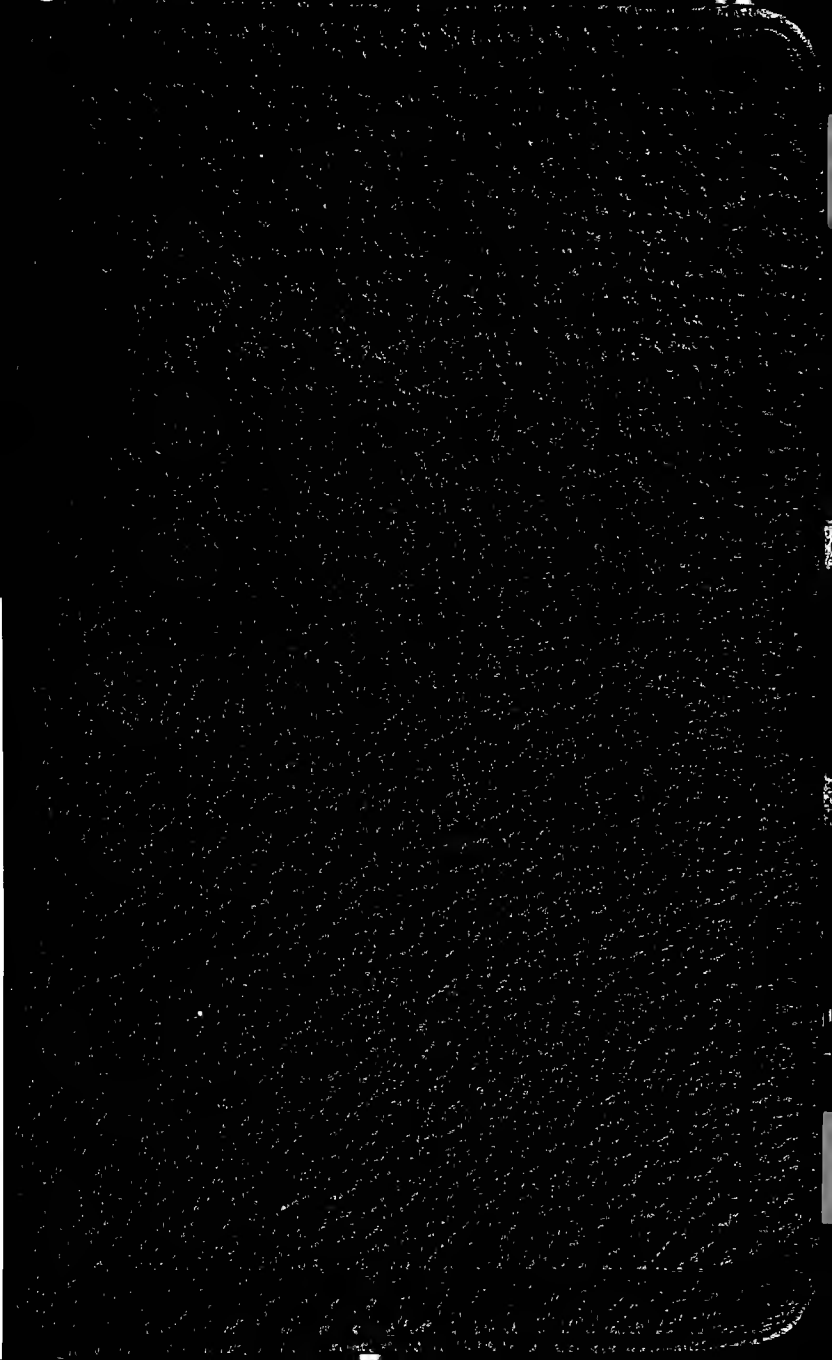


L.F. Placke writes at Bartlesville } both wrote from Okl
Geo. E. Burton at Oklahoma City } 17-

Wallace C. Thompson
Norman, Okl. for the tracks.

W. L. Goldston
Drawer F, Bartlesville, Okla.
Dealing on the Arbuckle area

George E. Burton, Oklahoma City
Was at one of the Arbuckle Mts Area.

4955 Oklahoma City
5062 Guthrie — 27 miles
5182 Ardmore Wednesday night.
5280 Ardmore. Saturday morning.
5357 Ardmore Sunday morning.
Medical 5384.
5447 Atoka Oct. 27 morning.
4955
492

doc 115

Charles Schuchert
Yale University
New Haven,
Conn.

1919

3466 Oct. 11 – Nov. 5, 1919
Oklahoma

26.33
2.67.3
5.2.0
2.49.50 Travelling cost.

Oct 11 - Amr Harvard to N.Y. 2.34 ✓
" 11 N.Y. to Cincinnati and Sleeper (3rd) 29.79 ✓
" 11 Lunch at C.H. .30 ✓
" 11 Dinner on Train 1.60 ✓
" 12 Breakfast on train 1.00 ✓
" 14 Cincinnati to Bartlesville 25.73 ✓
" 14 Sleeper Cinti to St. Louis 2.16 ✓
" 14 Dinner at Cincinnati 1.50 ✓
" 15 Pullman to Parsons and Bartlesville 2.18 ✓
" 15 Breakfast at St.L. 25 Lunch on cars 1.00 Dinner 1.00 2.75 ✓
" 16 Hotel at Parsons Lodging & Breakfast 2.00 ✓
Bring forth west. ——— $71.35

" 25 Expenses on 4 horses from N.H. 7.53 ✓

Nov 1 Tolls to Muscogee 1.67 ✓
" 2 Muscogee to N.Y. City and Return 52.26 ✓
" Dinner at Muscogee 1.00 ✓
" 2 Breakfast and dinner [illegible] ✓
2 [illegible] Jeffers Hotel Muscogee 1.50 ✓
" 2 Night Letter to C.N. Stevens 1.00 ✓
3 Porter at St. Louis .50 ✓
" 3 Breakfast and Lunch at St Louis 1.00 ✓
" 3 Extra fare to Muskogee on 30 Days [illegible] ✓
143.05

143.05

Nov 3	Meeting Ch. J. from St. Louis	5.25
" 3	Dinner on cars	1.00
" 4	Breakfast and lunch on cars	2.00
" 4	Porter	.50
" 4	Cab to hotel	.75
" 4	Dinner for [illegible] and Murray	.10
" 5	Room at " "	3.00
" 5	Breakfast 20 and lunch 80 " "	1.00
" 5	Ch. J. to Pier Haven	2.34
		$161.85
	Same Summa	50.00
	Paid in my return	74.00
	Rec'd otherwise	64.15
	Due on/ Count	$350.00

Ch. J. 8-1917 Dem. [illegible]
$164.32.
Paid Nov. 27, 1917

New Haven, Conn. Nov. 8 1919.

Arpin Tool and Gas Engine Co.

To Charles Schweikert.

Traveling expenses from New Haven to Oklahoma and return to New Haven during Oct 11 to Nov. 5 1919.

Amount $164.32

Railroad fare New Haven to Bartlesville via Cincinnati	$2.20
[illegible]	1.10
Ferriage at Coal fork at Parsons	2.00
Railroad Tulsa to Muskogee	1.67
Railroad fare Muskogee to New Haven, including Pullman, via Penn. R.R.	63.00
Subsistence en route	5.75
[illegible]	4.20
one day at New York to consult Mr. [illegible] including [illegible]	8.00
Expenses at factory, New Haven	10.00
	$164.32

doc. 115

October 11 - 1919

Left New Haven at 1.30 for New York.
Left New York on N.Y. Central "Southwestern Limited" at 4.30 P.M. to arrive at Cincinnati Tomorrow at 11.05 A.M. The day is as hot as most summer days. Have an "upper" for tonight. By the time we get to Albany the temperature was normal for this time of year.

October 12 - 1919. Sunday.

Had breakfast while passing Delaware, Ohio. Left Columbus at 8 A.M., and passed through the same old station that I saw with Mildred for the first time in 1887. It rained during the night, beginning at Albany N.Y. This is over the mountains and was a bit dark. I now remember that I saw Columbus for the first time with my father about 1872.

Arrived at Central Station, Cincinnati at 11.05 A.M. Took the Vine and Hammond car in front of station to get to Albert's home where I went to meet the family.

Had a good time with the family one day to 10.30 P.M.

Oct 13-1919. Monday. Cincinnati.

With Emma visited Aunt Fredrick and Miss Thomas. Then over Phil and Elbert at the Litton Home where we had lunch Together.

Later in the day looked up all of my youthful Cincinnati homes. Where I was born at 418 West Fifth is now 714 W. Fifth. The entire region is now occupied by negroes. The place has gone back very much. No decent white man would live in the general region. The two story double brick (present #2) is just like it used to be, except that the front door is now a window. Back of the house is the same alley about 8 feet higher than the back yard.

Then I went to our first home, which used to be 265 Richmond Street between Linton and Lenin. It is now 703 It was in the corner of Richmond and Lenin that I used to wait to stand in the long evening, Before the commencement of 18 — ?

Then went to #241 used to be 2 Nathaway Street now 806. The lumber yard to the east is now an empty place but otherwise it is as it was when we lived in it. Negroes and about Less now. Jane Street is just back and runs into Lockman's Brewery, now a dead and empty place.

Father moved from Pearl Street near Plum to now number 308, and is a very old. Opposite is the Storage House of the Big Four Railway.

Our factory after father's failure in business was in the fourth and fifth floors of a brick building five stories high on the south-east corner of Johnson and Augusta streets. It was a foundry. In my day it was a veneer mill.

Our next place was the Conklin Box Factory on the corner of Broadway and Eggleston Ave.

Our Dwight home was 428 Saratoga street the second house only from the corner of Harris ave. Ninth Street. St Stephens Church is on the northeast corner.

Ethrich's home was on Central Ave and Talbot ave Central Ave and Tenth street. On the corner on the third floor is where Phil, Albert and I lived after mother's death.

Phil, Albert and the Potters family had supper at Emma's home. She has a splendid home and lives well.

Sam Emma paid for his allowance for Annuity.

Oct 14-1919. Tuesday. Cincinnati.

A very dark day with rain. Said good bye at Alta's home at 8.30 and spent the day down town by myself looking around at the city of my birth.

In a dark and rainy day Cincinnati is not a very interesting city. Spent one hour at the Art Museum. Together the rest of it make this a good museum, but is very thin as to exhibits as the University. Often the cars and streets together that one can't get around them.

Left for St. Louis at 8.55 P.M.

October 15-1919 Wednesday.

Arr to St. Louis at 8 A.M. Had breakfast at the station and then boarded the Katy Limited at 9.03. It is a very dark day at St Louis, almost night and it is raining. In a Pullman to Parsons where I get off at 8.35 P.M. to change cars for Bartlesville. If on time will arrive there at 11.45 P.M.

After two hours of gray the day is bright and warm. All along the north side of the Mo. river are high cliffs of the Ozarkian-Bucklin and Tunn succession. Heather

to a milky white luminosity in a light blue or drab cloud. In general the clouds lie horizontal but in localized places there are small flexures indicating faulting. The dip appears to be steepest to the north and west.

Fort Scott is just on the Kansas line. Here 7 P.M. and the very last of day light. Here will be Parsons at 8.35, and have to change cars for Bartlesville, Okl.

At Parsons where I am to change cars the next train is two hours late. I therefore conclude to stay here tonight.

Hot lightning and prairie fires rain during the night.

October 16 – 1919. Thursday. Parsons, Kans.

A dark cool and windy morning. All trains are late. Instead of starting over the Kansas line at the station and over it not for until 30 minutes later or 8.40.

Many oil wells about Offerville, Kans. Here the National Oil Refining Co. Left Bartlesville at 11 A.M. and both McCoy and Sayer were at the depot to meet me. Jean Jones lived in the same rooming house that Dixon is last spring.

Sidney Perry, 8th grave [illegible] 235' below the top of the Texas Cretaceous between the Pecos Station & Fort Pecos, 2 miles S of Marathon 6 miles. Rose was sent to D. White who reported the Pecos as follows: Best plant is Lepidodendron Aranetum, that is characteristic of the Pottsville." Am Astisia (one of the Cordaites), a Cardiocarpon and a Calamites all undetermined. "As a basis for the age correlation of the coal-bearing Texas formations at Marathon, Texas, the fossil fragments are scarce and insufficient, yet the determined species of L. Aranetum is different from the United States is, after all, so limited as to leave little doubt that the fossils are of Pottsville age. The fossil of Lepidodendron as here shown points more strongly to the upper rather than to the middle division of the Pottsville."

"The coal-bearing beds are probably of the age of the Magdalena group of New Mexico, Bituminous with the same species has been gathered from the base of the Magdalena at the coal mines of Socorro, New Mexico, and at the identical coal-bearing formation of the crystalline, about 6 miles east of Albuquerque. Also in Pecos Valley east of Santa Fe."

"Not later than Triassic" "Possibly as old as the Carboniferous" Leaves of fossils to Stevens.

"Appears to represent the initial stage of subsidence in the southern Rocky Mts,

Thinks H. Kimple = Hay Valley of New Mexico. He asks "Is it Triassic of Texas."

Reede got in El Paso County Texas some Permian forms. Are a species of Carbiniella, Pentremites Swifti, Fusulina from the Permian. Reede sent in to Texas during 12 trips of fossils. Some when seen by Beede. He also got the fauna in the Marathon region. Mr Thamm was seen in the East of Texas. The Cy thinks the Thamm was re-stricted to central Texas. These conclusions not in harmony with Hyatt's plant evidence.

Boone is known in deep wells in northern Oklahoma west of the Stacks of the granite ridge.

The older Permo-Carboniferous in Kansas butts against the granite ridge and does not cross it. The younger Permian comes over it to the west but apparently not very far. All stages, as observed by Lane, overlap the granite ridge and become sandy. The limestones are changed to shales &c. The granite ridge was an old high land mass for all the Permian.

The Cy thinks the Thamm and possibly the Permian spread south east and west into the Gulf of Mexico. This is an interesting new proposition. See my Diagram of the maps of

fare the Coz. This is done on the evidence of deposition of three of the Stamm to the west in the Bend country. Even if so I cannot see why the equivalent of the Stamm may not be in the Marathon region of Texas.

Gregor tells me that in 1913 he had 60,000 specimens of Trochilidae in about 6000 lots. To it he has added since then many a lot. He now thinks of selling out to Gale and Schnackenberg, and to use the money to guarantee an education for his only child. He said he owed well to Chicago University for $2500, but that in a short time (months) he would let me have it for $1500. Both to take my own time to pay for it. Then what should be done with his library. It cost him over $2000. I told him that I was inclined to give him cash $2000 for the entire collection and library. He wants to remove the mounts of the Rhynchophanes, Pyrgita and a few other things. To this I agreed. I wonder if in the end he will let me have the collection? He appears to be willing, but as the collection is the dearest possession he has he may in the end not let me have it in my time.

