Iron County, Utah: [specimens] 46487-46613. No. 421 Summer 1906

Harder, Edmund Cecil, 1882-; Ward, Freeman, 1879-1943
[s.l.]: [s.n.], Summer 1906

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U. S. GEOLOGICAL SURVEY

FIELD SECTION BOOK

9-891

LAKE SUPERIOR DIVISION.

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left-hand page, place a map of as much of the section as has *actually been seen.* Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and number attached, showing the direction and amount of the dip. Denote a shaly or other very plainly bedded ledge by right parallel lines, and a ledge having a secondary structure by wavy parallel lines running in the direction of the strike, with dip arrow and number attached as before. The greatest care must be taken to avoid confusing slaty or schistose structure with bedding, and in all cases where there is the least doubt about the true bedding direction, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue lines as 100 paces, and twenty of these spaces to one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right-hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left-hand side of the page. The ruling of the left-hand pages is also arranged so that, if desirable, a larger or a smaller scale can be used, eight inches, two inches, one inch, or one-half inch to the mile. With the two-inch scale, the squares outlined in black represent sections, and those in red, quarter sections and "forties," while the space between the blue lines is 200 paces.

2. On the right-hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left-hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section and the dip and strike when observable, the latter always being expressed from the north; for instance 4025, 250 *N.*, 300 *W.*, *Strike*, *N.* 78° *E.*, *Dip* 50° *S.* Then follow with a full description of the ledge. When topographical maps are used for locations this paragraph applies only in part.

3. Collect a specimen from every ledge, or wherever there is a change of rock on any one ledge, taking care to get fresh material, unless for a special purpose the weathered surface is desired. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be specimened. The position and extent of the ledges not specimened should be marked on the map, with notes that each is of a rock identical with specimen so-and-so. Under the same conditions small-sized specimens, trimmed to a uniform size of 2 x 2½ x ¾ inches will be allowed, but in all other cases *large-sized specimens*, trimmed to a size of 3 x 4 x 1 inches, must be selected, in accordance with section 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. Specimens should not be placed together without protection in the collecting bag, as the fresh surfaces, important in determining the character of rocks, are thus destroyed. They should be damaged by no temporary mark, but the numbers should be at once marked in at least two places upon the inclosing paper or cloth bags. Specimens may be permanently marked in camp by painting the numbers upon them in white upon a black background, using Silver White and Ivory Black oil tubes for color, with turpentine as a diluent.

4. On the last twenty-five pages of the book give, as may seem desirable, a general account of the examination of the region mapped in the previous pages, correlation of observations, sketches, cross sections, etc.

5. Forward this note book as soon as filled as registered mail matter to C. R. Van Hise, U. S. Geologist, Madison, Wis.

Sp. 46487-46613
SL. 17253-17297

Notebook 421
Iron County, Utah
E. C. Harder & Freeman Ward
Summer of 1906.

Memoranda for Mr. Harder.

Fossils sent from Utah are in most cases too fragmentary or ill defined to be positively identified. The results of examining them are briefly as follows:

#46513. Worn gastropod of undetermined age.

#46489. Fragments of a plicated shell, apparently a brachiopod, age unknown.

#46487. Productus sp.
Fenestella sp.
Crinoid stems.
These are all of Carboniferous age.

#46489. Lithostrotion ?. If identification is correct, it indicates Carboniferous age.

#46488. Productus sp.
Lithostrotion ?.
Chaetetes sp.
Rhynchonelloid brachiopod.
Spirifer sp. ?.
These indicate Carboniferous age, but whether upper ~~of~~ or lower is not known.

#46494. Aviculopecten sp. This genus ranges from Devonian to Triassic.

? . Mostly cherts.
Zaphrentis sp.
Crinoid stems.
Bryozoans.
Probably Carboniferous.

Eliot Blackwelder

Iron Springs.

46487 Fossils from congl. interbedded in red beds. S of Iron Springs.

46488 Fossils from congl. above red beds. S of Iron Springs.

46489 Fossils from congl. above red beds. N.W. of Three Peaks.

46490 Fossil from Brown Ss. series. W of Three Peaks.

46491 Fossil from red ridge S of Iron Springs. Found in talus a base of ss cliff.

46492 Fossil from congl. in series above Brown ss.

46493 Fossil from congl. back of ls. breccia ridge S. of Three Peaks.

46494 Fossils from dark siliceous ls. at base of series. SW of Three Peaks.

46495 Chert from chert limestone formation under lava flows NW of Three Peaks.

46496 Magnetite showing contact minerals E of Three Peaks.

46497 Magnetite showing alteration from andesite

46498 Altered andesite interbedded between ls. breccia & red ss.

46499 Fossil(?) from Brown ss series W of Three Peaks.

March 15. Succession in sedimentary knoll NE of Roots.

