

FIELD OBSERVATIONS: Bumpass Hell
 Made for Naturalist Department;
 Lassen Volcanic National Park.
 8-29-53
 By Peter S. Bennett

Note:

Barrometric pressure on 8-29-53; 26.56 in. Hg.

Ave. air temperature: 19.9 C.

All temperatures are given in terms of degrees Centagrade and are not corrected for pressure, immersion or calibration.

<u>NPS #</u>	<u>Map #</u>	<u>Samp. #</u>	<u>Type</u>	<u>Ave. Temp.</u>	<u>Turb.</u>	<u>Inflow</u>
31	5	1,A	Pool	42.7°	2.5"	Dry
31	4	---	P	65.0°	0.5"	Dry
---	6	---	P	42.5°	0.5"	None
---	---	---	Solfatara	59.1°	---	None
33	---	2,B	P	84.1°	0.25"	None
34	3	---	P	13.6°	Clr.	Seep
---	2	---	P	12.0°	Sl. Trb.	Seep
---	---	---	S	---	---	Seep
35	1	3	P	12.0°	1.5"	Seep
3958	13	---	Fumarole	115° (est.)	---	---
40	12	4,C	P	79.0°	0.0"	None
---	---	5	S	56.2°	---	---
---	10	6	Mudrot	86.2°	0.0"	None
43	21	---	P	48.3°	4.1"	None
---	7	7	P	87.0°	0.0"	None
45	19	8	M	---	0.0"	None
44E	16	---	P	73.2°	4.0"	Inaccessible
			S	66.0°	Trb.	---
44W	17	---	P	66.0°	5.0"	Inaccessible
			S	60.4°	Trb.	Inaccessible
44SW	18	---	P	77.2°	3.0"	Inaccessible

<u>NPS #</u>	<u>Map #</u>	<u>Samp. #</u>	<u>Type</u>	<u>Ave. Temp.</u>	<u>Turb.</u>	<u>Inflow</u>
---	20	297	M	89.0°	0.0"	None
26	21	---	F	92.-°	---	---
27	8	9,D	P	41.5°	3.5"	Dry
---	---	---	P	63.7°	0.0"	None
29	7	---	P	Inaccessible		None
---	9	10	S	50.3°	2.4"	---

Outlet of nos. 21.
 Spouts to a light of 1".
 No activity.
 Dry.
 No. Some suspension, no activity
 visible. Outflow #31
 No.
 Very noisy and hot. Three
 temps. taken; all above the
 100° range.
 Drainage has some pyrite.
 Drainage was out. 11 & 12.
 3' N. of trail below #43
 Large sulphur pool overflowing
 over entire surface. Outlets
 one to the S. the other into
 #44.
 Small sulphur pool with no outlet, rather deep.
 Small amounts of pyrite, and
 very thick.
 Taken on W. edge.
 Taken on E. edge.
 Outlet inaccessible, drains into
 #43.

FIELD NOTES: Bumpass Hell

8-29-53
(Cont.)

<u>NPS #</u>	<u>Map #</u>	<u>Outflow Depth</u>	<u>Width</u>	<u>Flow F.P.S.</u>	<u>General Remarks</u>
31	5	0.25"	8"	1	Pyrite scum in frothy masses.
31	4	Dry			Aprox. 30' N. of above.
---	6	---			Just N. of nos. 31 outlet
---	---	1"	18"	6/5	Outlet of nos. 31.
33	---	---			Spouts to a height of 1".
34	3	2.5"	5"	2	No activity.
---	2	Seep			Do.
---	9--	1"	7"	4	Do. Some suspension, no activity visable. Outflow #35
35	1	1"	8"	4	Do.
39	13	---			Very noisy and hot. Three temps. taken; all above the therm. range.
40	12	Thin mud trickle			Drainage has some pyrite.
---	---	1"	11"	6/5	Drains map nos. 11 & 12.
---	10	---			3' E. of trail below #40
43	21	2 but both dry			Large sulphur pool simmering over entire surface. Outlets: one to the S. the other into #44.
---	---	Small sulphur pool with no			outlet, rather deep
45	19	---			Small amounts of pyrite, mud very thick.
44E/	16	---			Taken on W. edge
		1"	10"	6/5	
44W.	17	---			Taken on E. edge
		3"	24"	6/7	
44SW	18				Outlet inaccessible, drains into 44W.

