the land lay the Morrow sea, and the greater subsiding geosyncline with the [illegible] bed of Stanley and Jackfork. To the south of the barrier lay the Bend sea coming in from Sonora. See more beyond in Bend Arch.

The Ouachita uplift may not have been covered by the Comanchian and Cretaceous seas, but the peninsula to the S. E. & the Ouachita mts. a peninsula to the west of which lay a bay ending in a Cul de sac to the N.E., which the Comanchian transgression filled. [illegible] Comanchian peninsula [illegible] distribution [illegible] Lee appears [illegible] Black Mesozoic [illegible] Comanchian [illegible] peninsula Ouachita. Therefore Comanchian is a Gulf invasion followed by those of Cretaceous and Cenozoic time. Why is the Comanchian or Calcareous to the east?

Therefore in the Ouachita uplift, it lies on the La. and Texas line south of Arkansas line. The Ouachita and the S. E. Arkansas Louisiana about like this




For detail see Lull 4, 1905, M. 37 [illegible] Ark. Surv. Clarke see Hill, N. O. & J. Geol Repl 1899. Also

Stephenson Pap. Pap. 120 U. 17. The Salina
and is over in Bear Midway formation.

In Balcones Fault on Reading Cr.
and Bear Cr. points of Texas. Knight to
continue in southern parking to near Old
Ferry and south to San Antonio where he
begins to swing to west into the Marathon
Country. In General the trend some
few Deg. of east to S.E., but the re-
verse is also true. Bear says at least one
Rock 3 miles north in direct down some
hundred, of Eat. This murkiness of effect doubtless
the significance
of the Fault, and also was it made?
Cuts all formations including the Mid-
way. Hr Kiefer Strata are at Round.

A well in Walker penetrated the
Cret. and Comanchian and entered the
Pennsylvanian (probably the Strawn). Mine
entry probably within century before Comanche

Ord. and Cincinnatian and Eocene. The Pennsylvanian [illegible] the Strawn). Mac

In the latitude of Dallas but to the west the Strawn thickens very rapidly to eastern Palo Pinto and then becomes truncated to east by eastern uplift and overlap away. Beaver has plotted the various sections.

Smithwick under Palo Pinto thickens rapidly to east and is split more than 500 feet thick. Some of the Upper Marble Falls does grade into shale.

Under Fort Worth the Bend is all shale and shaly limestone. See Waite and Texas reports.

Near eastern border of Palo Pinto Cisco thin zones of sandstone are interbedded. In Brown Co. [illegible] are lenses up to 30 feet thick of sandstone. Some thin zones are fine sand, arkosic, even coarse sand, and conglomeratic. On the upthrown of the Bend in Johnson Co. and Wise Co. the Marble Falls limestone.

The Bexar Creek area is surrounded on south. The Austin Creek lies in Uvalde, Clay, Zavala, Dimmit, Frio, Maverick, and Kinney counties Texas. To the north it lies again. As to the rock beds in our information. Granite area drilled into in northern Clay county, and a record the granite the Bexar area. Good [illegible] in my [illegible] notes.

The Bexar is not to scale under southern Edwards, northern Uvalde, central Bracket and southern Bandera counties to the southeast of the San Saba uplift. In southeastern Kimble county the Bexar has some limestone, and it is because of this occurrence that the Hard shale of the Bexar in southern counties is contrasted with it. Sandy, like evidence of the Bexar from a country in Coleman County. All of these Hard shales are very [illegible] the Cretaceous. Hard shales [illegible] deep areas.

In Evangeline county, Louisiana in the Lafayette gravels occur commonly chert pebbles that look to Dickson (formerly of Missouri university) like those of the Meramecian of Texas. Have fossils, mostly crinoid stems. He will send some to me as they are excedingly common and Mrs. Conrad will have some for Mr. Harris' ~~Mr. Harris~~ ~~has many~~ ~~to~~ ~~a report about~~ these pebbles. If these fossils are Miss. how did they come to this place? Lie on a salt dome seemingly. If they are Penn. as they could have come from S.E. Oklahoma.

From the fossils and ~~[illegible]~~ these are transitional ~~[illegible]~~ Meramecian into the Chesterian, the latter stage is with the Brachiopod genera and species, and they overlie the chalky Limestones.

