PE - Seward
PE-95-22

State of Alaska
Department of Natural Resources
DIVISION OF MINES AND MINERALS
Box 5-300
College, Alaska 99701

December 18, 1967

PROPERTY EXAMINATION REPORT

on

RUSSIAN RIVER TRAVERTINE

by

Gordon Herreid
Mining Geologist

PE 95-22

KX 336 337

RUSSIAN RIVER TRAVERTINE

The travertine deposits that lie along the east side of Russian River were visited on June 16-18, 1967 by Gordon Herreid, Mining Geologist, accompanied by Jerry Colp, Field Assistant. These deposits occur in two separate areas, one located ½ mile east of the north end of Lower Russian Lake and the other 1¼ miles further north, along the middle trail. The visit was made in the company of Harold Davis of Seward and Cooper Landing. I am much indebted to the two other men interested in these claims, Mr. James Dunmire of Cooper Landing for his hospitality and Mr. Max Hamilton, also of Cooper Landing, who arranged a flight into the property. Mr. Davis showed us most of the known showings at the southern area and the drill holes at the northern area. There are no surface showings in place in the northern area.

Southern deposit. An area of about 500 x 1000 feet is underlain partly or perhaps mostly by travertine which crops out along the small spring fed creek along the north side of the area and in scattered outcrops on the hillside to the south. (See map) The slope is steep and shows much evidence of glaciation. In the better exposures the stratigraphic section consists of banded travertine two to six or more feet thick (the top and base of the travertine were not clearly visible in any single outcrop) underlain in places by breccia up to at least four feet thick composed of angular fragments up to two inches in diameter of travertine, graywacke, and black slate, in a travertine matrix. This breccia is hard rock in some outcrops and a loose wet aggregate like newly poured concrete in places along the creek mentioned above. The travertine clasts in the breccia occur as pitted, sub-round, worm-eaten-looking fragments up to two inches across, and there is only a small percentage of graywacke and slate.

In some areas the breccia is missing and the banded travertine rests directly in sharp angular unconformity on east dipping graywacke-black slate of Mesozoic (?) age. The travertine mainly dips 40° west, approximately parallel with the present hill slope.

At 1000 foot elevation the south half of the deposit appears to contain only patches of travertine. The travertine forms scattered small west-facing scarps 3 to 6 feet high separated by moss and humus covered areas, some underlain by graywacke. Each of the scarps exposes a cap of vuggy, rough, colloidal banded travertine (1 to 3 or more feet thick) dipping west about parallel to the hill slope. This cap is underlain by softer travertine which weathers away to form a small cavern, often a porcupine den.

In the northern half of the deposit at 1000 foot elevation, travertine appears to be continuous.

The rocks of Mesozoic (?) graywacke sequence are mostly non-calcareous, but locally, near the head of the above mentioned small creek where it issues from a hillside spring (1450' elevation), the rock contains some slightly calcareous black slate. In this place the small joints contain ± 1/8" calcite veinlets.

In two places this creek has cut down 6' - 8', through the travertine-graywacke and slate contact. At no place was any evidence of present deposition of travertine seen.

In places the streams cut down to graywacke bedrock; elsewhere they are still choked with large travertine blocks which rest on unconsolidated travertine-graywacke debris(unconsolidated breccia). Areas underlain by travertine have a particularly lush growth of snake alders, devil's club, and nettles, and are damper than elsewhere. These make a useful guide to "ore".

The travertine is post-glacial as glacial scouring would have removed it from its exposed position along the hillside.

History of travertine deposition:

1. Glaciation

2. Deposition of travertine along creeks from spring fed waters.

3. Down cutting of creeks through travertine.

Northern deposit. This deposit shows up as buff colored wormy-looking travertine fragments in "Lime" Creek where it crosses the middle trail to Lower Russian Lake. Jim Dunmire and Harold Davis have drilled a number of vertical diamond drill holes down through the travertine. Davis reports that travertine occurs in the lowland along and south of the creek to a thickness of up to 9' 1". It is overlain by only a few inches of vegetation and humus and is reportedly underlain by black slate grit. Davis estimated a content of 10,000 yards of travertine in the deposit.

The occurrence and origin of this deposit appear to be similar to the better exposed deposit to the south, which was described above.

