

150
100
3
11/11/51

June

1951

5075
116
5191

Hess R p. 349

116	116
3.5	35
	<hr/>
	580
	580
	<hr/>
	638
	638
	<hr/>
	5712
5075	
5491	696

P. 20 NR

98
65

163

4550
4592

4642

2500
-11

192/5
105
45

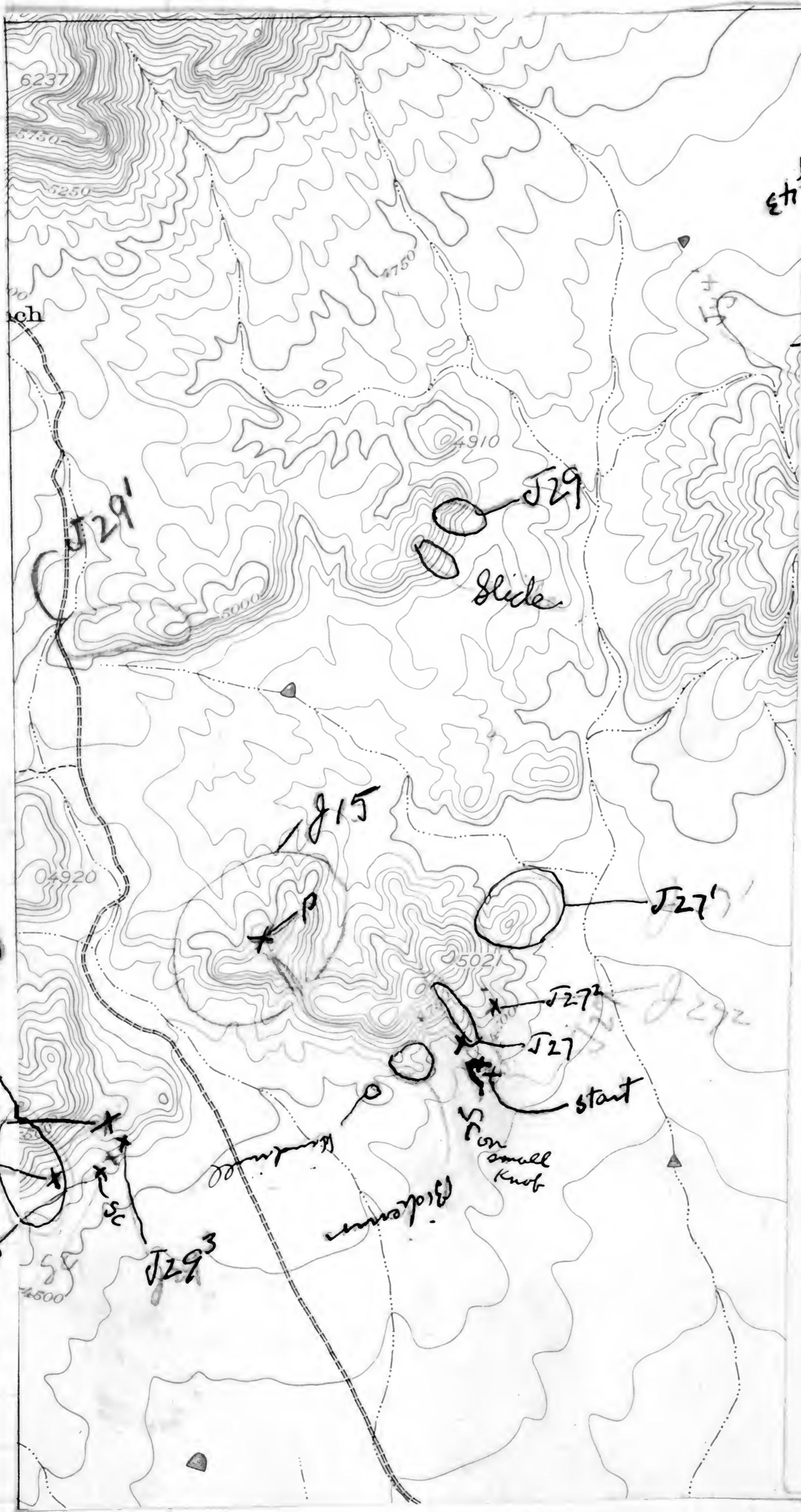
2600
2632

758

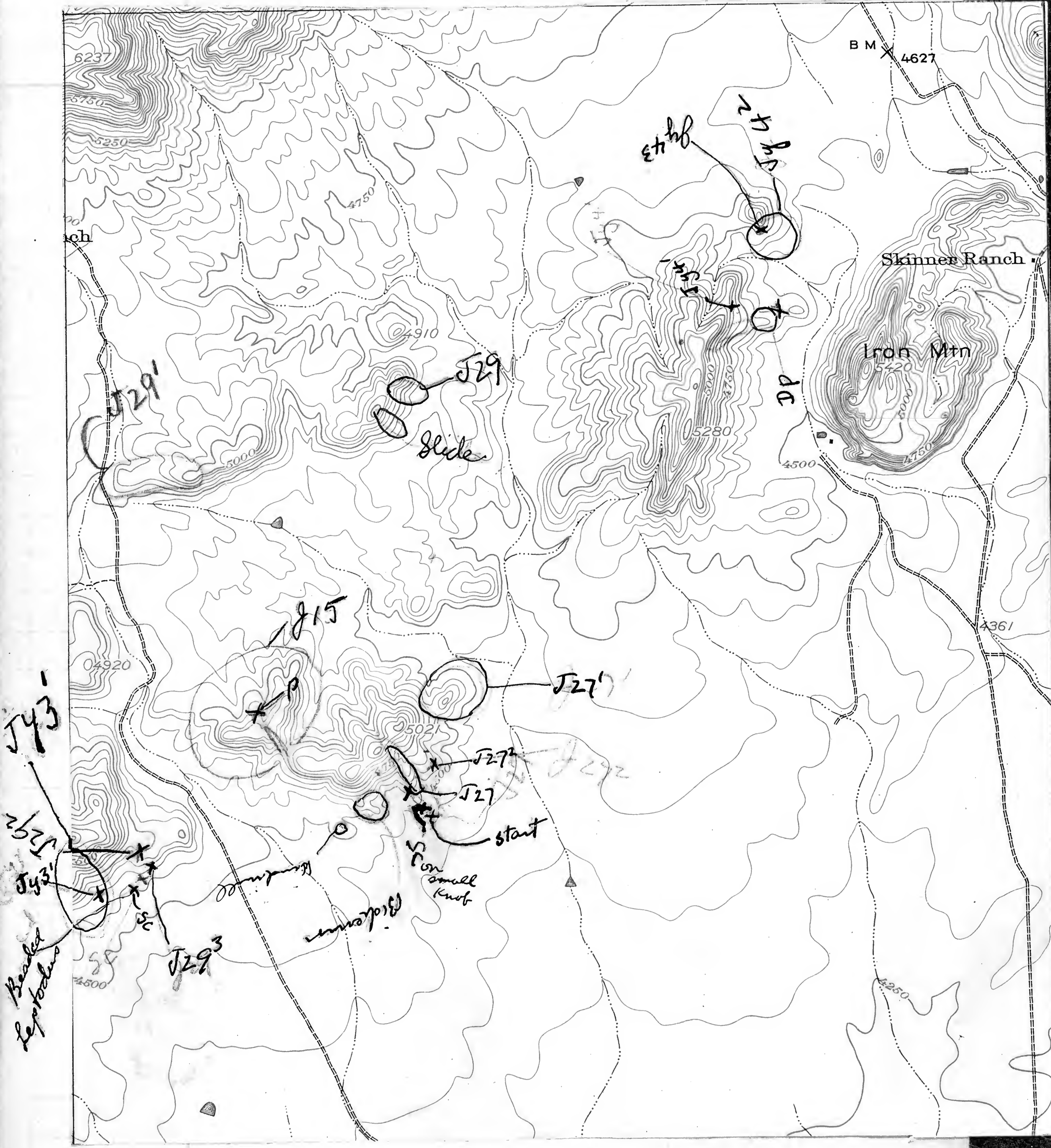
0331

Leonard Mtn	2, 35
Decie Ranch	8
N of Hess Ranch	10
Windmill Hill	12, 39
Decie Ranch - Artinskia 707m	16
Dugout Mtn	20
Wolfcamp Hills	22
Hill W of Lyon Mtn	57
Brooks Ranch	25
Sap tank	43
Clay slide	46
Sullivan Ranch Knob	48
Hess Ranch Howt	49

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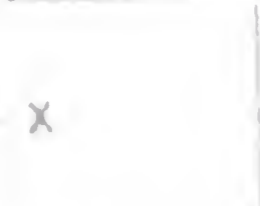