If [illegible] an erosional unconformity about the volume of the earth's crust dug by Comanchian and Cretaceous time thus

Where are all the salt domes come from? No one knows, but the oil geologists are inclined to think that are deep seated salt beds. Or are what is the type? They are inclined to think they are of Permian age. Hardly! Is it not that the Comanchian age, against the Cambrian were sunken into the Gulf of Mexico?

Here seems like no regular or linear arrangement of the salt domes. When did they arise? Or have they been arising? Have they done the younger of geologic deposits.

Fort Worth, Texas
Sunday, March 26, 1922

Got up late, read the daily papers and took a short walk in the morning. At 1.15 W. C. Bean called and in his car took me to his home for dinner. Here I met Mr. and Mrs. Wilson, a chief [illegible] me with the oil development in Louisiana. He appears to be well informed, a great talker and does not hesitate to express his opinions. Told me of the continuous differences between Ferris and Heller, and Wilson thinks that is present the latter appeal to more acceptable than the former. He [illegible] will [illegible] me at Rotan on a [illegible] had to [illegible]. Big a small man and unfortunate in [illegible] does not get on well. Wilson is a student of Baptists.

Late in the afternoon the [illegible] out to Lake Worth, the water supply tank

for Fort Smith. Here a great body of water dammed across a stream, making a lake one mile & ½ wide.

On the hillside above the dam-seen the first Cherokee habitation. It was too late to examine the place for fossils.

Fort Worth, Texas.
Monday, March 27 - 1922

At eleven in the morning got started for Ardmore, Oklahoma. Hope to meet here to morrow Mac Cay, Jones and Morgan. Then to the Chickasaw and the Medicine formation.

On time at Ardmore, Put up at the New Ardmore where I met Mr Morgan, Mr Jones and Mr Blanford. Talked over the trip a while then out in the morning.

Ardmore, Texas.
Tuesday, March 28 1922.
A dark morning and cool. Start out at 8 A M. for the Arbuckle.

We first went northeast to Henry House Creek about 3 miles east of Broadford to see Reeds Henry House section of the Hunton formation. The stream falls over the hard and thick bedded Chimney Hill formation. About the only fossil seen in it were coronal orthoceras. Reeds give the thickness as 25 feet, the time of this limestone is Brassfield or early Silurian. Then a break in sedimentation that one does not see it in the sequence.

Then follows the Henry House shaly limestone having a thickness of 170 feet. It is a series of muddy limestones, shaly and shale ones, that on the surface weathers down to a yellowish or a white [illegible] of one of a shale color. On fresh fracture usually the rock is a blue gray color. Some buff color in this series. Fossils are very rare [illegible]

[illegible] some [illegible] fallen. Otherwise the rock [illegible] was a small Glyphea that [illegible] the [illegible] of a small Cardium. [illegible] 10 to 12 feet a number of thin bedded sandy limestone strata and these Beds used to limit the top of the Henry House. This thickness of separation is an [illegible] value.

Then follows the Stonewall formation of the same kind of shaly limestones as the Henry House. Beds give the thickness as Eight. Abt 13 feet above are nearly recurs a Camarotoechia, and here was also seen a large Lophiodus respiratory [illegible] but with almost no plications. In the zone fossils appear more common but practically none weather out free. This takes one nearly to the top of the hill.

Then comes in the Boss d'Arc series of somewhat heavier and harder limestones that weathers out as one ascends in the series more and more abert. This horizon [illegible]

