

# **Field notes supporting the fossil collections from New Mexico**

**A. L. Bowsher**

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Socorro, New Mexico 87801

**Open-file Report 388**

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PREFACE TO NOTEBOOKS, US NATIONAL MUSEUM  
8/10/48-11/14/48; 6/4/51-8/5/51; 7/9/52-8/29/52  
& 9/1/56 to 10/15/56  
with appendices 1-Stevenson 1940, 2-Keyte, Baldwin  
and Blanchard, 1928 and 3-Bowsher bioherm sketches, 1946.

Arthur L Bowsher was employed by the US National Museum as a Curator of Upper Paleozoic Molluscs during the period of March 1, 1948 to November, 30, 1952. One of his tasks was to collect material from the Paleozoic strata of New Mexico, especially the Mississippian and Devonian, to round out the collections of the US National Museum. The greater part of periods of three months each year were spent in collecting, primarily in New Mexico. The notebooks are for collecting done by Bowsher with the help of William T. Allen. Bill was a very fine person to work with and was a great help in collecting the fossils. It includes work done during the summer of 1948, 1951 and 1952, 1956. Some of the collecting was done in cooperation with Lloyd C. Pray, then mapping the geology of the Sacramento Mountains, and Carel Otte, mapping the geology of the La Luz area of the Sacramento Mountains. Assistance was given to Jicha mapping in the Lake Valley area and to R. Jahns in the Hermosa area.

During this period of time collecting was also done elsewhere in the United States and Alaska. From May 1, 1949 to on or about January 1, 1951 Bowsher was reassigned to the US Geological Survey to study the stratigraphy and Paleontology of the Central part of the Brooks Range. The field notebooks and manuscripts, "Geology of the Central Brooks Range, Alaska (unpubl)" and Glacial Geology of the Central Brooks Range, Alaska (unpubl)" prepared in study of the Brooks Range from May 29, 1949 through August 31, 1949 and later with the WM. Brosge 1950 field party in the Brooks Range are on file with the US Geological Survey. Bowsher, A. L. and Dutro, J. T., 1950, A Handbook of some Mississippian fossils from the central part of the Brooks Range, Alaska with an appendix was prepared for the use of geologists working in the Brooks Range. A preliminary report on Mississippian corals and bryozoans from the Brooks Range by Helen Duncan is also on file with the US Geological Survey. The Paleozoic section in the Shainan Lake area, central Brooks Range, Alaska was published as U S Geological Survey Professional Paper 303A in 1957 by Bowsher and Dutro.

Bowsher transferred from the US National Museum to the Navy Oil Unit of the US Geological Survey on 1 October 1952, where he remained until April 31, 1957. He was Chief of the Laboratory, Navy Oil Unit, USGS from October 1952 until late in 1954. He then went to Washington, D. C. in Office of Navy Oil Unit writing reports on the work in Alaska until 1957. He then left the employment of the U. S. Geological Survey. The Navy Oil Unit of the US Geological Survey permitted Bowsher to accompany G. A. Cooper to New Mexico to obtain material to complete a study of the brachiopods of the Devonian of New Mexico during the period September 12, 1956 to on or about October 10, 1956. The results of the study are published as, "Cooper, G. A. and Dutro, J. T., Jr., 1982, Devonian Brachiopods of New Mexico: Bulletins

of American Paleontology, Vols. 82 & 83, Number 315, Paleontological Research Institution, Ithaca, NY." The stratigraphic sections in this paper came primarily from the Bowsher Notebooks. Most of the collections reported on in the Cooper and Dutro report were collected and are documented by the information in these notebooks.

The collecting for the summer of 1948, August 18 to November 14, was primarily from New Mexico by Allen and Bowsher. Several days at the end of the season were spent in Oklahoma and Kansas. These fossils are US National Museum Accession No. 180195.

Bowsher spent 4 June to 5 July 1951 with Cooper in Marathon, Tx. collecting blocks of Permian for dissolution in acid. No notes.

Bowsher and Allen spent July 5 to 28, 1951 collecting in new Mexico. July 29 to August 2, 1951 was in Oklahoma. August 3 to 10, was in Missouri, Illinois and Indiana en route to Washington. We arrived at the Museum on August 15, 1951. These collections are US National Museum Accession No. 191737.

The notebooks for August 1952 report on collecting in Oklahoma, Missouri and Kentucky. They are US National Museum Accession No. 195672.

The notebooks from September 12 to October 10, 1956 were to help Dr. G. A. Cooper to complete Devonian collections of New Mexico for a study he and J. T. Dutro, Jr. had in progress. The writer was graciously allowed to make the trip by George Gryc, Navy Oil Unit, U. S. Geological Survey, Washington D. C.

#### APPENCICES

##### Appendix 1

During the summer of 1940 Frank V Stevenson came to New Mexico to study the Devonian strata as material for a Ph D at The University of Chicago. Arthur L Bowsher accompanied him to examine and collect from the Mississippian. Because of the proximity of the strata we had interests in common in exposures all across the south half of the state of New Mexico. Frank had a brand new 1940 Ford stationwagon. We spent May, June and July of 1940 examining the exposures accross southern New Mexico. We camped out under the stars for the entire period. The crinoids collected by us from the Devonian are in the Springer Collection of the U S National Museum. All fossils collected by Bowsher prior to 1949 are in a collection donated to the U S National Museum in 1949 as a separate accession.

##### Appendix 2

Notes taken in New Mexico and Wyoming by Keyte, Blanchard and Baldwin in 1928 are included because they represent early collecting in the Sacramento Mtns. Ray Moore in Kansas, Fred Plummer the Colorado River Valley in Texas and these three professors from Colorado in the Rocky Mountains searcjed for evidence of the contact between the Pennsylvanian and Permian rocks. These notes were sent by Keyte, Blanchard and Baldwin to James H Williams and George Girty of the US Geological Survey in Washington, DC for identification and age dating. This copy was made from the set in James H Williams file in the US Geological Survey in Washington, DC and are entered here fundamentally because of their historical significance.

Platycrinites and associated crinoides from Pennsylvanian rocks of the Sacramento Mountains, New Mexico (Bowsher, 1986, NMBM&MR

Circular 197) were originally found by Keyte, Blanchard and Baldwin in 1928.

Sheets 11-15 concern the relations of the Pennsylvanian-Laborcito-Abo in La Luz Canyon. These relations are discussed by Carel Otte, 1959, Late Pennsylvanian and Early Permian Stratigraphy of the Northern Sacramento Mountains, Otero Co, New Mexico: State Bureau of Mines and Mineral Resources, Bulletin 50.

#### Appendix 3

Abundant biohermal masses occur in the Mississippian of the Sacramento Mountains from Indian Wells Canyon south to Mule Canyon. Bowsher began the study of the bioherms on a trip to the Sacramento Mountains from Lawrence, Kansas in thesis study in June 1946. Bioherms were located on aerial photographs and from field investigations. Sketches of each set of bioherms was made from the opposite side of exposures in each canyon and then a similar set of sketches were made of the bioherms or their correlatives from the other side of the canyons. A geologic map of the area was made from aerial photographs and the bioherms were numbered on sketches and the aerial photographs. Appendix 3 is a set of these sketches by Bowsher with an accompanying geologic sketch map showing identification numbers.

It is hoped that the collections referred to in these notes will be of great help to paleontologists and students working in New Mexico. The bulk of these collections are in a single set, mostly unworked in the U S National Museum. Some collections are fairly extensive. Numerous localities from these notebooks are well picked over. Localities in the San Andres Mountains are no longer accessible because the range lies in White Sands Proving Grounds. The set of notes are made available in open file in order that the collections in the U S Museum can be made available to paleontologist and to make locality and stratigraphic source available.

Respectfully,

*Arthur L Bowsher*  
Arthur L Bowsher



ITINERARY OF 1948 TRIP  
TO  
NEW MEXICO, ARIZONA AND WEST TEXAS  
A L BOWSHER & W T ALLEN  
U S NATIONAL MUSEUM

AUGUST 1948

- 18-Bowsher traveled by air to Biltmore Hotel, Oklahoma to meet G A Cooper to begin the field season.
- 19-Traveled from Oklahoma City to Norman to pick up Bill Allen and the Museum truck at the Oklahoma Geological Survey and to visit Dr. Bob Dott. Then traveled to Pampa, Texas.
- 20-In Pampa, Texas.
- 21-In Pampa, Texas.
- 22-In Pampa, Texas.
- 23-Pampa to Canyon, Tx via Palo Duro Canyon and the Museum at Texas Western University at Canyon; then on to Roswell, N M.
- 24-Traveled from Roswell to Mayhill, Cloudcroft and Alamogordo. Collections of Permian: 3001-3012. These are US National Museum collection numbers.
- 25-Collecting Ouate (3013) and Caballero Fms (3014) in Alamo Canyon.
- 26-Alamo Canyon: Caballero Fm (3015)
- 27-Collected in morning and had the car fixed in the afternoon. Later went to White Sands Military, to request permission of Colonel Helmrick to visit the San Andres Mts.
- 28-Collected at Sly Gap type locality (3016), south slope of Sheep Mountain, northern San Andres Mountains. Spent the night stuck in the sand east of San Andres Mountains.
- 29-From stuck in the sand to Alamogordo. Tired.
- 30-Truck repairs and collected in Clay Pits, Tularosa (3017). This is the quarry from which Bose, Emil, 1920, (Am Jnl Sci, 4th ser, v. 49, p. 57-60) discussed Pennsylvanian type fossils from the Permian Abo Formation.
- 31-Collected on the south side of Marble Canyon, Sacramento Mountains from Andrecito Fm (3018) and from the syncline in the top of the Sly Gap (3019).

September 1948

- 1-Collecting from Nunn and basal Tierra Blanca Fm on the north side of Marble Canyon (3020), Sacramento Mtns.
- 2-Collected from the top part of the Fresnal Fm in La Luz Canyon (3021), Sacramento, Mtns,.
- 3-Collected from the base of the Laborcito Fm in La Luz Canyon (3022), Sacramento Mtns: slept at Sgt. Garcia's Tula Camp.
- 4-Collected from Ouate FM (3023) near Little Tank, Mocking Bird Gap, San Andres Mtns and spent the night north of Capitol Peak; old ranch house with 2 Mexican caballeros.
- 5-Collected near Big Tank (north of Capital Peak) from Pennsylvanian (3024).
- 6-Collected Sly Gap Fm .5 mi due NE of Mud Springs Mtn (3025).
- 7-Collected Percha Fm. 1/4 mi NE of Clarence Wilson Ranch (3025) and at The Lake Valley Type Section (3026), Hillsboro quadrangle.
- 8-Collected at Nunn Ranch, Hillsboro quad-10 T17S R8E; about 25 mi SW of Hillsboro, NM. Percha Fm (3028 and 3028a). Percha from Tierra Blanca Mtn (3029).
- 9-Collected at Wilson Ranch (Percha 3025) and Lake Valley Fm, Lake Valley (3026).

- 10-Scouted Trujillo Cr, 3.3 mi S50E of Hillsboro, Sierra Co., Sly Gap Fm. (3030) and Percha Creek Fork (3031). Cooper obtained wings on *Pseudosyrinx* from the black shale of the Percha here. The locality is now destroyed. A wide two lane highway passes right over the Percha and Lake Valley collecting sites of "ole".
- 11-Collected at North Percha Creek Ranger Sta (Ready Pay Fm-3032) and along road between Sawpit and Carbonate Creek, 2 miles N of Kingston, silicified Penna.
- 12-Collected at Lake Valley and Wilson's house (3025 & 3026)
- 13-Collected at Wilson's Ranch (3025)
- 14-Spent the day wrapping fossils.
- 15-Collected at Wilson's Ranch (3025)
- 16-Collected at The Box, Percha Creek, 2.3 miles ESE of Hillsboro Percha Sh, The Box member (3034) and 1/2 m east of Kingston (3036).
- 17-Collected at Ladrone Gulch, .5 mi west of Kingston (Box Mbr-3035)
- 18-Trip Hillsboro to Hot Springs to Socorro to see Anderson and staff at N M Bur Mines and MR. Returned that night to Hillsboro.
- 19-Collected at C. Boyds ranch 3.3 mi west of Hillsboro ( 3038 & 3039). Wrapped in the afternoon.
- 20-Collected 1.2 mi So of Earl Wilson's ranch (siltstone with *Orbicella* at base of the Ready Pay mbr of Percha-3037)
- 21-Trip to Hot Springs for laundry,
- 22-Hillsboro to Silver City. Visited Harrison Schmidt in evening.
- 23-Visited USGS in Silver City. Hernon visited the Bear Mtn loc to assist us in collecting from the Box Mbr of the Percha.
- 24-Trip to Paradise, Arizona to examine Hernon's section of the Devonian and Mississippian in the Chirachichua Mtns. (3041). Accompanied on this trip by Robert Hernon.
- 25-Collected at Bear Mtn and went to Hillsboro (3042).
- 26-Drove to Tuscon, Arizona to visit Dr Stoyanow at the U. of Arizona.
- 27-Silver City to Hillsboro. Collected 3.5 mi E of Santa Rita, Grant Co (3043).
- 28-Collected at Apache Hill, Lake Valley.
- 29-Lectured at Hot Springs High School.
- 30-Collected at F. Nunn and Boyd Ranches.

#### October 1948

- 1-Drove from Hillsboro to Alamogordo.
- 2-Collected in Indian Wells Canyon, Sacramento Mtns (3044)
- 3-Collected in Arcente Canyon, along West Side Road, Sacramento Mtns (3045)
- 4-Bowsher hiked from east side to Alamo Peak to meet Allen in Marble Canyon (Lake Valley-3046)
- 5-Collected in Dry Canyon, Sacramento Mtns. Pennsylvanian (3047 M. Des., 3048 M. Des., 3049 U. Des. and 3050 Basal Can?)
- 6-Collected Penna. on West Side Road, 6.1 Mi south of High Rolls (3051 U. Can.?). Accompanied by engineers Vikes and Gerome on tour of Pig Canyon.
- 7-Collected at east side of Alamo Peak and at Pig Canyon (3052).
- 8-Day off to do laundry, haircuts, wrapping and getting pass to the White Sand Range.
- 9-Packed in morning and made trip to Rhodes Canyon, San Andres Mtns.
- 10-Collected in Rhodes Canyon, Sly Gap Fm (3054).
- 11-Packed boxes for shipment to the US National Museum, Wash. DC; 3793 lbs.
- 12-Collected on easts slope of Alamo Peak (3053).
- 13-Collected in Pig Canyon, 3 mi Se of Tunnel on US 180, head of Dry Canyon.

- 14-Collected in Indian Wells Canyon, north branch; (Morrow 2-300 feet above base of Penn. 3055) and Mississippian (3056) at the upper end of main central canyon of Indian Wells Canyon.
- 15-Packing for shipment.
- 16-Collected in Grapevine Canyon, south end of Sacramento Mtns. (Miss? 3057 and Penna-Silicified gastropods-3058).
- 17-Day off.
- 18-Conference with E Russel Lloyd and collected at Tularosa (3061).
- 19-Packed and collected in Alamo Canyon (Montoya 3059).
- 20-Packed and collected east of reefs and in old clay pits at Tularosa.
- 21-Visited Escondito Canyon with Pray (3017).
- 22-Visited Russia, Karr and Haynes Canyon (3060, 3062, 3063 & 3064).
- 23-Visited Nigger Ed Canyon, south of Sacramento Mtns (3067).
- 24-Packed for shipment.
- 25-Finished packing, shipped rocks and drove from Alamogordo to El Paso, Tx.
- 26-Visited Dr. L A Nelson at Texas School of Mines and collected in the Franklin Mtns, Vinton Canyon (L A Nelsons type-Onate-3068 & 3069).
- 27-Collected in the Franklin Mtns.
- 28-Collected in Hueco Mountains, near Hueco Tanks. (Upper Helms, Dolite with complete silicified fronds on Archimedes (undescribed), spectacular and trilobite written up by Harry Whittington-3070) and (Pennsylvanian at bend of road east of Hueco Tanks (3071).
- 29-Visited Ranger Naturalist at Carlsbad Caverns.
- 30-Visited Dr. LeRoy Patton at Texas Tech. and drove to Pampa, Tx.
- 31-Pampa, Texas.

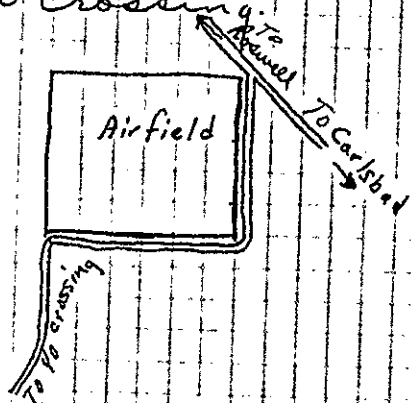
#### November 1948

- 1-Drove from Pampa, Texas to Norman, Okla.
- 2&3-Collected in Arbuckle Mtns. with Bob Dott, Sr and Hamm; Caney Sh SESEW 35 T3N R6E, Pontotoc Co. (3074); Caney Sh- Camp Clausen, Murray Co (3072); Sycamore, 1 mile S of Springer near old airport; Caney-Jack Fork Creek (3075); Caney sh (3076) and Weldon near Sheep Creek, Pontotoc Co (3077); Caney sh-Rhine's Wrinkle Sock Ranch (3077).
- 4-Wrapping fossils in Tulsa, Oklahoma.
- 5-Visited L E Fitts and attended the Tulsa Geological Society luncheon collected from the Tiawah Limestone at the Fin and Feather Club on Claremore Road.
- 6-Wrapping fossils and packing.
- 7-Day off.
- 8-Drove to Talequah, Ok, vicinity and collected St Joe Fm. Spent the night in Pleasanton, Kansas.
- 9-Drove to Lawrence and visited at the University of Kansas.
- 10-Collected near Booneville and spent the afternoon at the U of Mo.
- 11-Lectured to Dr. Peck's Advanced Paleo. class on Miss crinoids.
- 9-Drove to Lawrence and visited at the U of Kansas. Drove to Cincinnati.
- 10-Drove to White Sulphur Springs.
- 13-Drove to Washington, DC via Newport News, Va for Bill Allen.
- 14-Reported to work in the US National Museum.

24 Aug 1948

to Roswell, New Mexico.

we drove southeast from Roswell toward Carlsbad to ~~northeast~~ corner of Roswell Airfield and turned south on road (gravel) toward Y.O. crossing.



8070.0 (speedometer reading) at Jct. of Carlsbad highway and Y.O. crossing road, 3 mi. southeast of Roswell N. Mexico.

8080.0 Small 6" drain ditch on west side of road. Coll. B-1 (USNM 3001) from algal

3001

P. 2

24 August 1948

Acc. 180195

Bowsher, A. L. and Allen, W. T. trip to New Mexico and Oklahoma during the summer of 1948. This is the first attempt by me to keep a notebook. The results are so unsatisfactory that I have transcribed many of the notes. This notebook includes the old notes and the transcribed ones. They were transcribed on 28 Oct 1952. Mileages from Carlsbad - Roswell road jct with Y.O. crossing road are from red truck speedometer and are 0.12 <sup>more than</sup> ~~short of~~ actual mileage.

We obtained the survey truck in Norman, Oklahoma and drove P. 1.

24 Aug 1948  
has chert nodules (fossiliferous)  
on top surface. Collection made  
(3003) <sup>(B-4)</sup> from 10 to 150 feet from  
road on south side. Exactly  
one mile east of cattle guard  
on highway. 6 miles west of  
Jct N. Mex. 83 and 13. Sec 7-  
17<sup>S</sup>-19<sup>E</sup> Chaves Co. N. Mex.

8140.9 - Fill in road cut, right  
side of road at base of cut  
on N.M. highway 83. Flot  
in road fill from cliff and  
cut. Coll 3004 (B-4).  
15.6 mi west of Jct NM 83  
and 13, near Trails End,  
27-16<sup>S</sup>-17<sup>E</sup> Chaves Co. N. Mexico

8141.2 - In north road cut, Permian  
about 20 feet above base of  
P.4 exposed sequence as seen in

24 Aug 49  
limestone, near 30-12<sup>S</sup> 24<sup>E</sup>  
Chaves Co. N. Mexico.

8082.2 Bend mark on highway  
8123.1 Junction of NM 83 and NM  
13 - Y.O. crossing.

8125.7 - Ledge of Permian limestone  
150 ft. south of road at level  
at approx 25 feet above road  
level, dark "trapants" lime-  
stone ledge 18" thick with  
many Euomphalus casts. Loc.  
3002. 2.2 miles west of the  
Jct of N. Mex. 83 and 13.  
Sec. 7(?), T17<sup>S</sup>, 20<sup>E</sup>, Chaves  
Co, new Mexico.

3002

8129.9 - on blacktop highway 83 - solid  
gray ledge of limestone (Permian  
at road level on slight  
east slope of drain. Bed

P.3

24 Aug 49

hillside in gray limestone just above 4 ft cut on west side of road. Collected 2 slabs 3.5 ft. above road level, 100 feet above cattle guard, near highway sign. Coll 3006 (B-6). 20.7 miles west Jct. NM 83 and 13. 18-16<sup>S</sup> 17<sup>E</sup> Chaves Co, N. Mex.

8153.4 - Above north road cut on NM 83, 2.5 ft. above top of road cut. Cut is 9 ft high. Coll. 3008 (B-8). 26.6 miles west Jct NM 83 & 13 near Elk, 4 or 5-16<sup>S</sup> 16<sup>E</sup> Chaves Co, N. Mex.

8154.9 - Road cut on nw side of road at road level, Permian, San Andres ls. Echinoids

P. 6.

24 Aug 48

3005

cliff Black dense, semi-lithographic limestone, with silicified white fossils. Coll. 3005 (B-5).

0.3 mi west on highway from loc 3004. Sec. 27-16<sup>S</sup> 17<sup>E</sup> Chaves Co., New Mexico.

for 3006  
see p. 6

8147.2 - along east road cut on US 83, overlooking river with varved clays. Black ls. with many comminuted fossil fragments, <sup>coll 3007 (B-7)</sup> about 20 ft above base of exposed section 150 yds south of Penasco Stock Farm. 21 miles west of Jct NM 83 and 13, 18-16<sup>S</sup> 17<sup>E</sup>, Chaves Co, New Mexico.

3007

8146.7 - Along west side of road on P. 5.

24 Aug 1949.

8187.0 - ~~road~~ road cut, just west  
of road, 200 feet south of  
Jct of NM 83 and Mescalero  
road. 56.2 mi. west of  
Jct NM 83 and 13. 4 or  
5-16° 13'E, approx. 6 mi  
E. of Cloudcroft, Otero  
Co. New Mexico.

8210.3 City limits of Alamogordo,  
N. Mexico.

3012

24 Aug 49

Coll  
3009

27.9 mi west of Jct. NM 83  
and 13. 13-16° 15'E Otero  
Co. New Mexico. Coll. 3009(B)

8156.6 North side of road in  
17 ft road cut. Coll. 3010  
from 6 ft above road level  
Permian, San Andres ls  
Coll. 3010 (B-10). 29.5  
miles west of Jct. N.M. 83 &  
13. 11-16° 15'E. Otero Co.  
New Mexico.

3010

3168.0 - Road cut on north side  
of road, 40 ft. above road  
level. Permian. Near  
Mayhill. Coll. 3011 (B-11).  
39.5 miles west of Jct of  
83 and 13. 16-16° 15'E,  
Otero Co. New Mexico.

3011

8141.2 - on N.M. 83 in north road cut  
Permian, about 20 ft. above  
base of the sandstone  
B-5  
3005 ~~Black ls. w/~~  
~~shale and siltstone~~ fossils, B5

8146.7 - on N.M. 83 along west side of  
road on hillside in grass  
B-6  
3006 log just above 4 ft. cut  
on west side of road  
collected 2 slugs 35 ft  
above road level, 200 feet  
above cattle guard, below  
near sign on highway

8142.1 - on N.M. 83 along east road  
cut overlooking river with  
B-7  
3007 excellent large clasts.  
Black ls. w/ much concretion  
fossil frags. about 20 feet  
above base of siltstone  
in road cut. Road cut just  
south 150 yds of Penasco stock farm

8153.4 on U.S. NM 83 ~~along~~ North road  
cut. 25 ft above top of road  
B-8  
3008 cut with 9 ft. cut

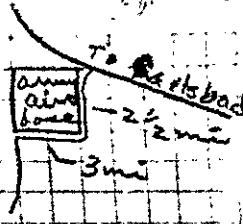
8154.9 ✓ NW road cut @ road level  
B-9  
3009 Echinoids Permian sand  
and sh. ls.

8156.6 ✓ North side of the road in 12 ft  
B-10  
3010 road cut 6 feet above the  
level of the road.

P.2 P.10 - 8148.0

2400 ft. 8000.0 G. Sunset of Carlsbad - Y.O. cross  
road 3 mi SE of Roswell

8080.3 - small 6" drain  
ditch on west side  
B-1  
3001 Road Loc. B-1 -  
Algal ls - Carlsbad P. ls.  
BM.  
8123.1 NM 83+13



8125.7 on Blacktop ledge Permian  
B-2  
3002 ls. 150' south of road at level  
of asp. 25 feet above road level  
Dark tan panto limestone ledge  
18" thick w/ many Echinophidius  
casts. Loc. B-2. Sample & collect.

8129.9 - on Blacktop, Highway 83 - pit  
B-3  
3003 gray ledge of limestone (Permian)  
at road level on slight east  
slope of drain. Bed has chert  
nodules (fossiliferous) on top  
surface. Collection made from  
10' to 150 feet from road on  
south side of highway.  
Exactly 1 mile east of cattle  
guard across the highway.

8140.9 - Fill in road cut, right side  
B-4  
3004 of road at base of cliff. W.M.  
Highway 83. Brought in. Nant.  
and ~~blue~~ ~~shale~~ float, were  
unable to tell source of float.  
Believe float came from cut  
below road level.

P.9



B-13 Onate fm. - Collection from  
unit of red feet below the  
middle of the topmost  
3 ft. ledge of the Onate fm.  
200 yds. south west of the  
type section of Landow and  
Burcher in Alamo Canyon  
dead man branch on SW  
exposure on slope of nose  
from just above excellent  
exposures in the creek  
bottom. See 9" x 9" photo  
CTF-3-121. Secor NE 3/4 sec  
3. T175, R. 10E

B-14 Caballero fm. - from Caballero  
above basal S. Louisiana ledge  
with several fossils from this  
ledge from type locality of  
Caballero fm. in Scammon  
Canyon, SW/NE 1/4 sec 3,  
T. 175, R. 10E, Otero Co, N.M.  
See CTF-3-121.

B-15 Caballero fm. - from north  
wall of Alamo Canyon 1/4 miles  
above the mouth of the canyon and  
N 3/4 W of Landow and Burcher type  
section. Collection from basal  
ledge and from lower Caballero  
fm. S. 3, T. 175, R. 10E, Otero Co, N.M.

P-4 P. 12

815 B. 5  
B-12 Road cut on the side of  
road 40 feet  
level. Permian.  
3011 V  
8168.0 Max Hill (+)  
8169.6 James Canyon Pass  
8187.0 Junction of Cloudcroft -  
Mescalero road in direction  
of B3 and 22. Permian?  
19 1200 feet south of junction  
in road cut just west of  
road and in road cut of  
A.B. block loc  
B-12a  
3012

Arrived at Alamogordo  
8210.3

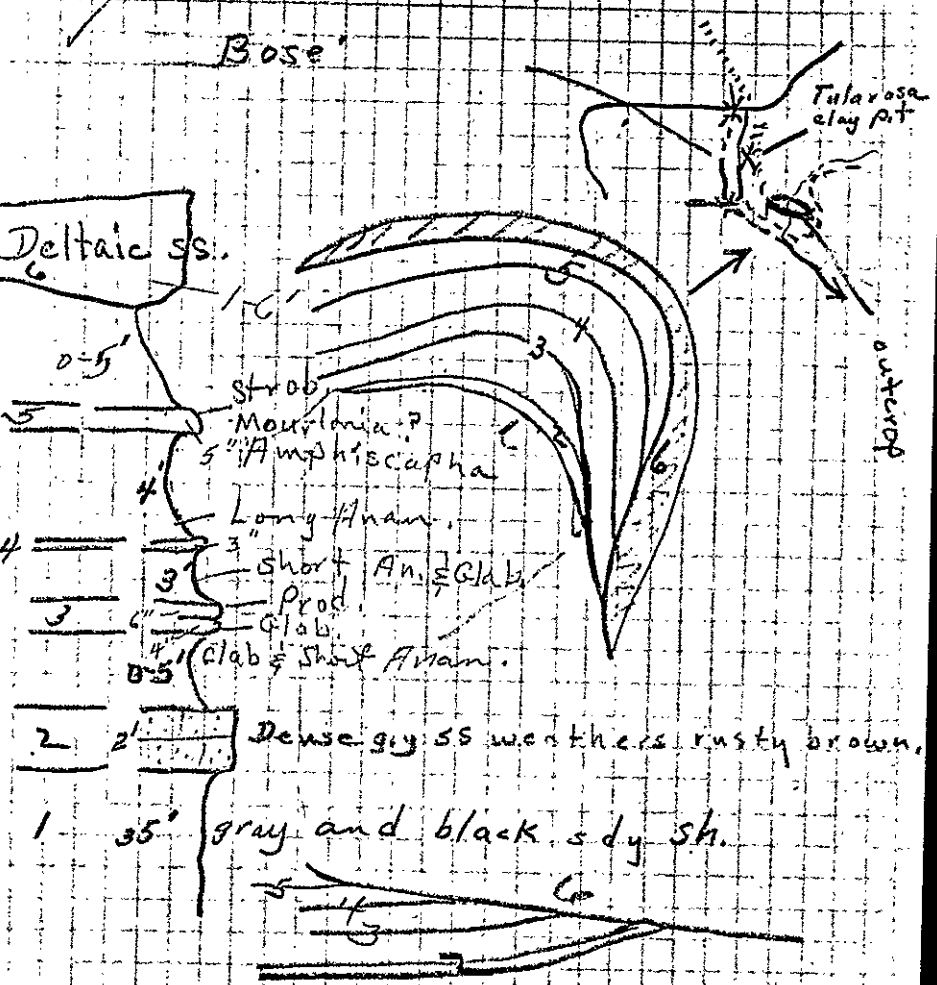
P-3 P. 11

48-8-30

18 inches from this locality  
are marked B-21 See p. 82-83  
the notebook

B-17 Topmost beds of Fresno  
group, 10 miles east and 0.5 mi  
S. of Tularosa.

3017



48-8-28

B-16- Onate & Sly Gap @ Steven  
son's type section

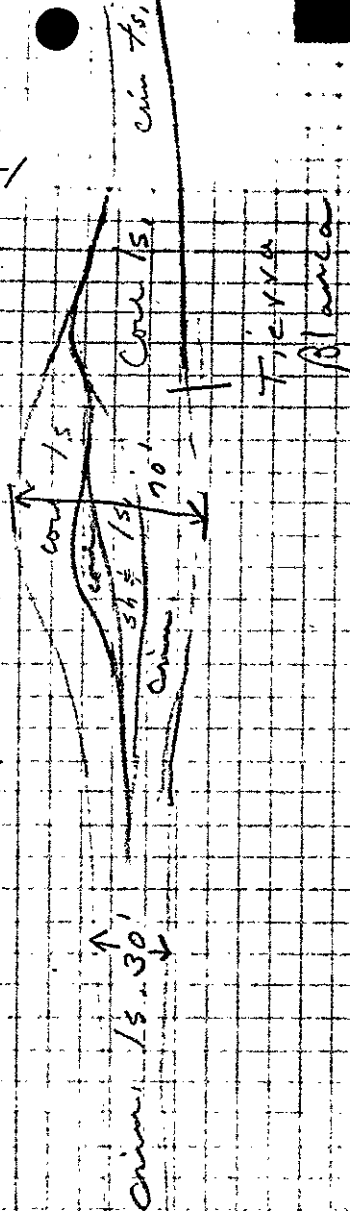
See field label on  
collection. Believed to be  
from Sly Gap loc, Sheep  
Mts. San Andres Mts.

3016



48-9-1

Bidwell F-7-V



P. 18

48-9-1

B-30 Nunn and basal Tierra Blanca on north side of canyon mouth of Marble Canyon.

3020 from hillside slopes on north side of entrance to Marble Canyon on west side of Scarp.

cen 19-16<sup>±</sup> 10E otero Co.

Sacramento Mts. N. Mexico

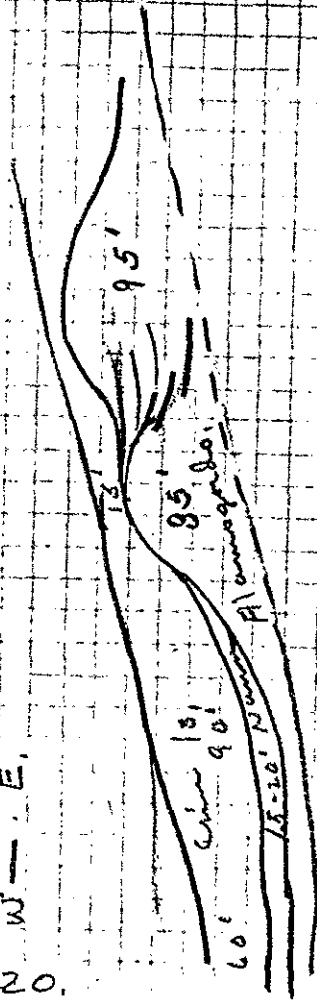
P. 17

47-9-1

F-7-W

W-E

p20.



48-9-1

F-7-N

F-7-0

F-7-1-2

p19

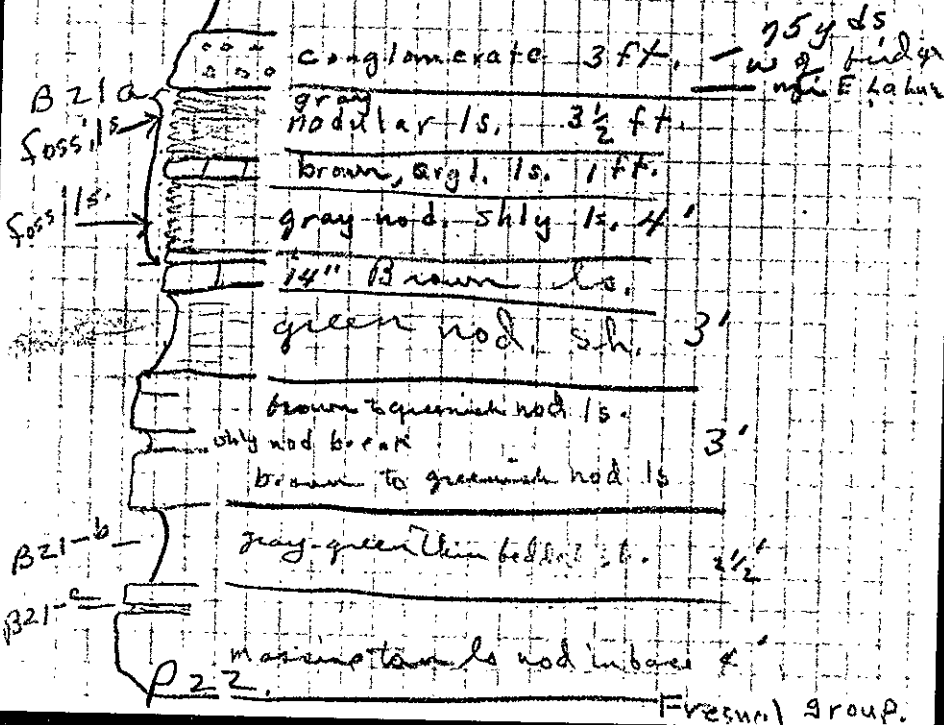
48-9-1

B-20 Caballero-Andecito - 1/2 mi NE  
of quarry in Marble Canyon.

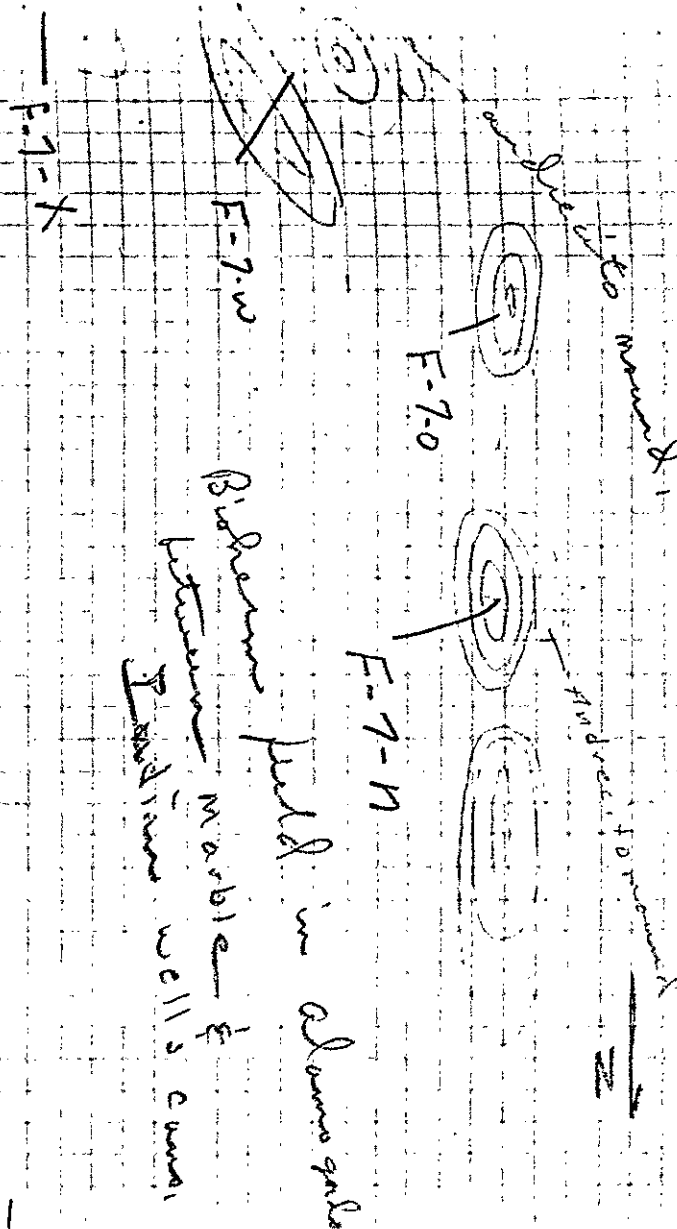
48-10-2

B-21 Top of Fresno Group, Fresno  
section sec E-3 SE cor NW 1/4 Sec 30  
T. 15 S, R. 11 E, Otero co. From nodular  
beds below conglomerate zone, 3.1 mi  
SS. on old highway B3 to High Falls.

30' black & gray shale



48-9-1



P21

48-9-3

3022  
Loc. B-22 - Fresnoal or Wolfcampian.  
outcrop lies 400 yds due north  
of bridge on creek 1/4 mi. west of  
La Luz. Patterning works on old N.M. high-  
way B2 up Fresnoal Canyon. at road  
level is congl. overlain by bl. sh.  
30 feet this overlain by 200 feet  
green sh. and ss. congl. capped by  
red X-bedded ss 10 feet. then 20-30  
feet green - gray sh. then 1' bed of  
nod. calc. siltstone plus with  
gastropods. 10 feet green sh.  
black nodular ls w. many fossils  
brachiopods & gast. Cliff 3 1/2 feet  
calc. ss and airt. lg.

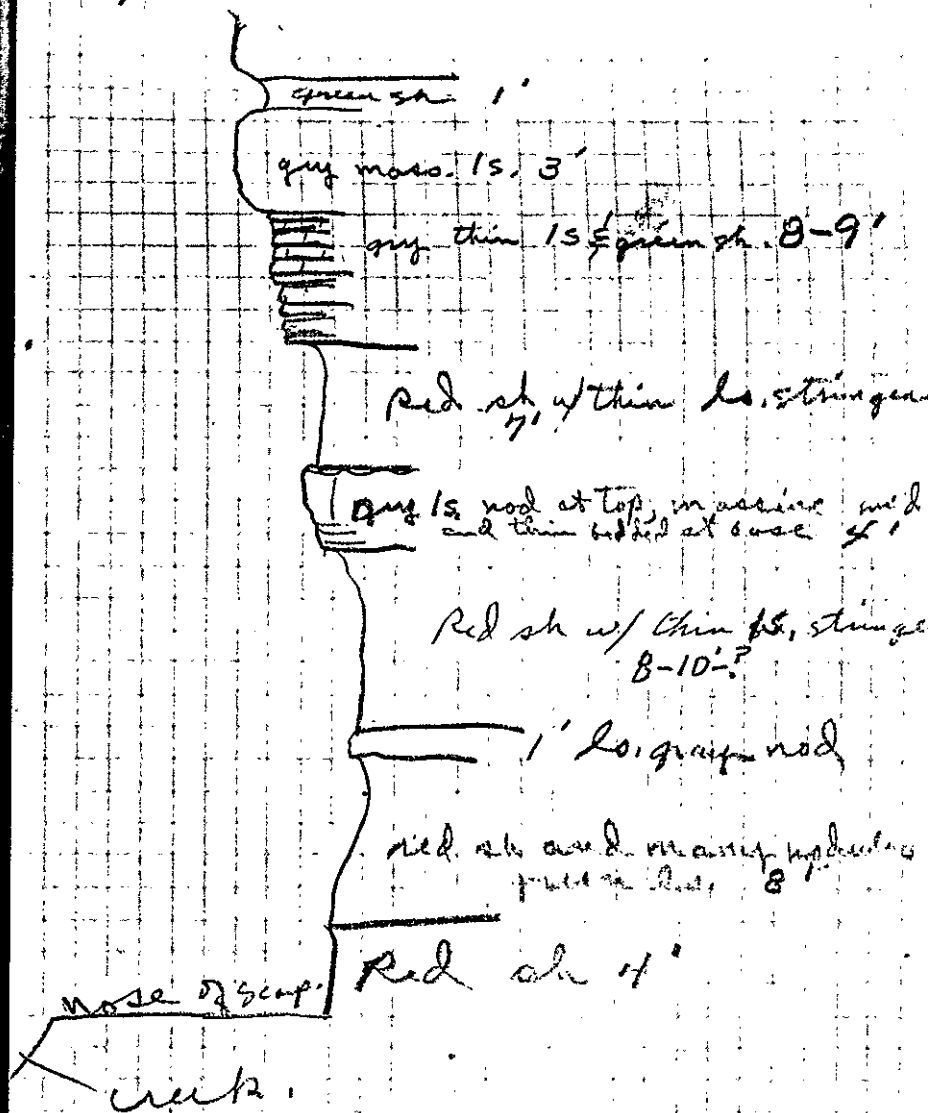
B-22a ls. float in creek just  
below loc B-22. were unable  
to place in section.

"Bursum" coll. ne sec. 30,  
T15S - R11E Otero Co, New Mexico.

P24

La Luz Pottery

48-9-2 cont.



P23

La Luz Canyon Fresnoal type

p. 26

L. Buvo Mt

48-9-4

B-23 Canutillo - Dnate and Sly Gap  
app. cen. w L, sec. 5, T. 10 S R. 5 E,  
app. 2 <sup>3</sup>/<sub>4</sub> mi N. 6° W. of CCTank, 1 mi  
S 6° E of Little Tank, San Andres  
Mts. Mocking Bird Gap, New Mexico

3023

23a from thin beds of lenticular nov  
aculite 1-2' above base Orate.

23b from thin dolomite beds 3'-4'  
above base of onate.

23c - from ss 4" thick 6-7 ft above base  
of Devonian.

- Corals  
 Schuchertella  
 23C → fine hard grt. ss, 6"  
 light tan sandstone. Parapirifer  
 6'-7' mostly covered.  
 23b → brown sandy shale, with brown  
 Delonites linear fossils in lower 1 ft.  
 23a → 1' hard platy calc. ss,  
 1-2' soft, thin bedded arenaceous sh.  
 El Paso  
 gant.  
 0-1" fossiliferous chert zone

p. 25.

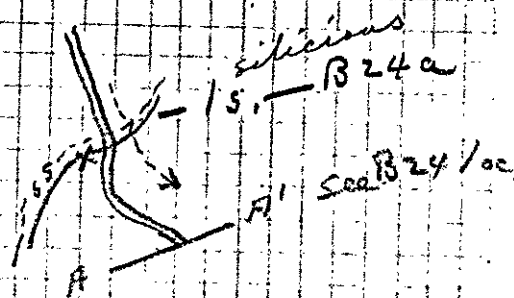
L. Burro Mt.



48-9-5

B24a Pennsylvanian ls. 200 yds  
 520 yds on loc B24. fusulinids  
 app. ~~200 yds~~ higher than  
 coll @ B24

3024A



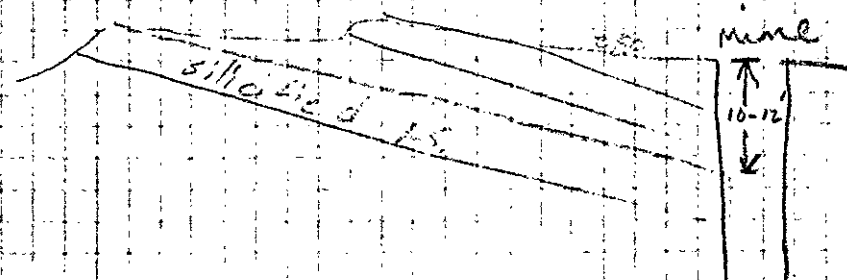
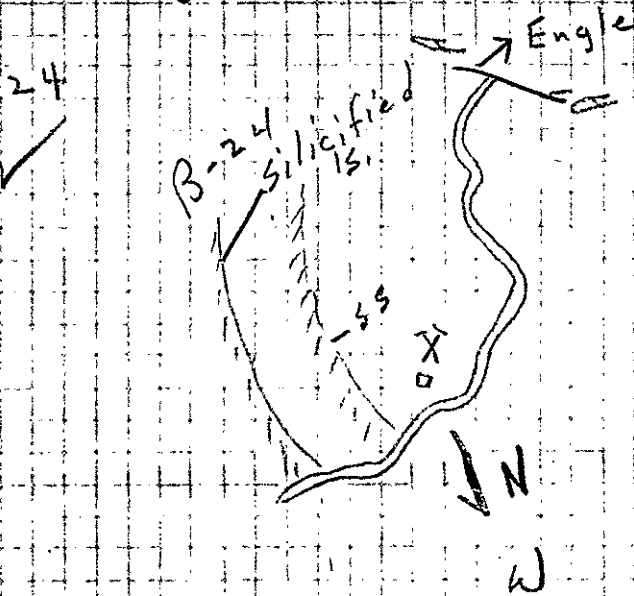
P.28

West of Mockingbird

48-9-5

B-24 Pennsylvanian ls exposure just  
 east (100 ft) of Mine shaft along  
 road from Capitol Peak to Engle.  
 approximately SW Sec 19, 10S 4E  
 north end of San Andres mts,  
 New Mexico. 2 1/2 mi west of  
 Big Lake (NW 1/4 Sec 12, 10S, 4E)

3024



P.27

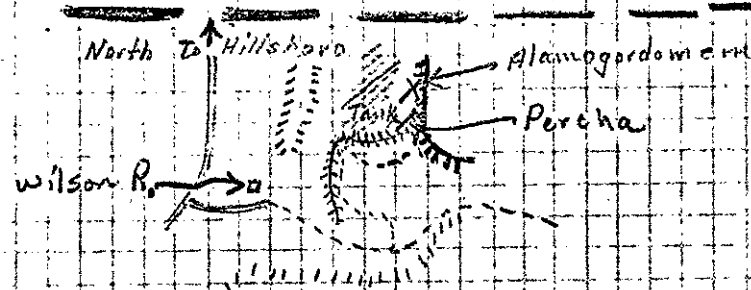
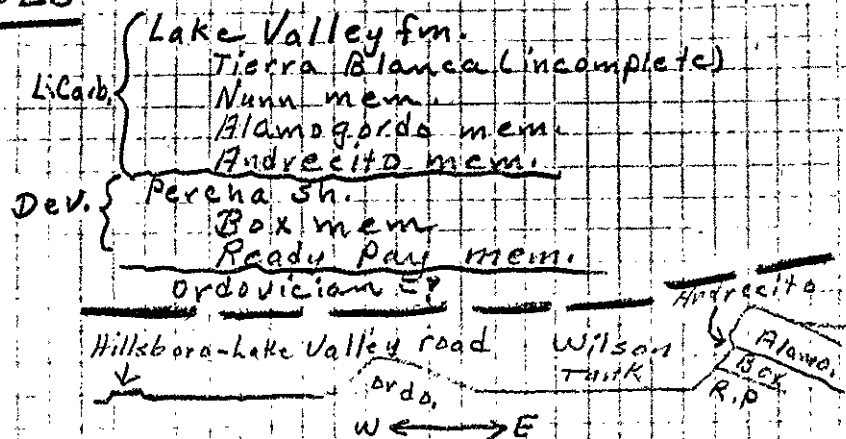
West of Mockingbird

48-9-7

Locality B-26. - Hillsboro quad.

Sequence:

3026

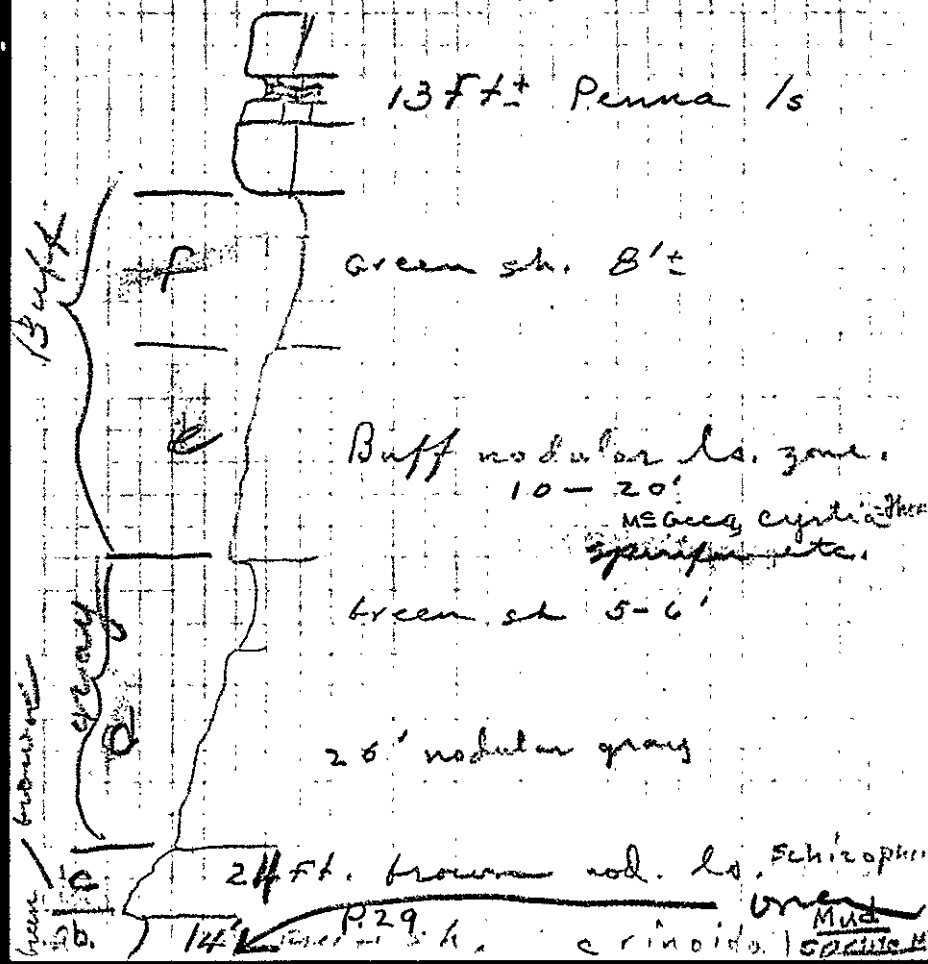


Exposures on western slope of  
 scarp to east of tank, approx. 0.6  
 mi. N. 65° E of Earl Wilson (Wilson  
 Ranch, app. SE/SE/NW, Sec 11, T18S, R.  
 7W, Sierra Co., N. Mexico.

P.30

48-9-6

B-25 Sly Gap, fm at 107°18' W Long  
 33°10' N Lat. 3.7 mi NW bend in  
 Main Highway thru Hot Springs  
 in SE corner of town. See Rib  
 3025 Grande Photo map #146.  
 1/2 mi due NE from highest point  
 in Mad Springs Mts.

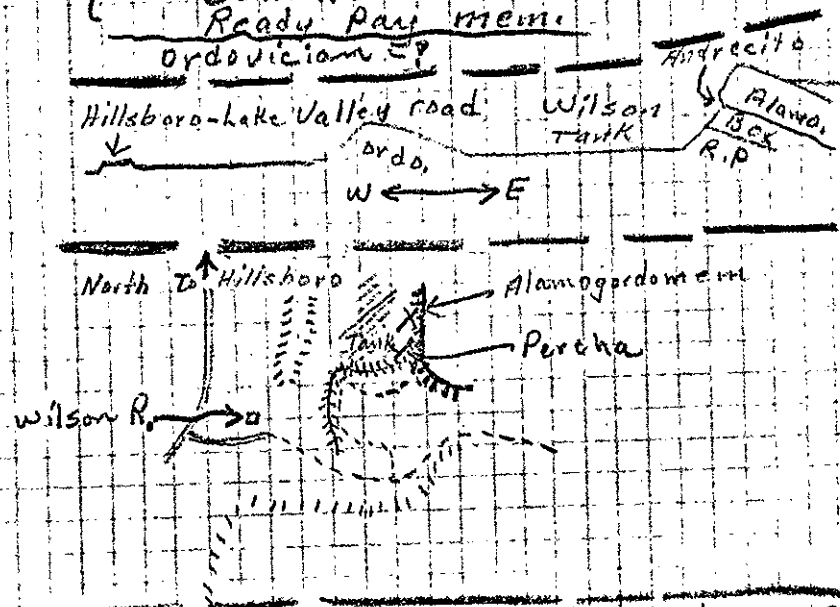


# Locality B-26. - Hillsboro quad.

sequence:

3026

L. Carb. { Lake Valley fm.  
           Tierra Blanca (incomplete)  
           Nunn mem.  
           Alamogordo mem.  
           Andrecito mem.  
 Dev. { Percha sh.  
          Box mem.  
          Ready Pay mem.  
          Ordovician sp.



Exposures on western slope of  
 seard to east of tank, approx 26  
 mi. N. 65° E of Earl Wilson (Wilson  
 Ranch, app. SE/SE/NW, Sec 11, T18S, R.  
 7E, Sierra Co, N. Mexico.

P.30

a. 5' gray-brown dolomite  
 with soft thin sh.

48-9-8

3026

Locality B-28 - Hillsboro group.

sequence:

Lake Valley fm.  
 Tierra Blanca mem (incomplete)  
 Nunn mem.  
 Alamogordo mem.  
 Andrecito mem.

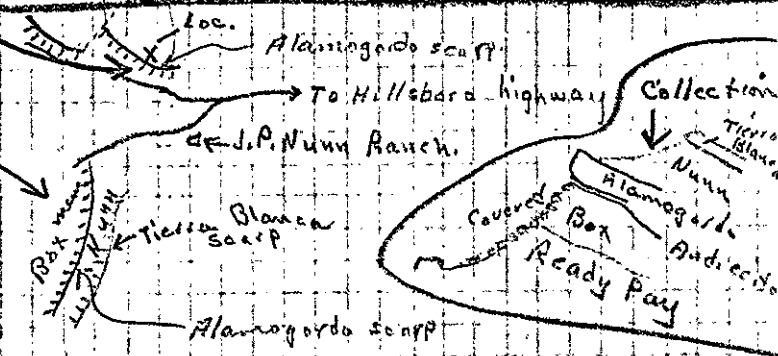
Dev. { Percha sh. fm.  
 Box mem.  
 Ready Pay mem (Partly exposed)

not exposed.

loc 3028a

loc 3028

Nunn Ranch



Hillside slope (sw side) of scarp  
 approx 0.1 mi NW of J.P. Nunn ranch  
 along Tierra Blanca cr, approx.  
 SE/NW sec 10, T19S, R.8E, Sierra  
 Co, N. Mexico. P. 32

48-9-7

3027

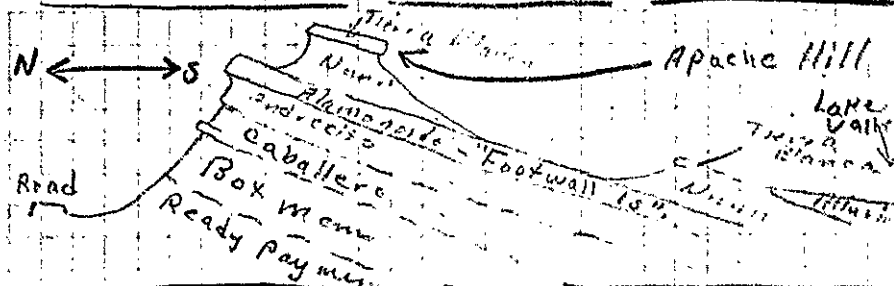
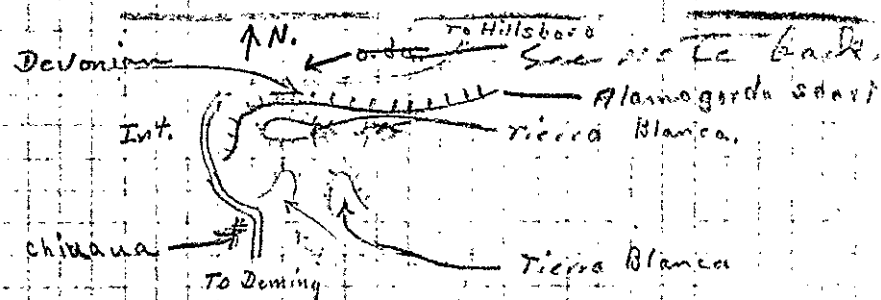
Locality B27 - Hillsboro group.

sequence:

Lake Valley fm.  
 Rhyolite (Tertiary)  
 Tierra Blanca mem (incomplete)  
 Nunn mem.  
 Alamogordo mem.  
 Andrecito mem.  
 Caballero fm.

Dev. { Percha sh. fm.  
 Box mem.  
 Ready Pay mem.

Ordovician - ?



Scarp due south of Apache Hill at Lake Valley type section, approx. cen. SW 1/4 sec. 21, T18S, R. 7W, Sierra Co, New Mexico. Also on Apache Hill & N. scarp. app. SE/NW sec. 21, T18S, R. 7W. P. 31

48-9-B

3028

Locality B-28 - Hillsboro greens.

Sequence:

L. Carb. { Lake Valley fm.  
Tierra Blanca mem (incomplete)  
Nunn mem.  
Alamogordo mem.  
Ardecito mem.

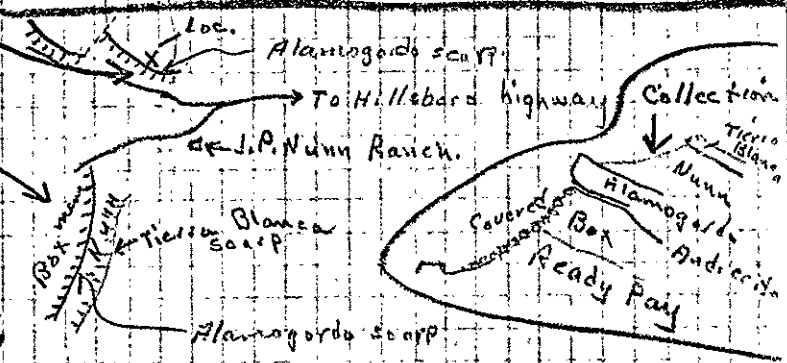
Dev. { Percha sh. fm.  
Box mem.  
Ready Pay mem (partly exposed)

not exposed.

loc 3028a

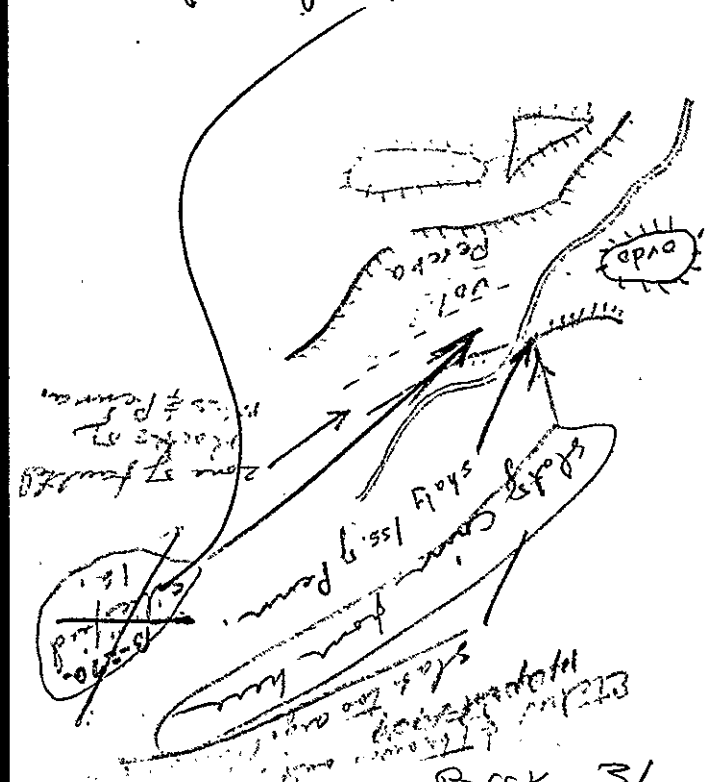
loc 3028

Nunn Ranch



Hillside slope (sw side) of scarp approx 0.1 mi NW of J. P. Nunn ranch along Tierra Blanca cr. approx. SE/NW, Sec. 10, T19N, R. 8E, Sierra Co., N. Mexico. P. 32

Sketch attached. Produced a  
has been local geologists, which shows  
away. Should be collected and studied.  
Pray preserved fossils.  
11 Oct 50 C. H. B.  
not 3028



48-9-80

## Locality B-30 - Hillsboro. quad.

Succession:

Tierra Blanca mem. Crin ls. 20'

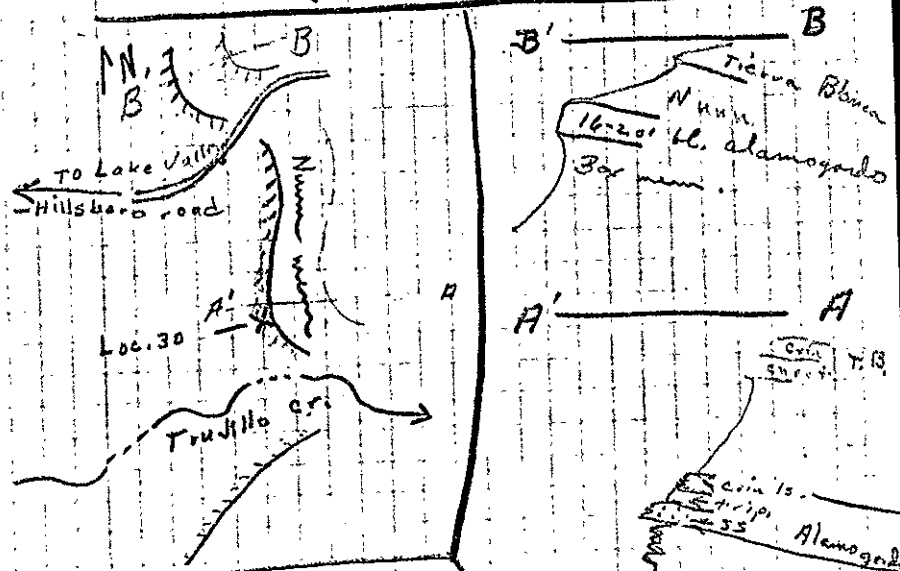
Nunn mem.

Alamogordo ls. 5-6' Crin, cherty gyps. ls.  
2-3' trispartite zone w/  
concentric bl. chert

Cavallera ??? 2' brown sandstone

Box mem. - 45-50' nod. brown w/  
6-7' crin argl. ls. in  
top part & C. Whitneyi  
& P. cooperi in base

Ready pay - 20' green sh. exposed.

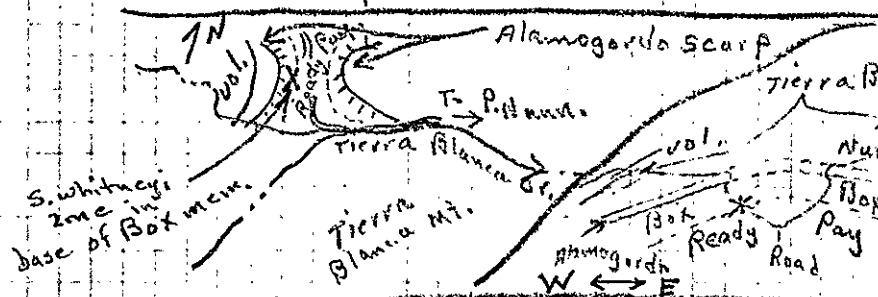


Exposures to north  
Trujillo Cr. on west facing  
Scarp along canyon running  
North from Trujillo, approx 8 mi  
S 50° E Hillsboro, approx cen. S. 26, 14  
Sierra Co., N. Mexico to cen. N. Sec 26,

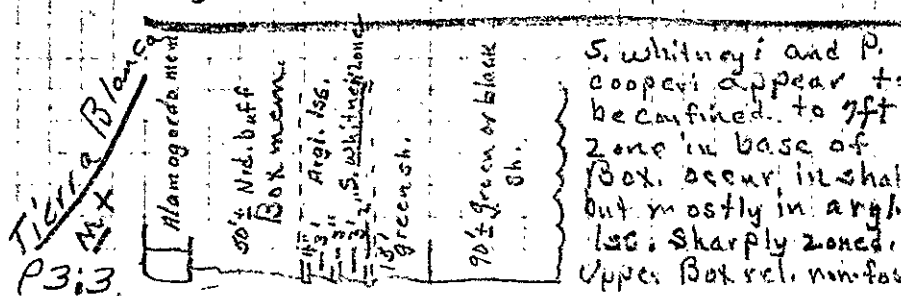
48-9-80

## Locality B-29 - Hillsboro. quad.

3029 Succession:  
Tertiary Volcanics  
Lake Valley fm.  
Tierra Blanca mem.  
Nunn mem.  
Alamogordo mem.  
Andreito mem.  
Dev. { Percha sh. fm.  
Box mem.  
Ready Pay mem.  
not exposed.



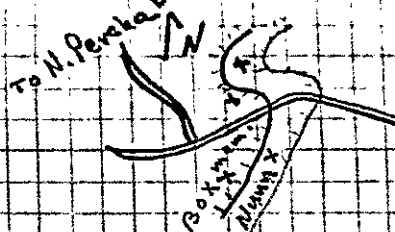
From exposures on East facing scarp  
on west side of gap on Tierra Blanca  
road 2.2 mi N 70° W of P. Nunn Ranch,  
1.2 mi N 30° W of Tierra Blanca Mt.,  
app. SE/SE, sec 5, T. 17S, R. 8W, Sierra  
Co., New Mexico.



S. whitneyi and P.  
cooperi appear to  
be confined to 9ft  
zone in base of  
Box. occur in shal  
out mostly in argl  
ls. sharply zoned.  
Upper Box rel. non-fav

Locality B-31 - Hillsboro, Ind.

3031



Pennsylvanian

Lake Valley fm.

Tierra Blanca mem.

Nunn mcm.

Alamogordo mem.

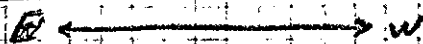
Andréito mem.

Решаеи

Box mem. - nodular shaly ls.

Ready Pay in cm - Black? - greenish

W. Upper 20 ft. nodular.



Pennsylvanian

Tierra Blanca

2437

Almagordo

INDEXED  
B-1

Patch  
S. wh  
merry

on hillside

slope on both sides of

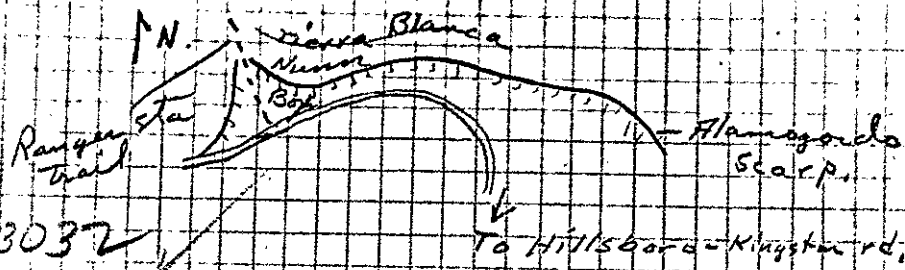
Hillsboro-Kingston road

approx. SW/SE sec 9 and N/2,  
NE, sec 16,  $6\frac{1}{2}$  mi., RB  $\frac{1}{2}$  mi., Sierra Blanca

Perchut, Er A

48-9-11

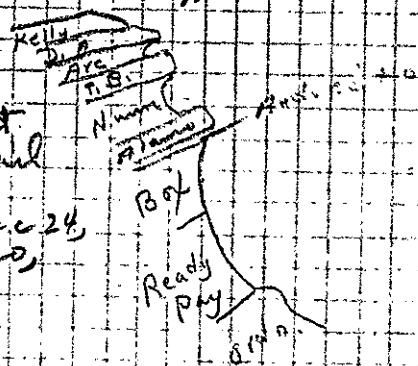
## Locality 32 - Hillsboro



Succession  
 Dona Ana  
 Kelly  
 Dona Ana  
 Arcata  
 Tierra Blanca  
 Nunn  
 Alamogordo  
 Andacito  
 Dev. { Borl  
 Ready Pay

black(green) sh.  
 Siltstone - 15'  
 = 2' siltstone  
 = 2' white sh.  
 Ordo.

Exposure 200ft  
 due north of house  
 on North Pech cr. at  
 junction N. Percha trail  
 with Alamogordo trail.  
 App. 1/2 mi. S.W. 1/4, Sec 24,  
 T. 15 S., R. 9 W., Sierra Co.,  
 N. Mexico.



P. 36

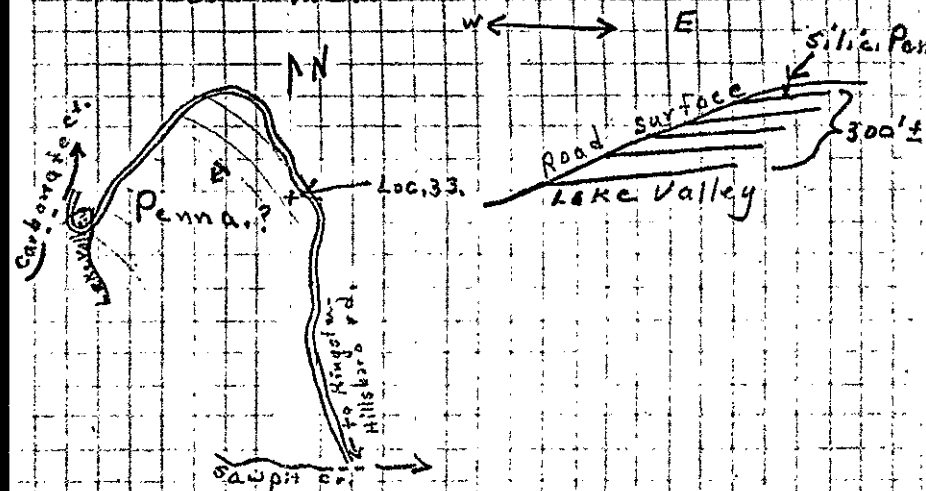
N. Percha R. star.

48-9-11

## Locality 33 - Hillsboro

3033

Silicified Pennsylvanian or Permian  
 along road between Sawpit cr and Carbonate  
 creek 2 mi north of Kingston, N. Mex.  
 Approx. Cen E/2 of Sec. 6, T. 16 S., R. 9 W., Sierra  
 Co., N. Mexico.



The Tierra Blanca (Lake Valley)  
 is exposed at the bend of the trail  
 on Carbonate cr. The rocks dip  
 west and south at gentler angle  
 than slope of hill. Therefore, at  
 divide between Carbonate cr  
 and Sawpit cr. the upper beds  
 of Penna. or Perm. strata are  
 exposed.

P. 37

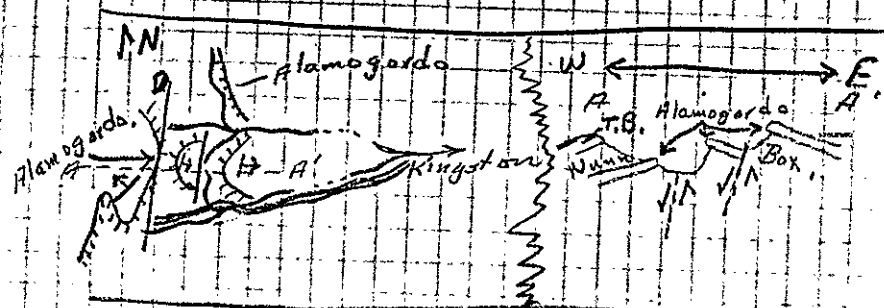
Sawpit



48-9-17

Locality 35 - Hillsboro quad.

3035 Succession:  
 Tierra Blanca }  
 Nunn } Lake Valley fm  
 Alamogordo }  
 Andrecito? }  
 Box }  
 Ready Pay } Percha fm.



From exposures 0.5 mi west of Kingston to the north of Ladrone gulch, approx. SE/NW/NN, Sec. 18, T.16S, R. 8W, Sierra Co, N. Mexico.

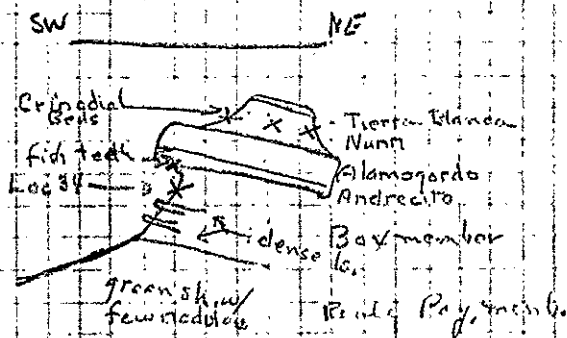
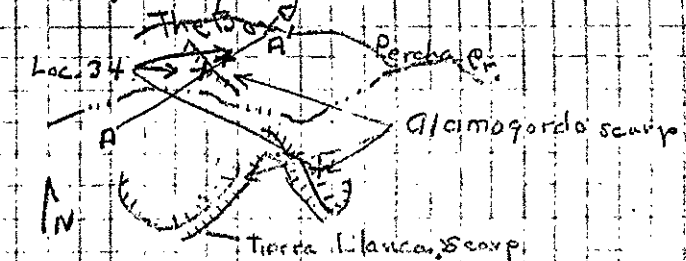
P39

W. Kingston

48-9-16

3034 Locality 34 - Hillsboro quad.  
 Succession:

✓  
 Tierra Blanca member??  
 Nunn member  
 Alamogordo memb.  
 Andrecito member  
 Box member - Top 15'-20' almost all ls.  
 Percha Sh. Ready Pay member.

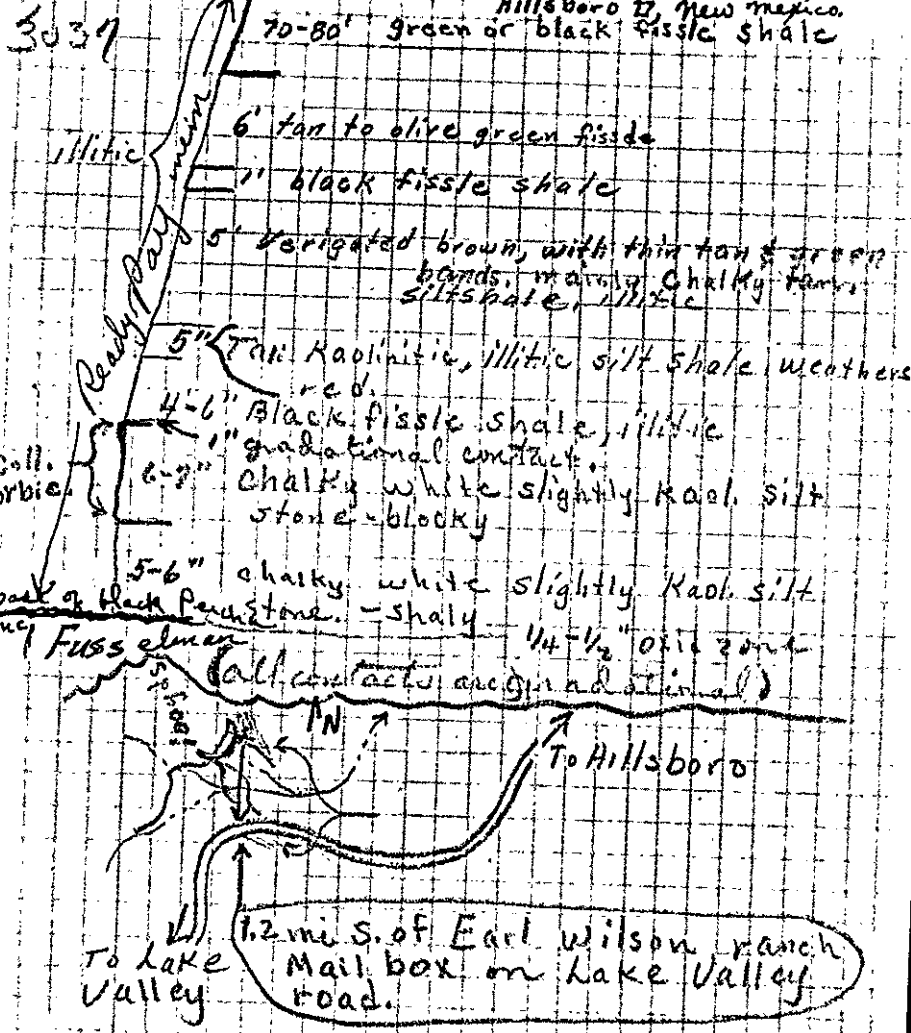


From exposures along scarp (facing SW) in Nunn & Box members. approx. 2.3 mi ESE of Hillsboro, in SW 1/4 SW 1/4, Sec. 14, T.16S, R. 7W, Hillsboro Quad., Sierra Co, N.M. 1/2 mi. S of Box on Percha Creek. Type section Percha Shale Garden & Garden 1911.

P. 38

Percha cr. Box

loc. 3037  
48-9-20  
Hillsboro quad.  
one mile SW. Wilson's Ranch house, ne. cor. 9-18S-7W.  
Hillsboro T<sub>2</sub>, New Mexico.  
70-80' green or black fissile shale

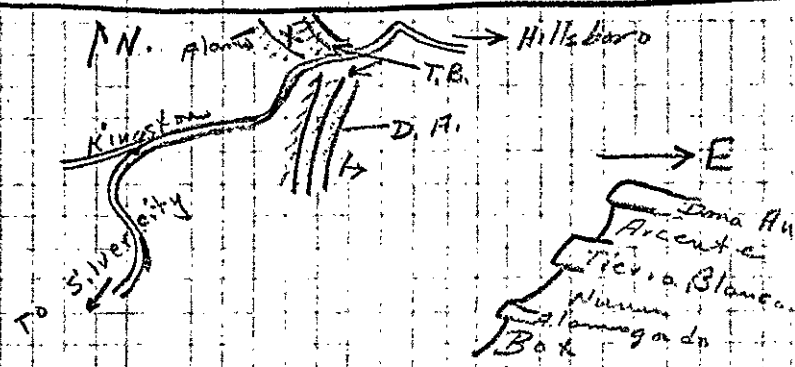


exposure in gully on N side of road (100 yds) 1.2 mi S. of E. Wilson ranch, approx.  
P. 41

So. Wilson's

48-9-19  
Locality 36 - Hillsboro quad.  
Succession:

- 3036
- Dona Ana
  - Arcente?
  - Tierra Blanca
  - Nunn
  - Alamogordo
  - Andreite?
  - Dev. { Box Ready Pay

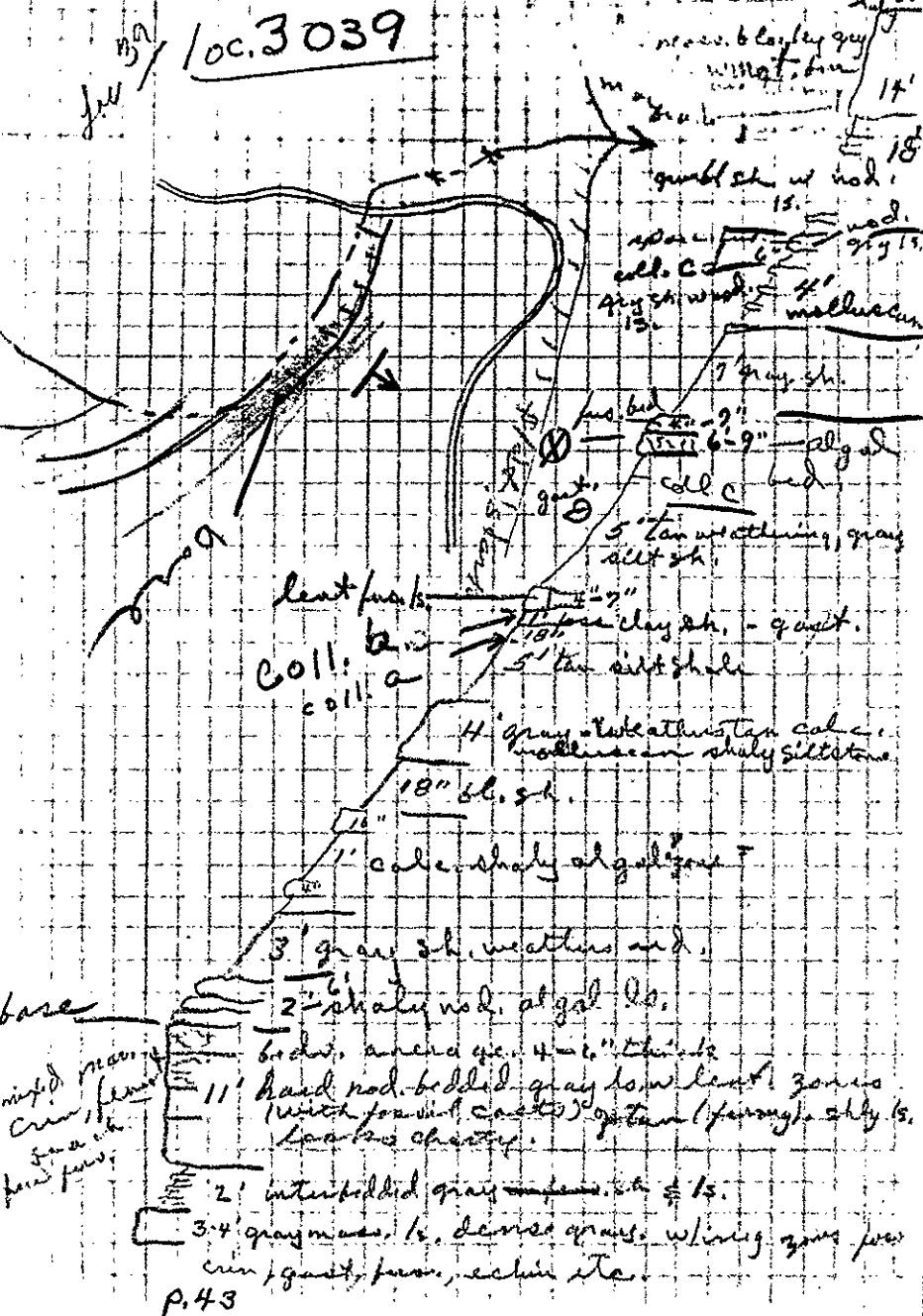


Exposure to north of Kingston Hillsboro road, 1/2 mi east of Kingston, approx. cen. EL. NE 1/4 sec 18, T 16 S, R. 8 W, Sierra Co, N. Mexico.

P. 40

E. Kingston

loc. 3039



p. 43

48-9-19  
3036

Loc 3038-12  
38-1-55

Pennsylvanian ls. and shale,  
gastropod locality (Bayds Ranch),  
1.4 miles N. 10 W. of B.M. 5559 (3.3 mi.  
W. of Hillsboro), 1.3 mi north of NM  
highway 180, ne-11-16S-8W, Sierra  
Co., New Mexico.

p. 42

Bayds.



4B-9-19

Locality 40 - Hillsboro quad

✓ Pennsylvanian ls and sh. on  
Kingston - Hillsboro highway in cut  
on south side of road 0.3 miles W. of  
Cecil Boyds house, approx. Cen E/2,  
NE/4 sec. 12, T 16<sup>3</sup> R 8<sup>W</sup> Sierra Co,  
N. Mexico. (Few bryozoans).

P. 45

4B-9-19

Loc. 39,

Boyd's

Limestone and shale along creek

2.2 miles N 20±° W of B.M. 5559, 4.7  
miles NW of Hillsboro, Cen W/2  
sec 2 - 16S-8W, Sierra Co., New  
Mexico.

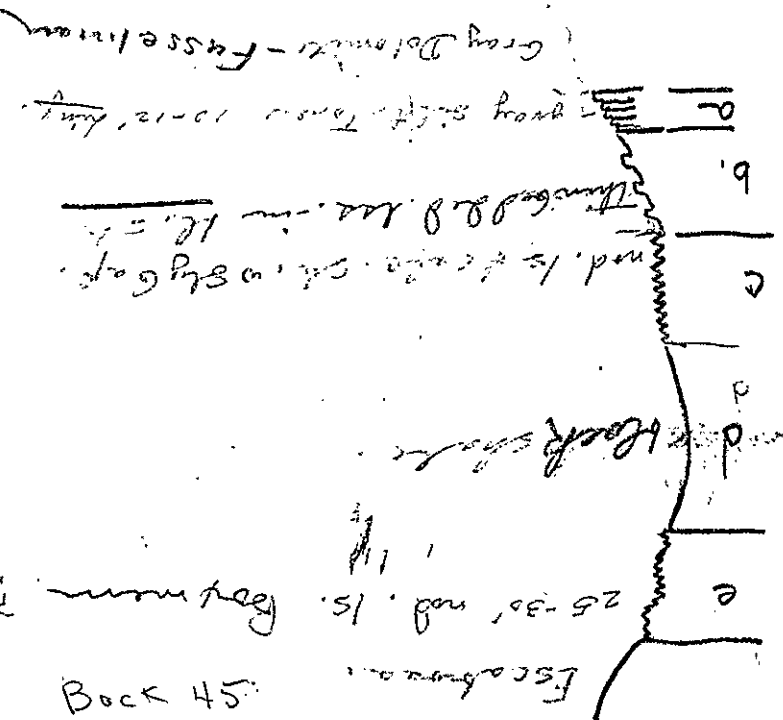
P. 44

48-9-19

Loc. 39,

Boyd

Limestone and shale along creek  
2.2 miles N  $20 \pm^\circ$  W of B.M. 5559, 4.7  
miles NW of Hillsboro, cen w/2  
sec 2-165-8W, Sierra Co., New  
Mexico.



# Hernon's sequence:

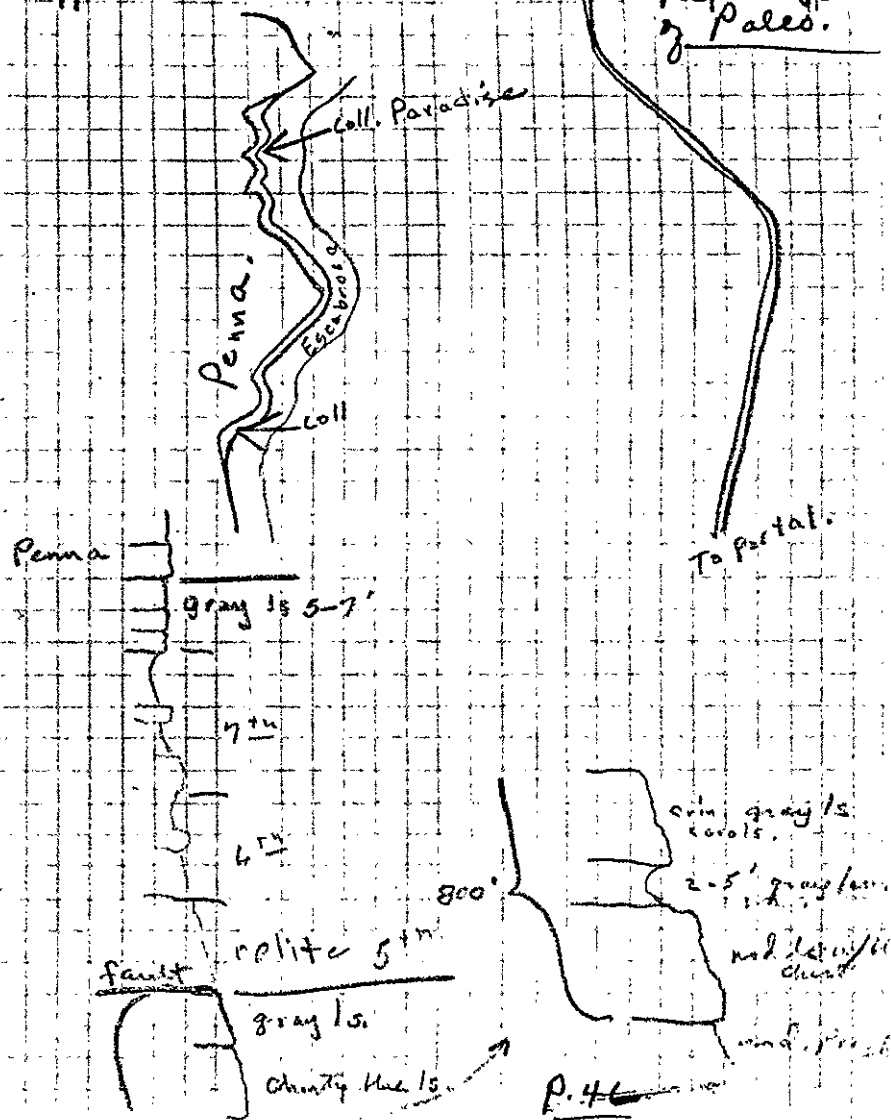
	8 <sup>th</sup>	mem.	- gray gran ls.	14 ft.
	7 <sup>th</sup>	"	- shale w/ thin ls.	9 ft.
	6 <sup>th</sup>	"	- shale bl. ls. & sdy ls.	29 ft.
	5 <sup>th</sup>	"	- dolitic bl. ls. Frch.	8 ft.
	4 <sup>th</sup>	"	- bl. ls. & shrubby plants	10 ft.
cross bed ded.	3 <sup>rd</sup>	"	- gray ls. w/ molluscs.	25 ft.
	2 <sup>nd</sup>	"	- gray ls. Dielasma-like	21 ft.
	1 <sup>st</sup>	"	- gray ls. - congl.	72 ft.
			St. Louis ls.	

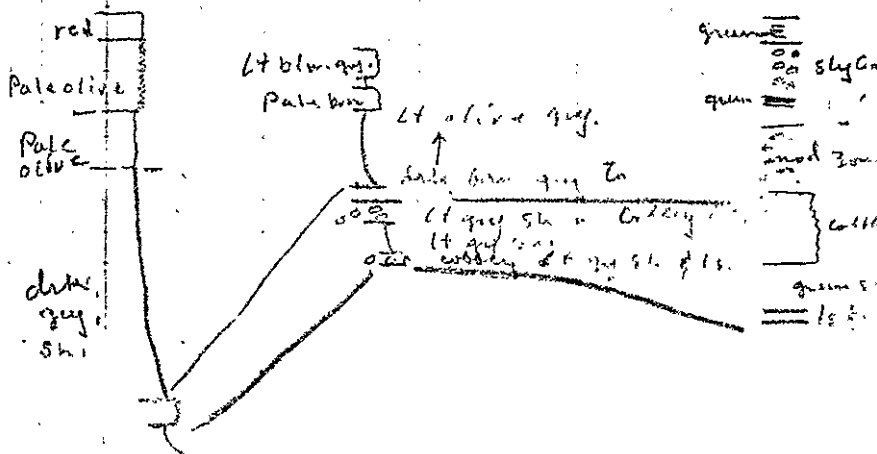
P. 47

48-9-24

3041

Locality #1 - *Ehiractichua* grad.  
see. Hernon's  
paper four  
pales.





Taylor

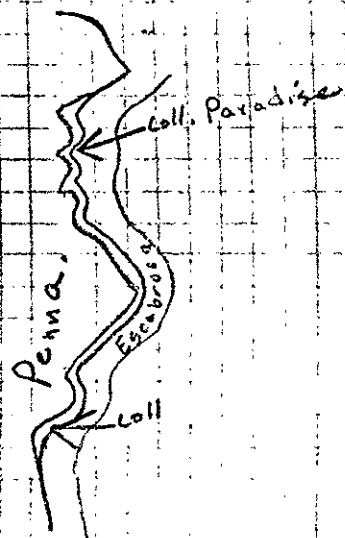
follows 46



48-9-24

Locality 41 - Chiractichua grad.  
see. Hernon's  
paper four  
pales.

3041



Penna.

gray ls 5-7'

7"

4"

faust pelite 5"

gray ls.

cherty blue ls.

800'

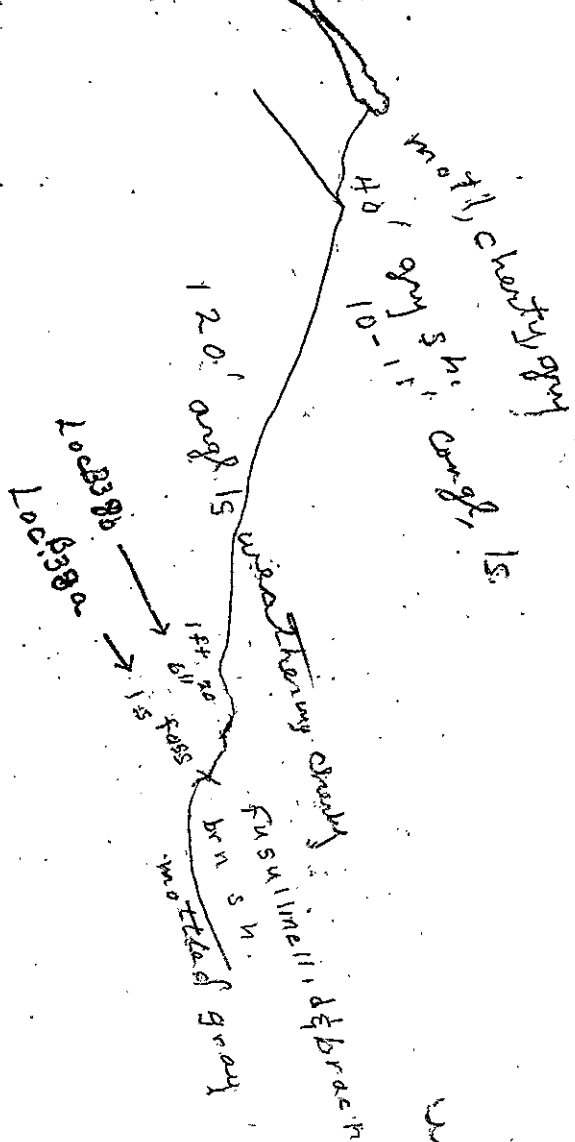
crin. gray ls.  
corals.

2-5' gray ls.

nod. cherty ls.

nod. cherty ls.

P. 46



Back 46

48-9-25

Locality 42 - Silver City quad

Succession:

Hanover ls.

Tierra Blanca

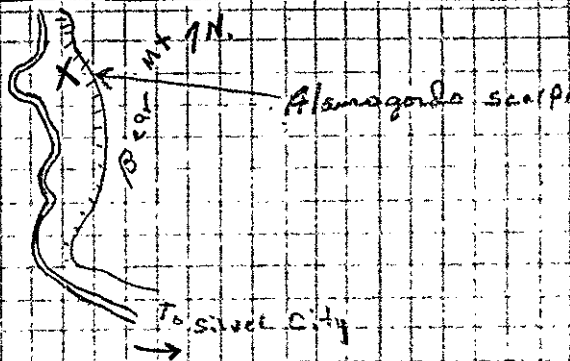
Nunn

Alamogordo

Andresito

Box

Ready Pay



exposures on NW slope of Bear Mt. approx. 300' above road to east, SW corner Sec. 11, T. 16<sup>s</sup>, R. 15<sup>w</sup>, Grant Co. N. Mex.

Locality B-42S - Silver City quad.  
Exposures to east of Bear Mt.  
Road, approx. 1 mi SE of Bear Mt.  
approx. cen E/2, sec. 11, T. 17<sup>s</sup>, R. 15<sup>w</sup>  
Grant Co, N. Mexico.

No. 3042S

FORMATION: Percha sh.

LOCALITY: Exposures south east of Bear Mountain on east side of Bear Mt. road. SE cor sec. 13 T. 17<sup>s</sup>, R. 15<sup>w</sup> to SE cor Sec. 12, T. 17<sup>s</sup>, R. 15<sup>w</sup>, Grant Co, N. Mexico.

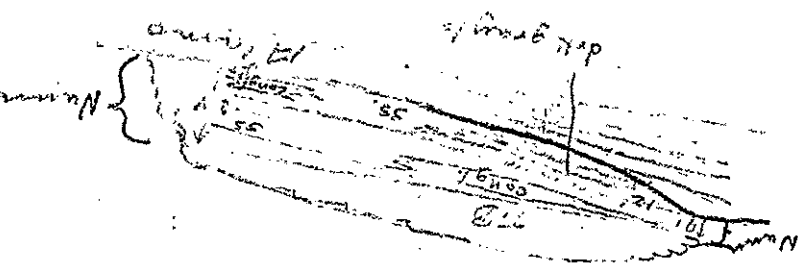
Collector:

Date:

Note Book:

Page:

Memoranda:



in Tierra Blanca  
 green ss - Nunn  
 sh - Nunn  
 clay - Nunn  
 clay - Nunn

Page.

Resume for  
 4th road  
 of

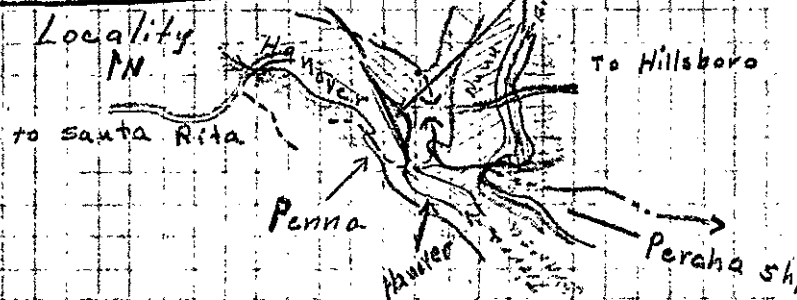
48-9-21

Locality 43 - Silver City road.

3043

succession:

✓ Hanover ls. (70'±)  
 Tierra Blanca 63'  
 Nunn —  
 Alamo gordo  
 Andresito - 32'±  
 Box m. m.  
 Ready Pay m. m.



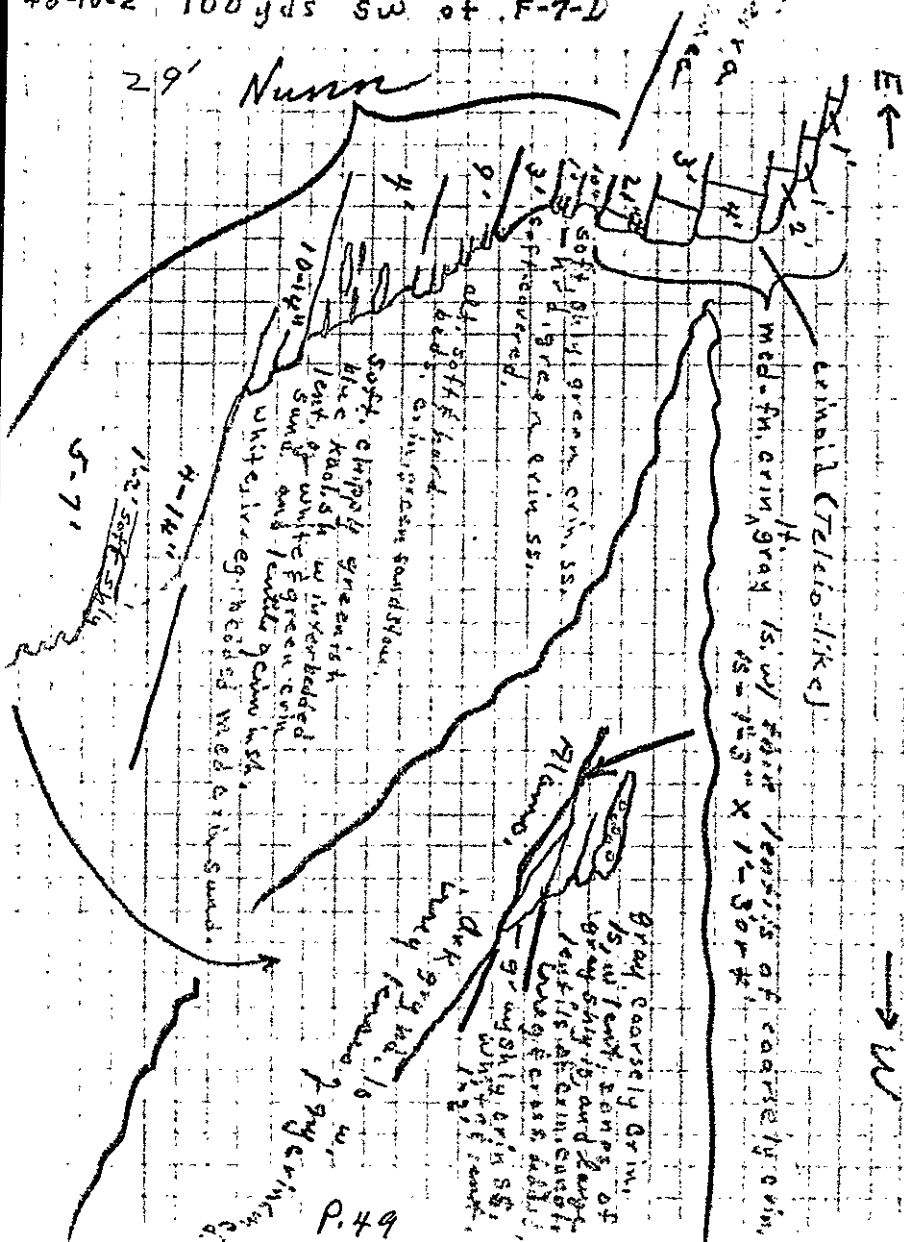
Exposures on Highway 1180 approx.  
 3.5 mi east of Santa Rita, Grant Co,  
 N. Mexico.

P. 48

Marble Canyon area

26-16S-10E, Otero Co. N. Mexico

48-10-2 100 yds SW of F-7-D



48-9-27

Locality 43 - Silver City good.

3043 Succession:

✓ Hanover ls. (20'±)

Tierra Blanca 63'

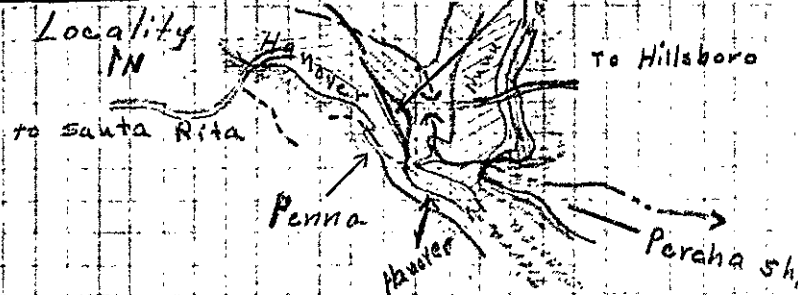
Nunn

Alamogordo

Andresito - 32'

B&K mem.

Ready Pay mem.



Exposures on Highway 1180 approx.  
3.5 mi east of Santa Rita, Grant Co,  
N. Mexico.

48-10-2

3044

Locality #4 - Lincoln National Forest map  
2 mi S of E of Indian Wells parking lot  
at point of hill above (E of F-7-D)

cab. + 82-35

caballos  
(d) 8' med. ls. w/ S. louisianensis  
11" gray sh. w/ thin. med. of ls.  
11" soft gray sh. w/ phos. nod.  
4" soft tan sh. (c)  
8" blocky brn. med. clay sh. or claystone (b)  
4" soft crystals in very soft sh.  
6" massive chock brn. (lt) sh. (a)  
1" fossiliferous trans zone (a)  
2 1/2' black fissile silt shales.  
(actually choc. brn. very dark)  
1 1/2" H brn. sdy  
1 1/4" powdery lt. tan sh.  
sly Gap. 1 - soft tan sh. of sly Gap. Sacramento Mts. 11

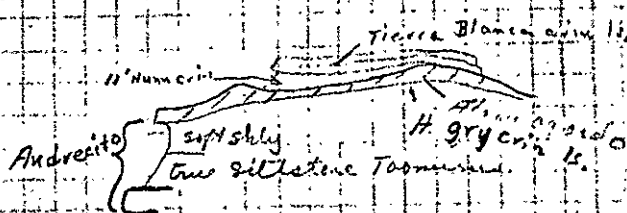
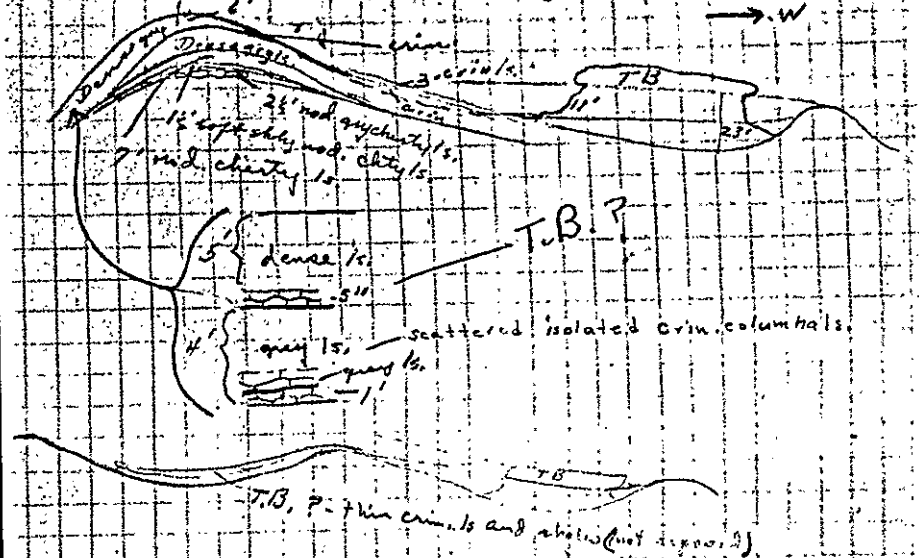
cen 13-165-16E  
otero Co. New Mexico



P.50

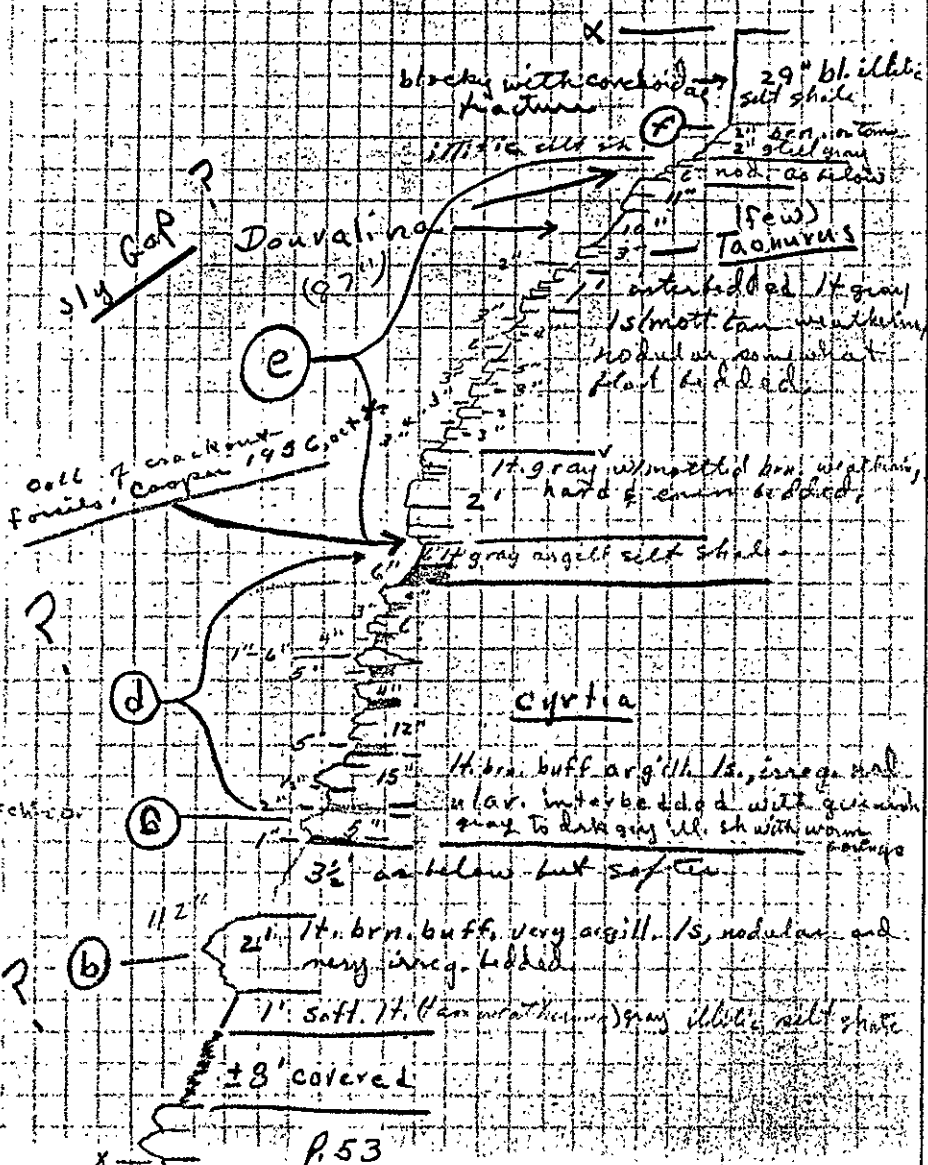
48-10-2

Marble Canyon  
26-163-10E, Otero Co., New Mexico.  
Birkham F-7-D - 100 yds. E of cutlier



P.50

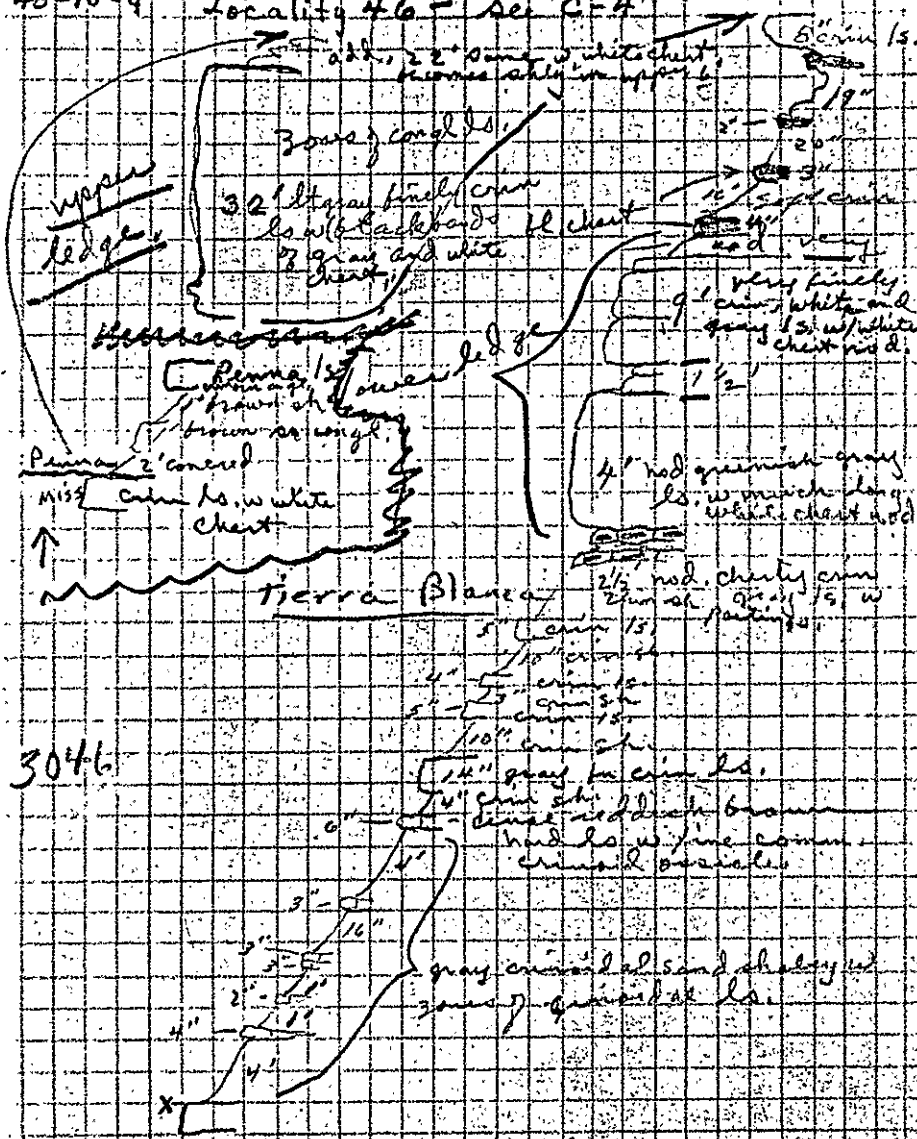
48-10-3 Loc. 45-Cont'd.



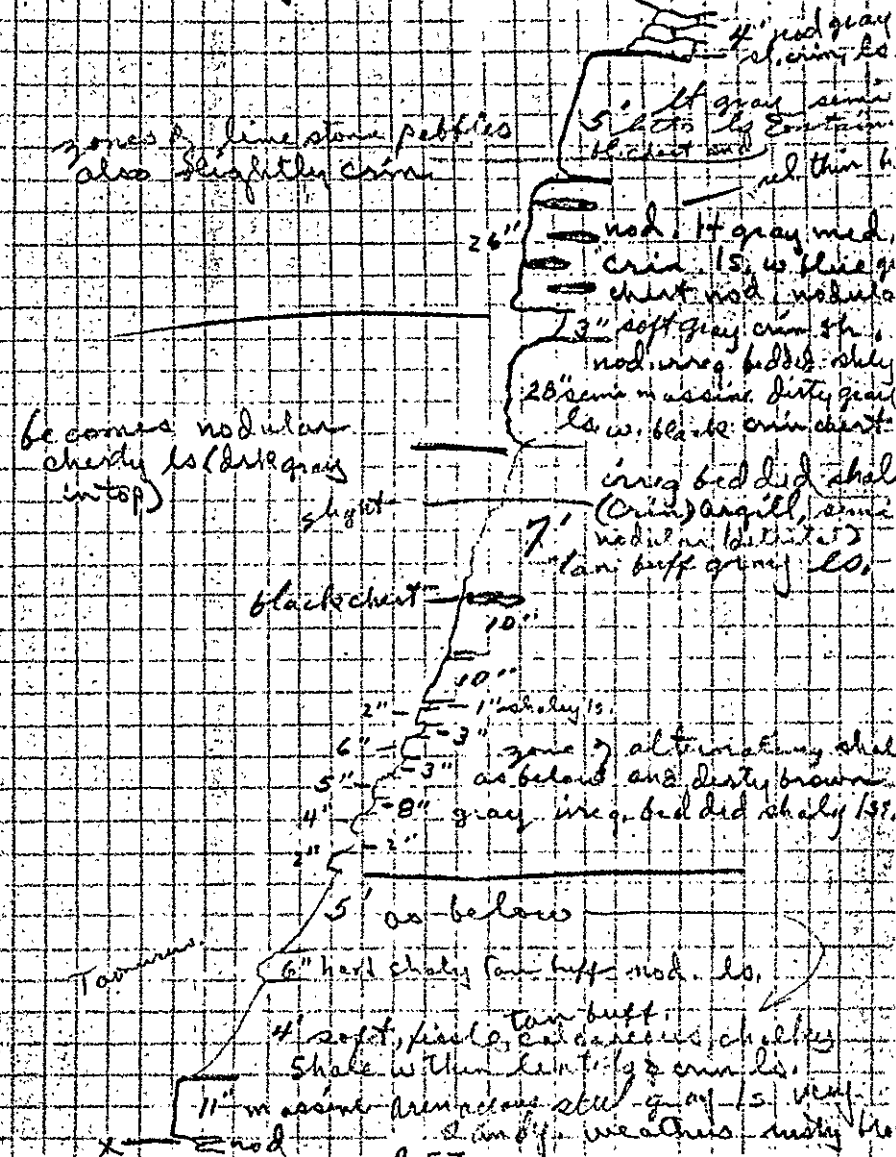


Exposures in canyon SW of Ortega Peak, approx. SW/NE/S.W, sec. 24-T16<sup>S</sup>, R. 10<sup>E</sup>

48-10-4 Locality 46 - see C-4



48-10-3 Locality 45 cont'd





48-10-5 Pennsylvanian in canyon south  
of Mill Ridge in northern Sacramento  
Mountains.