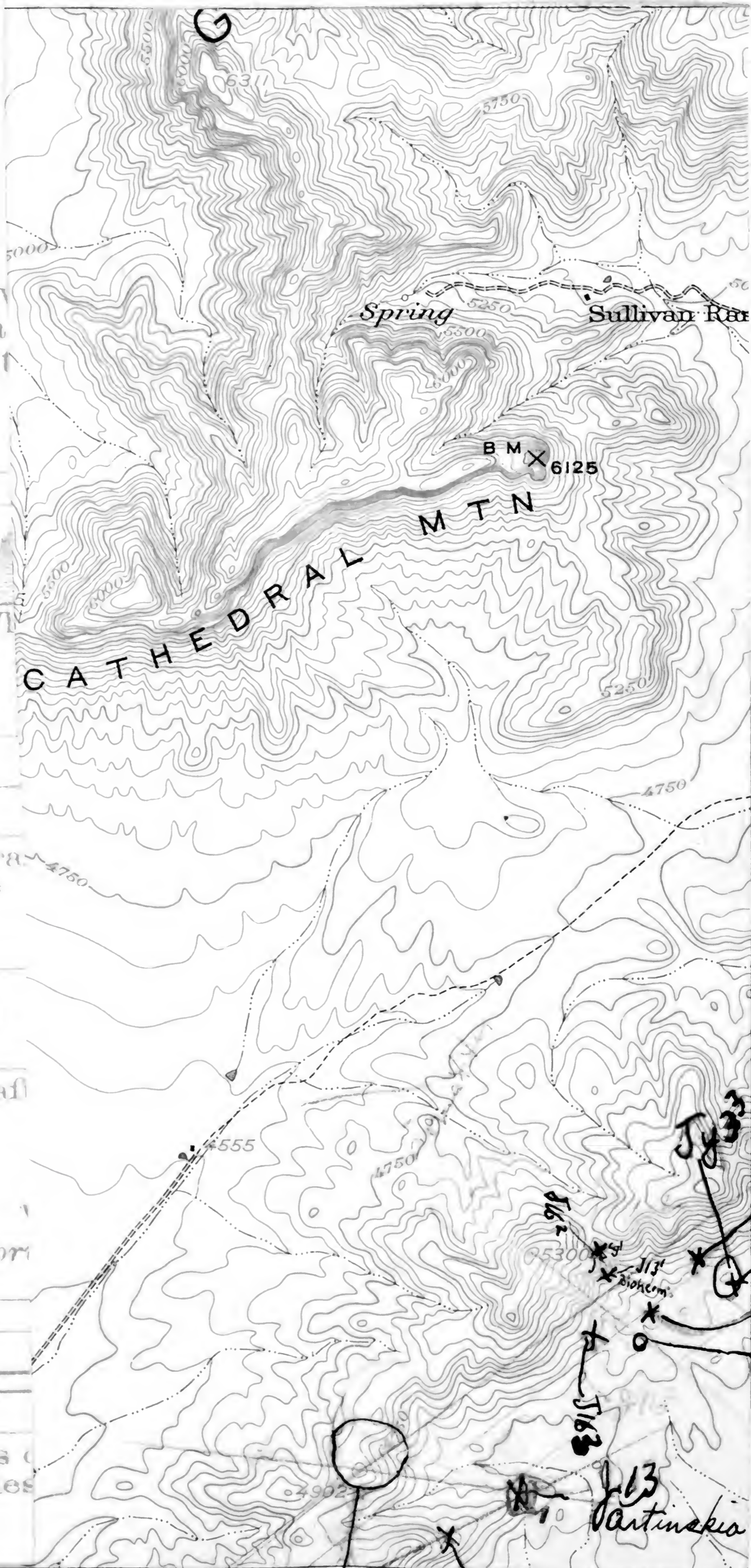
J43
262
J43
Beaded
Leptodus



between two
that is partly
the valley is
row gullies.
gently slop-

NOTE:—Effectiv
quadra
amount

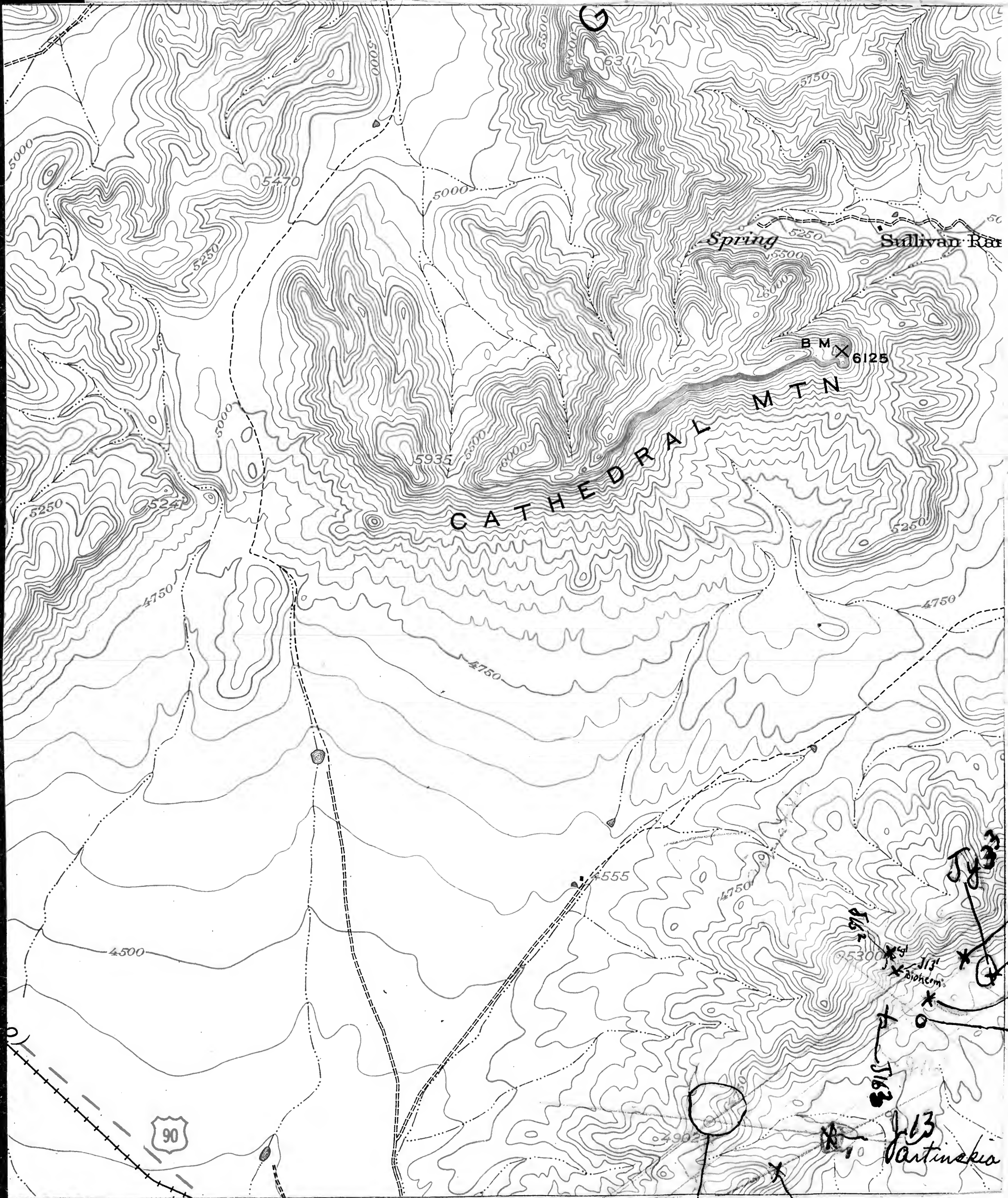
-  Power transmission line
-  Land grant line
-  Well
-  Shaft
-  Canals and ditches



(1950) J18 = 2700' S 50

4550
380
0720

0333

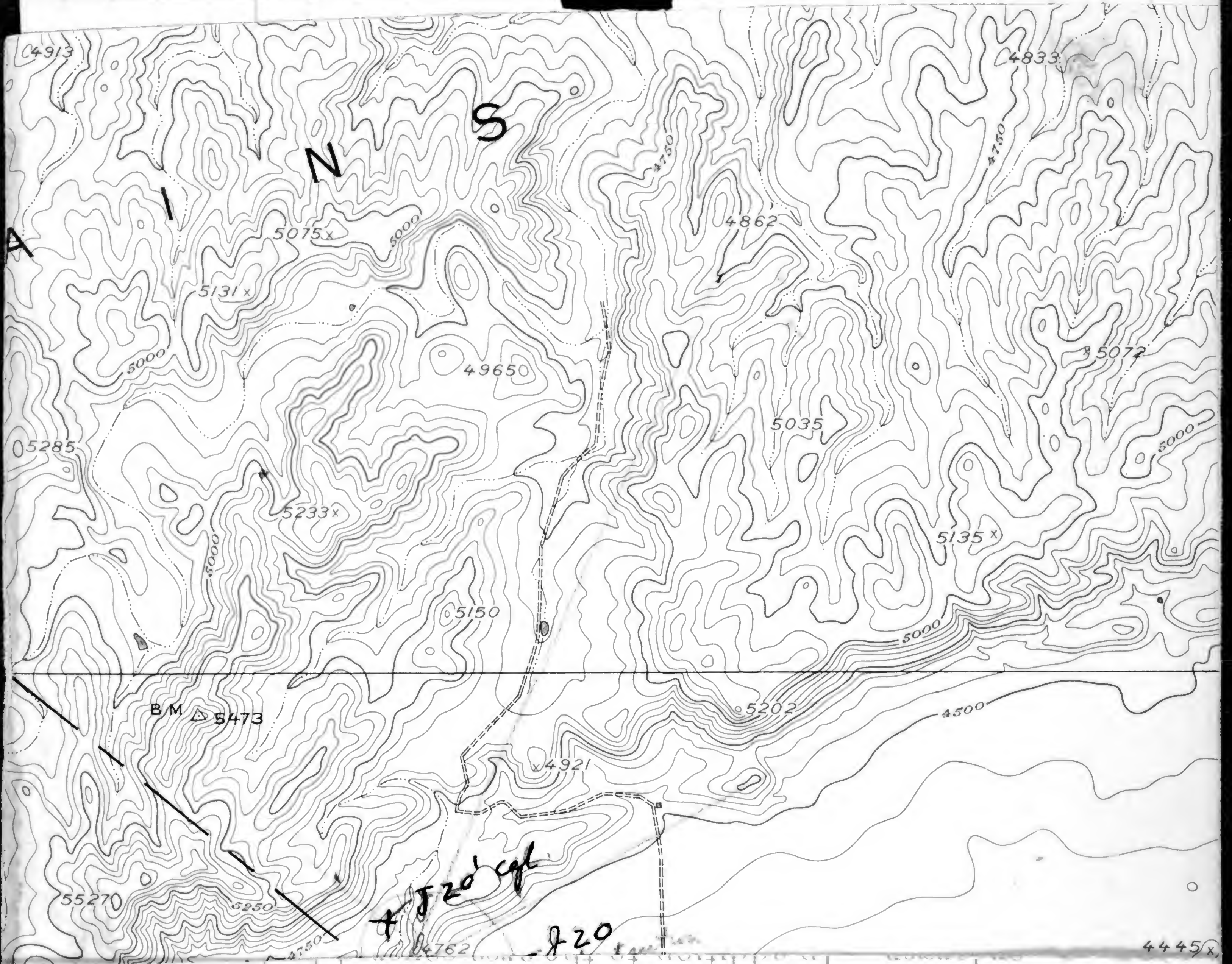


4500
3500
2500

J16

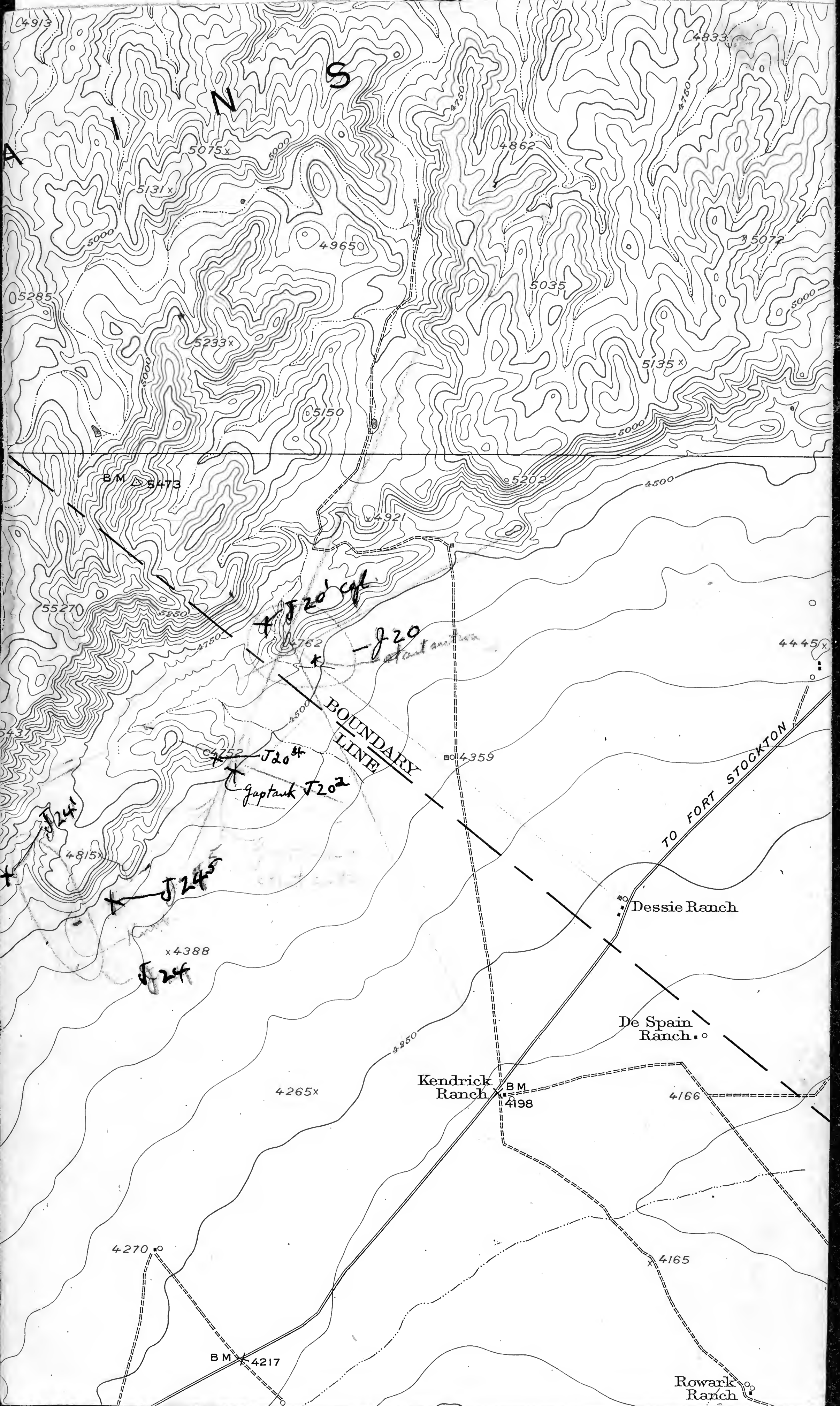
J16'

