

Junius Henderson
Field Notebook
No. 12

1927 - Aug. 22, 1930

~~Time book
Colo. Geol. Surv.~~

~~J. Henderson~~

~~125 W. Main St. Boulder~~

Note  Book

No. 12

1927-

J. Henderson
University of Colorado
Boulder
Colorado

Helena, Mont., Friday,

Aug. 19, 1927.

Bright morning, cloudy afternoon.

Woll. Sta. 686, small ditch 13 mi. E.
of Helena.

Sta. 687, slough N.W. of Townsend.

" 688, slough 2 mi. E. of Three Forks
Camped at Livingston.

Gas. 7 gal. oil 1 qt. at Helena

" 6 " " 1 " " Livingston

Livingston, Mont., Saturday

Aug. 20, 1927

Bright, hot day, morning

Woll. Sta. 689, 4 mi. S. of Livingston
in river.

Sta. 690, ditch 22 mi. S. of Livingston

Camped at Mammoth Springs, Yellow-
stone Park.

Rained on the road, & turned
cold.

Mammoth, Yellowstone Park,

Sunday, Aug. 21, 1927.

Very cold night, bright morning,
soon clouding up.

Moll. Sta. 691, *Oreohelix cooperi* under
same low, broad-leaved herb that sheltered
the genus at Utah & Idaho localities;
near Orange Spring, S. of Mammoth.

Gas, 5 gal., oil, 1 qt.

Mammoth, Monday,

Aug. 22, 1927

Partly cloudy, cool; sprinkling at intervals
in afternoon.

Drove through Norris Basin and
camped at West Thumb.

West Thumb, Tuesday,

Aug. 23, 1927

Clear morning, partly cloudy later.
Drove to Moran.

Moll. Sta. 692, slough at Jackson Lodge
about a mile N. of Moran.

Got pictures of Mt. Moran, Grand

Teton, etc.

camped again at West Thumb.
saw five mule deer bucks.
Gas. 5 gal., oil 1 qt., at Moran.

West Thumb, Yell. Park,
Wednesday, Aug. 24.

Bright, cold morning, warm day.

waited for President Coolidge's party
and joined the procession that escorted
him to Yellowstone Lake camp. Then
drove on past the canyon and Falls
to Mammoth and camped.

Moll. Sta. 693, slough ^{along} ~~on~~ Yellowstone
River, $6\frac{1}{2}$ mi. S. of canyon Junction.
Gas, 4 gal., oil 1 qt.

Mammoth, Thursday,
Aug. 25, 1929

Bright, cold morning.

Moll. Sta. 694, Emigrant, ^{ditch} slough by
roadside

Sta. 695, slough about 3 mi. S. of
Livingston, below 689.

Sta. 696, stagnant slough 2 mi. west

of Livingston on Helena road.

Camped at Livingston.

Gas. 5 gal at Livingston oil 1 gal.

Livingston, Mont., Friday

Aug. 26, 1927

Bright, cool, breezy morning.

Wells. Sta. 697, 2 1/2 mi. E. of Livingston

7 mi. E. of Hunter's Hot Springs, in
irrigation ditch.

Sta 698, ditch 1 mi. E. of Springtime

" 699 slough 2 " " " Laurel.

Camped at Billings.

Gas. 7 gal, oil 1 qt. at Billings

Hard rain in evening

Billings, Mont., Saturday

Aug. 27, 1927

Bright morning.

Wells. Sta. 700, slough formed by old
R.R. grade across a shallow, dry
gully, 3 1/2 mi. E. of Billings on Custer
Battlefield highway to Hardin; about
18 mi. W. of Hardin.

Sta. 701, slough about 5 mi. E. of
~~the~~ Hardin.

Sta. 702, slough about 20 mi. S.E.
of Indian Agency (crow).

⊗ Camped at Sheridan, ~~Wyo.~~
Gas 2 gal. at Hardin.

~~At~~ Sheridan, Wyo.

Sunday, Aug. 28, 1927.

Mostly cloudy forenoon, warm.

Moll. Sta. 703, ditch and slough about
1 mile down creek (N. or W.) from
Sheridan; *Lymnaea*, *Physa* and *Planorbis*;
dead valves of *Sphaerium* along creek
in towns.

Gas. 4 gal., oil 1 gal.

Sheridan, Wyo.

Monday, Aug. 29, 1927

Cloudy morning

Moll. Sta. ⁷⁰⁴, small artificial reservoir
near head of dry gulch draining east,
18 mi. S.E. of Sheridan, better highway.

Sta. 705, slough in abandoned stream
channel, 3 mi. E. of U-cross.

Wells. Sta. 706, small creek 15 or
20 mi. ~~S. E.~~ N. W. of Gillette.
Bumped at Newcastle
Gas. 7 gal., oil 1 qt.

Newcastle, Wyo., Tuesday,
Aug. 30, 1927

Bright, hot day.

Collected fossils in Pierre shale
concretions 6 mi. E. of town. No mollusks
in cracks.

Newcastle Wednesday,
Aug. 31, 1927

Bright, warm.

Wells. Sta. 707, creek S. of ~~Jay~~
Jay - E. 24 mi. S. of Lusk
Bumped at Torrington.
Gas. 7 gal., oil 1 qt. at Newcastle
Oil 1 qt. at Lingle
Gas 5 gal., oil 1 qt. at Lusk.

Torrington, Wyo., Thurs.,
Sept. 1, 1927.

Bright, warm morning.

drove to Boulder

3 gal. gas at Torrington

3 " " 1 qt. oil at Cheyenne.

See Items under July 22 + June 21

Gas for trip 2.59 gal. oil, 13 1/2 gal.

Mileage. 5-470

Gas, 21.1 ^{miles} per gal.

Oil, 457 mi. per gal.

~~Boulder~~

June 10, 1928

Dodge Standard Six Sedan.

Has now been driven 561 miles

Gas tank $3/4$ full. = 8 gals.

Serial No. J. 5388.

Engine " J. 13694

License " 174995

Charged oil at 480 miles

Gas - Ft. Collins		2 gals
" Medicine Bow		10 "
Oil " "	1 qt	
Gas Point of Rocks		8 "
Charged oil at 936		
Granger, Wyo. Gas		6 "
Morgan Utah	oil 1 qt. gas	9 "
Malad, Ida.	"	5 "
Seco, "	"	10 "5-5"
Glenndale, Ferry -	"	7 "
Boise "	"	7 "
Weiser " (8+9) "	"	17 "
" charged oil at 1825 miles		
La Grande (Pine cone camp)		9 "

Boulder, Colo., Tuesday,
June 12, 1928

Started at 8:20 a. m. with Eben Nelson
in Dodge car, ^{and snowed} rained at intervals all day.
Camped at Medicine Bow at 4 p. m.
Speedometer 760.

Medicine Bow, Wyo., Wednesday,
June 13, 1928

^{bold night} Partly cloudy morning. Rained at intervals
during the day. Road slippery where not
gravelled. Started 8 a. m.

Camped at sunset camp, Rock Springs,
at 4 p. m. Speedometer 936

Took pictures of Elk Mts., N. end of
Medicine Bow Range.

Rock Springs, Wyo., Thursday
June 14, 1928

bold night. cloudy forenoon, clearing
and warming after leaving Evanston.
Camped at Lower Springs camp ground,
Morgan, Utah, at 4 p. m. Speedometer 1110

Moll. Sta. 708, ^{Albert} small creek 37 mi. W.
of Loge Lyman, 12 E. of Evanston, Wyo.
A few Physa and Lymnaea.

Moll. Sta. 709, Camp at Sono Springs,
Morgan. *Oreohelix cooperi* + *Vitrima alaska*

Morgan, Utah, Friday,
June 15, 1928

Cloudy, warming as we got into
Salt Lake Valley. Passed up Malad
Valley and over to Pocatella, where
we camped at 4 p.m. Speedometer 1279.

Rained in afternoon.

Took photos of beautiful Lombardy
poplars in northern Utah.

Pocatella, Ida., Saturday,
June 16, 1928

♣ Cool, cloudy, rained in afternoon.

Camped at Mountain Home, Ida., at
5:30 p.m. Speedometer 1524
Sprinkled in evening.

Mountain Home, Ida.

Sunday, June 17, 1928

bold, cloudy morning. Warmer in afternoon.

camped in fine camp at 2 p. m. at Weiser. Speedometer 1652.

B. Francis Miller called in evening.

Weiser, Ida., Monday,

June 18, 1928

Bright (mostly) and hot. ^{5 mi. up Hog Creek}
Miller & son Jim took us, about 8
miles (10 by or 12 by road) N.W. of town
collected geodes from lava and fossil
leaves from Weyette formation.
Foss. Sta. No. 1

Weiser, Ida., Tuesday,

June 19, 1928

Foss. Sta. 2, Sand Hollow, near scrub
Mt., about 16 mi. S.W. of Vale, ^{ore} fresh-
water shells in ls.

Foss. Sta. 3, 3 mi. S.W. of Vale, Ore.
Fish Vertebrae, lime formations, polished.

pebbles, recent lizards.
Bright, hot day.

Weiser, Ida., Wednes.

June 20, 1928

Warm, partly cloudy morning.

Sta. 710, ^{swath} river shore, dead *Gouidea*
angulata; Under willows on shore mud,
Polygona abundant, at Oregon Trail
Park, in edge of town, some out on
mud 20 feet from shrubbery or other
vegetation

Clear, hot afternoon. Sprinkled
in evening.

Weiser, Ida., Thurs.

June 21, 1928

Clear & hot.

Shipped 2 boxes by express.

Started into Oregon.

Collected *Polygona* in gulch above
recent plant ^{bed} beyond Huntington, same
as last year's ^{camp} above

Camped at ^{Spring} La Grande, Ore. at
4 p. m. Speedometer 1961.

La Grande, Ore., Friday
June 22, 1928

Hot, bright morning

Moll. Sta 711, Pine Bone Auto camp,
on Grande Ronde River, about ^{3 or} 4 mi. above
La Grande. Polygyra and Anguispira
under Willows, birches, etc.; dead *Gonidea*
on sand bar. alt. about 2,800 ft.

Sta 712, along small creek on
road Pendleton, Ore., to Walla Walla,
Speedometer 2020, about 6 or 8
miles N. of Pendleton. Polygyra

Sta. 713, about 3 mi. above 712,
in same creek; 1 dead *Planorbis*;
fragments of *Physa* and *Anodonta*
not saved.

Camped at Locust Grove camp,
near Walla Walla, Wash.
very hot all day.

Walla Walla, Wash.,
Saturday, June 23, 1928.

Another very hot day.

Moll. Sta. 714, tiny rivulet in field
near camp. *Sphaerium*, *Pisidium*,

Physa and Ferrissia?

As we came down from the Blue Mts. into Lemah Valley yesterday, it was very hot and bright with a warm wind blowing, many small and a few large whirlwings constantly forming. This continued all afternoon. It seemed ridiculous to expect land snails anywhere, and especially active ones; yet at Sta. 713, where stopped to look for fresh-water mollusks in a ^{small} brush-lined rivulet channel and found it dry, we found ~~Polyzera~~ *Polyzera* abundant and quite active & juicy. Got a bagful in a few minutes.

Sunday hot & dry.

Walla Walla, Wash., Monday
June 25, 1928.

cooler this morning.

Drove back to Weston, Ore., and took road S.E. to Blue Mts. (nearly S.)

Moll. Sta. 715: along ^{Pine} creek in Mts., speedometer 2112. *Polyzera* 2 spp., *Haplotrana*, *Thysanophora* and *Vitrea* (not collected). 9 mi. S. of Weston, Ore.

Moll. Sta. 716, under bleasotis on banks of Walla Walla River, 5 mi. S. of town;

1
Polygona, 2 spp.; *Agricolitax* x Not far
from Oregon line.

Walla Walla, Wash., Tuesday,

June 26, 1928

Rained during night. Cooler this morning.
Drove to Milton, Ore., & turned up Walla
Walla river.

Sta. 717, at 1st bridge over river
at edge of Milton. *Polygona* 2 spp.; *Anguipica*
juvencula; on river bank under *Clematis*, etc.

Sta. 718, 2 mi. above 717. *Physa* x
small land shells in river bottomlands.

Sta. 719, N. fork of river at 1/2-
ometer 2166, 9 mi above 718, about
a mi. above fork. *Oreohelix* in lava
rock slides.

Sta. 720, lava slides 2 mi. above
No. 719; *Anguipica* x *Polygyrella*?

Sta. 721, 4 mi. above # 720 at
Power Co. dam. *Haplotrema*

Sta. 722, tany marsh 2 mi. below
Sta. 721, *Pisidium* & *Physa*.

Walla Walla, Wash, Wednesday.

June 27, 1928.

cooler today. Drove to Milton and up Walla Walla River. Hard rain and hail as we drove through Milton.