1 A Andesite
2 A — no outcrops of ls.
3 A Brown ss. Dip 18° SW. strike N 35° W.
4 A Cherty ls breccia. Dip 18°. Slope 15° width on slope 98 ft.
5 A Conglomerate with small pebbles of qtz & chert. Matrix is ss, occupies bulk of rock. Thickness about 8 ft.
6 A Sandy shale; greenish white; very thin.
7 A Yellow ss. Thickness about 15 ft.
8 A Purple ss. Grades into 7.
9 A Yellow ss. No distinct bedding.
10 A Sandy sh. greenish
11 A Purple sandy sh. spotted white } 5 ft.
12 A Yellow sandy sh.
13 A Yellow ss. Good bedding. Dip 27 SW Strike N 45° W.
14 A Sh.
15 A Ss. grey
16 A Grey ls. 6' (about)
17 A Heavy coarse cg. Laminated ss. Pebbles of ss, qutz, & chert. Repeated with interbedded ss.

Upper cg. Slope of hill = 20° Distance along slope - 40 paces. Dip = 20°

Lower cg & ss. Slope of hill = 11° Distance along slope - 60 paces.

Top of bx breccia downward. Slope of hill - 19° Distance along slope - 130 paces.

Brown ss. Dip 32° S Strike N 75 W

Purple & green sh.

Top of blue cherty ls. downward. Slope of hill = 20°. Distance along slope - 28

Top of gray ss. downward. 20 paces.

Andesite.

March 15, afternoon. NE. of Granite Mts.

Center of three knolls.

Succession.

1. Andesite
2. Dark cherty ls. (very wide)
3. Brown (reddish) ss. ← Purple & green sh.
4. Cg. with coarse qtz & few chert pebbles. Also pebbles of dark cherty ls.

5. Grayish brown ss. Dip 25 NE.
Strike N 45 W.

6. Cg with pebbles of dark shty ls, qtzt (white & reddish), & sh.

7. Greenish white & yellowish ss & s. sh.
Dip 32° N. Strike due E & W.
Also strike NW.

March 16 & 17. Snow storm.

Mch. 19 (Monday) Section N. of Marshal claim.

1. Andesite
2. Dark siliceous ls.
3. Spotted ss. etc.
4. Cong. with pebbles of qtzt., dark cht. & few ls.
5. Grayish brown ss.
6. Gray fine grained calcareous ss. (thick) (Weathers like ordinary ls.)
7. Yellow ss
8. Dark siliceous brecciated ls. Very massive; shows no bedding, but indicates it by dip slope on N side & sharp scarp toward E.

Mch. 19 Afternoon. Section N 2 Iron Springs Camp.

(Going N.)

1. Coarse grained yellow ss. Dip nearly vertical. (Probably toward N)
2. Siliceous brecciated ls. Dip 42° E. Strike N30E. Not as dark or as much brecciated as #8. above, but undoubtedly the same formation.

(Going S.W)

3. Erosion valley. May be caused by sh.
4. Purplish pink siliceous ls. Dip 20°–30° S.W. Strike N 35° W. Has pitted & ridged weathering surfaces.

(Going N W)

5. Ridge of same material as 4.
6. Wide valley
7. Ridge of same material as 4. Dip 25° SE. Strike N 30° E.

(Going S)

8. #5 S of place crossed before has 2 formations :– an upper gray siliceous & a lower purple siliceous ls. Dip 20° S.E. Strike N 35° E.

(Going S E)

9. Gray coarse calcareous ss with interbedded cg. Latter has large pebbles (up to 6") of dark siliceous ls and also of qtzt. Some pebbles have fossils in them. Dip 20° S.E. Strike N 45° E.

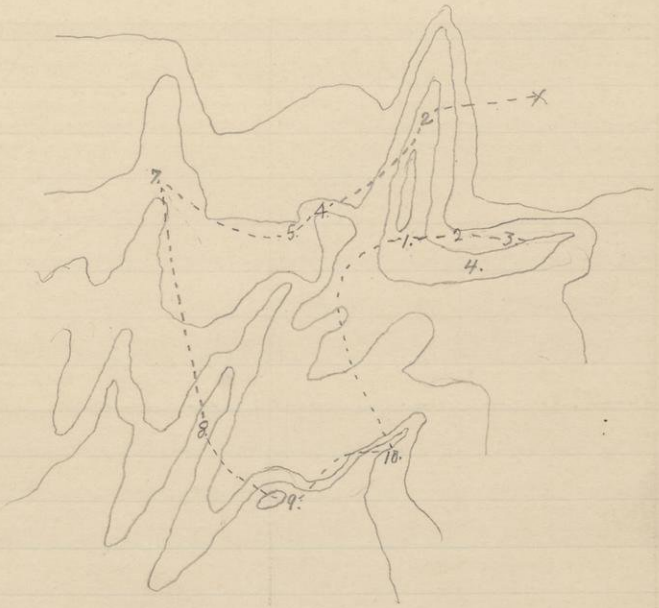
Sp.

(Going E 15° S)

10. Ridge of white ls.

Going E from S end of ls ridge N of Camp.