[The above will never come to naught because I had to take on another find the birds about Gregor.]

October 17- 1919. Friday

A fine cool morning. Start more than one hour at the Empire Building, and was shown the fine Oceanic room on the 56th ninth floor.

We are off at 12 for Oklahoma City the train being late 1½ hours. Then we go by trolley to Norman to see the final exhibitions of the state University. Oregon is the only field visited about Thursday when the City teams of.

This morning for ten minutes saw Professor Monroe of Kansas University. I learned that he had not changed his mind a grand to the Lower Permian Red. He thinks that one is one indivisible series and of early Pennsylvanian age. I believe that he is wrong in that the lower shales are of Tennessean age. Oregon says he never has seen contact between the Coon shales and the Burlington Falls. Certainly we saw such a contact on the stream on our way to Rock Creek in the San John country.

Left for Oklahoma City at 6:30 instead of 4:30 P.M.

From about 10 miles S.W. of Bartlesville to Norman (27 miles) one sees a succession of outcrops of heavy bedded sandstones and occasional thin limestones. On the Kansas line the limestone layers are generally not but few sandstones, but for 20 to 25 miles south many are these have changed over to shales. Not only the sections thicken to the South, but become more shaly and sandier.

(one 50 miles)

From Agra to Oklahoma City one sees in the Permian red beds. From the car windows the several railway cuts show a brick-red sandy shale with thin zones of red sandstone & thicker zones of thin bedded sandstone. The sandstone often irregularly in the sandy shales as if channeled and mainly shows more or less cross bedding of the fine-sorting type. The whole looks to be the subaerial side of a delta with the material coming in from the north. Another part of Cardmore 120 miles the high Permia at Bartlesville is massive for large stretches and a belt replete with fossils and not a single Productus. and all of one species (Plumpton Lily) Later I am to go almost to the western end of Oklahoma (into the Panhandle area) to see the marine Permian fauna collected by Cowell and described by Beede (Tuchatula - Wichita) along with fossils.

The Permian seen today has thin seams of gypsum. Secondary gypsum fills the joints.

We passed through a number of oil fields today and finally those of the great Cushing Field. Tank farms seem here mile after mile, and now the 15 oil refineries are here. Many new wells are going down in the Cushing field. This fault runs up to the Permian and no oil fields seem to get in the Permian area. Beneath the Permian there may be good fields. I made note of the mile of wells there.

October 18-1919 Saturday Norman.

Left on the 8 A.M. train for Norman to see Dr. Hanna, the Hale coal, etc and the collections of fossils. Met on Dr Hanna at 9.30

Fossils from the Jackfork formation collected by C. W. Hoover in 1919.

Grey sandstone (number 941) with a single bifoliate Lepidodendron. I think White could identify it. It suggests even the Devonian genera. It is a fossil wood form.

Grey carbonaceous weathering chocolate brown (943) has small round cross sections and tiny fragments of trigonia. All are moulds. This piece should be completely broken up to get the fossils.

Same as 941 grey with small rounded and flattened crinoid columns and small fragments of trigonia. 942-4 are of same type.

No 945 shaly sandstone shows true-in-one. Suggests casts of the bivalves but are true-in-one.

No 942 grey sandstone with leaf & wood casts suggesting Cordaites.

Fragments broken from 943 and 944 with the same forms as above. The trigonia casts suggest bifoliate forms like Cyclodendron, or Stictoporon. Stipes about 3/16 inch across. Still broken casts. There are a few other fragments of organisms but cannot make them out. There also a slender Rhabdocarpus like form.

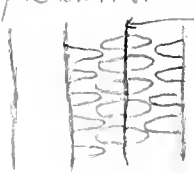
No 946 yellow coloured concretion [illegible] open, about 2 inches in diameter. Suggests Columnaria or Also a Michelinia Calospiccia. Corallites plainly like ones, cross radial lines of septa. Tabulae exceedingly close. Pores like Tabulata and yet [illegible] doubt. May not be organic.

Br 977 what is it? Specimen about 3 inches long

suggests bones ribs but probably not. Flattened at all. Just rounded wavy markings.

Br 994 A small fragment of a calcareous shelled brachiopod, or small ? piece of it so it cannot be identified. It suggests most Chonetes, one sees the inside [attitude] though it may be Spirifer (Spiriferina ?), the arteries may show. The shell is pierced by and the tubules go through the shell. The shell is pitted or pits. Hardly a Productus because the tubules are too fine.

Br 882 fine grained sandstone. Looks as if it might suggesting a fossil but probably nothing of the kind. It suggests a plant. It looks like the Rhizocorallium a fern cast.



of a fern like this in the middle.

Br 1015 a very fine grained sandstone with a thin shale parting. On it are three Orbiculoidea 3/8 inch across. The circular lines are [denoted] fine and close together. All are fossil valves. Might prove to be Common Devonian Orbiculoidea manhattanensis. There a slight and short median septum in [type] of the shell with two muscle scars, one on either side. Br 1016 has the other specimens of the same Orbicular valves.

These shells are almost circular but have a very short flattened portion margin (2) - This is little larger than the average shell.

See more 2 pages on

Jellomys Birdseye (Lowville) like limestone with fine Isotelus (whole) suggesting the Trenton form. Also 2½ miles E. of. Color specimen here and vernal pigment. A white Encrinurus fan and form, a small tail. Head of Dalmanites. Tail of Ceraurus Tail of Bumastus (suggesting Trentonform). A very small new form of Ptychopleura of the filitexta section. Ortonia suggesting minor. A coarse fenestrate Phyllopora. The Oklahoma occurrence was not from me.

Lee Packford plants are from Beech Creek, Section 22 T 1 N, R. 26 E. Oklahoma. Collected by Noonan Dec. 1917. Number of lot 469. Thin dark dirt dark (almost black) sandstone with an abundance of carbonized plant pigments. Saw no large plants such as I could identify. No Lepidodendron, Dalmanites and ferns are present small pigments of a Dio, known only to the time to be more than a small pigment. Fruit and leaves of fruits like Cardiocarpon are the most common. The ferns are branching sprays and suggest Cyclopteris or rather Archaeopteris venation.

Late collection from the Ordovician of Grady County, with tracks of amphibians (Ichnites) impressed on the bedding. One of the tracks as seen in photo looks human-foot like, but is most probably amphibian. See the 3 photos I have. Collected by Wallace C. Thompson, a senior at O.A.C. University.

No 1019 A cast of some woody stem. Might well be a Cordaites. Section about 2½ × 3 inches across.

No 1020 may be another wood cast.

No 1004 fucoid.

No 1006 A fine worm burrow track. No 880 and 881 the same thing. ~~Like this.~~

All the rock specimen seen this morning of the Deckertown are more or less quartzitic and have conglomerates. The quartz pebbles are not small usually ⅛ inch across and all well rounded. Some have black shale angular pebbles = intraformational. Very rarely is there a shale sample that has passed, more or less, slaty.

I can explain the fossil evidence better as Cartonifarms. Bryan had reported his observations to Stevens and MacCoy as Upper Ordovician on the basis that he had seen a fragment about ⅜ inch across of a Trematis shell. He is certain it was calcareous phosphatic as that it had about five rows of pits. As he drew it to me his drawing suggested Trematis. There were two fragments, but today we could find neither. Has Stevens taken them to New York?

The question I must ask Stevens at Columbia University is did the Lefevre Formation come from the same formation as the rest of the fossils. If so there can be no

Ordovician and all is of distinctly early Pennsylvania age. Certainly all is marine in origin. At present the evidence is clearly against Troyer. Certainly not a single fossil found Ordovician characters.

The plants of the Jacksonburg Troyer tonight take from recorded Jacksonburg flora. His entire evidence appears to be the soft muddy nature of the plant beds. They are the characteristic forms. When contrasted with the Jacksonburg quantities of course the difference is great, but on the evidence no one would be justified in saying that the plant beds are recorded Jacksonburg. I must have a talk to Stevens about these relations.

Troyer is deeply concerned over my Jacksonburg decision!

Professor Weeden had me, Grove and Placke to lunch. Mrs Weeden is a good talker and the hour behind the time. Had a good time and a good meal at their home.

Troyer is deeply interested in Dr. Stevens' efforts to get on the Coal Survey as Paleontologist at $2000. With the Empire he makes too much. If he goes he will in the end fail. He will not get on with the crowd and will soon run afoul of Mrs Weeden. Troyer is not a university type of man.

October 19. Sunday. Sulphur. in Bentons car.

Left Oklahoma City at 9.40 for Sulphur. At 10.10 we passed through Norman, on the way (about 65 miles) south to Sulphur.

North of Norman several miles we see for the first time the dissected Permian. It here consists of a soft sandy shale in a very muddy fine grained sandstone. It is thin bedded often laminated, occasionally rippled with the smallest of current ripples. Many of the layers show that they have been exposed to the sun and hardened and then the incoming water broke up the top thin layer and made angular pieces of it. I saw no clear cases of sun-cracking, and before small pieces that appeared to be marked with rain prints. The only organisms seen were a worm track [illegible]

The ground is red all the way as we go through Norman, Noble, Lexington on one side of the Canadian river and Purcell on the other side. This river here is a very shallow affair about ¼ mile across and looks like a smaller Platte river of Nebraska. Cliffs about Purcell are good exposures of the Permian.

South of Purcell are low broad flat lands and beds.

Five miles south of Paoli there is an exposure of Permian sandstone making the crest of a hill. The

sandstone is fine grained in thick beds or finely laminated and decidedly cross-bedded. Some of the surfaces show beach sculpturing. The white is parious to crater with the result that some surfaces show limonite incrusting, and along joints crystal (calcite) accumulations. Also a sign of a fossil. The whole appears to be the outcrop of a delta deposit.

At 1.30 we are at Pauls Valley and have lunch. At 2 P.M. we are again on our way south. We pass through Wynnewood, Ardmore and at 4.30 we are at Sulphur.

At about Davis we are out of the red character of the Permian. South of Davis are begin to see the first of the great limestone (Trenton) conglomerate. At the contact a low hill is a good exposure of the conglomerate. It is an exceedingly irregular deposit, here beds of fine grained sandstone interbedded by irregular deposit of conglomerate. In an area of a few acres may all the pebbles are of limestone usually under 4 inches though I saw one of the 3 foot size. Most of the conglomerate is a very coarse gravel with quite pebbles of the 3 inch size and limestone pebbles of the same size. The planes all appear to be a fresh surface. I saw one granite pebble 3 inches across and it appeared to be fresh. These conglomerate and sandstone beds are about 4 feet thick. Beneath are red and green shales. Just in a short distance farms

into stiff consistency. I never saw a more heterogeneous mixture of materials, yet I could not make out a clear case of torrential deposit. In fact the lime cement in all of the rocks I seem to preclude a cold climate.

The city of Sulphur is built on the Permian conglomerate, and just as far as can be seen here, this is a limestone boulder conglomerate with local grey & yellow pebbly limy sandstone. Here the boulders range common of 6 inches across, and rarely there is one of 1½ metres (4 feet) in diameter. All of the boulders are rounded, more than subrounded, and yet very few are truly ellipsoidal as one sees on a marine beach. There are also angular pieces, and some of these rarely stand as edge stones in the more or less rounded boulders.

The Permian (Carboniferous) conglomerate appears like a land deposit marked down and out of the Carboniferous beds after their rising in Pennsylvanian time. There is so much [illegible] and some clay that we cannot [illegible] a steep grade from the mountain. It is the first mark in Permian time of the open and Paleozoic strata.

In Sulphur much sulphur water issues out of the ground and the artesian spring in front of the [illegible] rate of "2000 gallons per minute". It is a fine

hill country. The valley is down 865 feet. Sulphur is a summer resort and health place. The town is upon hills and trending draws.

We are stopping at the Eastman Hotel.

We made 109 miles by speedometer today

The Seminole conglomerate at Sulphur probably does not exceed 2 to 3 feet in thickness and according to Mr. Geo. E. Newton rests on upturned Simpson. See below p. 21.

The Sulphur water appears to be a mixture of the waters from the Seminole conglomerate and the sulphur springs.

The rocks seen in the Seminole conglomerate appear all to be of limestone. Commonly they are from 2 to 4 inches across but some where seen up to 18 inches. All are fairly well rounded though not to the same extent seen in track bottles. All are said to be derived from the Cadiz-ian formations. This means that about 23,000 feet of strata had been eroded since the Cadiz-ian time before the Cadiz-ian became exposed to furnish the boulders for the Seminole conglomerate. Here for this reason that I would refer it to the Permian and to the close of the Paleozoic time.

October 20. Monday. Sulphur.

A dark threatning morning, but we are off for Ardmore at 8.30 A.M. It is about 35 miles to Ardmore. By nine o'clock the indications are for a clear day.

Five or six miles south of Sulphur we see the first deformed strata of the Carboniferous, the Woodford chert. Here beside the road at the outcrop a mile thick strata dipping about 35 degrees to the north consist of a series of white shales (with shales of lighter green or lighter pink) with thin seams of small chert (2 to 4 inches thick). Small silky chert nodules occur in the shales. Brachiopods are found here. In the stream near the bridge on the north side of the road [illegible]

A little to the north of the Woodford chert exposure [illegible] I saw the Devonian conglomerate. This conglomerate rests on the older formations and its character depends upon the underlying formations. In places where it rests on limestone, Woodford chert, or other material

About 8 miles south of Sulphur we turned into a side road going east 1/2 mile and then to the farm on which is located the "White Mound" of Hershey and Ross. I never saw or many other fossils at any locality before. Beneath the Woodford chert and limestone I saw a thick series of muddy light blue limestone or calcareous land shales in which the fossils

around. Unweathered the material is a light blue firm material. Weathers down into a yellowish earthy mud with the fossils in. What we collected mainly all came from a zone probably 10 feet thick some ten or so feet beneath the limestones. The same kind of matter of recent colour for probably 20 feet more. I looked at it but found the fossils too much weathered to be of value. It seemed to me to have the same kind of colour. Lepidodendra, Stigmaria and Sphenopteris seem together in a zone 3 feet thick at the base of the upper zone that we collected all our shells in. Rain stopped our collecting and we hurried away from the top of the quarry to the road.

Road climb of 330 ft. Berrington on the railway. Then 5½ miles to Craven Arms.

Here we go into Ordovician the upended strata are covered by Permian and Trias or Permian residual clay or Pre-Cambrian residual conglomerate. Once or twice we can see the Silurian [illegible] cornbrash.

We got to the hotel at Craven Arms just in time [illegible] to avoid a heavy rain with thunder and lightning. It rained more during the evening.