Moll. sta. 723, lava slides (small on N. fork of river from 6 to 9 miles above Milton. *Oreohelix*, *Polygyra*, *Boehlicopa*, *Pupilla* etc.

All *Oreohelix* of last two days have been in very dry south-facing slopes, and most of them were clinging to rocks in slides with thick mucous diaphanous covering the aperture.

Walla Walla, Thursday.

June 28, 1928.

Cool, cloudy morning

Drove East to Cottonwood Canyon.

Sta. 724, under lava slides (small) in shrubbery. *Oreohelix*, *Anguispira*, *Polygyrella* (?), *Polygyra* 2 spp., 1.5 mi. from city, up N. branch of road, in Blue Hats; also *Thysanophora* and *Haplotrema* (immature, best on east).

~~Gas & Oil~~

~~Walla Walla oil 1 qt. gas 7 + 7 3/4 gal
= 14.3 3/4~~

Rained hard in late afternoon at
Walla and at noon in Vets.

Walla Walla, Wash., Friday,
June 29, 1928

Cool, cloudy morning.

Sta. 725, along steep north face of
high sand dune, about 3 mi. ~~S~~ W. of
city, under shrubbery above ditch.

Polygonum 2 spp., *Arquiespina* and slugs.

Sta. 726 ditch in Walla Walla valley,
about 5 or 6 mi. W. of S. from city,
Sphaerium, *Pisidium* & *Physa*.

Sta. 727, swamp in willows at
edge of Walla Walla valley about
1 mi. below 726 on N. side.

Polygonum, *Succinea* & *Pisidium*.

Sta. 728, slough on river below
Sta. 727 at bridge, 8 mi. S.W. of
Walla Walla, and about

Walla Walla, Wash.

Sat., June 30, 1928

Bright, warm morning

Sta 729, Slough by roadside

5 mi. S. of Dayton N. of Walla Walla.

Pisidium, *Physa*, *Planorbis* & *Succinea*.

Sta. 730, Union Flat back 9 miles
S. of Colfax. *Pisidium*

Camped at Spokane Municipal Park
at 4:30 p.m.

Spokane, Wash., Tuesday,

July 2, 1928.

cool, partly cloudy.

Stayed in camp all ~~so~~ day nursing
a bad case of ivy poisoning.

Spokane, Monday,

July 3, 1928.

Bright + warmer

Called at Chamber of

Gas and Oil.

Oct. 1st 95-

Walla Walla,	oil 1 qt.	gas 7 x 7 3/4 = 14 3/4 gal.	
"		"	9 "
Bozart	" 1 "	"	7 "
And Spokane			9 "
"			11 1/2 "
Bolville		"	8 14 1/2 "
Busick		"	8 "
Davenport		"	8 "
Boule City		"	8 "

Oil changed at 3000 miles 6 qt.

Wenatchee	7 + 6	gas	1 3/4
Yakima		"	4 1/2 9 3/4 "
Bolville			2 8 3
Le Cleun	oil 1 qt.	"	5 "
Redmond		"	9 "
"		"	9 "

Mt. Vernon		"	9 "
La Bomer		"	10 "
Camp Lewis	oil 1 qt.	"	12 "
Battle Rock, Wash.		"	5 "
Portland		"	7 1/2 "

Oil changed at 4600

continued Aug. 9

267 1/2

Spokane, Monday,
July 2, 1928

Bright and warm.

Called at Chamber of Commerce and
then at Public Museum.

In afternoon T. A. Bousler, Curator,
went out with us & we obtained fossil
leaves from the Latah formation (see
U.S.G.S. Prof. Paper No. 140)

Spokane, Tues., July 3.

Began to rain toward daylight

attended dinner of Chamber of Commerce
this noon as guests of Mr. Bousler &
was called upon for a brief talk.

Walk, etc. 731, Latah Creek at auto
camp and Hangman ("High") bridge.

Vitrina, etc., Goidica, Anodonta, Sphaerium.

Spokane, Wed., July 4th day.

Rainy, cloudy morning. Rained at intervals during.

Sta. 732, Meadow Lake, about 12 mi. S.W. of city. Pisidium musculium, Planorbis 2 sp., limpets ^{water} on lily stems.

Sta. 733, 2 mi. S.W. of 732. Lymnaea, Planorbis, apleta, Succinea in very shallow lagoon by roadside.

Sta. 734, ^{Fishy} Willow Lake, 5 mi. further south. Planorbis 2 or 3 sp., musculium, Pisidium, Physa, Succinea.

Sta. 735, Willow Lake about ^{14 or 15} mi. S.W. of Spokane; Lymnaea appressa, L. sp., Planorbis trivolvis.

Sta. 736, Silver Lake about same distance from town 2 or 3 miles beyond last station. Many Planorbis, Physa, Pisidium, valves and a few Valvata in deposits far above present water line, which has been lowered many feet within a few years by pumping for irrigation. Has no outlet. Near present level is a lying, porous deposit from 1/2 inch to many inches thick, containing Physa shells, resulting from concentration of water by evaporation long ago, probably.

Mr. Bousar went with us again as guide.

Spokane, ^{Thurs.} ~~Thurs.~~ July 5, 1928.

bold, rainy morning.
Sta. 737, Bowl + Pitches ^{lava rock slides,} canyon of Spokane River, a mile or two below Fort Wright,
5 or 10 mi. below Spokane. *Aschelma*,
Polygyra (2 spp.) and *Helicodiscus*?

Rained a little in afternoon. Bousar went with us.

Spokane, Friday, July 6.

Mostly clear morning, warmer

Nelson and I went up Latah Creek, Sta. 731, a mile or so. Found *Louidea*, *Anadonta* (perhaps 2 spp.), one Margaritans valve showing colored nacre, 3 live sphaerium + some dead valves, 1 live *Physa* and *Limpets*, the latter on water grass stems & roots. Streams rocky and rather swift, quiet places with coarse sand; no mud + no vegetation except a fringe in a few places. also a few small *Planorbis antrosus* and *Planorbis* small sp. *Limpets* also on rocks in same quiet place as on grass.

In afternoon went downstream half a

mile or so. Just below camp found *Sphaerium*
in abundance in shallow water in grass.

Hot day. Dined at Bousars in evening.

Spokane, Sat., July 4.

Bright, warm morning.

Sta. 738. Slough by roadside, Roosevelt
Highway, on road to Walla Walla, about
a mile or two from city; small *Planorbis*,
Physa, *Lymnaea* and slugs.

Sta. 739. Latah Creek 5 mi. above city.
Limpets.

Hot day.

Spokane, Sunday, July 8.

Partly cloudy, warm.

Drove N.H. with Mr. ~~the~~ Bousar

Sta. 740. Little Deep and Deadman Creek
near junction. *Physa*, *Lymnaea*, 1 example
Margaritana with purple nacre, *Succinea*.
7 mi. from city limits.

Sta. 741 slough on Little Spokane
river 1 mi. from last. *Physa*, *Lymnaea*,
Planorbis.

Sta. 742, Little Spokane River at

Buckeye, about 3 mi. above 741. Physa,
Lymnaea, Succinea, Limpeta, Pisidium,
Fluminicola.

^{Monday}
Spokane, July 9, 1928

Bright, warm morning

Sta 743, lake on Bow Hill Game Farm,
about 8 mi. N. of city on Colville road.

Lymnaea, Physa, small Planorbis.

Sta 744 Sheep Creek, N. of Little
Spokane River, 11 mi. N. of Spokane.

Sta. 745, Lion Lake, 38 mi. N. of
Spokane, Planorbis 2 small sp., Physa.
5 mi. N. of Colville.

Sta. 746, quartzite slide 14 mi. N.
of Springdale; Orsohelix - a few alive.
In a nearby slough, nearly dry, along
Q.R. track; Lymnaea, Aplanorbis, Planorbis,
Musculium & Succinea.

Sta 747, slough and slides (quartzite)
along Colville River, 14 mi. above Colville,
Creek, Orsohelix, ^{mostly dead} Valvata, Planorbis (3 sp.)
Musculium, Physa, Lymnaea, Valvata, Paludostoma?
small Pisidium?

Worked at Colville, Wash., at 5 p. m.

Cobville, Wash., Tuesday,
July 10, 1928.

Foggy, cloudy, cool morning.

Sta. 748, In woods at camp.

Zonitoides, Encrinurus, Polygona, etc.

Sta. 749, small, enclosed pool 2 mi.
above Cobville. Valvata, Physa, Planorbis

Sta. 750, slough & creek 1 mi. further
up. Pisidium, large Sphaerium, Anodonta,
Physa, Planorbis (2 spp.), Valvata, etc.

Sta. 751, slides 4 mi. above Cobville
along Cobville Valley. Orbulina, ^{all dead} Polygona.

Hot day, bright.

Cobville, Wednesday, July 11, 1928

Hot, bright day, cool breeze in shade.

Drove through Kettle Falls village to the
falls 2 mi. above on Columbia River. Water
pours pours over falls and rapids com-
posed of quartzite dipping upstream.

Sta. 752, pools in quartzite at upper
end of falls on E. side. Lymnaea, Physa
& Planorbis (small).

Sta. 753, sluggish backwater from
river half mile above 752. Physa.

Sta. 754 sluggish slough 6 mi. below
(N.W.) of Colville. Valvata, Planorbis (2 spp), Physa
(small), 1 Pisidium, Succinea (2 spp.) on bank of
creek at bridge near by.

Colville, Wash. to Thur.,

July 12, 1928

Bright & hot morning.

Sta. 755 lake 5 mi. N.E. of town on
Pend Orielle road, Planorbis 2 spp, Physa
(small). In tiny inlet Lymnaea abundant,
a few Aplysia.

Sta. 756, marshy place in very small
stream 2 mi. farther on. Planorbis, Physa,
Lymnaea, Pisidium, small land snails & one
large, dead Polygyra.

Camped at Little Pend Orielle Lakes
about 25 mi. N.E. of Colville, alt. 3,000 ft.
blondy (partly worst of day).

Little Pend Orielle Lakes,

Wash., Friday, July 13.

Bright, warm forenoon.

Though only 3,000 ft. above sea level, the
forest & general vegetation much like that
of Colorado at 9 to 10,000 ft.

Moll. Sta. 757, the lakes, shores, etc. Physa
in stream connecting 2 lakes, with limpets and
Planorbis, the ~~same~~ Ferrissia ~~on~~ on rocks
& also on lily pads in lake. Pisidium in
small rivulet flowing into one lake. Polydora
(2 spp), Loricata, Gonyodiscus, Encyclus
in moist alder thickets along shore.

Region has been logged, but the large
tamaracks, 2-3 ft. in diameter & 125-ft.
high have been left.

Little Pend Oreille Lake Sat. July 14

Coal, bright morning

Sta. 758, slough on Pend Oreille
River, $\frac{1}{2}$ mi. below Locke. Physa,
Lymnaea, Planorbis, Succinea & Unscutellaria

Sta. 759, slough 8 mi. N. of Chatteroy,
 $\frac{27}{27}$ mi. N. of Spokane.

Camped at Spokane municipal camp
ground, after a warm, bright day.

Spokane, Sunday July 15
Bright, warm
Stayed in camp all day

Spokane, Monday July 16, 1928.

Partly cloudy morning
started west

Stn. 760, rivulet in lava beds
10 mi. E. of Davenport; *Lymnaea*, *Physa*,
small *Planorbis*, *Pisidium*

Stn. 761, 4 mi. W. of Davenport,
rivulet. *Pisidium*

Stn. 762, 5 mi. farther west,
Lymnaea & *Berda succinea*

Stn. 763 12 mi. W. of Davenport.
Lymnaea, *Planorbis* (3 spp), *Musculium*

Much of country after leaving Davenport
was a lava plain, with many
sinkholes mostly dry. On hills where
considerable soil covers the lava are
many wheatfields. Near Coulee City,
in Grand Coulee, we turned S., past
dry falls, where Columbia River,
while deflected from its course
during glacial epoch, plunged over a
400 foot cliff, with several ^{attached} lakes at
base. S. of them we passed Park
Lake and camped at Blue Lake, both

fresh, containing trout, perch, bass and sunfish.

Blue Lake, Grand Coulee,

Tuesday, July 17, 1928

Bright, hot morning.

Sta. 764, ~~no~~ lava slides S. side of E. end Blue Lake. *Oreohelix* and *Vallonia*

Sta. 765, rivulet connecting Park and Blue Lake. *Physa* and small *Planorbis* abundant, *Pisidium* common in spots.