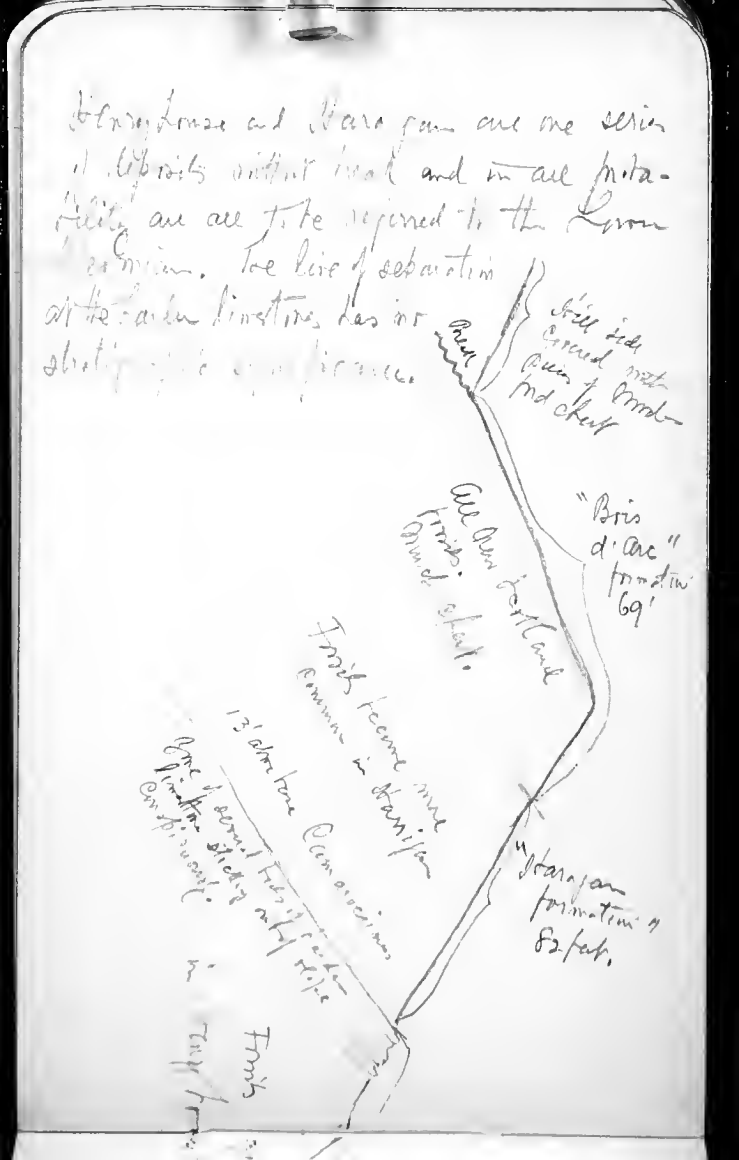
my chalky weathering limestone. The thickness in Granby Reefs as 6g feet. In the fine forms are far more conspicuous and are very often Spirifer acuminatus. Finally at the top the last 18 feet of limestone display many crinoid stems & fragments, some of which are inch in diameter. In the bridge of the 18 feet is a thin crystalline bed full of fossils and here I saw Phacops Logani, Proetus Calmanites, Spirifer acuminatus, O. cyclostoma, Atrypa reticularis, Leptaena rhomboidalis, Strophomella punctulifera, [illegible], Rhynchonella dentata, and many other species and Rhynchonella. Mr Winslow collected large suites of these fossils and identified them.

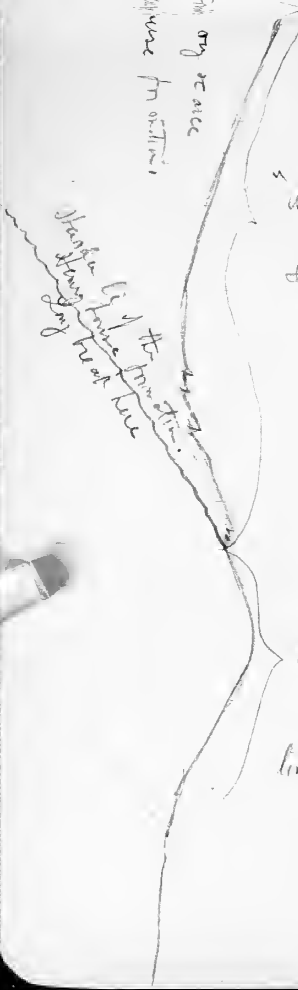
Then came the Burlington chert.

From this it would be seen that all the Lower Coal Measures (Carboniferous of Missouri) and Coal is in the Cretaceous and that a line can be drawn to separate any thing higher as the Cretaceous and especially the Chalk.

Furthermore what I saw shows that the

Hornby Limestone and Marangai are one series of deposits without break and in all localities are referred to the Lower Permian. The line of separation at the Salem limestone has not been [illegible]





"Henry house formation"
170 feet.
Somewhat softer than
Haragan formation.

Chimneyhill sand
limestone 25 feet
Creek flows over these
limestones and makes the falls.