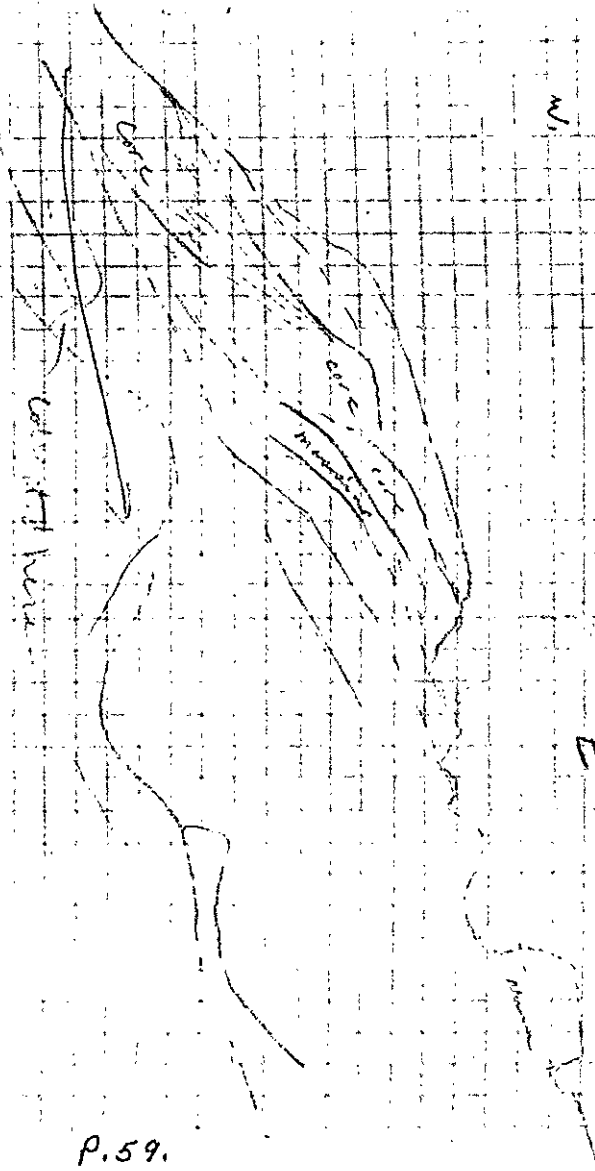
3047 ✓  
Locality 47 - Medial Des Moines  
argillaceous ls with interbedded  
dark gray shales 5 ft above road  
level on north side in east 3.5 mi  
east of Junction of Tularosa - Alamo-  
gordo & Mountain Park high-  
ways, approx. 330 ft. S & 750 ft. W  
of NE cor. of sec 4, T16E, R10E,

3048 ✓  
Locality 48 - Medial Des Moines  
60 ft. stratigraphically below coll  
at loc. 47 in creek 100 yds south  
of Alamo-gordo highway, approx. 1320  
ft south and 1320 ft west of NE  
cor. of sec 4, T16E, R10E, Otero  
co. N. Mexico. 4 mi E on highway

3049 ✓  
Locality 49 - Upper Des Moines  
100 ft below Missourian  
strata, 20 ft above level of  
Alamo-gordo - Mountain Park  
highway, 4.75 mi east of Tularosa -  
Alamo-gordo highway, approx. 1500  
ft south and 700 ft west of NE  
cor. sec 3, T16E, R10E, Otero  
co. N. Mexico.

3050 ✓  
Locality 50 - Basal Missourian  
50 ft above highway but on  
old wagon road 5.2 mi east  
of Junction of Alamo-gordo - Tularosa  
and Alamo-gordo - Mountain Park  
highways, approx 1350 ft south  
p. 60.

48-10-4 Bioherm F-8-F



48-10-5 Pennsylvanian in Canyon south  
of Mill Ridge in Northern Sacramento  
Mountains.

Locality 47 - Medial Des Moines

3047 ✓ Argillaceous ls with interbedded  
dark gray shales 5 ft above road  
level on north side in cut 3.5 mi  
east of Junction of Tularosa - Alamo-  
gordo & Mountain Park high-  
ways, approx. 330 ft. S & 750 ft. W  
of NE cor of sec 4, T16N, R10E,

Locality 48 - Medial Des Moines

3048 ✓ 60 ft. stratigraphically below coll  
at loc. 47 in creek 100 yds. south  
of Alamo-gordo highway, approx. 1320  
ft. south and 1320 ft. west of NE  
cor of sec 4, T16N, R10E, Otter-  
tail Co. N. Mexico. 4 mi. E on highway

Locality 49 - Upper Des Moines

3049 ✓ 100 ft. below Missourian  
strata, 20 ft. above level of  
Alamo-gordo - Mountain Park  
highway, 4.75 mi. east of Tularosa -  
Alamo-gordo highway, approx. 1500  
ft. south and 700 ft. west of NE  
cor sec 3, T16N, R10E, Otter-  
tail Co. N. Mexico.

Locality 50 - Basal, Missourian

3050 ✓ 30 ft. above highway on west side  
old wagon road 5.2 mi. east  
of Junction of Alamo-gordo - Tularosa  
and Alamo-gordo - Mountain Park  
highways, approx. 1350 ft. south  
p. 60.

4  
56'6"

57'6"

518  
" 0  
22'9"

19

2'27" - homology from

from road 2000 ft S - 4'8" 8 ft  
road 2000 ft S - 4'8" 8 ft

40'9" 45'20" 57'6" 0 ft  
50'7" 0 - 100' above road level  
1'9" - 15'

45'10" 57'6" 0 ft  
100' above road level

15' - 100' sub 1' E

15' 40' 16' 410'

Back p. 59

15' 10'

Return to Penna.  
 D. my can see back of page.

4-8-10-6 Pennsylvanians in canyon  
 south of mill Ridge in western  
 Sacramento mountains.

Locality 50 contd.

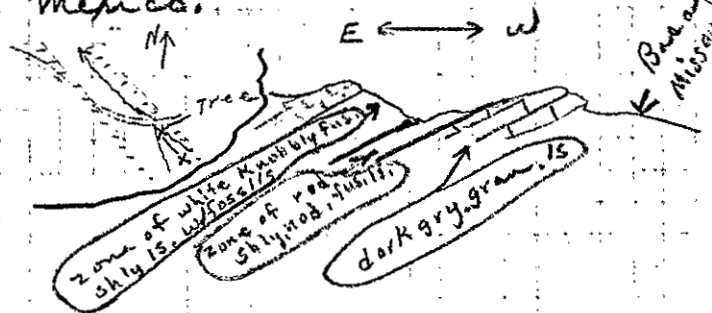
and 2020 ft west of NE cor of  
 Sec. 2, T16E, R10E, Otero Co,  
 N. Mexico.  
 2' nod. gyps. w/ fus. & Campop.  
 3' fossiliferous gyps. ls.

Locality 51-Upper Missouian

3051

✓

in gully running south from  
 highway at road level to 10 ft above  
 road level near road cut at bend  
 of road, approx. 6.1 mi east of  
 junct. of Alamogordo-Tularosa and  
 Alamogordo-Mountain Park high-  
 ways, approx. 1800 ft south and  
 700 ft west of NE cor of Sec.  
 2, T16E, R10E, Otero Co, N.  
 Mexico.







0.6' hard dense blue-gray  
 semi-little ls. w/  
 gray cherts

0.6'  
 0.4'  
 0.7' drk gray.

0.9' soft light gray argill  
 accretion nodular in  
 3.3 top part.  
 Taomurus.

Taomurus.  
 1.5' dark gray chert

2.3'

2.1' drk gray

2.1' drk gray

3.2' drk gray

1.3'

1.3'

1.1'

U. chert  
 5.5'

0.7'

3.3'

0.9'

0.6'

0.4'

0.7'

Hard dense brownish blue gray  
 chert. interbedded in w. gray & black  
 chert.

Alamo gordo.

Back 63A

Alamo gordo.

0.2' lt. gray powder calc. ss.

1.3' lt. blue gray hard  
 argill. ls. w. thin silt

0.7'

1.6' buff gray soft  
 shaly, very nod.  
 3.7' argill Taomurus  
 ls.

1.6' buff gray soft  
 mottled greenish mud  
 4.5' very argill ls.  
 Taomurus, thin gray  
 zones, hard chert  
 above

52T

1.2' interbedded  
 1.2' lt. brownish gray  
 argill. ls. and  
 0.9' yellowish tan  
 very calc. silt sh  
 in top sand silt  
 0.6' white, in base  
 2.2' Taomurus.

0.05'

1.7' Yellow hard, very  
 arenaceous ls.  
 - more limy, almost ss.

1.3' drk gray hard dense  
 ls. gray thin & some more  
 0.3' listy dark gray hard  
 1.7' argill. ls.

0.9'

1.0' soft shaly nod. lt gray very  
 argill. ls.

0.9' nod. argill. ls.  
 pale calc. dense  
 0.9' hard dense argill. ls.

1.2' drk gray argill. nod shaly ls.

Back 63A

1/4 mile. n. of Section 3052

Caballero

0.4'

0.2'

0.3'

1.3'

0.4'

0.4'

0.5'

0.3'

maxime drusy yell. fr.  
 fine & calc. ss. ls. ss

as below

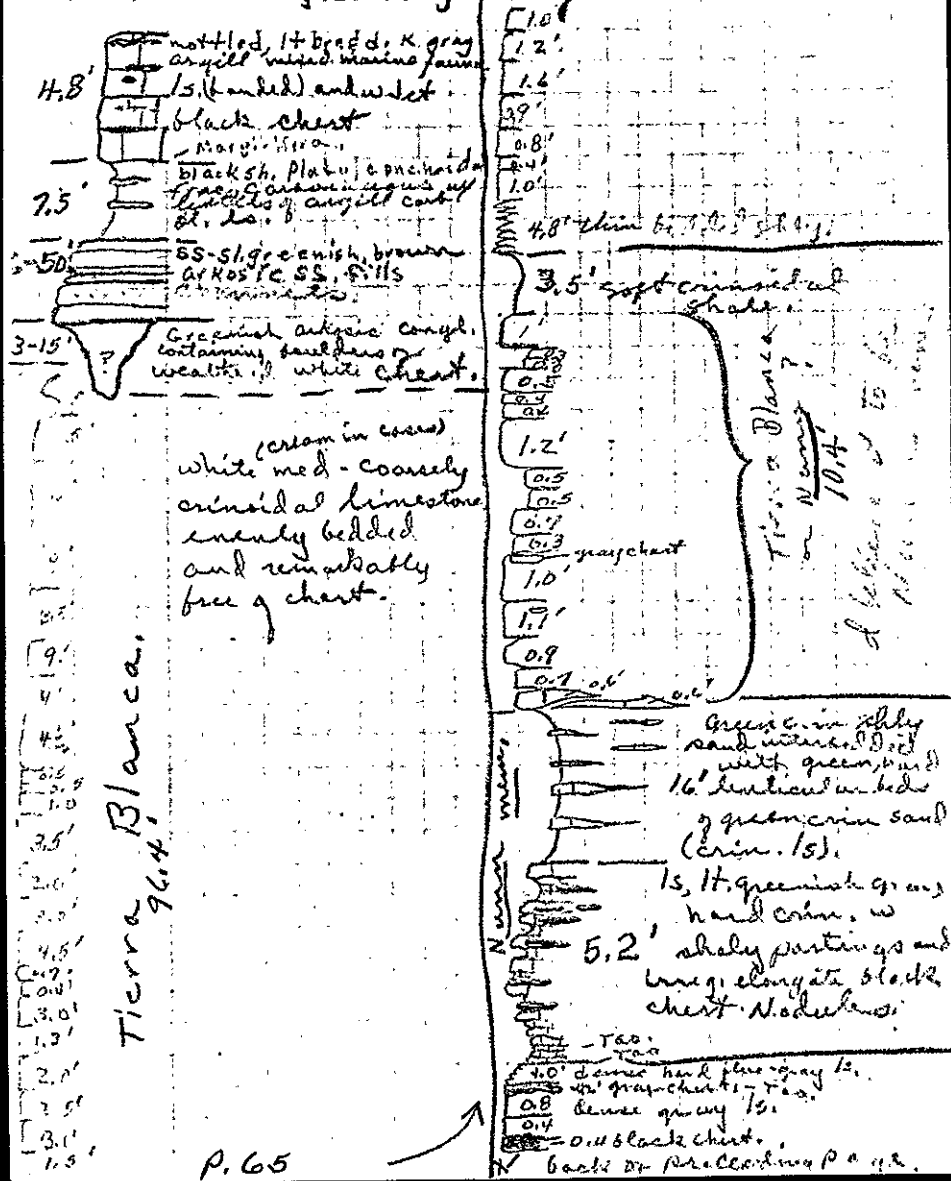
< 0.4'

3'

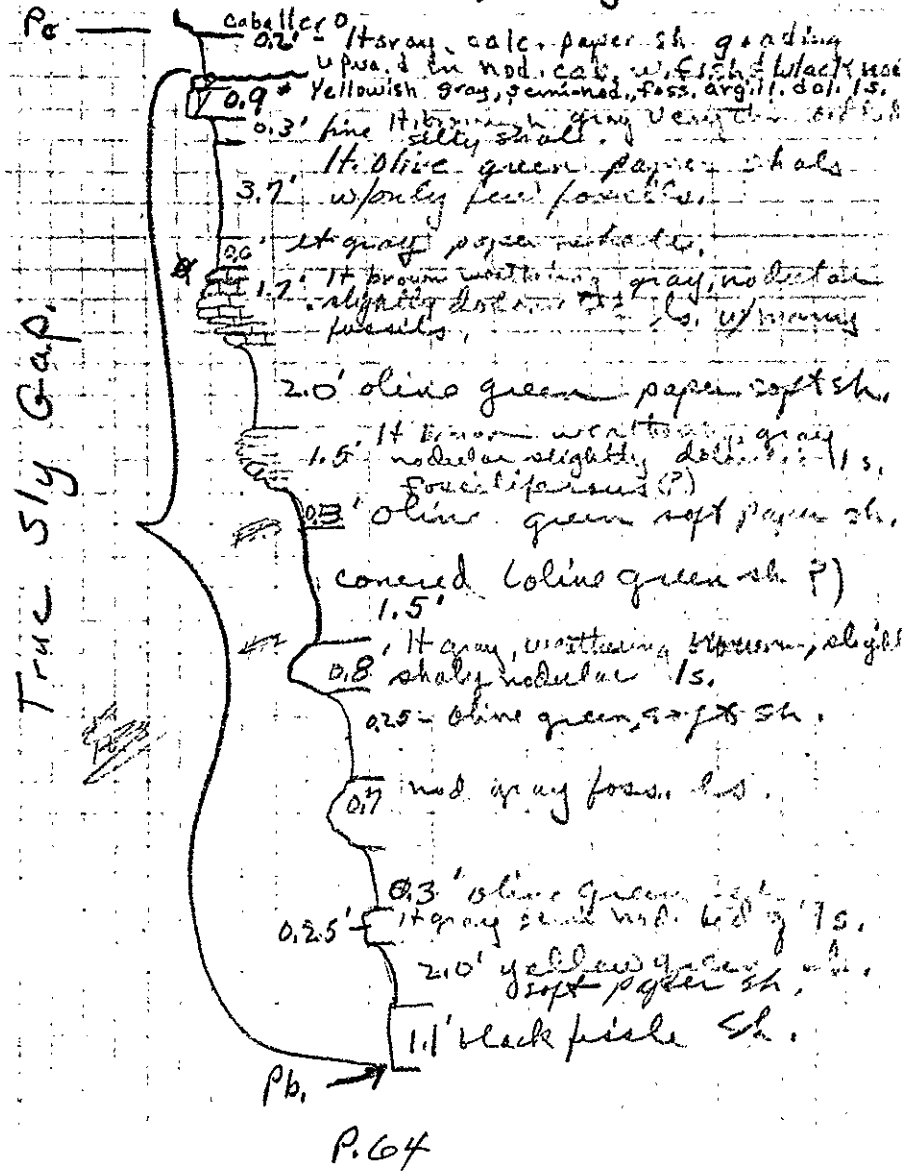
Pale yell. fin. fr. x bedded  
 ss. lam. mm thick  
 Drusy yell. fr. grain &  
 shaly, calc. ss (or ls. & ss).

48-10-13

## Locality 52 - Pig Canyon



48-10-13 (From Bill) Locality 52 - Pig Canyon



(From Bill)  
48-10-13 Locality 52 - Pig Canyon

Pc

Caballero

0.2' It gray, calc. paper sh. grading upward in nod. calc. sh. & black ls.

0.9' Yellowish gray, seminod. foss. argill. dol. ls.

0.3' fine It brownish gray very thin bedded

It olive green paper sh.

3.7' w/only few fossils

It gray paper sh.

1.7' It brown weathering gray, nodular, slightly dolomitic ls. w/many fossils

2.0' olive green paper, soft sh.

1.5' It brown weathering gray, nodular slightly dolomitic ls. w/many fossils

0.8' olive green soft paper sh.

covered (olive green sh. ?)

1.5' It gray, weathering brown, slightly shaly nodular ls.

0.8' olive green, soft sh.

0.7' nod. gray foss. ls.

0.3' olive green, soft sh.

0.25' It gray & nod. ls.

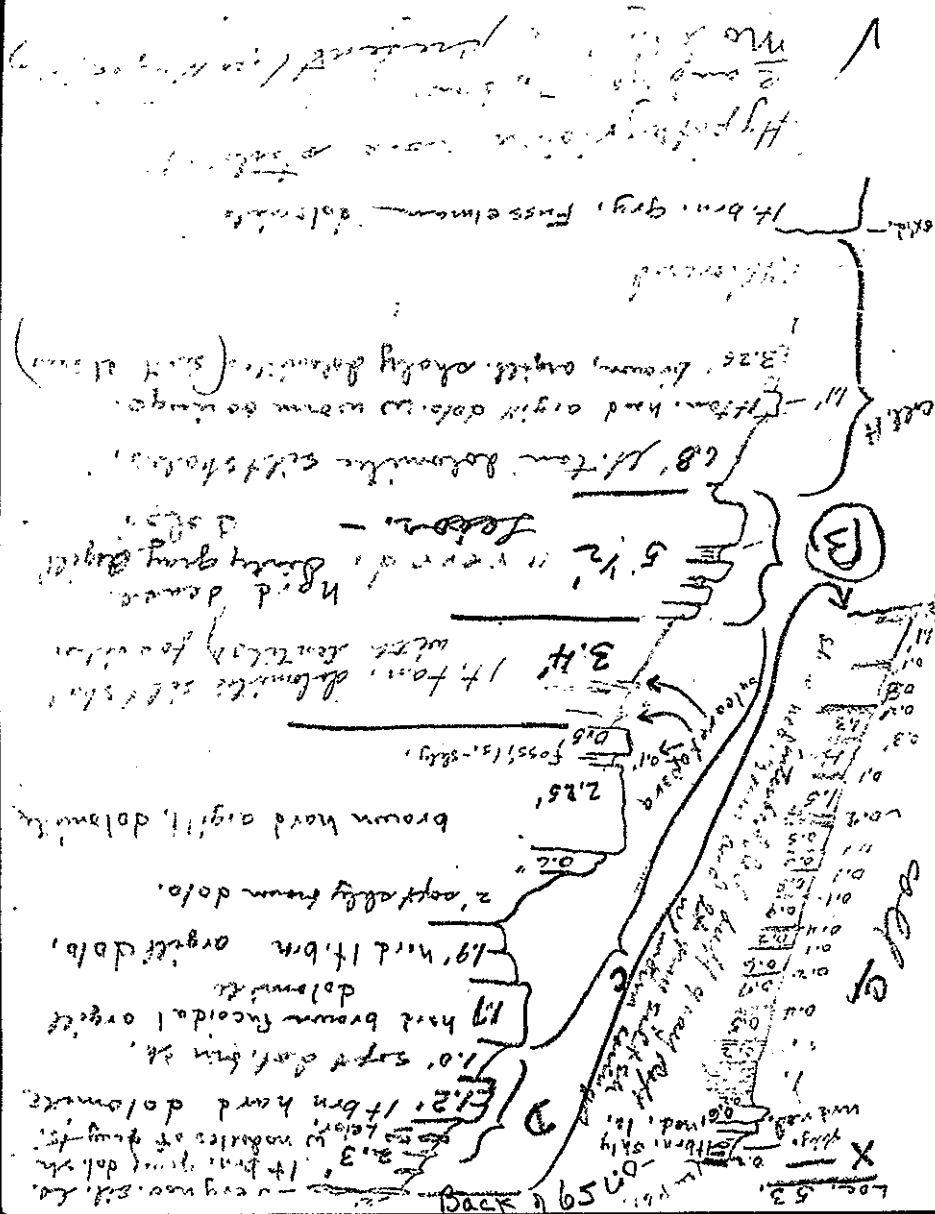
2.0' yellowish gray, soft paper sh.

1.1' black piece sh.

Pb

P.64

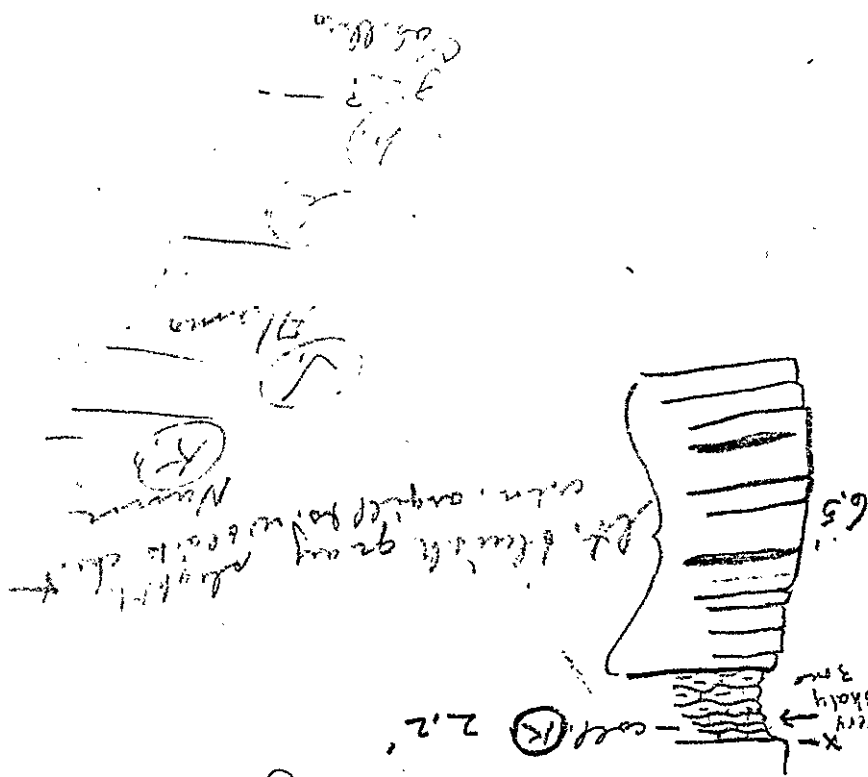
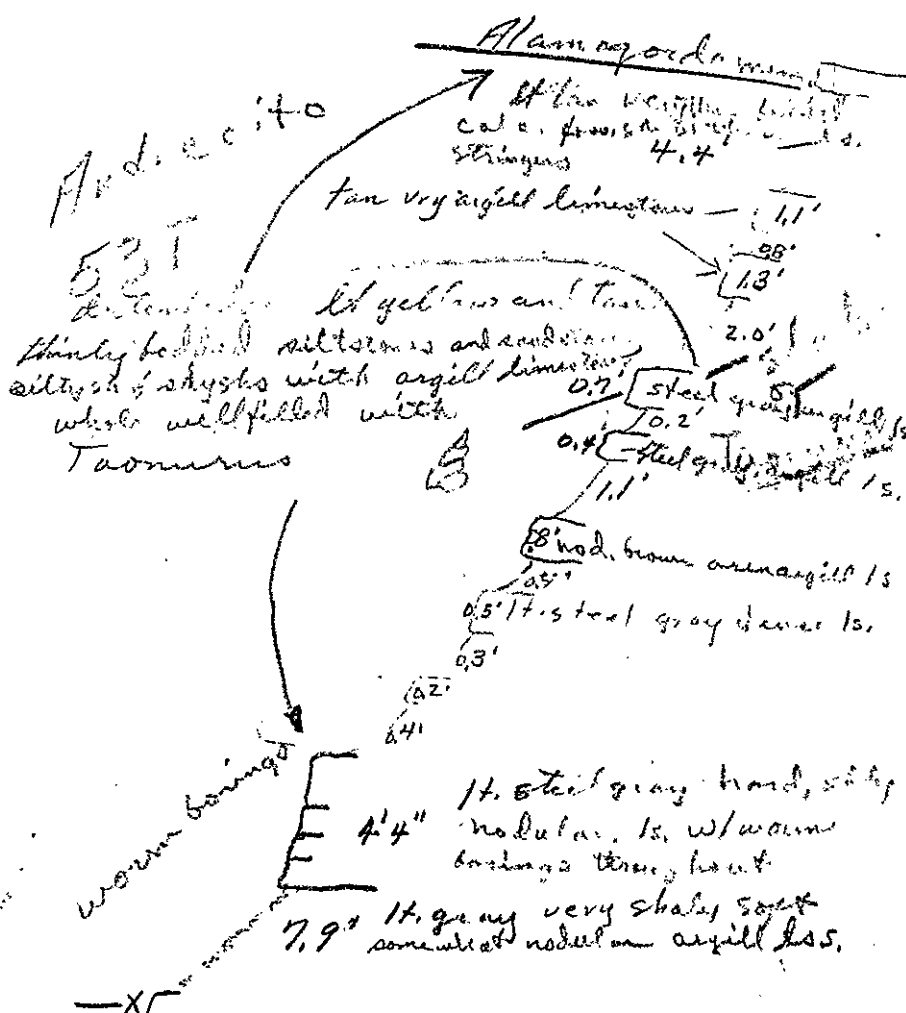
True Sly Gap.





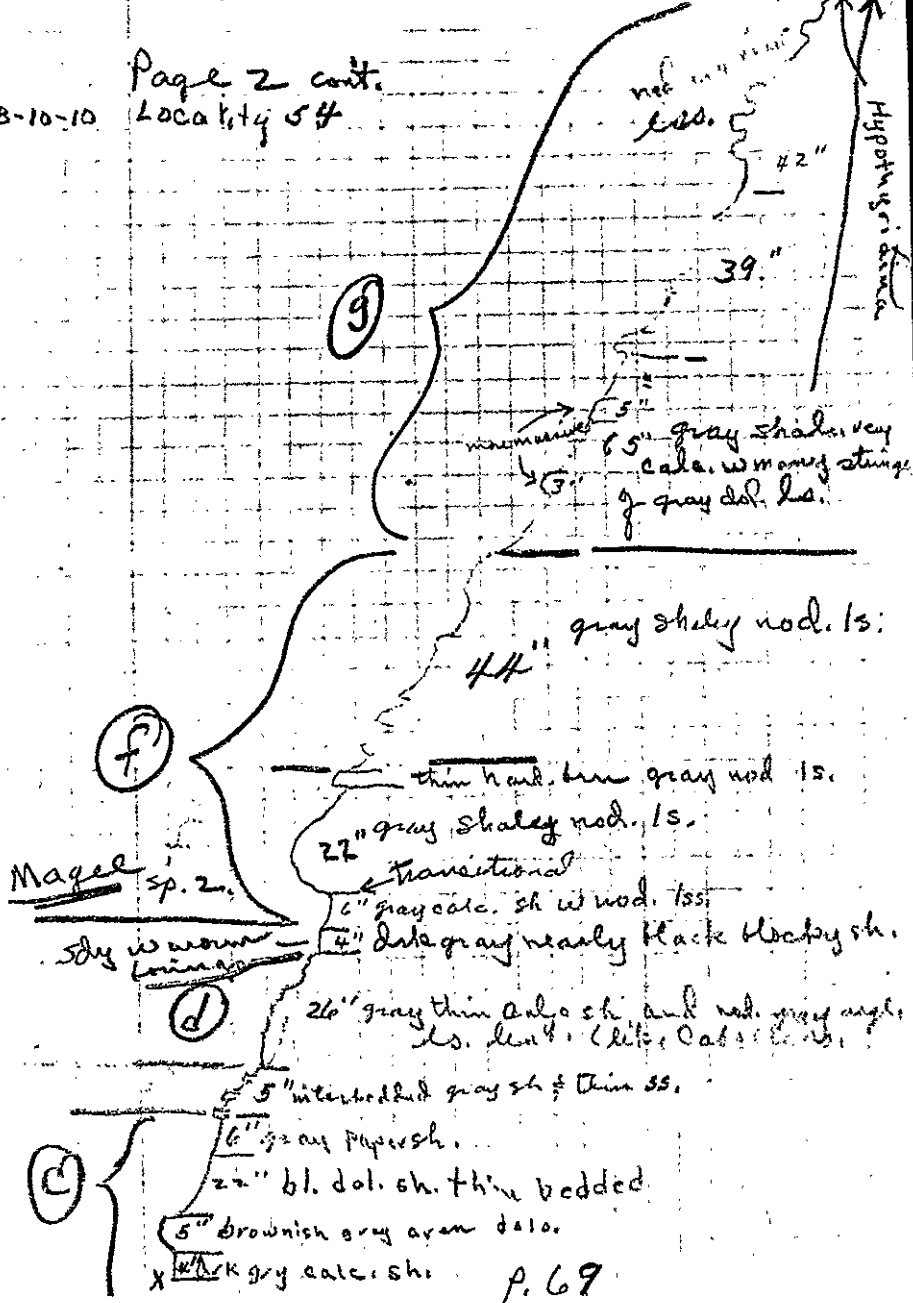


Ar. d. c. 40



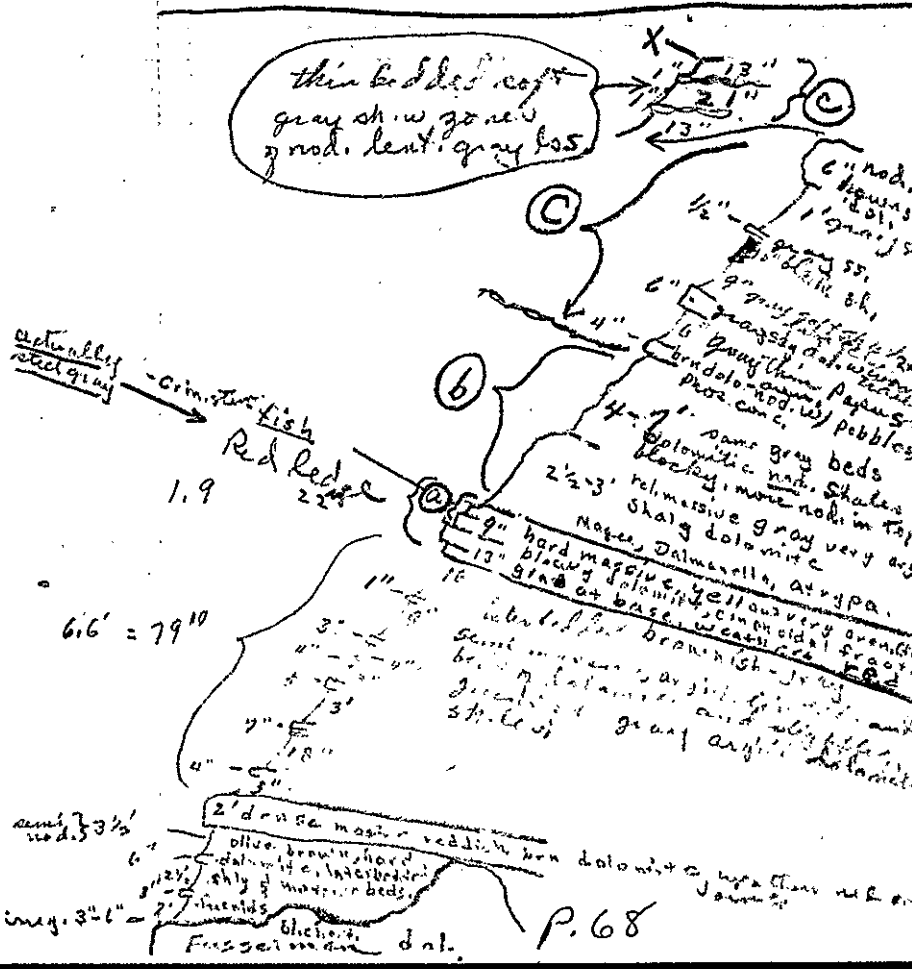


Page 2 cont.  
Locality 54



Rhodes - my own

48-10-10 Locality 54 - Grazing Survey map No. 1  
exposures  $\frac{1}{4}$  mi north of Rhodes  
Canyon highway, above old cabin, reached  
via old mine road coming north from  
highway 2 miles west of Tularosa,  
approx.  $\text{Cm. SW } \frac{1}{4}$ , sec. 3, T13E, R. 4E





Page 5  
48-10-10 Loc 54 - Rhodes Can.

MISS

DLVI

bluish gray hard algal  
ls. w/ p. conc. and p. thin

finely laminated  
green sandy shale

cross bedded ss.

(P)

fossil zone in lentils

gray and  
olive green  
nod. calc. ss.  
interbedded  
olive greenish  
mud thin ss.

Three Forks

interbedded olive  
green and very  
green mud. ls. beds.

poorly fossil  
13" bl. brownish gray very  
argill. shaly nod. ls. w/  
fossils.

interbedded olive green  
shale and many thin  
waf. like lensing beds  
of brown ss.

1" brown ss.

interbedded calc. whitish  
gray and gray  
siltshales piece w/ interbedded  
brown waf. like thin lenses  
of argill. ss.

blue gray  
hard argill.  
ls.

nod. greenish  
green ss.

14" nod. brown  
sandstone

Page 4  
48-10-10 Loc 54 - Rhodes Can.

very fossil.

Calerintop.

(M)

0.5'  
0.8' add  
0.7'

(M)

Phos. pebbles:  
frag. eroded  
frag. of fossils

3" grayish white fine ss.

5" brownish gray hard ss.

6" soft brownish gray ss.

10" massive brownish gray  
ss w/ bl. ch. ls. (beds)

4" massive calc. gray ss.

11" reddish brown sandstone

15" soft shaly nod. ls.

19" below but very nod. & st. part  
very nod. gray argill. ls.  
shaly part fossils

(Q)

(K)

30"

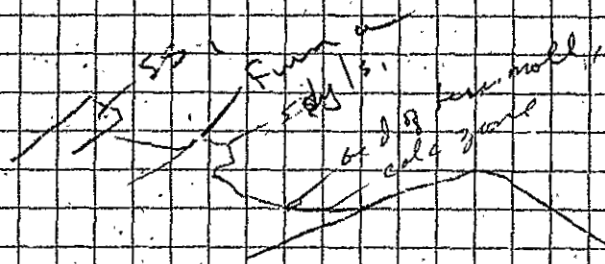
gray semi nod. dol. argill.  
ls. with interbedded calc. sh.

plumodietyon, sp. ifer, D. ovalis, P. m.

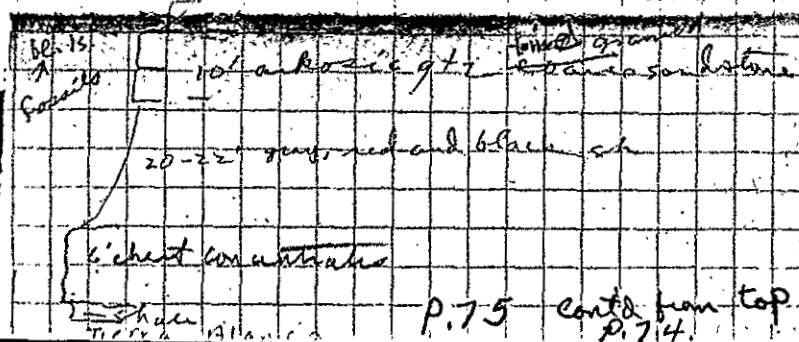
3" brownish yellow ss.   
P. 71



Penna in Indian  
wells case



13-20 red arkosid gfr coarse

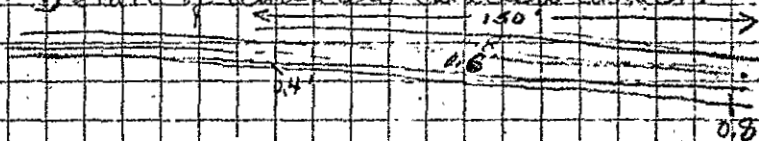


p. 75 cont'd from top  
p. 74.

48-10-4

48-10-14 Onkato near fork of Canyon - 1100 ft  
branch of Onkato - CRD Canyon  
can see 11-16S-10E otero Co, N.  
Mexico. Sacramento Mts.

Detail of Audre's Caballero contacts



Flanagan, John

Detrital Co. Gravelly  
interbedded with sand  
alone,

[illegible]

[1.9] 1/4 grain hard, very angular fl. for  
Co. P. Thompson.

[illegible]

10.5 Compensated - 10.5  
10.7 Soil with that much, 10.7, 10.7, 10.7, 10.7  
10.7 Soil - 10.7, 10.7, 10.7, 10.7

$\frac{0.3}{1.0}$

1. by gray, Hard. Sl. Sinter 17m, shell 16 small

- 1.2' old hole 8' ... well hole 4' 4"

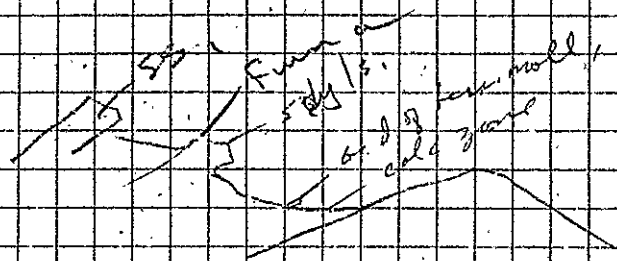
[illegible][illegible]

Yellowish - Caballero

p. 73



Penna in Indian  
wells Can.

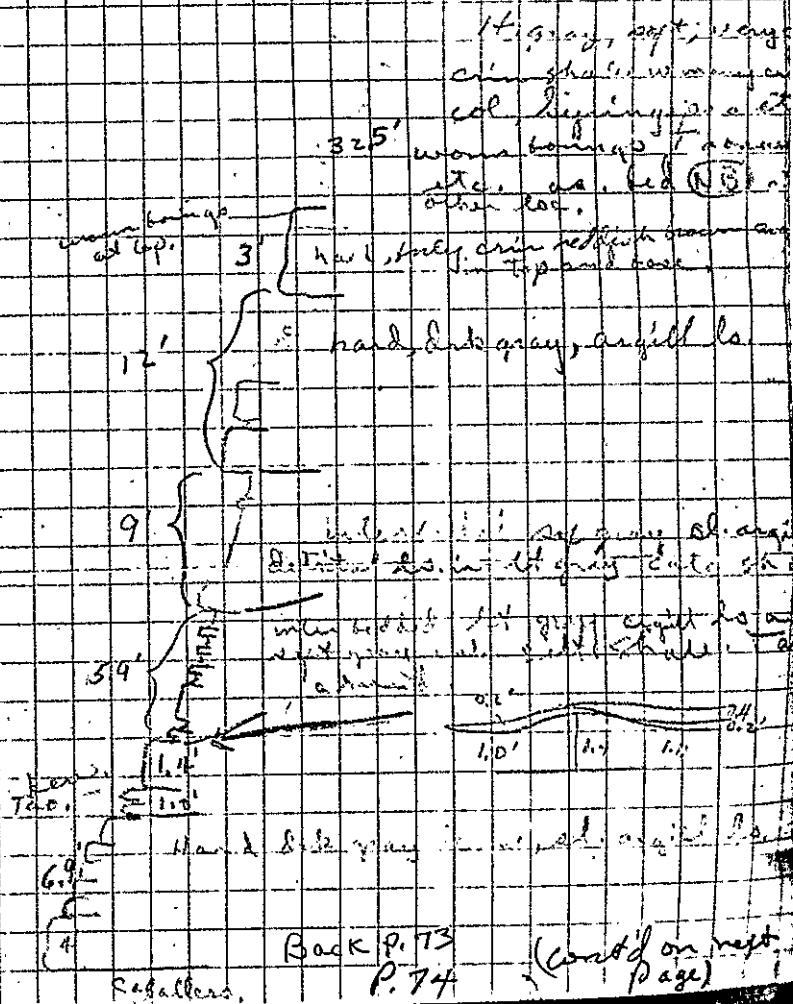


13-20' red arkosic gtz coarse

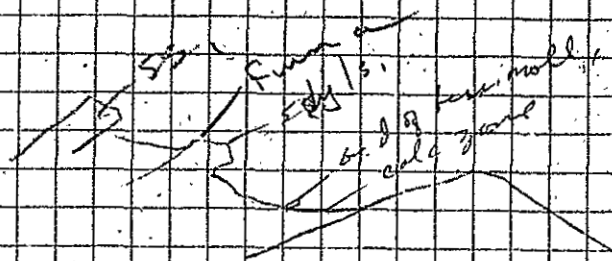
60-15' 1' 10' of arkosic gtz coarse sandstone  
20-22' gray, red and black sh

75P.

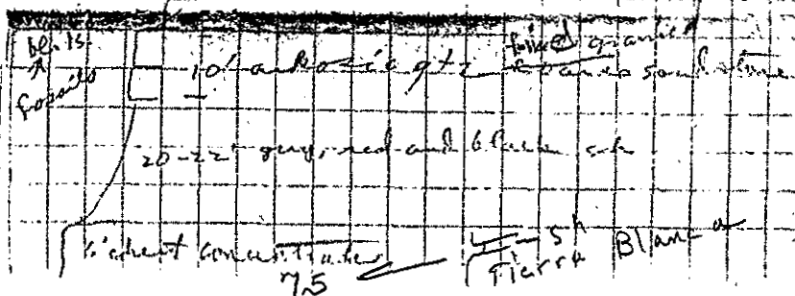
Sketch of Reducito at head of canyon  
under bioherm F. T. A.  
ne 11-16 S-20 E, Indian Wells,  
Sacramento Mts, Otero Co, N. Mexico



Penna in Indian  
wells case



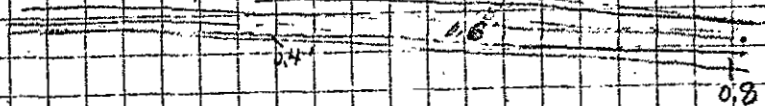
13-20 red antrozoi q/r 2 crani



48-10-4

48-10-144 Amiridicta near Fork & Canyon - North  
branch of stream. 12600 ft.  
cen. sec. 11-16S-10E Otero Co, N.  
Mexico, Sacramento Mts.

Detail of Andresito Caballero contact



Flanagan, J. D.

Detrital ls. greenish gray  
interbedded with sand  
alms.

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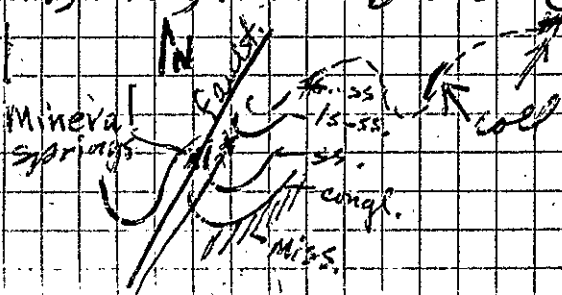
18. bulbiferous, leaves 1-6 dm. long, flowers  
and fruiting branches very woody.

in the case of the above mentioned person

4-2-10-14  3055  
Locality No B-55 - Lincoln Nat'l Forest

Pennsylvanian - 250'-300' stratigraphically above the base of the Penna. in NE part of Indian Wells Canyon - Fossiliferous fossiliferous limestone in top of 4<sup>th</sup> prominent ledge approx  $\frac{3}{4}$  mile east of Mineral Spring approx Sec 5/2, sec 11, T16E, R10E Otter Co. New Mexico. Also lentil developed in NE/SE/EN sec 11, T16E, R10E

*Perrinites* - 150-200 ft strati-  
graphically above the base the Penna  
in N E part of Indian Wells Canyon  
fossiliferous ferruginous molluscan  
limestone and *Crin.* Calc. zones above  
2<sup>nd</sup> sec. - approx. Cen. W. ~~1400~~ 1400 sec.  
14, T 16<sup>th</sup>, R. 10<sup>th</sup> E. Otter Co, N. Mex.



coll

30.5/10

Locality B-56 - Lincoln National Forest  
Sierra Blanca at upper end of main  
canyon coming out at  
Indian Wells Parking Area  
approx. cen NL, NW/NE & c 14 T<sup>16</sup>

7  
T. L. L. (Pray, L. C.)  
T. L. L. General

Troy is generally a V. Miss. section  
for south Sacramento Mts.

Penns

shale (slaty)

ashy zone  
sh K (shaly) ← ? two productus zone

Archimedes gran ls. (shaly)  
sh and ls. (largely sh)

massive gray ls (dark - blue)  
thin bedded buffed gray weathering

low brown bands same  
maybe shale break - black 2-6'

dark brown ls. - detrital zone @ base  
lt gray argill ls (black weather - gray)

upper part shaly 120 ft.  
lower " massive

low gray ls weathers yellow brown  
C 30-60' - 2-10'

detrital gray ls. (some upper  
thin bigger etc.)  
in places in  
San Andreas, Dog,  
etc.

thin bedded same  
black ls weathers  
gray

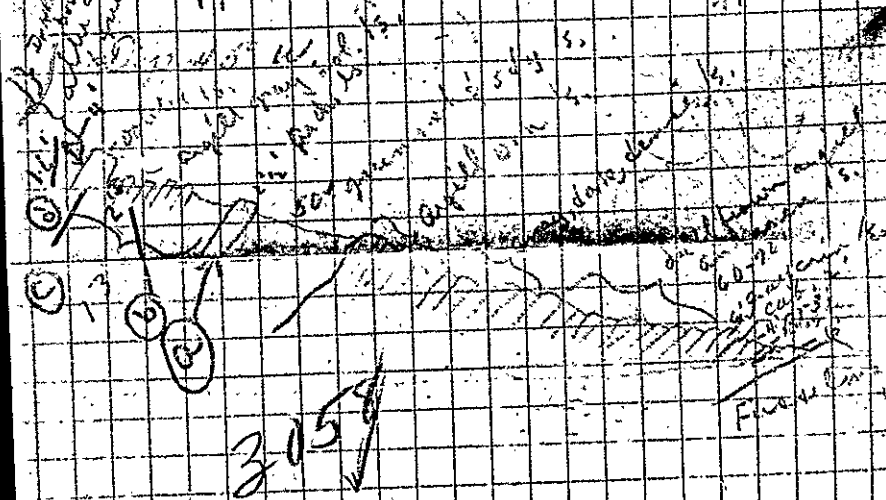
(Los Cruces ???)

P-76

48-10-16 - Locality 57 - Lincoln Nat'l For  
Small exposure on east  
side of fault in E-W trend approx  
1/3 mi. N15E of Horse camp on Grapewin  
Came Trail approx. NE/NE, sec 34,  
T192, R11E.

Rancheria - 5'  
Cavallero - 5'  
brown ch + mod. ls - 3'  
black 15'  
H. brn. dol. or - 7'  
Euscelinus

48-10-14 Locality 5 E - Lincoln Nat. P.  
Exposures in the ravine can be seen  
1/4 mi above point where road leaves Canyon  
approx. Sec. 14, T. 19S, R. 10E, S. 10E



P. 78

(Pray, h. C.)  
Lloyd's generalized V. Miss. section  
for south Sacramento Mts  
Reman

Helms  
 ↑  
 sh and ls (large)  
 white zone  
 sh & ls (large) ← ? Ino productus zone  
 Archimedes gran ls. (shaly)  
 sh and ls. (largely sh)  
 massive gray ls (dark-lam)  
 thin bedded buffed gray weathering  
 ls w brown bands lam.  
 maybe shale break - black 2-6'  
 dark gray ls. 2' detrital zone @ base  
 lot gray argill. ls (black weathering)  
 upper part shaly 120 ft.  
 lower " massive  
 low gray ls weathers yellow brown  
 30-60'  
 2-70'  
 detrital gray ls in clay (low upper in  
 in places in  
 San Andreas, Do  
 etc.  
 thin bedded, some  
 black ls weathers  
 gray.  
 (Los Cueros??)

P 76

48- Locality 60 - <sup>map B-43</sup> Lincoln National Forest.

Lithified Permian - San Andres ls  
250-300 ft. above base - <sup>near</sup> Kewa, N. Mexico.

Coll by H.C.P.

Same as Loc B-43

USNM 3060

✓

31

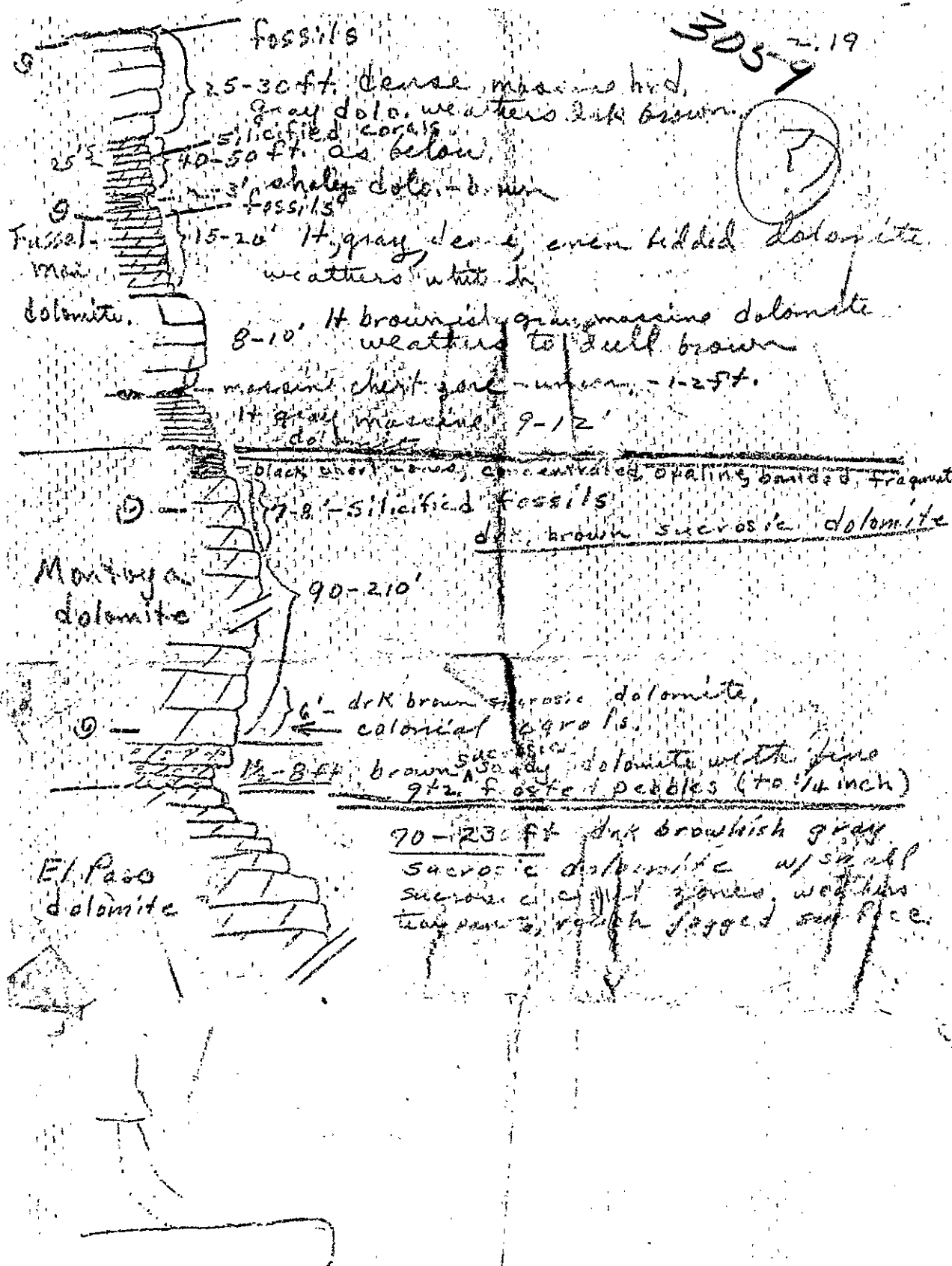
48-10-14 - Locality 59 - Lincoln Nat. Forest  
exposures along canyon walls at entrance  
to Alamo Canyon, along Alamo Canyon  
water pipe trail, approx <sup>NE/CO. Sec. 4, T 16E,</sup>  
R 10E, Otero Co. N. Mexico. (Lithified Permian)  
6' from top, 20' above water trough - 59<sup>N</sup>

3059

79

Forest

305-2.19







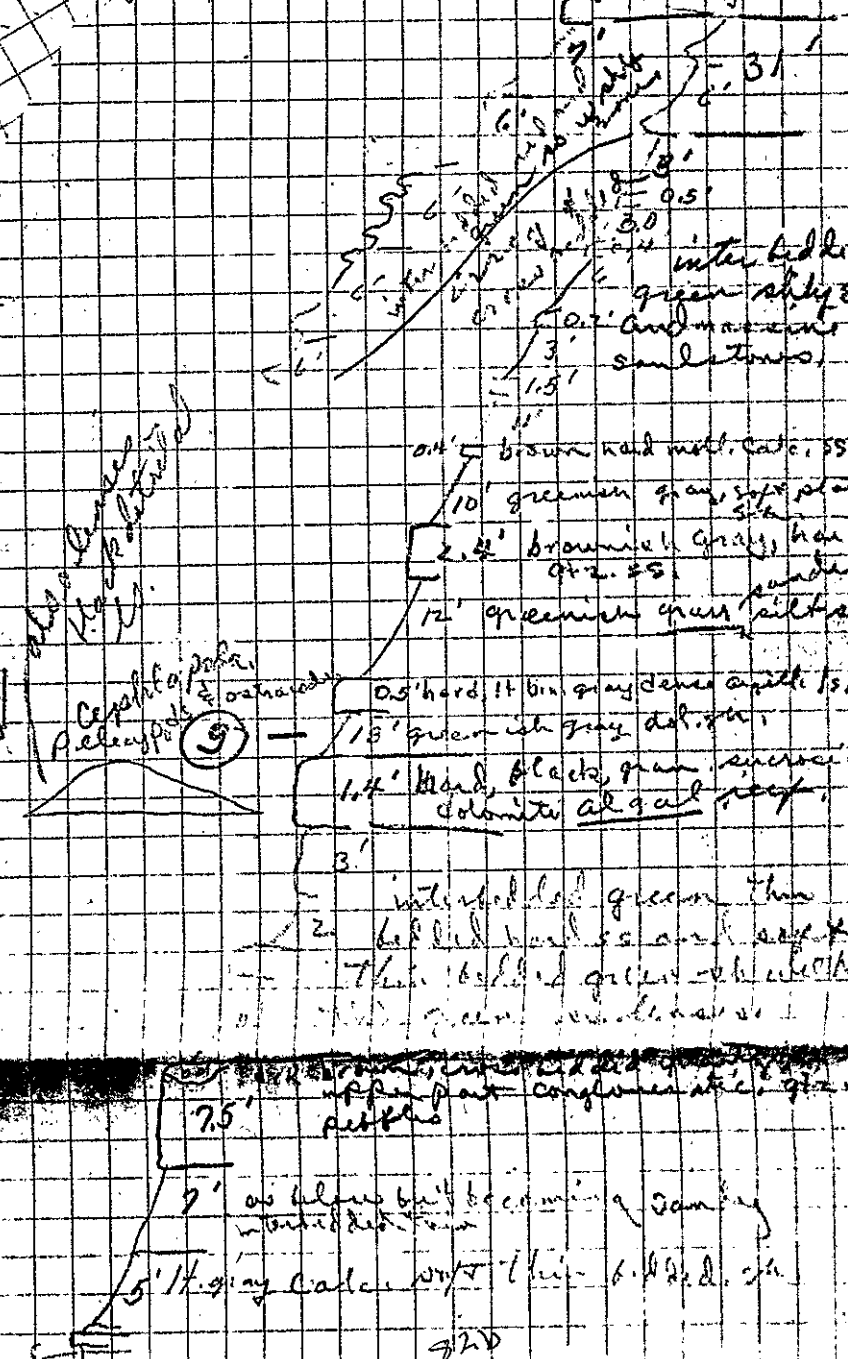
Escondido Canyon Loc. 61-  
 Penna clastics  
 red green and gray sh. 30.61  
 algal dolite, gray ls  
 Linprocturus bed.  
 14' - 15' - 16' - 17' - 18' - 19' - 20' - 21' - 22' - 23' - 24' - 25' - 26' - 27' - 28' - 29' - 30' - 31' - 32' - 33' - 34' - 35' - 36' - 37' - 38' - 39' - 40' - 41' - 42' - 43' - 44' - 45' - 46' - 47' - 48' - 49' - 50' - 51' - 52' - 53' - 54' - 55' - 56' - 57' - 58' - 59' - 60' - 61' - 62' - 63' - 64' - 65' - 66' - 67' - 68' - 69' - 70' - 71' - 72' - 73' - 74' - 75' - 76' - 77' - 78' - 79' - 80' - 81' - 82' - 83' - 84' - 85' - 86' - 87' - 88' - 89' - 90' - 91' - 92' - 93' - 94' - 95' - 96' - 97' - 98' - 99' - 100'

22' dense hard gray cherty ls.  
 brown cherty ls.  
 white cherty ls. - gray band  
 see 14, 13, 6, 1

9' - 10' - 11' - 12' - 13' - 14' - 15' - 16' - 17' - 18' - 19' - 20' - 21' - 22' - 23' - 24' - 25' - 26' - 27' - 28' - 29' - 30' - 31' - 32' - 33' - 34' - 35' - 36' - 37' - 38' - 39' - 40' - 41' - 42' - 43' - 44' - 45' - 46' - 47' - 48' - 49' - 50' - 51' - 52' - 53' - 54' - 55' - 56' - 57' - 58' - 59' - 60' - 61' - 62' - 63' - 64' - 65' - 66' - 67' - 68' - 69' - 70' - 71' - 72' - 73' - 74' - 75' - 76' - 77' - 78' - 79' - 80' - 81' - 82' - 83' - 84' - 85' - 86' - 87' - 88' - 89' - 90' - 91' - 92' - 93' - 94' - 95' - 96' - 97' - 98' - 99' - 100'

Col. N. Mexico  
 p 84

age 2. 48-10-20 - Tulsa clay pits.





# Escamido Canyon Loc. 61-

*Perna clastica*

red green and gray sh.

30.61

algal siltite, gray ls

*Linoproductus* bed,

altern gray sh and hard fine gray

ls.

st. black detrital ls - archimedean zone

2' - 14' shale and dense hard gray ls.

22' dense hard gray cherty ls.

50' brown cherty ls.

White cherty ls - gray band

See 14.13 Sec.

Exposures on south wall of Escamido Canyon and just outside canyon on foot of escarpment at south margin of appropriate section, T. 4B, R. 10, S. 6, Co. N. Mexico.

*Perna*  
*bolite*

*Linoproductus*

gray (arch.) ls.

gray bed

brown

Generalized sequence  
in Escamido Canyon see p. 84



HB-10-22

Locality B-63 - Russia, N. Mexico  
Silicified San Andres ls. - 250 ft above

Exposure along old railroad cut  
approx. 0.2 mi north of R.R. stn at  
Russia, approx. 1/2 SE NW  
sec. 24, T11S, R11E, Otero Co.

main part of collection came from  
the gray dense limestone at road bed level  
at south end of cut. These beds approx.  
250 ft above the graptolite ss at this locality.

Slab marked B-60 also  
from this locality. Collected by  
Hoyt C. Bray 4-6-10-19.

Slab B-63a is from horizon  
50 ft (?) below horizon at B-63  
approx. Cor E/2 SE NW, 24, 11E 11S.

1/3 (11a)  
✓

Locality B-62 - Kan Canyon near  
San Andres ls.  
in road cut along Kan Canyon  
road 8 mi S. of highway 93, approx.  
cen E/2 SE 1/4 sec. 26, T11S, R11E  
Otero Co. N. Mexico 0.3 mi W of  
Junction of Hasmes Can - Sacramento  
River roads.

B6.2 @ Junction.

3062  
✓

Locality 67 - South of Higgin Ed.

1 3067 - very poor

Yellow hillside  
band.

cont. 12  
13-205-10E  
dormito N.M.  
of Co. N.M.  
S. of Canyon  
S. of Canyon  
S. of Canyon  
S. of Canyon

13-205-10E  
dormito N.M.  
of Co. N.M.  
S. of Canyon  
S. of Canyon  
S. of Canyon  
S. of Canyon

13-205-10E  
dormito N.M.  
of Co. N.M.  
S. of Canyon  
S. of Canyon  
S. of Canyon  
S. of Canyon

13-205-10E  
dormito N.M.  
of Co. N.M.  
S. of Canyon  
S. of Canyon  
S. of Canyon  
S. of Canyon

13-205-10E  
dormito N.M.  
of Co. N.M.  
S. of Canyon  
S. of Canyon  
S. of Canyon  
S. of Canyon

13-205-10E  
dormito N.M.  
of Co. N.M.  
S. of Canyon  
S. of Canyon  
S. of Canyon  
S. of Canyon

40' brown bands.  
dense dk gray ls.  
2" bedded ls. 15-20'

28' black s. weathering  
gray when  
broken

30' shaly dense gray  
gray dense ls. massive  
26-52'

40-50'  
brown gray sigill ls.  
brown band

Black chest band  
5' dk gray, crinoidal cherty  
ls.

20-25' lt gray thin  
bedded shaly ls.

Calc. shaly crin and ostracode ls.  
10-20'

4' gray dolomite, shaly and nod.  
4' black shaly  
brown shaly dolomite 15-20'

Dark limestone  
p. 88

48-10-22  
Locality 64 - Russia, N. Mexico

San Andres ls. - Probably from  
150-150 ft above horizon at loc  
163.

In westward cut on Haynes -  
Canyon - Russia trail approx  
3 mi North of Russia, approx  
SW/4 NW/4 Sec 7, T16S, R10E, Otero Co. N.M.

3064 ✓

Locality 65 - Haynes Can.

San Andres ls. -

In road cut 1/2 mi W of  
junction Haynes Canyon and  
Russia - Cloudcroft road approx  
Cen S 1, SE/4 NW, Sec 6, T16S, R10E,  
Otero Co.

3065 ✓

3066  
Locality 66 - Dry Canyon ✓

Thermal Dr (?) middle part?

In road cut on highway  
175 ft east of sign post at end  
of lower left exposure in Dry  
Canyon approx. 3800 ft S  
and 600 ft E of NE cor. sec 2, T16S  
R. 10E, Otero Co.

p. 87

Locality 17 South of Higgin Ed.

1/ 3067

2' gray ls. - very fine.  
gray ls. - 20'

Yellow hillside  
band

20' brown bands,  
dense dk gray ls.  
2' dense brown gray ls.  
4' dense dk. ls. - 15'

can 42  
13-205-10E  
Dacianite Mts.  
off Co. N.M.  
San Juan and  
see Boreas  
Dome

28' blue ls. 5' weathering  
gray brown  
bands.  
30' sh. lag dense gray

gray dense ls. massive  
25-52'

20-50'  
tan brown, gray, buff ls.  
brown bands

Black chest band  
5' dk gray, conoidal cherty  
ls.

Arctic

20-25' 14' gray ls.

Cal. 10-20'  
shaly crim and intracrin. ls.

Dev. 14' gray dolomite, shaly and red,  
4' black shale,  
brown shaly dolomite 15-20'

Dark Saccabum  
p. 88

same w  
band 7-20'  
dense brown  
20-25' gray foam  
15' w dense black  
chests

Targen siltstone

15' white beds

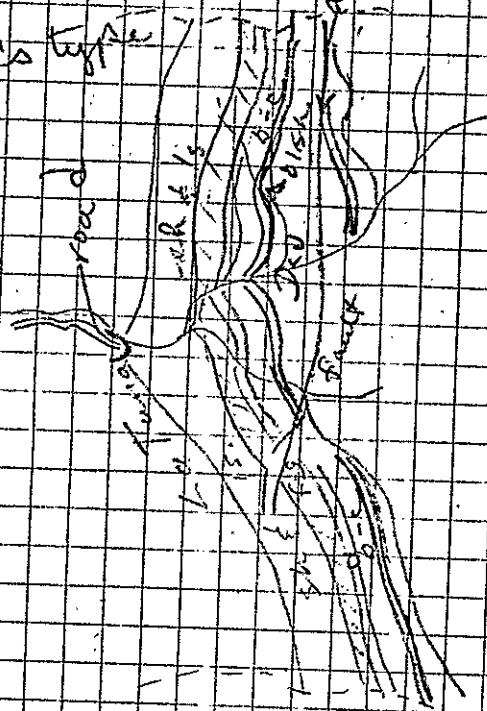
Helena 30'

Very 1000' - gray gray 02' bed at  
top

Back 87

12-16-27 *Damonian* Loc 68

Nelson's type



brown-yellow ls. 15. 6 and 7  
dark brown gray 15. 4-7  
light gray 15. 3  
mostly ls. gray sh and gray ls.  
gray ls. 15. 2  
L. 5. 15. 1

Nelson's locality, 5 mi. E. of Vinton  
Slope of Franklin Mts.,  
El Paso, Co. Texas. Carutello quad.  
106° 29' 30" W. 31° 30' N.

loc 3068

Back 89



48-10-27 Devonian Loc 18

48-10-26 Locality 18

Franklin Mts - East of Vinton, Tex

Dr. Lloyd A. Nelson took us into his Franklin section, type of Canutillo at Lina, Basins and

The Canutillo basal dolomites are similar to the orate except it (former) is more shaly in the medial portion, it doesn't appear to have the same thickness. *Brachiatopora* there are however smaller species of *Trilobites*, *Crinathus*, large species and *Chonetes*? along with fish remains. *Brachiatopora* appear to be spines from the hinge end of the *Chonetes*. Nelson places the basal chert zone in the Canutillo. This chert zone has *Chonetes* - Devon?

The Helms (unsect.) is in the lower part similar to the sequence in *Wichita* and *Gasconade* basins. There is the *La Cruz* (40 ft), 4-6' shaly argill ls, 5-10 ft granular ls, 80-190' a brown wood sand some ls, 40 ft gray ls (gray band) (gray ls not shown 70' 80' measured at base shale break, 60' brown gray brown ls, (rest not seen today).

Locality 68 - Franklin Mts  
Nelson's Sec. See P. 4  
this notebook.

306 ✓

48-10-27 Dev. Loc. 68  
P. 90.



15 October 1952

Dr. H. B. Whittington  
Museum of Comparative Zoology  
Harvard College  
Cambridge 38, Massachusetts

Dear Harry:

I am glad to hear that you are moving along with the Helms Trilobites. I hope you realize they are museum property, not mine personally, and that you have them on a shipping invoice. I do not remember what was done. I presume that you had Cooper take care of getting them to you.

The information concerning localities is as follows:

U.S.N.M. loc. 3070-Helms formation, El Paso quadrangle, Texas, 2 1/2 miles west of Powwow Tanks, approx. 31°50'17" N., 106°04'40" W. Stop 13, West Texas Geol. Soc. Guidebook, Field Trip 5, 1949 and Stop 1 on map to accompany West Texas Geol. Soc. Field Trip May-June 1946.

3070-2 is from a limestone thought to be the same as bed 9, sec. "C" of 1946 Field Trip Guide book listed above.

3070-4 is from a limestone thought to be the same as bed 11 of the same section.

U.S.N.M. loc. 3069-Helms formation, El Paso quadrangle, Texas, 1.1 mile west of Powwow Tanks, approx. 31°50'17" N., 106°05'38" W.

3069-2 is from about 10 feet above the base of the Helms in saddle; from oolitic limestone lens. Approx. =3070-2

3069-4 is from about 25-30 feet above the base of the Helms in saddle; from oolitic limestone with Archimedes. Approx. = 3069-4

Glad to help you with this information. Hope to see you sometime in November when you come to Washington.

Sincerely yours,

Arthur L. Bowsher  
Associate Curator

The preservation of many of the specimens does not show the reticulation (figs. 5-12), but the presence of specimens with patches of the reticulations abraded (fig. 1) indicate that the smooth forms having the characteristic outlines and hingement are conspecific with the reticulated forms.

Measurements	Greatest length mm.
Holotype figs. <sup>3, 4</sup> U.S.N.M. 118307.	.81
Paratype figs. 1, 2, U.S.N.M. 118306	.86
Paratype figs. 5, 6, U.S.N.M. 118308	1.27
Paratype fig. 8, U.S.N.M. 118309	.93
Paratype fig. 11, U.S.N.M. 118309	.98

Type locality: U.S.G.S. 10889 Helms formation, El Paso Quadrangle, Texas,  $2\frac{1}{2}$  miles west of Powwow Tanks, approximately  $31^{\circ}50'17''$  N.,  $106^{\circ}04'40''$  W. Stop 13, West Texas Geol. Soc. Guidebook, Field Trip 5, 1949, and limestone bed 9, sec. "C" West Texas Geol. Soc. Field Trip May-June 1946 (stop 1 on map accompanying this trip). Coll. C.C. Branson, November 1949, A. L. Bowsher, 1948 (U.S.N.M. locality 3070-2).

Distribution: This species is abundant also in bed 11 of the same section (U.S.N.M. locality 3070-4), and at approximately the same stratigraphic level in a saddle 1.1 miles west of Powwow Tanks, approximately  $31^{\circ}50'55''$  N.,  $106^{\circ}02'55''$  W. (U.S.N.M. locality 3069-2).

Loc 68 - Franklin Mts. 1500 ft. 24 mi. N. of ...  
 3069  
 10' (???)  
 brown band  
 100 ft. as below but shaly and with ...  
 100 ft. gray ls. weathers to brown slope  
 2' black sh.  
 25' dense semi litho argill. very dark gray ls.  
 gray band  
 14' very calc. bl. sh.  
 dense gray sand, lithographic ls. with gray sh. breccia.  
 60's  
 The Crinoids

Locality 69 - Hales Mts. 48-10-28  
 1 1/4 mi west of Row W on Tank  
 sec 17 School Block 5 - outlier from  
 North of Road

Coll 5 - thin plate ls.  
 shaly ss  
 3069-4 Coll 4 - and  
 brown band  
 Coll 2 - 9  
 3070-2  
 14' gray, very soft, very argill.  
 limestone with corals and  
 sh. coll 2

3069  
 see p. 1, Whittington, H.B., 1954, Two  
 Silicified Carboniferous trilobites from  
 west Texas; Smithsonian miscellaneous  
 collection, vol. 122, # 10, (3079-2)  
 Paladin (Paladin) Helmsensis n. sp.  
 Pl. 2, 3; text Fig. 1  
 Paladin (Paladin) Helmsensis (Mather)  
 Pl. 1 - Pls. 1-6, 8, 9.  
 p. 92

Locality 71 - Hueco Mts.  
Texas  
Lower P.O.W. zone.

Pat bendy Road, @ Jack

48-10-20

Gastropods 4.11.26 0.90

3071

Sample 107

4.

3

30-40. To Row W-O-W Cong

3014

150 20 11  
150 30 71

AN

US/80.

pow wow  
Tantros

Pow. covered cough.

p. 94

Locality 70 2 1/2 miles west  
of ~~Arco~~ ~~Arco~~ ~~Arco~~,  
POW WOW TOWNS 5

3070

8. Powwow Tanks

3070

3070-6  
soft & shaly argill ss w crinoidal zone

3070-5

3070-4

3070-3

3070-2 brown gray silt

3070-1 brown

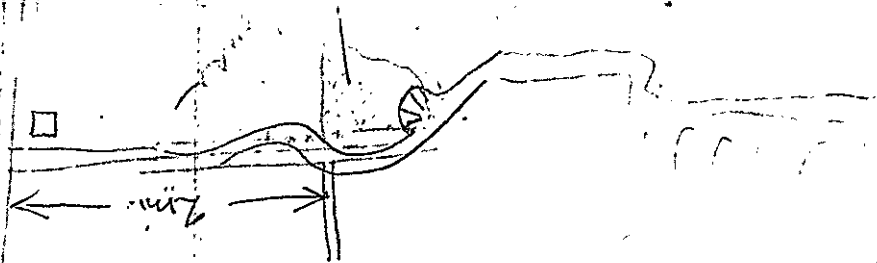
white series of ind. bld. sh  
and very arm. / 9 or very calc.  
ss. brown sand.

See note on p. 92 - Whittington, 1954

043

Hwy 99.

Point X



p. 95

11/2/48.

Stop

- 1 - NE  $\frac{1}{4}$  24 - T1S, R1E - Sycamore - lower Caney (Lick Cr.)  
2 - SE  $\frac{1}{4}$  25 - T2S, R1E - Sycamore (Hwy. 77)  
3 - SW  $\frac{1}{4}$  35 - T3N, R6E - Woodford - Weldon - Sycamore (?) } Jackfork Creek.  
4 - NE  $\frac{1}{4}$  35 - T3N, R6E - middle (?) Caney concretions }  
5 - NW  $\frac{1}{4}$  8 - T2N, R7E - Springer (Pa. Caney) upper Miss. Caney - Cephalopods in concretions  
6 - NE  $\frac{1}{4}$  2 - T1N, R6E - Weldon (wedges out) - Sycamore (?)  
7 - NE  $\frac{1}{4}$  26 (adjacent sections) } T1N, R7E - Woodford - Sycamore (?) - Miss. Co.  
Goose Creek } - P. 15 - fig 2. - Pontotoc Co., OKla.

30293029 ✓  
Fin & Feather Club.

3p20 - Cypripedium loc. Indian wells can sw/sw, NW, sec. 14, T6S, R10E, Otter Co. Ia. M.

3080 ✓  
M.H. Kuhlman, Mississippian and Lower Penna Stratigraphy of  
positions of Stone wall and Atoka gneiss, Okla. 1948. unpubl. U. OKla. MS  
P. 14, fig 1 - Caney gneiss, conc. loc. Caney gneiss.

2 Nov 1948 - Stonewall quad.  
 Arbuckle mts, Oklahoma  
 1/4 mile from Roff 1/2 mi turn  
 right on state hwy 61, go west  
 into Frank's graben toward  
 Frank's, arrive @ Oklahoma 99,  
 go north (came onto it 1 mi N.  
 of Fittstown - Fitts pool to SE).

SESW 35-32 6° Pontotoc

3074 ✓

13 7/1

1/4 ← (C) tan white green and gray sh.

2 1/2' - ① argill zone 0.4'

2-3' - 17. brn. very argill. dol.

② - woodford gray fossil sh.

P297

Locality - Camp Creek, Rockwell  
 NW 1/4 13 1/2, 1E Murray Co. Okla.  
 N. 1/4 mi. off highway 77 to NW 200 yds.  
 beyond blacktop.

250-300' area brown weathering gray  
 massive ls. 3072  
 - 9' - ① - 6-12' - brown and  
 calc. zone 18" - gray shale  
 with fine  
 black fossil  
 shale zone

10' ②  
 30' - ③ - 1' - dense ls. - 1' - ammonoites  
 - black fossil sh. typical Caney

sequence is overturned and  
 dip is 15° SW. with 10° N. dip,  
 all.

sign on R.R. line S of Springfield  
 turn east on 79 E, go 5 1/4 mi E and  
 go north on trail along west of old  
 Army airport, approx 5 mi S of Springfield  
 6, 31 02 3, 3E. Cist on R.R. line  
 shale breaker Superior. P. 100  
 and fossils? see also, 1921,  
 Okla. Geol. Surv. 1, 1921.

P96





48-11-3

3079

48-11-5

Tiauaon ls from hillside  
on west side of draw north  
of Fin and Feather Club  
SE NE 30 20' Roger  
CD & KIA 1.4 mi N of OKla 33

p.100

3 Nov 48

2 1/4 mi west of Jesse on West road  
to see line. 1/2 South 1 mi then  
west 1/2 mile to vicinity of Canyon  
creek trap of Kibblum and walk  
1/2 mi to sand corner, walk 1 mile  
to Canyon Creek section  
section of sand corner to Wapamuk  
up creek then lower section  
to Huntom

① 48-11-3 In creek 200 yds N of  
Huntom 100 yds S of 1/2 mi house  
NE 1/4 sec 24, 12 75 100 yds S of  
Huntom

B-78 2' x 1' nod. ls. dk  
gray

3076 20' soft gray sh  
50-60' covered

3' sub.  
1' silt + g

4' gray argill ls.

1' zone of massive white sh. ls.  
6-10" zone of phos.  
black and gray / white sh.  
p. 99 sh. chert

ITINERARY OF 1951 TRIP  
TO  
NEW MEXICO, MISSOURI, ILLINOIS, AND INDIANA  
A L BOWSER & W T ALLEN  
U S National Museum

4-JUNE TO 5 JULY 1951-Assisted G A Cooper to collect silicified fossils from the Permian and Pennsylvanian of the Glass Mountains out of Marathon, Tx. We drove the museum truck, that had been cached for the winter in Norman, Ok., to Marathon, Tx. after flying from Washington, D C to Norman, Ok.

Bowsher had spent the summers of 1949 in exploration in of the central part of the Brooks Range on behalf of the Navy Oil Unit, USGS, Washington, D C. He returned to the Brooks Range in the summer of 1950 to assist Brosge's USGS party of 13 to conduct a helicopter survey to extend the work begun in 1949 in mapping of the Brooks Range.

JULY

5-Cooper left on the train for Washington at 0640 AM. Bill Allen arrived at 1130 AM from Washington. Bill Allen and Bowsher departed by the museum truck from Marathon at 1310 hrs., arriving at Mesa Courts in El Paso at 2200 hrs.

6-visited with Dr L A Nelson at the School of Mines at El Paso, Tx. Nelson drove with us to the north end of the Franklin Mountains through Anthony Gap and return to the school to examine his collections. Nelson has a fine collection of cephalopods and snails from the clay pits just east of Tularosa, NM. (p. 14, 3017). These fossils reported by Bose and cephalopods are described by Miller.

7-L C Pray arrived at tourist motel at 0800 hr. We left for Anthony Gap examining the Silurian Fusselman Fm. Returned to Desert Motel at 4531 Montana (owned by L A Nelson) for the night. L A Nelson came over later in the evening and discussed geology of the area with him.

8-Had an early morning discussion with Nelson and drove north to Orogrande to collect Pennsylvanian and Permian. F5 of 8 July 51 are huge hexagonarid corals. 4'hi, and 5' in diameter. Only place I ever saw such material (p. 117). Drove to Alamogordo and packed fossils. Visited L C Pray's field camp 13.5 mi south of High Rolls on the West Side Road. Ate supper with them and lectured on bioherms. Returned to Alamogordo.

9-Drove south of Valmont and into Grapevine Canyon to the old Danley Ranch to search for silicified Platycrinites. 3286.

A locality map is Bowsher, 1986, Platycrinites and associated crinoids from Pennsylvanian rocks of the Sacramento Mountains, New Mexico; Circular 197, NMBM&MR, page 6, Fig. 1. Cooper described Cryptocantha from F7 of 9 July 51 (3302).

10-Returned to Grapevine Canyon to search for Platycrinites.

Silicified specimens were found at loc. 3353. Drove to La Luz for discussion with Carel Otte. Agreed to work the fossils for Carel in his mapping of the area.

11-Drove to Fresnal Canyon through La Luz and collected from the Pennsylvanian and Wolfcampian Bursum Fm. (3022, 3286, 3366, 3370). One loc. was called the Taosia LOCALITY (3022 OR 3284)

12-Bill Allen and I drove to La Luz to meet Carel Otte and visit the Tularosa Clay Pits (former brickyard)(3297and3368). This is the locality where Bose wrote that the Pennsylvanian fossils are in the Abo FM (Permian). A K Miller reexamined the cephalopods and

- came to the conclusion that they are Pennsylvanian. All species can be found in the Red Eagle Limestone near Bartlesville, Ok. which is Permian. It is an important locality. (3261)
- 13-Bill Allen and I drove the Permian Laborcito reefs ENE of Tularosa to collect from the reefs and the subjacent beds. This area is discussed in Bowsher, 1986, in Ahlen and Hanson, SW Section of AAPG Trans. and Guidebook of 1986 Convention, Ruidoso, New Mexico, p. 65-69.
- 14-Bill Allen, Carel Otte and Bowsher went into sec. 11, T14S, R10E, from just below the thick sill near the top of the Laborcito Fm. (Collected 3362, 3371 and 3372, etc)
- 15-Allen and I drove to Capitan to field camp directed by Stuart Jones to arrange to meet him on 23 July at Hillsboro on mapping in the Hillsboro region. Drove to Fresno Canyon to collect fusulines with Carel Otte. Allen measured the section and we collected fossils from beds 39, 40 & 49.
- 16-Collected from Tularosa clay pits (3281, 3284 & 3285).
- 17-Allen and I drove to the fork of the road in Fresno Canyon and measured section from Conglomerate zone of Bursum down to the top of the Fresno Fm. Only one collection given loc. number of 3379. This is the Laborcito Fm. and identifies the Taschia beds (3022). There were many other collections. Allen and Bowsher drove up Fresno Canyon to SW/NW/NE Sec. 1, T16S R11E (3378). Spent the afternoon building and packing boxes in which to ship the fossils. Dick Jahns came by and ate dinner with us before going on to Socorro.
- 18-Packing and shipping 776 lbs. fossils to Smithsonian. Drove to Hot Springs. Met Jim Waters, Chief Geologist and their Dist. Geologist from Midland, Sun Oil Co.
- 19-Drove to Winston to meet Dick Jahns, Cal. Inst. Tech. He was mapping a pegmatite north of Winston. Callihan, Bowen and Kottowski arrived at 1015 hrs. Drove toward Chloride Creek toward Chiz. Examined Percha cen NE/4 sec. 18, T12S, R7W. This Chiz locality has produced fossils from the basal part of the Percha but we did not get any. Flower later on sent a collection to the US National Museum. They were brought to me by the rancher Johnston living at Winston as Post Master.
- 20-Callahan, Bowen, Kottowski, Allen and I accompanied Dick Jahns to the part of the Iron Mtn. he was mapping and looked at the rocks.
- 21-Allen, Jahns and I went east from Winston to Red Gap on the Hot Springs hiway. Found few fossils and metamorphosed section. Raymond Johnson, PM of Winston, accompanied Allen and Bowsher up the stream from Hermosa.
- 22-Allen, Jahns and I drove north to Goat Canyon, S of Iron Mtn. Exploratory work in the Winston area. Drove to Hillsboro; met Henry Jicha who was mapping the Hillsboro quad.
- 23-Kuehlmer, Jahns, New Kuehlmer, Stuart Jones, Phil Woodside and Bill visited Tertiary lake beds 3 mi. west of Hillsboro. The group went to Lake Valley where we reviewed the Laudon and Bowsher section. Nunn Mbr Lake Valley 3027. Drove north to Earl Wilson's ranch to collect from the 3026 and 3026A. Examined Tierra Blanca Creek (3029). Spent night in Hillsboro.
- 24-Allen and I in company of others from NMBM&MR drove in to the east side of Cook's Range. Describe important locality of conodonts in the basal beds of the Percha black shale. This is an important locality (3280). Drove to Lake Valley and collected from Apache Hill. On way to Hillsboro collected Andrecito 3298) on Berenda creek near Bill Nunn's house.

- 24-Allen and I drove to Cecil Boyd's house and collected from the basal sandstone of the Caballero on the north slope of the Apache Hill at Lake Valley. Spent night at Hatcher Hotel.
- 25-Drove south to Lake Valley. Collected on north slope of hill from the sandstones of the base of the Caballero. Drove via Nutt, Hatch and Las Cruces to Alamogordo.
- 26-Drove up Dry Canyon and collected at 3051 and lower in the Pennsylvanian near the hiway. Drove on through Cloudcroft to Roswell where we spent the night.
- 27-Allen and Bowsher drove to Pampa, Tx to spend the night with Sallie and Dallas Bowsher.
- 28-Drove from Pampa, Tx to Bartlesville, Ok.
- 29-Drove from Bartlesville to Collinsville, collecting from near Ramona and Collinsville coal strip pits spending the night in Tulsa.
- 30-Collected along the exposures of the Avant limestone north of the Arkansas River. Spent night in Bartlesville.
- 39-Allen and Bowsher drove east toward Hulbert, Okla. to collect from Mississippian rocks. To maybe locate source of Alcimocrinus of Ulrich that came somewhere along the 1902 Crittenden to Hulbert trail. There are now new roads and the old trail is lost. Collected by Ulrich in a buggy years ago.

#### August

- 1-Spent additional time looking for the Alcimocrinus locality. Drove north on Okla 10 to see Fernvale Fm, Burgen Sandstone, and the St. Joe at Eagles Nest. Spent night in Seligman, Mo.
- 2-Drove to Roaring River State Park on Ark. 112. Drove to Flat Creek Valley in Arora quad on Highway 44 to examine the Reed Springs Fm. Spent the night north of Reed Springs, Ark
- 3-After car trouble went to Springfield, Mo. Searched for Lower Mississippian, Northview, Pierson, and Lower Burlington, in Southeast Mo. Spent night in Mansville, Mo.
- 4-Examining and collecting from Northview and Pierson in SE, Mo. Spent the night in Springfield, Mo.
- 5-Bill Allen and Bowsher drove north from Springfield to collect from the Northview Fm. and spent knight in Warsaw.
- 6-Drove south from Warsaw on US 65 to Mo 83 toward Fairfield. Examined Chouteau-Sedalia Fms between Iconium and Oceola on the Osage River. Drove to Hunt-Bullard quarry at Osceola. Drove to Sedalia for the night.
- 7-Visited quarries in the Choteau limestone at Clifton City, Mastins Bridge and Pleasant Green. Spent night in Sedalia.
- 8-Bowsher and Allen drove east out of Sedalia to the Sweeney quarry to collect from the Choteau limestone. Drove to Rolla, Mo. Visited Al and Wealthy Spreng, he is teaching General Geol and Paleontology at Mo. Sch. Mines, Rolla.
- 9-Bowsher and Allen drove to Castlewood in SE St Louis to examine the Bushberg, Sedalia ,Fern Glen and Burlington in RR cut. Spent the night at Waterloo, Illinois.
- 10-Bowsher and Allen drove east from Waterloo to Floraville, Ill. to find a Shaeffer quarry in Mississippian rocks. Could not get to it in time available. Visited the type Valmeyer section at
- 11-Bowsher and Allen drove from Chester to Ruma to collect from the type section of the Chester, Paint Creek Fm. Drove from Ruma to Red Bud and to Kaskaskia to collect from the Chester here. Then drove to Baldwin to Campbell Hill. Spent the night in Jonesboro, Union Co, Ill.

- 12-Bowsher and Allen drove east from Jonesboro to Mt Pleasant and north to Lick Creek, Ill. to examine the Kinkaid Fm. and other Chester strata of the area. Spent the night in Carmi, Ill.
- 13-Bowsher and Allen drove from Carmi, Ill to New Harmony, Ind. to search for the source gastropods Norwood and Pratt's paper that for the first time described gastropods of the Pennsylvanian rocks of North America. They had been in the original "New Harmony Socialist Community" of Robert Owens. Glabrocingulum. Saw the warehouse in which David Dale Owen had housed the original US Geological Survey collections from the Survey of the Ohio Territory. Drove east to Croydon, Ind. and visited Guy Campbell who had donated many fossils to the Smithsonian Institution. Drove from Croydon to Versailles, Ind. for night.
- 14-Bowsher and Allen drove from Versailles, Ind. to Cincinnati, Oh. and Athens, Oh. to spend the night. Spent the evening with Myron Sturgeon at the Geology Building of Ohio State University. Myron was working on gastropods and I was helping him thru J B Knight.
- 15-Drove from Athens, Oh to Washington, D C
- End of trip

Acc. 192477

15 August 1951

Drone from Athens, Ohio to Washington,  
D.C. Arriving at Washington, D.C. at 1806 hrs.

Speedometer reading on arrival  
in Washington D.C. 52712 miles.

Collections by Cooper,  
Boushka and Allen from  
4 June 1951 to 15 August 1951,  
are acc. 191737.

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22 October 1951

Dr. Edwin Kirk and I left  
the U.S. National Museum at  
0900 hrs in Geol. Survey Ford  
Ledan (T 41255) [mileage 6092.77]  
we drove south via US 29 to  
Charlottesville then west to US 11  
and south on US 11 to Wytheville  
Tenn., where we spent the night  
at Spring Court Motel (Good).

Driving time 9 hrs 30 min.

Mileage - 314

Arrived at 1830 hrs.

23 Oct. 1951

Left Wytheville, Tenn. at 0800  
hrs. Drove south on U.S. 11 to  
Knoxville then west to Tenna  
58 Drove south to Chattanooga  
Tenna.

Collected a slab with ostracodes  
a few miles south of Decatur, Tenn.  
Ordovician well along the valley.

Drove west a Chattanooga on  
US 72 then south to Scottsboro  
Alabama. Arrived at Scottsboro  
at 1830 hrs. Stayed overnight  
at 5 point motel (\$3.00).

Driving time from Wash. 21 hrs 45 min

Mileage from Wash. 695.

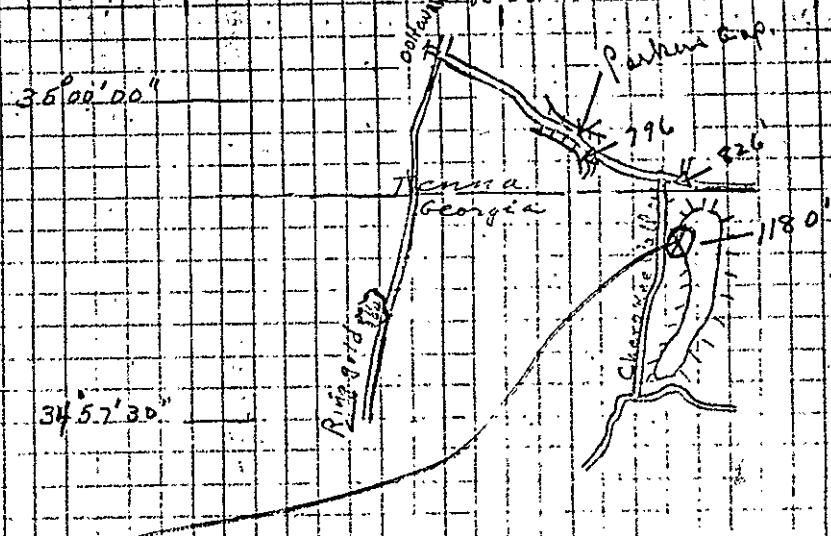
Aver. Driv. time 31.7 mph.

Mileage on gas 20.3 mpg.

Mileage at Scottsboro 678.7.

Oct 1951

Meet Strimple @ Park Plaza  
Motel, 6 miles south of Huntsville,  
also Highway 38 and alt 241,  
85° 07' 30" 86° 05' 00" 85° 02' 30"

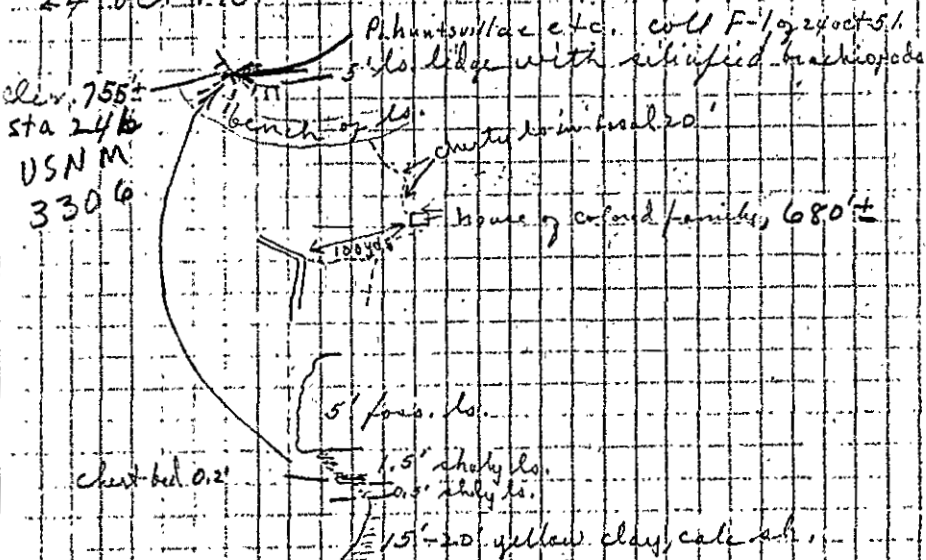


Gasper - north of Dividing Ridge, Ga,  
South of Tenn. line, 1 1/2 miles SE of  
Parkers Gap, Tenn.  
Ringgold □ Ga-Tenn - 113 ne.  
ed. 1946. 7 1/2' □

To get  
Ringgold □, Ga-Tenn - 113 ne 7.5  
Isbell □, Ala 15'  
Farley □, Ala, 75 SE, 7' 30" □  
Huntsville □, Ala - 30' □  
" □, Ala - 7' 30" - 7.5 ne.  
Barton □, Ala - 15' □ - 36 FVA  
Tuscumbia □, Ala, 15' □ - 45 FVA  
Spruce Pine □, Ala, 7' 30" □ - 46 nw 7 1/2'



24 Oct 1951



col. ls. bench  
approx. cen. S.W. 1/4 sec 8, Twp. 5 S, Rge 1 E, Madison Co, Ala.

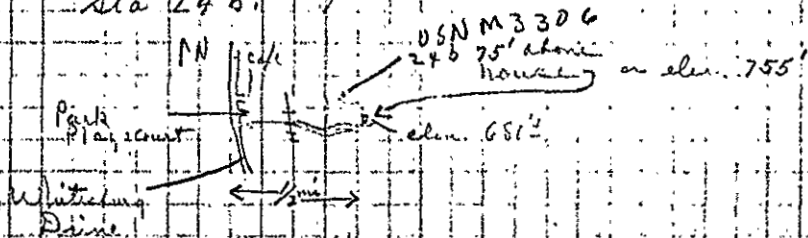
24 Oct. 1951

Drove from Huntsville to Huntsville, arriving at 810 hrs. Arranged for cabins at Park Plaza Motel, changed clothes and drove slowly south along Alabama Highway 38 to Whitesburg as Dan Kirk believed the hillsides in an effort to determine the locality which Mrs. Wachsmuth in 1902(?) showed him as Dr. Wachsmuth and Thos. old collecting locality.

We then drove back north on Ala 38 to Sta 24a at St. Lukes Church, cen. south line, 11 E, sec 18, Twp. 5 S, Rge 1 E, Huntsville Meridian, Madison Co. Alabama, which Kirk believed to be approx. the Wachsmuth locality. We worked up over the hillsides for an hour but did not find the locality. We are to try again later.

We then drove into Huntsville to obtain washing machine, returning for lunch at cafe near Park Plaza Court at 1330.

After lunch I drove east from just south of the Park Plaza Court to Sta 24b.



25 Oct 1951

Drove east up Bankhead Parkway toward Monte Sano State Park.

F-3  
USNM  
3313

Stopped at Shely ls. zone near cor, SE/SE/SW sec 29, T. 3E, R. 1E, Madison Co, Ala on Bankhead Parkway and made coll. F-3 on 25 Oct 1951 (Sta 25a) from 60' above the base of the Gasper fm. (by Butts) at elev. of 970'.

Drove on up highway and turned right up switch backs to "Cold Spring" and south across Monte Sano Mt. by Radio Tower W HBS-FM toward Round Mt.

Pattensville observed from elev. of 1400'± on north side of Monte Sano Mt. to elev. 1380'± near Round Mt.

F-4  
USNM  
3315

Coll. F-4 on 25 Oct from old road cut on east side of road in SW cor of Monte Sano State Park, elev. 1450', approx. cen w line, SW/NE sec 4, T. 4E, R. 1E Madison Co, Ala. This is either Pattensville or Pennington fm. (Sta 24b)

Drove on south to US 241 and Ala 1. Turned to east and drove down section toward Haden. Turned around and drove back west on US 241 and Ala 1. Stopped 0.3 miles southeast Jct. of Monte Sano Mt. road and US 241 at elev. 1100'±, approx. SE/NE/NW sec 9, T. 4E, R. 1E, Madison Co, Ala.

25 Oct 1951

F-1  
USNM  
3311

Returned to Sta. 24b to finish collecting there. On the way up Bankhead Parkway approx. 2 1/2 miles east of Sta. 24b and collected coll. F-1 on 25 Oct 1951 from shale which was *P. hunteri* (see top part) and then turned north to the Gasper fm. (see note above) and collected 40-50 ft above the *P. hunteri* zone.

F-2  
USNM  
3312

Coll. F-2 on 25 Oct 51 Gasper fm. zone near Sta. 24b. Elev. 1450'±. *P. hunteri* zone.

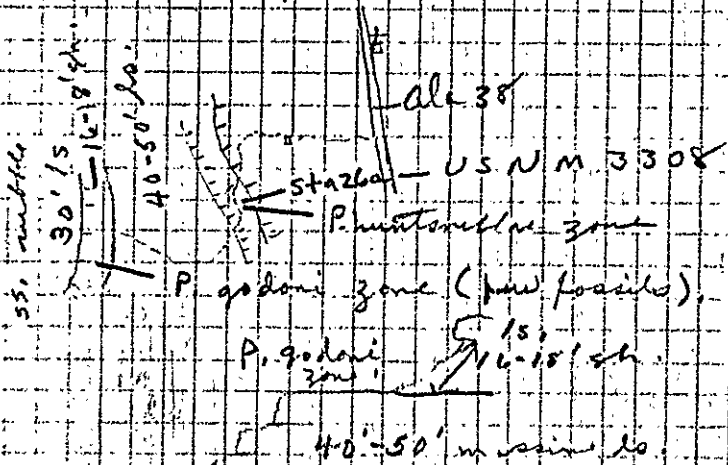
Spent the remainder of the morning digging slabs at Sta. 24b. Returned to the court for dinner at 1400 hrs.

Left the Park Plaza court at 1400 hrs going north on Ala. 38. Turned right on side road at Mt. Lebanon Church (cen 19, T. 4E, R. 1E Madison Co, Ala). Drove east 2/3 mile, turned north 2 miles, turned west for 1 mile and turned north on Ala 38.

Drove north thru Antinville to Monte Sano Park Road.

26 Oct 1951

Harrell and Melba Stimpert and I drove south on Ala 38 to trail going to house on c. w. line. N. W. 1/4 Sec 18, T3S, R. 1E Monroe Co. 0.2 mi. S. of Farley Church, Ala. Drove up to house (0.2 mi) at elev. 675'. Walked up trail to SW to bench at 710' where we found 46 ben. clay sh. with thin bed. of arg. ls. Harrell found *Dizygossinus* with ann. trace, we then found numerous brachiopods and crinoids in middle of shale. Collected on large slab of ls. in a drag trail on shale stop.



Coll. F-1726 Oct 51  
Crimoids  
P. huntinellae  
house  
40 ft massive ls.  
Edentus

25 Oct 1951

USNM and collected *Prismniopsis serripinna*  
Archimedis and *Chonetes chesterensis*  
F-50 from lower Bangor fm in west  
25 oct road cut, F-50 25 oct 1961.  
3320 (Sta 250)  
None on west on 11.5241

3320 Drone on west on US 241  
toward Huntsville. Stopped  
at quarry in ls. and shale, prof.  
Perrinites, NW Cor. NE/NE sec 8,  
T4S, R1E, Madison Co. No fossils.

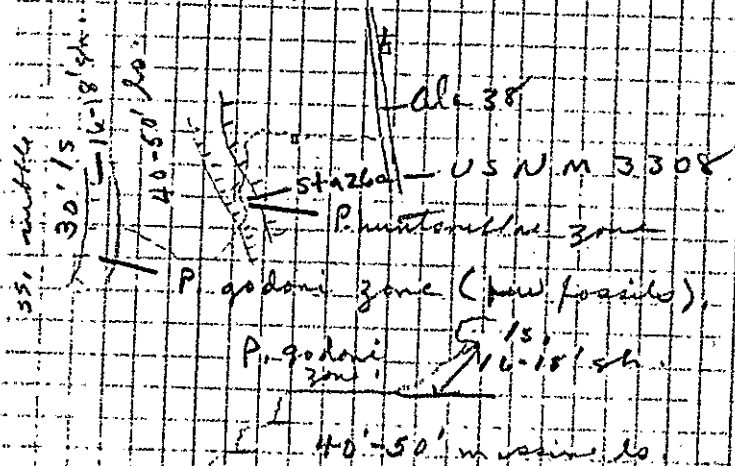
Drone on west on US 241  
toward Huntsville. Stopped at med  
gray shale zone at elev. 880, near  
Jct of US 241 and trail, approx. cen  
ne/nw/nw/sw sec 5, T4S, R1E,  
Madison Co, Ala. Coll F-6, 25  
1951. out from near top of Ste Genevieve  
USNM (C) of Butts, sta 285 d.

3310 Returned to Park Plaza  
Motel at 1760 hrs.

F-70 25 Oct. 1951 - A collection of loose fossils from bench below Sta. 24a from sub. loc. in top shaley Ste. Genesee containing 6 specimens, 1 certainly from Cooper zone 60 ft above, 3 prob. from this Cooper zone, 1 prob. from Ste. Genesee shale, and one certainly from the Ste. Genesee shale. Coll. illustrates how float from higher zones contaminates lower zones in this area.

26 Oct 1951

Harrell and Melba Stimpale and I drove south on Ala 38 to trail going to house on c.w. line NW 1/4 sec 18, T5E, R. 1E Monroe co 2 mi. so of Falley Church, Ala. Drove up to house (0.2 mi) at elev. 670'. Walked up trail to SW to bench at 710' where we found 4' ben clay sh with thin nod. of agl. ls. Harrell found *Pisgy. godoni* with arm loose, we then found numerous brachiopods and crinoids in middle of shale. *Asim. sp.* on large slabs of ls. in a drag trail on shale slope.



Coll F-1 26 Oct 51  
*Crinoids*  
*P. hunteri*  
 House  
 40 ft massive ls.  
 22' ben clay sh.  
 USNM 3308

5' 2" x 3' 5" { 1' 4" x 9" 7' 1" x 5" }  
 dump  
 160 yd

26 Oct 1951

26 Oct 1951 from the P. godoni zone  
q. Gasper from sta 26c

F-5  
USNM  
3309

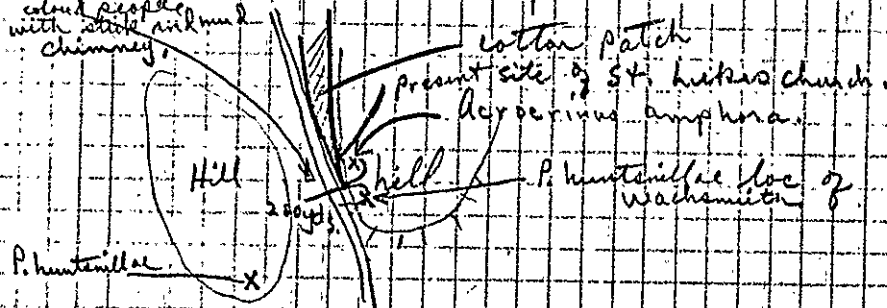
Coll F 5 of 26 Oct 1951 from  
bench at base of P. hunterillae  
zone.

Dr Kirk, Harrell and Melba Strimple  
and I walked southward along the bench  
made by the P. hunterillae shale looking  
for the old Wachsmuth locality but were  
not successful.

Dr Kirk relates that he and Melba  
Wachsmuth drove south from Puntigama  
burg Pike to point near the base of the hill  
close to site of St. Lukes Church where a cotton  
field narrowed to nothing, stopped the carriage  
and climbed straight east to the base of a  
3-5' ledge. Mrs. Wachsmuth instructed the  
colored men they brought along to dig there and  
they then collected from the shale and limestone  
just beneath the bench.

Dr. Kirk's description.

old shack of  
colored people  
with smoke and mud  
chimney.



afterwards they walked on the same bench  
(3) 150-200 yds north and got Acrocerinus amphora

26 Oct 1951

we walked about  
150 yds to a faint trail running  
west up the side of the hill  
appearing to be the base of the shale.  
Examined at sta 26b to take out  
crinoids at elev. 730 ft, made coll  
F-2 of 26 Oct 1951 from this zone.

4' massive ls.

USNM 3307

Coll F-2

of 26 Oct 1951

of 26 Oct 1951

of 26 Oct 1951

F-3

Coll F-3 of 26 Oct 1951 along the same path to the base of the shale  
containing P. hunterillae.

Returned to the court at noon.

Drove north on Ala 38 to SE cor  
of Hunterville to visit 9" narrow near country  
home. All are sand & limestone.

Returned to Ala 38 and drove south  
on Ala 38 to St. Lukes Church and went  
up the hill 100 feet, elev. 720 ft to the  
P. hunterillae zone. Secured about as high  
then climbed up to the P. godoni zone  
of the Gasper + 50' above. Coll F-4 of

USNM  
F-4  
3314

26 Oct 1951

26 Oct 1951 from the P. godoni zone  
of Harper from sta 26c

F-5  
USNM  
3309

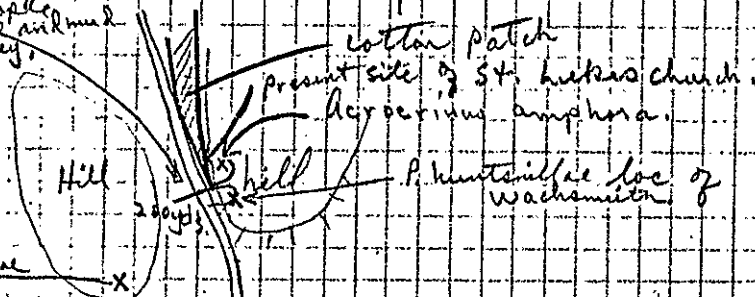
Coll F 5 D 26 Oct 1951 from  
bench at base of P. huntianillae  
zone.

Dr. Kirk, Harrell and Melba Strimple  
and I walked southward along the bench  
made by the P. huntianillae shale looking  
for the old Wachumuth locality but were  
not successful.

Dr. Kirk relates that he and Mrs.  
Wachumuth drove south from <sup>Wachumuth</sup>  
burg Pike to point near the base of the hill  
close to site of St. Lukes church where a cotton  
field narrowed to nothing, stopped the carriage  
and climbed straight east to the base of a  
3-5' ledge. Mrs. Wachumuth instructed the  
colored man they brought along to dig there and  
they then collected from the shale and limestone  
just beneath the bench.

Dr. Kirk's description.

old shack of  
colored people  
with stone and mud  
chimney.



afterwards they walked on the same bench  
(2) 150-200 yds north and got Acrocerinus amphora

Re find road  
Carver RR 2  
Drake in Good left side

Good left side  
RR 2  
H.D. Willcutts

26 Oct 1951.

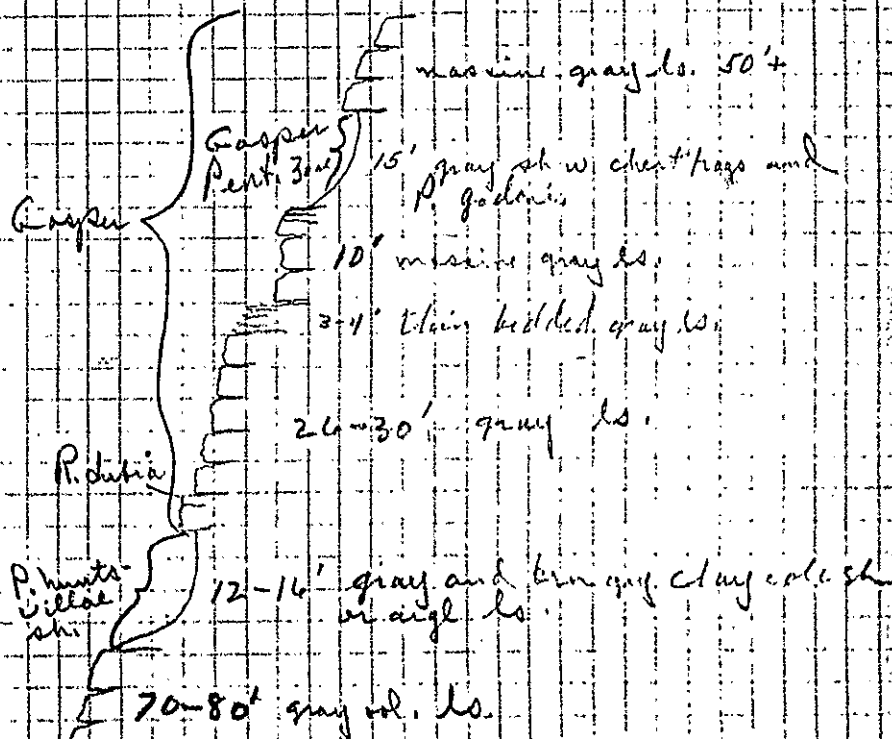
After tracing this zone to the south, found enough fragments of *P. hunterillae* to verify this zone, we found good exposure of the zone in cen S line, SE/NE sec 18, T. 5 S. R. 1 E. Nearly all of the zone is exposed. we then came down the hill just opposite Farley School. I walked up to car at St. Lukes Church then picked up the others and we returned to the camp at dark.

26 Oct 1951.

Next they went across the ridge west to the south end of a hill and collected slabs with *P. hunterillae* on a flat grassy field from which they could look out over the river to the south. Here there were on the south end of the hill.

we went up on hill (east) at St. Lukes Church (T. 5 S. SE 7 1/2 quad) to the *P. hunterillae* bench at elev. 725-733.

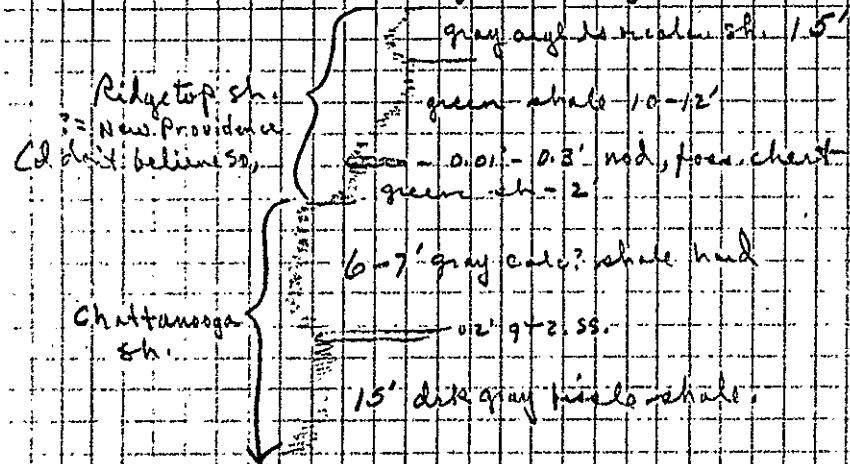
Section (cen S line NE sec 18, 5 S. 1 E.)





28 Oct. 1951.

Drove north from Goodlettsville on US 41 to Bakers Sta. Road  $\pm$  1 mile north of Jct. of US 41 and 31 W. Turned west and drove to Bakers Sta. crossing. Parked to east of R.R., didn't cross and examined the Chattanooga and Ridgetop. This is Basslers type loc. of the Ridgetop.



Drove north up the valley but could not easily reach the section at the south end of tunnel so went to US 41 and north to Ridgetop. Good section of Miss. just south of Ridgetop.

Turned east on Woodruff Ave. at the north edge of Ridgetop, went west  $\frac{1}{4}$ - $\frac{1}{3}$  mile to old store, turned 90° left to south 100 yds., took middle road down thru deep cut to R.R. at south

27 Oct 1951

The Strumples left us at 8:10 hrs this morning. Dr. Kutz and I left. The Park Plaza motel, 6 miles so. of Huntsville, at 8:25 driving south on Ala 38, crossing the Tennessee River. Drove south up Madway cone and onto Whitesburg mountains to elev. 1200'. The top of the mountain is Pennsylv. in age. Turned around and returned along Ala 38 to sta. 27a, S.W. 1/4 Sec. 12, T. 6 S., R. 1 E., Morgan Co. Tenn., where we collected. F. 1 of 27 Oct. 1951 from shales and limestones of the lower Bangor.

F-12  
27 Oct  
USNM

3316

Drove north to Huntsville and via US 241 to Nashville. Arrived in Nashville at 3:20 and visited Dr. C.W. Wilson in Garland Hall, Vanderbilt University (Garland Hall is on the S.W. corner of the campus). Examined their Crinoid collection and obtained information about White Creek Springs and Ridgetop.

Drove north of Nashville on US 41 and US 31 W to Goodlettsville to spend the night.



28. oct 1.95/

6-8 ft above road and 5-2 from  
10-50 ft above road level

36°19'25"N-86°48'59"

chest or argl  
siltstone. 60-80.

75

lt. gray c.  
Red clay sh.  
many fine  
fossils.  
most conc.  
'in top 15'

USNA  
3318

Few crin frags above  
this level.

5-2\*

-most of fossils of F-2 from  
this level. 720-760' approx

road.

USNM 100337

USNM 10033 } 22' as below  
3F-1 680-685' approx. } but pass. and  
675' } with casts.

Spillway

660'±

dark calc. Kool clay sh. 5' and 6' and 12' 4'

Fauna seems to occur throughout zone from 675-760' but there may be some zonation, this is doubtful.

Drove back to Goodlettsville.  
Learned that the best way to winter  
creep specimens is Nashville to Goodletts  
ville and, mile north US 41 to Dickin-  
son Pike, then left go to "

28 Oct 1951

- end of the tunnel. The mailman of Ridge-top uses this road twice each day to pick up mail, good gravel road. (Has been raining all day).

Spent a few minutes examining the sequence, looks like all the rest of the base strata reassessments, we're up with the gables.

Returned to Goodlettsville and drove west on Brick Church Pike toward Union Hill Church (Kidato p. 5), turned left and drove to Ficketts School. Gravelled ls. of Laurel (good crinoids) on fork of Shaw Branch (Sta 28 a) 1 1/2 miles south west of Union Hill Church. Had no chance to collect yet - get them Melocrinus and Eucalyptocrinus in road cut.

Drove to Lickton and turned north up Crocker Springs Road to old Crocker Springs. Drove to upper end of second lake where Mr. Bill Wallcut property (old William Crocker Springs farm) turned right thru gates across creek and 100 yds up creek to small lake and cut in north valley wall for lower New Providence C.S. Coll. from

base field  
x

1

Japan oil  
Lake

12

coll F-1 and F2 of  
28 Oct 1951.

29 Oct 1951

Dr. Kirk and I left Cookeville  
on Tenn. 42 and drove north toward  
Livingston, stopped in quarry just  
south of Livingston in Warsaw.  
Drove on Tenn. 42 to Monroe and  
3/4 mile north to Eagle Creek Road.  
Turned left to north and drove 3.6 miles  
north to mill on Eagle Creek.

Mr. Winingham  
operates mill  
at 4 am.

bluff  
wrecks.

Wingham  
Eagle Creek  
mill  
Eagle Creek Rd. (Livingston H.)  
cypress on road  
thickly exposed

mill pond

loc 3319.

WFS-1, 29 Oct

36° 29' 26" N  
85° 14' 5" W

Eagle cr.

loc sta 29a.

11 mi. ne Livingston

Tenn. 42

3/4 mile

To Livingston

Drove back to Livingston for  
lunch. Drove north toward Monroe  
on Tenn. 42.

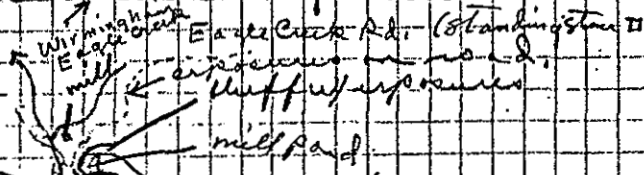
Livingston  
H. 11 mi. ne  
Eagle Creek  
3/4 mile  
to Livingston

29 Oct 1951

D. Kirk and I left Cookeville on Tenn. 42 and drove north toward Livingston stopped in quarry just south of Livingston in Warsaw? Drove on Tenn. 42 to Monroe and 3/4 mile north to Eagle Creek Road. Turned left to north and drove 3.6 mi north to mill on Eagle Creek.

Mr. W. W. Wingham  
operates mill  
at farm.

bluff  
wrecks.



GPS - 17 29 Oct

loc 3319.

36° 29' 26" N  
85° 14' 5" W

Eagle cr.

loc, sta 29a.

11 mi. N.E. Livingston

Tenn. 42

To Livingston

3/4 mile

Drove back to Livingston for lunch. Drove north toward Monroe on Tenn. 42.

28 Oct 1951

Bright Church Road, Union Hill Rd, Crocker Springs Road to White Creek Springs and E.L. Spaulding.

PP. 805-809

See C.W. Wilson, 1936 GCPG for section at White Creek Springs.

Address of H.D. Willcutts owner of White Creek farm.

R Route 2, Goodlettsville, Tenn.

Mr. Willcutts says that Mr. Drake formerly mail carrier of R. Route #2, Goodlettsville, Tenn. used to collect fossils in this area. He is now retired and lives in Goodlettsville. He may have locality data and collections.

29 Oct 1951

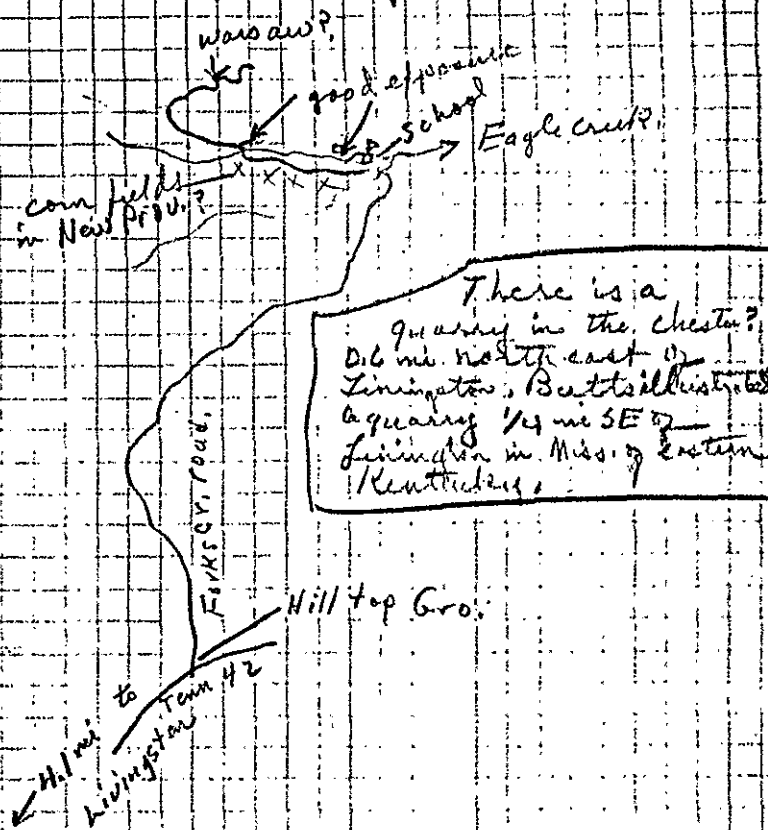
and Obey River and on the western edge of the Cumberland escarpment.