● Sta. 766, W. end of Park Lake, on shore, dead *Lymnaea* sp., *Physa* sp., *Planorbis trivolvis* + *P. antrosus*, probably drifted in from deeper water, shorewater for a long way out being shallow, very small *Lymnaea* common alive among shore vegetation on mud. Large *Succinea* ^{766-a} on mud in vegetation and beneath willows; small form, ^{766-b} mostly dead, farther along the shore in more open mud without much vegetation. One dead *Valvata*. The *Valvata*, large *Lymnaea* + large *Planorbis* may be from a fossil bed up the lake.

Hard, long-continued wind & a little rain last evening, same with much rain this evening, July 18, 1928

Sta. 767, East shore Park Lake on beach; dead *Lymnaea*, *Physa*, *Valvata*, *Planorbis* (3 spp.) & *Pompholyx*, *Succinea*. (Washed from fossil beds)

Sta. 768; Slides of water worn pebbles about $\frac{1}{2}$ mil. E. of S. end of lake near shore. *Oreohelix*, small form, also near next sta in chff.

Sta. 769, angular lava shale at foot of cliff $\frac{1}{2}$ mi farther east. *Oreohelix*, larger form. *Oreohelix* all around here abundant.

about $1\frac{1}{2}$ mi. from camp (outlet) was bet. E. end Blue & W. end Park Lake we found source of shells found dead along shores of Park Lake. They are all fossil in a local formation composed of pebbles and angular pieces of lava cemented by calcareous material. In one place there is a bed several inches thick composed of *Amudonta* shells, ^(buried alive) for a distance of 25-feet or more. The deposit is a remnant of a bed laid down by the

river as it was cutting its gorge.
I rest laterally against the lava
walls of the canyon, 12 to 15 ft above
level of lake.

Sta. 770, lake shore near fossil
locality, Succinea 2 spp.

Sta. 771, ~~Blue Lake, Thursday July 17~~
gulch S.E. of Blue Lake, about
3 mi. Vallonia

Another wind + rain storm this evening.
Has been not very hot here, usually a
cool breeze.

Blue Lake, Grand Coulee,
Wash. Thurs., July 19,

Bright warm.

Wash. Sta. 772, small ditch + lagoon
1/2 mi. S.W. of Coulee City. Planorbis
Beynonia + Pisidium

Bumped at Wenatchee

Wenatchee, Wash., Friday
July 20, 1928

Bright, warm.

Sta. 773, shallow slough, seepage
from ditch, 1/4 mi. up river on
W. side. Beynonia + Pisidium

Drove to Lake Shelan, 38 miles.
No mollusks. Barrier has been raised so
as to raise level of lake 12 or 15 feet
recently. Rock slides up river not
good for snails.

Wenatchee, Wash., Saturday,

July 21, 1928.

Bright & hot, drove over Blewett Pass to
Ellensburg and camped at Riverside Camp,
Yakima.

Moll. Sta. 774, Lava rock slide near
top of canyon wall ~~2~~^{1.5} mi. N. of Ellensburg.
Arenobry, 2 live ones, several weathered
shells. Very dry.

Moll. Sta. 775, reservoir, ditch & bank
of stream at 3 mi. S. of Ellensburg, at
old mill. Physa, Planorbis, Pisidium,
Succinea.

In the mountains N. of Ellensburg at
noon it was just 100° above zero in
the shade, must have been hotter in
the valley. The wind at Yakima in
afternoon was hot. The vegetation at
Sta 774 was dried up and rock slides
very dry.

Yakima, Wash., Sunday,

July 22, 1928.

Bright and hot, 100° in the shade
at noon. Stayed in camp all day.

Yakima, Wash., Monday,

July 23, 1928

Bright, hot morning.

Sta. 776, small spring creek at Union
Gap, 4 mi. S. of city. *Aphaereticus*, *Pisidium*,
Physa (juvenile), *Planorbis planorbatus*, ^{Ferrissia}

Sta. 777, Antanum Creek, S. of Union
Gap, on Wheeler Gap ^{road}. *Margaritana* &
Goniobasis, & *Anodonta*

Sta. 778, small slough about 1 mi.
N.E. of fairgrounds, Yakima. *Planorbis* and
Pisidium

101° in the shade this noon.

Sta. 779, cottonwood grove about camp,
1 1/2 mi. above Yakima. *Polygyra* & *Buccina*
& *Physa*. The *Polygyras* are the most fragile
snails ever cleaned except perhaps *Vitrina*.
Many broke in collecting them, others broke
between my thumb and finger in trying.

to clean them, and if the snail
hook touched the shell it went right
through.

108° in shade in afternoon

Yakima, Wash., Tuesday,
July 24, 1928

Bright & hot.

Sta. 780, lava slides in canyon, 8
mi. N. of Yakima. *Oreochelys* & *Polygona*

Sta. 781, 26 mi. N. of Yakima, about
100211 mi. S. of Ellensburg, slough.

Musculinum, *Pisidium*, *Planorbis*, *Physa*
& 1 small *Lymnaea*.

Bumped at Seattle municipal auto park
at 6 p.m. *

103 at Ellensburg today - hot wind
above 80 at Seattle Seattle.

Seattle, Wed. July 25:

Hot in sun, cool breeze, comfortable
in shade.

Spent forenoon with Trevor Kinsaid
and F. S. Hall (Museum) at University,
& looked over mollusk collection.

Kincaid reports *Arion ater*, black slug, introduced from Europe, common now out-of-doors at several places in Seattle.

He also reports *Margaritana* common at Falls, Bellingham, & *Gonolosis* ^{and} at North Creek, near Bothell, N. of Seattle.
In collection at Museum:

Monodonta fidelis. Eleton & Salem, Ore.; Seattle, Wash

Polyzia townsendiana, Seattle & Kalama
" *ptychophora*. Spokane

Haplotrema Vancouverensis. Seattle & Astoria.

" *spartella* "

" *hemphilli* Olyupia

Planorbis binneyi. Columbia slough, Ore., under name *trivoloris*

Fluminicola virens. Olyupia. Spokane (Mrs. Olney).

Anodonta cygnea, from ⁱⁿ several lots from Washington incorrect, showing Humboldt's influence. Ask for them for examination.

Seattle, Wash Thurs. + Fri.

July 26-27, 1928.

at Carnation Stock Farms. Hot + dry,
cooler Friday.

Margaritana in Snoqualmie River at
the farm.

Back to Seattle Friday evening. Cool.

Seattle, Wash. June 28.

Cloudy morning, cool

Sta. 752. North Creek, Canyon
Park road, 2 1/2 mi. N. of Bothell,
Margaritana. Hivaid days very
large ones here. 4 specimens, 2
with purple marks, 2 white.

sprinkled in morning, clear evening.

Car stopped with Judge Shields
at Mt. Vernon in afternoon.

Mt. Vernon, Wash. Sunday

July 29, 1928

cool, cloudy forenoon, clear afternoon.

Mt. Vernon, Monday,
July 30, 1928.

cool, cloudy morning

Mt. Sta. 783, Whatcom Falls Park,
Bellingham. *Succinea* ^{+ *Physa*} on soft moss near
about lily pond. *Margaritana* *M. foliata*,
Physa and *Planorbis* just below falls.
Arctonitars *c. maculatus* common.

Acadota above falls; also *Pisidium*

collected again at N.W. end of Lake
Whatcom; *Lymnaea*, *Physa*, *Planorbis*, *Acadota*

Mt. Vernon, Wash., Tues.,
July 31, 1928.

cool & cloudy. Spent day at Rosario.

Mt. Vernon, Wash., Wed.,
~~July~~ Aug. 1, 1928.

Rained in morning, clear in afternoon.
Spent day at La Bouverie & Snee-osh.

Olympia, Wash., Thurs.,
Aug. 2, 1928.

cool, cloudy.

camped at Municipal auto park in
Olympia

Sta. 784, *Ariolimax columbianus*, unspotted form,
common in gulch at camp. *Polygona*, 2
sp.; *Haplotrema*.

Olympia, Friday

Aug. 3, 1928

clear, but ^{very} cold morning, soon warming.

Sta. 785, "small creek S. of Claham";
Polygona goniobasis, *Fluminicola*; 8 mi.
N. of Castle Rock - on coal breeze.

Sta. 786, "small waterfall" ¹/₂ 1 mi. above
Juman & Polson's old shops on road
turning from Kelso-stella road 8 or 10 mi.
N.W. of Kelso. *Polygona* & *Goniobasis*.
Unspotted *Ariolimax* very abundant. One
spotted one seen by Nelson. Test. fossils here.

camped at Clarke County auto camp
just north of Vancouver, Wash.
cool breeze.

Vancouver, Wash.,

Sat., Aug. 4, 1928.

Cool, cloudy day.

Had Houdaille shock absorbers
installed at Portland, Oregon

Bumped at Salem, Ore., auto park.

Salem, Ore., Sunday,

Aug. 5, 1928.

Bright, cool morning.

Stn. 787, small creek at auto park.
Goniobasis, *Fluminicola*. Slug with
rows of small spots. *Polygona*, *Haplotrana*

Stn. 788, North Umpqua River,
Winchester P.O., 6 mi. N. of Roseburg.
Lampro, *Goniobasis* + *Fluminicola* all
abundant; a few dead *Margaritana*

Stn. 789, River 17 mi. S. of
Roseburg. *Goniobasis*, *Fluminicola*,
Lampro. South Umpqua River

Bumped at Umpqua auto camp,
9 mi. farther south.

Bright morning, hot day

Monday, Aug. 6, 1928.

South Umpqua River

Tuesday, Aug. 7, 1928

Bright & cool morning

Woll. Sta. 790, at camp. Anadonta,
Goniobasis, Margaritana, Leach. Goniobasis
& Fluminicola vivans abundant, not collected.
Mussel shell.

Sta. 791, 8 mi. S. of Canyonville.

Polygona. 1 mi. N. of Agalea

Sta. 792, Cow Creek, 7 mi. S. of
Agalea. Goniobasis, Fluminicola vivans,
Lundlachia(?)

Sta. 793, Crane Creek, 7 mi.

S. of Wolf Creek village. Goniobasis
sibirica, Lundlachia(?), Murex, Polygona

Sta. 794, Rogue River at bridge, Grant's
Pass. Gony & Goniobasis abundant.

Camped at Eves Shady camp, near
Phoenix, 6 mi. E. of Medford
very hot day.

Phoenix, Ore., Wednesday

Aug. 8, 1928.

Bright, cool morning, soon getting

very hot.

Small Sta. 795, small, vegetation-closed ditch at Oberlin, Musclemm, Pisidium, Planorbis large & small species, several small Lymnaea & Physa.

Sta. 796, 2 mi. E. of Talent, Lonicaria, Physa & limpets.

Sta. 797, Emigrant creek, 8 mi. E. of Ashland, Physa.

Sta. 798, near top of long E grade 7 mi. farther east. *Orvaldella* in slide, near summit of Green Mt. Pass, alt. 4600 ft. *Epiphragmophora* in slide; *Pisidium* & small *Lymnaea* in spring.

Sta. 799, Jenny creek, 9 mi. down from Pass on E. side. *Margaritana* abundant, *Lonicaria*, limpets & sphaerium.

Sta. 800, Klamath River 18 mi. above K. Falls. *Fluminicola* exceedingly abundant on rocks.

Sta. 800, 7 mi. below 800. Abundant *Lymnaea*, *Physa*, *Planorbis* large & small, *Valvata*, *Musclemm* slough.

Camped at Altamont camp, 1 mi. E. of Klamath Falls

Klamath Falls, Thursday

of Aug. 9, 1926.

Bright, cool morning, soon getting hot.
Well. Sta. 802 Lost River, a mi. N.E.
of Merrill, S. of Klamath Falls. *Fluminicola*,
etc.

Sta. 803 slough & ditch 1 mi. N.
of 802. *Lymnaea* very abundant.

Sta. 804 slough at head of Lower
Klamath Lake S. of Midland, Flanahan's,
Lymnaea & *Physa*

The lake has been to a great
extent drained. We drove 8 miles along
the old shore line, found dead shells of
same species & also abundant *Valvata*
and a few fragments of *Lamina* *prosublysi*

Sta. 805, slough 1 mi. S.E. of
Klamath Falls. *Physa* & *Lymnaea*

Gas + oil - see July 2		fuel.	267. 1/2
Myrtle Creek		gas	8 gal
Aspland		"	7 "
Klamath Falls		"	4 "
"	"	"	5 "
Crater Lake		"	8 "
Bend	1 qt. oil	"	8 "
Riley Ore		"	7 "
Arlington		"	9 "
Eugene	6 qt. oil	"	6 "
Burns		"	9 "
Dayville		"	6 "
Changed oil at 5-717.			344 1/2
Boardman Ore.		"	10 "
The Dalles	6 qt. oil.		
Walla Walla	1 " "	"	7 "
Saltese, Mont.		"	8 "
Missoula	"	"	9 "
"	"	"	6 "
Harder	"	"	8 1/2 "
Harder	"	"	7 "
Yellowstone Lake	1 qt oil	"	9 "
Everball		"	9 "
Spokane		"	10 "
Wheatland		"	6 "
Shoshoni		"	8 "
Casper	1 qt oil	"	7 "
Ft. Collins		"	10 "
at Boulder 7454 speedometer			
15-mi. per gal.			