1. Siliceous brecciated ls.
2. Reddish cg.
3. Coarse grained red ss.
4. Purplish pink siliceous ls.

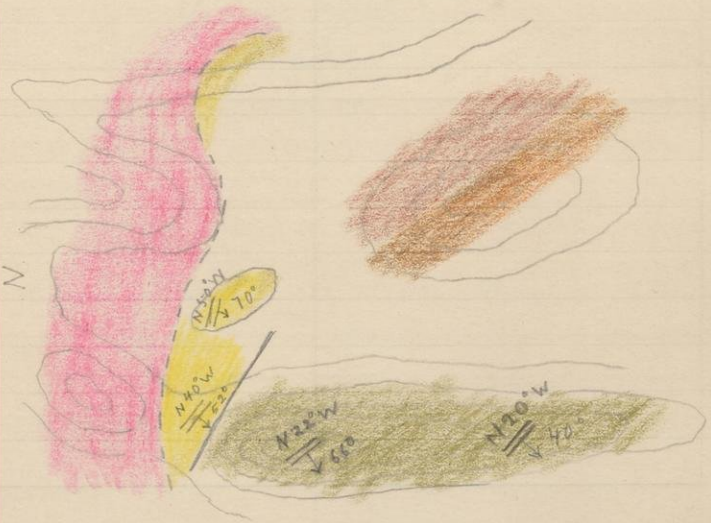


March. 20. Trip around E side of
The Three Peaks.

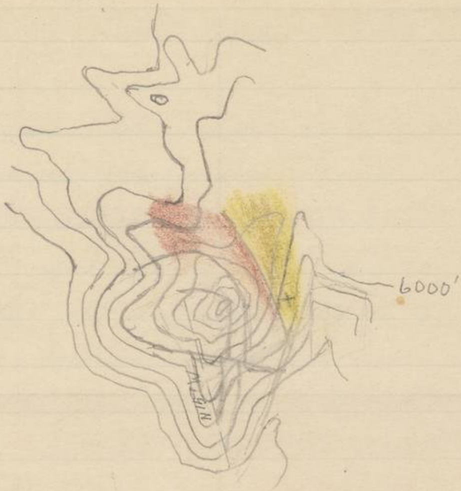
Found a number of little faults on
S.E. corner causing successive outcrops
of dark siliceous lava andesite.
Faults trended about N.E. - S.W.
Found that granite extended out to
the edge of the map covered in most
places however by outwash.
Found several veins of magnetite in
of granite rock by Parowan road.
Also found that 3d Peak was granite.
Found no sediments inside of the
main andesite mass.

Mch 21st. Trip through sedimentary hills S of Three Peaks to establish a succession & look for faulting.

Big hill of silicious brecciated ls very probably not the same as lower silicious ls.



Little eg knoll SW of big ls hill.
Dip 60° S. Strike N 5° E
Knoll showing contact of eg & andesite
Dip 35° SW. Strike N 35 W
Dip 50° S Strike N 60 W
1st ls knoll. Ss & cg on SE end.
Dip vertical Strike N 20 E.



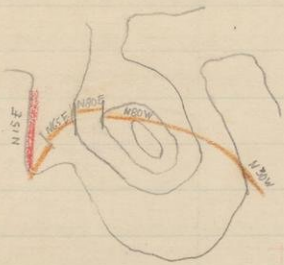
2d ls knoll. Red ss West corner
Dip 60° NW Strike N 45 E

Mch. 22 Trip through sedimentary hills S of Three Peaks.

Section N.E. from I on Springs.

1. Grayish white ss.
2. Fine-grained gray ss breaking in blocks and flakes.
3. Dark siliceous ls. Dip 25° SW Strike N50°W.
4. Reddish brown ss. Dip 30° SW Strike N 50° W.
5. Spotted ss.
6. Purple sh.
7. Green sh.
8. Dark siliceous ls.
9. Andesite.

Sedimentary hill SW of Bear Eagle.



N80°W
40° S.

Conglomerate - pebbles - dark ls., pink qtzt., sh.
Fine grained grayish ss
Fine grained flaggy green ss
Coarse gray ss.
Coarse soft greenish ss
Heavy brown ss.
Flaggy white ss
Coarse brownish ss. (thin)
Dark gray sh.
Quartzitic ss. Thin bed having wall-like dip slope.
Green sh.

↕

Conglomerate - big pebbles - qtzt., ss., ls.,
Has coarse matrix.

↕

Yellowish brown ss.

Mch 23. Sedimentary knoll N.E. of Roots.

N.E. end - dark ls. Dip 36° S W.
Strike N 20 W
Reddish brown ss. Dip 30° SW
Strike N 45 W. Interbedded shale layers. Purple sh. beneath breccia.
Ls breccia
Conglomerate. Dip 25 S W.
Strike N 15 W
Coarse ss weathering yellow
Strawberry & green sh. → Sandy breccia bed.
Fine flaggy green ss
Lavender sh.
Dark sandy breccia. → Flaggy green ss.
Dough. - interbedded ss.
Green flaggy ss.

Section down stream bed N of sedimentary knoll.

Fine grained gray ss.
Shaly coarse green ss.
Green sh.
Purple sh.
Green blocky ss.

Section up stream bed on S N of knoll.

Coarse greenish gray ss. Dip 40° N
Strike N & S.
Greenish gray sh with beds of ss.
Coarse cong. with coarse matrix.

↕

Brown quartzitic ss.
Gray sh.
Reddish brown ss.

