3,4,5,8.

WESTERN MINERALS, INC.
Elsah, Illinois

SAMOA VOLCANIC PETROGRAPHIC SUITE (Tutuila - American Samoa; Upolu - Western Samoa)

Introduction

Ten specimens were collected from the island of Tutuila in American Samoa, and twelve from the island of Upolu, Western Samoa. No specimens were collected from the larger, westernmost island Savai'i because of difficult access.

Representative material was collected from each of the main volcanic units identified by Macdonald on Tutuila, five from outcrops sampled for che mical analysis. Most of the main units on Upolu were collected, however, a bridge wash out about 15 miles east of Apia prevented access to some important outcrops in the eastern end of the island.

All collecting was done by Dr. Forbes Robertson, Principia College, Elsah, Ill.

References

Macdonald, G/A., 1963, A contribution to the petrology of Tutuila; Geol. Rundich. v. 57 # 3, p. 821-837.

Kear, D., and Wood, B.L., 1959, The geology and hydrology of Western Samoa, New Zealand Geological Survey Bull. 63, 90 p. Good geologic maps.

Description and Location of Specimens

Specimens 1 thru 10 are from the island of Tutuila. The locations are given on a sketch map.

1. Dense, brittle basalt (Olomoana Volcanics), along beach about $\frac{1}{4}$ mi. west of end of road. Not outcrop, but substantial percentage of beach covered with this type. Outcrop at Kidd Point. Hawaiite ?. (MaCDONALD ANALYSIS 5 ?)
2. Dense, fine grained basalt, with distinctive sub-spheroidal weathering which does not persist, distinguishable, along breaks. Same locality as 1. Float.
3. Dense basalt, Olomoana volcanics., Hawaiite?. Road cut 0.65 mi. W of Utumea. Correct location for Macdonald analysis 6.
4. Light gray basalt, with olivine clusters. Alofau volcanics. 1.5 mi. SE of Alofau and back of Cape Fanango.
5. Hawaiite ?, 1.2 mi. SE Alofau, Alofauavolcanics. Good outcrop, roadcut just back of Cape Fagango. This is probable location of Macdonald analyses 3,4 as there are no other outcrops which fit the description. If a small store with Alofau written on it is taken as the town, then the milage is correct for the location of the analysis.
6. Grey, dense basalt with flat vesicles. Taputapu volcanics. Roadcut at headland just Ws of Failolo. The only dense rock is in the cut, whereas others are scoraceous and partly weathered. Note brown mica crystals in some vesicles. No olivine noted with hand lens. This should be the site for Macdonald analysis 2.
7. Olivine basalt, Taputapu volcanics. Road cut 1800 ft. SE Nua. Macdonald analysis location 1. No other possibility.
8. Vesicular olivine basalt, Leone volcanics, on headland just S of Vaitogi. This has to be a relatively recent flow. The pahoehoe surface is clearly distinguishable.
9. Alkali olivine basalt, Pago Volcanic Series. Low sea cliff W side of bay, 600 ft. NW of mouth of Agasii stream. This is a dike which cuts scoracious basalt. Distance correct for Macdonald analysis 7 and it is the only dense rock for some distance along the headland.

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10. Syenite, intrusive ?. Float cobbles and boulders on beach at locality 9. Source area most be upstream to SE.

Specimens 11 thru 22 from Western Samoa, Upolu Island.

11. Basalt, Mulifanua volcanics. Hedge et.al. analysis locality 4. Outcrop at shore at Faleasi'u about 12 mi. W of Apia along the coast road.

12. Lefago volcanics, Safa'otoa quarry, N. sode of road, Safa'atoa.

13. Somewhat vesicular basalt, Mulifanua volcanics, at crest of island just N of Tanumalala at Hedge et. al. analysis loc. 5.

14. Vesicular basalt, olivine bearing, near end of airstrip, near PT 502.

15. Olivine pikritic basalt, Fagaloa volcanics between Cape Utumau'u and Namo vollage, about 12 mi. E of Apia at Hedge et. al. analysis loc. 2.

16. Olivine phyroxene pikrite, just back of Cape Utumau'u. Similar to 15 but larger phenocrysts - a beautiful rock. This rock was collected while a land-slide, which crossed the road, could be breached to allow trafic back to Apia!

17. Puapua volcanics, near Lauli'i village on N coast about 6 mi. SE of Apia, at Hedge et. al. analysis loc. 6. Poor crumbly sp. collected in rain. ✓

18. Sulani volcanics, somewhat vesicular basalt with some olivine, at crest of island, S of Apia, between Fiamoe and Vaitoa cones, at Hedge et. al. analysis loc. 3.

19. Limbergite, with distinctive white splotches weathering on as fresh material as is available in quarry at point 523. Puapua volcanics.

20. Another flow exposed in the quarry, olivine bearing, with small mia;rolitic cavities. Note: no trachyte seen below the dam because of very high water.

21. Fagaloa volcanics, between Letogo and Lauli'i villages about 6 mi. SE of Apia at Hedge et.al. analysis loc. 1. Olivine and pyroxene phenocrysts, very similar to 6 which is clearly a flow. This is probably a lava tube filling.