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8-29-53

(Cont.)

NPS#	Map#	<u>Outflow</u> <u>Depth</u>	<u>Width</u>	<u>F.P.S6</u>	<u>Remarks</u>
---	20	---			Mudpot 10' SW #43
26	21	---			Sulphur fumaroles
27	8	Trickle			
---	---	Trickle			Thin mud in spring, boiling very hard. Just below #29
29	7	---			Simmering over entire surface
24	9	2"	38"	2.5	Outlet of Bumpass Hell to the South.

ASSEY REPORT: Bumpass Hell
Made for the Naturalist Department;
Lassen Volcanic National Park
9-16-53 to 1-7-54
by Peter S. Bennett

Note: All results are expressed in percent. Several ions are found in these samples that were not present in sufficient amounts to record in the liquid samples, this may be due to the fact that a large volume of mineral bearing water is evaporated to form these salt incrustations making the ions more concentrated.

Sample No.

A. H 0.31, NH₄ 0.10, K 0.33, Na 0.41, Ca 0.09, Mg 0.92, Fe⁺⁺⁺ 7.30, Fe⁺⁺ 1.03, Al 8.32, SO₄ 80.50, Cl trace, SiO₂ trace
B₂O₃ 0.09, Ti 0.02, Mn 0.03, Li 0.01.

Total 100.02%

B. H 0.9, NH₄ 0.3, K 2.7, Na 0.6, Ca 1.3, Fe⁺⁺⁺ 0.6, Fe⁺⁺ 0.6, Al trace, SO₄ 17.3, Cl trace, SiO₂ trace. S absent, H₂O 8.3.

C. H 0.9, NH₄ 13.8, K 13.4, Na 31.0, Ca 8.8, Mg 0.8, Fe⁺⁺⁺ 17.7, Fe⁺⁺ 1.8, Al 31.1, SO₄ 115.1, Cl 1.1, SiO₂ 240.2, S 19.7, H₂O 4.8.

D. H 0.8, NH₄ 4.3, K 13.9, Na 40.1, Ca 3.8, Mg 2.3, Fe⁺⁺⁺ 25.1, Al 33.4, SO₄ 712.7, Cl 0.8, SiO₂ 110.3, S 2.9, H₂O 3.2.

E. H 11.4, NH₄ 10.6, K 47.7, Na 28.4, Ca 22.0, Mg 17.4, Fe⁺⁺⁺ 11.4, Fe⁺⁺ 0.4, Al 43.4, SO₄ 325.9, Cl trace, SiO₂ 1302. S 11.7, H₂O 35.8.

F. H 0.0, NH₄ 61.2, K 3.1, Na 34.0, Ca 4.7, Mg trace, Fe⁺⁺⁺ 10.9, Fe⁺⁺ 10.9, Al 34.9, SO₄ 635.6, Cl none, SiO₂ 75.6, S 39.1, B₂O₃ 24.4.

G. H 31.7, NH₄ 16.1, K 17.8, Na 30.5, Ca 11.1, Mg 1.1, Fe⁺⁺⁺ 22.7, Fe⁺⁺ 0.1, Al 17.8, SO₄ 220.5, Cl trace, SiO₂ 140.7, S 4.4, H₂O 35.5.

H. Sample destroyed by breakage of collection bottle.

I. H 0.0, NH₄ 27.9, K 10.5, Na 25.4, Ca 11.6, Mg 0.1, Fe⁺⁺⁺ 23.8, Fe⁺⁺ 0.3, Al 20.0, SO₄ 293.7, Cl trace, SiO₂ 134.6, S trace, B₂O₃ 22.6.