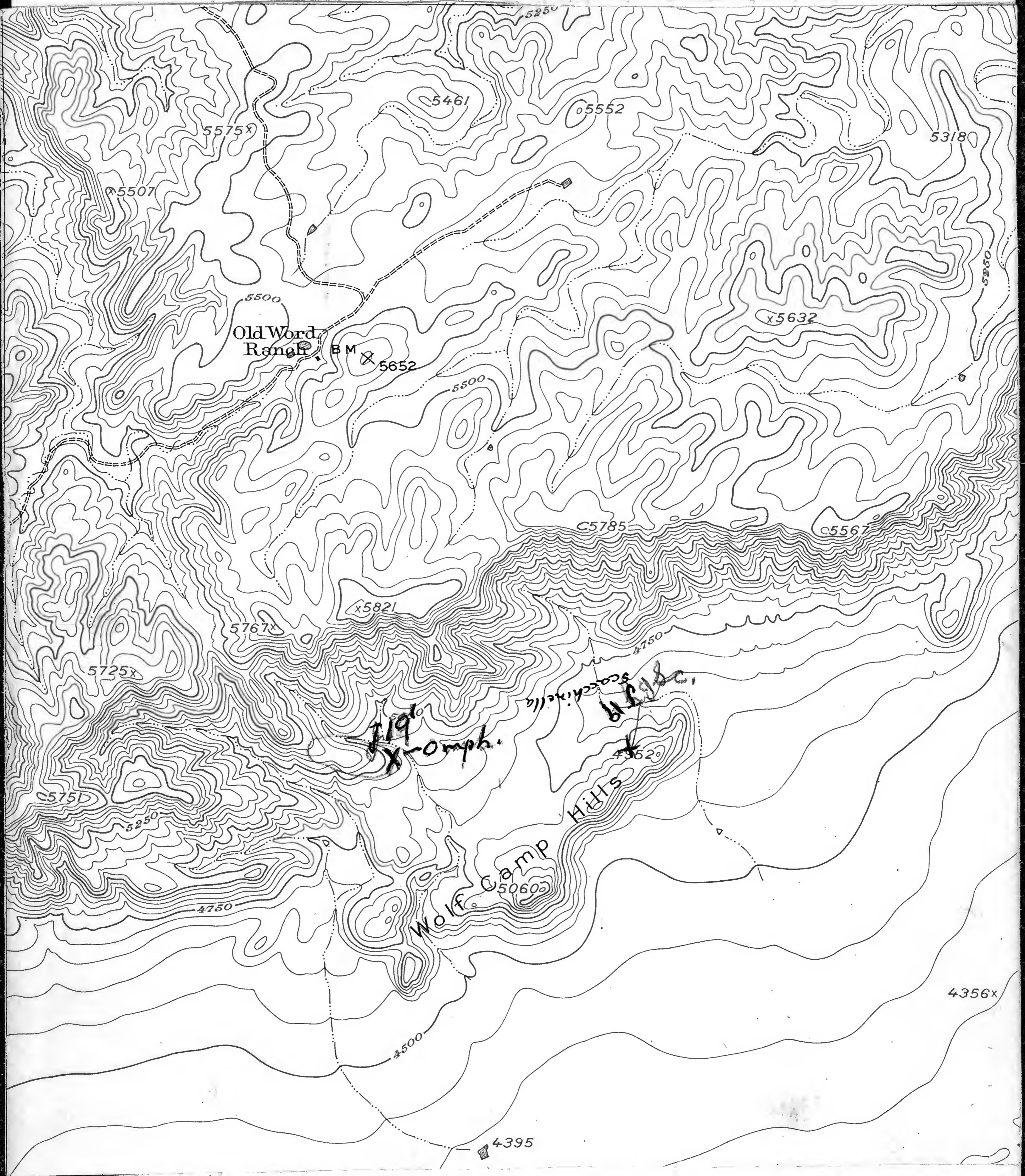
J172
Jy33*
J171
J163
J16
J13
Vartinska
Bohem



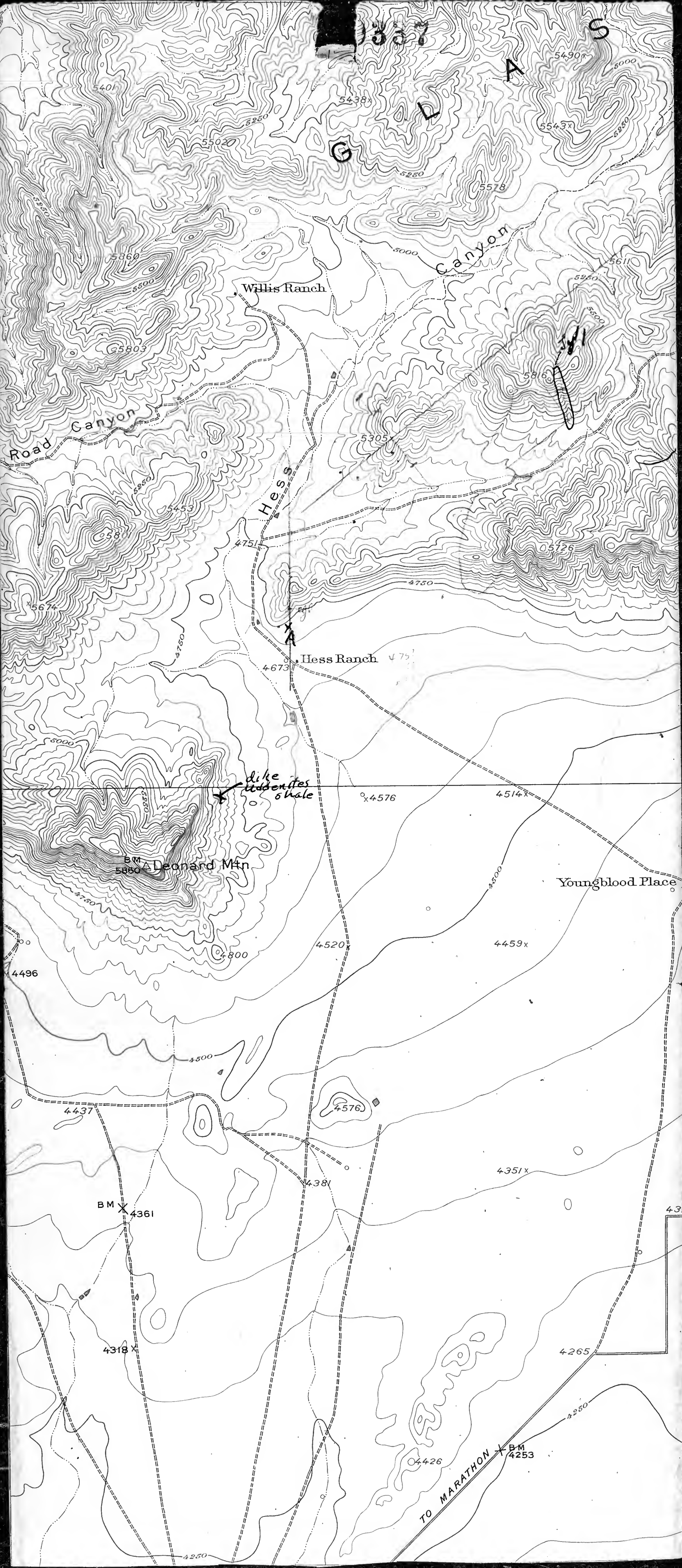
areas in the United States. By the use of stereoscopic projection apparatus, aerial photographs are utilized also in the making of the regular topographic maps, which show relief as well as drainage and culture.

A topographic survey of Alaska has been in progress since 1898, and nearly 44 percent of its area has now been mapped. About 15 percent of the Territory has been covered by maps on a scale of $\frac{1}{500,000}$ (1 inch = nearly 8 miles). For most of the remainder of the area surveyed the maps published are on a scale of $\frac{1}{250,000}$ (1 inch = nearly 4 miles). For some areas of particular economic importance, covering about 4,300 square miles the maps published are on a scale of $\frac{1}{62,500}$ (1 inch = nearly 1 mile).





1807 S



Willis Ranch

Road Canyon

Canyon

Hess

Hess Ranch

BM 5880 Leonard Mtn

dike hidden in shale

Youngblood Place

TO MARATHON

BM X 4361

BM 4253



100
 253
 42
 23
 63
478

20
 87
 75
 74
 136
 80
 74
746
 1478
1214
 380
 146
234

4950
234
 70
 4716

4600 10
 248 16
4848 10 5
 4950
 380
570
 4762
 248
4514

4762
 4825
 4740
120
 86
304

IV 10
 P

0338

Record of Pictures 1957

- 1 Hill 4815 and foothill
- 2 West side Hill 4815 + foothill
- 3 To N west of Knot J 24
- 4 East end Wolfcamp Hills in afternoon ^{light}
- 5 View from top of knot showing dip
- 6 East end Windmill hill
- 7 West end Windmill hill showing ^{separating} of ledge
- 8 " " " " " " / Bioherm
- 9 Looking N on front Windmill hill show "
- 10 Clay slide
- 11 J 29 " front
- 12 Sullivan Peate

WC

Sandy sh. - covered 53

Gray ls. 35

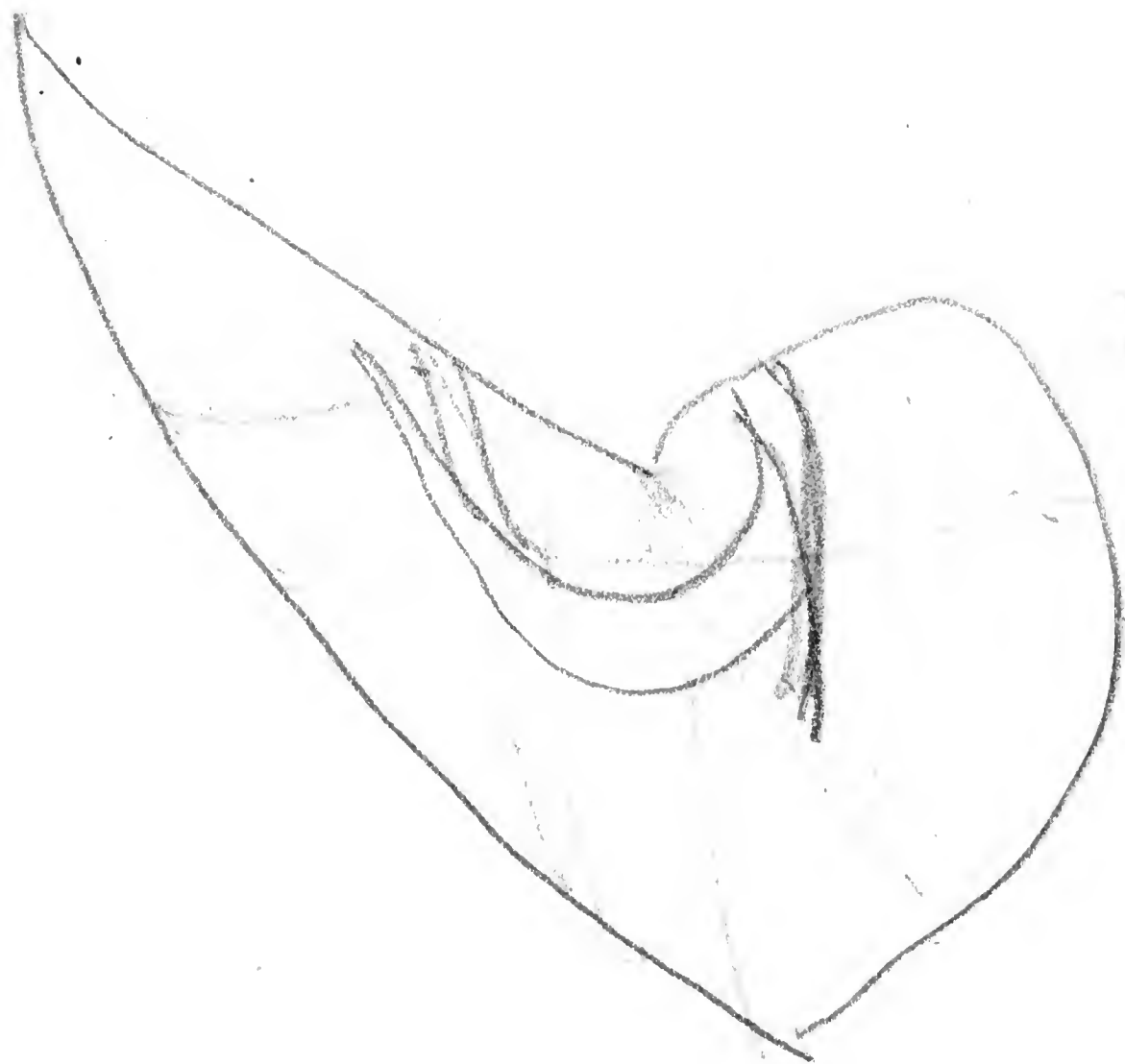
Brown sandy ls. 39

5th ls. 43

Blue gr. sh. 35

4th ls. - 2

Covered - 5



Record of pictures 1951

Pack I

1. Tenuous unconformity Leonard Mtn.
2. South face Leonard Mtn.
3. Looking N at Hess + Leonard #1 from Dec. Cr.
- 4 " " " " } saddle in windmill section
- 5 " " " " } showing merging of ls.
- 6 " NE " " " "
- 7 Decie R looking N at end section starting on Normalite
- 8 " " " " W " gressa " " "
- 9 J 16 - top of Hess ledge
- 10 Bisham J 13' + J 16'
- 11 " " " " " "
- 12 " " " " " "

Pack II

- 1 Wolfcamp shale N W of Decie R. J 16'
- 2 Dugout Mtn.
- 3 Baptists bisham
- 4 Blank
- 5 East end W.C. Hills
- 6 " " " " "
- 7 Wolfcamp silhouette at saddle
- 8 Blank
- 9 June 20 - Brooks R - hill 4762
- 10 Blank
- 11 Goniatite bed Hill 4752
- 12 Profile from goniatite Hill
toward Wolfcamp Hill.

U.S.