Mrs Cocks, our Red Cross [illegible] the Empire [illegible]

This means that the strata beneath the Cretaceous are less folded. Measuring from south of these across the Anticlines it is safe to say that these rocks have a width of 50 miles at least.

(Written Oct. 26-1919).

The Pennsylvanian has a thickness about Cochrane of about 18,000 feet. If to this is added the 3000 feet of Carey the thickness becomes 21,000 feet. For the detailed stratigraphy see the six sections given me by B. R. Goldston of the Empire Co. Note on the remarkable lithic changes in the first sets of sections to the north and south of Cochrane.

A little coal has been seen in the Permian and the lower part of the Triassic [illegible] Evidently these are outliers of deposits.

The evidence is all in favor of very shallow seas. The limestone are nearly clear lime and the conditions must always have been quiet and sometimes shallow enough for ripples. The scarcity of land plants is remarkable.

October 21. Tuesday. Gardiner

It showered much of the night and it drizzled this morning. Accordingly we cannot get out in the field. We hope to go at noon if it rains no more. It rained no more and we are off at 12.30 for Berwyn on the Santa Fe railway 3 miles north of Gardiner.

At Berwyn we reached about 2½ miles north along the railway. At 1½ miles past 463. Just to the north in a cut we see a series of very Cretaceous and Tertiary laminated, thick and thin bedded Hackberry limestone. There is some small Ostrea, a small Baculites and a small coiled Planorbis like fossil. The sandy shale is Cretaceous Hackberry and probably not more than 90 ft thick. About 15 ft beneath the Ostrea and Baculites are common. Still below in the shales some fossil wood, and a good coal in the limestone. In the ravine. All the Cretaceous fossils found in the small ravine about a mile south of Coal Creek are Tertiary, the same we found in the railway.

We walked at the branch and found the Penn. shales above the Cañon sandstone. The sandstone in place is probably 200 feet thick and is Hackberry but above. Here we come into Blue shales

the introduce more cut more than any impure limestone beds that in thickness are rarely always under one inch. The weathered surfaces of these shales are covered with the limonite pyrites. These shales continue up to the Stonewall a limestone. Their thickness in the neighborhood of 1500 feet.

Below the Carey shales are intensely black laminated shale and grey sandy shales, these shales have nodules of iron pyrites and calcareous concretions fracturing clear fine lines. These shales, defining the sandy beds like coal, or rich are the in certain seams. Coal Creek flows into a large stream that runs north and are finally 700 feet above Carey. to be well on the Ordovician limestone

3/8 In all the Carey shales, On Red River the estimated thickness of about 330 feet. These are less than 2000 feet of Carey and Penn. shales and possibly there may be 5000 feet, up to the Mississippian.

The Kaskaskia limestone here about 400 feet in thickness consists of two earthy crinoidal limestone each about 3 feet thick and between a blue shale one about 10 feet thick and a little more than crinoidal limestone. The joints here are all smaller and especially the upper one. Here the crinoidal

on all Productus, a small Lemonala, Lowetella, Nemile, Euphachyaxinus, Rhombopora, Cystodictya, and Lebedotia. Probably 20 species could be gotten together.

[illegible] on Brush Run between the Kabanuckla and the Blue and Brush Run below. Here is there a break above the Kabanuckla. The Pennsylvania Limestone is only here at least 18,000 feet thick.

The following is from Mr. Gilbert's notes.

[illegible] between T. 3 S, R 1W and R 1E the Kabanuckla lies in Coal Run. Coal and Penn. rocks at least 1000 feet thick. The upper portion on the Blue Hole Little Blue Creek Trail. We next [illegible] Kabanuckla [illegible] creeping [illegible] grey, from 6th 120 feet thick. As I now have copies of these notes the details should be brought into [illegible]

In T. 2 S, R. 1E the Kabanuckla consists of [illegible] limestone 3' and [illegible] from 16' of shale, 30 feet [illegible]. Then Blue Hole [illegible] Brush Run. Together the [illegible] are as follows: 40 feet, 20', 80', 270, and 40 feet.

In T. 4 S., R. 2 E the Kabanuckla limestones are as [illegible] 18' shale 200, li. 15', sh. 240, li. 20 sh. 260, li. 30, sh. 100, li. 18. The shales are at least 3400 feet [illegible].

Letter 22. Wednesday. Gisborne.

Left up at 6.30 to get started for Bradford to see the Quarry and Bradford. Was a dark and threatening morning.

It was 8 o'c the time we got started to the northward. At 7½ miles north of Gisborne we stopped to collect on the Waipaweka [illegible]. The place is beside the road and just opposite a small farm house. Here the limestone is from 15 to 20 feet thick and is a muddy carbonifer limestone. As there is almost no shale joining the limestone surfaces are badly weathered and we got but few fossils. Michelinia rectus here is most in evidence. One Productus close at valve that I got is about 3 inches across.

We then went on past Bradford a short distance to within a mile of Milo. Here the Waipa[illegible] Permian series comes in, and I was taken to the place to see a fossil Carnian limestone 6 feet thick. In weathered exposures the limestone appears somewhat concretionary and in places one sees a sort of fossil structure. In the glass it looks as if granular. In places one sees included patches of the same material. No fossils of any kind seem in it. We paid Easton and I bought

it looks a Caliche like limestone and later I asked if it might not be a chemical deposit — a limestone as the first deposit from super-saturated seas in a dry climate. The limestone rests on brick red clay. I was told that here the Leonardian has a thickness of about 700 feet. It is composed near the base of two limestone conglomerates, a sandstone, and alternating of two gravel beds that are loosely cemented and two limestones like the one described. The rest is brick red shale. Over the limestone in places lies a sandy laminite probably recent dry deposit. The limestones are said to be fairly persistent at the same level in this part of the Anadarko.

The [illegible] went to a place in [illegible] Creek on Hackberry Creek [illegible] miles west and [illegible] miles south of Mangum [illegible] saw another exposure of [illegible] limestone. Here it is almost all an oolitic about 15 feet thick. Crinoidal material is [illegible] common and some of the layers have the appearance of a [illegible] limestone. The average fossils here are [illegible] and Productus and a small

Leiminda are the common forms, Bolbina is rare. One layer has many goniatites ranging up to about 3 inches in diameter. Saw one nautiloid with a very large umbilicus perhaps 3 inches across but the chief set septae were marked did not follow it. Have fragments of another specimen. The fauna comes from real thetuce and thruje a thickness of probably 20 feet.

At 12.30 it began to rain and soon we found that we had to again put on coats. During the rain we were at Dinwoodie. It was then 20 miles through the rain and slippery roads back to Lindsay.

We passed through Lindsay to the Glenn - the type locality for the Glenn Pennsylvanian formation. These are almost the only exposures in this country, and it is a very poor type locality.

October 23. Thursday. Ardmore.

At 7.30 it was still dark and very threatening. By 8.30 it seemed to be clearing and by ten it was a bright day.

Started at 8.30 first on the [illegible] one mile south of Ardmore to see a Fusulina li. beside the road and a grove and. The li. is 20 feet thick and is 15,000 feet above the base of the Pennsylvanian (= Bapannuka), or 3000 [illegible] the same series. In places the li. is earthy and [illegible] Fusulina occur in a 2 inch li. But for it [illegible] rocks, be the weather. Original [illegible].

We then went to the S.W. ¼ sec. 2, T. 5 S. R. 1 E. one mile west and four miles south of Ardmore. Here occurs a [illegible] about six feet thick, and of a white color. It is replete with [illegible] fossils and some other species. See the list collected. Here the [illegible] a quarter of a mile. This one is about 3,000 feet beneath the tip or 10,000 beneath the Fusulina zone previously described. In places [illegible] Lustrous, the grey is a limestone, and in other places it is a limestone conglomerate. This fossil is the [illegible] of fan coral. Meek calls it D. cundra or D. tennessiæ.

Are there near the Central East Sec. T. 5 S., R. 1 E. on two miles west and 4 miles south of Cudmore. Here are exposed a Beattie like small fauna in a blue clay that is 2200 above the base of the Pennsylvanian or 1600' below the Upper conglomerate zone. This shale fauna is restricted to a zone 3 feet thick. Over the small lens of marine fossils. Nearby Dalton got a large piece of Fusulina limestone, but the zone a place was not located, in which the crinoidal limestones occur closely associated.

North a fourth locality on the east side in the N.W. ¼ Sec. 28 T. 5 S., R. 1 E., on two miles east and one mile south of Brock. This is in the vicinity of the Cement Mills. Here the second limestone from the base of the Pennsylvanian on west side of the hills anticline. On about 350 feet above base of Penn. The fauna is a very small one and has Fusulina. Here a muddy oolitic limestone with the crinoidal limestone most common. Also some here a [illegible]

Finally to mention one more little fauna in S. Central Sec. 4, T. 5 S., R. 1 E., on two miles south and 1 miles west of Cudmore. The zone is 600 feet

above base of Permo-Carboniferous, kept almost within. See the small bit. Fossils forming part of the Productus Productus and the fine things gotten today.

In the afternoon we passed over considerable high ground composing the basal Carboniferous Eraine sandstone with grits & pebble conglomerate. The soil of this Carboniferous looks fine red and I surmise that they may be the residual Permian left overall the Carboniferous.

Saw little of Newton, Tegarmine, Fitts and Carbuckle. In the latter saw a number of Orthotetes and one undoubted Camarophoria. The fresh Fitts looks somewhat like a Productus limestone in its laminated bedding. Some hard crystalline fossiliferous limestone was found on the road to it. The Carbuckle is a dolomite of fine grain.

The Brodford Chert consists in the main of thin beds (1-4 inches) of dark blue and flinty very fine sandstone this weathers brownish or light chert separated by very thin layers of black shale. It is in a totally different looking chert in other parts of the region.

The contact of the Oquanna on the Brodford is not exposed. The Oquanna is a very fine grained sandstone that weathers yellowish.

On the Oquanna possibly another small unit with the Caney shale and it seems to form the base of the cycle of deposition.

The Hindsville, Boldon, says the "Batson" is in the Hindsville and the Sallisaw at the base of the Pennsylvanian or Caney. He has three points for each horizon.

October 24. Friday. Ardmore.

Started out at 8:30 for Brookford to see the Brookford chert. It is a black shale interbedded with much blue-black thin layers of fine sandy-clay gray that weathers out as chert.

We then went up Fiddler's Run and saw the regular succession from the Pella-Gimpsom-Hunton (Clinton,-Reedsburg shale-Upper Hunton Li) and then the Brookford chert. Then followed a covered zone about 10 feet deep when the regular Sycamore sandstone followed.

Then came in a series of blue to black shales with an occasional thin sandstone. About 110 feet above the Burton for a small Camerella fauna. Forty feet higher or so got the Chonetes flemingi zone with many Camerellas and Leiorhynchus and several horizons yielding fine fossils. Then came a thin sandstone beneath which Bowen got a fine Rhynchonella (see the specimen).

We then went on down about Hindsville to 1600 feet which is the base of the first prominent sandstone (that is according to Bowen's section) which is 50 feet thick. Then came an unexposed zone followed presumably by the Pennsylvanian. As this sandstone is like those of the Pennsylvanian and wholly unlike that of the Caney we took it as a guide and drew the Penn.-Penn. line at the bottom of this sandstone.

We then concluded to go on to Berryman and reexamine the Caney 2½ to 3 miles north of Berryman, the same place we saw on Oct 21st.

In Cook creek Mc Coy and Burton overt 1½ mile
north from mile post 463 and then near the stream cutting
the Woodford and from the Lycoming. At less than 100 feet
above the Lycoming Chas. Goldstein found in a nodule
a few small uncompressed goniatites and a Carneyella
showing unmistakable Irvin Cave. At about 100 feet above
the base [illegible] some long sponge spicules. Otherwise barren
[illegible] in the area of rocks.

The estimated height of the Carey from the Lycoming up to
the sandstone here means 2500 feet thick from the sandstone
to the bridge over Cook Creek 700 feet and thence 1800
[illegible] the Lycoming. The irregularly laminated dark Carey
[illegible] sandstone is probably 50 feet thick.

Above this sandstone we concluded to place the Pennsylvanian
at nearly 2000 feet from the sandstone up to the
so called [illegible] limestone &c. In the lower part of
these beds Weller found a Bryozoan that I have. Also
from 600 feet above the Carey sandstone.

It is [illegible] to see that the Carey has very different
thicknesses in the short distance from Woodford to
Berwyn. This maybe explained by the time of erosion
following the Carey and before the Pennsylvanian
began.

The Brassmanella Limestone should not be called by this name as it does not lie at the base of the Penn. but lies above the base, here are of shale. The fossils of this limestone are unlike those of the True Mononga-Brassmanella, though they appear to be of old Pennsylvanian time.

It seems to me that I have now demonstrated that here is Carey Lime in the western Appalachians, and as the Carey Lime are Pennsylvanian fossils, or anything to suggest Penn., they should be classed with the Tennessean as claimed by Girty. The Carey Lime runs between 1600 feet and about 3000 feet. Mr. Schlotter will measure this thickness later when he comes to survey the part of the Cumberlands.

For general notes on the Pennsylvanian see under date Oct 30.

The field belt has it away. Mcdonald as here
as [illegible] [illegible] Penn.

October 25, Saturday, Birdmore.

A fine but warm morning. We get started at 8:45.
There are now ten in the party. Mr. Bean of Texas came up from Fort Bennett to join the party. There are altogether too many in the party for the good of the work. Two-thirds of the men do not know or do not care to collect. They are out for a picnic and they are having it at the expense of the Empire Co.

Our first collecting ground was to a place 7 miles north and 2 west of Birdmore. Here we found a vertical limestone (carnivorous) that is in low cliffs in weathering. It is 10,700 beneath the top of the Pennsylvanian of the Cimarron. Here south of Caddo Creek, the fauna is very abundant and small one. We got 3 species of Productus and a few other things. See the CA.

Placha came on a sleeping rattlesnake about 3 feet long. He angle worked him and one died.

The next collecting ground was [illegible] north-east of the Permian one. Here is a vertical limestone 10 feet thick, followed below by 6 feet of sandstone and then by 30 feet of [illegible] shales. It is 2200 feet

lower in the section than the previous locality. In the limestone we get a small fauna, the common form being Camarophoria Tripleicum. In the shales beneath we get a much more varied fauna and the best one of the season in the Cincinnatis. Ornately crystallized crinoid stems.

We then collected in a limestone quarry in the outskirts of Indiana, but got almost nothing.

McCoy, Davidson and Lewis went home for a few days. Bill turned up at Attica on Thursday.