↕

Fine brown weathered ss.
Gray sh
Greenish purple sandy layer
Purple sh. Dip S. 30°.
Reddish & yellowish fine grained calcareous ss.
Brown quartzitic ss.

Mch 24. Sedimentary knoll N.E. of Roots.

Low red ss knoll E of big sedimentary knoll.

1. Red shaly ss.
2. Coarse brown ss. (containing fragments of 3.)
3. Brown weathered andesite (?) (containing fragments of 4.)
4. Ss. breccia
5. Coarse brown ss.
6. Red ss with yellow pebbles
7. Sandy yellow breccia
8. Red ss.

Red ls knoll middle of Iron Springs valley.

Yellow ss.
Cng. - quartzite pebbles.
Red or purple ls. Dip 35° SW.
Strike N 50° W. Thick
Coarse brownish pink ss.
Red or purple ls.

Ss knoll E. Dip 65° S. Strike N & S.

1st red ridge across valley NW of ls.
brown ridge.

Purplish pink ls. Dip 15° NE.
Strike N15W

Red ridge S of Camp.
Red & gray ls. Very thick.
Red sandy eg.
Pinkish purple ls.
Yellow coarse ss Dip 40° SW
Strike N50° W
Red coarse ss. Very thick
Dip 30° S. Strike N80E.

Monday Morning, March 26, 1906

Trip N. from Root's across red ridges

1. Pleistocene Congl. containing purple ls; red, yellow & brown ss; cherty ls, andesite
2. Unconformity
3. Yellow & brown ss (coarse)
4. Brownish ss with congl. (pebbly) streaks
   Dip 8° W. Strike N 15° E.
   This is probably the little 5550 contour knoll N.E. of B.M. 5365 about 1¼ miles
   The series includes several beds of ss. varying in color from yellowish brown to reddish brown & showing cross-bedding frequently. A couple of shaly beds are in with them.

Continuing North

5. Broad Valley
6. Yellow & Red ss of consid. thickness & ~~probably~~ interbedded with shales. Low dip. The yellow ss has pebbly layers; it also passes into the red ss
7. Very Coarse Congl. containing practically only qtzt. fragments. Strike N 70° W Dip 30 N
8. Pebbly Congl. containing some cherty ls fragments
9. Limestone purple & light colored having a sandy layer which changes grad. into ls Dip 25° N Strike N 60° W (65°)

* The ss directly below the congl. is calcareous in places & at times is a siliceous ls (light colored)

10 Congl. less coarse than 7
11 Purple ls
12 Gray ls
13 Red ss having a pebbly (congl) layer at its bottom
14 Ls with "moss agate"
15 congl. (?)
13a Congl. (coarse) whose fragments contained some fossils.
16 Lavas (acidic) with interbedded tuff

Rain

S. T. R.

	Iron	Phos.
46600-	4.56	.076
46502-	7.43	.060
46503-	7.79	.074
46504-	4.03	.174

Tuesday Morning March 27, 06

Eight Mile Hills

N. E. corner

46500 Purple Trachyte — dense near cracks, porous inside; glassy pheno. of sanadin, no qtz visible

46501 same as 46500 but showing flow structure

46502 Cream colored rhyolite with glassy gr. mass containing cryst. of qtz, sanadin + black mica, + fragments of reddish felsitic material

46503 Pinkish Rhyolite with crystals of qtz, sanadin + phlogopite, + fragmental material; ground mass felsitic

46504 Hauyne Andesite containing qtz, phlogopite, hornblende, sanadin, with a pinkish brown gr. mass making up only a small mass of the rock. On Top of the ridge

on top of ridge

46505 Lavender Trachyte containing carlsbad twins of orthoclase (sanadin), phlogopite (golden) with felsitic gr. mass, shows some flow structure

on E side going down

46506 Black Pitchstone with pheno. of feld. + biotite; + little red spherulites;

Wednesday March 28, '06

N.W. of Eight Mile Hills (N.E. end)

Going N.W.

1. Gray ss strike N. 55° E
   with interbedded congl. ~~who~~.
2. Thick Congl. whose fragments contain some fossils
3. Gray Ls. strike N. 60° E.
4. ? Valley
5. Coarse ss Dip 30° S.E. Strike N.50° E.
6. Soft red ss
7. Fine dense ss
8. Cream colored Ls. Ls gets more sandy as
9. & Purple Ls. congl. is approached
9. Congl. strike N. 55° E.
10. Purple Ls
11. Sandy Ls
12. Purple pink Ls
13. Gray Ls
14. Purple Ls
    valley
15. Pinkish Ls strike N. 25° E Dip 30° S.E.
    Valley
16. Purple Ls Strike N 20° E Low Dip
17. Congl. Mostly ashy pebbles
Fault? →
18. Yellow ss strike N 5° W
19. Congl. ± 2" (?) Strike N 18° W Dip 35° E.
20. Gray ss weathering yellow

21 Purple shales
22 Brown (reddish) ss. strike N 20° W.

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ss S.W. of Red Ridge S of Camp #1
Strike N. 50° W.

March 29, 06

At NW. End of 3 Peaks range
ss west of the Blackbird Mine
Dip 60° S.E. Strike N. 20° E
ss. knoll S.W. of Blackbird
Dip 90° ± Strike N 30° E.