Drove <sup>10 miles north</sup> on US 27 to Helenwood Tenn. Then east on Tenn. 63 to Carasville, Tenn. Drove north on US 275 to La Follette and spent the night.

29 Oct 1951

at Hilltop Gro.

Turned north on Forks Creek Road 4.1 miles n.e. of Livingston and drove north to school on Eagle Creek,  $\pm 3$  miles from Hilltop Grocery.



Returned to Tenn. 42 and Livingston. Drove east on Tenn 52 to James Town, Tenn. and hence Elgin on Tenn. 52. There are good exposures of Miss. Cox in Big Indian Creek.

30 Oct 1951.

we asked him to check on  
G/ans 1937-38, Va. Acad Sci. Proc.  
p. 77, for loc. and coll. of *P. shensi*  
type.

asked him for locality on rim  
of Chester of western Va. we  
want to send him *Pulastri* for  
data.

Asked him of locality near  
Flaggon (Flaggon) or Flag  
pond, or Flaggon, Va, western  
part, Chester Crin. coll by  
Wilson.

30 Oct 1951.

Drove from La Follette via Tenn.  
63 to US 266 at Cumberland Gap.  
Drove to divide in gap then south  
to US 58 and east. Good Miss.  
section in Cumberland Gap, see  
Butts, *Geol. of Eastern Ky.*, Ky.  
Geol. Survey, Series 1, Vol. 7,  
1922.

Drove east to Dotts Va and  
US 241 and 241 east to Gate  
City and Va. 71.

Good Miss.  
Dotts section 5 mi east of  
Dotts.

Drove from Gate City on US  
58 and 241 to Lebanon and  
via US 19 and 460 to Blue  
field and Glenwood Syn and  
Rich Cr.

*Pentamerites mcalleys* Schuchert  
is from Glenwood Syn. Good  
Miss. at Bluefield.

Drove via US #60 to Blacks-  
burg to spend the night.

Passed Rye Cone (good ord.  
oystids) near Pounding Mill?.

Joined Byron Cooper at the  
Geol. Dept of V.P.T. and spent  
an hour or so.

51-25 Jy - 23-25  
51-26 Jy - ~~25~~ 26

51-26 Jy - 27-28  
51-3 Aug - 29  
51-5 Aug - 30

51-5 Aug 31-32  
51-13 Aug 33

23 - 26

27 - 30

31 - 33

31 Oct 1951

Drove from Blacksburg, Va. to  
Washington D.C., arrived at 1915  
hrs on 31 Oct 1951

6 July 1951

Visited L.A. Nelson and talked of examining the fossils in tomorrow, went down town for maps. Returned to court at noon. Drove to L.A. Nelsons courts, Desert Motel #531 Montana Avenue, El Paso. Dr. L.A. Nelson took Bill and I north on U.S. 54 to the Dona Ana Garret Range road and came to the pipe line road, thru Anthony Gap. Returned to El Paso and Desert Motel. Talked of fossils with Nelson this night to the west Texas State College to examine Nelsons collection of goniatites from the Tularosa Clay pits. He has an excellent collection. They seem to be from lower Virgin or upper Missourian rocks. Returned to court and obtained groceries after supper. Waiting for L.C. Bailey.

Notes appended to back

One E. Kirk and A. Bowsher 22 Oct  
to 30 Oct. 1951 in Tennessee.

Notebook: Arthur L. Bowsher, Assoc. Cur.  
US National Museum, collecting in New Mex.  
5 July to 15 August 1951. (also End + Ill.)  
5 July 1951

Copper left on the train for Washington at 0640. The train was scheduled at 0430 but was late.

Bill Allen arrived at 1730 from Washington.

Bill and I left for El Paso at 1310. Speedometer reading at Marathon 4637E.

Drove from Marathon to Alpine. Stopped at Sull Ross State College. They have a fair Dept. of Geology. Dr. V. B. Speers formerly Supt. of Keller town public schools, old friend of my father's is Public Relations officer with Sull Ross State College.

Drove north to Ft. Davis and McDonald Observatory, hence via 118 (good road) to Kent.

Ate supper at Van Horn.

Arrived at Mesa Courts in El Paso, 2 1/2 miles north on US 80 & 85 at 2200 hrs.

Acc. 191737

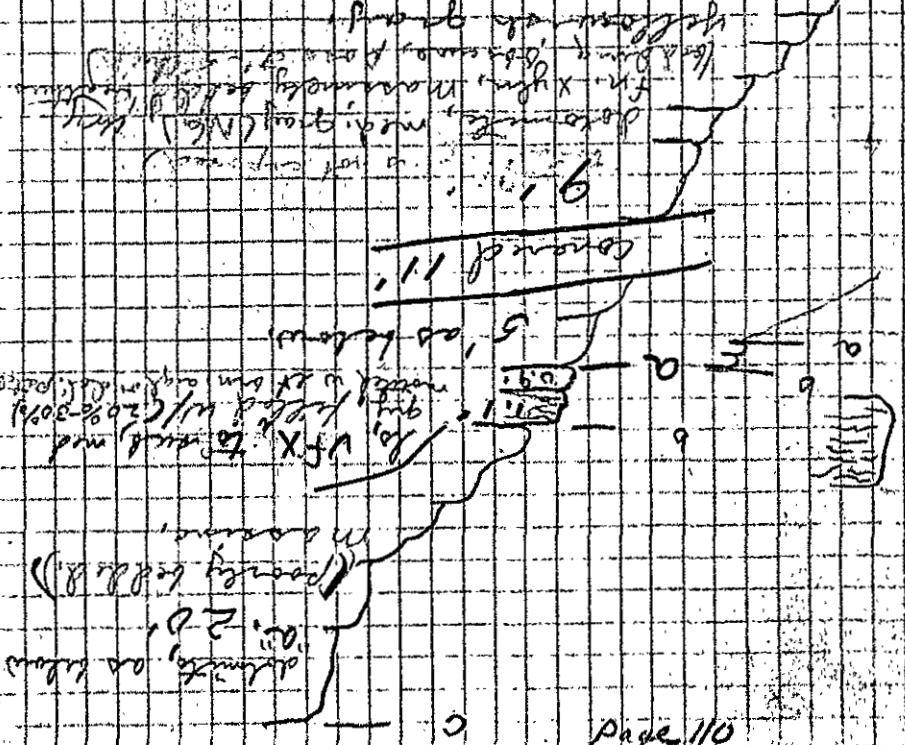


7 July 1951

at sta 7d made call F-1  
 7 July 1951 of pentamerid  
 from sta 7c to point  
 X (Hel 5820) S 17°W and S 89°E  
 from sta 7c to Y (hill)

Start approx 100' S of  
 gully or nose extending  
 east from hill at sta 7d.

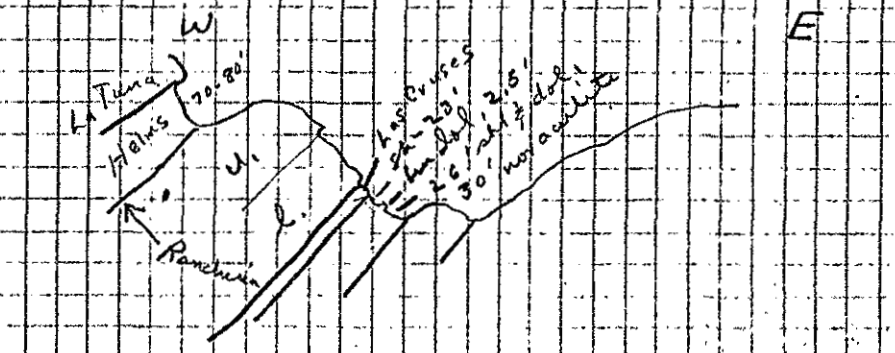
Bottom of section: (monoclinic  
 up section)  
 Dip 30° at



7 July 1951

L. C. Pray, Cal. Tech, arrived at  
 tourist court at 0800. we left  
 El Paso going north from city limits  
 on US 54, turn 30° NW at 2.2 mi, then  
 left on Dona Ana Target Range road at 4  
 mi, follow black top to 15.3 mi. Go  
 NW on Pipe line gravel road to 16.3, road  
 turn left go to Anthony Gap @ 22.6 miles  
 turn left and follow dirt trail to end  
 23.5 miles. La Luna on bluff at west.

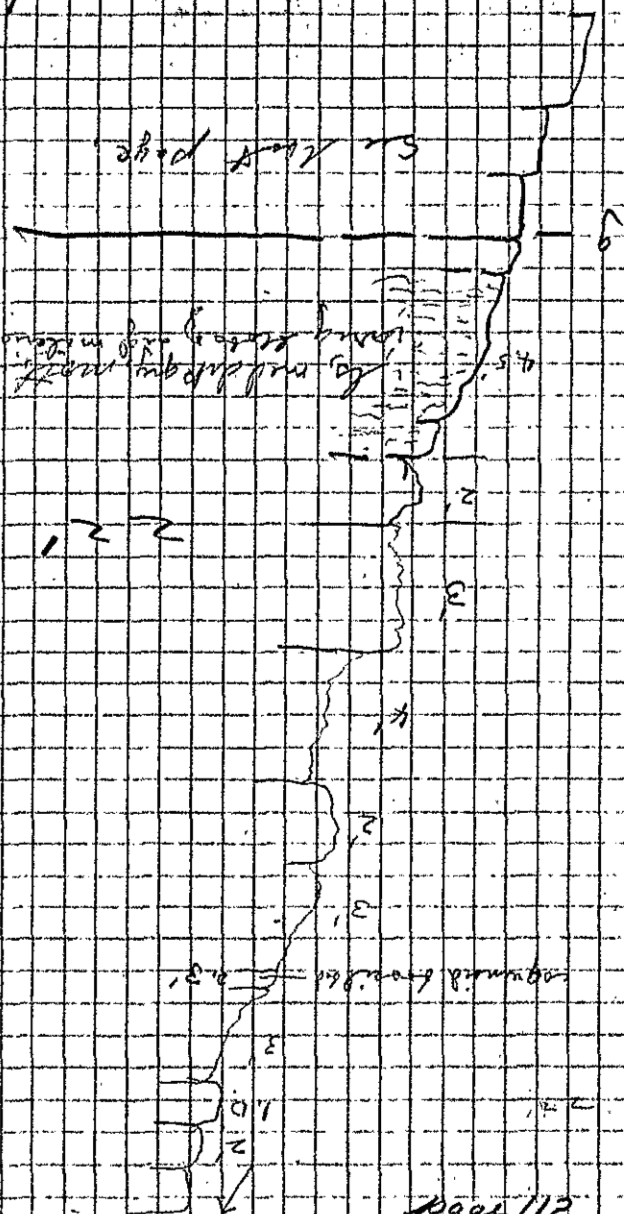
Left car at sta 7b. Climbed  
 to 6660' to base of Helms sh. then on  
 south east by saddle climbing down  
 thru Helms 60-80'. Rancheira upper  
 150', Rancheira lower 120', Las Cruces  
 140' to Comitillo at sta 7c



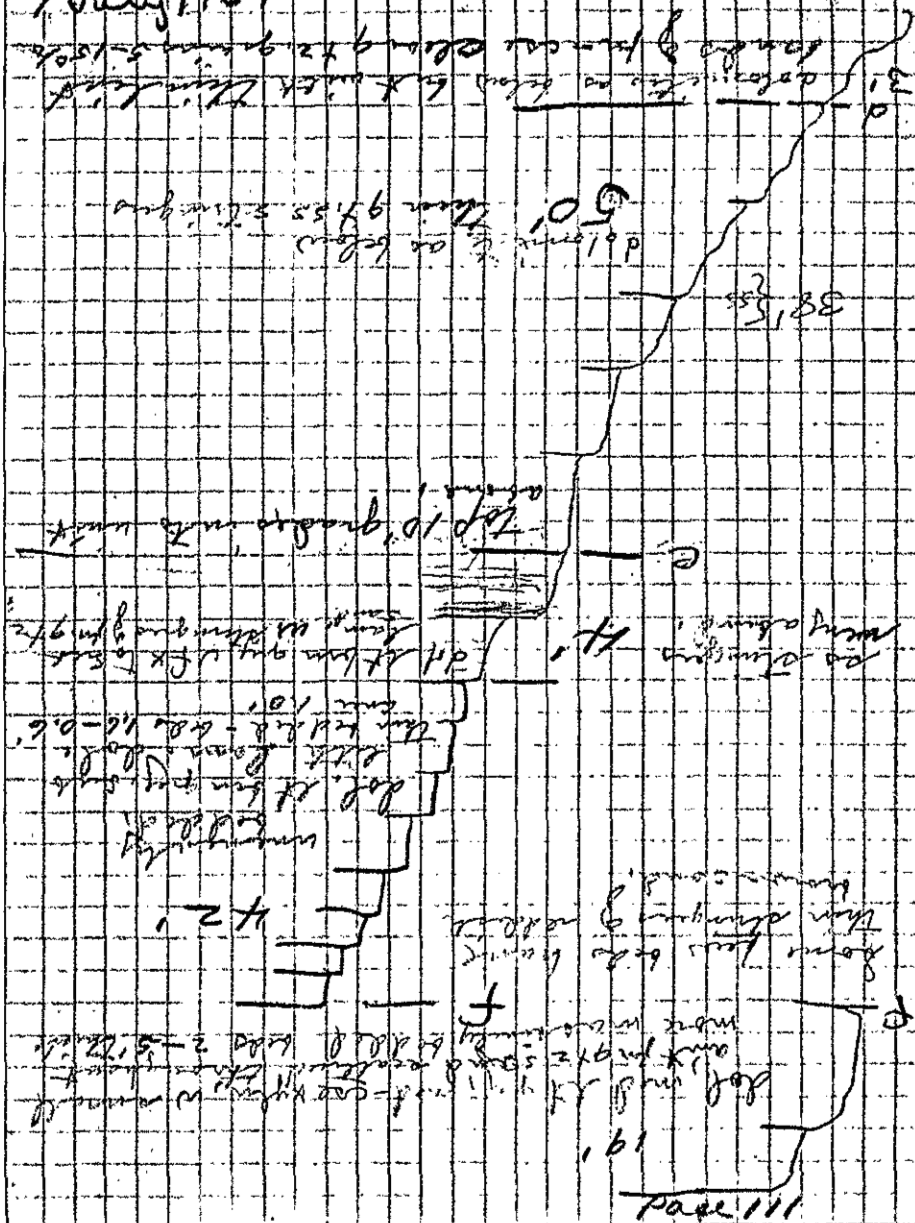
we walked on around to the  
 south east down thru 20-30 feet  
 of reddish gray dolomite, coarsely crystalline  
 Beneath this was 100'± of white  
 coarse crystalline dolomite which grades  
 down into dark gray fm. crystalline  
 dolo. The top part of this dark gray  
 fm. dolo. contains pentamerids



7 July 1951



7 July 1951

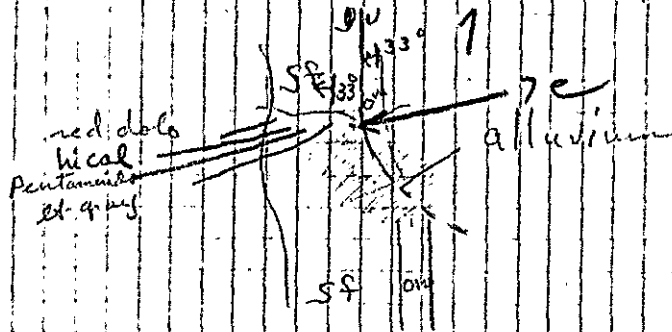




7 July 1951

for the night. Allen, Pray and Hogan joined Tom & we discussed and camped with Nelson in the evening.

Seems most likely that we were measuring thru the Montoya and across a fault into the Fossilman. All the section measured by us was Montoya. Coll F-2 is from top of Montoya north of fault. Coll F-4 is from Fossilman 10' above the fault.



7 July 1951

From 15' stone saddle in lt gray, in 2 yds dolomite coll F-4 of 7 July 1951.

From 25-30' above saddle coll F-3 of 7 July 1951.

There is lt gray for 1 yd dolomite nearly to top of hill to the dark of even. Numerous beds. Probably 130-150' (not measured) below the Pentamerus beds. These beds are approx. 30' thick. Pentamerus at coll F-3 of 7 July 1951 near 5000'.

Returned to car and went west toward Anthony along pipe line road. 1 mile west of the pipe station in Anthony, go to the right fork, take left fork at 5.5 miles, road comes in from right at 5.9 mi, turn left at 6.0 mi, road from left at 6.4 mi, US Highway 80 at 7.0 mi, turn left, 1/2 R mi. west, 1134 ft, 0.1 mi S of turnoff to Anthony Gap. Texas line 0.7 mi S of turnoff to Anthony Gap and Anthony post office 1.7 mi south of turnoff.

went to J. H. Nelson's Desert Motel at 4531 Montoya on highway 80 to stay the night. Pray stayed in

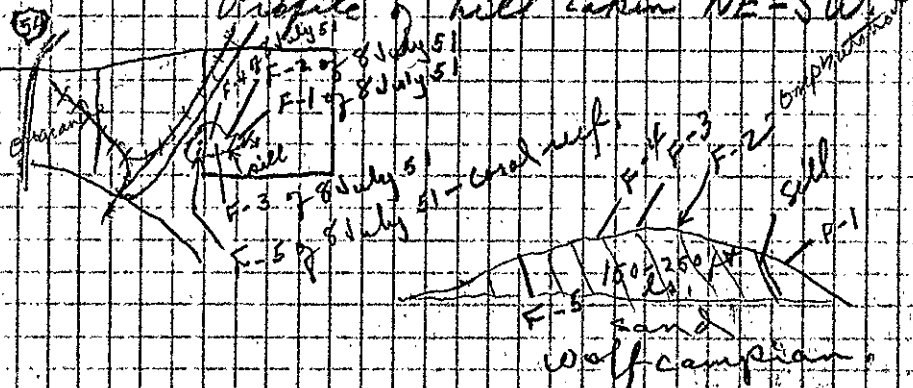
8 July 1951

Left El Paso on U.S. 54  
at 0845 going north to Alamo-  
gordo after talking with Speedy  
a while.

Drove to crop circle, turn  
right on first road to right, cross  
RR at           , turn left along  
trail, thru gate @           , stop  
at           . Walked north east to  
top of hill and down slope to SE corner  
at Sta 8a.

From allusion on SE corner to  
shale silt is                                   
several shades of it to med dark grey,  
semi lithography breaks into blocks  
along shear zones. Little lithology  
break in this part. No major litho-  
logic break in the section down to  
level of F-5 of 8 July 1951.

Profile of hill taken NE-SW



51-7Jy-01



51-7Jy-01



8 July 1951

Drove on to Alamogordo for dinner. Stopped about 10 miles north of Organito at hill to west of the highway. The ridge well exposed to be a formation is even bedded and gray ls with no fossils.

Drove on to Alamogordo, arr. at 1500 hrs, ate dinner 1500-1600.

Wrapped and packed fossils and cleaning trucks 1600-1700.

Left Alamogordo at 1700, and drove to Pridy's field camp (California Institute of Tech) 13 1/2 miles south of High Rolls on the west side road.

Ate supper with his wife, talked about the Shinarump Canyon and Kryptos section. Saw them a talk about the breccias of the area.

Left the CITT camp at 2230 and Alamogordo at 2400.



9 July 1951

Drove south of Alamogordo to Valmont and south of Valmont to m.p. 134.5 on Santa Fe Ry. Go to 22nd ~~feet~~ <sup>feet</sup> ~~long~~ <sup>long</sup> pole south of Valmont to gate with 6" of water. Dip on either side of gate. Turn left, cross the R. transfer going east. Road from right @ 3.9, road to left. Keep straight at 4.1, keep straight ahead (further) at 5.6, turn rt. at 8.0, turn left 8.5, enter canyon 11.3, Horse Ranch (Dadley's place) @ 14.6.

Visited Dadley to get permission to work on his ranch.

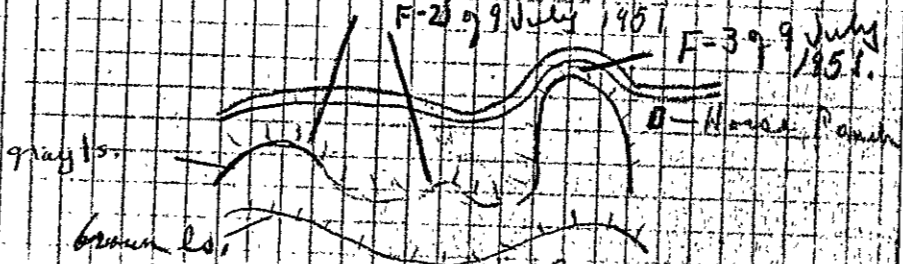
Turned around and drove back to west 0.2 mile to Cen SW Sec. 34, Twp. 19S, Rge. 11E.

Climbed hill to look for crinoid bed of Keyte. Did not locate it.

(USNM Loc 3296) F-13 9 July 1951 (sta 9a)

F-29 9 July 1951

F-39 9 July 1951



8 July 1951

Drove on toward Alamogordo for dinner. Stopped about 10 miles north of Escondido at hill to west of the big house. The ledge which seems to be two or more is even bedded and gray ls. with no fossils.

Drove on to Alamogordo, arr. at 1500 hrs, ate dinner 1500-1600.

Wrapped and packed fossils and cleaning truck 1600-1700.

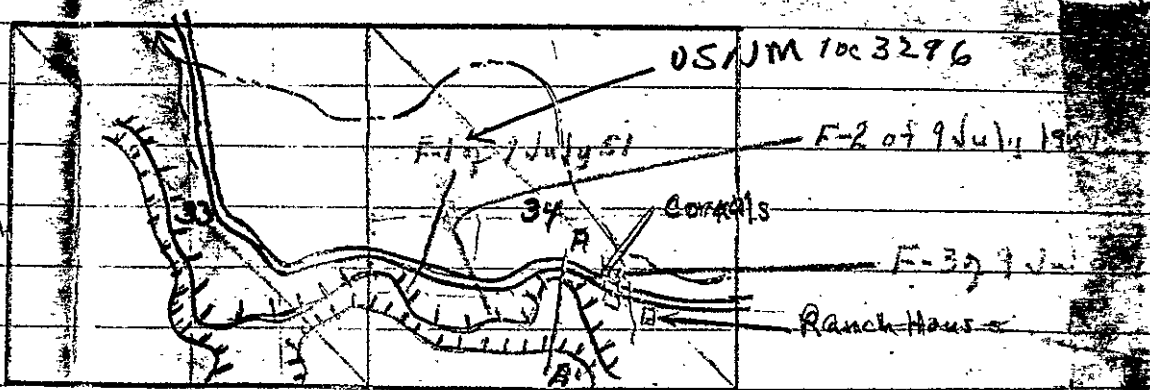
Left Alamogordo at 1700, and drove to Pridges field camp (California Institute of Tech.) 13 1/2 miles south of High Rolls on the west side road.

Ate supper with his party, talked about the Grayson Canyon and Keyte section. Saw them a ~~few~~ <sup>few</sup> about the ~~hills~~ <sup>hills</sup> of the area.

Left the CITT Camp at 2230 and Alamogordo at 2400.

USNM loc 3296

Twp 19 South



Rge 11 east

A'

A

4' sh. gray - weathers brown  
10' covered

8' LS, lt. gray - weathers to dusky brown - conspicuous Red-brown ledge

6' LS, med. gray - algal

65' sh. & ss, green arkosic

S ← → N

F-1 & F-2 of 9 July 51

5' LS - covered

Marginalifer

7' LS, med. gray

Silicified brachiopods & Productids

6' sh.

8' LS, algal, dk. gray

algal

14-16' ss & sh. mostly covered

F-3 of 9 July 51

18' ss, massive red & white coarse qtz.

P 119

Road

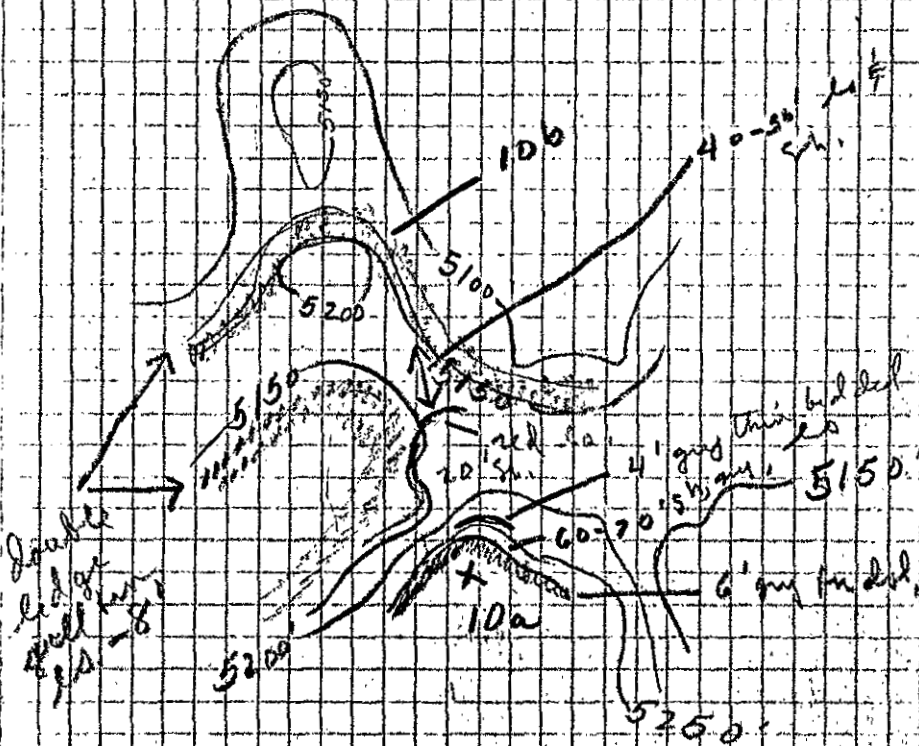




10 July 1951

Drove south from Alamogordo to Horse Ranch & Old Glinn Lee Ranch in lower Arapimino Canyon. Parked at nose 150 ft. west of house.

Crested to nose and watered  
mouth to high point of the ridge  
1 1/2 - 3/4 mi. south of Ranch House.



Page 123

9 July 1951

9 July 1951 Returned to Old Juniper and  
 F-7 99 stopped 100 yds. SE to make call.  
 July 1951 F-7 99 July 1951. F-7 30 from 6'  
 below F-5 of 4 July 1951.



Returned to Horse Ranch  
and to sta 9a where we packed  
up the blocks of starting fossils  
of E-1 of 9 July 1951.

1 We did not collect F-3  
2 9 May 1951. We will collect  
3 22-30 May 1951.

Returned to a lamograde  
at 1700 hrs

100-122

9 July 1951

the above

FN

F-72 9 July 1951

USNM 104

3305

F-50

9 July 1951

USNM 104

3302

Bowsher, A. I. 1986 NMBMS

MR, Circular 197

Platystrophia

EXSULACRIPES

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

g. g.

Abol lower red bed  
red sand & lime green  
sandstones with beds  
hard dark grey calc. 550.  
Some fine beds  
10 ft.

3305 - see Cooper, 1954, J. N. L.  
Paleontology, Vol. 130, No. 3, p. 572-  
530, Pl. 61.  
Cooper, G. A., 1957, P. L. L. 4267  
Smithsonian Misc. Coll. V. 134, No. 3.  
Cryptocantha

Drove up the canyon to sta.  
9c in the Yeso fm. to get oriented.  
Turned around and drove down  
to sta. 9d approx. 200 ft below  
the base of the upper Abol red beds.  
Found ostracodes in the shales and  
limestone in the lower part of the  
"Huaca 15" formation. F-62 9 July  
1951. Rd bed about 30 ft above  
the coll. horizon.

Island sh. w/  
ostracodes  
F-62 9 July 51.  
Red bed

Page 1201

9 July 1951

Section at sta 9a.

F-1 and F-2  
9 July 1951

Section on hill beside road  
at Horse Camp.

F-3 9 July 1951

road.

We then drove on up the road  
to camp, 1.2 miles above the Horse  
Ranch, to Juniper tank 3.7 miles  
above the Horse Ranch at sta  
9b, 0.1 mile and 30-40' stratigraphi-  
cally below the base of the Abol small  
coll. F-4 9 July, and 100  
yds south of Juniper tank  
where coll. F-5 9 July 1951.  
from 15-20' below the base of  
the Yeso fm.

10 July 1957.

10, grey, underneath brown, 4' covered 10'

8

ls. lit. qu., weathered  
lucky vein. p. red  
red. lit. g.

C 1 lbs, med mag  
us in many parts of the  
chips at 1/2 lb

covered but  
green, arsenic  
SS in soap.

Excellent coll. of  
shifted gastropods.  
in Antilleanan Invertebrate

*Ch. med. gey* w. r. 1849, 5  
*marginifera*

9-10" core of  
laminated clay sh.  
2-3' sil. sand  
and gravel

F-1  $\frac{1}{2}$  sat. Prod 17  
F-2 29 med prod  
July 1951 1/2 ym ls

Page 124

3-4' ~~lx~~ - me 1 dark group, 1  
for x gls. w post. 1  
sheds 2 to 1.

covered but with few  
red muds - see p. 2, 15  
and probably minor  
phases

F-3  
9 July 181

ss, massive, red, north  
white & red clay  
ss beds 0.6 - 2.5'

Large, covered but so as  
above (red to buff) with limo  
or small pebbles large. in  
lower part

18-20' ss, thin bedded  
flagstone, mottled red & white  
and is fine gray.

Went due north of Horse  
camps to bluff overlooking  
river went down to the bottom  
of the section where alluvium  
lies at base of slope.  
Is about 50-55-60 feet thick needs  
for another 25 ft down. Top  
of massive ls. at 5130'. This  
grade approx 90 ft + above river.

Page 28

Page 22

10 July 1951

60-70', probably limestone.

Valley alluvium covers about 35 feet.

Overlain by 40 ft. of  
grey fine med. x. ylm. ls. congl.  
gray bed at top.

Overlain by 5' thin bedded  
shaly, brownish gray ls. with brown  
brown.

Overlain by 7' of grey med  
are x. ylm. ls. with slight faint  
weathered tint.

Overlain by 18' thin  
bedded, aren. argl. ls. which  
weathers to brown and red shales.

Overlain by 6' of grey  
fine med. x. ylm. ls. with  
ls. 4' ditto.

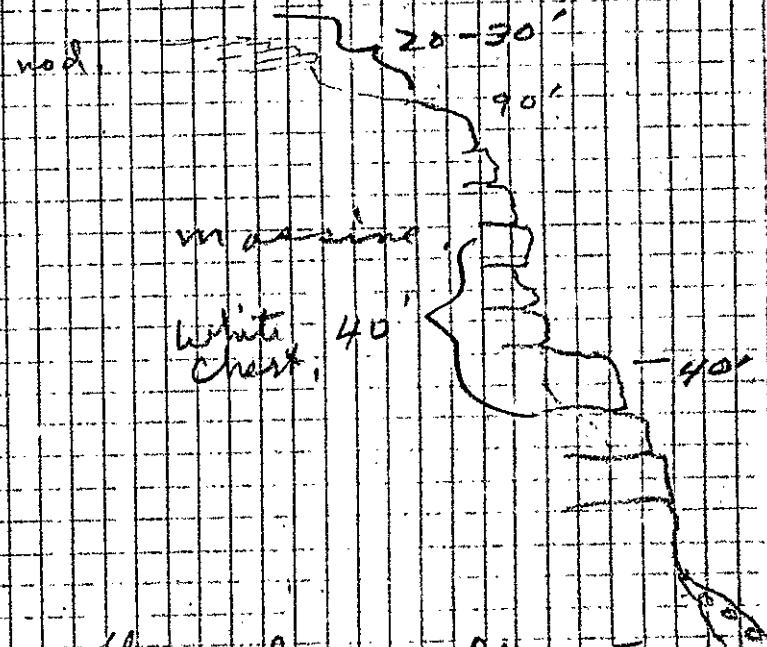
Overlain by 30 feet of  
same kind of ls. as above with  
just north of the base camp.

This top limestone  
lies approx. 100-120' strat.  
gray shales below the road  
where we call F-30, 9 July  
and fossils on 9 July 1951.  
F-30, 10 July 1951. The  
strata in between are mainly  
ls. 17'

10 July 1951

lt grey, fine x. ylm. semi-lith.  
ls.

Above this is 20-30 ft  
thin bedded, aren. nodular,  
fine x. ylm. ls. with  
corals and brachiopods.



The nod. is an limestone  
overlain by 35-40' of med. grey  
fine x. ylm. ls. - lith. ls.  
which forms the top of hill  
0.5 mi. north of the base  
camp.

S. slope is little covered  
for stratigraphic interval of  
approx. 126'





There are problems at this level  
may be a fault.

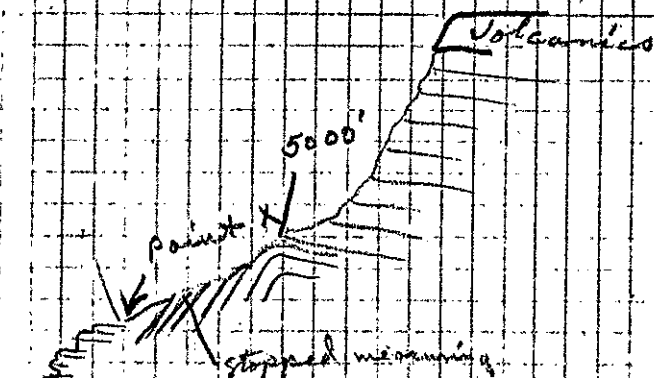
8 1/2' / 6-8'

X

[illegible]

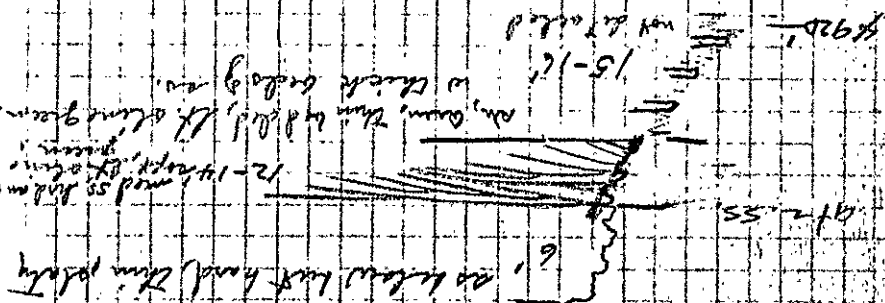
11 July 1951

at this point sta 11b, elev. 4910'. we discovered that beds from point X on page 131 to this level we climbed to 5000 feet where beds are again normal. Sketch indicates conditions on the hill side.

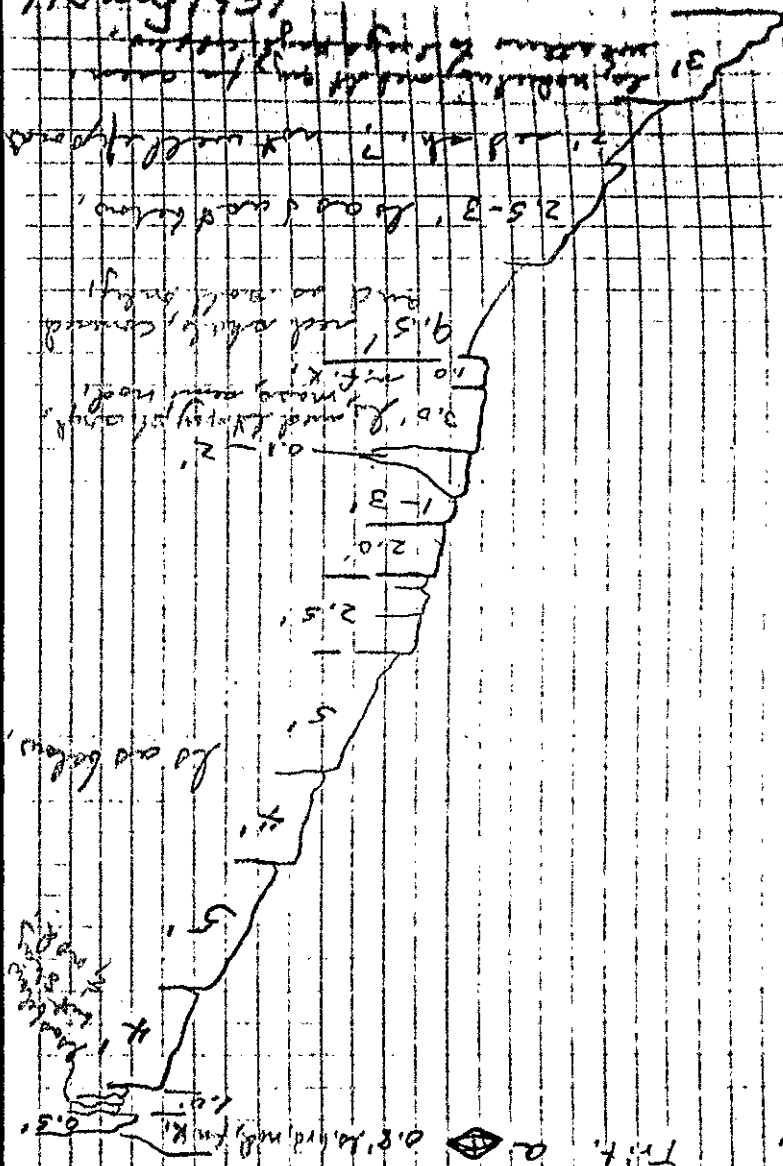


At this point discovered that we had not gone on far enough up the canyon. went on around to sta 11c (CTF-6-12).

Started section at the top of the cliff on the NW bank of the creek.



11 July 1951



11 July 1951


After dinner we drove to the Taosja locality north of Grand Canyon. Road c/n SW NE Sec 30, 15E, 10N.

Base  
Bureau  
F5 gll  
1951

$H, a, b, c, d, e, f$  are all from the same line.

20-25' is at top of hill  
about 1/2, e.e.

3' bacho etc

Cold zone.  aryl. ls.

F-59 11 July 1951 Is from the  
age nod. ls. found above Thompson's  
bed 94 and below the basal Gough  
the Permian. Not in Thompson's  
section.

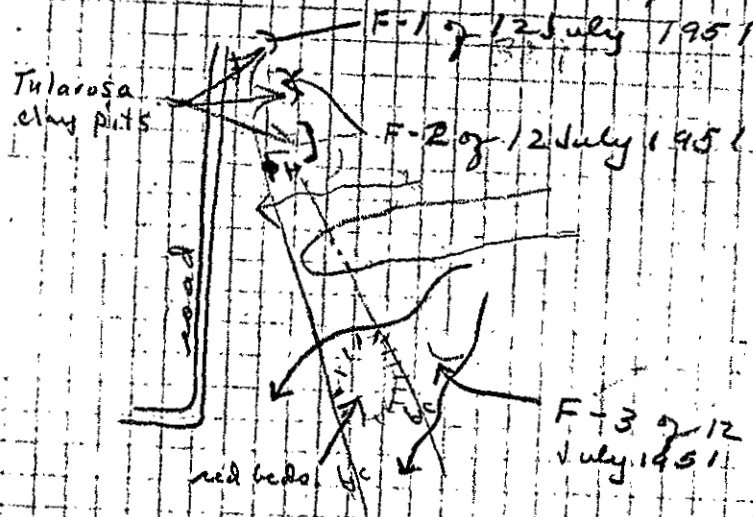
11 July 1951

11 July 1951



12 July 1951

Bill and I drove to La Luya to meet Carl and I drove to the Tularosa Clay pits followed by Bill while Carl and I walked over the clay pit area. Bill collected fossils.



We drove north from the pits to the highway. Turned east (to right) at the highway. Take trail to right approx 1.4 miles east of Tularosa, go thru a apt and take right fork at 2.6 miles. Left turn at 3.2 mi, take apt fork at 3.8, take right fork at 3.9, take left fork at 5 1/4, take right cen. fork of sec 35, 1/4, R 10 E, we parked the car before we dropped over the rim of the canyon because there is no where to park.

These forms are printed by Govt. Printing office.

16-37601-1  
Form 9-076

12 July 1951

1.0' limestone bed shaly and num.  
may be largely  
a limestone  
dark gray, thin bedded, platy, fine med  
no weathering shaly bed.  
makes a massive cliff  
2.2' high

4' soft shaly ss

hard, massive but thin bedded  
ss.

Sequence here is

red beds

also

clastics

see p. 187.

limestone

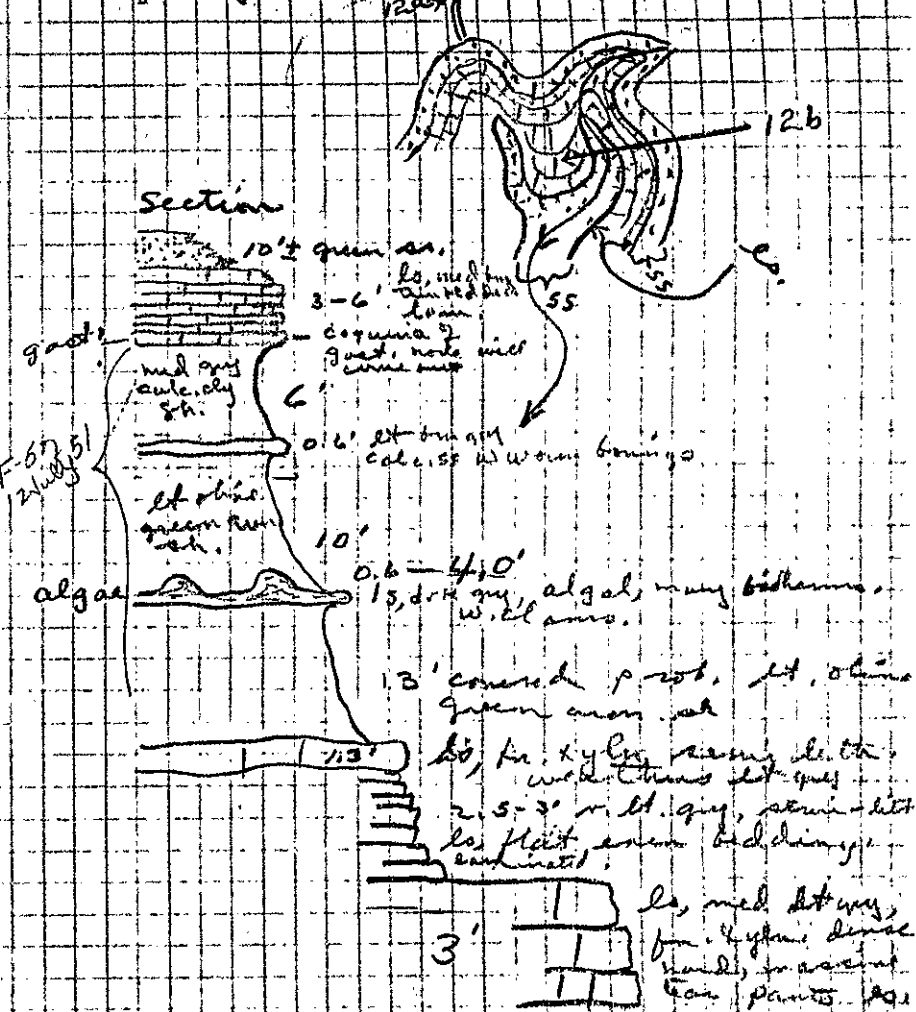
clastics

we next walked WSW 0.5 miles  
to a gray shale exposure at sta 12c in  
the Pecos river. The intrusive  
at dinner. This section is well  
below the limestone at sta 12b.

Section is as below (see next page).

12 July 1951

To turn around down in the canyon  
went SSE to canyon where the  
limestone is shown in the  
canyon at sta 12b.



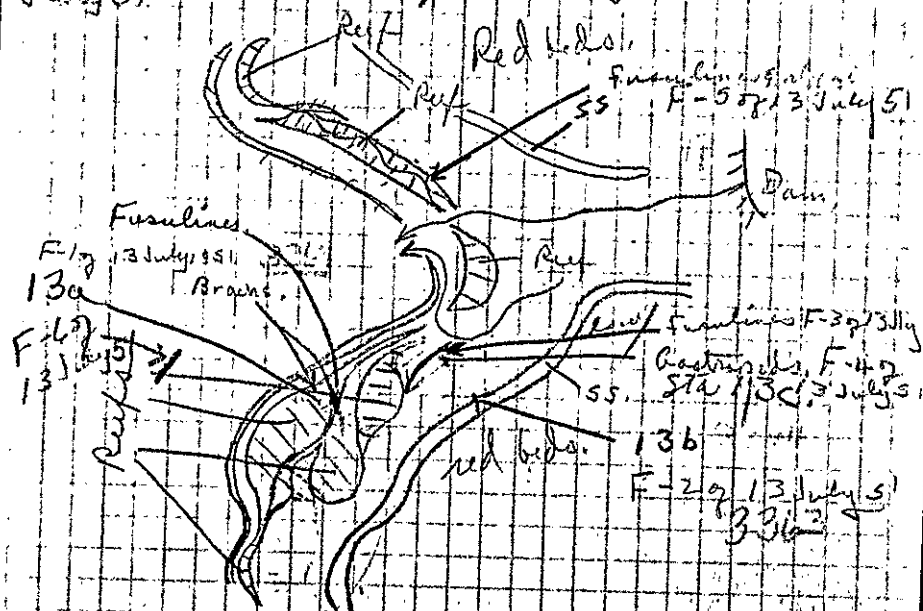




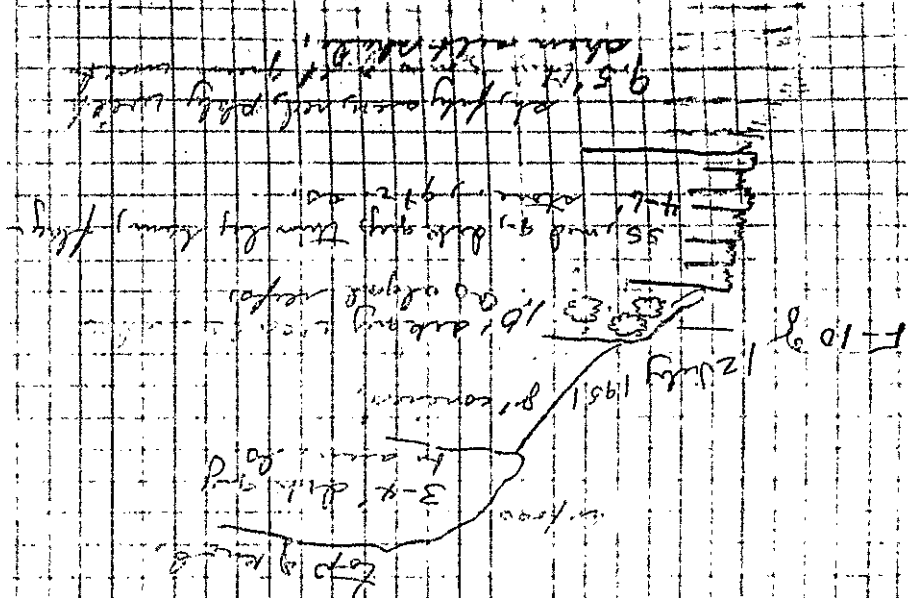
13 July 1951

Bill and I drove from Alamogordo to Llanos following the main highway turning right at Summit to Three Rivers. Road is one mile, then left on gravel road for one mile, then right for one mile, stop near Mustang Farm. The hills on the back of the farm are capped by algal bioherms. Bill and I climbed to Sta. 13a to examine the bioherms. These bioherms are made essentially of algal, only occasionally does one find brachiopods. Those we did find were in nodules in beds at the base of the bioherms and in peripheral beds of the bioherms. F-13 July 1951

F-13 July 1951



Page 142



Page 141

13 July 1951

\*1  
\*2  
\*3  
all along, all 14 w, potatoe chips  
along.

lt grey, sandy, siltstone.

lt grey, sandy, siltstone.

sh as above with semi-lith  
limestone nodules.

1.1'

6' sh

0.2' x 0.2'

24'

2.0' hard siltstone.

4'

2' hard siltstone.

13 July 1951

We then climbed down the slope, the  
bushes to the shore which fill the inter-  
val area, and climbed to the base of the  
cross laminated or it sta 13b.  
Section as below

5.5' lt green, grey and red  
mud, pitted, 9 ft ss.

0.7' sh silt, clay, calc, green, hard, pitted, nodules, ss +  
shale, lt green, soft, pitted, 9 ft ss.  
F-29  
13 July 51  
331.7  
silt shale, hard, olive green, plates with  
Prod.  
clay sh, lt green, soft, pitted, paper sh.

sandstone, greenish brown, hard, pitted, 9 ft ss.  
9 ft ss w. clams, allonites etc.

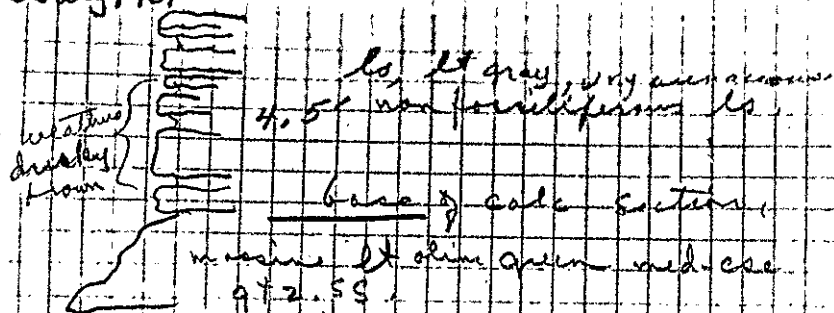
\* shale and nodules, fm. area, 0.4  
calc. red silt shale and 1.1' ss  
\* lt grey, blue, lt green, fm. 1.5'  
\* potatoe chips algae, not predominant  
\* brachiopods and gastropods.

sh w/ thin nodular ls.  
sh, thin, platy, green, greenish  
calc, greenish brown and  
olive green  
ls, lt grey, algal, area,  
nodular.

3.5'

Page 1113

13 July 1951



Carl Otte came over the hill from the south. He collected at sta 13c. He went on to continue mapping in the B.W. and drove north to sta 13d.

Sketch of topography on north wall of canyon below:

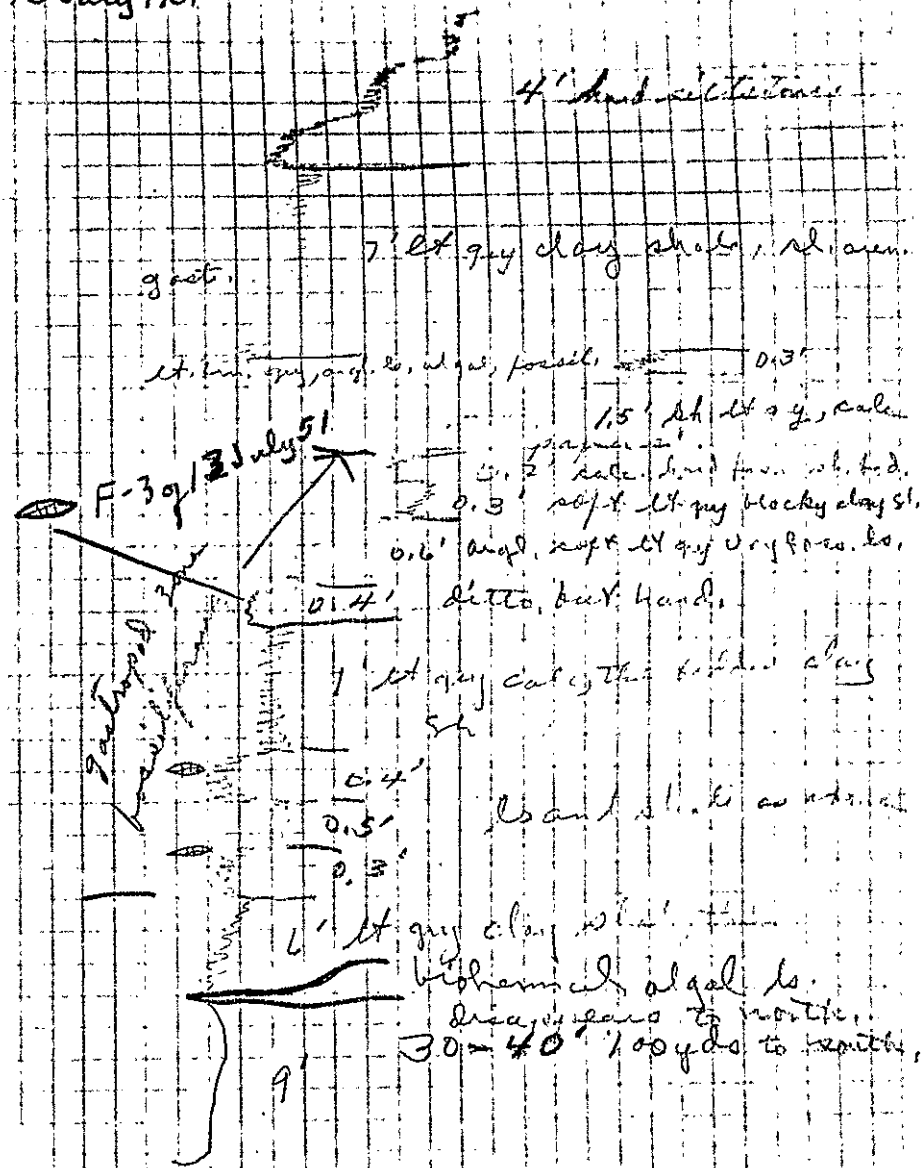


There is one bed of ls. in the cluster of sub-terranean beds at sta 13d.

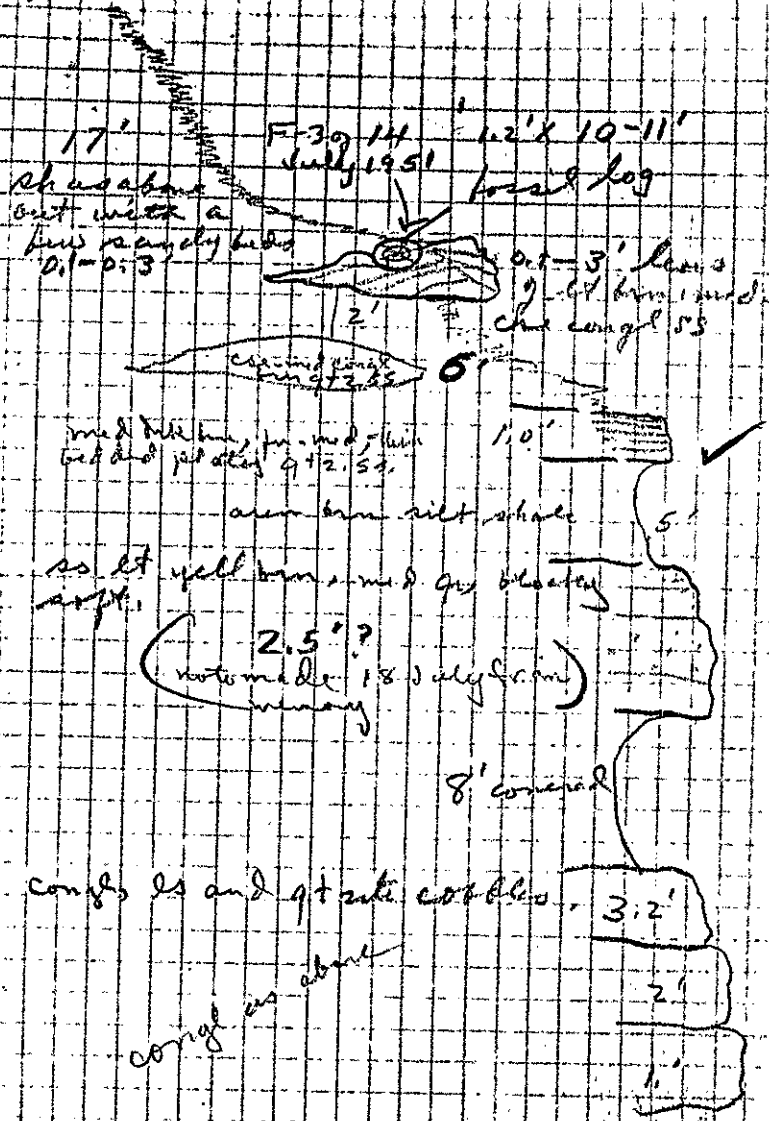
On way back to car found some algal bed at sta 13c. coll. F-6 of 13 July 1951 from this bed.

Rain started at 1:00. Ret. to Alamo G. & G. Hill.

13 July 1951

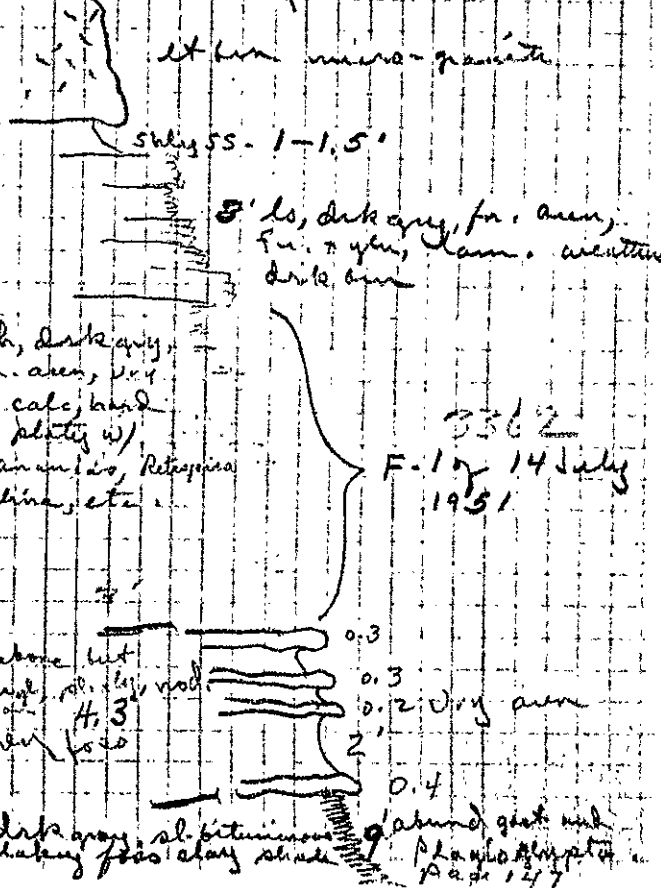


14 July 1951



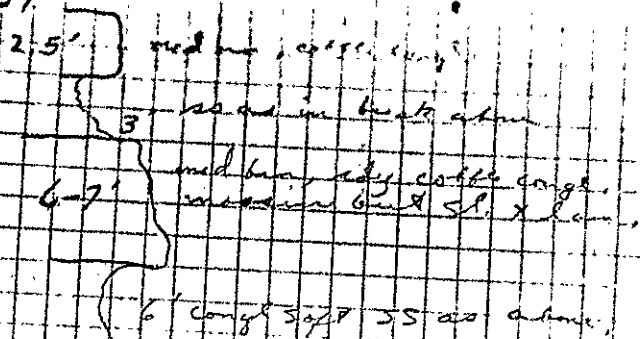
14 July 1951

Bill and I drove to La Juez and met  
Carl Otter. Carl and I drove in his car  
followed by Bill in the truck north  
1/2 miles on the old Cloudcroft road,  
turned north and went 0.4 mi to  
point just south of Taylor Canyon.  
We walked up the canyon to the 72' shale  
shale in the top of Otter's "Burrhead"  
14a just beneath the micro-granite intrusion  
sill. Section starting at 14a.





14 July 1951



med br. calc. congl., gl. z. it. white clay, etc.

This congl. sec. is characteristic and is the one just above the Tascia zone at the Tan Lung Pitting.

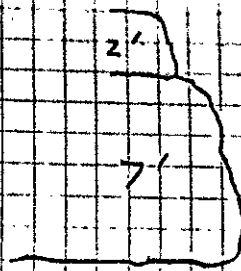
lt. yell. br. sh. shaly med. ss (etc.) very argillaceous



ls. dark gray, fine grained, very arg.

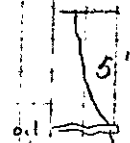
sh. ss as above

14 July 51

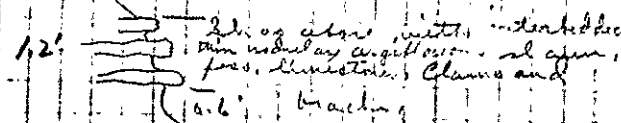


Variable may be ss interbedded w/ congl. or sh with congl. etc.

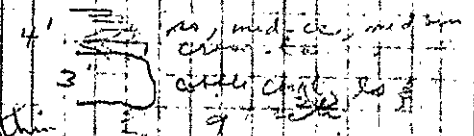
Bill and I were unable to measure this shale interval on going up the gully from the SE to sta 14a. We found that there were thin argillaceous limestones just beneath the conglomerate which were very fossiliferous as below.



sh, lt greenish gray, fine grained, calc. w. fossil fragments



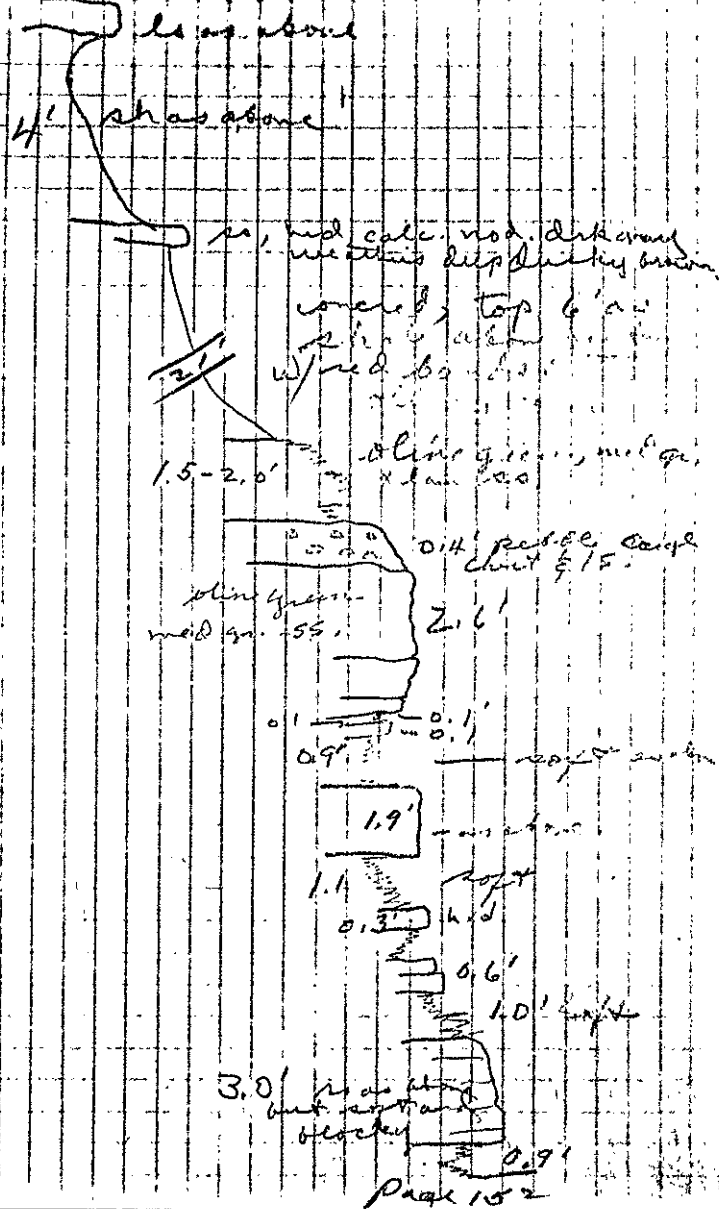
These beds are in the top 6-7' of the shale below the congl. I estimate 1120 ft. shale, but can't find section. This shale lies on



14' ss, lt. yell. br. thin bedded (2 in), med. br. calc. at 2154.

Disregard section further to page 151

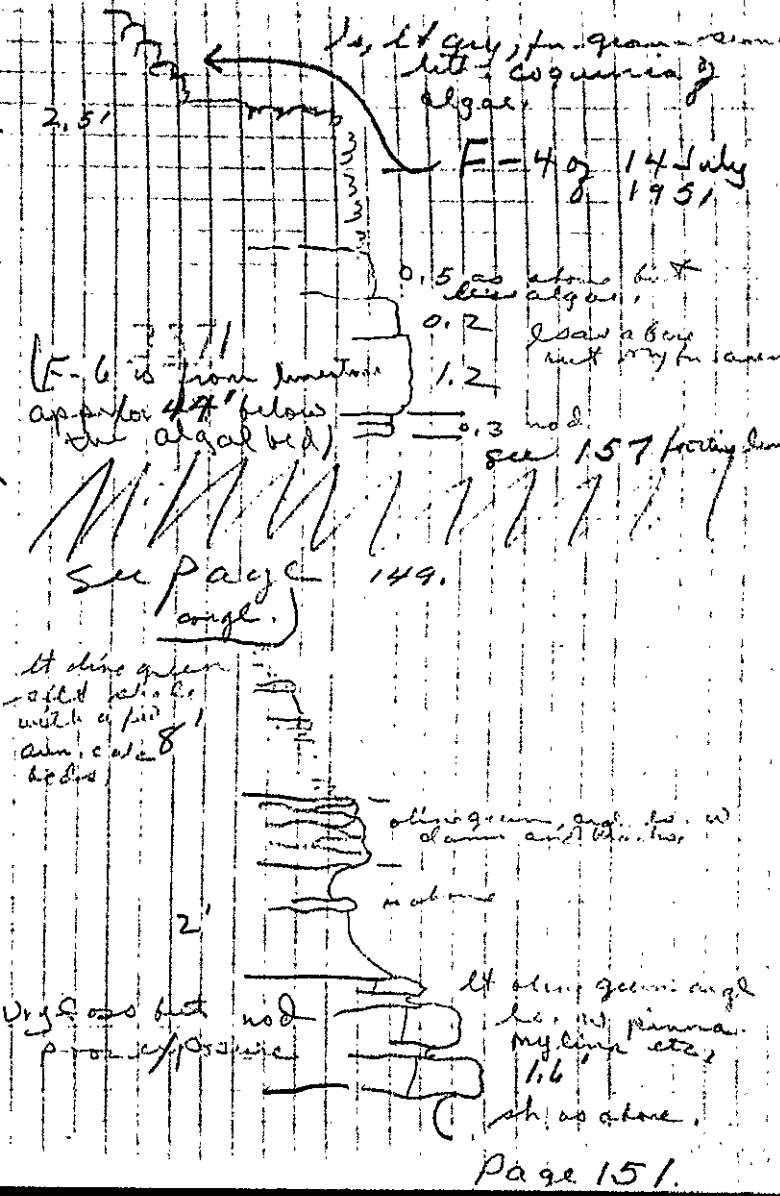
14 July 1951



Page 152

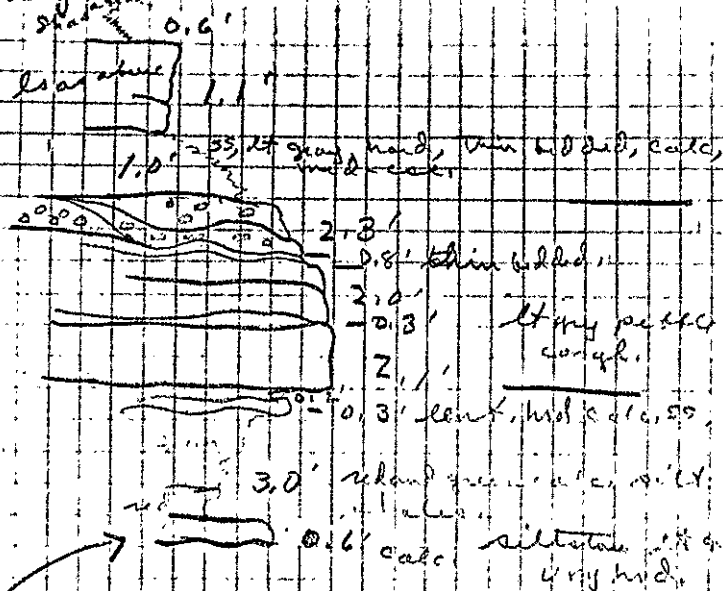
14 July 1951

base of Burroughs 2' top of Fossil



Page 151

14 July 1951

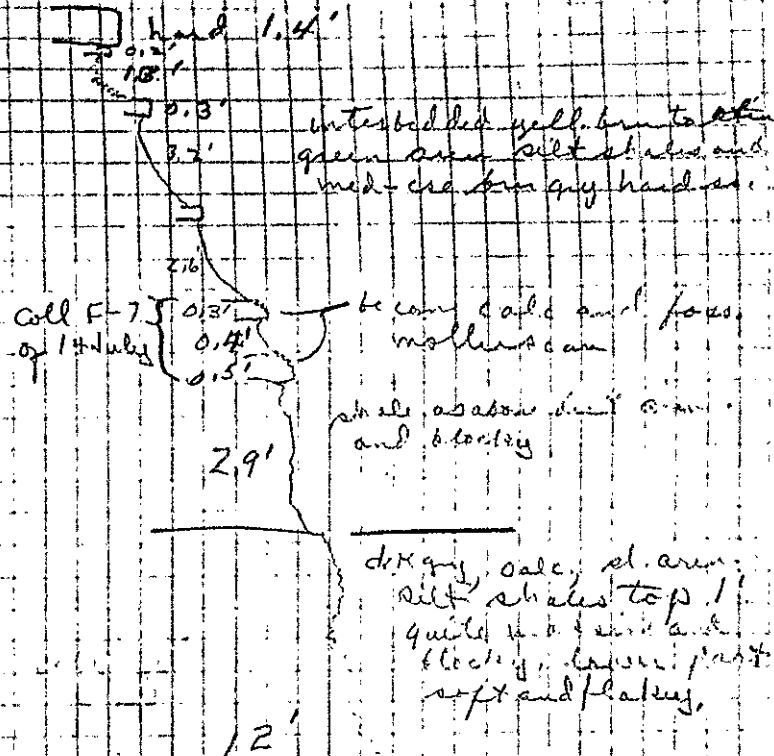


we ate dinner at this level then walked up stream to shale from which we made coll. F-1 and F-2. 14 July dips into the canyon. made coll. F-9 from this 67 ft shale.

- 0.6' sh, lt olive green, med
- 1.5' ss, lt olive green, very calc, algal?
- 0.8' ss, med olive green, med calc
- 2' covered part so soft, lt olive green

14 July 1951

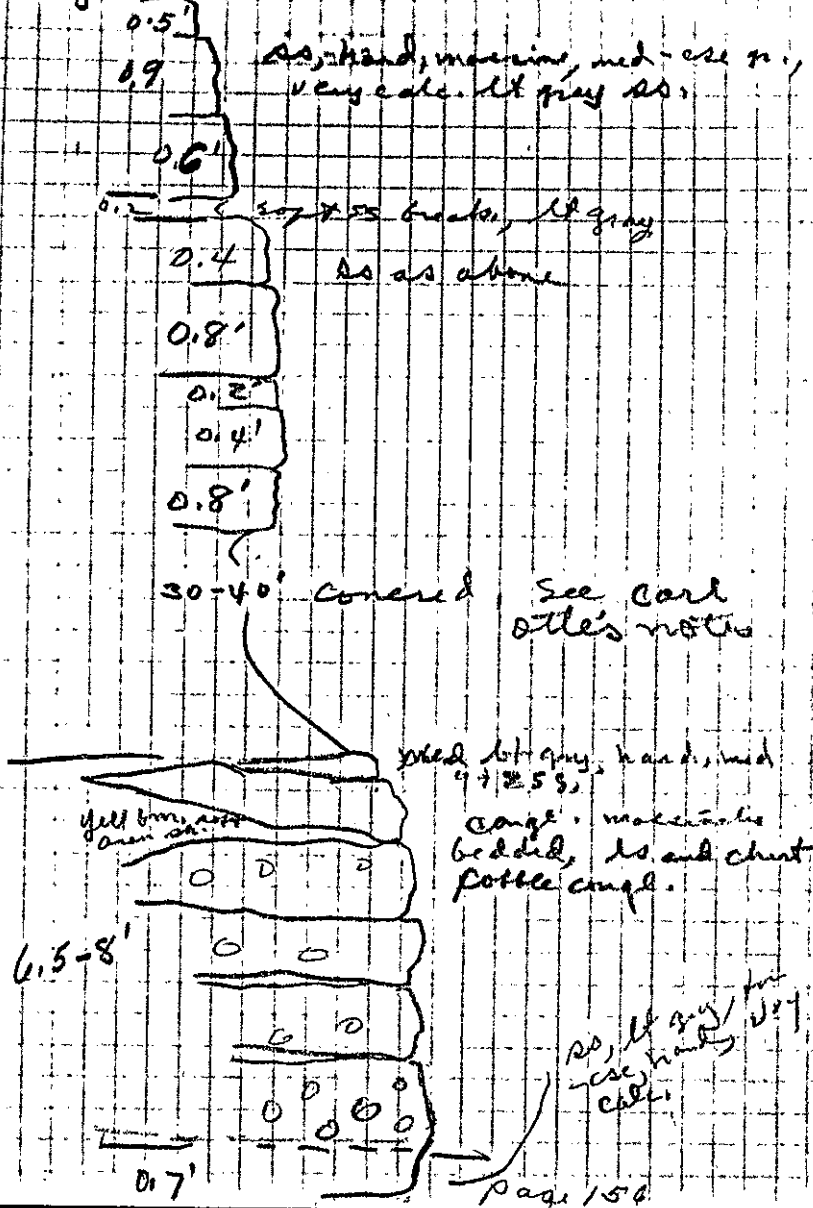
coll. F-6 Sep 1951



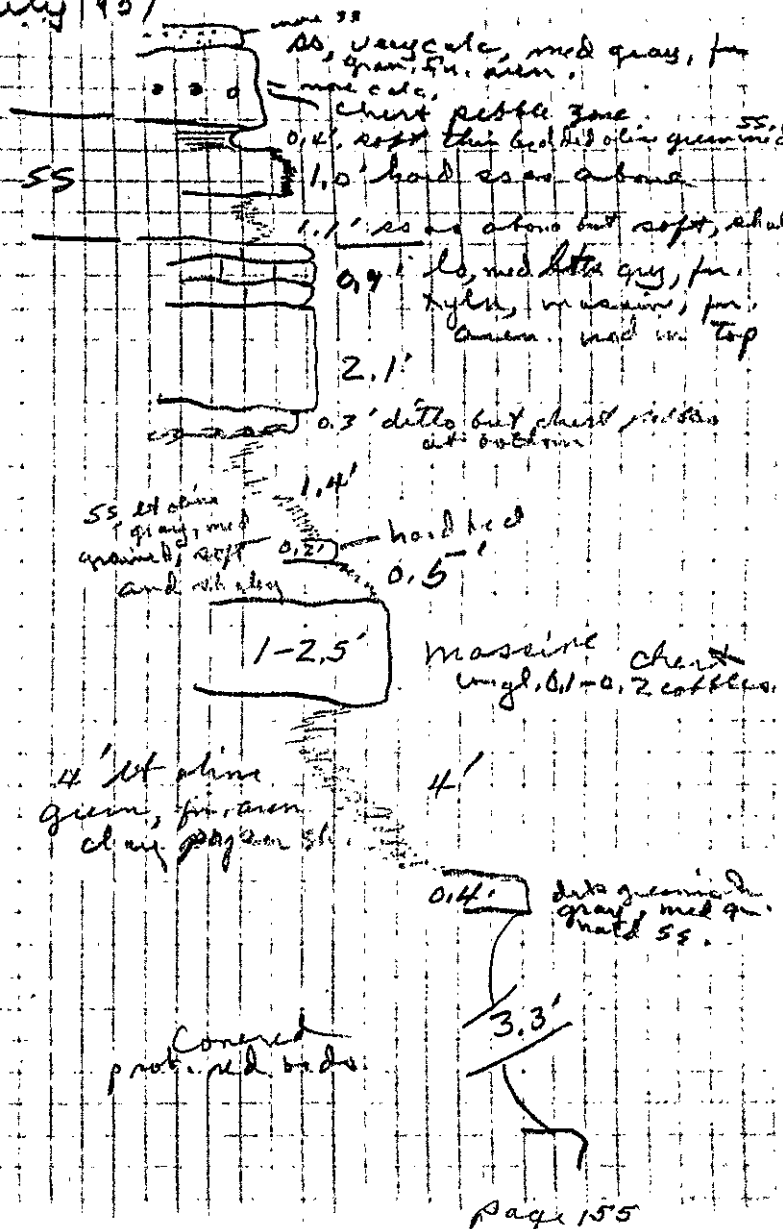
coll F-8 of 14 July 1951

- 0.9' sh, med olive green, med calc, algal?
- 0.8' ss, med olive green, med calc
- 0.7' 337
- 0.5'

14 July 1951



14 July 1951





14 July 1951

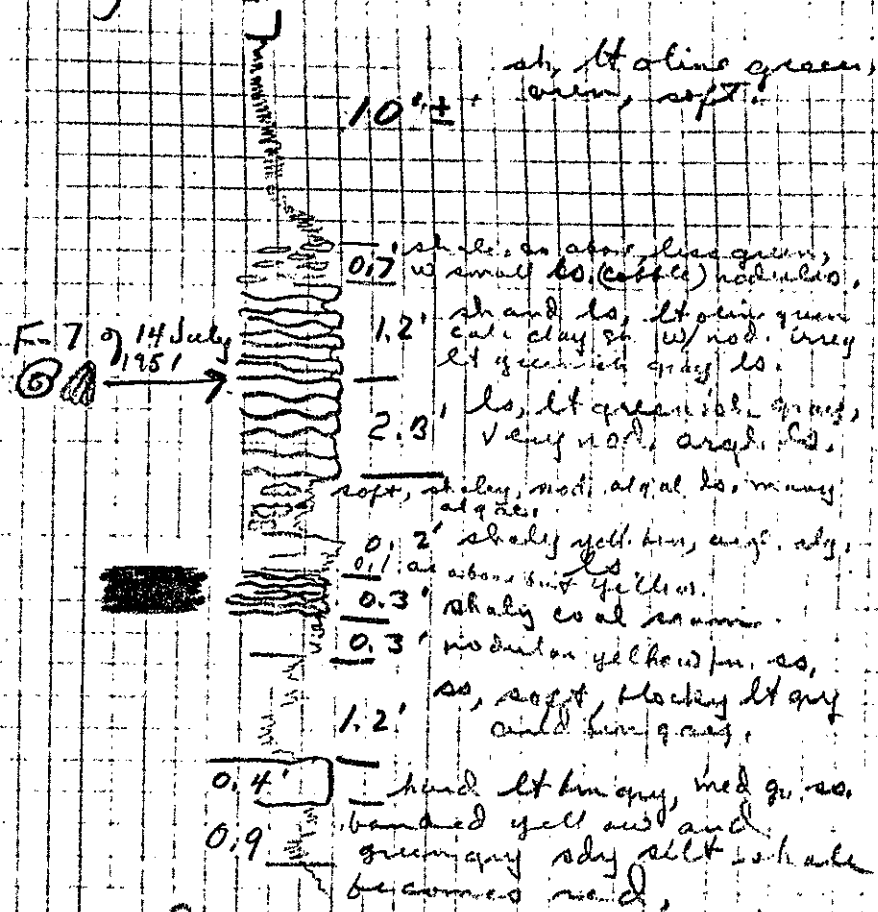
early taken for the top ls  
bed of the Arnold group.

Walked down along the strike  
of the lower part of the "Bursum" but  
could find no possible exposures in the lower part.

Returned to car and  
to town.

Carl, Bill and I went to  
the show this morning, after the  
showers met "Dick" Johns at a  
filling station, one of the C.T.V. men  
known had been injured in a  
water fight, cut on the forehead and  
and required 2 stitches. Johns  
came by the car after leaving  
the station, I am to go to Capitola  
tomorrow to learn when I should  
meet Robert Jones in Hillsboro.  
Then leave with Carl, Bill  
in La Jolla. Found my Johns will  
leave word with John when  
he wants Bill and I to visit  
him in the Winston, M. M. L.  
and co.

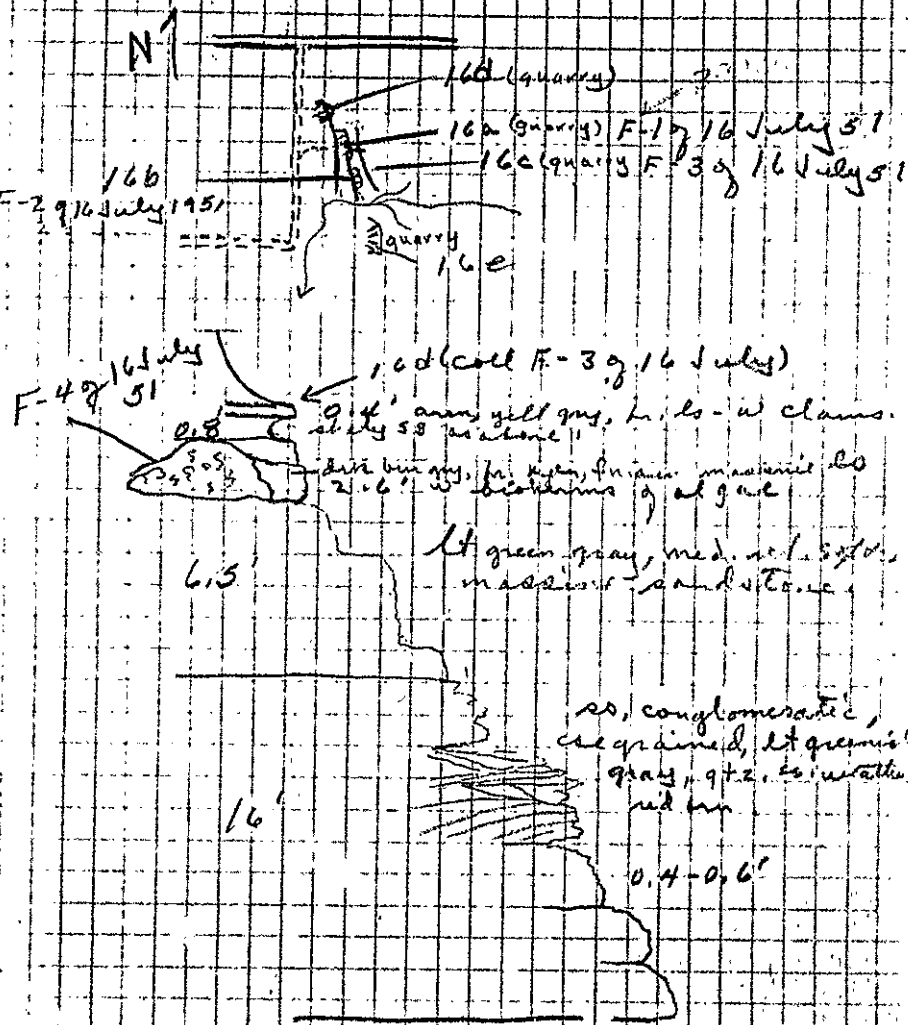
14 July 1951



Section stopped at this  
point, 100 ft ± above the base  
of the "Bursum".  
It is striking that except  
this mapping, the bed from which  
F-7 of 14 July was taken could

16 July 1951.

Bill and I drove to the Tularosa clay pits to collect fossils. We went first to site 16a where we collected graptolites and snails.



15 July 1951.

Bill and I drove to Capitlan to see Sheriff Jones, Director of the N.M.I.M.T. field camp north of Capitlan. I am to meet Jones at the Hatcher Hotel in Hillsboro, N.M. at 0800 on Monday 23 July 1951 to go over the Mississippian rocks of the area, preparatory to his beginning the mapping of the Hillsboro Quadrangle.

At dinner in Capitlan. Drove back to Aztec to ask Carl Otte to pass information for me to Dick Johnson and Floyd Pray of Calif. div. of Geol. Drove to Alamogordo to change clothes then returned to Aztec to get Carl Otte. Bill, Carl and I went to Thompson's type locality. I helped Otte collect fusulinids and also looked for fossiliferous beds in the Freman.

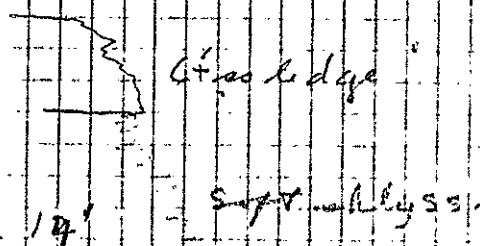
Bill measured the section and obtained fossils from bed 48. I got fossils from beds 39 & 40 and 1.5 ft of med. algal ls above beds 44 & Thompson's Freman alga.

16 July 1951

sta 162

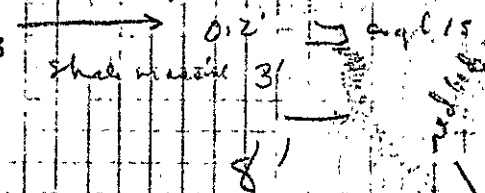
At this level stopped collecting and went to southern most quarry. Coll. F-6 of 16 July from this quarry not coll. stratigraphically but from shales from 20-40' below main sandstone ledge.

Rough sketch of section in quarry.



many gast. 0.3' -> arg. ls.

This may be bed X p. 143

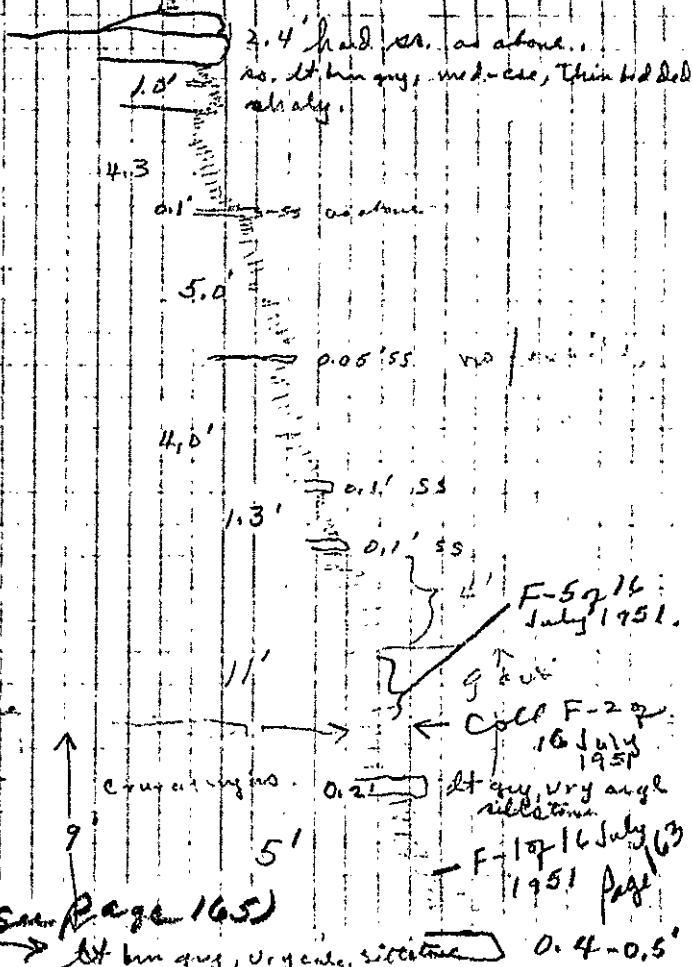


Page 164

16 July 1951

6'

as above but soft and thin bedded, purple cross laminated



main gast. zone of 1948 -> section 1948 from 50' to south

bed 2 (See Page 165)

lt. brn arg., Urg. coar. siltstone 0.4-0.5'

F-6 of 16 July 51 = USNM loc 3281



16 July 1951

Returned to sta 16 b and  
 carried bed X (p. 163) to sta 16 a.  
 bed X 0.6' [ ] arg. in my to. a calc. siliceous  
 1' calc. massive med dry clay (Karl?)  
 siliceous.

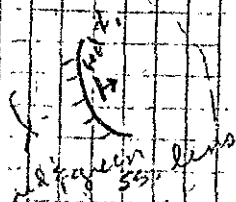
7' soft black, p. med. dry, clay  
 (Karl) shale.

← hard carb. clay stone 0.2'  
 4.6' ph. stone

N.B. approx 11-13' below  
 bed X are small nodules and  
 lent. nod. beds of yellow brown limonite  
 nodules w/ quartzite.

Bed X makes a scarp in  
 quarry at sta 16 d. main quartzite  
 zone below this scarp.

sta 16 d.



at 16 d the limonite nodules are  
 absent. The red and green ss. is  
 about 10-11' thick. The internal  
 bedding is 2' clay arg. med grey shale  
 above which grades downward into congl.  
 1'.

Alamogordo, N Mex.

Barometer corr. to sea level  
 12 July 12:00 hrs — 29.9  
 13 July 17:00 hrs — 30.2


The interval between bed X and  
 the SS. below is 3' thick.



17 July 1951

ls. lt. br. gray, fine grained  
angle nod. with thin  
chert. shale partings.

Trifolium  
F-30-17 1931  
3379

51. <sup>alone</sup> Triticite & schway, 

ls., lt. br. gray, dry  
and, shaley ls.

sh and ls. of gray  
v. calc. thin bedded  
clay sh and nod  
irreg. v. argill. ls.  
beds, w.p.c. at base

4-2

Source  
Finnish  
Chapman  
100

F-57  
17 July 6

2. Heavy, unyielding clay  
shales.

0.5' at long angle, nod. ls.

sh, med gray, rept.  
11.5' flakey sh. green, clay  
shale.

Page 169

17 July 1951.

1. It is an open  
place, rocky

sd, lt brn gray  
aen. concs, thin  
9.5' bedded, flake  
silt shale.  
calcareous?

(became a more complete  
lower 13)

0. 2' Calc. blocky zone.  
0. 3' Siltstone, thin grey to med grey,  
med blocky, very calc. Siltstone.  
0. 2' Siltstone, blocky zone.

F-19 17 July 51.

8' sh - lt brown gr.  
thin bedded, aren, silt  
sh. base calc.

F-2  
17 July 51

0.3' red, 1/2" green, 1/2" blue, 1/2" white

0.4' - pellets, 1/4" - 1/2" color green, the  
ball of ground in the box.

0.9' sh. 1st py, calc. harden

9' shaly lt gray, calc thin

page 168

17 July 1951

with zones of small  
dark and lt grey pebbles  
questionable from here down

1.2-2' above  
but massive  
5' ss & sh  
8' lt grey green  
5' soft sh  
as above  
5' sh w/ fresh  
water ls nod.  
30' shale lt grey-green  
dry concrete  
3' cobble congl.  
11' sh con.  
0.9' congl.  
3' sh  
0.7' congl.  
6' sh con.  
1' thin platy dark grey arg. ls.  
sh 36' con.

0.7' 0.9' dark arg. ls.  
0.1' 1.1'  
0.6' 0.8'  
9' lt grey green congl.  
as

17 July 1951

and cont.  
F-6 of 17 July 51  
main Tarsia  
Zone  
2.1' calc. soft  
clay sh  
(armail)  
lt grey or white  
arg. ls. mud hor.  
sh, lt grey to white  
clay sh. in mud  
0.9' med. lt grey, soft aren.  
calc. siltstone or mud.

Tarsia  
fauna

5.5' shale as above  
0.4' med. lt grey, soft aren.  
calc. siltstone or mud.  
1.0' aren. calc. grey sh.  
0.2' siltstone as above  
med. lt grey - med. grey  
shaly fm - med. ss &  
with soft shaly  
beds.

4.5'

17 July 1951

21' shale covered

0.6 med grey, weathered brown

3' sh. covered

2' dark brown grey ls.

4.5' sh. covered

4.0' ls, med dark grey,  
fine, even, thin platy.

18' red and dk green grey  
even, silty shale

1.0' brn. congl. ss.

2' sh. covered and

1.9' lt grey mott. pebbles

0.9' calc congl. chert pebbles

3' red soft ss.

9' soft grey sh.

17 July 1951

3' sh. con.

1' dk grey, ls.

10' ss. covered

0.5' dk grey ls.

6' sh. covered

3' coarse ss, lt brn, congl.

26' lt brn grey calc. clay  
shale, brown at base,  
slopes, fine, calc.  
and silty green grey  
fine, even, silty.  
shale.

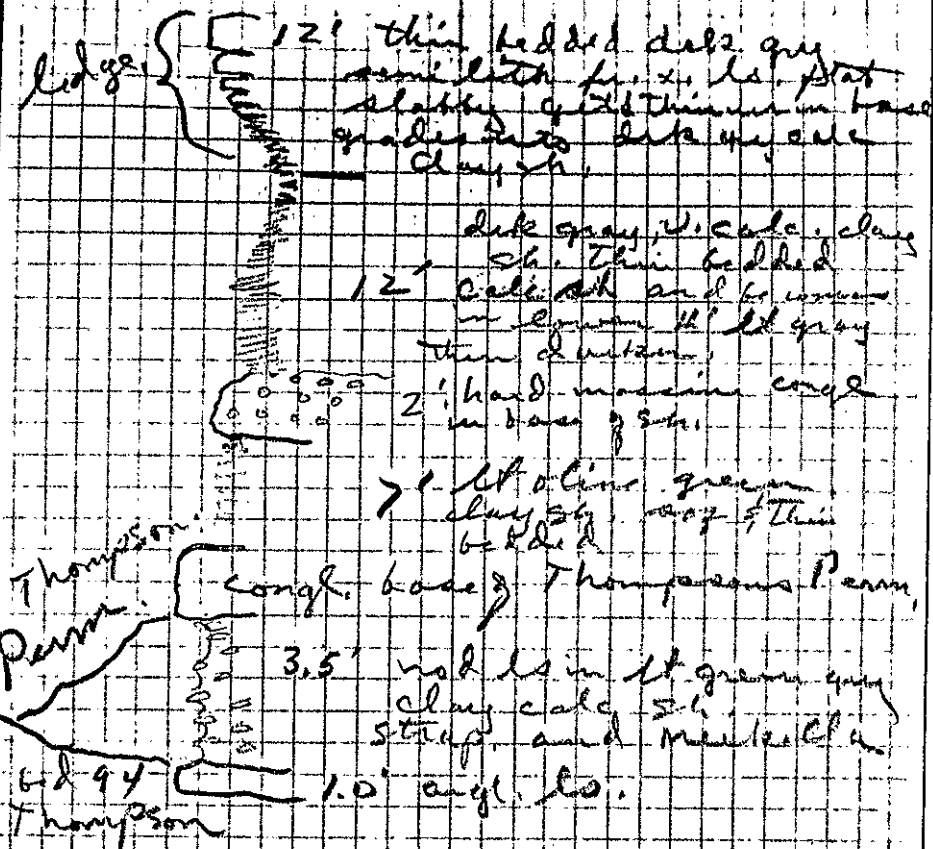
0.9' lt olive green med ss.

2.5' red, brn med ss.

11' massive white quartz  
congl. beds 2-4' thick

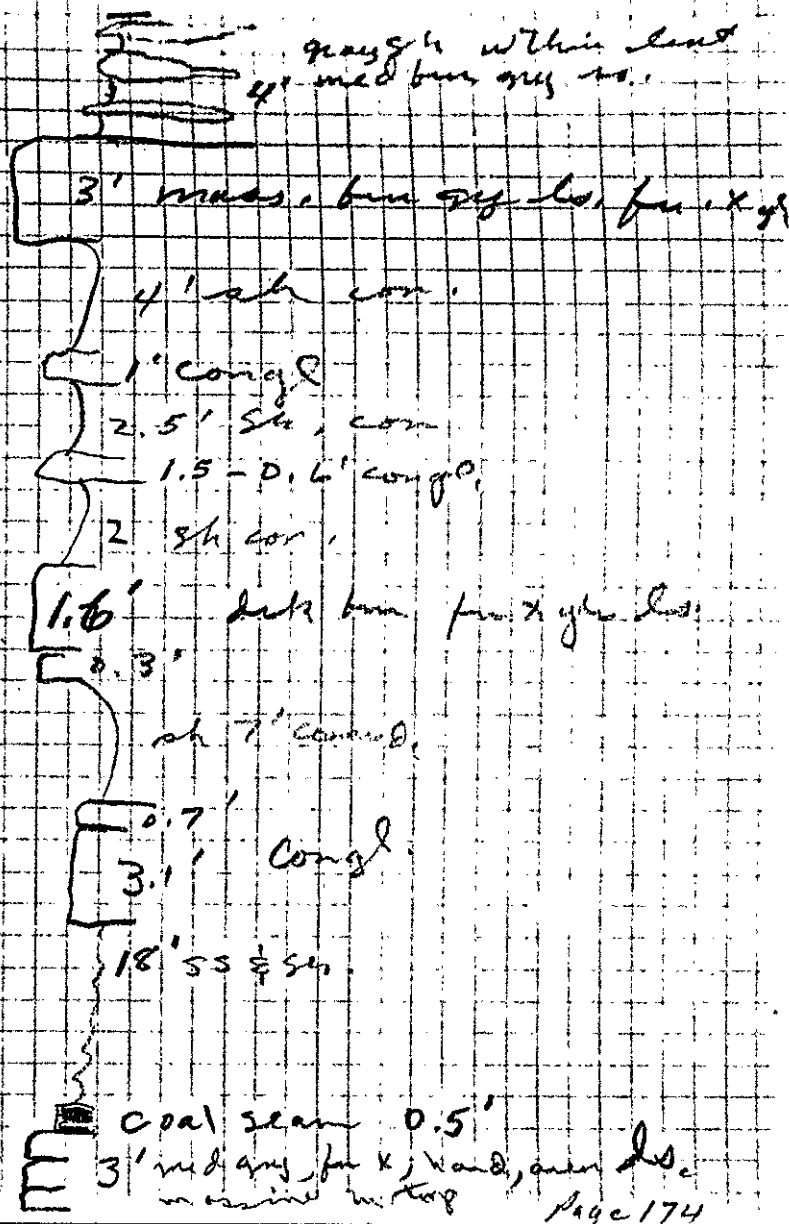
2-4' lt brn quartz congl  
pebbles, thin  
bedded, med ss.

17 July 1951

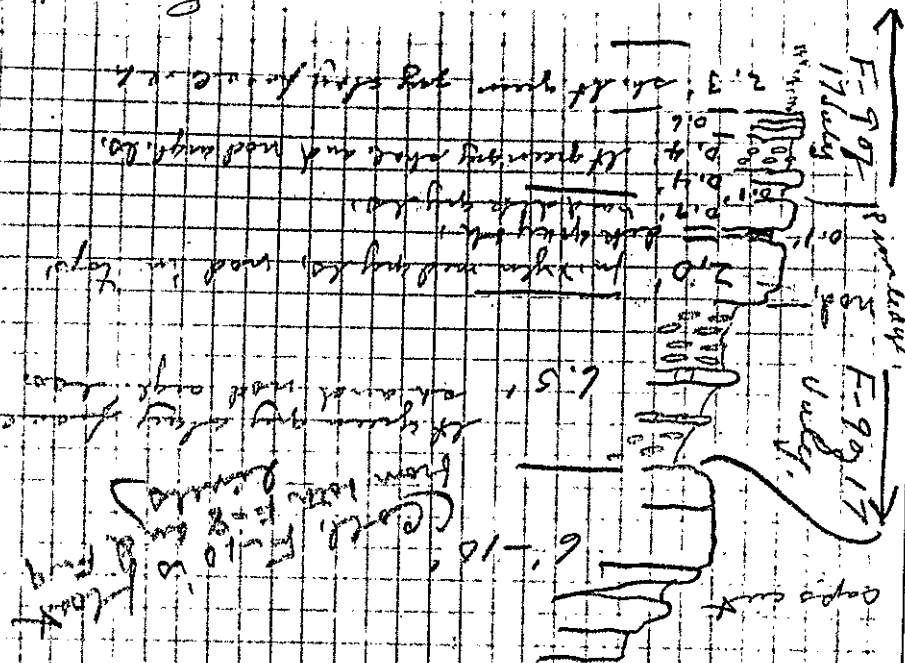


Bill and I drove on up Farnold  
 Canyon to sta 170, SW NW 1/4 sec. 1, Twp. 5 N, Rge. 11 E, locality on  
 south side of road in cut 500 feet  
 east of highway bridge. See map of  
 Pray, Page 175a.  
 Section starts on page 176.

17 July 1951



17 July 1951



Walked NW across the creek  
after dinner and climbed up  
the sequence of the "Bluestone"

coal of page 176

9-10' greenish ls. gray shale

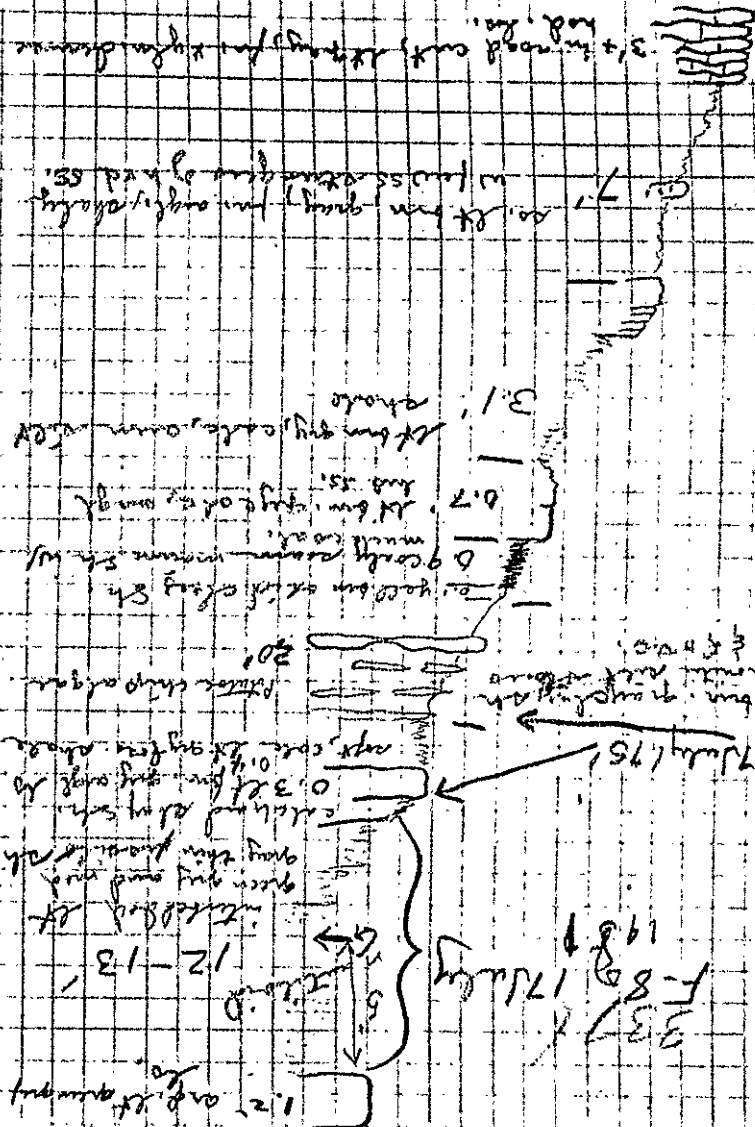
mytilina det. ls.

5' yell brn shale

20' carb. ls. and coal seams

same as on page  
175 at top.

17 July 1951



18 July 1951

Spent the morning finishing  
the packing and shipping 776#  
of fossils to Museum.

Drove to Hot Springs with a  
side trip to Hillsboro for mail.

Met Jim Waters, chief geologist,  
with Sam Oil Co. their Dist. Eng.  
in Midland and two engineers. Waters  
stayed in the cabin next to ours at  
the Ace Court in Hot Springs, N. Mex.

17 July 1951

Spent the latter part of the  
afternoon building and packing  
boxes.

Dick Johns arrived at 1830  
and ate supper at "Red" Chavez's.  
Rooster chukle with us.

He drove on to Socorro tonight.



19 July 1951

Walked across a fault from  
Abo to Pennsylvanian on the north  
side of the canyon. Limestones here  
seem to be upper Penn. Crossed to  
south side of the canyon to the  
El Paso ls. Estimated section

andesito = Alamosa

75' dk greenish gray, fissile  
shale.

Ready  
Pay

3-4' interbedded greenish gray sh. &  
lt yell. lim. ch. siltstones.

15-16' lt yell. lim. siltstones.

20± "Valmont" (Pay) beds.

El Paso Fm.

sh., as above, but thin bedded, mod  
fossils throughout

del. 2' dk gray, sh. & thin  
#4 del. for 2' gray  
mod. dk. gray.

as above  
but more massive  
and cherty

covered

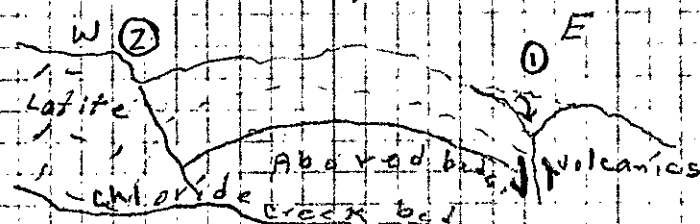
This is believed to be the northern  
most occurrence of Pennsylvanian  
Fossiliferous and El Paso in  
Page 181

19 July 1951

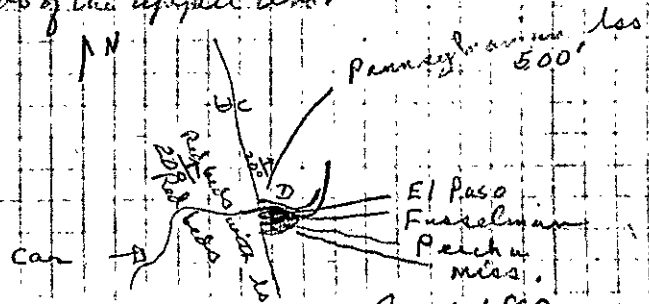
Drove to Winston to meet Dick  
Johns, Calif. dist. Tech.

Callihan, Bowen and Kozlowski  
arrived at 10:15 hrs.

Drove in Callihan's car to chloride  
and 1/2 mi west up canyon. Started



← 2 1/3 mi →  
at fault ① and walked three  
abo to fault ②. Retained to  
car and drove east down chloride  
creek toward CHIX. Parked at  
cn NE 1/4 Sec 18, T 12 S, R 7 W, Sierra  
Co. on Cuchillo Creek. we walked  
east down the creek thru the basal  
beds of the upper Abo.



Page 180



H. R.  
R.

51-19Jy-19

F. Kotzebue, NMBM & MR.  
Patrick Callaghan Dir, NMBM & MR.  
Bowen, N.L. Geophysical Laboratory  
Richard Johns, Calif. Inst. Tech.  
Allen, W.T., USNM.

Photo by Art Bowsher (neg in book at USNM).

Callaghan  
5/1/51



51-19Jy-17



51-19Jy-18

Kozlowski, , New Mexico B. M. & M. R.  
Callighan, Patrick , Dir., N. M. B. M. & M. R.  
Bowen, N. L., Geophysical Laboratory.  
Jahns, R., Calif. Inst. Tech.,  
Allen, W. T., U. S. N. M.

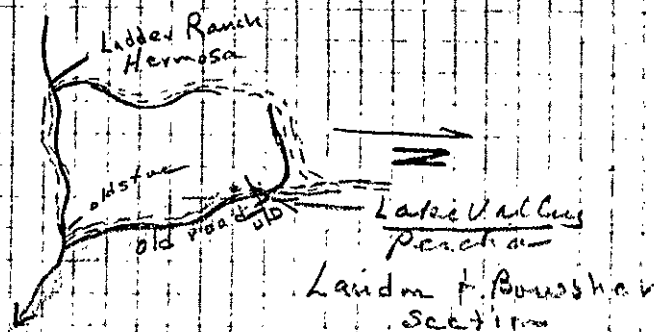
20 July 1951

Callahan, Bowen, Kottlowski, Allen and I accompanied Dick Johns near certain of the parts of his drain Mt. mapped area. At several places we found limestones, presumably Pennsylvanian, but were unable to locate fossils. The entire day was spent in the drain Mt. area. Callahan, Bowen, and Kottlowski returned to Socorro, leaving Winston, N.M. at 1500.

19 July 1951.

southern New Mexico, The Valmont (Furselman gr.) has no fossils but the El Paso is filled with abundant silicified brachiopods.

We then drove south to Hermosa which is now 1 mile above the old store location. We drove

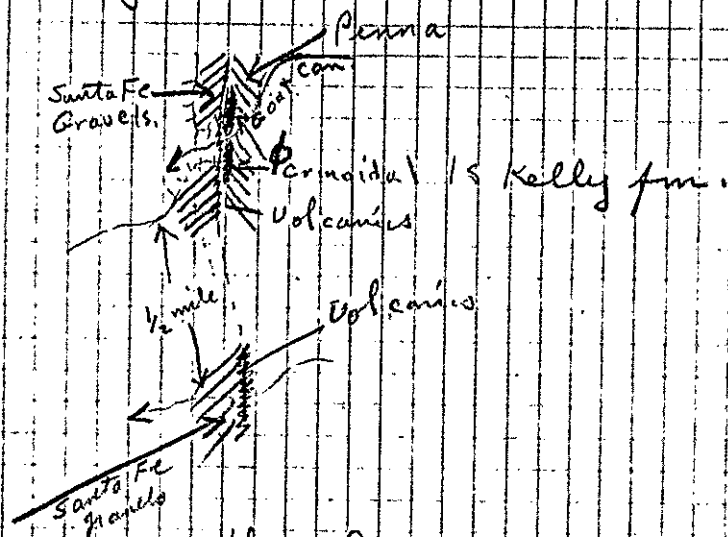


east to old store location and to the north to location of Landon and Boushaker section (fig 37). The Landon section.

Returned to Winston for supper. Callahan, Bowen and Kottlowski stayed in Winston overnight.

22 July 1951

Bill, Dick Johns, and I drove north to Goat Canyon to the south of Brown Mt. Winston, N. Mex. As we crossed the western fault scarps we found 20-36 ft of Kelly in the base. Dick Johns had mapped as Pennsylvanian. There were no fossils but the lithology is very distinctive.

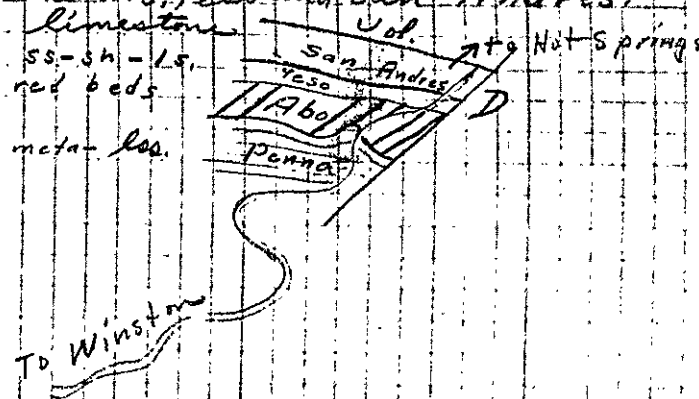


We then drove on up Goat Canyon to the place where road goes around a sharp bend in the creek at the base of the Abol red beds. Johns has

USGS 4979  
(top Penna  
see Henshaw),  
Fossils

21 July 1951

Allen, Johns, and I went east from Winston to Red Gap on the Hot Springs highway. Examined the Pennsylvanian along the highway where there are few fossils and the beds are badly metamorphosed. Walked on east thru the Abol, Jesso and San Andres.

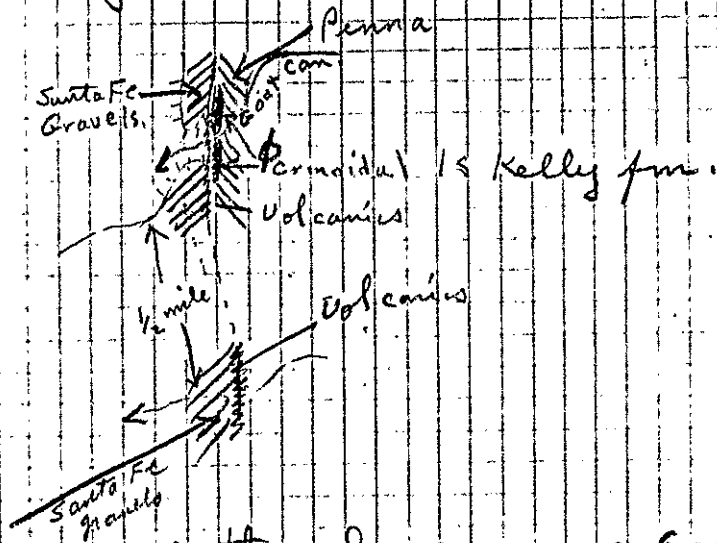


Returned to Winston and then on south to Hermosa. Raymond Johnson accompanied us.

We drove up each canyon going west from Hermosa in an effort to locate a locality visited by Laudon and me in 1941. After finding only two exposures we spent the remainder of the afternoon examining the section. We were unable to find a real boundary (unc. disc.) between the Tierras Blancas and the Kelly. The Kelly is more coarsely crinoidal, massive and relatively free of chert. F-1 of 21 July 1951 is from the Union member at Laudon's Brownish loc, Fig 37, p. 72, H.S.A. 1949.

22 July 1951

Bill, Dick Johns, and I drove north to Goat Canyon to the south of Iron Mt. Winston D.N.Mex. As we crossed the vegetation fault scarp we found 20-25 ft of Kelly in the base of what Johns had mapped as Permian. There were no fossils but the lithology is very distinctive.



We then drove on up Goat Canyon to the place where road goes around a sharp bend in the creek at the base of the above red beds. Johns has

USGS 4979  
(Top Permian see Henkoff)  
Fossils

page 185

On returning trip to  
we noted a fault on mountain  
Creek to separate the Permian  
sequence. Cor. F. 29 21 July 51

23 July 1951

Kuehlmer arrived at the Hatcher Hotel at 0815. Stuart Jones and Phil Woodside arrived from Socorro at 0830. Dick Johns, Ned Kuehlmer, Stuart Jones, Phil Woodside and left for Lake Valley in Johns car at 0845. Bill Allen took the museum truck and went up the Kingston Road to the lake beds 3 miles west of Hillsboro, NW/NE Sec 13, T. 16E, R. 8W, coll F-17. 23 July 1951.

I took the group to the north side of Apache Hill and up thru the section where Lander and I measured the section. Made coll. F-2 of 23 July 1951 from medial beds of the Caballero fm. Made coll. F-3 of 23 July 1951 from the main member of the Lake Valley fm USNM loc 3027.

We then drove north to Earl Gillman Ranch ate dinner then examined the sequence at loc 3026 and 3026a. Coll F-4 of 23 July 1951 from Box number 8 the perch a shale at loc 3026 and 3026a. Wolfgang and Strute joined us.

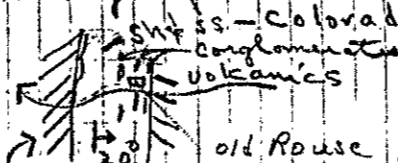
We then drove north to Tierra Blanca creek and west up Tierra Blanca creek to USNM loc 3029. Henry Sicha and Charles Valentine and W.T. Allen joined us here.

Coll F-5 of 23 July 1951 from the Box number 8 at USNM loc 3029. We returned to highway 25 and went north to (180) and then west.

22 July 1951

has report on collection from here.

Drove on up Canyon thru the red beds, Yeso ss, sh and ls and San Andres lime - stone to old Rouse Ranch to the crest of the salt dome underlying the San Andres ls.



15. (not very fossiliferous) We were unable to find fossils in the Colorado Shales.

Returned to Roland Johnson home at Winston to eat dinner. Bill and Dick Johns by Winston in Dick's car at 1430. I packed in the museum trunk. We ate dinner at the Hot Springs and Bill and I changed for the trip to Hillsboro.

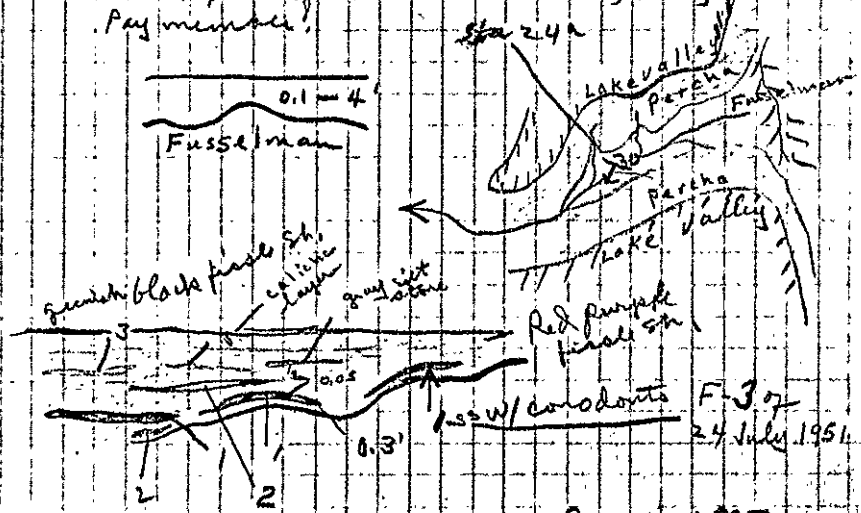
Dick and I drove to Kingston and visited Ned Kuehlmer before supper. Bill collected from the Lake beds 1 mi W of Hillsboro.

after supper at Hillsboro Bill, Dick and I drove by the Wilson Ranch (Clemens) and to Lake Valley to visit Henry Sicha.

Returned to Hatcher Hotel to spend the night.

24 July 1951

Drove south to Lake Valley after  
fixing a flat to meet Henry & L. Gichay  
and his assistant, Charles Valentine.  
Henry Gichay and I drove in the museum  
truck and A.T. Allen and Valentine drove  
in Gichay's jeep to Thomas house just east  
of Cook's Peak. Allen, Valentine and  
Thomas drove south to London and  
Bowsher's south Cook's section to  
collect the Andrieto member of the  
Lake Valley. Gichay and I drove to  
north end of Cook's Range and parked  
in the saddle (1/2 mile north  
of McCrae mining co. property). We  
traveled along the old trail down the  
valley toward the west, then dropped down  
to the top surface of the Fusselman  
and worked along the contact of the Parsha  
and the Fusselman. at sta 24 a found  
conodonts in the pale red purple shales  
at the base of the Parsha shale, Ready  
Pay member.