H/W

S

H/E

A/C

①

June 6 Ordovician on Pressman's Home
and Bureau Quadrangle

Chert cgl. in contact with
Knox dolomite, about 5' above base
in reddish calcarenite found
Rostricellula. Section above is
marble or calcarenite for some
400 feet. About 300 feet above
base is a shaly band in road
to house. This contains Dinorthis
atavoides, Parrorthis, Cystonotella
and is Lincolnshire. Thin bedded
limestones in the marbles
contain D. atavoides. Part of the
marble is thus Lenox and
Lincolnshire. The marble above
the shaly Lincolnshire is the
Rockwell of Cooper = Ward Cove
in part. On top of the marble
is Bambolt, followed by limy
Wardell. On upper Wardell
yellow and red Moccasin
fingers appear followed by
a long sequence of Moccasin.
The Witten is in a Moccasin
lithology.

The remarkable part of this
section is the long basal
sequence of marble = Murat
in part.

5060
4975
85

4975
4800
175
75

②
June 11

SE slope Leonard Mtn.
Section started above cgl at 4850
at 4975 comes first limestone
conglomerate.

at 5050' fusulinic, fine cgl.

" 5060 Scacchinella. Found
brachial valve of Parantelites.
Beds above Scacchinella not
markedly conglomeratic.

Above Scacchinella beds rock
is a sugary calcarenite which
is dolomitized on top of the
small knob. The knob is
about 5100-5750 on crest.

Barometer is 5150 on very top.
5245' on slope Fusulinid sample
in calcarenite.

5290-5300' comes base of thick cgl.
Thus there are 240' of calcarenite
above the ^{part} Scacchinella beds.
5430-40 Scacchinella bed. Base
of Hess.

5560 contact of granular ls
calcarenite with dolomite.
Top of dolomite at 5750'

On top of dolomite is a
bed of flatish silicified
algae, the reticulate marginifera.
Barometer at top of mtn is 5860
checking B.M. absolutely.

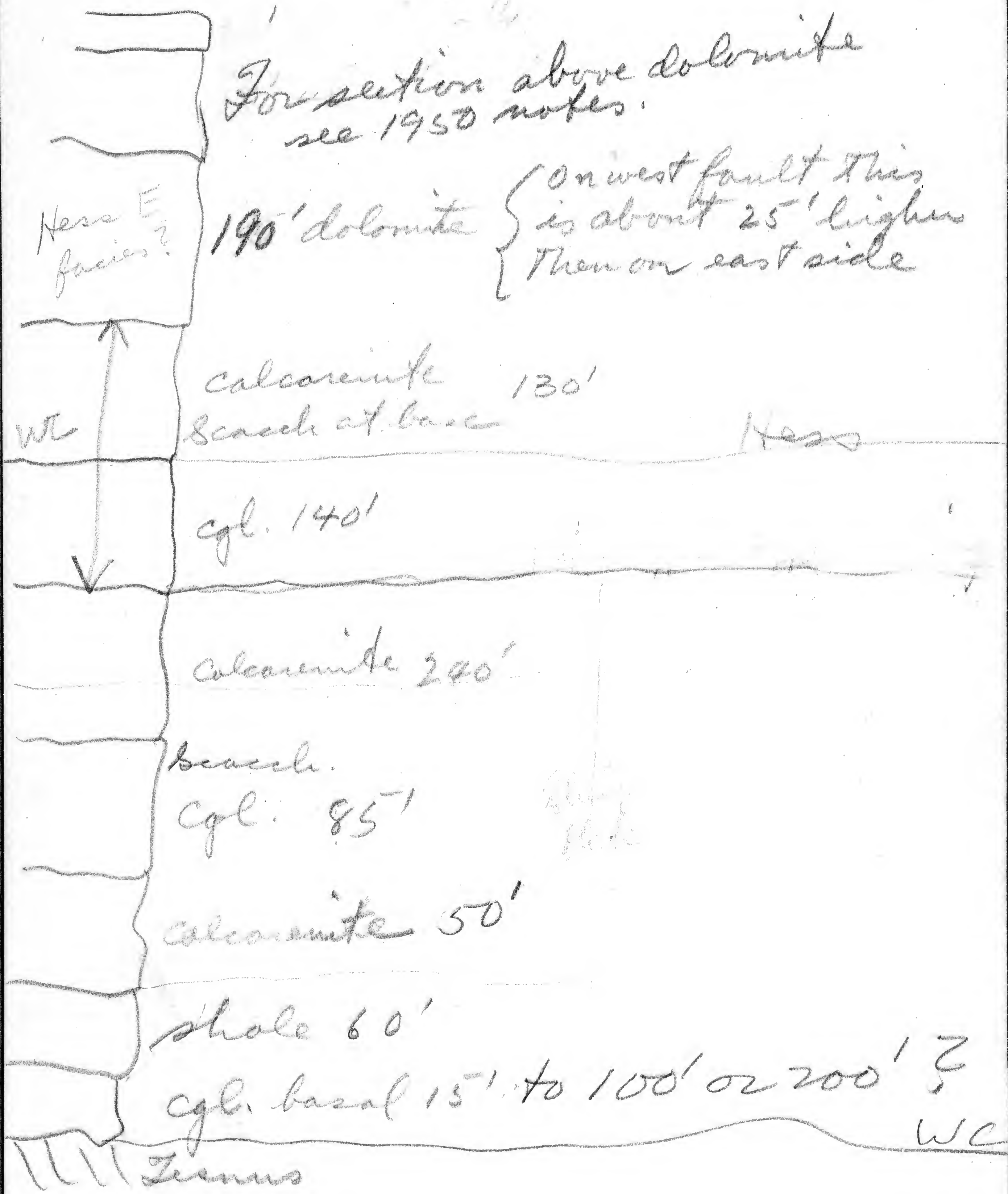
The rock on the top knob is
massive granular ls.

506'

556'

575'

For section above dolomite
see 1950 notes.



920

③

On the knob NW of BM can be seen platy shale capping knob of massive Hess granular ls all overlying dolomite

yellow shaly Leonard.

massive Hess

Going NW to base of knob NW of BM 5860 we follow along flat granular ls beds capped by massive biohermal ledges. This rock seems to thicken as the dolomite thins to NW. At base of NW knob at 5760' comes a thin layer of yellow shale, probably 8-10'. Biohermal beds follow for 120' followed by yellow shale for 8'. The main biohermal ledge is about 30' thick. The bioherm is followed by 45' silicious shale platy ls and yellow thin-bedded shale. This is the base of Kings old Leonard. This must just underly Uncinuloides which I have on the N side of Leonard Mtn.

20
450
165
130
140
240
85
100
60
15

10 05
48 50

58 55

~~008~~
15
09
25
58
06

5060
4800
260

④

For shale in canyon - Sight on high ridge of WC hills N 70° E. Sight on ranch SE of WC hills is due E

My section is not in accord with King's. He divides the Hers + WC 150' below the 140' egl. This contact may be in the interval between top of knot to base of main mass of mountain. Plotting the section should straighten this out.

The *Beacchinella* bed high on the Mtn. at 5430-40' is about 20' thick and consists of a biohermal hump surrounded by egl. The bed has very little lateral extent. A peculiar elongate orthotetid rather than *Beacchinella* is the most abundant shell. The *Heliospongia* is also present.

⑤

June 12 Followed contact of Tesnus and conglomerate west on Leonard Mtn. The cgl. evidently is laid on a very irregular surface because lugs occur in the Tesnus that extend more than 100'. Patches of shale were seen in several places above the cgl.

Up ravine nearly to head - Ravine cuts down east side of knob. The knob makes a bare rounded slope against the ravine. On the east side of the ravine a rounded mass of dolomite occurs with top at about 5000'. Near base of dolomite knob occurs layers with potato chip algae and orange ls. At 5075 occurs shale exposure with uddenites lithology under large Cedar tree. Here abundant *Prod. lasalleensis* and a few other fossils.

Wolfcamp type lithology can be seen in the slope ahead to head of ravine at about 5250'. The Wolfcamp lithology is thus higher than the knob with *Scacabrella*. The shale seems to occupy the sides of the knobs and probably filled in between them.

The flat at 4850 where we park, probably is a shale slope.

⑥

Here we found goniatites but the cgl. on the east side of the flat extends up 50' on the west side across the gully shale occurs in the lower part of the knob. This would make the shale all of 350' thick between knobs.

The goniatites occur at about 5100'.

FJ12 - at 5100 feet under a ledge of hard limestone came a shale slope having fossils. Some of the rock is blue and nearly like the paste in some of the boulders, potato chip algae common, fusulines abundant in lenticular masses.

On following the cgl-Terms contact it became apparent that considerable relief was etched on that surface. The cgl. thickens and thins. Usually some shale can be found above the contact throughout a range of 300'. The saddle on the *Sacchinella* knob is probably made by weathering away of this shale.

The area may be looked at as a great thick shale

⑦

containing bioherms. On the west side of our Leachinella knob 2 Bioherms are visible. The lower one is separated from the upper by a shale. The beds of the upper one dip up to the west and seem to be truncated by the heavy limestones of the main mass of the Mtn. This may be King's unconformity but the dips look to be tied up with the bioherms.

4950
9515
4625
140
275

⑧

June 13. - Exactly 25' above the Devonian novaculite occurs a lenticular layer of cgl with rounded & ragged pebbles. This contains Artinskia and other goniatites. It is thus at the very base of the Wolfcamp sequence.

Location of Leptodus knob on Decie R. -
 Poplar tank - $S 60^{\circ} E$
 Decie Ranch - $S 12^{\circ} E$
 Arnold Ranch - $S 11^{\circ} W$
 Crest of hill (Windmill) - $N 60^{\circ} E$

J13'

When looking at Leonard ls. #1 from below massive biohermal ledges can be seen in the layer. Top of Hess at 4675'. Bioherm in Leonard #1 ls $S 53^{\circ} E$ of Poplar Tank at 4815'.

Decie Ranch $S 10^{\circ} E$. Top of ls. at 4950' where it matches a flat. Above lower bioherm occur cherts, thin shales but upper half in coarse ls. cgl. Retinulate marginifera just above lower reef. Another bioherm appears above the lower one. Lower one about 15' by 60'± cgl. on W side of lower reef. Cgl about 50" thick, small pebbles throughout but some

⑨

heavy ls. ~~and~~ boulders $1\frac{1}{2}'$ in diameter at ~~the~~ 25' down. The lower 25' have much sand and are a real ss. Next 20' down is in upper bioherm. Under bioherm are mainly cobbles. Remainder of section about 60' are in thin yellow shale and ls beds up to 1' thick. 20' under upper bioherm comes the reticulate marginifera which is commonly on silicious skins on flat ls beds, about 10' above lower bioherm. The measurements were taken from the base of the lower bioherm. This is thus included in the lower 60' under the upper bioherm.

The fauna of the bioherm is rich in *Waldarella*, which look just like those taken out of the Hess below, it is possible some of the Hess blocks are float from above but I recall getting blocks with similar fossils in places. This particular bioherm abounds in small productids suggesting *Strophalosina*.

The occurrence of *Artinskia* at the base of the WC suggests that the WC changes age westward. King, p. 135 notes

⑩

that the basal WC conglomerates of section 11 pass out by overlap to the east.

In the Actiniskia locality few other fossils were found. The rock is fresh and fossils do not break out well. I was unable to find Scacchiella at this place.

June 14

Section on nose north of Hess Ranch.

110

32

6

11 dol

3

162

Section started at point A. To top of cgl. by hand level 110' going due north. Cgl. succeeded by dark gray granular ls. 32'.

Granular massive ls. forming reef dump 6'.

Dolomite 11' followed by 6' quartz ss and this by 3' to top of hill. Formed in cgl. dolomite. From base to top of hill is thus 162'. The ss forms a small syncline or possibly a lentil.

Strike on ss $N50^{\circ}E$ dip $12^{\circ}NW$

Starting section on ss.

N for 141 paces in massive granular, fine, dolomite.

$N28^{\circ}E$ 74 paces same dolomite.

$N35^{\circ}W$ 44 paces same dolomite.

$N12^{\circ}W$ 89 " "

①

At this point I am on the hillside over the *Scacchinella* locality (which is N 75° W of this point). The dolomite here is coarsely granular and has big crinoid stems.

N 51° E 89 paces coarsely xln dolomite

N 25° E 89 same coarse dolomite

N 35° W 12 paces coarse dolomite

N 35° W 132 paces finely granular blue gray massive ls. at 29 paces comes *schistofenids* and *Entolites* in smooth green gray Leonard type ls.

N 35° W 40 paces dolomite massive granular and dolomitic cgl.

This was a ls cgl. now dolomitized.

N 48° W 73 paces granular massive ls and dolomitized ls. of same type. Barometer 4900'

N 22° W sight on Hess gate 260 paces in massive granular ls & dolomite.

After completing the section I examined the *Scacchinella* beds. These have no regular dip and seem to lie on the mountain side rather than being a part of the Mtn. I saw no trace of *Scacchinella* in the dolomites. This section I think is high Wolfcamp and Hess.

(12)

June 15.

Daniel Jarvis has goniatites from Cisco and Wolfcamp he will send the Museum.