Then drive to Georgia on the A. T. & S. F. Railway, and then 8 miles north to see the Carey and Permo-Carboniferous section of the Pennsylvanian. Mossom and I spend the night with Mr. Mackey studying the geology. We walk over the ridge of the Carey formation. The Hackberry limestone is fossiliferous sandy marl and then a dirty sandstone. The transition continues into the Permo-Carboniferous sandstone and the Hackberry becomes low and lay and deathly all treeless Hare-pea marls.

Then we strike Hoot & Carey. Then here we pitch camp and I and Permo-Carboniferous before the rains and limestone came in. These are normal forms, nothing to attract you but, and carry the Permo-Carboniferous fauna of diminished forms. See my collection; the second one made. The earliest one was made here years ago.

We then walked along the Santa Fe R.R. north to near Cruzen to see the big Carboniferous section. The total thick-

men is between 5750 and 9000 feet. Of this 4000 to 6000 feet is Cretaceous = Beds mountain.

Then at 6 P.M. turned north across the mountains, and drove 23 miles to Sulphur where we stopped one night.

Dalkeith – Daingean, Offa.
Wednesday March 22nd 1922

Started out from Dalkeith at 8 a.m. and got to Rec. locality number 5 on hand of Post card, one mile north of Daingean, at 9.30.

Again started in just below the Boyne at the top of the Bris d'Arc. Here as before are very common large stems of Laminariaceae and the common forms are Halidrys osmundioides, H. siliculosa, Fucus serratus, Ascophyllum nodosum, Chorda filum and Rhodomenia palmata.

The Bris d'Arc is given by Rec. as 57 feet thick. It has considerable shale through it. In the lower half fossils are far more common and are many species. Productus cuspidatus are present also with less P. semireticulatus, Martinia clathrata, the large Athyris and many other species. Crinoid stems, Glyptocrinus decadactylus, Platycrinus, various Cyathocrinus and Poteriocrinus crassus are present in the Bris d'Arc and Cregmaun and not the Dalkeith Limestone.

Collins Ferry

here we have same formation as elsewhere
[illegible] under mantle limestone from 1 to 2 feet. Here
the Cryptozoa fossils in greater abundance.

Then the stratigraphic section noted of
the Ely as described by Weidman Ill. Thickness
as noted.

From the Kinnickinic limestone
[illegible] saw no evidence (lithologically)
to distinguish the Dubuque and Decorah
formations from the Fort Atkinson, all classed
as one to the earliest known Ordovician sequence.

We then drive a short three miles
northwest of Dubuque, and to the west of the
Illinois C. R.R. to a place where an oil well
has been drilled into an Ordovician dome, that
struck a very thick oil, practically an asphalt.
Here in a small stream within a quarter mile
of the well we saw the top of the Prairie lime-
stone, a brittle light colored thin bedded lime-
stone. It has many comminuted fossils,

among them and common are Rhynchitellina
cafax, and many fragments of a narrow
bivalved Illaenus that must have been ten
inches across in life. Fish and bones
in the rock
Taff says enclosed shows 30% fat.

Continually upwards [illegible] quartz
[illegible] pebbles that resist the [illegible]
are characteristic calcareous and
[illegible] remains of limestone. Near the base
[illegible] Silurian rocks in very large masses
[illegible] Plinnamon Gate. Here
[illegible] Stales, and
[illegible] a bed of limestone
[illegible] and
an abundance of Encrinites, and more
rarely a small Lophiostoma and a large
Orthoceras. Within the limits of the green schists
[illegible] Silurian rocks [illegible]
Quarries but they are closely [illegible] to
the Pickmedian, and [illegible]
[illegible]. The Pickmedian is
here [illegible] and [illegible]

Over my muddy roads we drove slowly northward Libby stopped to Piney Creek, half a mile all afternoon and we concluded quitting. After much labor with the car and chains we reached a 1:30 Dutchess where we put up for the night.

They can tell me that on the north side usually called the Tyrone
there are many limestone conglomerates, and that these
when traced around are seen to interfere into
various levels of the Trough. Furthermore as
we approached the slope of the Pennsylvanian
outcrops appear made up of large feld-
spars. These conglomerate and outcrops, Morgan calls the Portatoe conglomerate, and
can not be traced more than 40 miles out from
the Catskills mountains. The evidence appears
to be that the limestones and finally the outcrops
is derived from an Catskille dome in Penn-
sylvanian Time. That the limestone boulders
fall apart up to 6 inches across and not

[illegible] of the Conch [illegible] and have been transported hundreds of miles from their native sites the majority are not rounded. If transported far they would have been ground either completely away or to small pebbles. In all of these we seem to see an Arkwright drive in Pennsylvania there. I understand that limestone implements also occur in the Carey. Beaver Lake may mean a shore line still preserved.