23 July 1951

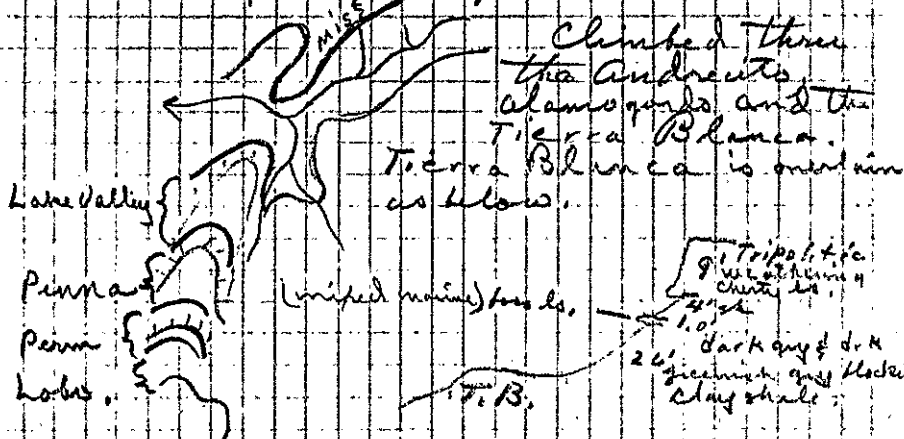
to the Tertiary lake beds 3 miles  
west of Hillsboro where we stopped  
a few minutes.  
Drove on west noting the Panna  
just west of Cecil Baird's house and  
into the Parsha Creek pass.  
Coll F-6523 July 1951 from this  
USNM loc. 3031. Gained section  
here then drove on to Miss. section  
1 mile west of Kingston, loc. USNM  
3035.  
Returned to Hillsboro  
for supper. Made arrangements  
to go to the Cook's Range with  
Henry Gichay on 24 July 1951



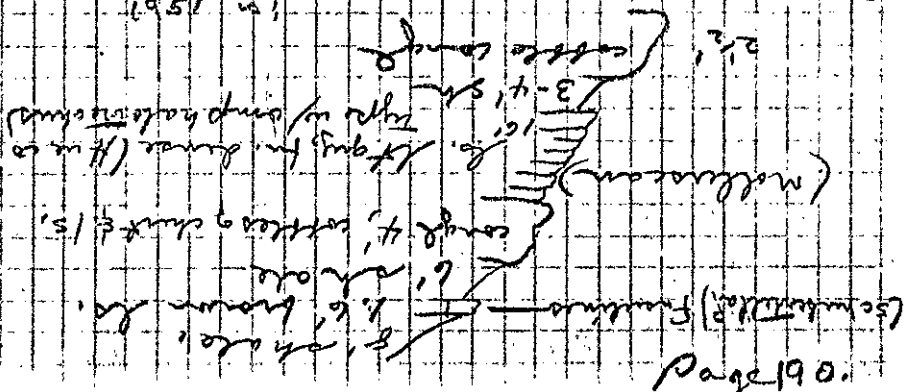
24 July 1951

35 feet above in the shale is a 0.1 ft bed of argill. fossil. limestone. 1.5 ft up is a sand 0.25 ft bed of same.

We walked on down the canyon and up the first fork to the south.



The 9' limestone was covered by a 10-12' chert concentrate zone which made up the hill side. The section is chert from the canyon on 26 July 1951.



51-24Jy-22



51-24Jy-21



51-24Jy-20

modest  
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one north

51-24Jy-20  
51-24Jy-21  
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51-24Jy-91  
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51-24Jy-93  
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51-24Jy-95  
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51-24Jy-20

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Henry Jicha, Jr., New Mexico Bureau of  
mines and mineral Resources, collecting sandstone  
from basal 2 ft of Perche sh (Ready Pay  
mem.), Sta 24a, cen East line, Sec. 23,  
T. 20 E, R. 9 W., Luna Co. (Grazing Survey  
map. No 11, Mar 1941, Cooks Range, N. Mex.  
U.S. N.M. loc. 3280. (Sandstone stringers  
in basal 2 ft., gully on north side of  
a large dry stream bed, 1.2 mi north  
10° W of Cooks Peak.

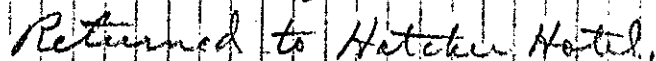
Bowsher & Jicha.  
24 July 1951.

Taunted spurs on Rio  
Cuchilla between Hot Springs  
and Winston, N. Mexico. on County  
highway.

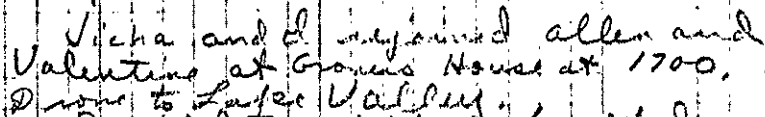


51-19Jy-18

Berenda creek



Atty. Gen. [illegible]  
[illegible] of [illegible], etc.

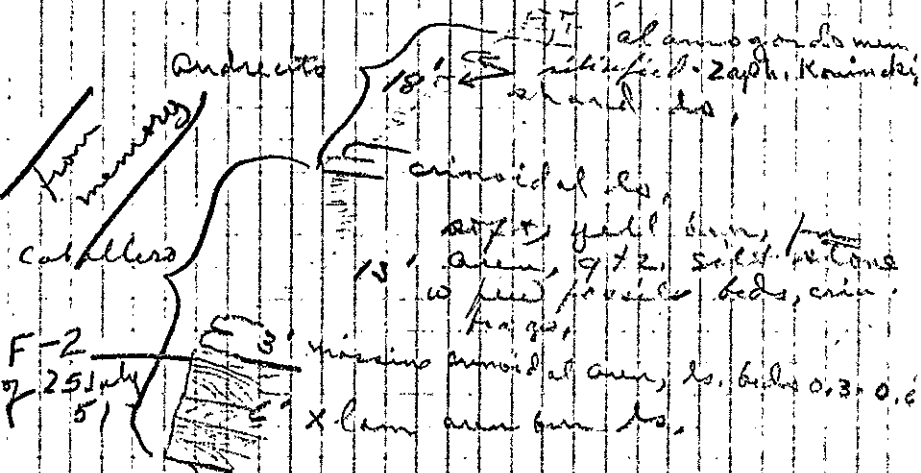


Decided to visit a faulted block on Berrenda creeps. so drove west from Lake Valley to home west of Bill Nunn's Ranch on

25 July 1951

Drove to Casilda / Boyd's house  
to find him & drive. Had flat in the  
hills on return. Drove south  
after fixing flat to Clara Wilson.  
They were gone so I left a note.  
Drove south to Wilson (F. and  
Ranch to sta 25a, Collected.

F-1 of 25 July 1951 from the  
top of the Pancha  
Sh and F-2 of 25 July 1951  
from the top beds of the basal  
fer. sandstone of the Caballeros  
fm.



Pancha  
F-1 of 23 July 1951

Drove to Alamogordo via  
Nutt and Hatch. Got room at  
Alamo Courts.



51-25Jy-23

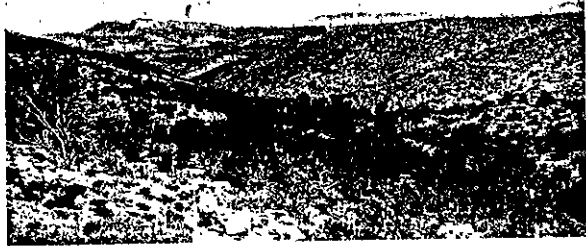


51-25Jy-24



51-25Jy-25

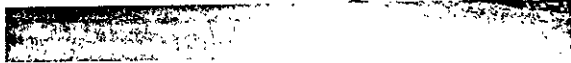




51 - 26Jy - 26



51-2649-27



51-26 Jy - 28

26 July 1951

Spent morning on notes while running the car greased. Left Alamogordo at 11:00 hrs. went east toward cloudcroft up Dry Canyon. Stopped at USNM loc. 3051. Collected F-1a 26 July 1951 from shales and reddish limestone in bottom of canyon  $\frac{1}{2}$  mile west of loc 3051 and 200 ft lower in the section.

Section estimated

F-30 July 1951  
Core 30.5'

18' —  
15' —  
12' —  
9' —  
6' —  
3' —  
0' —

ls. cong.

F-27 — 8' mod. sh. g.  
4' sh. g.  
mod. sh. g.  
20' —  
3' —  
sh. g.  
8' —  
a. l. s.  
mod. sh. g.

F-19 26 July 1951  
Page 194

26 July 1951

Spent morning on notes while waiting the car greased. Left Alamogordo at 11.00 hrs. went east toward Cloudcroft up Dry Canyon. Stopped at USNM loc. 3051. Collected F-1a, 26 July 1951 from shales and reddish lime-stones in bottom of canyon 1/4 mile west of loc 3051 and 200 ft lower in the section.

Franklin  
F-30 26 July 1951  
(Ref 30.51)

F-3 Life 30.51

Actions and Sentences

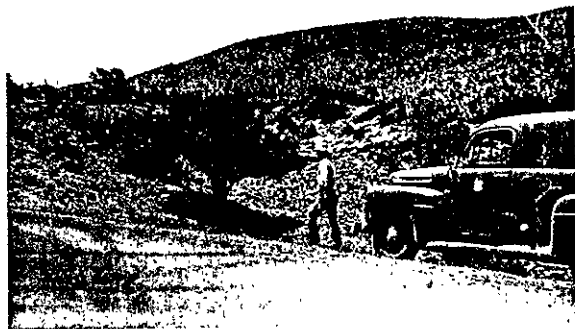
F-22

264

4

26

June 1944



26 July 1951

View looking north-northwest from  
USNM loc. 3051. 5/1-26 Jy-26.

51-2644-27-28 View of U.S. N.M. 3051  
(see Bowsher)

Spent morning on notes while washing the cars & greased. Left Alamogordo at 11:00 hrs. west coast toward clouded crop up Dry Canyon. Stopped at USNM Loc. 3051. Collected F-1a & b July 1951 from shales and reddish lime stones in bottom of canyon  $\frac{1}{4}$  mile west of loc 3051 and 200 ft lower in the section.

Section estimated

F-30 26 July 1951  
Life 30.5'

18' — ls.  
4' — ls.  
2' — ls.  
20' — ls.  
30' — ls.

F-27 26 July 1951  
8' — ls.  
4' — ls.  
20' — ls.  
3' — ls.

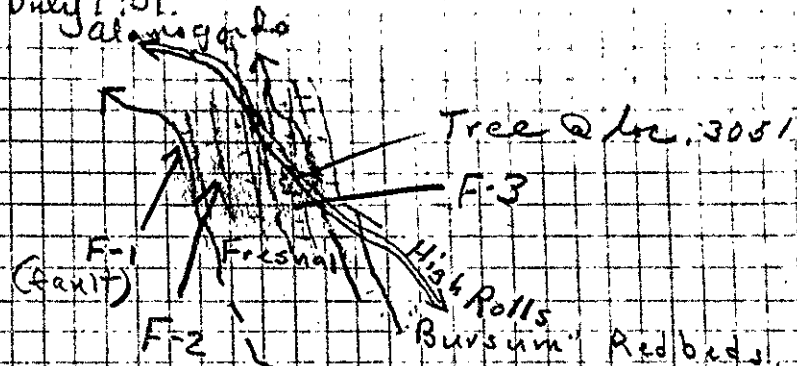
F-17 26 July 1951  
9' — ls.

Page 194

27 July 1951

Drove from Roswell, N.M.  
to Pampa, Texas. Spent the  
night at Pampa Texas.

26 July 1951

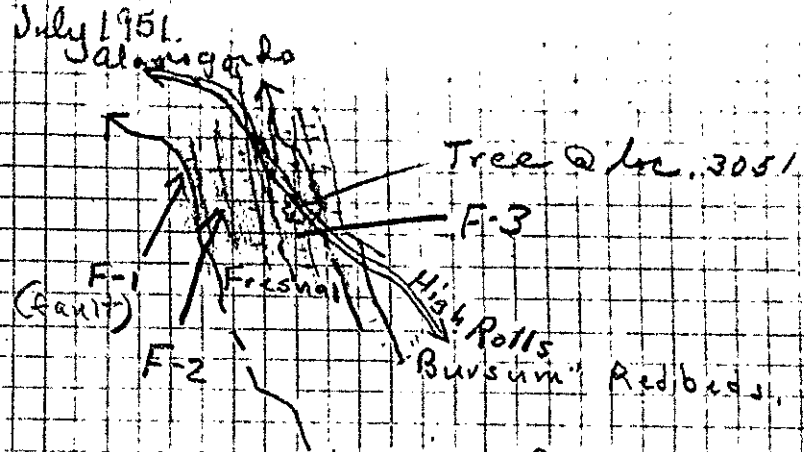


Drove to High Rolls arriving  
at 1430 hrs. Decided that there  
was not time to see the Los  
Cruces? or Ranchos? exposure  
on the South side of a large Peak  
so we drove on to Cloudcroft.  
Drove north to Cloudcroft  
to Mesquite Road, is rough  
gravel and then toward  
Roswell on U.S. 70.

Too tired to drive beyond  
Roswell. Spent night at the  
Zuni court in Roswell.

R. J. Gannons  
 Representative of the  
 Smithsonian Inst.  
 at De Witt, Ariz.  
 1951  
 adding further for Smith-  
 Inst.

26 July 1951.



Drove to High Rolls arriving  
 at 1430 hrs. Decided that there  
 was not time to see the Las  
 Cruces? or Rancheria? exposure  
 on the South side of Alamo Peak  
 so we drove on to Cloudcroft.  
 Drove north of Cloudcroft  
 to Mesquite Road, a rough  
 gravel road and then to  
 Roswell on U.S. 70.

Too tired to drive beyond  
 Roswell. Spent night at the  
 Zuni Court in Roswell.

29 July 1951

Drove south of Bartlesville looking at several new road cuts on the new highway. Stopped at hill west of Ramona to collect from

Drove on south to Collinsville and collected for animals from the strip pits.

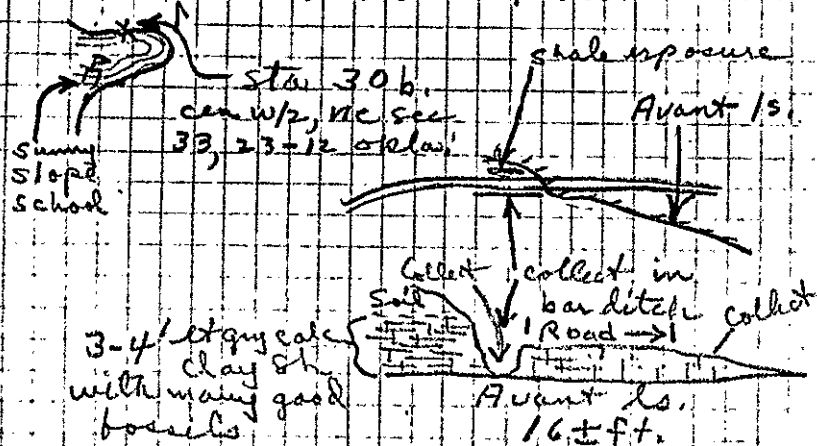
Drove on to Tulsa for dinner and spent the afternoon and night with Lanorah's folks.

28 July

Drove from Pampa, Texas to Bartlesville, via Fairfax, Okla. Learned that Shrimp was gone for the weekend. Spent the night at the DeWitt Motel near Shrimp's house on U.S. 75, east side of town. 600 E. 4th St., Bartlesville, Oklahoma.

30 July 1951

Drove to east around nose of hill  
Just north of swimming place. To school  
and collected } from the edge, clay sh  
Just above the Anaxids.



F-37 Made collection F-37  
30 July 51, 30 July from this locality,  
SW/NW/NE Sec 33 T23 N, R  
12E, Osage Co, Oklahoma.

Drove north to Sunway Shoshone Plant  
turned right, 0.1 mi, turn left down hill, cross creek  
swimming right by tailgate to ex. quarry. Some zone on  
top of canyon as at Sta 306. Made no coll.

loc. → fossils  
SESE sh.  
NE

went on north to Grant, west  
to east edge of town and north  
line west of location line  
between Secs. 5 & 6 Coll. F-

F-49  
30 mi. Plant  
1951

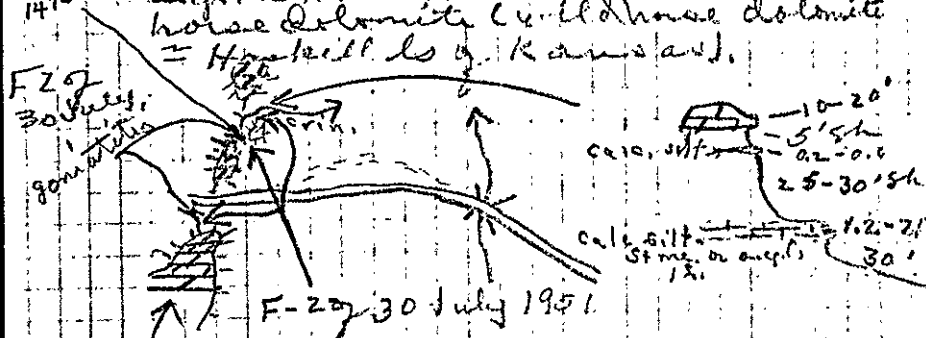
4-8-88 Soil from pseudomorph  
limestone 60-80' below top  
of hill 3/4 mile north east of  
Amanty, Okla. NE 1/4 Sec 6, T23N,  
12E, Osage Co., Okla.

page 200

30 July 1951

Drove west from Tulsa thru  
 Sand Springs and west on ok 57 to  
 loc. 30a collected from Nellie Bly  
 formation, SE/SE 1/4 Sec. 11, T. 19 N, R. 10 E,  
 Tulsa Co, Oklahoma. The goniatites  
 from this locality were described by  
 Miller and Furnish in Jour. Paleog.  
 Returned to Sand Springs and  
 north to Skiatook. Went west on  
 Oklahoma 20 to exposure of  
 wildhorse dolomite NE/NW Sec. 21,  
 T. 22 N, R. 10 E, Osage Co, Okla. made  
 coll. F-2 of 30 July 1951 from thin  
 arg. lss. in sh. below the wild-  
 horse dolomite (wildhorse dolomite  
 = Haskell ls. of Kansas).

Melba's Strimpler  
 Goniatites (coll.)  
 147566



wildhorse dolomite

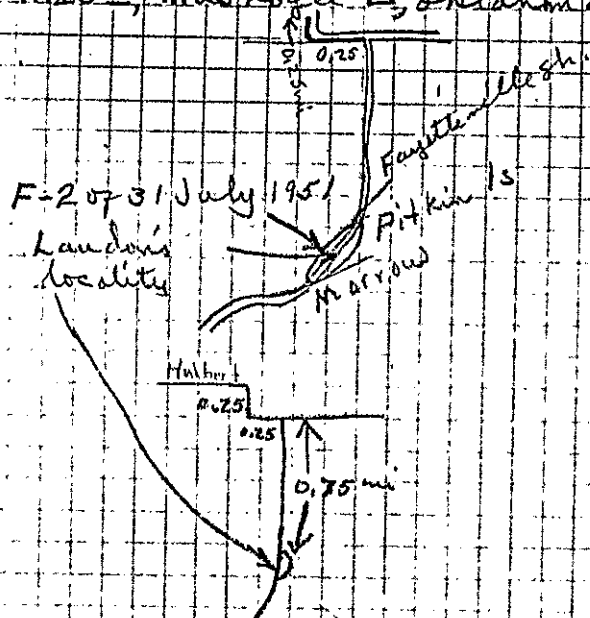
Fossils occur most abundantly  
5' below and 30-35 ft below the  
base of the Wildhouse dolomite.  
The Forcellites are most abund-  
ant in the upper part of the shale.

Returned to road junction 1/2  
mile west of Skaitock and went  
north on poeage highway 92 toward  
Sunny Slope School

Page 199

31 July 1951

3 Drove back to Hubbert and 1 mile  
east on Okla. 51. Turned south on  
first section line east of Hubbert  
and drove  $3\frac{1}{4}$  miles south to well  
scarc. cen E 1/4 sec. 26, T 17<sup>2</sup>  
R. 20<sup>e</sup>, Muskogee Co., Oklahoma.

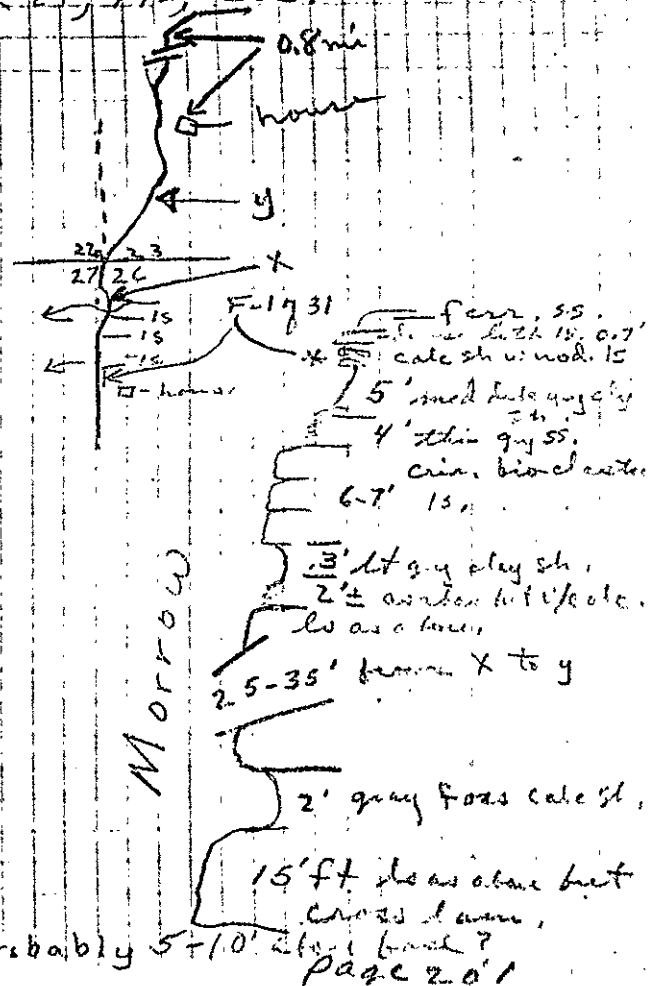


Returned to Hulbert. Drove east to SE corner of Sec. 28, 17<sup>n</sup>, 21<sup>E</sup>, drove north old road going west from Crittenden to Hulbert. Old road not passable. Drove on north on new county road. Boone chert is exposed at Crittenden. Drove one mile and into valley swinging to left back to RR and south to the highway. Saw nothing but Boone chert. Came out on section line between

Page 202

31 July 1951

Left Bartlesville, Oklahoma on  
U.S. 66 for Hulbert, Okla via, Nowata,  
Oologah, Claremore, Enola, Choteau  
and Wagoner. Ft. Gibson Lake, 20' below high  
Drove south from Hulbert on  
section line between Sections  
26 and 27, 17<sup>n</sup>, 20<sup>e</sup>.

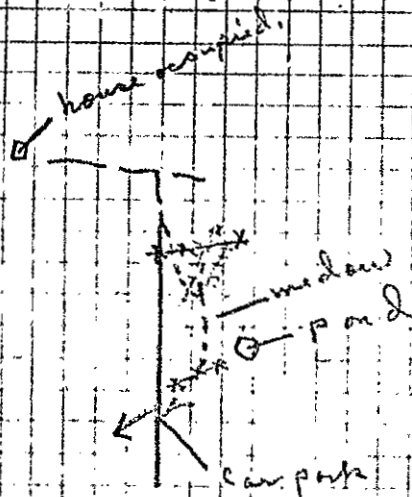


Probably 5-10' above beach?  
page 201



1 August 1951

Drove west from Talquah on Okla 51 to Deane Vaughn's Place 2 mi SE of Hulbert on E line of Sec 30, 17<sup>2</sup> 21<sup>9</sup>. Parked at gate and walked north along old country road looking for Ulrich's *Alouatta* locality.



Returned to car. Have been unable to find a locality to find Ulrich's *Alouatta*.

Drove east to SE corner of Sec 29, 17<sup>2</sup> 21<sup>9</sup> and drove east on section line. Booms chert exposed all along the road.

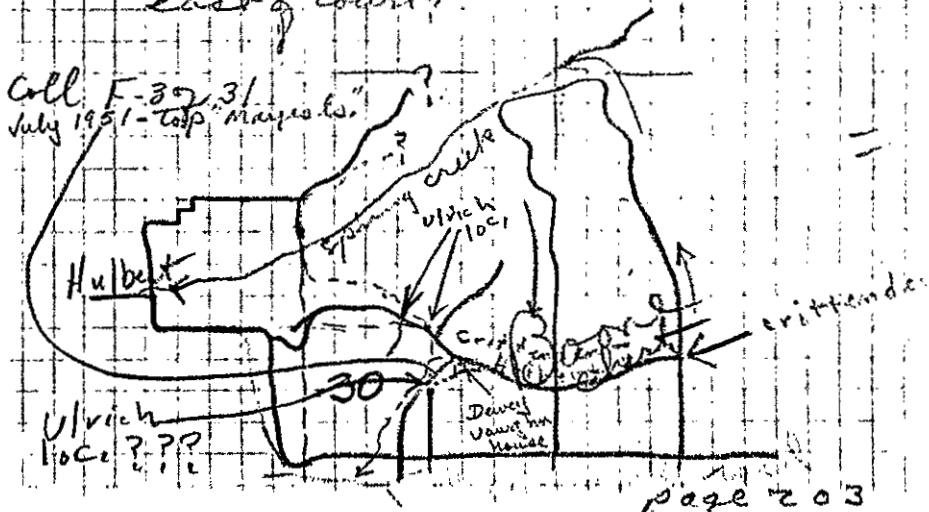
Drove east to section line between 25-17-21 and 30-17-21.

Drove south to SE cor 30-17-21 then west to old road (0.15 mi) and

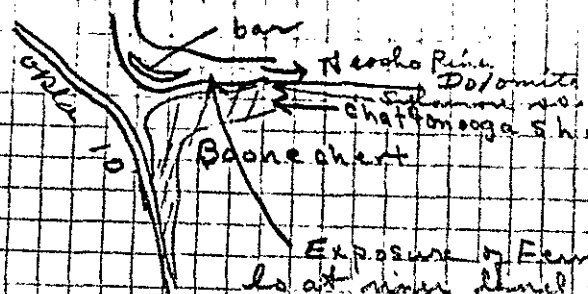
31 July 1951

Sec 29 & 28. Drove back to Hulbert to NE corner of Sec 25, 17<sup>2</sup> 20<sup>9</sup> and drove east then north on section line between 17<sup>2</sup> 20<sup>9</sup> & 21<sup>9</sup> to good gravel road (this is little more than a trail). Drove north east but found road going upon scarp to north. Valley is in the Chattanooga sh. Returned to Hulbert and drove east on highway to SE corner of Sec 30 17<sup>2</sup> 21<sup>9</sup> and talked to Dewey Vaughn who owns the farm in SE 30 and SW 29, 17<sup>2</sup> 21<sup>9</sup>. He remembers the old Hulbert-Crittenden road of 1907. From his description there seems to be only two possible locations, one possible, the other improbable, observed 1830 hrs and too late to check. Drove to Talquah obtained rooms in. Noted, Good (300) on 62 south east edge of Talquah. At Harp's Cape 1/4 mile east of Court.

Coll. F-39, 31  
July 1951 - top "mapes ls."



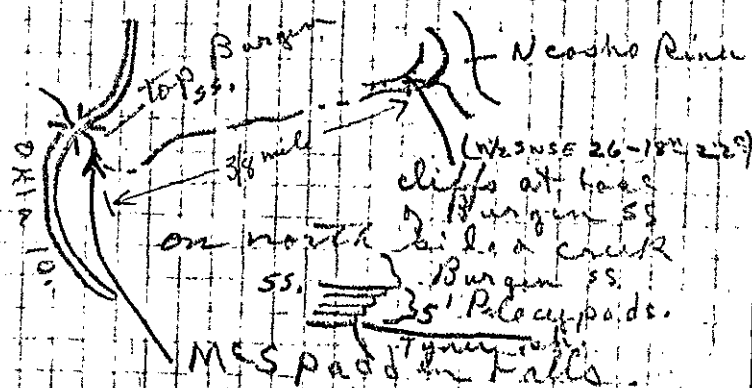
1 August 1951



Exposure of Fern Vale  
ls at main level of road.  
Cen 12-18"-22"

F-2 of Coll F-2 of 1 Aug 51. Diluvial  
1 Aug 51. Fern Vale ls. (See Talequah Folio)

Drone on north to exposure  
of Burgen ss at MSPadden Falls.  
Cen E/LSW 26-18" 22",  
Cherokee Co., Okla.



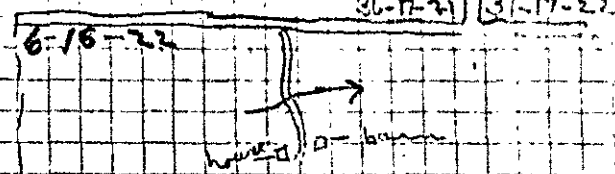
Cen W/2 SE-26-18" 22"

Drone north to exposure of St.  
Joe at Eagles Nest NW cor sec 24-  
18", 22". DSA not stop

Drone on north to cross-road

1 Aug 51

Drone on north



Drone on north  
(not visited)

When returned to highway and  
drone on north but could not find  
road to cross near the local tip.  
Drone west on north line of  
TWP 16N to sec corner of Sec 34-17-  
21, turned north to made coll F-1  
of 1 Aug 1951 from cen of E/LSW 34-  
17-21 Cherokee Co., Okla from  
Pittkin limestone or limestone  
beds in Fayetteville Sh.

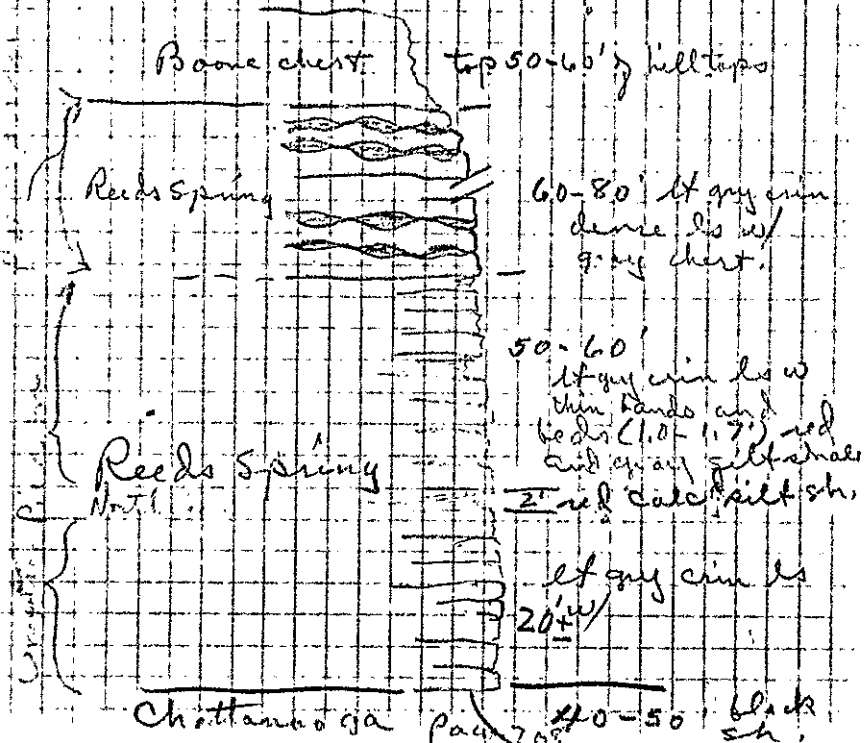
F-17  
1 Aug 51

Drone east on Okla 10 today  
for ground level

Drone east to jet of Okla 62  
and Okla 10, went north to exposure  
F-2 of Fern Vale ls Cen W/2 SE  
1 Aug 51, 042-17-22, Coll F-2 of 1 Aug 51

2 Aug 51

Discovered that I had left the pack containing a Brunton Compass at ca 12-18"-2' while on a near the Neosho River (left hurriedly yesterday because of blasting). Returned for the pack, Highway Contractor found the pack returned same and Brunton left at 0940. Arrived at Seligman at 1200. Drove on to Roaring River State Park via Mo Hwy 112. B. L. Benson (1938) shows photographs Fig 5 and 6 of Reeds Spring, Pearson, Northrup, and Compton. I don't believe it. Section seems to me, (Guesstimate)



1 Aug 51

of U.S. 33 and 01:10 11. D. L. Benson 1 mile west to Kansas, O.K. Could not find exposure which D. L. Benson showed me in 1940. Write him about locality.

Drove to Seligman, Mo to spend the night.

2 August 1951

observed that hilltops in area around Roaring River are capped by from 50-60 ft of Boone(?) chert, which seems to overlie the Reeds Spring chert. This may be but the weathered top part of the Reeds Spring, but I believe it may be Reeds or Grand Falls. This chert zone caps hills on Highway 112 in the north half of 22-22N 27W. Reeds, <sup>primarily</sup> underlies this chert.

This chert zone forms the high level surface on Highway 44 from Cassville, Mo. to the n.e. edge of the Coesville quadrangle.

Flat creek <sup>valley</sup> in the Arora T. along Highway 44, to farm of Chert, Reeds Spring, St Joe? and or Lewis and I saw no chert. Highway 44 from 17-24N 25W to SE corner 33-25N-24W is on the high level chert zone plateau. Dry creek in 5-24N-24W cuts through the Reeds Spring quarry at the junction - SE SE NW 5-24-24 in lower Reeds Spring or St Joe. ledges in cen 5-24-24 just below the chert zone may be basal Bonanza. If so this may be an important exposure of the Reeds Spring zone.

The chert zone forms the high lands on Highway 44 between And Reeds Spring in the Fossythe T.

Drove north of Reeds Spring to Set of 65 and 76 to Mother's Cape Courts farm, 1951.  
Page 209

3 August 1951

Drove south from Reeds Spring one mile and started to drive north to Tunnel on R. 1/2 mile SE of Reeds Spring to examine the type locality of the Reeds Spring.

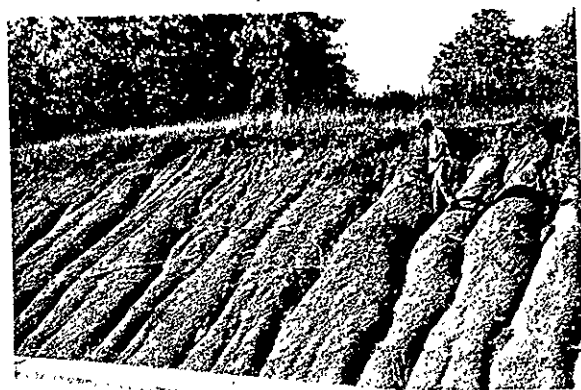
The car stalled and we had trouble getting the motor started. Decided to skip the R. S. and go to Springfield to get the car fixed. This trouble has plagued us all summer. R. S. is no place for motor trouble. Arrived in Springfield at Cone Carburetor Co. at 0930.

Required until 1130 to get car running right. Adjusted fuel pumps put in new points, new distributor.

Drove south to east-west road, Greene co. D, and drove east to SW corner of 29-20W to Kaiser (1950, Q.A.P.G.) Section in fig 7b.

Agree with Kaiser's conclusions and details of sections but find it difficult to recognize difference between lithology of Sedalia and Sedalia ls. of Sharon just above crystalline beds at base of Reeds Spring.

Drove back to west, to Cor. W. NW NE 35-29N, 20W and turned south on gravel road toward old zinc and lead mines. Drove by hillsides where the mines are located, SE 1/4 of Sec 35-29-20. This is the type locality.  
Page 210



51-3 Aug-29

3 August 1951

Drove south from Reeds Springs one mile and started to drive north to Tunnel on R. 1/2 mile SE of Reeds Springs to examine the type locality of the Reeds Spring.

The car stalled and we had trouble getting the motor started. Decided to spin the R.S. and goto Springfield to get the car fixed. This trouble has plagued us all summer. R.S. is no place for motor trouble. Arrived in Springfield at Cape Carburator Co. at 0930.

Required until 1430 to get car running again. Adjusted fuel pump put in new points, new carburetor.

Drove south to east-west road, Greene Co. D, and drove east to SW corner of 29-29 1/2 20 W to Kaiser (1959, Q.A.P.G.) section in fig 7b.

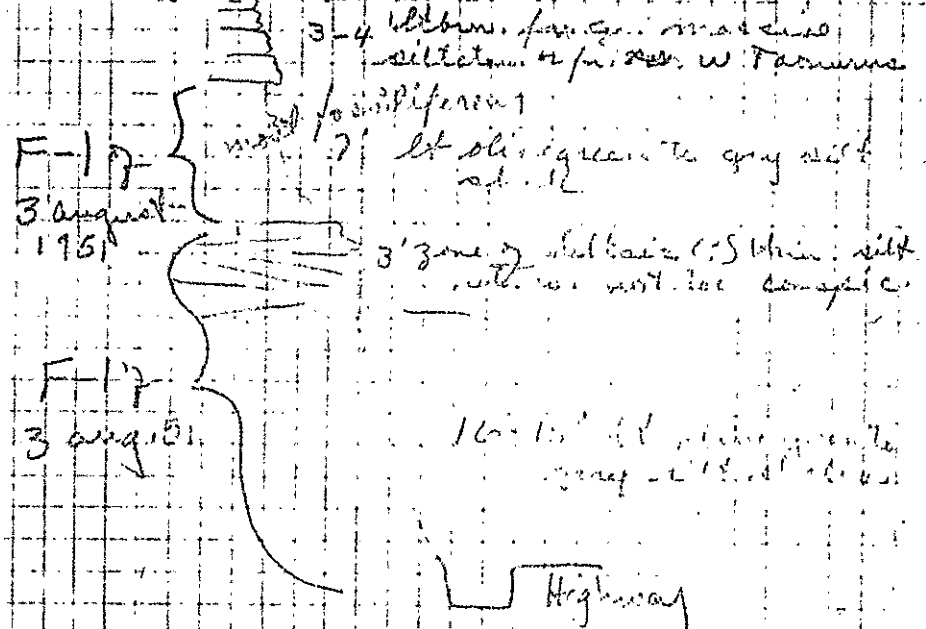
Agree with Kaiser's sub divisions and details of sections but find it difficult to recognize difference between lithology of Sedalia and Silurian ls. of Reeds Spring. A large columnar bed at base of Reeds Spring.

Drove back to west, to Cmp. W 1/4 NW NE 35-29 N, 20 W and turned south on gravel road toward old zinc and lead mines. Drove by hillsides where the mines are located, SE 1/4 of Sec. 35-29-20. This is the type locality.

3 August 1951

of the Pierson ls. only the mine dumps are exposed in the wooded hillsides. There are no outcrops. When appear to be some new dumps (1939-46?) on east of the old mine.

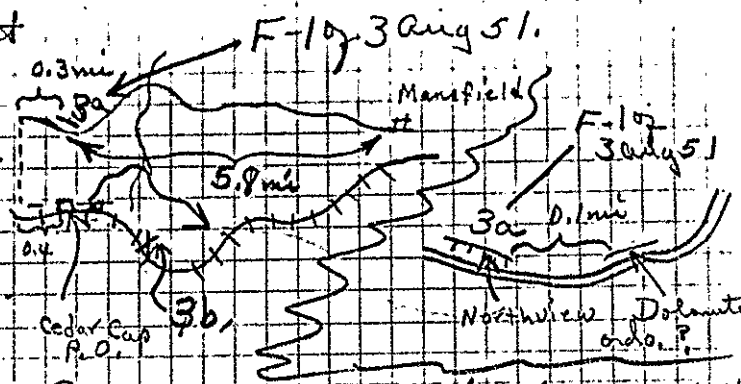
Drove east on Greene Co. Road to Mo. 125 and south on Mo. 125 to U.S. 60. Drove east on U.S. 60 to only siltstone exposure on north side of the road. This is Northview siltstone. Stage 3a.



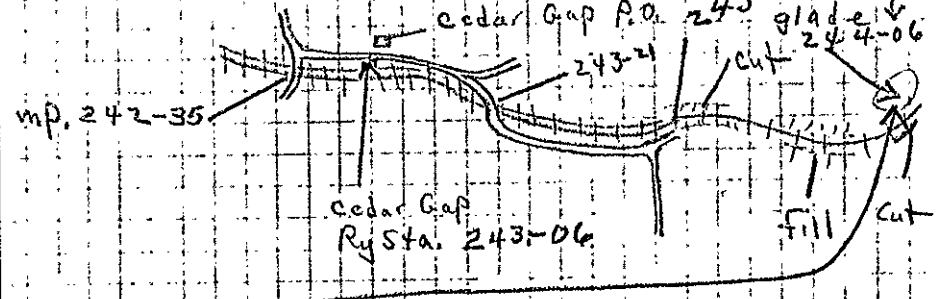
Exposure approx. 35 miles east of Springfield on U.S. 60.

3 August

F-1 of 3 Aug 51



Drove on east to Mansfield and obtained a cabin for the night. Drove back west to Cedar Gap (6 1/2 miles west of Mansfield). Turned south to R.R., then east to Cedar Gap, east along R.R., cross tracks and parked by switch at m.p. 243-27 on the San Francisco R.R.



Coll F-2 of 3 Aug 1951 from Middle part of the Northview shale from a ledge along north side of R.R. tracks one mile east of Cedar Gap Rysta.

Returned to car and lunch to supper in Mansfield, Mo.

4 August 1951

Left Mansfield on U.S. 60 going west toward Cedar Gap. Stopped 5.8 mi west of Mansfield at exposure of Northview shale to collect F-1 of 4 August 1951. (Sta 3a).

I observed that at the base of the 14-18' perhaps as much as 21 ft of shale, is from 6-7 ft of lithographic limestone, the Compton.

6.5 miles from Northview exposure on U.S. 60 to Courtes Road and US 60 turnt west East of Seymour.

Drove north from Seymour on section line between sections 2 and 3 - 28 1/2 17 W.

Drove north and west from Seymour on country road.

Good exposure of lower Northview in Saddle, cen 5 1/2 NW - 9 - 29 1/2 17 W. Very few fossils.

Poor exposure of Northview sh. at SW cor SE SW sec 32-30 1/2 17 W. on north side of Teague Creek.

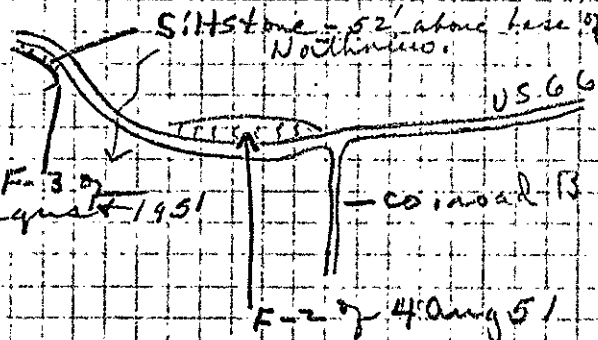
Drove on NW of Teague Creek to creek in cen 5 1/2 of 31-30 1/2 17 W. so-called siltstone of Northview is fairly massive dolomite, but soft.

4 Aug 51

Drove north toward Ebenezer ch. Road thru sec 31-28<sup>2</sup>, 18<sup>W</sup> goes thru the massive dolomitic beds of the Northview siltstone.

Drove north by Rocky Point Sch and Ebenezer ch. turned left on mo. 38 to Marshfield.

Drove west from Marshfield on U.S. 66 to Northview Hill, SE cor sec 22 and SW cor sec 23, T30<sup>N</sup>, 19<sup>W</sup>, type section of Northview Shale. F-2 of 4 Aug 51 from 12-20. 4 Aug 51 ft above the base of the Northview. Just opposite Jct. of S.G. 66 and county road B, SW cor sec 23, 30<sup>N</sup>-19<sup>W</sup>.



coll F-3 of 4 Aug 51  
coll F-3 of 4 August 1951

Walked up thru the section to the west to the first siltstone of Karsels section (52' above base). This is not a siltstone but a dolomite of type almost identical to the Weldon of Oklahoma. Found fossils in the basal, non working beds. coll

P. 214

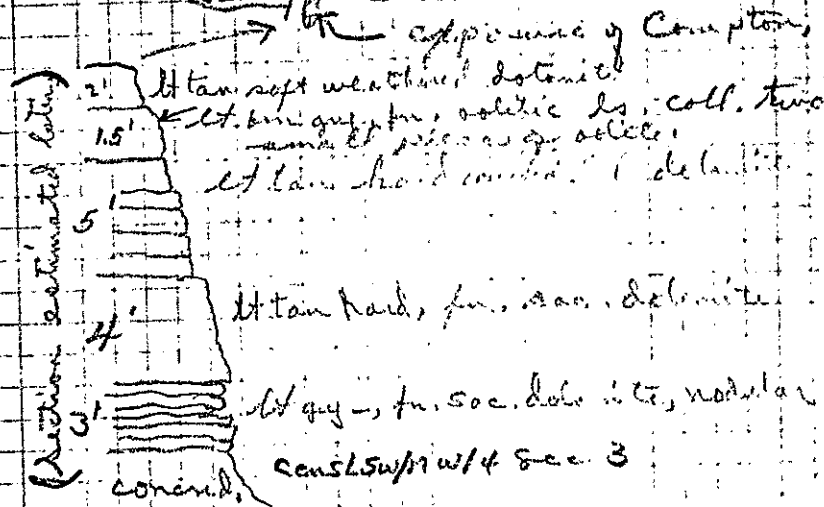
4 Aug 51

F-3 of 4 Aug 1951 from these dolomite beds. 52' above base of fm.

Below these dolomites are Sedalia

Drove south of Northview on county road in west half of sec 35-30<sup>N</sup>-19<sup>W</sup> to new bridge over the James River. Exposure of Compton on east side of bridge in soft chert.

James River Shallow



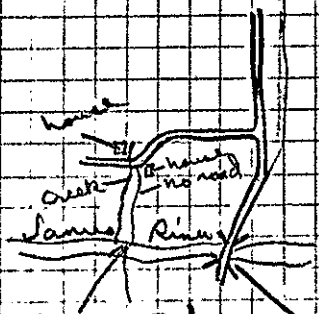
Drove back north to first road west to drive to Cameron Ford. Roads have been changed since Stratford was finished.

Page 215



4 Aug 51.

You can no longer drive across the  
Dameron Road.



Dameron Road  
Cen. N.W. Sec 3  
30° 19' W.

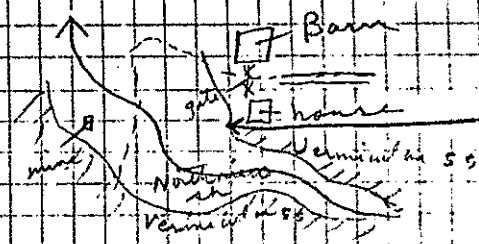
cen. S.L./S.W./N.W. Sec 3  
30° 19' W.

The Compton appears to differ lithologically from what I have always considered the "lower Choteau" of the Choteau Springs area. The Compton may be the lower Secalia dolomite.

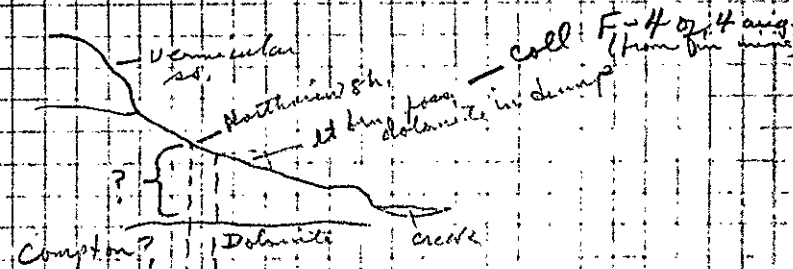
Drove west on county road to end in attempt to reach US 66. Came to end of road and turned back, returning to Northview then driving west on US 66 to location of Lyman Sta. (abandoned in early 1920s). Drove west to rd. road between sections 3 and 4-29° 21' W. Drove to end at farm corner of 1/2 sec 3. Drove back to highway and east to Ingram School Road, in E 1/2 sec 3, 29° 21' W. Drove north across South Dry Sac River to TWP line. Drove 2 1/4 miles east and 1 1/4 north to

4 Aug 51.

To farm at end of road in cen. SE 1/4 sec 30, T 30° R 21° W. Man senting the farm to V. M. Mills. Walked down to creek and mines SW of house. Creek is cut in shaly Northview and mines are in lower Secalia.



F-5 of 4 Aug 51



F-4 of 4 Aug 51  
(from the mine)

On way back to car found clams in base of SS from above shale of Northview.

Drove back south to SE cor. 31 30° - 20° W. Then west to sec 34-30° 21' W. North to SW of 19-30° - 20° W then NW and west to road junction on east line, 1/3 mile north of sec corner, sec. 23, T 30° R 21° W. Here a massive 1/2 mi dol. with white chert nodules.

4 Aug 51

Drove west to cen SW 23-30-21<sup>W</sup>, then north to cen NE of 23-30-21. We saw no quarry, although the Chert? is partially in tank to north of road. Shale of Northview is in road cut up the hill. Drove west, then south half of 14-30-21. Saw massive beds in the creek coming in from Little Sac River cen SW 14-30-21.

Drove south into hill in NW 1/4 sec 22-30-21 (Vermilion ss) then returned north and went west to 1/2 mi SW of Mt Comfort ch. Drove south to cen NE 21-30-21 (Kaisers lo.) coll. F-6 of 4 Aug 51.

Little

14' 0.9'

Vermilion ss.

F-6 of

4 August 51.

(cen NW Sec 22-30-21)

15' lt grey siltstone (dolo)

Kaisers (1950) Fig 8, sec 5.

Drove north toward Mt Comfort Church SW SW NE sec 16-30-21<sup>W</sup>, Greene Co. Northview shale zone is exposed in SENE 16-30-21<sup>W</sup>. Exposures other than Northview shale zone are poor.

4 August 51

# Comments

The Compton in sec 36 (moor's type loc.) is a lt brn ferr. ? fm. dolomite, lower part nodular. There is an oolitic bed near the top. That's some sort of dolomite, though thin occurs in the Cedar Gap area, and in the area north of Seymour. I suspect that the Compton may be simply a dolomite facies in the base of the Northview.

The Northview is largely a dolomite sequence. I suspect most of the phos. is dolomitized or at least very dolomitized.

In the Cedar Gap area the massive dolomite beds are 100' and then and confined to the top 60' of the Northview. Northward around Marshfield the upper 15-20 feet of the Northview becomes more massive and hence and the lower 30-40 ft becomes more blocky and clay siltstone. A 0.3 ft. dolomite appears in lower part. Worm burrows are predominant in upper half of the sequence.

Toward the west the lower shale of the Northview becomes thinner and more thin bedded and of consistent lith. The upper dolomite becomes more massive and thickens the intervening shales become more blocky and thinner.

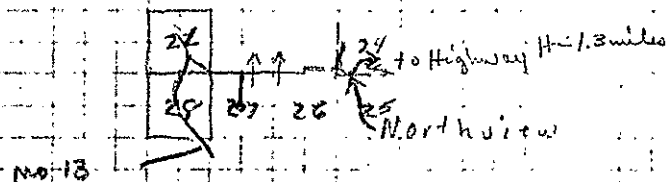
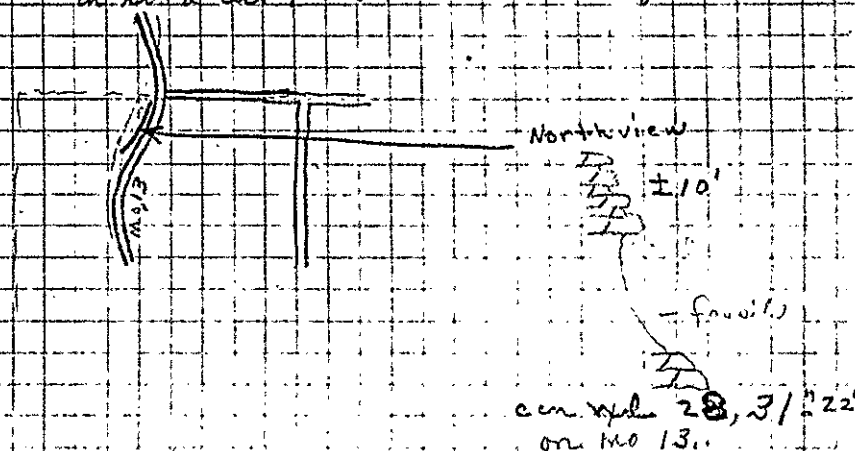
The only good limestone in Kaisers

4 August 1951

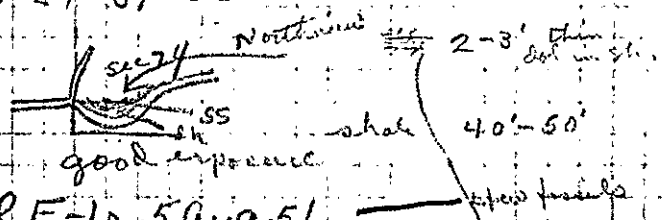
sections is south of mth Comfort  
ch, cen n/2 Sec 28, T30N, R21W.  
Pierson at the type area is somewhat  
dolomitic.

5 August 1951

Drove north from Springfield  
on Mo. highway 13th exposure of Northview  
in road cut





Drove east 2.5+ miles to exposure  
in SW 24-31-22W,

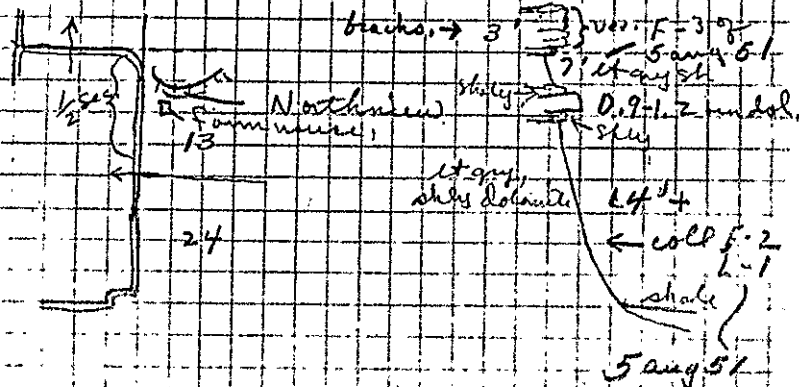


Coll F-19, 5 Aug 51



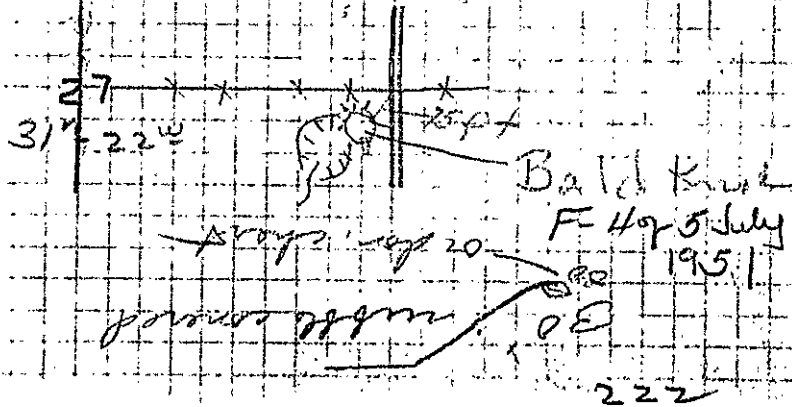
F-1  
F-2  
F-3

blacks.  $\rightarrow 3$   ver. F-3 g-  
5 and 5-1  
? at any sh  
shells  $\rightarrow$   0.9-1.2 in. d.  
sh



This may be a good locality to  
beats for fauna. Blocks are few and  
easily accessible.

Drove south to county road CC then eastward to cap. N. 1/2 sec 27 and drove 1/2 mile south to an open sec to Kings Bluff or Bald Knob as it is known to the local inhabitants.

[illegible]



5 Aug 51

is thick at the expense of the Northwestern shale units.

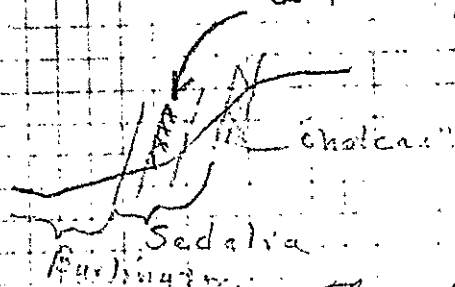
Kaiser's Chert is not present in section seen by us in the area south of sec 20-37-22W. So-called "Chert" of Kaiser in the Springfield area appears to be the same as the lower part of Kaiser Sedalia of the northern or Osceola area.

6 Aug 1951

Drove south of Warsaw on Mo. 65 to Jct. W/Mo 83. Drove south west on Mo. 83 to Fairfield. Turned west on section line and drove west by Shiloh Sch. Bluffs from  $\frac{1}{2}$  to  $1\frac{1}{2}$  miles west of Shiloh School are Burlington. Some ledges offer possibilities for Burlington chert. Drove on west to Ticonderoga and south west from Ticonderoga toward Osage River and Osceola. Stopped at Kaiser locality 57 NE side of hill NE 1/4 Sec 8, T 38 N, R 24 W,  $\frac{3}{4}$  mi NE Corbin, St. Clair Co., Mo.

coll F-19, 6 Aug 51

F-19<sup>6</sup>  
Aug 1951.



The top 3 feet of the middle chert zone of the Sedalia is shaly, and produces abundant silicified *Caninia*, *Zaphrentis*, *Heliolapora micheliniana*, *Zaphrentis*, *Heliolapora* and other corals. The white chert of the lower part carry *Springer* *Caninia* and *Caninia*. The upper corals are silicified in situ. Most of the good fossils. Most of F-19 6 Aug 51 from this corals zone.

6 August 1951

Drove south to Bentomille -  
Osceola road and on to Osceola  
Drove across old south bridge  
at Osceola to the Hunt Bullard quarry.  
The quarry is in reality a limestone  
mine in the "white ledge" or Cacto-  
crinus prebolivian zone of the Burl-  
ington (Kaiser, 1950, p. 2166). As far  
as I can see there is little possibility  
of collecting crinoids from this locality.  
There may be some good weathered surfaces  
south of the mine but we did not  
see them if so.

Returned to Osceola and drove  
north to Clinton on Mo. 13. I forgot  
that J. Br. H's own lines in Clinton,  
so did not stop. Had a flat just east  
of Clinton and ruined a wheel.  
Drove on via Mo. 52 thru Windsor  
to U.S. Highway 65 and went to Sedalia.

Spent the remainder of the afternoon  
obtaining a new wheel for the truck,  
and attempting to learn of an old  
crinoid collection supposed by Kirk  
to still be in Sedalia. No information  
obtained.

Postmaster at Sedalia suggested  
that Mr. Schotten Pres. of M. R. Keaton-  
son, Past Pres. Pettis Co. Historical  
Society, Court House and that they  
might know about the coll. I did  
not have time to check further.

Mr. Ashberry Goodnight, RR 2,  
page 225

6 August 1951

Sedalia is an Antiquar collector and  
his many reliques.

Obtained room at El Rancho,  
very good, court, reasonable. Best  
in town.



7 August 1951

Spent the morning obtaining two new tires, having them mounted, shifting tires on the truck, etc. Had to hunt all over Sedalia (Ford Motor Co. did the checking). Obtained two from the Ford M.C. Co. from The Goodyear Tire Co. They are Armstrong tires but sold by the Goodyear people. They have the same guarantee as Goodyear tires for material and workmanship. If they go bad we are to return them to the Ford People in Sedalia (W. Smith Motor Co.). They will replace them.

Drove  $3\frac{1}{2}$  miles south of Sedalia to the Hampson Lime Co. Quarry, Sec 33, T.4, R.21E, Pettis Co. Mo. The quarry is in the lower Ordovician (Cottler dolomite?).

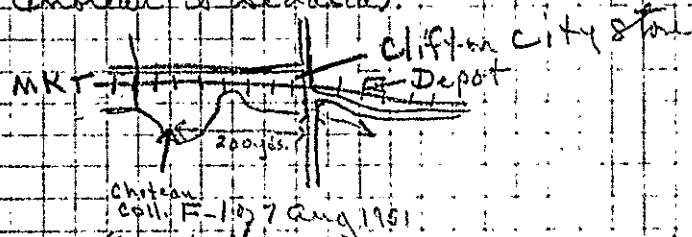
No Mississippian rocks there. Mr. Hampson, quarry owner, asked me to look at some of his rocks, gave him information on them and information on other dolomites in the area, Sedalia dolomite. One of the rocks seems to be a meteorite. It is supposed to have been broken from the Ordovician dolomites in 1944 (?) but there is a possibility that it came from the ones hidden about the quarry and the lab work who found it may have been mistaken. We obtained the rock for Dr. Henderson.

We drove to town for dinner (Arriving at 1:40 hrs).

7 August 1951

We then drove north by Sunnyside School and east to Beaman and on to Clifton City.

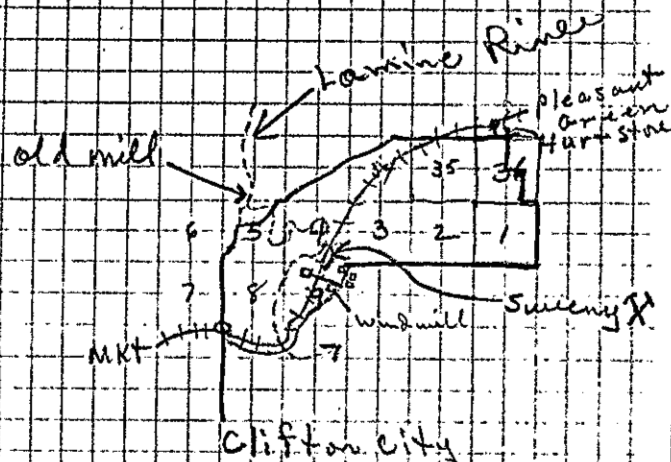
We collected F-1 on 7 August 1951 from the 'Choteau' - lithographic limestone in the creek on the south side of the MKT RR at Clifton City. This is the fauna of Swallows and Bransons - lower Choteau and Kaiser's Choteau of the Ocala Group (Kaiser's Compton = Choteau is Sedalia).



The Choteau (or Kaiser) or lower Choteau (or Swallows and Bransons) fauna on the floor of the stream from the bridge up the stream for nearly a quarter of a mile. We went only to the coll. site. Dr. B. Williams described this locality to me. I believe it is the right one.

We then drove north and west from Clifton City toward Pleasant Green. Mr. J. R. Thomas, Clifton City, told me of an old mill built by Fink in civil war days and known as the Sells Warden mill. The mill is gone but the site remains (see map on next page). This mill site is believed by me to be Swallows site  $\frac{1}{2}$  mile north of Marston's Bridge.

Pronounced locally, Mastins.  
Bridge, Chateau section.



To reach Sweeney quarry go approx  
2 mi east of old south bridge 1 1/4 miles  
east of Clifton to old road to house west  
of RR and SW of quarry. walk north  
on RR 1/4 mi to quarry. or

Go from Clifton City via road  
Mastins Bridge to Pleasant Green  
2 mi south, 3 miles west and  
1/2 mile SW, turn left to R.R. tracks.  
Walk north to quarry. Found  
road to quarry too late to walk  
it today.

Returned to Clifton City via  
south bridge, Chateau and Sedalia  
exposed in creek on south  
side of road just west of bridge.

7 Aug 1951

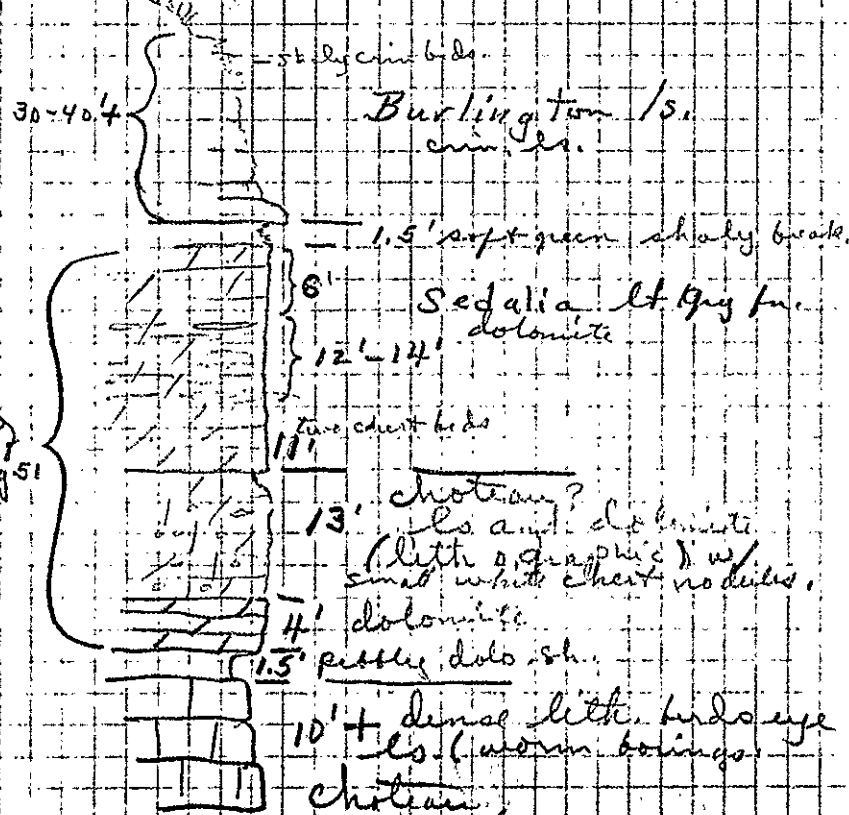
we did not have time to  
examine the exposures in this  
creek.

Returned to Sedalia for  
the night.

8 August 1951

Drove east of Sedalia on U.S. 50 to Smithton, 1.3 miles east of Smithton to Mo. 135, turned north and drove to Clifton City. Drove south across tracks and drove left along R.R. tracks to the east, crossed Lawrence, drove 3 miles N.E. from bridge and turned left down the Valley wall to the M.K.T. R.R. walked north along the R.R. 1/4 mile to Sweeney quarry.

Estimated the section,



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8 August 1951

went north to Branson's exposure in SE 1/4 Sec 9, T 47 N R 19 W. The penciled notation of TWP on the Cooper Co. map were wrong, we passed Branson's exposure not realizing but noted his exposure on the map as we drove by. Spent several hours trying to locate a bridge and exposures in SW 1/4 Sec 19 E thinking it was 47 N 19 E. Exposures on clear creek in sec 9, 47 N 19 E are good. I recognized the Sedalia, and Burlington but do not recall the "Choteau" of Kaiser. I believe it is there. A good place for a section.

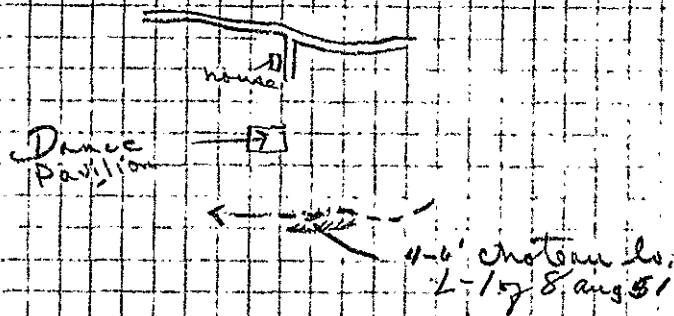
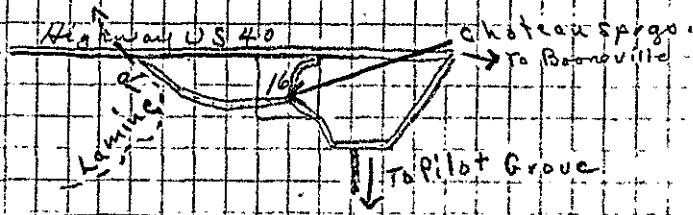
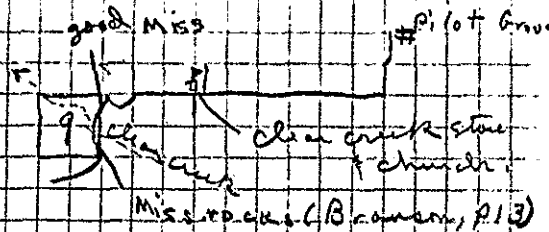
Branson's (1938, p. 13) determination of Northwick is based mainly on lithology (beds 3-5). I am not sure at this location of any correlations because the Choteau seems to be slightly dolomitic in the Choteau Springs area.

Drove east to Clear Creek store and church (see map, page 236). Drove to Pilot Grove and NE on Mo 135 to point 2.0-2.6 miles SW of Jct Mo 135 and US 40.

Turned due west and followed main gravel road to Choteau Springs. Road goes right thru Choteau Springs. Stopped at the dance pavilion and walked to the creek 200 feet south and 60 ft east where there are about 4-6 feet of dolomitic ls. exposed. on the basis of present knowledge I cannot

Page 235

8 August 1951



correlate this part of the section with the section in Sweeney Quarry.  
Drove to Jefferson City and then to Rolla. Spent the evening with

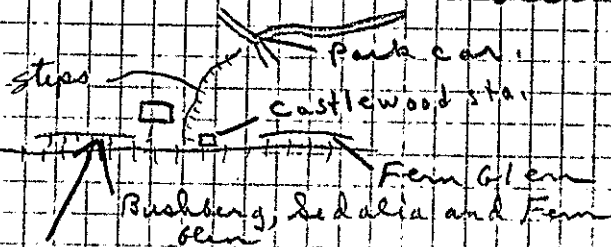
8 Aug 51

Al and wealth of Spreng. Al is teaching general geology and Pale at the Mo. School of Mines. Working Mo. Bureau of Mines during the summer on Paleol coll.

9 August 1951

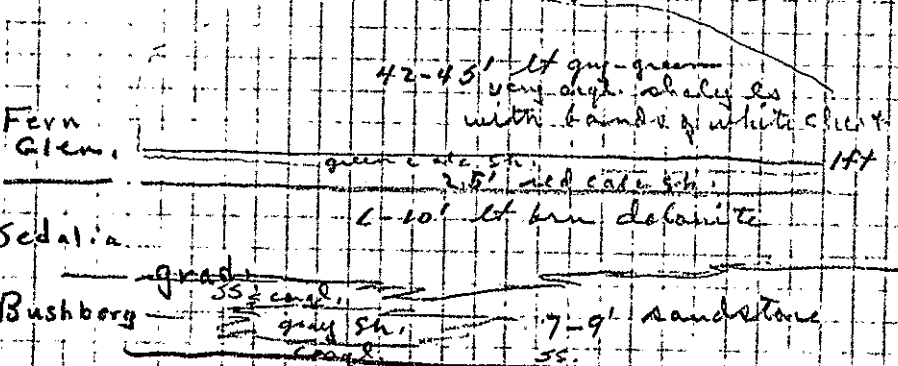
Spent the morning talking with  
Al Speng and Walter Learight  
on problems of Missouri Paleol. and  
naming the units (front) unpacked  
at the Ford garage.

Drove to Castlewood 18 miles SW  
of St. Louis on U.S. 66 and U.S. 50.



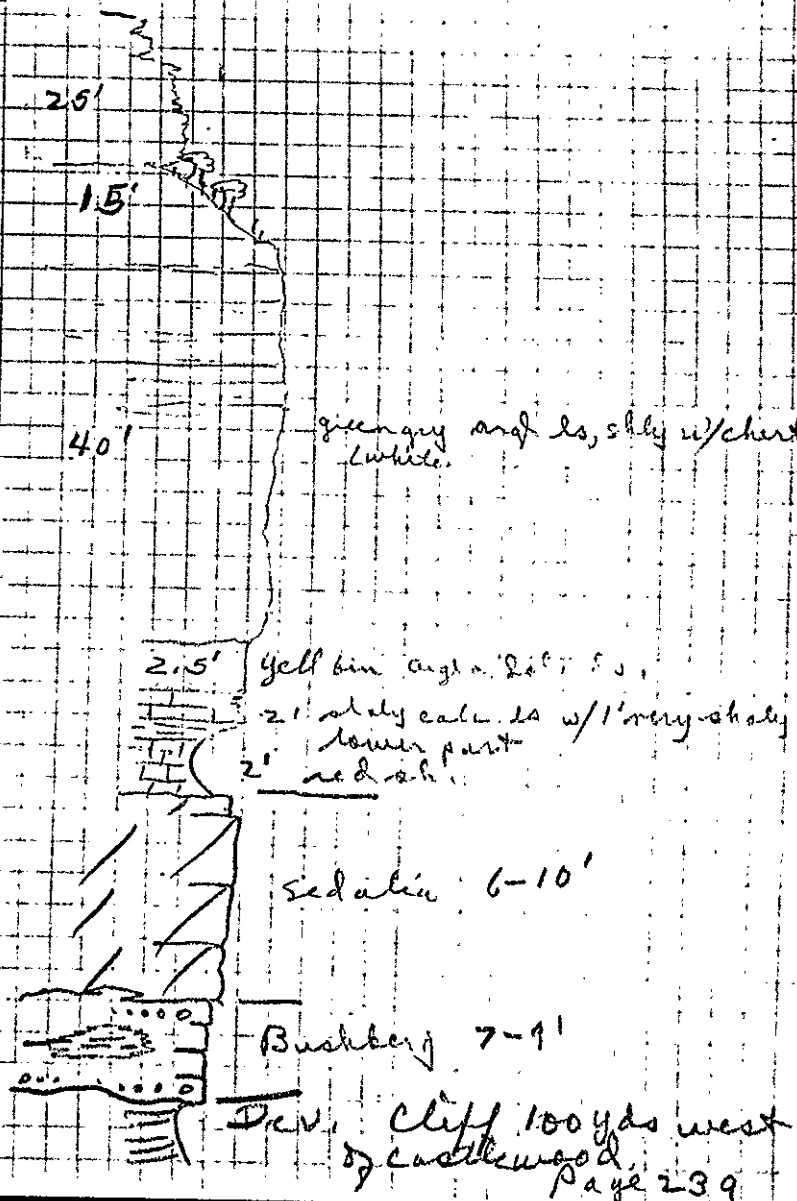
cen w/ 2 S w/ SE / sec 15 T44E  
R4E, St. Louis Co., Mo.

Burlington?



Face of quarry 100 yds west  
of Castlewood sta.

9 Aug 1951



9 Aug 1951

Spent several hours trying to locate the Fern Glen Sta. cell loc. we were unsuccessful.

Drove on south via U.S. 61 U.S. 77, across the Mississippi R. to Waterloo Illinois.

Spent the night at Waterloo at the home of Mr. & Mrs. Wedell. want to send them a copy of the Waterloo ☐.

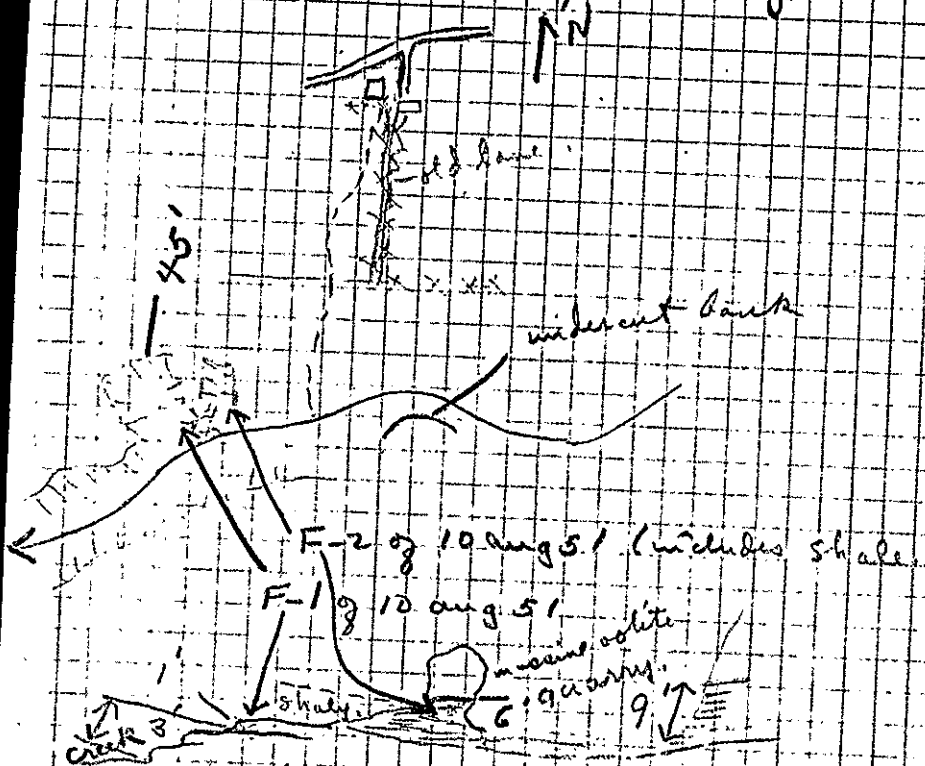
10 Aug. 1951

Drove east of Waterloo to Floraville to find locality in Drove routes listed below but lost  $1/2 - 3/4$  mile in creek bottoms in all directions were dirt and we could not drive because of yesterday's rain. There was not time to walk in to the exposures.

Went south to then southwest to try to locate Shaffer Quarry. Could not get to it from the east (see below), went back to Floraville and back to Waterloo then east to but were unable to get within  $1/4$  mile of quarry. No time to walk in to the quarry.

10 Aug 1951.

Returned to Waterloo and drove west toward Valmeyer on Ill. 156. Stopped at J. Oster farm, for permission to visit the Wolf quarry.

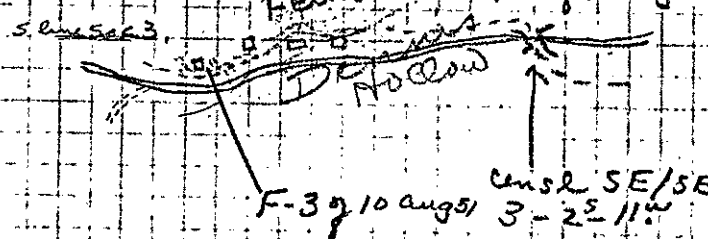


I believe this quarry is Ste-Genesine or Warsaw.

10 Aug 1951

Returned to Waterloo for dinner, obtained Monroe Co. Plat Book.

Drove west from Waterloo to exposure of Fern Glen in Dennis Hollow, 1 mile east of Valmeyer, SE corner Sec 3, 27, 11<sup>W</sup>, Illinois. F-5 of 10 aug 51, F-4 of 10 aug 51.

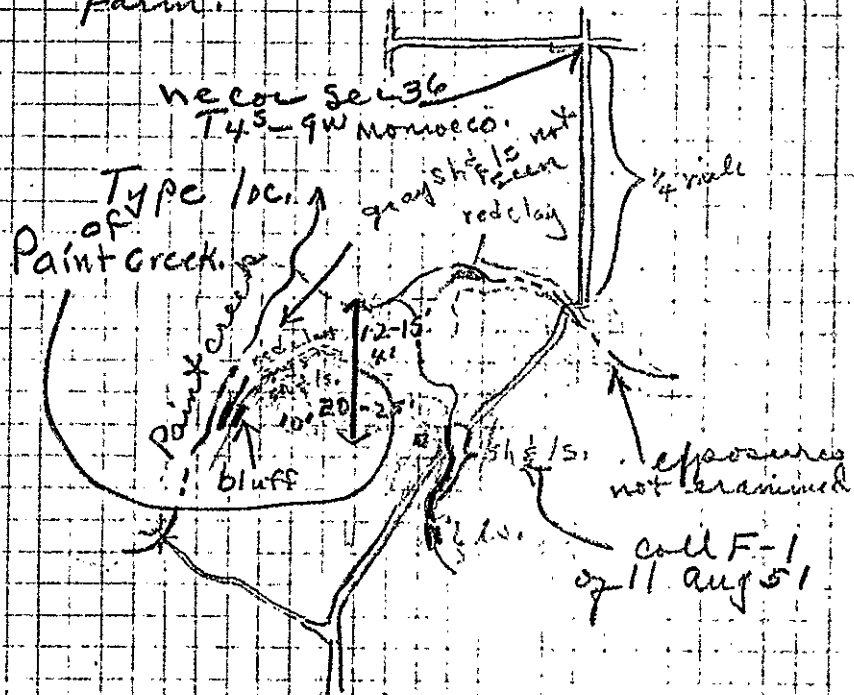


Climbed up creek in cen S/2 sec 3, 27, 11<sup>W</sup>. Climbed nearly to the top of the hill on north side of creek. Found 15-20 feet of red Fern Glen. Nothin member, Lake Valley fm fossils at about 40' ± (perhaps 60') above the base, I believe there are at least 150' of Reeds Spring and Fern Glen. I did not see a bit of Bushington ls. I do not check wellers section here. Needs further work. See Kimmerly's ls.

Drove west to quarry just north of Valmeyer. Parked at the south end of the quarry and walked north 100 yds on top of the Fern

11 August 1951

Drove from Chester to Parma  
and west from Parma on Mo 55  
for 3 1/4 miles, turned north and  
drove to Ames, Monroe Co (census NW 1/4, 36).  
Drove east and south east from  
Ames then north east to Lee Cowell  
farm (census SE 1/4 sec 36, 45 9W  
Monroe Co.). Drove 1/4 mile north and  
1/4 mile west to Eichensey farm for  
permission, met Lee Cowell on road  
just below Eichensey's farm. Received  
permission and returned to Lee Cowell  
farm.





10 Aug 51

Vale fm Climbed to top of ridge and went north along the ridge to the Fern Glen exposure. Section here is like that in Deming Hollow. were unable to find the contact - part of the Lake Valley fm at this locality. made F-6 coll. F-6 from 40 ft above the base of the Fern Glen. There are about 80-90 ft of ls. exposed. all seems to me to be Reeds Spring equivalent.

Burlington of Miller & Reeds Spring?

F-6 → NW 1/4 SE 1/4 NW 1/4 Sec 3-35, 11 W.

Drive to Chester for Hotel accom.

Fern Glen

30-60' ±  
lt gray to x. yln. ls. with much red white chert.  
lt gray to x. yln. ls. 25' ± gran, fine ls.

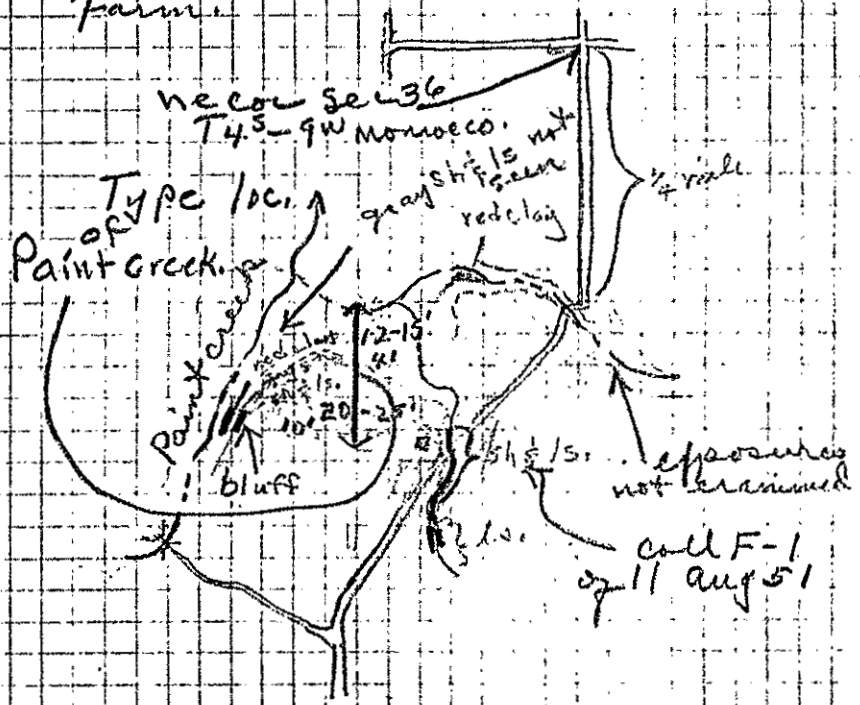
red and lt gray calcarenite  
30'

Maquoketa

on way back to car coll. F-7 20 Aug 1951 from base of Maquoketa near road at south end of quarry. These fossils are either upper Fern Vale or lower Maquoketa. Cen 1/2 Sec 3-35, 11 W. Monroe Co. Mo.  
Page 244

11 August 1951

Drove from Chester to Peoria and west from Peoria on MO 155 for 3+ miles, turned north and drove to Ames, Monroe Co. (NW 1/4, 36). Drove east and south east from Ames then north east to Lee Cowell farm (Cen. 1/2 SE 1/4 Sec 34, 43, 9 W. Monroe Co.). Drove 1/4 mile north and 1/4 mile west to Eichensofer farm for permission, met Lee Cowell on road just below Eichensofer's farm. Received permission and returned to Lee Cowell farm.

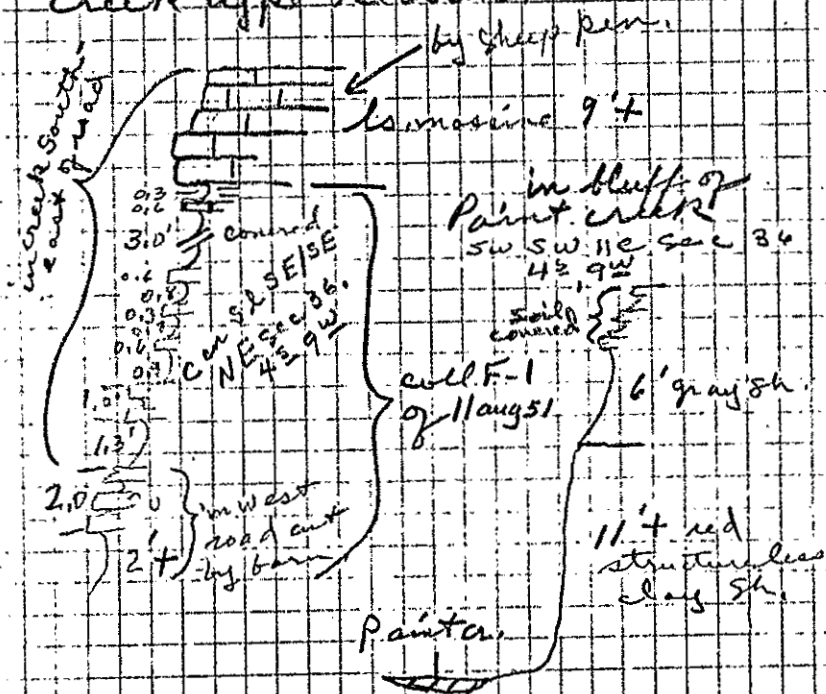


11 Aug 1951

we did not measure the Paint Creek, we were short of time so I am sitting down the following on the evening of 11 Aug 51 in the Tourist Court in Loveston for reference only:

All available time at exposure was spent collecting, Lee Conwell returned to his house and joined us for the rest of the morning and helped us collect.

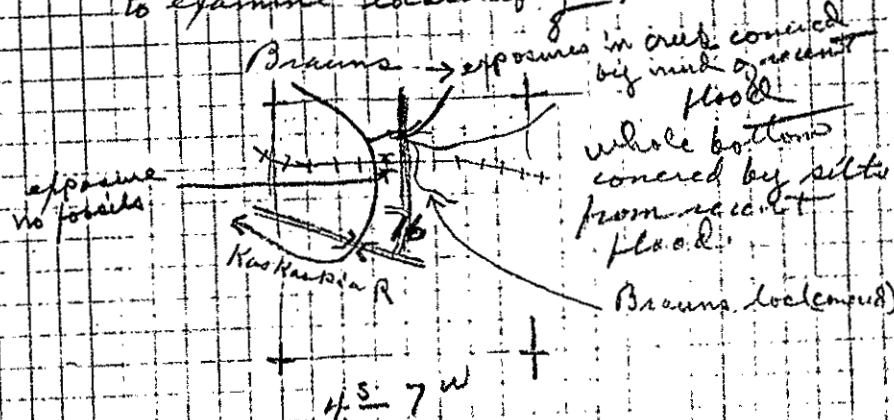
This is an approximate Paint Creek type section:



11 Aug 1951

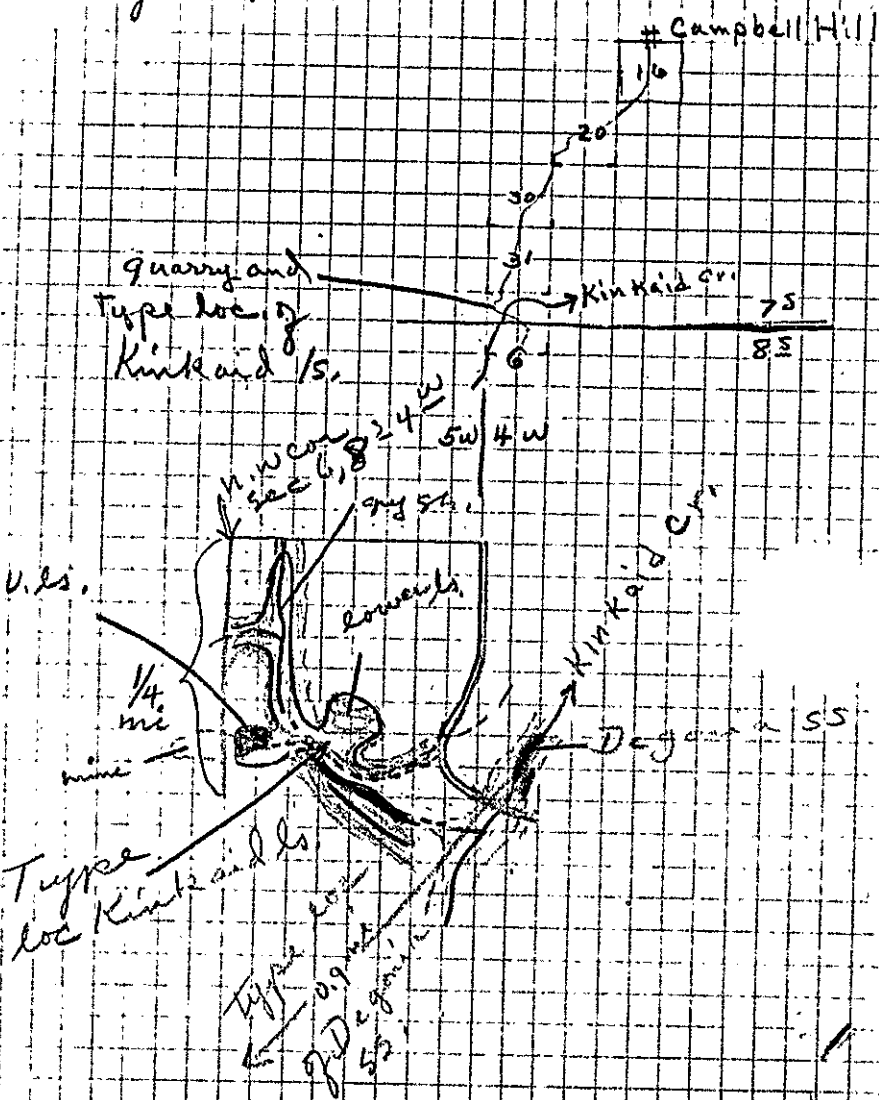
we collected in the stream in the eastern edge of Lee Conwell's farm then we took up west to the bluffs on Paint Creek; no fossils at the later locality. we then drove east to the Red Bud - Rummy highway (I-11-3) and north to Red Bud.

Drove east from Red Bud to the Valley of the Kaskaskia 1.75 miles west of Baldwin to examine locality of Brauns.



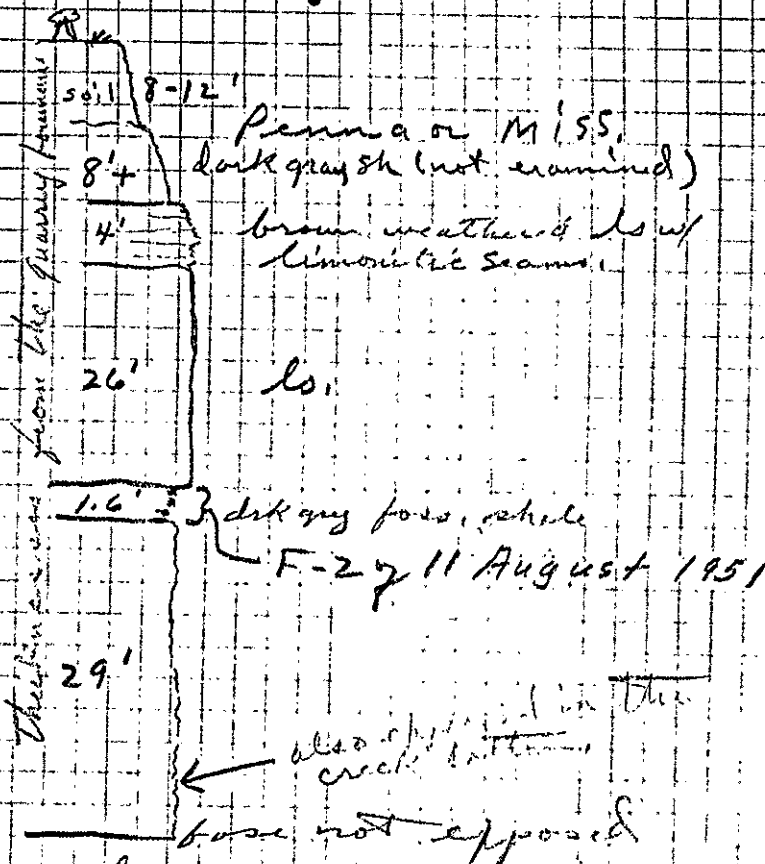
Drove from Baldwin (1200 hrs) to Campbell Hill via Mo 154-150 and 43. Drove south from Campbell Hill on country road three cen sec 16, 7, 4 then angling off to the SW to the NW 1/4 sec 6, T 8 R 4 W, Jackson Co.

11 August 1951



11 Aug 51

Section recorded in court on 11 Aug 1951 because no time available while at quarry for note taking.

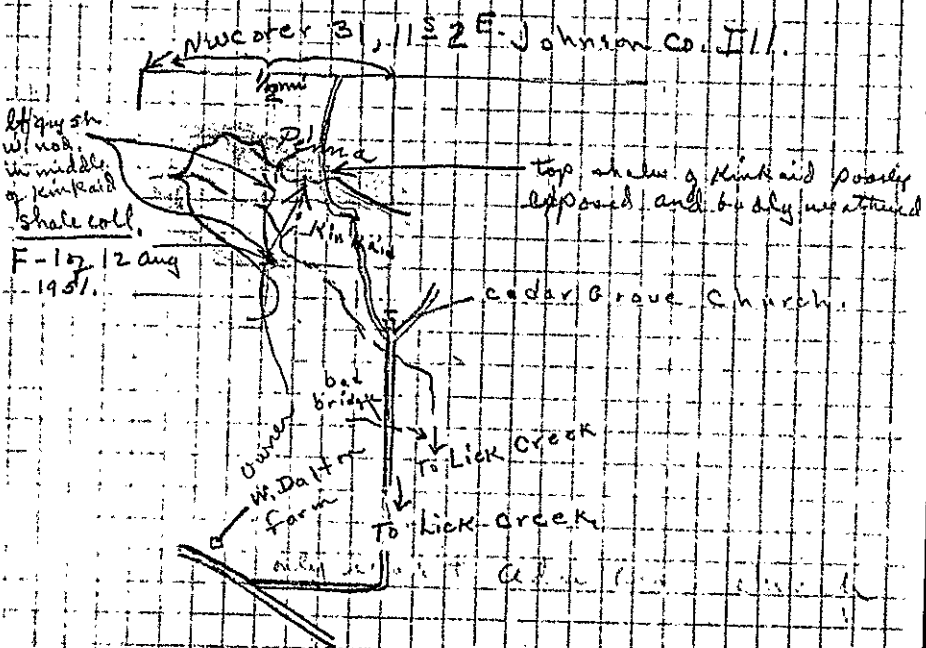
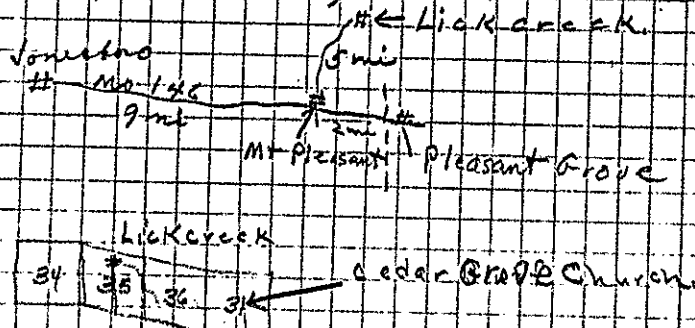


I made no notes on the lithologic characters of the limestone of this segment.

Drove via MW 3 and 146 to Jonestown, Union Co., Ill. for the night.

12 Aug 1951

Drove east of Jonesboro to  
Mt Pleasant and north to Lick  
Creek, Union Co., Illinois.



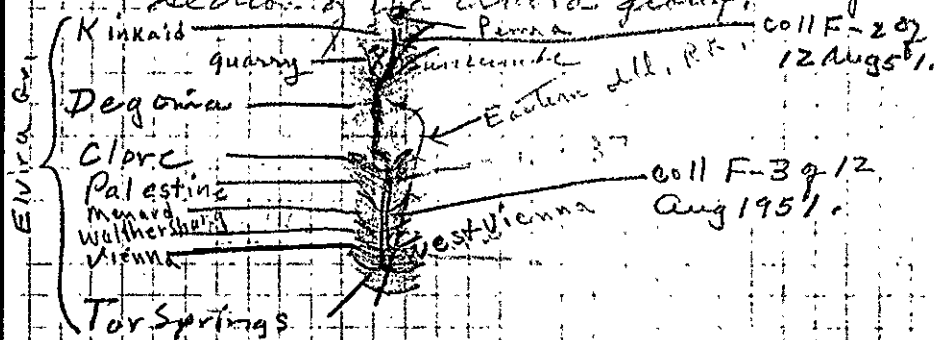
High sh.  
w. no.  
in middle  
of Kinkaid  
shale coll.  
F-107, 12 Aug  
1951.

12 August 1951

Bill and I went up the road from  
Cedar Grove church to the massive  
sandstone of the Penna. The top  
Kinkaid shales and basal Penna. shales  
are poorly exposed and badly weathered.  
we did not believe this to be Cooper's  
(C. Cooper, 1947, Jour. Paleont., vol. 21,  
No. 2) locality, we then walked  
NW up the creek examining the shales  
for exposures, found only the shales  
in the middle of the Kinkaid.

Then went south across the  
creek, found only the shale in  
the middle of the Kinkaid. Coll  
F-107, 12 August 1951 from quarry  
NW of Cedar Grove Church, shale for  
microfossils.

Drove back to Mo highway 146  
and drove to Vienna. Drove north  
of Vienna on Mo highway 37 to  
Bennetts, passing through the type  
section of the Elvira group.



12 August 1951

Turned around and drove back to west Vienna stopping at road cut exposures of the Kinkaid and Menard to coll.

Coll F-2 of 12 Aug 1951 from lower beds of the Kinkaid, cen SW 1/4 sec 15, T12N, R2E, Pulaski Co, Ill. in road cut, MO 37.

Coll F-3 of 12 Aug 1951 from the lower beds of the Menard, NW 1/4 sec 34, T12N, R2E, Pulaski Co, Ill. in road cut, MO 37.

Drove east from west Vienna to Vienna. Could not find "old quarry just west of town" in short time.

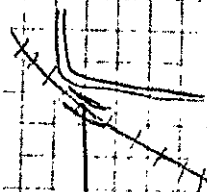
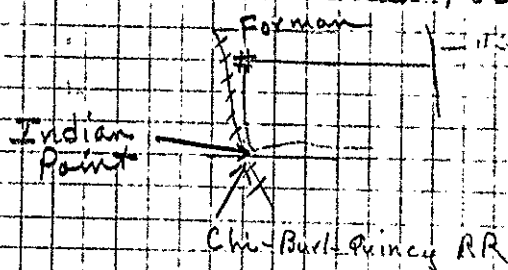
Drove south of Vienna on U.S. 45. Found an abandoned quarry in solid limestone on U.S. 45, 1.5 mi due south of I-44 US 45 and I-146. This may be the so-called Glen Co. I can find. (McComer sec 17-18-3E, Massac Co. Ill.)

Drove farther south to road cut on U.S. Highway 45, cen NW 1/4 sec 28-13E, 3E, Massac Co, Ill. Can see gray sand and red clay of the Colona fm. on east side of road. Coll F-4 of 12 Aug 1951.

Drove south to road to Forman,

12 August 1951

Went to Forman and south 3/4 miles to Indian Point (Vienna Co.).



cut in Paint Creek fm. cen SW 1/4 sec 32, 13E, 3E, Massac Co, Ill.

Coll F-5 of 12 August 1951

Returned to Vienna and drove to Waltersburg and 3/4 mi SE on I-146, turn north and drive to SE corner sec 16, T13N, 6E trying to get to *Spirifer lucasensis* locality in cen east half sec 9, T13N, R6E. Old road no longer passable. You must come west from Eddyville on the north side of I-146. There is no longer a road beyond the SW 1/4 of sec 10, 13E 6E.

12 August 1951

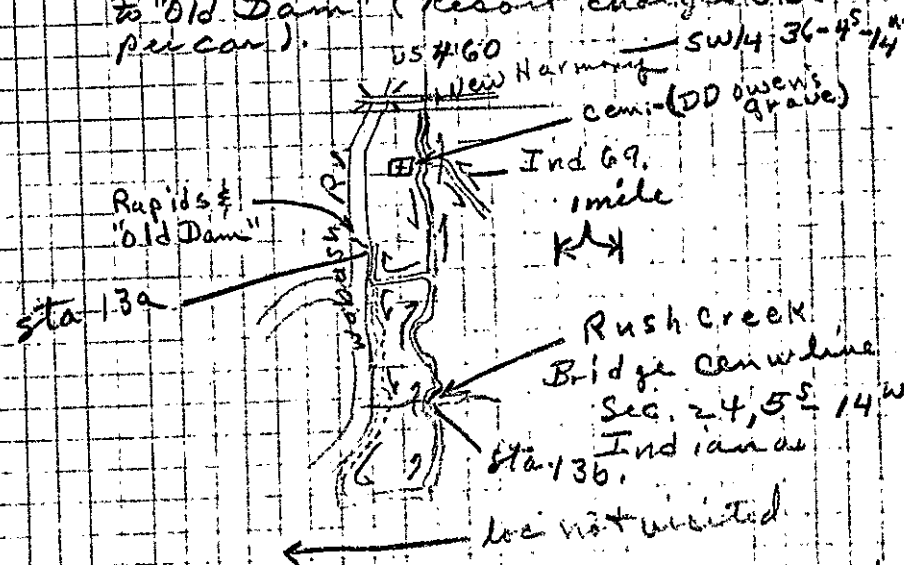
Drove SE to cen south line  
Sec 22, 13E, 6S on dll 146, turned  
south on road to Hamburg. Found  
damaged bridge (Road comm. sign  
said safe for only 3300 lbs - truck  
gross wt 4700#). Returned to highway  
and drove to Solwada.

Left Solwada on dll 146  
(late afternoon - end of field  
work) and drove to Carmi, Ill.,  
via dll 34 and US 45.

Spent the night at Carmi  
Illinois.

13 August 1951

Left Carmi, Ill. and drove east  
via US 264 to New Harmony, Ind.  
Drove to south edge of town  
(New Harmony) on Ind 69, took  
gravel road straight south near  
cemetery where Ind 69 turns SE.  
Drove 1.5 mi south then turned  
right on "Old Dam" road. Drove  
1 mile west to junction. Turned right  
to "Old Dam" (Resort charged \$0.50  
per car).

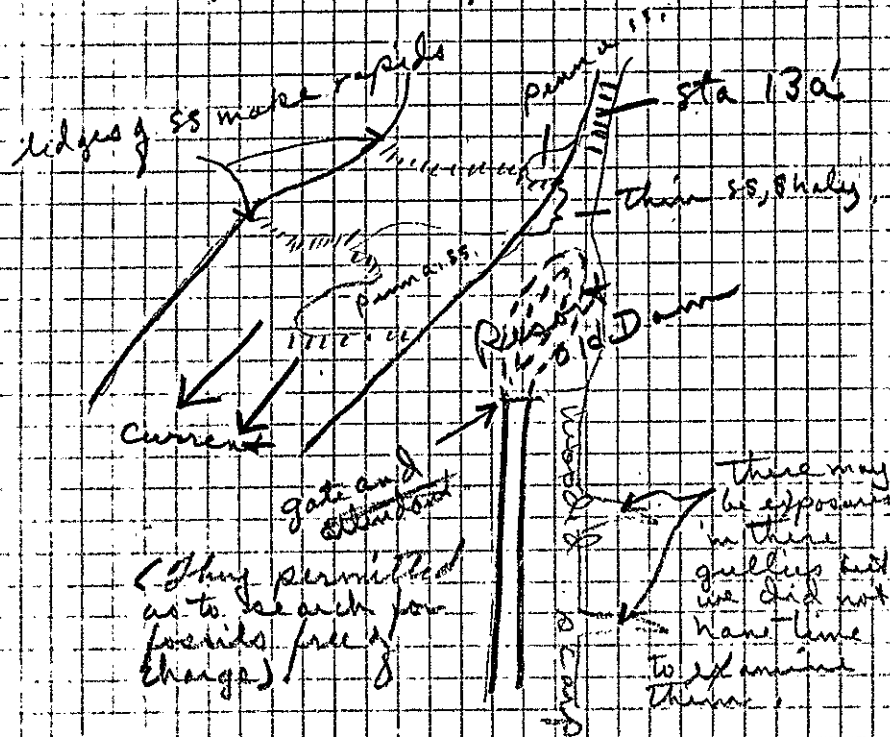


Just above the entrance to the "Old  
Dam" resort, we examined the  
sandstones in the road cut coming  
down the hill; no fossils. Paved  
sandstones are exposed in the  
rapids at the "Old Dam" site  
and in the bluff east of the river.

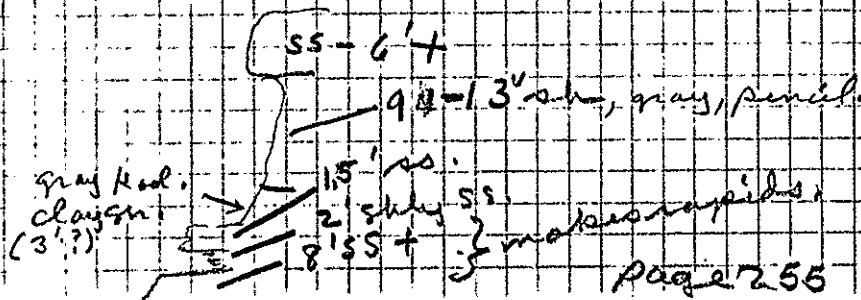


13 August 1951

but found no fossils.



Section at sta 13a'



13 August 1951

we found no fossils at the old dam site, but one should examine the sections up the scarp on the east side of the river. This is the source of some of the type specimens of Notropis ventriosus. (C. n. s. w. 11, 52-14 w. d. d.)

Drove south along an oil field road to cen E/2 sec 27, 52 14<sup>th</sup> Ind, turned east on gravel road to cen W/4 26, 52, 14<sup>th</sup> Ind, then drove north to bridge on Rush Creek, type loc. for some of the type of Notropis ventriosus. (C. n. s. w. 11, 52-14 w. d. d.)

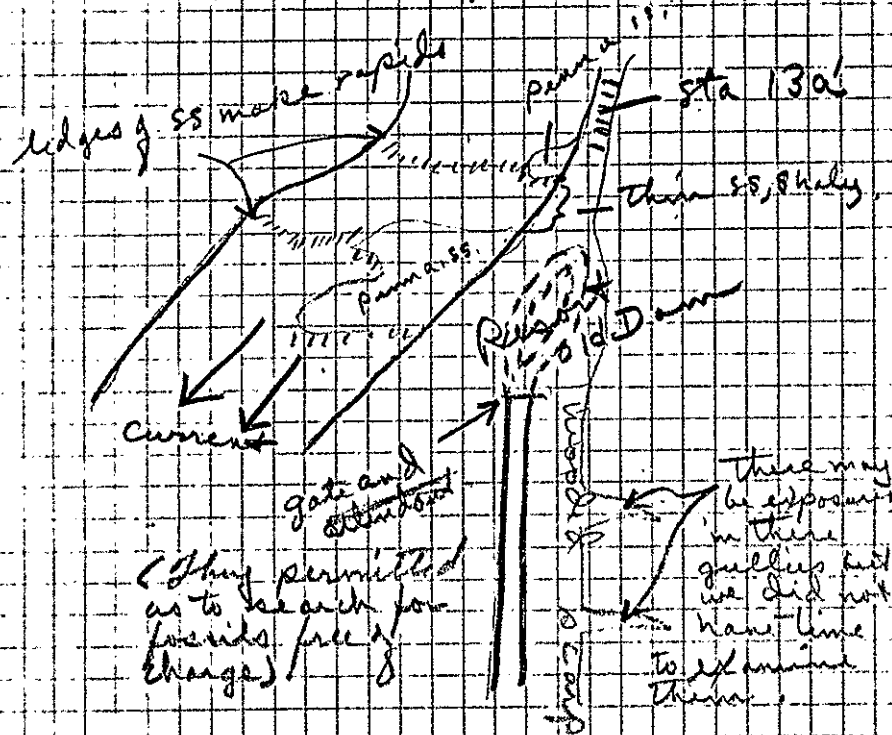
Broke bottom rung of farm's gate in crossing to creek. Could not find farmer to tell him. Fixed gate so stock could not get out.

Returned to cemetery at New Harmony and visited D.D. Owen's grave. Drove 1 mile south east on Ind 69; saw only ss.

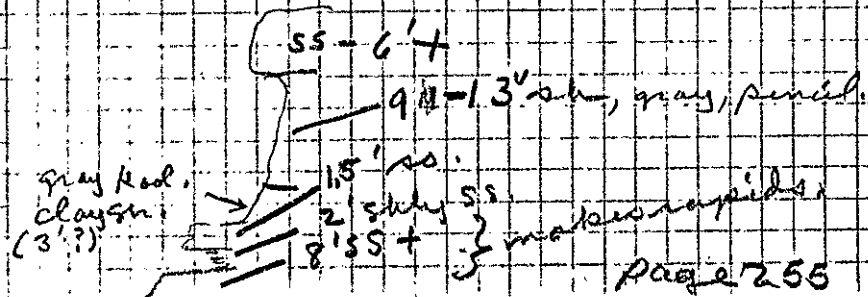
Returned to New Harmony and drove east to Corydon, Ind.

13 August 1951

but found no fossils.



Section at sta 13a



Page 255



51-13 Aug-33

Guy Campbell of Conydon, Ind.  
 & grandchildren



13 August 1951

Spent several hours in Corydon, Indiana with Guy Campbell. (see back page 256)

Campbell gave to the museum approx. 35-40 specimens of brachiopods from the Herrodsburg ls from Bachman's quarry, Breckenridge (Fallsville, Ind.) Ind-8-1-56 date of coll.

Campbell gave the museum one nail keg of corals from the Jeffersonville ls, Falls of the Ohio.

Allen and Bowsher carried these two collections to the museum in the truck.

Drove via Ind. 460 to Edwardsville, Indiana.

#~~Salmon~~ Herrodsburg

Herrodsburg

Edwardsville

Carmichael

RR.

# New Albany

Drove to Versailles, Ind. for night

14 August, 1951

Drove from Versailles, Indiana to Cincinnati, Ohio.

Spent the morning going thru the U. of Cincinnati museum while Fuller Mose Co. gave all the truck and balanced the wheels.

Caster, Rich, Ritterhouse and Holland were all away.

Drove from Cincinnati to Athens, Ohio.

Spent the evening with Myron Sturgeon at the geology building of Ohio State University.

ITINERARY OF 1952  
TO  
OKLAHOMA, MISSOURI, TEXAS, NEW MEXICO AND KENTUCKY  
A L BOWSHER AND W T ALLEN  
U S NATIONAL MUSEUM

JULY

- 9-Flew from Washington, D C to Tulsa. Cooper and Allen arrived at 0845. Bowsher, Cooper and Allen drove northeast from Tulsa to collect Meramec and Chester fossils near Adair, Okla. Spent the night at Muskogee, Ok. Cooper remained with Bill Allen and I till 26 July 1952.
- 10-Drove east from Muskogee to collect Mayes limestone, Meramec. Drove to Greenleaf Lake south of Ft. Gibson to collect Morrow, Brentwood Ls?. Drove to Braggs Mtn to collect from Fayetteville Fm. Spent night in Muskogee.
- 11-Drove from Muskogee, Ok to Cisco, Tx.
- 12-Collected from Permian, Putnam, Moran, and to Ballinger, Tx. and Sweetwater, Tx where we spent the night.
- 13-Drove from Sweetwater, Tx. to Carlsbad and on to Pine Springs just below El Capitan. Searched Getaway limestone 3 mi. south of Pine Springs Camp. Spent night at Pine Springs Camp.
- 14-Drove to Pratt's place near McKittrick Canyon. Collected 400 lbs of Rader limestone with silicified fossils. Returned to Pine Springs.
- 15-Drove SW to Pasotex Pipeline road and collected Getaway Limestone (P. B. King's loc, PP 215). Collected 12 blocks of silicified fossils. Collected at foot of first ridge west of the Hegler Ranch, Pinery and Bell Canyon.
- 16-Drove to 6100 ft elev. SE spur of Lonesome Ridge on ne side of Big Canyon, Carlsbad quad. Collected blocks from 50 yds south of the Gray Ranch.
- 17-Shipped 1259 lbs of blocks.
- 18-Drove from Pine Springs to near Pow Wow Tanks to collect Helms Fm (3356, 3357).
- 19-Drove east from Santa Rita on U S 180. Collected Andrecito Fm. and Devonian. Spent night in Silver City.
- 20-Collected The Box Member of the Percha on NW slope of Bear Mtn, 6 1/2 miles north of Silver City.
- 21-Drove from Silver City to Hillsboro, arranged for rooms in Hatcher Hotel, went to Cecil Boyds to collect Pennsylvanian gastropods.
- 22-Drove from Hillsboro to Clarence Wilson's ranch to collect The Box Mbr of the Percha Shale and drove to the Mud Springs Mtn north of Hot Springs to collect Sly Gap Fm. on southwest slopes.
- 23-Drove from Hot Springs to Alamogordo.
- 24-Collected Percha in first canyon south of Indian Wells Canyon. Spent part of afternoon getting permission to visit Rhodes Pass area of San Andres Mtns. Spent night in Alamogordo.
- 25-Drove to Grapevine Canyon in south end of Sacramento Mtns. to collect silicified Platycrinites and Cryptocantha from Desmoinesian strata. Spent the afternoon wrapping and packing fossils.
- 26-Drove to Rhodes Pass at the north end of the San Andres Mtns and collected Sly Gap Fm and Pennsylvanian north side of the pass just inside the pass above the old road through the canyon. To the best of my recollection, G A Cooper was placed on plane at Hollaman Air Base for flight to Washington, D. C. Bill Allen and I retained the museum truck and continued collecting as we continued collecting on our own.

- 27-Bill Allen and I drove to High Rolls and south to collect Sly Gap Fm and Caballero Fm on the east slope of Alamo Peak. Returned to the motel in Alamogordo in afternoon and with Caryl Otte visited the Lake Valley, Mississippian reef in Indian Wells Canyon, just east of Alamogordo.
- 28-Spent morning with Bill packing and shipping fossils to the U S National Museum. In afternoon we collected from the lower part of the Laborcito Fm, the "Taosia zone", in La Luz Canyon.
- 29-Drove from Alamogordo to Pampa, Tx. Spent the night with Dallas and Sallie Bowsher.
- 30-Drove from Pampa to Ponca City. Collected from Brownsville Ls. east of Fairfax. Night in Ponca City.
- 31-Drove from Ponca City to Arkansas City and to Dexter to collect Derbya from Wreford Limestone; north to Dexter and north to Burden to Cowley Co/Elke Co line to collect the Grand Summit trilobites and Florence Shale before returning to Ponca City, Ok for the night.

