Across Iceland: Discussion
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basalt has remained. That the basalt has not escaped erosion altogether is shown by various big upright rocks, and also by the circular crater or "caldera," of which the larger half is preserved, while about two-fifths have disappeared. It would be difficult to say how far the breaking down of these hard masses may have been hastened by earthquakes or similar violent shocks.

A few remarks only about the Mývatn. The beautiful crater Hverfjall (Figs. 8 and 9) and the unique phenomenon presented by its interior have been described by me *in extenso* in the November number of the *Glacialists' Magazine*. The steaming sulphur mountains, the mud geysirs, the desert, have been well described by previous travellers. The Hrafutinnuhryggur formed the subject of a special excursion, and enabled us to collect exquisite specimens of Obsidian.

From Mývatn we returned to Akureyri, expected by more than fifty people seeking medical and surgical advice, some of whom had come a long distance. Then followed our hurried ride across the country in order to catch our steamer at Reykjavik. Of the last 66 hours, we spent 44 in the saddle; but we had the satisfaction of arriving at Reykjavík just in time.

APPENDIX.

GEYSIRS. JUNE 20, 1892, 1 P.M.; BAROM. 29·575″ ENGL.

1. Great Geysir. Bowl (crater) oval, obliquely elliptical; diameter, west-north-west to east-north-east = 15·5 meters; north to south = 17·5. meters. Temperature at 22 meters depth., 123·5° C.

2. Blesi. Temperature 9 meters below surface, same as near surface = 94° C.; surface level with ground, overflowing.

3. Spring close to Blesi. Surface of water 2 meters below opening; thermometer reaches 6·5 meters, deep in water, and registers 101·5° C.

4. Steaming mud spring close to Blesi. Thermometer enters only 4 inches, and shows 95° C.

5. Strokkr. Surface of water 3 meters below opening; temperature in 10·5 meters of water, 108° C.

After the reading of the paper, the following discussion took place:—

Sir ARCHIBALD GEIKIE: At this late hour, and after such a pleasing excursion through Iceland, little room is left for comment or criticism. The photographs have given us a vivid picture of Icelandic scenery, and have brought out clearly some of the salient features of Icelandic geology. But I will not enter into any discussion on questions of scientific interest, though Dr. Grossmann has provided us with ample material for it. His pictures of the volcanic regions suggest many points on which we might ask for further information, and his illustrations of the peculiar topography of the island might be made the text for a long discourse. He did not himself enter into scientific problems, and his explanations of some of the superficial features might be open to question. It is remarkable to what an extent all over northern Europe such surface-features have given rise to legends of witches, warlocks, and giants. It would be interesting to know how far the

Icelandic topography has impressed the imagination of the race which has so long inhabited that region.

Sir HENRY HOWORTH: I should like to begin my remarks by emphasizing what has been said in praise, not only of the photographs, but also of the art with which a very great number of picturesque facts have been selected from a large number of observations by Dr. Grossmann. Of this very terribly barren land my old friend Vigfusson used to give a very graphic picture by saying that no man in Iceland was ever known to die in the same house in which he was born. Everything there is in a process of continual destruction by the elements. It s very hard on some of us who love fighting, and who have had a fight already with Dr. Grossmann elsewhere, that it is so late, because we might have had an interesting discussion to-night. One thing is remarkable in all these pictures, namely, the extremely recent-looking surface of this great island. There are reasons for believing that these great outflows of lava and basalt were not there at the beginning of our knowledge of this island. For 150 to 200 years after the island was settled, the volcanic phenomena were unknown altogether, and it was a great surprise to the Icelanders themselves when they began. Since then, and perhaps also in the ages long before then, the island has been overflowed in all directions by these great lava-currents, and the surface has been so dislocated that I am bound to say it is impossible to deduce great laws or important explanations from a visit of only five or six weeks. What our friend has done to-night is to present us with a chain of difficulties—a great chain of questions to be solved. They press upon us all the necessity of having a careful and deliberate examination of the problems of this island, such an exploration as that carried on in our island by the great institution over which Sir Archibald Geikie has presided during his four years' exploration of this country. There is no place where some of the more difficult problems of geology can be studied in the same way as here, where the soil has been removed from a large part of this island, and we can see the naked bones of the land. It seems to me that if we could be transplanted to the moon, we should see there, on a large and exaggerated scale, very much what we see here—large rifts, circular volcanoes, great fields and seas of lava, to be seen nowhere else on the face of the earth except in this island. The questions that arise are of every kind of interest, polemical and otherwise. A great point dividing some of us from the general views of Dr. Grossmann is whether the glaciation of Iceland was by local glaciers on the higher ground, or general glaciation of the whole island. One thing you will all agree with me in—namely, in thanking Dr. Grossmann for the excellent treat he has given us to-night.