22. Salani volcanics, olivine, pyroxene and crowded small white feldspar phenocrysts at small outcrop at Letogovillage, about 1 mi. W of 21.

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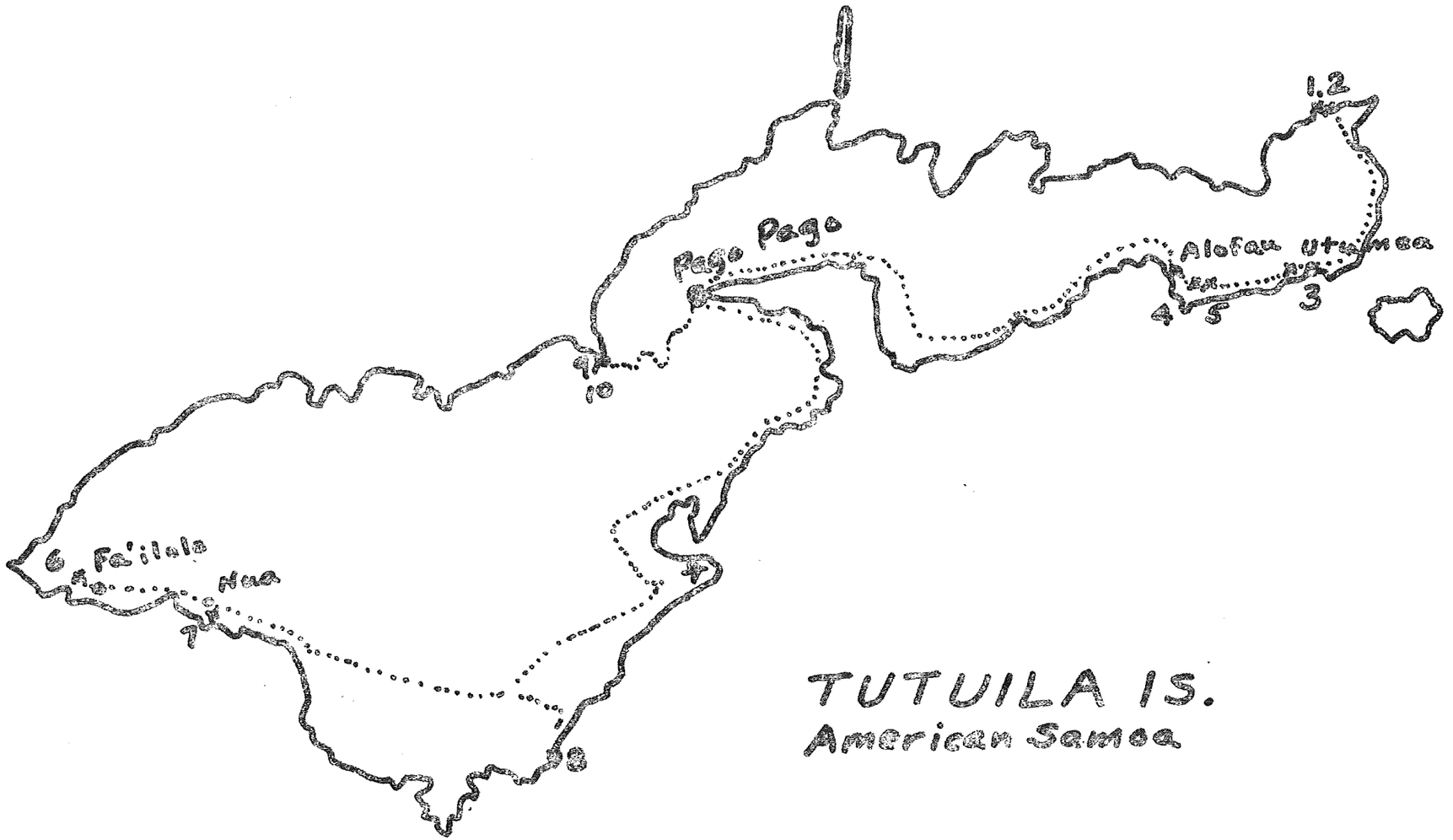
C hemical analyses