#### August 1952

- 1-Allen and Bowsher drove east of Ponca City to limestone quarry in the Wolfcampian Red Eagle Limestone just east of Burbank, Okla. Hurt my knee jumping a fence.
- 2-Drove from Ponca City to Bartlesville, Ok. Hurt knee on fence.
- 3-Collected from the Cowbarn Limestone near Barnsdale School.
- 4-Spent day in Tulsa having new gas tank put on truck and getting an X-Ray of my knee.
- 5-Spent the day collecting Pennsylvanian goniatites from Collinsville coal strip pits.
- 6-Drove from Tulsa, Ok to Rolla, Mo.
- 7-Drove from Rolla, Mo to Columbia, Mo. Drove to Bonne Femme Creek near Providence, Mo. to collect from quarry 1/4 mile Se of RR Station. Drove to Easley, Mo and Sapp, Mo. Retd to Columbia, Mo. Collecting from Choteau Fm.
- 8-Drove NE of Columbia. Collected Robinson Farm, Boone Co. from Lower Burlington. South from Columbia to Cole Co. lime quarries near Claysville and returned to Rolla. Visited by Clark, E L and Beveridge, T R at motel.
- 9-Drove from Columbia, Mo to Sedalia, Mo.
- 10-Drove west on US 50 to quarry and collected from Choteau Fm. Drove north of Sedalia to Pettis Co. quarry. Collected Pierson Fm. Drove to Georgetown to collected Choteau Fm. List of quarries in Pettis Co.
- 11-Made boxes and shipped fossils. Visited Sedalia Public Library to learn of history of R A Blair and F A Sampson, Choteau Fm crinoid collectors in early days at Sedalia.
- 12-Drove south of Sedalia to quarry in Benton Co. for Choteau Fm. collections. Collected at numerous localities in Benton Co.
- 13-Continued collecting from Chouteau, Pierson and Sedalia Fms in the Sedalia area.
- 14-Continued collecting from Choteau, Pierson and Sedalia Fms in the Sedalia area. Spent the night in Warsaw, Mo.
- 15-Continued collecting Choteau, etc. Coal, Henry Co., White Sulphur Springs, Finney, Clinton, Browns Ford, St. Clair Co., Mo., Lowry City, Mt. Zion, and Scotts Camp before returning to Warsaw, Mo. for the night.
- 16-Drove north from Warsaw to Kasinger Bluff and Little Tebo Bridge. Returned to the Sedalia area to continue collecting Choteau and Pierson Fms. Drove to Osceola, Mo. for the night.
- 17-Collected from near Weaubleau Bridge and 36-38N-25W for Choteau and Pierson Fm. Drove 1 mile east of Gerster for excellent collections

- of Sedalia and Northview Fms. Returned to Osceola, Mo. for the night.
- 18-Drove south of Osceola, Mo. to cut in Hickory Co., Mo.  
Drove to Hermitage for dinner then returned to quarry.  
Collected 20-37N-22W. Spent night in Osceola, Mo.
- 19-Drove south from Osceola, Mo. to Collins and Weableau Creek.  
Collected Northview at localities in Hickory Co. in Weableau, Humansville, Gerster vicinities with T Beveridge.  
Spent night in Osceola, Mo.
- 20-Collected Sedalia-Northview in St Clair Co. with T. Beveridge.  
Collected near Gerster, Old Concord School. Spent nite in Osceola, M. Shipped boxes of fossils to USNM.
- 21-Outcrops were too wet because of heavy rain so drove east to Columbia to see Unkelsbay and on to Kirkwood Mo.
- 22-Collected to the west of Keyes Summit on Mo. Pac. and San Fran. and St Louis RR. Collected lower St. Louis Ls.
- 23-Drove from St Louis, Mo to Cloverport, Ky.
- 24-Collected Glen Dean in quarry 6 miles east of Cloverport, Ky.  
Then drove to Sample, Ky Chester fossils. USNM 3355.  
Collected Glen Dean Fm. 0.5 mi E of Glen Dean. Drove south from Glen Dean to collect Glen Dean Fm. near Falls of Rough.  
Spent the night in Brandenburg, Ky.
- 25-Drove east and south from Brandenburg, Ky to Fort Knox and Elizabethtown to collect "Warsaw" and Herrodsburg? in an operating quarry. Spent the nite in Brandenburg, Ky.  
Collected from quarry near Brandenburg, Ky and road cut 12.6 mi east of Elizabethtown, Ky. New Providence Fm in cut 13 or so miles east of Elizabethtown, Ky. Drove to Crab Orchard to look for goniatites and then to Waynesburg, Ky where we spent the nite.
- 26-Drove from Waynesburg, Ky to Eubanks and east to Broadhead and then to Mt. Vernon. Collected silicified fossils from the St. Louis Ls.? Then on to Conway and Broadhead. To Farmers, Ky for nite.
- 27-Drove to high road cut on US 60; section New Albany Sh, Bedford Sh, Sunbury Sh and Cuyahoga FM (Farmers and Bluestone facies). Also examined Cuyahoga Fm. quarries at Bluestone and Moorehead, Ky.  
Visited Christi, Haldeman, Stockdale, Mt Olive (overgrown) Graydon, Portsmouth, New Boston Ky and to Jackson, Oh where we spent night.
- 28-Drove to Cumberland, Md to visit Mr Perdue and arrange to collect with him on the next day.
- 29-Mr Perdue and Mr Terry went with us to examine the Romney Fm. (in part Hamilton in age) east of Jersey Mtn. near Points, W Va. Allen and I drove on to Washington, D C for the night.
- END OF THE TRIP

BOWSHER, A. L.

Field work in Texas, New Mexico,  
Oklahoma, Missouri & Kentucky during  
July & August 1952.

ACC. 195672

July 52

9 Adair, OKla  
10 Ft. Gibson, OKla  
10 Braggs, OKla  
10 Greenleaf Lake, OKla  
11 Cisco, Texas  
12 Putnam, Texas  
12 Baird, Texas  
12 Ballinger, Texas  
13-17 Pine Springs, Texas

Page

1-4  
2-4  
3-4  
2-4  
5  
6  
6  
6-7  
8-16

Remington Rand  
S2<sup>1</sup>/<sub>2</sub> STK 5X7 9/16

Bar - Spl

Style - Elfc

Back - angle 1 ran

Binding Kerato 1

Cap. - 3/4 - 1 1/4.

Factory on den

No 25/E2431

U.S. Patent No 5

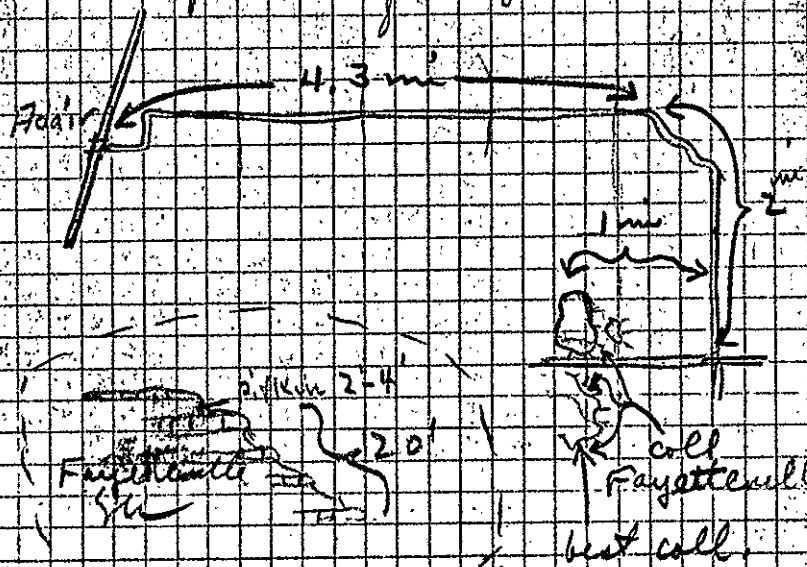
acc. 195781 - Coll. from Jessie Blair, p. 86

acc. 195783 - Crinoids from T. Beveridge,  
Mo. Geol. Survey.

acc. 195782 - Crinoid from George  
Miller

9 July 1952

Cooper and Allen arrived  
in Tulsa at 0845. After packing  
bag to P.R. stay there, east  
to US 33 via the I. 24 Tulsa,  
Drove east to Chotaw and  
then north to Adair, Okla.  
Drove 4.3 miles east of Adair,  
0.5 mi winding to SE 1/4 mi  
south then 1 mi west  
to campment of Fayetteville.

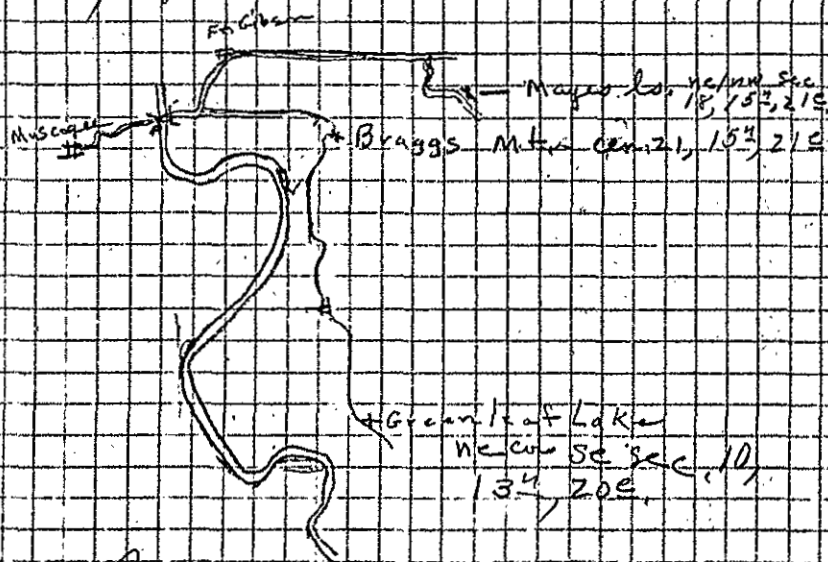


Cooper,  
Allen & Art  
Beveridge

Spent the night at Muscogee  
courts, Muscogee, Okla.

10 July 1952

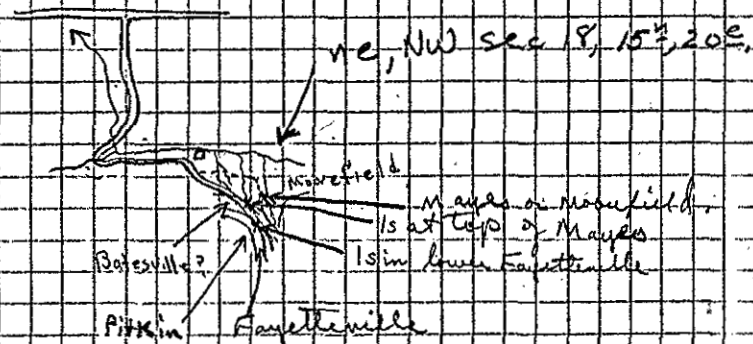
Drove from Muscogee to Ft. Gibson and then 6 1/2 miles east of Ft. Gibson on Okla 10 and U.S. 62. Turned south through center sec 12, 15<sup>N</sup>, 20<sup>E</sup> Oklahoma, crossed bridge and drove east and sl. south for one mile. Parked in northeast sec. 18, 15<sup>N</sup>, 21<sup>E</sup>. The old negro shack no longer exists.



Page 2

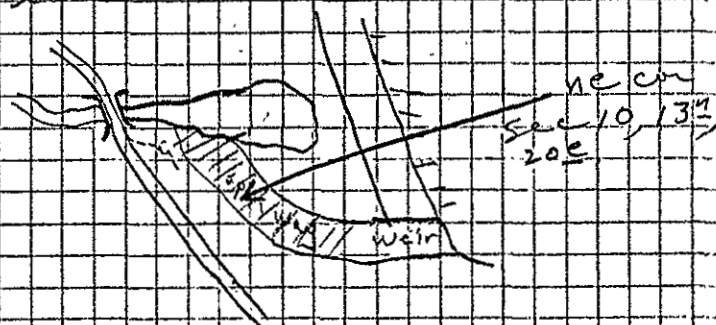
10 July 1952

Mayer Loc



Collected Mayer or Moorefield ls fossils crinoids from top of Mayer and fossils from lower ls. in Fayetteville shale.

Then returned to Ft. Gibson for dinner then drove south to Greenleaf Lake and collected at spillway to lake.



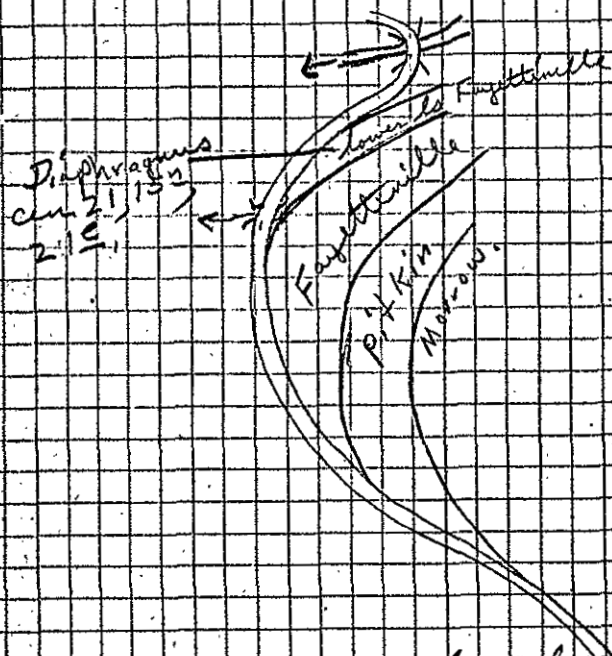
Returned to Braggs and north, tried the old road but could not get thru to the old Braggs Mt. exposure. Returned to the highway and drove

Page 3



10 July 1952

to new Bragg Mt. exposure.



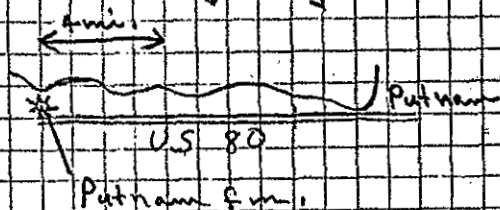
Col. from the lower ls. lentil  
in the base of the Fayetteville.  
Returned to Muskogee County,  
Muskogee, Okla.

11 July 1952

Left Muskogee and drove  
via McAlester, Atoka, Denison,  
Sherman, Beckwithe  
and Graham to Cisco, Texas.  
Spent the night in Cisco,  
Texas.

12 July 1952

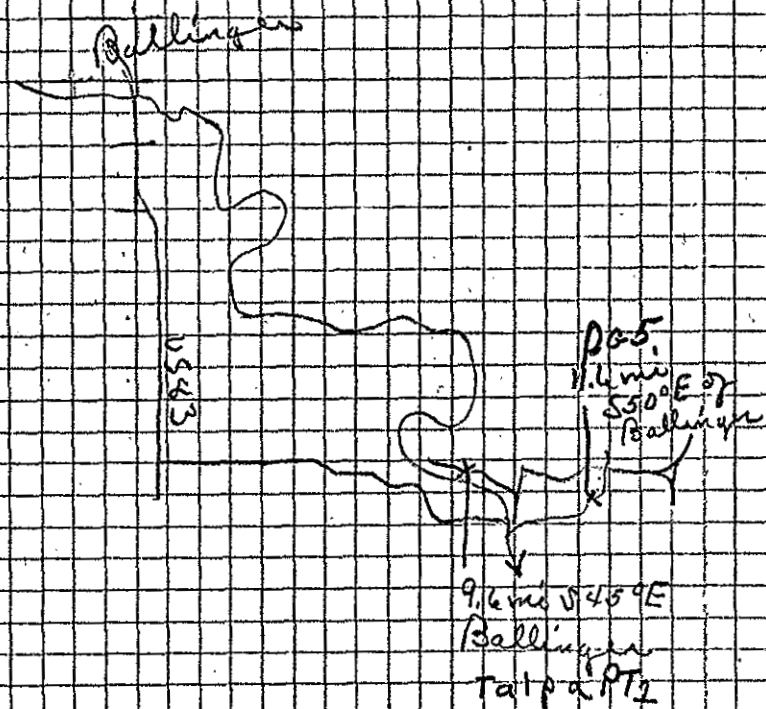
Left Cisco on US 80 and drove to Putnam and 2.3 miles west of Putnam on US 80 to knob on north side of highway. Collected here from Putnam formation from knob near highway.



Drove west to Baird and hunted for Moran fm. locality 2 miles west of Baird on P.R. Could not find the locality. Walked for 3 miles along the P.R.

Drove west to Abilene and then south to Ballinger.

12 July 1952.



13 July 1952

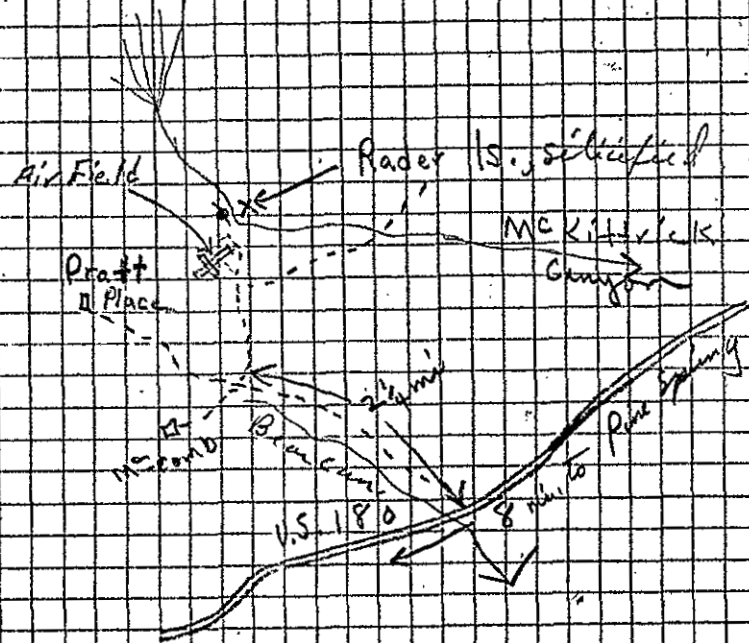
Drove from Sweetwater to Carlsbad via US 180. Had car washed in Carlsbad. Drove on to Pine Springs, Texas. Stopped at Gloues and made arrangements for rooms. Keithley is to arrive at Pine Springs on 14 July 49 at Noon. Spent the remainder of the day looking for silicified fossils <sup>(Pittsaway limestone)</sup> on ~~the~~ <sup>the</sup> ~~road~~ <sup>road</sup> ~~2 3 1/4 miles SE of El Capitano,~~ <sup>2 3 1/4 miles SE of El Capitano,</sup> and 3 miles south of Pine Springs Camp. Found no blocks worth taking. Returned to Walter Gloues at Pine Springs camp for supper.

14 July 1952

Left Pine Springs Camp (after changing a flat) and drove east to point where US 180 crosses Bear Canyon, approx 8 miles east of Pine Spring Camp, and turned left on road to McComb and Pratt Place and to McKittrick Can. Drove up Bear Canyon for 2 1/4 miles to fork of road. Took middle fork and drove to Pratt Place. Visited Mrs. Pratt and made arrangements to see Mr. Pratt who was out flying to Marfa and Carlsbad. Returned to fork and took right (east) fork and drove approx. 1 1/2 miles to point 200 yds south of section twelve well, just

14 July 1952

North of the east end of Pratt  
air field. walked to bluffs  
approx 1/4 mile east of section  
twelve well to collect blocks  
from the Rader limestone.  
Collected 9 blocks (400 lbs+) from  
here.



Returned to camp and wrapped  
blocks.  
P.V.O.

14 July 1952

Keith Rigby, Mrs. Rigby, Jay  
Rigby, Joe Hall, and Bill Wilds arrived  
at Glouers at 1500 hrs. All drove  
with Rigby to the Z (Figure 2)  
Ranch owned by West-Pyle  
for permission to collect on  
the Z Ranch. Had no word  
from West. Could not get  
on. Returned to Pine Springs.

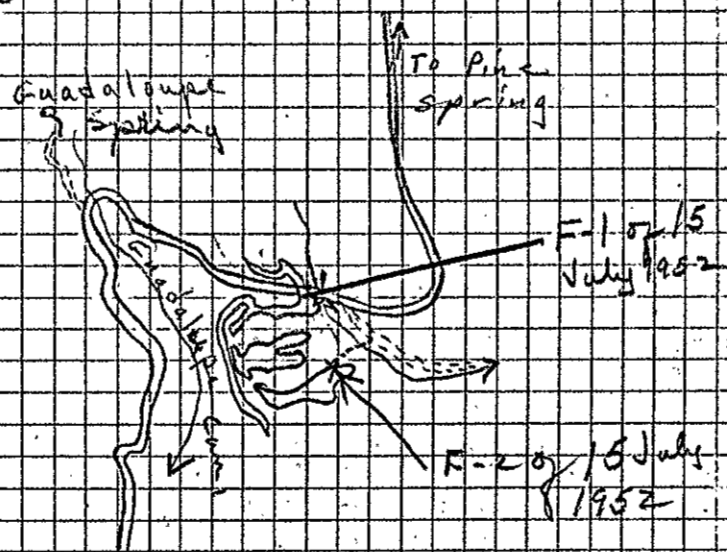
Today was rainy all day.  
Heavy scattered rains from  
all parts of West Texas for  
last weeks.

15 July 1952

Left Pine Springs camp on US 180 (west), drove  $2\frac{1}{2}$  miles SW to Parate Pipeline road and parked at gate 50 yds from the highway. Collected a few blocks of limestone with silicified fossils from the Metaway limestone (see King USGS P.P. 215). Same loc as visited on 13 July 1952. Drove 150 yds southeast, turned right and drove thru field, across gully to foot of hill capped by Metaway ls. and collected 12 blocks of silicified limestone from the Metaway limestone.

P12

15 July 1952



Returned to camp and unloaded blocks then drove east on US 180 to Mickle Creek Sta. obtained permission of Mrs. Puckley to go onto Hegler Ranch. Drove one mile to Hegler Ranch and 100 yds beyond ranch. Parked at the foot of the first ridge west of Hegler Ranch. walked

P13



15 July 1952

around the south side of the ridge and up to dolomitized limestone in the lower Pinery, 150 yds SW of Hegler Ranch and collected F-3 of 15 July 52. Keith Riebel and I walked south to near the end of Peder Ridge and collected from lower Pinery, Echinoids, coll F-4 of 15 July 52. On way back stopped 1/4 mile SW of Hegler Ranch collected Leptæna from upper Pinery, F-5 of 15 July 52. Drove SE from Hegler Ranch to fork of road, turned left and drove 1 1/4 miles north to south side of Bell Canyon 1 mile, N 10° W of Hegler Ranch and coll F-6 July 52.

16 July 1952

We left Pine Spring on US 180 east and drove 9 1/2 miles to trail north to Big Canyon. Drove north 5 miles to upper Hay Ranch (Mrs. Stanley). Drove 1/8 mi SW on trail to fork, drove left for 3/4 mile and climbed fan to draw just east (1st one) of Big Canyon. Climbed to limestone promontories and collected from Larnan = in reef beds. Returned to car and drove back to Hay Ranch. Collected F-1 blocks from 50 yds south of the ranch house. Returned to the Pine Spring Camp.

at 100 ft above SE spur of Peder Ridge on NE side of Big Canyon called W.H.

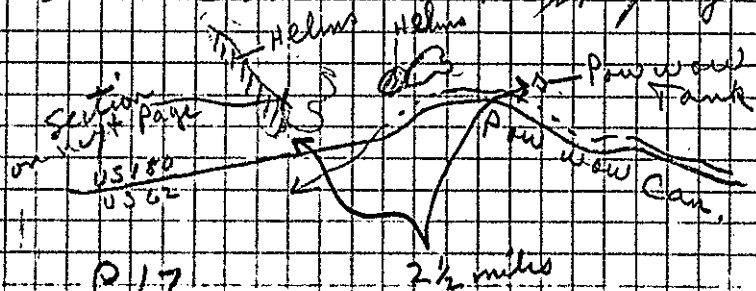
17 July 1952

Coyne and Allen took a load of 1259 lbs. of blocks to Carlisle for shipment. They returned at 1230 hrs. I spent the morning on the crinoid paper. All three of us took a load of 1360 lbs. of blocks to Carlisle for finishing the shipment. All got haircuts and returned to Pine Springs Camp.

18 July 1952

Left Pine Spring on US 180 west and stopped at westernmost exposure of Helms on the north side of the highway in the Huaco mts. Bill and I went north to the exposure and Cooper remained at the camp. Was given 30 minutes to check the thicknesses of the strata in the Helms for John. Were 10 minutes late in returning to the car!!!!

Section of the Helms is shown on the next page.



1916

017

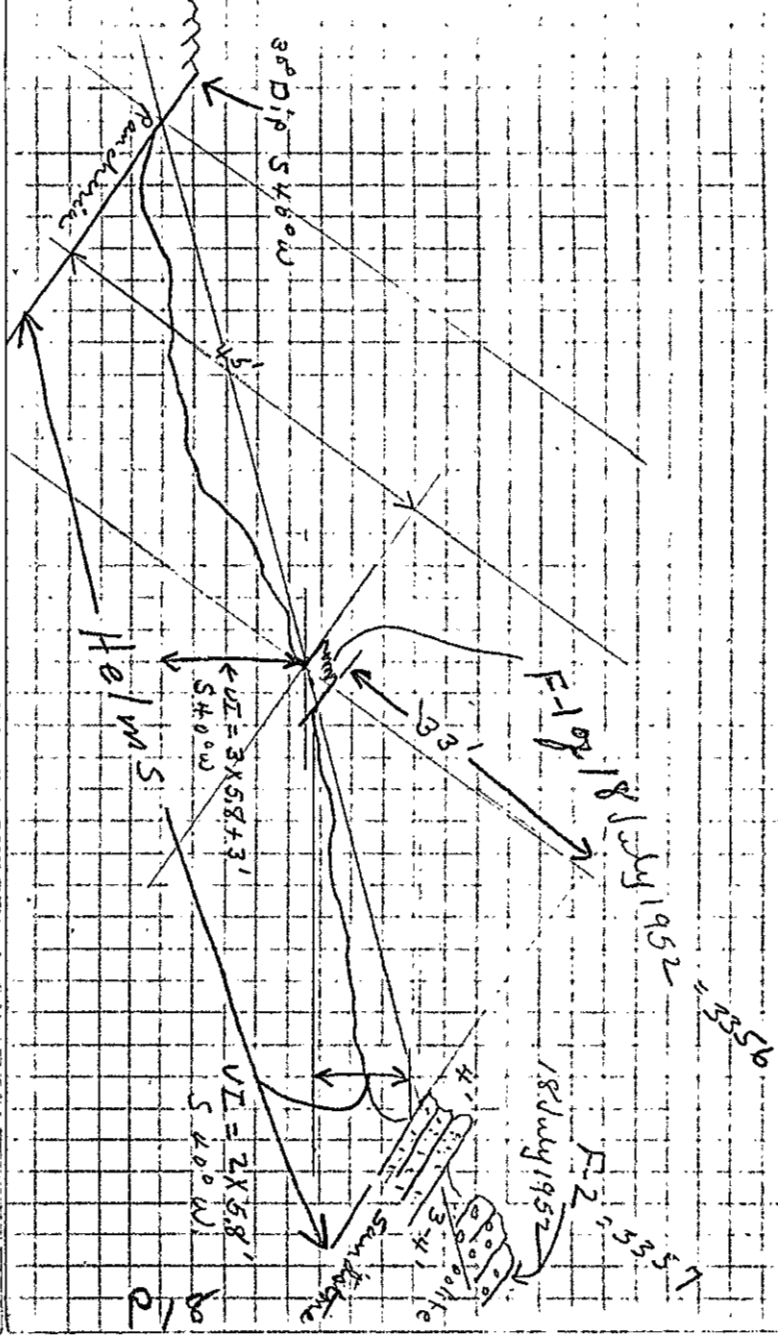
2 1/2 miles

18 July 1952.

Drove on to El Paso to  
Desert Motel of L. A. Nelson.  
on US 180 ~~62~~. Visited an  
hour with L. A. Nelson then  
on to Las Cruces, Deming,  
Hurley and Silver City to  
Clark Court north of town  
on US 260 (near Danlugs Cafe)  
Drove to 107 Texas street to  
visit U.S.G.S. P. M. Kernan's  
still here for summer but  
in Deming for the winter.  
Has 6-8 men at work here.  
Returned to Court for  
evening.

Mr. Bingham (Jesse), 2409  
Cactus St., Silver City, is said  
to have a collection of crinoids.

P-19

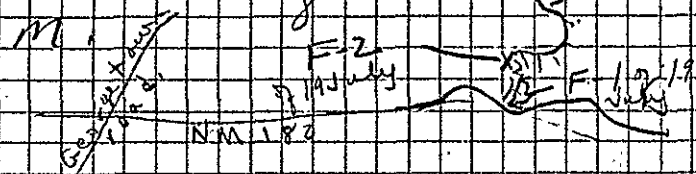




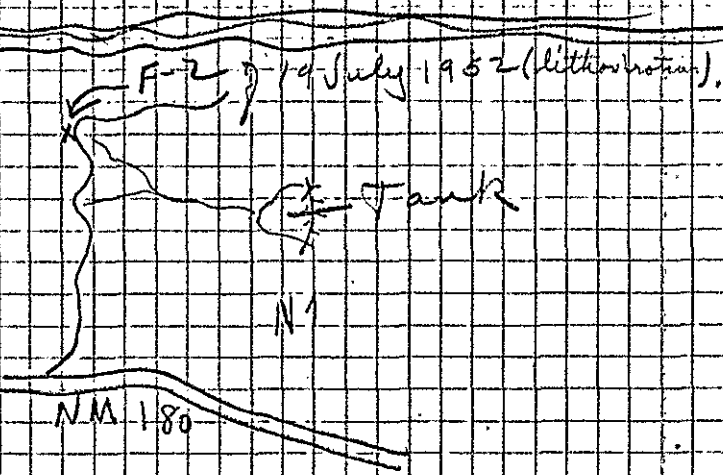
19 July 1952

miles east of Santa Rita,  
N.M.

see between city quad.



#  
Santa Rita



Then dropped down the  
scarp and collected *Pachy-*  
*poils* for Cooper.

Returned to car to eat  
lunch.

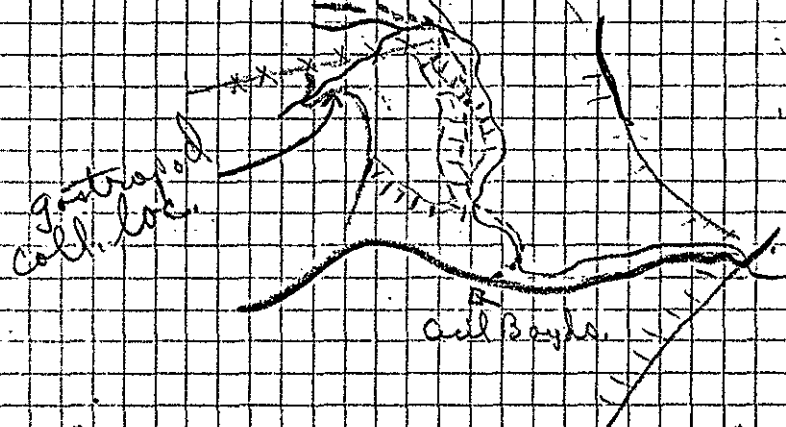
P 21

19 July 1952

Drove east of Silver City  
to Santa Rita and east of  
Santa Rita on N.M. 180 to  
cen. E.L. of sec 19, T17S, R11W  
and parked the car on top of the  
Alamogordo mem. Lake Valley  
fm. and walked north at  
the contact between the Androsito  
and the Alamogordo. Made  
collection from Androsito  
beds for approx. 1/4 mile (F-1  
of 19 July 1952. Found  
lithostratigraphic in top beds  
of the Androsito (F-2 of  
19 July 1952 from elev.  
6800 ft on crest slope of 500 yds  
sw/nw of sec 20, T17S, R  
11W, Grant Co, N. Mex. 3 1/2  
P 20

21 July 1952

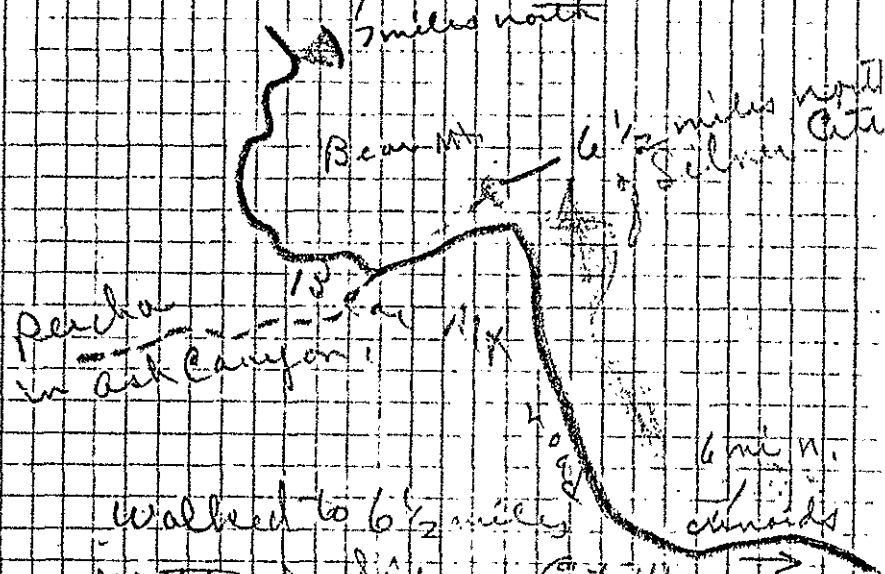
Drove from Silver City to Hillsboro arranged for rooms at Hatcher Hotel. Returned to Cecil Boyds ranch to collect *Pemula*.



Rain ran us off the hill. This locality is pretty well cleaned by snow. Not good anymore.

20 July 1952

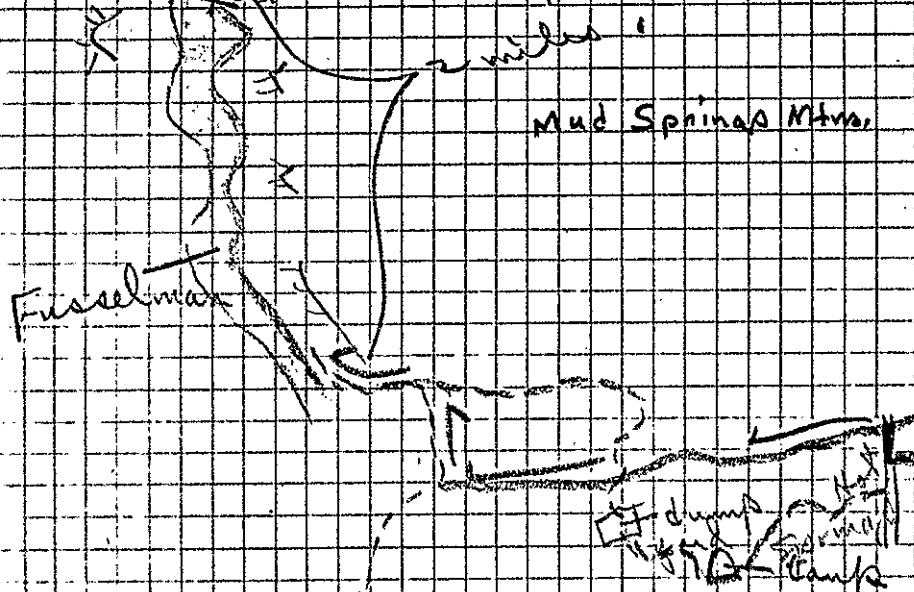
Drove north of Silver City on road to Bear Mt. Stopped at exposure 6 mi n. of Silver City to collect *Pachia* fossils.



Walked to 6 1/2 miles north of Silver City off collecting *Pachia*. Drove to Bear Mt. for lunch and call after lunch. P24 because it looked like rain.

22 July 1952

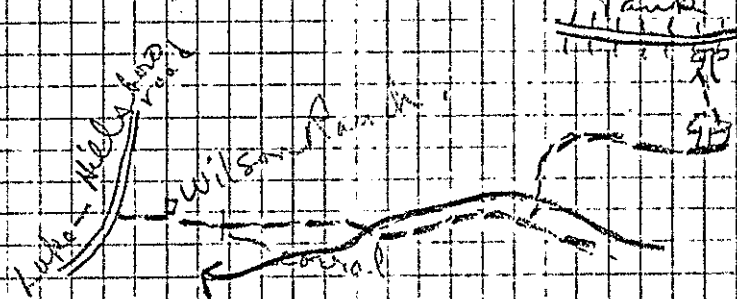
exposure of  
shy Sep. Coll. here



Returned to Ace Motel  
for the night at north edge  
of Hot Springs.

22 July 1952

Drove south from  
Hillsboro to Wilson Ranch  
and collected on east  
side of lake after visit  
with Clarence Wilson



Drove via Hi-Cut Road to  
Hot Springs, & obtained a  
cabin there at 1300 hrs.  
Drove to south edge of  
Mud Springs Mtns. &  
walked to shy Sep. Coll.  
the shy Sep. Coll. site.

24 July 1952

Coast. Spent the afternoon at Holloman Air Base getting permission to visit Rhodes Pass. Obtained permission to visit Pass from Major William F. Haynor for all day Sat 26 July 1952. (C. O. is Ostetallen (?)). Returned to Alamogordo.

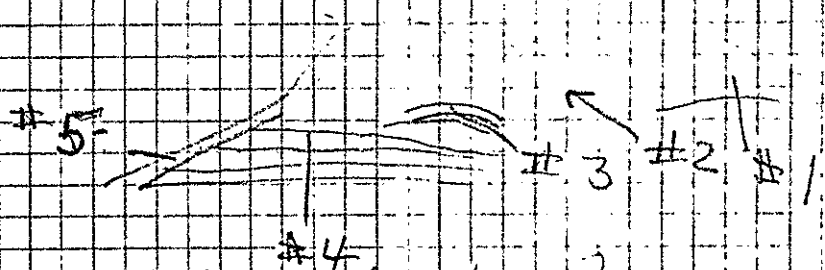
24 July 1952

Left Alamogordo and drove to Indian Wells Canyon. Collected Mykops and Caballero from exposures in first canyon to east of Indian Wells.



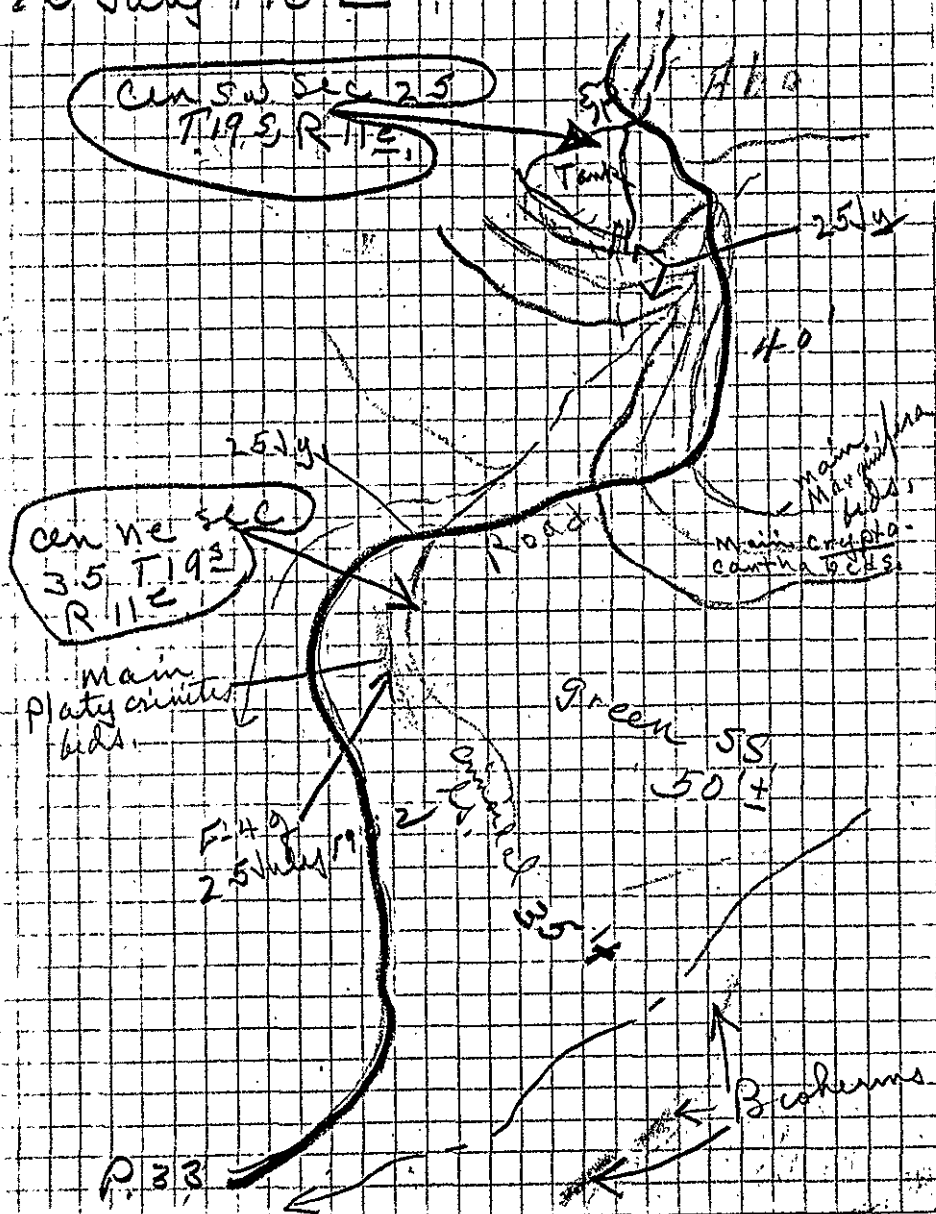
Bioherm localities collected

on the return trip & collected samples from this Bioherm while Cooper and Allen returned to the car.



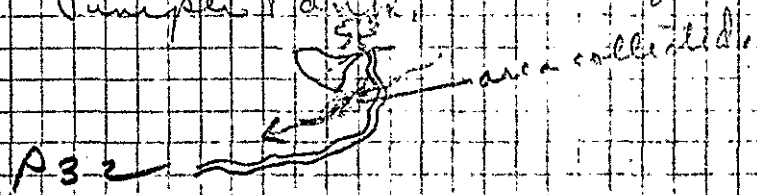
#30 Returned to Parkman

25 July 1952



25 July 1952

Left Alamogordo on  
highway to El Paso and  
drove south to Valmont  
and to road 7 miles south  
of Valmont. Turned east  
on Graspering Canyon  
road. Drove east up Grape  
vine Canyon, by Horse Camp  
and to old Juniper and tank.  
Collected blocks for etching  
from *Stenochisma*-*Cryptot-*  
*Cantha* beds 10-40' below base  
of above which is old Juniper  
tree. Blocks collected from  
draw 100-200 ft south of old  
Juniper tank.



25 July 1952

containing silicified  
F-3 gastropods, F-3 July 25,  
25 July 1952 from same loc as  
1952 collected in 1951. Coll.  
Leptoniceras from this loc,  
loose on slope. Returned  
to highway and Alamo-  
gordo. Spent remainder  
of afternoon packing and  
wrapping fossils.

25 July 1952

Drove down the canyon from  
old Juniper coll loc to  
limestone at base of sandstone  
which underlies *Cryptoceras*  
beds. Collected July 25, for  
abo

40' ls w/ *Murchisonia*  
& *Cryptoceras*  
50'± green ss

July 25, July 25, → 35' Perinatal ls  
20' *Platycrinites* beds  
the top of these limestone  
20 feet below the top of  
these beds coll F-4 July 25  
July 1952 - *Platycrinites*  
Drove on down 1/4 mile  
east of Horse camp on  
collected blocks of lime

no  
F-2 July 25  
July 1952  
F-4  
25 July 1952  
USNM  
3353

26 July 1952

next draw and walked up  
to the Devonian to collect,  
obtained fossils from the  
top nodular bed of Sly Gap.  
Returned to Alamogordo  
for the night.

26 July 1952

Left Alamogordo north  
on US 54. Turned left on old  
New Mexico state highway 52  
thru Alamogordo, Bonanza  
Range. Drove to eastern  
end of Rhodes Canyon to old  
Barter mines and foundation  
of old house. Drove 100 yds north  
of highway on trail. Parked and  
walked north up the canyon  
to exposures of the Sly Gap fm  
and the Contreras fm. Collected  
from these exposures. Cooper  
believes that the Contreras  
is equivalent to the upper  
part of the Devils Gate fm  
of Nevada. Returned to  
truck and drove west to



27 July 1952

Returned to court and met  
Carl ~~otte~~, Carl and I  
left at 1700 hrs to visit  
the bioherm in Indian  
wells Canyon.

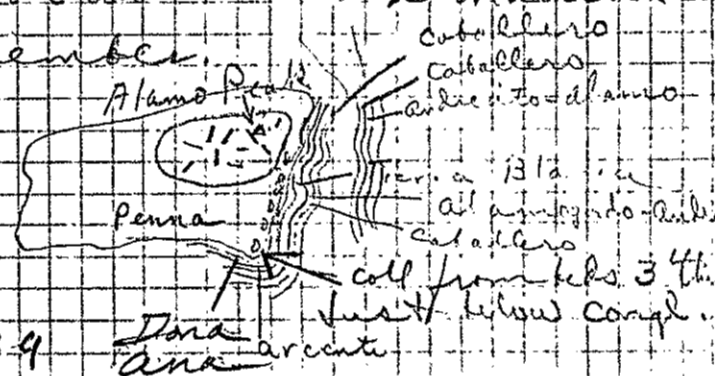


Returned to court at 1900  
hrs.

P40

27 July 1952

Drove to High Rocks and  
south on the west side  
road to East foot of Alam  
Peak. Collected Slit Gaps  
and Caballeros fossils. I  
went to SE corner of Alam  
Peak and collected crinoid  
brachiopods from a limestone  
at the top of the Mississippi  
Pray thought it to be Las Cruces  
but the fauna is Rio Ruck  $\pm$   
therefore I would correlate the  
beds with the Dona Ana  
member.



P39

Dona Ana arcuata



29 July 1952

Drove from Alamogordo  
to Pampa, Texas. Spent  
the night at Mother and  
Dad's at Pampa.

P42

28 July 1952

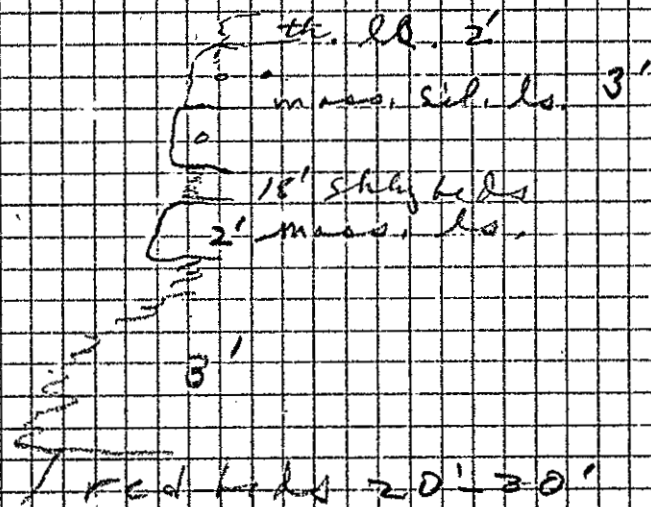
Spent the morning  
at Holloman Air Force  
Base packing and shipping  
fossils. Returned to  
HAFB at 1500 hrs to  
get C.B.L.

Drove to Fresno, Cal.  
and collected specimens  
from Taosia localities  
west of the Knob  
near Lafayette. Pattern  
plant. (see Bowsher  
Aug 1951 note loc 2). Return  
to court.

P41

31 July 1952

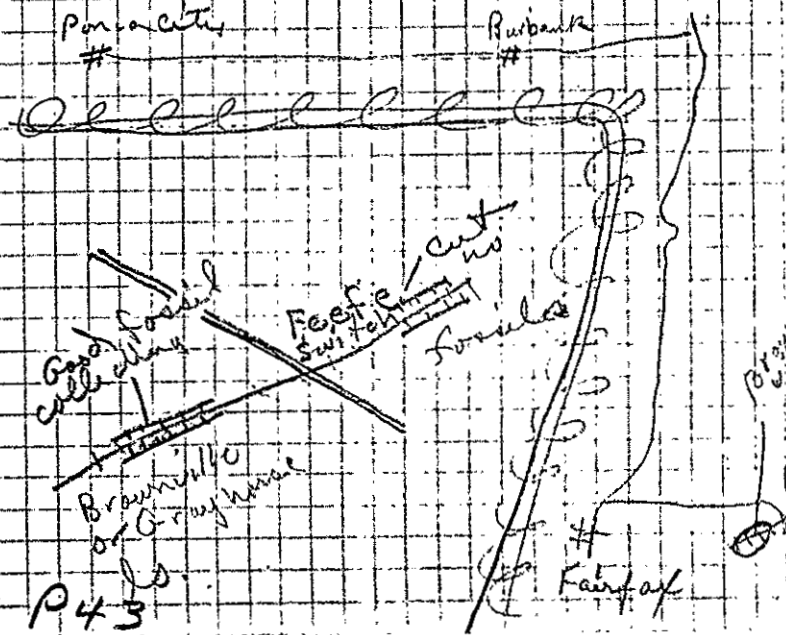
Left Ponca City going north on 77, east from Arkansas City on Kan 166, north on Kan 15 toward Dexter. Cut in unroaded ls, 3.1 mi so of Dexter where we collected D. craya in road cut on Kan. 18.



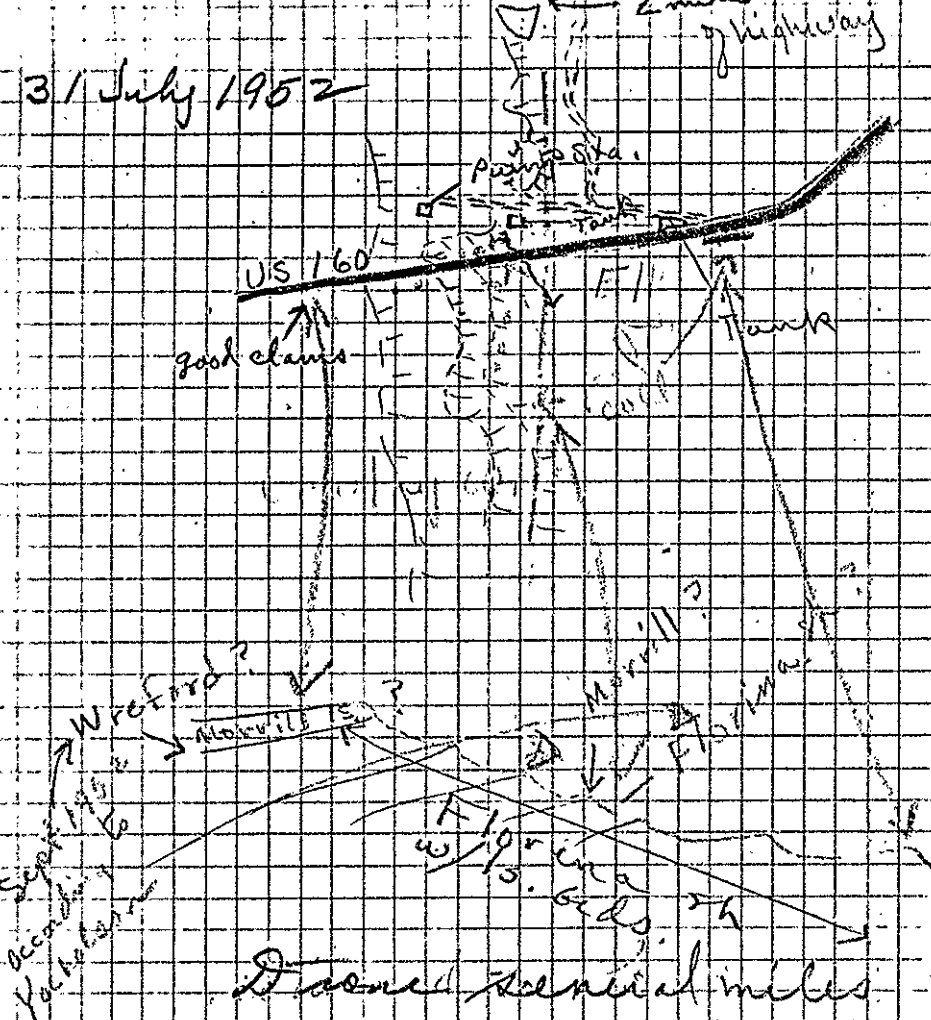
Drove north to Dexter  
bought groceries then drove  
P44

30 July 1952

Drove from Pampa to Ponca City; arriving at 1515. Drove to Miller Motel in Ponca City north of US 60 on US 77. Left Ponca City and drove east on US 60 toward Pawhuska.



31 July 1952



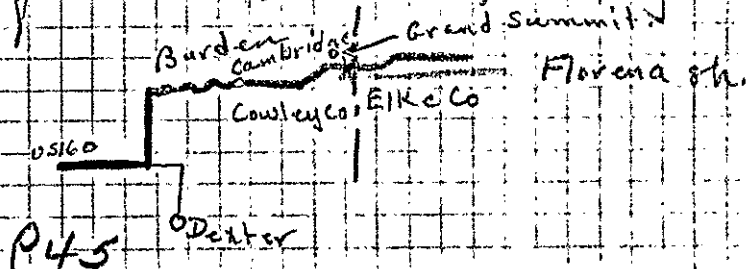
Traveled several miles north along scarp collecting at convenient spots, Rtd. to US 160 and then to Ponca City, Okla.  
P46

31 July 1952

Went north on Kan 18 to road cut 3.2 miles north of Dexter on Kan 18; exposure of Wrexford and Derbya cym. Rula loc.

2 - 1/2 mi. to.  
gray ls. 2 and 3'  
red beds. 1 2'

Drove north on US 160 to Burden then turned east still on US 160. Drove east thru Cambridge to Cowley Co. Elke Co line, one mile south of Grand Summit, Cowley Co. K.



2 Aug 1952

Drove from Ponca City  
east to Bartlesville to  
412 Wyandotte St, H.L.  
Strimple. Phone 2331.

P48

1 Aug 1952

Drove east from Ponca  
City on to limestone  
quarry in Red Eagle limestone  
just east of Burbank, Okla



Hurt my knee jumping  
a fence at 1.650 hrs just  
north of Fairfax, Oklahoma

P47

Aug  
4 July 1952

Spent the day having  
a new gas tank put on  
the car and having an  
X-ray made of left knee  
at Hillcrest Mem Hosp in  
Tulsa to learn if there was  
any injury. Dr. reported  
no broken bones.

P50

Aug  
3 July 1952

Cowbarn  
sat.

H.C. Barnsted

P49

6 August 1952

Drove from Tulsa to Rolla.

Passed good exposure of Pierson on NW side of Northview Hill on U.S. 66 northeast of Springfield, Mo. (New cut and info from Clark Eick and Beneridge, T.R.)

P52

5 August 1952

Drove north of Tulsa to Strip pits just south of Collinsville and collected goniatites.



Drove north to Tallahassee and west to old strip pits. Found no fossils. Returned to Collinsville strip pits and spent rest of afternoon collecting goniatites from limestone nodules.

Returned to Tulsa.

P51

7 Aug 52

Walked 30 yds west to RR and then 50 yds NW along RR track. Collecting done currently by U. of Mo is in first  $\frac{1}{2}$  mile along track. I could not climb the slopes because of my knee so worked in slump and rubble. We worked slowly NW along the RR to Providence collecting where we could. I saw no bluff which I could recognize as the one illustrated by Brown as at Providence although there is a small quarry about  $\frac{1}{4}$  mile SE of the RR sta which may be the one illustrated. Collecting is not especially good except in a few places and a few thin shale beds.

August  
7 July 1952

Drone via USG 3 from Rolla to Columbia, Missouri. Visited at the Dept. of Geology, U. of Mo. Unklesbay was on vacation in Ohio. Peck in Wyoming for the survey on forams of Jurassic-Cretaceous boundary. Talked with Pchel, the mineralogist about Chautau localities. He gave us instructions concerning Providence and Early localities for Chautau.

Left Columbia on county road # going south on Providence road. Passed two forks, taking left turn (road marked "Early") and drone to bridge over Bonne Femme Creek. Parked on north side of Bonne Femme Creek and



7 Aug 52

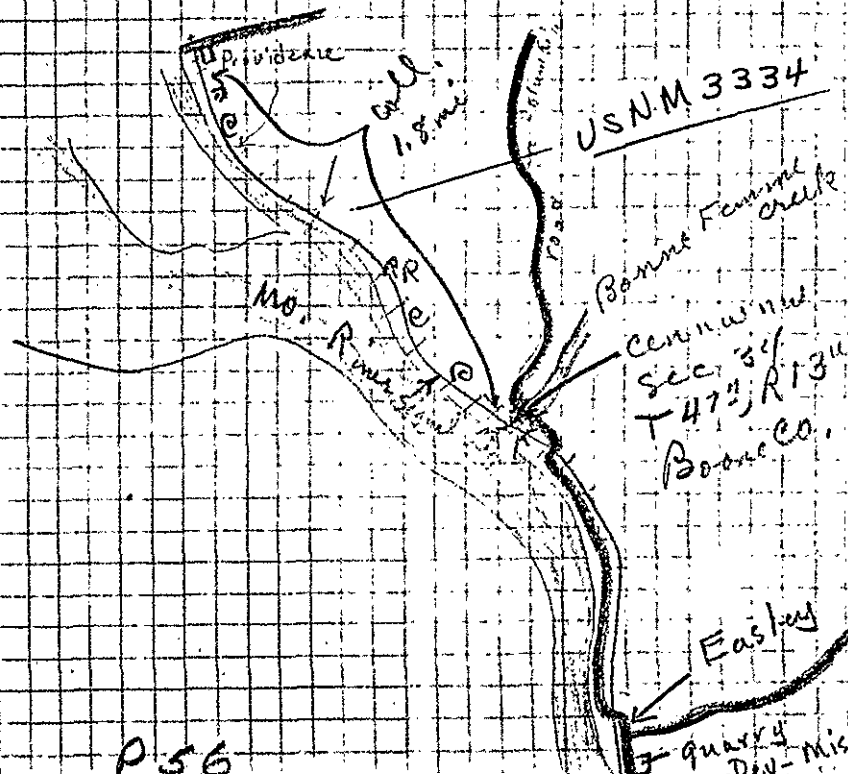
Drove south to Early and the rock wool quarry. Found no fossils. Returned 100 yds to Early and turned right. 0.3 mile east drove up over bluff of Chautauq and Burlington. Collected crinoids from the base (lower 10 ft) of the Burlington, *Nannocrinus pettisonae*, *Dichocrinus* and *Phyllocrinus* sp. Drove east to U.S. 63. Made no collections but found Burlington near Sapp and 1.5 mi. east of the highway. Ret'd. to Columbia.

P57

7 Aug 52

most of the sequence is massive and fossils are rare. Learned at Providence from residents that you can drive to Providence.

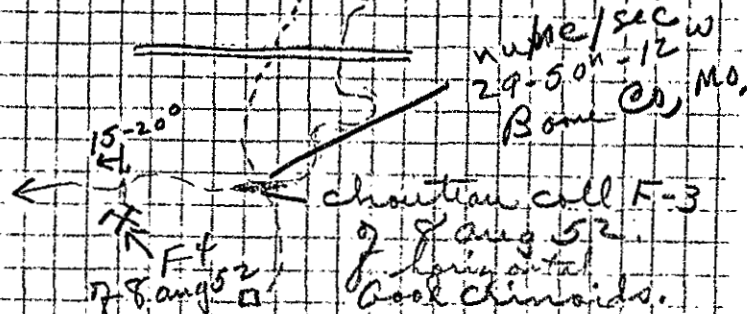
Walked back to Boone Femme Creek and Car.



P56



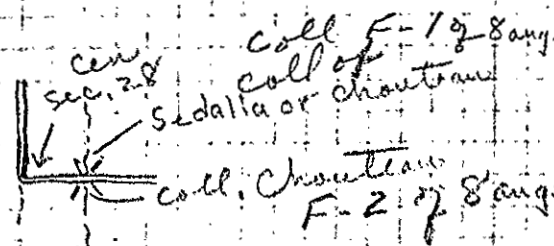
8 Aug 52  
 mile east, 1/4 mile south,  
 1/2 mile west to Billy Robin-  
 son (Georgia Robinson farm)  
 place. Coll. Chautau, 30-40 ft  
 below top. Coll F-3 of 8 Aug 52  
 from creek bed Georgia Robinson



Billy Robinson came down  
 and remarked about quarry. Took  
 us west to it. Coll F-4 of 8  
 Aug 52 from 20 ft above base  
 of Burlington, Hypsophy lites  
Colceolus. No question about  
 this being in Lower Burlington.  
 P59

8 Aug 1952.

Left Columbia, Mo going  
 ne on county road (B) and  
 to Browns Sta on Wabash  
 RR. Drove north from Browns  
 Sta. to cen. sec 27-50<sup>th</sup> 12<sup>th</sup>  
 Boone Co., Turned left and  
 drove to cen sec 28, 1 mile W.  
 Chautau (upper?) is exposed  
 in creek and road at sec  
 corner



Chautau  
 exp. w/ fossils  
 and chautau  
 (not visible)

Collected fossils at bridge  
 then drove north 3/4 mile, 1/4  
 P58

9 Aug 52

Spent the morning talking to Benneridge concerning loc. for Compton, Northview, Dedden and Pierson fossils.

Drove to Boots Hotel Courts, Dedalia, Mo for the night.

P61

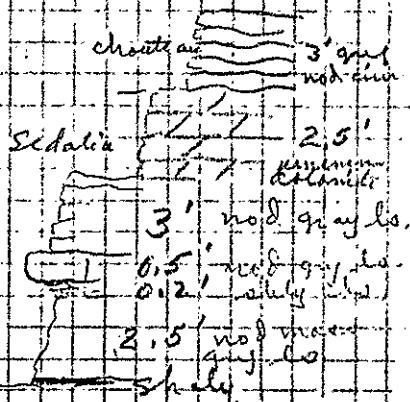
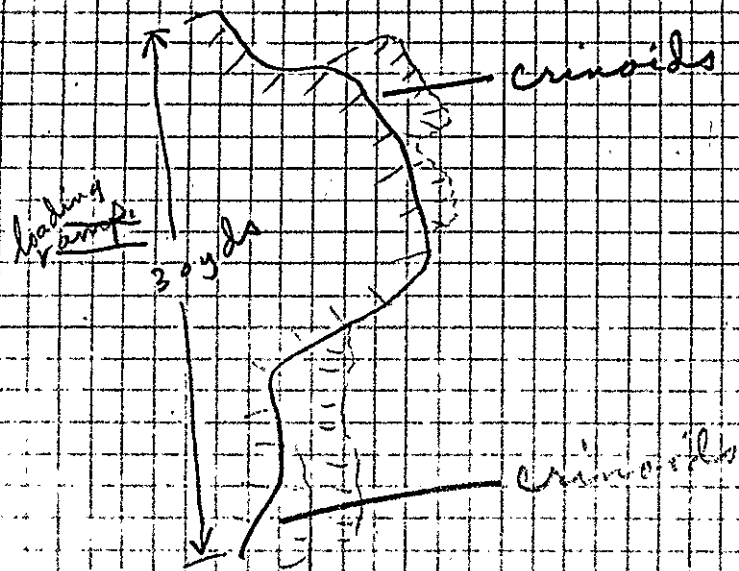
8 Aug 52

Drove to Hallsville for dinner then to Columbia. Left Columbia going south on U.S. 63. Stopped at Cole Co. lime quarries  $1\frac{3}{4}$  miles N.  $10^{\circ}$  E (on U.S. 63) of Claytonville, F-5, Boone Co. Mo. Coll. F-5 from 8 Aug 52. Cen. sec. 4-45 &  $1\frac{1}{2}$  mi. Boone Co. Minkola in quarries; Fav. alporas, Cystophyllum, Stromatopora etc. Drove on to Rolla, Trav. L. Lodge.

Clark, E. L. and V. R. Benneridge came to the court at 2000 hrs and stayed until 2200 giving info on lower Mississippi and localities of Missouri.

P60

10 aug 52



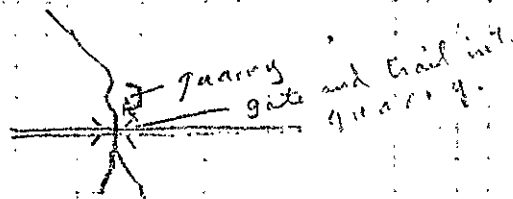
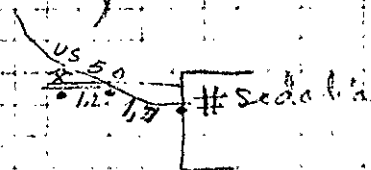
F-17  
10 aug 1952

good crinoids

Sedalia / 2' massive shaly  
Perm. dol. ls.  
63

10 aug 52

Drone west of Sedalia 6 miles on US 50 to first E. county road, turned west and drone west on county road, 1.25 miles. Stopped at quarry on north of road in woods.



62

Back of p. 65

most crins 20-26"  
26' crin ls.

---

4' brown dol.

---

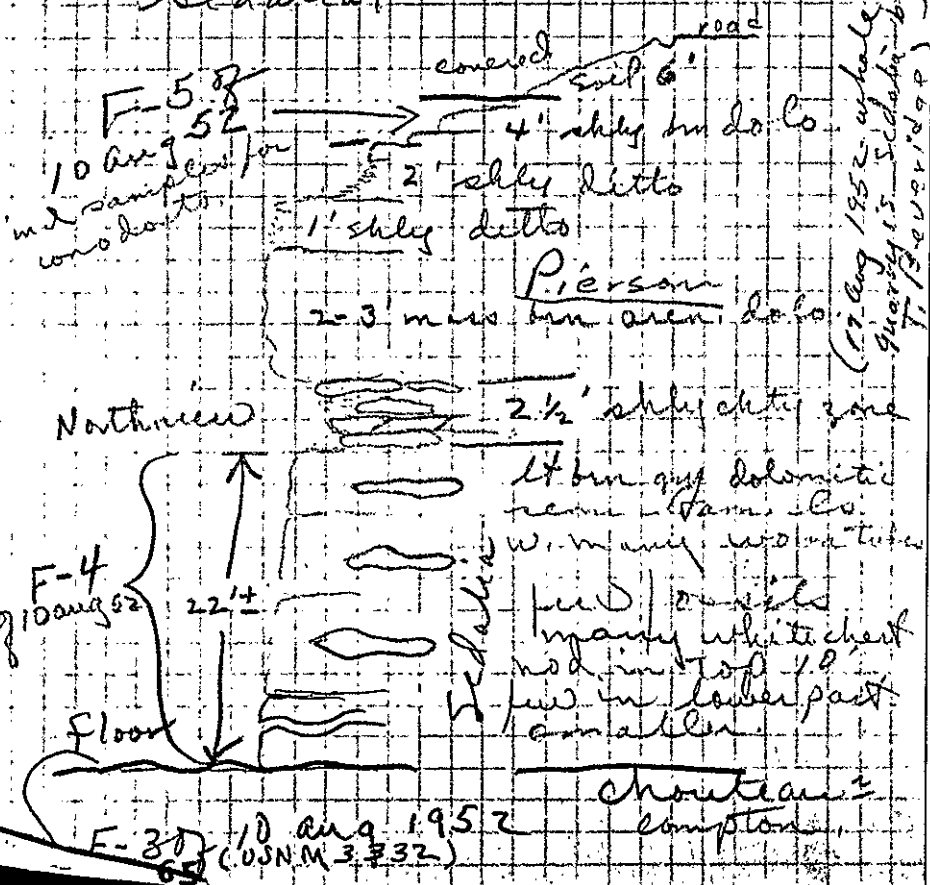
6' 1/2 grey crin

---

4' ± to Pierson

10 Aug 52

Drove north 1.2 miles,  
east 0.2 mile to quarry in cen  
SE 1/4 of sec 28, T46N, R22W,  
Pettis Co. Quarry is in the  
Sedalia.



few trees X

Chouteau

floor quarry

2' massive gyps chert ls. not in place

Chouteau

4' + massive, bioclastic l w f.o. etc. few fossils

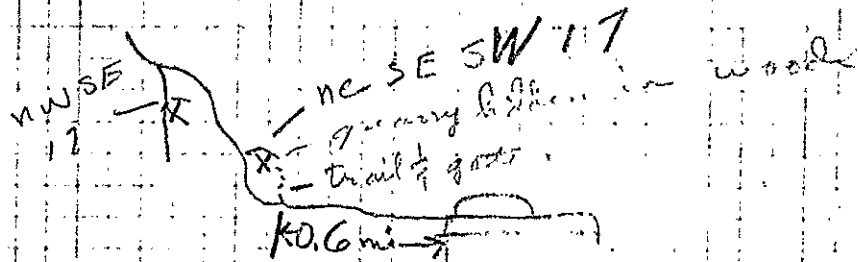
Drove to country road from quarry and drove up along south line of Sec 33, 46N, 22W to near Brown school and to road 1/4 cen NW SW 51 Sec 33, 46N, 22W. Turned north along road thru center sec. 33. Saw exposures in creek in cen NW SE Sec 33, 46N, 22W and walked to expo 10 Aug 52 in creek and coll F-2 of 10 Aug 52.

10 Aug 1952

Drove to Georgetown and one-half mile north from west edge of town for Miller loc  $\frac{1}{2}$  mile north of Georgetown, found nothing. Drove west of Georgetown to quarry NW  $\frac{1}{4}$  sec 17, T 46<sup>N</sup>, 22<sup>W</sup>, Pettis Co. See p. 66. No good crinoids. A few brachiopods on slabs. Returned to Georgetown and drove  $\frac{1}{4}$  mile north on eastern road to end of road, trying to find locality  $\frac{1}{2}$  mile north of Georgetown. Drove south from Georgetown toward Sedalia observing quarries as we drove along the highway. Stopped at pop stand at

10 Aug 52

Drove north to Dreedden Pettis Co, then north to quarry in NE  $\frac{1}{4}$  sec 5, 46<sup>N</sup> 22<sup>W</sup>, Pettis Co. There are coal mines. Drove north and east to County road H and south east to X just north west of Georgetown, NE/SW 17, T 46<sup>N</sup> 22<sup>W</sup> Pettis Co Mo.



Section in quarry  
F-6 of 10 Aug 52  
Crepuscular zone  
brown band  
26' green ls. Lower Burlington  
4' brown qtz ls.  
6' lt. buffy crin ls.  
1-31  
Pittman 66

Rained all night and until noon - so we were unable to go into field. A good hard long rain.

11 Aug 52

After Breakfast made arrangements at Home Lumber Co for lumber for boxes. Made shipment of 546# of fossils in afternoon. Drove to Sedalia Public Library. Miss English, librarian helped us in locating books concerning R. A. Bilain and F. A. Sampson.

History of Pettis County 189-? and 1919, Missouri Historical Review (The State Historical Society of Missouri Floyd C. Shoemaker Sec, vol XII, Oct 1917 - July 1918 contains a sketch about Francis Asbury Sampson, and Harriet Lacy of Cincinnati. Children Marybelle

10 Aug 52

Colored swimming pool in NW edge of Sedalia. Mr. Byr (colored) owner Shady Lawn Cabins, Sedalia (phone 5021) made available to us an old 1896 Pettis Co Plat (Northwest Pub. Co. book). The following were shown on the Plat book.

Quarry - SW NE SW 28' 46" - 21 W  
" W 1/2 SE NW 28' 46" - 21 W  
" Cen S 1/2 SE 16' 46" - 21 W  
" Cen 17' 44" - 21 W  
Sedalia Stone quarry  
nearly all W 1/2 NW 46" 20 W  
C P Shepperd Farm S 1/2 NE 1/4  
46" - 21 W.

County Farm - Cen 21-46"-21  
all Pettis Co.

Drove east to location of Sedalia Stone quarry. Remnants of quarry (originally 1000 ft long) only at south end SW corner 16-46" 20 W. To check later.

Rained all night and until  
noon so we were unable to go into  
field. A good hard long rain.

11 Aug 52

After Breakfast made arrangements at Home Lumber Co for lumber for boxes. Made shipment of 54.6<sup>th</sup> of fossils in afternoon. Drove to Sedalia Public Library. Miss English, librarian helped us in locating books concerning R. A. Blair and F. A. Sampson. History of Pettis County 189-(?) and 1919, Missouri Historical Review (The State Historical Society of Missouri Floyd C. Shoemaker Sec) Vol XII, Oct 1917 - July 1918 contains a sketch about Francis Asbury Sampson, md. Harriet Lacey of Cincinnati. Children Maybelle

S M T W T F S / Fairfair  
31 1 2 str.

coll. T-R  
- 3 5 6 7 8 9  
10 11 12 13 14 15 16

Harry L. Collins 629 F 11<sup>th</sup>

Sedalia, Mo. 3435 J., coll fossils



11 Aug 1952

some Chautau group fossils which Miss English will hold in anticipation that Miss Jessie Blair will donate to the U.S. National Museum. Segregated a group of 10-12 specimens of plants from Mazon Creek which we labeled for her. None of the material in the Blair collection, 150-200 lbs, has identifications or locality documentation. There appears to be some handsome and worthwhile specimens.

The County recorder's office has a 1929 Plat map.

Sampson's collections appear to be in the hands of the Missouri

11 Aug 52

Miller and Lacey F. Sampson of New York. Leroy Vernon Sampson died at age 9 yrs. Sampson died in 1918. He was a lawyer in Sedalia. R. A. Blair was a Dentist and Supt. of Schools in Sedalia.

Miss Jessie Blair, 420 South Grand, Sedalia, Mo Phone 1382 is a daughter of R. A. Blair. She is in her late 80's. we are to call on her.

Miss English permitted us to examine the remnant of the R. A. Blair collection which are largely minerals and recent shells. we segregated

11 Aug 1952

Looking for limestone  
to collect fossils

Shepard farm is in sec  
8-46<sup>n</sup> 22<sup>w</sup> just north of  
Georgetown owner Vellie Moore.  
His son C. T. Moore lives on the farm.  
Cites <sup>(Moore)</sup> Lone's Leap at corner of sec  
sec 8-46<sup>n</sup> 22<sup>w</sup> a bluff with  
lots of rock ledges on Ed.  
Curry farm, part (65 acres) of  
the old Shepard farm.

R. Dow cites Hacker farm as  
now Peters farm NE sec 16, T. 46<sup>n</sup>  
22<sup>w</sup> 3 1/2 miles north of Sedalia  
on Cedar Creek. Remarks  
that old timers collected also  
in quarry on Tekman farm, on  
S 1/2 sec 16, 46<sup>n</sup> 22<sup>w</sup>, Cedar Twp  
now owned by Murphree.

11 Aug 1952

State Historical Society's  
Columbia, Mo.

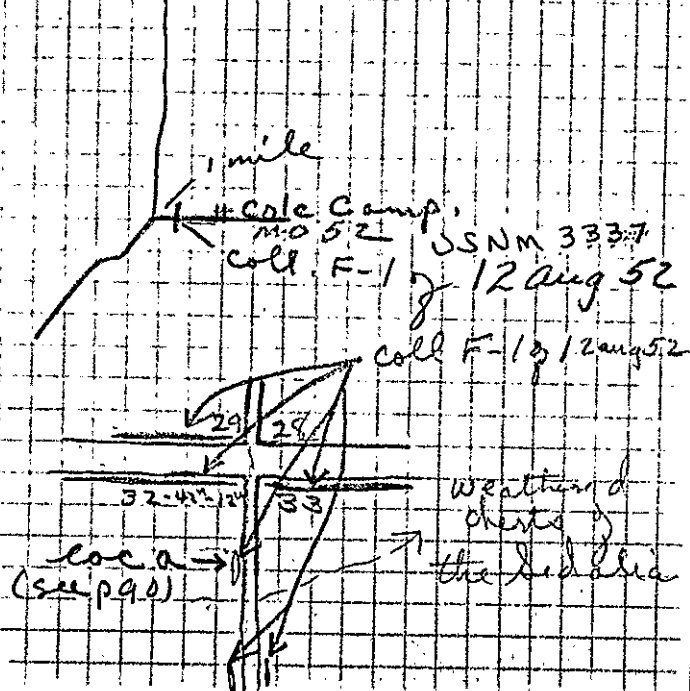
It is believed that Joes  
Blair has a dairy kept  
by R. A. Blair. This may  
help in determining where  
he made fossil collections.

Drove to home of Vellie  
Moore, 1301 South Lamine  
Sedalia, Mo, policeman, Sedalia  
who owns the Shepard farm  
just north of Georgetown. He  
suggested we visit R. Dow  
in Georgetown and old timer,  
teacher at Georgetown about  
Hacker and Shepard farms.  
Drove to Georgetown. R. Dow  
knew both Blair and Sampson.  
He said they wandered everywhere

12 Aug. 1952

Drove south of Sedalia on  
U.S. 65 for 18 miles to Jct US 65  
and Mo 52. Turned left (east)  
on Mo 52 and drove 1 mile,  
passing Plainview School,  
to intersection at n.e. cor sec 32-  
42<sup>n</sup>, 21<sup>w</sup> Benton Co.

# Sedalia



12 Aug 1952

Library has very early city  
Directory of Sedalia.

Drove south from Georgetown to south of County farm,  
then east 3/4 mile to U.S. 65.  
Drove north along highway, saw  
old quarry, very small, on W. 1/2  
sec 10 T 46<sup>n</sup> R 22<sup>w</sup>. Drove by  
bluff at Barthwell estate to  
T & O quarry, on n. 1/2 sec  
34 T 47<sup>n</sup> 22<sup>w</sup>. Made arrangements  
to visit and collect in this  
quarry at a later date.  
(Burlington quarry 3/4 mile west  
of Georgetown, on W. 1/2 sec 17,  
T 46<sup>n</sup> 22<sup>w</sup> is on R. Dow lands.  
R. Dow lines in Georgetown).  
Returned to Sedalia at 1900 hr.

12 Aug 52 Drove west on MO 83 to  
SE ne sec 28-39<sup>n</sup> 23<sup>w</sup> and coll  
(3/4 mi. north of Bentonville, Benton Co., Mo.)  
F-30 12 Aug 1952 from road cut  
Piercer?

F-3 of  
12 Aug 52 Northwest view of  
road rock exposure of 12 Aug 52

Drove westward toward  
Osceola to location of  
Kaiser (1950) locality on  
road and hillside, 6 miles  
east of Osceola on Bailey  
Creek can w/2 ne ne sec  
8, T. 38<sup>n</sup> R 24<sup>w</sup> St. Clair Co,  
Missouri. Collected from  
here last year also. Collected  
this time for crinoids. A  
behind most of the fossils  
are from the shales in the  
top of the sequence. Just

12 Aug 52 Collected *Sidalia* fossils  
from residual cherts in  
bar ditches on either side  
of highway and along road  
to the south at ne cor 32-  
42-21<sup>w</sup> Benton Co.

Drove on route  
to Warsaw, Mo and south  
on U.S. 65 to MO 83. Turned  
west on MO 83 and drove  
via Fairfield to SE in NW  
1/4 of sec 27 39<sup>n</sup> 23<sup>w</sup> Benton  
County. Locality from  
which Partridge obtained  
Crinoid given Museum  
from *Sidalia*. Stopp. and  
coll F-20 12 Aug 1952 from road  
cut here.

F-2  
of 12 Aug  
52  
76  
coll F-21 12 Aug 52

12 Aug 52

Miller in Miller and  
Cullinson, 1951, Lower  
Miss. Ann. of Mo. Jour. Pal  
Vol 25 No 4, p 454-487,  
pl. 68-71. J.B. Owen gave the  
following info.

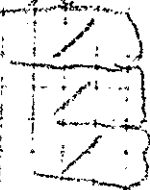
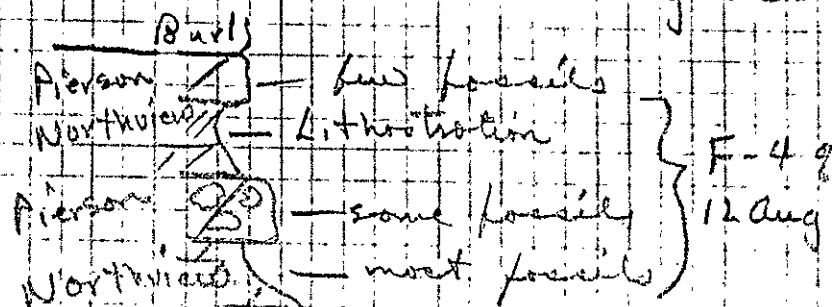
(Sedalia) Chautau - 1 mile N. of Sedalia  
small quarry (dating to 1896)  
N.E. SW 28-4162 21<sup>st</sup> Pott Co,  
Mo. Another very small, and  
one grown quarry (1/2 mi. N. of  
0.23 mi. North of town) on  
east side of Georgetown -  
Sedalia road, Pott Co

Saw them most of  
several quarries on west  
side of Georgetown - Sedalia road,  
quarry one grown, Pott Co

Chautau - Rize Brook  
Bridge - on west side of  
Muddy Creek on west side  
of road SW 1/4 Sec 36,  
T47.4 R 21<sup>st</sup> Pott Co,

Shepard Farm (Sedalia)  
on trip to Cedar Creek, starting  
at vet. of road & creek (can  
W line, sec 14-46, 21<sup>st</sup> Pott Co

below the Burlington



Cont

Found a couple of fragments  
of crinoids but not much.

F-49 Coll F-49 of 12 Aug 52 from  
USNM 333 1/8 Three shale and dolomite  
beds.

Drove to Decatur for mail  
Drove north to Clinton  
and visited with J.B. Britts  
Owen. Following general  
localities were described by  
78

12 Aug 52. 24 W Henry Co, Mo.  
 Also has good *Pateriacrinites*,  
*Cromyocrinus* and *Nunacrinus*. Has good *Chonetes*  
*trilobites*, complete, 10-12 from  
 small tree covered quarry  
 on east of Georgetown - Sedalia  
 road, coll by Blair acc. to  
 Jesse Blair who is mentioned.

obscure  
 obscure trilobite quarry  
 100 yds W. of Sec 28  
 T46N R21E Just  
 east of highway  
 1 mile from Sedalia

Drove to Sedalia from  
 night.

12 Aug 52.  
 Co.

County farm - at country  
 farm in quarries W. of house  
 at base of hill, E of house  
 and creek, E/2 - N - SW - 21 N 21 W  
 Pettis Co. Sedalia?

Hocker Farm - Sedalia?  
 In creek bed W. of 1st of old road  
 and Cedar creek bed W. of 1st of  
 old road and cedar creek 1/3 mile  
 N. of SE cor. Sec 16, T16N 21 W  
 Pettis Co. and down stream  
 to some point in  
 section 16.

Owner has his 8 and 1/2  
 coll which includes specimen  
 from Blair and Sampson.  
 One is a *Rhodocrinus* coll by  
 Owens grandfather from Chouteau.

13 Aug 52

Drove over Pin Hook Bridge, turned right and drove east then north on main road thru Newland to ne corner. Stopped to collect along west road cut from weathered shale and residual chert from the Northwood-Pierson, nw/se/ne/ 36-47N 21W Pettis Co.

coll F-2  
13 Aug 52

coll F-2 of 13 Aug 1952.

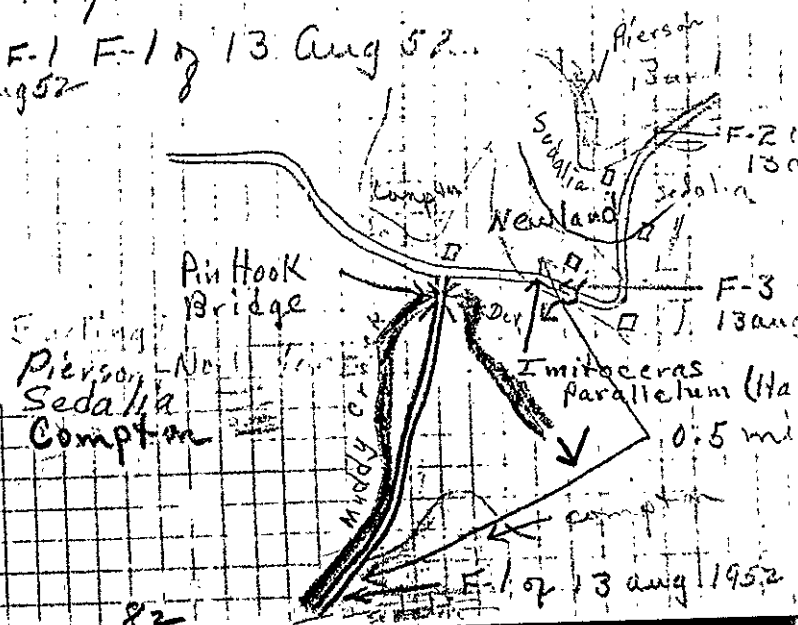
Turned around and returned to exposures of Compton just below bend of main road thru Newland (this is the Pin Hook Bridge locality). Made coll F-3 of 13 Aug 1952. Found a specimen of *Imitoceras parallelum* Hall 8 ft above the base of the Compton, above the

13

13 Aug 1952

Drove north from Sedalia on Sedalia-Newland road 7 point 0.5 miles southeast of Newland (Pin Hook Bridge) on muddy Creek nese - 36-47N 21W Pettis Co, 7 miles ne of Sedalia, Mo. Collect from Compton mem. of chert fm. at road site. Fair collecting

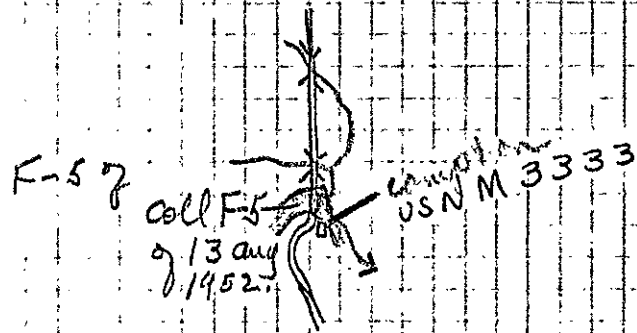
coll F-1 F-1 of 13 Aug 52.  
13 Aug 52



82

13 August 52

Drove west across Muddy Creek 0.25 mi., turn south and drove 0.5 mi. to roadside exposure in Compton cen w line SWSW 35-47° 21'W Pettis Co. Coll. F-5 of 13 Aug 1952 from this excellent but poorly foss. exposure.



Drove south to SW 14-46° 21'W and drove east to Clifton City, Cooper Co, Mo. Drove south across RR and Chagan Br., good loc. collected last year, and 94a

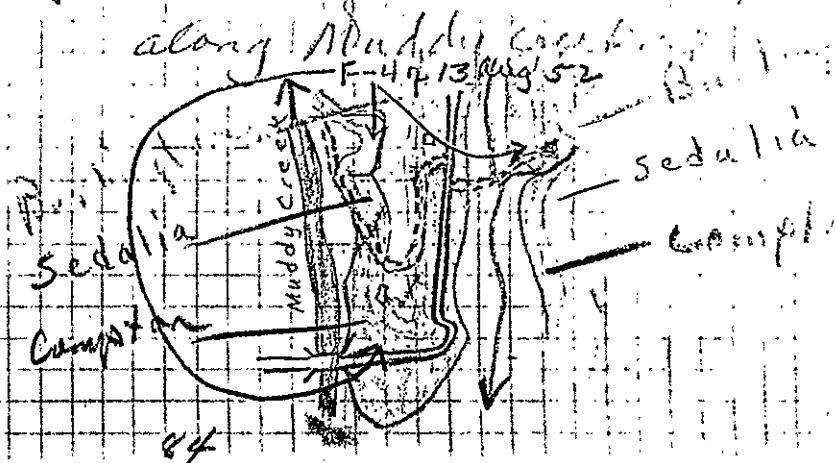
13 Aug 1952

top of the Devonian.

Drove 0.5 mi west of Newell 2.75 mi north, 0.25 mi west, 0 mile north, 1.5 miles west a then 1.3 mi. south to farm where Devonian and Chautau are exposed on east-wide road. Drove thru field to old quarry west of road, 1947 T.M. & Owen quarry, ne, SWSW 47° 21'W. Collected from Can coll F-4 of 13 Aug 52, in base of Chautau in quarry.

F-4 of 13 Aug 52

along Muddy Creek





13 Aug 52

Remnants of R. A. Blair  
coll. Miss Jessie Blair  
has given them to the U.  
S. National Museum. Incl.

acc 19578 { sponge, conularia, geode, Krieto-  
pora, Michelinia (?) and Stenodonta.

Drone to home of  
Miss Jessie  
Blair, daughter of R. A. Blair,  
now 80 yrs old, #20 So Grand  
Sedalia, Mo. Visited for an  
hour with her. She noted  
that she often accompanied  
her father collecting. He was  
a local merchant and did not  
spend lots of time out. Went  
to same places over and again.  
Coll. quarries north of Sedalia  
near Georgetown and thought

13 Aug 52

to hillside road cut 0.3 mi  
south of Clifton City.  
Coll. sample (F-6 of  
vermicular Sedalia) F-6 of  
13 Aug 52 from this road  
cut cen w line sec 18, 46  
19<sup>th</sup> Cooper Co, Mo. Drone  
south looking for J. B.  
Owens loc. 1 mi. So. Clif  
City (see Miller & Cullison  
found it as he described. It  
was 2.5 mi So Clifton City  
on road cen NW 29-46<sup>th</sup> 19<sup>th</sup>  
Cooper Co, Mo. Coll. F-7 of  
13 Aug 52 from here. D.  
to Otterville and then to  
Sedalia.

After Dinner visited  
the library to obtain

14 Aug 1952

Drove north of Sedalia  
on Georgetown-Sedalia road  
to County farm 2 1/2 miles north  
F-1 of Sedalia and collected F-1 from  
quarries just east of road at creek  
level, cen NW 1/4 n. 1/2 sec 21,  
T 47 N, R 21 W Pettis Co, Mo.  
Stepped into weeds west and  
after waiting for them to subside  
hurt knee again running  
away from the weeds.

Returned to Sedalia and  
checked out of the camp because  
the rain last night made  
road into Sweeney quarry  
a poor gamble, mud road  
from Clifton City. Drove  
17 miles south of Sedalia

13 Aug 52

that Sweeney quarry was  
the best in the area. Many  
specimens coll. by Blair  
fell into Sampson's hand  
and never returned. Blair  
and S. F. Miller were cousins.  
Miss Jessie went to Columbia  
in 1894 when Norwood was  
teaching there. R. A. Blair  
and Dr. John Britton  
(S. Britton's uncle and  
father) were the closest of  
friends. S. Britton coll. has  
many Crinoids etc. which  
were given him by R. A. Bla

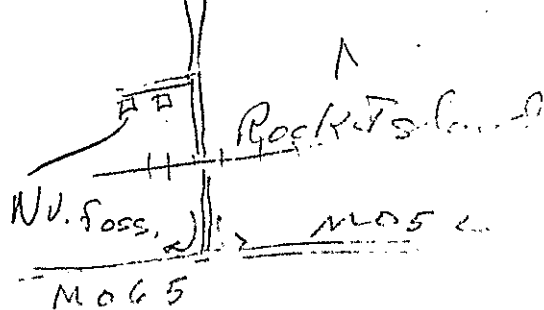
14 Aug 1952

F-1 of  
14 Aug 52  
USNM  
3335

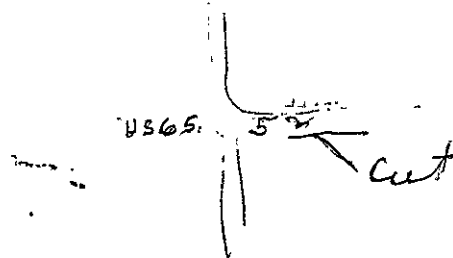
Drove north of Sedalia  
on Georgetown-Sedalia road  
to County farm 2 1/2 miles north  
of Sedalia and collected F-1 from  
quarries just east of road at creek  
level, cen 1/2 mi. e/s. sec 21,  
T 47 N, R 21 W, Pettis Co, Mo.  
Stepped into wash west and  
after waiting for them to outside  
burst back again running  
away from the west.

Returned to Sedalia and  
checked out of the camp because  
the rain last night made  
road into Sweeney quarry  
a poor game, mud road  
from Clifton City. Drove  
17 miles south of Sedalia

88



F-1. county farm, n. of  
Sedalia Northview  
F-2 N.V. Pierson SW cor 29  
T 43 N 24 W.



14 Aug 52  
mile east then almost  
mile north to exposure  
in an NW/NE sec 33-

43° 2' W Benton Co, Mo.  
Coll F-5 from residual  
Sedalia or Northview-Pleasant  
cherts (see p. 75 loc a).  
Same as F-10 12 Aug 52.

Drove to Warsaw, Mo  
to get a cabin for night.

14 Aug 52

to SE cor sec 19, 43° 22' W  
= 29 Benton Co. Coll F-29

4 Aug 52

JSNW

3339

14 Aug 52 from residual  
Sedalia or Northview-Pleasant  
chert on west side of highway

Drove south to point  
18 miles south of Sedalia  
at let of Mo 52 and I-565.

F-30

14 Aug 52

JSNW

3336

Coll F-30 14 Aug 52 from road  
cut in NW cor sec 29, 43°  
21' W Benton Co, Mo. Very  
good collecting.

Drove south along west  
line of sec 32-43° 21' W to  
center sec 32-43° 21' W and

F-4 coll F-4 14 Aug 1952 on  
road cut (bar ditch), Residual  
Sedalia or Northview-Pleasant

Drove 3/4 mi south, sec

Grand River. A good bluff of Burlington on river  $\frac{1}{2}$  mile east of bridge. we did not examine. The section is too high for Compton ls.

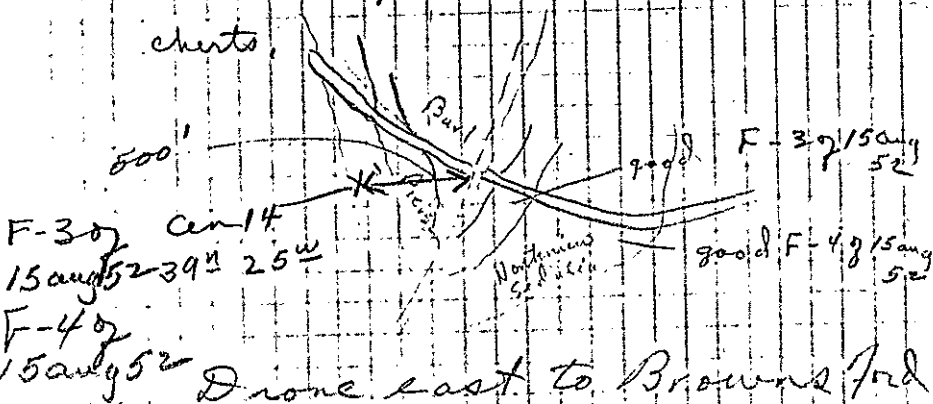
Drove north on 29  $\frac{1}{2}$  N 24<sup>W</sup> then west and south to river along west edge of 29-32- $\frac{1}{2}$  N 24<sup>W</sup>. Returned to Mo 35 because of no exposures. Drove to Clinton for dinner and south to Pecca to arrange a date for Sat with Ridd, via Mo 13 to Lowry City then east on County road C. Found good exposure of Sedalia.

15 Aug 52

Drove west from Warsaw, Henry Co. Mo. 35 to near Coal, <sup>Henry Co.</sup> Found no good exposures along this route. Returned to set <sup>NW 22-40<sup>N</sup> 23</sup> near Opposite Farm (Fairfield  $7\frac{1}{2}$ "  $\square$ , Mo.) Drove west toward Finney, Finney Co. Mo. Turned south and set in cen 19-40<sup>N</sup> 23<sup>W</sup> Benton Co. Mo. Drove to White Sulphur Sp. No exposures on road. Returned to set cen 19-40<sup>N</sup> 23<sup>W</sup> Benton Co. Drove west to Finney, cen. W 24-40<sup>N</sup> 24<sup>W</sup>. Turned south and drove to W/2 12-40<sup>N</sup> 24<sup>W</sup>. No good exposures. Returned to Finney. Drove west from Finney to SW cor Sec 23-40<sup>N</sup> 24<sup>W</sup>. Drove north across South

15 Aug 1952

Drove on east over ridge and  
by cross road. Excellent exposure  
of Sedalia - Northview - Pierson  
Coll. F-3 from Northview - Pierson  
Coll. F-4 from Sedalia residual  
cherts.

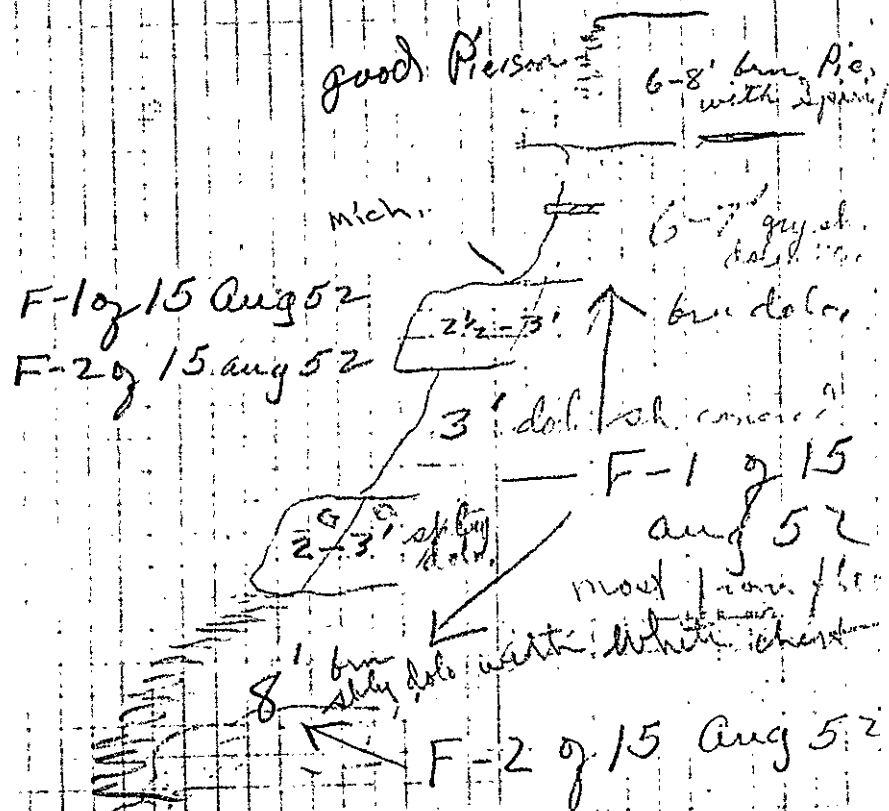


Drove east to Browns Ford  
on Osage River. Crossed bridge  
and followed the road east  
and south east. Found Compton  
Northview - Pierson in n.w. 1/4  
nw sec 19 - 39° - 24°.

F-5 Coll. F-5 from Compton  
F-6 and F-6 from Pierson.

9.4

Northview - Pierson - Burlington  
on road cen 14 - 39° 25' W,  
St. Clair Co.



93

15 Aug 52  
at a good Sedalia exposure  
F-8g on the road cen nw SW 20-  
15 Aug 52 40° 22' 22" W. Coll. F-8 of 15

Aug 52 from Sedalia.

Returned to cabin at  
Tetter Hill Courts.

These courts are A-1  
Poor. Never stay here again.

15 Aug 1952

Returned to Lowry City  
and drove north to Mt.  
zion road and east to  
Mt. Zion (SE cor of SW/SE  
Sec 25-40° 25' W, Henry  
Co. MO.). Drove east from  
Mt. Zion to SW<sup>cor</sup> SE/SW 34  
40° 24' W. Henry Co.  
on road to exposure  
of Compton, Col. 3 blasts.

F-7g  
15 Aug 52 F-7 of 15 Aug 52 from the  
Compton here. Drove east  
to Scotts Camp and then  
southeast to Fair Hill,  
then north on AL 83 to  
intersection in SE 32-39° 22' W  
Benton Co. North on county  
road to west end of bridge  
west of Warsaw. Stopped

16 Aug 1952

Pierson carries *Michelinia* and *Caninia* which we have collected elsewhere.

Coll. F-17 16 Aug 52  
from top part of Sedalia  
2-4 ft. below top at Kasinger  
Bluff, near cen nw nc 27-  
40<sup>th</sup> 22<sup>nd</sup> 1.5 mi nw of Warsaw,  
Benton Co, MO.

Returned to the car.  
Drove to intersection in nw  
8-40<sup>th</sup> 22<sup>nd</sup> and drove west  
1/4 mile then nw across <sup>Little Teco</sup> ~~Stewart~~  
Creek, nw across Bridge and  
by Kincaid Cen (Shawnee Bend  
7 1/2 min), past limestone  
school to good exposure  
of Burlington, Pierson and Sedalia  
98

16 Aug 1952

Drove north of Warsaw  
to parking area above  
Kasinger Bluff. Walked  
southeast along the edge  
of the bluff to the crest  
of the Pierson then back  
along the bluff at the  
line of the Sedalia.

The Pierson was considered  
as basal Burlington by Kiser  
but is recognized as basal  
3 ft of Kiser Burlington  
Clark and Beneridge.  
I suspect that it is the  
first zone of the Bu-  
rington. Almost surely  
part of Moore's Sedalia  
I don't yet know why it is  
basal Burlington.  
97



16 Aug 52

Sedalia exposure cen SE

24-41" 23" W. Coll. F-5 of

16 Aug 1952 from Sedalia  
including some float from Pierson  
Drove east to cen  $\frac{1}{2}$  SE  
19 41" 22" then returned  
to Warsaw.

Drove west from Warsaw  
on MO 35 across bridge to cen  
SE 18 40" 22" Benton Co.  
Turned south on Lake Road  
54 and drove to Sedalia exposure  
SE  $\frac{1}{2}$  NW SW 20-40" 22" W  
Coll. F-6 of 16 Aug 1952  
from Sedalia, coll. F-7 of  
16 Aug 1952 Pierson crinoid  
from surface of Sedalia exposure  
and F-8 of 16 Aug 1952 from  
Burlington 50-75 ft west of  
100.

16 Aug 52

along road n-s thru center  
26-41" 23" W. Coll. F-2 of

16 Aug 52 from Sedalia, F-3

of 16 Aug 52 from basal Burlington

and F-4 of 16 Aug 52 from

weathered Pierson all just

east of center 26-41" 23" W

Benton Co. Mo. This is a

very excellent exposure of

Burlington, basal 15 feet  $\pm$ .

Returned north to county

road and drove west to

ne 28-41" 23" W Benton Co.

saw no good exposure. Return

to Little Teto Bridge and

turned north at intersection

SE SW 30-41" 22" W. Drove

nw to cen  $\frac{3}{4}$  24-41" 23" W

turned east and found good  
99.

17 Aug 1952

Drone from Osceola to  
west end of bridge over Weaubleam  
bridge can. rd. N. W. 13-38<sup>1</sup>  
25<sup>W</sup> St. Clair Co. Mo. Coll  
F-1 of 17 Aug 52 from Compton  
F-2 of 17 Aug 1952 from  
lower Sidalia all from road  
cut.

Drone south thru secs.  
14, 23, 26 and 35-38<sup>1</sup> 25<sup>W</sup>,  
St. Clair Co. Then east across  
Weaubleam creek (Osceola  
7 1/2 min □). Drone east on  
County road thru sec.  
36-38<sup>1</sup> 25<sup>W</sup>, 31, 32, 33,  
34, 38<sup>1</sup> 24<sup>W</sup> (Iconium sheet  
7 1/2 min □). Low exposure  
in hillside SW sec 36-38<sup>1</sup> 25<sup>W</sup>.

16 Aug 52  
road.

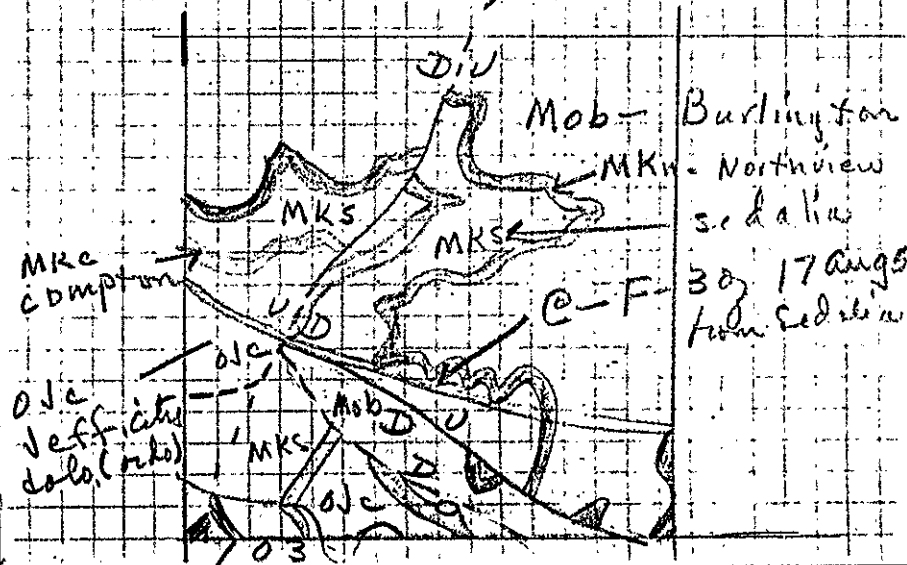
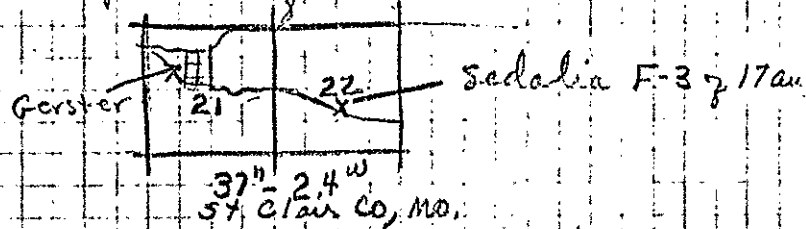
Drone via MO 83 to  
Osceola, MO.

17 Aug 1952

This is the best collecting spot yet visited. Coll F-3 of Aug 1952 from here. Abundant Tripliphyllites calceolus and an occasional good crinoid. These are from the Sedalia and maybe the underlying Northview. A few specimens of Michelinia (2 small) and a few Caninia were found, probably float. The crinoids are from the Sedalia because fragments of columnals of the same size, color, etc. occur in the Sedalia which is weathering down. Only a very little material comes from the underlying Pierson. There are many cruddy nodules from

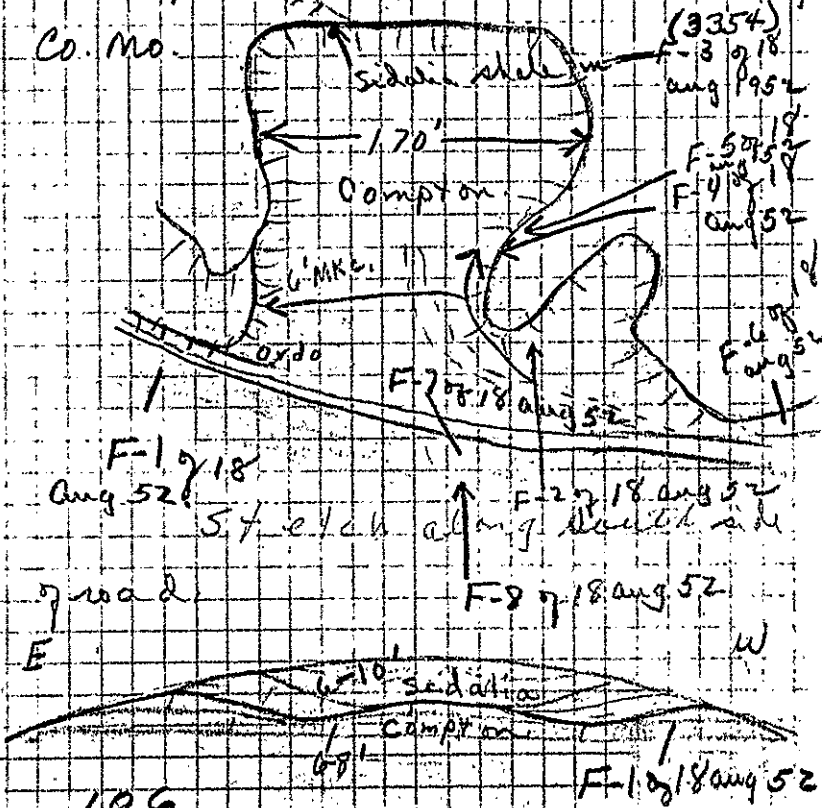
17 Aug 52

but did not study it. Dione south and west thru 3, 2, 11, 10, 15, 16 and 21 - 37<sup>n</sup> 24<sup>w</sup> to Gerster, St. Clair Co, Mo. Dione east of Gerster along gravel road for one mile to exposure of Sedalia.



18 Aug 52

Drove south of Osceola on  
Mo 13 to Collins and hence  
west on US 54 to 4 1/2 miles  
east of Weaubleau to quarry and  
road cut in Chautau group,  
cen n/2 sec 21-37 22 W Hickory  
Co. Mo.



17 Aug 52

the top Northview in the  
exposure, as some material  
is from the Northview.

The crinoids here are definitely  
new as "Chautau types." The top  
Sedalia carries typical Chautau  
crinoids in many localities but  
the fauna here is different.

Drove south and east  
along Northview exposures  
thru 23, 26, 25, 37 24 W  
and 31 37 23 W and 6-36 23 W  
to U.S. 54, 2 1/2 miles east of  
Weaubleau, St. Clair Co. Drove  
by Diemel farm near  
13-36 24 W and to Weaubleau  
then returned to Osceola.

105

18 Aug. 1952

in NW corner of the quarry,  
includes sampling shale and lens  
of Sedalia.

Bill coll F-4 of 18 Aug 52  
from shale between Compton &  
Sedalia in quarry.

Bill coll F-5 of 18 Aug 52  
from shale break  $3\frac{1}{2}$  feet above  
base of Sedalia; Agosierinus  
~~Agosierinus~~

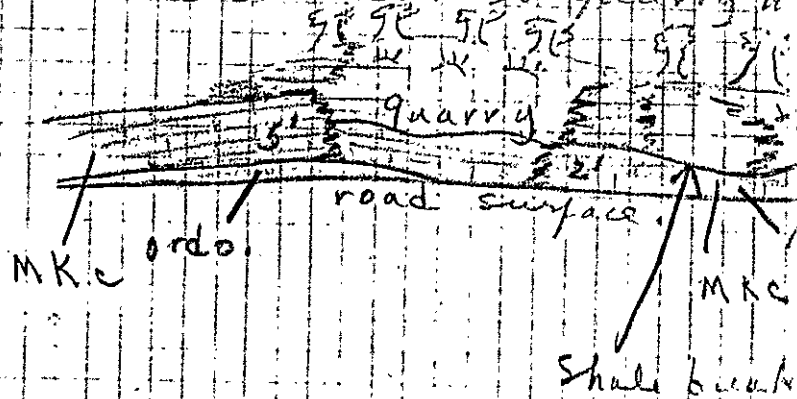
Coll F-6 of 18 Aug 52 from  
weathered Compton along the  
road cut 50 feet east of  
quarry on north side of the  
road.

I went to Hermitage for  
dinner. Returned to quarry.

Coll F-7 of 18 Aug 52 from  
shale between Compton and  
108

18 Aug 52

Sketch across quarry

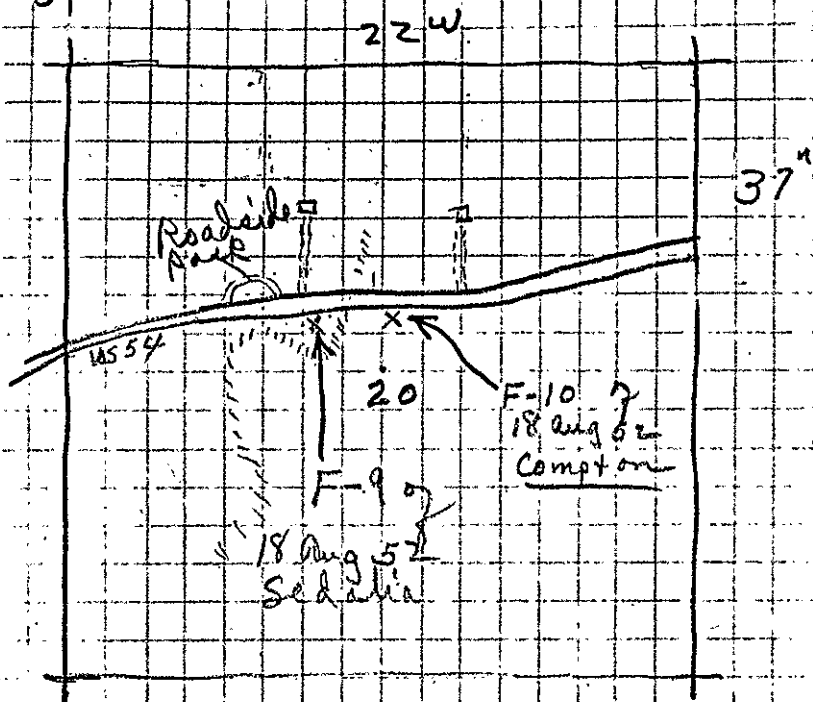


Bill collected F-1 of 18  
Aug 52 from shaly slope  
along west end of road cut on  
the south side of road. Included  
both Compton and Sedalia fossils.

I collected F-2 of 18 Aug 1952  
from Compton in the quarry  
on the north side of the road.  
There may be a few Sedalia  
forms but nearly all are Compton.

I collected F-3 of 18 Aug 52  
from Sedalia

18 Aug 1952

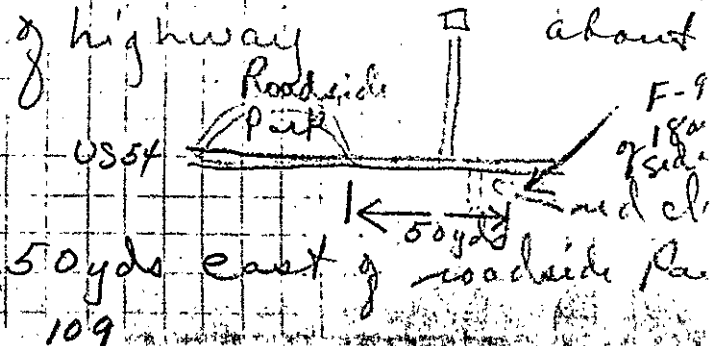


walked 50 yds farther east to Reef knolls of Compton on south side of road. Excellent subtidal Antopora and small brachiopods. Reef knolls are solid Antopora.

18 Aug 52

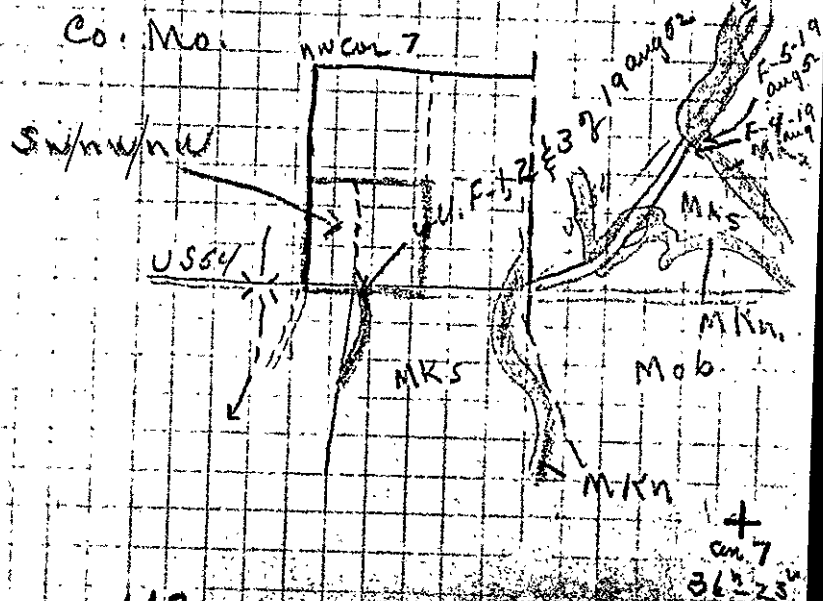
Sedalia opposite quarry on south side of road. Coll F-8 of 18 Aug 52 / Sedalia on south side road. Good crin from 3 feet above base. Sedalia found by Bill Allen.

Drove west to census P.W. 20-37N 22W a collected subtidal corals on south side of highway about



19 August 1952

Drove south from  
 Excelsior on Mo. 13 to Collins,  
 then east to Weaubleau Creek.  
 Stopped at exposure 150  
 yds east of bridge on Weaubleau  
 Creek, U.S. 54 south side, Cass  
 Co. Mo. S.W. N.W. 7-36" 23" W Hickory



18 Aug 52

coll. small blocks of  
 stone for etching. Coll. 5  
 bags of weathered clay  
 reef knolls for washing  
 F-10 of 18 Aug 1952.

19 Aug 52

352  
p44). Collected F-#1 from  
weathered top Sedalia on  
east side of highway. Collected  
F-5 of 19 August 1952 from  
weathered shale just below first  
siltstone in the Northview  
on east side of the highway F-6  
(no F-6.)

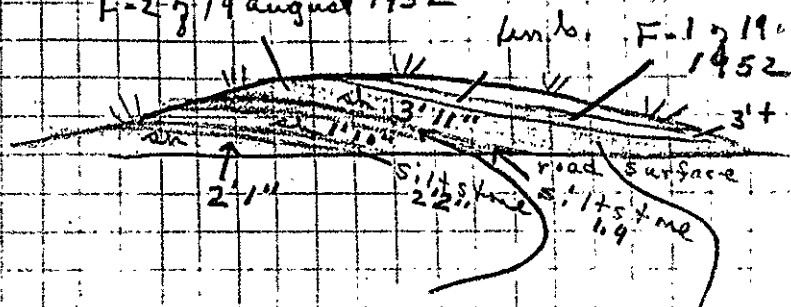
on east side of the highway F-6  
(no F-6)  
~~7/9 Aug 1952~~ F-77/18 Aug from top North

Met T. Beneridge along  
Mo. Geol. Surv. & Water Resources  
Highway Just east of Weaubleau.  
Drove to Weaubleau for  
lunch.

Drone south to north  
edge of Humansville to exposure  
of Northern bedalia interfingering.

19 August 1952.

F-2-7/19 August 1952



F-3219

August 4 1952

F-20 19  
Aug 1952

For information see T. Beveridge  
1951, Geol. of Waimblean Creek  
Area, Mo. Geol. Sur. & water Resources  
Vol. 32, 2<sup>nd</sup> ser., p. 42.

Dune north east to upper  
of Northview on se side of  
road, US 54, south-west-facing  
slope, SW/SW/SE 6-36" 2-3"  
Nickony Co. Mo. (Beveridge, 1951)

113



19 August 1952

Compton and Sedalia in  
Weaubleau Creek. This is  
Darnell farm of J. Britts  
Owen (Miller and Cullison  
195), Lower Mississippian  
Cephlapoda of Missouri, Lower,  
Paleo. I. Collected F-10 of  
19 August 1952 from Compton;  
F-11 of 19 Aug. 52 from Sedalia;  
and F-12 of 19 Aug 1952 from top  
beds of Sedalia from along  
gully just north of exposures  
in the creek.