Professor JUDD: At this late hour I shall be consulting the general wishes of this audience if I do no more than express in the shortest possible manner the sense of obligation we all feel to the author for taking us to Iceland for a short time, and in such a very pleasant manner. We must all have been struck with the photographs of this wonderful country that have been shown to us, and if we have not heard all we might have wished, yet our eyes have been feasted with such a display of the scenery of this wonderful country, that I think we shall all go home instructed and delighted with what the author of this admirable paper has placed before us, and look forward to the time when we shall be able to read the full descriptions of these scenes, the wild beauty of which we cannot fail to remember.

Dr. GROSSMANN: I will not detain you any longer, especially as a large number of Icelandic exhibits awaits your inspection in the reception-room. The time at my disposal has been very limited for a subject so full of interest as a journey in Iceland, and I could therefore select a few striking features only on which I should have liked to enter into a discussion. It has been my endeavour to lay

before you these facts as impartially as possible by means of photographic views, leaving it principally to you to draw your own conclusions.

As the time is too far advanced for any discussion, it only remains for me to thank you for the very kind reception you have given to my paper and to my illustrations.

CAPT. WHARTON (who occupied the chair): It only remains for me to thank Dr. Grossmann for the very pleasant evening he has given us, transporting us by means of his photographs to Iceland, and enabling us to realize the country in that way better than in any other.

The Map of Iceland.—This map is a reduction of Gunnlaugsson's survey of Iceland.

JOHORE.*

By **HARRY LAKE**, Engineer in the Service of the Sultan.

JOHORE territory occupies the most southerly portion of the Malay peninsula; it extends from Cape or Tangong Bulus in latitude 1° 16′ 12″ north to about 3° 1′ north.

On the north it is bounded by the protected native states of Pahang and the Negri Sembilan, and on the north-west by Malacca. A narrow strait, the "Selat Tebrau" of the Malays, separates the territory from the Island of Singapore. In former times all merchantmen engaged in the China trade passed through this strait, as the present route to the south of Singapore was extremely unsafe owing to the hordes of pirates which infested these seas; even in the Tebrau Straits ships were often attacked and destroyed by Malay piratical phraus. In common with the rest of Malaya, the coast-line is bold and rocky on the east, where it is washed by the China Sea, and low and swampy on the west, where it borders on the Straits of Malacca. The formation is chiefly granitic, traversed in places by veins of quartz and dykes of intrusive masses of diorite, quartz felsite, trachyte, etc. This granite is overlaid by a series of clays and clay shales, with here and there beds of laterite. These clays are non-fossiliferous, and are probably of Paleozoic origin. In the north-east a little sandstone is found, whilst in the extreme north-west there are signs of a limestone formation. On the east coast the clay shales show distinct evidences of metamorphism, in some places, notably near Kuala, Indau merging into a highly stratified clay slate. Amongst these shales and slates are masses and deposits of brown ironstone.

Before proceeding further, it may be interesting to give a short *résumé* of the history of this state. The Sultans of Malacca, before they were driven out of that place by the Portuguese, who were succeeded by the Dutch, may be said to have been the dominant power over the Malay

* Paper read at the Royal Geographical Society, February 12, 1894. Map, p. 356.