ASSEY REPORT: Bumpass Hell
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9-16-53 to 1-7-54

Note: Results listed as mg./l. although only 100 ml. samples were taken. In some cases ferrous and ferric iron are combined. This is because of an excessive length of time taken to prepare the sample for assay, the ferrous ion being very unstable.

Sample No.

- 1 H 8.6, NH₄ 12.5, K 15.4, Na 43.0, Ca 37.6, Mg 30.7, Fe 49.9
Al 24.9, SO₄ 1033.7, Cl trace, SiO₂ 358.5, S 36.3, B₂O₃.
- 2 H 7.8, NH₄ 15.0, K 12.5, Na 33.3, Ca 6.7, Mg 6.2, Fe^{'''} 17.9
Fe^{'''} 4.1, Al 31.1, SO₄ 697.5, Cl 1.5, SiO₂ 248.-, S 25.9
B₂O₃ 4.1.
- 3 H 0.9, NH₄ 6.1, K 2.7, Na 0.8, Ca 4.5, Fe^{''} 0.6, Fe^{'''} 0.1
Al trace, SO₄ 17.3, Cl trace, SiO₂ trace, S absent, B₂O₃ 2.6.
- 4 H 6.2, NH₄ 13.8, K 13.4, Na 31.9, Ca 6.5, Mg 5.3, Fe^{''} 17.7
Fe^{'''} 5.5, Al 31.2, SO₄ 718.3, Cl 1.1, SiO₂ 240.0, S 19.2
B₂O₃ 0.8
- 5 H 6.3, NH₄ 6.3, K 13.9, Na 45.1, Ca 6.2, Mg 5.3, Fe 23.8
Al 33.4, SO₄ 712.7, Cl 0.8, SiO₂ 110.3, S 9.9, B₂O₃ 3.2.
- 6 H 11.4, NH₄ 18.6, K 47.7, Na 28.4, Ca 29.0, Mg 19.4, Fe 38.5,
Al 63.4, SO₄ 323.9, Cl trace, SiO₂ 1002.- S 2.6, B₂O₃ 33.3.
- 7 H 6.0, NH₄ 41.9, K 5.1, Na 24.0, Ca 4.7, Mg trace, Fe^{''} 29.6
Fe^{'''} 10.9, Al 34.9, SO₄ 635.8, Cl none, SiO₂ 220.5, S 39.4
B₂O₃ 24.4.
- 8 H 11.7, NH₄ 18.1, K 47.9, Na 50.3, Ca 6.3, Mg 5.5, Fe^{''} 29.7
Fe^{'''} 8.1, Al 69.9, SO₄ 328.5, Cl trace, SiO₂ 1009.- S 4.4
B₂O₃ 36.5.
- 9 Sample destroyed by breakage of collection bottle.
- 10 H 5.6, NH₄ 27.9, K 10.0, Na 25.4, Ca 11.8, Mg 0.4, Fe^{''} 25.9
Fe^{'''} 5.3, Al 20.6, SO₄ 593.7, Cl trace, SiO₂ 134.8, S trace,
B₂O₃ 22.5.