Morgan tells me that he has the record evidence to show that the Boggy is a transgressive formation over the Arkwright drive. The Boggy has a thickness of about 2000 feet and overlaps unconformably the Arkwright formation down to the Kiddle.

The Fraser conglomerate was originally thought to overlie the Wapanucka and therefore early Penn. age. Morgan says the Fraser is faulted against the Wapanucka, and as one traces the Fraser, around in continued outcrop it is seen to interfinger with the Boggy.

Sulphur - Ada, Okla.
Thursday, March 30 - 1922.

Another dark and threatening day. At 9.30 Morgan and Brainard go on with the auto to Ada, while Howes and I go via Davis to Ada. Get started at 10.20 for Sulphur where we expect cars, and then on to Ada.

It rains a little part of the time, and we will probably not be able to do anything today.

Put up at the Chas Evans Hotel.

It rained hard most of the afternoon and so looked over the fossils collected by Morgan; out of the Caney formation

does a fauna of about 100 species that looks to me like the Kenwka one. Has the Dupray ordynotanus, but lacks some of the gasteropods. Then too some of the species are smaller & may be assembled rather than the Kenwka.

Has some five genitalis from the Lipsie Pennsylvanian. Like the species. Have 3 species.

Has some fine Caney prints in limestones and these mounted. I must get some of them.

Has one minute fossils and similar material out of the Lyannne. Many are broken but could not identify any. Collected some of this fauna the next day.

The [illegible] genuine Trapanuella fauna and also Cincinnatia and the elongate Pentamerus sp. All are weathered out.

Holds that the Biggs Lake is an invading transgression from the east across the peneplained surface of the Cutmeadow one, the Biggs one, the Seventeen Mile fauna.

Limestone conglomerates are said to appear in the Clarey Fraunts conglomerate not considered as associated and not of one time. But a series of limestone conglomerates that interfinger into the Biggs. These come from the south - the Lisbon land - and are the shore deposits merging into the marine Biggs.

Finally after Borgaga Time comes in an arkosic conglomerate, indicating that the 7000 to 9300 foot[?] earlier Paleozoic limestones had been eroded off the granites. & the arkose the bulk of the material is feldspar with pieces up to one inch long. Showing in this that in late Pennsylvanian Time the climate became more dry and desert like.

There was no folding in the Arkoses at the close of Pennsylvanian. The Caney is conformable on the Sandia Strata. The mountain making came late in Pennsylvanian Time, apparently in early Permian Time or at the close of the Pennsylvanian

Ada, Oklahoma
Friday, March 31 1922.

Started out with Morgan, Ames and Brainard at 8.30. Cold morning after the rain. The day cleared up fine.

First collected in a cut of the Santa Fe R.R. near turn-pike about 2 miles due south of Ada. Horizon near base of Caney shales. The fossils mostly white all else from Cenomanian limestone that weathers into septaria. Here got a lot of small gasteropods.

Then collected about 8 or 9 miles south of Ada in Jewett fork Creek where the road crosses the Creek. This is in the west side of sec 36, about 6 miles S. and 1 mile E. of Ada. Here got a lot of gasteropods and three plates with various things. These are about out of exposures near the base of the Caney. Have not yet seen Caney fossils recorded in the Ada sheet.

These Comanchean fossils are for Lower Cretaceous.

Section continue to show the strata
across Brisa d'Arc creek and here Lo-
calities with Fossils are also found (3).
Locality number 11, here we find about 3
feet of a fossiliferous Exogyra layer of
crinoidal stems. The fossils collected are
out of the ledge about 2 to 3 feet and have
Exogyra arietina (rare), O. mucronata,
the various oysters and other Lower Cretaceous
fossils. See the list sent home. They
are good only for horizon determination.
Locality 12 is a fossiliferous Exogyra ledge 2 to
3 feet thick exposed to me not to be
other than material like the Camden
Horizon. It had no fossils. It is bentonite
brown weathered clay. The middle of the Brisa d'Arc
group is 3 of type. The next ridge is Dakota and
in a little further south we collected
a small fauna into the Exogyra lime-
stone, here 2 to 3 feet thick. These fossils
when determined are to be returned to
Orojan. They are in Section 11, 2 N. 6 E.

