

spark that it was at a great distance from me. This flash lasted for a longer time than any one I have seen since. I happened to be gazing at the actual spot when the flash occurred, and I saw it well.

The only explanation I can offer is this: that the spectator is looking along the axis of a spiral-shaped flash; the flash occurring from cloud to cloud.

BENJAMIN DAVIES.

Liverpool, October 3.

Distribution of Galeodes.

It seems hardly worth while my interfering in this matter, but as Mr. Pocock, in his note on the distribution of Galeodes, in NATURE of August 20, omits Sind, I hasten to record it from that province, where I have often dug it out of Indus alluvium. I used to think that Galeodes was a desert animal, and was surprised to hear from friends that it is common along the Malabar coast south of Bombay and further inland, where the rainfall is heavy.

F. GLEADOW.

Dehra Dún, September 14.

THE RECENT EARTHQUAKES IN ICELAND

ON August 26, at 10.30 p.m. and next day, at 9.15 a.m., severe earthquake shocks were felt throughout the south-western part of Iceland. The seismic focus seems to have been situated in the neighbourhood of the volcanic ridge out of which Hekla rises, and the waves moved in a direction which they had formerly been observed to take, namely from north-east to south-west. According to reports to hand, these shocks were felt as far north-west as *Ísafjord* and as far north as the head of *Skagafjord*. Thus it appears they overran an area of more than 20,000 square miles, or half the island, for they also caused damage in the Westman Islands, which lie further south than the most southern point of Iceland. Even at sea the shock was felt. A sailing ship was so badly shaken, thirty-five miles from land, that the crew feared it had struck a rock, and began to lower the boats.

From this it is clear that these earthquakes spread their waves over an area unprecedented in extent in the history of the island.

After some minor and slighter shocks, the next severe ones occurred on September 5, at 11.30 p.m., and two and a half hours later, in the night, at 2 o'clock. These shocks were fully as violent as the first ones, but they were more local, and the seismic centre from which they proceeded seemed to be further to the south-west than in August. The shocks were preceded by heavy rumbling noises underground. Land-slides came down from the mountain-sides, destroying the green home pastures. Immense rocks were hurled down from their peaks, and the echoes of these convulsions of nature reverberated among the mountains. The turf and stone walls of the Icelandic farmhouses crumbled like card houses, but the people, being warned by the 11.30 shock, saved their lives through doors and windows. While many were bruised and wounded, and some were dug out of the ruins, only two are reported to have been killed. In the August shocks one man was killed in the Westman Islands, being crushed by a rock that tumbled down over a precipice.

While it is calculated that two to three hundred homesteads, each representing five to six houses, have been wholly or partially destroyed, it is singular to note that no timber house has fallen down, though some of them were actually moved out of their position. The inhabitants have since September 5 camped out, as best they could, in improvised tents and huts.

The violent vibrations in the crust of the earth have torn it open in places. Deep chasms yawn where the ground has been burst open, and a number of fissures have been formed. The largest of these is situated close by the *Oelvus* River, on its western bank. It is about

six miles in length, but neither very broad nor deep, and half-filled with water.

Still more noteworthy than these longitudinal cracks in the ground are the new geysers, which have forced their way into the open. Some of the old hot springs have disappeared, and been displaced along with the stratum through which they issued. Of the new geysers, information has been gathered about three at the farm *Hveragerthi*, west of the *Oelvus* River, and one at *Reykir*. The largest of those at *Hveragerthi* has a basin measuring fifty-four feet by twenty-four feet. Its depth has not been ascertained. The column of boiling water rose at first thirty to forty feet into the air; but, according to the latest reports, its height is decreasing. The people of the two farms say that the crash, when the column of water first broke the earth crust open, was terrific and deafening.

Many other changes took place in the surface of the ground. High ground subsided, and became wet instead of dry. Low, miry ground became hard. In brooks and lakelets the water grew yellow and turbid. In fact, the whole appearance of the districts affected by these earthquakes has undergone a noticeable transformation.

The intensity of the vibrations caused by the shocks was greatest in the neighbourhood of the *Oelvus* River. Persons standing on level ground could not keep their feet. A farmer was literally thrown out of his bed on to the floor. The duration of each shock was from thirty to fifty seconds; in some cases less, but none of them seem to have lasted a whole minute, though the time appeared to be much longer than that to the frightened farm people waiting in anxious suspense for the fate of their houses.

No earthquakes comparable to these have occurred in Iceland, save in 1784. The severest shocks then took place on August 14 and 16, but were confined to a much more restricted area than the present ones, an area reaching farther north-east and less south-west than in 1896. These earthquakes lasted from the middle of August till December of the same year, and caused great damage to farmhouses, sixty-nine of which were totally broken down, while 372 were made almost uninhabitable. These earthquakes must, it is thought, have stood in some connection with the volcanic eruptions close to the glacier-covered volcano *Skaptarjökul*, which lasted on, with short breaks, from June 1783 to January 1784. The Icelanders draw the inference that earthquakes must be preceded, accompanied, or followed by eruptions. One glance at *Thoroddsen's* history of eruptions and earthquakes suffices, however, to disprove this popular fallacy. It is feared that the earthquakes will continue for months, unless the subterranean fire breaks out and puts an end to them. One hears the natives earnestly wishing for an eruption ("*eldgos*," *i.e.* fire-spouting). Meanwhile they have saved all their cattle, with few exceptions, and wish to rebuild their farms.

The last news from Iceland is of date September 19. Slight shocks were felt from time to time. The severest of these was one on September 10, at 11.20 a.m. New fissures appeared in the ground, while some of those already formed were widened. Strange subterranean noises resembling thunder have been heard, sometimes unaccompanied by shocks. To all appearances the earthquakes are not over yet, though it is to be hoped, for the sake of the suffering people in the districts of *Rangarvalla* and *Arnes-sýsla*, that the worst is past.

Some money has been subscribed, and the Government will contribute to the funds thus raised. The Czar has given £160, the Dowager Empress of Russia £100, and the King of Denmark and his family the same amount. The sympathy of Europe has been aroused for the brave people struggling for their existence amid frost and fire on the verge of the habitable world.

It has been stated that there are over 700 extinct craters