At 8 P.M. I shipped 4 small trays weighing 143 pounds to Chas. Hazen. Had to pay $1.53/100.

Sept. 26. Sunday Ardmore - Atoka.

Today we are to go via auto to Atoka. Heavy clouds are in the skies just as yesterday but in all probability they will not rain. We are off at 9 A.M.

As we go along we remain in the Cretaceous for most of the trip. Ardmore is also in the Cretaceous and for a long distance we are on the basal sandy-conglomeratic beds. The land is usually prairie or oaks, the farms are poor, and the country is in fact in the main the "poor white trash". One is struck by the brownness of the people and the misery displayed in the faces of the women. The latter are burdened by a series of very young children, many in motley family, who live in wagons as they go, and we see during the forenoon. Later as we get higher in the Cret. in the Edwards limestone the land and farms became better. Cotton and sugar cane are the staples. The roads are bad limestone.

We passed through Macmillan, Caddo and Madill where we had lunch at noon. Then through Kentucky, Aylesworth, across on a ferry over Red River (40 miles south of Ardmore, and 14 to Durant) Bread and Utica. Through the latter place we

Passed at 2.30.

At Devon we turned south east and at Caddo we began to follow the M. K. and T. Railway. At Caddo we took out the Canadian Caddo limestone in the railway cut near the station. Bryce one common. Beyond Caddo we got into the worst roads in my experience and more are more stuck in the mud. This muddy stretch of "Terrible" road was through the swamp land known as Boggie the name of a Pennsylvanian township. Here we got [illegible] it was nearly 6 P. M. Bryce says that not only does not Caney show at the place but even within ten miles of the place. (It is the locality of Caney.) At 6 P. M. we were at the Hotel at Atoka [illegible] the railway.

We have come at least 85 miles, but our speedometer indicating 90 miles.

At about 11 o'clock the warm temperature of the last day or two changed. The wind shifting into the northeast and it began to rain. The rain was cold and delightful. It appears to be [illegible] no rain.

October 27. Monday. Atoka.

Started at 8.30 A.M. about 5 miles + a road cutting just beyond a bridge over a small stream. Here Tallihina chert and shales is well exposed and form graptolite zone collected. They are of the Normanskill Loiyon. Also got three species of brachiopods, one being a very large Paterula.

We then went further north to the M. K. and T. railway bridge in Limestone Gap. Ballard quarries at Chockie. The railway has been operating these quarries for 25 years and have taken out about 100 to 125 feet of the cliffs of Li to road one half mile in length. The strata dips to the southwest 75°. The thickness is about 100 to 125 feet. Towards the base the limestone weathers into thin beds and all the fossils gotten are of these lower strata. All are small and 9/10 are bryozoa. Otherwise the fossils are much broken and crushed.

Wallis (Kansas Survey Bulletin no 23) gives the following section of the Chockie quarries. Beginning at the top the strata are (T. 1 N., R. 12 E.)

Limestone	(This is the Loiyon that gave us all the fossils)	70 feet.
Coralite		3 "
Chert (Called by a dense Lowville (Li)		43 "
Argillaceous blue Li that weathers yellow and is composed of comminuted crinoid stems		15 "
		131 "

Hale gone 115 feet
Ferruginous sandstone 15 "
Blue limestone 5- 10 "

The Papanuchia limestone remains one mile of the "Papanuchia Ls." seen in the Catskills.

Between next several miles further north to Limestone Gap (Sec. 31 T. 2 N., R. 13. E) where the N.Y. and Pa. has cut through Limestone Ridge. Here Dallis gives the following section descending

Limestone 65 feet
Arrolite 3 "
Chert (I should say a dense Pentamerus Ls) 30 "
Blue shale 200 "
* "Z series" argillaceous sandy Ls. Blue separated by 2 ft of Lauraceae Blue shales. } 97 "
Here we find some fossils and worm tracks of fucoidites. The latter attain to 12 inches in diameter. They are upside with worm tracks, like the slab taken from the Ferrona quarries, and often like Arthrophycus. This zone is clearly to be correlated with Rensselaer in the Catskills and in some ways it forms a natural division of the Bird series. If this is true then the base

of the Permo-Carbonian should be drawn at the base of these sandy-argillaceous beds and shales with coal seams and in the Cretaceous. * See below, and opposite page

I did not see a trace of the Hastoid here today nor has Hayden ever found one. The cretaceous are not pure the Inoceramus dimidius zone, and those fossils by Bullis must come from either the shale below or the argillaceous lie beneath.

Beneath the argillaceous lie comes in the dark-blue shales, the Carey. What their relations are here with the Jurassic cannot be determined because of the Rhetine fault. There is a great thickness of Carey here to judge by the width of the 4th side of Limestone Ridge. See ^ of last day's trip to Carey.

Over the [illegible] to Limestone [illegible] but in shale about 1 foot in thickness of Inoceramus pl. Has ferruginous concretions.

Bullis station Inoceramus dimidius zone sections show that the orientation is very variable. This is in harmony with the fact of the folding of a very varied and one of very rapid deposition.

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* In the Kinney Springs Fort Lage Patelostium, Trochonema, one cephalopod, and some trilobites that I thought have Camptonectes Equivicus (small about 3/4 inch in diameter).

Mather has listed an Attica fauna (A.f.) characterized by Dinichthys zonatus and in it are several species of Gastrioceras. Accordingly I cannot give so much value to the goniatites seen in the basal portion of the Caney as other seers. Among great Bonner, Zaphrentis prolifica Foerste, and Productus cora are all closely related faunas in age with Attica tendencies. The Atoka, Atoka fauna, and related Lorings begin the cycle of deposition of muds and sands to great northern Texas, southeastern Oklahoma, and Arkansas south of the Arkansas River. There is said to be a weak unconformity between this series of deposits and the Caney but I have seen no great significance attached to it. It may be that the difference might be explained by marine oscillations. The fauna of the Caney is said to fluvial conditions, but [illegible] absence of [illegible] with the appearance of [illegible] the uplift of the Ouachita mountains would be marked out to sea and cause the more rapid deposition seen in the Atoka, Hartshorne and related sandstones.

October 28. Tuesday. Africa.

At 6 P.M. last night it cooled off rapidly and by 7 a little rain came down. During the night it rained much and today we are all "hung up" waiting for drier conditions. Bogue hates the country and is so ugly that he is mad to live with. Everything and everybody is wrong and would be under except in the Ouachita country.

He will remain at the hotel today.

This afternoon the Coy telegraphed Bogue for us to get out of the country and to go to Hartshorne and other places by rail. We have decided to start out Tuesday morning via auto to McAlester if possible. This probably will mean that I will not get back here, though the Coy will write or wire as it seems. What I wanted to see is the backfire and the possibility of fossils. The chances are all against my getting them. Even too I wanted to see the Caney resting upon the backfire. That this is the relation I must now accept on the evidence of Taff, Girty and Ulrich.

In looking over Girty's [illegible] I see he found some of the Caney fossils at Calvin — it is fair that we are dealing in the Kiamichi as in the Ouachita and that it is Mississippian. Of course Ulrich places it in the Pennsylvanian along

with the Jacksons and Stanley. Of course on the train
a kind of one which has been the argument.
Nevertheless I am sure ... and the
real evidence that correlates the Carey with Jefferson
Tennessean time. On the train there must have been
mountain scenery at the close, the Travelyan and we
do not know elsewhere of a distinct one at this time.
If however the Windsor should turn out to be Tenn.
scape and not Travelyan then we would have moun-
tain scenery in full force, as we can't see.

At 4 P.M. it is raining again.

October 29. Wednesday. Attica.

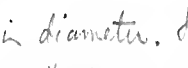
A dark rainy morning. We are to start for Muskogee at 8.50 if the train is on time. As it rained much during the night it is probable that the train will be late. We are usually late here in Oklahoma. The train was 3/4 hours late and we got to Muskogee at 1.45 P.M.

It remained a dark day and misting some at times.

October 30 Thursday. Muskogee.

We concluded to get to Holly and train to nearby Wauteka station to see the Light Tennessean a thirty (now) Seminole Indian settlement. It is a very dark morning but the weather man does not say anything about rain. It got warmer during the night and there is no fear of rain. We are off by Holly at 8.40 to Fort Gibson. At the station we learn that the train is two hours late therefore concluded to go to the Kerr Dam 2 miles northeast of Fort Gibson.

At the "Red dry store" [illegible] a pet manatee about

five inches in diameter. Has a very wide dorsum and
nodular on the inside.  It may be very
hamite fr it.

Kergh Quarry Section. Cliff about 80-90 feet high.

1 Heavy bedded ferruginous sandstone (2 to 3 feet) with shale partings
Pelecypod remains. About 10' or so on quarry face.

Unconformity = Disconformity

2 Thick bedded dark li (2 to 4 feet thick) with black shale
partings (8 to 12 inches). About 12 to 15 feet.
Irregular cavities and recumbent.

2a Black shales with a limestone gone just above certain (1 to 2
feet thick) About 4 to 10 feet.
The lower surface is very irregular, hummocky (the
depression up to 3 feet deep). Gastrods occur here and
all the black shale forms is altered type. The shales fit
into the irregularities of the lime.

Unconformity. Erosional unconformity

3. Heavy bedded limestone at top (one bed 12 feet thick) and
thinner beds above (2 to 4 feet thick) with a little of shale
partings. About 20 feet. Has Hastrites at top. Abundance of Chonetes hyspora.

4. Shaly knotty limestone irregular beds in thickness.
Four to 6 feet thick.

5 Heavy bedded [illegible] limestone - the Pitten fossils. 6 to 8 feet.

6. [illegible] shaly li. 15" Land Shale
Heavy bedded dark li. 3 feet

7. Heavy bedded [illegible] Shale & grey Land li 5 feet

Has a typical Hastite fauna

Lower Carboniferous Limestone

This is the horizon of the Productus of new prof.
Hercules Arkansas Pass, Camargo Series.
8. Same as last [illegible] 5 feet
9. Quarry floor with Archimedes. At least 3 feet thick.

Zone 1 is unquestionably Pennsylvanian.

Between zones 1 and 2 Hayes says there is an unconformity because at Hartz a limestone comes in with the true Mississippian fauna.

Beneath zone 2 there is an unmistakable erosional unconformity. It is plainly to be seen. Hayes also calls it an unconformity.

All the zones from 2 to 9 both inclusive Hayes reports as high Tennessean. He tells me that all of these zones are included by Snider in the Mississippian, and that Mathis has included all the fossils from these beds in his Mississippian fauna.

Beneath the quarry in Snider's Wages formation of about Kinderhook age. There is therefore a big break between the Wages and the Keigh quarry. This is the unconformity that [illegible] the Fayetteville Fm. rests on.

At the top of no 3 occur the first Productus, many Orthotetinae, Strophomena and most of the bryozoa.

The loose Archimedes Chonetes etc come from zones 5 and 6.

The fine Euphemites and other loose fossils come from zones 5 and 6.

I am as much convinced today as I was the last time I drew that genus 3 trig are Tennessean & E. Pitkin. These are not Pennsylvanian species and all the forms are decided Chesterian forms.

The genus 2 and 2a might be Pennsylvanian and is probably to be correlated with the Mauch.

Some I cannot name forms, but its sandy nature and position indicates that it is in the Pennsylvanian.

October 31. Friday. Mussorgue - Hautot

It thundered and rained hard several times during the night, but this morning it is bright and warm and hazy clouds in the sky. It may rain again today.

We took the 8.30 car for Fort Gibon and then at 11 A.M. on the 3rd Art branch of the Decauville Pacific the train for Hautot. Fort is 7 miles south of Fort Gibon or about 7 miles south east of Mussorgue. The exposures are the banks of the Railways as seen along the railway.

(1). At the top of the hill occurs Upper bedded Pennsylvanian sandstone. At the base of this sandstone is a thin little fossiliferous shaly limestone that has many small Productii, Spirifer, Rhynchonella, Fenestella and algal growths. See the list of forms.

(2) Then a blue shale gone probably 20 feet thick. I saw no fossils in it. It probably belongs to the Monroe series below.

Monroe series.

(3) Heavy bedded grey to blue crinoidal limestone with some thin zones of blue shales. Seeming from 40 to 50 feet thick. It is impossible to get much from fauna here. In places the limestone weathers down into a rubble then bedded mass yielding many small beautiful fossils, a

fossils. Pentremites do occur here. See the small list of fossils.

(4) Shaly limestone with some shale beds. This is thought to be above the Coal shale at Keyes Quarry. It may be so but I am not convinced of this. The thickness is considerable, may be 200 ft or more. Have no fossils.

(5) Heavy bedded hard grey crinoidal limestone. May be 20 ft or more thick. Has Pachyphyllum, Michelinia and Fenestella. See the small list of fossils.

(6) Thin thick series of blue and black shales with an occasional dark blue waterlime like limestone or layers of concretionary limestones. Thickness undetermined.

At Dalton Falls about 30 miles across the whole of these beds from tells me are a thickness of 190 feet. Probably a similar thickness occurs in the vicinity of Haute. All of this thickness is not in sight in above the unconformity seen on the road at Keyes, 1½ miles above Dalton and beneath the Pennsylvanian.

I am inclined to group all of these shales as the [illegible] and why are they not more like [illegible] Many of the Devon fossils found by Mather do not turn up at Haute.

November 1 Saturday. Muscogee.

Bryan called me at 6.30 A.M. to say that McCoy wanted to see me at Tulsa and that he was on his way to testify in a law suite in New Mexico. We boarded the 7.30 train and were at Tulsa at 10.15. We met McCoy at the Tulsa Hotel and when with him until 1.45 P.M. I left Tulsa for Muscogee at 4 P.M. on the Midland Valley and got to Muscogee at 7 P.M.

McCoy wanted to rearrange plans for a new trip and upon me a great favor. Told him that the weather and other things were against me doing desirable work, and that I did not like the trip at all.

I then took McCoy to myself and finally told him that I would not work the problem simply because Bryan had not done the work, or because the weather did not permit me to see the localities in succession as I would understand the features. I did tell McCoy that I was mentally incapable of solving the geological problem, because it was not a country in which he could live. He has no patience to search for facts in a dry stretch. then too I said that Bryan did not do the localities justice in making extensive collections. We talked a few minutes, and then Bryan & I wandered around

Shelly Hickory or calcy nuts or other wild fruits. Now a crime after six months I would not more positive faunal evidence in hand. Then I told him that I knew some formations today than I did three weeks ago. Father Wheeler and Degnan are responsible.

Mr. Snell for some and see if I cannot add to the evidence for Caney, Jackfork and Atoka equivalents. Also as to the time when the Ouachitas were raised. With the information I have, the facts I am now [illegible], and the literature I shall [illegible] adjust the problems.