March 30, 06

General Section W of Three Peaks

Dip 60° S.E. strike N 30° E

1. Andesite
2. Yellow sand Rock
3. Dark Ls.
4. Valley. (green + purple shales)
5. Brown (reddish) ss with interbedded shales. contains layers of spotted + white ss other colors
6. Dark Ls breccia very often conglomeratic
7. Congl. fully 75% of the fragments are white & red lgt.
8. ss with shales
9. Ls (sandy)
10. Coarse ss brown to blackish on exterior, Light inside. Conglomeratic in places
11. Shales ?
12. Coarse quartzitic ss (brownish, espec. on outside)
13. Congl.
14. ss similar to 12
15. Congl. (thick)
16. ss. (thin)
17. Congl. (with some ss)
18. ss

Fault →

19. Andesite

March 31, 06

1 Knoll SW of the Granite-Red Bed Fault
SS Dip 35° N Strike N 75° E.

2 Knoll 2nd S.W of above (1)
SS Dip 25° N Strike N 60° E

3 Knoll W of (2)
SS Dip 25° N Strike N 60° E

4 Yellow + Brown SS NW of 3 + at Foot of Red Beds cliff
SS Dip 30° N Strike E + W.

5 SS under Big Congl. cliff — Red Beds
Dip 20° ± N Strike N 70° E

46507 Ls breccia above Brown ss series. Or of Three Peaks. Below 1st congl.

46508. Fine grained ss forming bulk of series between 1st & 2d congl.

46509 Green congl. often present between Ls breccia & 1st congl. Or of Three Peaks.

46510 Sandy alteration phase of lower Ls at andesite contact.

46511 Andesite alteration phase at lime andesite contact. 46510 & 11 found few feet apart on Or slope of Three Peaks.

46512 Congl. above brown ss series, S of Three Peaks

46513 Fossils from little congl. knoll S of Three Peaks This is not the same congl as 46512, it is one higher up in the series

46514 Fossil from Ls Hill S. of Three Peaks

46515 Fossil (?) from shales directly above the dark cherty Ls, near prospect holes on sedimentary hill N.E. of Root's house

46516 conglomeratic S.S. on back of big Ls hill S of Three Peaks Has fragments of Ls in it. The main mass of ss was not there only fragments + ss veins in the Ls

Ring put his foot here

April 2, 1906

Big Ls Breccia Knoll S of Three Peaks
Line of Fault N 85° E.
This is 1st fault from S. End.

Antelope Springs

46517 Trap found in debris at top of most northernly peak of Three Peaks

46518 Typical dark cherty Ls (Power Ls)

46519 Fossils(?) in greenss in Southern Star Hill

46520 Andesite with basic inclusion
East of Granite Mt.

46521 Tuffaceous rock with qtz, feld, mica + fragmental material — E of Eight Mile Hills

46522 Scoria — E of Eight Mile Hills

46523 Purple Pumaceous Rock — E of Eight Mile Hills

46524 Calcedony Druses in Lava — " " " "

46525 Trachyte ½ mi S of Antelope Springs
contains cryst. of Sanadine (carlsbad twinning) and phlogopite

46526 Rhyolite (?) Sanadine, Black Mica, Green Hornbl., phlogopite, Qtz (?). ; pinkish to reddish gr. mass

46527 Same as 46526 but with redder gr. mass and with more phlogopite

S. T. R.

46533 Iron 5.58 Phot. 138

46528 Rhyolitic Tuff. – crystals of sanidine, Qtz. Antelope contains opalescent Qtz B.M. 6259' s.w. of Spring

46529 Rhyolite (banded) – purplish gr. mass with bands of qtz containing crystals of sanadine, phlogopite & black mica. sanadine & phlog. in gr. mass also

46530 Same as 46529 but with finer bands

46531 " " " " " fewer " (2 specimens)

The above three make up the main mass of the northern Antelope Range (?) the part that is off the map

46532 Pinkish dense trachyte E of northern part of Antelope Range. Has phenocrysts of sanidine and black mica.

46533 Dense dark eruptive with few crystals of feldspar. Probably trachyte.

46534 Same but darker. Has also black shiny phenocrysts, probably magnetite

46535 Dense dark red rock.

The preceeding three make up the main mass of the S. Antelope Range

Apr. 14, 06

Red Beds S.E. Antelope Range

1. Pinkish Ls
2. Congl. with red matrix
3. Congl. & yellow brown ss
4. Red sandy Ls
5. Yellow brownss with congl.
6. Gray Ls
7. Congl
8. Red ss
9. Congl. with red matrix

? } purple Ls.

Gray

I Yellow Ls interbedded with pink + purple shales
II Congl. with red matrix
III Pinkish purple ls
IV Congl. (like II)
V Yellow gray Ls
VI same as 3
4
5

April 18, 1906 Wednesday.