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19 Aug 52

coll F-8 of 19 August 1952  
cen sec 9-35<sup>n</sup> 24<sup>w</sup>, Polk Co. Mo  
from Cherry Sedalia.

Drove north from  
Humboldt 2 mi. toward  
Weaubleau to exposure  
Sedalia residual - cen s/2  
SW-34-36<sup>n</sup> R 24<sup>w</sup> St Clair Co  
and coll. F-9 of 19 Aug 52.

Drove north toward wea-  
to cen n/2 14-36<sup>n</sup> 24<sup>w</sup> and to  
west, drove east to Weaubleau  
creek, cen n line nw sec 9  
13-36<sup>n</sup> 24<sup>w</sup> St Clair Co, Mo.  
walked 150 feet north, down  
stream to exposures of

115

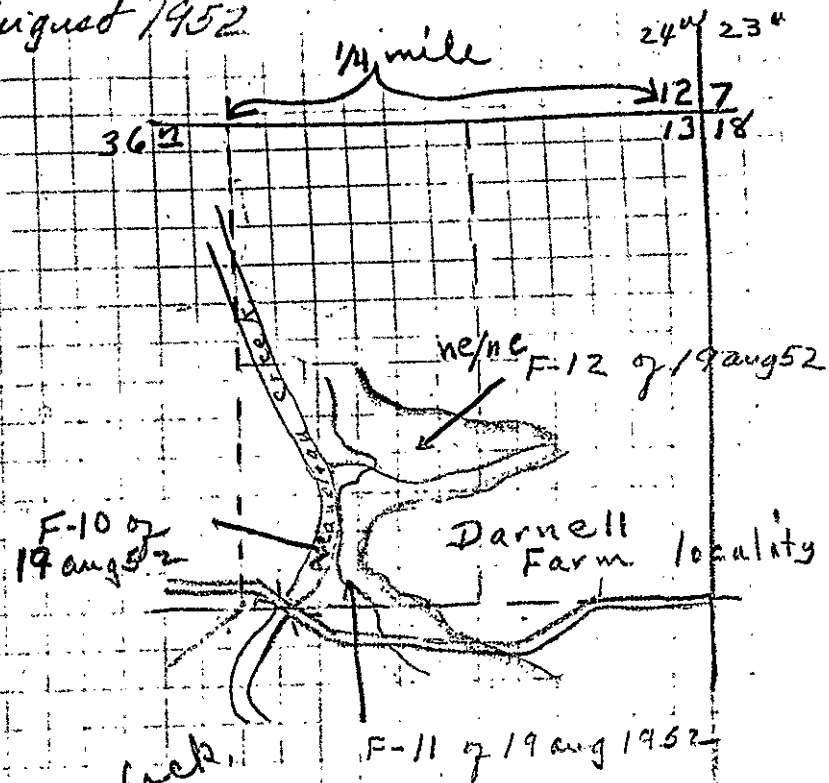
19 Aug 52

across Weaubleau creek,  
1/2 mile SW of Berster, to  
cen n line, ne nw sw <sup>21-</sup>37<sup>1</sup>  
23<sup>4</sup>, St Clair Co, Mo. Coll.  
F-13 from top beds of the  
Sedalia.

1/2 mile to Berster.  
Weaubleau cr.  
F-13 of 19 August.  
cen n line, ne nw sw <sup>21-</sup>37<sup>1</sup> 23<sup>4</sup>, St Clair Co.

Drove north to Berster  
and east to exposure of  
upper Sedalia, same as  
(see p. 103)  
F-3 of 17 Aug 1952. Coll put  
in with F-3 of 17 Aug 1952.  
118

19 August 1952



see back

Returned to Weaubleau  
and T. Benenridge obtained  
his car. We drove both  
cars north from Weaubleau  
to south side of bridge  
117

19 Aug 52

across Weaubleau creek,  
1/2 mile S of Berster, to  
cen n line, ne nw sec <sup>21-</sup>37<sup>n</sup>  
23<sup>w</sup>, St Clair Co, Mo. Coll.

F-13 from top beds of the  
Sedalia.

1/2 mile to Berster,  
Weaubleau cr  
F-13 of 19 August.  
cen n c nw sec 21  
37<sup>n</sup> 23<sup>w</sup>, St Clair Co.

Drove north to Berster  
and east to exposure of  
upper Sedalia, same as  
(see p. 103)  
F-3 of 17 Aug 1952. Coll. part  
in with F-3 of 17 Aug 1952.  
118

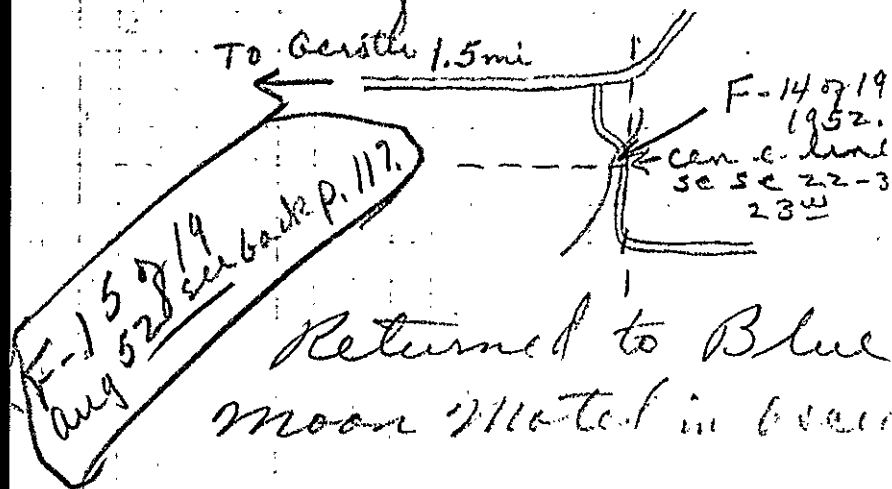
Drive east from Donald farm  
then northeast and north  
Weaubleau 1/2 mi US 52  
top of Sedalia  
F-15 of 19 Aug 52  
N 24° 45' E  
12-36 24 W  
St Clair Co  
Donald farm  
0.4 miles  
1.1 mile  
1/4 mile  
Weaubleau cr  
Sedalia

also coll F-7 on 28 Aug 1952  
 from roadside 6 miles east  
 of Decatur on County road  
 "N" sec 12 SE 22-38 24W  
 St. Clair Co, Mo. from decatur  
 upper Sedalia.

back 120

19 Aug 1952

Drove east and south  
 to exposure of Sedalia cen  
 east line se se 22-38  
 23W, St. Clair Co, 1.6 miles  
 east of Huston,



119

20 Aug 1952

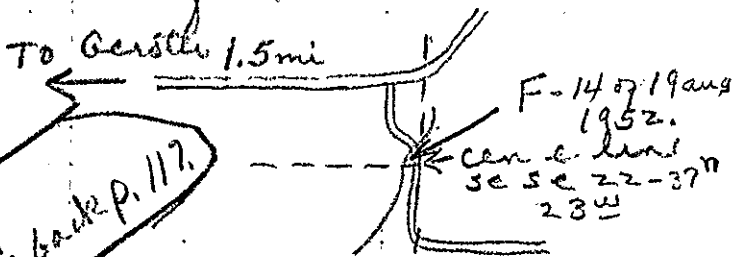
Drove east from Osceola with T. Beneridge on County highway N. to exposure of Sedalia - Northwood and Pierson in cen n/2 se se 8-38<sup>n</sup> 24<sup>w</sup> St. Clair Co., Coll.

F-1 of 20 Aug 1952  
see back of F-1 of 20 Aug 1952 from Compton in north road cut.

F-7 of 20 Aug 1952  
Drove 1/4 mile east to an n/2 sw/sw/sw 9-38<sup>n</sup> 24<sup>w</sup> St. Clair Co., Coll. from weathered Pierson or Northwood on se side of highway, F-2 of 20 Aug 1952.

19 Aug 1952

Drove east and south to exposure of Sedalia on east line se se 22-37 23<sup>w</sup>, St. Clair Co, 1.6 mile east of Hirster,



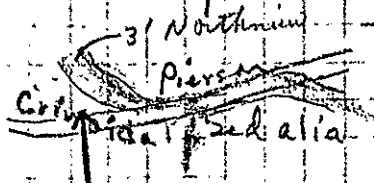
F-15 of 19 Aug 1952 see back p. 117.

Returned to Blue Moon Motel in Osceola

20 Aug 1952.

Drove south east to  
cen w/2 sec nw 30-38<sup>n</sup>  
24<sup>w</sup>, St. Clair Co. Mo. Found  
no fossils.

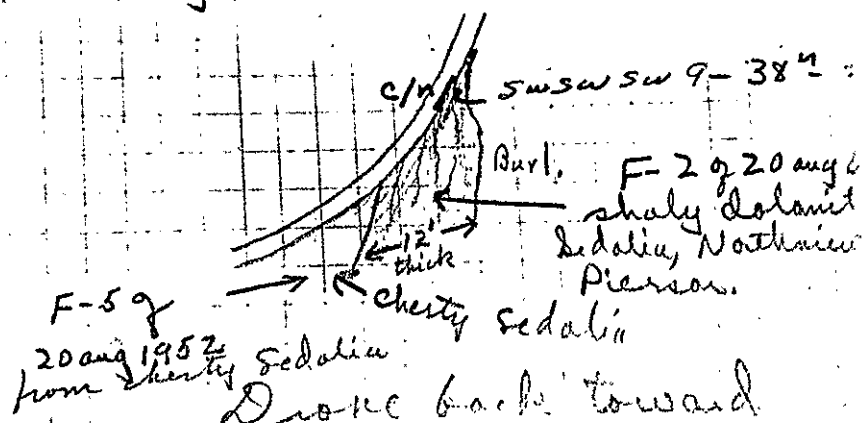
Drove east to crossing  
on Bear Creek and hillside  
1/4 mile east, nw sw sw  
26-38<sup>n</sup> 24<sup>w</sup> St. Clair Co.  
Coll. F-4 of 20 Aug 1952  
from top Sedalia (1 Productid)



F-4 of 20 Aug 1952 nw sw sw  
26-38<sup>n</sup> 24<sup>w</sup> St. Clair Co. Mo.

Bill Allen and I parted

20 Aug 1952

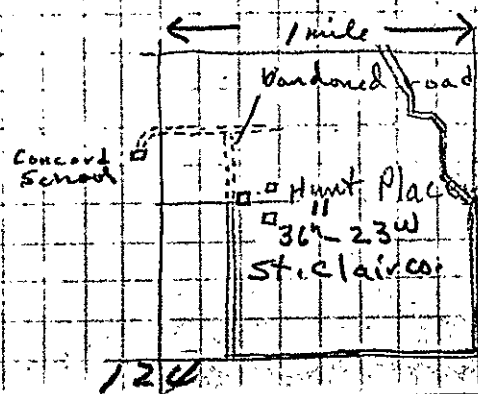
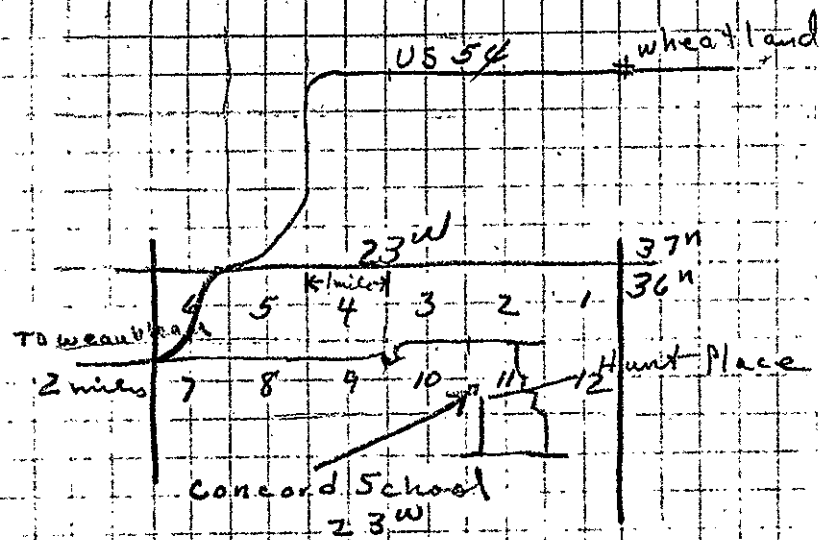


Drove back toward  
Osceola on St. Clair Co  
N. examining Northium expro  
obtained Benneridge's  
car and drove 3.6 miles  
east from Osceola to sec  
se se 24-38<sup>n</sup> 25<sup>w</sup> an  
W. Allen collected a crin  
crinoid from the middle  
compton, F-3 of 20 Aug

20 August 1952

ne sw 11-36<sup>n</sup> 23<sup>w</sup>

St Clair Co



20 Aug 1952

with Beneridge and returned to Osceola to catch upon fossil wrapping etc. Built boxes and brought notes up to date

Drive south <sup>from Dec</sup> via

Mo 13 to Collins and  
east on US 54 to Weathervane

Drove east of Weaubleau  
across Weaubleau Creek

then due to  $\sigma^2 \rightarrow \frac{n}{2}$

Sec 8-9-10 & 11, rem. the three

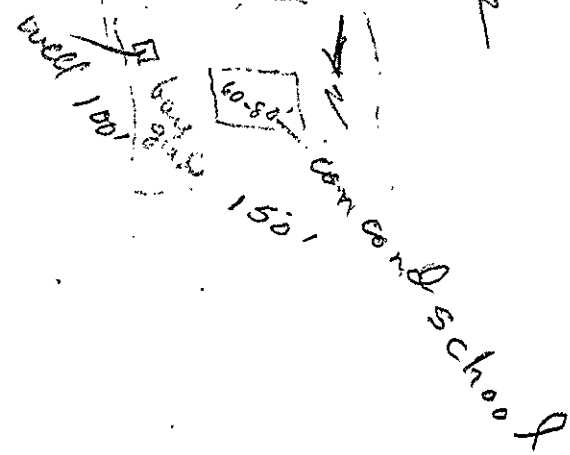
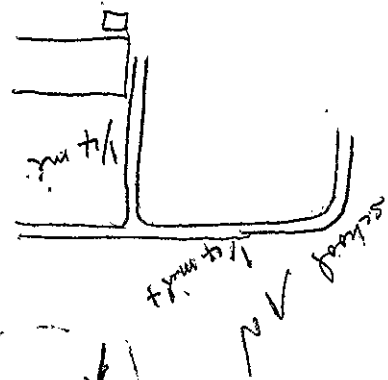
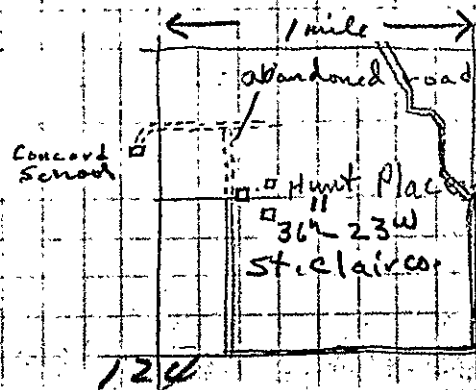
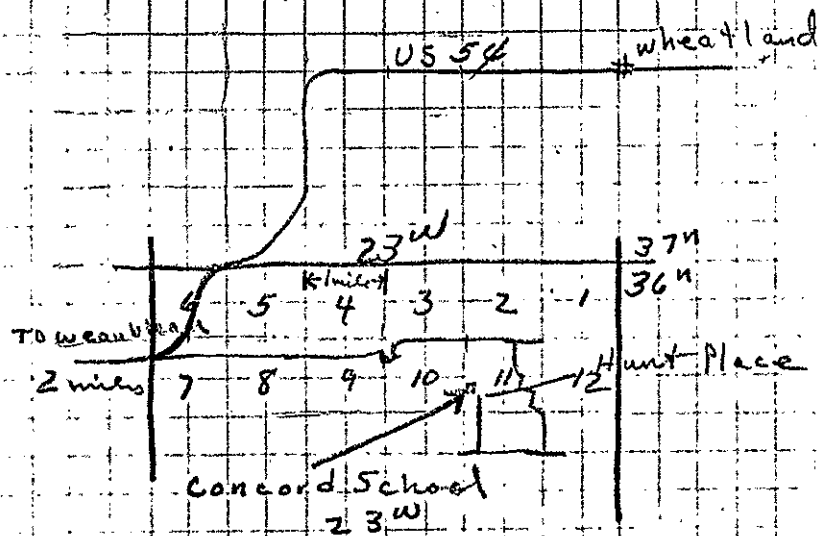
11, south between 13 & 14.

east along Cen. 14 then

north to Hunt Place (abandoned)

123

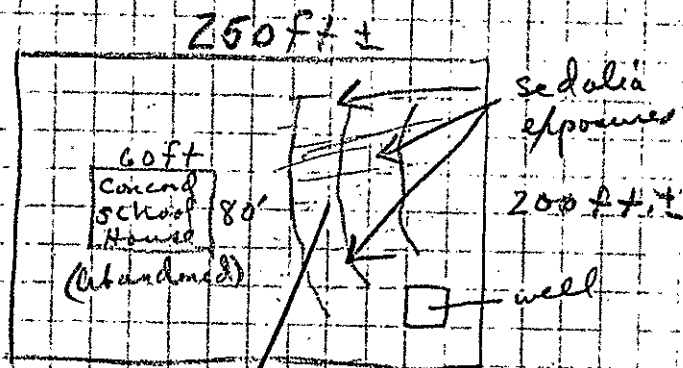
20 August 1952  
 ne sw 11-36<sup>n</sup> 23<sup>w</sup>  
 St. Clair Co.





20 aug 52

Honalo phyllites. However  
this is not a good locality  
because the exposure  
is rapidly being grassed  
over.



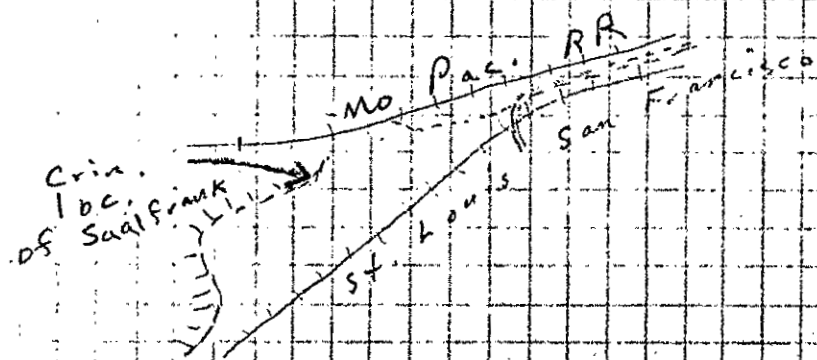
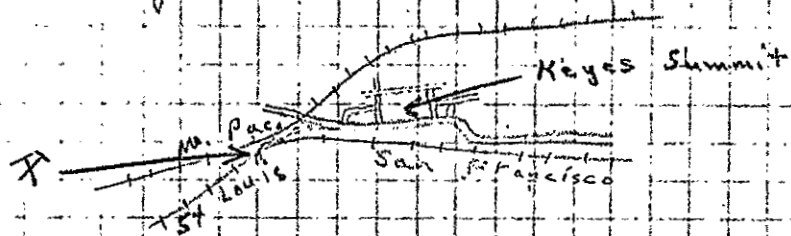
coll F-6 of 20 aug 1952  
n/s e/n/s 10-36° 23' W, Hickory  
Co.

20 August 1952

walked  $\frac{1}{4}$  mile north  
along abandoned road to  
Jct. with another abandoned  
road. Turned left and  
walked  $\frac{1}{4}$  mile. This abandoned  
road ends at the Old  
Concord School owned by  
Nenita - Pros. Att. Hermitage  
The old school building  
and the well remain.  
The school yard is on the  
top surface of the Sedalia  
and the school yard on  
the east side of the sch  
house produced a few

22 Aug 1952

Drove west to Keyes Summit and quarries on Mo. Pac and San Fran. St. & Louis R.R. Just west of Keyes Summit



128

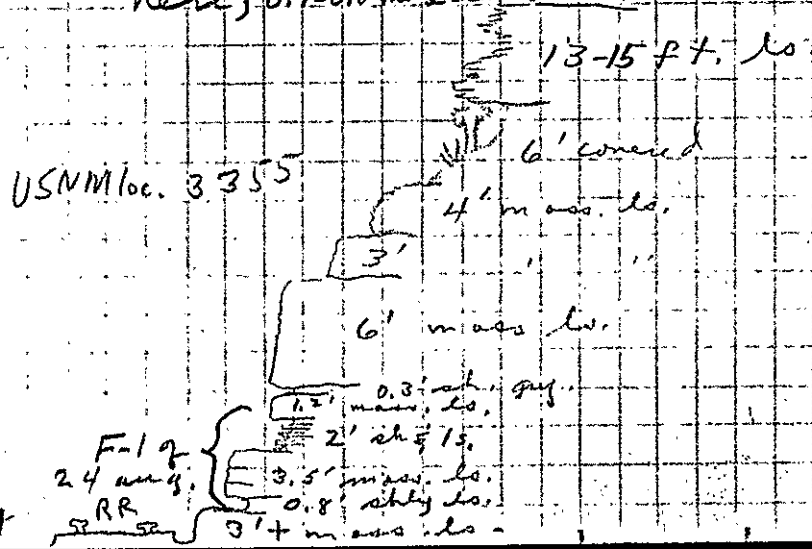
21 August 1952

Began raining last night at midnight and rain hard all night. Streets are now too soft to walk and dirt roads are in bad shape. Decided to drive on to St Louis because we would get little done in the next 1 1/2 days around Asciola. Drove north on US 65 U.S. 40 and Booneville, La. east on US 40 to Columbia. Visited a little while with Unkelotay in Columbia. Then drove east on US 61 to Kirkwood, Mo.

127

24 August 1952

Drove north to Sample, Ky on Louisville and Nashville RR. Parked at the RR sta and walked east to mp 67 to first good exposure of oolitic ls., 75 yds east of mp 67. Coll. F-1 of 24 Aug 1952 from here, 0.7-0.8 mi east of Sample.

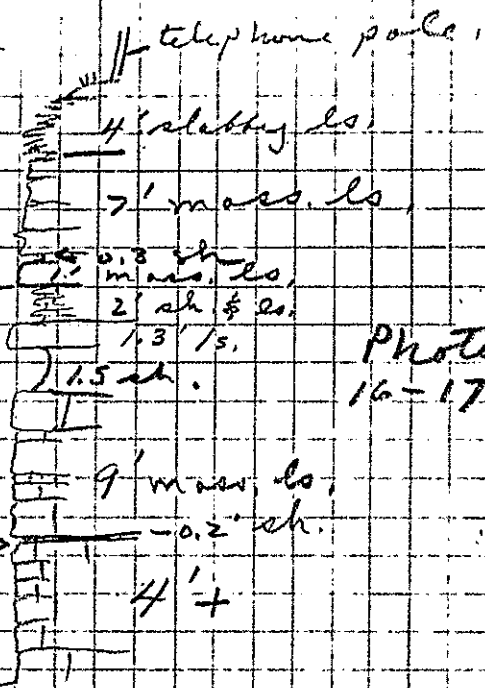


24 Aug 1952.

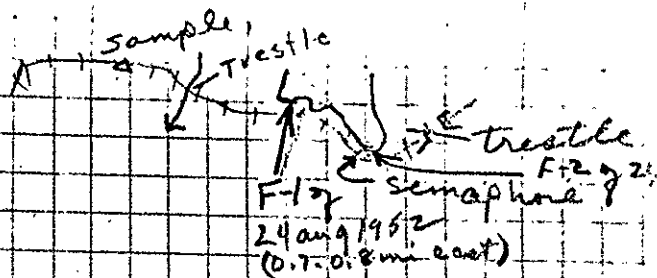
Drove east from Clonerport toward Hardinsburg on U.S. 60. Visited a Glen Dean (?) quarry along the highway on north side, 6 miles east of Clonerport, Hardinsburg Co., Mo.

Drove east to Hardinsburg and then north on 259 toward Sample, Ky. Fairchester fossils in road cut in west wall of Hardins Creek 3 3/4 - 4 mi NW of Hardinsburg on 25. Did not collect because fossils must be cracked out. Diaphragmus, Spinifer, Levigata etc.

24 Aug 1952



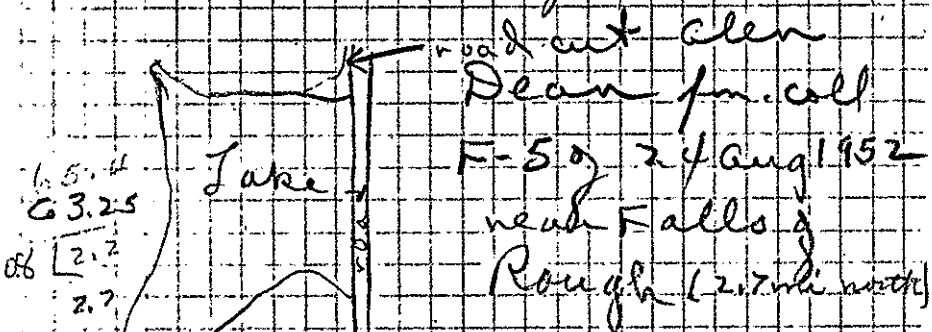
Drove to Hardinsburg for lunch. Drove south from Hardinsburg on 261 toward Glen Dean. Took left fork 6 miles north of Glen Dean



walked on east to check to make sure we were at Butts locality. Section rises to the east and the Talarocinus zone is at top of cut at bend of RR between semaphore and trestle. Collected F-2 of 24 Aug 1952 here but not poor. Butts exposure is at loc for F-1 of 24 Aug.

24 August 1952

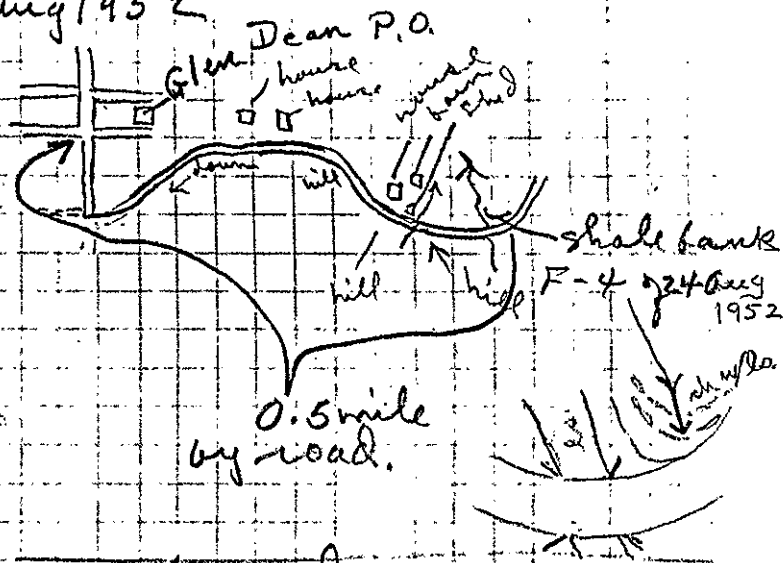
Drove south of Glen Dean on old R.R. Road  
 bed. 4 4 miles south  
 of Glen Dean came  
 to fresh shale exposure  
 at ne corner of a lake.



Drove on route to  
 Falls of Rough 2.7 miles.  
 Turned east on Ky 110 and  
 drove toward M.E. Donald.

Coll F-6 of 24 Aug 1952 from  
 residual soil around top

24 Aug 1952



Found exposure of  
 shale and limestone in  
 bar ditch 0.5 mile east  
 of Glen Dean, Col  
 F-4 of 24 Aug 1952 from  
 this cut *Prismopora*,  
*Phanocrinus* etc. All from  
 6'± above limestone in shale  
 at level of ls. lentils

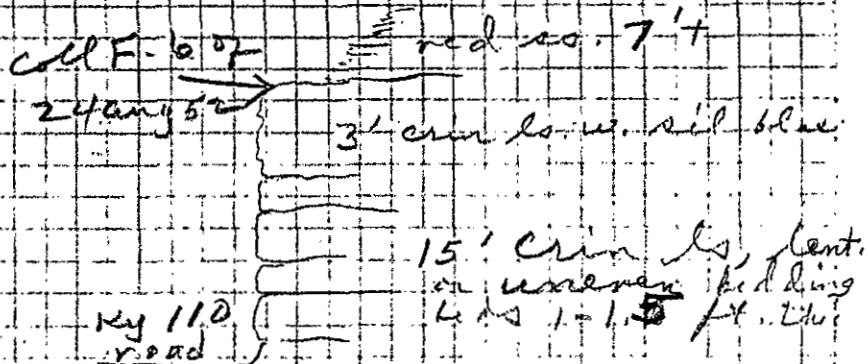
25 Aug 1952

Learned that more of the Brandenburg quarries were operating. The old ones in the town are grown over according to town's people.

Drove east and south on US 60 to Fort Knox, south on 31W to Elizabethtown. Drove east from Elizabethtown on US 62. Found quarry in "Warsaw" and Herrodsburg, operating quarry, along US 62 ~~but~~ miles south east of Elizabethtown Ky. Col. F-10 25 Aug 52 from weathered shales in top of quarry.

24 Aug 52

Limestone. Saw it below red sandstone in south road cut (much silicified material) 3.4 miles east of Falls of Rough on Ky 110. Simpson Co.



Last locality (F-6 of 24 Aug 1952) is 4.1 west Jct. US 65 and Ky 110.

Falls 3.4 x 4.1  
# of Rough (Ky 110) US 65

Drove to Brandenburg for the night.

$$\begin{array}{r} 9.3 \\ 7.4 \overline{) 8.7} \\ \underline{7.4} \phantom{0} \\ 1.3 \phantom{0} \end{array}$$

# Eliza bath house  
 38.3  
 6.7  
 7.4  
 9.3  
 0.6  
 1.0

Back 140

24 Aug 52  
 Limestone just below  
 sandstone in south road  
 cut (much silicified material)  
 3.4 miles east of Falls of  
 Rough on Ky 110 of Henderson

coll F-6 of red co. 7' +  
 24 Aug 52 → 3' crin ls. w. sil. blue  
 15' crin ls. blue  
 on weathered bed in  
 ledge 1-1.5 ft. thick  
 Ky 110 road

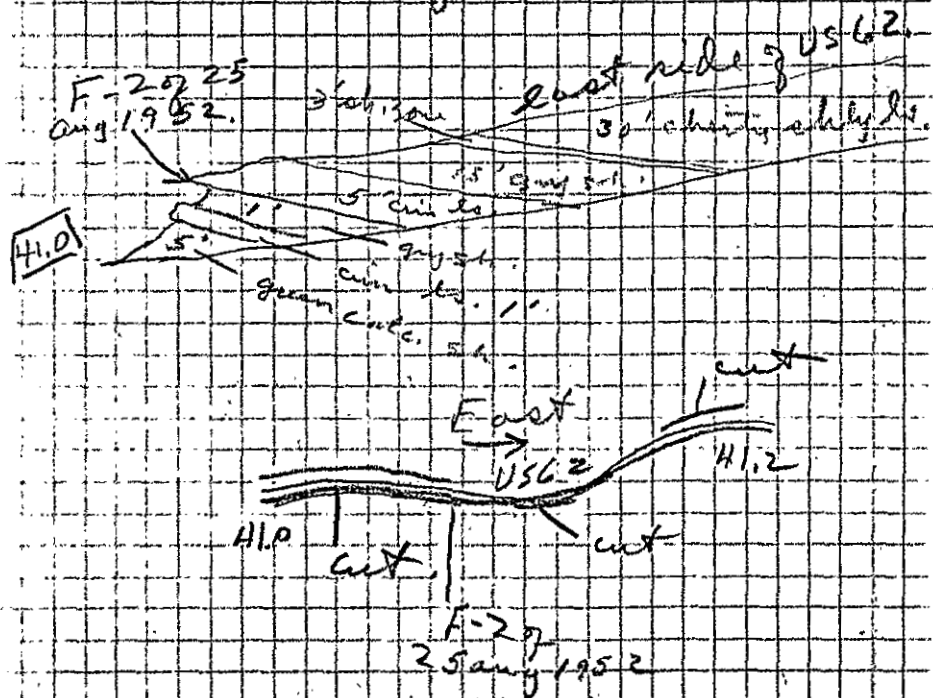
Last locality (F-6 of  
 24 Aug 1952) is 4.1 west  
 Jct. US 65 and Ky 110.

Falls 3.4 x 4.1  
 of Rough (Ky 110)

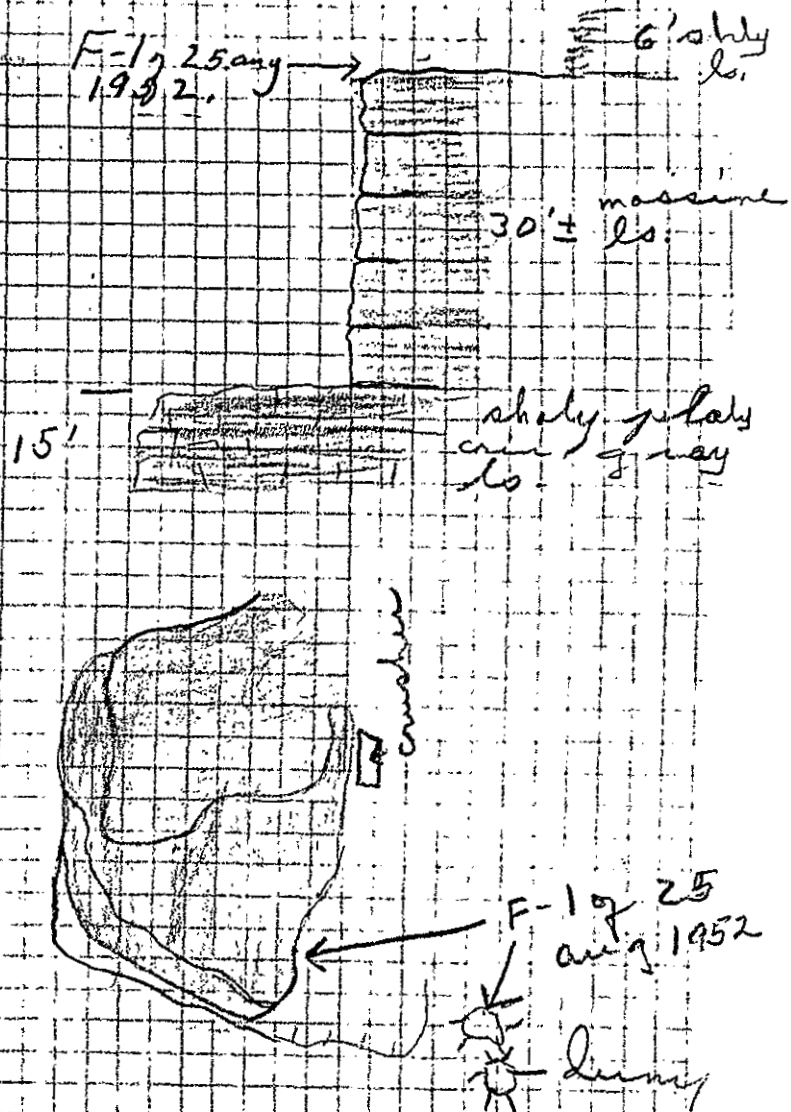
Drove to Brandenburg  
 139 for the night.

25 August 1952

Very good road cut  
12.6 miles east of Elizabeth  
town just west of (miles)  
from River. Coll  
F-2 of 25 August 1952 from  
base of crinoidal ls. at  
east end of cut.



25 Aug 1952

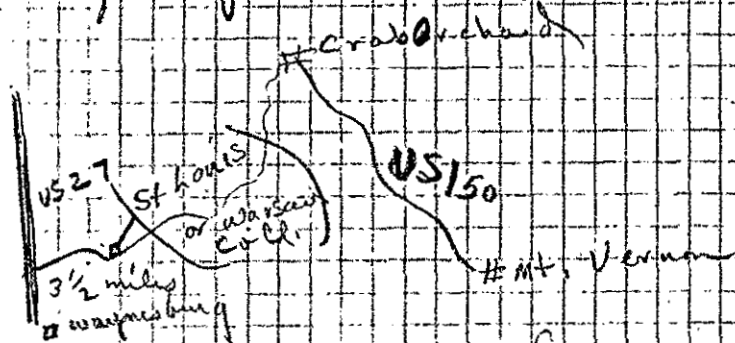




25 Aug 1952

Orchard, Ky.

Drove south west of Crab Orchard and then around toward south and west coming east on US 27 3 1/2 miles north of Waynesburg, Ky.

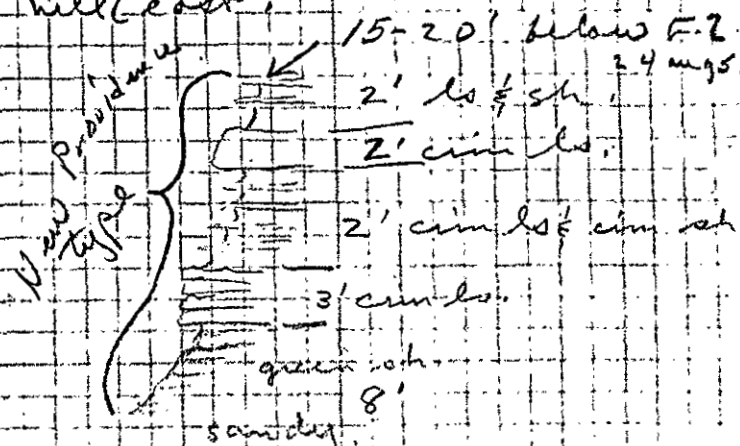


Drove to Motel north of Waynesburg for the night.

at *Eumorphosis* from Crab Tree

25 Aug 1952

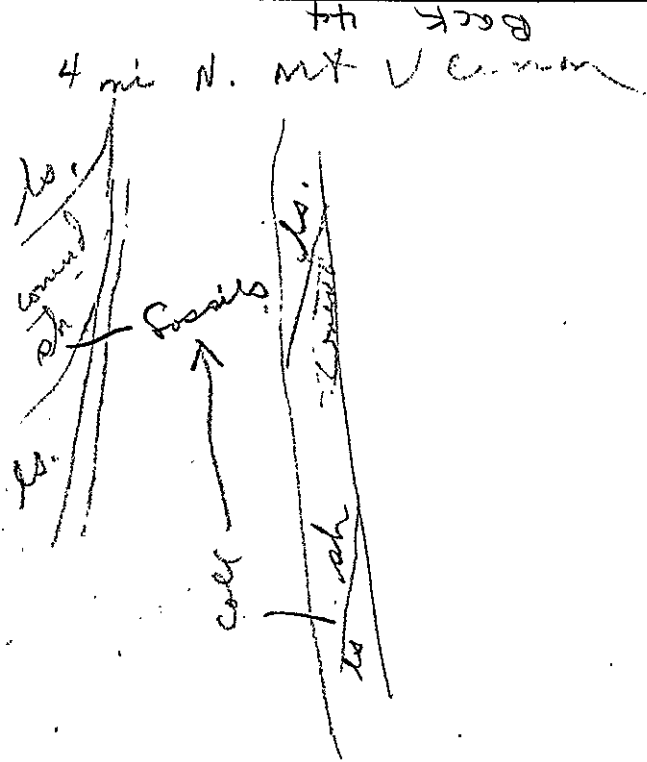
Stopped at next cut 200 yds. east.



Stopped at next cut, 0.1 mile east of first cut. This cut is gray green N.e. Providence crinoidal shale. Coll F-30 of 25 Aug 1952 from these shales.

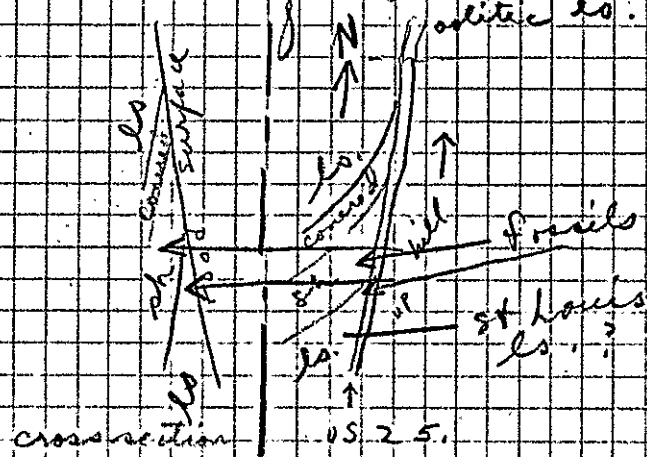
Drove via US 62 to Bardonia and U.S. 150 to Springfield Dannelle, Stanford to Crab

508.2 150 South  
N. 206 010.0,  
Jc + 09.4



26 Aug 1952

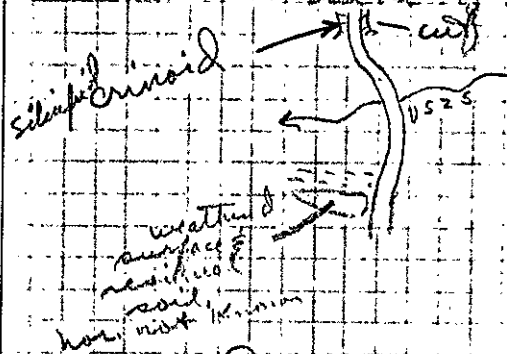
from St. Louis? zone with  
lithostratigraphic road cut  
on west side of U.S. 25 4  
miles north of Mt Vernon



Drone to Conway and west  
across country to Broadhead  
but did not find goniatite  
exposures. were unable to find  
the so called "St. Louis"  
locality in Rockcastle Co,  
near Crab orchard. Drone to  
Farmersburg for night.

26 Aug 1952

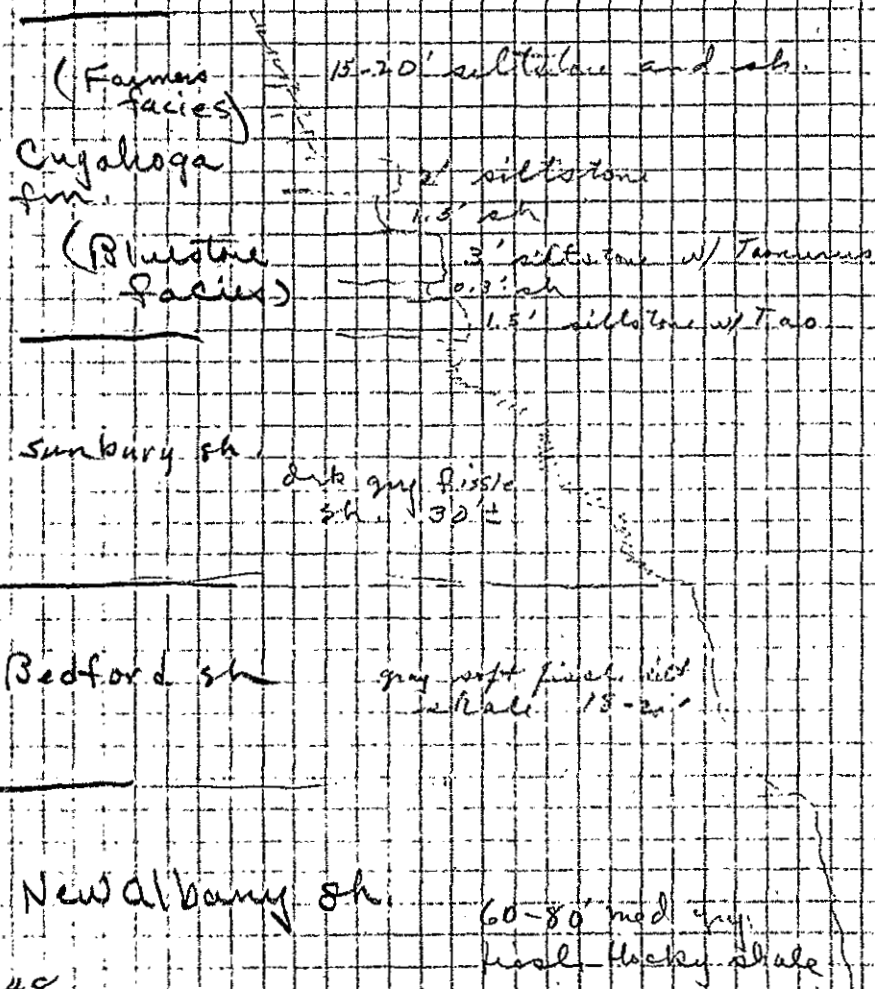
Drone se via US 27 from  
Waynesburg, Ky to Eubanks  
and east on Ky 70 to Broadhead  
Ky then via US 150 to Mt  
Vernon. Drone north on U.S.  
25 toward Conway, Ky. Found  
exposure of Upper Miss.  
at north edge of Mt. Vernon  
west side of US 25.



Drone north of Mt Vernon  
on US 25 to road cut 4 miles  
north of Mt. Vernon.  
Call silicified fossils

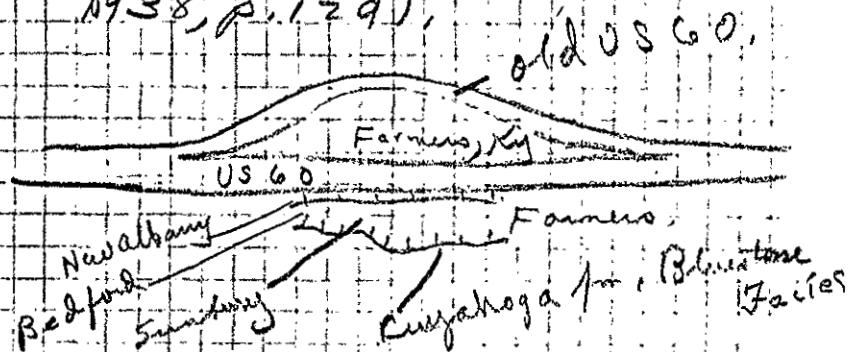
27 Aug. 1952

Rowan Co. Freestone X at  
Farmers, Ky. estimated section.



27 Aug. 1952

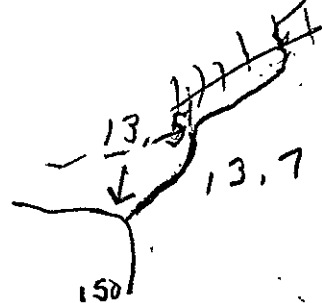
Drove to high road cut on  
U.S. 60 at Farmers, Ky. This  
is right thru section at  
quarry of Rowan County  
Freestone Company and adjacent  
hillside, at the village of  
Farmers, about 6 miles SW  
of Morehead (see, e.g., Stockdale  
1938, p. 129).



Estimated section on next page.  
*Taonurus* is abundant in basal  
siltstones of Cuyahoga fm. (Bluestone  
facies).  
No other fossils were seen.

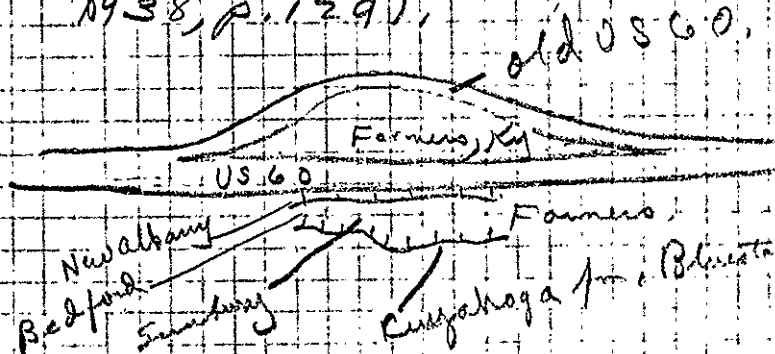
16.6 } Gap.

winds up  
east side  
of V. Aug.  
14.9



7.1 E (8)  
7.5 C  
L'8 C

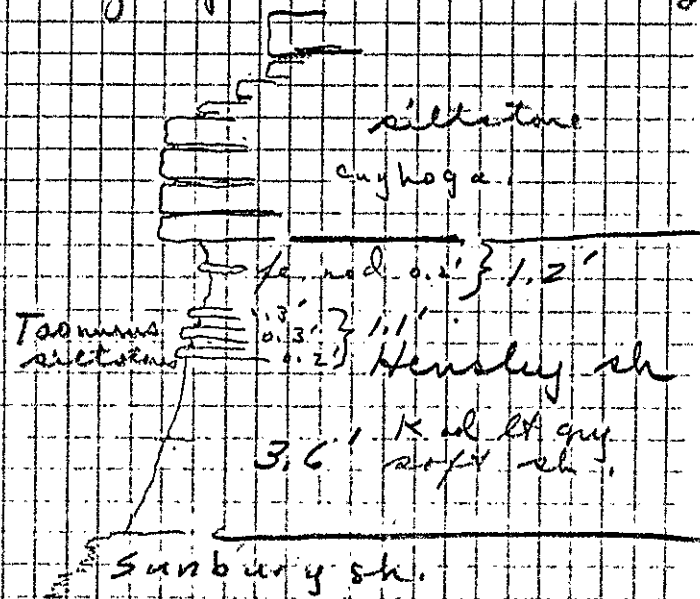
27 Aug 1952  
Drove to high road cut  
US 60 at Farmers, Ky. This  
is right thru section at  
quarry of Rowan County  
Freestone Company and adjacent  
hillside, at the village of  
Farmers, about 6 miles S of  
Morehead (sec. 61, Stock  
1938, p. 129), old US 60.



Estimated section on right p  
Taurus is abundant in basal  
strata of Cuyahoga fm. (Bluestone)  
no other fossils were seen

27 Aug 52

The Cuyahoga rested directly on the dark gray fissile shales of the Sunbury sh. At this point the Hinsley shale comes in between the Cuyahoga and the Sunbury.

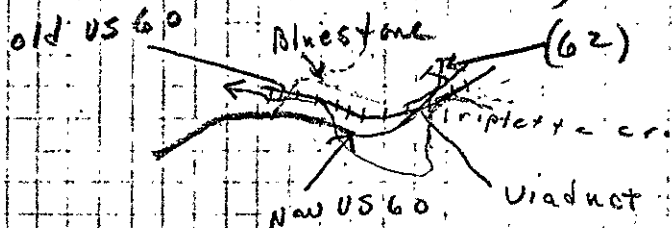


Drove north of Morehead on US 60 to Radburn then east up Christy Creek to first

27 Aug 1952

Drove east on US 60 to quarry just east of Free. Some of the same siltstone in Cuyahoga become predominant and thicker.

Drove east to quarry at Bluestone (62) section at quarry of Kentucky Bluestone Company and along US 60 a foot of hill below it, one fourth mile east of village of Bluestone, 4 miles south of Morehead (Stoll date, 1938, p. 12 old US 60).



At preceding two quarries the siltstones of

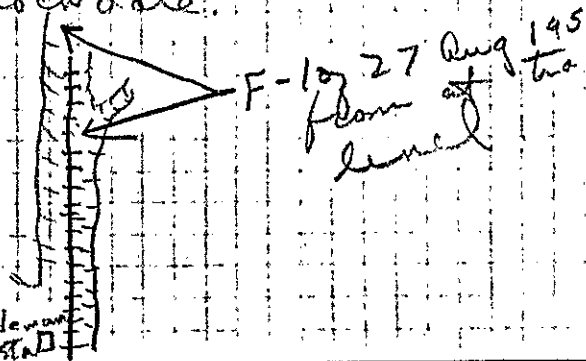
27 August 1952

Drove east on US 60,  
other exposures listed by  
Stockdale near Mt Olive  
were not visited, one we  
overshot and the next  
two were too grown over.

Drove east on US 60 to  
near Graydon where we  
had to detour north to  
north of Oakland to get  
with US 23. Drove US 23  
to Portsmouth and New  
Boston then Ohio 139  
to Jackson, Ohio for  
the night.

27 August 1952

road north approx. 1.5 mil  
east of Christie and drove north  
to Haldeman. Farmer told us  
of operating brick quarry 1 mile  
se of Haldeman. Drove to  
Haldeman for lunch. After  
lunch walked up the track,  
se from Haldeman R.R. sta  
Coll. F-1 of 27 Aug 1952 from  
Haldeman siltstone 75 yd  
se of R.R. sta <sup>at track line</sup>. These fossils  
are *Sedalia*-*North* and *Squid*  
and not high o-sage as thought  
by Stockdale.



29 August 1952

Drove to home of Mr. Perdue in Cumberland, Md. at 33 Virginia Ave. Joined by Mr. Perdue and Mr. Terry we drove south from Cumberland on West Virginia highway 28 to Springfield, W. Va.

toward Points  
W. Va. 28  
in Springfield  
W. Va.

In Springfield instead of following W. Va 28 on a right turn, take county road which goes straight east out of Springfield, W. Va. toward Points, W. Va. 3.9 miles east on Jersey Mt. there is a road cut and small quarry in the Romney (Hamilton part).

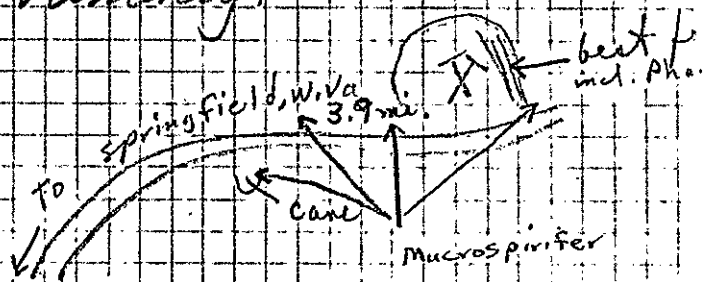
28 August 1952

Drove east from Jackson, Ohio on Ohio 124 to Pomeroy then northeast on Ohio 7 to Parkersburg, W. Va. Drove east on US 50 from Parkersburg to New Creek, West Va. then north to Cumberland on US 220. spent the night at New Falls Motel in Cumberland. Called Dr. H. Perdue and made arrangements to collect with him on following day.



29 Aug 1952

we stopped here and  
collected fossils from the  
Romney.



Drove to top of Jersey  
Mt for dinner. Bill Allen  
and I then drove on to  
Washington, D.C. Arriving  
in Alexandria at 1645  
on 29 Aug 1952.

End of Trip

Truck mileage 8181.5.

ITINERARY  
OF  
DEVONIAN COLLECTIONS OF NEW MEXICO  
ARTHUR L BOWSHER  
ACCOMPANIED BY COOPER AND DUTRO  
SEPT 12 - OCT 6, 1956

SEPTEMBER 1956

- 12-Bowsher flew from Washington, D C via Ft. Worth to El Paso. Visited L A Nelson and spent night in El Paso, Tx. The US Geological Survey had allowed Bowsher leave time in which to show Cooper and Dutro the significant Devonian localities in southern New Mexico. Bowsher had transferred from the USNM to the USGS in 1952. At this time he was working in the Naval Oil Unit in Washington, D C. Cooper and Dutro had begun the study of Devonian brachiopods of New Mexico (Devonian Brachiopods of New Mexico, 1982, Cooper, G Arthur and Dutro, J Thomas, Jr., Bulletins of American Paleontology, vols. 82 & 83, Number 315, Paleontologic Research Institute). Most of the U S Museum numbers in the notebooks of 1949, 1951, 1952 and 1956 are placed in the books by Cooper and Dutro. Most of their sections are taken from the notes of Bowsher 1949, 1951, 1952 and 1956.
- 13-Bowsher traveled by bus from El Paso to Alamogordo.
- 14-Waiting for Cooper and Dutro.
- 15-Received letter from Cooper; delayed because of illness. Cooper arrived from Nogales in the museum truck at 1900 hrs.
- 16-Cooper and Bowsher collected from the Onate and Sly Gap Fms. on the north wall of Indian Wells Canyon. Includes discussion of faunas at these localities.
- 17-Dutro arrived in midmorning in Alamogordo, NM.
- 18-Cooper, Dutro and Bowsher drove from Alamogordo to Silver City and drove north on 12th St to west slope of Bear Mountains to collect from the Percha, Box Member.
- 19-We three drove from Silver City to old Georgetown, NM. to collect the Box Member. Also collected Box Member 3-4 miles east on Santa Rita, N M copper pit, on highway.
- 20-Drove from Silver City to Hillsboro, N M in morning. Met Russo Flower and Gus Armstrong. All drove to Lake Valley, N M to collect from the Box member on the north slope of Apache Hill. Night at Hillsboro.
- 21-Collected 3/4 mile west of Kingston and drove to Hot Springs, N M for night. (Truth or Consequences).
- 22-Cooper, Dutro and Bowsher drove from Hot Springs to Rincon and north on old Engle Road to Taylor Tank, 1-T186-R3W. Measured section and collected from the Percha Box Member. Returned to Derry and west east to near Derry Hot Springs to collect
- 23-Drove north and west of Hot Springs and to the south end of the Mud Spring Mtn. Walked north and collected on the west slope of Mud Spring Mtn. from the Onate and the Sly Gap Fms.
- 24-Drove to Socorro and spent the day there.
- 25-Drove to Alamogordo and collected from the Onate and Sly Gap in Deadman Canyon of Alamo Canyon at the Laudon and Bowsher type section of the members of the Lake Valley Group.
- 26-Spent morning at White Sands Proving Grounds planning our schedule. Cooper, Dutro and Bowsher spent afternoon collecting in Indian Wells Canyon.

- 27-Cooper, Dutro, Flower and Bowsher visited San Andres Canyon, San Andres Mtn near the lead mine. Collected Onate, Sandstone, Sly Gap, ovelying sequence, and the Caballero Fms. Nite in Alamogordo.
- 28-Cooper, Dutro, Flower and Bowsher drove thru Tularosa and west along NM 52 to Pole Line road, 33 miles west of Tularosa. Into Ash Canyon, San Andres Mtns. Russo fell and I stayed with him; Cooper and Dutro measured and collected the Devonian sequence. Night spent in Alamogordo. Russo left for Socorro.
- 29-Relaxed in Alamogordo, N M.
- 30-Cooper, Dutro and Bowsher collected from the first canyon on the north side of Rhodes Canyon, San Andres Mtns. Measured and collected the Onates, and Sly Gap Fm. USNM 3054.

October 1956

- 1-Cooper, Dutro and Bowsher collected from Johnson Park Canyon, San Andres Mtns.
- 2-Cooper, Dutro and Bowsher collected from Capitol Peak, San Andres Mtns.
- 3-Missing, Pig Canyon, Sacramento Mtns.
- 4-Missing, Arcente Canyon, Sacramento Mtns.
- 5-Cooper, Dutro and Bowsher collected Sly Gap Fm. from the east side of Alamo Peak, Sacramento Mountains.
- 6-Cooper, Dutro and Bowsher collected Onate/Sly Gap Fm. from Dog Canyon, Sacramento Mountains.
- 7-Cooper and Dutro collected Sly Gap Fm. from Alamo Canyon, Sacramento Mtns. Bowsher spent day in Alamogordo.
- 8-Cooper, Dutro and Bowsher collected Sly Gap Fm. from Nigger Ed Canyon, Sacramento Mtns. Cooper took notes at this locality.
- 9-Cooper, Dutro and Bowsher collected from Canutillo Fm. in Vinton Canyon, Franklin Mtns. Spent the night in Alamogordo, N M.
- 10-Drove from Alamogordo to Los Alamos. Cooper, Dutro and Bowsher spent several days in the Santa Fe area with a young man from Los Alamos that had been sending Pennsylvanian material to Cooper at the US National Museum. After drove the truck to Washington, D. C.

END OF THE TRIP

- Notebook. Arthur L. Bowsher, assoc. Cur. U.S. National Museum. Trip to South central N.M.  
9/12 to 10/6/1956 w/ Cooper, G.A. Dutro, T.  
9/12/56 Left Washington D.C. on AA  
flt 637 to Ft. Worth at 1:00 PM.  
Arr. Ft. Worth @ 3:10 PM (CST)  
Left Ft. Worth on AA flt  
965 to El Paso at 3:20 PM  
(CST).  
Arr. El Paso @ 4:50 PM (MST)  
Stayed all night at Knox  
Hotel in El Paso, Tex.  
9/13/56 Visited L.A. Nelson on 9/13/56.  
Left El Paso on Greyhound  
Busline for Alamogordo, N.M.  
at 6:30 AM.  
Arr. Alamogordo, N.M. @ 8:30 PM.  
obtained room (#7<sup>th</sup>) at Alamo  
Court thru Ralph Smith, owner  
of Postmillers court for night  
of 9/13/56. Left note at PRR  
Sta for Cooper.  
9/14/56 Moved to Rm 20 Parkview  
Courts at 9:00 AM. Have double  
room (#2<sup>nd</sup>) so Cooper can  
join me today.  
Cooper did not arrive today.  
9/15/56 Rec'd letter from Cooper at  
10:00 A.M. He is delayed because  
of illness, will drive north with  
Dutro and arrive on 15<sup>th</sup>.

9/15/56 Called Russo & Lerner, his  
ill and can't join us yet, we  
will call him again when  
Cooper arrives. (\$1.80 for call)

called col. at White Sands  
proving grounds about seeing  
him to visit San Andres Mts.  
we will visit him Monday.

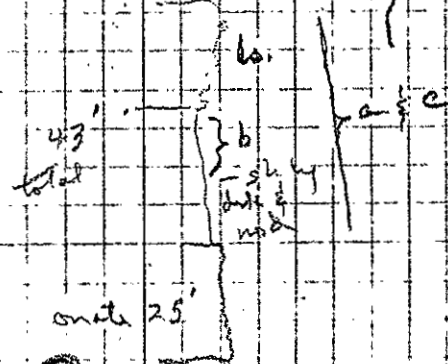
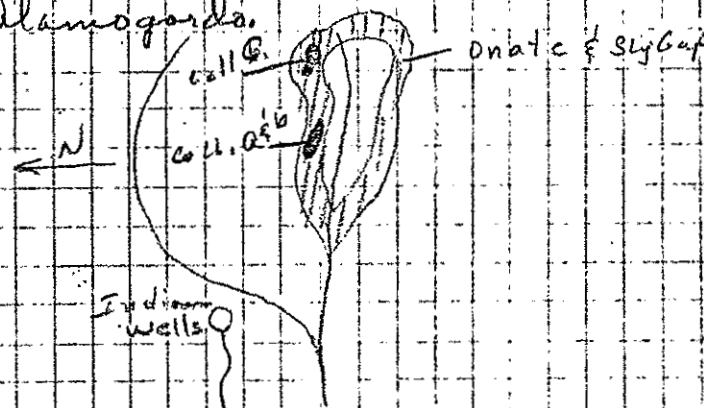
Cooper arrived from Nogales  
at 7:00 PM.

Dutro is to come to P.O.  
here at 10:00 AM Monday 9/17/56

(2)

Sept 16 1956 (Sunday)

H.A. Cooper and I left  
the Parkview Motel at 7:00  
AM and drove to Indian Wells  
Parking lot northeast of  
Alamogordo.



Wall A & C were  
put together at  
tourist court.

(3)

9/16/56

we agree on following

Sly Gap

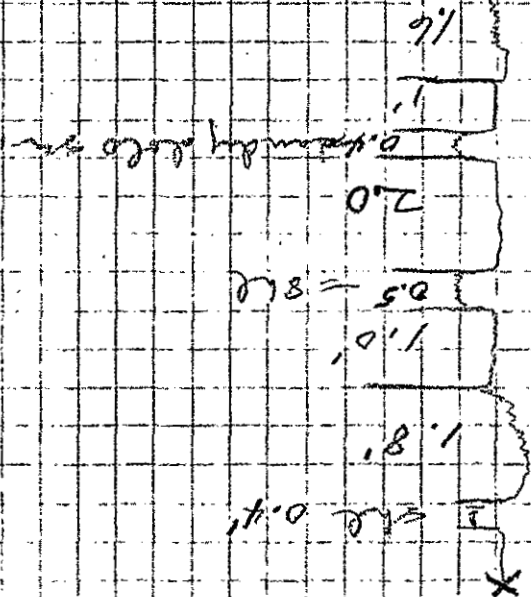
Nodular ls. and minor sh.  
dashed & nod. ls. interbedded

Onate

Dolomite

total 0.5 ft. Fussellman

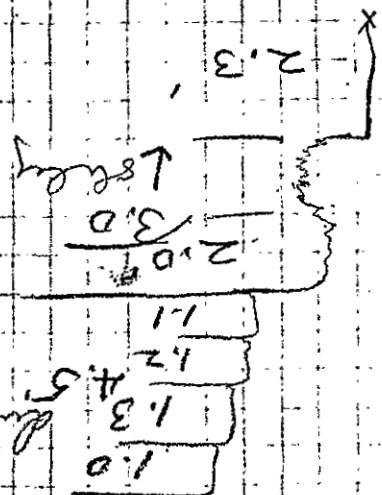
thin gray fossiliferous  
ocean dolomite and  
shale known to be 5 ft.



④

9/16/56

Drinking water



⑤

9/16/56

## Resume of trip to Indian Wells:

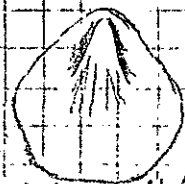
Cooper and I parked at Indian Wells parking area and crossed to next draw to the south. we went up this draw to east to approx. ~~3000~~<sup>500</sup> ft east of west line and 2000 ft south of north line of section 14 (nw/sw/na), T.16S, R.11E. Collected here from the whole of the Sly Gap. 200 ft. east we collected from the lower part 3 specimens. Then went on east to a point 1000 ft east of west line and 1900 ft south of north line of sec 14 (nw/sw/na) from whole Sly Gap.

## Onate Formation:

The Onate formation in the vicinity of Indian Wells Canyon consists of 2.5 feet of massive dolomite with a few thin beds of ~~at~~ dolomitic, blocky sandy shale. The whole sequence is medium gray and weathers to pale yellowish brown except for the top beds, 3 or 4 ft total, which weather to moderate brown. These top beds are conspicuous along the outcrop as they make a bench and because of their color. No fossils are present in the

9/16/56

lower and middle part of the formation. In the upper part sparse fusoidal structures are conspicuous. Near the upper part of the area examined a few <sup>intended</sup> casts of a brachiopod were found. This appears to be a Cleiothyridina like form. One is collected and returned to the museum although it probably is of no use. The Onate is here characterized by its massive, up to 2 or 3 ft thick, beds of sandy dolomite. Landrum and Bowsher have described these as siltstones in earlier papers.

Cleiothyridina?

from 2.2 ft above base of Onate.

## Sly Gap fm.

The Sly Gap formation in Indian Wells consists of two parts. The lower part 17 feet thick is interbedded and alternating medium gray, blocky, dolomitic, arenaceous silt shale and from 0.3 to 0.6 ft thick and lt. brn gray <sup>now</sup> nodular

⑥

⑦

9/16/56

dolomitic limestone beds. Few if any fossils are present in the shales but a few fossils are present in the limestone beds. These are cobbly beds and not ~~good~~ bedded limestones. This unit contains about 40% ~~dark~~ <sup>medium</sup> gray shale and 60% cobbly limestones. The fossils found in place are:

Arthroacanthus  
plates.

Pugnax

Calvinaria

All of the above are collection  
k.g. Indian Wells collection.  
They are from 12-14 ft above  
base of the Sly Gap fm.

⑧

9/16/56

This part of the Sly Gap is not  
markedly fossiliferous. The Pugnax  
appear to be confined to this lower  
part.

Sly Gap fm. (upper part).

The upper part of the Sly Gap  
in Indian Wells Canyon is <sup>moderately</sup>  
lt. brn., gray, sandy, dolomitic limestone  
separated by a few thin medium  
gray, dolomitic blocky, calcareous  
shale beds up to 0.4 ft. thick.  
Few fossils are present in the  
shale and most of the known  
Sly Gap fauna comes from  
these beds. These fossils roll  
down over the lower member  
here and it is not known which  
species are confined to the upper  
part and which to the lower part.  
Below are the fossils from the  
whole of the Sly Gap. Those  
that are certainly from the  
upper part are marked (U)  
and those from the lower (L).

Magee (U)

Atrypa (U)

fenestralis bygonia (U)

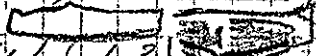
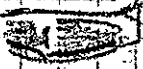


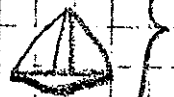



⑨



9/16/56



*Calymene* (L) (See on site)  
*Arthroacantha* (L) Poor  
*Flexibilia* (L)   
*Thurmanaria* (U & L?)   
*Strophodonta* (U)  
*Hyolithina emmardsi* (U & L)  
*Ephyra* (U)  
*Dinnia* (U)  
*Cariniferella* →   
*Hybomynchella*   
*Dinnia*   
*Nemistropia*   
*Dinnia*

*Atrypa* is rare  
 in the Sacramento  
 Mts. but abundant  
 in the Rhodes Can. area.

*Hybomynchella* occurs about  
 20 ft. to 25 ft. above the base  
 of the Sly Gap, 3 to 8 ft. above  
 base of upper Sly Gap unit.

(10)

9/18/56

Left Alamogordo at 800  
 hrs. Drove to Silver City,  
 arriving at 1215 hrs. Ate  
 lunch and went north  
 on 12th St. to Bear Mountain  
 I did not measure the section  
 but began at igneous sill at  
 base of the section and worked  
 up thru the section to look  
 for fossils.

Resume in office that night  
 The base of the Ready Pay  
 member is <sup>med gray</sup> ~~is~~ <sup>stone</sup> ~~stone~~  
 up to 6 ft thick (estimated) and  
 is overlain by a section (up to  
 25 ft est.) of gray shale with  
 lens plate like lenses up  
 to 1/4 inch thick. (Took picture  
 1. thru of whole Peicha and  
 of this section). Then into black  
 shale. Shales have plant remains  
 only poor. upward goes into  
 black silt shale with fe.  
 platy conc. upward into black  
 shale. about 75 ft up in  
 bl. sh. was lent zone of  
 phos. concretions, 15 ft higher  
 lens. of siltstone up to 0.1 ft.  
 30 ft higher into green  
 silt shale which becomes

(11)

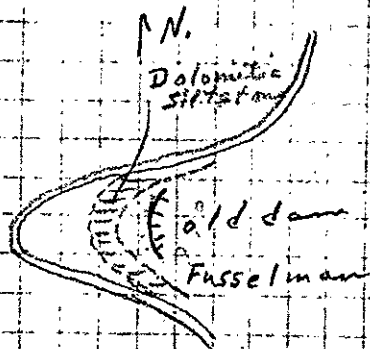
9/18/56

blocky upward and nodules  
of dol. sdy ls. become more  
abundant upward. Found  
Chonetes about 15 ft into  
this green zone, above  
limestone nodules are abundant  
and Cyrtospirifer, Pugnax, and  
Corals are present but rare.  
Fauna comes in abundant  
above green sh at base of the  
cobbly limestone.

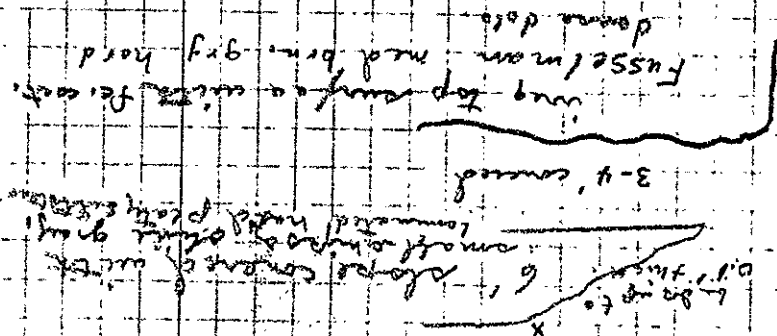
(12)

9/19/56

Left Clark County and  
followed highway 26.0 east  
to 18.0 then east to Santa Rita.  
Turned north on old Georgetown  
road. Drove north to old  
Georgetown.



Just above the massive dolomite  
of the Fusselman is dolomite  
at base of Ready Pay mem.

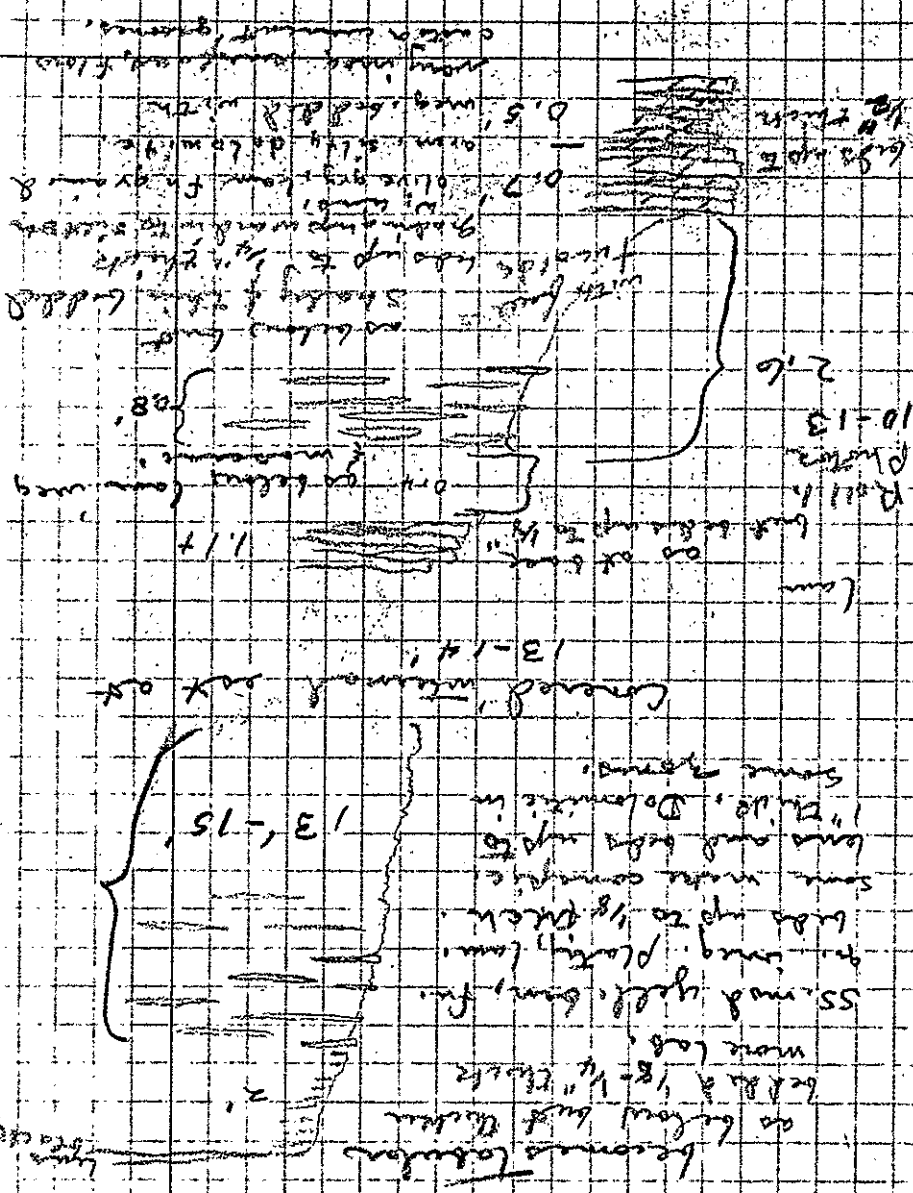


13

36-30' gr. sh. & sand in 68.5 ft  
 5 Shales up to 10' gray sh.  
 6' no ss below but beds up to 1/2"

Chimed through about 120  
 feet (est) dark gray shale.  
 In bottom part found re  
 fer. cast. May be float. coll  
 9/a 19/56.

at top the black shale  
 changes abruptly to green  
 sandy sh. 20' above base  
 of green sh. were Chert.  
 coll 19 b (9/19/56) of these



9/19/56

About 35 feet up in  
green sh. begin lime  
nodules. 8 ft. of nod.  
then into cobbly ls.

Ate lunch at Santa  
Rita. Visited section  
3-4 miles E. of Santa Rita  
in P.M. collected Pandora.  
Section of Pandora here is  
similar to Bear Mtn and  
Georgetown. The green sh.  
is only about 30 <sup>no chert</sup> ft. There  
is only about 8 ft. of green  
sh w/ nodules below first  
cobbly ledge. Thinner than  
at other two localities.

9/20/56

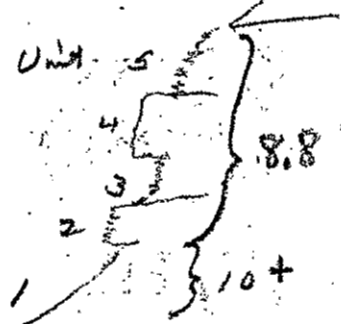
Drove from Silver  
City to Hillsboro in morning  
met Russo & Jensen and  
Cous Armstrong at Hillsboro.  
Went to Lake Valley  
right away. Contact of  
Black shale and green  
at Lake Valley is same  
as in Silver City area.  
I believe if the exposures  
were larger there would  
be cobbly limestone here  
too in the Box member.  
Collected here from Nunn  
member all day. Spent night at  
Hillsboro.

9/21/56

exposures of Pescha 3/4 mile west of Kingston. Here the Black shale was at least 25 feet of med. - gray shaly siltstone at the base, in fossils found Lingula and Chonetes in upper part of black sh, approx 25 ft below the base of the green siltstone of the Box mine. Drove to Hot Springs, Acc Hotel at north end of town, in the afternoon.

Spirifer  
coll of Cooper

$13 \times 5.8 - 3 = 75.3 = 72'$   
unit 6 Black Sh.

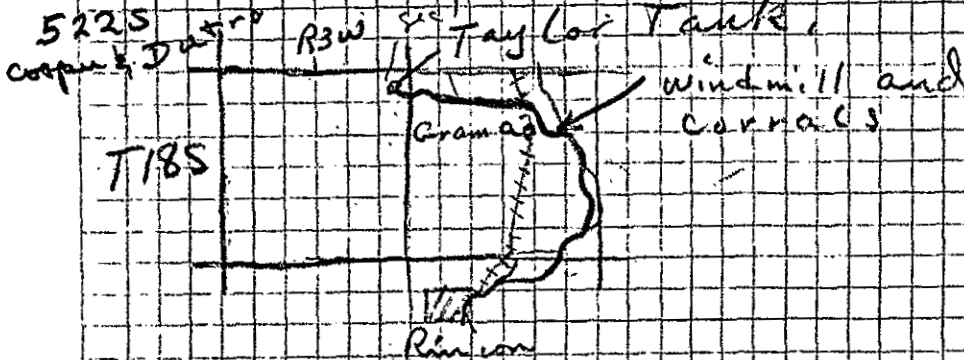


148 ft. total.

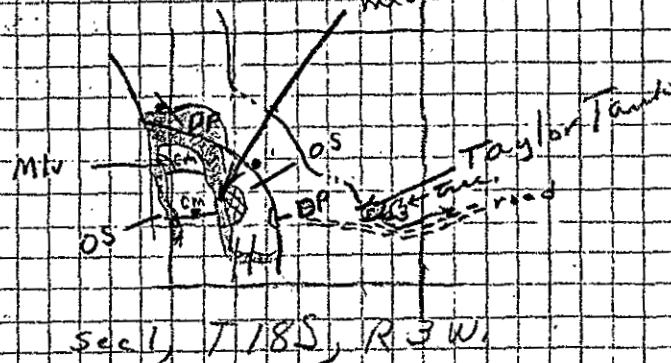
Back 21

9/22/56

Road from Rincon to  
Taylor Tank in sec. 1,  
T18S, R3W.



Details of outcrop.  
measured section



20

9/22/56

Drove from Hot Springs  
to Rincon then north on old  
Engle road to  
Here turned to west at windmill  
and corral. Drove west  $\frac{3}{4}$   
miles then took right fork.  
Followed NW to R.R. then follow  
main trail to Taylor Tank.  
walked due west to hills.  
cen  $\frac{1}{2}$  sec 1, T18S, R3W.

Percha

measured section as follows

Base not seen because of cover

Unit 1 {  
{ 10' + (part. 15') shale, mott.  
{ bluish bedded, yellowish orange,  
{ calcareous, weathering to  
{ pinkish red w/ fossiliferous  
beds

Unit 2 {  
{ 3' - 4' (part. 15') shale, mott.  
{ bluish bedded, yellowish orange,  
{ calcareous, weathering to  
{ pinkish red w/ fossiliferous  
beds

3'

See Cooper & Duro  
p. 133  
514607

Top of Taylor Fork section  
 Above the sandstone appears  
 to be Pennsylvanian too  
 transition by 9 feet of red ss.

(Cooper thinks this is Devonian)

Unit 8.  
 Sandstone, fine grained, sandy.  
 grad. upward.  
 into ledge 0.3 ft thick,  
 5' x 5' = 290  
 (I believe this is Andreno)  
 Cooper wd. splitter from base of part.

Shaly, blocky, pale, calcareous  
 becomes more sandy upward.

$$3 \times 5.8 + 2' = 17.4 + 2 = 19'$$

Unit 7.  
 Shale, up to 10' thick.

Unit 6.  
 Traverse 4 170 @ 5 yds.  
 13 x 5.8 Shale, fissile, dark  
 gray, clay sh.

Unit 5  
 grad. upward into shaly  
 green clay sh.  
 1.4 ft. as unit 3.

Unit 4  
 0.8 as unit 3 but into thin  
 Pale brown

Unit 3.  
 1' Shaly thin bedded

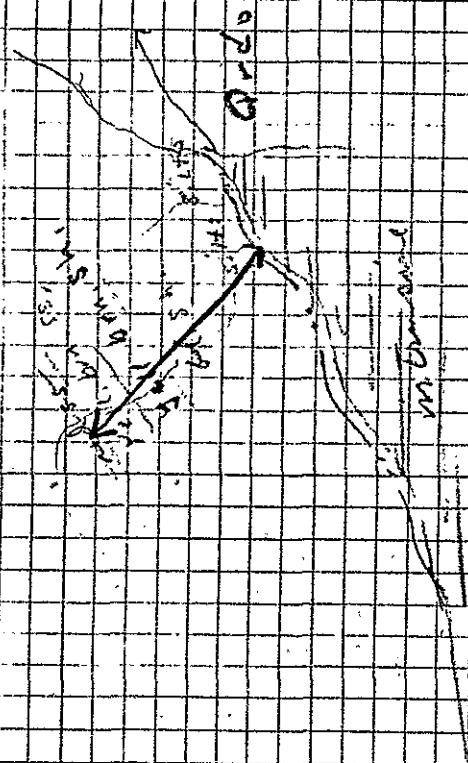
lt, orange gray ss, thin bedded

Pale brown.

Unit 2.  
 Collected woodrat sample  
 236 ft above base, coll. from ss.

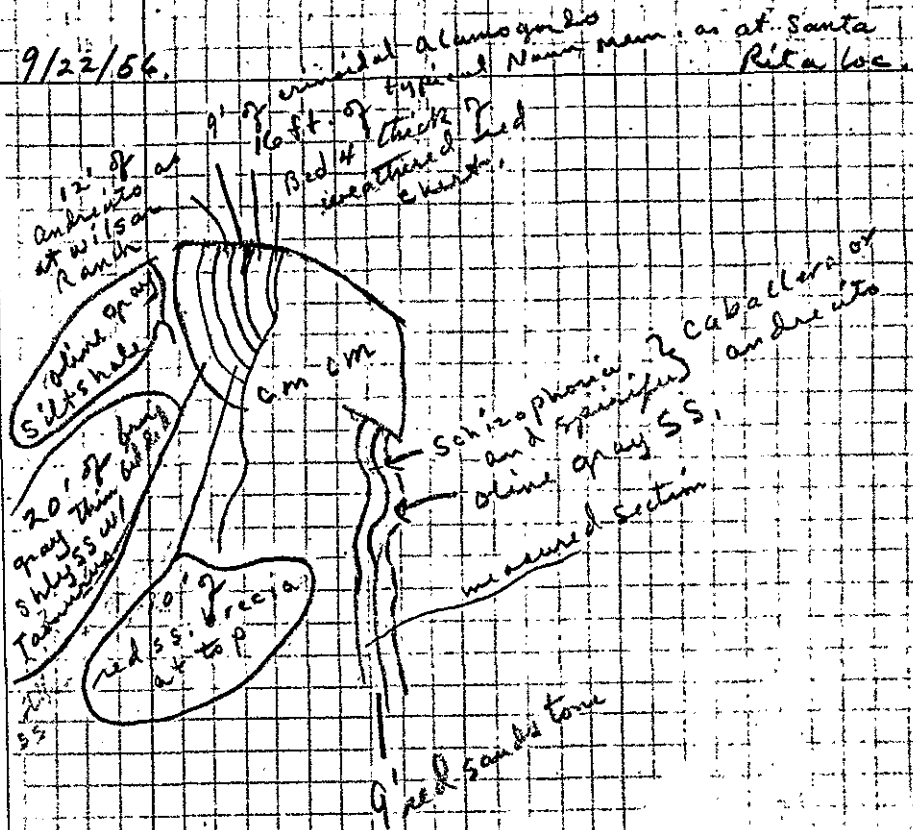


9/22/56



24

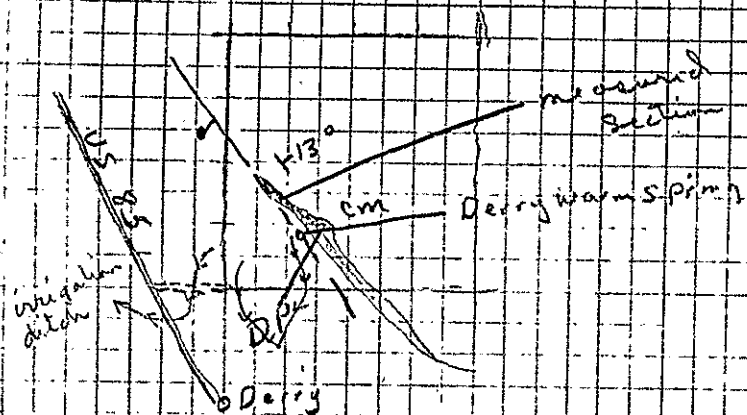
9/22/56.



25



9/22/56



Section 29, T17S, R4W.

See Kelly and Silvers, v. 07

N. Mex. Publ. in Geol. No 4,  
Pl. 2,

Cooper  $\frac{1}{7}$  Dutro, 1982, p 133

523 a  
private

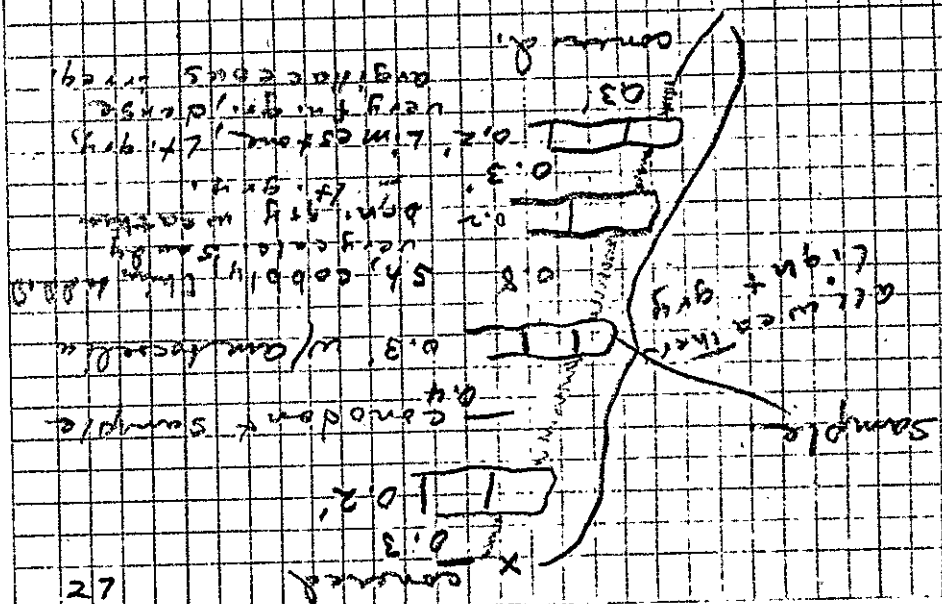
26

9/22/56

9/22/56 Returned to Derry and  
went east of Derry to slope  
near Derry Hot Springs.

Following section is measured there.

Basal part of the section is not exposed. The thickness of the exposed part is not known.



27

lam. lt. gray  
and choc. brn.  
very shaly ss.

bedding up to  $\frac{1}{2}$  inch  
reddish brn. weathering

and lt. brownish  
pale brn. fm.  
ss.

2/10'

becomes  
sandy 1/6'

from

13'

sh. becomes  
lt. brown gray

5.0'

shale dark brownish gray,  
fossil weather dark gray,  
with thin stringers up to  $\frac{1}{2}$ " thick  
of lt. brn. gray lam siltstone.

concreted 4'  $\pm$

sh. as belows

2.6

shale lt. olive gray  $\frac{1}{2}$ "

paper thin

0.6'

olive gray

lt. gray, blocky

1.0'

siltstone

martined, Pugnate

atry pr.

1.0' shaly

10 sh. as belows

as below w/ lime nod  
cobbly.

0.4'

0.5' lt. gray, thin bedded,  
silt sh. a crin. col.

Appears to be  
shale, light gray,  
thin bedded, silty  
gyps & yes. laminated  
pale brownish or pinkish  
part dug in this

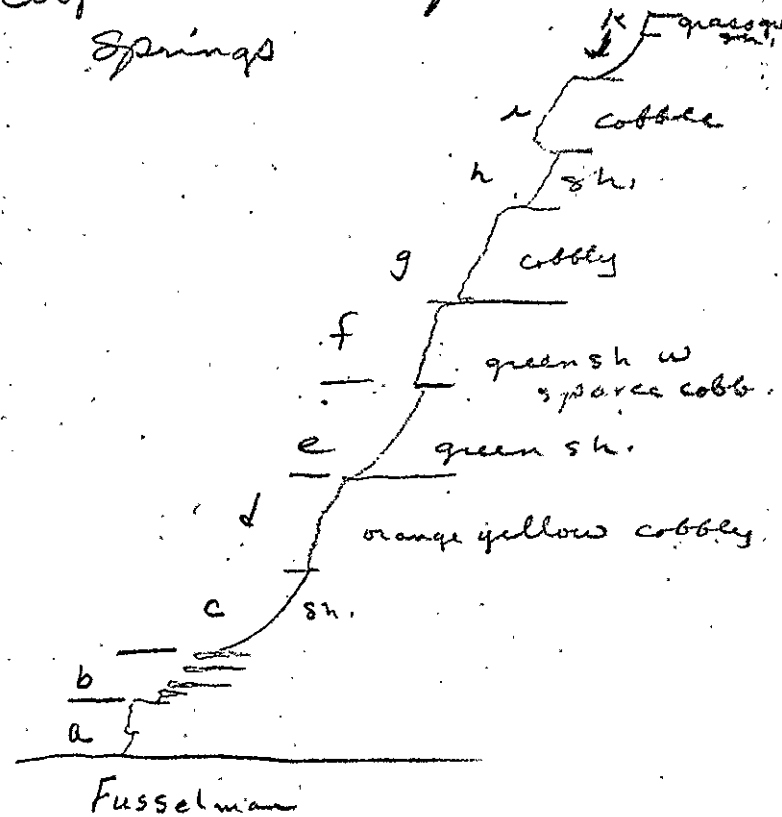
concreted 11'

remains  
 of Pennsylvanian  
 fossils common  
 in ss. & sh.  
 17' bluish gray  
 ss. & sh.  
 6' bluish gray  
 ss. & sh.  
 17' bluish gray  
 ss. & sh.  
 6' bluish gray  
 ss. & sh.

6'

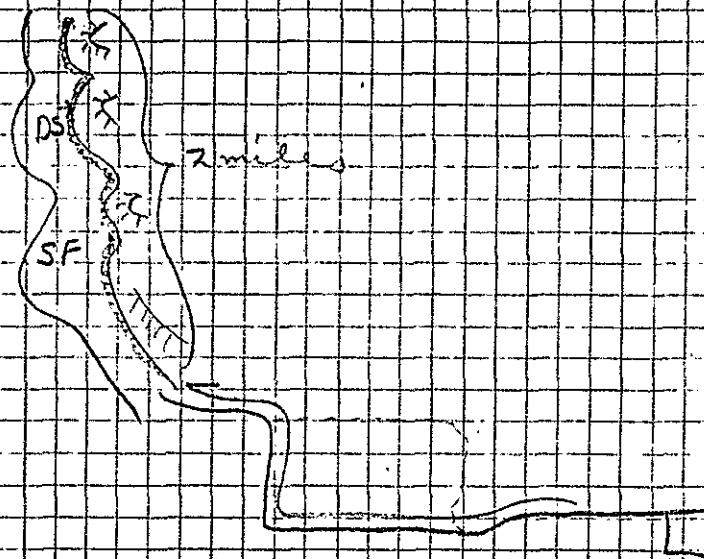
At unconformity at top  
 of section found Penns.  
 fossils in cobbly gray bed.  
 This is in channel 4-6'  
 deep into lt. bluish gray  
 ss. at top of section

# Coopers units for Mud Springs



9/23/56

Sketch from 22 July 1952

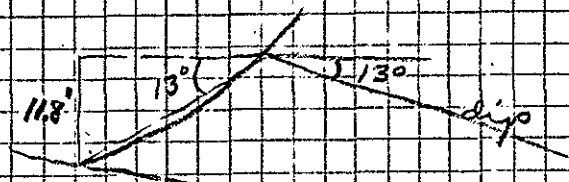


water tank

9/23/56.

Drove west of Hot Springs to south end of Mtns. Collected as we walked north to Den exposure. Found Martindale at highest saddle.

(a)



(b)  $4 \times (5.8 \text{ at } 13^\circ) = 1 \text{ ft}$

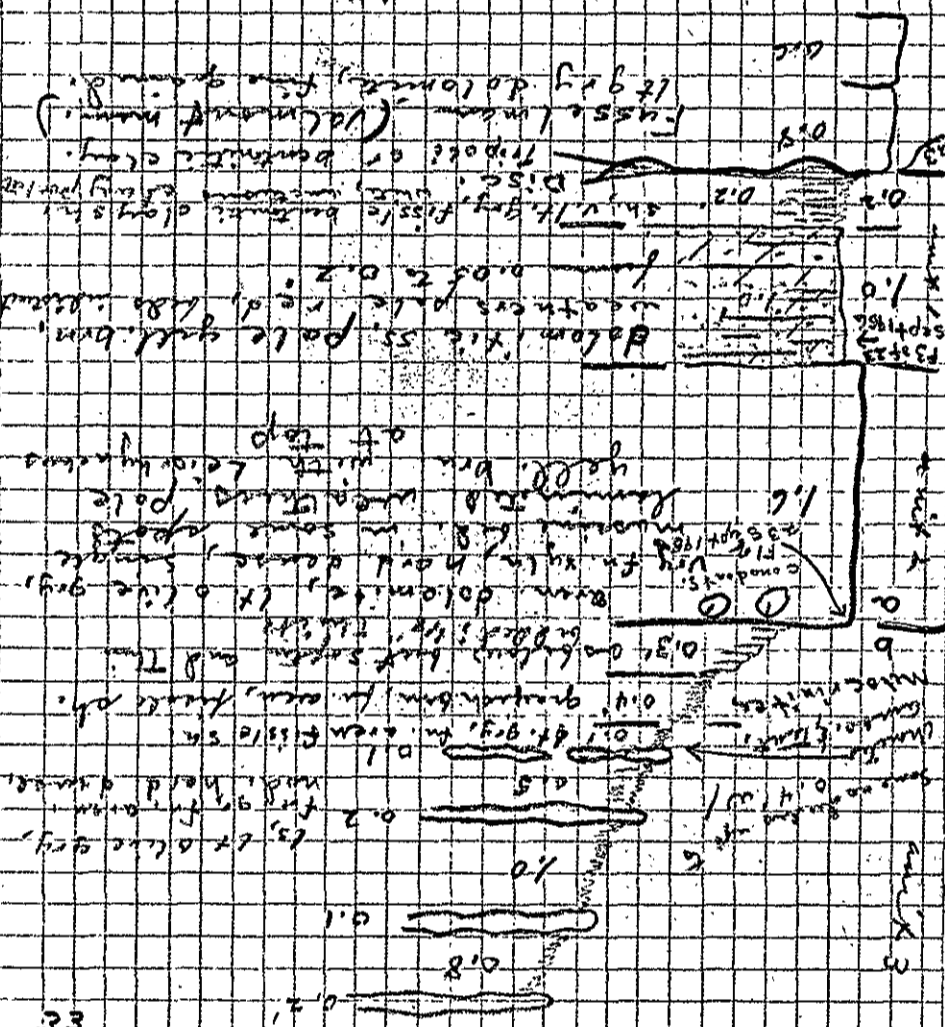
Stratigraphic

Graphic sol. for (a)  
= 24 ft. level for Martindale  
in place in section

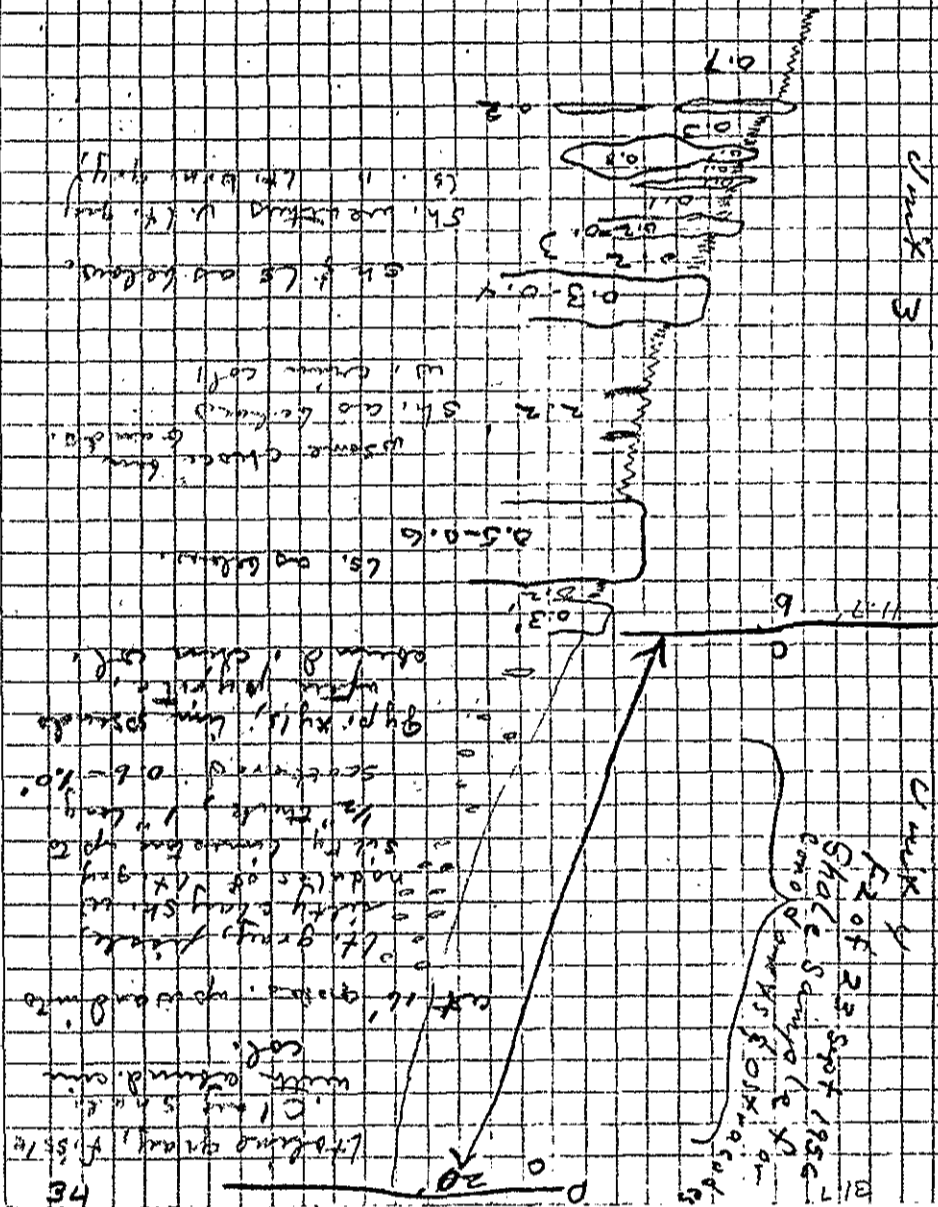
Went on north to Stevenson's exposure.

9/23/56.

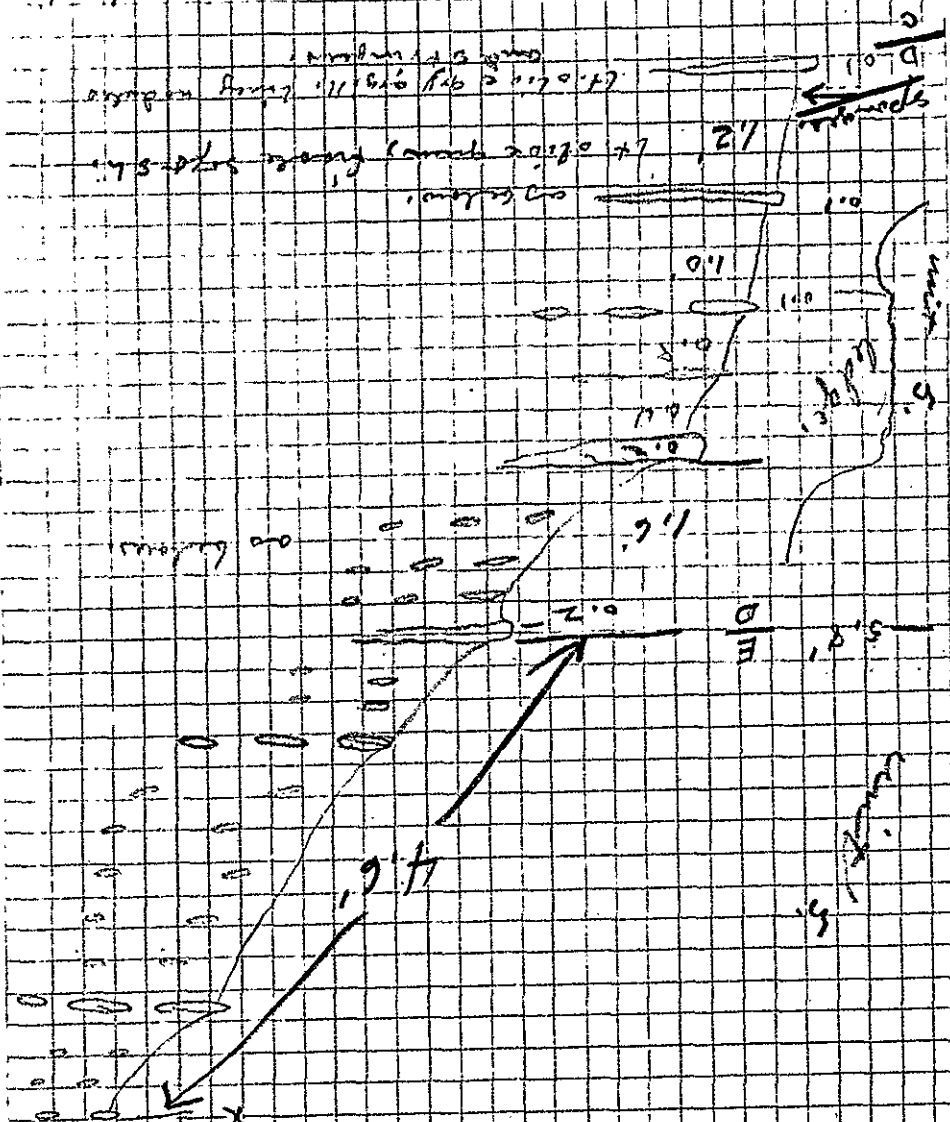
Following section measured  
at north end of Mud Springs  
Mtn. (approx.)



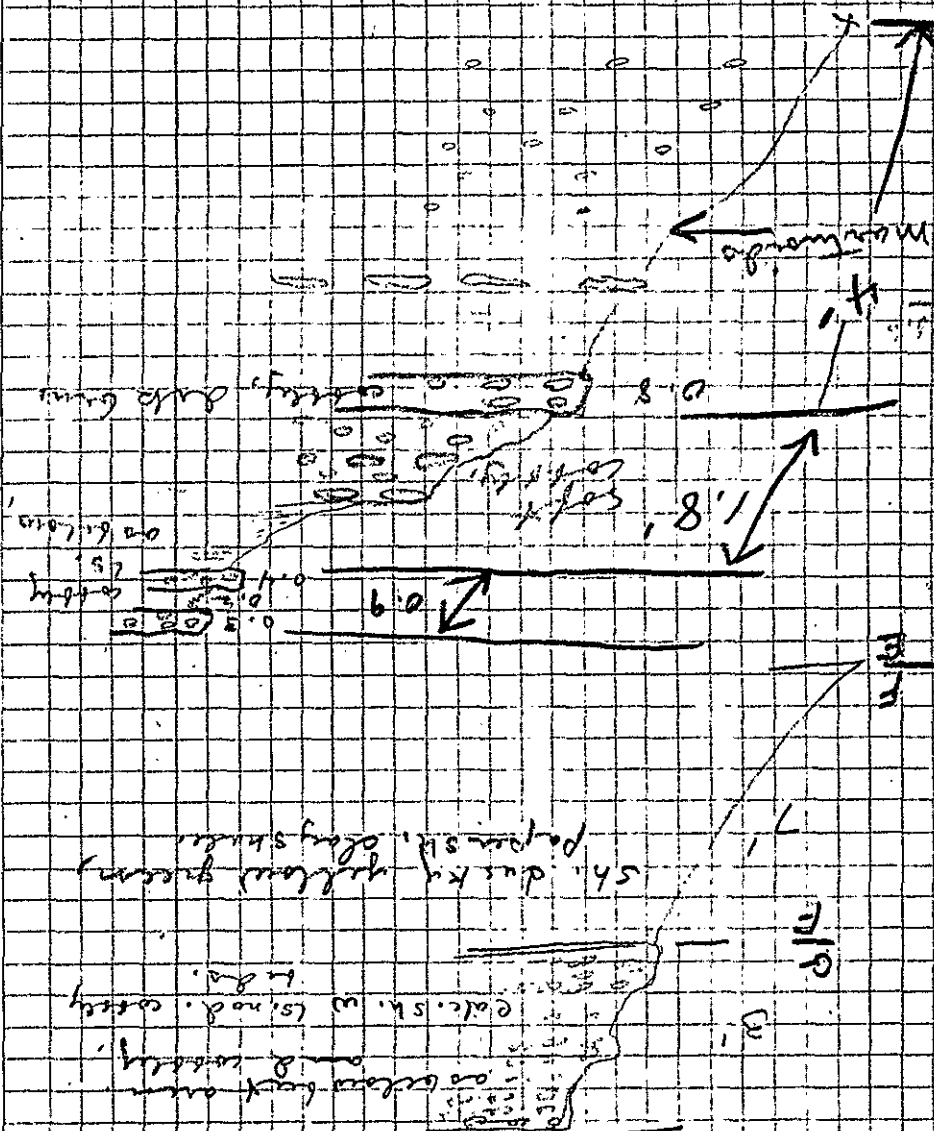
9/23/56



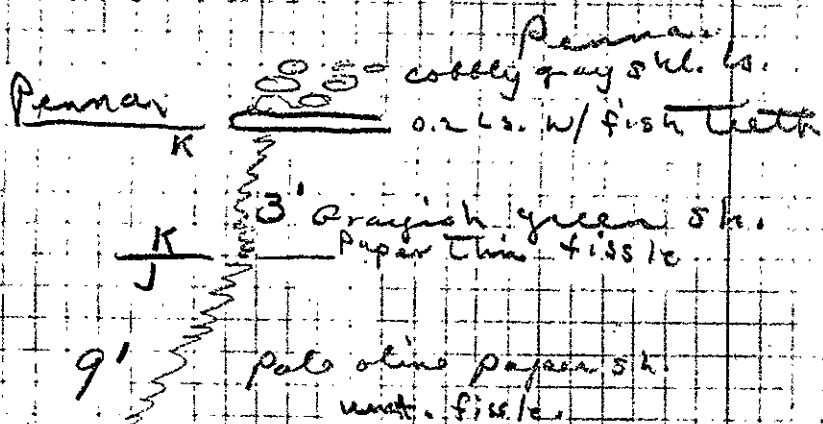
35



36

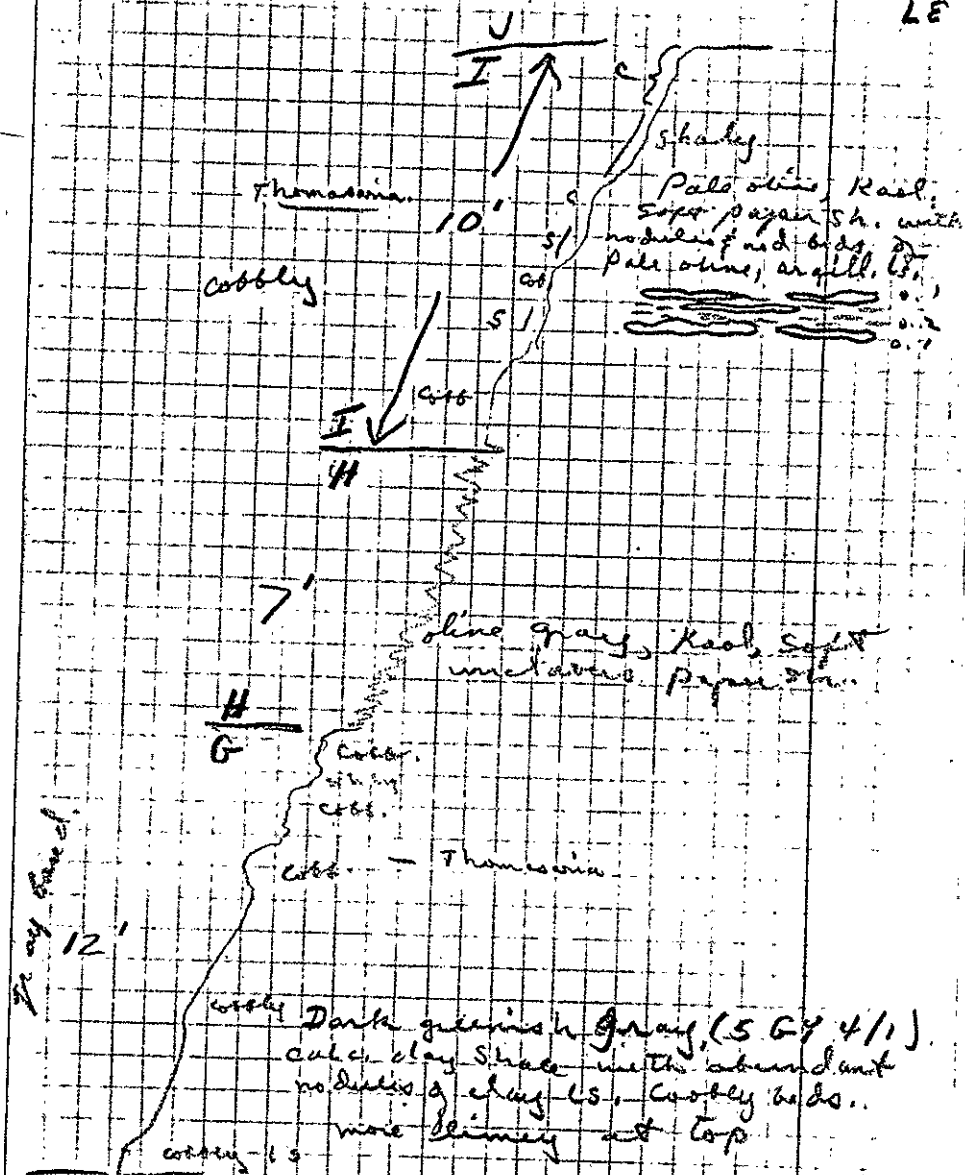


SE



99/27/6

LE



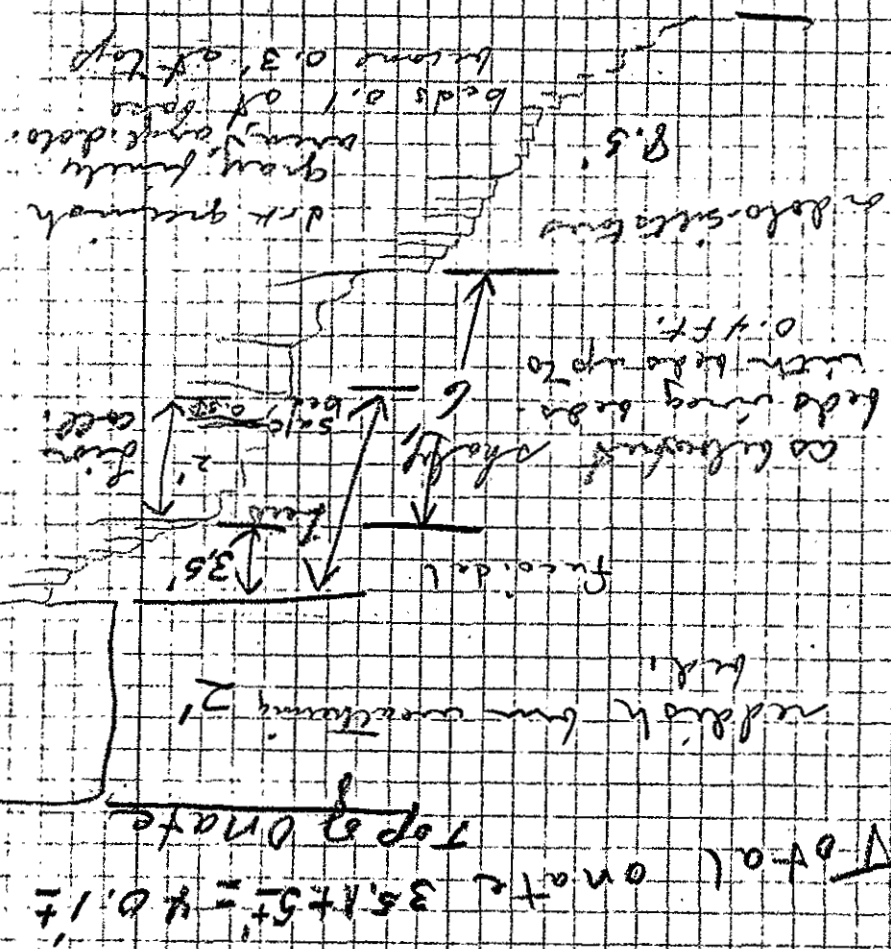
99/27/6





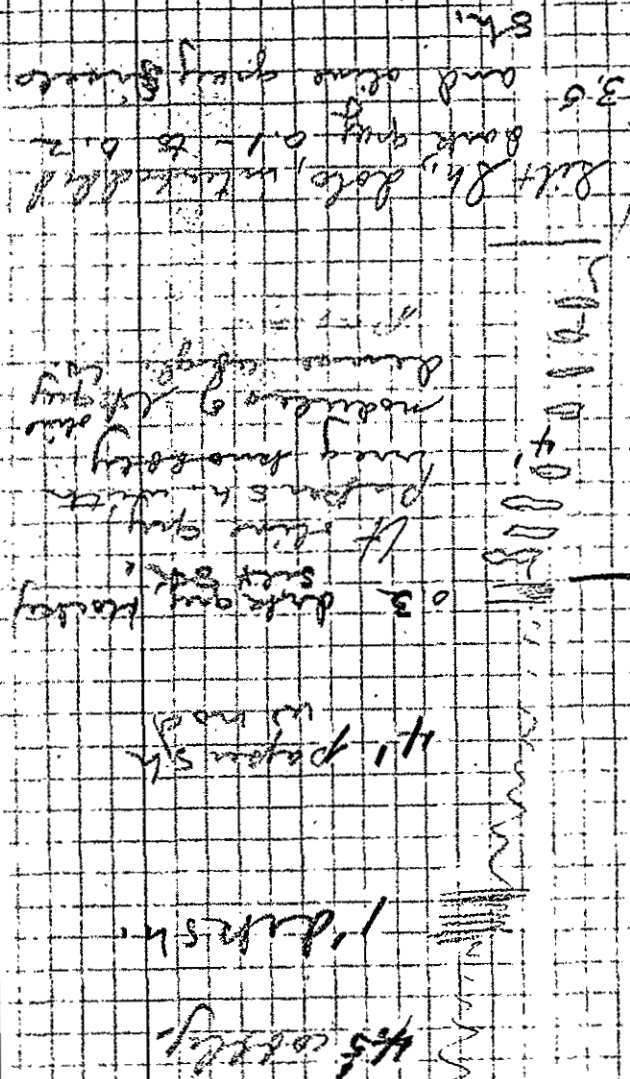


9/25/56



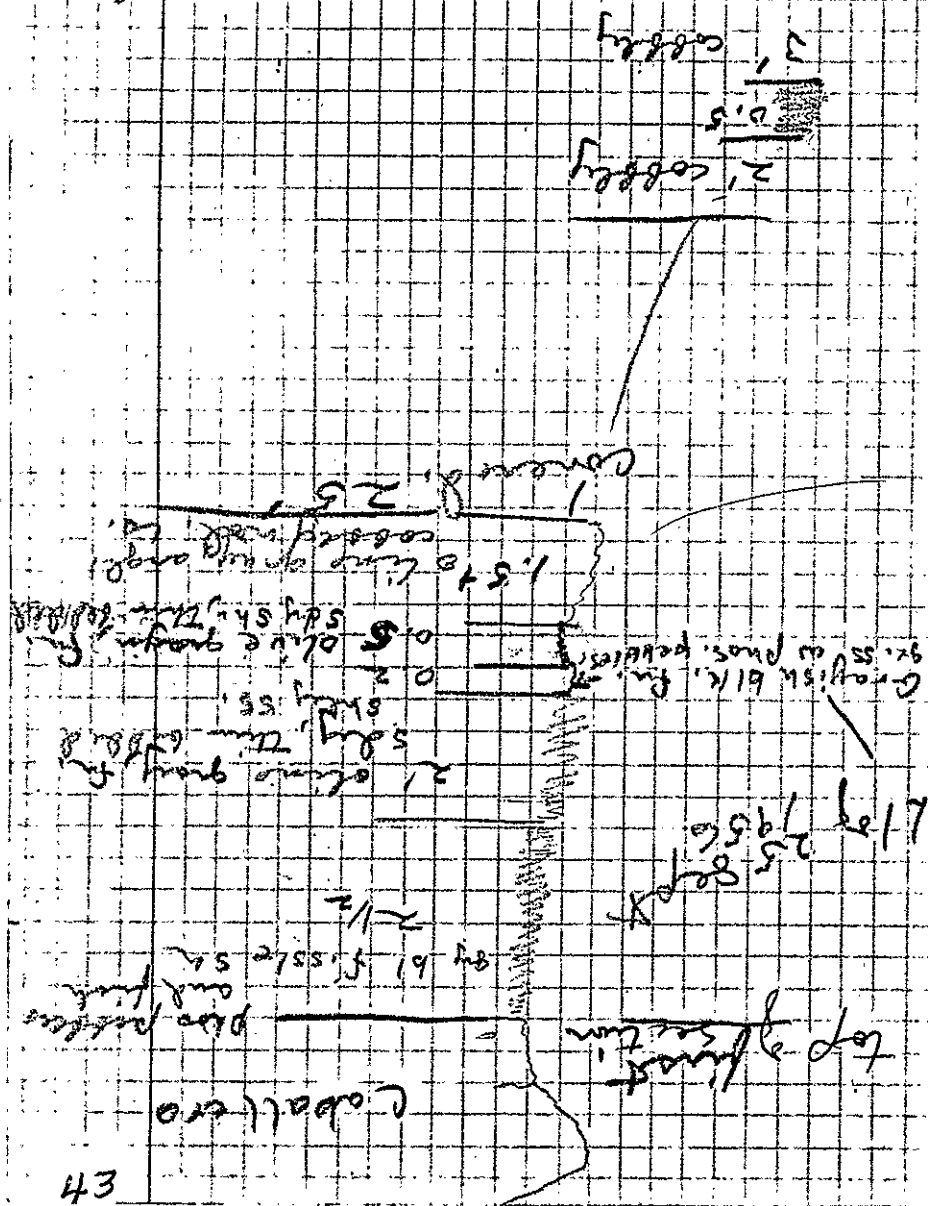
41

9/25/56



42

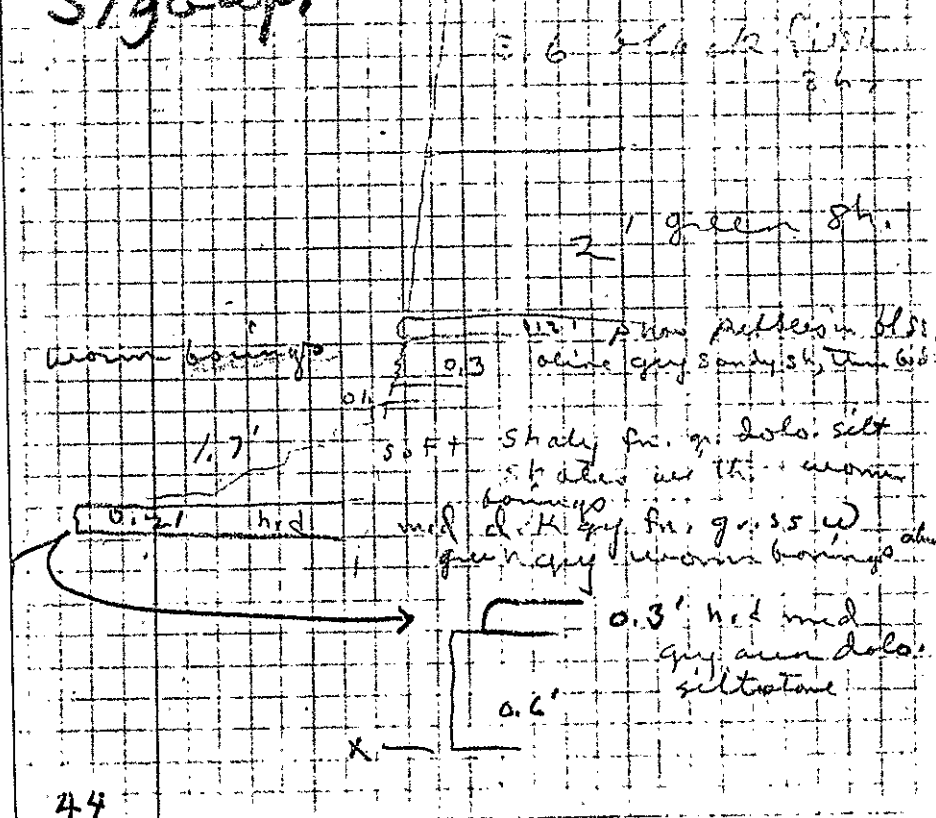
9/25/56



9/25/56

50 went north 100 yds then  
east to base of Cuballero  
to measure down from Estrella  
into Sly Gap to get part of  
Sly Gap covered in section on  
preceding pages.