Klamath Falls, Ore. Friday
Aug. 10, 1928

Hot & bright.

Sta. 806, lava slide ~~at~~ 5 mi. N.
of city near S. end of lake. Small spp.

Sta. 807, tule swamp at edge
of lake (Upper Klamath) along R.R.
Track, *Anadonta*, *Ferussia*, *Physa*,
Lymnaea & *Planorbis*, *Ferussia* at
base of tule stems.

Sta. 808, open lake shore, East side
Alvora R.R. station. *Lym.*, *Physa*, *Plan-*
orbis, *Corbicula*, *Pompholyx*, large, flat
Lamp., *Fluminicola* & *Anadonta*. Larv
on rocks, also *Flum.* & *Pom.*

Sta. 809, Fort Creek, a very cold,
clear mountain stream a mile or two?
N. of Klamath Indian agency buildings.
Small *Fluminicola* abundant; *succisa*
few.

collected at Crater Lake.

Crater Lake, Oreg., Saturday,
Aug. 11, 1928.

Bright, cool morning. Warm in
middle of day.

Sta. 810, On pine logs about 1 mile S.
of the Lake. Small snails.

Sta. 811, In Crater Lake, Porphyrus,
showing strong tendency toward
spiral ribbing, not transverse, as the
Klamath Lake ribbed variety.

Crater Lake, Sunday.
Aug. 12, 1928.

Bright, cool morning & evening, warm
at midday. Took many pictures of lake.

Crater Lake, Monday.
Aug. 13, 1928

Bright, hot day

Sta. 812, N. Klamath Lake near
N. end. about same fauna as at 808.

Sta. 813, Stream at Klamath State Fish
hatchery, at speedometer 5059. Lymnaea,
Physa & Fluminicola. Crooked Creek.

Sta. 814, roadside ditch about
a mile N. of ~~813~~ 813

Bend, Ore., Aug. Tuesday
Aug. 14, 1928.

On road after leaving Klawath drainage we saw no chance for mollusks. No water for 50 or 60 miles or more and after that only ditch water, dry ^{country} forest, ~~to~~ with no chance for land snails. Camped last night on Deschutes River bank at Bend.

Moll. Sta. 815. Deschutes River at Bend. *Margaritana*, *Lycunasa* (small sp.), *Physa*, *Planorbis planulatus*, *Ferrissia* & *Psidium*.

Sta. 816. Deschutes River 1/2 mile below edge of Bend. *Margaritana* and *Pompholyx*.

Bend, Ore., Wednesday
Aug. 15, 1928

Bright, cold morning, warm later.

Drove to Burns, 150 miles, much of road rough, partly excellent, after passing irrigation ditches for about five miles, saw no water until within a few ~~miles~~ sight of Burns. Sagebrush &

cedars, only a few inhabited houses.

Sta. 817, large spring by roadside, 4 or 5 mi. W. of Burns. *Paludetrina* (very abundant), *Physa*, *Lymnaea*, *Planorbis* and *Anodonta*. The *Epidermis* eroded or colored white or bluish on most of them.

Bend, Ore., Thursday,
Aug. 16, 1928.

Bright & Warm.

Moll. Sta. 818, below Narrows, between Malheur and Harney Lakes. *Lym. stagnalis* var., *L. palustris*? var., *Planorbis trivolvis*, *Planorbis* small sp., *Valvata*, *Paludetrina* (1 large dead shell). Shallow, stagnant water. *

Malheur said to be a tule shore lake, evidently draining slowly into Harney, which is saline.

Sta. 819, sandunes on old shoreline of Harney Lake. Many species. Lake has receded much in last two years, it's said - water far from dunes.

Sta. 820, small stream about 6 mi. A. E. of narrows, on road, E. side of Malheur Lake. *Aphaecium*, *Psidium*.

Physa, Planorbis, *Gonidea*, *Ferrissia* ^{on rocks}
Sta. 821, ^{Siberia} ~~Siberia~~ River, S. E. of
Burus, 2 or 3 miles. *Acodonta*, *Sphaerium*,
Gonidea.

Burus Ore, Friday,
Aug. 17, 1928

Bright, warm.

Sta. 822, small brook 9 mi. N. of
Burus on road to Canyon City. *Pisidium*,
Physa, small *Planorbis*. *Ferrissia* on
coarse grass stems.

Sta. 823, ^{Siberia} ~~creek~~ River, 32 mi. N. of Burus
on same road. *Acodonta*, *Sphaerium*,
Pisidium, *Physa*, *Planorbis* 2 spp., *Ferrissia*,
Valvata, fragment of *Gonidea* + of *Lymnaea*

Sta. 824, creek 45 mi. N. of Burus on
same road. About same fauna

Camped at an apple orchard 5 mi.
below Dayville on John Day River.

Dayville, Ore., Saturday,
Aug. 18, 1928.

cool morning, warm, windy afternoon.
Drove to and down Columbia River
and camped at The Dalles.

The Dalles, Ore. Sunday.
Aug. 19, 1925.

Windy, bright morning.
Moll. Sta 825; Mill Creek, at Auto
camp. *Gonobasis*, *Physa*, *Ferrissia* (?)
(or more probably *Gundlachia*),
Moussonia (?), *Polygyra*, *Haplotrema*
spottella?

The Dalles, Ore., Monday,
Aug. 20, 1925.

Bright, calm, warm.
Sta. 826 pool just above town.
Planorbis, *Physa* + *Lymnaea*.
Sta. 827, mouth of Deschutes River.
Fluminicola, *Pompholyx*, *Gonobasis*,
Ferrissia?

Sta. 828, lava slides 27 mi. above
Dalles, Ore. Col. 2 mi. below Rogue.

Sta. 829, Umatilla River, a mi. or two
above Umatilla. *Planorbis*, *Physa*, *Succinea*.
Drove through Pendleton to Walla
Walla and camped.

Walla Walla, Wash. Tues.,
Aug. 21, 1928

Cooler.

Drove to Spokane & camped
at municipal auto park.

Spokane, Wash. Wednesday,
Aug. 22, 1928.

Crossed the Bitter Root Mts. &
Camped at St. Regis, Montana.

St. Regis, Mont., Thurs.,
Aug. 23, 1928.

Rained yesterday afternoon & last
~~so~~ night. Cloudy most of today.

Camped at Missoula, Mont.

Sta. 8:30, rock slides high on mountain
E. of Missoula. Or solidly.

Missoula, Mont., Friday,

Aug. 24, 1928

Cool, partly cloudy forenoon, sprink-
ling in afternoon & drove through
Bitter & got a cabin for the night

at whitethall, just as a hard down-pour of rain began.

Whitethall, Mont., Saturday

Aug. 25, 1928

Bright, partly cloudy, warm forenoon.

Sta. 831, Slough E. of Madison River E. of Three Forks. Lymn., Physa & Planorbis

Drove through Livingston of north entrance of Yellowstone Park and camped at Mammoth Springs camp.

Mr. Avery, of Avery Garage, Three Forks, says by telephone that he knows where there are mussels in Madison River slough.

Mammoth, Yell. Park.

Sunday, Aug. 26, 1928.

Cold, cloudy morning.

Sta. 832, beside trail on Jupiter Terrace. Small form of crehelix abundant.

Rained most of forenoon, & some in afternoon & evening.

Yellowstone Lake Camp
Monday, Aug. 27, 1928

Cold, mostly cloudy day sprinkling
a little, ~~so~~ windy.

Drove from Mammoth to this
camp and camped here.

Saw 5 black bears along road

body, Wyo., Tuesday
Aug. 28, 1928

Cloudy, windy & cold. Rained most of
forenoon.

Drove to Yellowstone Canyon & back
to camp, then through east ~~exit~~
exit to Park & camped.

Reached Boulder Thursday.

Total expense bill 40⁰⁰ but I paid
for some provisions myself

(Provisions \$96; gas, oil & grease \$127)

June 5, 1929.

Speedometer Register 13854

Put new Double Eagle (Goodyear) tires on right side, new McBlaren autocrat tires on left side, for test of durability.

Saturday
Sunday, June 15, 1929

Partly cloudy

Speedometer 13992, gas tank full.

Left in Dodge sedan with the Blanchard family, Paul also driving his Buick coupe.
at 11 a.m.

Camped at Salida, 8 1/2 m. speedometer
14174

Sunday, June 16, 1929

Drove through San Luis Valley to Breede.

Got cabin ^{at Wascon} for Ruth & Mrs. B. John, Paul.

Gladys and I took food and a blanket apiece and started up trail for Wheeler National Monument. Camped at 7:30 ^{E. of Farmstead} below

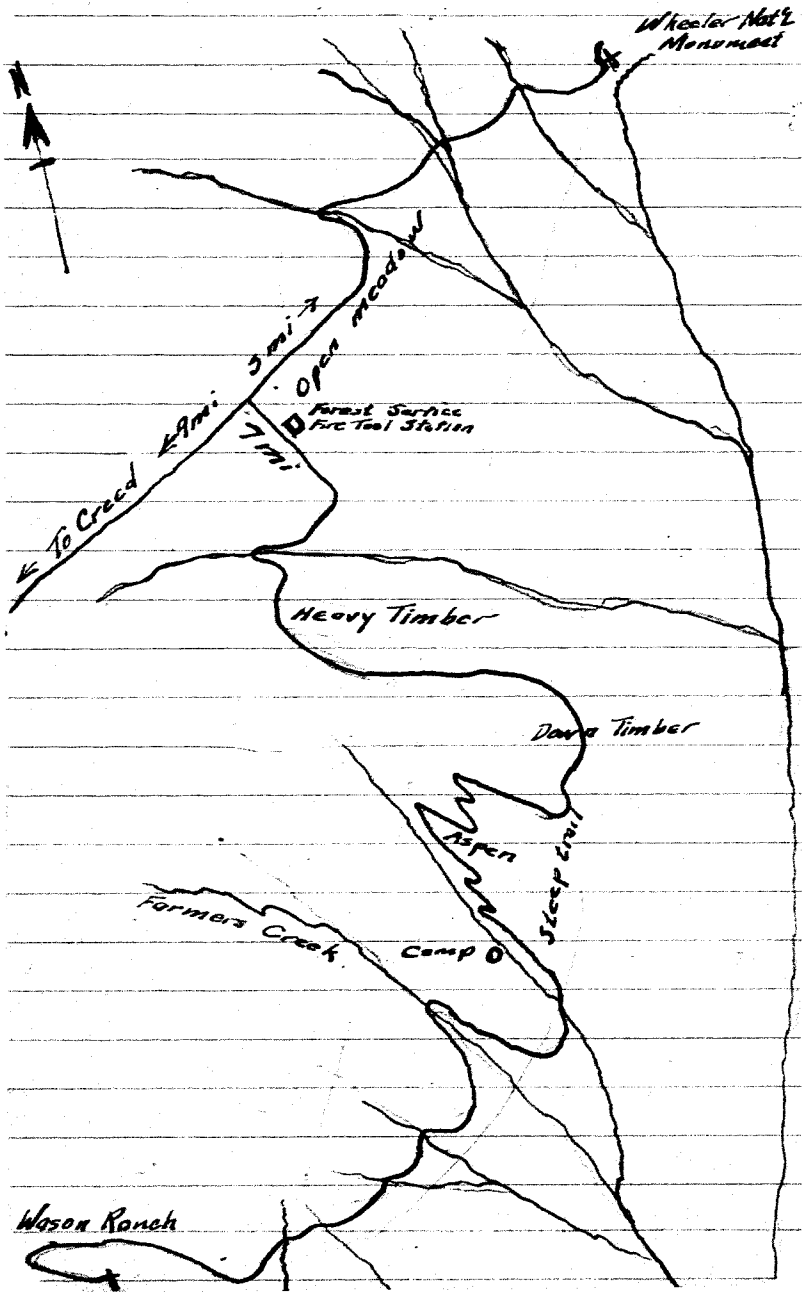
labin camp at Wascon Ranch, 2 mi below Breede.

Monday June 17, 1929.

Sprinkled during night. Very windy not cold. Cloudy morning. Broke camp at 6 a.m. Reached Wheeler Monument at 9:30, started back at 10:45, reached foot of trail about 4:30, where Ruth met us with car. Distance according to sign post at foot of trail, 10 miles, making 20 mile round trip. Monument close to timber line, probably over 10,000 ft. alt.; camp about 8,500, making a climb of 2,500 ft., but to this must be added considerable (perhaps 1,500 to 2,000 ft.) on account of numerous gulches crossed.