[illegible] the [illegible] in a deep shelter and if should be. He is not a responsible man in an important place as [illegible] is to the Survey. He either cannot explain the true conditions of things as they are, jumps to conclusions that he may be able to prove or not prove, as the case may be. He tells me that he goes to localities and makes a faunal list as he sees the forms. He tells me that he opens and goes over the soil for them. Now in the fossil delimitation. Correlations in the Pennsylvanian cannot be built up this way.

If the Seminole conglomerate came to rest down fairly close to the conglomerate of the Catskills, then there is hope that the time of distribution of these mountains came to an end. It will mean however a close study of the various conglomerates near the north and west sides of the Catskills.

The Cog is the only man in the Empire State that is equal to the privilege of the fair sex in Oswego. He has lots of faith in himself and got a wedding present. He has a long memory and is thoroughly competent to weigh all the physical evidence. What he needs and clearly understands is a confidential talent to help him with what the books teach. Then he can get only in an indirect way of Eugene. If Cornell professors in the Geology Department would be willing to check his work - but Eugene has his own friends without asking the consultancy.

Ask Ulrich what is the age of the sandstone limestone which is only a sandstone? Is it the base of the Carey shales?

November 2. Sunday.. Muskogee.

A fine cool and perfect day.

All morning Evans studying the sedentate Cretaceous faunas as listed by Whitfield in his report of 1904. It is now clear to me that the Chester faunas are mixed with the Cretaceous at the Gravel Quarries. All the other Oklahoma Cretaceous localities have straight Cretaceous faunas. In Kerr's the Cretaceous appears to be thinner, about 50 feet, while elsewhere it is 75 to 150 feet. This then is one clear point, and then can be no more doubt about the Cretaceous formations of Oklahoma. It tends to be more decidedly limestone in the Muskogee region than in Arkansas.

As there is no Carboniferous in the Muskogee area its place must be taken by limestones with the Fitchburg Chesterian faunas.

In regard to the Seattle Falls, limestone I should not be surprised if it is younger than the Cretaceous taking of a part of the Atoka. This then may be the explanation of the Cretaceous outliers in the San Saba County of Texas.

left Worcester on the 4 o'clock P.M. train for St. Louis. Worcester & Springfield one hour and a half late like all trains in Ohio and Indiana, Illinois are on time.

October 5, Monday ... and.
arrived on time at St Louis, 7.07 A.M. a
train having made up the lost time during the
night.

After changing into train and road and a
breakfast at the Depot started out to make
a round of St Louis. The air is full of inflammable
smoke and it affected my throat. Then nothing
but prairie country to Kansas City, Missouri.

At 12.02 Sam left on the (P.R.R.) Pennsylvania, one
of the fine trains in America for New York City.

The days clear and sunny and we
the plains of Illinois and Indiana. At 4 P.M.
became at Terre Haute. The Natural is
with its trees.

Tuesday November 4. Homeward.

I slept better in my "after" last night than in the "from" of the night before. Written more completely restful.

Hot raining lightly and the run through the Cathedral was not interesting. We are on time and the very last night and today. The last railway today in Connecticut is the N.Y.N.H. The cars run more directly on the Sunday that we run from Chicago to N. York and it is made in about 20 hours actual running time. This is at the rate of 42 miles an hour including stops. Without the stops the Train runs about 50 miles per hour.

[illegible] it is 503 miles and from Chicago to New Haven 95 miles more. Together 1052 + 503 + 95 = 1630 miles from Home to Muscogee. I made on 520 miles in Pullman cars. An additional hundred by train and 300 with mine. In the 1630 miles during the last 3 weeks I travelled over 4000 miles.

Had C. N. Stevens of the Oklahoma State Survey to dinner at the Murray Hill Hotel. He is now studying with Professor Bailey in Columbia. Asked him to look to me about the Stanley and Juedpre and he did it to completeness. I then urged him to protect himself by procuring the notes he has made in the winter at Boston, & to publish a preliminary report in the U. S. Geological Survey.

He has walked over the entire area of about 1000 square miles since April 1916. He camps in the centre of each township on my east and west and walks north and south in the section lines. The country is covered with cedars and scrub shrubs. The cattle now all have corn and do not eat the bark which kills the trees. He uses Tincture of Iodine for the stalls and thus kills the ticks. He uses Tincture of Iodine.

The area is wonderfully interesting for geological structure, and I am to see his maps in the morning.

The Stanley hotel is a hotel with asphalt and cement floors, and Stevens believes there will be found to the south under the overlapping cover.

The Stanley hotel is a cement and stone [illegible]

and to the west merging into sea of shales. Because of the incompetency of the beds, and the decided competency of the Novaculite below and the Jackfork above, the Stanley is much folded and crumpled. Against the Novaculites the basal Stanley is much sheared and metamorphosed.

The Jackfork measures in the main 4 thousand feet in most places, simple folds, dipping at low angles, rarely as much as 20 degrees.

At the base is the tribantite Arkansas Novaculite. The basal third consists of thick bedded sections of hard and dense rock, Prof. Bailey says is mainly made up of volcanic ash which is a very fine and uniform mixture of which constitutes a very flinty rock. The lower third has a thickness of 200 to 300 ft. The middle third consists of thinner bedded material with the upper third in the stone-stone layers. It weathers to a chalky material, brittle in color, white or gray. This unidentified of the Novaculites only seen south of Waldron [illegible] but it seems did not occur in any way.

The fossil 976 a coral comes from the base of the Novaculites. If it is a coral then we may locate the base of the Arkansas Novaculite.

Because of the Stanley thin bedded shales and sandstone is much altered in being followed over the resisting Arkansas novaculite. The thickness be varied with reasons but may be assumed [illegible] In these typical beds be left the It was these shales that began called Tremont. Upstream on a Caddo Creek near 1015 and 1016. A little N, he up comes an anticline and then pass under that does have oil beds. This for the reason that Stanley in making to expand the Arkansas novaculite as belong with the Stanley series. In this town Hamil Creek for a large [illegible] and the one Bear, also the one Hill Bear, number 946.

Near the middle of the Stanley occurs the zone with the marine [illegible] number 945 and 947. These seem to break up and identify in here.

The Stanley under goes into the [illegible] and no sharp line can be drawn either there. Some has measured the upper 2000 feet in detail of the Stanley and [illegible] of the Trinidad series. But the many [illegible] some [illegible]

The Stanley where sandy is [illegible] (current riffle) and clays faulted [illegible] No seen-

exceeding 100 feet. The evidence however says all is for shallow water for delta, and hence all of the marine only but near the subaerial part of the delta.

Near the middle of the shale are oval black shales and oval black chert like nearing mud of the Burkhead, however stating to believe that this is the equivalent of the Burkhead and if so it casts a new light on the age of the Burkhead and explains why geologists have noted the absence of the Burkhead in the Ouachitas. Much black shale occurs above in the Lyon Hanly formation.

Thin beds of coal occur near the top of the shale in association with the plants. These beds are very thin, 1 inch in thickness, and of short lengths. They are known many places.

The sandstone is usually a somewhat clayey with olive green. Brown says they are in very many like rock in Pennsylvania. These beds are replete with plant fragments. Most of the has been Calamites, many small ones less than one inch in diameter, Knorria has been found

cards up the creek seems.

What is relation of the Carey to the Jacksboro stream does not seem. Does anyone know or see together. See would not venture to express an opinion of any kind. This then leaves the Carey still in the air, unless we say that it is equivalent of the Black shales [illegible] above the middle of the Stanley. This is a very plausible explanation of the Jacksboro and Carey. If the Carey is Tennessean it is the Jacksboro and all of the Stanley. The Jacksboro should then be early Pennsylvanian and the equivalent of the Dewey strata.

On the other hand the Tennessee nonvolcanics and the Stanley may be the same division of the Ouachitas (including the Jacksboro) while the Stanley may be the equivalent of the Tennessean (including the Jacksboro and Carey) for the great mantle folding. Morrow seems and then the first incursion of Pennsylvanian sands.

Grain the Stanley may be the equivalent of the Tennessean (including the Carey) for

underlain into the Jackfork which is the equivalent of the Bronson, followed by the continuance of the fresh waters of Carb. Pennsylvanian time.

In any event the Hartly and Jackfork are Carboniferous and not of earlier Paleozoic age.

The plants should solve the question, and David White should have the solution of the problem.

As the Hartly becomes more sandy eastward we must look in that direction for the land or river the source of the detritus.

How about the volcanoes of central Arkansas and within Louisiana active? Was it in early Cretaceous time or late Jurassic? On the basis of sedimentation seemingly the latter. Are the Tertiaries Camden and the southern Mexico Claiborne formations (miocene?) absent? Look them up.

Hoover was born in northern Ohio in the town of Scientific Wallace College and a graduate. Stanford. On the Coast now living he gets $ 210 per month.

He is in love with geology and can live in any old country under any old conditions. He has learned slang. He walks. He Cowboys and can learn to talk Hi for ten days at a time. I don't think I can leave him here for the subject and his girl to live among the white trash of the Catskill mountains. He should make a good field geologist, because he is fond of fresh air and action. He does not impress me as ready for making a teacher. He does not appear to [illegible] as a leading geologist but he may be clever within his limits. He may grow slowly into full stature as a leading geologist.

Wednesday, November 5. New York.

Called on Professor Bentley and Mr. Hoeven at Columbia University.

Bentley says that the Ordovician mica schists of Oklahoma are one of the best examples of metamorphosed tuffs & volcanic ash beds. He ask[s] about the water-born tuffs & thinks the alteration in the granite to make certain.

Mr. Hoeven showed me his very large scale map of mainly the Cortlandt area. In the southeast corner occur the oldest rocks, Cambrian & Ordovician schists. The folds run east and west and the bending appears to be to the north. Faults cut the folds trend N.E.–S.W. To the north and northwest lies first the Stanley and then the Paleozoic. The broad line of folds lie about in the center of the Stanley area trend N.E. and S.W.

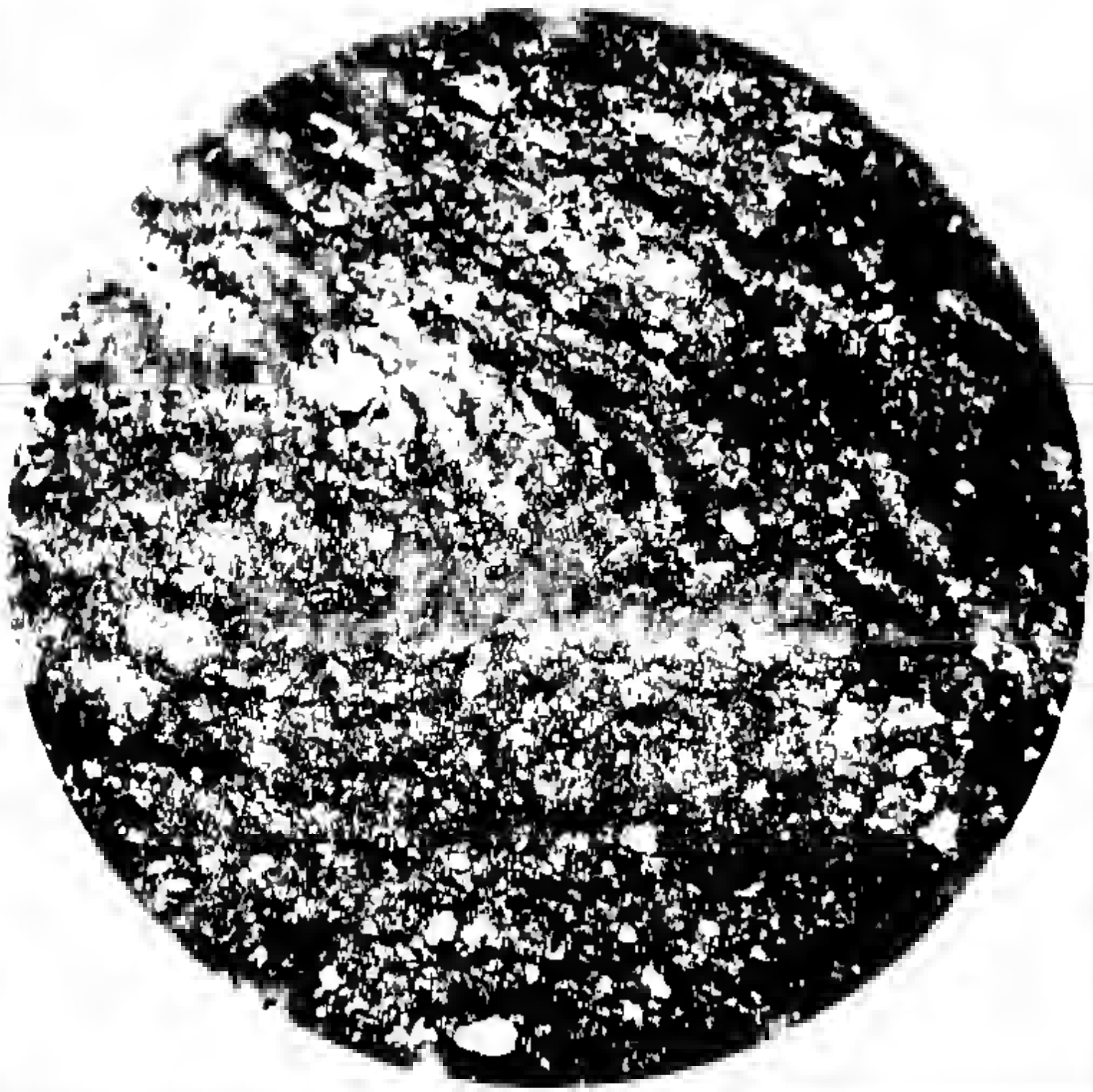
Hoeven says that rock was folded at one time and in Middle Pennsylvanian time. As he has no Pennsylvanian strata in his area this deformation is based on general knowledge. The basal rock is schist and it is the first part formed in this area. The Cambrian and Ord. in the center.

Hoeven wants me to use Diamond to allow

early publication and presentation before the S.I.A.
Also to write O'Mitra to take off the labeling of
the plants. Bentley agrees with me that Stevens
should make early publication and presentation
before the S.I.A.

Hoehnel has a large series of 8 x 10 photos
showing various rot crops, some of these show
much crumpling of the stalks and considerable
exhibition. The back part because it's competing
plants but little metamorphism.

From Earl A. Trapp
Bartlesville, Okla.
Sections 350 x to show oil and
Kerogen.
Their letter of Jan 30-1920.