The cgl just N of The Hess house look like lower Wolfcamp cgl., because they have numerous brown sandy boulders and sandstone

Note - It must be recalled that Bill Allen found a goniatite in the shale at the base of the knot on Leonard Mtn.

Section at Windmill on
Dexter Ranch

Basal cgl is 20' thick

at 4575 is top of biohermal bump.
Barometer 4500 forming a small flat. 25' above comes another small bump.

4600'; N35E 14° NW on sandy bed near top of second bump.
Top at 4600' bump of massive granular ls. with small pebbles + corals at top.

4640 found patches of shale.
Probably most of covered slope is shale.

4710' under main saddle comes cgl., sandy and with small chert pebbles. I think all of the slope from top of bioherm with

(13)

corals is shale.

4750 To top of cgl. The lower half of the cgl. is very sandy & in places shaly. Upper half is solid sandy ls. packed with small chert pebbles.

4800 To top of saddle. Thick *Beacchinella* bed is conglomeratic with ls & chert pebbles in lower part. Otherwise it is granular and biohermal and very massive.

Barometer out by 100 feet which should be divided among the intervals. The saddle is actually at 4900'. The two knobs on each side of the saddle may be beehive humps. There is a shale between the *Beacchinella* and the humps. The shale disappears to the east.

North end Windmill Hill

J 15 - handleveling begun at 4775.

Long dip slope of limestone has small *Entelites*, sponges and *Leptodus* on the surface. The saddle just below the J 15 is made up of biohermal limestone with some ls cgl on the south side and in the topmost part. Small chert pebbles also present.

Handlevelling to pass $N30^{\circ}W$
Strike $N52^{\circ}E$ dip $18^{\circ}NW$ Compass set at 18° .

22 H₂ steps in yellow shale and thin-bedded ss. = about 120'

(14)

Covered 10'.

HL steps - at 20' ^{25'} above covered interval Peririnites abundant. 25'-40' above covered interval bedded thick dolomite, 40-65' biohermal ls with small pebbles 65'-100' massive fine grained unfossiliferous dolomite without fossils, 100'-138' platy sandstone + sh. yellow thin bedded, ss layers up to 2". 138-163 to top of knob all in massive fine-grained sugary dolomite. On the long dip slope of the center lobe of this hill Peririnites occurs. I think this is ls #3-4 of the Leonard.

15

The beds in the saddle of the Windmill section = The 50' foot Hess in the hills to the west.

South end Lenoir Hills

Top of Hess at 4666'

J 16 - 92' above stream comes base of Hess ledge here very conglomeratic. At 157' comes brink of hill with flat beds of ls. N 24° E dip 11° NW. At 146' comes top of massive cgl. ledge mapped as Hess. Eleven feet higher comes flat bed on which dip is measured.

4770
92
157
146
15

157' - 166' comes top of low hill. Rock in this interval is thick beds of ls at bottom, cgl, and near top thin beds of dark gray ls. Some interbedded chert or ss + a little yellow shale. N 53° E 11° NW

166 - 218' Bedded ls, beds up to 1' thick separated by shale. Beds often cgl. At top 1 1/2 - 2' bed of yellow weathering ls.

4770

218 - 304' mostly covered in bottom half but mostly thin platy yellow shale in upper half.

4950
76 38
162

304 - 380'

4930'
4950' to top of hill

- Decie Ranch S 35° E
- Poplar Tap S 85° E
- Sullivan Peak N 10° E

4950
862
4788

Mostly biohermal limestones with numerous fossils some thick bedded ls with flat chert layers.

16①

I searched this bioherm carefully from top to bottom for *Scacchinella* but found only a doubtful one. It has *Streptobryachia* just like the Wolfcamp ones and those that occur in the upper Hess sponge beds. I suspect this bed correlates with the sponge bed and the fossil bed on the crest of the mtn. It is possible that Q #1 ties up with the fossil bed of King that overlooks the Wolfcamp hills.

J16² Picture 12 on pack one. Bioherm base at 4860'. This bioherm proved to be a great mass of huge cobbles. We are probably on the fringe of it. Poplar tank! 553° E, Deche Ranch 511° E

The bioherm at J13' measures 4860' by barometer.

In the bioherm of J16² one boulder measured more than 4 feet in its longest axis.

J16³ - At the place where I have collected most of my big *Scacchinella* about 92' below the base of the Hess ledge is the base of a thick shale. 15' vertically from the base of the shale comes goniatites & bryozoa.

(18)

The Wolfcamp seems divisible into 2 parts, a cgl. in the lower half or two-thirds and shale and ss in the upper half or one-third. The two small knobs at the front of the hills are in cgl. but are overlain by shaly sandstone, pink and yellow in color. This can be seen in 2 ravines on the dip slope of the knobs. The shale contains layers of yellow sandstone, cgl pebbled with small pebbles. The shale may or may not be overlain by cgl. at loc 163. goniatites occur 62' vertically below the Hess with Artinskia in the upper zone. The lower zone occurs 77' below the Hess ledge. We followed the shale from the west side of the hills nearly to the east side. The only good exposures are the ones marked. In places the sh is overlain by cgl which is directly overlain by the Hess. If this cgl. is interpreted as Hess unconformity is suggested.

soft,

Hess

Clay Sh with ss + cgl

fine ss

50'

Cobb
ls +
Cgl

17
See Bowsher
notes p. 244

J 16' - About 116' of clay shale with some cgl and ss beds in lower 20 or 30'. Contains snails and occasional goniatites = 160'

June 17

Location of goniatite bed $S 63^{\circ} E$ on Poplar Tank, $S 14^{\circ} E$ on Decie Ranch. Location is 50' below this point.

Lower Hills

J 17' - Good exposure of platy ss, shaly ss and cgl. with a few fossiliferous limy bands. Fossils include productids, *Darbyia* and a fragment of *Seschinella*. Just south of this exposure, platy ls. and bioherms (without fossils) appear interbedded with the cgl.

See
Bowsher
notes p. 245

Strike $N 34^{\circ} E$ dip $15^{\circ} NW$. The exposure is on a line $S 54^{\circ} E$ of Poplar Tank. Thin platy, yellow sandy shale strongly resembles the Leonard above. Some cherty and sandy beds resemble the Leonard.

J 17² - Good exposure of upper shale in ravine $S 42^{\circ} E$ of Poplar Tank. Alternating blue sh, yellow ss and cgl. Saw no good fossils. The ss beds are thin and numerous generally known weathering.

92
15

97
15

62

(19)

The lower half of the cgl is also variable along the Utu front. Where Actinophid occurs it is a ls cobble cgl but with some chert. At the Leptodus ledge limestone cobble cgl. can be traced laterally into quartzic cgl with little or no limestone.

In the west end of the Utu shale predominates between the cgl & the Hess. The lower 30' contained some sandy & cgl beds but the remainder is mostly clay shale.

I suspect that the shale in the windmill section is related to the upper shale but here is overlain by a thick cgl. I suspect that all these beds have an interlocking arrangement and are facies of one another.

Dugout Mtn.

(20)

June 18 - Barometer reading at start - 4420'. Gap tank seen on mountain front up to 4670'. Top of Wolfcamp egl. at 4770' where shale is exposed under crest of mountain.

Saddle between Hess ledge and egl mass to NE is occupied by yellow platy, silicious shale of Leonard type. It also contains some thick (1-1 1/2) ledges of ls. with silicious skin on top. They look like upper Hess at S end of hills north of Decie Ranch. The saddle is at 4870'.

5095
4870
125'

At 5020' comes a 3-4' ledge of sparsely egl. limestone. Below this occurs mostly paper, yellow shale. Another egl ledge about 2' thick occurs about 5070' up in this interval.

At 5095 on NE edge of mtn comes base of main massive ledge which is limestone with pebbles egl. in lower part but with some silicious pebbles.

The main high ledge contains granular limestone of Hess type with some small bryozoans. I did not see *Saccinella* but

(21)

The lithology in several places is right for it.

Top of mtn at 5195.

The ascent from 5095 to top of mtn. is all in very massive ls., some ls. cgl. and some flat, thick-bedded ls.

I walked northwest along the rim of the hill and over a long spur to 5110 feet which is the top of ls #1 from the crest of the mtn.

Here lumpy silicious yellow brown rock appears to a low knob made up of cgl. ls, mostly thin-bedded. Small biohermal lumps, fossils are present. This is evidently ls #2.

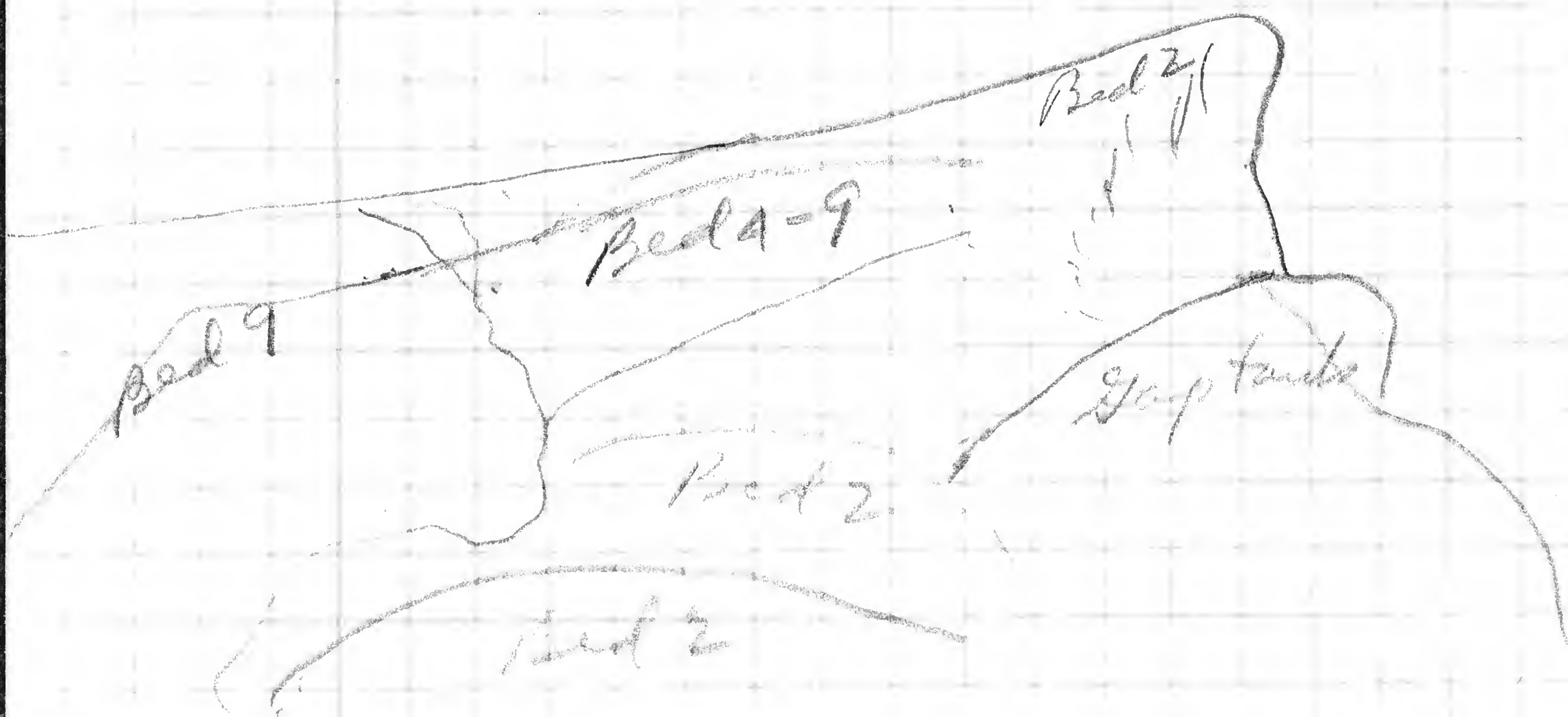
Another small lump (hill 4811) is capped by ls. but it does not appear to be strongly biohermal. As elsewhere the main ledge of ls #1 seems the end of the big bioherms.

Dip and strike above Hess ledge - $N 62^{\circ} E 16^{\circ} NW$
 $N 18^{\circ} E 10^{\circ} NW$.

The shale appears to be all of 100 feet thick at the west end of the exposure. The goniatites occur in cgl. ls. in the midst of the shale.

(22)

June 19 - Wolfcamp Hills
 Looking east on long slope
 of Bed 2 shows that beds 9-4
 lap onto the sloping face of
 Bed #2. A gully cuts down
 on the shales in this wedge.



About 50' of shale occurs between
 the cgl and the last flat yellow
 ls. at the top of the Wolfcamp.
 The Heos cgl. is almost wholly
 a ls. cobble cgl. Silicious pebbles
 or any pebbles other than ls
 ones are rare.