Tonnage. Southern deposit:

Assuming that the thicknesses seen are approximately representative of the whole area, a rough estimate of tonnage can be calculated.

$$\frac{500' \times 1000' \times 5' \text{ thick}}{2(\text{discontinuity factor})} = 1{,}250{,}000 \text{ cu. ft.}$$

50,000 cu. yds.
80,000 tons

Northern deposit.

Mr. Davis' figure = 10,000 cu.yds.
16,000 tons

Analysis. X-ray diffraction of the travertine shows it to be calcite with traces (less than 1%) of quartz, strontium, and iron. No dolomite is present.

Origin of the Travertine. At the south deposit, the travertine forms a surficial layer up to ten feet thick on the steep glaciated hill slope. The deposit is located below a hillside spring and is at present being dissected by the creek from that spring. Bedrock is generally noncalcareous black graywacke-slate except that in the area of the spring the rock is somewhat calcareous with cross cutting calcite veinlets. The deposit extends south of the spring in an area where vegetation choked gullies represent abandoned drainages, probably from now dried-up springs, south of the present spring.

It is evident that the deposit has formed since the last glaciation. A knowledge of the conditions that can cause deposition of carbonate is useful in understanding the origin of the deposit. "Calcium carbonate deposited in lakes and around springs is formed as a result of the escape of carbon dioxide from the water, whereby the solubility of calcium carbonate decreases. The loss of carbon dioxide may be the result of the release of pressure when the water reaches the surface, of an increase in temperature, of agitation, or of the biological activity of green plants." (Rankama & Sahama P.215) Travertine deposits form along rivers, in lakes, and around hot springs as a result principally of pressure release, warming, or evaporation of water.

The location of the travertine along a creek which is now cutting down through it may indicate that carbonate was once deposited by the creek, but now, due to changed conditions, the role of the creek is reversed and it is eroding the deposit away. Possibly deposition occurred during the warmer period, about 3500 years ago, when a more luxuriant vegetation cover provided more CO_2

to the percolating rain water which dissolved calcium carbonate from the bedrock only to reprecipitate it at the surface due to pressure release and warming.

Other possibilities.

1. It is possible that the source was a hot spring which is no longer active. In this case the source of the calcium carbonate may lie at depth, and the presence of the spring just above the deposit is only an accident.

2. Another possibility is that the travertine has been precipitated as a result of evaporation from surface seepages. The deposit could be forming as rapidly today as it ever did, with erosion by the present creek only an incidental feature which does not represent any change in conditions. Discoveries of travertine deposits elsewhere in the area will give additional data that may allow one to determine the origin with greater certainty. With the data at hand the first possibility seems most likely to me. This mechanism carries with it the probability of finding other similar deposits in the general area, whereas a hot spring origin would require rather special conditions.

Summary. Two areas of travertine located east of the Russian River near Lower Russian Lake contain a total of roughly 96,000 tons of rather pure calcium carbonate.

These deposits are in the form of surficial blankets up to roughly 9 ft. thick which have formed since the last glaciation in the area. The source of the lime was springs of probable meteoric origin. There is a good possibility that other similar deposits are present in the area.

Gordon Herreid, Mining Geologist
December 18, 1967

DM-11
Rev. 8/66

Report No. 834

Date of Report June 20, 1967

STATE OF ALASKA
Department of Natural Resources
DIVISION OF MINES AND MINERALS
3001 Porcupine Drive, Anchorage, Alaska 99504

LABORATORY ANALYSIS REPORT

For Gordon Herreid Address Division of Mines and Minerals, City

Number of Samples 1 Date Sample Received June 19, 1967

Work Done:
A. X-ray fluorescence quant. ☐ , semi-quant. ☒
B. X-ray diffraction ☒
C. Spectrographic quant. ☐ , semi-quant ☐
D. Fire assay ☐
E. Identification ☐
F. Other ☐

Laboratory Number	Sample Marked	Analysis or Identification
19653	Limestone Russian River	B. Calcite with a trace of quartz. (less than 1.0%). No dolomite detected by X-ray diffraction. A.* Strontium: tr. Iron: tr. * tr. - less than 1.0%

Russian River
Travertine

Namok Cho
A,B. - Namok Cho Analyst

Analyst

Analyst

Approved: Gordon Herreid, Geologist-in-Charge

NOTE: Samples discarded after 60 days and pulps after 6 months unless instructed otherwise.