#6

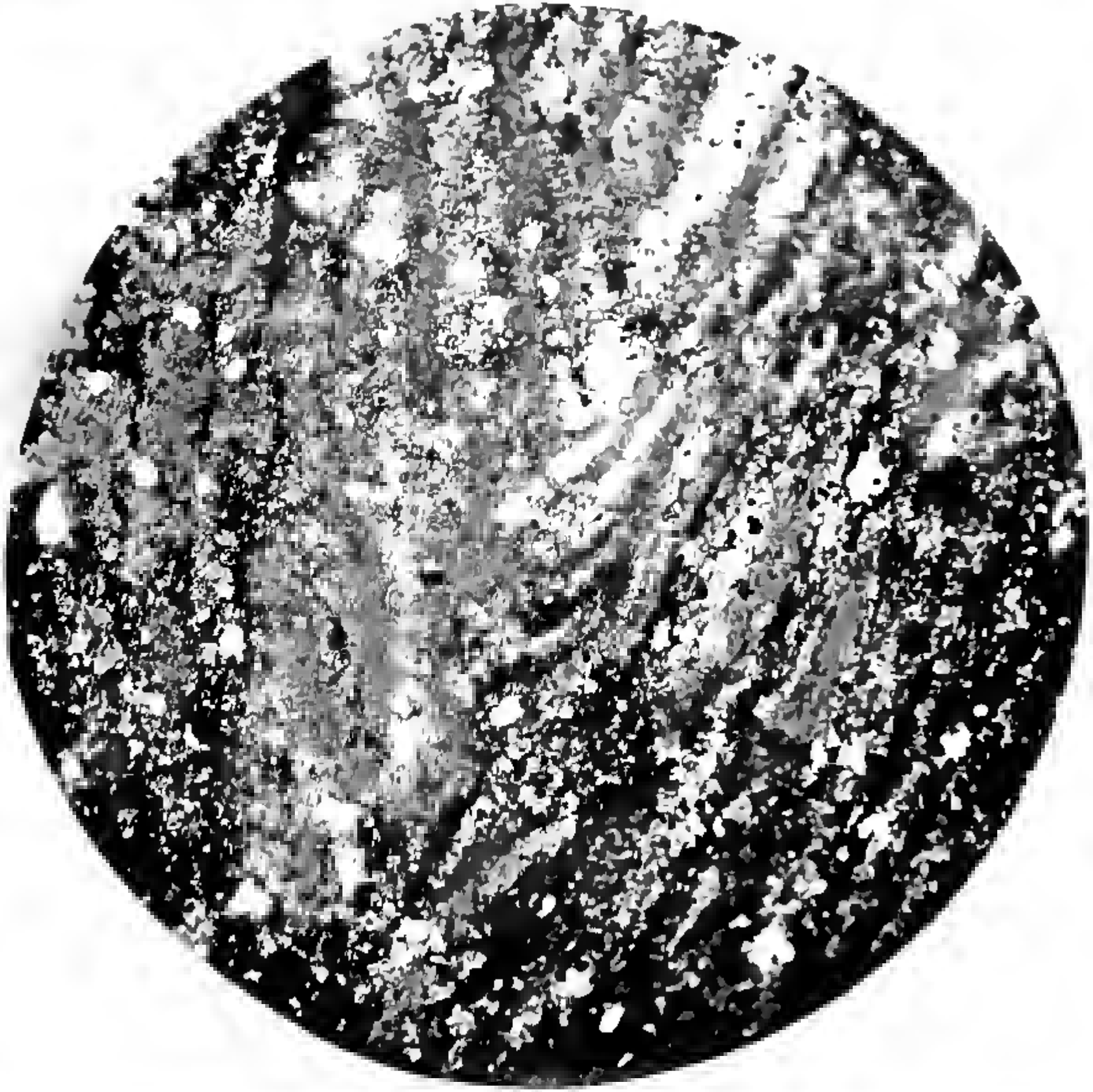
~~Horizontal~~ section
Vertical

68.0 gal. oil per ton.

The settling was uneven in this area producing this "knot like" appearance.

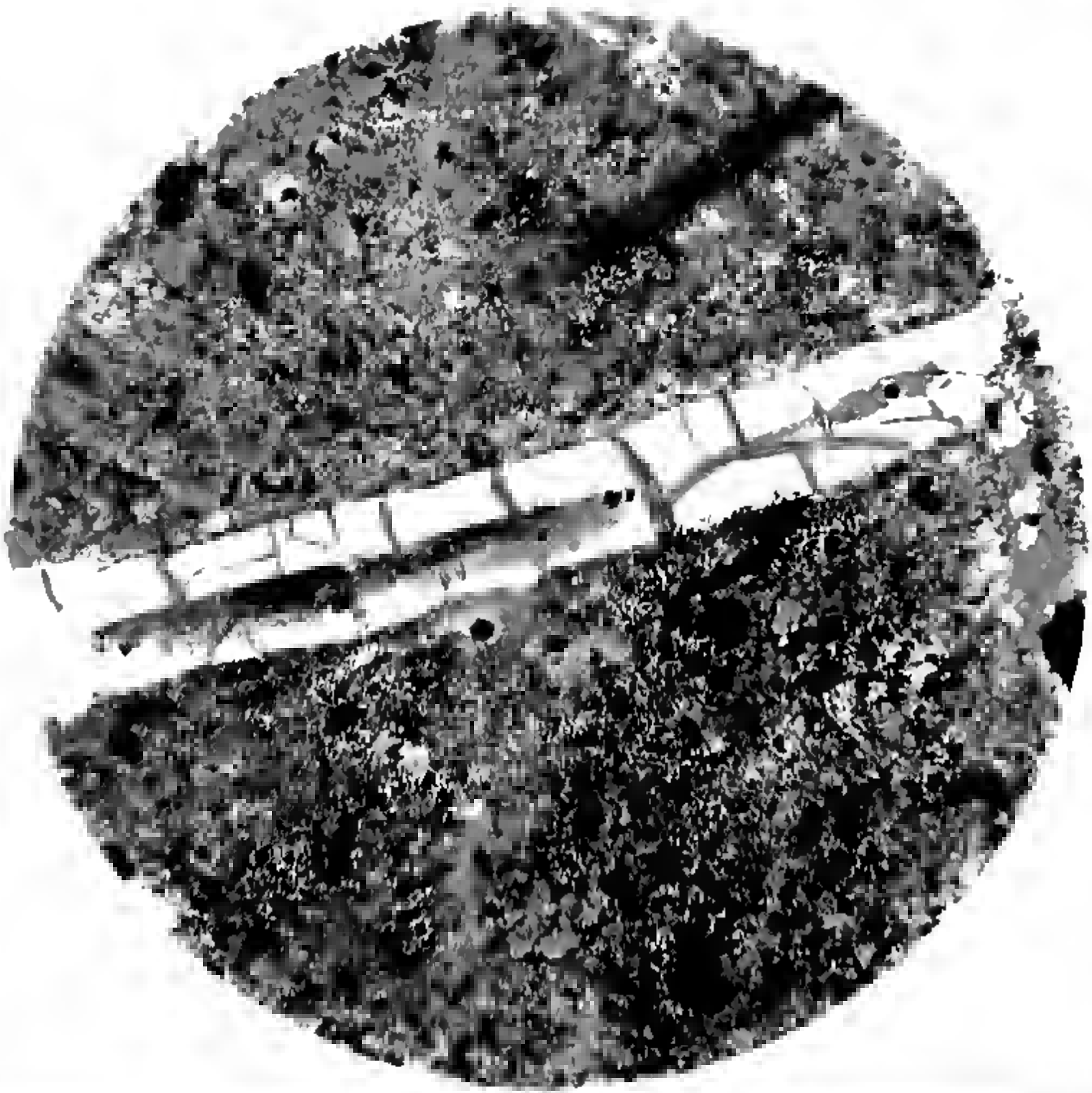
All plots at 1/8 3/8 diameter

doc. 115



#6

Vertical section



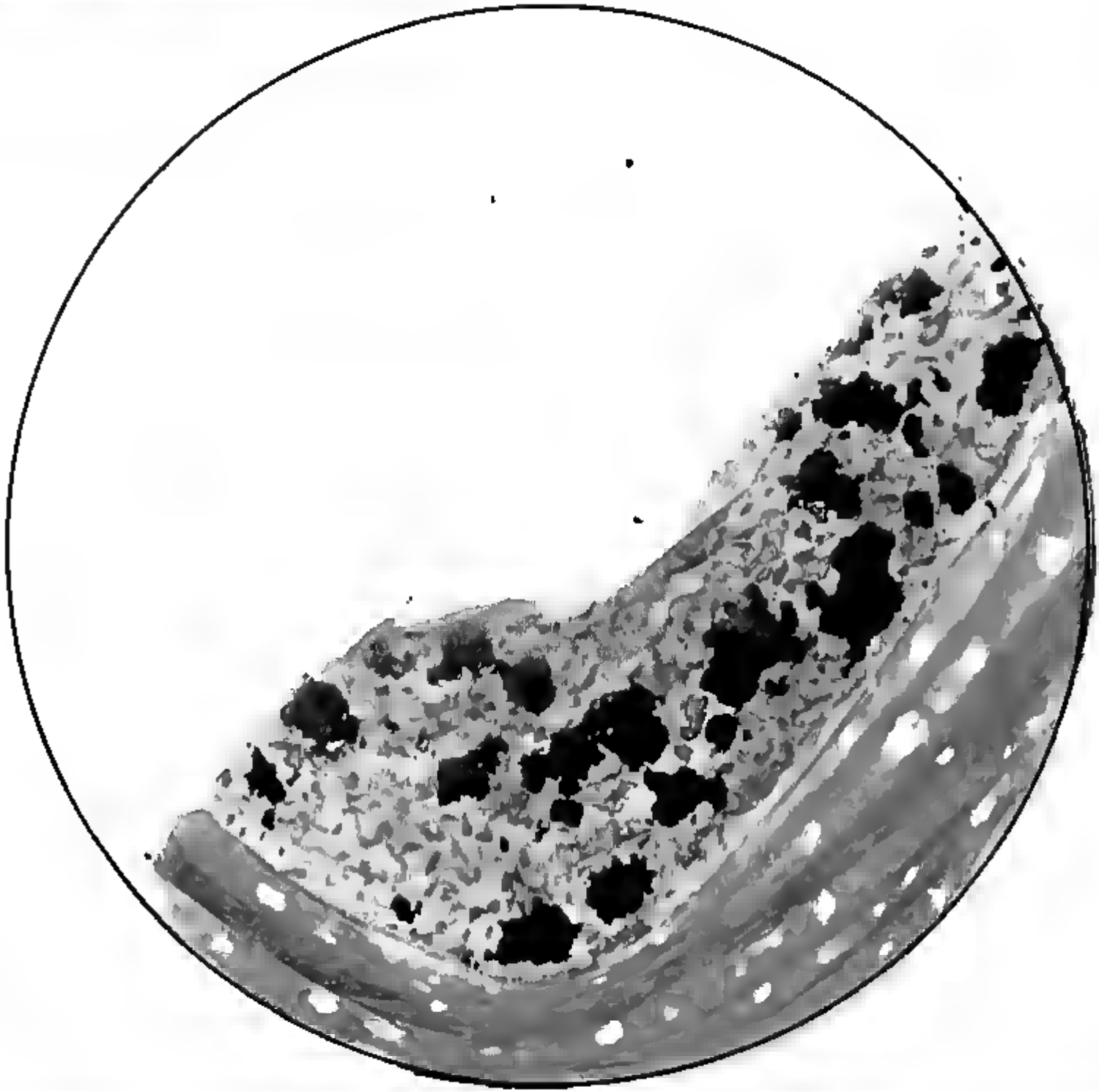
A fossilized stem containing kerogen in all the cracks. The uncolored portion is silica. The black spots appear to be carbon.

Horizontal section

34.0 gal. oil/ton.

#16

Vertical section

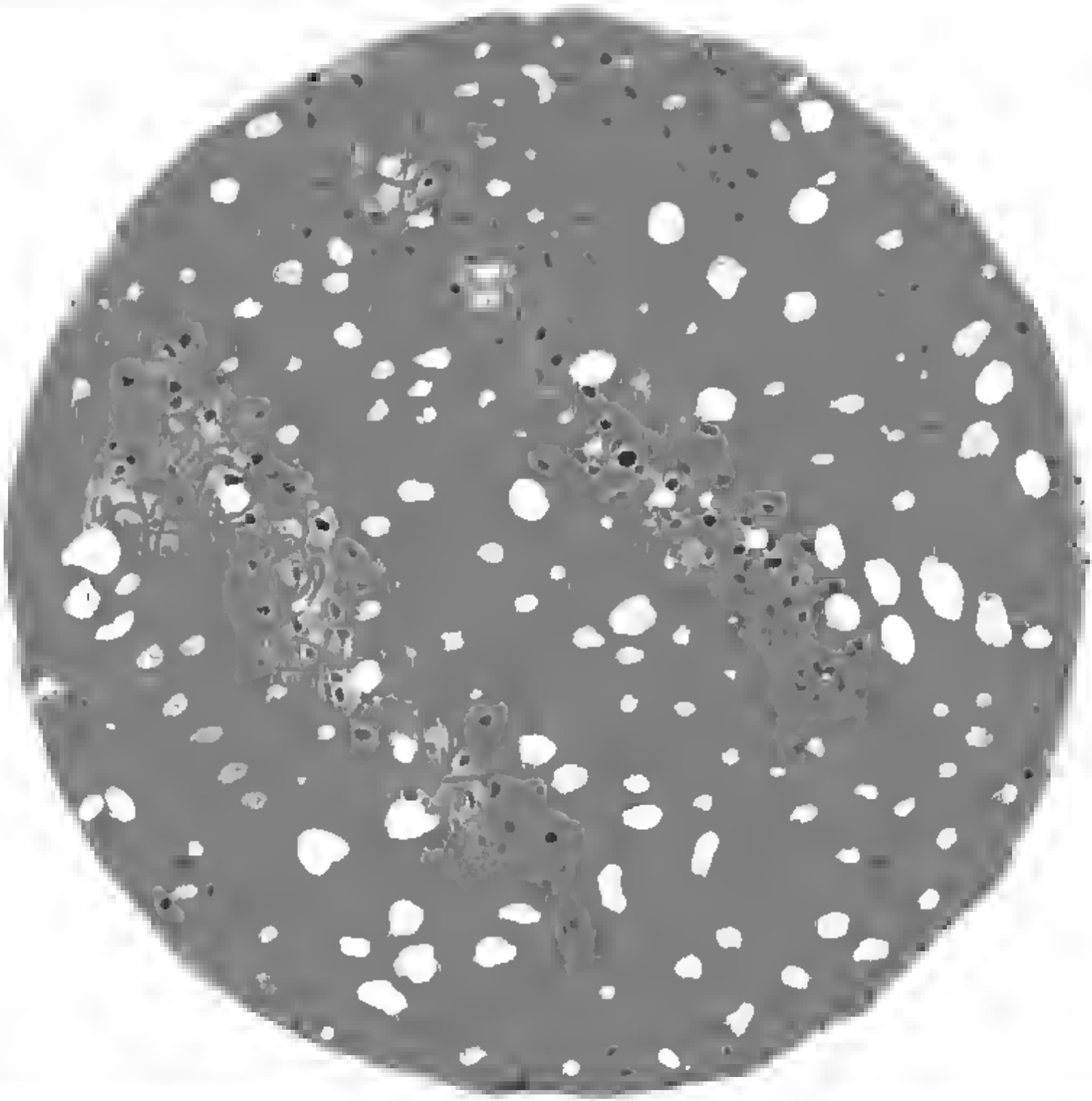


#16

Vertical section.

