index 1963

Bighorn sheep
Cibola Mtn.
D. Ranch, Guadalupe
e.
Dugout Mtn.

Dugout Mtn. 5. side

Fossil bed of King
Billard Canyon E side

Hass Ranch Horst

W (hill 5305)

Hill 4920
Hills E of Windmill Hill
Hill W of Johnson Mtn.
Hill NE of Hass Ranch

NW 4

S (small Knob)

Lone echo李 ranch

Lone Echo Hills Shale

W (hill 5300)

W (open E end)

W (end biostrms)

Leonard #2

Leonard Mt. N end

Locality 706

7260

Montgomery Ranch

Neal Ranch, Hays R. Horst

Neil Word Ranch

Rossi Head Gap

Split Ranch

Three-Mile Mtn.

Victoria Peak

Windmill Hill

Wolf Camp Hills

Wold mtn north of 7020

Biostrms in as. Sullivan Pk 974
The aerial camera is now being used in mapping. From it information recorded on the photographs, planimetric maps of 120 to 220 feet

of a contour interval, with a contour interval of 1 to 100 feet. 1 inch = nearly 4 miles. (1 inch = nearly 4 miles.)

the publication of maps on a of 1:12,500 scale or

of the northwest, are made with sufficient detail to be used in

region of Arizona or New Mexico, and the high mountain areas

public importance, such as much of the mountain or desert

Surveys of areas in which the problems are of major

with a contour interval of 1 to 100 feet, according to the

scale of 1:12,500 (1 inch = nearly 4 miles.)
WASHINGTON, D. C.

United States Geological Survey.

THE DIRECTOR.

End of money order (not postage stamps) and should be

December 1937.
April 26

Spun at E and Senor Hill.

From top of Deser R. to base of Bollivan peak on end of spurs in 228' Top of Deser Range tour at 4512', at base of spur. Poplar Tank is 24 steps - 130' thick. Ridge mostly covered. The extreme name is 33' higher then.

Desenat at 4350', the knos at end is almost certainly faulted down about 38' from highest part of spur. The Bollivan peak is about 66' but this is not the full thickness. According seen on west slope top knob.

On slope of spur, about 20 yards east of high hill, surface of SP has large number of finer like larger patches of Cathedral Mt. appears on the side of spur near the main hill.

Rall 1 - 26 Sponges in top of S.P.
27 Patch of Cathedral Mt. near

Feet from

SP = 126'

Section from top of Deser R. to top of main hill at Knob 5250' (unmarked). 34 handlevel steps between tops of Deser & base of S.P. Poplar Tank. Third signals 184' of slope.

SP = lowest & H.D. steps are
massive calcarenite with numerous
speleothem lines in chalk bands.
8-9 cm a cal band of 2-3 cm and
at base 6-8 cm of silt material like
the PT below. Top of 12 the massive
calcarenite became mainly calcarenite
rock with bio-erodates, many
sponges + algae.
Dip + strike top of SP N 67° E 100° N
SP = 20 Ht = 108 feet of slope
Handicapping continues to first
Section stone SP
Knot 5250'
A 26
16 Ht steps = 877 feet of slope
all in yellow to pink silty shale
characteristic of the Cathedral Mt.
base.
A 26
Ht steps
8 Ht in knot of limestone lime stone
in blocks of 4-6 cm. Thickness and
with goaiths
8-9 cm in shaly beds
9-12 to summit in limestone cd.
Total Ht from top of DR to top of
Knot is a total of 82 Ht steps =
444. This route from top of DR at
4970'. The As on top of the Knot
is undoubtedly Kings Leonard 5-4
Picture 28 = knot A 26 showing
color change of CM above
Sulf. Peak member
A26 - Knob on North is 12 ft. steps above SP which puts the SP-CM contact at 4835. There are here 65' of Cathedral Mtns in top part of knob. Contact of CM+SP at root point. The latter is smooth surfaced calcarenite. Latter is hard fine-grained so of undetermined thickness (30 feet?).

The southern slope of A26 is mostly bioclastic, bluish, smooth. Lg. with Bryocella hypergonia (large) about 3" diameter. This bioclastic part forms the first gully below the head. Rock contains many large crinoid stems up to 2" in diameter.

From upper part of SP(A26) collected bioclastic material with same assemblage lithology etc. as 7082.
Windmill hill
Shale slopes & dikes to up to about 4650', on slope on E flanks.
Typical WC float seen at about 4700' on slope just below western knob. Not in place but still of it.
At this point there is considerable soft shale in WC float. WC float up to about 4725.

In same under westernmost saddle are 20' of conglomerate with sparse pebbles and much sand and silt in lower part but becoming steadily crowded with pebbles in upper half. The pebbles are mostly small to 3 or 4 inches in diameter. Some pebbles of Ia but there are subordinate. Pebbles of as with fossils algae present but rare. Fossils seen are bryozoa, crinoid stems (small), belemnite & echiuroid spines. Saw no fossils. The WC with fossils mentioned above must be under Woodland.

The Scaphinella beds to the saddle measure 4 feet thick. The saddle is at about 4800' and the base of the WC at 4710'.
Hand rolling west knop of WM hill from saddle
0-5' to top of shale = 26' of slope
5-28' to edge top of hill = 125' feet of section. This makes the top
of the hill 49.41' so that the
heading from the map is 4930
in 9K.

A26° about 4 mile N down slope
from high knop a thin patch
Cathedral Mtn. in a cubate in
the S.P.

A26° from south saddle repose in
Cathedral Mtn. section
begun at 4780'. Dip + strike
N30E 12N.

9HSL - 0-50' is all yellow pink
pandry shale with little or no
limestone.

2HLS
50-62' Plate 6A. Thin beds bituminous
62-127' Massive light brown dolomite
127-139' sandy shale

2HLS 3' 139-154' % to top of knob which is
Thus at 4924' but the plateau
top is given at 4900'

The lower dolomite contains
scattered pebbles and some
poorly preserved fossils, Bryozoa
A 267-Wolframp. Blocks concentrated 50 feet below the base of the main ledge of the Skinned Ranch (D.R.) Characteristic yellow brown with many jasperite.

The windmill is at 4550 and the top of the west float block with many species at top is 98 feet above at 4648 = 4630. The WC blocks are 92' above top of Knob at 4742'. The base of the Brachinella beds is 50' higher at 4792' = 4800'.

The day's work confirmed the views regarding the constitution of the spurs and the nose of the hill just west of it. The spur consists of D.R. at bottom of hill at 45125'. Three knobs are evident on spur, the median or the highest, the two eastmost have only a partial section. The western one near the main hill has a large patch of Cathedral Mt. on it.
The section up the more of the hill on east side shows the SP with a vertical section of 108'. The SP seems to thicken east to end of hill where a big bosheral debris appears which has the same fossils as 708E. The easternmost end of this hill with crest at 5250 contains 87' vertical of yellow shale and 65' vertical of bituminous limestone having goniatites. This is same I think as north end of Windmill Hill.

The shale of PT pinches out in Windmill Hill but it is possible that the lower Foradavillla beds do also.

Not possible to get any consistent dips or displaced blocks on west Windmill Hill. The beds are all very massive and seem to be a great jumble. The fact that a west edge can be traced under displaced block indicates that the base of the West block is Deere Ranch Member.
April 27

Went to Alpine for box.

First to knob on east side Windmill Hill. On closer examination this appears to be another of the slipped blocks. The east slope of the hill has an aggregation of different types. The west slope or short side has some recognizable beds with Wolfcamp at base, followed by some beds with silicious slates and containing Sphenophora. The upper part is calcarenite or biotom Bed, quite massive. It is all slimmer sand but no normal sequence is recognizable.

Went up east knob Windmill Hill at about 4750' came sandy cgl with scattered pebbles. The following note made by R.B.

10' covered to base of SK R.

Vertial

13' dirt pebble cgl. lightcol red marline

17' coated

5' rest coarse

30' yellow sandy cgl

base of SK R at about 4668.

