The Volcano Letter

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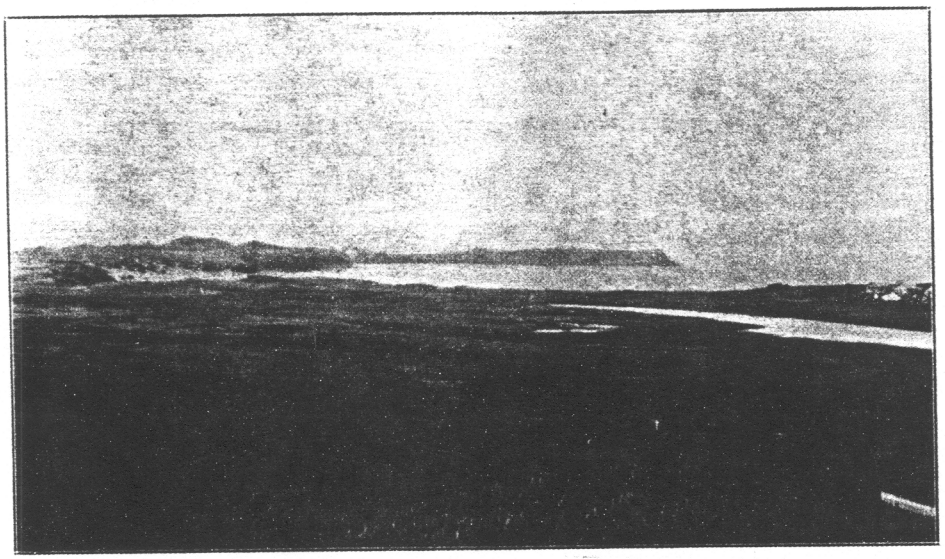


South end of St. Paul Island in the Pribilofs showing Gorbat rookery and Reef Point rookery with Otter Island in the extreme distance and St. Paul village beside the salt lagoon on the right. Photo Rauch.

ST. PAUL ISLAND IN THE PRIBILOF GROUP

During the writer's visit to the Aleutian Islands in 1917 he had the privilege of meeting Mr. William P. Rauch who kindly gave him specimens he had collected on St. Paul Island, the larger northwestern member of the seal islands, or the Pribilofs, where the fur seals are protected by the United States. St. Paul lies 200 miles north-northwest from Unalaska Island in the Bering Sea, and off the line of the Aleutian Islands. Mr. Rauch took photographs, some of which are reproduced herewith. The rocks of the Pribilof Islands have recently been described by Washington and Keyes (American Journal of Science, November, 1930). One of the pebbles collected by Mr. Rauch is described by these authors as hyalobasanite, a basaltic lava which would have contained much nephelite if the lava had been completely crystallized. This rock also contains olivine. Other specimens are ordinary fine-grained basalt.

Mr. Rauch writes: "I obtained a small piece of sedimentary rock containing shells, and have turned it over to Dr. P. S. Smith, Alaskan Branch, U. S. Geological Survey. This sedimentary rock was some ten to twelve feet above high tide, embedded in the perpendicular cliff just to the right of what is known as East Landing on St. Paul Island. I should judge that weathering and heavy seas had exposed it. The whole island gives one the impression of a sort of volcanic fairyland so many diminutive volcanic cones and craters, so small, and so different."

Black Bluff, a sea-dissected cone on the eastern coast, contains tuff with rounded, calcareous, or marly clay fragments with fossil shells of post-Pliocene age and of species now living including walrus bones. There is no glaciation. The island is volcanic and according to Stanley-Brown (Bul. Geol. Soc. Amer., Vol. 3, 1892, p. 496) was built up after the Tertiary with outpouring of lava from a central vent in a submarine eruption. "Its surface is diversified by at least a dozen cones and vents of unusual symmetry, surrounding in irregular fashion a true crater dome some 600 feet in height called 'Bogoslof'" (not to be confused with Bogoslof, the active volcano near Unalaska). Washington and Keyes say, "The island of St. Paul, the largest of the Pribilofs, has a greatest length of about 13 miles between its northeast and southwest points, and widths of from 6 to 8 miles. Its area is about 33 square miles. In its early stages it may have consisted of a group of 10 or 12 small islands, now joined together. The lava flows gradually built up the basement floor of the island, and these were vesicular basalt rich in olivine. There followed from the central vent great flows of basalt, with others from smaller cones, all together constituting an overlying sheet. It is more crystalline than the basement lava. The marked contact of the two sheets is near sea level. There are thin, unbroken lava domes" and small spatter heaps. No andesitic nor trachytic lavas are present and tuffs are rare. An analysis of the nephelite basanite by Washington and

Reindeer herd on St. Paul Island, looking southwest on the south side of the island in the region north of the salt lagoon. Photo Rauch.

Keyes shows a composition rich in iron, titanium, magnesia, lime, and the alkalies, with 44 per cent of silica.

St. George Island, about 40 miles southeast of St. Paul, reaches a height of a thousand feet, is bordered by bluffs, has a basement of dark basalt, and contains many breccias and tuffs as well as some non-basaltic lava. There is andesitic ash and possibly trachyte occurs.

