

Junius Henderson
Field Notebook
No. 4
Sept. 7, 1909 -
Aug. 30, 1910

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mostly California and New Mexico.

Pueblo, Colo., Sept. 7, 1907.

Still densely cloudy as we entered Royal Gorge at, and soon began to rain again. River high and muddy. Rock slides and old track washed in recently. Gorge in gneiss and granite. Breakfast at Pueblo, 8 a. m. Clearing up as we left Colorado Springs at about 10 a. m. Clear when we reached Denver at 1:15 p. m. Dined at Oxford hotel. Bought some instruments of J. Durbin Surgical and Dental Supply Co., 1508 Curtis st. Called on Fred E. Anderson, 1735 Gilpin st., to see seal skin and skull offered to the Museum by his father, Dr. Anderson, then on Joads Bros., ^{1814 Stout st.} to arrange for mounting it at a price of \$12.⁰⁰. Left for Boulder at 4 p. m. by C. & N. Heavy rains indicated all the way. Prof Lockwell and wife on train, returning from Europe, also

Austin Russell, returning from
White River. Reached Boulder at
5:15 p. m.; went to museum, then
got a room at G. M. C. A. building.

Boulder, Colo.

Dec. 21, 1907.

Started up Boulder Canyon at
1:15 p. m., with camp pack and 16
gauge double barrel shotgun. 15° above
zero. Heavy snow on ground. Sun shining.

Just inside the canyon saw flock of 25
pinon jays, a few mt. chickadees and junco,
long crested jays and magpies. at Coburn
Mill saw several birds which I believe were
red breasted nuthatches. Reached the Marston
tunnel at 3:30. Saw a pine squirrel.
set 11 traps for mice, shrews, etc. John
Blanchard reached the cabin at 4:30.

after getting a short distance up the canyon
even the *Peromyscus* tracks became
scarce. at the Marston there were

very few tracks, set 11 traps about there.

Marchioness Tunnel.

Dec. 29, 1909.

West wind in morning; 6° above zero at 6:30 a.m., 26° above at 7:45. Nothing in the traps. I do not understand the absence of small mammals, especially of *Peromyscus*. Is it possible they are hibernating. Some tracks, but several days old, as the last sift of snow has obscured them. After breakfast found 2 house mice in the traps at the stable. We killed a mountain rat in the tunnel. Then climbed the mountain on north side of creek. Coyote and rabbit tracks. Saw two rabbits but did not get a shot at them. Took ~~one~~ ^{two} Townsend solitaires and saw half a dozen more. Saw at least one red-breasted nuthatch plainly with glass, but rough ground prevented a shot. Plenty of Mt. chickadees and Junco spp. Returned to house at noon for dinner.

Skinned the rat after dinner. Then we went up the mountain north of the creek. Saw two Western robins and heard several more. Took another solitaire. I returned to skin the ~~mammals~~^{nuice} and birds, while John went to the Marchioness Tunnel and brought back 2 bats and an Arctic towhee. I skinned and prepared the two bats and two nuice. We had the phonograph running all evening. Has been windy today. Bright tonight, 20° above zero at 9:30 p.m.

Marchioness Tunnel,

Dec. 23, 1908.

16° above at 6:30 a.m., bright morning. While I was skinning birds Blanchard went out and shot a robin and a pygmy nuthatch. I caught another house mouse and a gray-headed junco in traps in the chicken coop. I put up two solitaires, robin and one Arctic towhee. Returned to Boulder at 4 p.m.

Boulder, Colo.,

Saturday, July 9, 1900.

at 1:30 p.m.

Went up Gregory canyon with Betta and Marvin to try new - Marble "Game Letter" gun, .20 rifle and .44 shot. Cold west wind. Gun proved satisfactory. Saw following birds.

Townsend solitaire (took one) 1

Pink-sided junco (took one) several

Long-crested jay several

Magpie several

Mountain chickadee common

Long-tailed chickadee common

Batchelder woodpecker one

Heard canyon wren constantly on hillside.

Returned at 4:50.

Trip to Round Butte Trip

Boulder, Colo.
Boulder, ~~6~~ Mich. 17, 1910.

Beautiful, balmy morning, west wind.
P. G. Worcester, H. A. Arund, R. M. Butters and I
left Boulder on C. & S. R. R. at 9:50, 27 min-
utes behind time. Round trip fare to
Ft. Collins \$2.⁵⁰ each. Reached Ft. Collins
at 11:25. Got dinner at Orpheum cafe.
Left for ~~Worcester~~ ^{Wellington} at 1:15, reached there
at 1:40, round-trip fare 60 cents. Got rooms at
Hotel Wellington, then started north along
the beet sugar spur to a cut ranging to
20 feet in depth, through probable Pleistocene
deposits, laid over Pierre shales as indicated
by fossils found in the bottom of the cut at
one place - Baculites, etc. The Pleistocene?
at base of walls of cut is ^{sarcally hardy consolidated} sandy, in color
resembling Fox Hills sandstone, enclosing
some pebbles, with some intercalations of
pebbly strata in higher horizons, capped
by the usual ~~was~~ coarse, unconsolidated
conglomerate, including quartz, jasper,
fossiliferous Pierre concretions, carboni-
ferous crinoidal limestones boulders,
etc. In one place were numerous

fragments of horse bones in the sandy lower zone, of which we collected two teeth, which I take to be Pleistocene. Then started S. E. for a big ditch cut, and found Pierre shale on the way. The latter cut is about half a mile E. by N. from the Wellington station. At the West end Pierre shales are exposed, with numerous concretions as at Boulder brickyards. Fossils were few, but we collected *Baculites ovatus*, *Muculidae*, etc. Returned to hotel at 6 p.m. Retired at 9:15. Saw one bluebird. ~~From 9:40.~~

Wellington, Colo.
March. 18, 1910.

Up at 6 a.m., clear morning and cool. Started with team from Hall's stable at 7:10 a.m. 3 mi. N. and $1\frac{1}{2}$ mi. W. of Wellington found ditch cutting through Hygiene sandstone, containing *Ducoceramus* spp., *Baculites*, *Amisouyon*, *Avicula*, *Ostrea*, etc. Reached Round Butte at 11:15. In creek bluff $\frac{1}{2}$ mile S. of the butte Pierre dips S.E. 58° , and is badly crushed.

Hygiene sandstone passes through the
butte, we ate lunch, fed the horses, then
walked to the bluff N.E. of the butte, &
photographed the bluff, with ^{red} Pleistocene
conglomerate resting on lower Fox Hills
sandstone, ^{this} in turn underlain by black
Pierre shales. One sandstone (Dakota or
Arikaree) boulder in the conglomerate
is 2 ft in diameter. We collected Fox Hills
fossils at the bluffs, then collected Hygiene
fossils S. of Round Butte, where the strike
is S. 32° W and dip is 5° 40'. The concretions
are similar to those at Fossil Ridge. Some
of the Fox Hills fossils were found in con-
cretions like those E. of White Rock
fault. The Pleistocene conglomerate con-
tains much agatized wood or wood
jasper, etc. I found a sandstone
boulder 3 ft. in diameter in it. We
started back at 6:10, reached Wellington
at about 8:40, very tired. Team \$4.00

Wellington, Colo., Mch. 19, 1910.

Up at 6:15, got breakfast. Beautiful, perfectly clear morning. ^{Hotel bill \$2.70 each} Left on 7:30 train, reaching Ft. Collins at 8 a.m. Started south by team at 8:15 a.m., reached Trilby schoolhouse at 9:10 and began collecting fossils on Fossil Ridge. Very hot by 10:30. Returned to Ft. Collins at 3:30. Team \$4.00.

Boulder, Colo., Apr. 29, 1910.

Boiler and cloudy today, S.E. wind. Has been hot for several days. I left for Denver on 4 p.m. train, on way to Salida. Round trip Boulder - Denver \$1.60. Reached Denver at 5:10. Dined at Offord Hotel 85¢. One way ticket Denver to Salida \$6.00, sleeper \$2.00. Got on sleeper at 8:30. Train started at 9 p.m. Had been sprinkling since 7 p.m.

Salida, Colo., Apr. 30, 1910.

Arrived at 5:10, but as the car was left here I did not arise until 6 p.m.

Got breakfast at the depot lunch room, then went to Principal Edgar Kesner's house. He went with me to Kenyon's house and Kenyon and I walked up Tenderfoot hill. Rock hereabouts all basaltic, at noon the Kenyons, Mr. Gady and I dined with the Kesners. At 1:30 I talked about Economic Ornithology to the County Teachers' Institute, for over an hour, then went home with Kesner. After supper I went to Kenyons, Mr. & Mrs. Kenyon and I went to a moving picture show, after which I got on the 11:35 train and went to bed. I was partly cloudy through the day, wind variable, a little rain about noon.

Denver, Colo. May 1, 1910.

Arrived here at 7:50 and took narrow gauge train for Boulder at 8 a.m., without breakfast. It was foggy the latter part of the night and is cold this morning.

Denver, Colo., May 16, 1910.

bleared off during day and snow melted. Attended Dr. Edgar L. Hewett's lecture on Central American ancient art, then took 9:30 p.m. car for Denver on way to Wecker. Went to Oxford Hotel. Quite cold, way freeze.

Fare 70¢

Denver, May 17, 1910.


Got good night's sleep. Arose at 7:30. Quite cool. Breakfast 55¢, room #1 50 at 12:45 I ^{emerged} ~~drove~~ on car just beyond Colorado Springs - soup and straw-berries and tip 55¢. Soon came to a series of short tunnels, then more open to Lake George. Another series of tunnels in Granite Canyon. Then came South Park, a broad, comparatively level valley through granite mountains, bounding slopes rather gentle, pine-clad, heavy marginal terrifications to valley. South Platte river meanders through it, shallow, well-grassed banks quite uniformly about a

foot or two above the water valley suggests a filling stage, rather than cutting. It seldom discloses a steep embankment of even 3 or 4 feet and no terraces. There are some beautiful meanders. Lots of sandstone, conglomerate and shale just before reaching Bath. Then passed into Arkansas Valley. Storm gathering on mountains. South Park free from snow. Arkansas shows decided cutting and terracing, flowing in deeper channel than the Platte. River bed filled its valley with boulders to depth of 50 feet or more, big boulder, and has now cut to at least that depth. I suspect glacial deposits from Colliate Range.

Left Denver at 9:15 a. m. for Rifle over Colorado's Wickburg R. R. Fare one way \$11³⁰ no round trip rate.

Rifle, Colo., May 18, 1910.

Reached here at 12:45, got to bed at 1 a.m. Arose at 6:30, having slept well. Bright and much warmer this morning. Slept and breakfasted at the Winchester Hotel, \$1⁵⁰. The Little Book & Giffa look very near, and a very light gray in color. River in a secondary bottom, the terraces being probably 75 to 100 ft. high on south side. Stage started for Meeker at 8:15 a.m. Round trip fare \$8⁰⁰. Did not get out of town until 8:45 with 7 adults, 4 children and heavy load of baggage. Yellowthroats and orioles common at Rifle. First change of horses at 11:05, 12 miles from Rifle. About a mile² further we found the slide which occurred a month or two ago. The slide continued for 8 days, a hundred yards or more wide, the head being $\frac{1}{4}$ or $\frac{1}{2}$ mile up slope, the tongue extending about 100 ft. beyond old road, covering it to a depth of 25 feet or more. Cedars all along the top of the slide are toppled in all directions. Reached Piceance Creek stage station at 1 p.m. and stopped for dinner, 50¢. At 3:30

changed horses again, 28 miles out from
Rifle. Reached Meeker, 44 miles from Rifle,
at 6:25 p.m. Roads rough. Drainage
channels all along are deep and narrow
at bottom of valleys, showing present
down cutting. At hotel J. L. Rilaud, Dr.
Stetson and Col. Montgomery met me,
and the first two dined with me. Spent
evening with Rilaud. He told me of big
Indian mortars, etc., on Blue Mt., near
Rangely, discovered by John A. Story, of
Meeker. Also of a jade ? idol in possession
of J. B. Nummerich, of Buford, plowed up by
him in Oregon. Also stone walls on a
cliff ledge discovered west of Meeker by
Chester Lytle, whose address he will
get. He had the jar discovered by Lytle
which I saw last summer. I reexamined
it. It is of typical San Juan black-and-
white type, but shows a barely perceptible
glaze especially on the black lines. Outline
this  with loops for thongs. Retired
at 9:30 very tired.

Meeker, Colo., May 19, 1900

Up at 7:15 a.m. Bright and warm. Breakfasted at ~~the~~ with Rilaud, then went with him to call on Mr. Douellyⁿ, a taxidermist, who was not at home. He had an enormous Mt. Lion skin prepared, with an immense head. Met Miss Davis and Miss Shapcott(?), teachers in the Meeker school, Mr. Strocker (Miss Davis uncle), called on Mr. Lytle, editor of Herald, and Mr. ^{J.H.} Dennis, Episcopal rector. Then ^{Henry J. Hay} one of the school directors took me through the graded school. Also met Mr. Oland, in the bank, a University graduate. Mr. Moulton, a bank official, called on me at the hotel, having a son in the University. Dr. Samuel French took me to his rooming house and showed me some Indian grave relics which he presented to the University and Mr. Strocker, in the drug store, agreed to pack them for shipment. Met Principal Hale at the hotel table at noon. afternoon

laid down for a time. At 6 p. m. I dined with the rector and his family. Got to the hall at 7:30, but the exercises did not begin until 8:30. I delivered the commencement address, talking about 45 minutes. Has been a fine day.

Neeker, Colo., May 20, 1910

Cloudy morning. I arose at 6:45 a. m. to take morning stage. Hotel bill \$4.00. Stage got out of town at 7:40. Cold. Reached change of horses at 11 a. m. and Piceance Creek, 20 miles from Rifle, at 1:05 p. m. in rain. Dinner 50¢. Rained more or less at first in afternoon, then frightfully dusty, giving me an attack of hay fever. Reached Rifle at 6:05 too late for the Midland train. Got off on D. & R. G. at 10:05, 35-minute late. Sprinkling as we left. Supper 50¢. River 90 yds wide at bridge, bed twice as wide. Bath \$2.00.

On I. & R. R., May 21, 1910.

Cloudy, sprinkling this morning.
Up at 7 a.m., cold better. Breakfast
5:5⁴ Roads muddy north of Pueblo,
snowing at Colorado Springs, ground
soon white. Driver 5:5⁴ Reached Denver at
1:40 p.m., caught 2 o'clock Interurban car for
Boulder, still storming, about 2 inches of
snow between Colorado Springs and Denver,
none on ground at Boulder, but ground
muddy. Reached Boulder at 3:30 p.m.

Southern California Tertiary and
Pleistocene localities from
Arnold's San Pedro

Report.

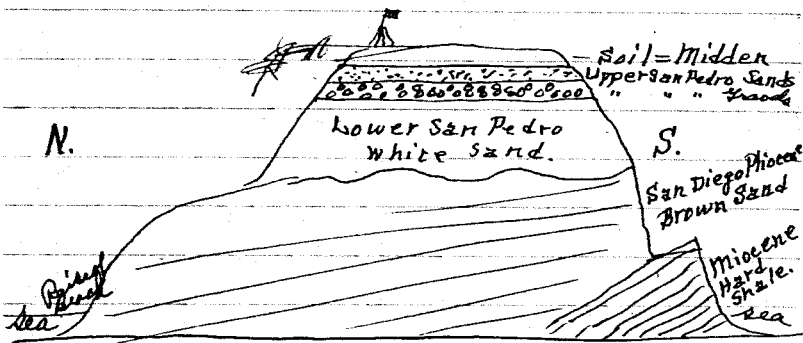
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San Diego formation = Pliocene
San Pedro " = Pleistocene

Long Beach.

Bluff east of town is upper San Pedro
Pleistocene, with fossils especially
at base of bluff, about 50 spp.

Seachuan Island.



Raised beach at N. end shows uplift still
in progress, perfect color still preserved in the

fossils, 34 species still living.

At the arch point on east end Pliocene bluff capped unconformably by Lower San Pedro. "Miocene" fossils reported are all from a Pliocene stratum unconformable on Miocene Arnold p. 225.

Pliocene - ~~most~~ ^{many} species now live only in colder water far north, 17.3% of fauna now extinct. Arnold pp. 15-16. 87 spp. Pliocene on Deadman Isl., of which 55 now live at San Pedro, 16 only north, none only south, 15 extinct, 1 doubtful.

Lower San Pedro - a stratum 4 to 10 ft thick on W. side, 20 ft. on E. side filled with fossils. ~~San Pedro~~ Many of the species not found in Pliocene, 247 spp. in Lower San Pedro of Deadman Isl.; 158 now live at San Pedro, 43 only N. of San Pedro, 8 only S. of San Pedro, 31 extinct, 7 doubtful habitat. This also northern fauna.

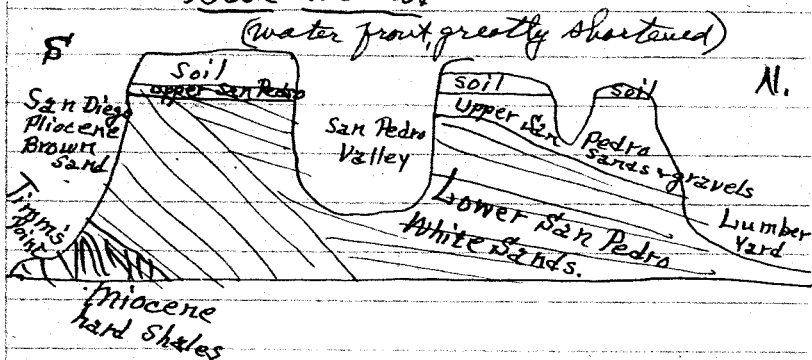
Upper San Pedro of Deadman Isl. 134 spp. Not as many as at San Pedro.

Post-Pleistocene

Kitchen middens at Deadman Isl., San Pedro, Santa Barbara, etc.

San Pedro.

(water front, greatly shortened)



S. end lowest terrace (bluff) looking N.E. from brownish loesses toward Timms Point, contorted Miocene shales overlaid by thin horizontal layers of upper San Pedro.