This is a decidedly banded shale. The shale settled around a fragment of limestone containing pyrite? (black). Note the foreshortening or constriction around the corner. The water must have been very quiet when this material was laid down.

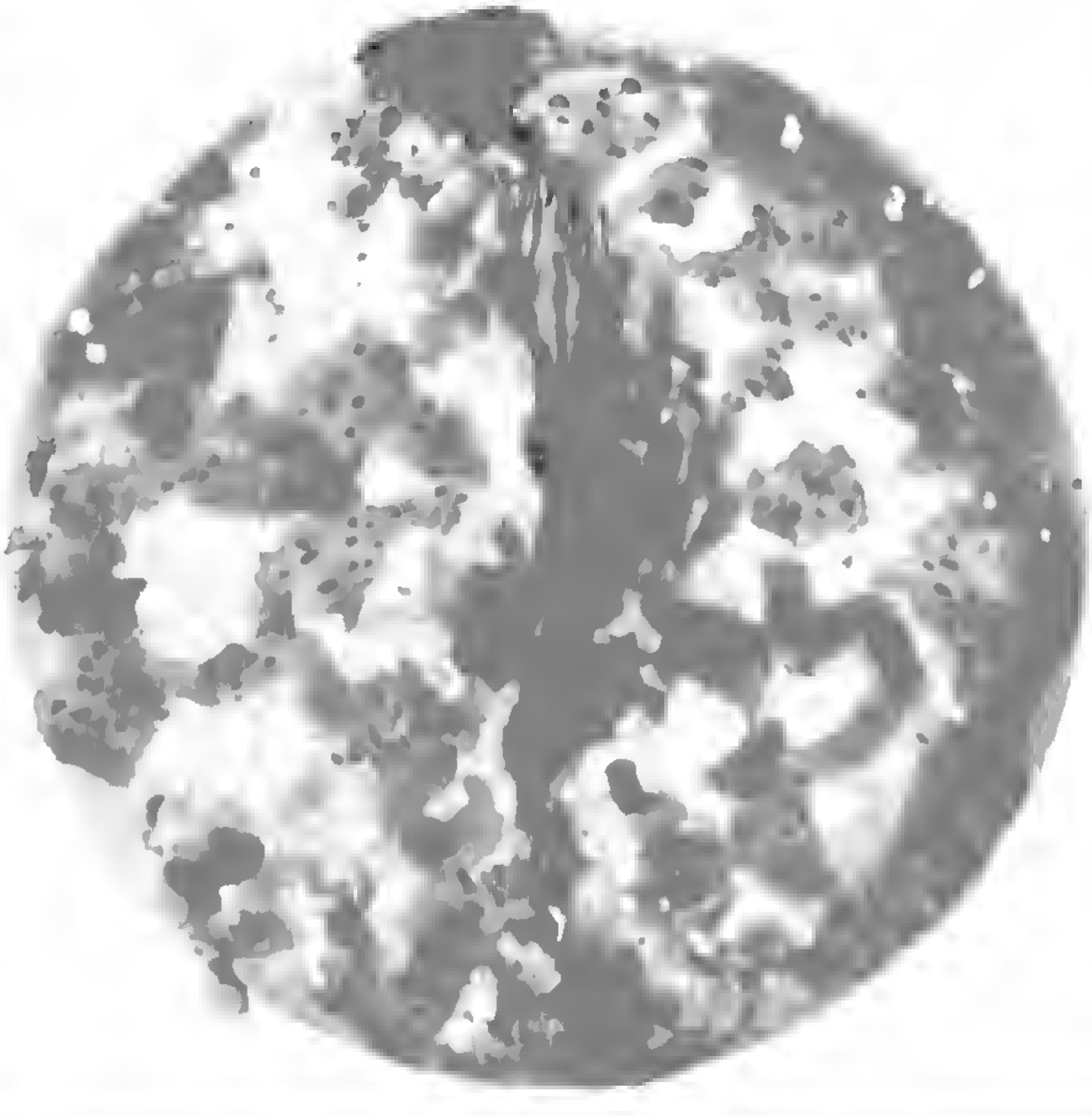
28.5 gal. oil per ton.



#13

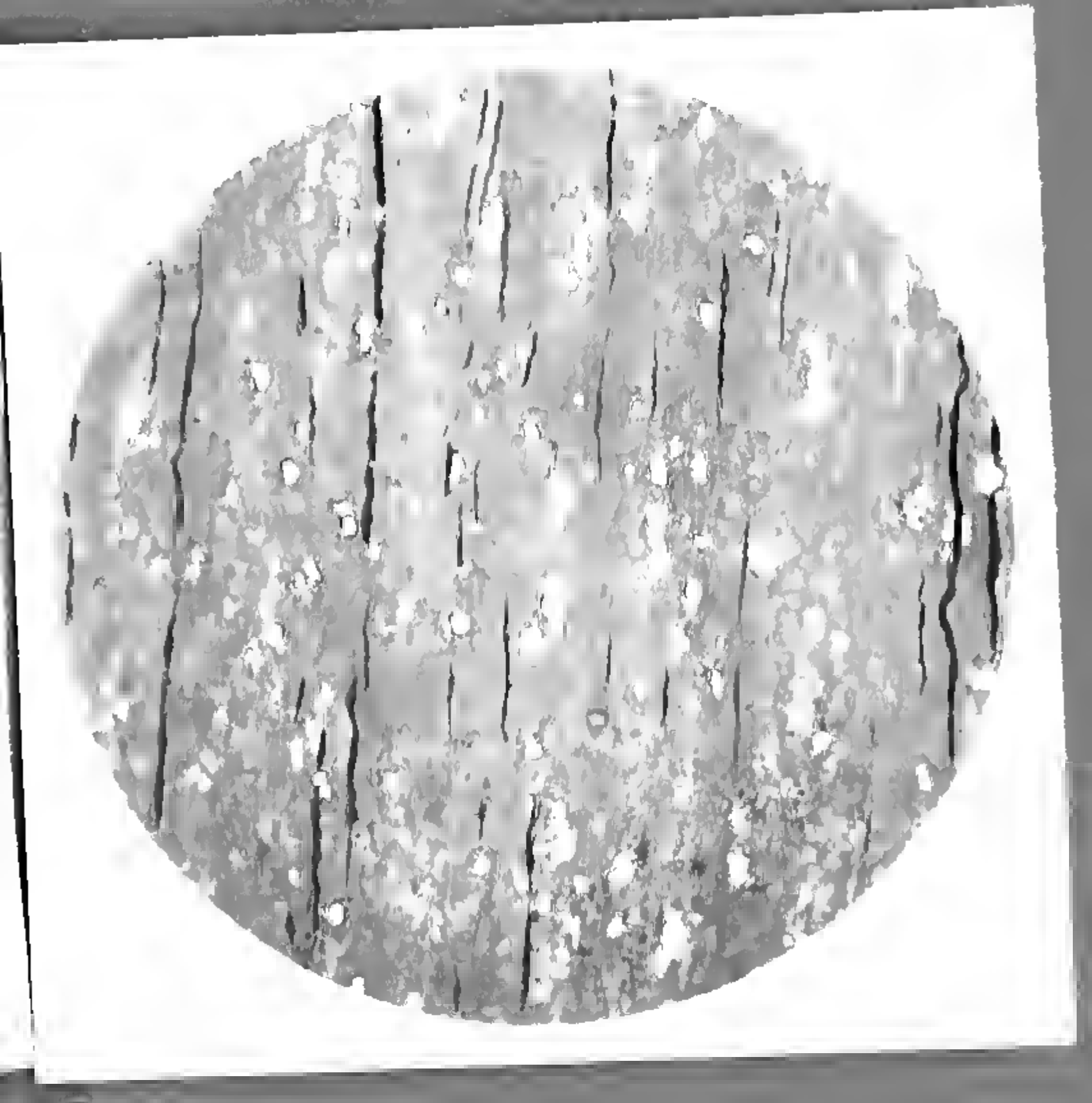
Horizontal section
61.0 gal. oil per ton.

The dark streaks are
too red in this photo.
The kerogen is around the
darker brown organic matter.
The white spots are Qtz.



#1

Horizontal section (same as #2)



#2

Vertical section

Shale yields 70.0 gal.
oil per ton.

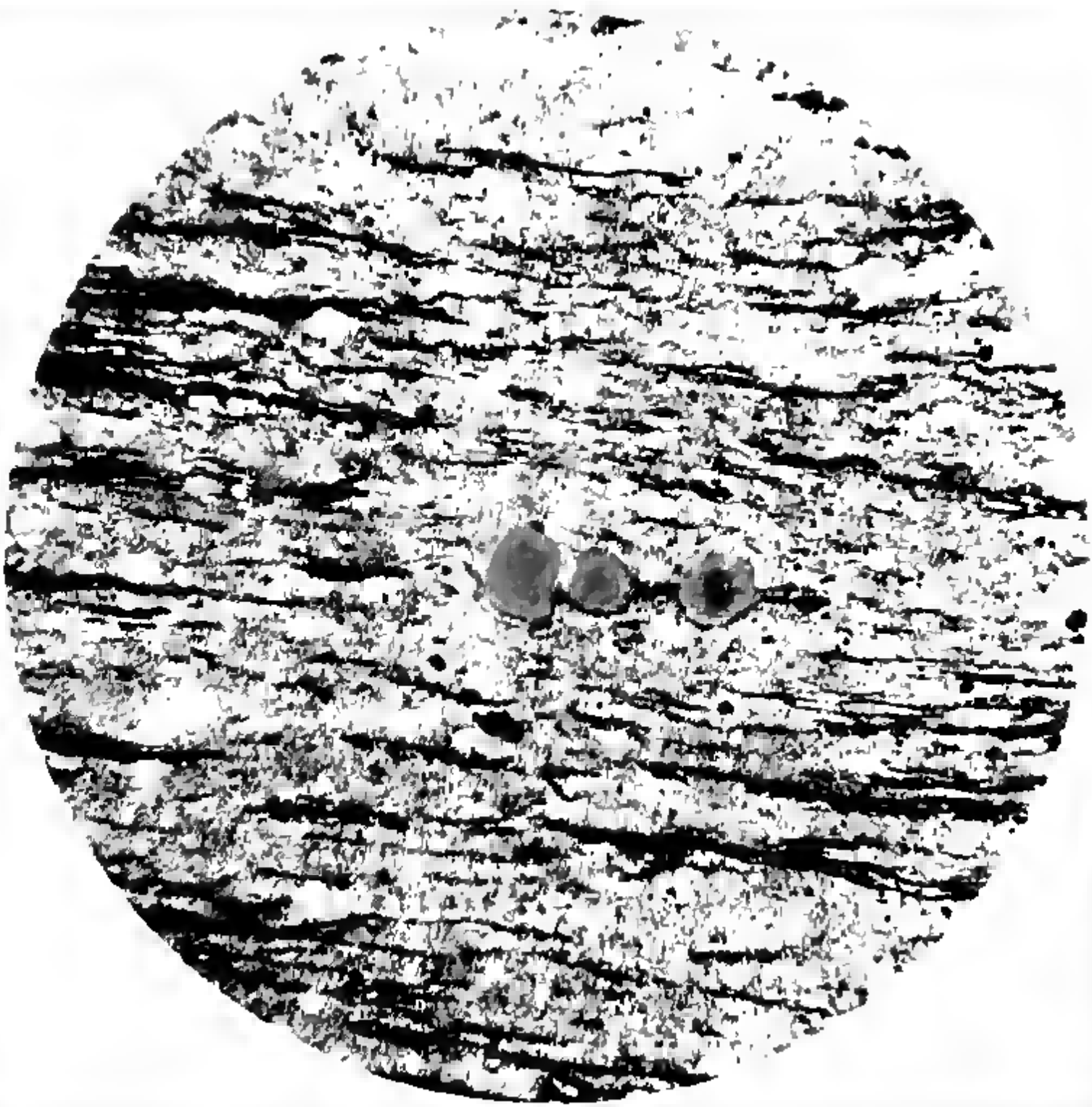
Kerogen dispersed throughout "groundmass" as small grains.
Brown streaks are organic matter, not kerogen.

#13

Vertical section
a large piece of kerogen
which suggests that the
kerogen did not compact as
much as the shales did.
The shale seems to have
settled around the kerogen.

34.0 gal. oil per ton.