Top of SK R on east knob mostly calcarenite, fine-grained and with some cgl. Carbonatites, Evaporites. Small cgl at 7229.
All 4720 - on N side gem

0-8 HR to top of SKR. All massive limestone, some cgl.
8-11 Clastic & shaly beds with thick bands of limestone at top. 14
11-13 - Marl 2 + goniatites capped by a 3' band of cgl.
13-15 - Covered shale slope
15-18 - Shale & l.
18-20 - Massive cgl. calcareite
20-28 - Shale slope of typical Leonard shale
28-31 - Shale in thin beds between limestone layers.
31-52 - Heavy-bedded sparsely fossiliferous bs. with goniatites
Some beds of fossil "trash". Upper surface with many
goniatites

A27 Contact of SKR & CR

is in road & stream 1000 (400 feet)
from Sullivan Ranch Road.

723.7' large fusuline. From
(40' vertical) below top of SP.
Data on 722g should be changed. As located here it is in wrong gully. This is second gully north of main ridge east of Sullivan Peak. Don't blocks 74 to collect here.

At 723g we saw Ophioglossum and Scabellinella. These belong clearly the SP members but are only at base of hill. Their top 400 feet west of the road. The collections from further up this road from 707B (check) must belong in the Cathedral Mtn. formation.

Send Weding picture of Blosso Mtn. fossils.

Did not recognize any separate layers of the main base of the Cathedral Mtn. on hill 4720. The whole hill except the SE base is Cathedral Mtn. The lower part of the CR is not so shale as in the knife to the south and the basal part has much more limestone. We saw no limestones in this hill and do not expect we may have been too low for it. This does appear in the E Woolley to North
Miranda roll 1 - pictures 1-9 Windmill Hill, NE from WH Hill; 4 Clay Slide, sometimes on hill 4920.

Alpha Roll 2 1-4 Views from hill 4920.

April 26
Just at entrance from N to pass between hills we cross Leonard 2 #1 of thing which is not very thick and is mostly of limestone barren tone with some white bands, a foot thick, made up of broken fossils.

723K = one block

723-2 contact of CM 4 SKR sharp with yellow shale and massive lo, just below contact are smooth greenish lo with many fossils, especially peyrids and echinoderms. This is the very top of SKR. We took one large block and 2 small ones.

Area = 723m Whole hill in SKR near top. Fossils scarce, 1-2 ledges occasional.
A 28 - just below crest of hill about 15' in contact of SKR and Cath. Mtn. Here the former has silicious shales with glyptostegas but most of rock is calcarenite. Contact is at about 45°75'.

723m = King lot 9 - on edge of spur beside archives 15-20' of gray beds in shaly and cherty Cathedral Mtn. with lithians of medium dark gray lime stone. One double fold follow by a/A. This locality is definitely in Cathedral Mtn.

Miranda Roll 1 - 10-21 hills between Windmill Hill and hill W of Chin Mtn.

723o - One block and some goniastites from SW base of hill west of Chin Mtn.

Spent day on hill between Windmill Hill & hill W of Chin Mtn. South part hill is in SKR, north part in E.M. The contact is well marked by CM shale on massive SKR limestone on the west side of the hill.
but on the east side the contact is of bituminous limestone against massive calcarenite. Visited King’s localities 8, 9 and 10, they are as he records, the beds at loc. 9 look like split tufa, stuff, but fossils were not common. Saw Chonosteges.

April 29
Hill W of chon. Mtn. =
WC - N 85° E 15° N = 723 ft.

15' Shale

1' chon-stained sandy band. N 25° E 10° N

3'-1"
Shale

6' sandy band.

10' sand of 2 small layers of small tufa.

2"
Shale

6" sandy band

32'-1"
Dark brown breccia with fossils

6'-1"
Small pebble egl.
Section up more of the high hill
converge ledge about 150' below base
of main ledge in a slipped block
of limestone cgl. The upper part with
large pebbles. The lower with fine
shrift pebbles. W/A sandstone, orange
pieces appear in float above the
egl. ledge.

Hand leveling begun at transition
of shrift cgl. to ld. cgl. There are 15'
vertical of shrift cgl.

Le cgl. measured 65 feet vertical.

This interval has smaller cobbles
and shrift pebbles, a great variety at base
but after about 10'. The rocks is fine
calcareous with large pebbles, some
about a foot across. No fossils found.

This rock also contains angular
rusty masses, probably Silurian
pebbles.

55' mostly non conglomerate, with
occasional pebbles. Mostly fine
Calcareous. Nash spined Orthothorax
Fimbrella, Hinge lined stones
N 24° E 7.1'

Mostly
D. Some lithology as below
occasional shrift pebble. Rock
fine-grained, dolomitic.
E - 5' cg at base, scattered gobbles in fine calcarenite matrix at top. A heavily bed with calcarenite gobbles.

F. Calcarenite. Thick bedded with layer of lo. cg at top.

G. Partially calcarenite at bottom, upper 45' mostly braconioldi, and coarse calcarenite full of fossil small corals, sponges.

Dip on Yrs 12 to 13. 45' str. at the W20E dig. The Yrs 12 knob 13 to 15' 25' str. diagonally below the top of the knob at 5250' just to north.

Visited King's loc. 3. All in coarse calcarenite with scattered broken fossils. Elongate Thin born corals common. The dip slope of hill 5250 containing circular depressions in which are beds of The CM in form of bit, limestone, and chest/yellow clumps.

A29 - The correct location for the beds with Ursininales = Forneyalus. I think this is the Tropidonotus bed of the Shenone Ranch. The Dysnclus bed has a 2 to 4" silicious
skin on it when it makes contact with the CL.

Miranda roll 1-22-26 hill W. of Iron Mtn.
Alpes roll 2-4-18 hill W. of Iron Mtn.

Saw Wolfcamp on SW side hill W. of Iron Mtn. (= Mile High Mtn.) Our section agrees in thickness with that of P. B. King. Then went up both the west and Mtn. about the direction of strike. At base fine chert pebble cgl. gradually passes into limestone boulder cgl. Took pebble with fossils. The boulder cgl. extends for about 65' vertical - after which little cgl. was seen. The upper surface of the SKR must have very irregular, just many hollows. The cocalia patches of CR "slide" and chert appears in the slopes and down the hill.

The Uncumboides is right at the top of the SKR.
April 30

A 30' Kiny 37 - Mostly steeply dipping bituminous, sandy limestone with
gorists and pebbles. Some have small bioherms, small
probably patch reefs, made up of
bryozoans and brachiopods. Photograph
ole with A. trigonalis, about 3 1/2 x 4',
early square and about 1' thick.
Also saw Choristrella at several levels.

729x - About 25 feet below top of
lower word, Ledge 60-70'. Thick
at about 52 25 feet just below band
This is N 45° W of sandligneous cone
near large mega.

A 30' Leonard & #2
N 62° E 10° N - Rock measured
60' of Leonard & 2. This is predominately
light gray weathering calcaremite
but with many bioherms. The latter
is its most characteristic feature.

723t - The rock is generally a
course calcaremite light gray weathering
often light colored on fracture. It
looks very much like higher
word limestones. Fossils
scattered in blocks where
they occur, not closely packed.
A 32' coring brush 400' high. Top 5' feet in leaving massive limestone above bioturbated. Forming on Australia 600 feet years ago & also many fossils. The bed appears to be dolomitic. Cannot make out bed to which it belongs. Perhaps Leucon #2. Cup corals are common.

7/14/55 - Visited this old place on the highest hill but collected nothing. Just below this locality and about 20' above the creek is another outcrop like that of 7/14/55. This appears to be faulted down from 7/14/55. Here in the faulted block above the creek we collected several blocks with A. trigonalis. We also saw a large bush with many astartelle, It's a picture.

Miranda Roll 1 = 27
Alfa " 2 = 19-21
May 1

Spent day at searching the Rock Canyon formation on the west side of Billie Land Canyon. First locality is 723 W and the hill above it.

MI - Nearly a full section can be seen here, about 70-100 ft, a guess. Base has one large biohem which was collected and is 723 W. Above the biohem are gray sandy limestones, fairly bedded, 6" to 2'. Some beds have silicified fossils. Fossils are uncommon, except for goniatites which are scattered usually but in a few beds are concentrated. Not far above the biohem, sound goniatites suggest Wacoanoceras forms. These are usually limonitized and silicified, are difficult to collect and align. Few characters. Good goniatites were taken from the biohem which contained species suggesting Tertiary but with some exotic elements such as Stegoceras, Entelites and Podonites. This section and the collecting took all morning.

Miranda roll 1 - 28
Alpa " 2 - 24
May 1st – Visited King’s locality

14D which is north of 72-3 W. Here the rock is the same

Thick-beded sandy limestone

but we saw no bioturbated

limestone. Fossils are rare

throughout but near top

occurred occasional Riehlofia and goniatites. Saw several

poor Mellictonia and occasional

Orosmoceras?