The monument consists of light-brown (above) to whitish (below) volcanic breccia, carved into various shapes by wind and stream erosion.

Trail to monument is fairly well marked by forestry Service. Leaves river and climbs very rapidly for about a mile then flattens out a little while crossing several dry gulches. Upon reaching



Wheeler Nat'l Monument



← 9mi

5mi →

Open meadow

7mi

Forest Service
Fire Tool Station

Heavy Timber

Dava Timber

Aspen

Sleep line

Camp 0

Farmers Creek

Wason Ranch

farmer's creek it starts to climb
very rapidly until it comes
out on top of a ridge which
~~is~~ ^{is} at first burned over
and then rather heavily forested
until it comes to a fire tool
station. This country is rather
flat and easy to travel. From
the tool station the trail follows
around a fairly even contour
~~the open country~~
going in and out of several
gulches. From Farmer's Creek
on all gulches containing water
but some of these may be dry
later in the year.

Windy all day and yesterday
~~set photos~~

Tuesday, June 18, 1929

Frost this morning, quiet, bright.

Down down river to forks, 14,337.

Thence up Wolf Creek, over Wolf Creek
Pass, through Pagosa Spr., Durango &
Huerfano to Miguere.

Pictures Beside canyon
Wheeler monument
Falls on Wolf creek
Rt. W. of Pagosa Spr. in
New Mexico

Wednesday, June 19, 1929

Visited Square Tower ^{House}, Balcony House, Bluff
Palace, Sun Temple, etc.

Had a good visit with Supt. Jesse
Nusbaum & wife & Miss Reynolds. Ranger
Frank a student at U. of Colo. last year.

Hot bright day.
Got photos from George B. — D. F. R. G. Gardner
apt. Equitable Bldg Denver

Thursday, June 20, 1929

Hot bright

Left Park at 7:30 a.m., taking pictures
of Far View House & Round Tower as we
left. Passed through Cortez, dined at
Hotel at Monticello, thence through Moab &
camped at fine cabin camp in Price, Utah.
at 9:30 p.m. Speedometer 4,795 - 275 mi.
today.

Photo of a "window" about 30 mi. N.W.
of Monticello, Utah.

Friday, June 21, 1929.
Bright, hot.

Left Price at 9 a. m.
Camped at Bryce Canyon, ^{Nath. Park} at 6:30⁰ p. m.
Had accident on road.

Saturday, June 22, 1929

Went down into the gulch & took pictures.

Broke camp at 11:30 drove to Cedar
Breaks, alt. probably about 10,000 ft. &
reached Cedar City, about 5,000 ft. at
about 4:15 p. m. Fine camp.

Speedometer 15-125-

Cedar City Utah.

Sunday, June 23, 1929.

Very hot day. Hot wind down Valley.

Drove to Zion Natl. Park & took pictures
Returned at 4:30 p. m.

Speedometer 15-263.

Cool breeze toward evening.

A great deal of black lava on mts. E.
W. of here, much of it looking like ^{the} very
edge of flows. S. of here one flow
is at rim of bluffs, another in valley.

in some places resting on stream-worn boulder beds, indicating that the flow occurred after the valley was cut to its present depth and partly refilled, since which it has been recut through lava & gravel - probably Pleistocene

Found *Oreohelip* and *Pisidium* at spring, upper end Zion Park.

Monday, June 24, 1929

Pleasant morning, hot afternoon.

Left Cedar City at 7:50 ^a m.

Reached Salt Lake City 4:30 p. m.

Speedometer 15-527

Physa at lake 3 mi. S. of Juab.

Tuesday, June 25, 1929

Very hot day

Drove to Bingham & around city

Wednesday, June 26, 1929.

Slightly cooler

Left Salt Lake City at 6:25 a. m.

Drove through Ogden, Malad, Pocatello, Blackfoot, etc., & camped at Arco at 6:30 p. m.

Very poor camp Speedometer 15-865.

Thursday, June 27, 1929

Hot day

Drove to Craters of the Moon National Monument, 25 miles, and back to Arco, thence to Blackfoot, where we camped in shady grassy place

Speedometer 15,980.

Mollusks in Lost River, Arco, Idaho.

Friday, June 28, 1929.

Hot, bright morning, somewhat cooler as we gained altitude

Left Blackfoot at 8:40 a.m.

Arrived Old Faithful, Yellowstone Park about 5 p.m.

Lymnaea in N. fork Snake River, Last Chance Run, about 35 mi. from W. entrance to Park.

Rained in evening

Saturday, June 29, 1929.

Drove to Moran & back, camped at Lake Camp. Speedometer 16,300

Rear right tire (double Eagle) off for repair - 20 miles - Thence to Lake camp.

Sunday, June 30, 1929.

drove through Canyon June, Mammoth,
Harris June. to ~~the~~ E. entrance speedometer 16427
checked at E. entrance

Monday, July 1st, 1929

very hot.

drove to Powder River & camped.

Tuesday, July 2, 1929

Hot.

Reached Boulder 8 p.m.

speedometer quit registering at
Thermopolis at 16610; to Boulder by
map 410 miles. (total 17,000)

Total distance for trip 3028 miles

235 gal gas. = 12.9 - per gal.

Left rear tire (Double Eagle) off at
badly - drove Greybull - drove 5-12
mi. with it on spare rack.

Speedometer repaired & set back to
zero at about 17,050.

Double Eagle replaced on left rear wheel.

Boulder, Colo., Aug. 5, 1929

Cloudy most of day.

Left Boulder with Dr. F. J. Seaver
and Paul Shope at 9:30 p.m.

Speedometer 296

Arrived at Cheyenne 12:15

Stopped at Municipal auto camp at
4 p.m., at Torrington

Speedometer 478

Torrington, Wyo., Aug. 6, 1929

Cloudy day. Drove north, then
east. Rained as we entered South
Dakota, and began again furiously at
Edgemont at 1 p.m., continuing, so we
went to an auto cabin for the night.

Speedometer 605

Edgemont, S. Dak., Aug. 7, 1929

Bright day. Drove to Hot Springs
(never mind) thence N. to Wind Cave.
Then North.

3 1/2 mi. N. of Wind Cave. Physa & Piskin
Camped at American Legion camp,

31 mi. N. of Hot Springs, 20 mi. N. of
Wind Cave. Fine yellow pine timber.
Rained all evening.

N. of Wind Cave, S. Dak.

Thurs., Aug. 8, 1929.

Fine, clear, cool morning, soon warm-
ing up.

In Wind Cave there is said to be a little
bit of water running in one place.

Sylvan Lake, alt. 6,400 ft., 46 N. of
Hot Springs. *Pisidium* & *Musculium*

Rained hard most of afternoon

N. of Wind Cave, S. Dak.

Fine, clear morning. Aug. 9, 1929

Started back to Wind Cave

About 5 mi. below camp, *Punctum*
Gonogobis, *Vertigo*, *Eucypris*, etc.

For 4 mi. farther, *Pisidium*

Hot Springs, S. Dak.

Aug. 10, 1929

Antone Snyder, Supt. of Wind Cave Park
& beyond Nat. Monument, went with us to

latter place. Only a few cyed fragments found. Mr. McKnight, who lives there thinks there never were many and that making it a "monument" was a graft.

Heavy rain in afternoon.

Camped at Hot Springs.

Hot Springs, S. Dak.

Aug. 21, 1929.

Fine, bright morning

A mile or two east of Edgemont,

Physa in a spring by roadside.

No Residium

Torrington at 4:45 p.m. & camped

Pueblo, Colo., Monday,

Aug. 26, 1929

Hot day. Left Boulder in Dodge car alone, at 9 a.m.; speedometer 1305; gas tank full except 2 gallons; Took $\frac{3}{4}$ gale at Littleton, drove west off main road 5 mi. & back, ate lunch Palmer Lake ~~at Colo Springs~~

Pueblo, Congress Hotel, at 2:30 p.m.
Took gas, 8 gals. at Pueblo.
Called up Hugo G. Rodock, 826 - E. -
8th st., Pueblo, to arrange for him to
go with me south tomorrow morning.

Santa Rosa, N. Mex. Tuesday,
Aug. 27, 1929.

Left Pueblo 8 a.m.

Arrived El Doran Hotel, N. Mex., 6²⁵ p.m.

Rained lightly on Raton Pass, very
hard bet. Raton and Las Vegas twice,
and once very hard S. of Las Vegas.

Santa Rosa, N. Mex., Wednesday
Aug. 28, 1929.

Hot morning. Drove 18 mi. E. & 4 or 5 N. to
Cimarron, to meet D. L. Keckler, of Midwest Ref. Co.,
Tucumanari, who had promised to be there
and show us the new fossil fish locality.
Waited for 2 hours & he did not appear &
drove S. again to main road ^{main} west to
Santa Rosa, but turned S. for about 12 miles to
where road turned N. and dropped over an
escarpment into a valley, searched for possible

without success. Camped at ruin of
escarpment at noon, ate lunch, rained
hard, after rain we resumed search.

30 mi. E. of Santa Rosa,
Thurs., Aug. 29, 1929.

Rained most of night, cloudy morning,
rain beginning again at 11 a.m.

Resumed search for fossils, without
success, & returned to camp at 1 p.m.,
raining hard.

Irregular l.s. just below ^{pinkish or,} very light
salmon colored, massive ss., 100 to 200
ft below top of escarpment, evidently the
horizon from which Kessler and E. May
Baker obtained the fishes. It is underlain
by another massive ss., dark salmon or
reddish.

Mr. Kessler arrived after it quit
raining, and took us to the point locality
where we got a lot of fairly good material.

30 mi. E. of Santa Rosa,
Friday, Aug. 30, 1929.

Clear, fairly cool today.

Kessler joined us and we collected a

lot more fossils.

Santa Rosa, N. Mex.
Sat., Aug. 31, 1929.

Bright morning, cool breeze.

Broke camp at 8 a.m. Drove through
Santa Rosa & took Las Vegas road.

Planorbis, 2 spp., and Physa in small
brook in Dakota ss. $4\frac{1}{2}$ mi. N.W. of Santa Rosa.

One mile farther N. three sink holes,
two 50 to 75 ft deep, narrow, dry. One
more shallow contained water, no mollusks

Very shallow lagoon E. of road, ≈ 30
mi. N.W. of Santa Rosa, 2 specimens
of *Lymnaea cockerelli*.

Arrived at Hotel Eldorado, Las
Vegas, at 3 p.m.

Rained hard at 4 p.m.

Las Vegas, N. Mex.

Sat., Aug. 31, 1929

Sep. 1

Bright, cool morning

Left for the north at 8 a.m.

Physa in spring at bridge just N.
of town - none in river.

Physa, *Planorbis* & *Lymnaea cockerelli*
in slough 8 mi. N. of Las Vegas.

Dead *Lymnaea* in margin of
shallow, land-locked lagoon 21 mi. N. of
Las Vegas.

Physa, *Planorbis* & *Lymnaea cockerelli*
in small creek (see Mora River?) 27 mi. N.
of Las Vegas, 15 mi. S. of Wagon
Mound.

Reached Pueblo at 6 p. m. & went
to Congress Hotel.

Rained as we drove into Pueblo
and again on road to Pueblo.

Pueblo, Sept. 2

I left Pueblo about at 8:05^{a. m.}; reached
Boulder 12:30 noon.

April, 1930

Apeolometer 4111 Boulder to Tucson, Ariz.
Left Boulder with Bass, Dr. Kamaly and
Edward Johnson, in Dodge sedan, Wednesday
1 p. m., Apr. 16; cloudy forenoon, clear at noon.
Hard blizzard on Palmer Lake divide. Stopped
at Pueblo 6 p. m., Vail Hotel

Thursday night at Las Vegas, ^{fine} Meadows Hotel

Friday night at Hot Springs, Odell Hotel

not very good. some detours N. of Socorro
& some bad roads south

Sat. night at Douglass, Ariz. Fine Hotel,
Gadaden Hotel, ^{fine} some bad roads over Mts.

Sunday, 1 p.m., at Tucson, Santa Rita
Hotel, fine & high priced.

Speedometer played out at 5000, but map
mileage made 1078 miles.

Tank full at Boulder

6 gal. gas at Pueblo _____ 1.26

greasing ^{1.00} " Wash ^{1.50} storage ^{.50}

adjust generator 2.5 _____ 3.25

5 gal gas at Battle Rock, Cal. 1.00

7 " " " Major Mound, N. Mex. 1.75

2 " " " Gas Vegas .48

storage .50 - Wash. & grease 2.00 ^{2.50}
~~2.50~~

6 " gas at Santa Fe 1.44

6 " " " Socorro 1.50

7 " " " Hot Springs 1.75

Repair tire " .50

5 1/2 gal. gas at Stairie 1.43

3 gal gas at Douglass _____ 1.50

~~2.50~~ storage " .50

3 gal gas at Tombstone .72

1 qt. oil " " .28

7 gal. gas at Denning	1.61
1 tube " "	2.45-
Storage " Tucson	3. —
4 gal gas " "	.94
Rep. Speedostat "	4.50
oil greasing truck "	7.25-
4 1/2 gal gas. "	1.86

Tucson, apl. 29 - Sunday, 1950

Speedometer reset at ~~5000~~ 5011.