The fauna follows directly the Arrad fnd and appears to me to be Lindström, and very Lindström at that. Has Permian Orbi ness.

On the tip of the Arrad fnd occurs a bed less than 1m fast thick that is often replete with corrd. Darw a great deal of such corrd and took a specimen. It is evident from this zone that the thick calcareous Reef comes from.

Be [illegible] went in 1½ mile due S. of Frenck, to see Reid's locality marked A on Quelch's map. [illegible] the stream sports of the Reids [illegible] the farms. Below the Arrad fnd occurs [illegible] Stictoporina, a large form branching irregularly. Fen came in a light [illegible] line, evidently the type of Bois d'Arcadien it had the reputation Nov Scotland fossils as Dawson.

Fusulina, F. oculpitis, F. cylindrica
Large Platycrinus, Stictopora, Fenestella
etc.

[illegible] Henry are one to two feet
thick according to Reed, and the Coal
seams are filled with Conchostracans.
I seem some or many at one time before.
The shale, could be seen above and in the planed cotton fields
the weathered of the Land calcareous
shale.

Then Reed gives 12 feet of Henry-
house but in the planed land I could see
no point. Near walker if Henry house I
could not [illegible] see.

Then come the Chimney Hill in the
limestone ridge. Reed gives the thickness
as 33 feet but we saw nearer 100
feet. Oolites gives from 3 to 7 feet thick
are conglomerate, Lime, and have ocean
relics 3/16 inch across. Up in the

chimney hill or this of Lee? Is the section
repealed through [illegible]?

Ada, Oklahoma
Saturday, April 1-1922

Started out at 8:30 A.M. with Morgan, Homer and Brainard.

First examined the great cement mills at Lawrence to the southwest of Ada. Here occur very extensive quarries in the uppermost Viola, where fossils are not easily to be seen. Much of the Li. has been diagenetically altered and appears like a micropoikilitic or even dolomite. Other layers are pure Li. The face of the quarry may be 70 feet high. Some segments of Nileus, Platystrophia ainsata, Rhynchonella, Rafinesquina and a very large Strophomena.

Farther east among the quarry men houses the Upper Sylvan Shale of the Viola is exposed. Here Rhynchotrema capax, Pleetambonites sericeus etc.

About ½ mile further east are the famous of the Upper Sylvan Shale, but none of them are the slightest fossil remain. The upper ten feet have become indurated in the beds and are often

due to ore & rocks that come down through the Chimney (Chimney Hill rolite). Silica probably underlies WD feet thick.

Chimney Hill Section — Diorite formerly in the Chimney Hill rolite quarry here 6 to 9 feet in thickness. Five deep log exposures like the first one and continue in the line more than 18 inches prior to the flare. Increased five inches at the Chimney Hill is mainly a crinoidal limestone with some fine Cyathocrinites, one stem was about one inch high. Also Cyathocrinites multibrachius. About 30 inches higher is a bed of Chonetes (see the silicified head that I have taken). Part of the Chimney Hill, probably most of it is rolite, small and the large ones. Much of it has been changed into silica. See the Description.

These quarries are fine to see for the Upper most beds and the upper Siphonia stone.

Then started in to study Reeds Ice (2) South Fork of Jacobs Creek Section.

Shale.

We then drove one mile south east of Lawrence and began to study the Hunton series. On the road side was a fine exposure of the base of the Chimney Hill, the first erinoidal layer. Crops in discernably in the Henryhouse calcareous light green shale that weathers to a light yellowish-white clay. Some fossils are rare but we must collect intently to get the fauna. Here I saw the Cyrtoceras nanus-headed Calymene, Cariste, Dalmanites, Encrinurus, Proetus, small Acidaspis, small Strophomena, mostly small species of Leptaena and Rhipidomella, Orthis biforata subplanus, small Spirifera radiata of the Clinton type, Atrypa small of the aspera type, Meristella, Pentamerus, Favosites Favosites and Favosites Favosites, Favosites Favosites small form and a Favosites form.

All the above came from the base to 1st 1 feet 22 feet one. Chapman has all of the material collected.