Next visited 720D for more

blooms. Only found one. Searched about

30’ above #1. If Word comes a

thick lens of #2, perhaps 100 yds.

long, well exposed in jilly and

 petering out in both directions.

720D is evidently related to this

lens. Fusulines are common. Rest

of fauna seem more related to

Word below rather than to the

Word above.
May 2
Miranda Hill 1 - 34 cleat in Word 9 #1 - Other side Road Canyon on
N1 Wider Hill large Canyon on
35 face of Thin banded cherty Word #1
M2 - East face Hill 4910 capped
by Word 9 #1, Thin banded at
bottom but becoming heavy
banded and massive at top.
Fossils uncommon and scattered
in lower part. Much cleat in
middle region and some
sandy beds. Upper massive in
coarse calcarenite with
conoidal debris, common but
scattered, long tetrascalar common
on top of 7252. Brachiopods are
uncommon.

723y - West side low hill contains
numerous yellowish-gray mealy
bioherms which contain scattered
fossils. Bryozaans abundant. Ammonite
common. Bioherms seem cobbled
but usually grade into calcarenite
on shell criteria. These are best
those of 7119, near Clay Slide.
Placodella present, saw no
bioherms at base or at top.
The section is fans quite
unlike that on the Eastside
of the valley and at Hill
4910.
May 2 = 724 b - Slight on top of Legend Mt. N 35° W of outcrop
light on small plug N 81° W.

" hill 4910 ft N 120° E
outcrop to road 0.7 mile

Mostly silicious platy limestone
with much chert, mostly thin banded.
Typical of upper part of Road
Canyon. Contains biotomes or
sabcd b applications which contain an
abundance of corals and other
fossils in concentrations. Bachi-
roids are not well distributed.
This appears to be the upper-
part of the Road Canyon, similar
to Top J layers on The Hill 4910.

Notes on May 3 - Examined Road Canyon
on both sides: Killiland Canyon. Saw
no biotomes on west between 724 b
and 723 w where one occurs at the
base. Denticites common but poor
in upper part at 72-4f. Bicheme
occur at base and up on east side.
Thick-beded calcarenite 30-35' makes
top of Road Canyon on E side but
biotomes lessab & calcarenite Baron
laterally replaced by shale occur
in the 35 to 40' of the massive
upper ledge of the Road Canyon.
May 3—Specimen marked 7212 comes from very top edge of the main mesa of the road
Canyon. I tentatively think it may be stratigraphically like 724c.
The upper bioclastic marcas seem to swell and contract.

724c Less 35', vertical above main ledge, fails isolated mostly, still breakable, about 2-2½
feet thick.

19.3—West side Gilliland Canyon.
Road Canyon, 70-80', thick moderately heavy-beded limestone, fine grained,
usually dolomitic, weathered light
grey, in beds of a few inches to
2-3'. Fossils rare and
scattered. Uppermost layer with
a thin of 1-2" of brown
siliceous material. Also graptolites
in uppermost bed. Very round
ones (Waagen, 1902) and
flat Melicocelidae. Small collection 724f

Alpa roll 2 and Gilliland.

Muraenda Roll 1-4—Gilliland Canyon.
Hill N5° E of small igneous knob, 724 ft N of Leonard Mtn.

Wedge gray granular, massive & many fold. Blocky massive less finer grained than F, blocky and bedded or blocky. Main part is wedge. Many massive bygges. Blocky somewhat bituminous 2x bed 1'. Thicks blocky covered but lower half in 10 beds about 1/2 thick upper half yellow shale. Massive blocky 2"-3" wide 3 blocks with limonite. Silica layers.

F 32 1/2
E 51
D 27
C 21
B 16
A 18

Vertical 1944

Mild Mtn.

For top of road canyon as shown on this point of hill. Laterally 3 is represented by shale. Section located at about 5200' el.

N5° E of igneous knob

724 ft fuscule
724 ft N
one block

Miranda roll 2
Alpaca roll 3
Billibland Canyon

May 4 - 7, 4g.

Knob in valley. Upper 50' vertical of knob as in Hobel Canyon Limestone. Blocks moderately thick-beded, broken in rectangular pieces, some with siliceous skins. Scattered fossils but usually rare and widely distributed. Lower Nash ledge with many ammonites of three or four kinds of Leonard with.

M 41 Big bedding at base of Road Canyon is conglomeratic at base, very massive, coarsely granular. Full of fossils.

N 250'E of small plug.

Platy shale N 70°E 10°N

C. G. F. E. D. C. B. A. 14. 12. 15. 27. 35. 27. 18. 11-25. 13. 0-44. 195

Bed of massive limestone above bryozoa.

Fine-grained calcarenite immediately below.

Coarse oolites mostly at base, possibly with Albian fabric, bottom very irregular.
A. Base about 5200 above Whorf. Leonard Mt.
B. Top 2' in bedded chalk underneath bioclastic ooze.

C. On line of section the bioclastic material decreases only 11' but the section is in a cove and the bioclasts on the west face 20' or so. The one on the east to 25', clays between is yellow slate perhaps float but all think red and platy calcarenite.

D. Very coarse calcarenite.
E. Petty shale.
F. Light gray calcarenite, numerous fossils, moderately moderately thinly bedded but with some large bioclasts. One is 10' high by 25' wide.
G. Thin-bedded red, ochre and yellow shale.
H. Calcarenite with scattered but numerous fossils. Looks like our 720d. This same level with top of chalk at Mt. about 5400. We are due north of the N. knob of Leonard Mt.

K. Deciduous yellow shale - two thin 6'.
L. Yellow shale capped by a foot of fine-grained loam.
M. 50 feet to top of knob in shale.
Base of section. Thus begins at 5311' and extends to bed 7 which is top of Road Canyon or to top of bed Erolic in last massive calcareinite.

Cosmopora from bed 14

The biocenm appears to me to be a veneer over the massive conglomerate. The veneer measuring 10 to 20 in thickness.

Specimens marked 7119 from clay strata must be whole ball of 724 j. Two blocks from a huge boulder piece detached from main lower biocenm.

724 K biocenm of Cathedral Mt. with large Pernites.

Miranda roll 2 - 5-10
Alpa roll 3 - 5-8

The Road Canyon has biocenms at different levels, that swell and thin. The lastest is the one at 724 j.
May 5
Leonard Mtn. N and
Line of section N 5° W

all in unbedded massive calcarenite forming the capping ledge of the cliff. Mostly conchoidal, shale. Imbricated calcarenite 6'

Massive, bedded calcarenite silicious shale. 1' shale 3’ below 9y6. Masson shale

flat banded sand, sand in patches, not silicous shale, thin limestone-partially covered calcarenite, flat silicous shale

Mostly covered, but much shale. yellow
calcareous, thin pinky brown

Massive to cgl. Peneclastics

bedded calcarenite-massive
Massive sphygolites, elliptic, especially
Bedded (thick calcarenite-base of cliff

smooth fine grained broken folds.

covered

Coarse massive calcarenite with large cement, sand. 1' silicous shale

mostly blocks calcarenite, shale 6' 6” silicous shale

Campbell gray bluish marls, elliptic, (open

thick bedded, light yellow, gray calcarenite

Massive gray green biogenous, with cemented oysters of fauna.

Massive calcarenite, silicious tops, bed 31' thick

covered

Massive calcarenite, not showing bedding
tone, biogenous to. N 45° 8' 0" N

covered

Bedding with many folds, amygdaloidal

gray calcarenite, broken surface, biogenous

calcareous, biogenous

Solid massive fine grained, pellet limestone

with frama and some sand
D - Smooth greenish bioclastic limestone with many fossils. Brachioceras, Helicoceras (large). N58E6°N.

F - Very massive - have some lime cobbled.

H - Dark gray calcarenite with siliceous streaks. Lithina, Mesozonites, Dickella, Elliottella.

Q - Contains large Entelites, Austrodelia, Penninianites, large Welwitschia and possible Brachioceras.

R - Chest light brown - 5°1 sandy limestone in basal foot. Michella.

T, V, pebbles small 3-6", ragged.

Miranda well 2 - 1st 151/2 "SF chart
            "  2 - 13 1/4 " sandy 3, 4.

Z - and on surfaces 1' below top is a layer of shale of unknown thickness.