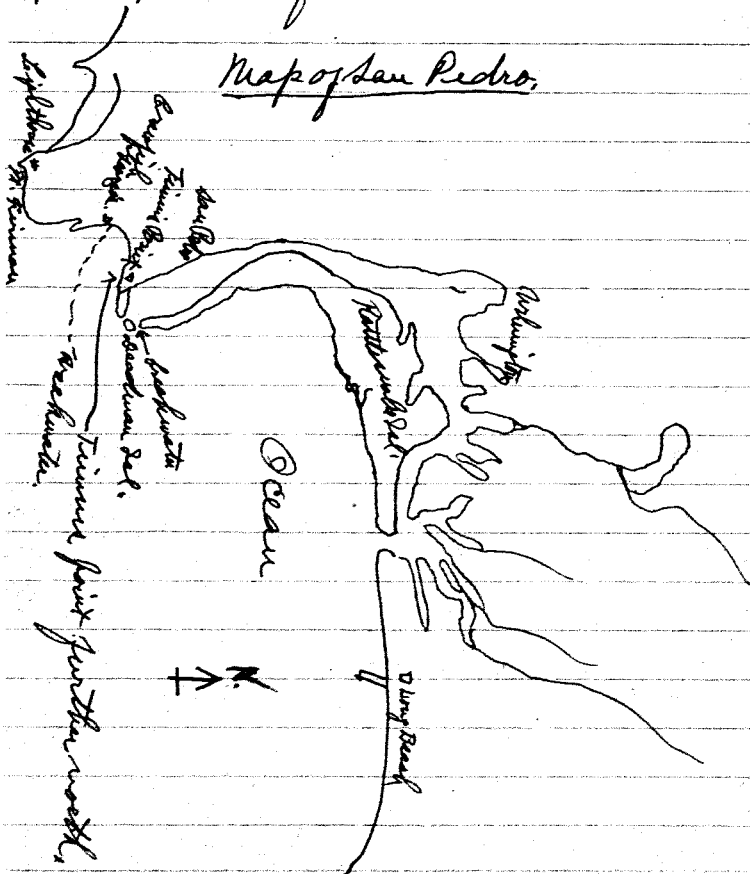
Lumber Yard bluff looking S.W. toward San Pedro Valley, upper and lower Pleistocene, unconformable. Upper soil is kitchen midden. Lumber Yard fauna more like that 200 or 300 miles further south shows change of climate.

Pliocene lithologically and faunally same as at San Diego. 28 Pliocene species at Timms Point. Pliocene also found at R.R. cut in bluff ⁱⁿ S.E. San Pedro, with a stratum filled with *Trapezium Thracia trapezoides*.

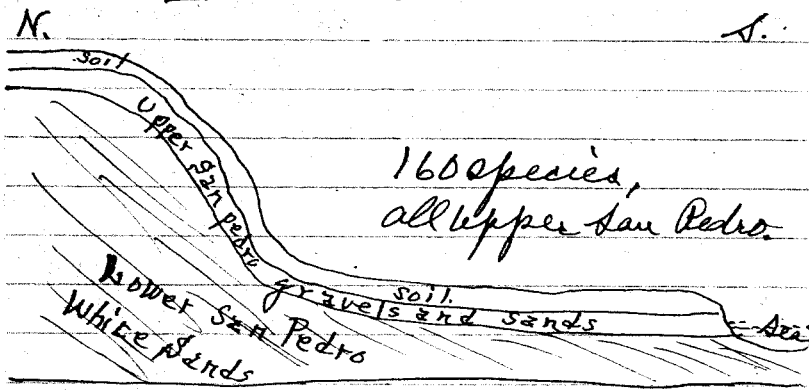
Lower San Pedro in bluffs, 140 species, including 14 not found on Madman Island.

Upper San Pedro - shallow P.R. cut at S.W. limit of San Pedro Terrace, 2 to 3 ft. bed of gravel with fossils, particularly in ravine cutting bluff at Crawfish Georges. 25-2 species, 14 $\frac{1}{2}$ now living at San Pedro, 15 only N. of San Pedro, 36 only S. of San Pedro, 24 extinct, 4 doubtful.

Map of San Pedro.



Las Cerritos.



160 species,
all Upper San Pedro.

Port Angeles, Santa Monica.

Hard sand beneath 100 ft. of soft sand
at mouth of canyon at end of large wharf.
16 species, Pleistocene.

Ventura.

Pleistocene, N. of Barlow ranch, 3 mi. E. of
Ventura, nearly to summit of "The Peak," 25-
ft. fossiliferous in many layers. 50 species.
Extends to nearly Peak 1000 ft or more high.

Port Harford.

R.R. cut at Fossil Point, with 6 foot
kitchen midden.

Pismo.

Miocene overlaid by San Pablo Neocene
unconformably, all capped by Pleistocene
brecciated shale.

Santa Barbara.

Packard Hill late Pliocene

Bluff W. of bath house Lower Pleistocene
I found apparently same bryozoan horizon
on S. end of Packard Hill ^{higher} than
Pliocene exposure on east face.

La Jolla.

Bluff capped by Pleistocene gravel
and sands.

Prof. W. E. Ritter, Director Biol. Station

San Diego.

Spanish Bluff, hard layer fossiliferous
Pleistocene forms beach at foot of bluff.

Pacific Beach, slightly tilted San
Diego Pliocene sands tone capped by
horizontal upper San Pedro gravels.

San Diego formation rests on
massive gravels and conglomerates
at Pacific Beach. Here San Diego
has a *Pecten expansus* and *Opalia*
varicosata horizon.

Foot of 26th St., upper San Pedro
formation in lower half of bluff, with
Anomia limatula horizon at base and
forming low reef on beach.

Pliocene, 2 faunal horizons, but one
stratigraphic unit.

Mollusca.

Gastropods. - *Cypraea spadiosa* - Brown cowry
Strophia vitellina, 1/2 in., heavy, smooth, aperture toothed.
Columbella nuxia, smaller, delicate
Onula deflexa, slender - var. *barbarensis*
Trinia calandri, large coffee bean, with dorsal canal
californica, small, no canal
Cornus californica

Loetteria planax - ^{gray striate} columella flattened by dissolution in
advance of growing whorl
" *seculata* - checked striate, smaller, grayish
gray, white bands of spiral columella not flat.

Melampus alivaceus, pear shaped, tide flat.

Lunatia heros - large Atlantic coast
Natica duplicata - small " "
Palynices lewisii - large, ridged mussel shell
" *reclusiana* - southern mussel shell, thick umbil.
isabramel.

Natica clausa - closed natica.
Novisica novisii - smooth, brown naticoid, green umbilicus
Pomaxanax nodosus - wavy top shell
Rhysianella compita - small Pheasant shell
epidermid obscured obsd in live shell.

Vermetus lituella - ill shaped, flattened cone, not colonial, rough 1/8 in.
V. " *squamigerus* - scaly worm shell

Acumaea spectrum - Ribbed limpet.
" *patina* - Plate limpet, nearly smooth, very fine striae
" *felta* - shield limpet, blunt ribs high conical, gray
or striped, internal brown stripe (marginal) and brown
central spot often.
" *aruni* - black limpet, black, conical, 1/4 in. long.
" *persona* - mask limpet, apex near terminal Δ , ribs
prominent, irregular, outside gray or mottled, inside
varying brown and white.
" *scabra* - file limpet, fine file-like riblets, variable light to
dark, usually white inside.
" *mitra* - white cap, white, conical thick.
" *incessa* - sea-speed limpet, small, dark brown,
horny, high-peaked Δ .
" *instabilis*, 7/8 in., narrower than *incessa*, smooth,
brown out and white in.
" *depicta* - Painted limpet, narrow, flat sides straight,
white with brown radiating lines, 6-12 m.m., southern
on grass at low tide.
" *palacea* - chaffy limpet, small, like last but narrower,
brown no stripes. Has a var. *triangularis*

Lothia gigantea - Oval limpet - low, apex terminal, largest on coast.

Fissurella valcano - Volcano limpet, striped with reddish

Fissurella aspera - Rough, conical, pumative oval, not narrower as in
valcano, ribbed, gray with dark purple rays

" *murina* - white key-hole limpet, smaller, more skiant,
oblong round-hole 1/3 from end, fine ribs
sheeted concentrically pure white, 15 m.m.

Luscapina ornulata - Great key-hole limpet, largest American sp.

Luscapinella cellomarginata - Southern K.K.S. - small, low, large oblong
hole, rough rays, white interior, gray or dark spot
anterior

Keyhole limpets continued

- Megatebernum bimaculata - smaller, hole large, dark rays on end making 2 white spots, northern
- Puncturella major - large white limpet, Behring sea.
- " galeata - elevated. Purple sordid
- " cuiculata - ribbed. " to Monterey
- " cooperi - Catalina Isl. - dorsal plate bet. pedicels + apex.
- Submarginella gatesii - Monterey, large trough from apex to margin outside its side.

- Haliotis fulgens - Green abalone - Southern, rather thin, low spiral ridges, interior mostly green, fine pearl scar, about 6 holes 6 inches.
- var. malacensis, from Kualala, Sonoma Co., longer, flatter, paler hue.
- " rufescens - Red abalone - outer layer projects over inner + makes fine red edge. Outside rough, holes large (3), prominent scar, 9 in, getting rarer.
- " crassirostris - Black abalone, smooth
- " corrugata - Corrugated abalone - size + color like rufescens but nearly circular, high arched, thick & tubercly, connected, 2 or 3 large holes, scar large and brilliant - Southern.
- " assimilis - Threaded abalone, deep water San Diego to Monterey, large one 4 in long x 3 1/2 wide, 7 holes, exterior threaded like tapestry carpet, moderate furrow below - holes high arched, reddish outside, inside smooth silvery, no visible scar, thick compact soft.
- " gigantea - Japanese abalone - Central California to Aleutian Islands, smaller southward, only 5 in. long - Thin shell, sharp edge, spine prominent surface uneven, 4 holes with high walls, interior very iridescent, light colors prevailing, scar not distinct.

Crepidula forficata - Atlantic coast.

- " ovata - Panama etc.
- " rugosa - Bali, largest on Bali coast, abundant
- " adumata - small, hooked beak brown, white deak.
- " navicelloides - white flat or irregular
- " lessonii - like navicelloides, but long, narrow, thickened by several layers partly detached at edges.
- " dorsata, small, flat, circular, thin, wrinkled, brown + white, deak partly detached.

" aculeata - low apex curved to one side, irregular radiating ribs, small, yellowish, white, southern.

Buccibulum spinosum - Cup and saucer

Calyptraea manillaris - Chinese hat - white, low conical, pointed, small, dark twisted, mostly northern

Cepulus californicus - like Brepidula adumata but no disk, white inside, brown, ^{epidural} outside, 4 or m. m.

Amalthea ~~abundant~~ antiquata - ancient hoopshell - rough, irregular, flat, apex at one end.

Amalthea craticoides - flat hoopshell - like last but still flatter apex near center

" turvens - much more regular, apex recurved radial lines crossed by growth lines, small

Calliostoma brunnescum - Brown turban. Brown, white about aperture, growth lines very oblique, umbilicus open, rather smooth.

" auriculatum - few spiral ridges, waved, gray or black, yellow umbilical stain

" montereyi - very rare

" pullis

" viridulum ligulatum, raised beaded spiral bands dotted with black.

" gellina - southern, mostly black, speckled with lighter.

" var. tructum - yellow at base

" funerale - Black turban - black or dark purple, umbilicus nearly closed, 2 teeth at base of columella.

Calliostoma, spp. raised often beaded lines, some spp. small.

Margarita - same as Calliostoma but smaller.

Olivella hiphcata - large

" urtica like above, smaller on fold on columella

" pedroana - tapering to spine.

Berithidea californica - on tideplate

Bulla gouldiana - Newport, Alameda, San Pedro.

Bivalves

- Platystrodon cancellatus* - swollen beaks, spoon shaped
tooth, finely cancellated exterior
- Mytilus californianus* - bony ribbed muscle
steeply, very small, numerous ribs.
- Modiolus capax* - red under epidermis - Terminal
recess - long, slender, fragile
- Septifer bicusatus* - divided ribs, beaks within beaks.
- Saxea laevigata* - beaks near end
- Saxea californica* - beaks more nearly central.
- Tegulus bifurcatus* - very narrow razor shell, beaks
central, very abundant.
- Siliqua lucida* - small, beak nearer end, rib vertical
within from beak to ventral edge
- Salen sicorius* - beak terminal.
- Saxea rosacea*
- Phacoides nuttallii* - finely cancellated
- Phacoides californicus* - nuttallii (Portuguese Bend)
- Mastra falcata*, 2 internal radiating ribs, long
triangular, small, sinus thick
- Mastra californica*, sinus shorter, wide, thus
- Mastra esolata* - Mexican (Cal. Pleist.) sharply triangular,
convex, elevatedumbo, sharp submarginal
pachyria ridge
- Mastra humphilli*, large triangular, sinus
- Mastra catidiformis*, oblong, large, sinus
- Tresus nuttallii*, very large oblong, spoon pit, big sinus,
beak near end - largest except *Tivola*.
- Heterodonta bimaculata* - small, purple rayed, brackish
water (at Alameda).
- Petricola* - irregular, rough, rock bosers
- Zirphaca crispata* - rough at one end, large common
- Peritella pentia* - small, not common
- Diplodonta orbella* - round, inflated.
- Metis alta*, big sinus double ridge posteriorly, abundant
- Senecle decisa* shape like above, rough, red at Terminal
- Lapidomus nuttallii*, heavy, prominent growth wrinkles
- Periploma planiscula* smooth, silky, spoon tooth, beaks
subterminal.
- Glycymeris intermedia* - Terminal dol. - many toothed.
- Cardium substriatum*, small, nearly obsolete ribs - Terminal
- Cardium quadrigarium*, large 40 ribbed, ribs tuberculate
on posterior angle

- " *procerum* - 22 subangular, smooth ribs, narrow grooves between - angle near anterior side.
- " *corbis* - 37 prominent, squarish, regular, close-set ribs, slightly reflex by growth lines - ribs less prominent and rounded towards posterior side.
- " *clatum* - numerous joint, square ribs, fine wavy growth lines - very large nearly smooth surface.
- Tivela stultorum* - large, heavy, short triangular sides.
- Cryptomya californica*, spoon tooth in one valve, shell small, oblong.
- Lime dehisca* - small, oblique, narrow winged, finely ribbed as in *Pteria*.
- Pecten squiculatus*, large, abundant. *P. circularis* now lives only S. of Cali.
- P. lobes*
- " *latioritis*, thin, round, common
- " (*Thinites*) *giganteus*, large, heavy, irregular.
- Anomia lampe*, radial ridges, common at Long Beach
- " *limatula* - southern, no radial sculpture.
- Ostrea luvide*, common
- " " *expansa* - circular
- " " *rufoidea* - red within
- Moria macrochisma* - like large heavy *anomia*, green within, muscle scar radial ribbed
- Chama etopyra*, sinistral from above, not pellucid
- " *pellucida* distal " " "
- Psammobia* - oblong, red raised, sharp cardinal tooth with vertical raised plate back of it.
- Macoma secta* - large, with horizontal plate back of cardinal tooth, sinus large & irregular, posterior external ridge - common
- " *nasuta* - smaller, no plate back of tooth, posterior point bent back.
- Chione succinata* - concentric ridges remote, prominent, lunule with growth lines and radial ribs.
- " *undatella*, concentric ridges more numerous & regular and more prominent than ribs, lunule not radially ribbed.
- " *fluctifraga*, surface blocked, no lunule, sinus small on this genus. cf. *nesti*.
- Raphia staminea*, concentric and radial ridges about equal, cancellation beautiful.
- " *rudrata*, concentric ridges much heavier than ribs
- " *tenuissima*, concentric & radial lines fine sinus on this genus very long.
- Amiantia callosa* - common, fine.

Wednesday, June 8, 1910.

Bright, hot day. I marched with the commencement procession to the cars and rode up to the Chautauque Grounds, then remained on the car instead of going to the Auditorium, and came down town to get ready to leave. I got my trunk off on the 8 a. m. train, checked to Los Angeles, and left on the 12:30 noon Interurban car.

Express on trunk to depot 25¢.

Round trip Santa Fe Boulder to Los Angeles \$57.30

Interurban Boulder to Denver 70¢.

Keiper Denver to Los Angeles \$9.50

Very hot afternoon on train, cool toward evening. Reached Colorado Springs at 6:30 and got dinner at depot, 70¢.

Changed cars at La Junta and got a very fine care, leaving at 10:45, making close connections, got to bed at 11 p. m., very tired.

Santa Fe Road

Thursday June 9, 1910.

Awoke at 6 p. m. somewhere in N. Mex. Had a fine night's sleep. Breakfast or dinner straw berries, wheat cakes, coffee and water 70¢. Lunch - fish, raspberries & ice cream & water \$1¹⁰/₁₀. About 2 p. m.

We were stopped at Grants, in Western Mexico by a wreck 7 miles ahead. Started on at 5:20, 2 h. 58 m. behind time. Dinner in diner American plan at 6 p. m. \$1⁰⁰/₁₀. Hot through day & cool breeze toward evening. Retired at 10 p. m.

Santa Fe Road June 10, 1910

Had a cool night and slept well. Arose at 6 a. m., having forgotten the change to Pacific time. Breakfast or dinner strawberries, farina, toast, coffee 35¢. Mrs. Ella Davis Roberts, of Denver, formerly of Telluride and a friend of Mrs. Rohrer and Mrs. La Forge, has the berth opposite mine. Her husband is a physician and druggist. Reached Los Angeles at 3:10 p. m., 40 minutes late. Nellie, Alice, Eva and Dr. Carter met me at train. Trunk did not

~~Our~~ arrival. Went out to Frauks and spent afternoon and evening, Dr. Carter soon leaving for Long Beach and we reached Long Beach about 10:45 p. m.

Long Beach, Saturday.
June 11, 1910.

Arose at 7:15 a. m. Bright, beautiful very comfortable. Dr. Carter and I walked up beach in forenoon and collected a few razor shells and Modiolas. In afternoon Nellie and I called on S. H. Underwood, justice of the peace, a U. of C. law school graduate. at 3 p. m. we and Dr. Carter ~~came~~ ^{went} to Los Angeles to visit my brothers and sisters.

Los Angeles, Cali. Sunday.
June 12, 1910.

Foggy morning, soon clearing up. Spent the entire day at Frank's house and returned to Long Beach in the evening.

Long Beach, Cali. Monday
June 13, 1910.

Foggy morning, cloudy most of the day, quite warm about noon. I got my trunk and unpacked it.

Santa Fe Time Card.