Boulevard

Phoenix storage	.75-
" gas 8 gal	1.44
Prescott storage	.50
" gas 9 gal.	2.25-
Flagstaff 8 "	2.00
Holbrook 5 "	1.25-
" storage	.58
Navajo 6 "	1.50
Gallup 5 "	1.20
Sunswell 5 "	1.50
Santa Fe 5 "	1.20
Albuquerque 8 "	1.92
" oil 35, greasing 2.00	2.35-
" greasing 125 storage 50	1.75-

Taos 5-1/2 gal gas	1.65-
Raton oil	2.40
7 gal gas	1.40
storage	.50
Pueblo, 6 gal gas	1.26
Battleton 8 " "	1.60
Boulder 3 " " about	.60
<hr/>	
Pod. by Ramsey	
8 gal gas at Pueblo.	1.60
3 " " "	

Speedometer at Boulder 6338
 Total mileage for trip 2417

6338
 2417
 2227
 2417
 190

Field Trip, summer of 1930,

Gas tank filled at 6858

Oil changed at 6750

Indian Hills, 5-gal gas	.95-
Fairplay 4 " "	1.16
Bueno Vista 7 " "	1.89 at 27°
Saguache 4 " "	1.12 " 28°
Monte Vista 7 " "	1.50 21
Pagosas Spr. 5 " "	1.50 @ 30°
Mancos 9 " "	2.61 " 29°
41	

Cortez, June 22, 1930, 6 1/2 gal gas @ 20¢ 1.89
 Monticello Utah " 25 " 7 " " " 35¢ 2.45
 Moab " " 28 " 8 " " " 30¢ 2.40
 " " July 9 " 9 " " " " 2.70
 Green River " " " 3 " " " " 29¢ .78

Oil changed at Price ^{14 1/2} 7830.

car used before speedometer set back first time for repairs 17,010 miles

add for mileage not registered in N. Mex. & Ariz 190; total 17,200

add present mileage 7898
 Total mileage for car 25,098

New tires, Double Eagle & M. Brown at 1385¢.
 add mileage when speedometer out. ¹⁹⁰ 390

~~present mileage~~ ²⁷⁵⁻⁶ 5-80
 add present mileage - 7898

Total tire mileage 11234 to 7898

Price 6 1/2 gal. gas 1.60

Salina 9 " " @ 27¢ 2.43

of oil 35¢

Panguitch 7 gal ^{gas} @ 30 2.10

Mt. Carmel 9 " " " " 2.70

Badger City 8 " " " 26 2.10

Fillmore 8 " " " 25 2.00

12 1/2 gal 1 qt oil 35¢

Boulder, Colo., Tuesday,

June 17, 1930

Beas + I left at 9 a.m. Speedometer 6988.
Warm, bright morning, somewhat cloudy
in afternoon in Mts. + Indian Hills.
Drove through Morrison, up Turkey Creek,
then down into Platte Canyon, up the
river to South Park

Moll. Sta. 833, roadside irrigation ditch
at N. end of South Park. *Lymnaea caepulata*.
Drove through Fairplay, etc., over Trout
Creek Pass to Mount Vista.

Speedometer 7027

Bumped back of a filling station on vacant lot.

Bueno Vista, Colo., Wed.,

June 18, 1930

Left Mount Vista at about 9:30.
Cloudy, hard rain as we crossed divide
into South Park. 1 white heron S. of Saguache
at 3:30 camped at municipal free camp-
ground, 1 mi. E. of Mount Vista.

Speedometer 7138.

Moll. Sta. 834, ditch about 1 mi. S. of
Saguache.

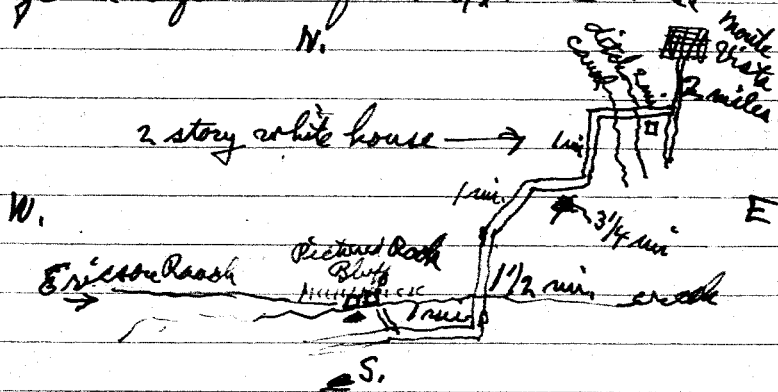
Monte Vista, Colo., Thursday

June 19, 1930.

cool morning, soon warming. Windy
afternoon, very dry season, dusty, no
rain for many weeks.

Drove to Piedra Pictada Canyon
mi. S.W. of town, on Ericsson Ranch
(possibly Ericson not spelled correctly),
to photograph pictographs. Broke ground
glass before we finished. Route thus:

N.



Bluff on N. side of creek, volcanic rock.
Go through 2 gates to get to ranch house.
Formerly ranches of W.M. Maguire & F. T. Hudson,
according to 4th Ann. Rept. U. S. Geol. Surv., for
1882-3, pp. 27-28, and 10th Ann. Rept., for 1888-9,
pp. 72, both quoting Kansas City Rev. Sci. &

Industry, VII, 489-490, 1883.

Moll. sta., 835 ditch 4 mi. S. E. of Monte Vista. *Lymnaea*, *Musculina*, *Pisidium* & *Crustaceans*.

Monte Vista, Colo., Friday

June 20, 1930

Bright, warm. Left at 9 a.m.

Speedometer 7164. Road over Wolf Creek Pass good except where road work was in progress, though narrow on one long winding steep hill. Excellent from Pass to Pagosa Springs except where work was being done, better from Pagosa to Durango.

Camped at Brookside Camp, Durango, at 5:15. Speedometer 7503.

Durango, Colo., Saturday

June 21, 1930

Had cloudy morning, sprinkled, partly clear later & hot.

Had brakes adjusted & car greased at 7310 speedometer. Left Durango at 11:10, at Mancos 12:30, fine road.

Camped at Mesa Verde Park at 3 p.m.
Speedometer 7368. Road up mesa fine
except where men were at work.

Mesa Verde, Sunday
June 22, 1930

Rained toward daylight.

Made trip to various ruins.

Visited with Mr. & Mrs. Finnan, acting
supt.; saw Rangers Frank & Donohue,
from N. Colo.

Mesa Verde, Monday,
June 23, 1930

Left at 9 a.m.

Visited Far View house on way out,
Moll Sta. 836, pond 1 mi. E. of Cortez
Colo.; Sycamore & Plavortis
Sta. 857, a small spring creek 18 mi,
N.W. of Cortez, bet. Lewis and Yellow
Jacket.

Reached Monticello, Utah at 4 p.m.
Speedometer 7488.

Clear day, hot in sun, but cool breeze in shade.

Camped at Hansous log cabin camp.

Monticello, Utah, Tuesday,

June 24, 1930

Bright day, hot in sun,

Drove $4\frac{1}{2}$ mi. ~~to~~ ^{near} mouth of North
creek canyon then walked up to James
gold saw mill.

Roll. Sta. 838; in aspen from where we
left car nearly to sawmill, a few *Arceuthobium*
from $\frac{1}{2}$ mi. to 1 mi. below sawmill.

Encrinurus only at lower end of station,
also *Gonyodiscus*, afterwards found *Arceuthobium*
there. In addition, the day yielded *Louisa*,
Vallone, *Vitrina*, *Vertigo*, *Pupilla*, *Coelocopa*
All in predominant aspen forest,
with spruces + oaks mingled.

Monticello, Utah, Wednesday,

June 25, 1930

Another perfectly clear, ~~hot~~ bright day
hot except in breezy shade.

drove 8 mi. S. over dry mesa,
oak scrub dwarfed, but road was torn
up by graders, so turned back to
town & drove east on Cortez road.
Only one road leading south, one
east one north and short road W.
to North Canyon.

Fossils 6 1/2 mi. and 8 mi. S. of
town in Benton horizon of Mancos
Cretaceous. Some horizon outcrops on
many hills east, north & south of
there, but did not examine them. Only
fossils found were Gryphaea newberryi
Stanton.

Monticello, Thursday,
June 26, 1930

Bright hot morning
drove north

Sta 839. rivulet about 6 or 8 mi.
N. of town. Pisidium & a few very
small Lymanaea in alcohol.

Took 3 pictures of cross-bedded ss. in
or above La Plata ss., 1 of car with

La Sal Mts, in background, + 2 more
of crossbedding about ³⁰ mi. N. of Moab,
cells. 25 mi ^{from Moab} further is window photographed
in 1929. 20 mi. S. E. of Moab took
pictures of "caves" high in cliffs.

Reached Moab at 12:30 + took a camp
cabin. Speedometer 7604.

This is the 5th day without a
cloud.

Moab, Friday, June 27.

Hot in sun, a few ^{thin} drifting clouds.
Fairly cool breeze, not bad in shade.

Called on editor L. P. Taylor
+ on Stewart to see about trip to The
Windows. To Pritchard bridge would
be 2-day horseback trip.

Bess + I walked down canyon trails.
Formations much as in Dolores canyon
region. Pink massive La Plata
ss. above, dark red Dolores ss. below,
making vertical canyon walls, with
gypsum at base at entrance to canyon.

Woll. Sta. 240, pool at edge of town
near camp. *Physa* + small *Lymnaea*
Cerioderma with *Lym.* + *Physa* also in alcohol.

Sta. 841, at entrance to canyon
river drift contained several species
of small ^{land} snails, all new shells.
Paul & Gladys Blanchard came
into camp at 10:30 from Salt Lake.

Moab, ~~Friday~~ ^{Saturday}, June 28, 1930.

A very hot, almost breezeless, cloud-
less day. We stayed at camp all day.

Paul & Gladys Blanchard came into
camp at 10:30 ^{p.m.} from Salt Lake in 8 1/2
hours.

Moab, Sunday, June 29, 1930.

Hot, cloudless, bright as usual.

Bess, Paul, Gladys and I, with Wesley
Stewart, as guide, started for The Windows
National Monument, about 8 or 10 miles from
Moab in an air line. Drove about 30 mi.
to the junction with the road to Thompson,
then over it for 2 miles around the end
of a ridge then down the valley on the
other side of the ridge, almost
parallelly the other road for 20 miles,

leaving the car at the Wolf Ranch fence. We then walked & climbed up hill and down, to the windows, about 5 or 6 hard, hot miles. Took a lot of pictures with the 5 X 7 camera and some with the 3 1/4 by 4 1/4.

There are only about 3 good sized windows and several smaller ones, all of the same origin. The massive ss. shows a marked tendency toward crosscutting erosion, forming many shallow caves. Water, washing down joint planes or cracks, breaks into the backs of the caves, forming windows. This seems very evident. The process has been described by ^{W. H. Murray} ~~Bunnings~~ with reference to some other windows, or arches. Some very strong crossbedding and sandstone structure is exhibited in some of the sandstones, but mostly below the window horizon. There are many pinnacles of various shapes and sizes in the region & fine badland topography. West of H.W. of Wash are two remarkable box like buttes, with flat tops and vertical sides.

Reached Moab at 8 p.m., tired and very thirsty as the four canteens did not contain anywhere near enough water.

Moab, Utah, Monday,

June 30, 1930.

Hot & bright. Stayed at camp most of day, but visited small electric power & ice plant.

Moab, Tues., July 1, 1930

Bright hot morning, partly cloudy afternoon.

Paul & Gladys left for Colorado at 6 a.m. We started at 8:45. Some bad road on account of repairs. Reached Erdies camp at Price, at 3 p.m., after delay by tire rock breaking off.

Speedometer 7827.

Price, Wed. July 2, 1930

In camp all day. Not quite so hot as at Moab. Partly cloudy afternoon.

Price, Utah, Thursday,
July 3, 1930.

Hot + bright.

Started at 9 a.m.

Woll. Sta. 842, small creek at
Castle Dale; *Physa* + *Lymnaea*, small.

Reached Salina at 4 p.m.

Speedometer Price 7938

Going down the canyon to Salina we
crossed the coal railroad 27 times in
16 miles.

Salina, Utah, Friday,
July 4, 1930.