B - Entelites, Heteroceras, Foreruminus, Penninianites, Leptodus, Foreruminus of very top.

D - Foreruminus 15' with conchs, occasional small pebble 20' 25' with few fossils.
I found Melanaria in top sed.
It is possible that the upper 4-11
really belongs in the Sweet Alps
Mountain ifone correlated on
Tonguechus fawn. Lower Tonguechus
occurs in topo of loc. 709

724.7 Saddle
N65°E 9 N5

Chert surfaces in saddle show
best the fauna

Tonguechus extends stratigraphically
450-501

724 m - north knoll (high) of
Leone Hill

On south near the following
vertical section occurs:

C

E 724m
Thin bedded to medium clay forming 5
1-2' gray clay
5/6' thick bedded to 724 m

B

76' vertical yellow, thin bedded
shale and occasional thin to bed
or lens

A

Skinner ranch

E Abounds in Amselkella. C
may leave Tonguechus (P. Physthagra)
Near the Mountain north of Leonard Mtn. King 132, NNE of BM 462.

On top of hill in Gilliland Canyon between BM 468 73+4869.

0.8 mile SW of Word Ranch house King 237 on nose of hill.

Mark on maps.
Biolome appears on northeast side of this knob. On the north face of this knob, the biotomal ledge lies some 10' of massive sand rock is much different from the Skinner Ranch because it contains scattered quartz and chert pebbles, all well rounded and small. Less than an inch 724 m - Thin dustitella beds 724 m - 5' Bed near top of Mt. C 724 a - Fissilines from old A B main Skinner Ranch section 724 b - 2 acracinella bed (D) of main section (See page 28.)

Solomon
Cgl. on 4700' contour on east side same

11-18 Leved Mt. Skinner Ranch +

Geocrinellae abundant between 2nd & 3rd biolome and on top of secondone Helicospring on top of melone
Igneous Body

Road to outcrop is 50' horizontal and from beginning of outcrop to igneous body is 325' horizontal. This igneous body is estimated at 200 faces = 500 feet horizontal.

Outcrop consists of massive limestone with small well-rounded pebbles and some biotermal material with fossils. Pebbles extend 150' from south end outcrop for 200' toward the igneous body. Beyond the last pebbles to the north the rock is clean, biotermal and loses all of its inner structural character but maintains the distinction between biotermal material and non-biotermal.

7247

Contact of 7247 with 7248 is sharp. 7248 is massive with scattered pebbles. Some beds go up to stream down W. face of hill and across road.
They also are in the hill making an prominent cone. 724ft.

Conical hill for 50' is all dolomite dipping south steeply.
Dick thinks it is here under.

The base of Cathedral Mt. the bluck on the conical hill is thru punched up and faces southeast. We found dolostone on the west slope of this hill. Dam unable to see any rock in this hill except the lower Cathedral Mt. The rock is very steeply tilted about 42 to 50'. Opposite the rest of hill, normally dipping W on fault against it. This about where the igneous body ends. We saw no jumbles in the CM here, but in unaltered rock dolostone is common. Saw fossil line chadons in black limestone in steeply tilted part of it.

Strike N 85° E 50°.

Thin dark coarse calcareous suggest line and between他们.
A little yellow shale also suggests CM.

Miranda Roll 2 -19 - friend
Hese Ranch area
Miranda Roll 3 - 1-9 area around the igneous body at the nest.
May 7

724U - Kin 2143
Lower part Word is mostly buff, sandy lo in ledge 1-2' thick, some brown puddles, clayey bands, alginate 100' of le.

724V - Fine pebble cgl. with fishmarks.

717 - Light colored dolomite which forms part of two easternmost knobs appears on west side knob at 717. Could this be the same light knob above the Secchiniella of Hess Ranch.

Hill NE of Hess Ranch

Hills west of the 717 mark we have dark buff dolomite, massive, hydrothermal?

Hill 5801

May 7 - Center knob above Fool canyon ledge - Handcaving above top biohermal mass of Road Canyon.

726C - Ammonites at 719x
724 y, 726 e

Top of hill in yellow shale, vs. co + chalk
Fusulinid forning upper rim of hill. 724 y.

Shale
- 2' packed with fusulinids, 2" siliceous crust
- smooth to lense
- yellowish

So packed with fusulinids + silic. fossils. 2-4" Ashley
(724 y) crust

Yellow shale N 23° E 12° W

C 712 f
- coquina of fusulinids, with small bichonool
- yellow shale 726 e

B 5' 726 e
- Bichonool. Rich in cup corals

A 12' 726 e
- Upper Bighorn Shale
- 35' Bighorn Ricks in cup corals
- Mostly thick-bedded shales, with
- siliceous shins + many fusulinids
- 27 bichonool, massive with Casavighora

Road Canyon proper measured
on 721 f. Possibly does
not include the lowest bichonool.
Ammonite bed = 726 C is 70' underneath the top ledge (upper biocenm) of the road canyon.

The small leptodes mud bed is about 25' below the same joint. Ammonite bed is at 4900'. Ammonite bed is in form of calcareousite microfold, poorly bedded and ammulate a biocenem.

Upper biocenem just below 5250' thick is about 20' thick.

726e is faultlines from bed B in section on p. 35.

Miranda well 3 - 10-14th Road Canyon and Road Canyon for.
One specimen 724 turned over to Garner Wilde. May 3
Section up cliff with 721.j.

Large bioherms with elongate encrusted shell + thin-bedded limestone. Bed of 721.j.
Blocks, some shale, burst on ice shelf.
Shale + thin beds, shale, yellow.
Bioherms with Camachima.
Bioherms + massive calcareous limestones.

Tip + strike between top bioherm and ledge 726.e. N 53° E 14° NW.

United 708.4 walked to top of hill. On side nearest main mountain mass. The rocks are tipped steeply toward the northwest, showing evidence of considerable disturbance and definite presence of a fault.

Miranda roll 3-15, 16 fault + Kip 104
Alpa " 3-14, 15 fault, east
and Kiak Ranch Horst.
Section over hill 5305
69

line of section N 5° E.

May 9

Bithornal beds with Geochelone
squelines at base.

Dolyl beds with pyms less conglomolized but
mostly calcareous, dolomite biocams.

Massive bithornal, like ho, dolomitized
massive
Heavy bedded dolomite with internal strain
base 5K R.

Massive limestone, smooth to

fractured numerous squelines WC.

Generally cobbled to measles limestone
with many crinoid stems.掌柜 skeletal 50'
silians

meaty zone, crinoid stems

all to congl. tightly cemented. pebbles up
to 6" few echinoids ones. pebbles with
fossil algae.

Limestone cal. basal 25' with sheet
a quantity pebbles as well as rounded
be cobbled 2-3" Echinoids absent or
rare in upper 2'.

446' to crest at 5305, Geochelone

found 25' below top and at 5280' cl think

contact with SK K is 35' below top at

base of 291 dolomite + 8' bithornal dolomite.
Beachlinella bed fossils occur about 250' down slope off crest or 25' below the top of the hill at 5280' on north facing slope.

The top of the Knob at 5305 is a thin, albinaeous, in the base of the Sk R. but it's top is dolomite and the sides are patchy dolomite and dolomitized limestone. In this case the contact between WC, SK R would be at about 35' below top of hill or at 5270' on mountain front. 25' below (west of the Knob) at 5280' is a saddle formed in shaly material at the base of another knob, albinaeous or series of albinaeous here we took fusulines, Beachlinella and other species from low in the Sk R.

Handling down from 5280' to 5230' all in dolomite faithfully preserving characteristics of rock, massive albinaeous or flat bedding 5280 - 5270 - covered H-shale with Amphibolite Twelve forms a saddle at point H. This makes a prominent break in the contours of the hills. From the maps this elevation...
appears at about 5\(7\frac{3}{4}\)! We came out at 5\(1\frac{1}{2}\): about 60' off. This is in a crinkle between

bichem

Strike + dip on H = N\(57^\circ\)E 24\(0\) NW

726j - bichem on top of bed 11. The sandy beds with Enypholitrocha. Here we found abundant fossils, Brachiopoda, and other typical fossils.

Bed 1 - Measured at 35', is one bichem. (Think! Much of the surface dolomite.)

The saddle at H has 51 H.L. steps above stream at 4850' and puts saddle about 5-150' by map location. It is at 5\(7\frac{3}{4}\)."