San Diego to Los Angeles

early morn

	AM	AM	AM	AM	PM	PM	AM
Li National City			7 50				8 30
San Diego			8 35		2 00		2 30
Pacific Beach			f 8 47		f 2 12		f 2 27
Linda Vista			f 9 02		f 2 27		f 2 46
Sorrento			f 9 11		f 2 37		f 2 57
Del Mar			9 23		2 47		f 3 10
Encinitas			9 38		3 00		f 3 25
Carl			f 9 51		f 3 19		
Oceanside			10 02		3 30		3 45
Las Flores			f 10 17		f 3 43		f 4 00
San Onofre			f 10 37		f 4 00		f 4 17
Mateo			f 10 47		f 4 08		f 4 26
Serra			f 10 57		f 4 15		f 4 36
Capistrano			11 02		4 21		4 43
El Toro			11 20		4 38		5 03
Irvine			f 11 27		4 46		f 5 15
Aliso			f 11 35		f 4 54		f 5 23
Santa Ana	7 15		11 45		5 02		5 30
Orange	7 20	9 30	12 01	5 25	5 13	5 23	5 40
Anaheim	7 28	9 47	12 09			5 37	5 60
Fullerton	7 33	9 52	12 15			5 47	5 56
Northam	f 7 43	f 9 59				f 5 54	f 6 05
La Mirada	7 46					f 5 57	f 6 08
Santa Fe Spgs.	f 7 53					f 6 06	f 6 17
Los Nietos	f 7 56					f 6 08	f 6 20
Rivera	f 8 00					f 6 11	f 6 25
Hobart	f 8 11					f 6 23	f 6 37
Ar Los Angeles	8 20	10 35	1 00	6 35	6 10	6 30	6 45

Long Beach, Cali.

Tuesday, June 14, 1910.

Clear and warm most of day. Dr. Barter and I, ^{in forenoon} walked nearly to Alamitos Bay and collected shells, etc. I took several pictures. In afternoon Nellie and I walked to northeast part of town to get photo of Signal Hill.

Long Beach, Cali., Wednesday,

June 15, 1910.

Clear most of day. In forenoon saw a "baby" elephant taking a bath in the surf. In afternoon tried a photo of San Pedro Hill from end of pier, using color screen. In evening we went to band concert, then developed photos.

Long Beach, Cali., Thursday

June 16, 1910.

cloudy morning. Harl Kittle with wife, Margie and Harlan, arrived ~~at~~ in their

auto at 10 a.m. and Dan McAllister, with wife and Marion, arrived on the electric car at 11 a.m. We all went to the wharf to see Little Hip, the young elephant, take his bath in the ocean. We all dined at noon at a cafeteria. At 3 p.m. we all went into the swimming pool and then into the surf. The Kittles and McAllisters all left at 6:45 p.m. in the auto.

Long Beach, Cali. Friday,
June 18, 1910.

Very fine day. I remained at the house most of the day, nursing a toe which I skinned in the swimming pool yesterday.

Long Beach, Cali., Saturday,
June 18, 1910.

Nelli cloudy morning. Arose at 6:45 a.m. Took ^{and} 9:30 train for E. San Pedro on Salt Lake Route. Train 10 minutes late. Fare one way 15¢ each. Ferry to San Pedro 5¢ each. Took Santa Rosa for San Diego, fare one

way #3⁰⁰ each, leaving San Pedro at 10:30 a.m. Boat is old and dirty. Sea rather calm. Saw fire and boat drill about 11:30 on upper deck. Had rather poor dinner at 12:45 p.m. (included in fare). In afternoon saw a school of sharks and a whale, but no more flying fish. Gulls left us after dinner. Picked up another lot off La Jolla. Reached San Diego at about 5 p.m. and went to Jewett Hotel, corner of 4th and A streets, a neat, clean place, good room for two at for \$1⁵⁰ per day. In evening we went to Garrick Theatre and saw "The Lion and the Mouse", a good play well presented. Supper at Opera Cafeteria for two 49 cts.

San Diego, Cali., Sunday
June 19, 1910.

Up at 8 a.m. Bright, hot morning. Breakfast at Adventist "Vegetarian Cafe," 30¢ for two. Walked W. to bay, then north along shore. Found only dead Chione succinea

and fluctifraga, Tagelus californicus,
Paphia sp., Ostrea lurida and var. effusa,
a very large Bulle gouldiana and num-
erous ^{small} berithidea californica. Returned
to hotel at noon, and at 1:30 dined at
Opera cafeteria, 58¢ for the two of us.
Cool seabreeze where not sheltered from
it. Fruit 45¢

San Diego, Cali., Monday
June 20, 1910.

Up at 7 a. m. Breakfasted in company
with C. S. Buckingham and mother at
Opera Cafe, 70 cts. for us two. Nellie &
I then caught the 8:23 a. m. car at
~~Go D~~ and 3rd sta. for Ocean Beach, at
N. end of Pt. Loma, arriving there about
9 a. m. Surf there as fine as we have
seen anywhere, several long white lines
of surf as we looked northward. We
collected some mollusks and crustacea,
but could only follow beach a short
distance, then had to take to the
bluffs. Precipitous bluffs (sea cliffs)
and rocky shore, deeply and sharply
channeled, did not succeed in

getting back to the beach ^{again} until we
reached Pt. Loma lighthouse. We
collected two species of land snails.
All along the fences W., N.W. and S.W.
of the Theosophy buildings we found
warnings against trespassing, but
kept straight on through. Fried beef
steak and made coffee at noon, Reached
lighthouse about ~~was~~ 2 p. m. and
were shown through by officer in
charge. Collected shells on the beach
there. at Ocean Beach the *Littorina*
~~littorina~~ ^{planatic} are very large. Left the
light house at 4:45, climbing the
hill by a trail and striking an old
road at the old Spanish lighthouse.
Further along the government is
building a boulevard, and the work
made walking very hard. Reached
Roseville at 7 p. m., very tired, and a
Mr. & Mrs. Eucky, in a tent, got us
a ham and egg supper for 70¢.
Got at car for San Diego at

8:35 and reached hotel shortly after nine. In air line our walk would be about 10 miles, but we really travelled about 15 miles, and they were very hard miles, crossing gulches, pushing through shrubbery and travelling in deep sand along the roadways, ~~and~~ and we carried heavy loads. Not sorry we went but glad we do not have to go again. The day has been ideal.

San Diego, Cali., Tuesday
June 21, 1910.

Up at 7:30, both rather sore. Breakfast at restaurant on 6th st. toast, coffee + cantaloupe 40¢ for the two of us. Fruit, bread and jelly for lunch 40¢. Left hotel at 9:30, got car at 5th + D st. for Ferry at 9:50, reached beach at Coronada Tent City at 10:30 and started down beach. Shells scarce. Lunched at noon. Partly cloudy, breezy. Went on at 12:45. Turned back at about 2 p.m. Then I walked to Spanish Bight and got a few fossil

Ammantia callosa and one fossil sand dollar at foot of bluff. We reached our hotel at 5:50 p.m. bar for to ferry from our hotel & back in evening 10¢ ^{each}. Ferry round trip 10¢ each. bar for from ferry to Tent City & return 10¢ each, total 60¢. Dinner at Opera Cafeteria for two 60¢. Then we went to Lohen Theatre and saw Little Hip, the "baby" elephant, perform.

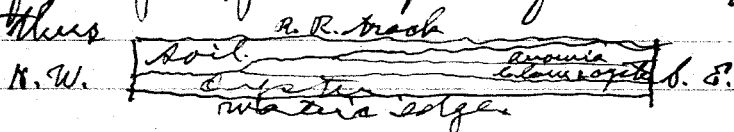
The ^{sand} spit on which Coronado is located is evidently a "raised beach." *Trivella stultorum* and *Donax laevigata* occur in great numbers in the sand dunes, with a few *Chione fluctifraga* etc. On the beach of the Ocean side found very few of the *Trivella*, more *Donax* and no *Chione*. at Coronado found 21 *Ammacia nitra* and several of the rough white keyhole limpets, one *Moschulus rectus*, several *Mytilus californianus*, a few *Scrupocuma planiscula*, *Macoma* sp., *Platydora cancellatus*, *Liriplaca crispata*, *Pecten latiauritus*. On the bay beach

we found Chione fluctipraga, Cerithidea,
^{abundant}Melampus olivaceus, a few Heterodonta
biaculatus and one or two Paplia sp.
Except at Tent City, the ocean beach of this
beach has no shells except Tivela and Douay

San Diego, Cali. Wednesday
June 22, 1910.

Awoke at 7 a.m. cloudy, soon
clearing. I breakfasted at Opera Cafeteria,
20¢, Nellie not being up yet. Then I
took car and ferry to 10th st., Coronado,
and walked to bluff N. of Spanish Right,
where I collected fossils at base of bluff.
Amiantia collosa and Dentalium spp.
were very abundant. Got quite a lot of
specimens. Started back at 12:30 m. Fossils
very abundant in a two foot horizon at base of
bluff, occurring in masses. Saw ~~not~~ ^{none} above.
At 2 p.m. Nellie and I had dinner at
Opera Cafeteria, 62¢. Nellie's breakfast 20¢.
At 3 p.m. we took Logan Heights car
on 5th for foot of 26th st., where we
collected Anomia, Ostrea, Dosinia etc.
Returned at 6:30 p.m. to hotel. At

foot of 26th st. ^{the} Anomia horizon is
~~12 or 15 ft.~~ 12 or 15 ft. above the water
 with a clam horizon lower down and
 an oyster horizon at the base, forming
 the beach of the bay. Up the beach,
~~W. W. of~~ ^{or so} we did not find any Anomia,
 the Pliocene bed having been eroded
 away and about 10 ft of loose soil
 forming the greater part of the bluff,
 thus



San Diego, Cali., Thursday
 June 23, 1910.

Up at 6:30. Breakfast at Opera cafe-
 teria, 55¢ for both of us. Cotton 15¢. Got
 a box and finished packing our specimens.
 The box contains only material from
 foot of 26th st., all fossil. The other
 material and a few 26th st. fossils
 fill one of the suit cases, the other
 containing our clothes. All these are

to be expressed to Long Beach.
Key for suit case 25¢ Tips to bellboys
for expressing stuff, etc. 50¢. Left on
9 o'clock motor car, corner of 4th. + ~~20~~ C, for
La Jolla. Two tickets for Braemar 60¢, but got
off at Pacific Beach and started south
to round the point which juts into the
False Bay. On east side of this cape we
found old hitabeu middens crowning the
bluffs, containing chiefly Pecten and Chione
but with very numerous Pomaulax nudosa.
At the point we struck a shell conglomerate,
mostly Douay laevigatus, probably Pliocene,
^{at base of bluff} and following around to ^{west} north side,
found it extending higher up the bluff
(dip being south) and containing great
numbers of sand stars, of which we
collected 60 or 70. At north end of
bluff we packed our stuff, the fossils
making one bag full. Also had a lot of
^{recent} land snails and Bulla gouldiana. Then
we ate dinner and took two pictures.
Continued due ^{west} ~~north~~ to the ocean and
turned north, where we found within a
short distance a Pleistocene horizon
containing many species, of which we

collected quite a lot. They were small ^{specimens}.
The strata dipped south. A few rods
further up the beach we found the
Pecten expansus and Opalia harison
and collected a lot. Proceeding ^{west} up
the beach ^{the} bluffs got higher and we
got into lower Whorizons, the dip being
perhaps 5 or 10° S., but no more fossils.
Got some recent Pomaulax unolosus.
Left the beach at Bird Rock and
walked to La Jolla, where we got a
room at Cabrilla Hotel at 5 p.m., very
hot and tired. Had a tremendous load.
At 6:15 p.m. we dined at the "Brown
Bear", \$1.00 for the two of us, after
dinner I wrapped our fossils and got them
ready for packing.

La Jolla, Colo., Friday

June 24, 1910.

Up at 7:20, breakfast at private boarding
house 60¢ for the two of us. We then

Walked to the ~~New~~ new marine biological station, a mile or two up the beach. None of the staff were there, so at 11 o'clock Nellie ^{started} went back to the hotel. I started later and caught up with her just as she reached town. We went to the old biological station, met Prof. Torrey, of the University of California, and Prof. Childs, of Chicago, Prof. and Mrs. Ritter not being there. At 12:30 we dined at the Crescent Cafe, in the bath house, 50¢ each. It was an excellent meal. Then we bought some ham, fruit and 4 cantaloupes for 65¢ and packed the specimens for shipment. At 3:30 p.m. we started down the beach and collected a large number of small specimens, including several species of limpets, and Lrepidula and Amalthea. Returned at 6 p.m. and turned our boxes over to Holston's Transfer Co. to be expressed by Wells Fargo Express tomorrow. Transfer charges 15¢. Lunched at Crescent Cafe, 75¢ including waiter. After lunch a local band played on a corner near the hotel. It was the worst music

I never heard. La Jolla is a beautiful place, with a number of fine homes. The sea cliff is very precipitous, with short stretches of sandy beach at the base. The sandstone is much faulted without ^{much} vertical displacement, and jointed, and along the fault and joint planes the waves have cut deep, narrow, sharply defined channels, some only two or three feet wide being 15 feet or more in depth and extending for 50 feet or more into the sea wall. There are numerous arches and caves from the same cause. Has been cloudy most of the day.

La Jolla, Cali., Saturday,
June 25, 1910.

Up at 6 a.m. Breakfasted at Crescent
Cafe in Bathhouse, \$1.00. Hotel bill \$3.00.
Started at 7:40 north with our packs.
after passing new Biological Station

the sea cliff is high and precipitous for miles, with an occasional ^{narrows} gulch opening back into it. Most of the way there is a beach. Only had to run around one point between waves. About 3 miles north of Biological Station we found many *Oral Limpete* on the rocks. A mile or two south of the Torrey pines we collected large, heavy fossil oysters which form several layers at the foot of the cliff and 30 to 40 feet above. I suppose they are Tertiary. Further down coast we had noticed a marked unconformity in the bluff. Lunched at 11:30 p.m. still cloudy. Took 2 pictures of the bluff with fossil horizon at base, then started on, reaching Del Mar at 3 p.m. and got room at Stratford Inn, ~~My *Hinnick's* Hotel.~~ I went to the postoffice store, packed the fossils, etc., in a box, addressed it and took it to the express office, where I left it in the hallway, the agent being absent. The postmaster promised to see that it is shipped. Got a 50¢ black and white striped shirt. My khaki coat is badly discolored from

the dye sweating out of my black suspenders. ~~There~~ We had dinner served in our room, as we looked too "stacky" to go into the dining room at so swell a place. Tip for bellboy 25¢. The inlet shown on the U.S. G.S. topographic sheet at the mouth of La Soledad Valley, which I feared would give us trouble, is not now an inlet at all. It seems above the highest tides and there was no water coming from the valley. Along the north edge of the valley the Santa Fe ^{R.R.} is grading a new line to run along the top of the bluff. Passed the Torrey pines before we knew it. Bloody all day.

Sel Mar, Cali, Sunday,
June 26, 1910.

Expected to stay here over Sunday. but the hotel is too fine for our rough and dirty khaki clothes, so concluded to go on. Had breakfast served in our room at 8:45. Nellie left for Oceanside

on the 9:23 a.m. train. Then I started
^{on foot} up the beach with my pack. Reached
Encinitas at 12:45 and went to the
Derby House for dinner. A very decent
looking village hotel. Del Mar Hotel bill
\$5.⁵⁰ and 25¢ for bellboy who brought our
breakfast. From Delmar to Encinitas
the most common shell was Sonax
laevigatus, next was Platydora cancel-
latus. Pecten latiauritus is also com-
mon and numbers of Pomanax un-
dosus occur - dead shells above high
tide. Other species were not common.
Cloudy again today. A fair country hotel
dinner 50¢. Found the same fossil
oyster horizon at base of sea cliff at
Encinitas that we collected from further
south yesterday. Nellie's fare Del Mar to
Oceanside 60¢. My fare Encinitas to Ocean-
side 40¢. Left Encinitas at 3 p.m. on
train. Nellie met me at depot and
took me to room she had found.
at 5:30 we supped at a restaurant,
70¢. Retired at 7:20 p.m., very
tired.

Oceanside, Cali., Monday,

June 27, 1910.

Arose at 6 a. m. Breakfasted at restaurant
70¢. Started south along beach at 7:10 a. m.,
without our packs. Sandy beach often up to
the foot of the sea cliff, though usually there
is a pebble gone above the sandy beach. In
the pebble gone we found many Pomaulax
undosum, with a few other shells. On the
sandy beach there were not many shells
except Sonax laevigata. Live Tivela stult-
torum are not uncommon. Reached Encin-
itas at 1:10, distance 12 miles. Dined at
Derby House, \$1.00.

Distances walked to present date:

Ocean Beach to Roseville via Point Loma	about ^{miles} 13.
Borovado Beach	12
Pacific Beach around bay shore to ocean	
thence to La Jolla.	9
at La Jolla	8
La Jolla to Del Mar	11
Del Mar to Encinitas (Nelle went on train)	7
Oceanside to Encinitas	12
	<hr/>
	74

Expenses up to present date:

Steamer fare to San Diego including dinner 6.00

Steamer fare to San Diego including dinner 6.00

Fare Long Beach to E. San Pedro	.30
Ferry E. San Pedro to San Pedro	.10
Breakfast at San Diego 49, 30, 5-8, 70, 45, 70, 70, 40, 40, 60, 40, 62, 55	6.89
Theater "The Lion and the Mouse"	.70
Fare San Diego to Ocean Beach	.50
Car and ferry fares at San Diego	1.50
Ice cream theater - "Little Hip"	.30
Booth	.15
Key for suit case	.15
Bell boys, tips for expressing suit case etc	.50
Fare San Diego to Racine (got off at Pac. A.)	.60
Hotel at San Diego (including laundry 40¢)	7.90
Meals at La Jolla 1.00, 60, 1.00, 75, 1.00	4.30
Transfer - express	.15
Hotel at La Jolla	3.00
Shirt	.50
Hotel at Del Mar including 50¢ for bellboys	6.00
Native fare Del Mar to Oceanside	.60
My fare Encinitas to Oceanside	.40
My dinner at Encinitas	.50
Meals at Oceanside 70, 70, 15, 70	2.25
Dinner at Encinitas	1.00
Fare Encinitas to Oceanside	.80
Ice cream, postcards, string	.35

Left Encinitas for Oceanside on 3 p.m. train, fare 80¢, supper at restaurant 70¢, ice cream and postcards 30¢, sunshine for a little while in afternoon. Retired at 7:30.

Oceanside, Cali. Tuesday.
June 28, 1910.

Up at 7:10. Breakfast at restaurant 70¢. Started north without packs at 8:45. Shells not numerous. Lunched at noon about 4 miles up beach. Lots of fragments of Polynicea lewinii, but not one good specimen. Fruit etc. for lunch 15¢. Left beach and walked S. to a station, but found it was Stuart, not a regular

flag station, so had to walk about 3 miles N. to Las Flores to be sure of a train. This is a regular ^{flag} station. It made the total distance walked today fully 12 miles. The beach was the same as from Del Mar to Oceanside, gentle sandy slope headed by a coarse pebble or boulder stretch at foot of bluff. These pebbles are from 2 to 6 inches in diameter, piled into a steep wall. Where valleys break through the cliff, fine barrier bars of boulders have been formed all along this coast and in some places several parallel narrow bars. Got a train back at 4:42. There was a noticeable absence of Pomaulax undosus. Fragments of Polynides lewisii abundant. Supper 70¢ Hot salt bath 50¢ Ice cream, candy and lemonade 55¢ Nails 5¢ ~~Box~~ bottom and paper tablet 25¢ Packed 2 boxes of specimens. Retired at 9 p.m.