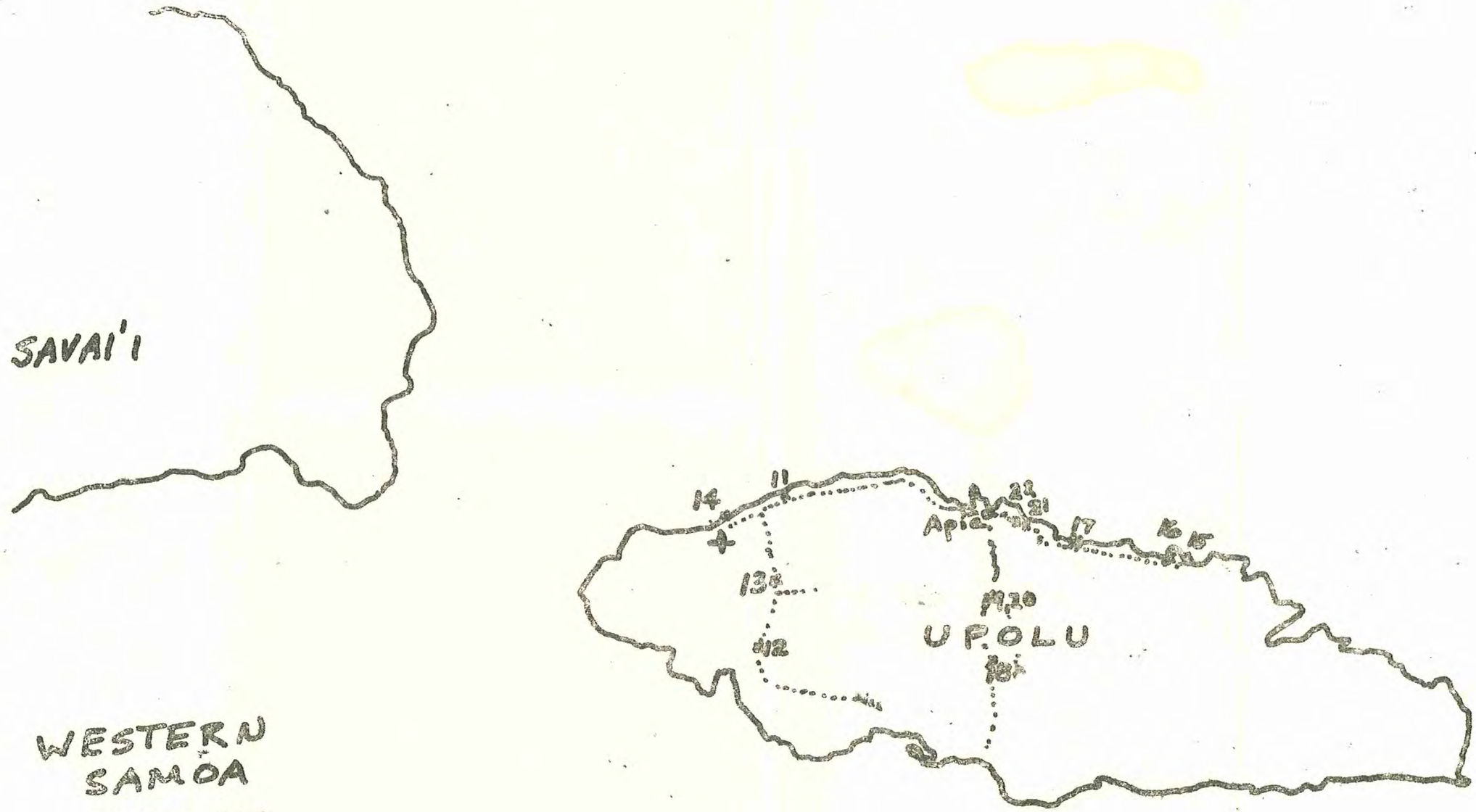
Specimen number in this suite	3	4		6	7	9	11	13	15	17	18	21
Macdonald or Hedge analysis number	6	3	4	2	1	7	4	5	2	6	3	1
SiO_2	48.33	48.95	48.02	45.08	45.09	43.88	44.4	40.7	46.5	41.8	43.6	46.1
Al_2O_3	16.16	14.03	13.75	14.87	13.70	8.88	13.1	12.8	12.3	12.2	12.7	12.1
Fe_2O_3	4.77	5.15	3.37	5.34	4.29	7.57	2.7	1.3	4.2	2.2	3.2	2.6
FeO	4.73	7.28	8.99	9.67	10.71	6.23	9.7	13.2	8.6	11.0	9.6	10.2
MgO	7.45	8.63	9.74	8.31	8.79	8.80	10.2	11.4	10.9	11.9	11.3	10.2
CaO	4.56	4.47	5.28	5.64	7.01	16.00	8.8	9.3	9.4	9.3	9.9	9.9
Na_2O	3.76	3.23	2.89	3.19	2.66	1.73	2.91	2.22	2.37	3.74	2.27	2.22
K_2O	1.68	2.11	1.78	1.29	.97	1.11	1.75	1.35	.73	1.97	1.17	.80
H_2O+	1.31	.90	.71	.81	.74	1.05	1.7	1.1	1.0	.56	1.6	.78
H_2O-	..91	.76	.48	.50	.54	.96	.46	.12	.46	.00	.46	.42
TiO_2	3.00	3.95	4.06	5.29	5.26	3.06	3.9	6.2	2.9	4.1	3.7	3.4
P_2O_5	.86	.64	.50	.53	.47	.37	.59	.43	.44	1.0	.63	.53
MnO	.16	.15	.16	.15	.15	.16	.18	.18	.15	.15	.18	.16
CO_2	___	___	___	___	___	___	]05	]05	]05	]05	]05	]05
Total	100.38	100.25	99.73	100.67	100.38	99.80	100.4	100.3	100.0	99.9	100.2	99.4

Macdonald, Gordon, Geol. Rundisch, v. 57 p. 821-837.

Hedge, et. A., GSA Bull. v. 83, p. 2709-2714, 1772.



TUTUILA IS.
American Samoa



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