I termed dates fossils as Leonard #1. The crassichthorina occurs on the long nose that extends east of the saddle at H. This bichem is clearly underneath our location. It must be in the lower part of the S.K.R. and thus above Brachioidea of the Declare Ranch. They are definitely above the crassichthorina zone.
726K. Erosion, Aria, flat 4-6" bed near Beach Ball.

Miranda Roll 3 - 17 - 30
Hesse Ranch Host 8305 + 720 e
Alpa Roll 3 - 15-17 eune
Horizontal 44 feet = 110 feet
Vertical 7 1/4 = 38'
Base up to 5' in conglomerate
is cobbled some 1" across with silicious margins. Mid
part with many silicious
tubes on which a tongue
about halfway up extends
into boundary cliff. This
tongue has small rich hydroid
(line new genus of Tegulifera)
and numerous sponges.
Matrix mainly smooth fine
grained limestone with small
bars of greyish calcite and
some calcareous algae
are present. This forms the
base of the bichrome
that breaches the inner
wall of the bichrome
which is present in the
sponge reef on west side and
near top.
The top of the bichrome is
capped by a post or top
which can be read by
bichrome
of the Skinner Ranch.
Top of bed has a thin layer of silica. A small fault cuts along the east side of the bed, a displacement of about 20'.

Windmill Hill

Beds with forams (WC) about 20', at a guess! Below calc in gruell, spysidiopora found in shale, dark margin of westernmost sand.";

Alina roll 3-17 and Sand Laminations
Miranda roll 3-314 and Seal " "

Alina roll 4-0-7, Laminations, Windmill Hill
Miranda roll 4-0-5 " " q ""
May 11.

Leonard Mtn. - Very deep 5075 ft in Chimmer Ranch Dist.
Leonard is on the larger knob to the north = my 726 m, n. a. four thickness drifts down the slope.

Went to Horst for lunch, walked with archer through notch to our 7200 locality. On this direction the disturbed bedding of the upper lens and lake bed are seen and on it a veneer of flatter bedded lunate running up the slope. This tends into a small scree and earthquake scree is present here. Then comes a small knoll and another gully to arrive at 7200. This knoll is also a Scacierella Knoll. The WC-Dr. contact must be at about 5075. Found ammonoids at 726 m.

Miranda roll 4-6-15 Leonard Mtn. Hesse Ranch Horst.
May 12

7260 - On slope near road just beyond stream crossing in Kewaunee formation King's lot 226 with Wellsville and Composita

7265 - Fine biocreme, light blue
Section at bottom grey abounding in richterite.

7260 - Dolomite with many holes of fusulines
Thin-beded bituminous limestone that weather white interbedded with flat silicous shale

Biocreme of richterite

Charity beds to base of hill = Cath. Mt.

King localities 235 and 249 are on this hill. King calls his locality 235 upper Leonard, clt looks to me to be the same as my 703a. Crossed elements at this place have the products of the germ. Rodactor which usually are lower in the section.
Hill 4801 - Southwest
Lemon Hills

Section started on top of 3 rice
Ranch member, N 15 S E 90
Section made by direct measure

N 40° E 17° N

Perimeter on bed of 6-8" Thistle
Boulder boulder cgl. = Kings cgl. #1
Boulder on 6" bed Thistle is 38" Thistle
Boulder on 72" P.

K 76'

yellowish to yellow grey
w. phaeidean it is a sandy cgl. it.
with the common ling. to the common
Lignes. It cgl. small quantity pebble, pebble 4"

Crumby yellow grey shale

J 1-3'

Hard smooth yellow grey it.

I 14'

Crumby grey brown shale

H 30'

G 30'

F 90'

E N 55° E
N 12° NW

D 2'

C 74'

B 2'

A 20'

315°
Bed N. Besides the dark-colored beds in this interval, there are small bichromes, with large cherty stems, which are draped over the large bichromes but appear to belong to the Leonard #1. The Cathedral Unit contact is abrupt and sharp. Top of this bed is at the Beachinella (Danie Ranch) bed is at 4409'.

Miranda Roll 4, 16-26 - Loc 7260 and cgl + other views at hill 4801.

Alpa Roll 4, 8-18 - Loc 7260 and cgl + other views at hill 4801.

At south end露天 hills in hill 4801. The two big bichromes are at about 4658', but the section goes 38' higher to include the dark limestone above them. Followed to the west, several other bichromes can be seen, but the dark limestone is not present and there are overlain directly by yellow shale. Along the cliff, huge boulders appear in the cgl. Some measuring up to five feet in one direction. At the base of these sections in the amyo and at about 4409', comes the top of the Danie Ranch.
member with great abundance of isocrinids, very beautifully displayed in sect. 2 on Medeset.
side of the area, is a low hill with many appearances of The Decie Range, with helicophris and other typical fossils. This appearance seems to be up dip from the beds on which we started our section. It also seems continuous to the rest of the section. The fault at the Eichen has only about 30' displacement, but this may not be the main fault, just a slice.

The knot at A 30° seems to be definitely Leonard #2.
May 13
Parage N from 702 C.
7769 - About 70' of Word 2 which is mostly dolomite but contains unmarked fossils. In many places the rock is crawled with them. Other fossils are rare and scattered and at this place the rock is mostly dolomite. It contains Centripinca and large Entelides.

7642 - One block from upper part Word 2.
Neal Ranch Shale in gully (M13) Strike is E-W dip 3° N
0-8 hand level steps to freshwater bed (1) lots of freshwater, a bone at 14.4 the reverse shale seen. 34 hand level steps from base of shale to base of clif.

Later in afternoon collected at King 196, and got blocks at 706 E for Simon of Minnesota.

Discrepancy between my measurement of Neal Ranch shale on horst with others is fact that my section is farther from real igneous body.
May 14 - Went to Alpine in morning because of fog. Afternoon went to King's fossil bed 716 m and the next locality east of it 716 o. Section with fossils:

Upper Limestone


This section was made at locality east of 716 m. Schemyrshenina was found low in the section. At 716 m Schemyrshenina occurs very low in the section all were found within 10' of the lower conglomerate.

Miranda roll 4 - 27-28
Page 15

Word Ranch.

Section across 7036 - 7032.

A 0-101 paces yellow shale, with bighorn and M. globosa, capped by 1 of poorly fossiliferous 12.

B 102-176 thick beds in thinner beds, but interbedded with 6 beds 4-6" thick.

C 177-188 bighorn with M. globosa.

D 189-218 yellow-orange shale mostly occasional thin bed, large E. o. h. artifex, Aspidina.

E 219-305 mostly gray bighorn, separated by thin beds of shale.

At 349' comns leptodactylus 2 shools = 62' 7032'.

306-406 shale with scattered bighorns

Miranda 31.32 roll 4, Chicotege bighorns.

+6' vertical in Erotogapes bighorns.

The rock above this bighorn is clearly a different type than any of the shale.  The shale is 

quarried, slabbled, case orange, and contains thin (1-3") slabs of bituminous limestone which are 

very faggy.

Miranda roll 4.

29' to end Word 4 and Word one at Word Ranch.

Miranda roll 5.  0-5 Word Ranch. 

and Words 2+3 at 706.
726a - Luptodine Ledge = 703d;
extends along S side of road
and produces a series of bighorn
humps throughout its extent. Lower
of bed is indurated, cobbly rock.
Like that typical of the bighorns.
This is the first ledge below the
uppermost bighorns just under
the Road Canyon and dies about 44
paces; Yuma vertical distance of
about 15'

In Ward #3 on crest of
hill SSW, Carboniferous 26'
below 703d, also indurates.
Ward #3 is about 60 feet thick.
Ward #2 about 45' thick.
Kang p. 143 gives 40 to 50 respectively.
Alpa roll 4 19-28 Old Work
Ranch and flowers.

At Old Work Ranch the Road
canyon formation consists of two
parts; lower with thin shale
bedded chert and bituminous
limestone. In this part occurs
loc. 703d, 703c. The upper part
of the RC is dolomite, massive
bighorn limestone. Along the
strike the lower bituminous
limestone can be traced at
least to 7260 where it is 50'
Thick West of 703c. The lower bituminous beds become very thick individually and a change in the thickness of the top.

A problem at this place is the proper disposition of the bitumen in the beds that form a ridge along the road. I might 703a. These abound in Edisto sands and are very similar to 702c and the bitumen at the base of Road canyon in the hill north of the sand. Mrs. Yellow shales come right to the base of these bitumen as shown by new cuts that have appeared by erosion.