J. 19 - small bioherm of
 cream-colored marble ls
 definitely ls. #2. I suspect ls #2
 appears on the dip slopes of
 the thickened upper ls of the
 Alderbank zone. This ls seems

(23)

to go under the big knob at 4962 but it is possible that the mass is a thickened knob of the Uddenites zone, I favor the view that the knob is ls # 2 rather than Uddenites.

J. 19 The upper Uddenites ls is very thick just west of hill 4952. The ls # 2 of the knob lies on a thin shale between the knob and the upper Uddenites ls. The orange-yellow biohermal beds can be traced across under the saddle without interruption. A small bioherm at the extreme end seems to overlie the ls # 2 or at least come on its flank upper surface of upper Uddenites bed just west of saddle and on slope down from saddle contains *Saccinella*.

703g

J. 19¹ - Walked over lower Hess in foothills. Above cgl it is yellow fine-grained dolomite interbedded with fine-grained limestone, both abounding in fraulines small and large. On the dolomites the fraulines are

(24)

cavities. Large *Omphalotrochus* like those from the upper fossil bed were taken at a windmill. The cgl. at the base of the Hess is a cobble cgl. with little or no silicious material.

Bed 12 is very conglomeratic and the lithology is very suggestive of that of the Artinskian bed just under the Hess. This is true of most of the platy limestones capping the shales. Each of these ls has small pebbles and fusuline sand.

The WC here is capped by about 50' of shale!

Perinites bosei was found in the crumbly fusuline beds of Bed 12 on the west side of the ravine in the center of the Wolfcamp Hills.

25

June 20
Section N 40° W uphill 4762
On Brooks Ranch

Section begins on plain about 100-150
yard east of arroyo.

0-54' covered

54'-55' - brown, fine-grained ss.

55'-68' - mostly covered, some shale
visible

63'-66' - brown massive ss.

66'-77' - shale but mostly covered

77'-80' - ss. brown, fine-grained

80'-124' - shale in lower part, upper
part in thin-bedded ss becoming
heavy bedded at top. ss forms upper 12'

124'-144' - white crumbly ss in lower
4' but massive and heavy-bedded
above.

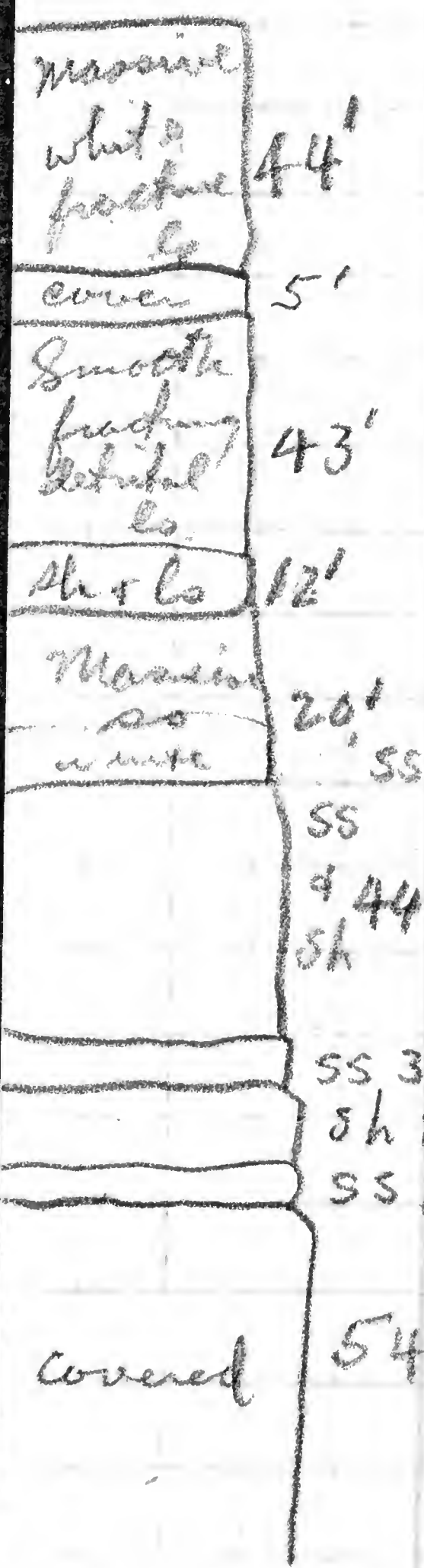
144'-156' mostly shale but with some
cobble ls containing fossiliferous.

144'-199' - smooth fracturing very
massive detrital ls. biohermal in
character and showing no bedding.

The lower 10' or 15' are made up
of cobble ls. This bed contrasts to the
next overlying by weathering gray
rather than brownish gray. The
weathering color is very conspicuous
from a distance.

199'-204' - covered.

204'-248' - marble-like, whitish-
fracturing detrital ls. This is almost
certainly the ls # 2 of the Wolfcamp.



0364

(26)

By sighting from top of hill dip is $12^{\circ} N 45^{\circ} W$.

June 20' small knob of cgl. Studied section in small gully $N 20^{\circ} W$ from knob.

J20²

Section up hill 4752
Montgomery R - $S 70^{\circ} E$
Hill 4762 - $N 25^{\circ} E$
Ranch Hill - $N 47^{\circ} E$

About 4500' appears Gaptank in plain at foot of hill.
Section goes about $N 50^{\circ} W$
4510' comes a foot of brown ls. King's bed #4.

4510' - 4550' mostly covered. ^{Shale with brown lenses flat algae}

4550' - 4561 - fine brown ss.

4561 - 4564 - Three foot ledge of hard gray granular ls. in a massive ledge. Contains goniatite sections.

4564 - 4575' dark gray granular ls. in beds 6" - 1" thick

4575 - 4576 - hard yellow ls.

4576 - 4615 - shale mostly covered

J20⁴ - 4615 - One foot ledge of dark brown ls with goniatites. ^{Small shells}

4615 - 4626 - brown ls. culminating in an orange yellow sandy bed.

4626 - 4660 - mostly covered shale terminating in an orange yellow algal and fine pebbled

(27)

4660-4670? - covered shale

4670-4700 - massive calcarenite
fairly smooth fracture4700-4710 - light gray limestone
suggesting ls # 2 of the W.C.4710-4752 - just above light
gray ls. comes a layer of ss. Slope
above this is mostly cobble covered
and poorly exposed. About 15' from
base and same distance from
top comes heavy bedded ls of
biohermal texture and form;
it is probably ls # 2. Top 15' of
hill is in ls. cobble cgl.On west side knob red mud
appears at 4700'At 4615' in saddle comes
a cobbly ls bed with *Dictyoelostus*
and large *Amphalotus* like
those seen in lower throAbout 9' below this bed art
took fusulines.At 4626' dark fine-grained ls
at 4700' comes fine-grained flat-
bedded ss. Slope below this is
covered shale slopeFrom 4700' to top of hill is
in bedded fine-grained ls
suggestive of the Hess east
facies but the more massive
beds are like Wolfcamp.J 20³

(28)

June 21 - East side Leonard Mtn.
 On a line N26°E from Hess House
 and at about 4850' - 4900' The spurs
 are capped by ls. some aqf. but
 some biohermal. Just south of Hess
 fence line about 100 yds. one spur
 has biohermal ls at base but a
 small knob has potato chip algal
 ls. dark brown in color.

Dike at N30°E and approximately
 cutting 4910' contour. Below dike
 shale extends down for about 120'
 to about 4790' contour. Here were
 seen brown ls. with fusulines and
 potato chip algae. Some snails
 and clams in shale just below dike
 75' above dike comes a brown
 potato-chip reef.

The shale goes up 130' above
 the dike, making a total exposure
 of about 250 or more feet because
 the base was not seen.

J. N. Allebrand.
 Parkway Hotel, Marathon, Texas
 The NE corner of Leonard
 Mtn proved very disappointing
 because we found so few
 fossils. The location of King's
 ammonoid locality suggests
 float specimens brought

0367

(29)

down the Mtn like the small one I found. The shale is certainly Uddenite zone because of the abundance of *Striatopora* corals.

7022

June 22 - Hill 4815 Brooks Ranch

Outlying hill on west end has 100' elevation from Valley floor to thick biohermal ls forming the crest of the hill. The shale contains bright yellow brown ls layers and some shaly ls.

The top of the big biohermal ledge less 30'-40' thick occurs in the lower part of hill 4815 at 4600'. The biohermal bed consists of 3 kinds of ls: biohermal gray ls, dark gray ls like that of Kings bed 9 at the general locality, and potato chip algal beds all dark gray. Surface very irregular with small bioherms resting orange red. Looks very much like Wolfcamp.

4600-4610 shale mostly covered

4610-4625 - platy yellow sandstone
N 54° E 13° NW

(30)

4625-4657 - gray shale
 4657-4717' - platy sandstone in
 beds thickening to a cliff face
 of about 15'

4717-4740 Sandstone terminates

4740-4743 - shale

4743-4746 - thick ledge of fossil-
 iferous ls. This 4726 by barometer.

4746-4753 - covered.

4753-4758 - massive ss.

at base of cliff at about 4760'

703n occur small fusulines. Top of
 cliff about 4790. Ls. mantle like

Above the massive ls comes
 an 8' red bed mostly covered.

To top of hill above red bed
 comes about 17' of cobbly ls.

Syringopora large on surface
 probably from upper cliff.

Big cup corals in shale in
 top of lower bioherm ls
 at 4600'

The lower bioherm forming
 the foothill is undoubtedly
 bed 9 of King. The bioherm
 capping the hill 4815 is
 probably not ls # 2 of the
 WC but is the top ls of the
 Uddenites zone. The whole
 section is Uddenites zone.
 If any WC exists it is
 above the cgl. The fusulines

(31)

in the base of the top ledge
look like those of the upper
Uddenites bed.

June 23 - Collected Word # 3
on Hess Ranch in morning
with Jim Wilson. Packed 2
boxes + 5 bags in afternoon

June 24 -

Sent pictures to Conoly Brooks,
Marathon, Texas.

Two foothills stand out from
hill 4815. These are bioherms
of King's bed 9 of the goniatite
section.

Barometer at 4447' Due N up west end hill 4815
0-76' up in shale slope showing
brown ls ledges + potato-chip
bioherms. In lower 25' limonite
concretions abound.

76'-103' - to top of knob at 4600'
by barometer. This interval
is in a bioherm which I believe
represents King's bed 9 of his section
on hill 4752. Few fossils can
be seen in the bioherm. Section
up rest of hill N5°W. Top of
bioherm in white subcrystalline
ls. Bioherm overlain by
shale absent at section where
overlapped by ~~rest~~ brown ls.
Shale quite thick on bioherm

(33)

flank.

103-104 ± shale thickening
to east + west off flank of
bioherm. This bioherm is same
as one seen on section over
hill 4815.

104-106 - yellow brown ss with
biohermal humps of yellow
potato-clip algae.

106-198' - mostly covered but shale
visible in places. Through ^{out} section.
I should say all shale except for
a thick dark brown ss lens at
at 161'.

198-258' - platy and massive yellow
fine grained sandstone culminating
in a 3' bed of hard brown ls. with
small cherty pebbles. This seems
to be the gromatite bed of King. This
comes at about 4700' by barometer
Barometer and hand level are out
only 5' at this place.

258-280 - mostly covered but
some sandstone showing. lateral
probably sh + ss.

280-300' ± base of cliff at about
4750'. White granular limestone
extends to top of hill about 25'
higher. I did not climb cliff, but
think ls may go up to 4800'. I
suspect the ls is about 50' thick
going from about 4730' - 47750'
possibly a little higher.

same as
hill 4815

(33)

at 4755' is a layer of cobbly ls. The ls is white but is nevertheless granular and detrital. I think the conglomerate overlying this ls on hill 4815 is probably the equivalent of Bed #2 of Wolfcamp. The conglomerate may be the cobbles off that big reef.

Lower Permian cobbly on bottom with cobbles separated by yellow sandy sh. These look like lowest bioherms of Uddenites zone at Wolfcamp Hills.

702W

J 24' Edge of hill on N side ravine marked by white ls. about 40' thick. This is at 4650'. In lower part white ls. are two ^{dolomitic} sandstone lenses.

4650' - 4675' Slope with ls. cobbles but capped by a ledge of white ls like that below.

Section goes N40°W from point on edge of canyon.

Cobble cap goes to 4675'.

4675' - 4700' - mostly covered probably shale. Top in 3' of light yellow smooth fracturing dolomite.

4700 - 4725 - smooth fracturing yellow dolomite, with purple streaks on the fracture. Top bed unrounded massive ls.

4460

(34)

suggesting a dolomitized bioherm,
4725-4755 - shale & dolomite
culminating in a thick biohermal
edge all dolomitized

4755-4800 - alternating sh. & dolomite

4800-4865 - some shale with
yellow dolomite beds up to 2' thick

J242

at 4865' found fusulines

Montgomery Ranch 583° E, old
Meeks place 522° E. Staffella at
4875'.