Oceanside, Cali., Wednesday.

June 2

June 29, 1910.

Up at 7:30. Supper 70¢ Fixing shoes 10¢ Took 10:02 train for Las Flores 50¢.

Sun shining hazily this forenoon. Left
on ~~10:02~~ 10:02 a.m. train for ^{Las Flores} San Anofre,
fare 50¢. At Las Flores we started up
the track, then crossed on a wagon road
to the beach, then north up beach. Shells
not abundant except *Douay laevigata*,
which thickly strewn the beach. Good
walking for first half, after which the
beach became steep and of soft sand, the
hard beaten sand being covered by the
surf, but with a good cow trail for
the last two miles at the foot of the
cliff. Cliff nearly vertical, with hard
sandstone unconformably overlaid
by coarse conglomerate about 100 feet
thick, with some deep gulches dissect-
ing it. The last 2 miles *Douay* disappeared
but *Chione* were fairly common. Found
2 colonies of rock boring pelecypods.
Reached San Anofre at 3:16 p.m. having
left Las Flores station at 10:30 a.m.
and stopped about 45 minutes for lunch.
Caught the 4:28 ~~am~~ train from San Anofre
to Oceanside, ^{\$1.10}. Got a boy to finish
packing our specimens 5¢. We are
also expressing some clothes, paying

pan, etc., to lighten our packs. We now have 4 boxes packed for shipment from here. Supper at restaurant 70¢. Ice cream, lemonade and candy 50¢. After supper we called on Mrs. Fulton and her daughter and son-in-law, Mrs. and Mrs. Sloan. Clear at bedtime.

Oceanside, Cali., Thursday.

June 30, 1910.

Up at 7 a.m. cloudy, soon clearing. Breakfast at restaurant 70¢. Fruit, sardines, etc., for lunch 45¢. Express on 4 boxes, 110 pounds, to Long Beach \$1.⁴⁰. Mrs. Maggie Stoker, room for 4 days \$2.⁰⁰. Tickets to San Onofre \$1.¹⁰. Between Cas Flores and San Onofre we passed through a bean field several miles long and extending from the sea cliff at least half a mile back. Left Oceanside at 10:16^{am} - 14 minutes late. Reached San Onofre at 10:43 and started up beach with packs on our backs.

Better beach for walking than yesterday but shells scarce. Very few *Donax* or *Platystrophia*. About 2 miles up there are boulders harboring many ^{marine} snails.

Found one live *Pomanalax undosum*, very large. Lunched opposite San Mateo rocks at 12:30, starting on at 1:05. The tide forced us up the beach to the steep, soft sand, and as there were no shells we finally took to the railroad track and wagon road, which parallel the shore along the flat which intervenes between the sea cliff and the shore. This flat extends from San Onofre to Serra, running from a few rods to several hundred yards in width. Reached Serra (San Juan) at 4 p. m. and went up the valley nearly to Capistrano (which is 3 miles from Serra) where we stopped for the night at the ranch of Mr. Barnes. This is a beautiful valley, devoted chiefly to walnut growing and appears quite productive. It has been a hot, bright day, but with a fair seabreeze along the shore.

Capistrano, Cali., Friday,
July 1, 1910.

Up at 6:45. Cloudy, clearing about
10 a. m. At 8:30 Mrs. Barnes took us in
the wagon to Lana Point, where we reached
the beach at 9:30 and began our tramp
up the beach at low tide. Collected a
great deal of small stuff, mostly gastro-
pods. Only a few chitons and no large
limpets. Pomaulx undosum not common.
About 6 miles south of Laguna ^(at 3 arches) we had
to leave the beach and take to the road
back on the bluffs on account of inability
to pass the numerous rocky points
and the great labor of carrying the packs
up and down the bluffs. Reached Laguna
Beach at 5 p. m. and got a room at the
hotel. Very tired. Retired at about 8 p. m.

Laguna, Cali., Saturday
July 2, 1910.

Up at 7 a. m. cloudy, cool. Shipped
my big pack full of stuff by auto stage

(thence by express) to Long Beach, to lighten our load. Charges 25¢. Started on foot at 8:30 a.m. Beach rocky, but we only had to leave it and climb the cliffs twice, first to pass Abalone Point, and then a mile or Laguna, ~~later~~ ^{two} below the entrance to Newport Bay. Reached the ferry at 3:13 p.m. Few bivalves yesterday or today except Mytilus, Chama and Lucina, and few Brucibulus irapidula rugosa or Brucibulus, but at approach to Newport Bay we found the same fauna as at Long Beach. Caught the 4:05 p.m. car for Los Angeles at 4:20, 15 minutes late, changing cars at Laferia, to the Redondo Ave. car, and arriving at Long Beach at about 5:10, fare 70¢ Hotel at Laguna \$3.00.

Distance walked, continued from June 27⁵ miles

Brought forward	74
Encinitas to Oceanside	12
Oceanside to Las Flores with extra 4 mi.	12
Las Flores and to San Onofre	10
San Onofre to Bapistrano	12
Bapistrano to Serra rode in wagon	—
Serra to Laguna	12
Laguna to Balboa	10
Total	142

• Refunded $\frac{5}{3.10}$ express to Dr. Carter.

Expense of San Diego trip continued:

Brought forward from June 27	\$45.34
Meals at Oceanside 70, 15, 70, 55, 70, 70, 50, 70, 45	5.15
Baths at Oceanside 50, 50	1.00
Paper tablet 25¢ nails 5¢ box 5¢	
Fare Oceanside to San Onofre Pastelora	.50
" San Onofre to Oceanside	1.10
Room at Oceanside 4 days	2.00
Express on 4 boxes	1.40
Fare Oceanside to San Onofre	1.10
Express on pack from Laguna (stage)	.25
Hotel at Laguna	3.00
Fare Balboa to Long Beach	.70
Express on boxes from San Diego, etc.	3.10
	<u>\$64.84</u>

Found ^{sister} Albee and her friend, Miss Brookman, staying at the Krosnest.

Los Angeles to Santa Ana and San Diego

STATION	MILES	No. 81 Daily	No. 71 Daily	No. 77 Daily	No. 73 Daily	No. 75 Daily	No. 79 Daily	
lv. Los Angeles	0	7.30AM	8.55AM	10.55AM	2.15PM	5.05PM	12.01AM	
" Hobart	3.4		f 9.03	f 11.02		f 5.12		28.3
" Bandini	7.6		f 9.10			f 5.19		
" Rivera	10.0		f 9.14	f 11.12		f 5.23	f 12.15AM	
" Los Nietos	12.0		f 9.18	f 11.16		f 5.26	f 12.21	54.4
" Santa Fe Springs	13.3					f 5.28		
" La Mirada	17.6		f 9.27	f 11.24		5.35	f 12.30	
" Northam	19.4		f 9.30	f 11.27		f 5.39	f 12.33	
" Fullerton	23.9	8.08	9.38	11.35	2.55	5.47	12.42	
" Anaheim	26.7	8.13	9.47	11.41	3.01	5.54	12.50	
" Orange	31.5	8.25AM	10.03AM	11.55AM	3.15	6.08	1.03	18.9
" Santa Ana	34.4		10.10		3.23	6.15PM	1.10	
" Aliso	36.4		f 10.15		f 3.28			
" Irvine	41.9		10.25		3.40		f 1.30	
" El Toro	42.0		10.35		3.50		f 1.45	
" Gallivan	46.0		f 10.42		f 3.58		f 1.52	
" Capistrano	56.1		10.49		4.08		f 2.00	
" Serra	58.7		f 10.57		f 4.15		f 2.06	
" Mateo	62.8		f 11.04		f 4.22		f 2.14	
" San Onofre	67.6		f 11.13		f 4.28		f 2.23	
" Las Flores	77.6		f 11.28		f 4.42		f 2.40	
" Oceanside	85.1		11.45		5.00		2.55	
" Carl	88.2		f 11.50		f 5.05		f 3.05	
" Encinitas	97.0		12.05PM		5.20		f 3.25	
" Del Mar	103.5		12.18		5.35		f 3.45	
" Sorrento	108.0		f 12.28		f 5.44		f 3.53	
" Linda Vista	111.9		f 12.41		f 5.58		f 4.04	
" Selwyn	113.4		f 12.44		f 6.00			
" Pacific Beach	119.7		f 12.55		f 6.12		f 4.17	
lv. San Diego	126.0		1.10PM		6.30		4.30	
lv. National City	132.0				6.50PM		4.55AM	

San Diego to Santa Ana and Los Angeles

STATIONS	MILES	No. 78 Daily	No. 76 Daily	No. 72 Daily	No. 74 Daily	No. 70 Daily	No. 80 Daily	No. 82 Daily
lv. National City	0.0			7.50AM		1.30AM	3.5	
" San Diego	8.5			8.35	2.00PM	2.15		
" Pacific Beach	12.3			f 8.47	f 2.12	f 2.27	46.9	
" Ladrillo	13.8			f 8.50	f 2.15	f 2.30		
" Selwyn	18.6			f 8.59				
" Linda Vista	20.1			f 9.02	f 2.27	f 2.47		
" Sorrento	23.9			f 9.11	f 2.37	f 2.57		
" Del Mar	28.5			9.23	2.47	f 3.10		
" Encinitas	35.0			9.36	3.00	f 3.25		
" Carl	43.8			f 9.51	f 3.19			
" Oceanside	46.9			10.02	3.30	3.45	54.9	
" Las Flores	54.4			f 10.17	f 3.43	f 4.00		
" San Onofre	64.4			f 10.37	f 4.00	f 4.17	46.9	
" Mateo	69.2			f 10.47	f 4.08	f 4.26		
" Serra	73.3			f 10.57	f 4.15	f 4.36		
" Capistrano	75.9			11.02	4.21	f 4.43		
" Gallivan	81.0			f 11.11	f 4.29	f 4.53		
" El Toro	85.0			11.20	4.38	f 5.03		
" Irvine	90.1			11.27	4.46	f 5.13		
" Aliso	95.6			f 11.35	f 4.54	f 5.23		
" Santa Ana	97.6	7.15AM		11.45	5.02	5.30		
" Orange	100.5	7.20	9.30AM	12.01PM	5.13	5.40	5.25AM	5.23PM
" Anaheim	105.3	7.28	9.47	12.09		5.56		5.37
" Fullerton	108.1	7.33	9.52	12.15		6.05		5.47
" Northam	112.6	f 7.43	f 9.59AM			f 6.08		f 5.54
" La Mirada	114.4	7.46				f 6.17		f 5.57
" Santa Fe Springs	118.7	f 7.53				f 6.20		f 6.06
" Los Nietos	120.9	f 7.56				f 6.25		f 6.11
" Rivera	122.0	f 8.00				f 6.30		f 6.15
" Bandini	124.4	f 8.04				f 6.37		f 6.23
" Hobart	128.6	f 8.11				f 6.45AM	6.35AM	
lv. Los Angeles	132.0	8.20AM	10.35AM	1.00PM	6.10PM	6.45AM	6.35AM	6.30PM

Long Beach, Cali. Sunday,
July 3, 1910.

Bright day. We stayed home all day except to go out for dinner. In evening we went down to the water front. Found tide high, with heavy surf. The pier and "roller coaster" are so much damaged that they have been closed by the city authorities.

Long Beach, Cali. Monday,
July 4, 1910.

Bright and hot all day. A noisy Fourth of July here, and big crowd. Brother Henry came down and Nellie and I went to the tennis tournament with him in afternoon. Found Frank there and later Alice and her friend joined us at our rooms and all went to dinner together at Thoup's, afterwards watching the fireworks. A section of the pier was carried away by the heavy seas in the late afternoon. The news of Jeffrey's defeat by Johnson was received in

the afternoon. I suspect that this may be the last big American prize fight. Folke returned to Los Angeles on late car.

Long Beach, Cali., ~~Monday~~ ^{Tuesday}
July 5, 1910.

Bright morning. I took a picture of the damaged pier. In afternoon I walked to Alamitos bay and back, collecting some shells. Very hot. In evening developed pictures.

Long Beach, Cali., ~~Tuesday~~ ^{Wednesday}

Very bright and hot.

July 6, 1910.

In afternoon Nellie and I went to Mira Mar, east of town, for fossils. Last year we collected Pleistocene fossils at the foot of the bluff east of the easternmost stairway. Collected some more at the same place. Also, west of the stairway we found a similar horizon, probably contemporaneous, full of fossils, underlain by a great bed of oysters, two or three feet

in thickness and partially cemented together. Collected a fine lot. Still warm at bedtime

Long Beach, Thursday,
July 7, 1910

Another bright, hot day. In afternoon Nellie and I went to Terminal Island on the 2:14 Salt Lake train, returning at 6:30. Got a fine collection of shells. Fore 50¢

Long Beach, Friday
July 8, 1910.

First cloudy morning for a week. In afternoon Dr. Carter and I went to Terminal Island and got a very fine lot of shells, including Cardium, etc. Mrs. Neil Lagard, of North Dakota gave us some fine specimens, and Mrs. Louisa Shattuck of Terminal Island gave us some of the delicate shells not to be found usually on the beaches. During our absence the Richetta girls called on

Nellie, fine, cool day. Got a new suit
of clothes, \$25.⁰⁰. Fare to Terminal + return, 50¢
for two.

Long Beach, Saturday
July 9, 1910.

Fine day. Stayed at the house nearly
all day.

Long Beach, Sunday
July 10, 1910.

Cloudy morning, soon clearing. Beau-
tiful day. ~~For~~ Nellie and I went to Los
Angeles on 10 a.m. flyer and spent the
day at Frank's. Reached Long Beach at
9 p.m. Have had swollen gums yester-
day and today. Have been treating them
with diopygen and compound tincture
of benzoin.

Long Beach, July 11, 1910. Monday.

Beautiful day, fine, cool breeze. Nellie
+ I went to Alamitos in afternoon and
got a good collection, also took a row
on the bay. The oysters from the bay

appear to be all of the circular form
O. l. expansa, while those on the
ocean side are the long form O. lurida.

Long Beach, Cali., Tuesday
July 12, 1910.

cloudy morning. I arose at 5 a. m.
and walked to Mira Mar. Tide was
low and I got some fine specimens,
including a very large hermit crab in
shell of Polynices lewisii, flexible
corals, several moonshells (P. lewisii)
etc. Met a doctor from Harvard, Neb.,
on the beach, who assisted me to get
a big fossil Cardium quadrigarinum
half way up the bluff. Returned about
9 a. m. and spent balance of forenoon
preparing and packing the material
collected this morning. Cleared up
before noon. John Kennedy, wife and
daughter called in forenoon, having just
arrived from Pomona. Saw D. E.
Sobbins at Kameha Cafeteria at

noon. In afternoon Nellie and I went to Los Angeles. I got some dry-plates. Nellie called on Mrs. Kerr and her mother and we returned on evening train. After supper we went to band concert with the Kennedys.

Long Beach, Wednesday
July 13, 1910

Cloudy morning. Cleared up before noon. In forenoon Nellie and I went into the ocean ^{and plunge} with the Kennedys. In afternoon Dr. Carter went to Los Angeles, returning in evening, and Kennedys supped here. Skinned my knuckles and foot diving in the plunge. Had teeth scraped at dentist's.

Long Beach, Thursday
July 14, 1910.

Cloudy, clearing in forenoon. Foot quite sore, so I stayed home most of day and studied Spanish.

"Salt Lake Route"

	Mixed	Motor	Sunday	Pass'r	Motor	Pass'r	Motor	Pass'r	Sunday
Lv Los Angeles...	5.45 AM	6.45 AM	8.10 AM	8.50 AM	10.50 AM	1.30 PM	3.45 PM	5.30 PM	11.30 PM
Lv 4th St. Los A.	5.46 AM	6.46 AM	8.12 AM	8.52 AM	10.52 AM	1.32 PM	3.47 PM	5.32 PM	.....
Lv Hobart.....	5.50 AM	6.50 AM	8.15 AM	8.56 AM	10.56 AM	1.36 PM	3.51 PM	5.36 PM	.....
Lv Bells.....	.....	6.54 AM	.....	9.00 AM	11.00 AM	.....	3.55 PM	.....	.....
Lv Cudahy.....	5.57 AM	6.57 AM	8.22 AM	9.03 AM	11.04 AM	1.43 PM	3.59 PM	5.43 PM	.....
Lv Workman....	6.00 AM	7.00 AM	8.24 AM	9.06 AM	11.07 AM	1.46 PM	4.02 PM	5.46 PM	11.45 PM
Lv Clearwater..	6.04 AM	7.04 AM	8.28 AM	.....	11.12 AM	1.52 PM	4.07 PM	5.49 PM	11.48 PM
Lv Hynes.....	6.06 AM	7.05 AM	8.32 AM	9.11 AM	11.14 AM	1.55 PM	4.09 PM	5.51 PM	11.49 PM
Lv 1st St. Long B	6.25 AM	7.17 AM	8.44 AM	9.25 AM	11.28 AM	2.10 PM	4.24 PM	6.04 PM	12.01 AM
Lv Long Beach	6.29 AM	7.19 AM	8.47 AM	9.30 AM	11.32 AM	2.14 PM	4.28 PM	6.07 PM	12.05 AM
Lv Brighton Bch	.....	7.27 AM	8.54 AM	9.40 AM	11.41 AM	2.22 PM	4.37 PM	6.15 PM	12.11 AM
Lv Terminal Is..	6.42 AM	7.31 AM	8.58 AM	9.45 AM	11.45 AM	2.25 PM	4.41 PM	6.20 PM	12.13 AM
Ar E. San Pedro	6.45 AM	7.35 AM	9.00 AM	9.50 AM	11.50 AM	2.30 PM	4.45 PM	6.25 PM	12.15 AM
Ar San Pedro...	6.50 AM	7.40 AM	9.05 AM	9.55 AM	11.55 AM	2.35 PM	4.50 PM	6.30 PM	.....

Steamers for Catalina Island leave E. San Pedro (Salt Lake Route dock) 10.00 AM daily and on and after July 5th at 3.00 PM week days and 6.00 PM Saturdays.