The first bitumen under the Edisto sands bitumen at basal Road canyon is characterized by top-end my oil at 703a. These are probably the same level as those near the top at Split Tank.
May 16

Split Tank Area
Miranda roll 5 = 6 ½ 1 3 Split Tank
Alpa roll 4 = 29 ½ 30

Section at Split Tank
Line of section N 50° W; Strike at face of cgl. N 55° E 15° N.

A. cgl. with gastropods, small fossils and foraminifers. This thickens and thins along strike
B. Shale. Yellow and yellowish gray. Thinly-bededded to 1/4" luni, thin with Kingdom.

C. Smooth massive biocrematolite = 702 sub - Forneusus, Instant

D. Yellow orange shale with many sponge casts. Shaly shale 1/8 at top for 35' horizontal
E. Smooth biocrematolite = 702 sub 51
F. Mostly shale with isolated thin beds of thin-bededded s.
G. Mostly massive bedded calcarenite, some chalk
mostly detrital but occasional bioherms in it

H. Mostly shale one small bioherm at base

I. Thin bedded coarse calcarenite
detrital with clathritella

J. Shale with a few thin
calcarenite beds 6" thick
End of clathritella
Many smooth products at
top; clathritella ends in
middle, smooth products
common at top

K. Large bioherms with
many small fossils, top of
M. globosa = 702a

L. Shale in covered interval

M. Shale with scattered
bioherms containing large
topo"bids

34'

39'

62'

57'

111'

39'

58'
N - Mostly yellow shale with some thin flinty beds and some smooth products at first 100' = 288
726 Walks with Peniculinae.
Above N comes smooth 30 of Wood 1 with some scattered bioclines
The RC-CM contact is at 5750
just 100' below top of bulk = 582
726 W is in first 100' of N and
726 V is at about 200'.

Miranda 5, 6 drumshallow beds at Split Point. 7 = 702 ccw
726y - shale above Johnston's bed with many smooth products
726z - Lower bioclines of RC.

Miranda Roll 5, 12-13 pebble bed at base of Cathedral Mtn.

Shale N can be traced to east where it contains mostly to cobby beds 4''-8'' thick which contain smooth products in abundance. Large Peniculinae common. It is difficult to find a line of separation between Upper C.M. and Road Canyon where no bioclines are present. Took
Split Tank

300

Fossil I. Incl. beds

Footings: shale, marl, &t. with small shells in.

Many small, small shells

Modern lime tree stumps

Extracted. some algal. yellowish.

Unfossil. Hands

702 +/−
Split Tank section

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Interval</th>
<th>Depth (ft)</th>
<th>Age (Ma)</th>
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<tbody>
<tr>
<td>N</td>
<td>Shale</td>
<td>116</td>
<td></td>
<td>139</td>
</tr>
<tr>
<td>M</td>
<td>&quot; scattered block of leptidolus</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>&quot;</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Biohem 504a</td>
<td>30</td>
<td>40</td>
<td>17.3</td>
</tr>
<tr>
<td>J</td>
<td>Shale</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>Course calcarenite</td>
<td>15</td>
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<tr>
<td>h</td>
<td>Shl.</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>Massive calcarenite</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>Shl.</td>
<td>12</td>
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<tr>
<td>e</td>
<td>Biohemalka</td>
<td>12</td>
<td></td>
<td></td>
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<tr>
<td>d</td>
<td>Yellow shale</td>
<td>24</td>
<td></td>
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<tr>
<td>c</td>
<td>702 un biohemus</td>
<td>19</td>
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<tr>
<td>b</td>
<td>Shale</td>
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<tr>
<td>a</td>
<td>agl.</td>
<td>8</td>
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</tr>
</tbody>
</table>

Total: 312
The first appearance of the bituminous light gray muds is with black fracture. Above this point thin beds of squashed fossils and scattered bioclines are like those of the R.C.

7262. This is also a difficult place to separate the two formations but the bioclines that run near the bottom of the R.C. seem to have fossils of 702c type such as lacy ordered rhizotheca, Edisteges, and the large miliolids.
Miranda Roll 5, 14-16

Alfa Roll 4, 31-34

Catto-Stage Ranch

700-2 Leonard #5 - crevices on the north west end of Dugout Mtn.
Rocks mostly thin bedded 4-8" beds of dark coarse calcarenite or shell breccia, with scattered fossils, the latter containing Eustitella + Axostegas triangularis. The exact same fossils as we see at 714-15 in the Lenox hills in limestone #2.

May 17 Dugout Mtn.

Leonard #4 About 15-20' of heavy bedded cherts 8-18" thick of dark fine-grained limestone, smooth weathering with silicified and chalky surfaces up to 4" thick. Also includes some sandstone. Occasional ammonite and fragments of other fossils near the distinctive fauna.

Miranda Roll 5, 14, 15 Leonard #4

" 5, 16 " #3
700m - Limestone number 3
N 83°E 140°N - 130 paces top to bottom

Blocky dark limestone in beds from 4" to 1' thick, fine grained.
Some layers with siliceous skins, fossils include: sponges and ammonites. The commonest.

700n - Same type of as above. Also contains the same ammonites.
60 paces across outcrop N 43°E 13°N
Beds 4"-1' often replaced by thin layers of shale. Some thin beds of slight conglomerate at base and a shelly helix at the top.
Ammonites all thin at = 700n

700p - Thin ledge of cgl.
Contains some ammonites as 2# 24 #3 but has brachiopods
Stephentes, Syngiropshora and
Peniculites. This bed is not in sequence with 6# and is opposite a shale interval.

The stream bed 100 yds up stream from 700p is heavily bedded & with cgl. laminae
having pebbles large pyritoids, sponges and ammonites. Possible
Syngiropsha. Mirror Projection
Miranda roll 5, 17
7000  Conical hill capped by about 70 feet of Lower Wood, poorly fossiliferous but many fish limbs. Lower part massive and somewhat bioclastic but fossils uncommon. Remainder of hill below in yellow shale, blue shale, some sand and a little clay. The upper Leonard formation very rare. Edrioasterites was seen in the lowest of Wood limestone beds. Biorhaphid - also long snale and some bygona.
May 18
Dugout Mtn.
South Side

In saddle just E of peak The
Design Ranch member pinches
gut the W.C. and makes the Togaf
Knob.

700v small knot of about 30' of lo
or deblende rock much altered
Leonard 3 of King. Under it
is about 15' of shale. This is
lar ammonite & brachiopods
like 700p of M17, and like 700m.

Poplar Tangle has very fine slate
yellow gray sh. Some type seen
with L 702. Yellow shale also
seen near face of Leonard

Hill 4811

700 S = Hill 4811 capped by
Leonard lo #3 of King.
Looked same as 700h
on small knot. Consists of
about 15' of heavy - bedded O
with silicious shales and many
broken fossils. Euryptidobr)ect
seen
Between 7005 and 700 t are
30' of chest, xx and yellow
shale.
200 ft along base of hill 4811 about 25 feet below us.

Yellow weathering, some sandy and siliceous skin. This is appears much coarser than above and is suggestive of 700 p. fossils, very badly broken up. Saw many ammonites! Much nautiloid sand and we collected ammonites low in the member. Leonardo #2 and 3 seem to be almost alike and have the fauna of the upper part of the Sullivan Peak member. Guess these converge and unite with the upper part of the Sullivan Peak. The beds just above the big bioherm at the south end of Lewis Hills were dark gray, bituminous like those of Leonard #2 and on Dugout Mtn.

Miranda roll 5, 18-23 Dugout Mtn.
Bane R. hill, agat base, small coireal hill.

Alfa roll 4, 35-36 Dugout Mtn.
Alfa roll 5, 0-2 ** 11 cholla
May 19

700w - Uppermost C.M. with light brownish yellow or orange cobbly, massive limestone with a few scattered fossils.

700w = M19 - Dark heavy bedded limestone 15'-20' thick, alternating in dark colored fossiline at top. This is like larnot at 700g.

700v - M19 is overlain by 10'-15' of sandstone forming small limbs. On this occurs about 5'-8' of coarse detrital limestone, a veritable bed of fossilines of larger size and better well defined. That was first cut on the slope. This contains fossils suggestive of 702c. Canopy is Road Canyon flows out to the west from Cathedral 700m.