4875-4950 - Rock becomes mostly
limy in this part and shale
becomes much less.

4950-5010 - mostly thick bedded dolomite
Double ledge about 100' above
and here abandoned the section.

706L = 702y

J243

J244

703f

Fusulines at 5005'

" " 4955'

Change from dolomite to ls.
at about 4890

J245 =
7015.

Beside road and for 100 yds to
the north occur brown bioherms
and thin beds of ls. yellow &
brown. Found 3 goniatites

Visited King's loc 113 in
saddle. Below red bed many
cobble & arenaceous ls. some with
large bellerophonites. About middle
are brown beds with large

(35)

colonies of *Syringogora*. This is all in the upper biohermal ls. The bed 2 of King. The beds in the ravine look like reef rubble off the side of bioherm. There are also large masses of potato-chip algae in very dark gray ls.

King records *Parenteleles* from 201.

June 25

Collected all day at Wolfcamp Hills

June 26

Leonard Nitro.

1.09.

Under knob at 4850' egl is exposed. First ledge rock appears in place at 4900'. Massive ls with no cgl. First cgl appears at 4960'. Cgl ends about 5025' and the fossil beds appear at about 5030'. Top of knob at 5100' even and section to top from fossil beds is all massive ls. except for top of knob which is dolomite. Top about 135' feet above the summit of the knob the terrane is still knobby and bioherms are evident across the front. Evidence of shale over these knobs is also very clear. The massive cgl going over these biohermal knobs may be King's unconformity. The

5425
136

5289

(36)

Shale would thus go from a little below 4800' to at least 5235' feet. Most of the bioherms are not of large size and egl develop on their slopes and help fill the cavities between them. Furthermore bioherms tend to form on lower bioherms.

At 5190' at base of small bioherms comes a small patch of fusulines. This is near the top of the bioherms.

At 5235' comes the top of the bioherms at this point. This is also the point where the Mtn begins to steepen into a cliff face. This, or above the egl. where *Sacchinella* again appears is the top of the W.C.

Base of WC

Top of egl. at 5410' - 5425' because surface very irregular. Two *Sacchinella* masses occur at this level and are overlain by at least 20' of shale but the shale laterally passes into ss and egl. Just above the shale the rock is massive and dolomitic but the same interval in the gully is limy.

At 5035 on west side of Knob is a bench formed by a bioherm under the main knob. The dips on the main knob all

(37)

seem very steep to the northeast at this place but they flatten out on the east side of the knob. On the west side of the knob is a deep ravine and in it appear brown limestones that cap out on the hillside. All these structures look like dips produced on the sides of mounds. In the case of our big knob the ~~mass~~ which it once flanked is no longer there but the rocks appear tilted.

J26' - In a small ravine off the main one up the hill at 4960 feet comes an unusual occurrence on the N side of the ravine and for some 25-30' up the hill are cobbly, mealy and algal beds abounding in *Autosteges*. These layers seem to be plastered on the side of the main knob. The assemblage beside *Autosteges* & *Scaphinella* includes *Teguliferina* and *Parentelites*. These suggest that this bed belonged to the *Uddenites* zone. Whether it has any connection with the *Scaphinella* bed at 5025 or not is hard to say.

Along with these beds are brown ss that are vertical and run

(38)

along the ravine. I suggest that these were once nearly horizontal in the shale that covered the bioherm but that when the shale was washed out in weathering the so slumped down into their present position.

The west side of the knob near the top has corals fairly common. These bioherms are thus suggestive of the ones in the Wildmill section.

(39)

June 27

Section up gully between two hills, one east and Windmill hill. Section starts on small knob at base of hill at about 4460'

The top of this knob is at 4490' and the whole knob is composed of massive biohermal ls.

Staccharella occurs on the west side of the saddle between this small knob and the next larger one. *Staccharella* seen on front small hill.

Between the small knob and the next larger one, in the saddle between the two a dingle is exposed for 20' or 30' horizontal.

At base of high knob cgl shows over the dingle exposure. 4710' comes top of knob and base of hill. Knob mostly covered above lower 50'; bed of brown ss at base of hill.

(40)

June 27'

West side knob, east end hill

- A - Cgl. ls with large pebbles in upper part and enormous crinoid stems all without real bedding. Up to 20' capping knob. This is undoubtedly the basal lens same as in cliff on upper part mtn.
- B - 17' mostly covered but with dark bl. ls. & making blocks up to 10" and covered on upper surface by brown siliceous stain. Blocks possibly interbedded with shale.
- C - 7'
- D - 2'
- E - 12'
- F - 2'

Dimple

C - Thick bedded sandy ls. with thin layer of cgl at top.

D - 2' cgl.

E - 12' shale with thin bands of cgl. Near middle, contains chert pebbles & crinoid stems.

F - 2' cgl. Chert pebbles up to 2" and a few ls. pebbles.

Strike N70E dip 16° NW.

Dimple form saddle between this knob and main part hill

J 272 small fusulines at 4600' on large knob

(41)

June 27th

On the ravine which bisects the knob limestone occurs at about 4530'. Above this about 15-20' of cgl. appears at 4575'. This cgl goes up the hill on both sides. It is evidently the cgl that can be seen in the rubble on the front side of the knob. A little higher in the ravine another 2-3' band of cgl appears. This is composed of large pebbles. At about 4600' limestone, massive appears which contains tiny fusulines like those on the small knob where *Scacchinella* occurs.

As shown by the knob on the west place the Dimple has enormous relief in this hill, at least 300' at the "West" knob. It is possible that the *bioherms* grew on Dimple lumps.

On the saddle between the knob at the Windmill and the main hill Dimple flat may be seen. This suggests that the *Scacchinella* *Bioherm* may occupy a bump on the Dimple. The supposed Dimple really may be only a shale + so is the Wolfcamp overlying the *bioherm*.

(42)

at 4710' just above bioherm
at base of hill comes dark
brown sh.

Under the cgl at the
windmill are corals and so
which might belong to the WC
but I think it is more
likely to be simple material.

Searched hard on the
slope for shale fossils
but were unable to find
any. I think the knots were
exhumed by weathering of
shale off them. In the big
ravine under the west
saddle the fans contain
many fine pebbles. These
are probably from soft
shaly cgl that may make
up a large part of the
section between the knots.

(43)

June 28 - Section at Gaptank
just west about 0.2 mile west
of road intersection. Section
starts on limestone 3 of Gaptank.
Section goes due N.

To 3 holes like a bioherm
like those common in W.C.
80 paces to another biohermal ls.
which is about 6' above the
other.

80-225 - ^{paces} covered. At this point we
come to a brown biohermal ls. at the
base of the hill 12' above the
starting point. Biohermal ls 3' thick

6' vertical covered

6-8-9 brown ls. with potato chip
algae

9-73' mostly covered slope

73'-96' dark gray granular limestone
in rather massive ledges.

Dips N20W at 15°. This is probably
ls #5 of the Gaptank section.

96'-134' - Mostly covered but
lower 9' in sandy brown ss.
This is overlain by 6 or 7' of ss.
This is evidently the *Uddenites*
zone. It is light gray
potato-chip algae.

134-156 - massive gray ls. The
#2 of the W.C.
Dip slope of about 40 paces

44

From top of massive ledge
handlevel at 15°

0-7Hb - mostly covered, but shale
and thin ls beds suggesting
low Uddenites.

7-8Hb sugary ss.

8-19Hb - pebble cgl in sand matrix

19-24Hb - cross bedded ss and
conglomerate forming a low
cliff.

24-27 - same but mostly sugary ss.

27-31 - light gray, fine-grained ls.

Creaceous - Section goes $N 30^\circ E$ and is
paced.

67 paces and 11' higher still in
the ls but it looks biohermal +
cgl. 132 paces to same level on
next hill

Uphill slope $< 21^\circ$; 16' vertical
same ls. some brown chert.

Slope $<$ on next hill 12° . 63'
vertical. a variety of ls. and
sandy limestone and considerable
dolomite.

I think the ledge purported to be
ls #2 of the WC is in reality
another ls. probably the one
in the lower part of the section.
The white ls above the ss is
the top Uddenites ledge and
the real ls #2 is lost. The
ss and cgl, I think is
probably the thick ss under

(45)

The top Uddenites ledge that we have followed on The Brooks ranch.

All of the ls in this section above the cgl is Cretaceous.

Just above the so-called ls #2 of WC is a shale and about 30' up in it is a layer of orange weathering ls, with fusulines.

About 100 yds 545° E of Gaptank occurs dip slope of ls #2. A small valley is made on the slope. 150 paces can be paced across the valley. The upper 40 paces in shale with brown ls layers. Fossils abundant in upper 40 paces.

N50E of Gaptank about 150 yds is another hill about 25' high face of hill with shales and thin bed ($2'' - 2'$) of brown & yellow ls. Hill capped by cgl & cross-bedded ls.

(46)

June 29
Up mtn just east of Clay Slide

4690 top of wash exposing 30-40
of shale & thin ls. This wash is
where most of the Clay slide
collections were made.

4690-4710 - platy yellow ss.

4710-4825 - gray sandy shale

4825-4829 basal ledge of sandy
limestone, rotted in lower part
and containing small *Lin. productus*
Spurferi.

4829-4850 - gray sandy shale

4850-4851 - sandy yellow ss.

4851-4875 - gray sandy shale

4875-4885 - yellow cherty ls.

4885-5000' - Up the edge of the
mountain occur cherty, platy
dark gray alabby ls weathering
ash gray. Few fossils. To the
west these become fairly coarsely
granular massive and show
no bedding. They are thus
bihermal. The platy beds are
typical Word #1 and they
have massive equivalents
which cap the ledges of the
scarps along Clay Slide Valley.
The suspected Leonard to
Word facies change evidently
does not take place.

47

The ledge at 4825 is formally suggestive of the 702c knob.

The clay slide starts about 4930' in center of hill just under top.

J 29' — Went up long slope to knob at 5000'. This is a great biohermal mass truncated to the SE. To the north and west the surfaces are rounded. In the saddle at about 4875 flat platy limestone with chert, the typical Word #1 lithology appears. This mass is thus undoubtedly ls #1 of the Word as mapped but its whole expression is Leonard. The rock is a fairly coarse calcarenite with cobbles in the upper part some of them with siliceous rims are common. Small mammillary lumps of brown silica are common.

The commonest fossil is a beaded Leptelasma. This belongs here and is associated with large fusulines - Parafusulina.

Hill east of road to
Sullivan Ranch

(48)

Knob next to Sullivan Ranch road.

Scallops seen at 4600', at 4650 cgl. heavy sandy ls. and a shale (yellow and Leonard-like appears). Base of Hess ledge in knob comes at 4710. Hess ledge 40' thick. This ledge is quite cgl. in places.

J 29² fusulines in Hess on top knob.

707r

J 29³ - fusulines at 4610.

Lowest beds at 4575' about 1/4 mile W of road in small gully.

Lowest beds under front knob at 4600'.

50016
90515
666

(49)

July 1
Hess Ranch Hermit
Ravine under Hill 5816

5150'

5150' lowest shale exposure.

5150-5190 - Dark gray indurated sh.

5190-5191 - hard limy layer with
crinoid stems.5191-5200 - thin bedded sandy
shale in flatish layers.

5200-5210 - same flatish sandy rock.

5210-5230 - covered

5230-5235 - crumbly dark blue gray
shale.

5235-5255 - covered.

5255-5265 - crumbly shale - capped
by yellow cal band of 9".5265-5270 - crumbly sh with 9" ls
band on top. Is bedded splintery
but showed no fossils.5270-5275 - gray crumbly shale with
three thin (2") limestone bands
about 15" apart at top. Dip
here 6°5275-5280 - crumbly shale with 5
sandy + cal ls bands 6" thick.5280-5285 - same with 2 6" ^{-10"} thick
beds at base separated by 6"
shale.5285-5290 - same crumbly
shale.

= 5320'

5290-5300 - Top 10' of shale
becomes cobbly but true rock

(50)

5370-5400

is soft. At 5300' comes solid hard cgl. ls.

5300' - 5370' - lower part with fairly coarse cobbles but upper part in dark gray irregularly bedded, but heavily bedded sandy and pebbly ls. sand & pebbles fairly angular. Cobbles below mostly round and fairly coarse. Poor fossils present.

5370-5376 - biohermal hump.

5376-5400 - Top of a conspicuous ledge. The interval marked by fine and coarse cgl. & sandy ls. Ledge is 5400' on west side gully. Section starts again on east side gully on same level as 5400 on west side.

5400' - 5430 - pinky to brown to dark gray ss.

5430 - 5470 - alternating thin ls and crumbly shale capped by a one-foot bed of hard cgl ls.

5470-5481 - sill or dike

5481-5482 - sandy ls.

5482-5600' - to top of bold bluff of cgl. This interval in coarse cgl interbedded with irregularly bedded ss and sandy ls. Cobbles up to a foot, in base mostly ls but above many chert &

5492'
base of
sill

5659' to
top of cgl.