SALT LAKE

ALL TRAINS DAILY UNLESS OTHERWISE SHOWN

GOING EAST	Pass'r	Motor	Pass'r	Motor	Pass'r	Motor	Week Days	Sunday	Sunday
Lv San Pedro...	7.05 AM	7.55 AM	9.45 AM	2.10 PM	4.00 PM	5.05 PM	5.55 PM	6.55 PM	8.55 PM
Lv E. San Pedro..	7.10 AM	8.00 AM	9.50 AM	2.15 PM	4.05 PM	5.10 PM	6.00 PM	7.00 PM	9.00 PM
Lv Terminal Is..	7.13 AM	8.03 AM	9.53 AM	2.18 PM	4.08 PM	5.12 PM	6.02 PM	7.02 PM	9.02 PM
Lv Brighton Bch	7.15 AM	8.06 AM	9.56 AM	2.22 PM	4.11 PM	5.14 PM	6.04 PM	7.04 PM	9.04 PM
Lv Long Beach	7.25 AM	8.14 AM	10.05 AM	2.30 PM	4.20 PM	5.21 PM	6.13 PM	7.13 PM	9.13 PM
Lv 1st St. Long B	7.29 AM	8.18 AM	10.09 AM	2.34 PM	4.24 PM	5.24 PM	6.16 PM	7.16 PM	9.16 PM
Lv Hynes.....	7.45 AM	8.32 AM	10.25 AM	2.48 PM	4.40 PM	5.38 PM	6.28 PM	7.28 PM	9.28 PM
Lv Clearwater....	7.47 AM	8.35 AM	10.27 AM	2.50 PM	4.42 PM	5.40 PM	6.30 PM	7.30 PM	9.30 PM
Lv Workman....	7.52 AM	8.40 AM	10.32 AM	2.54 PM	4.47 PM	5.46 PM	6.33 PM	7.33 PM	9.33 PM
Lv Cudahy.....	7.55 AM	8.43 AM	10.35 AM	2.57 PM	4.50 PM	5.50 PM	6.37 PM	7.37 PM	9.37 PM
Lv Bells.....	.....	8.48 AM	.....	3.00 PM	4.53 PM	5.54 PM	.....	.....	.....
Lv Hobart.....	8.02 AM	8.56 AM	10.42 AM	3.05 PM	4.57 PM	5.59 PM	6.44 PM	7.44 PM	9.44 PM
Ar 4th St. L. A...	8.08 AM	9.01 AM	10.48 AM	3.12 PM	5.03 PM	6.07 PM	6.48 PM	7.48 PM	9.48 PM
Ar Los Angeles...	8.10 AM	9.03 AM	10.50 AM	3.15 PM	5.05 PM	6.10 PM	6.50 PM	7.50 PM	9.50 PM

Long Beach, Cali.

Friday, July 15, 1910.

Bright, clear morning and hot forenoon. On account of sore foot I stayed home all forenoon studying Spanish. In afternoon Nellie and I went to Santa Ana via Watta, to visit the Kittles, reaching there at 4:40 p.m. Hot day.

Santa Ana
~~Long Beach, Cali.~~ Saturday

July 16, 1910.

Bright and hot all day. Unvoiled roads very dusty. The Kittles had the strokes over to breakfast in honor of Nellie's birthday.

In afternoon we all went to Kittles' ranch in the auto. In evening the women went to a motion picture show and Harl and I stayed at Carl Strocks' store and listened to the phonograph.

Santa Ana
Long Beach, Sunday,

July 17, 1910.

Bright morning, but became cloudy by

7 a. m. - "high fog," they call it in California, where they do not admit "cloudy" days. Heard thunder during forenoon. Dined at Strick. Started for Long Beach at 6:05 p. m. While at Santa Ana we saw a 17000 acre beanfield on a 100,000 acre ranch.

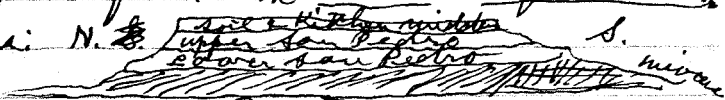
Long Beach, Cali., Monday
July 18, 1910.

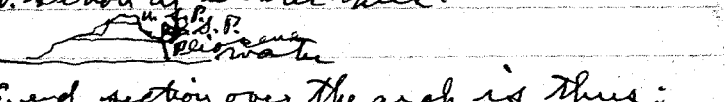
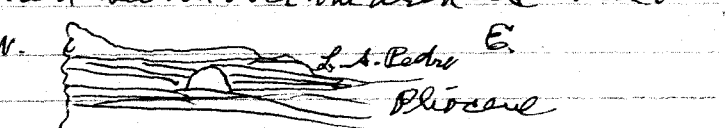
From 6:45 to 8 a. m. one peal of thunder followed another in rapid succession. at 7:30 it began to rain, continuing until after 10 a. m. and sprinkling fitfully until nearly noon. Afternoon said to have been the first July rain here for 16 years. afternoon clear. I remained at home all day nursing my sore foot. In evening Dr. Mabie, a Baptist minister who has at different times been located at Rockford, Boulder and Marshalltown the only towns in which Nellie has lived, called to spend the evening.

Truly, this is a small world, after all. Here he is now, temporarily located in the same town with her in another state, making 4 tours in 4 states.

Long Beach, Cali., Tuesday,
July 19, 1910.

Bright, hot morning. Arose at 7 a.m. started for East San Pedro on 9:30 a.m. Salt Lake train, ^{Nelly, the Ricketts girls and J.} Got boat from La Barge, and rowed to Deadman Isl. at ladder on ~~the~~ ^{N.} end of Island the lowest bluff is Pliocene, the slope is Lower, ^{San Pedro} Pleistocene unconformable on Pliocene, upper bluff is Upper San Pedro Pleistocene, above which is soil, in places filled with *Pecten* *acquistulatus* there: N. ~~to~~ ^{see entire middle} ~~to~~ ^{upper San Pedro} ~~to~~ ^{lower San Pedro} S.


Miocene underlies Pliocene at west end of bluff
E. + W. section at ladder there:


at S. end section over the arch is there:
W.  E.
L. S. Pedro
Pliocene

I believe Arnold reports *Pecten requiescens* a common fossil in the upper San Pedro formation at Deadman Island. I searched all the formations and did not find a single specimen of it in place in any of them except the kitchen middens of the soil layer at the top. They were abundant on the slopes ~~also~~ and at the base of the bluffs, but had quite evidently fallen and slid down from the middens. Found nothing in the Miocene. Returned to Salt Lake station at East San Pedro at 5:15 p. m. Very hot here, but breeze on ^{Deadman} the Island. Round trip fare for 4, \$1.00, boat 1.00.

Long Beach, Calif., Wednesday.
July 20, 1910.

Up at 7 a. m. Started for San Pedro on 9:30 San Pedro ^{electric} car, arriving there at 10 a. m., fare one way 15¢ each. Very hot, bright morning, where protected from the breeze, but fine breeze. At 10:30 took a car and rode nearly to Point Firman, beyond end of jetty. Then walked back to Crawfish Georges, where we collected.

Pleistocene fossils in the ravine. Reached the Pacific Electric Station at 2:45 and took 3:10 p.m. car for Long Beach. In evening attended band concert at auditorium.

Long Beach, Cali., Thursday,
July 21, 1910.

Bright, hot morning. Nellie and I and the Ricketts girls took the 9:30^{a.m.} Salt Lake train for East San Pedro, where at 10:15 we started on launch Camignin for Portuguese Bend, reaching there at ~~11:45~~ 11:45 a.m. After a fine fish dinner I went to Moonstone Beach and collected sea urchins, etc. The large Owl limpets seem to occur only where the waves splash. Started back at 4:15 p.m. Several were sea-sick both ways, including Nellie. After supper at Shoup's Restaurant I cleaned the urchins.

July 22, 1910
Long Beach, Cali., Friday
Warm day. In forenoon I went to Los Angeles to have plates developed, as the warm sulphurous water of Long Beach is

not fit for developing. In evening Nellie & I attended band concert.

Long Beach, Cal., Saturday
July 23, 1910.

Warm day. Nellie & I went to Los Angeles in forenoon to remain over Sunday with Frank and the girls. I engaged sleeper for Santa Fe for next Friday night. 5.

Long Beach, Cal., Sunday
July 24, 1910.

Spent the day quietly at Frank's house reading "Anne of Green Gables". We all returned to Long Beach in evening and Nellie and I attended the band concert.

Long Beach, Cal., Monday
July 25, 1910.

Pleasant day. I stayed at home most of the day nursing my sore foot.

Long Beach, Cali., Tuesday
July 26, 1910.

cloudy morning, as usual, soon clearing. In forenoon I had Dr. Sellery examine my sore foot. He said there is no puss under the new skin, but he put on an iodine pad to stimulate the sore and advised boracic acid dressing covered with rubber cloth to retain moisture and heat, lying down with foot raised to aid ~~in~~ prompt return of blood from foot to heart. So afternoon I stayed in all day lying down with foot bandaged.

Long Beach, Cali., Wednesday,
July 27, 1910.

cloudy morning, soon clearing. A. E. Wilbur called in forenoon. I finished packing the specimens and shipped 11 boxes to the University via Salt Lake Route, cartage 50¢ freight \$12.⁵⁶. Frank and his wife and Henry came over from Los Angeles and spent the evening with us.

Long Beach, Cali. Thursday
July 28, 1910.

Fine cool morning, breezy, cloudy at first, soon clearing. Sent my trunk to Los Angeles on morning "Salt Lake" train. In afternoon we all went to Denver. I got my ticket validated, rechecked my trunk to Santa Fe, ~~and returned~~ ^{and we} dined at Franks house, returning to Long Beach on the 10 p.m. car.

Long Beach, Cali., Friday
July 29, 1910.

A beautiful morning, cool and breezy. At 3 p.m. ~~the~~ Nellie and I took the Pacific Flyer for Los Angeles, Dr. Carter coming later. Went out to Frank's house. Took the 8 p.m. train on the Santa Fe Road for Santa Fe. Got ticket from Lamy to Santa Fe yesterday ^{so} to check my ~~bag~~ trunk ~~was~~ clear through, 75¢. Validation fee on my return ticket 50¢.

I left Los Angeles at 8 p.m., got fine cool breeze.

Bagdad, Cali., Saturday

July 30, 1910.

Breakfasted here at 6 a. m., 1½ hours late. Cloudy and hot. Started on at 7 a. m. Breakfast 50¢ fruit 25¢. We are going through a region of dissected lava flows, the mountains being abrupt, with broad fans of broken rock, gravel and sand occupying the valleys, sparsely covered with a desert flora. The sent us around over the new road to avoid a washout. At 11 a. m. we stopped at Parker, a new town in the copper region, where we got dinner, 112°+ in the shade. Left Parker at 1:15 p. m. Reached A. & C. Jet. at 6 p. m. and waited there until ^{8:15}~~7:30~~ for our engine to go and get water & fuel and for an extra engine to help up the grades to Prescott. Then we made another long stop soon afterwards. It has rained in the nearby mountains yesterday and today.

Ash Fork, Ariz., Sunday

July 31, 1910

Quite cool in early morning. Rain

Long Beach, Cali. Thursday
July 28, 1910.

Fine cool morning, breezy, cloudy at first, soon clearing. Sent my trunk to Los Angeles on morning "Salt Lake" train. In afternoon we all went to Denver. I got my ticket validated, rechecked my trunk to Santa Fe, ~~and returned~~ ^{and we} dined at Franks house, returning to Long Beach on the 10 p.m. car.

Long Beach, Cali., Friday
July 29, 1910.

A beautiful morning, cool and breezy. At 3 p.m. ~~the~~ Nellie and I took the Pacific Flyer for Los Angeles, Dr. Carter coming later. Went out to Frank's house. Took the 8 p.m. train on the Santa Fe Road for Santa Fe. Got ticket from Lamy to Santa Fe yesterday ^{soot} to check my ~~bag~~ trunk ~~or~~ clear through, 75¢. Validation fee on my return ticket 50¢.

I left Los Angeles at 8 p.m., got fine cool breeze.

Bagdad, Cali., Saturday

July 30, 1910.

Breakfasted here at 6 a. m., 1½ hours late. Cloudy and hot. Started on at 7 a. m. Breakfast 50¢ fruit 25¢. We are going through a region of dissected lava flows, the mountains being abrupt, with broad fans of broken rock, gravel and sand occupying the valleys, sparsely covered with a desert flora. The suit us around over the new road to avoid a washout. At 11 a. m. we stopped at Parker, a new town in the copper region, where we got dinner. 112°+ in the shade. Left Parker at 1:15 p. m. Reached A. & C. Jet. at 6 p. m. and waited there until ^{8:15}~~7:30~~ for our engine to go and get water & fuel and for an extra engine to help up the grades to Prescott. Then we made another long stop soon afterwards. It has rained in the nearby mountains yesterday and today.

Ash Fork, Ariz. Sunday

July 31, 1910

Quite cool in early morning. Passed

through woods south of here. We were stalled on a heavy grade at Cedar Glade and had to run way back and try again. Have passed lots of Cedars this morning. Reached Ash Fork, ^{Arkansas} ~~N. Mex.~~ at 8:45 a. m. Had a fine breakfast and got a better engine. Remained over an hour, ~~x~~ Dined at Winslow at 1:40 p. m. Has been nice and cool all day. Did not go out to supper.

Santa Fe, N. Mex., Monday,

Aug 1, 1910.

Reached Lamy at 2:15 ^{a. m.} and found train waiting for us, so reached here at 3:30 a. m. Miss Seligman, who was on the train, piloted me to the Peerless, where I got a bath and slept until 8 a. m. Got breakfast, then went to School of American Archaeology, where I was surprised to find Dr. Hewett, who said we would drive to camp tomorrow. Robbins arrived here last night. Very hot, bright day. Santa Fe lies in an erosion valley. The narrow, crooked streets radiating

from the old plaza. The school of archeology is in an old Spanish building ^{now} ^{of} ^{quartz} ^{fronting} toward the plaza. The mesas are covered sparsely with cedars. Hotel #2 ⁸⁵ Mr. J. L. Neubaum, the official photographer of the school, took me out on his motor cycle to see the town.

Expense Los Angeles to Santa Fe:

<u>1/2 return ticket Los Angeles to Boulder</u>	\$ 27.50
<u>validation</u>	.50
Sleeper Los Angeles to Lamy	7.00
Fare Lamy to Santa Fe	.75
Porter on sleeper	1.00
Meals 50, 50, 75, 50, 50	2.75
Room + breakfast at Santa Fe	2.85
" " Monday night + breakfast 35	2.35
Transfer of trunk +	.25
Meals 75, 45	
Barber .35 - traps 1.25	1.60

Rained at noon and in evening. In afternoon Neubaum took me to quarry near town, where I found *Spirifer*, *Productus*, *Hyalinea*, *crinoids*, etc., showing Lower Carboniferous age. Mr. Chapman the pottery man, told me about this place. It is a blue limestone associated with variegated clay which is being used for brick making. Robbins and I

at Palace Hotel

Spent the evening with Mr. Turtshel,
of Las Vegas, who is writing a history
of the Southwest, based ^{largely} upon old
Spanish documents for the early
history and U. S. War Department
documents for the later history.
Still raining at bedtime.

Santa Fe, N. Mex., Tuesday
Aug. 2, 1910.

Up at 5 a.m. Nearly clear, cool. Break-
fast at Coronado Cafe with Hewitt, Robbins,
& Kusbaum. A great many Indians about
town and the women are much addicted
to expensive black shawls. The Indians
here are Pueblo, a composite race, about 25%
dolichocephalic, 75% brachycephalic. The skulls
from the old cliff dwellings are all dolichocephalic.
The town is on east border of Rio Grande basin,
the camp on west border, about 25 miles N.W. of
town in air line, 35 by wagon train road.
As we climbed the mesa from town we passed
over ^{red} conglomerate like the Fountain dipping
westerly about 5 to 10 degrees. Old sloping

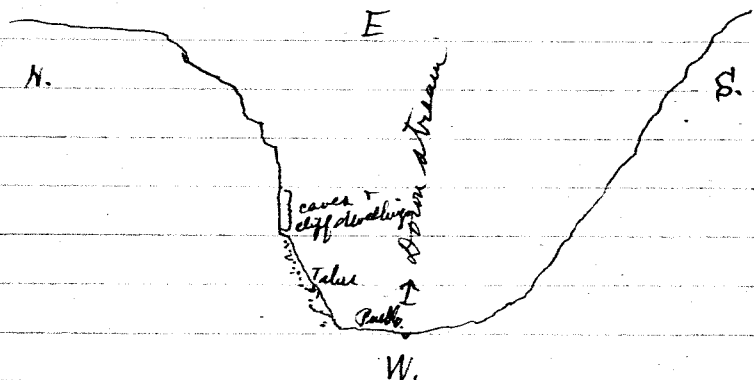
plain much dissected and covered with well rounded granitic boulders and gravel. Pinon & cedars cover the mesa. Started at 6:45 a. m. in a 2 seated carriage with driver, Hewett, Robbins, Kuschbaum and myself. Reached Buckman at 11:15. As we drove down a gulch toward Buckman on the left were ^{horizontal} sandstones capped by ^{columnar} basalt. Just before reaching Buckman there is apparently a neck from which the basalt flowed. A gulch has cut it in two. Crossed the Rio Grande at Buckman and began the climb out of canyon. N. of Buckman tufa covers a basalt flow, but is said to be buried at bottom by basalt showing that it is older than the basalt. It is ^{reddish and} yellowish. We reached camp in the Rita de los Trigoles at 5 p. m., the team stopping on the rim of the canyon, whence we carried our baggage down the trail to camp. Those 4 rooms in the old cliff ruins for our quarters and had the Indians carry our outfit up. Canyon wren singing over our heads. On trip saw night hawk, pinon jay, mourning dove, hummers, etc. also 2 cotton tails with brown or red spots just back of shoulder or on shoulder, and several Sparrows.

shells resembling the speckled one of Route 60.

Ruta de los Frijoles, Wednesday,
Aug. 3, 1910.

Up at 5:30 a.m., breakfast at 6:30. cloudy.
My sleeping cave is 6x8 ft., ceiling 4 ft. in center,
blackened by smoke of ancient fires. I went
among the narrow-leaved cottonwoods below
camp and collected ~~Succinea~~ ^{Abhyudata} sp., Loxostoma
lubrica, Louitoides arborea, Pupilla spp., Valoni-
cyclophorella (abundant) Encoulaea trochiformis
and possibly other land snails.