Above 10 feet above the base of the stony horizon with the same kind of material I saw the same species but much rarer. Here occurred a calcite attaining a much larger size; also the Arachnidia (small), Otia, Enchadii like,

Below these I within rain and collected at about 20 feet above the base of the stony horizon. Among Articularia (large), Nucleobina, Homocephala (some flicatim, and short), Spirigera oculata (of no use), Cheirotella (not altera), Corisidula galeata (still small), Orthothecia suffarana, Lepidomitralis, Strophomenella punctulifera, Calymenella elegantula, small Rhipidomella, large Rhipidomella, Pedicita rarica (small), Productus, Rhynconella, Rhiela whitiana, Leptaenella, Rimanella, Streptelasma, small semi-Favosites, Calymene, Cheirotella, Dalmanites (one trilobite saw).

The Camarocrinus zone crosses at about

#60
Sofar beneath the Wreckfort. Both it are
common are Astylospongia (see my Lagerlist)
A. reticularis, Farosites Ledeburgiae, Cellis
Fenestrata, Bilitholites clava and many of the
same forms. Here are Obrimia sculptilis, and
H. Hallei, Cannelodictyon Calymenes.
The Dicty. irregularis occurs in a thin part
bed about 10-12 feet above the Cava. crinoid
zone. The single valves are not rare. They are
largely in limestone formation.
None of the Silurian genes does one
see the typical Ind. and Faunas. It appears
to me like all Ragan time and even
including Arbuckle, and yet how different
to me from. to be here Silurian Rominger
fauna. Not all. Wisconsin Minnesota
and W into the Rocky mts, but as a rule not true
Just beneath the Wreckfort crowds mud
shale and the common fossils are Obrimia sp.
Cyclocrinus, also here but more rare Cyathocrinidae,
Eatonia peculiaris (the Ross form),
Obrimia sculptilis and other Ind. and Faunas,
but not O. macrocleura. In the

and Dr. Fairchild does not remember the true Mrs. Portland seen yesterday with D. macrolepis, but still below Gr. gore, a in the top of the Cretaceous.

Dr. Dana says Paraseriamus atrodes for Lima than it goes with them or Atrodentes.

Am I not adding myself if the 30 feet of Bois d'Arc seen yesterday was all Dakota? It may be that of the upper 3 feet collected from yesterday may be Dakota, the rest true Mrs. Portland with D. macrolepis.

Dr. Fairchild saw a circularly striated marking that appeared to me to be a piece of the body chamber of a Baculites. Mayer had also collected the same marking elsewhere and thought it to be a Belemnite. I saw it later and concluded it best referred to as Baculitoceras.

and concluded to not respond to the [illegible]

I am now satisfied that Reeb and I went wrong in retaining the Henry Lowe to the Columbia. It now appears to me that all of the Henry Lowe is not upland to the Cowlitz and in equivalent to the Hanlin and a good part of the Kegan.

The Cregmans is in the Marsyas and in place was a part of the Hertford. This is the Record. Following the Hertford was a time of visiting and removal of monuments of the Hertford. The followed the upon distance to the corner at Bois d'Arc.

The South End of Jackson Creek section 1. Rud. Inc. Ar. (2) is as follows:

Broad Ford Clear

Cregmans, Ti and Clear — 14 Chat.
Henry Lowe, Rail, Clays — 228 "
Chimney Hill (=Hamfield) 53 "

Dr Adams "Red" mill that the
last Oriskany is developed on Coal Creek
(Reds ave (14)). Here it is said to be
27 feet thick, the basal 2 feet being
a Corgina. It may be that it was 28 ft.
2 feet that we collected from yesterday,
the remaining 20 feet or being ~~[illegible]~~ above the
Oriskanian ~~[illegible]~~ and
Tell Mountain about it. Later he said
he would look into the matter. It
therefore appears that Oriskany comes
in at this Dr Ave (3 feet thick) and
seemingly thickens to the south east,

Ada, April 2-1922 Sunday.

Started out in a threatening day to see the Wapanucka-Caney escarpment.

About one mile South of Franks stopped to see the Frank Conglomerate and was surprised to see in it hundreds of pretty good silicified Camarocrinus balls. The Frank is only about one mile wide, and a middle Pennsylvanian thin limestone and shale overlies most these Camarocrinus and deposition has cut far away from the source of the Frank. Today the Frank and Hunton are in fault relation with a throw of some thousand feet.

Then drove to Caney Creek in section 8, Township 1 N., Range 7 East. This is in a straight line 15 miles south east of Ada near the limits of about 16 or 20 miles.