FORM SA 18
125 3M 8/67

JAN 12 1967
Div. Mines & Minerals

MEMORANDUM State of Alaska

TO: Mr. Gordon Herreid, Mining Geologist
Division of Mines and Minerals
College, Alaska

THRU: James A. Williams, Director
Division of Mines and Minerals

DATE : January 8, 1968

FROM: Dale Wallington
Deputy Commissioner

SUBJECT: Limestone Sample

The sample I gave to you came from Mr. Hamilton at Coopers Landing. I feel sure it came from the deposits on the Russian River Trail.

Thanks for your report.

DW:va

Seward, Alaska
November 29, 1967

Gordon Herreid, Geologist
State Office Building, Rm. 105
Faibanks, Alaska 99701

Dear Mr. Herreid:

We hope you people of Fairbanks are well along on recovery from the effects of that damaging flood.We also hope the response for aid by loans through our Federal Bureaus has been encouraging and restrictions on these loans were not too stringent. Sometimes these Federal Bureaus, with their bureaucratic restrictions, can certainly be irritating with the appearance of hindering we layman instead of helping.

At the time of looking over our Travertine limestone claims in the Cooper Landing area you stated, Gordon, you would probably get your reports out this winter. Realizing the flood and your moving to Fairbanks may have caused delay in getting the reports out we nevertheless are extremely anxious to see a copy of the report.

The Forest Service is on our backs, so to speak, and have even tried to discourage the farmers on the Kenai Peninsula from arranging to get lime from us for agricultural purposes. The Forest Service is trying to stop us frpm developing the claims and have stated they were going to send us a notice of eviction. The burden of proof is on us to show our Travertine is not a "Common Variety". It is in demand now as a building stone, for agricultural purposes and for use in the chemical plants now being erected in North Kenai. I have written the Commissioner of Natural Resources with copies to Senators Gruening and Bartlett, Congressman Pollock and Governor Hickle briefly outlining what our Travertine claims and our difficulties with the Forest Service.

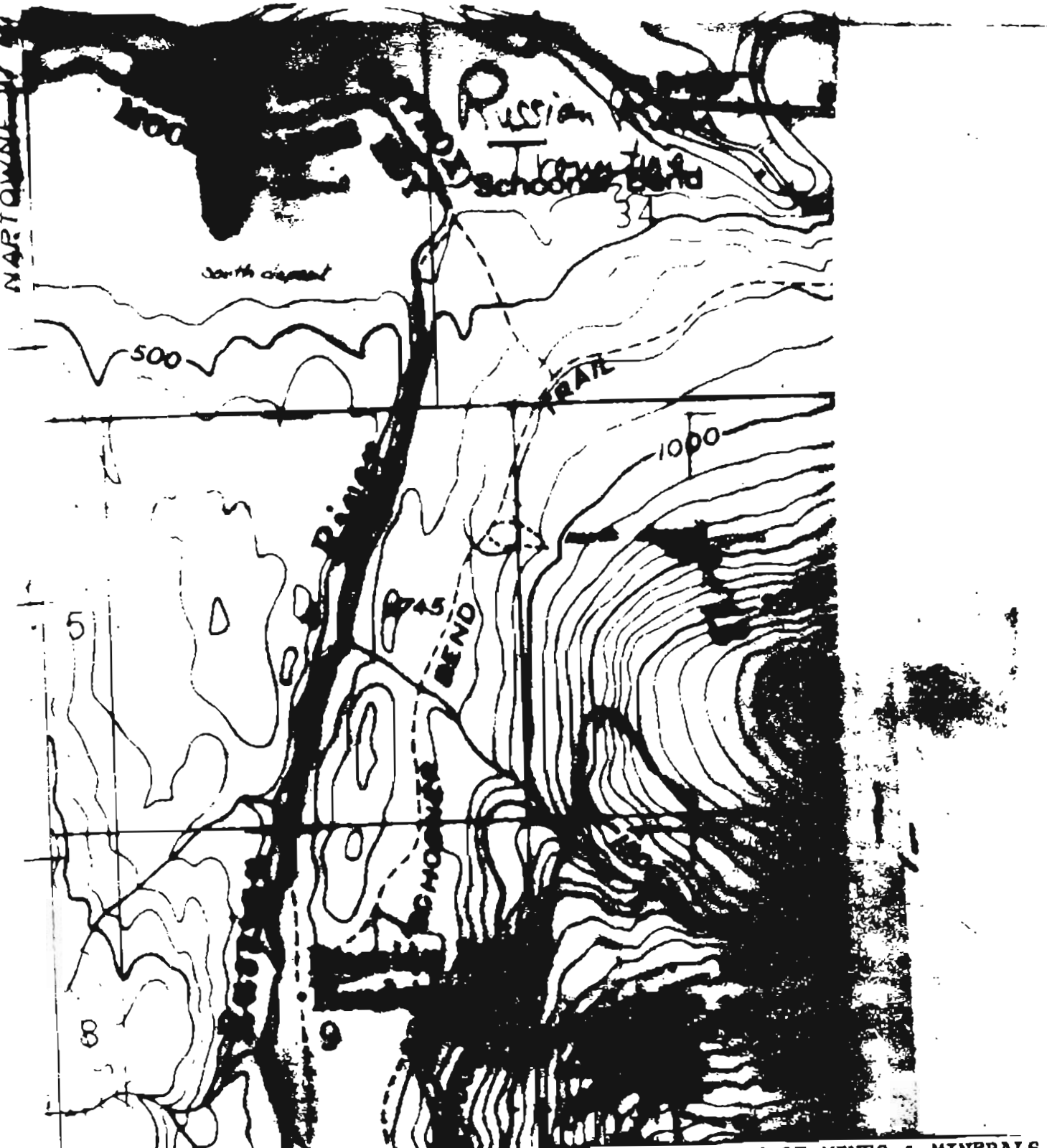
A statement from you giving your report on quality, location and if possible an estimated tonnage, will certainly be most appreciated. I may add that following your visit we have uncovered more travertine and staked more claims.