Trip S. from Antelope Springs

going up the series

1. Outcrop of tufaceous rock containing none or little qtz - gray - ash colored
2. Outcrop of similar material with banks of red felsitic material
3. Red Trachyte
4. Dense, hard, grayish rock having feldspar + qtz (3) seems to be related to the preceding 3 types
Dip W. Strike ?
5. similar to 4. but a little darker
6. Red dense rock much like preceeding having
→ also dense aggregates of granular qtz
7. Rhyolite (46526); pheno. very abundant, gr mass relatively small: granitic looking
→ 8. Same as 7 but redder (46527)
9. Rhyolitic tuff (46528) dip 25° N.W. Strike N 45° E

Along Antelope Range Southeastward

going down the series

1. Banded Rhyolite: on both sides Echo Canyon: 46529-30-31
Its position in probably below the series described above.

46536 2. Fragmental Rhyolite - similar to preceeding but qtz is not distorted nor in bands, is clear & glassy. Fragments dense, felsitic, darker red than main rock

46537 3. Amygdaloidal Rhyolite - dense; dark red; amygdules of qtz. From high peak in Antelope Range just off the map

all have phenocrysts

46538 4 Dense reddish rock below preceeding - has no amygdules - a few dark red phenos., perhaps garnet - also feld. phenos.

46539 5 Grayish purple dense rock - "clinkstone" contains a few small amygdules

46540 6 Another type specimen a little further to E along Range.

46541 Dark blue ferruginous rhyolite assoc. with 46540

46542 7 another type from top of sharp peak from middle of N. Antelope Range

1. Rhyolite series.

46543 2. Lavendar pumaceous rock - sometimes has big crystals of feld. (sanidine) - cavities lined with qtz. Is above dense purple rhyolites

46544 3 similar to 46543 but with fragmental material + with crystals of qtz + feld. + biotite

46545 4 Red Rhyolite - crystals of qtz, feld., biotite

46546 5 Rhyolitic Tuff

going down, towards N. from Antelope Hills

46540	Iron	6.49	Phos.	.192
46541	"	4.91		.090
46547	"	5.16		.087

April 19, 1906

—Razor Back Peak—

46547 Dark purplish gray rock with crystals of sanidine
46548 Dense lavendar rock above preceeding-
46549 Dark red spotted rhyolite – cryst of qtz + sanidine above preceeding.
46550 Red Rhyolite below banded rhyolite – cryst of qtz, sanidine, phlogopite – from group of hills at S.E. end of Antelope Range proper

Succession - going down

1 Antelope Rhyolite 46526-27
2 Lavendar, puntaceous rock
3 Banded Rhyolite Series { Banded Rhyolite; Non banded "; Banded "; Flaky Dense reddish " with enlongated areas of glyptic material
46551 4 Tufaceous Rock
Cryst. – qtz, feld., biotite, numerous fragments

section N.E. from E. end Antelope Range proper

1 Purple rhyolite series
2 Lavendar tufaceous rock
46552 3 Dark purple scoriaceous rock
4 Dense reddish rock with enlongated areas of glyptic material
5 Tuff (lavendar)
6 Dense red amygdaloidal rock

going down series

(contin. on next page)

7. Dense light gray rhyolite

46553 8. Black porphyritic pitchstone — with cryst. of qtz, feld., mica, + patches of light green material, a probably magnetite.

9. Light red rhyolite

April 21, 1906 Saturday

46554 Interbedded ss & congl. probably late Tertiary, containing fragments of the various Lavas & also some ls & ss which appear to have come from the red beds; fragments not well rounded, & some very large
Dip 25° N.E. Strike N. 40° W.

46555 Bedded part of tuff above antelope formation
46556 Bomb occurring in upper part of the ~~tuff~~ which is above the antelope formation

A heavy conglomeratic layer occurs in the lower portion of the tuff above the anti-form. Fragments sub-angular & many of good size

46557 Mottled rock (dark red, ashgray) containing cryst. feldspar, phlogopite.
46558 Felsitic greenish gray rock having cryst. of long slender hornblendes, & feld.
46559 Porphyritic pitchstone with phenocrysts of feldspar.
Above three are from Three Peak - NE part of Antelope Hills.

Succession in the Three Peaks - NE part of Antelope Hills.

Lavender trachyte (46557)
Banded reddish trachyte.
Black porphyritic pitchstone 10'- (46559)
Brecciated rock containing large & small blocks of dense felsitic trachyte, black & greenish dense rocks with crystals of hornblende (46558)
This rock in many places in the district shows malachite stains.

46560 Lavendar pumaceous rock
Beneath antelope rhyolite

46561 Tuff above antelope rhyolite, on Pyramid peak

46562 Fragmental phase of rhyolite (46545)

46563 Dense dark rock with hornblende cryst. also feldspar, from knoll in desert E. of Antelope Hills. Phase of 46558

46564 Green coffee stained rock with crystals of feldspar & hornblende. From formation directly under Antelope rhyolite. Found ½ mi. S.E. of Pyramid Peak.

46565 Volcanic breccia from formation directly underneath upper tuff. Found ½ mi. S of "G" in Antelope Range.

46566 Red rock with crystals of feldspar, biotite & hornblende; from same place & formation.

46567 Quartz & milk opal from lower part of upper trachytic formation

64568 Bombs from lower part of lower trachyte formation.

Succession N E from peak in Antelope Range just W of N boundary of map.