As to activity in recent times, flames are said to have been seen to rise from the sea northeast of the Pribilof Islands, and a submarine eruption is recorded for 1815 northeast of St. George, where there are small circular shoals at depths of from three to eight fathoms. Out in the middle of Bering Sea Pinnacle Islet five miles south of St. Matthew Island, was cited by Elliott as having been in an almost constant state of activity since its discovery, and as being active at the time he was there in 1874. This author also thought Otter Island, a small rock southwest of St. Paul (faintly visible in the distance in the photograph reproduced on Page One), had been recently active. All of these facts are culled from Washington and Keyes.

Mr. Rauch made the accompanying sketch map on Page Four to express roughly the position of his photographs. The map should be turned so as to make the long right-hand point turned northeast, and not east. St. Paul village is thus at the south end of the island, Rush Hill 665 feet high is the highest point on the island at the west end, and the principal anchorage is in English Bay west of the village. The photograph on Page One shows Reef Point which projects south of the village, on the right are seen the village houses, and in front of them is the salt lagoon bordered by tundra flats. The entire island is grassy, without shrubs or trees, and the same is true of the Aleutian Islands. A considerable herd of reindeer is maintained on the island as shown on Page Two. There are two fur seal rookeries on the two points near the village, and on the lowland bars of the northeast point there is the largest seal rookery ground. Formerly a drum tractor was used for hauling the pelts across the island, now there is a wire cableway.

Looking into the interior of St. Paul Island from the village northward, one sees flat, grassy, rolling country with the salt lagoon in the foreground and four or five cones beyond, of which Bogoslof is the most dome-like. Standing on the top of Bogoslof and looking westward we see six or seven cones with marked tendency to horseshoe shape, the opening of the horseshoe generally facing toward the north as though the prevailing wind tended to build the higher heapings of the lava fountains toward the south. This is the scene photographed on Page Three. From this elevated point the expanse of flat tundra to the northeast covers about one-seventh of the island, all very slightly elevated above the sea. A large triangular lake of brackish water is inclosed by two bars which have shut off the lake by connecting an outlying islet with the main island at the northeast point. Such ponds are common partly as fresh water crater lakes and also as longshore lagoons as shown on the map by L. The letter V on the map indicates volcanic hills and craters. Looking southward from the summit of Bogoslof one sees a broad slope leading down to the southwestern embayments, all grassland over lava, with small lava pits in the foreground, the topography suggesting the pahoehoe of Hawaii. The lava conelets of the Pribilofs are much more Hawaiian in quality than the eastern islands of the Aleutians, but in some of the western Aleutian islands there are wide lava flats greatly resembling the photographs of St. Paul.

With reference to the opening northward of the horseshoe cones and the sweep from northeast to southwest of the barrier beaches that trail to the main island from the northeast point, it seems probable that the constructional action of the sea has been from northeast to southwest with the prevailing winds, thus smoothing the northern and

southeastern shores, and leaving bays at the southwest. As there are three distinct embayments and two of them fairly deep on that side, it may well be that the volcanic tumescence which accompanied the outpouring of lavas had a tendency to uplift at the northeast and some drowning of topographic depressions at the southwest. The salt lagoon next north of the village, and the topography of the three bays adjacent to it, suggest drowned valleys among lava-flow ridges. T.A.J.

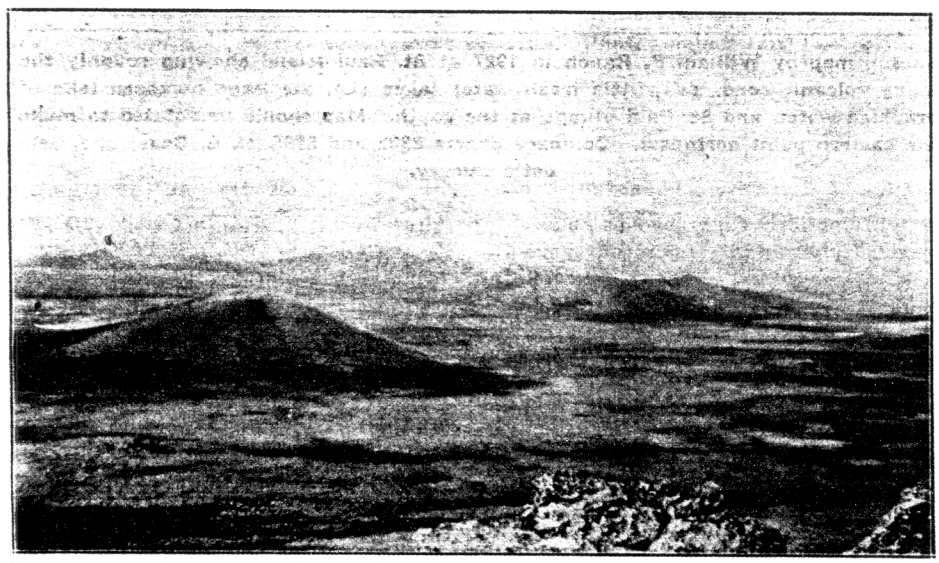
KILAUEA REPORT No. 1C09

WEEK ENDING MAY 24, 1931

Section of Volcanology, U. S. Geological Survey
T. A. Jaggar, Volcanologist in Charge

At Halemaumau pit of Kilauea Crater a slide occurred on the northwest wall about 9 a. m. May 18 sending up a dust cloud. At 10:30 a. m. fume at the larger sulphur spot on the floor had slightly increased, but there was very little vapor rising from the wet area of the south talus. The avalanche was seen to have left a slight scar on the wall. Other sulphur spots besides the fuming one west of the center are bright yellow against the black floor, particularly one at the far western side.