We thank you for any help or suggestions you have to offer.

Sincerely yours,

Harold W. Davis

Harold W. Davis
P. O. Box 1364
Seward, Alaska 99664



ALASKA DIVISION OF MINES & MINERALS

Geologic sketch map
of the
Russian River travertine deposits

¼ mile

Gordon Herreid
Mining Geologist
December 1967

Paul Nestor 262-4581
James Dunmire

Max-Hamilton - just past
~~[illegible]~~ R. bridge

start 55683
mileage - return 55,900

Russian River
Travertine Project

June 16-18, 1967

Gordon Herreid - geol.
Jerry Colp - asst.

Russian River Travertine Project

Date
June 16 Lv. Anch. 8:15AM Arr Cooper Landing 11AM in field until June 18
June 18 Arr Cooper Landing 10AM. Lv C. Landing 11 AM Arr Anch 2 PM

Mileage (State car)
finish 55900
Start 55683
217 miles

Lower Russian Lake Travertine

Fri June 16
1. 780 - 755 - No travertine to date on this hill

2 810 Bl. Shale breccia (1"x8" clasts) cemented by wh. calcite w/ Cc lining voids between clasts
First float seen.

TC-3
#3 Creek
875 In small C. 3' w 3' deep. Bedrock shown by in place rubble - dk gy shale & siltstone
- Qtz vein float - 10% w/ dk gy slst - shale
Travertine float 5% - vuggy - w/ breccia frags in it - a surficial deposit

4 975 dk gy shale - siltst
fairly massive, crisp, not well bedded, but w/ long shale cl.
1040 - 10' thick bl st-sh. cl clasts
dips w down hill looks like Fat Cong w/ Calcareous matrix - identical to #2 float
P17

5 1160 (1140) Pick of travertine
Picture traverting in Cc W / Howard Davis shows Trav w/ sl/st clasts
lime mud w/ T & SS clasts
½ - 1" - soft, ... A model of whole hill side?
Picture 1175 HD
shoots
lim. Clay as ...