Here the Wapanucka is dominantly a limestone-shale series with several thin

of some Gen. thick limestone and mudstone beds. In the upper most limestone, the thickest seen, some Fusulinids, Productus and Crinoid stems. Fossils of no value here.

The middle of the Wapanucka Group rises is about 900 feet thick, the thickness depending on where the line between the Caney and the Wapanucka is drawn. We draw the lower line at the first dominantly limestone bed above the Caney and the upper at the last limestone. The sequence here as at Berryman appears to be a continuous one.

Near the middle of the Wapanucka in thin bedded limestones are blue shales yield the largest fossil forms. They range in a shale of a Pentremites sub-type. Rhombopora is common here. See the list of forms.

Near the base of the Wapanucka in blue shales fossils are common but

from that many Permian localities alone with delicate fragments and some bracks.

Three hundred feet above the Casey occurs the Hall sandstone. Just below regulation Casey fossils, but above coal fragments like those in the Bernie sandstone. In addition a little material with a few simple stalked crinoids, Hall and described by Hall, Calceola and a small Orthoceras, Cruziana like Cruziana of Kansas City, Conocardium large and elongate, Trematopora, Fenestella, Rhombopora, Schizodus, Bellerophon and other gastropods, Leiorhynchus carbonarium, Derbyia, Productus, Chonetes, and possibly a Stenopterus were like the Devonian forms. We far more beyond.

For above no one DE transition Pedernales locality that had one small fossil. It rained and we did not get to the fossil locality. The locality is in Coal

creek, one of Gen. Austin's localities, when the Cherokees is said to possess. Told Gen. Jackson and he said he would look it up for me & determine if Chickasaw is here.

It appears to Preston that the Caney or Cayuga Creek goes into the Arkansas. This is also my view. That is the Caney from a collection of tribes, began to introduce Peace offerings in terms, with the Arkansas across Chester Hall route.

Ada, Sunday April 3 1932

Packed three boxes and shipped them by express collect. It is raining again today.

Program and Trainor called to say good bye, and then they were off into the field.

Left at 12.05 on the Driver for Tulsa where I will arrive at 6.30 P.M. Can leave for Bartlesville at 10.15 and get there at midnight, or at 8.00 A.M. Tomorrow.

Concluded to stop here for night.

Tulsa, Tuesday, April 4 1922

Left at 6 A.M. for Fayetteville when I arrived in a heavy rain at 9.30.

Spent the day with McCoy and at 5 P.M. left on "Katy" for St. Louis. Had supper at Parsons and a long wait here. Left started 1 hour and 15 minutes late.

St. Louis, Wednesday April 5.

Left St. Louis about 3 hours late on account of the flooded condition of the tracks.

At 12 noon I am 11 m. N. of Big Four for Cincinnati. When I am due at 8.30 P.M.

Put up at the Sinton Hotel.

Cincinnati, April 6-1922
Called on Edith and then Alton
the morning and had lunch Together.
At 4 P.M. Alton called for me and
we went to the home of Howard for
the night.
Emma and most Alton family were
together in the evening for a family reunion.

Friday April 7-1922
Visited the Cincinnati University
in the morning and called on Prof.
Ferneau but did not see Boyden.
In the evening the whole Dorricott
family met at Howard's home for
dinner. It was very grand.

Saturday April 8 1922

Left the Cheering at the Great Northern Railway and the afternoon visiting in Hendon and the East End of London.

After tea I had a talk with Mr Clair, the old Carrier Clerk now gone to Hedge, into the Land, & the local politicians and news taken men. There is no Science here, not even the faintest ray, only calm, dignity and foaming. Mr Clair & I went home and I saw Mrs Clair & Mr Clair having my with dinner men.

I saw a good collection of birds and fish and small mammals here. It is to be hoped that Science is at such a low ebb in Lincoln etc. Terrence tells me that the Cen Dove. Not Ring Dove, but Cen Dove is useful now.

Saturday April 9 - 1932 Clear.
Rained during the night.
A bright beautiful and clear morning. Left Price Hill to spend the day with Phil & Irene. In the afternoon strolled around Price Hill park formerly the home of the furniture man Klostermann.
At 9 P.M. got started for Pittsburg.

Monday April 10-1932.
Fine bright day at Pittsburg and [illegible]