The Observatory seismographs registered 25 tremors and one very feeble local seism, the latter at 12:18 p. m. May 23. Tilting of the ground was moderate SW, and microseismic motion very slight.



Photograph taken in July 1927 from the summit of Bogoslof hill in the middle of St. Paul Island looking westward toward Rush Hill in the extreme distance, that being the highest point of the island. At the right is shown a horseshoe cone resembling Diamond Head at Honolulu. Photo Rauch.

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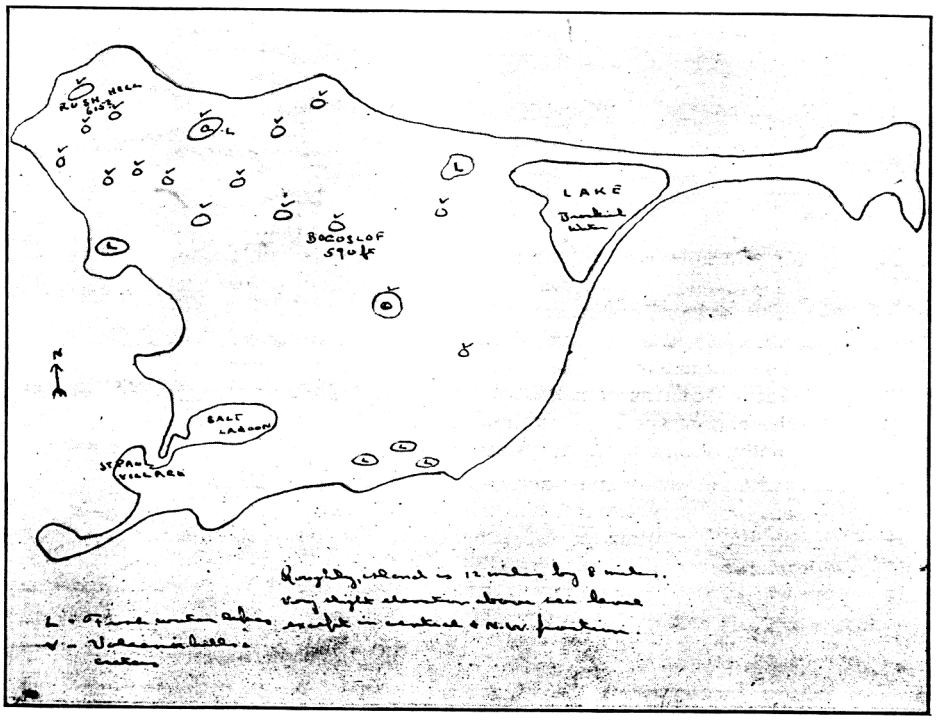

Sketch map by William P. Rauch in 1927 at St. Paul Island showing roughly the many volcanic cones (V), little fresh water lakes (L), the large northern lake of brackish water, and St. Paul village at the south. Map should be rotated to make the eastern point northeast. Compare charts 8802 and 8995, U. S. Coast and Geodetic Survey.

THE VOLCANO LETTER

The Volcano Letter combines the earlier weekly of that name, with the former monthly Bulletin of the Hawaiian Volcano Observatory. It is published weekly, on Thursdays, by the Hawaiian Volcano Research Association, on behalf of the section of volcanology, U. S. Geological Survey. It promotes experimental recording of earth processes.

Readers are requested to send articles, photographs, publications and clippings about volcano and earthquake events, instruments and investigations, especially around the Pacific.

Subscription for non-members **two dollars** per year of 52 numbers. Address the Observatory.

HAWAIIAN VOLCANO OBSERVATORY
Founded 1911

This laboratory at Kilauea Volcano belongs to the Hawaiian Volcano Research Association and is leased and operated by the United States Geological Survey.

It maintains seismographs at three places near Kilauea Volcano, also at Hilo, and at Kealakekua in Kona District. It keeps a journal of Hawaiian volcanic activity and publishes occasional Bulletins.

Membership in the Hawaiian Volcano Research Association is limited to patrons of Pacific science who desire personally to aid in supporting the work.

The work of volcano research so supported is in collaboration with the work of the United States Geological Survey, but supplements it with buildings, research fellows, instrumental plants, explorations and special investigations for which there is no governmental provision. The Geological Survey maintains volcano stations in Alaska, California and Hawaii.

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