The canyon runs approximately ^{south} east
and ^{north} west - a few degrees N. of E. and S. of W.
The walls here, so far as visible above
the talus slope, are composed of a light
and light colored tufa. On the south side
the slope is steep, but without a vertical
wall, and has pines and shrubs rather
sparsely scattered over it from base to top.
On the north side there is one high,
nearly vertical wall, with a tendency to
produce others less pronounced. a cross-
section much generalized is thus:

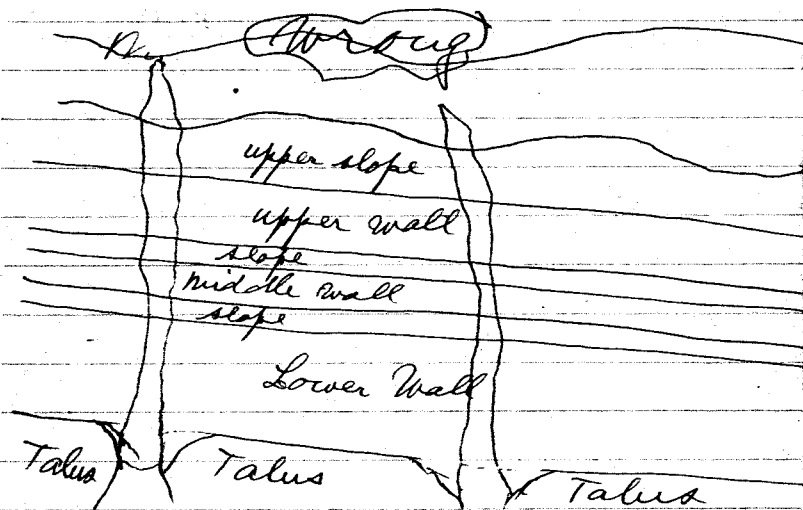


The vertical wall is thickly dotted with holes in the tufa, probably partly eroded by wind, though doubtless formed in spots which were either soft or composed of more soluble material which has been partly dissolved by storm waters. The larger holes were greatly enlarged by the ancient inhabitants and dwellings of stone walls two to three or more stories in height were then built in front of them, with the usual small rooms ^{about} 8 x 8 ft. The walls have mostly crumbled away. Part of the debris has been cleared away by the workmen of the School of American Archaeology, so as to show the sizes and shapes of the first story rooms. Probably the same walls extended up so as to make the rooms

overhead correspond in shape and size with those beneath.

In the valley on N. side of creek is a pueblo now being excavated. 60 rooms have been uncovered on the ground floor in about $1/4$ of the ruin. Probably there were 250 on the ground floor and about 150 above. Unlike most community houses of this district, it is ^{nearly} circular. The only left yet found is on the east side.

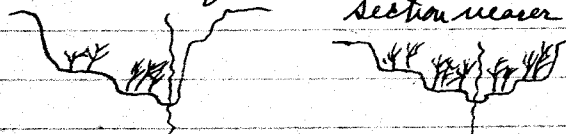
The slope of the stream bed and of the ~~top~~ rim of the canyon and of the top of the mesa are all about the same as that of the ^{chief} wall of tufa on the north side, so that the stream bed, base of wall, top of wall and rim are approximately parallel. The base of the wall is more uneven than the top, owing to the fact that very narrow gulches dissect the wall, and where these open out into the canyon talus is wanting, while between gulches the talus creeps up the wall, thus:



There are trees and shrubbery on the slopes of the north side, as on the south side, but of course none on the vertical walls. Possibly the difference between north and south side may be due partly to the vegetation covering.

Up creek about a mile where the creek cuts clear in to the base of the bluff the channel has not been deepened more than 5 or six feet during the growth of trees 30 inches in diameter now standing on the banks of the channel. Cross section thus:

section nearer camp.



We measured the tree nearest the creek in the first section and found it 30 inches in diameter 4 ft. above ground. Age probably at least 300 or 400 years.

On the way back we noted the breezes blowing the ^{light} tufa dust about on the slopes. Probably the erosion is greatly aided by wind.

The tufa contains myriads of ^{small} quartz crystals averaging perhaps $\frac{1}{16}$ in in diameter or less. In weathering out these crystals are preserved the other material being reduced to a very fine condition and swept away at once and the quartz crystals, being also small, are easily carried away. Hence the ~~eros~~ deepening of the channel would progress more rapidly, except that the stream is so small and is kept overloaded by during floods by debris swept in from the canyon walls. The stream at present can be stepped across easily.

Rained again at 5 p.m.

Saw today the following birds:

canyon wren 2

arkansee goldfinch abundant

mourning dove common

Hoopoe
Rock wren? 2

Western robin common

Thrush sp.

Long crested jay 3.

4 birds resembling black-headed grosbeak
with white stripes on head.

On way back ~~for~~ from up creek we found ant-heaps composed almost entirely of small quartz crystals, and in one place the sand at bottom of a gully was clear quartz sand. Very hot during most of day.

Rito de las Frigoles, Thursday,
Aug 4, 1910.

cool morning. Up at 5:30 a.m. breakfast at 6:30. I went below camp and collected mollusca. Searched for 2 hours and found only one colony of *Ashmunella*, collecting two or three dozen within a radius of 10 feet. Those collected yesterday were also all in one place, under cottonwood logs and sticks.

Bandelier says of this valley: "From the southern edge of the ~~the~~ Ziro-Ka-wash, or Mesa del Pajarito, we look down into the Rito as into a narrow valley several miles long and closed

in the west by rocky ledges, over which the stream descends to the bottom lands of the Pito. Through these it flows for several miles as a gushing brook, enlivened by trout." ~~at~~ (Papers of the Archaeological Institute of America, Amer. Series, 11, Final Rept., Pt. 2, p. 139. - Quoted in Bull. 32, Bur. Amer. Ethn. p. 27, James Plateau). There appear to be no fish now in the stream and the falls make it improbable that there ever were any. (See also ^{adobe #} Baudelie's "Delight Makers," Dodd, Mead & Co., N. Y., copyright 1890^{p. 8}).

"The entire formation of the chain [^W of the Rio Grande] as far as it faces the Rio Grande, is volcanic, the walls of the gorges consisting of generally of a friable white or yellowish tufa containing nodules of black translucent obsidian. Owing to this the rock is so soft that in many places it can be scooped out or detached with the most primitive tools, or even with the fingers alone. Owing to this peculiarity, the slopes exposed to the south and east, ^[this should be south and west] whence most of the heavy rains strike them, are invariably abrupt, and often even perpendicular; whereas the opposite declivities, though steep, still afford room for scanty vegetation." "Delight Makers, p. 1.

Perennial streams are few. Usually a ^{rattle} flat area on one side or the other, or both. The topography affords natural shelter and good hiding places from enemies, easily protected. ^{the} Pito de los Frigios is called in the *Leaves of the* Tiquonyin Gorge 6 mi. long, 20 mi. W. of Santa Fe in direct line. *Delight Makers* p. 3.

Tufa yellowish and white.

Judge ^{a. J.} Abbott says water ceased to flow at one place in the creek at his house for a few hours lately. He lives at our camp.

^{caves-} "Together with the cavities formed by amygdaloid chambers and craters caused by erosion, they give the cliffs the appearance of a huge, irregular honeycomb." *Delight Makers* p. 3 or 4.

Have seen several water snakes below camp.

"Ginger" ^(Fother) Dowell says he killed one rattlesnake in this canyon just above the Abbott ranch, the only one reported. Said to be abundant on the Rio Grande. Asked a young Indian about them. He said great big ones, circling his thumbs and forefingers together to indicate a diameter of about 5 inches, but when we laughed at him he contracted the circle very much.

Small lizards very abundant.

Striped sparrow-like siskin with 2 yellowish wingbars

Western flycatcher?

soves

Longcrested jay

Young robins 4

Thrushes 2

ark goldfinches ^{common}

House wren at cave entrance

Canyon wren may be constantly heard

Have heard ~~at~~ ^{top of} ~~the~~ above camp.

Asked Santiago, an old Indian, about the larger mammals. Says he has not hunted and does not know them.

Dowell, who stays with the Abbots, has hunted and trapped here. He says there are a few porcupines, and badgers, mountain lion, bobcats and bears, but no elk, mountain sheep, goats, bison, ^{wolves, wolverines} or lynx. Bison was never here, so far as known, though skins reached the region by exchange, probably. Coyotes are common, and both red and little gray foxes. No mink here, but mink, otter and beaver on the Rio Grande. Bears are probably black bears only, though, as usual, Dowell talks of cinnamon. Deer occasional here, but more abundant ~~in~~ ^{at} further up in the mountains, coming down the valley in

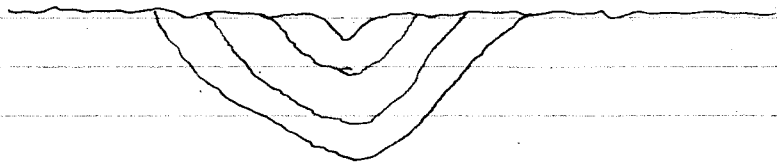
the autumn. Neither Santiagos nor Howell know the species, but from what they say and the character of the country it is probably the mule deer. Rained a little during the afternoon and evening.

Rito de las Frijoles, Friday,
Aug. 5, 1910.

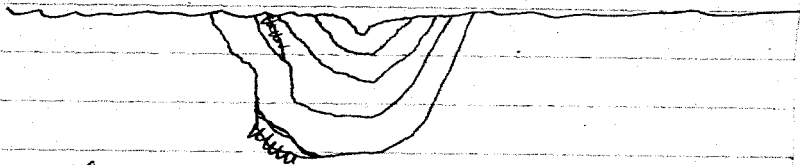
Up at 5:45. Cloudy. Breakfast at 6:30. Finished reading Bandelier's "Delight Makers". On p. 296 he makes Shotage tell about finding where a rattlesnake had been eaten. See yesterday's comments on snakes.

There are several important elements in the origin of the cliffs here. ^{it is a stream-cut canyon.} They are confined to the ^{N.E.} ~~N.W.~~ side of the canyon, being replaced on the ^{S.W.} ~~N.E.~~ side by a steep, rather uniform slope (see under Aug. 3. Bandelier says it is thus in all the canyons of the region. Newbann confirms this. Bandelier suggests that the cliffs are formed by the beating of the ^{heavy} rains and winds, which he says are prevalently from the direction which causes most of them to strike this side of the canyon. Probably, however, the dry winds are nearly as important

as the rains. Neither rain, nor wind, nor both, would produce such cliffs in a perfectly homogeneous material such as the tufa seems to be at first glance. Certainly the upper part of the cliff has been longer exposed to the attacks of storms and other atmospheric agencies than the lower part, for the attack began on the upper part as soon as the downward cutting of the ~~canyon~~^{stream} began to form an incipient canyon, and has continued ever since, while the lateral erosion of the lower part could not have begun until the stream reached the lower level. Consequently in homogeneous material and in the absence of any special attack upon any part of the canyon, the widening of the canyon should have proceeded by equal recession of its walls progressively as the down-cutting proceeded, thus:



Instead of as it has, by unequal recession at the bottom, thus:



The storms under such circumstances would cause the more rapid recession of the N.E. wall, ^{than the S.W.} but would not change its shape, as ^{they} would beat equally upon all portions of the N.E. wall. However, there are several ^{broad, well-defined possibly} rather irregular hard zones in the tufa, one of which is at the top of the nearly vertical cliff. These hard zones of course exist on both sides of the canyon. ^{They are much redened by iron oxides.} The material below it is very yielding. If the storms beat more fiercely against the N.E. wall they would weather the soft material on that side very rapidly without much affecting the hard zone, and would have much less influence upon the S.W. wall. Consequently the tendency would be to produce a bluff on the N.E. side and none on the ~~S.W.~~ S.W. side. If the hard protecting zone protecting the cliff ^{be comparatively} ~~was~~ were a massive, unfaulted sandstone rock it would be undermined and great caverns formed, ^{under overhanging ledges,} as in the Mesa Verde districts, thus:



The reason this

does not occur in the Rito de los Frijoles is that the hard stratum forming the cap of the cliff is traversed by numerous vertical or nearly vertical cleavage planes, so that ~~the cap~~ it keeps falling to the talus as rapidly as erosion of the main face of the cliff ~~progress~~ progresses. It is probable, also, that the S. W., facing N. E. and hence ~~not~~ suffering less from heat and consequent evaporation, is somewhat better protected by vegetation, ~~which~~ which would serve to hold the debris on the slope and thus aid in preventing the formation of a cliff. This difference in vegetation does not ^{readily} appear to the eye as it does in many similar situations in the semi arid West, but even a slight difference, continued through thousands of years, would exert a great aggregate influence upon erosion.

The "tent rocks" or cones at the base of the cliffs have an origin similar to that of the cliffs, the protecting cap in such cases being small masses of resistant material instead of continuous, approx-

imately horizontal zones.

The surface of the cliff itself has the appearance of having ^{being} a thin ^{hard} coat backed by soft material, so that where ~~the~~ a hole breaks through the surface weathering by the action of wind proceeds more rapidly within and forms a cavity whose interior diameter is greater than that of the entrance. It is not unlikely that the hardening ^{was} ~~is~~ accomplished by water descending along ^{former} cleavage planes and is now going on ^{along} ~~in~~ invisible cleavage planes back of the present face of the cliff. These hard surfaces are irregular and are largely responsible for the irregular appearance of the face of the cliff. There are many places where crevices etc show the deposition of thin films of material. One tunnel - nearly vertical - is seen on a vertical cliff, worn by water. It may disappear before many years by the breaking down of the face of the cliff.

In the tupa there are many fragments of hard, much darker rock of various kinds.

No rain tonight or today, partly cloudy all day, clear tonight.

Set 9 mouse traps and 4 steel traps at dark.

Rio de los Frijoles,
Saturday, Aug 6, 1910.

Up at 5:15. Perfectly clear morning. In
my mouse traps there were 4 deer mice and
bait gone from 2. Put up mice in forenoon.

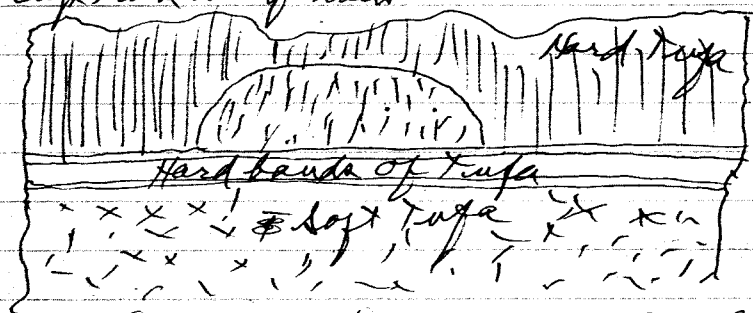
Get Archaeological Map of Jemez Plateau,
New Mexico, Forest Service U.S. Dept. Agric. 1906.

Went up creek in afternoon and shot one
each of the following: Brewer sparrow, pygmy
nuthatch, W. wood pewee? and hummingbird.
Shot latter on wing with 44 calibre shot barrel of
game getter. Fired 5 shots, got 4 birds. Saw a
red-tailed hawk, which we have heard every day
on the cliffs up the canyon. Also one ~~good~~ red-
shafted flicker and a woodpecker with white
below, black above, white stripe down back and
on head. In evening heard an owl like great
horned owl but not so hoarse. No rain today.
Hot afternoon.

Rio de los Frijoles, N. M.,
Sunday, Aug. 7, 1910.

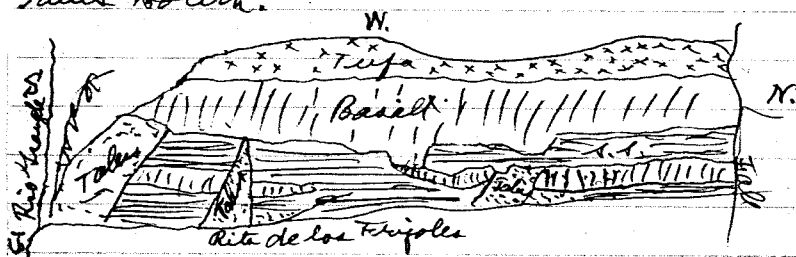
Bright, clear, warm morning. Arose at
6:15. Breakfast at 7 a. m.

Yesterday afternoon we visited a cavern
 a mile or two up the canyon, which was cut
 by the wind in the hard cap zone which cove
 the cliffs. At the base of this zone there
 we found several narrow bands of ^{still} harder
 material distinctly separating the cap
 rock from the cliff tufa and at the same
 time forming a shelf for ^{the large semi circular} cavern which
 the wind has eroded in the lower part of the
 cap rock itself there.



The cavern ~~is~~ is reached by
 several long ladders recently constructed
 in order to excavate it. There is a large
^{round} ~~hole~~ ^{chamber} excavated in the edge of the shelf
 and several small caves in the wall of
 the cavern. Here corn stalks well preserved
 are found covered up in the floor. That is
 the only large natural cavern in the region
 and reminds one of the Mesa Verde caverns.

At 8 a.m. most of the whites from camp went down the canyon to the Rio Grande. Some turned back at the first fall. I did not go clear to the river, but stopped just below the lower fall. Very little water is running at the falls, and in many places the creek bed is quite dry, the water flowing through the sand. Section below lower fall, W. side, where canyon runs South:

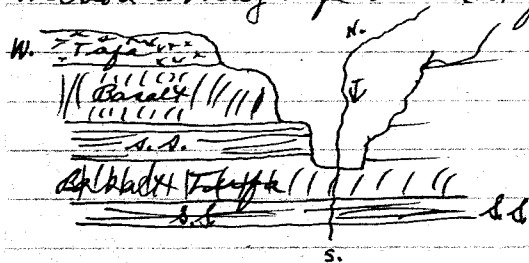


This is not drawn accurately nor to scale. At the two falls the canyon is very narrow and is cut mostly through the basalt ^{and some sandstone}.