Good morning, bright soon warming.

Started at 9 a.m.

Sta. 843, cattail slough 1 mi. W. of
Salina, very large *Lym.* + *Physa*, small
Planorbis.

Sta. 844, slough along Sevier River
about 7 mi. below Marysville, *Lym.*
+ *Physa* (large), *Planorbis*, 2 spp., *Succinea*

Sta. 845, 2 mi. south of slough,
Lym. (no *Physa*) *Planorbis* two spp., *Succinea*

Sta. 846, spring 1.7 mi. S. of
Junction (N. of Melyville)
Paludetrina & Pisidium

~~Spent~~ Spent at first sta. covered with
algae.

Beautiful trip through ^{beautiful} Red Canyon
brought us to Bryce Canyon at 4 p.m.

Bryce Canyon, Saturday.

July 5, 1930.

Hot in sun, cool in shade with
breeze. Spent forenoon and part of
afternoon taking pictures in canyon
& from rim.

Bryce Canyon Sunday,

July 6, 1930.

Hot in sun in morning, cool in shade.
Stayed at camp most of day. Several
showers in afternoon, soon drying off.

Bryce Canyon Monday

July 7, 1930

Bright, fairly cool breeze.

Started at 8:40

Woll. Sta. 847, small rivulet
3 1/2 mi. N. of Park. *Lymnaea*.

Sta. 848, creek at Junction of
Byce road with road from Paragutch
to Mt. Carmel, 18 mi. from Bryce Canyon.

4 *Physa*.

Sta. 849 same stream about 12
mi. farther up (south).

Drove by way of Mt. Carmel thence
to Cedar City, where we camped ^{on night} at
the Cedar Camp Ground at 5:30 p.m.

Cedar City, Utah, Tues.

July 8, 1930

Warm, partly cloudy, sprinkled.

Started 9:15

Sta. 850, pool from artesian water,
Physa & *Pisidium*, about 12 mi. N. of
Paragonah.

Sta. 851, small spring blough ^{south} at edge of
~~meadow~~, Beaver. *Lymnaea*, *Physa*, *Pisidium*
Camped in cabin at Fillmore, Utah, at
3:15 p.m., Robinson's Camp

Rained at intervals during afternoon and
evening.

Fillmore, Utah, Wednesday,
July 9, 1930.

Booke, partly cloudy.

Drove up canyon N.E. of town
Sta. 852, old rock slides near
mouth of canyon, dead *Oreohelix*.
Small snails under narrow leaf cotton-
woods etc.

Sta. 853, large reservoir 8 mi. S.W.
of Levan. *Lymnaea* & *Physa*.

Rained at intervals during after-
noon.

Camped at Riverside Tourist Camp,
Provo, at 5 p.m.

Provo, Utah, Thursday,
July 10, 1930

Cloudy morning.

Went to Chamber of Commerce,
Then to Brigham Young University,
where we met Dr. Vaseo Tanner, he
introduced us to Dr. ^{A.D.} Barrett, tourist
John Flechner (mollusk) & the President
of the Univ. who then introduced us

to Dr. Goodspeed, of Univ. Chicago.
Tanner & the president invited me to
use the biological laboratory at the
lake shore while here.

Had speedometer removed and sent
to Salt Lake city for repairs.

In afternoon Tanner, of B.V. Univ., & Garrett,
of East High, Salt Lake city, took us to
B.V. Univ. Lakeside laboratory.

Sta. 854, lake shore at mouth of Provo
River. Anodonta (?) and Succinea Haydeni.

(Sta. 854 1/2 artesian well on near lake shore
1 mi. S. of laboratory (which is near mouth
of Provo River); Physa

Sta. 855; spring 1/4 mi. or so S. of
laboratory. Small Planorbis, collected
by G.O. Garrett.

Sta. 856

Rained during afternoon & evening.

Provo, Friday,
July 11, 1930.

cloudy & cool.

Sta. 857, Provo River, at camp.

Large Lymnaea in ^{small} nearly dry slough
near River. Small Lym., Physa, (only)

Speedometer stopped at 8442, 10 miles
 S. of Provo. add 48 miles fixed

Provo, total 9 gal. gas @ 23¢	2.07
changed oil here, 6 qt. oil + greased	
Lehi 7 gal gas at 23¢	1.61
Lehi 4 " " " 23¢	.92
Provo 7 " " " "	1.61
Hyrum 8 " " " 24	1.92
Brigham 8 " " " 23	1.84
1 qt oil	.35
Montpelier 9 gal gas @ 29	2.61
" 10 " " " 29	2.90
Pocahontas 8 " " " 27 1/2 ¢	2.20
Arco 7 1/2 " " " "	2.25
Shoshone 8 " " " "	2.25
6 qt oil	2.10
changed oil + greased at 9164	
Mountain Home 9 gal gas @ 27¢	2.43
Baldwell 5 " " " 27 1/2 ¢	1.38
" 7 " " " "	1.93
Midvale 6 " " " 27	1.62
New Meadows 5 gal gas @ 30	1.50

	1 qt. oil	35-
Whitebird	6 gal gas @ 30	1.80
Lewiston	8 " " " 27 1/2	2.20
Moscow	5 " " " 27	1.35-
Chester, Wash.	9 gal. gas @ 24	1.68
Greased & changed oil at 9894		
Boondabone	7 1/2 gal. gas @ 27 1/2	2.03
16 gal. oil @ 9998, but only 46 mi. used on last.		
Wallace	9 gal gas 27 1/2	2.58
	1 qt oil 35¢	
Alberton	8 gal gas at 28	2.24
Drummond	7 " " " 29	2.00
Butte, Mont	7 1/2 " " " 22	1.65-
Roseman	8 " " " 27 1/2	2.20
Greased & oil changed at 10446		
Yellowstone	7 gal gas	2.00
	1 qt. oil 35¢	
Big Timber	10 gal. gas @ 27 1/2	2.75-
Billings	8 " " " 23 1/2	1.84
Roundup	8 " " " 28 1/2	2.24
Hardin	8 " " " 25 1/2	2.00
Sheidan	6 3/4 " " " 26 1/2	1.75-
Willetts	8 gal " " " 26	2.08
Moorecroft	8 " " " 26	2.08
Newcastle	4 " " " 24	.96
Rude	7 " " " 25	1.75
Bhewee	7 1/2 " " " 25	1.77

Provo, July 11, 1930, continued

Paludetrina & *Pisidium* in river. *Succinea*
haydeni along muddy banks of slough &
river. 1 dead *Fluminicola*.
cloudy & cool all day.

Provo, Utah, Saturday

July 12, 1930

Mostly clear, hot in sun, cool in breezy
shade.

Sta. 857 continued. The river Lymanas
& Physas a little farther down stream from
yesterday's collections. They are among ^{are larger} &
on small boulders in stream. The larger
species yesterday was in a ^{small} ~~slough~~,
vegetation-choked slough. Found more
Pisidium in small water-cross slough at
camp. ^{River Lyman & Physas often with whitish sand}
parallel with growth lines.

Sta. 858, narrow-leaved cottonwood grove
in river bottom about 1/4 mile below the
bridge over the river at camp. Fine *Orchelimum*
cooperi, *Vallonia* (?), *Vitrea*, *Zonitoides* and
Lymnaeidae.

Sta. 859, cottonwood & willow grove,
W. side of river, about 1/2 mi. above camp.

large colony of *Arachnoidia*, abundant, active
after rainy weather
Hot today, bright.

Provo, Utah, Sunday
July 13, 1930

Hot & bright in sun.

Went with Mr. Kartchner in motor
boat to an island in S. part of lake,
but heavy surf and motor trouble
prevented a landing.

~~Provo~~ Utah, Monday
July 14, 1930

Hot & bright

Sta. 858, beach on mud flats N. of
mouth of Provo River - dead shells.

Sta. 861, lake beach S. of Geneva.
Dead shells, *Aphacium* valves & *Flemingia*
abundant.

Sta. 862 ditch 1 mi. S. of American
Fork, not far from lake - very shallow,
gravel bottom.

Sta. 863 lake shore at end of
1st West St., American ~~Falls~~ Falls. High
spired *Lymnaea* & *Physa* alive where

a thin film of water from the
rushes spreads over the mud.
Succinea Haydeni abundant on the
mud. Sphaerium ~~valves~~ and dead
short spined ~~the~~ Lymnaea and
large dead Physa. (Upon examining
material at camp I find there are also
living short-spined Lymnaea. The
Succinea, as at mouth of Provo
occurs in and near reeds, on the
mud of the receding lake shore.

Provo, Tuesday

July 15, 1923

Hot bright.

Sta 864. slough S. of Lake
near lake. Pisidium, Physa, Lym.
+ small Planorbis

Sta 865, lake shore at power
plant near Lake Saratoga, S. W. of
Lake, sphaerium very abundant,
Physa, Lym. Planorbis, large & small
Bairdiana, Velveta Fluminicola & another
all dead & perhaps all ~~are~~ washed

these dredgings thrown out in dredging
canal from lake to power plant.
No live mollusks found. Water very
shallow at shore, bottom hard,
compass mud.

Sta. 866, lake shore N. of a long
spit on W. side, about opposite
Provo. Rushes in water. Only dead
shells found, of *Corbicula*, *Ferussacina*
& *Sphaerium*. Same condition for long
distance.

Drove clear around the lake &
reached camp at 3 p.m.

Provo, Utah, Wednesday,
July 16, 1930.

Hot, close, sultry, & partly cloudy in
afternoon, but no breeze.

Drove to Brigham & got a cabin at
Sycamore auto camp.

Brigham, Utah, Thursday,
July 17, 1930

Bright, hot morning

Sta. 867, small rockslide under oaks
just within canyon on road to Logan

● Sta 868, under broad-leaved plant
on limestone slope. *Arceuthobium*

Sta. 869, rivulet at east edge of
Wellsville, Utah. *Sphaerium*, *Pisidium* &
Physa.

Put up our tent at Logan Tourist
camp, Logan, Utah, a shady camp.

Logan, Utah, Fridge
July 18, 1938

Slow Partly Shady

Sta 870 Ditch about 1 mi. S.W.
of Logan. *Physa* *Lymnaea* &
Flemingia 1 *Succinea*

Sta 871, creek half a mile
farther on Wellsville road, *Lymnaea*,
Physa *Succinea* & *Flemingia*.

Sta 872, small rivulet in north
edge of Mendon, N. of Wellsville.
Physa & *Pisidium*

Sta. 873 Ditch 3 or 4 mi. S.
of Logan. *Paludetrina*, *Physa*, 1
Lymnaea 2 *Pisidium*

Drove around the whole valley
from Hyrum, Logan & Wellsville to
Trenton. Tried many favorable
looking places for mollusks, but found
them in only 4 stations, and
abundant in but one (Fluminea),

Rained in evening

Road from S. of Provo to Logan
& northward all paved

Logan, Utah, Saturday

July 19, 1938

cool, cloudy morning

Road up Logan Canyon fair,
gravelled

Sta 874, 13 mi. up Logan
canyon. Oreohelix, Agriolimax, etc

Sta. 875, slough about a mile
N. of Garden City, Utah, near ^{beach} lake
shore. Large Lymnaea abundant,
a few small Planorbis.

Sta. 876, spring near lake shore
about 1/4 or 1/2 mi. N. of 875; small
Lymnaea, small Planorbis & Pisidium
bumped in grove at Lakota
resort N. of Garden City.

Bear Lake, Utah

Sunday, July 20, 1930

Sta. 877. Shore of lake at Lakota
Resort. *Coriophy newberryi*, *Fluminea*,
Lym. utahensis + *Sphaerium*, all dead.
Small ditches leading over grassy ~~meadow~~
marsh to lake, another species of *Lymnaea*,
Physa, + *Sphaerium*.

Bear Lake Valley

Sunday, July 21

Bright, fairly cool

Sta. 878. battail slough east of
road about 2 mi. N. of Paris, Ida.
Lym. s. wasatchensis, *L. sp.*, *Planorbis*
trivialis, *Musculina* about 1/2 mi
S. of Ovid

Sta. 879. Slough 1 1/4 mi. S. W.
of Montpelier, along by roadside.

Planorbis, *Lymnaea* + *Physa*.
L. wasatchensis only dead shells.

Sta 880, roadside slough
3 mi. S. W. of Montpelier, *Lymnaea*
s. wasatchensis alive, *Valvata* +

Small Planorbis

Sta. 881, beach at N. end Bear Lake, Ida. Water has receded several hundred feet since 1917, shells especially *Barinifex*, scattered profusely through & on the sand and gathered in windrows near present shore line. No live ones found

In forenoon we dredged the lake at camp to a distance of several hundred feet from shore and a depth of 5 to 6 ft. Hard, sandy bottom, no live mollusks and but few dead, weathered shells, though on shore *Barinifex* occurs in windrows with some *Aphacium* and *Lym. utahensis*.