Sample (5) 1200' Sample of Trav. Vuggy Cc Rk w/ scat siltst. or bl st clast. Trav. sheets show no clasts in upper part
1-2' clast scattered
lime mud w/ T & SS clasts

7C6 1925 Med[th] gy moderately limy slate w/ Cc veinlets or joint planes ~Trav 6'   p20

dwg (see after 7C19)

Sharp [illegible] Trav. - slate cct on RL

Trav. Colloidal banded w/ bl sl frags to 1/4"

10' above "6" Creek emerges from a spring. Start of Trav 10' [illegible] below

7 1950 Side glacial channel
bl sl clast breccia cemented by Cc. (5% of RL)

8 1950 - 7-8 - Side Glac. Chan (?) or fault trace, or landslide scar.

7C9 1325 110° vuggy Trav
picture dips ~ 11 to slope. Porkypine droppings
No base or top visible ~ 4' thickness.

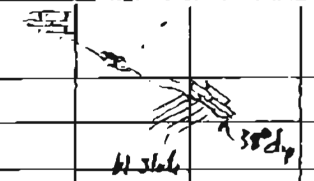
1100 - ~100 dn hill 4' of Trav. w/ slate clasts

10 1260 (1100 JC) Small Cr w/ Trav. stream bed exposed in width of 4'

11 1075 ~200' S of 7C3 Cr.
Bl. Slate float under 1' moss-humus.

12 1050 (JC 1010) ~100' to Rus Road ~10' thick bedding roughly flat.

colloidal banded is w/ [illegible] grade [illegible]

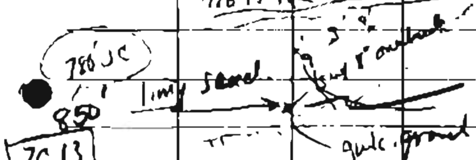


925 Cc cemented S[illegible] St. - Bl Sl breccia (dn hill fr 12) ~ 6' exposed dips ~ 11 to slope ~ 50% Cc.

7:15PM 650 (JC 630) on flat
past 590 actually so elev of lake station 60' hi
note all elev 30' hi as L. Russian Lake is about 540

Lower lake on limestone Cr. -
10,000 Cu Yds of ~ 6' thick ls underlain by grit. - 9'1" thickest at heading over 33' of non-calc grit (bl. slate) Cr. peters out just above. - An alluvial fan?
no ls [illegible]

7C13 (780' JC) 850



7C13 Sample ls sand contaminated w/ mud.

8"-1' overburden.

N 310

Note

James Dunmire
Cooper Landing

Harold Davis
Box 1364, Seward

E. B. Connors
Manager of Exploration & Development
Permanente Cement

Sat June 17 Flew in to Lower Russian L. w/ Harold [illegible] in 18C
Paid for by Max Hamilton. Jimmy Dunmire
[illegible] along. Will walk back to ~~tomorrow~~
New Alt & Old Alt (C)
9:50 AM

(7C14) 675 - Creek [illegible] [illegible] [illegible] [illegible]
[illegible]
No Trav.

7C 15 1050 (OA 1010) (JC 1000) 10/50
[illegible] silts [illegible]
Coal [illegible] too well
[illegible] slight [illegible] on [illegible]
1 pc andesite
med grayish gray w/ [illegible] plagio [illegible] phen [illegible] pc.

Conclusion: Red Rk is Gulk.? w/ a few ... from below a break in slope & corresponds [illegible] basin along Cr. in glac. has gone sediment taking the resistant [illegible] sect. DI stuff [illegible]!

16 1025 - (JC 1010) (OA 1000)
15-16 grassy meadow steep alder, [illegible]
16 - [illegible] [illegible] 8" [illegible] gulch slat

12:45 reset alt on Fbl (OA 560 from 610
JC - 560 from 590) (NA 560 to 560)

17 (950 (?)) (1750?) 125° to RRR rendezvous
[illegible]

32 N - (1000 OA) (1050 JC) RRR 125° Alder w/
Some clear spaces below, scattered Devil Club
No snake alder yet, nothing but gulch
[illegible]
& 4" Humus [illegible]

= (1070 CA) (1100 JC) RRR 116° [illegible]
V Steep Slope [illegible] alder [illegible] spruce [illegible]
45° slope

18 (1075 CA) RRR 109½°
First distinct drainage [illegible] valley
w/ many D. [illegible]
First insectivorous [illegible]
in first (dry) gulley seen [illegible]
w/ much D. Club indicating [illegible] a [illegible]
area.