The tufa above recedes considerably from the narrow canyon, thus ~~|||||~~ ^{|||||} ~~|||||~~

The sandstones are coarse, in places almost conglomeritic, yellowish brown and brown. The basalt varies on weathered surfaces from light gray through dark gray to nearly

block and from fine to coarse. It usually weathers with holes on outside up to half an inch in diameter. It is certainly later than either the tufa or sandstone, as it is intruded into and through both in a very intricate way - that is the main body of basalt. As the sandstone contains many ^{angular} fragments of basalt, however, often 3 to 6 inches in diameter, it is quite evident that there is older basalt in the region, perhaps partly covered by the sandstone. There are probably several floors, at the top of the lower fall (the fall itself being a wall of basalt) is a sandstone about 75 ft. thick. There are occasional ^{angular} basalt pebbles all through it, but they are quite abundant in the upper 25 feet. section looking up stream at falls

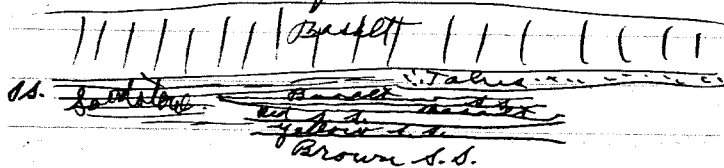


The sandstone dips S. 10°, approximately the same as the slope of the bed of the creek ~~on~~ below the falls. The lower fall is said to be 90 ft

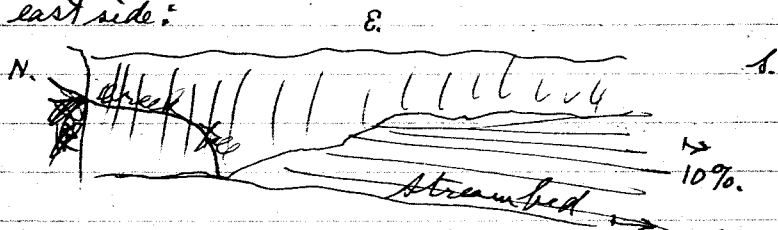
and the upper one 60 ft. of sheer descent. Then above the upper are heavy rapids. As the stream has doubtless been completely dry at times so far as surface water is concerned, and fish could not get up from the river, it is probable that there have been no fish here for centuries and perhaps never. (see note further on).

The sandstones have evidently been deposited by rather evenly flowing but strong currents, not at all tumultuous. The stratification is very even but very pronounced, showing no crossbedding, no cutting and filling, containing coarse gravel in many places and as above mentioned large angular blocks of basalt.

In places the colors of the sandstones at the contacts with basalt indicate burning. For example, on east side of canyon just below the lower fall we have this section:



In other places no such effect is visible. There are some water worn pebbles about 2 inches in diameter in upper part of s. s. of material other than basalt. Upper part of basalt which forms the falls is much broken and has not reddened the overlying s.s., though likely ^{an} intrusive sheet, but the underlying portion of s.s. is reddened in a thin layer. Just below the upper falls where the sandstone disappears, the red band at its top is several feet thick. The sandstone is truncated thus, as best shown on the east side:

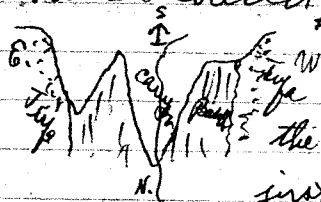


at noon we ate lunch, then took a refreshing bath in the pools below the lower upper fall.

Started for camp at 2, Robbins having gone to the river before lunch and returned alone to where I was working at the falls.

almost every moment pebbles started from the cliffs by the breezes, fall to the bottom of the canyon.

At the upper fall there is an approximately vertical contact of basalt with tufa, thus:



I believe that the source of the basalt is in the canyon just above the upper fall, where numerous vertical and some horizontal contacts with the tufa are seen and in one place the tufa immediately overlying the basalt is much burned. The main body of the basalt is certainly ^{younger} ~~older~~ than the tufa and sandstone and probably all that we have seen today except the fragments in the sandstone. It would be interesting to know the origin of the latter.

Reached camp at 4 p.m. ^{near Otero}

Judge Abbott says a man ^{named Otero} in Haute Fe claims to have caught lots of trout in the creek here, but as ^{Otero} also says a man living in the canyon then dug a well it is probable that the creek had dried up, so I doubt the story.

Hot day, no rain.

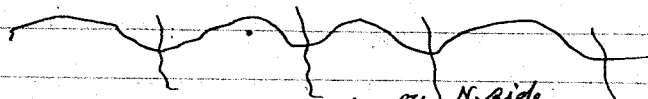
Rito de las Frigoles, N. Mex.

Monday Aug 8, 1910.

Bright, hot morning. Started up canyon at 8:15; returning at about 9:30. Shot one mountain chickadee, one chipmunk, and what appears to be the female of some species of towhee. The bird I shot Saturday, which I took for a western wood pewee, spoiled before I could skin it, so I am trying to skeletonize it. It is common here. Following is a description: Length 150 mm. Tail and wings black, head blackish, back blackish gray. ~~Primary~~ secondaries with very narrow white anterior margins, tertiaries with wider white margins forming two conspicuous wing bars. Below gray, with ^{or in front of breast,} delicate wash of yellow on sides. Under tail coverts white. The big hawk which I took for the redtail is brown-spotted beneath, perhaps Swainson's. Two birds near our sleeping caves I feel sure are Say's phoebe.

The depth of the valley here runs from 400 to 500 ft. The Rio Grande at the mouth of the Rito is perhaps 500 ft. lower than camp. The N. side rim presents a roundly serrated appearance, owing to lateral gulches which dissect it, while

the south rim is a simple slope about parallel with the stream bed. N. rim thus:



Just above camp the bluff ^{on N. side} is 90° , but in most places it is about 70 or less from the top of the talus to the top of the cliff. The S. wall of the canyon has a general slope of 40° from base to top, mostly talus, but with broken rocky walls in one or two places. Up stream the tendency to form a cliff ^{on S. side} corresponding to that on the N. side is more marked.

There is a wren here which is very plain colored, grayish, with no spots below, ^{flight} brownish ^{tips} on back, tail feathers and primaries obscurely banded with darker color. Also one which I believe to be the house wren, with more reddish.

In evening an Indian boy brought me a chipmunk which he had killed with a rock. Wanted a quarter for it, but when I told him they were too common to buy he gave it to me.

Sprinkled a little toward evening and again at dusk. breeze very low today.

Rito de los Frijoles, N. M.

Tuesday, Aug. 9, 1910.

Partly cloudy morning. More water in the creek this morning. Robbins and I started up stream just after breakfast, about 7 a. m., with an Indian boy to carry our lunch, etc., and he took his shotgun, I took the 22-⁴⁴ "Game Getter". Santiago Sanchez; this is his signature.

About 2 miles up we found a fine colony of Ashmunella, with Coeliospa, Vallonia, ^{Pyramidula} and Lou-
trides, ^{etc.} under narrow-leaved cottonwood logs. At first spruce, about 1/2 mile further up, heard a pine squirrel but could not get a shot at him, nor even a good look. Saw a pair of sparrow-hawks, probably desert form, and their nest, but did not get a shot.

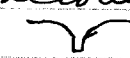
Bear tracks were reported here by Indians yesterday.

The canyon soon narrowed very much, becoming a deep, narrow, rocky gorge, the walls mostly of the hard cap tuff. For a long ways the creek is cutting beneath the cap on the N.E. side, forming an overhang of several feet. Occasionally the talus has forced the creek over so that it has formed a similar

well on the S.W. side. Further up the walls on both sides are practically vertical, with only a narrow bottom over which the stream meanders, from 25 to 50 or 75 ft wide.

Stopped for lunch at 11:45 where the creek nearly reaches the top of the lower cap rock and affords a way out of the canyon on the north side. We could get out most anywhere on the south side. Started on at 12:30.

Sometime back, perhaps 4 miles above camp, we found obsidian ^{fragments} in place in the tufa. Numerous obsidian fragments in the creek bed and all along the cliffs have probably weathered from the cliffs. The fragments in the tufa and in the creek bed have no sharp or angular edges.

We went out on the north side. On way back, coming down the north mesa, we crossed two very deep, narrow canyons, which were very difficult to cross on account of vertical walls on both sides, thus:  Crossed or headed several smaller ones, and finally turned down one which

enters the Frijoles canyon just above the ceremonial cavern, a mile or so above camp. This gulch also was deep and narrow, we crossed it and found a fair trail on the east side. Saw a mule deer (doc) and Robbins shot at it with the shotgun, but of course without effect. Saw deer signs several times. There are cattle and horses in the worst part of the canyon.

Reached camp at 4:30 just as it began to rain softly. The rain continued until 9 p. m., at times coming down lively.

Up canyon the tent-rocks show clearly that the protecting caps which formed them were fragments of the general hard cap rock which had fallen to the slopes and lodged there.

Rito de los Frijoles, N. Mex.,

Wednesday, Aug. 10, 1910.

Partly cloudy morning. Put up the skin of a squirrel caught by an Indian. He had skinned it in trapper style, without leg bones and cut down breast instead of down abdomen, and without measurements, but I made

a very fair skin of it.

Before noon I climbed to the rim rock on N. E. side, collecting specimens of the tufa all the way. I can see no difference in composition or structure, but the upper part is much harder and darker colored, with a tendency toward pink and red everywhere. However, between the cap of the cliff and the next ledge above there is a white zone perhaps 20 or 30 ft thick showing on both sides of the canyon. One or two big pieces of tufa had a metallic ring when struck, but were quite soft except a thin outer coat. Angular fragments of older rocks are included in the tufa all the way up. I collected some of these. The harder weathered coating on the tufa, both upper and lower is very thin, perhaps from $\frac{1}{8}$ to $\frac{1}{2}$ inch, not usually well enough defined for measurement.

From the ^{rim} top of the canyon there is a fine view of the mesa S. W. of the canyon, with the mountains in

the background.

Spent most of afternoon in cave, but set 19 traps before supper. It rained fitfully during first half of afternoon, but did not amount to much.

Rito de los Frijoles, N.M.

Aug. 11, 1910. Thursday.

Hot, bright forenoon, raining in Vata before noon. Put up 2 deer mice skins, one squirrel and 1 chipmunk in forenoon, then set traps and put out poison on the mesa. In afternoon I skinned a squirrel and chipmunk brought in by the Indians, then took a cool, refreshing bath in the creek. It threatened rain during afternoon and did rain in the mountains. At 6:45^{p.m.} a hard thunder shower came down the gulch, lasting for over an hour, with some hail.

Rito de los Frijoles, N.M.

Friday, Aug. 12, 1910.

Nearly clear this morning and the high water in the creek has nearly subsided.

a wash basin, cup and bucket sitting at the foot of the cliff each contained about a quarter of an inch of debris washed down by the rain, and the fine material which had covered the cut steps in the trail to our caves to a depth of several inches was all washed out, leaving the steps clear. With such storms cutting the cliffs I wonder that they have not been eroded more since the cliff dwellings were abandoned. Of course the structures erected in front of the caves had to first be destroyed before the attack on the caves could begin.

Nearly all the traps were sprung, probably by the rain or hail. Nothing in them. I hunted on the mesa for a while and collected two horned toads, a pinon jay, a bush-tit? and a woodpecker. Soon became partly cloudy. Saw lots of ^{lat.} chickadees, ^{midover} pinon jays, ^{woodpeckers} pygmy nuthatches, ^{sp. sparrow hawk} several bush-tit?, one western screech owl and several swifts or swallows. ~~Probably swallows~~ apparently violet green, though I am not sure. In late afternoon I set some more traps at the river

of the canyon.

Sprinkled a little in middle of day but very hot most of day.

Rito de los Frijoles,

Saturday, Aug. 13, 1910.

Bright, hot morning. Found only one deer mouse in traps at head of canyon. Skinned 2 squirrels and a chipmunk brought in by an Indian. At noon it rained, and at intervals in afternoon.

The squirrels are all terribly fat, while the chipmunks are quite lean.

Dr. Hewitt is in Santa Fe, expected back tonight. Dr. Kinnear, of St. Louis, left camp Thursday, leaving still in camp the Abbots, the Goebels, of Santa Fe, Mr. & Mrs. Henry, of Denver, Miss May, of Denver, ~~and~~ the Mosleys, Messrs Beauregard, Goldsmith, Adams, Judd, Robbins and myself.

Rito de los Frijoles, N.M.

Sunday, Aug. 14, 1910.

Dr. Hewitt, Mr. Goldsmith's brother and Mr. Robbins, a Los Angeles artist, arrived last night.

at 9 a.m. a crowd of us started for the Stone Lions & Painted Cave, climbed out of canyon on S. side on trail just above camp. at the rim the slope opposite (N. side) has only 2% slope. The N. precipice here has a number of parallel bands a few inches thick, of hard rock, and the terraces show well above.

We started over the old Navajo trail which crosses the ~~to~~ Jones Mts, going nearly west. Saw tufted ear squirrel, 1 cliff swallow and numerous *Sialia m. harrisi*; a woodpecker with much pure white; a swift or swallow very white beneath and on sides and on cheeks and apparently a narrow black streak down throat; a towhee (spurred?);

At 11:30 a.m. we struck the Cochiti trail, which cuts the Navajo trail at right angle, and turned south on it down a gulch into the Alamo Canyon, where we lunched ^{with water}. Here is a bluff on the south side, with pink tufa below and light colored tufa above, very hard tufa at the top. Canyon deep and narrow. Here saw a bird with white wing

tips about size of Clarke's brow.

Started on at 1:40 p.m. Where we got our ^{first} glimpse of the Pajarito Plateau and Rio Grande Valley I found the slope of the Plateau to be 2° toward the Rio Grande. It slopes also down the Rio Grande Valley, but I got no measurements. Went down the Colorado ^{nearly} to the painted cave, and camped just where the water disappeared, stopping at 5 p.m. Rather warm evening. The canyon here flows nearly south.

Heard canyon wren and saw several Rocky Mt. hairy woodpeckers at camp before night. Beautiful night.

Painted Cave, N.M., Monday.

Aug. 14, 1910.

Up at 5 a.m. Started down to the cave at 6:15. Most of the pictures are in red. A horse, 2 bears and a jay are in black. The cavern is in the cap tufa up the cliff, as at the ceremonial cavern in the Frigoles canyon. There are figures of men, hands, serpent, elk, a star, 2 churches surmounted by a cross, Mt. Lion, perhaps coyote and one somewhat resembles moose. Men are all front view, most of animals side view. There is one clear ^{front} view of an elk, and

a front view of a flat-horned animal very much like caribou which has been done within 2 years, according to Dr. Hewett.

Saw canyon wren (see color's throat), piñon jay, long crested jay, Townsend solitaire.

The cliffs in the upper canyon are short and about equally distributed on the two sides, the canyon running nearly N. Just before reaching the cave the canyon turns to S.E., and the high cliff, ^{in the soft top with cap. top} appears on N. side as at the Frijoles, with only a soft cliff on the ~~west~~ ^{South} entirely in the cap rock.

Back to camp at 8 a.m., Santiago and Hemyada (Zadine) having started back to the Frijoles with the pack burros before we reached camp, so we kept right on. Where the trail leaves the Colorado canyon there are massive red sandstones much resembling the pine horizon of the Fountain in northern Colorado. Here saw bluebirds, could see no reddish on back, but they were in a shadow.

The stone lion altar is a very few hundred rods from the trail, and is thus:



The horns are about 6 ft long, tail and all, each. Vandals have ruined them. Started out at 10 a. m. saw 2 gray tufted ear squirrel and shot one. Reached lunch grounds in Alamo Canyon at 11:30. Santiago says he saw a bear track. ^(blackberry) camp, where I thought I saw one yesterday. Found 2 owl skeletons and one jay or black crow skeleton hanging on a wire. I took them. Reached camp in the Pito de los Frijoles at 3:45 and put up the squirrel skin and solitaire skeleton. Very tired from long walk, hard climbing and especially the excessive heat of the afternoon. Retired very early.

Pito de los Frijoles, N.M.

Tuesday Aug. 16, 1910.

Cool and cloudy most of forenoon.

Identified a female spurred Towhee and a Woodhouse ^{jay}. Habits indicate that all the crestless jays here are Woodhouse instead of juncos.

afternoon very hot ^{and bright}. Got two fine lizards from the excavations, but one got away.

after dark the owl harked on the cliff just over our camp. I could not see it but took a shot at the sound and he flew up from near the point at which I shot. Its notes very closely resemble the barking of a dog with not a very deep tone.

Rita de los Frigoles, N. M., Wednesday
Aug. 17, 1910.

Bright but cool early in the morning. Went down the canyon with Miss Day and Mr. Robbins "birding". Saw only robins, long crested jays, junco or Woodhouse jays, Mt. chickadees, lots of pygmy nuthatches, abundant Arkansas goldfinches and several dozen hummingbirds. The hummers were hovering over a large patch of biloune. We collected 4. They do not appear to fit the description of any species. Returned at 10 a. m. and put up the hummer by removing the viscera and filling the abdominal cavity with arsenic and alum, putting some also down the throat. Getting hot.

The Ark. goldfinches are feeding mostly on the sunflowers.

The owls here, according to descriptions

of habits and calls, must be the spotted owl. It sits on cliffs or in trees and barks, two notes, then a ^{slight} pause, then two more, etc. thus: kwack-kwack; kwack-kwack; etc. but more like the bark of a dog than those letters indicate, it being impossible to reproduce the overtones by symbols. Saw big downy owls.

In afternoon I went upstream, shot two lizard (swifts) but they were badly mutilated by the shot. Also shot a red shafted flicker and a chipmunk and skeletonized them.

Owl hooted again in evening, not in pairs of hoots, as I recollect last night's performance, but several in succession.

Rito de los Frijoles, N.M.

Thursday, Aug. 18, 1910.

Cloudy morning. Robbin, Sautiaps (an Indian) and I started on horseback up to the north rim of the canyon at 7:30 a. m., then over the trail leading to Buchanan. About 2 miles up the trail we killed a tufted ear squirrel. Saw lots of juncos, nuthatches and chestnut-backed bluebirds, several sparrow-hawks, Rocky Mt. hairy woodpeckers,

mt. chickadees, long crested jays, many
pinon or woodhouse jays, one bird of nest-
hatch like habits with apparently white
head, nearly as large as a bluebird, ^{Rocky Mountain nuthatch} at Bush
man sawmill, at the foot of the Mts. we saw
a sparrow hawk chasing a flicker for some
time, unsuccessfully. Here we turned up
an old trail into a gulch leading up into
the Mts, and killed two pine squirrels,
which are common here. at 12:30 we found
a little water and had lunch of tufted-
ear squirrel, ham, bread and butter and
coffee. Chipmunk common here also.
One ^{or} red-tailed hawk near where we
lunched.

In this canyon the upper tufa is
roughly and irregularly laminated, presenting
a gneissoid appearance somewhat like horizon-
tally stratified rock at a distance, but quite
evidently not stratified.

Nearly clear at noon.

collected some mollusks, including 3
specimens of Ashmunella and 2 dead
Vitrina alaskana. started on at 2:30 and

soon shot 2 more pine squirrels, which are abundant here, but quit shooting because we have enough for supper. Reached the divide at 2:45 p. m., but no water, so came back down the gulch $\frac{1}{4}$ mile and camped in grove of big aspens. Robbins took the rifle and went after deer and Santiago went after turkeys and grouse with shotgun. Both returned at 6 p. m. with nothing. Santiago shot at a turkey and missed it. Indians are seldom good shots. I shot the squirrels with the "Game Getter", 44 calibre, #8 shot. Robbins reports deer tracks plentiful on the ridge.

Fine large aspens predominate at camp and for a mile or two below.