Dark red amygdaloidal rock with quartz fillings

4659. Lavender banded trachyte with cavities

Rhyolitic tuff

Hard fresh red rhyolite

Same with more & more fragmental material

Valley with wash

Gray trachytic rock

Red trachytic rock with a few quartz crystals

Valley with wash

Green breccia (Lower Copper rock)

Black porphyritic pitchstone

Flaky banded rock & rest of banded trachyte & rhyolite series

Lavender spinaceous tuff

Antelope rhyolite

Upper rhyolitic tuff.

465-70 Rhyolitic tuff from lower tuff formation. This rock grades down imperceptibly into fragmental rhyolite (465-62) and the latter grades into hard red rhyolite (465-45). Found 1½ mi SE of Three Peaks of Antelope.

465-71 Red phase of lower trachyte formation

465-72 Bright pink rhyolite from N side of Snett Hills. Lower tuff formation.

May 4. Oak Springs.

Section E through Red ridges.

Brown & reddish ss.

46573 Pinkish ls. with numerous parallel fractures, like that on knoll N of Iron Springs. Dip 25° E. Strike N 26° W.

Broad valley

Alternating layers of dark red & yellowish brown ss. Dip 30°-40° N.
Strike N 5° W.

Purple ls

Gray ls. Dip 70° W. Strike N & S

Purple ls with conglomerate & ss.
Dip 75° E Strike N 5° W.

Fault

Red cg., ss, & ls. knoll SSW of end of Sweet Hills. Dip 25° NE
Strike N 45° W

Afternoon. Trip through red hills below Harmony Mts.

Second ridge separated from 1st by fault(?) Dip of second ridge is opposite to that of 1st.

At gap where branch of Pinto road

goes N 60 yellowish brown ss in exposed for quite a width. It gradually thins until little is left & it half way up the second ridge. Here, an outcrop & coarse pinkish ss gives:- Dip 50° S.E. Strike N 40° E.

¼ mile N in same valley on W side of road is an outcrop of the same ss dipping less steeply to N W. Two ridges seem to be flanks of an anticline

May 5. Red hills below Harmony Mts.

Succession in knoll SE of pt. where Pinto road crosses Stoddard Ck.
Going S ward.

4. Grayish ls.
5. Pink ls.
6. Pebbly reddish ss
7. Reddish cg. with s layers N70E 60° S
8 Pinkish purple ls.

End of ridge on opposite side of valley.
Succession southward.

1. Pink purple ls. 65° N70E
2. Cg with large pebbles of blue & gray ls & quartzite.
3. Coarse gray ss
4. Grayish ls of above.

Fault.

Succession SE ward from above knoll.

9. Pinkish gray pebbly ss.
10. Fine yellowish brown ss. Cg layers. Very thick.
11. Cg with large quartz & qtzt pebbles
12. Pink purple ls. Probably same as 1.
13. Cg with large pebbles of blue & gray ls.
14. Coarse gray ss with pebbly layers.

Succession N. to central part of first curved ridge.

Heavy cg. On knoll E of gray ls.
knoll N of road. Dips
steeply E ward.
Dark pinkish ls
Cg with brown & red ss.
Dark pinkish ls. Dips steeply E ward
Outcrop material. Narrow belt.
Barren cg. Dips steeply N ward.
Valley with wash
Gray ls. Forms grayish white knolls
N of road. Dips steeply N ward.
Coarse gray ss
Coarse reddish gray ss with pebbles.
Quite thick & ending in fairly—
Coarse cg. with pebbles of gray &
blue ls.
Pink ls. Top of curved ridge.

S. T. R.

46577 Iron 51.90
Phos .373
Al_2O_3 .71
SiO_2 21.86

On north side of Sweet Hills & outlying purple lava hill there is at the contact with sediments a dark

46-586 red flint layer containing specks of iron oxide. There is also present in places a white flint formed probably by siliceous replacement of limestone.

46-574 Spotted iron formation from Desert Mound drill records.

46-575 Siliceous hot spring deposit coated by carbonate and containing apatite crystals. N side of Eight Mile Hills.

46-576 Ore from the Duncan containing pyrite & cubes of siderite.

46-577 Ore from contact vein west of the Southern Star. Contains apatite crystals & streaks of magnetite.

46-578 Apex pink is replaced by iron

46-579 Andesite like lava composing Stoddard Mt. & rugged mountains to west

46-580 Red conglomerate from sedimentary formation north of Stoddard Mt.

S. T. R.

46584 Iron 5.79 Phos. .133

46581 Lower amygdaloidal phase of purple lava series, from lava strip S of Iron Mt.

46582 Phases of quartzitic series west of Iron Mt. From Milner Hill.

46583 Coffee stained andesite found near sedimentary contact in three lava hills south of Rugged Mt.

46584 Phase of lower purple lavas from three lava hills north of Rugged Mt.

46585 Slickensided Antelope formation found at fault contact in lava strip S of Iron Mt.

46586A Harmony andesite from Swett Hills.