50' N (1107 [illegible]) Typical [illegible]
[illegible]
[illegible] Trav. w/ covers
under top layer

This doesnt represent a continuous deposit as some guide it to here. This is typical of most other occurrences seen - discontinuous ~~aprons~~ aprons of Trav. w/ cover under a [illegible].
Humus is much deeper

about 1 foot

N 18 (1100 OA) small straight Creek - trench 2½' ... 3' w w/ gne rubble & ~ 5% Trav rubble.

[7C 5(?)] 1125 (1090 OA) (1160 JC) (1210 NA)

#3 Creek — gnt ... — float or in place

limy mud w/ slate-Trav clasts

sample of grey calc mud w/ Trav & gne-Sl clasts underlies Trav apron. Typical of many exposures, but looks like ... boulders.

Creek float ...% gne ...% Trav ... all undul. by 1 [1?] elong. ... 75" ...

... = T.W. ... clast

up Creek ... 3 ... apron of buttressed

[7C5] Trav underlain by limy mud

[7C5] → In banks - limy mud w/ same slaty frags. ... meg. nodules of ... on Travertine. How did apron form? - they appear to be clasts - not ... on edges like they formed in place. ... slope ... extending ... along down stream.

extent of Trav at this elev - may be continuous for ½ way to #18 - ... beyond there.

[7C5] - mg Trav nodule ... side of Cr. ... underlain by ... limy mud ... shale ... Cr. ... cut ... the "mud" ... the gne-sl clasts so that they pave the creek bed and yet are underlain by ... mud.

7C 19 (1120 OA) 19' ... gne - 1 gv - 8" 1¼
... ... No ... Snake Alder

100' N Same elev. No D.C. SAH - grass - ferns - birch & bushes w/ greenish pink ball-like flowers. ... nettle ... darkish green leaves ... ~ 3' hi - w/ woody (... brown) stalks. ... of alder gne.

7C 6 (OA 1370) (JC 1460) (NA 1525) 1450
head of Creek - spring bubbling out of gne rubble. Cr. has cut down ~8' below Trav. (in 7C6 sketch) which overlies the E dipping gne-slate. Below here there is a Travertine sheet ~100 or more feet long in place. this extends N at least 50 at 1300 but impenetrable alders beyond to N. @ 1300 ... mosscovered ... cut bank
... bl-sl, gne rubble overlies Trav. To N. in alder, Trav. underlain w/ 4" ... (... mud) Trav. sheets are mainly free of gne frags. but underlain by gne frag. rubble. ∴ Travertine formed at surface underlain by rubble.
Cr. does not appear to be forming Trav now. No constructional - (accumulation) forms. Formed after glac. & then later was cut into by erosion (... ...).
The large apron of Trav. along Creek (#5) represents dissected - eroded larger sheets.
Areas underlain by T. have Snake alder (thick) to 4' dia., D. Club, nettles, a profusion of ferns & generally thicker humus layer (4-14"). A denser vegetation.

7C 20 980 OA 1130 NA 1085 JC — bedded Trav — $\frac{95}{40}$
1130 on #3 Cr. — Travertine ...
Not plotted due to congestion RR 101
RL Bank in 20' above Cr.
Bedded T above Congl. - all gne hard.
... this Cr. between ... #5 ... mostly gne ... Bedstone 5' up.

(WA 675)(OA 620)(JC 670)

Sunday - June 18 up @ 6 away at 7:25
... breakfast [illegible], Walk back to road.

[JC21] 780 at trail 890 at upper end
Lime Cr just above trail.
Tan. mud from Cr.
Lime Cr. Travertine deposit - Wormy looking
porous buff colored travertine nodules. ~1"
- 2" ≈ nodules. Scattered dark green
stained Trav. nodules, w/ typ. wormy appearance.
Harald Davis reports Trav w/ thickness
of up to 9'1" ≈ about 10,000 cu yards
of Trav. in this deposit.
All underlain by "sharp sand" w/ some
[illegible] (Sample 13) Creek has f. gr. almost
dl gray quake sl sand above Trav - ~~mostly~~ to all
Trav in deposit. - 2" wormy nodules ≈ lime
sand.
Creek is 2' w 3' deep