5840

(57)

Other silicious types.

5600-5630- flat-bedded dark ls weathering ashen-yellow, thin beds of ss and dark ls with angular dark chert fragments. This rock suggests the East Hess facies.

5630-5655- brown dolomite in layers $\frac{1}{2}$ -1' thick. Hess facies

5750'

5655-5715- granular massive and platy of the west Hess facies.

5715-5737- dark gray dolomite + ls probably Hess west facies

Barometer registers 5740' and is thus out by 26' (low). We went

5816' top of section

up the hill N 10° W in the depression that goes up just east of knob 5816

The northeast end of this hill also about 5816' is composed of granular dolomite. This is King's loc. 210. We saw nothing but large *Ornithotrochus* at about 5750'. This looks like Hess West facies altered to dolomite.

Down west face of hill 5816 to saddle at 5535' saw same section of dolomite + calcarenite turning to ss near bottom

704K

July 1' - At 5575' fusulines in

(52)
7040

cgl. above ⁽¹⁵¹⁾ main ledge of cgl.
 Jy 12 - Fusulines just above ^{5540'}
 main ledge of cgl. Saddle at
 5540' and thick cgl. ledge at about
 5520'. I should say a real lithologic
 change takes place above this
 heavy ledge. The rocks are
 thinner bedded, so and the
 cgl have small pebbles. Right in
 the saddle appear steeply dipping
 cgl which seem to be cut by
 the plate, so and is above the
 thick ledge. My two fusuline
 colls Jy 11 & Jy 12 are both above
 the scarp and unconformity.

Dip on upper beds N48E 13°.
 On the east face of the hill
 west of 5816 the dipping beds under
 the Hess are well shown. The
 dipping beds are not parallel
 to each other under the unconf.
 and thus suggest fragments of a
 reef.

Looking at west face of
 hill 5816 the dip on the Hess beds
 is 11°, that on the Wolfcamp 29°.
 When studied on west side of
 hill east of 5816 the unconf was
 at 5550.

Section above unconf.

(53)

5550-5600 - covered.

5600-5603 granular massive
gray ls. looks like Wolfcamp.

5603-5610 - covered!

5610-5700' Fusulines at base

Thick ls with small pebble cgl.

5' above are platy ls. with

fusulines. Whole interval is

thick bedded, irregularly bedded
sandy ls, ss and fine pebble cgl
with dark pebbles.

5700-5775' Lighter gray ls with

light or white chert pebbles

+ quartz pebbles. This cgl. only

in bottom part. To top of hill in

fine grained & coarse grained

light gray ls weathering light

blue gray! Barometer out 100'

(high).

Down nose to east barometer
reset cgl. sands are at about 56505550 fusulines on nose east
of hill 5675'. Came back to saddle

at 5525' which is correct.

Came down hill from saddle
at 5525'.

5425 - base of big cgl.

5425 - 5325 - shale & ss interval

5325 - 5200 lowest exposure of
cgl.Correct Elev
Jy 13
704mJy 14
704i704t
Jy 15
Correct

54

July 1⁶ - 5100' in gully blue gray shale with band of ls.

~~702h~~ =
704V

at the Windmill Art says a shale comes between Dimple and cgl of WC. There is a possibility of this also at the Windmill but the lithology looked like Dimple to me.

I recall seeing potato chips algae in the lower shaly part of the section on the Mtn. west of Iron Mtn. These would be good evidence of Uddenites zone.

July 3

Revisited section at Windmill. The shale along the base of the hill proves to be Dimple. This is true of cgl which I had previously placed in the WC can be seen interbedded with the Dimple shale. If the cgl are followed W & N to a small arroyo they can be seen interbedded with shale. Two small knobs N of the Windmill show Dimple underneath but with a veneer of rubble on top. On the NW side of one big knob Dimple can be seen forming nearly all of the

55

slope. On the saddle between the big knob and the main hill Dimple can be seen as flat at the base of the hill and in place. This was previously interpreted as WC in place but it is definitely Dimple. This is true also of the knob to the east.

The WC here is thus a veneer over a Dimple high or a sand-bank laid into a swale against a Dimple high.

The top of the knob at the Windmill is a cgl. with small silicious pebbles, broken sponges, corals and brachiopods. Fragments of Leptodius are common which indicate the rocks to be Permian in age. This material from its battered fossils and pebbles suggests wave-banked debris against a Dimple high.

The rocks of the knob are definitely in place. Their layers are parallel but the dips are generally steep into the Mtn. The whole dimple surface is quite irregular and this Knob + the east one are probably

(56)

Laid against highs.

Jy 3¹ Shale under cgl at
 about 4575' elevation opposite
 ravine in main hill about
 1/2 mile E of Sullivan Ranch
 road. Sight on Poplar Tank S27°E
 Shale overlain by cgl. Sight
 on Windmill E of Sullivan R
 road N72°E.

Jy 3³. Small knob with cgl
 dipping to hill and with shale
 slope on S side of about 40'.
 Elevation 4600'. cgl has big ls
 pebbles + siliceous pebbles. At the
 base of the knob a long ridge
 shows Gaptank float. Cgl ca 20'
 thick. The shale is probably same
 as Jy 2.

A coarse cgl. appears in a
 gully on East side of knob
 Jy 3³ and seems to underlie the
 shale.

Just east of the knob ~~15~~
 about 150 yds. is a low hill
 of chert cgl. and brown ss
 probably Gaptank or Dimple.
 This is overlain by yellow ss.

57

at 4600' above shale & cgl. of
 Jy 3' comes 25'-30' of slope in
 a small ravine of yellow ss.

At west end Decie Hill spur
 at King's fault at 4530' are
 blue gray granular ls. like 1/2 ss.
 This may be a fault or there
 may be separate bioherms at
 different levels. The blue ls. is
 overlain by small pebbles of.

At the supposed fault one
 mass is rounded and
 is elongated forward the
 mountain. The only way
 this can be explained is
 to have these bioherms and
 not faults. I could see
 no breaks in the limestones
 that follow the 4550' contour.
 These all seem to me to be
 Wolfcamp limestones.

00840

U+M

P

O

B M

5800

4750

250

519

glacial process

glacial

horizontal gr.

etc
Fermus

shale

shale
Fermus
Cgl

X-Fgr

ferrous
Cgl
contact

4750

00840



5860
2195

3665

(57)

July 4
Hill W of Iron Mtn

West from saddle on small knob. Knob at base of hill 110' feet high all in Dimple to base of hill. at base of hill base of Dimple at about 4735 in a low saddle. Here comes a cover of granular ls. blocks like those at the base of the section in the Windmill section. Went up 110' more in this loose block material to 4845' which forms about the level of the fan deposits. In recesses and bare spots evidence of shale clear to this level becomes apparent in more, well preserved crinoid fragments. The base of the main wall of the Hess is about 95' higher or at about 4935-4950.

Barometer
here at
4860

Jy 4' at 4850-4870 comes a shale break showing blue gray shale crumbly brown ironstone and flat, thin bedded whitish ss. We saw no fossils, not even crinoid stems. Bowsher coll. = 7080

Jy 4² - Below 4850' contour in center of hill and below 4750' contour on west end

(58)

near ravine the slope is composed of shale. The shale slope is about _____ feet high. Near the top under the cliff are thin ss interbedded with shale and have in a thin lining band (yellow) of small fusulines but they were rare. At 4850 under main part hill, I saw a small lump with potato-chip algae and poor Composita.

July 4³ - At 4800' on south slope hill concentration of blocks of brown cgl ls. with one gemmatid and fusulines. Blocks approximately in place. 50 yds to west is a dropped block of Hess material which overlies the cgl. The cgl. is in place in the shale under the main ledge just N of the dropped block. At 4700' is the base of a 20' bioherm of gray massive ls with some rusty streaks. Core of bioherm with potato chip algae in rounded pieces. Just below these come large cup corals suggestive of those seen on the Brooks place. The bioherm is clearly W.C. Art says 20' of limestone at base of hill

(59)

Base of hill came at 4650'
 In this hill are at least
 100 feet of shale. I think all
 of the shale belongs to the W.C.
 I saw no definite Uddenites
 zone affinities, except for the
 potato dip algae.

At the north end of this
 hill I saw no big cgl.
 underneath the Hess
 sand as occurs at the south
 end and as recorded by
 King.

On the Decie Ranch the
 big cgl. at the west end
 pinches out toward the
 east. We evidently saw the
 thinned wedge of it on Jy 3
 just west of King's faulted
 area.

The Hess ls at the north end
 of the hill W of Crown Mtn.
 consists of flat dark limestone
 in layers 9" - 1' thick, often
 with chert layers on top.
 The stuff looks a great deal
 like the Leonard in the
 Decie place.

Notes on King

King notes WC basal cgl. thicker westward from 10' west of Crown Mtn to 450' near Lenoxy. Cgl. are followed by sh. & sandy shale. The upper shales are variable because of erosion at top. 160' one mile W of Crown Mtn. SW of Lenoxy upper beds removed by pre-Hess erosion for 1 1/2 miles of outcrop, so that Hess cgl rests on WC cgl.

Note Key's section for Mtn front north of Meeks Ranch p. 57.

Base of Hess along its entire length from Gayfankle to Del Norte Mtns. marked by cgl. Angular divergence up to 10° between Hess & W.C. Variable up. WC indicates Pre Hess erosion.

Hess

Up division between silicious sh. above & massive ls. below. Meeks Ranch no basal cgl in Hess as they pass into a massive gray ls. without frequent material resting on the WC.

ls all rock from Windmill section to Dugout Mtn. Probably Hess, rather than W.C.?

0399

Wes. cgl. shows gressive in hills
N of Her Ranch.

Try to see Gaptank fossils from
7 mi E of Gaptank. Probably at
Yale - May - WC or Uddenites

Glass Mtn. fusulinids
Wolfcamp Fm.

- Ozawainella huacoensis* D. & S. WC (upper) Leonard
Mtn. (loc. 18)
- Schubertella kingi* D. & S. W.C. (loc. 7, & 17)
- S. melonica* D. & S. Leonard (Perrinites compressus zone)
- Triticites uddeni* D. & S. WC. bed 9 at W.C. (also loc. 7)
- ~~*T. uddeni*~~ *subventriosus* D. & S. Lower W.C. in
beds 4, 9. (Locs. 6, 7, 8)
- T. pinguis* D. & S. L.W.C. WC Hills
- Schwagerina franklinensis* D. & S. WC. bed 14 (W.C. Hills)
- ~~*S. hesonensis* D. & S. Base~~
- S. gracilitatis* D. & S. WC just below Hess cgl. NW of
Saptank.
- S. linearis* D. & S. WC 1/2 mi N 35° E of Hess R.
Highest WC.
- S. compacta* (White) Bed 9, 4 mi. WNW of W.C.
- S. diversiformis* D. & S. Mid sup. W.C. Saptank
- Pseudoschwagerina uddeni* (B. & K.) Bed 12 WC Hills
- P. texana ultima* D. & S. W.C. bed. 14.
- Paroschwagerina gigantea* (White) Mid W.C. at WC
- P. kansanensis* (B. & K.) WC beds 4-7 WC Hills.

Leonard Fm.

- Staffella lacunosa* D. & S. — 450' above base, 2 or 3
mi. NW of Gaptank.
- Schwagerina hesensis* D. & S. Base of Leonard
on Dugout Mtn
- S. hawkinsi* D. & S. Base of Leonard on Dugout Mtns
- S. queimbeli* D. & S. 1 1/2 mi. W. of Gaptank.
- S. g. pseudoregulans* D. & S. 450' above base, 1 1/2 mi W
of Gaptank.
- S. crassitectoria* D. & S. 400-500' above base N of WG
- Parafusulina bakeri* D. & S. Lower Leonard
W end Dugout Mtns, S. tip hill W of crown
Mtn

0402

Willis, Robin - Correlation of Texas and
New Mexico Permian. A.A.P.G. Bull
13, 1929, p. 1017

"The uplift which accompanied the folding of the Marathon region prior to the deposition of the upper Gaptank formation established a land mass southeast of the Glass Mts. which must have persisted until the end of Word time at least, and reappeared during Bissett time, if it did not remain throughout the Permian. The numerous conglomerates in the Hess indicate its proximity. The shales and sands of the Leonard and Word were derived from it, and from its westward extension. The successive overlap of the formations from the Gaptank to the Word is additional evidence of the proximity of this land mass. Southwestward along the southeastern front of the Glass Mts., each succeeding formation overlaps the ones below it and rests directly on the folded Pennsylvanian beds".

Top WC at 5714 in hole 5816

Top WC on hillside at about 5800'

5.5
90

495.0

5075
495

5570

27

2.2

5280
22

10560
10560

1161.80

1162' per mile

5810
5810

639,10
5075

5714