46587 Andesitic portion of Swett formation from Swett Hills.

46588 Breccia phase of Swett formation from Swett Hills.

46589 Lower trachyte from lava strip N of Pagis road.

46590 Breccia phase of Swett formation from lava strip N of Pagis road.

46591 Fine & coarse layered andesite from lava strip N of Pagis road.

46592 Crystalline hematite from upper part of banded trachyte series.

46593 Bull Valley rx
46594 Bull Valley rx from surface.
46595 Blue hematite from Bull Valley
46596 Lower part of Bull Valley lavas.
46597 Pine Valley andesite.
46598 Magnetite found as float in lower part of purple lavas.
46599 Sandstone from andesite contact N of Rugged Hill.
46600 Upper part of sandstone series. From curved ridge where crossed by Homestake road.
46601 Cg. from ls-cg series, from curved ridge N of Homestake road.
46602 Quartzite with rings of ferrous iron caused andesite baking. From contact E of Milner Hill.
46603 Shale from lower part sandstone series below second cg & above 1st cg. N of Three Peaks.
46604 Dark phase of ls lenses in sandstone series. From southern part of Three Peaks.
46605 Pinkish purple ls. from Red ridges N of Three Peaks.

46606 Hard dense trachyte from upper part of banded series above lavender pumice but not exposed except in E. portion of Antelope Hills. Find S of palisade-like tuff hill.

46607 Andesite from Rugged Mt.

46608 Basalt from Bellevue valley

46609 Rhyolite from Top of Brian Head

46610 Amygdaloidal rock from top of Brian Head

46611 Contact rock between lavas & ls from Brian Head.

Chamberlain.

46612 Fresh andesite E of Granite Mts.

46613 Vein quartz from Crystal claim.

46613A Agate from latest trachyte.

Blank Pages

45-54

Skipped

Rhyolitic tuff.
a. Thick, massive, fine grained phase with large cavities on weathered surfaces.
b. Thin layer of coarse sandy material.
c. Thick bed - same as (a) but has not such prominent cavities on weathered surfaces. Cream colored.
d. Conglomerate with big boulders & smaller rocks of dark igneous material of various kinds, - acid & basic.

Spec:- 46528; 46555; 46556; 46561; 46565; 46566;

Antelope rhyolite.
a. Thick upper part of brownish red color. Has spheroidal weathering.
b. Thin lower layer of grayish color.

Spec:- 46504; 46526; 46527; 46585; 46586;

Volcanic agglomerate & breccia.
Very thick in E part of area and is here a coarse agglomerate with large boulders of dark minette-like rocks.
Very thin in W part of area & is here more of a breccia, but also tuffaceous. Has malachite stains.

Spec:- 46563; 46564;

Banded trachyte series.

a. At the top of the series but exposed only in the E part of Antelope ranges is a layer of hard dense trachyte. b. Lavender pumaceous rock.

c Lavender & reddish trachytes, slightly banded in places.

d Reddish trachyte with quartz bands. Sometimes very hard & thick as in N part of ranges. In E part is comparatively thin & soft & crumbly.

e Black fine phyritic pitchstone.

Spec:- 46505; 46506; 46525; 46529; 46530; 46531; 46557; 46559; 46560; 46606

Volcanic breccia & agglomerate.

a. Thin in the N part of ranges & very thick in E. In thin area & N part of thick area it is a coffee stained breccia. In the middle & S part of thick area it is an agglomerate with black boulders of minette & kersantite like rocks; these boulders being as a whole smaller than those in the upper agglomerate.

Spec. 46558

Lower trachyte.

a. Red trachyte. Thins toward the S. Persistent over most of the area, but comparatively thin.

b. Black porphyritic pitchstone.

Spec:- 46524; 46568; 46571; 46589;

Lower tuff & rhyolite.

a. Rhyolitic tuff. Thick in E part of ranges; thins to W, where it grades imperceptibly into "b."

b. Fragmental rhyolite. Grades downward into "c".

c. Reddish dense rhyolite. b & c found only in W part of Antelope ranges.

d. Black & grayish brown porphyritic pitchstones.

Spec:- 46502; 46503; 46521; 46536; 46545; 46546; 46549; 46550; 46551; 46553; 46562; 46570; 46572;

Lavender banded trachyte.

a. A series of dense & tuffaceous beds of various colors in which the lavender trachyte predominates.

Spec:- 46543; 46544; 46548; 46552; 46569;

Purple trachyte series.

a. Forms base of lavas. Composed of dense, dark, red & purple rocks with few phenocrysts. The upper portion has small amygdules in places. It is very thick in the N W part of the ranges and decreases to S.E. Becomes partly fragmental in SE part. In the

upper part of the series there is in places a highly ferruginous phase.

Spec:- 46501; 46501; 46522; 46523; 46532; 46533; 46534; 46535; 46537; 46538; 46539; 46540; 46541; 46542; 46547; 46581; 46583; 46584;

Description of Antelope Mt. lavas is given because they give the fullest series. Specimens given are from all parts of the area.

Swett formation. (Not present in Antelope Mt.)
a. Andesite very much like Harmony andesite but has more hornblende.
b. Breccia of dark rock with some tuffaceous layers and sediments. (ls + ag.)

Spec:- 46587; 46588; 46590; 46591.

The Swett formation takes the place of the upper rhyolitic tuff in the area outside of the Antelope Mts.