Cloudy and threatening at bedtime. Turned in a little before 8 p. m.

^{W.} near ~~End of~~ Valley ~~is~~ angle
#30. of Buckman Mill, N. M. Frisby
Aug. 19, 1910.

It rained hard during early part of night and fitfully all night. Robbins and I had a good tarpaulin and slept dry, Santiago kept reasonably dry under a tree. Up at 5:15 a. m. in a dense fog.

saw a porcupine skin hanging on

a building near the sawmill yesterday.

In passing sawmill, ^{yesterday} we met a Mexican with a wagon load of cantaloupes and fruit. Santiago had a dime, the only money in the outfit and cantaloupes were 20¢ each so we compromised on half-ripe peaches.

Collected Salamanders, snails, etc., under the aspens. Only found one dead Ashmunella in an hour, numbers of Pupilla, a few Encourulus and probably Zonites. Snails not common.

Got a fine view of the rufous-thatched like bird which had puzzled me. It is nearly as large as an English sparrow, white below and on sides of head, giving it the appearance of a white-headed bird from the front. Back probably bluish gray, tail rounded tipped with white band as in Lark Sparrow, Hoary, (Rocky Mt. Nuthatch).

after breakfast Robbins started with the rifle on the S. side of the gulch after deer. ~~at~~ At 8: a.m. Santiago started down stream with the shotgun after turkeys and grouse and I went up the slope on the north side with the "Game Getter".

Long crested jays abundant, Rocky Mt. Hoary

woodpecker common, chickadees common; saw several Say's *Spennophiles*, ^{flickers,} house wren, hawk with light throat and upper breast, a dasher gone below formed by dark transverse bars and barred wings, about size of Swainson's hawk.

Our camp is near the head of a gulch just across the divide from a point about 2 miles below the head of Valle Grande. The latter is one of the most beautiful valleys I have ever seen, entirely devoid of trees in the low lands, but trees coming down the mountain slopes on all sides in dense conifer forests and ending abruptly where the slopes become more gentle. A stream meanders through it. There are lots of cattle and 2 big flocks of sheep to be seen from the slopes. All the open, park-like places in the forests on the mountains are covered with fine grass.

I have concluded that Robbins' "deer signs" are all made by sheep. I have seen no unmistakable deer tracks.

On the divide I saw 3 turkey vultures. Turning N., I soon found a flock of 20 or 30 turkeys in dense spruce timber. Tried them with the little gun, but without success, so turned back,

reaching camp at 12:45. As there was no one in camp, I cooked my dinner and ate it.

Saw gray-headed juncos and crossbills up on the top of the mountain.

Obidian flakes are found, ^{scattered} all over the mountain sides, as at Rito de los Frijoles.

Santiago returned at 2:50 with 7 dusky grouse. Then I took the shotgun and went back after the turkeys, but they were wild and I failed, and returned at 6 p.m.

I heard crows near camp and Robbins says he saw several and a campbird.

Heard poorwill's mournful song (2 birds, apparently) near camp all evening.

E. of Valle Grande, N.M.

Saturday, Aug. 20, 1910.

Up early, breakfast at 5:30. Robbins started after turkeys, where I was yesterday.

Santiago, our Indian guide and cook, is an old native priest. Speaks Spanish well and English rather brokenly. Says old Indians tell about great herds of buffalo, how they used to go off, get buffalo skins to make blankets

and sell them at good prices. Now all gone.
Wanted to know where they went. I explained that
white men's deadly methods destroyed them.

I went down gulch and in half hour shot
4 pine squirrels, then came back and got one
Say's Spermophile.

Found *Oreohelix* sp. in mixed conifers and
Aspen grove.

Robbie returned at 8:40 a. m., having seen
no turkeys. At 9:40 we ate grouse lunch,
at 10:10 I started down trail on foot hunt-
ing squirrels, leaving Robbins and Sautap
to follow on horseback. Bright morning,
but cloudy now. Rained on way down.

Saw Clarke's crow and Thrush with-
out rufous tail in gulch. Say's Sperm-
ophile found clear out to mesa. Reached
mesa at 12:15. Warblers just outside of
canyon bluish gray, yellow rump and
apparently white band on end of rounded
tail. Gray-headed juncos abundant at edge of
mesa at old sawmill with a few lark spar-
rows, also red-tailed hawk and two badgers
with very reddish hair.

Reached camp at 4 p. m. and cleaned the
grouse and squirrels. Took a very refresh-

ing bath ^{at creek} at dusk and retired at 8:15;
very tired.

Took one of the large nuthatches on mesa
near camp. It is Rocky Mt. Nuthatch.

They report 2 adult baldheaded eagles,
with snow-white heads, passing over camp
yesterday.

Rita de los Frigoles, N.M.

Sunday, Aug. 21, 1910.

Did not arise until 6:20 this morning.
Bright, hot morning. Spent forenoon taking
care of the skins taken on our trip. In
afternoon I wrote letters and worked
on the report on birds and mammals
of the region. In evening Judd and
Beauregard returned from Santa Fe, and
Mr. Harring ^{love}, the linguist, came with
them.

Ruta de las Arboles, N. M.

Monday, Aug. 22, 1910.

Bright, hot morning. Had a talk with Harrington about some proposed field work on the Colorado river near Needles next winter. Hope I may go.

at 8:30 I went up on the south mesa and started down an old trail, reaching the rim of Rio Grande canyon at 10:30, very hot and tired. Saw few birds and no mammals. a few bluebirds, ^{4 white breasted throated swifts} junco or wood house jays, small sparrows, 1 nighthawk, 1 ^{rock} wren, perhaps cactus wren, which I took for identification.

saw coyote tracks and dung at various places on trail. In places trail worn to a depth of 6 or 8 inches in the tufa.

Both walls of ^{deep, narrow} Rio Grande canyon where I reached it are basalt, but the vertical contact on the N. side is only a short distance from the rim as shown in lateral gulches. ^{canyon opens to a wide green valley a few miles down.} Started back at 11 a. m., travelling slowly and resting occasionally on account of the extreme heat.

No rock pines on lower part of mesa, only juniper and cedars, rock pines coming in some distance up the mesas

at the old pueblo on the rim above camp which has been excavated these are implements of mica schist, quartzite, etc., which must have been brought from some distance.

Reached camp at 2 p.m., exhausted from steady walking in the intense heat.

Rained in mountains, as it does every day, but we have had none here for a long time.

Set traps up canyon half a mile.

Rito de los Frijoles, N.M.

Tuesday, Aug. 23, 1910.

Had 2 deer mice only in traps. Singer & Howell caught a coyote at camp and Robbins and I skinned and skeletonized it. Rained hard at 1 p.m.

In afternoon 11 people arrived in camp, including Frank Springer, the paleontologist and Mr. Loomis, public librarian of Los Angeles.

Rio de los Frijoles, N.M.,

Tuesday, Aug. 23, 1910.

Rather hazy morning, not so hot as yesterday. Spent some time looking over material taken from the ruins. In implements basalt of course largely predominates. A little tufa was used. A very few pieces of mica schist and at least one piece which looks like gneiss have been found. Some rubbing stones seem to be quartzite and perhaps some are quartz. ^{which} Flakes of selenite occur, which may have been used for ceremonial purposes, or perhaps for closing the holes or window openings of the rooms, as was done by the Pueblo Indians when whites first visited the Southwest. No nearby source for such materials is known and some or all must have come from far away. Some of the pottery may be ^{nearly} pure clay, some contains many small mica flakes, largely composed of mica, in fact, and in a few heavy pieces small quartz grains occur. The latter point clearly to tufa origin. Possibly the fine debris from weathered tufa was mixed with clay or some other substance to make the paste. The source of the clay and mica is undiscovered, but is

may be and probably is distant.

at nine o'clock I conducted a field excursion in geology explaining the geological history of the canyon and mesa. Clear and warm by 10 a.m.

I experimented with tufa and included fragments in water. The igneous inclusions sink instantly, the light tufa very slowly, especially the very light pieces which look like an older tufa included in the new. In the cliffs no assortment whatever occurs. I do not believe it could have been deposited in water.

Why have this canyon and the Rio Grande canyon been cut through basalt in places instead of along the vertical contact?

are prevailing winds from south. Jage abbot says south winds passing over canyon produce an eddy, so that they blow toward his house from north. This would suck out soft material on north side and affect cliff.

also says snow does not remain on N side at all. Perhaps no frost in vertical fissures to topple cliffs over on that side, while good freezes on S. side, as he says snow has laid there 2 months at a time.

Dr. John F. Loomis
Loomis says he saw and caught trout in the creek here ^{about} 20 years ago ⁽¹⁸⁹¹⁾ and that then there were certainly many pools not now seen. Judge Abbott says same of latter.

Went down creek looking for snakes but did not see any. Have seen none since the first week here.

Bats seen the first two or three nights, but none since.

Thrushes have apparently disappeared.

Found one *Succinea avara*, but put a leaf hopper in the bottle with it and the hopper hopped out, carrying the *Succinea* with him. This is the only *Succinea* found on the trip.

Abbott says 2 rattlesnakes have been killed in the valley in 2 years, and he saw a big bullsnake near house a day or two ago.

also says scaled partridge was killed here recently and pine squirrel found

sometimes.

Misses Way and Friarmareca say they saw a badger this side of Water Canyon Monday.

Wt. Sheep heads are found in the ruins and catfish bones have been found in some ruins of the region, according to Hewitt.

Mr. ^{John P.} Adams says he saw a turkey vulture on rim of canyon at camp a day or two ago.

In evening I gave a talk at the library tent on the Zoology of the Canyon.

Rito de los Frijoles, N.M.

Thursday, Aug. 24, 1910.

Foggy morning. ^{cool, east wind.} Spent forenoon with Harrington, Miss Friarmareca and 3 Indians getting names and ideas about birds and mammals. They seem to have some very definite ideas about animals, with names for all parts, as bills, feet, claws, whiskers, hair, feathers, footpads, etc.

Hummingbird - they distinguish male and female correctly and say not found down in Rio Grande valley, but confined to moun-

various districts.

Pine squirrel - they say found ^{higher up} in tall slender trees tapering gradually to top, not down among rock pines, etc. South trees mean spruces and firs, which is accurate, though they do occur sparsely in pines ^{below spruce belt}, particularly in winter.

Ground squirrel - good to eat, does found all over cliffs in canyon and everywhere. Shed in April & May hair begins to thicken in July - cloudy a mistake, said use hair or skin, now gets nice hair, fix up for winter. Does great damage to fruit and gets into their food. Live about rocks, ^{in holes,} not in trees, but climb trees.

Deermouse - distinguished adult and nearly grown young # 22-23, but thought the bluish-gray specimens were male and those with reddish tinge female. Did not of course correctly distinguish sexes by color. Got young in spring at same time as horses and cows. Same with squirrels. Give young milk.

Woodrat, blue-gray like deermouse above, white below, tail round and short-haired. Gather pinon nuts in nest for winter.

Jumping mice ^{Probably Pocket mouse} yellowish above, white below. Long hind legs, short forelegs, smaller than deermouse.

Also one about size of small chipmunk.

Prairie dog at Valle Grande and San
il defonso. ✓

Big whitish rats living at Ojo Caliente
probably old individuals. Skull like skunk.

Speak of weasels at San il defonso.

Skunk striped black down middle, white
stripes on sides of black stripe.

Porcupine back in pits. sometimes in fields
below, eat bark of trees.

Pocket gopher described making holes,
carry dirt in pockets, push out, then cover
over. ✓

Tufted ear squirrel - lives in ^{big} rock pine.
seem to have correct ideas of anatomy.

Mole and phoe described to them, but did
not seem to know either.

Tufted ear gave special name on squirrel.

Badger described well. Told of badger getting
angry and catching man by trousers and holding
on until dragged long way to river.

Bears
describe white, yellow, brown and black. Two
kinds of white ones, one very large, one small.
Describe stroke of forepaw.

~~Large sperophilus~~ Big chipmunk, live under wood not in trees, but same name as pine squirrel, Live in hts. where pine squirrel lives.

~~Little chipmunk~~ - Live in rocks and rock trees in holes, live everywhere, canyons, mesas, hts.; and everywhere.

~~deer~~ - 2 kinds - describe 2 kinds with same horns, ^{and color} but differ in length of tail.

No elk here. ^{type of them} have been elk in Colorado, red-brown.

Pupilla, Arumella, recognized by name, but confuse Arumella with Sonitoides or Vitrea, Vallovia, etc.

~~Lizard-swift~~ - Not eaten, not poison. live in ground everywhere, not bite. snakes swallow them.

~~Big lizard~~ seeks food with black. bite, poison, have medicine. All old men say bad when they bite. Live under rocks, snake eats, swallows them.

~~Horned toad~~ not bite. do not eat them. Not used. snake ^{swallow} eats them, snake swells, bursts and toad comes out alive.

The apparent fog is evidently fine dust, as it is not moist, does not smell like smoke and the wind is blowing.

Judge A. J. Abbott says roadrunner occurs

on the mesas not far from camp.
Spent most of afternoon packing up.
Has been cool all day and quite cool in evening.

Rito de los Frijoles, N.M.

Friday, Aug. 25, 1910.

Cold night and cold and hazy this morning. ^{and Adams.} Sawell says scaled partridge comes into the canyon in big flocks. ^{showed them pictures for identification.}

The Indians seem honest. We have left numerous traps ^{traps} which would attract them, especially the boys, around loose all the time, and have missed nothing.

Sent off the trunks and 2 boxes of specimens to Bushman by mule team with Indian driver at 7:30 a.m., trunks to be expressed from Bushman to Santa Fe and boxes to Boulder.

Abel Sanchez, 10 years old. This is his signature. Says he cannot write, except this.

Continued linguistic work with Indians. They say in curing skin first dry it. ^{and then}

Then wash blood away with warm water.
Then dry again in sun. Then boil brain
in water and break it up, rather thin solution
thin enough to pour and wash skin inside
with solution when hair on, when cured without
hair, use it on outside too. Then hang in sun
today and leave out in air for two nights &
"soak" in air. Then to make soft, put in
^{cold} water again and soak, then faster to one end to
stick as tree and twist from other end to
squeeze water out. Then hang in sun and begin
to work by pulling back and forth from all sides
until dry to softer, whether hair on or not.
Without hair takes one day to soften, with hair
takes 2 days. Keep on working until soft.

~~Long crested jay - do not note that
crest is lowered for flying.~~

~~Chestnut backed bluebird - found in hills,
not in canyon. Correct.~~

~~Red-shafted flicker - picks into wood for
"worms" to eat, and makes hole for nest, but
not observed on ground or eating ants.~~

~~Recognize picture of junco as a winter bird.~~

~~Red wing blackbird down Rio Grande,
build nest in grass that grows in
water. ^{resident,} ^{birds,} ^{with} female's color
eaten by hawk.~~

Yellow head blackbird in Rio Grande valley only in winter same places as red-wings. Eaten by Indians.

Wagon wren on cliff, song whistle in descending scale.

Some other wren described as jumping about rocks, pointed to picture of winter wren, possibly mean house wren or rock wren.

Western ^{red-}tailed hawk, they note colors, tail, scream, etc. Hawks not eaten.

Turkey vulture, red head, no "hair" on head, lives on dead meat, not catch live animals. Found in kits. Not eaten.

Mourning dove, describe calls and wing whistles. Said to eat.

One Indian has been in California and describes California condor, bigger than eagle and not turkey.

When I imitated call of mourning dove in discussing it, one of the old Indians started the rain song, but in answer to question they seem to have no rain tradition in connection with it.

~~Report frogs if mate and platter frogs
(toads) jumping on land.~~

Goato says all Indians here all use same language, but from different places, as Santa Clara and San Ildefonso, pronounce slightly different, as "white men from different places do".

~~Describe Mockingbird by colors, and say it sings songs of all other birds. When I said "Mockingbird" he instantly recognized the name as one he had heard applied by the whites.~~

~~Describe W. Yellowthroat by habit & song and recognize picture.~~

Sowell says Ca. Tanager comes here in migration and that coons come up from the Rio Grande.

Hodge, of the Bureau of Ethnology, arrived in the late afternoon and in the evening we all had a conference about the form of our report and its publication. Retired at 10 p.m.

Rito de los Frijoles, N.M.

Aug. 27, 1910. Saturday

Up at 5 a.m. Robbins + I, with Mrs. Ed Smith and one of her sons, started for

Santa Fe by carriage. Bright and warm.

To north of trail ^{road} as we came down hill to Buckman, in gulch, there is a fine exposure of columnar basalt.

Along the road here is also a boulder deposit extending far up the hillside, including same material as is found in form of artifacts in the Frijoles ruins and may be the source of the latter. Saw no mica sheet.

Reached Buckman at 10 a.m. Bright and hot.

After passing Buckman frequently saw mica sheet boulders. Probably they occurred also before reaching Buckman, but were unobserved.

Reached Santa Fe at 2:45 p.m.

Expressed plants, had trunks transferred from Rio Grande depot to Santa Fe depot, then called on Dendahl, a university student who is in dry goods and clothing business. Had dinner at 6 p.m. at Palace Hotel, 75¢
Express on trunks Buckman to Santa Fe \$1.00
Transfer of trunks 50¢ other baggage 25¢
Total \$5.50
Bought a Papirito rug of Dendahl

and he gave me a smaller Estrella $\frac{3}{5}$
both Shiner's sweaters

Left Santa Fe on 7:20 p.m. train
Reached Lamy at 8:10. Got out on the
"Limited" on time at 9 p.m. Sleeper # $\frac{50}{50}$
Warm evening.

La Junta, Colo., Aug. 28, 1910.

Reached here at 6:50. Partly cool, cloudy
morning. Breakfast 75¢. Got train out
for Denver about 8:40. Pullman 95¢.

Reached Denver at 2:45^{50¢} p.m. and dined at
depot. Then caught the 4 p.m. train for
Boulder. Sprinkled a little between
Colorado Springs + Palmer Lake. Hot
most of day. Reached Boulder at 5:20
p.m., very tired.

Boulder, Colo. Monday Aug^o
Aug. 29, 1910.

Bright, warm morning. Had fine night's
rest and feel better. Went to Seven Yables
for breakfast. Lunched with Prof. George
and family.

Boulder, Colo., Tuesday,

Aug. 30, 1910.

Much cooler today & hazy. The
Kerms moved out of our house in
the forenoon, leaving me alone.

I dined in evening with the
Cockersalls.

Boulder, Colo.

L41 T12

H. E. inside $5\frac{1}{2}$ outside $6\frac{3}{4}$.

Foot to shoulder $18\frac{1}{2}$

Sixth back of shoulder

shoulder point to back of thigh bone $18\frac{1}{2}$