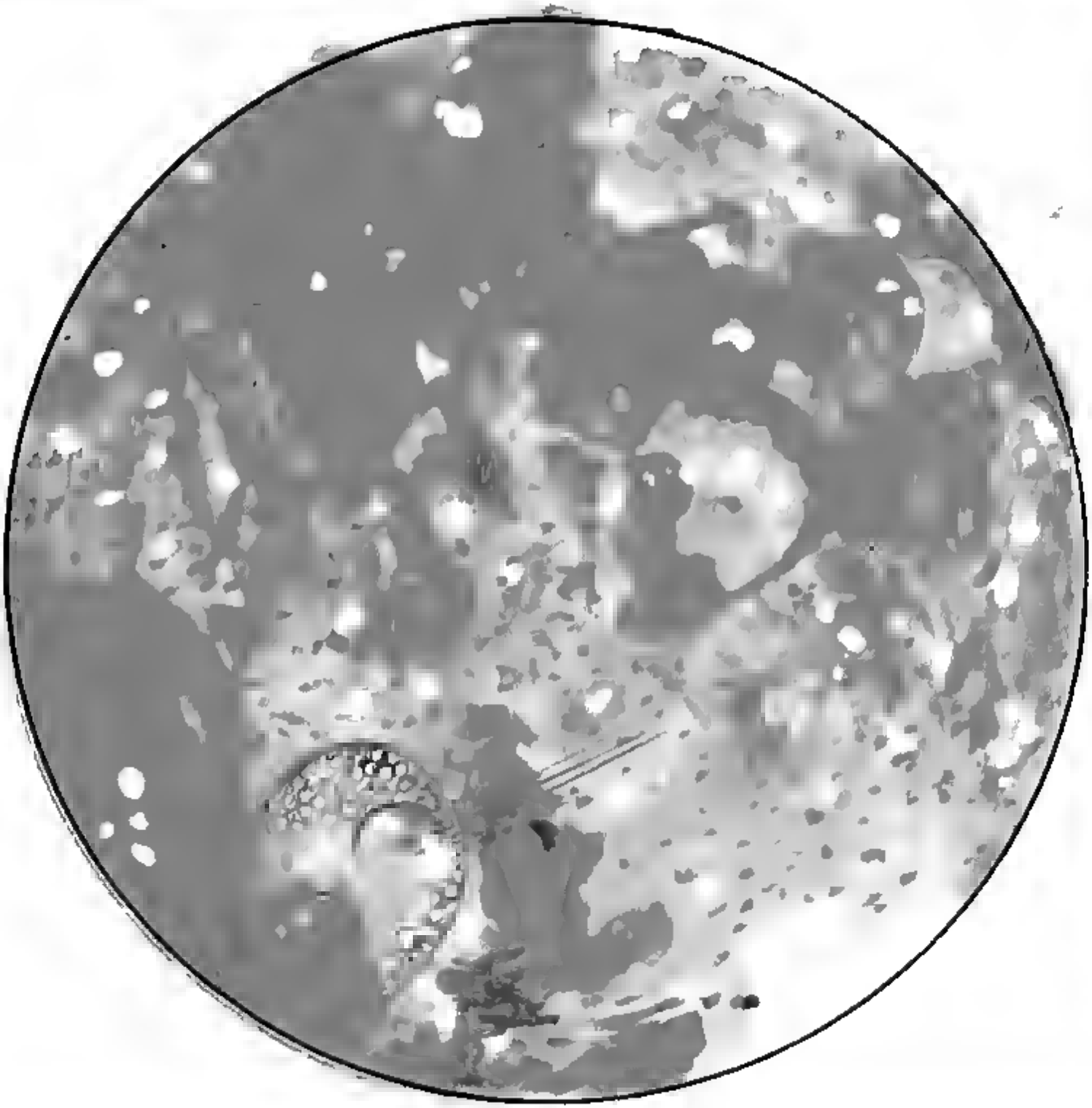
Again in this case the shales stratification reflect the shape of the kerogen. This kerogen may have yielded somewhat to the pressure, thus forming the two "lobes" paralled to the bedding. The original piece may have been more regular in shape.



47

same as 48, Vertical section.
In this case the
kerogen appears to be
altered around the edge.

19.

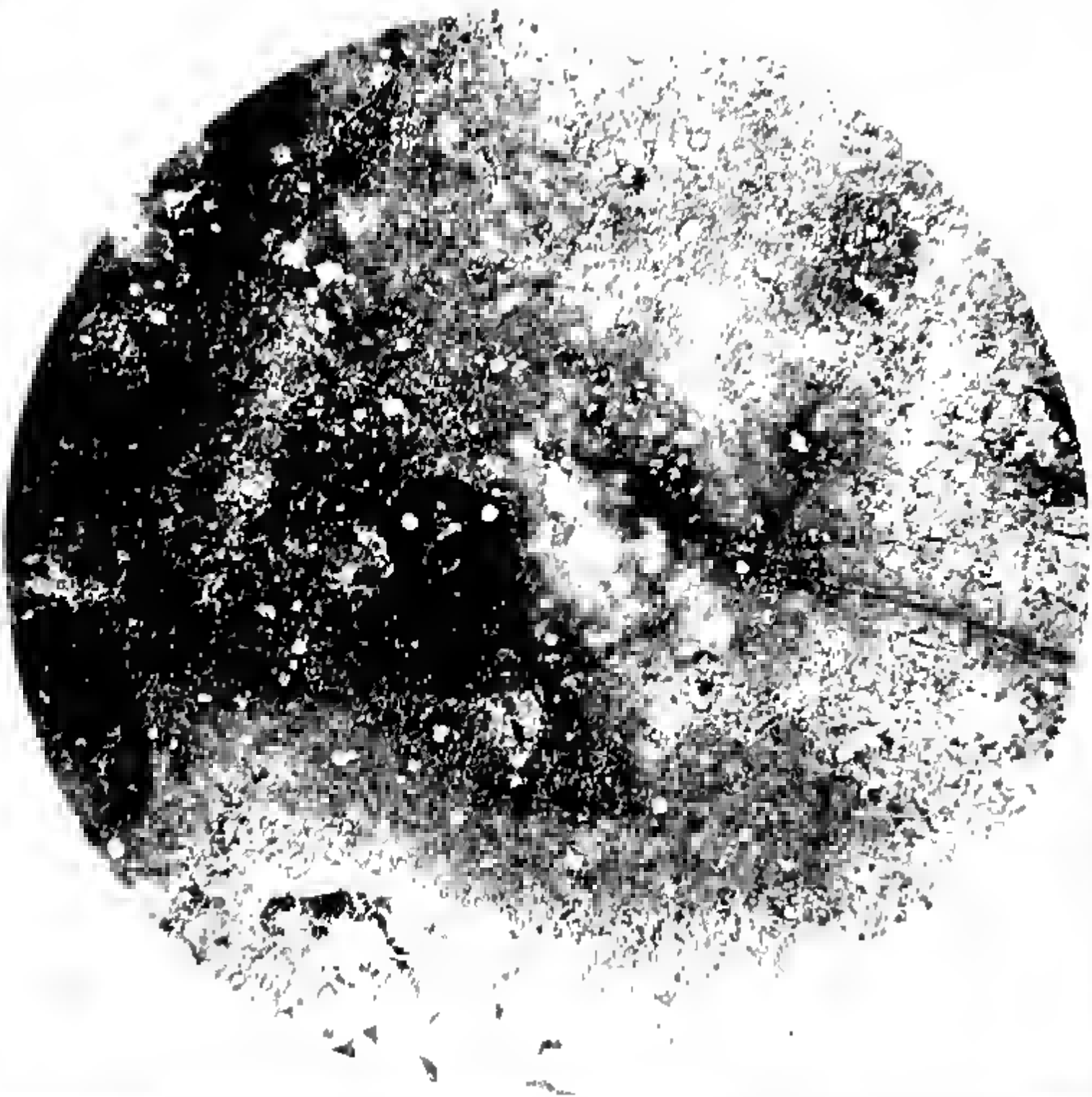


19.

Horizontal section
Colorado shales

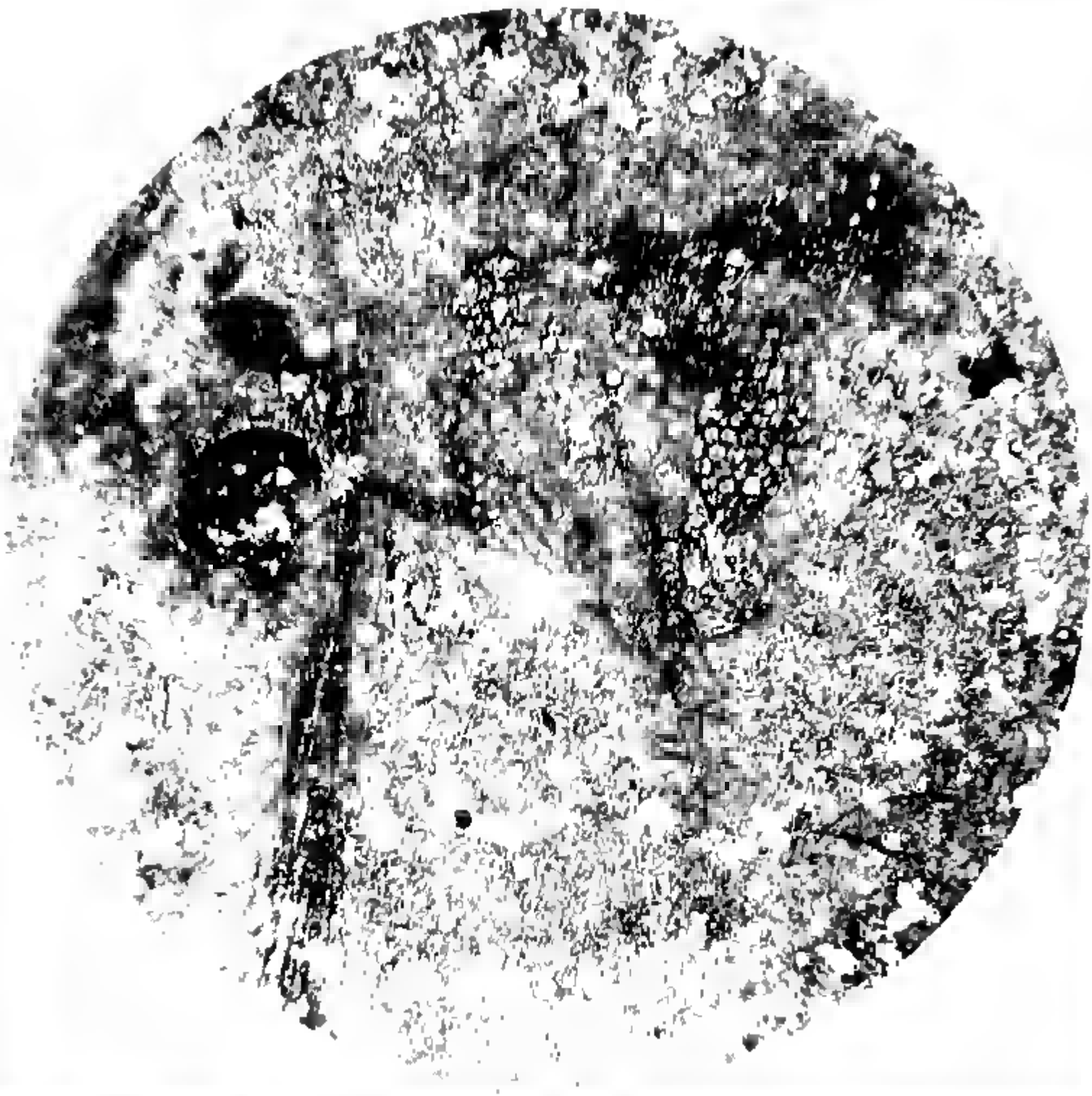
I have found this same structure (plant?) in Utah shales.

51.0 gal. oil per ton.



19_3

Similar to 19, but from a different location in the slide.



19_2

The coloring in this is the same as in 19_1. The annual segments with fines or bristles I believe to have been accidentally placed almost in line with the hexagonal plant: tissues

a silicified sponge spicule or portion of spicule deposited in an oil shale bed.

doc. 115

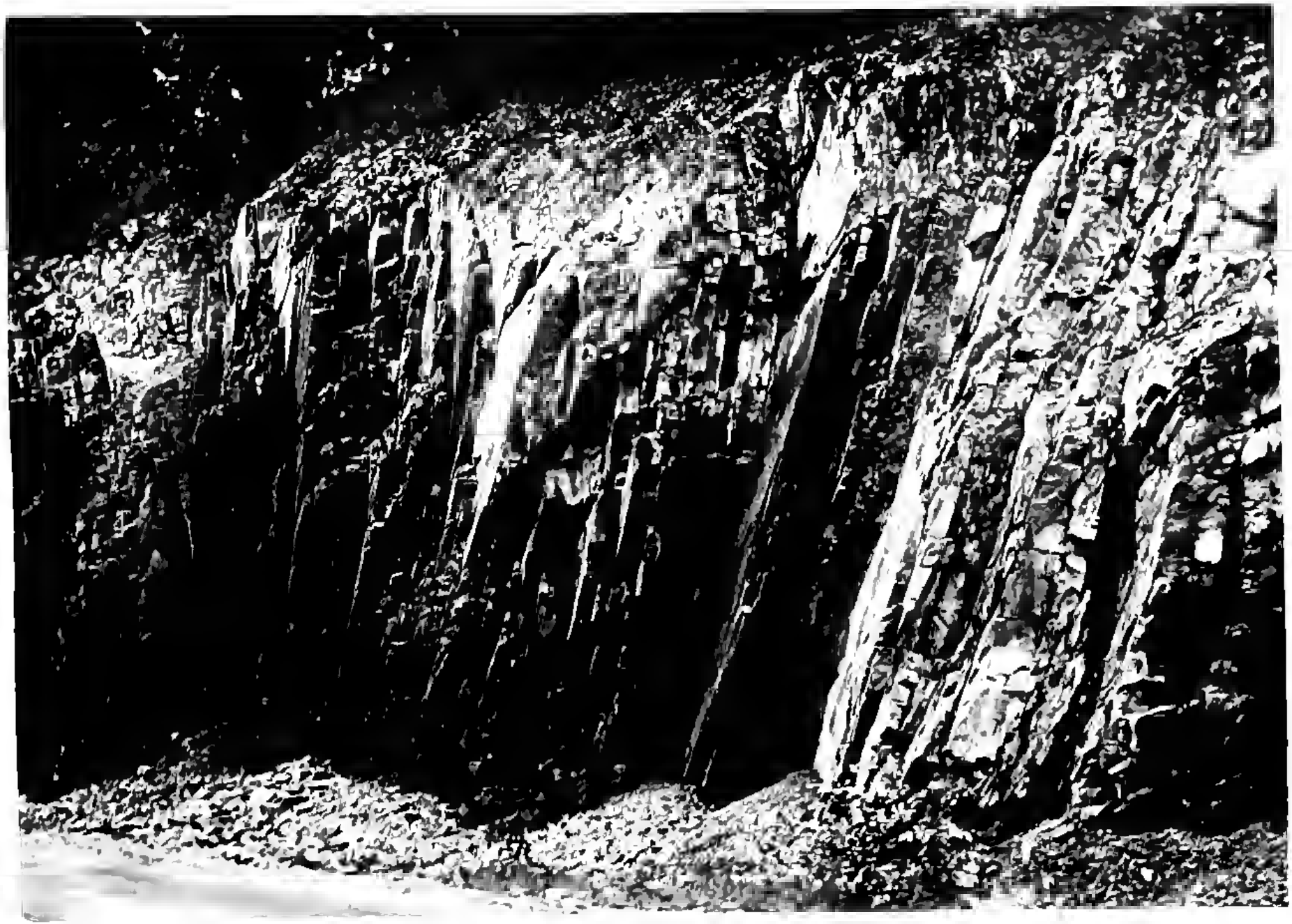
Woodward chart

Camp shoe

N. of Raiway

near Coal Creek, Ky

From Paul A. Tryon, Curator



Yours truly

N. B. Clarke.

[illegible], Feb 2, 99