700x - Rusticella beds of Leonard #5. Mostly calcareous but with small bioherms.

700y - Lower part of Leonard #1 with Poplarephytophytin 2 on slope. Col 2 pieces, the yellow one is Poplar Bank.
7002 - Fossilized about 50 above gully on the Roger Tank which consists of fine sand limestone bed up to 1' or more thick, mixed with calcite, thin cgl. and beds of pinkish clay. Also, the hill is capped by Sullivan Peak which consists of very heavy-beded massive lo. bond with thin brown silicious shins, others with thicker pinkish clay. The last also occurs in layers of 1' thick in form of lo. cgl. with pebbles near bottom. A small cgl. near top. A few shell breccias occur.

727a is a shell breccia about 10' below top. Fossilized also taken here about 2' of Leonard #1 on the edge of this hill. From this place it looks as though Leonard #2 may join Leonard #1 on the middle knoll of the Mtn.

An occasional shell occurs in the poplar Tank.

Miranda Roll 5, 26, 27
Dugout Mtn., Sandstone hill (2), Leon, #5

Alpa Roll 5, 3-8 Dugout Mtn. and small cacti at 700x.
Walked east from gully at 727a across interflupe. Drifting sand.
Consists of very angular, reddish-brown, dark reddish-brown, and white, \( \frac{1}{16} \) to about 3-4" parted, rounded, and scattered 727B. Found by B.R. Close than 2 a are probably Bolar Sand.

The Bolar Sand is found opposite 727b. Finds a full section of Bolar Sand in east

A complete section of the Bolar Sand is present form 727a up to 727a and about 75' of Leonard #1. The Bolar Sand is well displayed on these lands surrounding slopes.

May 20

Wolfcamp Hills
WC 4 is full thick mostly
broad, fine to light, well
scattered, bright, bright, thin, seen.

Sept 4th and definitely at top 727a 2, 400 ft. East, left, and
Faster and, to me, is definitely
Permian. Definitely an oilfield as
it has small amount and well
stratified about 10", diameter. is sawmill
and flatbed by calcrete. Top sand
above it of Permian clay with
shale. South side where it had
contact with shale

Collected in Underwater zone from
saddle to east and hills. At intersection
butt for Beadville, Bakken
algae abundant.
May 21.
Wolf Camp Hills, West side
Red 4 - N 62° E 60' N near 7270

At Uddenhoe, saddle, a great amount of gullying has taken place since the last report. Collecting not good.
At the saddle North of Red 4 it is 30' thick and about 5' of shale intervenes between it and the bed yellow beds of the Uddenhoe zone.

Bed 4 runs NNE. The western stop containing a great amount of limestone cobbles, in fact it is mostly cobbles. Limestone.

7270 - This is bed four and the locality is about 3/4 mile W of the westbound road to Uddenhoe saddle with one small offset to the west on North side of saddle. Here it almost line on belt in bed 4 it is about 1/4 mile thick and the rest the cobbles.

Alpha Roll 5 - 16-20
Wolf Camp Hills, Uddenhoe saddle

Miranda roll 5 - 30-end
Wolf Camp Hills, Uddenhoe saddle
Afternoon collected 2 blocks at 7210.
May 22

Small Hill NW of Ness R.
N35°E 21°N

D - Just under the clast on SE side hill come thin long lenses with occasional ammonites and many other fossils. Spinophorasp. seen An all parts of hill.

C - Some layers with clast skins containing fossils. Contains some large bivalves. With some especially W and hill bed. C may be fed by influxed by clast of D to east and west with bedrock.

11 D - Pebbly clast in layer up to 6" thick.

12 C - Pebbly clast up to 12" thick.

7 B - Heavy bedded, mostly calcareous.

26 A - Hard biothermal massive rock with fossil plants. Rock biothermal but now dolomite.

I suspect that the ammonite beds are found to biothermal from W to E. West end of section in massive, calcareous, with many ammonites, but they are unidentifiable.

Lower part C = 727 m.
Lower equivalent of D = 727 m.

This knob belongs entirely in the upper part of the Sullivan Park member.
calcarenite massive
biohermal beds
massive calcarenite
bioherms with Scaphirhiza

Trenches just 4.5' below crest of hill at about 5'15'7" on south slope of marine lobe. Proceed 10' over biohermal beds with Scaphirhiza and below then biohermal beds. Location of this place 727g is just west of the high part of hill where it narrows toward the west. Lower beds here toward the same perhaps 30-50' above it on a small "C" shaped hill.

727h - junction halfway down slope

727i - High Wollecamp dip slope directly from crest off 5'30'5" down to first notch is at lowest part of Scaphirhiza beds.

727k - About 1/2m from saddle on N of Hoo Ranch. Further...
Wolfe's Pond, Lenox Hills Hill E 39°

1. A large boulder up to 2' in one direction
2. A thin banded sandstone with some iron oxide at base of small algae reef

15' of shelly clay up to 175'
15' of shelly clay up to 175'
15' of shelly clay up to 175'

3' of shelly clay up to 175'
3' of shelly clay up to 175'
3' of shelly clay up to 175'

3' of shelly clay up to 175'
3' of shelly clay up to 175'
3' of shelly clay up to 175'

Total cliff = 310'

Rocks:
A: 15' long, mostly covered, algae and smooth. 2 at base and 1 more algae man

Shale measure

15' of shale with thin bands as long as

3' of shale capped by 4' of sand
3' of shale capped by sandstone 1'
3' of shale capped by sandstone 1'

15' of shale + thin banded (shl + sandstone) 1' deep
15' of shale 1' from mud to with graminoids

20' of shale
15' of shale
15' of shale
15' of shale
15' of shale
15' of shale

Total = 172'
Section in Deise Ranch at 5300
in cut just East of the type section of
Papaux Park

0'-32' massive unbedded conglomerate
with boulders of large size
up to a foot. Also with small graded
clast conglomerate. At top covered a
dipmeter of lenticular bed of
eight high and about 10 weeks
The 32 are overlain by
more unbedded
of which it is capped by a sand and silt of limestone.
Above this the yellowish chalk

Hill 5250

Went up gully just west of 7270
in which the bed sandstone was capped by
40' of small pebbles of the pebbles
weeham all over the hill.

Hill 5300

went up hill. That the dark calcareous is.
which calcareous was taken = 7270

The hill 5250 is about 15'-20' just below
The crest of the hill which is capped by
a lemony yellowish calcareous which calcareous was taken = 7270

The gully just on the east side of
Hill 5250 is about 15'-20' just below
Towards bottom of 3. Base of 3 is massive
small pebbles of about 15' thickness
This is capped by a large calcareous
Ammonites occur in calc as well as
the fine grained calcareous.

7270 dip slopes of hill 5250 where
drift under gravel bed is

7270 - Ammonites from middle
Bad 3 forms surface of divide between hills over to base of 5300.

From bed 3 to base of limestone on hill 5300 is 87'. The 5's are normal and the remainder which is 8' in in bed massive fossiliferous rock over hill 5300.

7275 - top of 5300 - rocks are a loose jumble of 7, 8, 9, etc. mixed up of slate, breccia and some more, some of which are banded with some fossils mostly corals and some sponges.

The shale between 243 and 3-4 hill 5300 is very fissile and split.

3-4 passes laterally from hill 5250 in dark blue shale. The edge disappears just east of hill 5300. The section appears like the west edge north the hills 2500. Along hill 5300 it is mostly chestnut colored and dark blue in beds 6"-11' thick.

130' Vertical between Loden #1 & #2 in hill 5300.

L. #15
6' 44' small pebble age
6' 25' massive aggl. b, with fossils
20' 4' dark shelly, bioclastic, some with Bryozoan

20' 5' dark shelly, bioclastic, with Bryozoan
King does not map limestone on top of hill 5300 and Leonard #4.

Miranda roll 6, 0-5
alpha roll 5, 121-31

May 24

Section up Deere Ranch
on hill with thick shale, this
section is at about the middle of the hill

5 feet, abundant at top = 727 ft
Gently massive calcarenite with a small
clay matrix 4 feet below the top.
Calcarenite with shale nearby. The clay scattered throughout.
Massive calcarenite. A few scattered pebbles.
Yellow pebbly calcarenite. 6-10 inches thick. 2-3 feet.