5/9 Cap.



9/25/56

X

0.1' olive gray, thin bedded  
shaly ls.

0.4' cobbly lt olive gray ls.

0.2' lt olive gray sh.

0.7' cobbly lt gray ls.

0.3' lt olive gray sh.

0.4' cobbly ls.

0.2'

1' soft calc. lt olive  
gray sh.

0.2'

0.4'

0.1'

0.4'

0.4'

2.8' soft cobbly ls.

0.1' nod dk  
0.2' gray dense  
ls.

0.4'

0.3'

0.2'

0.3'

0.2'

soft cobbly.

weather  
bluish  
gray sh.

olive gray sh.

X

45

9/25/56

X

0.1' soft, sdy olive gray sh.

0.5' ls as above

0.2' calc. lt gray sh.

20.6' from section  
top

0.5' calc. lt gray sh.

F17.25  
Sept 25, 56

L20.25

Sept 17, 56

weather  
shaly

2.6'

0.1' calc. lt gray sh. some  
fossils  
blackish, sdy, grad. w.  
downward into blackish then  
shaly then aren. sh.  
at base becomes lighter  
in color at base.

0.4'

rusty brown fine sh.

0.2'

cobbly lt gray ls.

0.4'

med. gray sh.

0.3'

brng. - cobbly ls.

0.2'

yell. gray silty sh.

0.2'

ls.

odd  
salmon  
pugnate

0.4'

yell. gray silty sh. w/ lime  
pebbles.

0.1'

ls. w many pebbles, cobbly ls. 9' thick  
in sandy, pebbly shales.

Sh 0.1-0.4'

3 1/2'

cobbly some

1'

olive gray sh. thin  
sh. w. wood borings  
and plant frag.

1.1' cobbly.

46

X

9/25/56

3' of olive green paper  
sh.

covered.

9/26/56

sun andalous Can.

Type Data  $32^{\circ}44'$   $106^{\circ}35'$   
on Bear Peak Mt.

Best access between

$32^{\circ}57'$  and  $33^{\circ}10'$

along  $106^{\circ}36'$  (Black Top Mt  
Taylor)

$33^{\circ}12' - 106^{\circ}37'$

Rhodes Canyon (Black Top Mt)

Sheep Mtn ( $33^{\circ}20' - 106^{\circ}28'$   
Capitol Peak)

Capitol Peak: ( $33^{\circ}22' - 106^{\circ}25'$   
Capitol Peak)

Johnson Park Canyon

( $33^{\circ}28' - 106^{\circ}27'$   
Capitol Peak)

Spent morning at White  
Sands Prov'g Grounds planning  
schedule. Spent afternoon  
with Cooper and Dutton coll.  
S. I. g. Rapin Indian Wells  
Canyon.

10/12/56

Capitol Peak.

Penna.

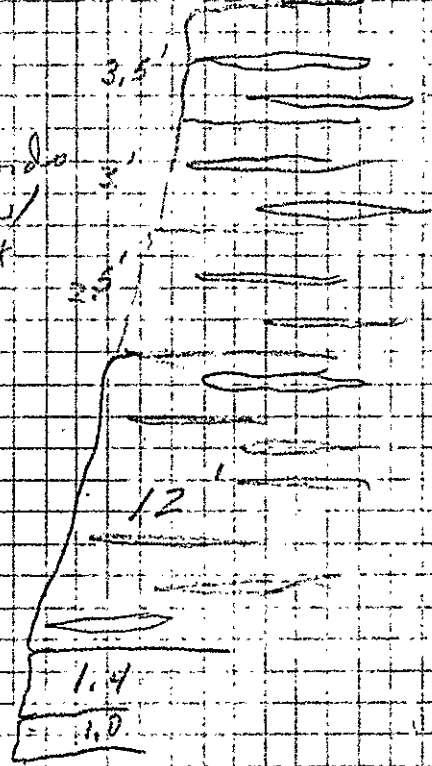
Red congl. ss.

15' = Murriacum  
typical 4'-med. gray  
crin. ls. w/ congl.  
w/ mainly sh. beds  
beds 0.3-0.5 ft  
thick.

alamogordo

typical w/  
black chert  
beds.

X -



X - 0.6' med. gray ls. + Kyles - w. crin.  
frag, nod. Fossils ls.  
Pachyphyllum 6' med. gray ls. w. crin.  
beds + nodules with  
lt. gray, cobbly ls. beds

went down and 100' west  
to top of ordovician, started  
following section at contact of  
ordo. & Devonian.

Algonquin  
few fossils  
faulted out  
2' Pale yellow, brown  
med. gray ls.  
upto 2' med. gray, brown  
dark brown gray, med. dense  
fine grained  
0.8-1.4' med. ss. and ls.

# Packing pith

med. brn. arg. angl.  
sandy lobes and fin.  
some with at. cobbly

0.6'

Pale yell. brn.  
calc. sh. w/ mod.  
and lens of cobbly  
ls.

2 1/2'

2a

Lept. mod. brn.  
arg. angl.  
ls.

1.2 pale yell.  
brn.  
calc. thin ss.

Coll #4  
to top

Meristophin

abundant at top  
thin ss.  
pale yell.  
brn. shale with  
calcareous limestone  
zones. ls. up to  
2.0'

0.6'

mod. brn. arg. ls.  
top to bottom

4.2' mod. yell. brn. cobbly,  
arg. ls. w/ fossils

EL

mod. yell. brn.  
silty calc. sh.

1.7'

Coll #2

becomes crin. 1.0'

as in  
brn. mod.

Pale yell. brn.

calc. ls. mod.

slaty  
propag.  
pith

as below but  
few mod.

1.4'

no scales

round  
up to 2" in dia

2.0'

SLY. arg.

0.5'

pale yell. brn. ls.  
calc. sh. into 1.8'

Coll #3

cobbly, ss as below

1.0' as below

0.4'

0.6'

0.3'

as below

0.5'

0.3' olive green sh.

0.3' ss as in below

0.2 olive green, sh. ss.

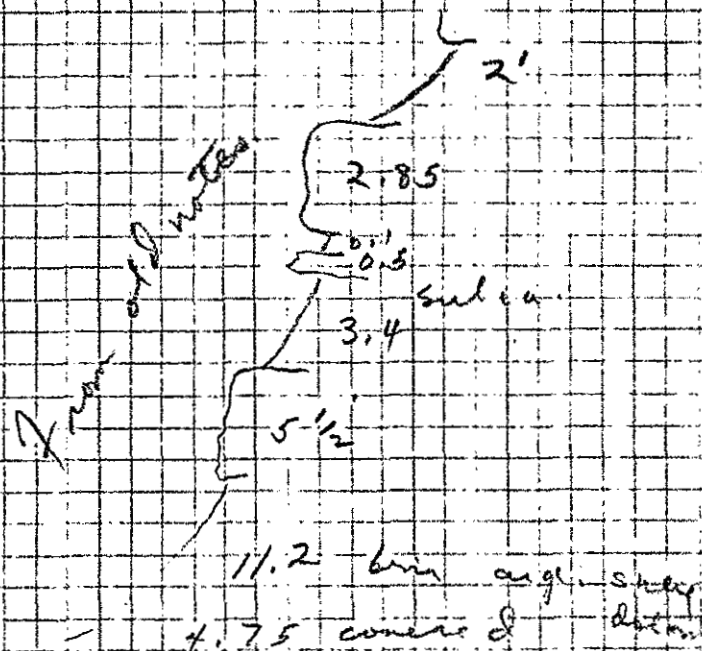
1/5 as distributed for 2000  
1/5 as distributed for 2000

add from 1000 ft. to 1500 ft. 10.6 ft. 15.0 ft. 17.5 ft. 20.0 ft. 22.5 ft. 25.0 ft. 27.5 ft. 30.0 ft. 32.5 ft. 35.0 ft. 37.5 ft. 40.0 ft. 42.5 ft. 45.0 ft. 47.5 ft. 50.0 ft. 52.5 ft. 55.0 ft. 57.5 ft. 60.0 ft. 62.5 ft. 65.0 ft. 67.5 ft. 70.0 ft. 72.5 ft. 75.0 ft. 77.5 ft. 80.0 ft. 82.5 ft. 85.0 ft. 87.5 ft. 90.0 ft. 92.5 ft. 95.0 ft. 97.5 ft. 100.0 ft. 102.5 ft. 105.0 ft. 107.5 ft. 110.0 ft. 112.5 ft. 115.0 ft. 117.5 ft. 120.0 ft. 122.5 ft. 125.0 ft. 127.5 ft. 130.0 ft. 132.5 ft. 135.0 ft. 137.5 ft. 140.0 ft. 142.5 ft. 145.0 ft. 147.5 ft. 150.0 ft. 152.5 ft. 155.0 ft. 157.5 ft. 160.0 ft. 162.5 ft. 165.0 ft. 167.5 ft. 170.0 ft. 172.5 ft. 175.0 ft. 177.5 ft. 180.0 ft. 182.5 ft. 185.0 ft. 187.5 ft. 190.0 ft. 192.5 ft. 195.0 ft. 197.5 ft. 200.0 ft. 202.5 ft. 205.0 ft. 207.5 ft. 210.0 ft. 212.5 ft. 215.0 ft. 217.5 ft. 220.0 ft. 222.5 ft. 225.0 ft. 227.5 ft. 230.0 ft. 232.5 ft. 235.0 ft. 237.5 ft. 240.0 ft. 242.5 ft. 245.0 ft. 247.5 ft. 250.0 ft. 252.5 ft. 255.0 ft. 257.5 ft. 260.0 ft. 262.5 ft. 265.0 ft. 267.5 ft. 270.0 ft. 272.5 ft. 275.0 ft. 277.5 ft. 280.0 ft. 282.5 ft. 285.0 ft. 287.5 ft. 290.0 ft. 292.5 ft. 295.0 ft. 297.5 ft. 300.0 ft. 302.5 ft. 305.0 ft. 307.5 ft. 310.0 ft. 312.5 ft. 315.0 ft. 317.5 ft. 320.0 ft. 322.5 ft. 325.0 ft. 327.5 ft. 330.0 ft. 332.5 ft. 335.0 ft. 337.5 ft. 340.0 ft. 342.5 ft. 345.0 ft. 347.5 ft. 350.0 ft. 352.5 ft. 355.0 ft. 357.5 ft. 360.0 ft. 362.5 ft. 365.0 ft. 367.5 ft. 370.0 ft. 372.5 ft. 375.0 ft. 377.5 ft. 380.0 ft. 382.5 ft. 385.0 ft. 387.5 ft. 390.0 ft. 392.5 ft. 395.0 ft. 397.5 ft. 400.0 ft. 402.5 ft. 405.0 ft. 407.5 ft. 410.0 ft. 412.5 ft. 415.0 ft. 417.5 ft. 420.0 ft. 422.5 ft. 425.0 ft. 427.5 ft. 430.0 ft. 432.5 ft. 435.0 ft. 437.5 ft. 440.0 ft. 442.5 ft. 445.0 ft. 447.5 ft. 450.0 ft. 452.5 ft. 455.0 ft. 457.5 ft. 460.0 ft. 462.5 ft. 465.0 ft. 467.5 ft. 470.0 ft. 472.5 ft. 475.0 ft. 477.5 ft. 480.0 ft. 482.5 ft. 485.0 ft. 487.5 ft. 490.0 ft. 492.5 ft. 495.0 ft. 497.5 ft. 500.0 ft. 502.5 ft. 505.0 ft. 507.5 ft. 510.0 ft. 512.5 ft. 515.0 ft. 517.5 ft. 520.0 ft. 522.5 ft. 525.0 ft. 527.5 ft. 530.0 ft. 532.5 ft. 535.0 ft. 537.5 ft. 540.0 ft. 542.5 ft. 545.0 ft. 547.5 ft. 550.0 ft. 552.5 ft. 555.0 ft. 557.5 ft. 560.0 ft. 562.5 ft. 565.0 ft. 567.5 ft. 570.0 ft. 572.5 ft. 575.0 ft. 577.5 ft. 580.0 ft. 582.5 ft. 585.0 ft. 587.5 ft. 590.0 ft. 592.5 ft. 595.0 ft. 597.5 ft. 600.0 ft. 602.5 ft. 605.0 ft. 607.5 ft. 610.0 ft. 612.5 ft. 615.0 ft. 617.5 ft. 620.0 ft. 622.5 ft. 625.0 ft. 627.5 ft. 630.0 ft. 632.5 ft. 635.0 ft. 637.5 ft. 640.0 ft. 642.5 ft. 645.0 ft. 647.5 ft. 650.0 ft. 652.5 ft. 655.0 ft. 657.5 ft. 660.0 ft. 662.5 ft. 665.0 ft. 667.5 ft. 670.0 ft. 672.5 ft. 675.0 ft. 677.5 ft. 680.0 ft. 682.5 ft. 685.0 ft. 687.5 ft. 690.0 ft. 692.5 ft. 695.0 ft. 697.5 ft. 700.0 ft. 702.5 ft. 705.0 ft. 707.5 ft. 710.0 ft. 712.5 ft. 715.0 ft. 717.5 ft. 720.0 ft. 722.5 ft. 725.0 ft. 727.5 ft. 730.0 ft. 732.5 ft. 735.0 ft. 737.5 ft. 740.0 ft. 742.5 ft. 745.0 ft. 747.5 ft. 750.0 ft. 752.5 ft. 755.0 ft. 757.5 ft. 760.0 ft. 762.5 ft. 765.0 ft. 767.5 ft. 770.0 ft. 772.5 ft. 775.0 ft. 777.5 ft. 780.0 ft. 782.5 ft. 785.0 ft. 787.5 ft. 790.0 ft. 792.5 ft. 795.0 ft. 797.5 ft. 800.0 ft. 802.5 ft. 805.0 ft. 807.5 ft. 810.0 ft. 812.5 ft. 815.0 ft. 817.5 ft. 820.0 ft. 822.5 ft. 825.0 ft. 827.5 ft. 830.0 ft. 832.5 ft. 835.0 ft. 837.5 ft. 840.0 ft. 842.5 ft. 845.0 ft. 847.5 ft. 850.0 ft. 852.5 ft. 855.0 ft. 857.5 ft. 860.0 ft. 862.5 ft. 865.0 ft. 867.5 ft. 870.0 ft. 872.5 ft. 875.0 ft. 877.5 ft. 880.0 ft. 882.5 ft. 885.0 ft. 887.5 ft. 890.0 ft. 892.5 ft. 895.0 ft. 897.5 ft. 900.0 ft. 902.5 ft. 905.0 ft. 907.5 ft. 910.0 ft. 912.5 ft. 915.0 ft. 917.5 ft. 920.0 ft. 922.5 ft. 925.0 ft. 927.5 ft. 930.0 ft. 932.5 ft. 935.0 ft. 937.5 ft. 940.0 ft. 942.5 ft. 945.0 ft. 947.5 ft. 950.0 ft. 952.5 ft. 955.0 ft. 957.5 ft. 960.0 ft. 962.5 ft. 965.0 ft. 967.5 ft. 970.0 ft. 972.5 ft. 975.0 ft. 977.5 ft. 980.0 ft. 982.5 ft. 985.0 ft. 987.5 ft. 990.0 ft. 992.5 ft. 995.0 ft. 997.5 ft. 1000.0 ft. 1002.5 ft. 1005.0 ft. 1007.5 ft. 1010.0 ft. 1012.5 ft. 1015.0 ft. 1017.5 ft. 1020.0 ft. 1022.5 ft. 1025.0 ft. 1027.5 ft. 1030.0 ft. 1032.5 ft. 1035.0 ft. 1037.5 ft. 1040.0 ft. 1042.5 ft. 1045.0 ft. 1047.5 ft. 1050.0 ft. 1052.5 ft. 1055.0 ft. 1057.5 ft. 1060.0 ft. 1062.5 ft. 1065.0 ft. 1067.5 ft. 1070.0 ft. 1072.5 ft. 1075.0 ft. 1077.5 ft. 1080.0 ft. 1082.5 ft. 1085.0 ft. 1087.5 ft. 1090.0 ft. 1092.5 ft. 1095.0 ft. 1097.5 ft. 1100.0 ft. 1102.5 ft. 1105.0 ft. 1107.5 ft. 1110.0 ft. 1112.5 ft. 1115.0 ft. 1117.5 ft. 1120.0 ft. 1122.5 ft. 1125.0 ft. 1127.5 ft. 1130.0 ft. 1132.5 ft. 1135.0 ft. 1137.5 ft. 1140.0 ft. 1142.5 ft. 1145.0 ft. 1147.5 ft. 1150.0 ft. 1152.5 ft. 1155.0 ft. 1157.5 ft. 1160.0 ft. 1162.5 ft. 1165.0 ft. 1167.5 ft. 1170.0 ft. 1172.5 ft. 1175.0 ft. 1177.5 ft. 1180.0 ft. 1182.5 ft. 1185.0 ft. 1187.5 ft. 1190.0 ft. 1192.5 ft. 1195.0 ft. 1197.5 ft. 1200.0 ft. 1202.5 ft. 1205.0 ft. 1207.5 ft. 1210.0 ft. 1212.5 ft. 1215.0 ft. 1217.5 ft. 1220.0 ft. 1222.5 ft. 1225.0 ft. 1227.5 ft. 1230.0 ft. 1232.5 ft. 1235.0 ft. 1237.5 ft. 1240.0 ft. 1242.5 ft. 1245.0 ft. 1247.5 ft. 1250.0 ft. 1252.5 ft. 1255.0 ft. 1257.5 ft. 1260.0 ft. 1262.5

walked 50 ft. SW and there  
was a fault where we started  
our other section. Seems to  
be 2-2½ ft of med brn. gray  
fm. grained calc. thin bedded slabby  
cherty med brn weathering so.  
with *Tropidoleptus cognatus* on  
top 0.4 ft.

5 oct 1956

Alamo Peak





9/27/56 San Andres Can. Lead mine

9/28/56 Ash Canyon - D5

9/29/56 Rhodes Canyon.

9/30/56 Rhodes Canyon

10/1/56. Not on Range

Call. 5263 Floyd Adams  
for arrangements to get into  
Sheep Mtn. Call @ 8:00 AM.

Pig Canyon.

10/2/56 Sheep Mtn.

10/3/56 Hays Gap & Capitol Peak.

10/4/56 Alamo Peak

10/5/56 Arcuate Canyon.

10/6/56 Marble.

10/7/56 Dog Canyon

10/8/56 Nigger Ed.

10/9/56

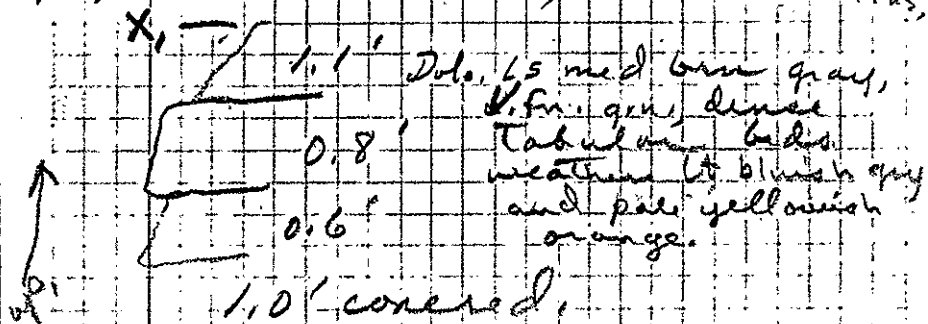
10/10/56

50

Plains of S. Canada

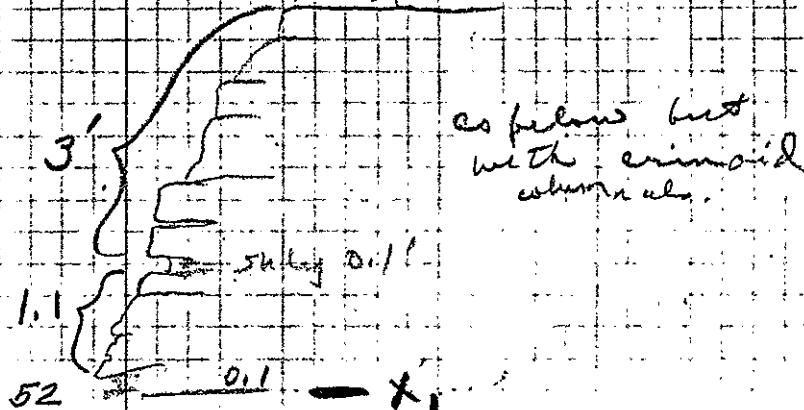
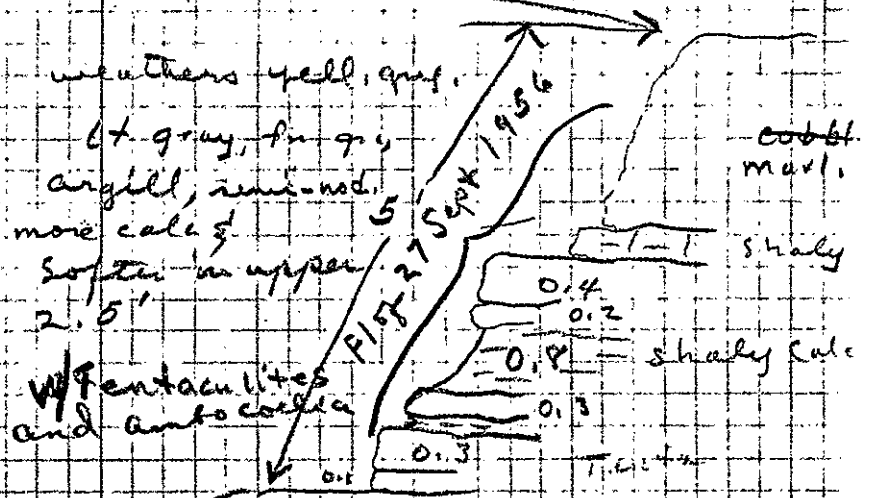
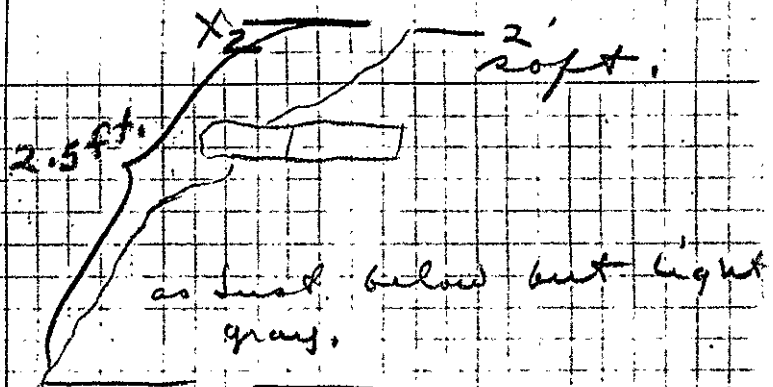


9/27/56 San Andres Can, San Andres Mtns.



Fusselman.

Above p. 51-61 are measured  
section of onate type section  
in San Andres Canyon, San  
Andres Mtns.



4 - 1 ft.

130°

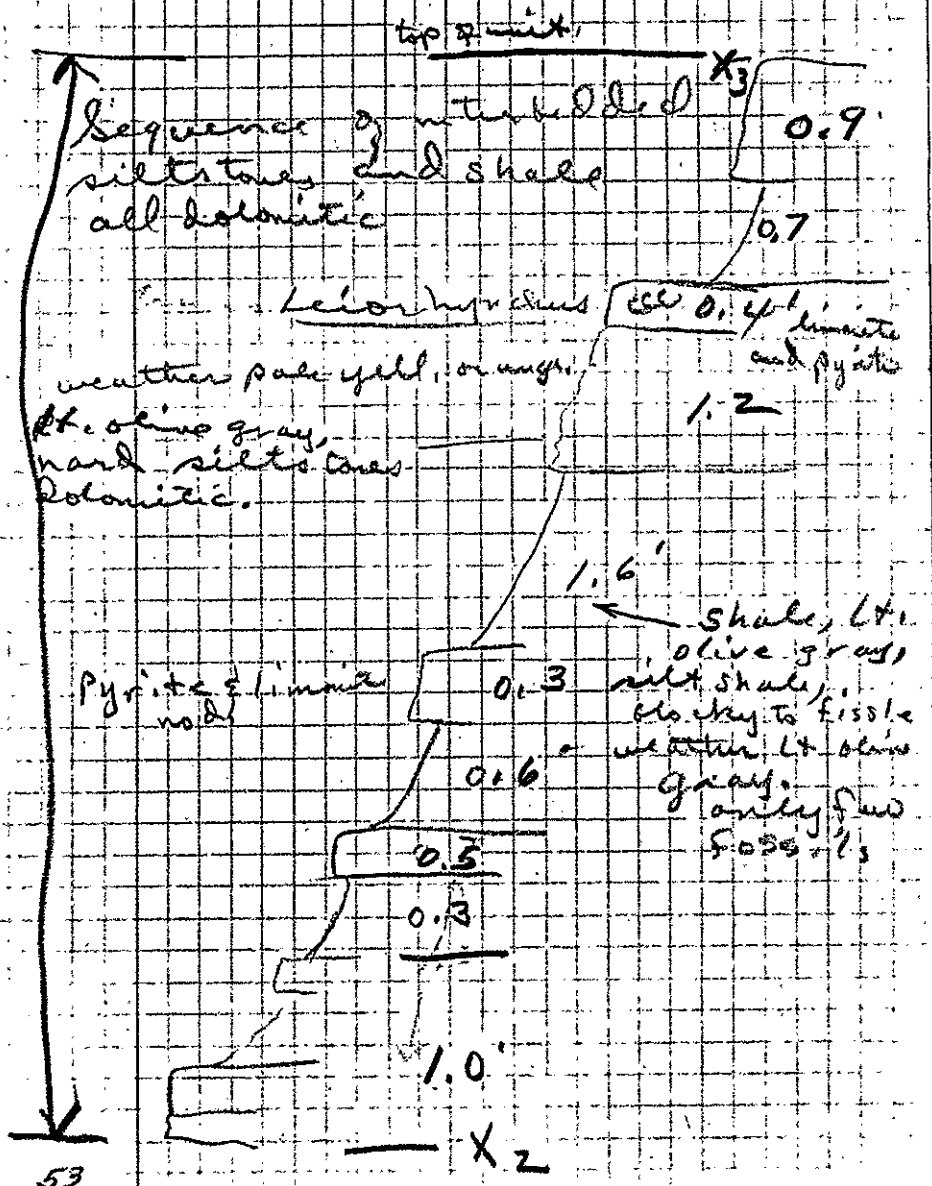
5.2

130°

9/27/56

Cooper, Dutton, Flower and I  
went thru gate 56 of the Small  
Missile Range White Sands Proving  
Grounds and drove 22 miles north  
on the Pale line road to the turn  
off to the Army's Seehorn post.  
Drove west to the Post then  
all transferred to the Chev. pickup.  
Russo. Flower was driving.  
Russo drove us to the head of  
the fans then we walked in  
3½ miles to the old Lead mine  
in San Andres Canyon and to  
the type locality of the ore from  
just north up the hillside  
above the Lead mine of Sec. 18,  
T18S, R. 4 E, San Andres M.  
Dona Ana Co. N. Mexico.

Fowler = Berendson  
 This form of SW West Met  
 188A Bull 63, 0101  
 p 1-37)



Keyes 1908  
 Bellas shale - Greenish 60'  
 thick underlying Berendson  
 to 4 over Silver sh. No.  
 fossils - up part Berendson?  
 Berendson = Meek.  
 Silver - U.D SW Map. 1908  
 B.C. arg. sh. non fossiliferous  
 C.B. & D. Wm. Engers, Bi-Met  
 Bull. 19, 1908, p. 4-21  
 1904 F.V. Stow, com 1744  
 Dulles & Engers, in Ann.  
 Meeting p. 96

F2 27 September 1956 X4  
 as below but sept 0.3

Silt shale, dolomitic  
 lt olive gray, weathers  
 pale yell or orange  
 blocky, weathers to  
 platy slope.  
 4' Sulcaretopora  
 Stroph.  
 atrypa

Siltstone dolomitic  
 lt yell. gray, weathers to  
 gray range. (massive bed)  
 0.9'

top of unit  
 Sulcaretopora  
 Chonetes aurora  
 fish teeth  
 Phacops.  
 5.5'

dolomitic  
 Shale as  
 below but  
 blocky and  
 hard, thickly  
 bedded, weathers  
 to platy slope.  
 weathers pale yell.  
 or dark of.

Papir sh.  
 3. Shale, thin bedded, lt. olive  
 gray, weathers  
 yell. gray,  
 very calcareous.  
 dolomitic

54 X3

Martine's  
 F3 27 Sept 1956 X5

Silt sh, blocky, lt. olive  
 gray, pale yell. orange  
 to grayish yellow  
 with discontinuous  
 ledges of dolo. 8.0'  
 siltstone  
 crinoid stems

top of unit  
 photo.

1.8' as below.  
 Last Leptostrophia

1.1' Shale as below.

1.0 as bed of siltstone  
 below.

1.7' same as below  
 1.0 bed but paper sh.

1.0' Siltstone, dolomitic  
 lt olive gray, dense  
 weathers dark yell orange  
 massive bed.

55 X4

top of unit  
 very dusky red - drk. yellow, orange,  
 resistant dol. siltstone,  
 massive ledge, olive  
 gray

0.3' 0.3

3' silt shale, blocky,  
 olive gray, weathers  
 pale yellow, orange

impr  
 bumps

2'

as in 2nd unit  
 below this one

mod. reddish  
 m. weathers

as below but  
 slightly coarser than  
 below, very thin  
 bedded but hard &  
 massive

dark yellow, orange  
 weathers

3'

lt. olive gray  
 dolomitic siltstone  
 massive  
 dense

unit  
 56

27 Sept  
 1956 (NM B M)

bed fossils

shy 6' grayish yellow, weathers

clay shale, porous, very  
 calcareous w nodules  
 of arg. ls. dense and  
 band of med. lt. to drk. gray, blocky

grayish bl. blocky  
 silt sh.

2' bl.

FB 27 Sept

2.5'

sh as below  
 w yellowish  
 dol. lenses from  
 drk. to gray yellow

gray micaceous silty  
 shale, med. drk. to olive

6'

concrete 3'

max. thickness  
 here

x 6

57

X<sub>8</sub>

black sh. as belows.

8.5

top  
becomes  
lt. olive  
gray.

shale, fissile, grayish  
black to black, sandy, micaceous  
w/ bands of limonite, orange  
red

weathers to olive gray-brown gray  
shale, silty, lt. olive gray  
to med. olive gray,  
thin bedded, hard  
platy

grades into

2'

Disc.

6'

58 X<sub>7</sub>

thin bedded X<sub>9</sub>

weathered silty  
calc. shale  
1.2' grayish &  
mucky yellow

top of unit weathers

Clay shale, fissile  
olive gray,  
with in top, lenses  
up to 0.1' olive gray  
weathers mod. brown  
and olive gray.

7'

grades

grayish  
black, fissile  
clay shale.

5'

more shaly  
4'

5'

F 5 of 27 Sept  
1956

thin bedded platy silty fine  
med lt. gray, weathers  
grayish orange

beds 1/8 to 1/2" thick.

w/ conodonts of same form

59

X<sub>8</sub>

9/27/56

# Top of Section in San Andres Can, San Andres Mts.

25' ± Spirifer Louisianensis  
Ceballero, conoidal ls. 5' of Lt. gray, fine grained ls.

6' Lt. gray soft calc. sh. with  
2' 5' 6' Lt. gray argill. ls. 6' 3' ← Spirifer Louisianensis  
base of Ceballero

best thin shales

fine grained  
sandstone, silty,  
slightly micaceous,  
mod brown fresh.

0.1' Lt. gray calc. sh.  
0.7' as below  
0.3' weathers  
brn gray to med.  
dark gray.  
1.8'

lens ————— 0.7'

1.5'

0.2'

0.7'

X 9.60 0.3

sh. as below.  
Limestone, argill  
finely micaceous,  
olive gray, weathers  
grayish yellow.

Ceballero

sh

slaty ls & sp

slaty G. ap

comp. ss.

onate

X 10.61



9/28/56

Cooper, Dutro, Flower and I drove from Alamogordo to Tularosa then west via old highway NM 52 to Pole Line road 33 miles west of Tularosa. (In going thru Tularosa got lost. Take the southern ~~most~~ road to west from Tularosa. It is black top and goes by the Tularosa railroad station) on arriving at the pole line road drove south on it (black top) to a point almost due east of Ash Canyon (northern one) of the San Andres Mtns. (about 8 miles south of hwy 52). Turned west on the trail into Ash canyon which is ~~some~~ <sup>very</sup> rough. Passable it runs by a gravel pit then to an Army station. The trail continues another mile

9/28/56

beyond to the mouth of Ash Can. we arrived at 8:45 (1:40 from Alamogordo). walked up the canyon for 50 min to first break in Montoya. Started to climb thru. Tom leading, Cooper next, then me followed by Flower. The main part of the Montoya is massive and forms chutes, while climbing one of these Flower, who was tired and wearing leather soles, slipped and fell about 20 ft. He took a terrible fall but it did not seem to do damage. opened a cut on his chin, bruised his hand and leg. Cooper and Dutro finished the climb to the Devonian and stayed with Flower helping him rest. Later we worked back down



9/28/56

and started slowly to the car. F. lower was only able to use his hand a bit. Aside from some minor bruises and being shaken he appears not to have suffered any damage. However, it was a hard fall and he may have been hurt internally. I hope not. Later Cooper and Dutro overtook us after having measured and collected the Denonian.

I feel very badly that this trip to Ash Canyon was so hazardous and that Russo was hurt. It does, however, fill in a gap in our San Andres Mtns. work. I regret that I was not able to make the climb and that Cooper had to do it. It was rough.

9/29/56

Today we took a break to rest and do a bit of shopping. My shoes are being resoled and I will be shod again.

9/30/56 Rhodes Canyon.

Rhodes Canyon 3054

P. 68

38

30

3054 c

3054 b

20

3054 a

10

0

Oolite friable

Sf 5fv

5

4

3

2

1

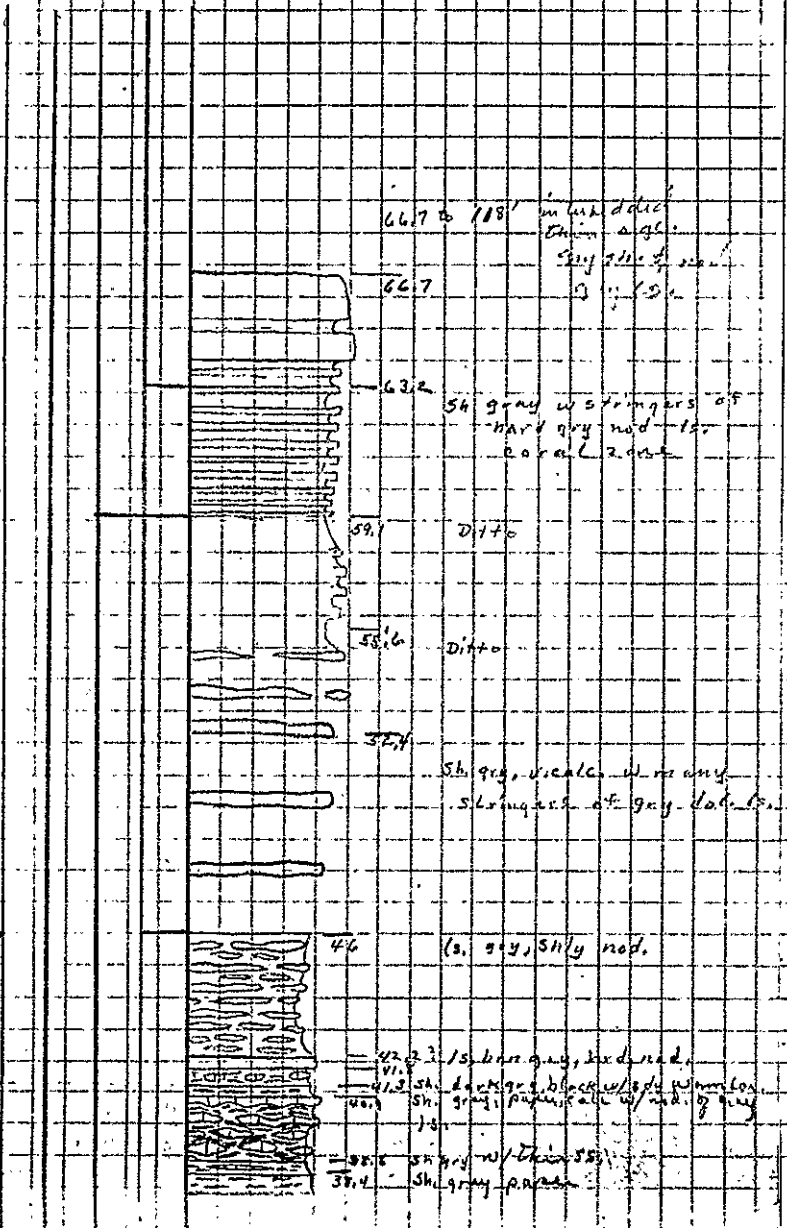
(Red 1st)

37.9 sh, bl. dol, fissile  
35.5 sh, brn-gr, area dol  
34.2 sh, drk gray, calc.  
30.3 sh, med gray, w/ locat  
med gray ls.  
30.0 Dol, brn-gr, stgy  
29.5 sh, gray  
29.0 ss, gray  
28.7 sh, black  
28.5 sh, gray, part w/ med ls.  
28.2 Dol, gr, dr, w/ w. on m. l.  
27.8 sh, gray, paper  
26.7 Dol, med, dr, w/ fls. p. lls.  
26.5 sh, gray, blocky, med  
in top  
22.5 Dol, gray, w. dr, med  
shaly, Maqel, Dolomite  
Grypa  
19.5 Dol, sh, gray, in. sub-  
fin, bl, med, massive, con. fls.  
and w. dr, gray, at base  
Fis. Teeth, 1/2 in.  
17.6 shale and dol, gray-greenish  
Dolomite shale, with ls.  
with brn-gr, fin. xyls, argil  
massive, head and beds  
Dolomite, purplish, thin  
to yel. sh.  
11' Dol, redd-bn, fin. xyls, w/ in  
w. dr, red-bn, dr. sh.  
9' Dol, shaly, as, below  
seminodular  
5.5 Dolomite, interbedded  
olive-bn, hard, massive  
dolomite beds, and shaly  
dolomite beds, fissile  
is but unit 3 in. Sf local  
P. 1.

# Rhodes Canyon.

75—  
70—  
60—  
50—  
40—  
38—

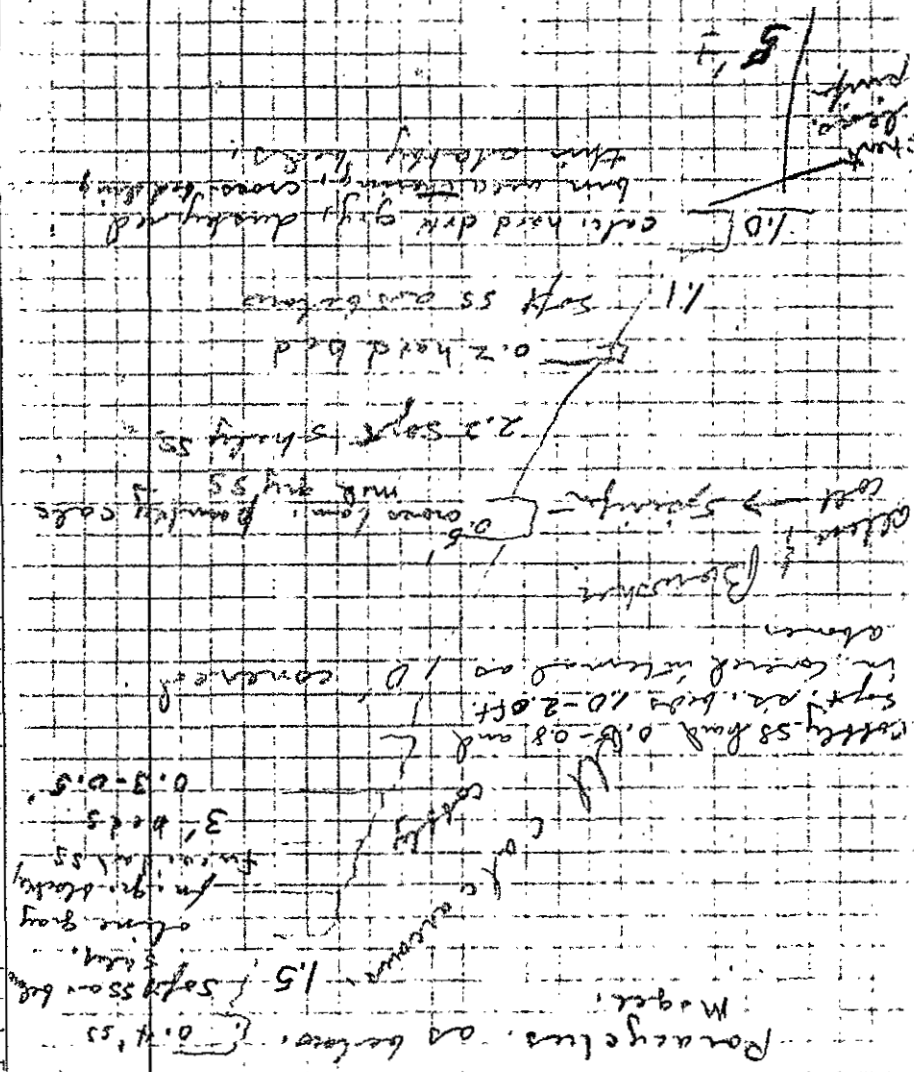
112—  
110—  
100—  
90—  
80—  
75—



f }  
a }

10/1/56

# Johnson Park Canyon



# Lake Valley.

9' covered appears to be  
lt. greenish gray  
shale with  
only small columnals.

1.0 soft lt. greenish gray  
ss.

appeared to be  
lt. greenish gray shale  
as belows  
Cobbly ss  
0.7'

lt. gray sh. bl. sh.  
Calcareous ss  
maxima  
0.4'

lt. olive gray, salt  
shale bedded  
0.5' soft cobbly  
ss as belows  
0.8'

0.6 cobbly ss as  
belows

coral  
1.3' sh. ss as belows

med gray sh.  
0.3 hard dense ss

1.0' sh. ss

0.5 cobbly ss as belows  
calcareous

2 1/2' soft ss sh. as belows

Top of onate 2L

med brn gry. arg. platy  
dolo ls. w. abund Sulcarectis 1.3'

med brn gry. silty sh.  
with thin lensest  
hard w many bryozoans 0.9'

1.3'  
1.3  
1.1' softer

Sulcarectipora

0.9'  
0.6

1.4 brn gry. hrd. massive  
argill dolo siltstone

maximo  
dolo brn gry argl  
thin micaceous  
platy on outcrops

as below but with  
fewer lens.

coll 2  
Chonetes zone

med brn gry. soft dolo  
silty sh. w lens of  
coll 2a harder siltstone  
3' KI 9L

becomes  
more fossil.  
0.8  
0.2 silty. as below.  
0.7 silty.  
0.5

2.6' All near there  
to above argl  
Leior

hrd. med brn  
gry. argl. dolo  
or dolo. siltstone

5.5' hrd med brn  
gry, platy dolo.  
sh.

1.2 hrd. med. brn. gry.  
arg. dolo.

grayish brn, soft silty  
dolo. sh.

4.5'

0.6' Dark grey, mic. sandy silt  
shale

Fusselman

phos.  
ss. 0.14"

End of layer of Alamo beds.

5000 56

Sept  
S M T W T F S

17 18 19 20  
21 22 23 24 25 26 27 28 29  
30 31

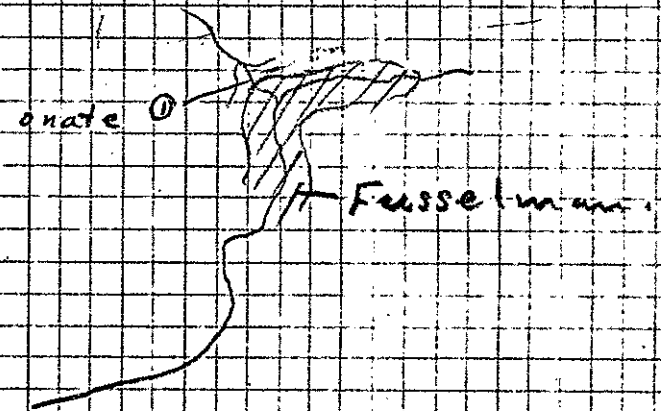
Oct

S M T W T F S  
1 2 3 4 5 6  
7 8 9 10 11 12 13  
14 15 16 17 18

- 19 { Georgetown
- 20 { Santa Rita
- 21 Lake Valley
- 21 Percha Cr. Box
- 22 Mud Springs
- 23 Socorro
- 24 Derry
- 25 Rincon
- 26 ~~Alamogordo~~
- 27 San Andres Can.
- 28 Ash Can., San Andres Mts.
- 29 Rhodes Can. Day off
- Oct 30 Rhodes Can.
- 1 ~~Day~~ Pig Canyon Johnson Park
- 2 ~~Shops into Capital~~
- 3 ~~Hayes Canyon~~ Capital Peak Pig
- 4 ~~Alamogordo~~ Arcata
- 5 ~~Granite Can.~~ Alamo PK.
- 6 ~~Market Can.~~ Day Can.
- 7 ~~Dog Can.~~ Cooper, Delta, Alamo
- 8 ~~High Ed Can.~~ Mule Can.
- 9 Camanche
- 10 To Los Alamos.

6 Oct 1956

Tom, Cooper, and I drove from Alamogordo to Valmont, then east to Dog Canyon, Sacramento Mts.



Walked east up canyon to first good exposure of onate on north side of canyon.

Onate fm.

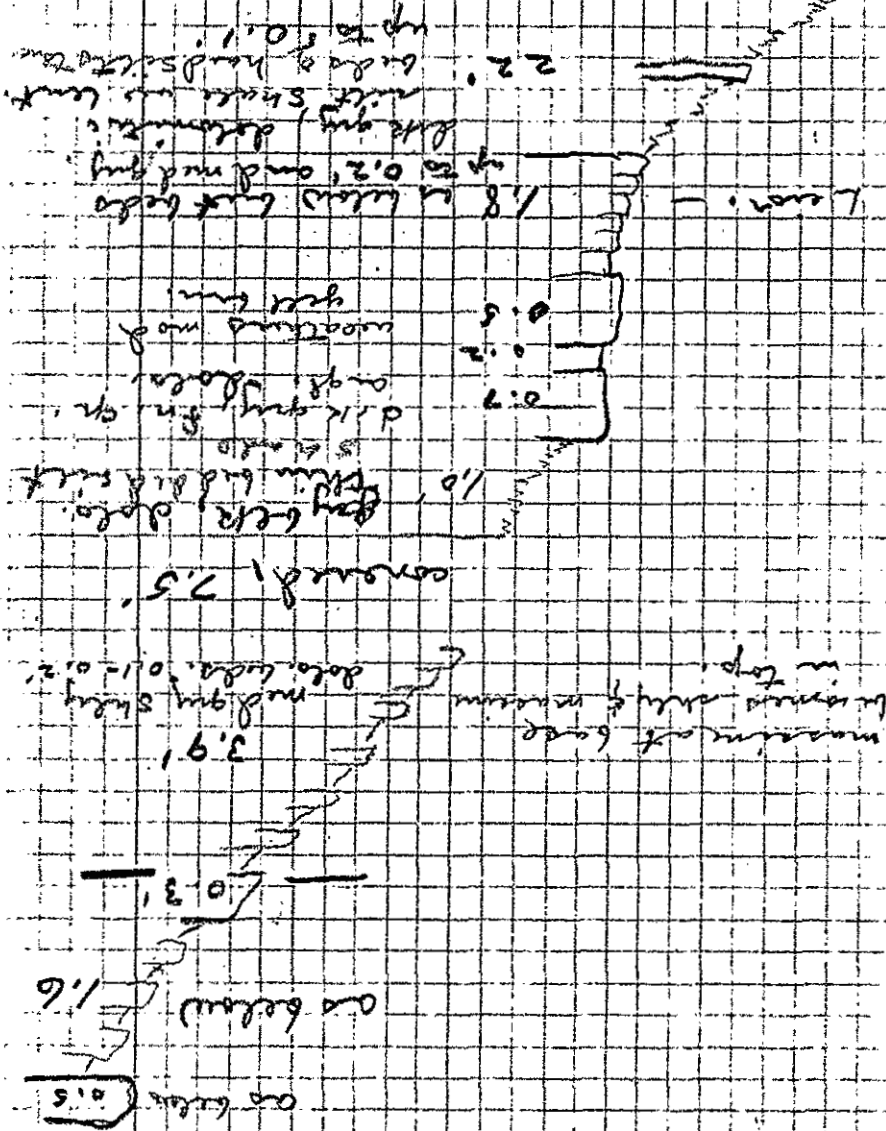
Fusselman

1956

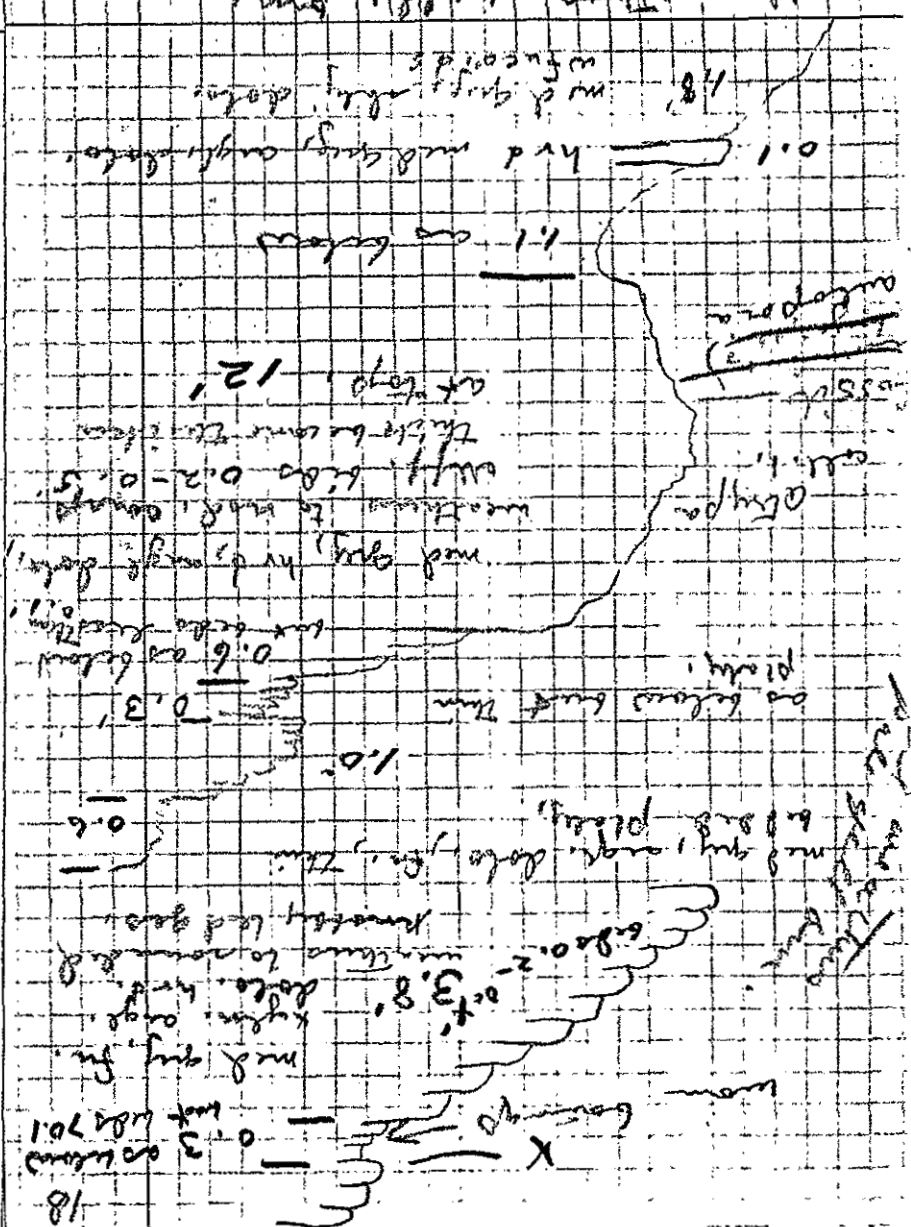
prunes, 4



6 October 1956

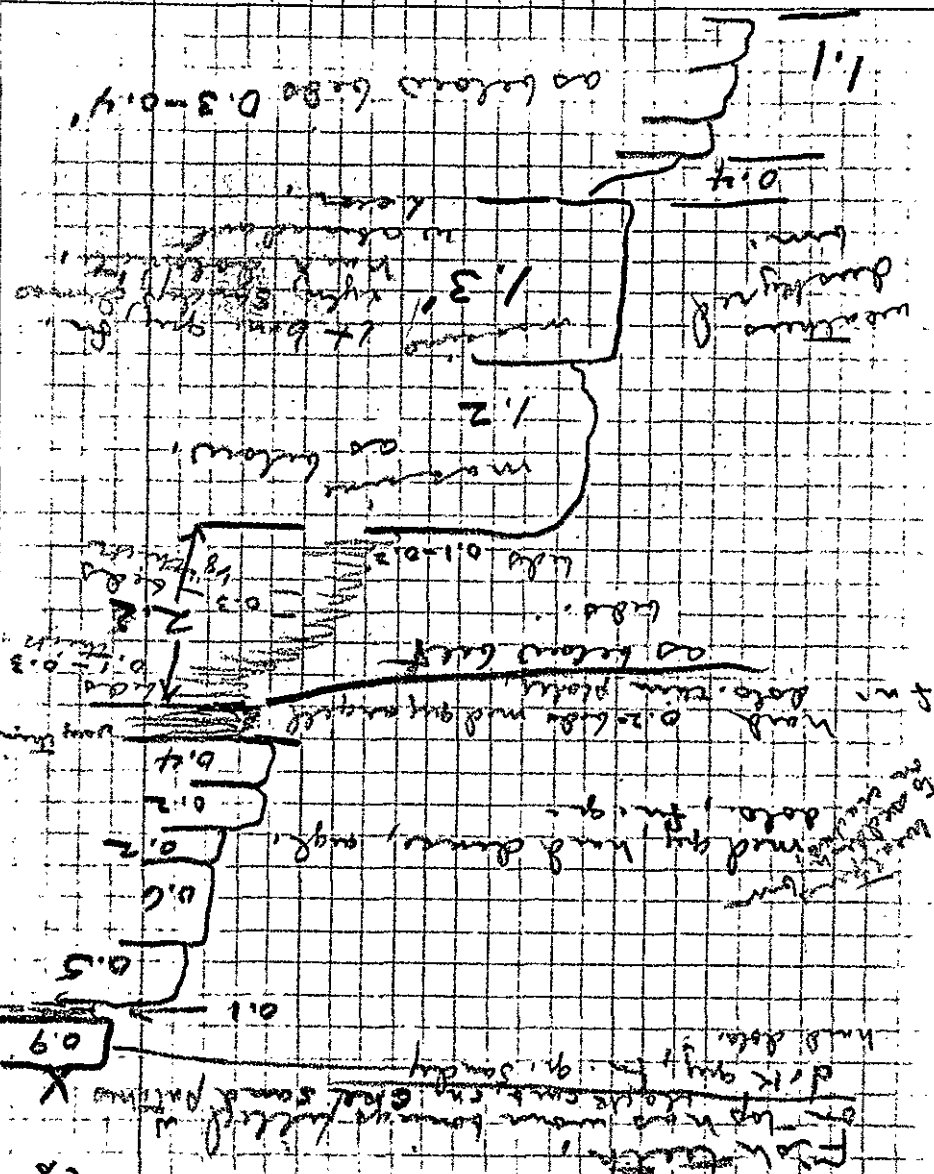


6 Oct 1956

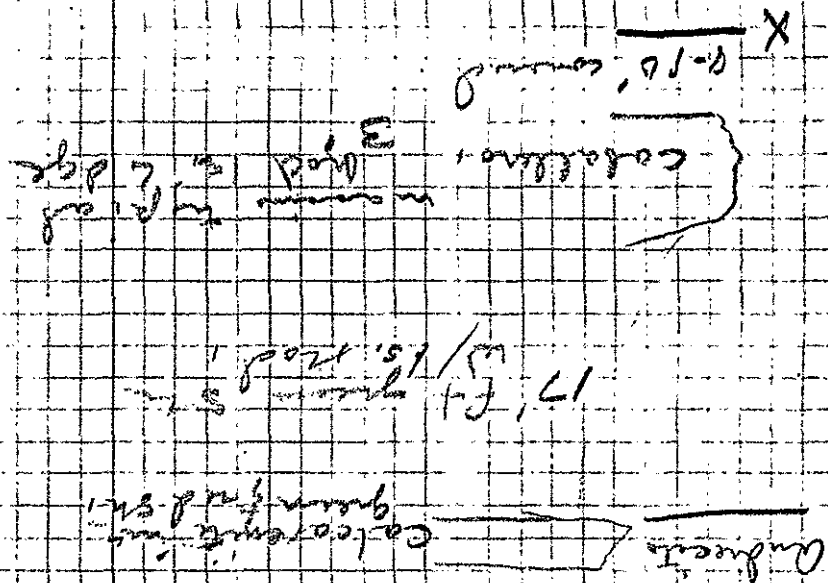




6 Oct 1956



6 Oct, 1956



83

7 Oct 1956

Stayed in Alamosa,  
Cooper and Dutro visited  
Alamo Canyon.

8 Oct 1956

Visited Mule Canyon. See  
Cooper's notebook.

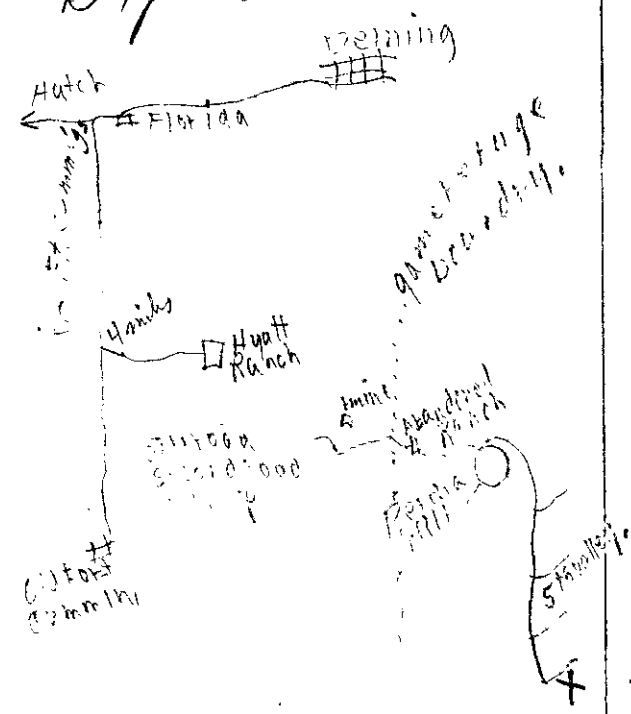
Appendix I-

F. V. Stevenson and A. L. Bowsheer, Field notes, 1940

8-9-40 Cook's Ranch: NE of NW 1/4 Sec 7 T12S R8W

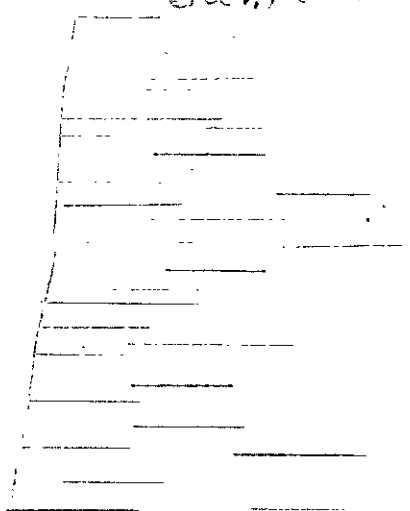
Canyon at South end, between  
L.R. Hyatt's Ranch and Pitt Cummings - See Denning Folio

Dip 25°



Black fissile shale 70'  
No fossils - few decomposed  
iron nodules scattered  
throughout.

same as above;



Lower 12" highly variegated, phased  
white - brown & black in color

Some disconformity at  
base of section. The  
stratification is  
there is an excellent  
horizon, it parallels  
the sill approx. first on  
Petcha, then Lake Valley.

Total thickness 181'

Devotion

Early  
Devotion

Gray-white sill - Hornblende + white 10'  
feldspar inclusions size up to 1/4 inch  
granite porphyry

Pitt

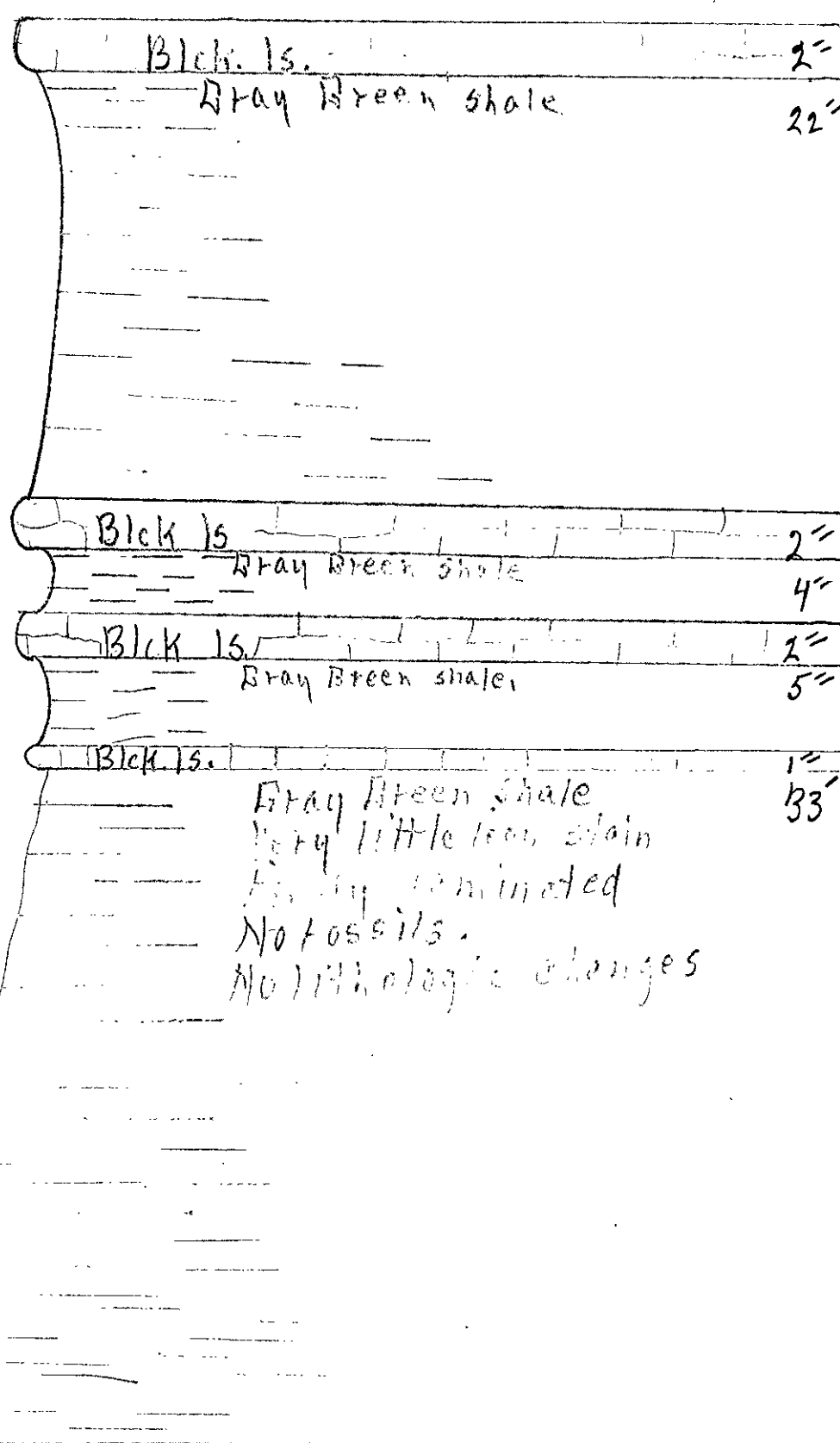
X X X  
X X Granite

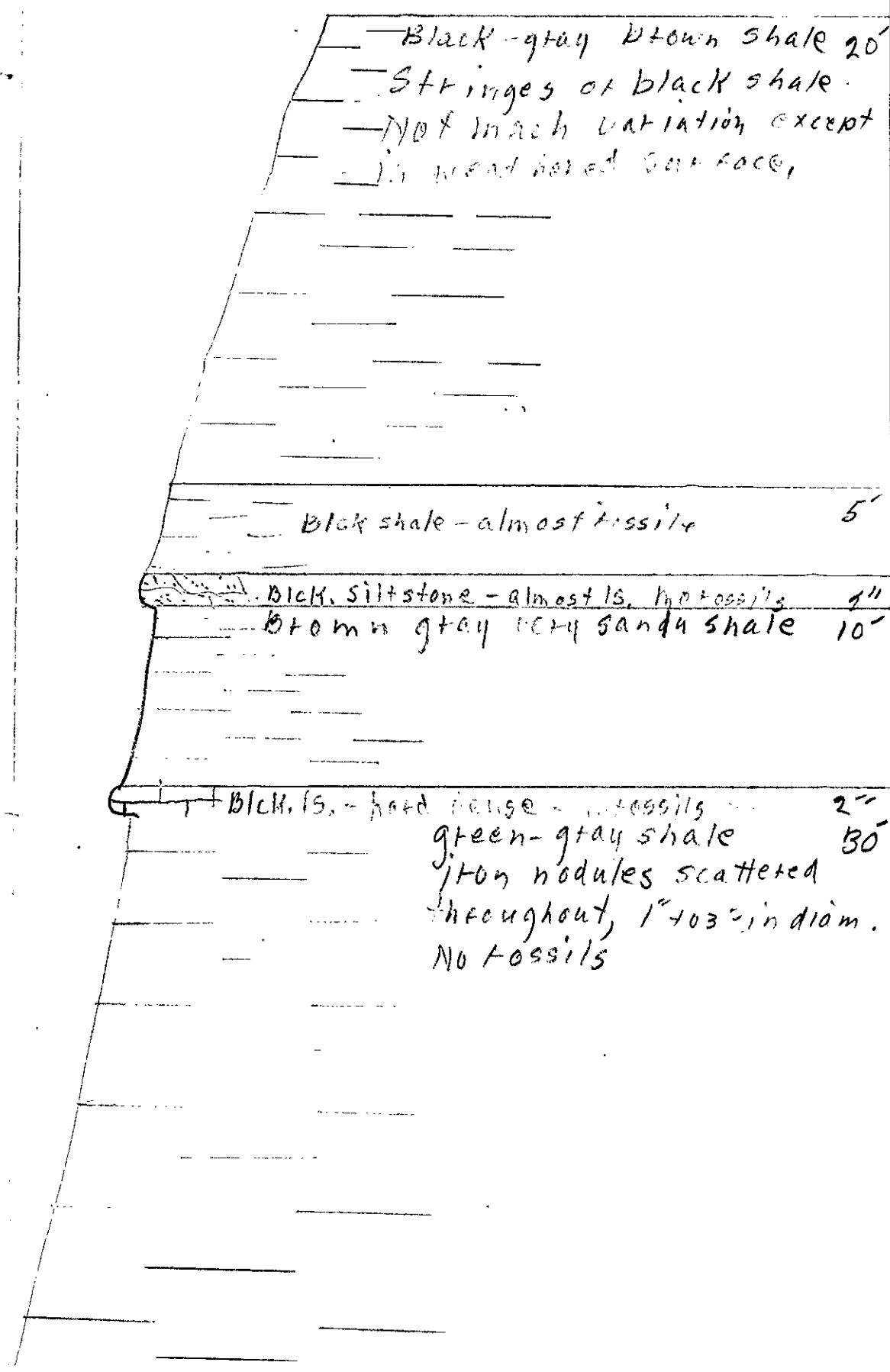
Frank A. Stevenson  
NE of NW 1/4 Sec. 7 - T12S. R8W  
COOKS Ranch

#2 8-9-40

exaggerated  
scale  
No fossils

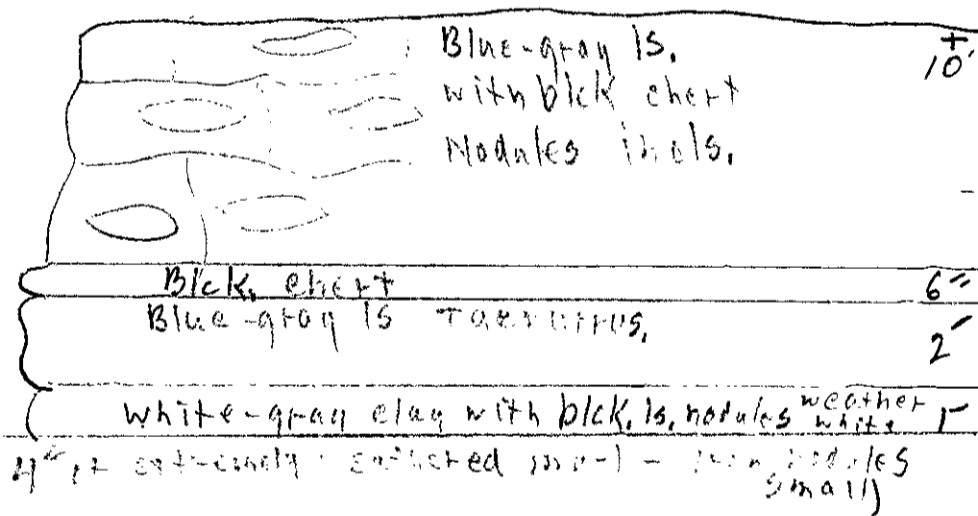
Dec 1940



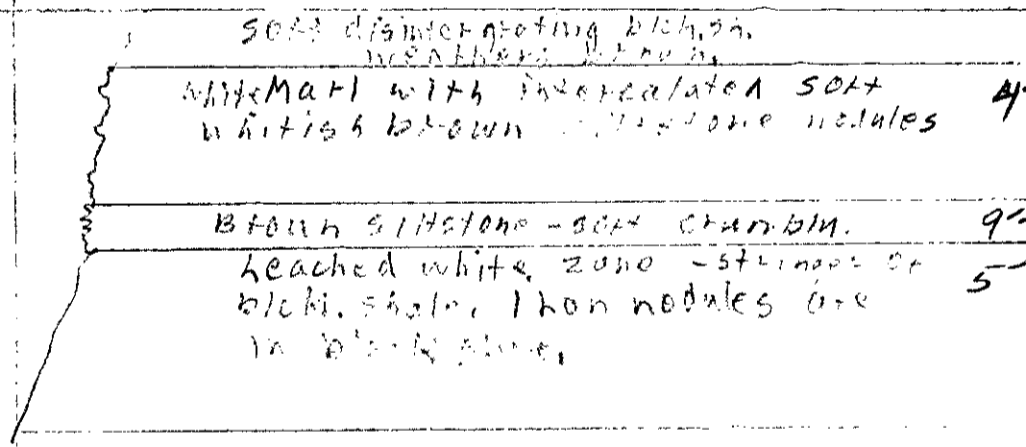


# 48-940

Mississippian



Devonian

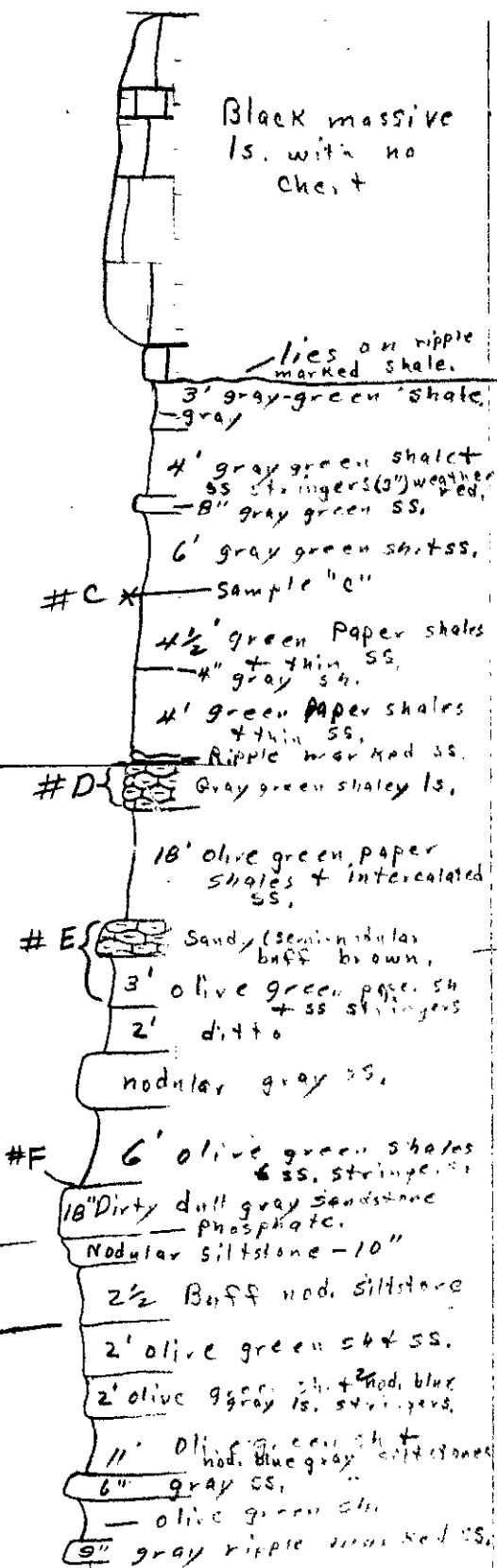


Bowsher

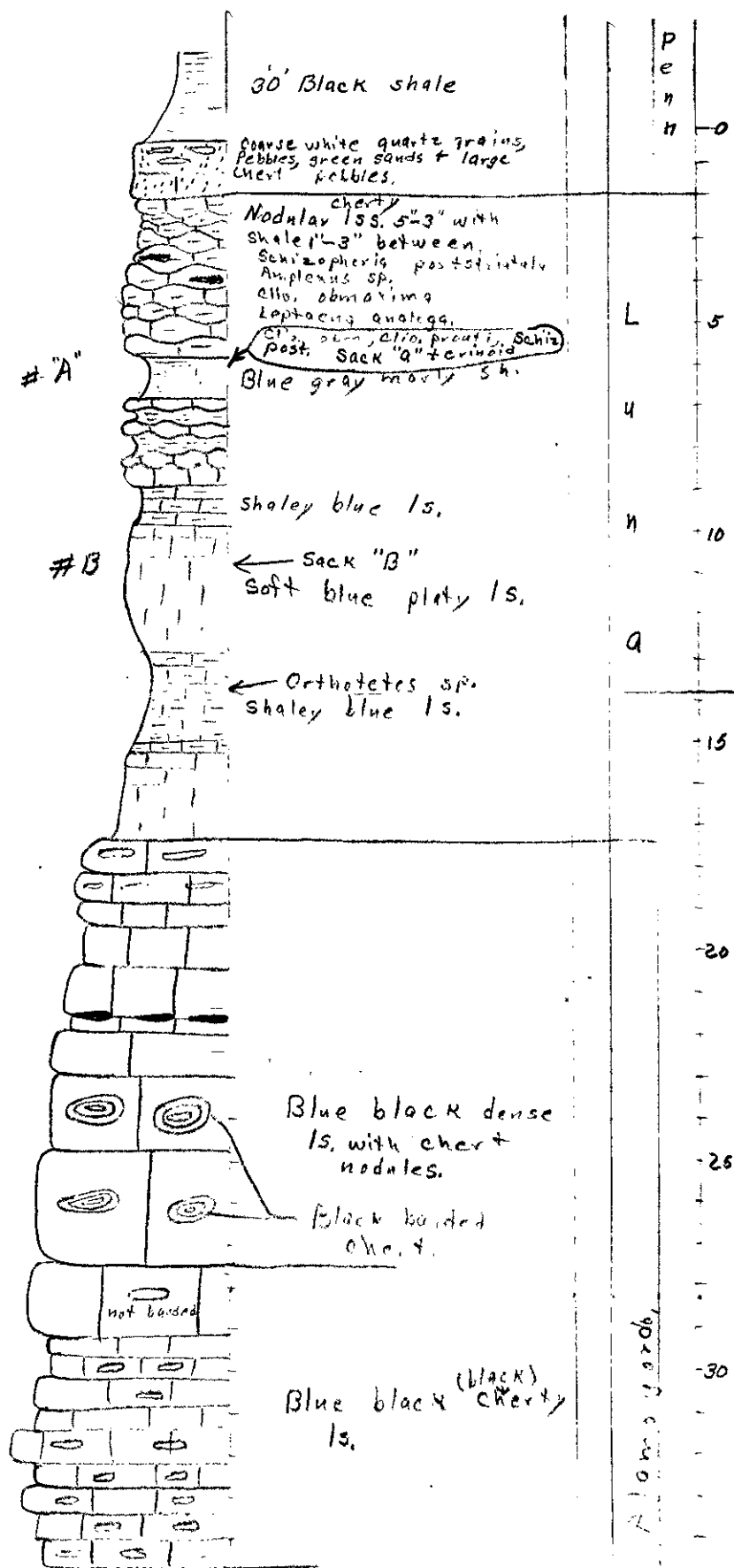
Station 10

7-23-40 Section "I"

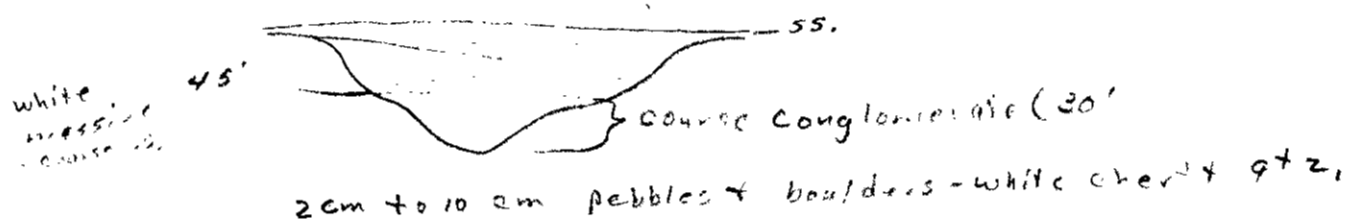
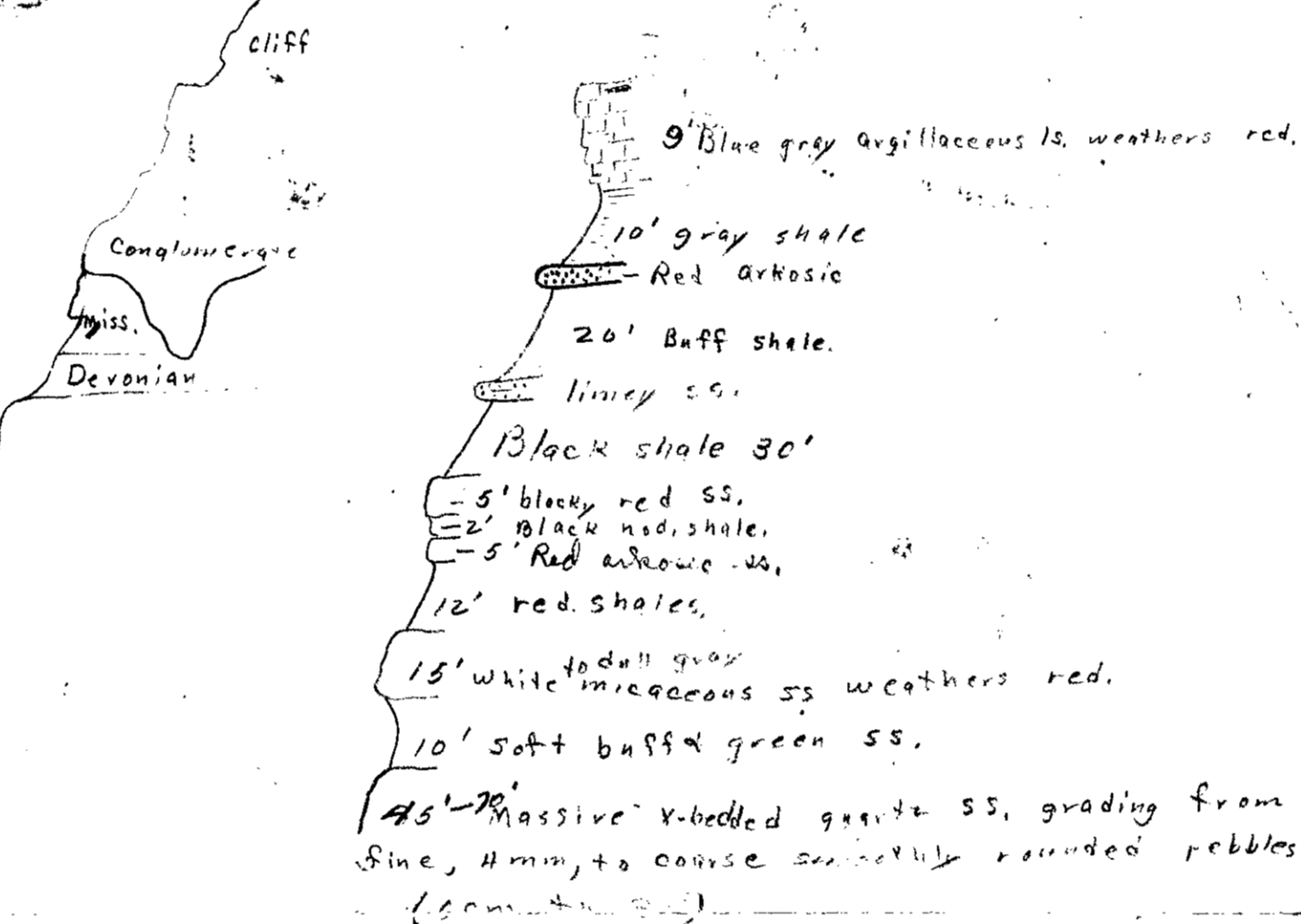
Canyon floor  $\frac{1}{4}$  mile NW of point where highway enters Rhodes Canyon. Section measured in O, NE/NE/SW  $\frac{1}{4}$ , 17S 4E.



Mississippian







Cav. floor, 1/4 mi nw of point where highway where pre 1942 road enters Rhodes Canyon from east, E/NE/NE 4-17E 4E  
San Andres m. two.

#1 8-17-40  
 CE 1/4 NE 1/4  
 OF the NE 1/4  
 Sec. 10, - T17S - R15W

R15 W.  
 See sketch of town  
 NW. 1/4 of Sec. 10  
 Pictures

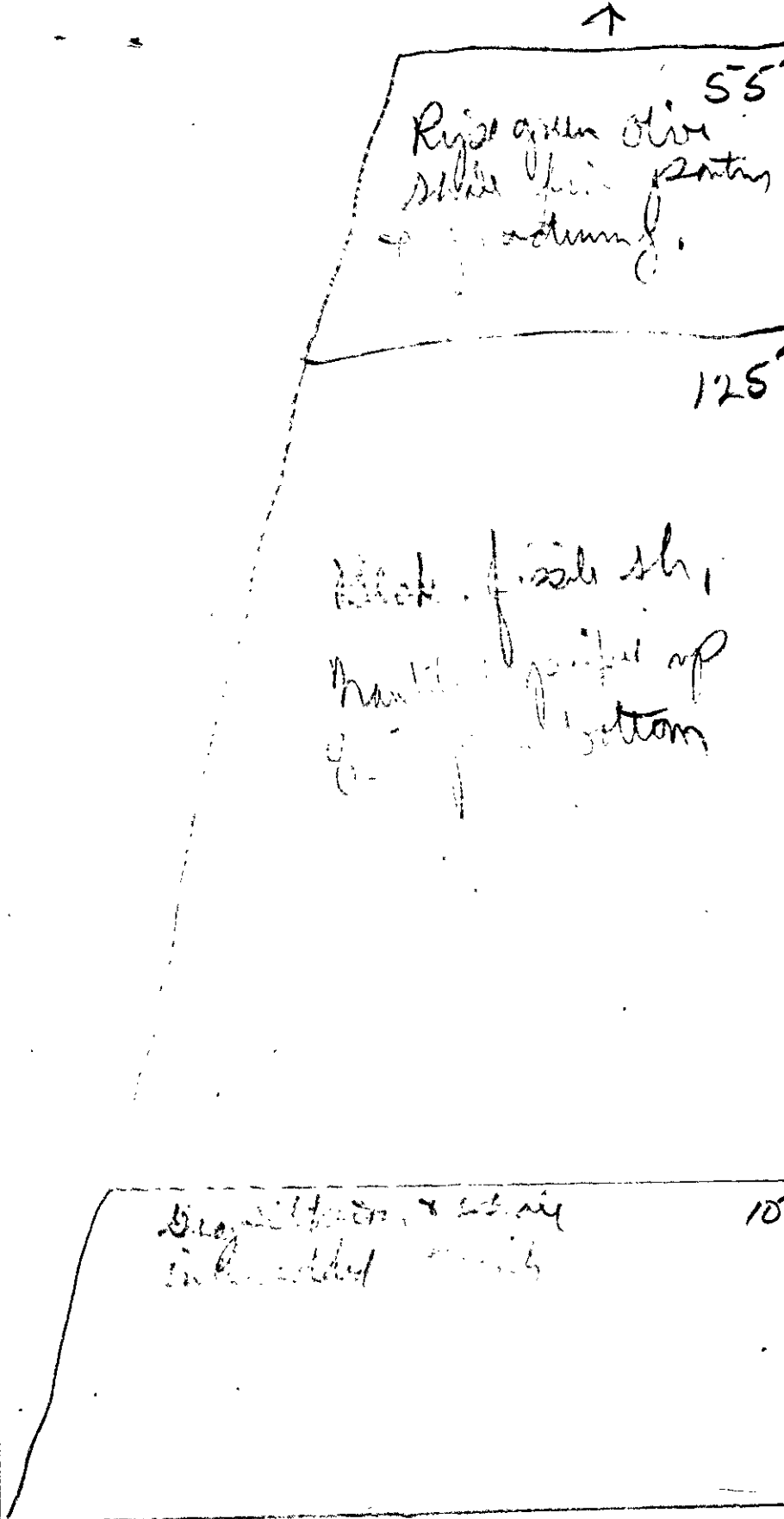
Product  
 b.  
 11.2  
 3

11.2

R

Dike from

Frank V. Stevenson  
 Bear Mtn, Silver City, NM  
 CEL, SE 1/4, NE 1/4 of Sec 10 T17S - R15W



#2 8-11-40

1/2 inch

Mass. mod. 22

gray ls.

in. thick & semi mod.

in. thick

in. thick & semi mod.

in. thick & semi mod.

in. thick & semi mod.

in. thick & semi mod.

in. thick & semi mod.

in. thick & semi mod.

in. thick & semi mod. 12

mod. & semi mod. 22

gray ls., intercalated

with very little black

sh. part. & semi mod.

gray ls. massive & semi

mod. at top, 6" piece

of gray ls. & semi mod.

Mass. mod. 22 15

semi mod. 22 2

gray ls. 22 6

mod. sh. at top & semi

mod. - 6" piece of semi

mod. 5

mod. 5

mod. 5

mod. 5

mod. 5

mod. 5

mod. 5

mod. 5

mod. 5

with the gray ls.  
Coarsely crystalline  
& coarse terminal,

42

#3, 8-11-40

100 ft. deep

July 20  
 100 ft. deep  
 100 ft. deep  
 100 ft. deep

100 ft. deep 10'  
 100 ft. deep 6"  
 100 ft. deep 10'

100 ft. deep 18'

100 ft. deep 5'

100 ft. deep 7'

100 ft. deep 9'

100 ft. deep 9'

100 ft. deep 2 1/2'

100 ft. deep 16'

100 ft. deep 3 1/2'

100 ft. deep 3'

100 ft. deep 3'

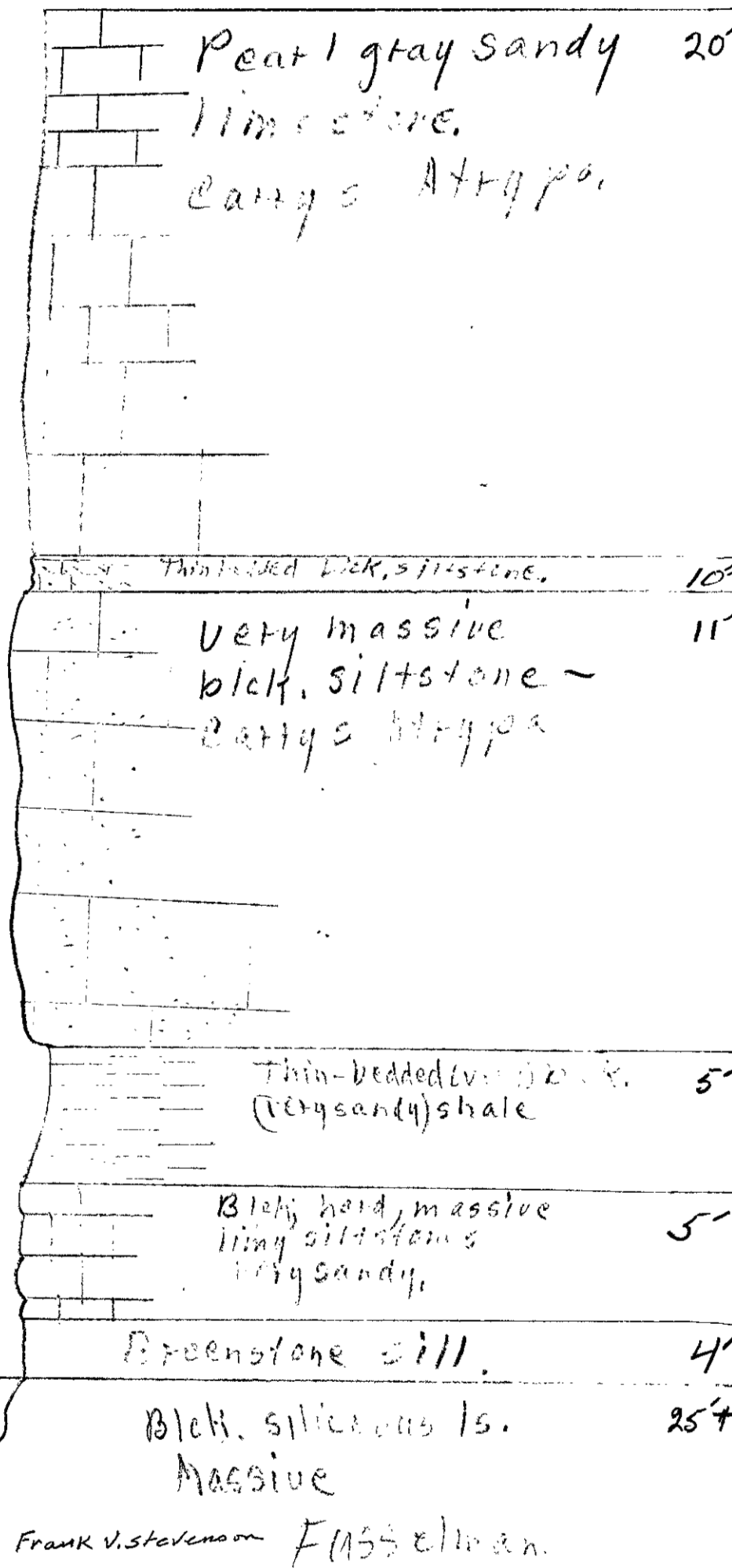
#1 1-15-40

Dog Canyon  
Sacramento Co. Cal.  
Where Fusselman  
notes Dog Canyon.  
Page 16.

C 5 1/2 Sec 15  
T 18S - N 1E

5 1/2 mi

Douglas



Silver City go West on Highway ~~260~~ 260

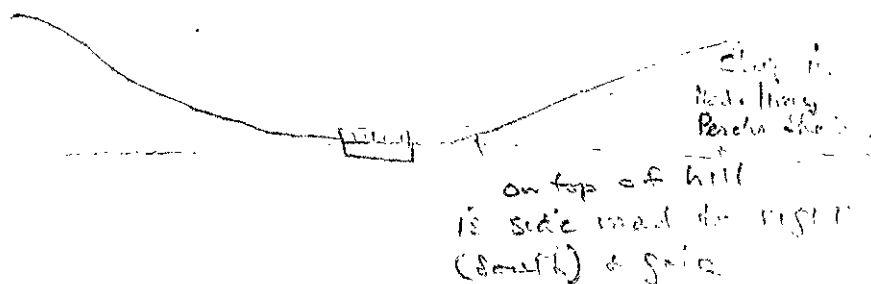
marked Giff, Glenwood, Mogollon.

After leaving City Limit Sign go  $\pm 1/4$  mile to top of hill. Turn right (north) thru

Santa into Chloride Flat. Go  $1/2$  North past house, <sup>(west)</sup> large dump to east.

Continue North to end of road.

4.5 miles east of Santa Rita P.O.



from Silver City Hospital. Continue to down  $\pm 1/2$  blocks. On right side rd. is Pennington's Wholesaler. 12 <sup>1/2</sup> mi. Grocery (SE corner), Filling sta & tourist camp (NE corner) turn right & go over ~~bridge~~ <sup>bridge</sup>. Continue west until street narrows, where turn right continue north. Past Bear Mt. Lodge sign ( $\pm 4 1/2$  miles) then North turn over divide South of Bear Mt.

Chinoids in Lake Valley  
Fossils in Perch. & clay section.

$$\begin{array}{r} 27.1 \\ 18.8 \\ \hline 8.3 \\ 25.7 \\ 18.8 \\ \hline 6.9 \end{array}$$

Percha. Go to the Silver City South Post  
 Court House on Landenberg Rd (pav-  
 Stop at city limits. Go up hill to west  
 20. ft.

30.3  
 51.3  
 53.5

2.6

Leave on Road 10

- 2-4 1st 1125 ft
- 18.1 South Ridge 180 to King
- 3.6 in Valley
- 2.0 in road cut
- 5.0 at road cut
- in Magdalena
- Big side road north to M...
- 3.6 South & D...
- 16.7 Enter Gila North River
- 24 River 15.
- 27. Summit of Grand Pass
- 29.4 Fault picture.
- 35.1 King
- 30.5 near Gila Mtn. For.
- 37.1 Road forks goes up
- Near Percha. Mt Percha
- 43.2 Hillsboro.

Frank V. Stevenson  
 Santa Rita, N.M.

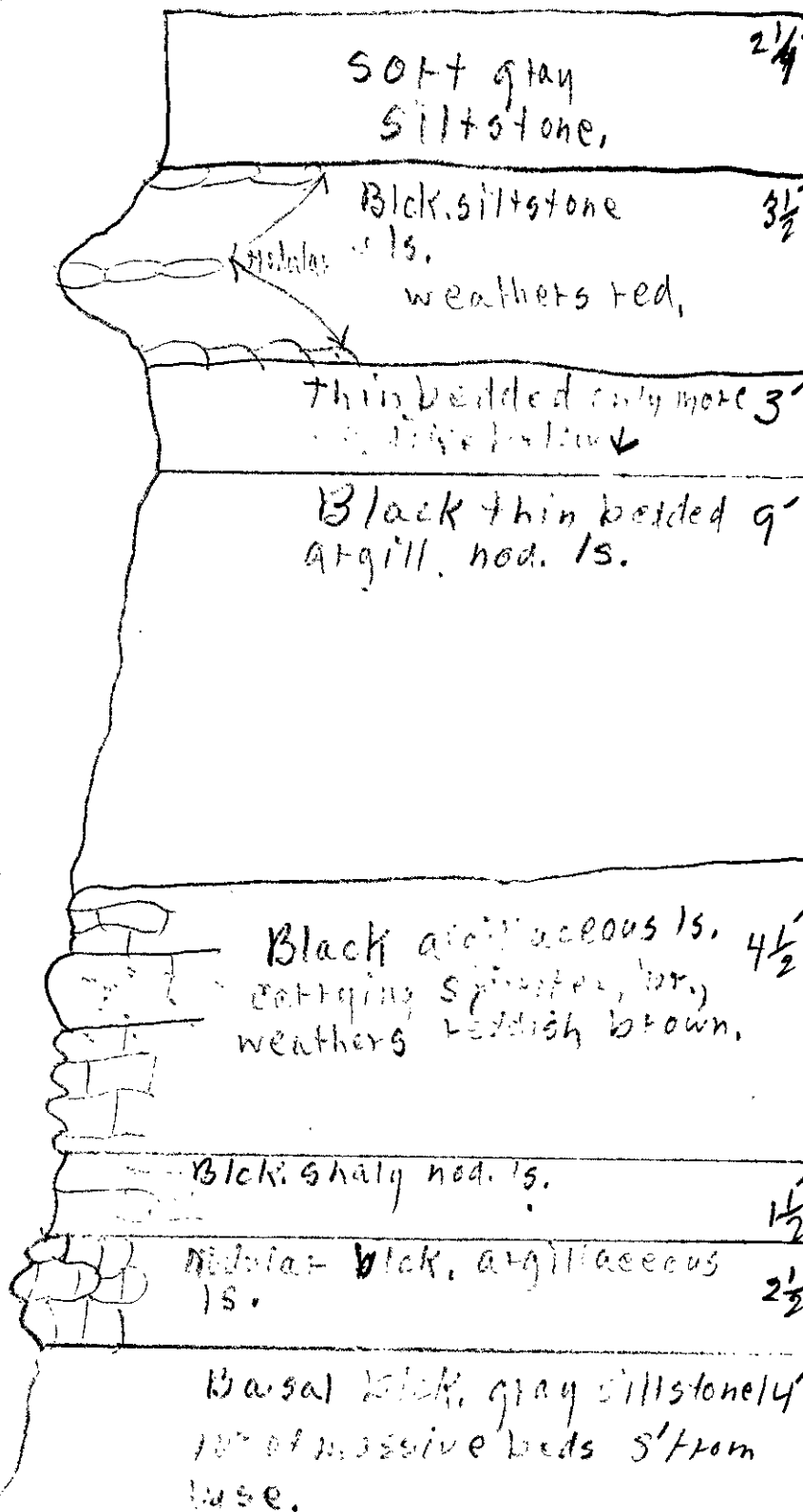
#7-18-40

Deadman Canyon  
 San Andreas Mts.  
 Below Frank Sullivan  
 Ranch  
 C w/ Sec 8 T 17S. R4E.  
160' total thickness

Pictm

460" = 38' 4" = 61' 2"  
 113' = { } = 9' 4"

Deadman Canyon



Sacramento Mtns.  
 Deadman Canyon  
 F.V. Stevenson

10-19-91

Frank V. Stevenson  
 Deadman Canyon, San Andreas Mtns.  
 C w/2 Sec. 8, T17S, R4E.

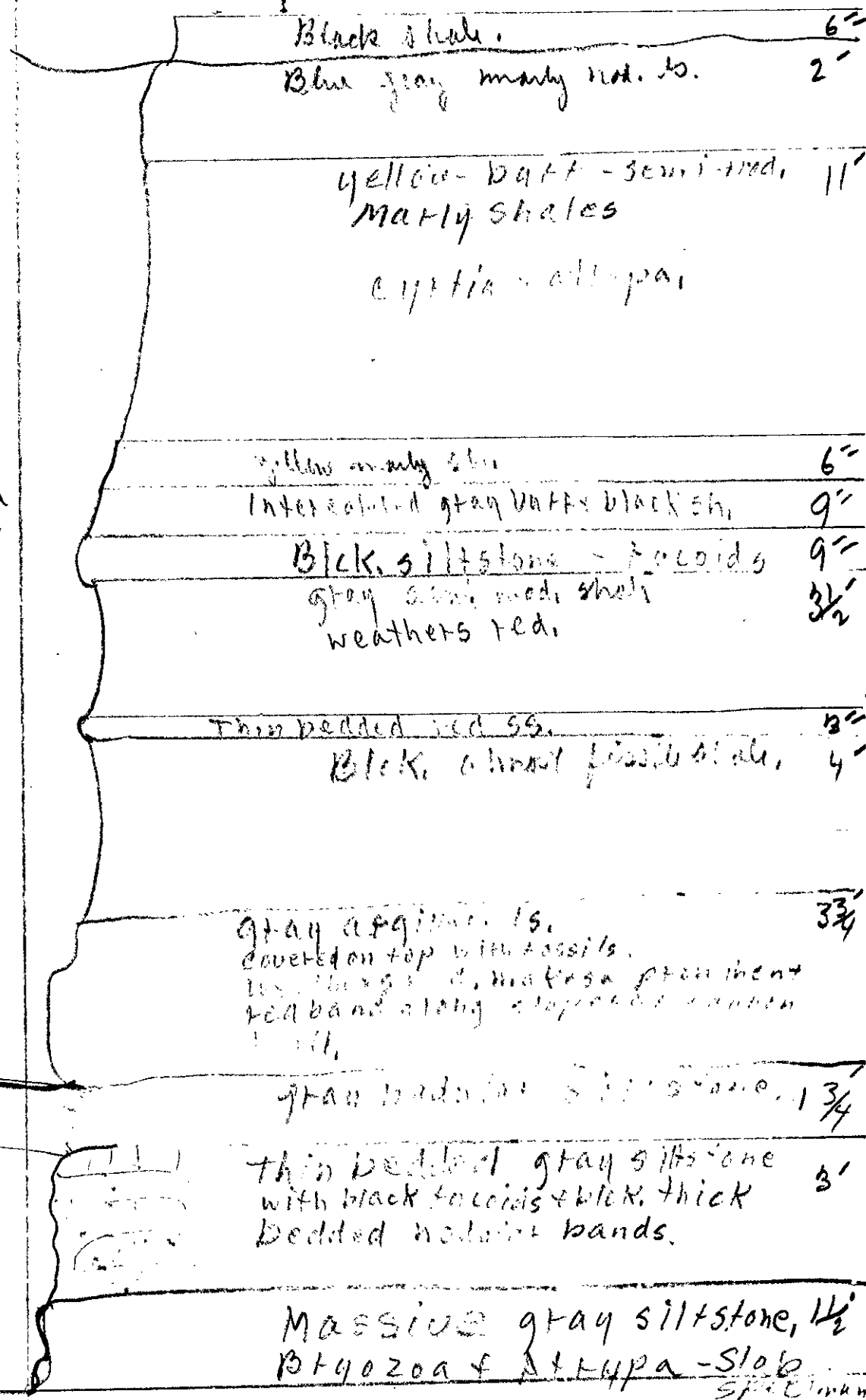
(Sullivan)



#2 7-18-40

Darby

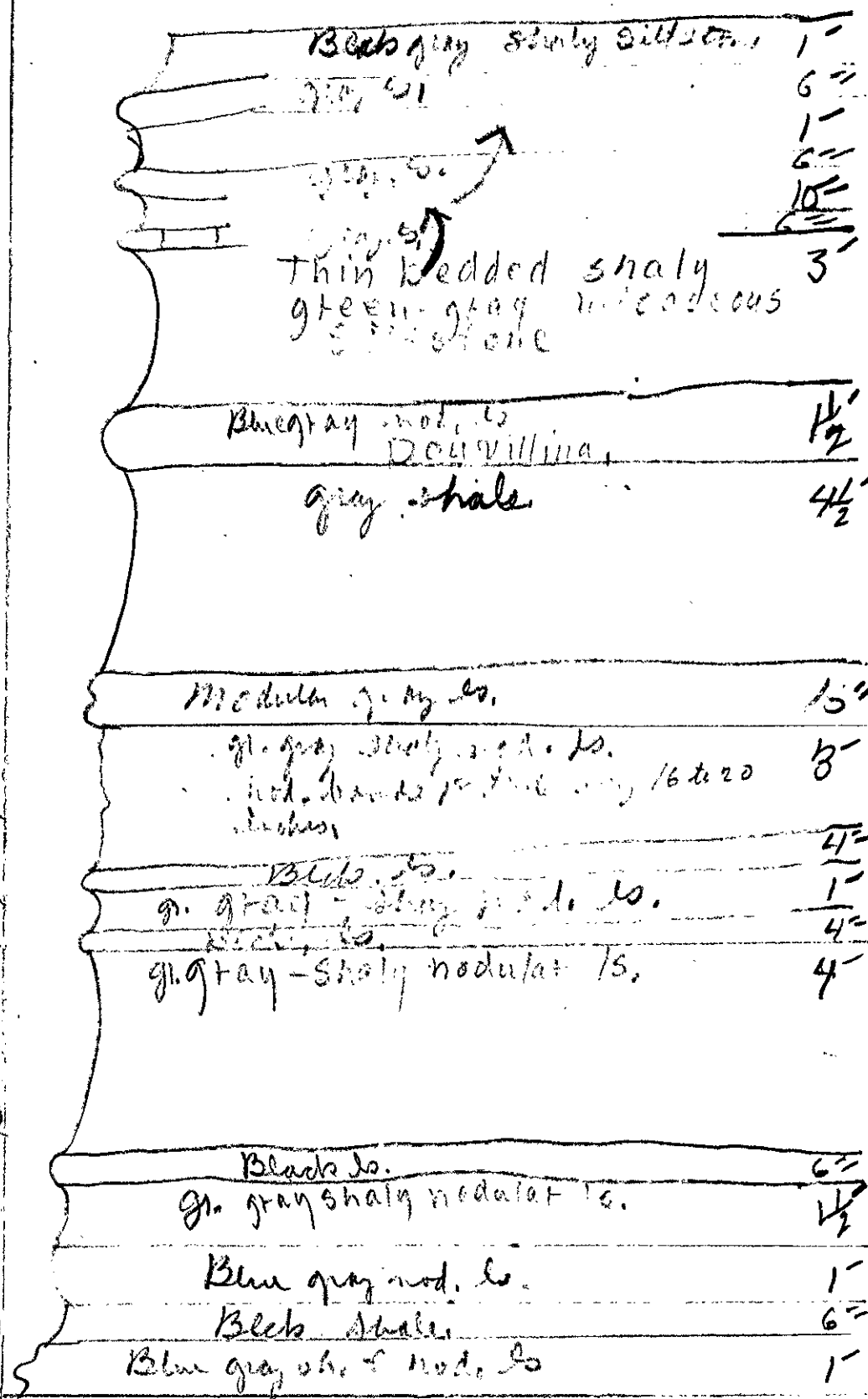
27



Frank V. Stevenson  
Deadman Can, San Andres Mts.  
c w/2 sec. 8, T17S, R4E.

22' 10"

Devonian



gr. : greenish.

Frank V. Stevenson  
 Deadman Run, San Andres Mtns.  
 c w/2 sec 8, T17S, R4E

#4 - 7-78-40

47 1 2  
 25  
 28"

20'  
 Blackish gray shale.

117"  
 Thin bedded gray siltstone 2 1/2'

Massive gray siltstone, an. fossiliferous  
 gray siltstone, fossiliferous  
 Bed. in fossiliferous  
 siltstone.

Blue gray siltstone, gray  
 interbedded with gray sh. siltstone

gray nod. ls. 9"

gray sh. 6"

gray nod. siltstone. 14"

Blue gray siltstone. 1'

gray black shale  
 fossiliferous 6"

Deadman Canyon

Frank V. Stevenson  
 Deadman Can, San Andres mtns.  
 C w/2 sec. 8, T17S, R4E.

#1.  
 July 10, 1940  
 Sec. 34 SE corner, T16S, R10E

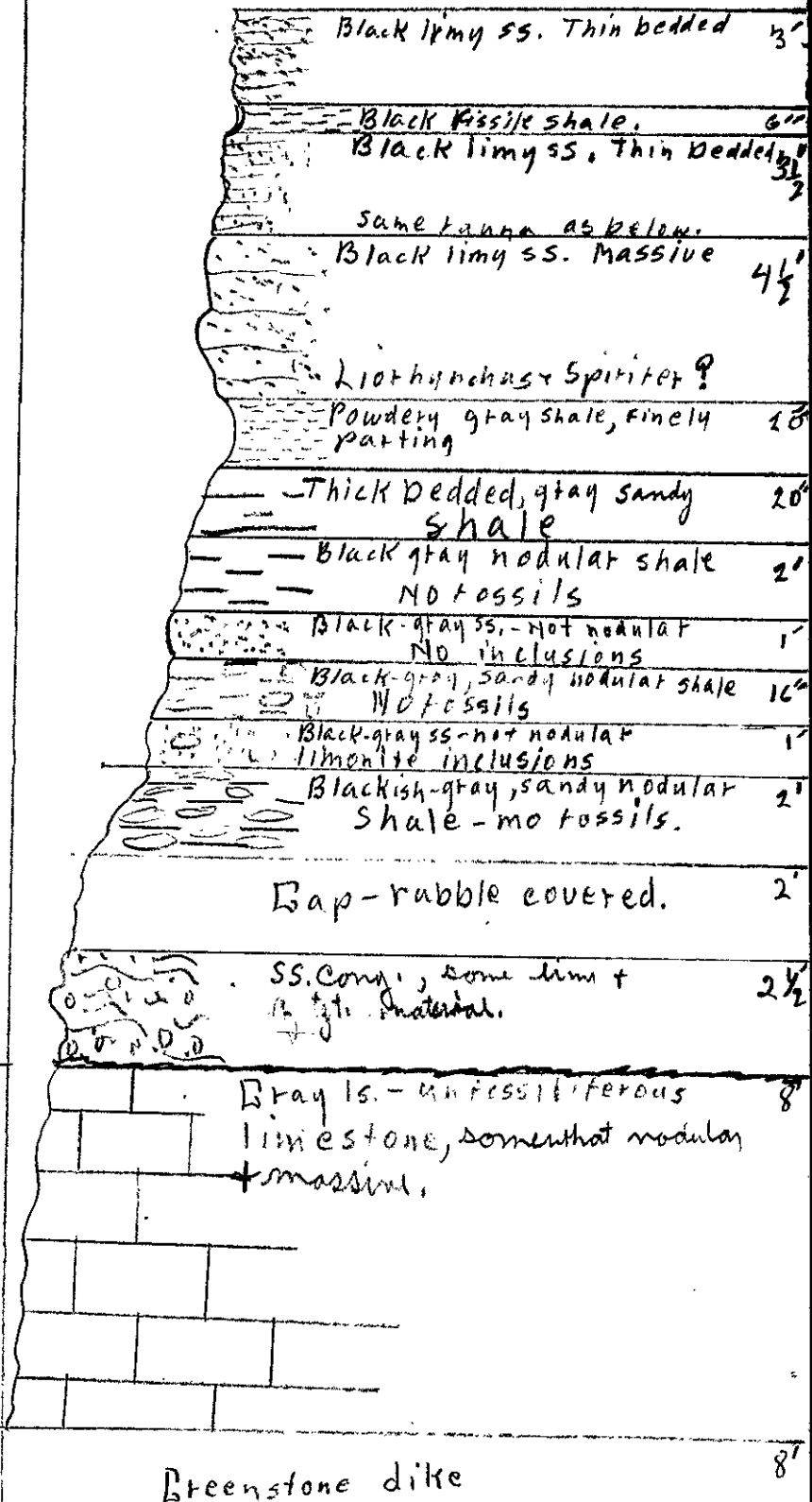
Alamo Canyon  
 1<sup>st</sup> canyon to north  
 From entrance to  
 Alamo Canyon

58 1/2' by exp  
 91' total

Devonian

Silurian

R.



Frank V. Stevenson  
 SE cor S. 34, T. 16S, R. 10E  
 Alamo Canyon, Sacramento Mts.

72  
July 18, 1940  
Sec 34 SE corner, T 16S, R 10E

Devonian



Black sh. 8"  
Fossils in 3" or 4" here  
Pugnax, Orthostrophis, etc.

18'

Yellow green shale  
with stringers of  
black shale

Productella sp.?

Fucoid zone  
Black limy ss.  
weathers a yellow  
iron rust color.  
Uneven bedding.

8'

Black fiss. sh. + ss nodules

6"

Black limy ss - Massive

5'

Liothychnus - spirifer?

Frank V. Stevenson  
SE cor S34, T16S, R10E  
Alamo Can, Sacramento Mts.