SKETCH MAP
OF "BUMPASS HELL" HOT SPRING REGION



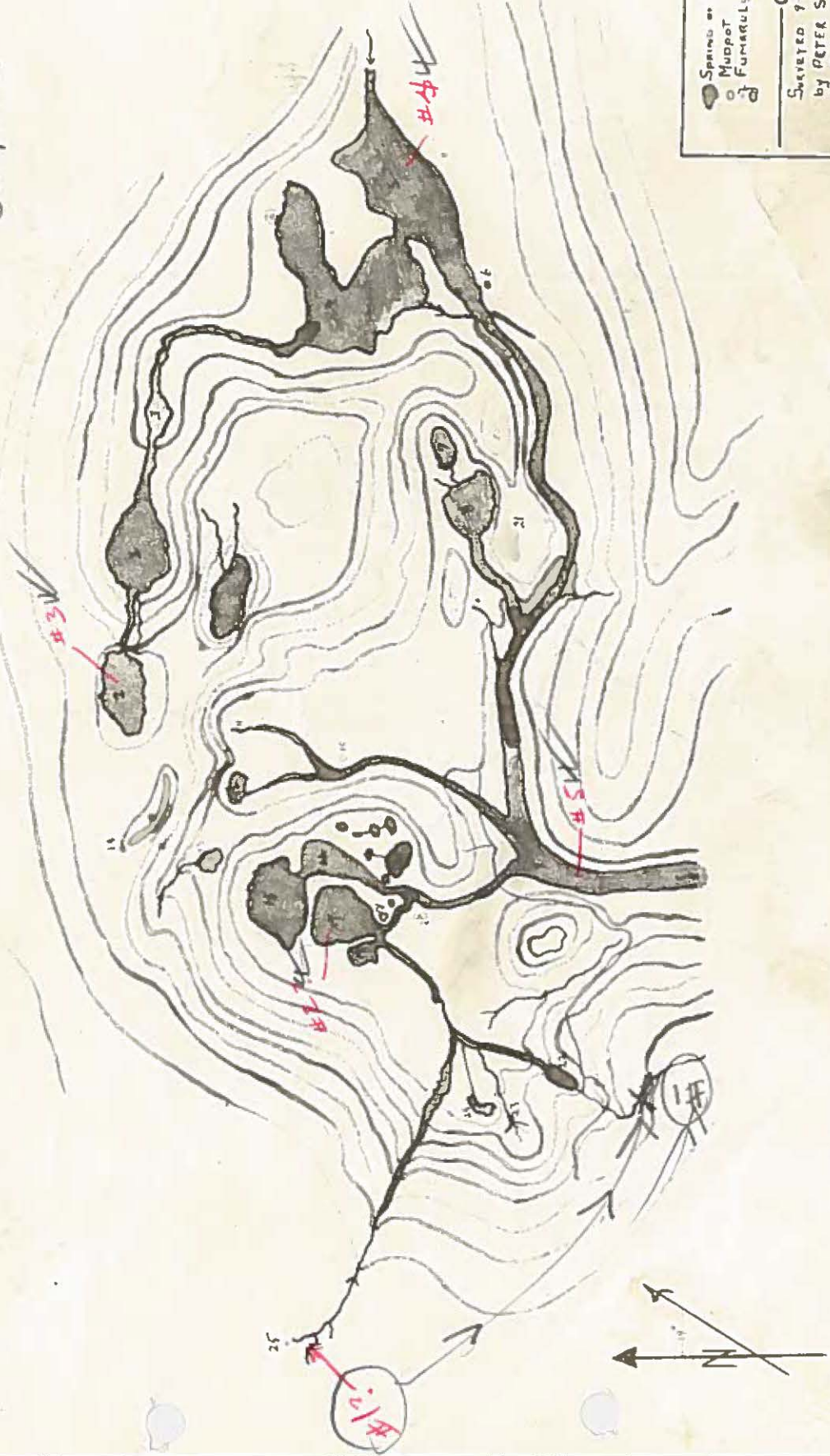
 Spring or Pool
 Mudpot
 Fumaroles

Surveyed: 9-5-53
 by PETER S. BENNETT
 To A Scale 1" = 125'
 by HAND COMPASS + AKINO

Sample for *Forams*

SKETCH MAP
OF "BUMPASS HELL" HOT SPRING REGION

- ① Spring Name & Hot
- ② Date
- ③ Temperature



Spring or Pool
Mudpot
Fumarole

Surveyed 9/3/51
by PETER S. BENNETT
at a scale of 1" = 1/2 mile
by HAND COMPASS & ALTIMETER