Bear Lake, Ida, Tuesday;

July 22, 1930,

Partly cloudy, calm, hot.

Drove north

Sta. 882, Lake north of dam at N. end of Bear Lake Susquehanna, Lym.

Sta. 883, E. side of Bear Lake, 8 mi. from N. end, about midway

between N. & S. ends. Dead shells plentiful, not abundant as at other stations, shore about same

Took pictures of ripple marks. Sta. 884, E. side Bear Lake, about $1\frac{1}{2}$ mi. from S. end, on beach of coarse pebbles, ^{dead} shells abundant, but not as much so as at N. end, Sphaerium very plentiful

Sta. 885, along slough just N. of Laketown, S. end of Bear Lake. Succinea

Sta. 886, $1\frac{1}{2}$ mi. N. of S. end of lake, on N. side, dead shells in windrows.

We saw only 2 tiny rivulets coming into the lake from the east side in driving around the lake. Returned to camp at 4 p.m.

The numerous dead shells seen about the lake lack the epidermis, but otherwise do not exhibit much erosion. The water level has been much reduced by the operations of

a power company, leaving wide stretches
of flats & sandy beaches all around
the lake. The failure to find any live
mollusks in the lake or even any
fresh shells, leads me to believe
that the *Garyidea*, *Physa* and
Lymnaea stagnalis are not living here
now.

At the north end of the lake
there are a few fragments of
Anodonta.

Rained

Bear Lake, Wednesday
July 23, 1930

partly cloudy

drove north through Montpelier
Sta. 887, brook near reservoir
about 2 or 3 mi. W. of Lake

Springs, Ida. *Lymnaea* & *Paludicola*
Sta. 888, slough at Blaser 3 1/2 mi. above ^{10 am}

Planorbis speciosus & *Physa* sp.

Camped at Pocatello city camp.

Rained hard in afternoon
near Lava Springs

Pocatello, Ida., Thursday

Bright, cool

July 24, 1930

Drove through ~~Blackfoot~~ and
Blackfoot and over to Braters of
the Moon, where we got a cabin for
the night. Very windy afternoon

Braters of Moon Idaho.

Friday, July 25, 1930

Cool, partly cloudy. Left at
10 a.m.

Sta. 889, ~~to~~ rivulet & slough
10 mi. N.E. of Carey, Platanus & ~~Lycium~~

Sta. 890, river 14 mi. S.W.
out of Carey on Shoshone road
Aphachin, Psidium, Physa, Platanus,
Lycium, Fluminaria & Valvata?

bumped in cabin at Shoshone.
Windy afternoon

Shoshone, Ida, Sat.

July 26, 1930

Bright, hot in sun, cool breeze
in forenoon

Sta. 891, Little Wood River, 9 1/2
mi. W. of Shoshone on Gooding
Road, Sphaerium, Fluminicola, Physa
1 dead Lymnaea

Sta. 892, shallow, rocky creek
1 mi. W. of Gooding. Lymnaea,
Physa Planorbis

Sta. 893, stream 5 mi. W.
of Gooding, Ida. Sphaerium (2 spec)
Planorbis (dead) Physa, Lymnaea,
Planorbis, Fluminicola, Pisidium
Big Wood River

Sta. 894, rivulet 8 mi. W. of
King Hill, Ida. Pisidium, small
Planorbis, Physa & Lymnaea

at 4:30 p.m. we put up our
tent in a tourist camp at Mountain
Home - grass & shade.

Mountain Home, Idaho,

Sunday, July 27, 1930

Hot in sun, fairly cool in shade
with a little breeze

Stayed in camp all day.

Baldwell, Ida., Monday,

July 28, 1930

Hot day. Drove to Caldwell & found H. W. Tucker & O. J. Smith of the College of Idaho (Presbyterian) who took us to the Valentine ranch, ~~across~~ ^{near} ~~the~~ ^{the} ~~river~~ ^{succor} creek, about ~~30~~ ³⁰ ~~miles~~ ^{miles} ~~south~~ ^{south} of the river, where we collected fossil leaves from the Payette? formation or Idaho formation.

camped at city camp ground.

Baldwell, Ida., Tuesday

July 29, 1930

Good morning, but hot day in sun.

Spent morning with Prof. Smith in Museum at college & packed box of fossils.

Baldwell, Ida., Wednesday

July 30, 1930

Hot morning. Drove to

Weiser then up Weiser River
Sta. 895 - Weiser River, 7 mi. above
Midvale. Physa, small Planorbis,
Pisidium (2), small Lymnaea (1), Lymnaea
(1 dead shell), Margaritifera (1 white).

Sta. 896, Weiser River on a branch
~~at~~ at Starkey ~~Resort~~ Hotel, 42
mi. N. of Midvale. Margaritifera,
Lana, Physa, Pisidium.

(Camped at Starkey's.)

(The Margaritifera are mostly with
dark purple nacre, but range to
pink + salmon - none white.)

Starkey, Ida., Thursday
July 31, 1930

Good morning.

Sta. 897, Weiser River, 12 mi
above Starkey. 1 dead Margaritifera

Sta. 898, Weiser River, Tamarack
Isd. Pisidium, small Planorbis x
Pisidium

899, Little Salmon River, 16 mi
N. of New Meadows, Lymnaea n. sp.?
Physa + 1 dead Margaritifera

None 14 mi. below (below Pollock)

Lymnaea at 899 very abundant on
rocks in swift shallow mountain
stream.

Cool evening. Camped at Grange-
ville, fine camp

Grangeville, Ida, Friday

Aug. 1, 1930

Cool morning. Warmer as we got
down to Clearwater River

Sta 900, Clearwater River, at
Spaulding, Ida. *Fluminicola* + *Physa*.

Camped at Moscow, fairly cool
most of day.

Moscow, Ida, Saturday

Aug. 2, 1930

Cool, windy morning

Sta. 901, Palouse River, at
Palouse, Wash. *Amygdalus* or
Quadrachia

Sta. 902 N. of Palouse ~~river~~
in slough. Ferriss on lily pads,
small *Planorbis*, large *Sphaerium*

1 1/2 mi. S. of Oakesdale, Wash.
drove ~~back~~ to apple way, E.
of Spokane, then to Coeur d'Alene
Hdqs. & camped in shady park
In Spokane River, above Post
Falls, Ida., home of *Amodonta*
idahoensis, is now a great mill
pond for logs. We saw found no
mistake.

Coeur d'Alene, Ida. ^{Sunday} ~~Monday~~
Aug. 3, 1930

Hot in sun most of day - partly
cloudy. Stayed in camp.

Coeur d'Alene, Monday
Aug. 4, 1930.

Partly cloudy, Warm
Sta 953, under ~~the~~ green weeds
at foot of mountains about 2
mi. east of Rathdrum. *Polygonum*
hirsutum *pterychophora*. In gulch made by
in granite slides, *Angiosperma koslii* var.
occidentale alive, *Polygonum* (2 spp.) and
Oreobolus dead.

Boeur d'Alene, Ida.

Tues. Aug 5, 1930

Hot day

Sts. 90 1/4 & swamp at West
side lake 9 mi. from town
Sphaerium, P. sibiricum & Physa
Drove to Ford, Ida, but found
nothing else.

Boeur d'Alene, Wednesday

Aug 6, 1930

Sprinkled during night. Hot this
morning.

Drove east & camped at Riverside
Auto camp, below Sattese, Murkams
Road good except a detour.

Riverside Auto Camp,

Thurs., Aug. 7, 1930

Hot day. Drove to Missoula, then
to Drummond & Southard, camping at
Keen Cabin camp, 6 mi. S. of Phillips-
burg. Good evening.

Phillipsburg, Mont., Friday,
Aug. 8, 1930

Cooler, but hot about noon. Partly
cloudy, breezy. Drove through Butte,
Anaconda & Roseman + camped at
Yellowstone Camp Ground, Livingston,
~~in~~ in cottonwood grove.

Livingstone, Mont., Saturday,
Aug. 9, 1930

Drove to Yellowstone Park. Road good
except some construction work and
a detour where regular road was
blocked by a slide, which detour was
very slippery from a hard shower.

Just as we got camp set, at 2:30
p.m., a terrific downpour of rain came.
Rained at intervals during evening.

Yellowstone Park, Sunday
Aug. 10, 1930

cloudy morning. Visited the terrace
at Mammoth

Sta. 905; at Jupiter terrace, under

Balsamorhiza and coarse grass, & whole
very abundant.

Rained furiously in late afternoon
and again at night. Mostly cloudy
all day.

Yellowstone Park, Monday

Aug. 11, 1930.

cloudy morning partly cloudy later.
Rained at intervals from noon until
nearly midnight. Stayed in camp
got a cabin.

Yellowstone Park, Tuesday

Aug. 12, 1930

Dark, cloudy, foggy forenoon.
Bus left by bus for trip around
the Grand Loop - 4 days.

Rained a little during the day.

Yellowstone Park, Wednesday

Aug. 13, 1930

cloudy to partly cloudy all forenoon.
Sta. 906, swamp just east of

auto camp, Mammoth, near Gardiner
River *Lymnaea*, *Physa*, *Aplexa*, *Pisidium*,
Agrion, *Limnoria*, ^{2 spp.} *Limnoria*, ^{sheathing} out small *Valoniopsis*.
In a glacial depression in glacial moraine
sprinkled at intervals during the day.

Yellowstone Park, Thursday
Aug. 14, 1930.

Began raining before daylight and
continued until noon. During a lull after
12:30, I revisited Sta. 906 and got
more material. Rain began again at
2 p. m. Rained at intervals during after-
noon & evening.

Yellowstone Park, Friday
Aug. 15, 1930

Cloudy forenoon, raining at intervals.
Sta. 907, big *Oreochelone* *cooperi* colony
extending from some distance south of
Orange Spring along the slope ~~back~~ back
(west) of the terraces northward, abun-
dant under *Balsamorhiza* grass, etc.,
as far up the slope as I went and as
far north as the gulch just west
of Liberty cap, then less abundant

north & west over the sagebrush
slopes up to and into the aspens.
From 1/2 doz to several dozen under
one plant. The colony must include
hundreds of thousands of snails.
on steep south side of gulch west of
Liberty Cap the little *O. pygmaea*?
is almost equally abundant at our
place, with *Cooperia* in ^{scarcely} conifer &
cedar forest.

Sta. 908, aspen grove about 1/4
mile (or less) N.W. of 907, N.W. of
Mammoth Hotel. *Oreochelone cooperi*,
Vitrina, *Louisa*, *Louisa*, *Louisa*, *Vallonia*,
Eucrenula, *Pupilla*, small *Pupillidae*
Slopes W. of Terrace (907) have
been much washed since I first
collected there, the mats of dead leaves
which afford cover for snails to a great
extent washed away.

Yellowstone Park, Saturday

Aug. 16, 1930

Nearly clear forenoon.

Reached Livingston and 1 p.m. &
camped in Yellowstone Auto Camp.

Livingston, Mont., Sunday,
Aug. 17, 1930

Stayed in camp all day
Cool, breezy at times

Livingston, Monday Aug. 18.

Cool morning, hot afternoon
Drove to Billings & camped on fine
grass at Municipal auto camp
20 mi. of road rough

Billings, Mont., Tuesday,
Aug. 19, 1930

Bright, hot day.

Drove to Musselshell River, road
good. River muddy in flood, drove
east, passed head of flood, road
rough. Flood caught us again
at Musselshell, just as we found
a shell

Sta. 909, Musselshell, in river
one *Lampatia ventricosa*, dead shell
Returned to camp at Billings.

Partner M. M. Stockwell at
Musselshell says mussels abundant
& promised to send some.

Billings, Mont. Wednesday

Aug. 20, 1930.

cloudy
Cool morning, hot day.

Drove through Hardin, Crow Indian agency, Sheridan, Wyo. & camped at Gillette, in cabin 247 miles. Wonderful electric storm to the north in evening.

Gillette, Wyo., Thursday,

Aug. 21, 1930

Cool, cloudy forenoon; clear, warm afternoon. Drove to Devil's Tower, then back to Moorcroft, & camped in cabin at Newcastle. Road mostly good except 12 miles from Barile to the Tower.

Newcastle, Wyo. Friday

Aug. 22, 1930

Cloudy, raised sand in forenoon. Left at 8 a.m., arrived in Boulder at 8 p.m.

Helena Mont., Friday,
Aug. 19, 1927

Bright morning

Well. Sta. 86, small ditch 13
mi. E. of Helena.

Sta 65, slope just N.E. of Town-
send.

Sta. 68, slope 2 mi. E. of Three
Forks.

Gas. 7 gal. oil 1 gal at Helena.
Bumped at Livingston.