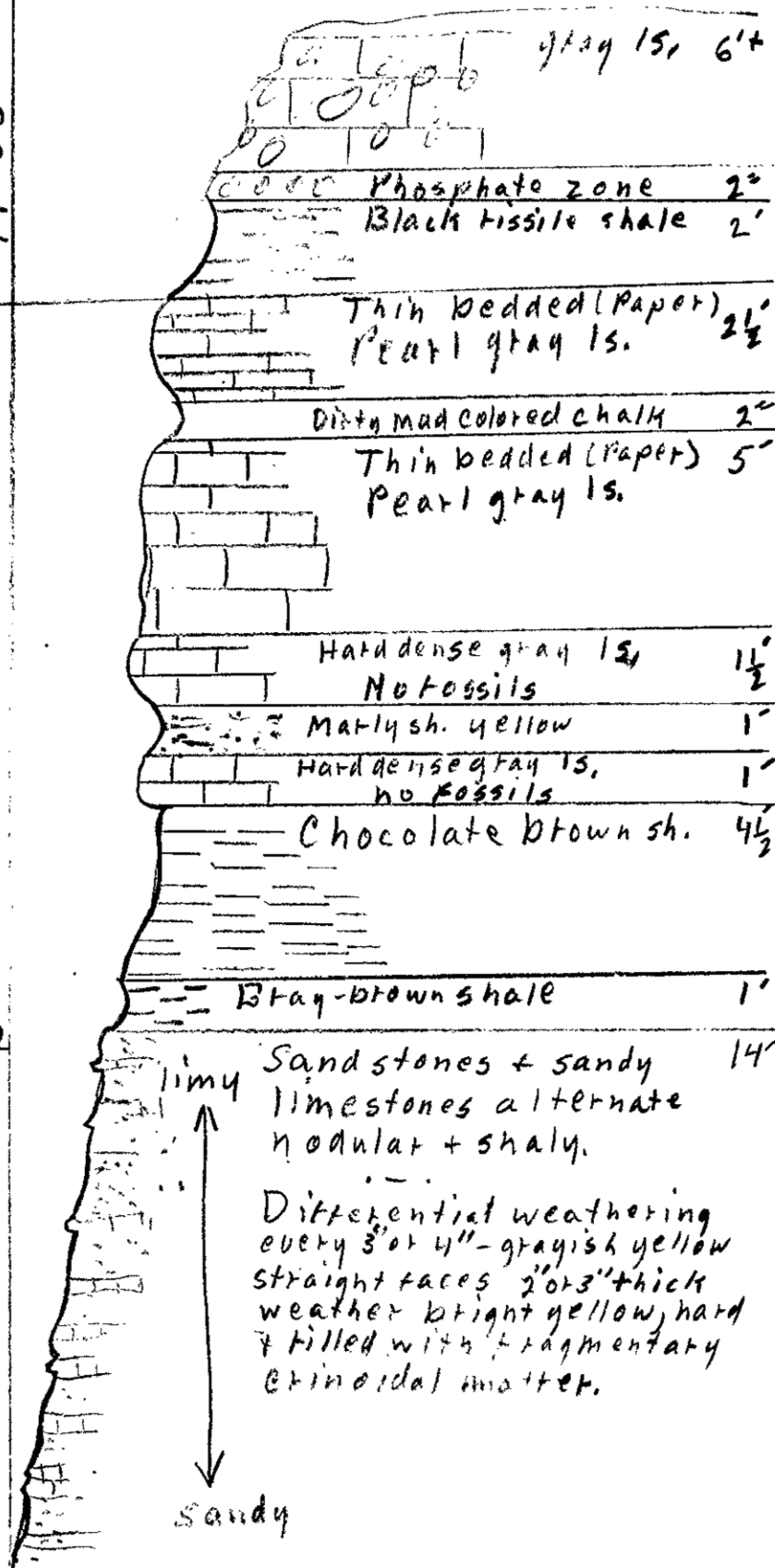
Original

#3

July 10, 1940  
 sec 34, T 16 S, R 10 E

Miss.

Devonian



Frank V. Stevenson  
 sec. 34, T 16 S, R 10 E

Alamo Can. Sacramento Mts.

Section measured at old lead camp, and prospect pits, on the north side of the Canyon.

(continued on page 2.)

- 2' Semi nodular massive buff siltstone.
- 1' Shaly, thin bedded siltstone. Buff color.
- 4' Massive buff siltstone. Same fossils as below.
- 2' Thin bedded buff siltstone. Atrypa, Zaphrentoid coral, Schuchertella sp.
- 2' Massive buff siltstone. Atrypa reticularis and Schuchertella sp.
- 8' Irregularly thin bedded, buff siltstones. Mashed fossils. Bryozoa layer 5' of 6
- 10' Massive siltstone, dirty-brown to black in color. Fossiliferous-Atrypa.
- 10' Paper shale bedded siltstone, dirty-brown to black in color.
- 1' Massive siltstone, dirty-brown to black in color. Atrypa present.
- 20' Paper shale bedded siltstone, dirty-brown to black in color.
- 5' Massive " " " " " " "
- 5' Paper shale bedded " " " " " " "
- 5' Massive " " " " " " "
- 3' Paper shale bedded siltstone, dirty-brown to black in color.
- 3' Massive siltstone, dirty-brown to black
- 2' Paper shale bedded siltstone. Dirty-brown to black.
- 5' Massive? dirty-brown to black siltstone.
- 6' White marl. *Disconformity* 1944
- 13' Thin bedded dirty-brown siltstones. Same fauna as below.
- 6' Lenticular, dirty-brown siltstones. Same fossils as below.
- 10' Dirty-brown paper shales, same fossils as below.
- 16' Thin bedded, black-brown siltstone, fossiliferous. Atrypa, Schuchertella sp. and Bryozoa.
- 1' Massive like below, fractures resemble mud cracks.
- 6' Massive, same as below fragmentary fossils. Joint fractures common.
- 3' Brown-black calcareous siltstone, weathers white. No fossils.
- 30' Grayish brown extremely brittle ls. Conchoidal fracture, excellent marker as it weathers a bright yellow-brown. Fucoids appear on top bed. No fossils.
- 3' Marly zone.
- 6' Like bryozoan bed below, stringers of bryozoan found throughout bed in stringers. Excellent Liorhynchus fauna. Occasional crinoidal zones with bryozoans.
- 3' Bryozoan layer (Petalotrypa type) Sandy gray-brown limestone.
- 6' Thin bedded 2 to 4" beds of brown-gray crumbly siltstone. Liorhynchus preserved well in this horizon.
- 4' Same as below, except fucoids appear throughout.
- 6' Dead black limestone. Appears almost vitreous on fresh breaks, no fossils. Weathered surfaces resemble shale, weathers yellow-brown to black.
- 26' Dark gray limestone, forms stream bed for 100'. Liorhynchus found in groups commonly near top of bed.
- 7' Massive, irregular bedded, gray-black shale. High calcium content. Fossils not concentrated in spots as below. Light gray fucoid markings present.
- 18' Black calcareous shale, has Liorhynchus concentrated in groups.
- 2' Nodular gray shale like below, no fossils.
- 2' Nodular gray shale, grading into compact thin bedded shale upper 8".
- 1' Concealed.

xxxxxx  
Fusselman Ls.- Dense dirty gray ls., marked by red iron stains, ferrous inclusions.

Lead Camp Canyon, San Andres mts.  
F.V. Stevenson 1940

Total thickness of the Devonian at this locality is greater than any other section measured east of the Rio Grande River in New Mexico. There are three possible divisions, definitely two formations. In the opinion of the writer the lower two divisions are middle Devonian, neither are represented at the type section of the Sly Gap formation. A portion of the middle division is represented incompletely in the Sacramento Mountains, probably throughout the Sacramento Mts. Correlation of either of the two lower divisions with the Canutillo is doubtful, as the Canutillo carries a different ~~fauna~~ fauna indicating a brackish water deposit with plants and marine invertebrates mixed indiscriminately. The Canutillo could possibly be a very near shore phase of the lower two divisions.

- 6' Brown to green shale  
10' Extremely fissile black shale  
7' Paper shale thin siltstone ~~st~~, buff color predominate, red with sandy particles at the base, going to gray, then buff, finally becoming green and very shaly at the top, fading imperceptably into the black fissile shale above.  
9' Black, fissile, carbonaceous shale.  
4" White marl.  
2½' Yellow-green, shaly siltstone. Carrys typical Sly Gap fauna.  
1' Nodular blue limestone layer, with occasional intercalated siltstone nodules Carrys Sly Gap fauna.  
3' Yellow-green, shaly siltstone. Carrys typical Sly Gap fauna.  
1' Black fissile shale.  
2' Yellow-green, shaly siltstone. Carrys typical Sly Gap fauna.  
6" Black fissile shale.  
1' Yellow-green, shaly siltstone. Carrys typical Sly Gap fauna.  
5' Black fissile, carbonaceous shale.  
2' Yellow-green marl.  
42" Massive, crinoidal, black-gray siltstone. Weathers rust red to yellow. Forms top of marker for base of Sly Gap formation. Basal beds composed of 5 parts, see three beds below.  
26" Irregular bedded, hard, gray-black shales. Beds 6 to 12" thick.  
3' Massive, thin bedded, gray-black siltstone. Beds 3 to 5" thick, weathers rust red to yellow.  
7' Massive, gray-black siltstone, weathers rusty red to yellow, Forms the base of the Sly Gap formation through correlation from type section, lithology.  
10" Marl of decomposed brown shale.  
1' Nodular bedded, crinoidal gray-brown siltstone  
7' Paper thin bedded buff siltstone. Bryozoan layer 2½" thick in center of bed.



Total Devonian section- 89' 8"  
Sly Gap formation- 57' 10"  
Middle Devonian? - 31' 10"

10 Lake Valley

10' plus. Gray, semi-lithographic limestone, with black chert inclusions.  
2' Black fissile carbonaceous shale.

2' Black fissile carbonaceous shale.

XX

2½' Thin bedded pearl gray limestone.

2" White mud colored marl.

5' Thin bedded pearl gray limestone.

1-1/2' Hard dense gray limestone.

1' Grav-shale

1' Hard, dense, gray limestone.

4½' Chocolate brown shale

1' Gray-brown shale.

14' Sands, siltstones, and limestones, thin-bedded, nodular, and shaly color gray to yellow, fossils fragmentary. Sand predominant toward the bottom, more calcareous toward the top. Crinoidal in some beds.

8" Black fissile, carbonaceous shale.

18' Yellow-green shale with narrow stringers of black shale blending into the yellow green. Typical Sly Gap fauna, *Productella*, *Cyrtina*, etc.

81' Black calcareous sandstone, weathers yellow to rust color.  
Many fucoids present from top to bottom.

6" Black shale, with intercalated sandstone nodules.

5' Clear, black sandstone. Liorhynchus? Spirifer?

3' Thin bedded black calcareous sandstone.

8" Fissile, carbonaceous black shale.

3 1/2' Thin bedded black calcareous sandstone.

4. Massive black calcareous sandstone. *Lionhynchus*? *Spirifer*?

20" Thin bedded, gray sandy shale.

20" Gray sandy shale. Thick bedded.

2' Black-gray nodular shale.

1' Black-gray sandstone, ferruginous inclusions.

16" Black-gray nodular sandy shale..

1' Black-gray sandstone, ferruginous inclusions.

2' Black-gray nodular sandy shale.

1 Covered.

30" SS. Conglomerate, some lime and quartzitic material.

[illegible]

8' Gray, massive, unfossiliferous limestone-Fusselman Ls.

Greenstone dike.

FRANK V. STEVENSON  
SE/SE/4 S. 34. T. 16S. R 10E  
Alamo Can. Sacramento mtrs.

## Shelton Ranch Road Section

Total thickness ~~43'~~ 8". ~~Any~~ ~~top~~, farthest eastern section measured. More shales present than in typical Sly Gap beds. Fewer fossils present, however all indicative types such as *Atrypa*, *Macgeea*, *Cyrtina*, *Productella*, and *Leptostrophia*, are present. The black shale at the top of the section could possibly be lower Percha.

Ready Pay = 28"  
Dry Gap = 26' 10"  
Denton = 14' 6"

Mississippian-Lake Valley-Black to gray thin bedded shales grading into a black-gray dense semi-lithographic limestone. (Lake Valley fossils)

28" Black, extremely hard, carbonaceous shale, conchoidal fracture-slaty appearance.  
6" Interbedded gray shales and siltstones every 2 to 4 inches.  
2' Massive pearl gray siltstone comprising 4 beds.

Alternated beds of nodular gray siltstones and gray shales. *Cyrtina* sp. found in central portion

16" Semi-nodular, buff siltstones.

2' Gray, thin laminae shales.

(20' gap)

4½' Massive yellow-buff siltstones.

4' Thin bedded, buff siltstones, intercalated nodules in upper 18".

18" Light, buff-gray silshales-thin bedded.

18" Dark-brown silstone, buff colored fucoids abundant.

5' Thin-bedded brown-buff siltstones.

8' Covered, probably shales &/or siltstones.

Fusselman limestone- Fairly fossiliferous. Favosites, gastropods, brachio-  
pods, and fenestelloid bryozoan present. Weathers  
rust red in color, grayish-white in unweathered pieces.

Frank V. Stevenson

Arcent. Can, Sacramento Mtns.

GNE/4 S. 20 T16S R11E

Atypical Sly Gap? Total thickness 24' 2"

Sill has probably replaced some of the Devonian beds, as metamorphism is indicated by the contacts, with the sill-dike.

Fauna not typical Sly Gap, however it is definitely not Percha or Canutillo. This Devonian section is probably Middle Devonian? as it compares favorably with the lower Dev. beds in Alamo Canyon, and in the San Andres Canyon, San Andres Mts. Sly Gap missing.

Location taken from Forest map.

Lake Valley (Cabellero) Phosphate zone at base.

12" Greenstone sill

20" Light gray argillite. *Atrypa* present.

6" Marl

20" Light gray argillite, *Atrypa* present.

6' Nodular, dun colored siltstone. *Atrypa* and *Schizophoria* present.

20" Pearly gray, argillaceous limestone. *Atrypa* present.

10" Thin-bedded black siltstone.

11" Massive black siltstone. *Atrypa* present..

5' Thin-bedded, sandy, black shale.

5' Black, hard, massive, limy siltstone.

4' Greenstone sill

25' Black siliceous limestone-Fusselman limestone.  
plus

Frank V. Stevenson  
Dog Canyon, Sacramento Mts.  
C. Sec. 11, T. 18 S., R. 10 E., Otero Co.

These beds resemble the more typical Sly Gap formation members, carries a meagre Sly Gap fauna, and should therefore be correlated as Sly Gap.

Frank V. Stevenson  
Nigger Ed Can., Sacramento mtns.  
CE 1/2 NW 1/4 S. 18, T19S, R11E.

#1

July 8, 1940

T 16 S, R 10 E, sec. 26

Middle canyon of Marble Canyon, on southeast side,  
in the center of the section.

Syncline

Age

Unconformity

Oxidized, leached yellow  
shale and sand-black shale  
stringer 3" thick in the  
middle-Not in reg. strata.

Fucoid nodular sandstone 28'

Thin, irregular bedded  
sandstone, with fossils  
ranging at top and bott-  
om, rare in between. Spi-  
rifer sp. at bottom, with  
Liorhynchus? at top and bo-  
ttom.Massive gray-limy sandstone 3'  
no fossils.Thin bedded limy ss. Buff  
colored-no fossils.Black, fine grain sandy  
limestone, massive.  
No fossils apparent.32' Conch  
Fly Gap  
25-30' L. ArchCaballero  
Black sh.Fly Gap  
Looking westFrank V. Stevenson  
Middle Canyon, Marble C., Sacramento  
Mts.  
SE 1/4 Sec. 26, T. 16 S, R. 10 E

#2

July 8, 1940

T 16 S, R 10 E, sec. 26  
 Middle canyon of Marble  
 Canyon, on south east side,  
 in the middle of the section

Synclinal deposit

X bedded ss. 1-2½'

Blk. sh. 3'  
 weathers to dark gry.  
 x bedded ss 1'

Black fissile  
 shale- weathers  
 to a dark gray  
 color.

Sequence in  
 eroded top of Gap Fm.

Brownish-white ss. 1'

Black fissile shale 1'

Brown shale 1'

Blackish-brown shale 3½'

Limy ss. Buff-hard and massive 1½'  
 Gray-hard and brittle 2½'

Black, fissile, finely  
 parting shale

Black sh. (slate), gas smell, massive 1½'  
 Chocolate brown shale 4½'  
 truncated at bottom by  
 black fissile shale and  
 by reworked material  
 shown on other column

Unconformity

Frank J. Stevenson  
 Middle can., Marble can., Sacramento Mts.

SE¼ Sec. 26, T16S, R10E

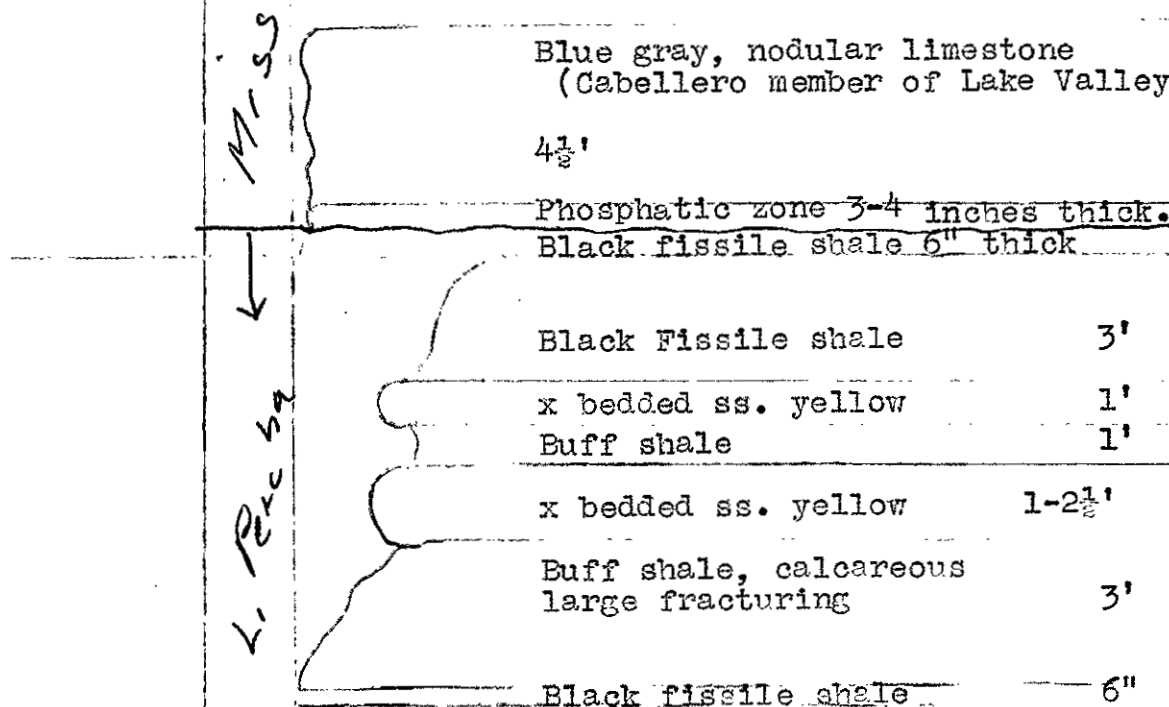
#3

July 8, 1940

T 16 S, R 11 E, sec. 26

Middle canyon of Marble Canyon  
on the south east side of Canyon  
in the middle of the section.

Top of Synclinal section



Frank V. Stevenson  
Middle Can., Marble Canyon, Sacramento mtns.  
SE/4 Sec. 26, T 16 S, R 10 E

#4

July 8, 1940

T 16 S, R 10 E, sec. 26

Middle canyon of Marble Canyon, on the  
southeast side, in the center of section.

The three limestones mentioned  
at the top of this page, seem to  
carry the most abundant fauna of  
the entire section, most of this  
section being unfossiliferous, with  
exception of the dolomite layers  
which carry the larger macro-fauna.  
The top dark gray dense ls. carries  
many *Douvillinas*, and fragments  
of *Chonetes*.

Devonian

51429

Chert

dark gray dense ls. 2'  
yellow marl  
dense med. gray ls. 1 1/2'  
yellow marl  
soft ls. light gray 1'  
Black fissile sh. 18'

Nine thin layers  
of sandy dolomite, with  
whitish yellow sand  
in between. 6'

sandy dolomite.  
Yellow brown in color. 3'

Gray ss. loosely cemented/  
sandy nodular gray/  
shale, weathers  
dark yellow orange. 15'

Black fissile sh. 1'  
Sandy nodular gray  
shale, weathers dark  
yellow-orange. 1 1/2'

Frank V. Stevenson  
SE side middle Br, Marble Canyon  
SE Cor S26, T16S, R10E 6'



#5

July 8, 1940

T 16 S, R 10 E, Sec. 26  
Middle Canyon of Marble Canyon  
on southeast side, in center  
of the section.

Mississippian

Devonian

Blue gray, nodular limestone 4 1/2"  
(Cabellero-Lake Valley)

Phosphatic zone-3-4"

Black fissile shale 6"

Soft, yellow, nodular, dolomitic sandstone. 3 1/2'

Three feet of sandy nodular shale, yellow in color. 3'

S. 1/4 M  
↑

Frank V. Stevenson

Southeast side, Middle Br.  
Marble Canyon, Sacramento Mts.

T16S, R10E.

7-13-40

1/8 mile South of Goatcamp  
Nigger Ed Canyon.

Sacramento mts.

page 14

C E<sub>1/2</sub> NW<sub>1/4</sub> Sec 18

T 19 S - R 11 E

South of saddle

at section of

Fusselman Highway.

Miss

Miss

phosphate med

yellow med. ls.

13' 20" med. siltstone

20' 20" med. siltstone

Semi-nodular siltstone  
Btwn.

Blk. fissile shale

Semi-nodular gray ls.

Blk. fissile shale

chocolate brown shale

Blk. fissile shale

chocolate brown shale

shaly siltstone

buff siltstone - soft

Massive buff siltstone

buff siltstone - soft

Massive buff siltstone

buff siltstone - soft

Stinoid stems.

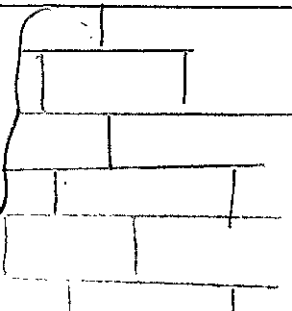
unexposed

Devonian

low

Ally Dep.

Silurian



Dark brown siliceous

ls. Carystosites 10'

Fusselman Fm

Frank V. Stevenson

Nigger Ed, 5 mi S of Goatcamp  
Sacramento mts.

C E<sub>1/2</sub> NW<sub>1/4</sub> S. 18, T 19 S, R 11 E NM

Located as the first major side canyon on the north side of Rhodes Pass; near old prospect camp. T. 13 S., R. 3 E.

Typical 5/4 Nap - 77' 8"  
High beds - 60' 5"

## Intactato Formation

20' Massive gray crystalline limestone, black chert nodules intercalated.  
5' Crinoidal marl, and phosphatic nodules.  
4' Massive, crystalline, black, oolitic and crinoidal limestone.

8' Gray-green shales, interbedded with crossbedded siltstone gray in color, worm trails near base. Weathers red.

20"	Yellow green shales
-----	---------------------

5"	Massive red limestone.
----	------------------------

5'8" Olive-green shale, two siltstone beds  $\frac{1}{2}$  to 1 thick near top.

Nodular gray limestone, with interbedded siltstones 2 to 4 inches thick,  
8" every 8 to 12 inches.

8" Nodular gray limestone.

11' Gray-white paper shales, interbedded with olive-brown siltstone layers averaging  $\frac{1}{8}$ " in thickness every 3 to 4 inches. *Merostella* cf. *barrissi*.

15' Olive brown shales, two siltstone bands 1" thick near top.

1' Gray massive siltstone. Weathers red.

1	Gray massive limestone. Weathers red.
1'	Gray, shaly siltstone- Weathers red.

8" Resistant gray siltstone, has black fusoids on top of bed. Weathers red.

1. Nodular gray limestone & siltstone, and stringers of calcareous shale, Douvillina found in top.

3½ Nodular Massive, gray ls. No shale. Ambocoelia in basal part

2' Nodular blue-gray ls. Thin stringers calcareous shale intercalated.

5" Blue-gray hard limestone, carries same fauna as the 5" bed below. No *Atrypa*

5" Gray limestone, highly diintergrated in spots resembling a a coquina in

5. Gray limestone, highly disintegrated in spots resembling a coquina in many places. Large numbers of Ambocoelia (atypical of Sly Gap), Spirifer argentarius, & Atrypa cf. spinosa.

4" Gray siltstone

6" Gray-brown shale

Rhodes Canyon, San Andres Mtns.  
F.V. Stevenson 1940

P. 1 Cen N/25.8, T13<sup>E</sup> R.4E NM

Sly Gap.

Devonian section, Total thick'ness- 34'2", plus or minus 20' green shale.

Base of the Devonian sediments(Sly Gap) rest disconformably upon the Fusselman ls., represented here by a light gray, cherty limestone. The Pennsylvanian sediments(Magdalene) rests disconformably upon the Sly Gap sediments, with erosional channels ~~up to~~ 20' or more in depth occurring in places.

Typical Sly Gap fauna is present from the ~~base of the formation~~ base contact to the top of the formation.

Magdalena

Sly Gap

Fusselman

- 1' Blue limestone, grades to conglomerate locally.  
 2' Blue-gray "tear-pant" limestone, small bed of white chert 1' from bedding plane.  
 4' Nodular, blue-gray limestone-Pennsylvanian fossils.  
 20' 4' Green shale  
 5' Light yellow-green shales.  
 6' Nodular, blue-gray limestone. *Atrypa*, & *Cyrtina*.  
 8' Light, olive-green shale. *Cyrtina*.  
 3' Nodular, blue-gray limestone, *Atrypa*, *Spirifer*, *Cyrtina*.  
 13' Gray shale, intercalated blue-gray ls. nodules. *Atrypa*, *Cyrtina*, *Schizoporia*.  
 6" Yellow-gray massive siltstone.  
 6' Yellow nodular siltstones, shale stringers.  
 4' Yellow-gray paper shales, no fossils.  
 2' Yellow shale, same fossils as below. *Pugnoides*, crinoid St.  
 11' Nodular yellow siltstone, & shale stringers, *Atrypa*, *Productella*, *Schizoporia*.  
 12' Thin bedded, yellow-green shale. Crinoidal, large *Atrypa*.  
 4' Thin bedded yellow-gray shale. Crinoid Stems.  
 6" massive gray siltstone  
 20" Thin-bedded brown siltstone.  
 1' Gray siltstone  
 4' Nodular, brown siltstone, weathers pink.  
 2' Brown siltstone. *Atrypa* present. Stained red in most places.  
 30' Light gray, cherty limestone, weathers red at contact.

F.V. Stevenson  
Mud Springs Mtn. - Mud Mtn.  
CNLS 525 T135, Row NM  
3 mi. new Hot Springs

L 101 119 128 125 201

- F. V. Stevenson 1940 p1

Total thickness of the Devonian at this locality is greater than any other section measured east of the Rio Grande River in New Mexico. There are three possible divisions, definitely two formations. In the opinion of the writer the lower two divisions are middle Devonian, neither are represented at the type section of the Sly Gap formation. A portion of the middle division is represented incompletely in the Sacramento Mountains, probably throughout the Sacramento Mts. Correlation of either of the two lower divisions with the Canutillo is doubtful, as the Canutillo carries a different fauna indicating a brackish water deposit with plants and marine invertebrates mixed indiscriminately. The Canutillo could possibly be a very near shore phase of the lower two divisions.

F.V. Stevenson 1940

#1: -  
2 miles east of Hilltop.  
1/2 mile S. of Butte #3  
mine.

2 Dues 11.00  
Up 11.00  
Total 22.00



gray very sandy shale 12'

Black - 120'

mostly shale  
shale - of which shale  
is mostly small  
fossils

Low 1/2 mile

Electrical channels in  
Chapin 7.25.1940

The Percha Cr. "Box"  
F.V. Stevenson 1940  
Page No 1

5175400

di-ab gehen sil+st+or

Therphole zone 4"

Gray calcareous 13"  
shaly nodular matl.  
same description as  
below.

Day dense is. 67

Gray calcareous shale 11'  
Nodular fossil. Catys  
typical upper petcha  
fauna. Many colored  
fossils. Not too  
many well preserved  
fossils.

Bay 15. Finely crystalline 1'

Quartzite nodular fossil. Is. 1'

Brng shale with argillac. 20  
15. very 15" to 30" hanging  
from 4"

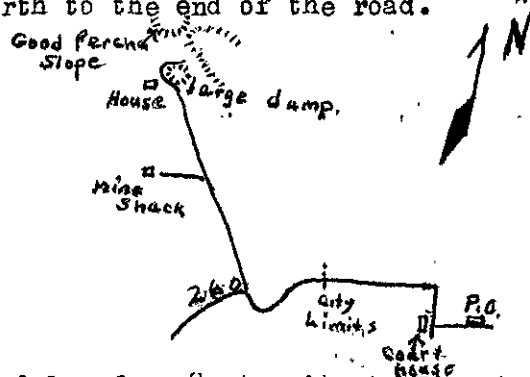




# Copy of Entwistle's Directions.

## Directions for reaching Chloride Flat

Leave Silver City going west on U. S. Highway 260 marked Cliff, Glenwood, and Mogollon. After leaving the city limit sign go  $\frac{1}{4}$  mile to the top of the hill. Turn north, right, thru gate, where sign says Caution Trucks enter, into Chloride Flat. Go 1.2 miles north past a house on the west side of the valley and the road. Large dump on the east. (Circle to the left of this dump-1940). Continue north to the end of the road.



Road log from Santa Rita to Kingston via State highway 180.

- 0.0-Hotel Martinez on the northeast edge of Santa Rita.
- 3.6-Hanover-Lower Blue limestone-Lake valley correlative.
- 4.3-Percha in both sides of the road cut.
- 6.9-Start down the valley in Magdalena.
- 8.6-Side road to Mimbres-North.
- 9.6-Side road to Deming-South.
- 16.7-Enter the Gila National Forest.
- 24.0-Pennsylvanian ls.
- 27.0-Summit of Smory Pass.
- 29.4-Picture of F. V. S. and A. L. S. standing on fault trace.
- 35.1-Kingston.
- 36.6-Leave Gila Nat'l. Forest.
- 37.1-Road forks and goes up North Percha Creek. Scarp made by the Lake Valley ls. and beds of Magdalena cross the road.
- 43.2-Hillsboro.

## Entwistle's directions-

4.5 miles east of the Santa Rita Post Office. Eight foot cut in the nodular limey Percha shale. On top of the hill is a side road to the right, south, and gate.



## Directions for reaching the outcrop at the west foot of Bear Mountain.

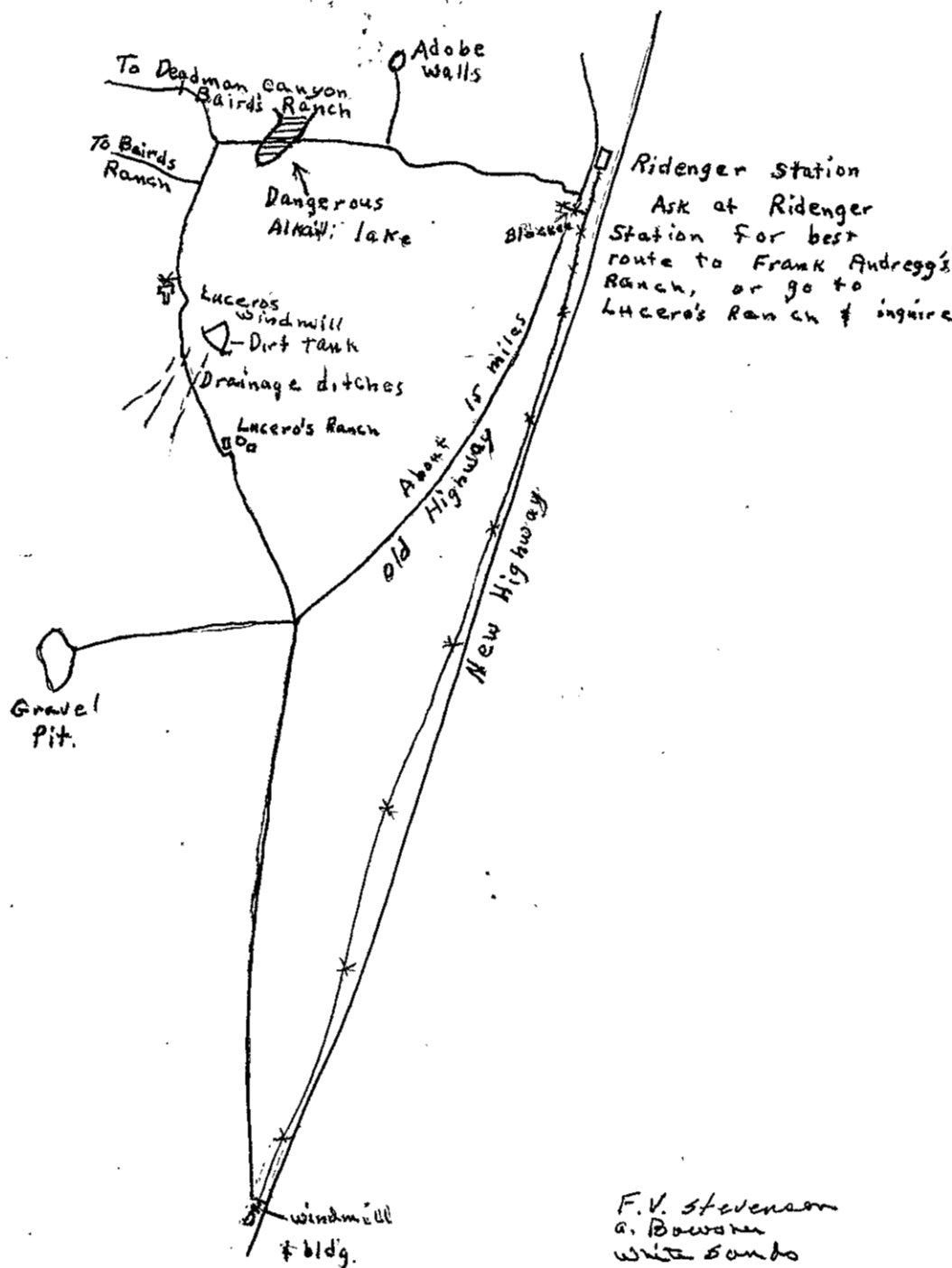
From Silver City hospital continue to town nearly three blocks on 12th st. On the right side of the road is Pennington's wholesale grocery (on S. W. corner). Filling station and tourist camp on the N. W. corner. Turn right on Alabama street and over narrow bridge. Continue west until the street narrows, where turn right and continue north past the Bear Mt. Lodge sign. (Bear Mt. Lodge sign is 3.0 miles beyond or from the intersection of Alabama and Atlantic streets.) Then north and west over the divide (6.9 miles from the above intersection) south of Bear Mt. On the northwest side of Bear Mt. is a little park, 8.5 miles from the above intersection, on the west side of the road and the bare bluff of Percha is to be seen 200 yards to the right, east. Park in the road side park. Two and six tenths miles from the intersection above is a good outcrop of fossiliferous Percha on the east side of the canyon. You will enter the Gila Natl. forest 4.5 miles above the said intersection.

F.V. Stevens - 1940  
Bawson 1940  
Silver City area

For Percha breccia-Go through Silver City south past the Court House on the Lordsburg road(paved-Highway 180). Stop at the city limit. Go up the hill to the west 200 feet.

George Skelly's map of White Sands

US Park Ranger  
@ White Sands Hq.



Lower Percha 232'

F.V. Stevenson 1940

how Percha.

Section of the Percha Shale at Chloride Flat,  
Grant County, New Mexico.

(Sections 32 & 33, T. 17 S., R 14 W.)

<sup>total</sup>  
Feet 456

Lake Valley Limestone

Percha Shale:

- 73' Upper Percha
- Red shale with limestone nodules, highly fossiliferous; in upper 25 feet *Camarotoechia endlichii* and *Schizophoria striatula* var. *australis* common, rarely found below the upper 25 feet. *Spirifer whitneyi* more common in the lower part, than in the upper 25 feet. *Productella* usually found with *S. whitneyi*. 70 feet
  - Gray massive limestone, zaphrentoid corals abundant. 3 feet
- 383' Lower Percha
- Red fissile limy shale and fissile shale with lenses of reddish sandy limestone. No fossils found in these beds. 120 feet
  - Gray to black fissile shale carbonaceous shale. Occasional balls of hematite which has resulted from the oxidation of pyrite. Often a few pyrite crystals are found in the center of the ball. 140 feet
  - Sill of diorite porphyry 28 feet
  - Gray to black fissile shale, carbonaceous. 92 feet
  - Breccia of hornstonized shale cemented by later chalcedonic quartz. Shale coloured red due to oxidation of the ferrous iron to ferric iron by mineralizing solutions. Breccia found in strongly faulted and mineralized areas only. Probably localized by faulting. 3 feet

Note: Red colour in upper beds due to oxidation of ferrous iron of unaltered beds to ferric iron. A gradation is found from the gray to black to the red beds. An analysis of the upper beds would probably show them to be shaly limestone with the shale content increasing down the section.

To the south of Silver City the upper beds have been cut out by the Silver City stock.

Silver ore has been found in the Percha shale immediately above the Fusselman dolomite, where sheets of native silver have been deposited in the laminations of the shale. Pearceite is also found in hair-like veins. Pearceite usually shows signs of supergene alteration; the mineral breaks down to argentite and covellite.

Pen notations made by F.V. Stevenson

(Rhodes pass)

[illegible]

Rhodes Can. San Andres Can.  
F.V. Stevenson, 1940  
cen. N 1/2 S. 8, T13S- R4E. NM

#1 7-30-40

Mud Springs Mt.

Pictures

East of ...

red siltstone 6'  
yellow nod. silty siltstone 6'  
yellow gray clay sh. 4'  
same as above yellow. 2'  
yellow nod. siltstone 11'  
shale. Com. type  
Duv. Productella  
small thin, Pugnoides  
Schizophoria.

light yellow gray sh. 12'  
thin, laminar, curved  
the near top edge  
of the section, all the  
way through.

2' siltstone  
yellow gray shale thin laminar 4 1/2'  
curved thin, top irregularly  
oxidized zone 2' siltstone  
massive gray siltstone 5'  
thin bedded thin siltstone 20'  
gray siltstone 12'  
sandy siltstone weather  
pink. 4'  
Ben. Siltstone - 2' (most top)  
siltstone 30'

Chalky - light gray  
weathered but not ...

Mud Springs Mtn.  
N 1/2 25, T. 13S, R. 5W  
F.V. Stevenson 1940 P. 1

#2 7.30-40  
Mad Springs  
Pictures.

Mad Springs Mtn.

Blue ls. grades to ls. congl. locally  $1\frac{1}{2}'$   
Blue gray ls. congl. of white  $2\frac{1}{2}'$

Blue gray ls. congl. fossils  $4'$

20' ±

green shale.  $2'$

limestone below.  $2'$

Blue nod. ls. & blue  
gray siltstone  
congl. & sand with crinoids  $4'$

limestone & chert green  
shale.  $8'$

Soft blue nod. ls.  
crinoids, bryozoans, & corals  $3'$

Blue ls. nodules  
in green sh.  
Crinoids, bryozoans, & corals  $13'$



Appendix 2  
Keyte, Baldwin and Blanchard, 1928, Notes  
for  
The Sacramento Mountains.

" COPY Keyte, Blanchard, and Baldwin  
from Notes given J. Williams  
of USGS, Wash., D.C.

June 18, 1928

Road Canyon 6 or 7 mi. NE of John Helm Ranch. West Well on road  
to Sierra Alta  $1\frac{1}{2}$  mi. above upper outlet of Canyon Hueco -

Magdalena 300'-400'

Morrow 150'-200'

Helms Gr. containing same fauna as in Beede's type locality.

The most fossiliferous layer is about 15 or 20' below a massive ls. that  
contains the main fauna of the Morrow. Collection from this locality  
included 2 crinoids, 2 trilobites, 20-30 Archimides, 1 blastoid (pen-  
trexite) and an abundance of bryozoans.

Forella, Wyo.

July 10, 1928

15 Top ls. near station contains a few gastropods and pelecypods.

50 Red sh. and ss.

20' Ls. pinkish very crystalline

Top foot contains many nautiloids and gastropods

30' SS red

20' Ls. pinkish

15' SS red

20' SS Xbedded - light red to white

30 SS red

15 Ls. white to gray, Productus cora, Spirifer triplicatus, Derbya sp.

Meekella, Spirifer rockymontanus, Fusulina seculica

150 SS and sh. red fine grained ss.

100-150 covered

Granite

South end of Casper Mt., Wyo.

covered

5 gray sh.

10' red sh.

10' red ss.

25 red shale

5 white to red ss. and ls.

20' shale red

10 ls. white - pink interbedded with red shale

40 shale and thin red ss. shale red

Madison.

South of Glenrock, Wyom.

Box Elder Canyon

10' white ls.

25' slope covered apparently same as below

30' white ss. cross-bedded

10' white ls.

50-60' slope covered

35' wh. ss.

8' covered

5' cherty ls. (mostly chert containing fossils *Productus semireticularis*,  
*Spirifer triplicatis*, *Morganifera*)

40' white ss. top grading into ls. and cherty ls. above, crinoid stems at top.

20' covered.

15' red ss. fine-grained

25' covered

20' red ss. fine-grained

South of Glenrock, Wyo. (cont'd)

10' covered

15' pink ls. massive

20' red - pink fine-grained ss. thin-bedded except 5' at top

40 covered slope

Madison

-----

18 miles north of Rollow's to Rollers, Wyo.

40' Conglomerate Lakota

320' varazated shales of Morrison

12 wh. ss. Basal Morrison

5' green sh.

5' ls. osterau, camponectes belemnites.

20' white ss. and greenish gray sh. interbedded.

80' gray sh. greenish

3' white ss.

60' shale gray, greenish

8 wh. ss. bottom of Sundance

23 white sh., grayish interbedded

48' Red ss. and sh.

8 Ls. thin-bedded, ripple marked

10 Pink ss 1-2 bed

8' Red thin bed ss.

50' white thin-bedded ss.

10 Red ss.

270' Red shale

35' White ss. with 20' gray sh. in middle

25' Red sh.

4' Red ss.

15' Red sh.

20' Red ss. and sh. interbedded

10' Creamy ss.

12 Alcova ls.

15 Red sh.

120 Red ss. some red sh, interbedded

10 Red shale

13' Red ss.

25' Shale and ss. interbedded red

3' Red to light brown ss.

40' Red sh.

1' Red ss.

50' Red sh.

1' Red ss.

32' Red sh.

1' Red ss.

5' Red sh.

2' Red ss.

10 Red sh.

2 Red cal. ss. small pelecypod casts

40' Red sh.

1' Red sh.

50 Red sh.

1 Red ss.  
12 Red sh.  
2 Red ss.  
15 Red sh.  
1' Red ss.  
6' Red sh.  
1 Ls. white fine gr.  
60 Sh. bright red  
15 Purple ls. gray in places especially bottom.  
50 Red sh.  
3 Ls. gray thin-bedded  
2 Brown shale - gray sh.  
2' Brown ls. thin-bedded  
20 Brown-red shale  
1500' ss. Xbedded fine-grained quartritic Penn.  
180 ls. and red Jasper  
14 ls. gray Jasper at top  
25'  
15 Red shale  
10' SS red at base - white, fine-grained at top.  
63' Gray massive limestone  
10 Pinkish hard ls.  
15' Red arkose much hematite at base - finer gr. red ss. near top.  
Upper 5' glauconitic.  
550' Sandstone  
Granite

Rawlins, Wyo.

Middle Fork Powder

Barnum, Wyo.

30' White ss.

3 Sh.

2' Shale and brown ss.

2' Ls. fossils largely pelcy.

Upper X bed

25 Ss, lower fossils

8' green sh.

2 Ss and cong. large Ostrea

150 Gr. sh. Belemnites Ostrea

20 White ss. fine-grained

15' Gray sh. Belemnites Ostrea

2' White ss.

25' Gray sh. ls at top

3' Ss. gray Pentacrinus

90' Gray sh.

5' White ss. known as Sundance

40 Red sh. and grp.

Lower part bright red non-resistant - 20' shale upper

600-700 Triassic - Poorly resistant ss yellowish not Alcova about 250' from top.

6' Thin bed ls.

25' Sh. yellow col. with iron

136' X bed ss. Tensleep

1 gray ls.

2 Red sh.

1 Blue-gray ls.

2 Red sh.

1' Purple ls.

(  
(  
( ← Amsden  
(  
(

62' Red Amsden sh.

320 Madison ls.

2 mi. N. Sulphur Springs on Sulfur Cr. South end Wind Rivers  
20 mi. S. of Ellis Ranch on Sweetwater

Fort Collins

Tertiary

10<sup>+</sup> Park City

70 Tensleep

80' Madison chert and ls.

10' Red sandy shale

200<sup>+</sup> Bighorn dolomite

8' Sandstone

80' Gallatin ls. containing trilobites and Eorthis desmopleura

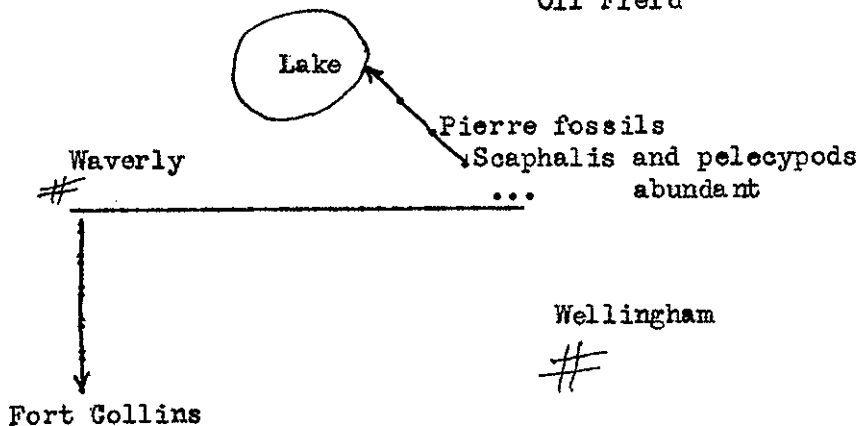
100' Deadwood ss.

?

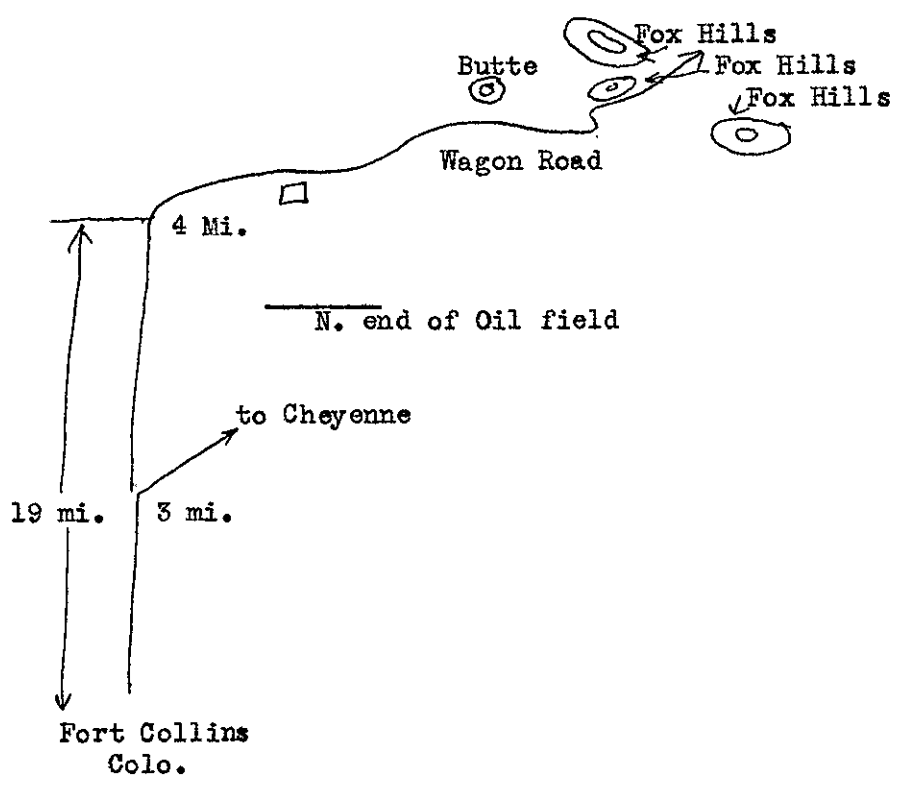
2 miles covered

granite

Oil Field







At locality indicated 26 mi. NE. of Fort Collins, Colo., the Fox Hills is very fossiliferous.

The pelecypods are in lower white sandstone while the gastropods, shark teeth, *Ostrea*, and sea weeds are found in a brown concretionary sandy limestone at the base of white sandstone. The fossils are very abundant and weather out in a fair state of preservation.

Ingleside, Colo.

At Stout there is one thin limestone in the upper Fountain.

At Ingleside there are three ls. the upper two thick - 15-20' - the lower about 5-10'.

The lower ls. is very fossiliferous especially at the top. The best collecting at 1.2 mi. south of Ingleside.

At Owl Canyon the middle ls. contains many derbya and composites. The upper limestone contains *Lophyllum proferendum*, *Productus cora*. Four or five miles south of Colo.-Wyo. line at Box Elder Canyon are five ls., the lowest being the same as at Ingleside. These limes vary from 10-30' thick, have some fossils. Three or four miles farther north and over the Colo.-Wyo. line there are 7 limestones. These are well exposed in Haygood Canyon, here again the lowest ls is the most fossiliferous. The character of this line has changed being very hard. About the same fauna with addition of many crinoid stems.

On the Fort Collins - Laramie Road - north and west of Ingleside, the ls. do not increase in number and the arkose at bottom of them continues to be thick, while it thins to the east and north.

2 mi. south of Grapevine Canyon, 35 mi. S. of Alamogordo, N. Mex.

June 23, 1928

150' ls. massive

200' ls. gray top containing nautiloids San Andreas

3' Productus ls.

60' ls.

50 shale and yellow and red.

20' ls gray

60' sh. gray with six 2-3' blue limes

300' massive gray ls., thin shales interbedded crinoid stems, Echinocrinus  
gastropods, Pustula, Gonospira bellerophon

15 ls. thin yellow

20 sh. red to yellow

250 Gyp.

3' ls. blue weathers brown

100' abo. red sh. & ss. with three 2-3' beds of yellowish ls.-found no fossils.

75' gray to brown ls. and sh. thin bed ls.

30' yellow ls. thin bed

20 gray ls.

10 yellow ls.

80' gray blue ls. shale interbedded

20' thin lime. and sh. interbedded bryozoa gastropod composites

8' bluish ls. gastropods abundant, Echinocrinus Productus

2 brown ls.

5' shale

20' ls. and shale - ls. blue.

Fault

15' gray ls. massive

6091

No. 4 Grapenine  
can.

Pleuronomaria  
Pleuronomaria  
Hestis

also ss(?) reddish to buff

Calc. ls. thin bedded in abt. 1' thick

ls. of ls. thin bedded in abt. 1' thick

Co. M. Nevada (Sta. 6091)

6092

6<sup>4</sup> 30 shale and covered

3<sup>8</sup> 2' ls. gray

Fault

3<sup>6</sup> 5' ls gray

3<sup>1</sup> 3' gray sh.

2<sup>0</sup> 2' ls. brown crinoid stems

2<sup>0</sup> 6' ls. massive gray sandstone ✓

2<sup>0</sup> 10' shale and thin ss.- shale green

10' massive ls. gray weathers brown west of ranch house.  
Allorisma termuilo, about 50' above crinoid layer.

Grapevine Canyon, Lee Ranch

#### Alamogordo, N. M.

In Grapevine Canyon the Abo, if present, consists of limestone, thin sand and shales - very little red present - about 20' red shale in places.

#### La Luz Canyon, N. M. Lower or Middle Magdalena

4' ls. massive

13' ls. and sh., ls. gray, fossil fragments, bellerophon echinoocrinus  
fusulina, Spirifer triplicata, Productus

13 ch. and sand sh.

8 ls. fossiliferous - sh. and ls. interbedded, gastropods bellerophon

11 shale

6 ls. massive

4 ls. and sh. crinoid stems productus enteletes

[Enteletes bed Conglomeratic 2' at top, thinning to south  
4 ft. of gyp. interbedded with thin very fossiliferous ls.  
Col. made Enteletes.  
The conglomerates thicken and are more numerous to the north.]\*

---

\*Position uncertain - I think goes here. JSW

---

35 sh. thin ss beds and ls. beds Gyp. at top

5 ls. fossiliferous - col. made

8 sh. and thin limes pelecypods

5 ls. massive

12 sh. and thin ls.

6' ls. massive

35 ls. and sh. poorly exposed, gray limestone on top - about every 5 or 6'

10' ls. thin bedded Echinoids pustula neb.

25' ls. sh. and ss. cong. chert

14 ls. hard gray massive large bellerophons

4' sh.

5 ls. from bellerophon crinal stems - many fragments

8 sh.

5 ls.

50 ls. interbedded with sh.

5 massive ls.

20' gray-blue sh., shale sandy

15 thin beddy blue ls. and sh.

20 ss. coarse, some cong., some fine gr. thinbedded

2 Cong. uneven surfaces

6' sh. thin sandy ls. fusulina

50' ss. green and brown cong. at base 8' - some shale breaks in ss.

40' sh. sandy green thin ss.

10' ls.

About 1,000' of ls. and sh. on top of Lake Valley.

Alamogordo, N. M.

Section N. La-Luz Canyon 1 mi.†

- 8 Red sh. and ss.
- 7 15 ls. fusulina and crinoid stems
- 6 20' shale
- 5 15 Fusulina lime interbedded gyp.
- 4 40 sh. ls. and ss. blue fossiliferous
- 3 15' blue sh. and ls.
- 2 8' Cong. chert ls. quartz
- 1 60-70 Felsite
- 10' ls.
- 50' black shale petrified wood.

Magdalena Upper portion

La-Luz Canyon 3 mi. E. of La Luz

Bottom of Abo sec.

- 40' ls. and sh. (4x sh. as ls.) Top ls.
- 4' massive Or. ls.
- 19 12' sandy sh. and ss.
- 18 12 ls. fusulina making up the most of ls.
- 17 70' lower red sh. 15' gray sh. and ls. nodules, ss. lenses, fusulina ls.  
upper to red shale grading to ss.
- 16 12' ls. base very full of fusulina  
upper portion massive
- 15 12 sh. and ss.
- 14 3' Cong. chert ls., Jasper
- 13 20' shale and ss.
- 12 3' ls crinoid stems abundant

- 11 18 ss and sandy sh.
- 10 3' ss. green
- 9 3'-1' Conglomerate chert and ls.
- 8 37' sh. sandy lenses, sandy ls.
- 7 5 ls gray massive
- 6 6' sandy shale gray
- 5 3' ls. massive base irregular Rhombopora
- 4 Fusulina
- 3 10' sh. sandy
- 2 6' ls. (Fusulina) massive - gray to brown
- 1 11' shale

Limestone crossing Creek

200 Gyp

150' Red ss. and sh.

40 Felsite stained yellow massive

1' Gray shale

3' Sh. black cong., gray ss., conglomerate at top  
 $\frac{1}{2}$ "-10 in diam. in shale

35' red sh. and ss.

2 $\frac{1}{2}$ ' red ss. cong., largely chert

50' red sh. and brownish red ss.

15' red sh., red ss.

15 gyp. sand, sh.

8' quartzite cong.

50-75' red shales containing thin bed gray ss. and lenses of ls.

Fault

4 gray to green ss. coarse

- 10' Gyp. and sh. yellow brown ss., ls. lenses  
20 Gyp. red ss. purple ls. nodules  
15' Cong. chert, Jasper and ls. - bottom very irregular  
12' Gyp.  
2' SS. coarse, cong. small chert pebbles  
5' Gyp and ls.  
1' ls. irreg. base  
6" Gyp.  
9' ss. coarse, massive gray  
2' ls. sandy  
12' Gyp. and sh. Lime conc. containing fossils

Section from Cong. in La Luz Canyon -  $1\frac{1}{2}$  mi. E. of  
La Luz, N. M. 8 Mi. N. E. of Alamogordo

- 41  $1\frac{1}{2}$  ls.  
40 27 gray and red shale, ss. lenses  
39 2' ss. cong. small pebbles  
38 25' Gyp. and red sh.  
37 2' Cong. ls. and chert and ss. Jasper  
36 5' Gyp.  
35 6' Cong. mostly chert and ss.  
34 18' Gyp.  
33 14' ls. massive - no fossils seen  
32 5' Gyp.  
31 30' shale, some thin ls. fossiliferous  
30 10' ls. thin, fossiliferous - half sh. and ls., fossiliferous  
shale black  
if  
29 40' Shale very fossiliferous in middle



- 28 15' Gr. shale and ls. some thin ss.
- 27 5' Gyp.
- 26 6" Red sh.
- 25 5-8' conglomerate
- 24 3' Gyp.
- 23 15' Cong. chert, ls.
22. 1' ls.
- 21 4' Gyp.
- 20  $1\frac{1}{2}$  Cong. rounded pebbles of chert ls. Jasper
- 19 40 Gyp.
- 18 2' ss chert pebbles
- 17 32' Gyp. and yellow sh.
- 16 11 ls. blue hard
- 15 8 Gyp.
- 14 4' ss conglomerate ls. and chert pebbles - part breccia
- 13 1' ls.
- 12 25' sh. gyp at top and intervals
- 11 5 ss. - cong. at top - ls. chert Jasper pebbles
- 10 12' Gypsum and sh.
- 9 2' Conglomerate and breccia, much chert and ls.
- 8 35' Gypsum
- 7 19 ls. black to blue at top, lower thin-bedded, upper massive conglomerate in middle
- 6 30-40' sh. 10' base brown-black at top, calciferous grading into black ls. at top.
- 5 3-4' Conglomerate chert and ls. abundant ss. brown
- 4 3' sh. brown, concretions gypsiferous
- 3 3' ls. blue, *Productus cora*, *Phymatifer pronodosus*, etc.
- 2 6" black shale
- 1 1' ls. pebble cong. in sh., pebbles well-rounded.
- Black to brown sh. Prob. top of Magdalena containing coal.

Appendix 3

Bowsher, 1956, 1948 and 1951, Reef sketches, Sacramento Mountains

1946

- 1-F-7-A
- 2-F-7-A
- 3-F-7-B
- 4-F-7-B
- 5-F-7-B
- 6-F-7-E
- 7-F-7-F
- 8-F-7-G
- 9-F-7-H
- 10-F-7-J
- 11-F-7-D
- 12-F-7-m
- 13-F-7-k
- 14-F-7-l
- 15-F-7-m
- 16-F-7-l
- 17-F-7-o
- 18-F-7-q
- 19-F-7-p
- 20-F-8-E
- 21-F-8-D
- 22-F-8-A
- 23-F-7-R
- 24-F-8-B
- 25-F-9-H
- 26-F-9-G
- 27-F-9-A
- 28-F-9-B
- 29-F-9-C
- 30-F-9-E
- 31-F-9-D
- 32-
- 33-F-9-F
- 34-F-7-S

(F-9-G & F-9-H  
not examined  
on ground)

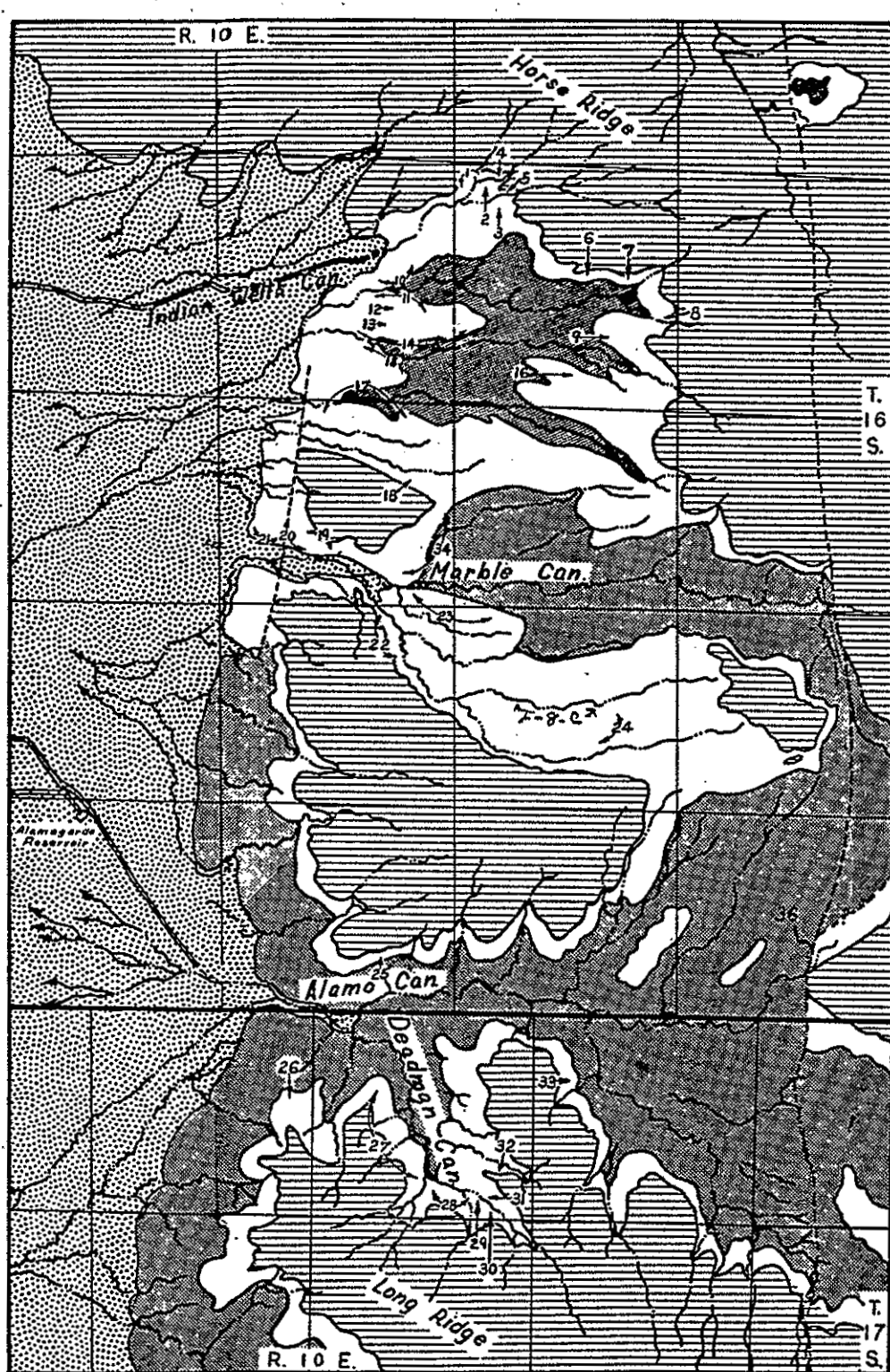


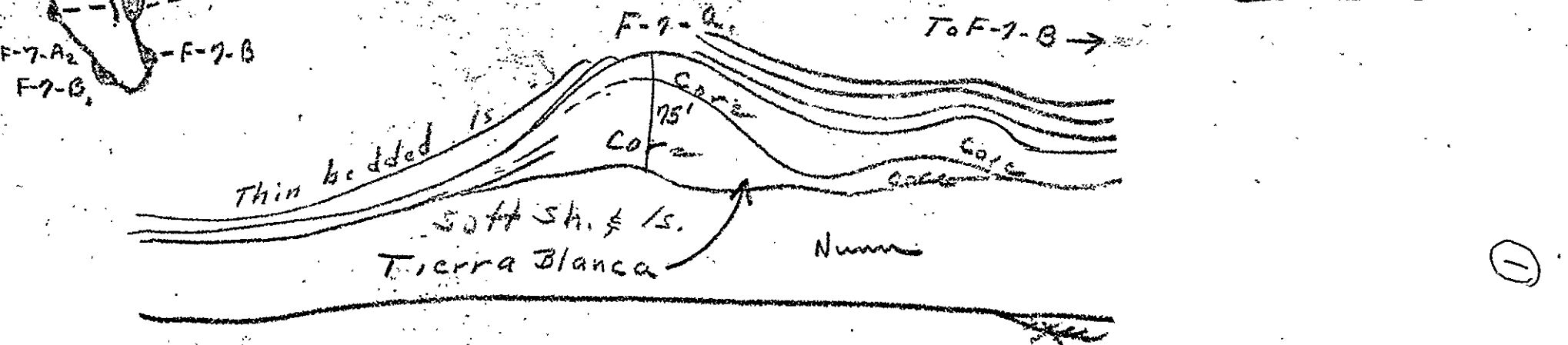
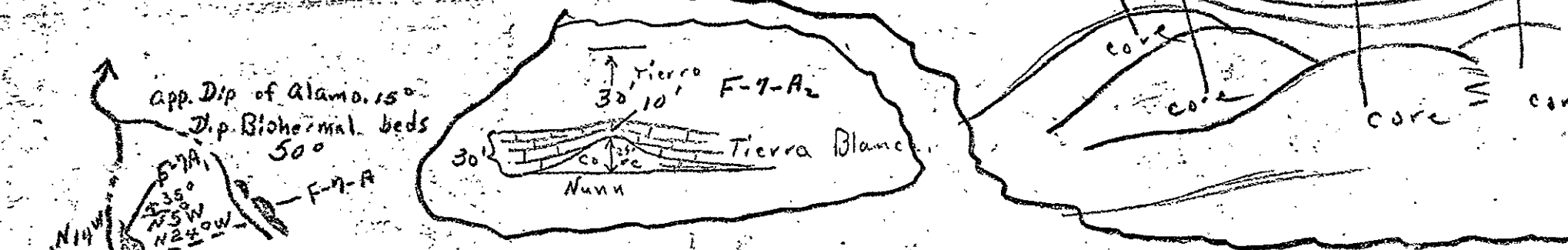
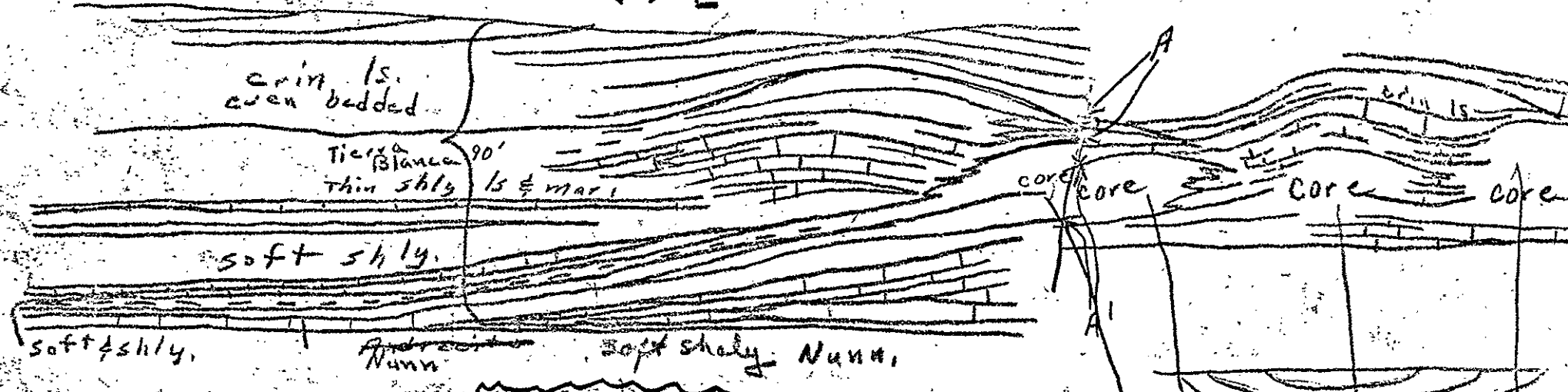
Figure 2

Index map to locations of bioherms in Mississippian strata in the northern part of the Sacramento mountains, New Mexico. The finely stippled portions represent the exposures of Pre-Mississippian rocks, the white portions represent the exposures of Mississippian rocks, the horizontally ruled portions represent the exposures of post-Mississippian rocks, and the coarsely stippled portion represents the coalescing alluvial fans and valley alluvium at the western foot of the mountains. The center of the area covered by this map lies approximately 3 miles east of Alamogordo, Otero County, New Mexico.

File  
copy

# Bioherm F-7-A

W ↔ E

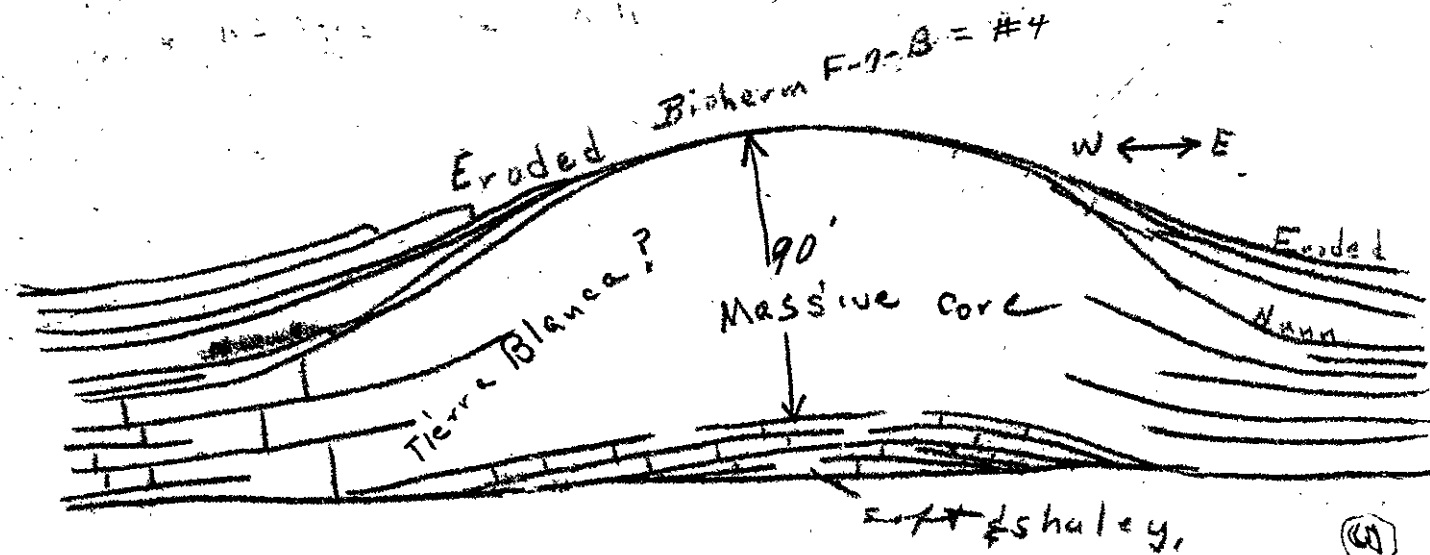
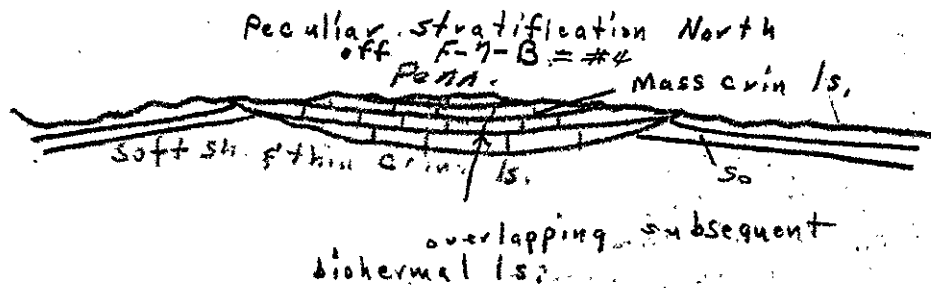
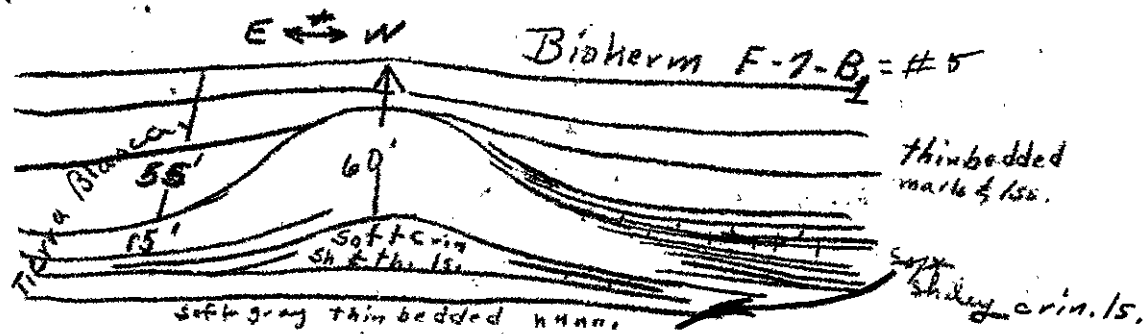


A. Bowsher  
Dept Geol  
U. of Kansas NW ↔ SE  
#31 Bioherm F-9-D

D. Arch. 19 D. Arch. 19



#1 F-7-A on another sheet



Bioherm F-7-D

E-W

Continued

Bioherm F-7-D

E-W

dunn soft gray

Andrecito

160

Andrecito  
Cab.

soft sh & ls

160'

175

6



F-7-G #8

N ↔ S



20' Covered

F-7-G #9

Core

60'

Andrecito

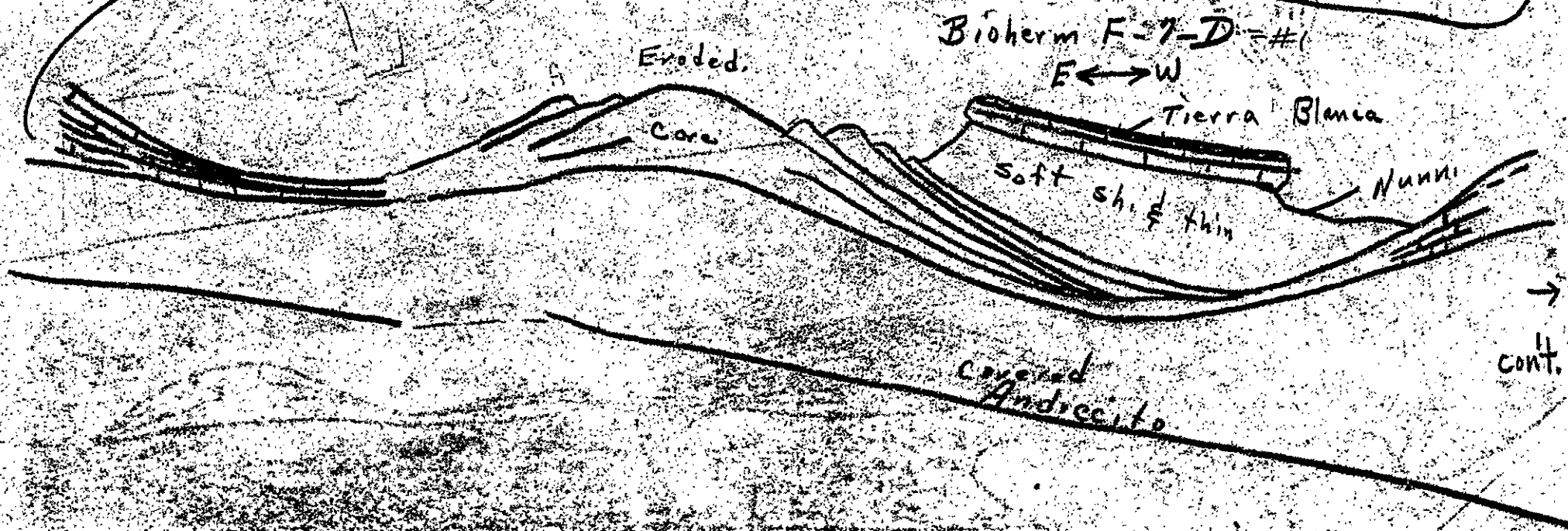
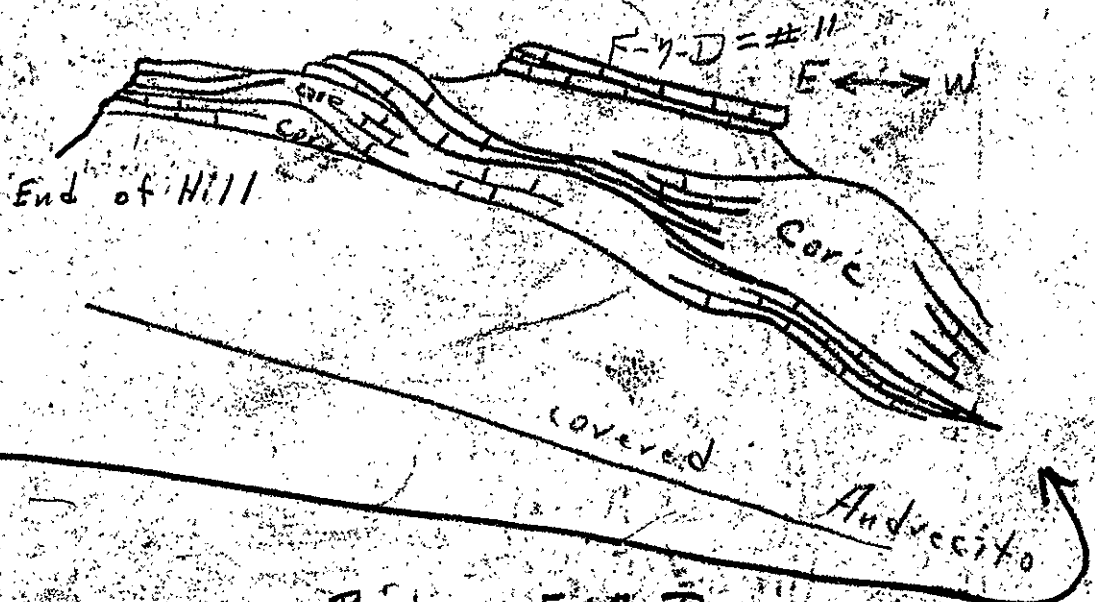
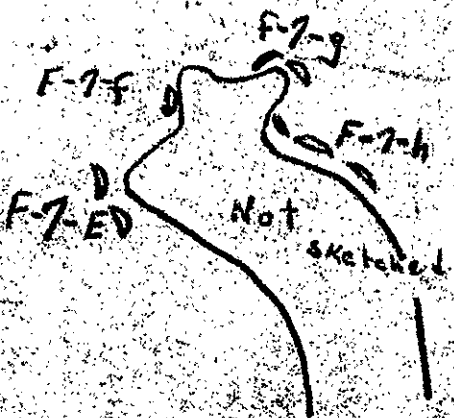
N ↔ S

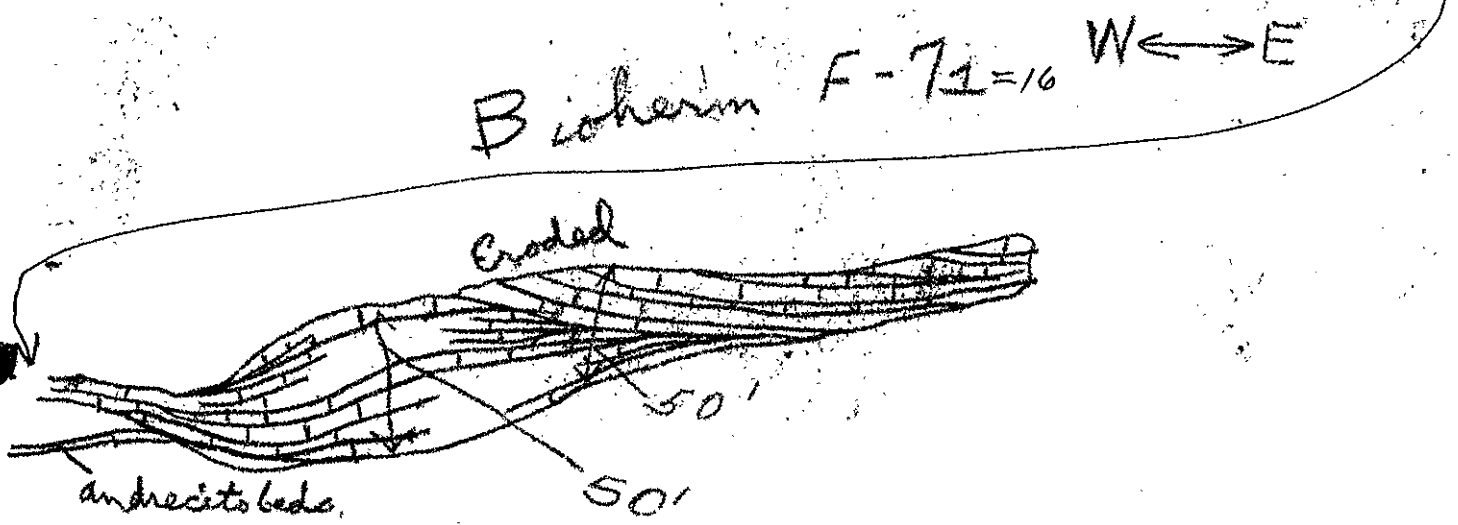
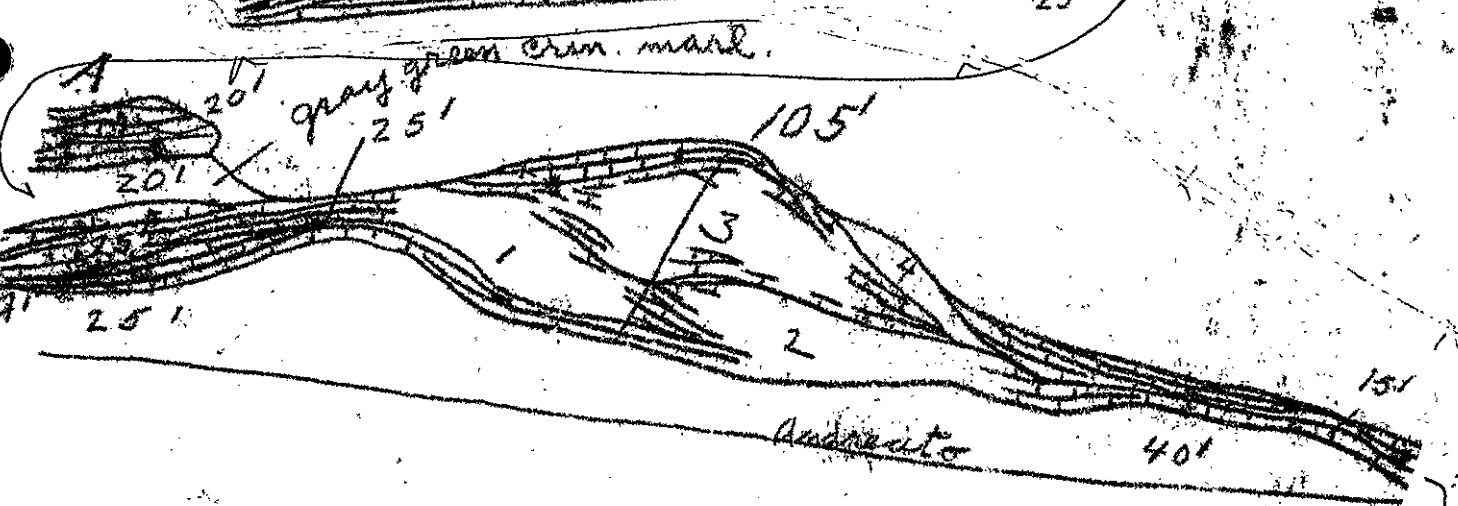
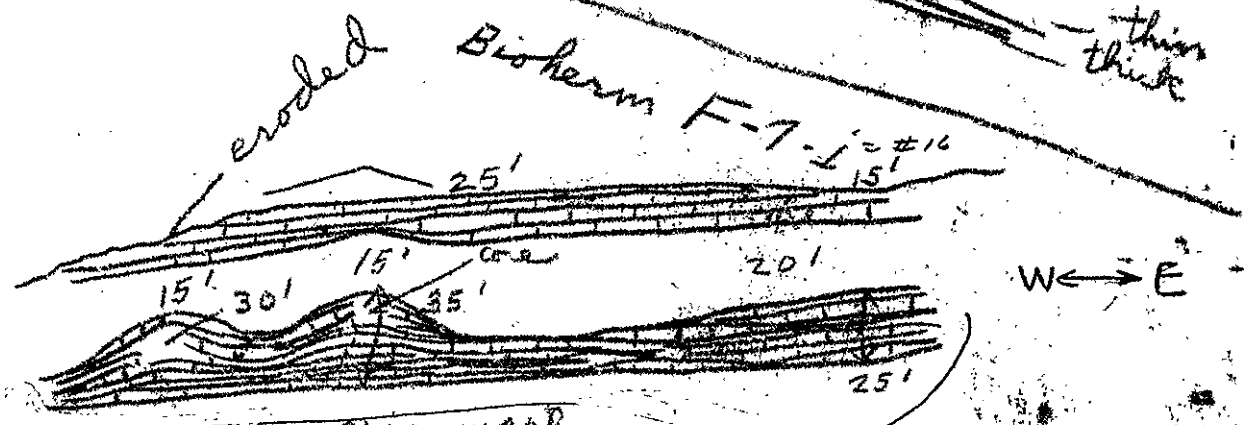
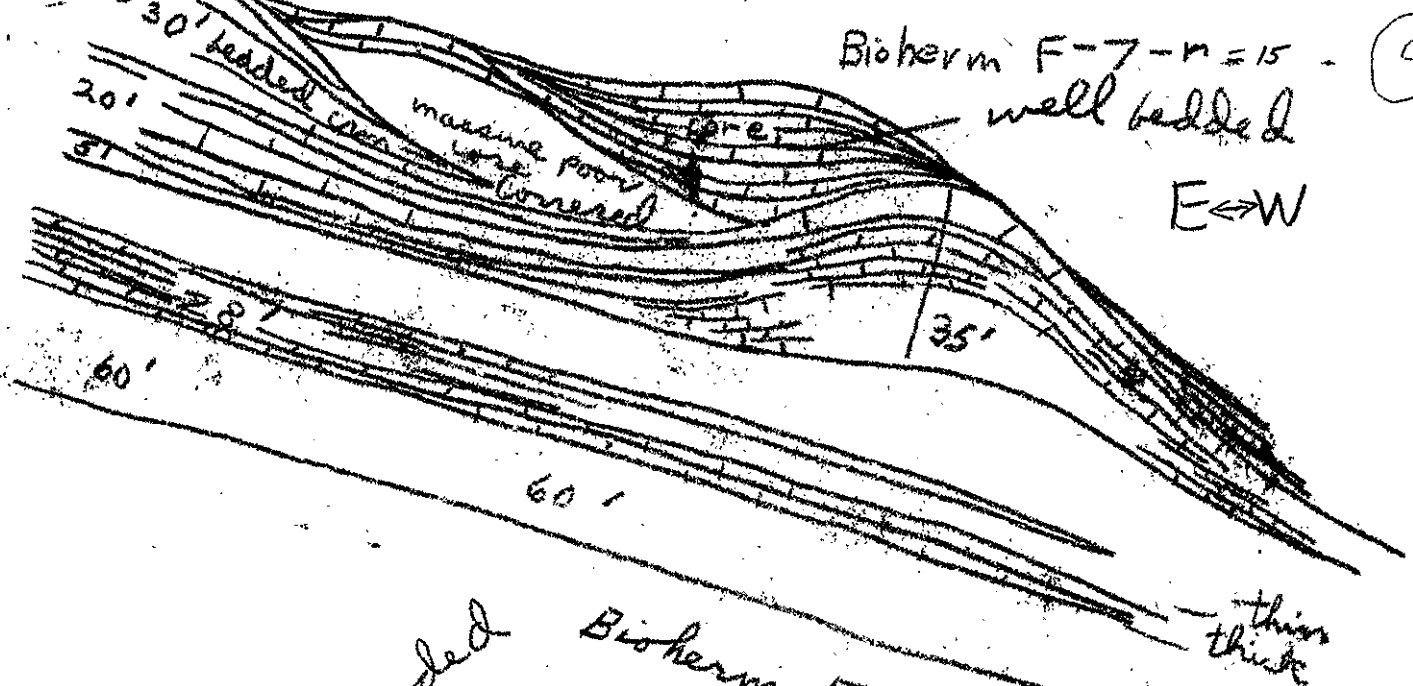
38'

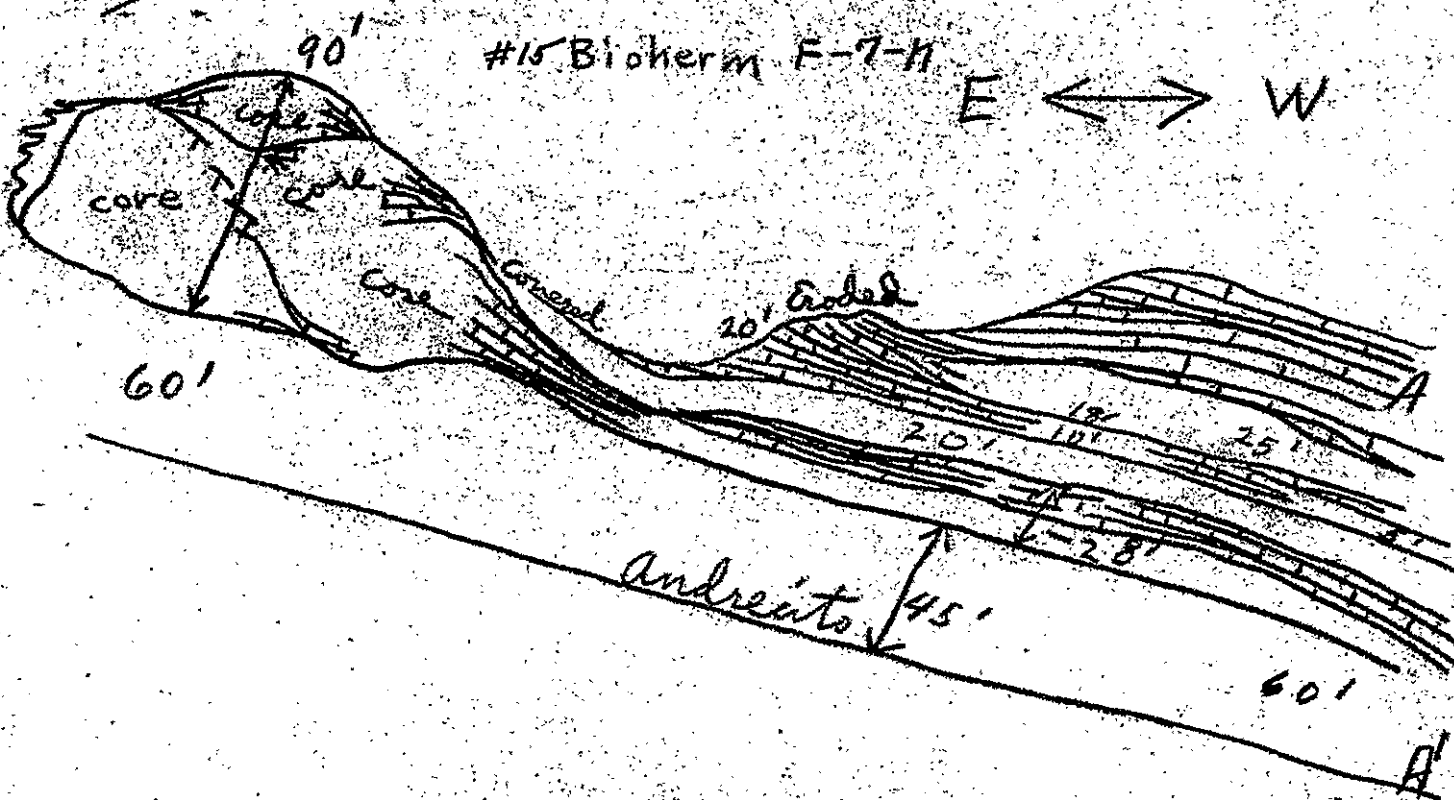
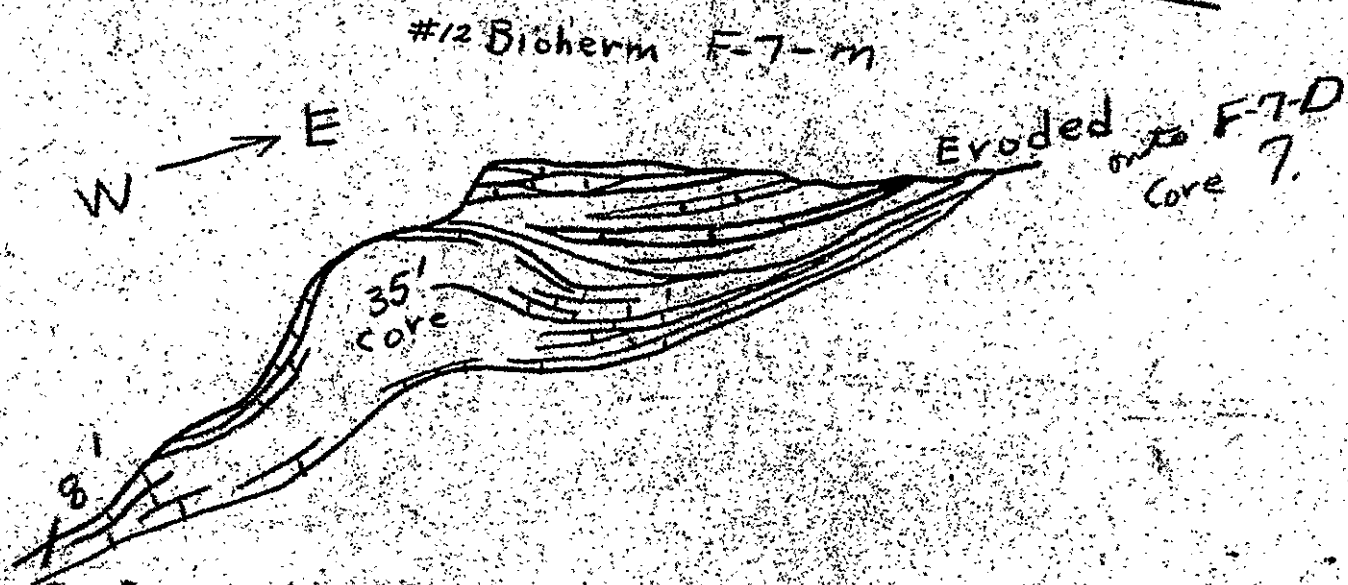
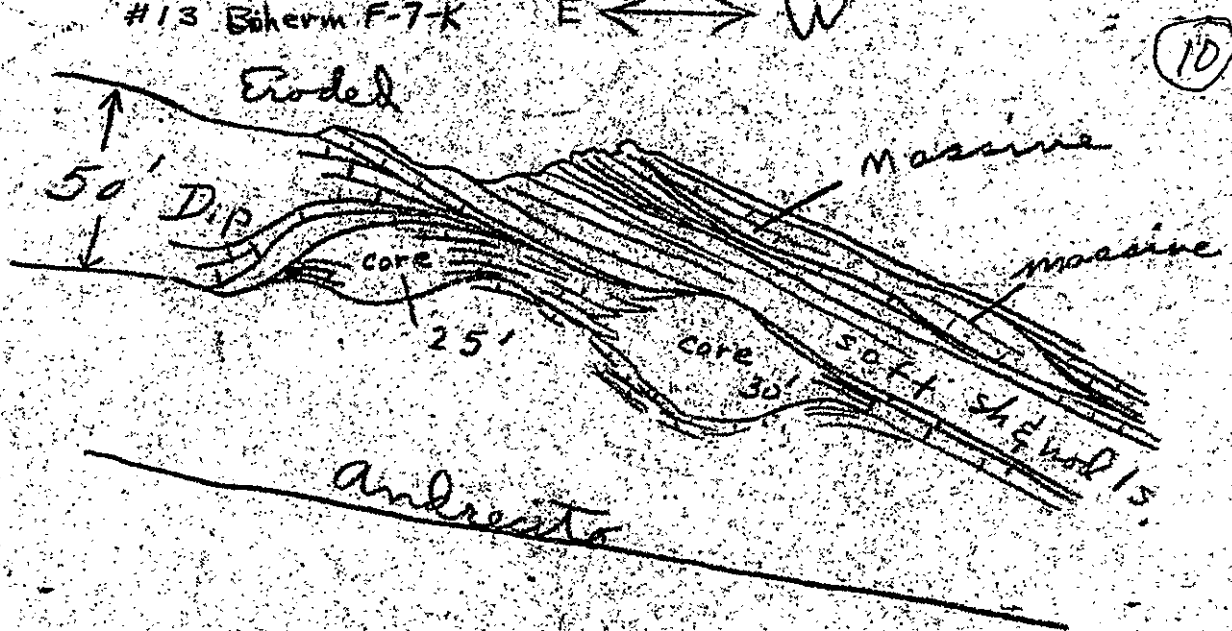


⑦



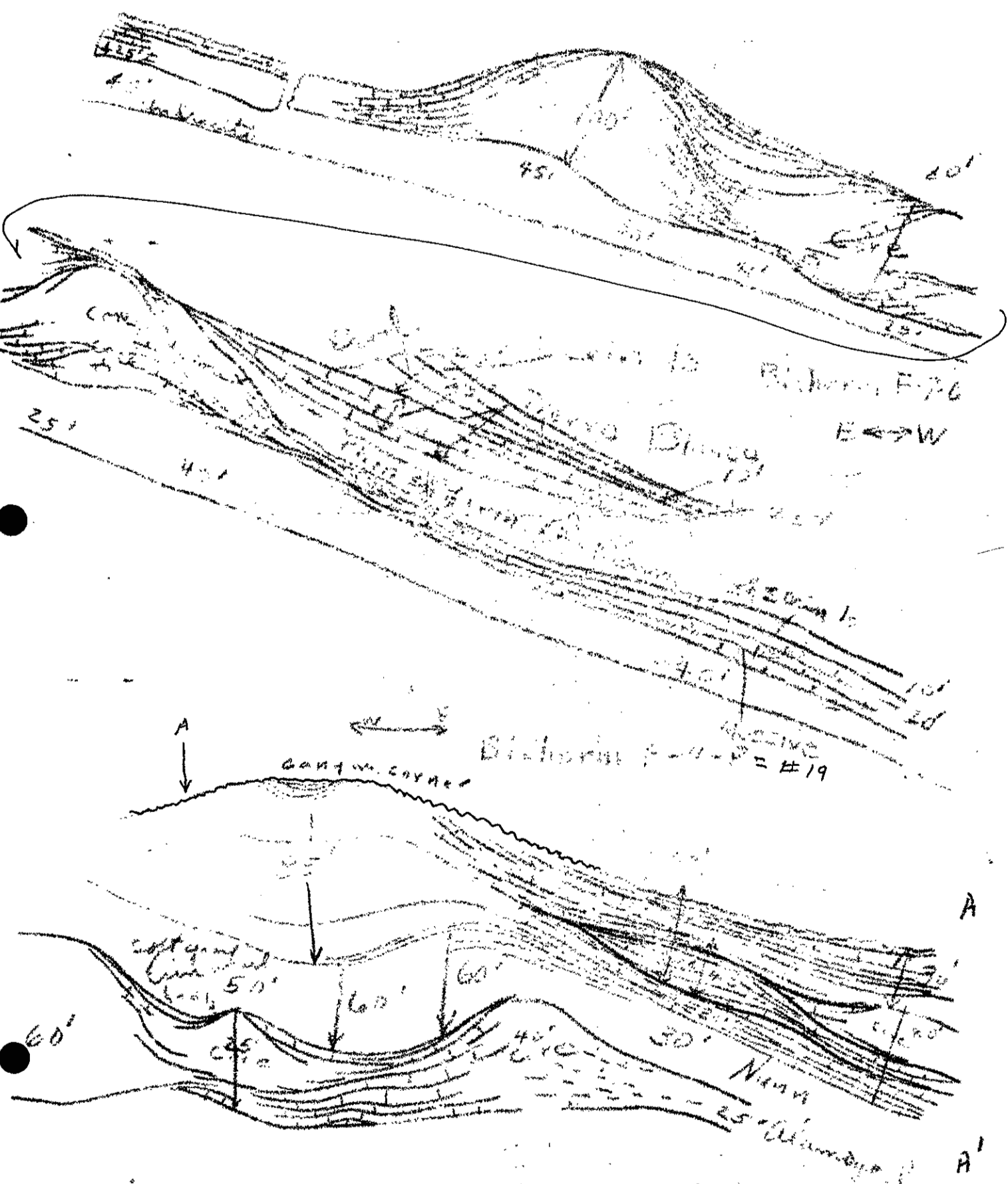






B. L. L. F-7-C = 17

E-W



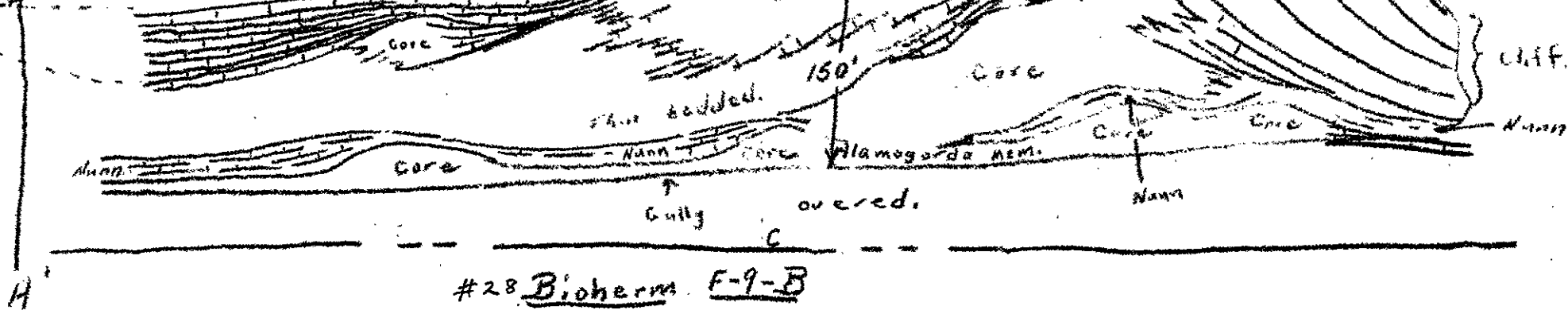
Arthur L. Bowin Photos. Roll #1  
 Univ. of Kansas 13, 14, 15, 16, 17, 18 & 19.  
 Dept. of Geol. Pan-x @ 50<sup>th</sup> - f. 11.  
 Aug 1946 also Roll #2  
 7-12

#27 Bioherm. F-9-A.  
 west wall Deadman  
 Canyon.

241

To Bioherm

F-9-B



#28 Bioherm. F-9-B

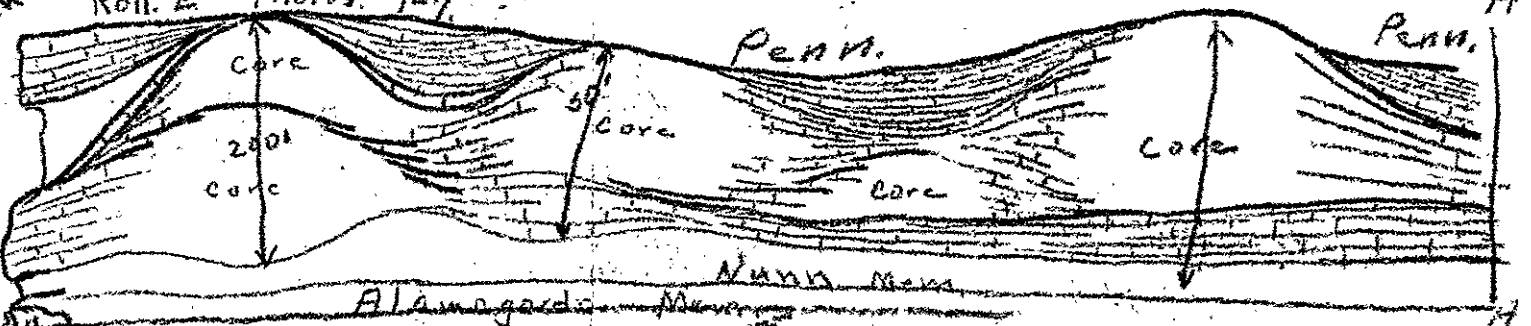
Southward continuation of F-9-A

S ↔ N

E ↔ W

Roll 2 - Photos. 1-7.

Sw Branch  
 of  
 Deadman  
 Cany.

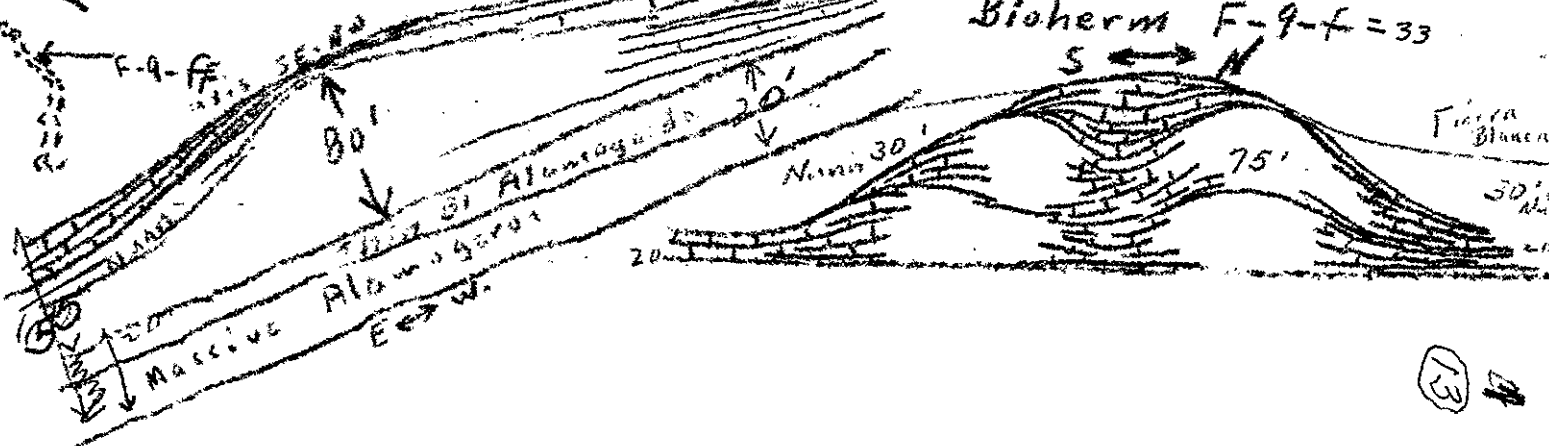


F-9-A

F-9-B

F-9-D

Axis  
 F-9-C



Bioherm F-9-f = 33

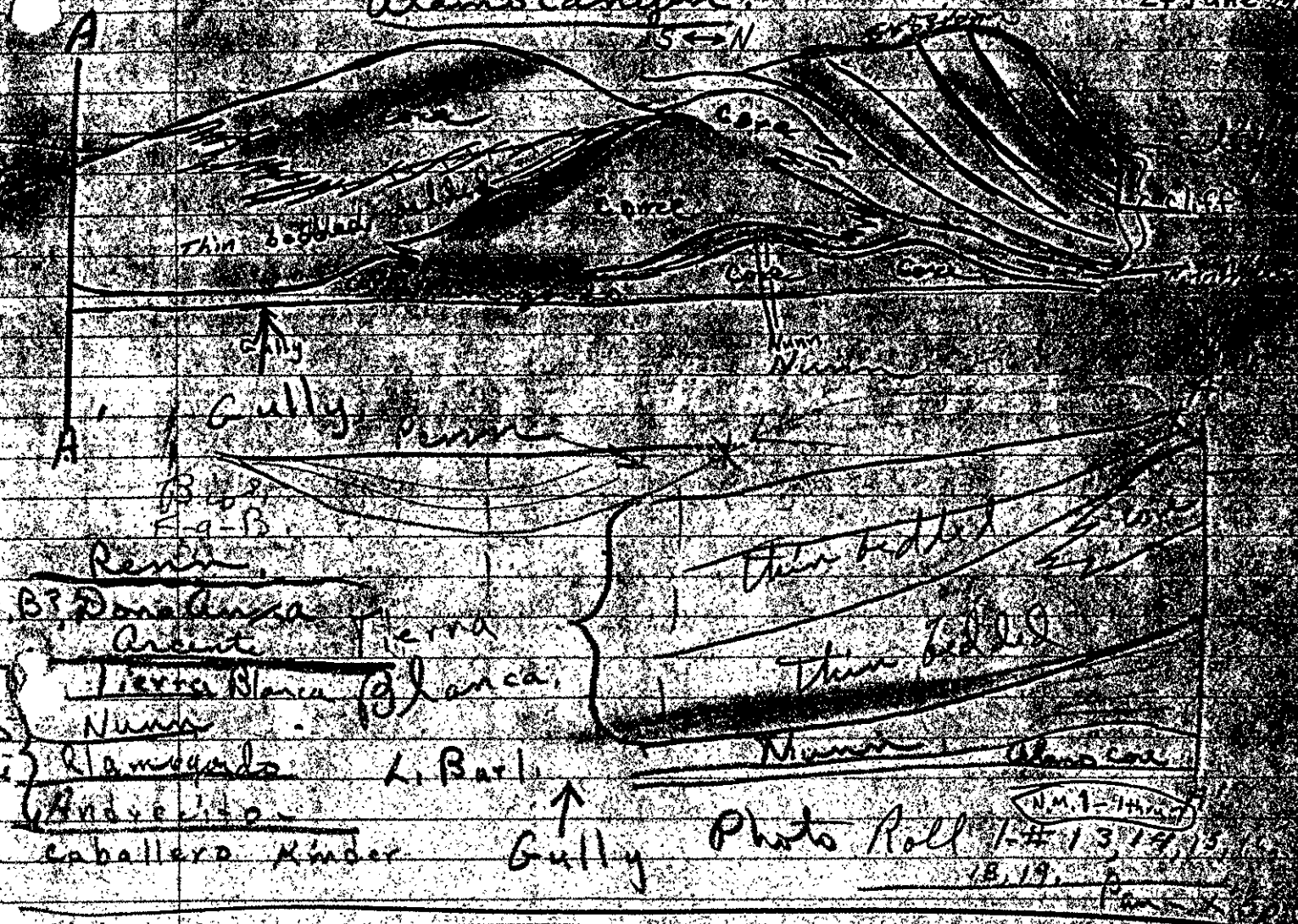
13



24 June 47

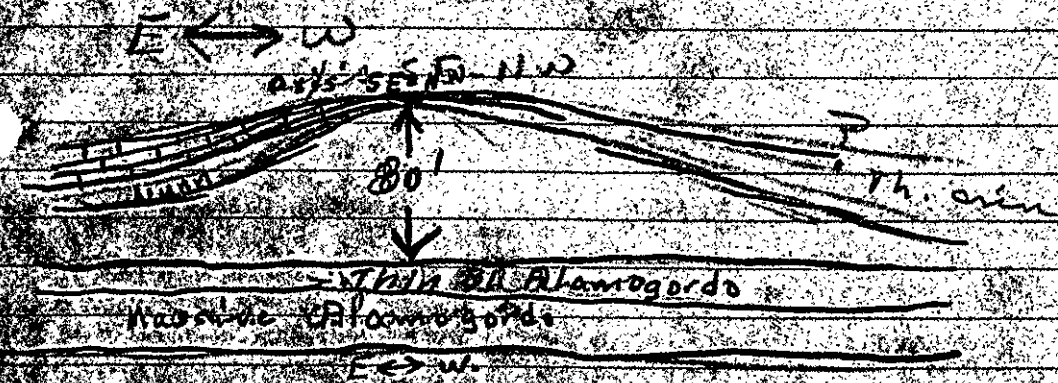
S. Bioherm F-9-A  
A. Alamos Canyon

N  
24 June 47



Bioherm F-9-B

Bioherm F-9-K



Bioherm F-9-D

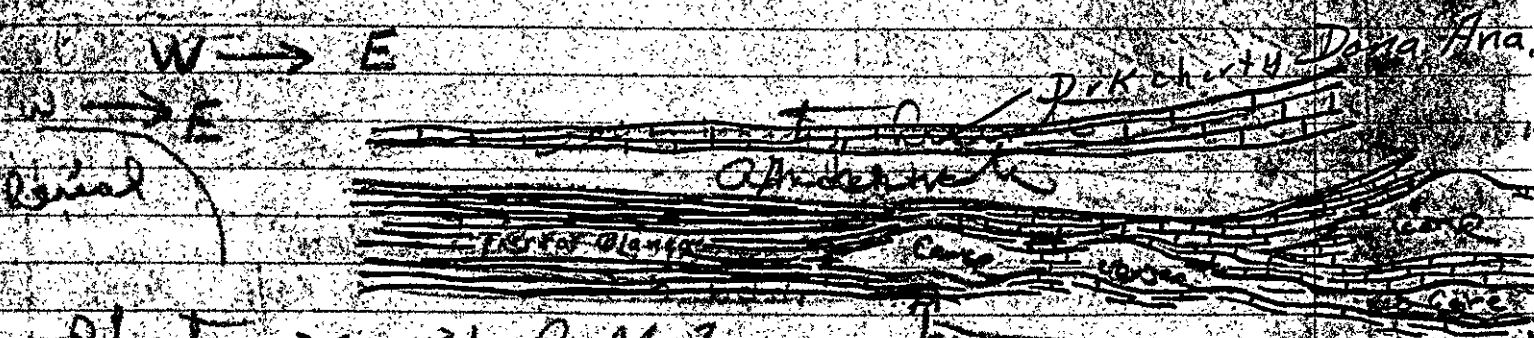
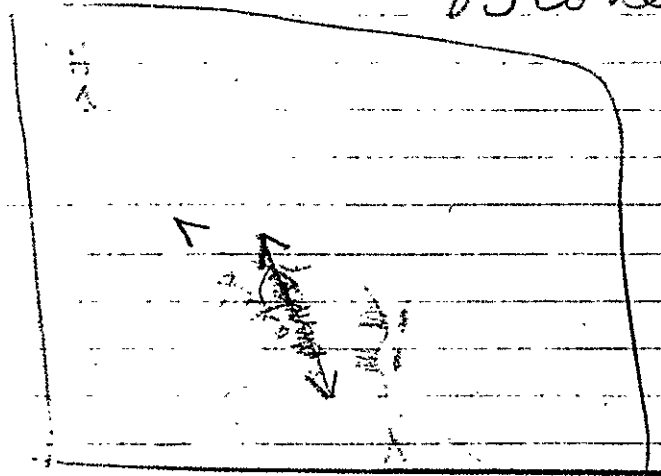


Photo 26-31 Roll 7

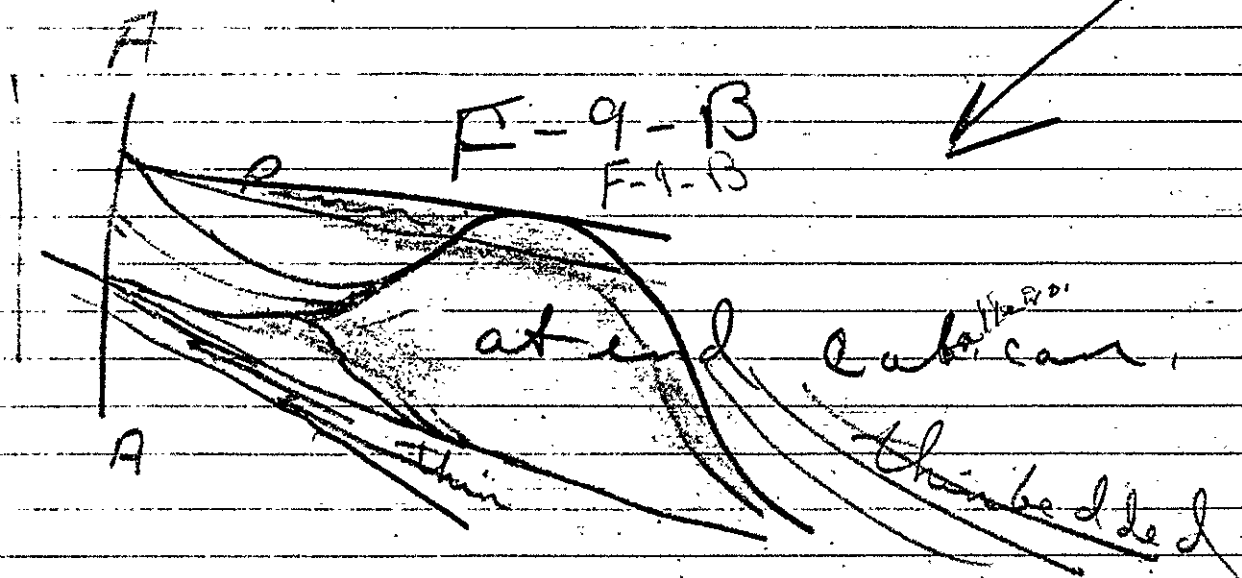
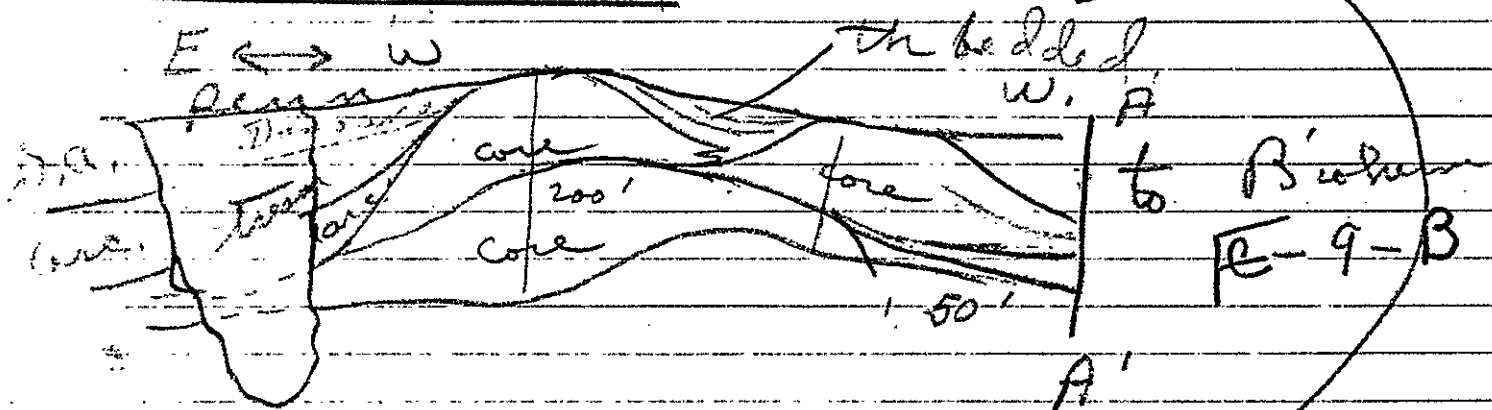
This is Eastern edge of Bioherm

F-9-C

# Bioherm F-9-C cont'd.



Photos  
1-~~12~~ 17



Photos 7-12 Bio F-9-A



Bioherm F-9-f

less massive

(18)