8 feet, pebbly calcarenite, small, dirt
Becoming alternately at top.
Calcarenite with calcarenite, stone with
a bed of air. Two feet, grade on 5-2, below top.
One quarried, massive. 6-10 inches of oddite,
Calc. grade variable. Band of pebbles.
Accordingly, calcarenite drops up to
30 feet with scattered small pebbles.
Ammonite small.

58 feet, hill
Shale at west end hill much thicker
20 feet, some flat beds and white lenses of rock, like that
below. Perhaps old Granites beds.
727 u - 2 lomita bluffs from Dave Panch.
E has a 2' siliconstein.

On east sidehill considerably yellow. Debris of top also yellowish. This suggests beginning of Laguna tank.
Perhaps up the 20' or 30' lomita tank.

Ditch measured in shale on east side 138'; on west more 124'.

727 x - Leonard #3 has 5% of small pebble (1/4 - 1/2')ogl. at base. Great mostly dark detrital with gammites at a grade about 15'. Upper part heavily banded fine grained calcareous, 10's up to 11.

About 35' of slope between 3 x 4 in cherty rock. Taking into small yellow balance.

727 v - ammonites from base of Leonard #4.
Leonard 4 - Lower 10 in rock folded dark calcareous abounding in ammonites in patches, about 35' of slope covered by this rock 727 v for ammonites.

727 r - patches with chertoids, allusorich, ghostly, and others. Specimen does not break out well and the material is fragmenting. This is at the top of Leonard #4.

727 x - biotome elongated green or blue grey, about 6' length by about 15' wide surrounded by gas bubbles containing mostly felsite and other associated fossils. Biotome long like split hands. Area approximately 30-31.
May 25 - Montgomery Ranch

Here - First fusulines at about
4880 = 7274: Fusulines at 4920 = 7272:
Fusulin - (a) Top of hill 4950 = 7272

First fusulines seen at 4880 on
slope. 48' and above comes another
Fusuline Band with Large Ammonoid Beds at Coast of Hill

7272 - Fossil bed consists of

6'-8'

- Ovoidal beds with a few fossils

15'-18'

- Silt, fine, with brown, irregular
small shelly masses - occasional fossils

5'-6'

- cgl. small to large pebbles

7272d - Algae coated fusulines near
Top of Hill

7272e - Large piece just under
first fusuline bed at 7274.
May 26

Packed blocks all day.

May 27

Packed blocks all day.

May 28

Finished packing, hauled blocks to R.R. Wharf to Maya.

May 29

Cibby Creek N 44° E 32° 5'
Section opposite tributary (15)
Compass N 73° 2'.

0-11 Steps mostly covered, probably shale and yellow thin-bedded limestone.

0-11 Cobble up to a foot or more. The cobbled zone of the hillside.

0-3 hard biohermal, massive in step (0-11 cobble), a large bioherm appears on side of ravine, and here we struck hydrocarbons and stopalled block. It is probably 30 feet below top of W.C.

Section on E. bank of Arroyo.

0-14 covered, highly cobbled, mantle

0-4 massive biohermal algae

0-9 covered, probably shale

0-8 cobble

0-6 massive biohermal, clotted foils

0-11 cobbled, mostly andesite.
0-5 Massive Limestone, Island
Capped by L. Shells, traces of
Fossiliferous 7.26 km

Above this the beds are black and thin with much coal.

Big galleries from sides of biotite where stream cut out west of ridge. The galleries are out of the biotite biotite, with much yellow in it. The higher biotite produced
large Scacchinella.

Collections:
Galleries from above biotite 728 m
Scacchinella from uppermost biotite 728.1
Collected 728.1

Septihood from lower biotite
Flint limestone 728 m

Went from slant house to Alta Creek to Permian district along the creek. At
the junction of the Alta and Cabot creeks is an igneous body, that has been
laid across the limestone and obliterated the fossils. A little farther on large
massive beds of limestone appear which are quite massive. These overlie
yellow, apple, and limestone perhaps a
Dolomite" above them. The massive limestone are biotite which occur
in a series of layers and an upper one
we found Scacchinella in both sets.
A possible intermediate one also
shows. In the lower one occurs
large septihoods which are faulted
as of paleosols. We also found a
mulberry beds. There are a
both beds with a large Wellerella.

What look like typical
flintstones were taken from
The meadow zone under the lower breccia which lies under the first conspicuous breccia that extends high on the hill. This is opposite the point where Delta Creek cuts closest to the Precambrian metapsammite. The (sic) Mission Roll 6 E Alpha Roll 6, junction 11 this is the highest breccia which juts up 1/4 mile to the air and in that first judgement must not west of the immediate body. It is about 1/4 miles NE of the junction of the two creeks.

The biotitanul beds are exposed by cliffs and thin-beded limestone and gneissic clasts. The latter suggests the Steiner Ranch fault.

The breccias are in the frescoed zone of Udden which has been exposed at Upper W.C. on the basis of faulting. Were it not for these it would exist. The record zone may come as the Steiner Ranch fault. Actually, the fault of the breccias suggest the Saltville lower zones of which are surely Steiner Ranch in age. It is just possible that the "fractured" beds, dense beds and rest higher limestone belong to the Steiner Ranch. Whatever most of Cabezonite is high MG.

Alpha - Some pictures of Cabezonite on roll 6.
May 30

Lept Marfa Bay Van Horn which we reached at 11 AM. After lunch collected at M.30 locality - Turkeyback, locally called 3-Mile Mtn.

May 31

Went to Victor's Canyon and collected blocks all day. Chilled to death by long exposure to the sun. The massive bone spring just above 125' of the top of the hill to about 465', where the thin banded material abruptly appears. The entire sequence of thick banded bone spring formations like those taken just above the Three Quadranolites and Rapadonella, Attiphus were seen at and near the top. Collected fusuloids at 465', = 7280. Faxed the radiator getting out of sand in Victoria Canyon.

Alpa role 6 - Views of Sand Dunes, Horses, coast and Victoria peak

Three-Mile Mountain is definitely the correct name for the easternmost knob about 3 miles NW of Van Horn. It is often called Turkeyback. According to the owner both names are applied to this hill. Labels must be checked & corrected at home.

June 1

Spent day waiting for car to be repaired.
June 2

Started out for localities 7.31 and Newells 6.35. Unable to reach
them because of washout in a
heavy rain on Saturday. Went
to 7.31 p which is famous in the
Cliff Quirt Sal entrance to
Dr. North's headquarters. The
form bed is in the lower part
of the cliff at the top of lovely
bedded 25- and just beneath the
thin-bedded layers. Called on
Mrs. Blower.

June 3

Went to Seven Shanty Gap. Lake road
extends about 1/2 mile N of RR station
in Uinta Park, from mile 1295. Entrance
to Gap is lined by massive unbedded
limestone varying in thickness from 15
to 30 feet. Help limestone is brokenal
in places and contains some algae
lithocysts, are mainly broken
and consist chiefly of Neophylocladina
and medical. Leda allenii, Newells
limestone is clearly Cretaceous.
Above the limestone bed comes
about 5 feet of thin-bedded
turbidites limestone with strong
bivalve shell and some
This contains small hydroids and
very few other fossils. Moss of
limestone, but fossils are generally
rare. Collected 769 fossils on
south side Gap entrance from
just below massive bed. Coll 7232.
is from the bituminous upper bed. Below the massive coal is thin-
bedded shale with some bitu- 
minous and is flatter-
banded than the upper beds. We looked at this line near 2-
place west of the rap. at 7285 
about 150 of the is overlain by the 
massive coal the latter by the Upper- 
bituminous limestone. The limestone 
also contains scattered bones 
and bivalves especially with abundant 
and detached valves of Neophriode-
thyra - Martinia.

The upper limestone is overlain 
by gypsum of the Ochlock. Met a 
Mr. Rechley, manager of bank 
working a in the gulf who says 
all of the limestone is gone. This 
writes in well with the fauna
June 4

packed blocks and boxes all morning. Sent 1 box to panel post and 17 bundles + 1 box of boxes on stone at 2603 lbs., 1 water gal at 29 pounds and 3 bundles of tools at 62 pounds. Tools = 3 bars, 2 fledge hammers and one shovel
Work out relationship of Secchiniella to Schwaegertia - as it reworked in the Poplar Lake cl. The Secchiniella Secchiniella is a lower zone than the Secchiniellas with S. crepitans. This must be harmonized.
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**Total:** 140 blocks

**984**