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 subterraneous 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 subterraneous 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 Árnes-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

in the peninsula of Reykjanes alone. The capital is situated on its northern side, and thus only fifty to sixty miles from the devastated districts. Some of the inhabitants of the town camped out, but none of its houses, which are mostly of timber, collapsed. The pictures hanging in the Parliament House were all thrown out of position, and rifts were visible in the plastered ceiling.

The eruption of February 27, 1878, is the last one recorded in the vicinity of Hekla. The craters, through which it took place, are situated about four miles to the north-east of Hekla, in one of its outlying spurs. This eruption was preceded by severe earthquakes in the adjacent districts. These, however, caused very little damage.

Mr. Th. Thoroddsen has given the only account and full list we possess of volcanic eruptions and earthquakes in Iceland within historic times. A *résumé* of it is found in the *Geological Magazine*, 1880, pp. 458-467. A much fuller translation, with a bibliography on the subject, is given by Mr. George H. Boehmer in the Smithsonian Report for 1885, pp. 495-541 (Washington, 1886). It appears that no earthquakes in the history of the island were experienced over such an extensive area as the present ones.

The earliest recorded earthquake in Iceland took place in A.D. 1013. Of fifty-five recorded earthquakes, more than one half were not preceded, accompanied, or followed by eruptions. The earthquakes of 1789 were most severe. The section of land between the chasm of Almannagja and that of Hrafnagja settled 60 centimetres, and new hot springs were formed. But the area was restricted to the district of Árnessýsla, and no volcanic eruption took place from 1783 to 1821. Thus it is probable that, though the present earthquakes may not discontinue for some months yet, they will not be followed by an eruption. The largest number of eruptions—fourteen—have taken place in the eighteenth century, and it will be observed that both earthquakes and eruptions are, in each period, concentrated in certain districts of the country, and that, in succeeding each other in time, they rarely make large jumps. It is only the want of seismographic stations which prevents Iceland from being an object-lesson in seismology such as Japan. Iceland, however, cannot any longer with justice be counted among the unexplored regions of the earth. Mr. Thoroddsen has, during the last sixteen years, systematically explored a part of the island every year, and now that he has reached the end of his labours, it is to be hoped that the scientific world will not have to wait long for the publication of the results of his explorations. They promise to be of the highest interest, and will modify in many respects geological views regarding Iceland. The geological map of Iceland, published by Dr. Konrad Keilhack in 1886, is not to be depended upon, for its German authors have put down as actual facts many things which then were only assumed and surmised.

J. STEFANSSON.

THE GERMAN ASSOCIATION.

IN the presence of the Empress Frederick, and under the presidency of Geheimrath Prof. Dr. Hugo von Ziemssen, of Munich, the sixty-eighth meeting of the "deutscher Naturforscher und Aerzte," founded at Leipsic on September 18, 1822, was opened in the Saalbau, Frankfort-on-the-Main, on the morning of Monday the 21st ultimo. After the preliminary speeches by Prof. Moritz Schmidt and other citizens, the President briefly addressed the gathering; but the principal speakers were Prof. Hans Buchner, who devoted his address to "Biologie und Gesundheitslehre"; Dr. Neumayer, to Antarctic Exploration; and Prof. Lepsius, to "Cultur und Eiszeit." The gathering was then broken up into thirty sections, eleven of which were for the Naturalists, and nineteen for the various Medical and Surgical branches. The sectional meetings were held morning and afternoon (9 a.m. to 6 p.m.) till midday on Friday, and were well attended, there being, so far as could be estimated (the officials being unable to supply the precise figures), about 2500 gentlemen and 500 lady members. As there were some hundreds of papers under discussion during these days, and the titles of them alone would occupy several pages of NATURE, it will be sufficient here to mention only a few dealt with in some of the sections. Prof. Quincke opened the Physics Section with a paper "Ueber Rotationen im constanten elektrischen Felde," followed by Dr. Tuma, "Ersatz für den Ruhmkorff'schen Apparat." "Ueber Berührungselektricität," by Prof. Nernst; "Ueber den Vorgang bei langsamer Oxydation," by Prof. J. H. van 't Hoff; "Grundlagen seines neuen Systems der Elemente," by Dr. Traube; "Ueber die physikalische Isomerie," by Dr. Carl Schaum; "Demonstration einer Tafel des Systems der chemischen Elemente," by Dr. Wiechert; "Zur Elektrochemie des Kohlenstoffs," by Dr. Coehn; and "Ueber Kathodenstrahlen," by Prof. Lenard, were some of the communications discussed by the Physicists alone or with the Chemists. The Sections for Zoology, Pathology and Pathological Anatomy, and Physiology, joined in a discussion of the paper by Dr. Born, "Ueber künstlich hergestellte Doppelwesen bei Amphibien." The Section devoted to Ethnology, Anthropology, and Geography, had very little work to do, a day sufficing to get through it. Dr. Canheim had a paper on the Faroe Islands, and Dr. Rein on the North Coast of the Island of Hondo (Japan), and the Land and Sea Fauna of Kamaishi. With nineteen sections out of the thirty, the medical men were able to discuss a greater variety of topics than the physicists. Very interesting papers were read by Dr. Däubler on "Die Beri-Beri-krankheit," and by Dr. Glogner, of Batavia, on "Neure Untersuchungen über den klinischen Verlauf und die Aetiologie der Beri-Berikrankheit," and by Dr. Plehn, from the Cameroons, on "Erkrankungen der schwarzen Rasse in Kamerun vom October 1, 1894, bis April, 1896." But the doctors' field-day was Wednesday, when the Medical Sections, and a considerable number of members from the Physical Sections, assembled in the Saalbau, under the presidency of Prof. His, to discuss the latest discoveries in brain investigations. Prof. Flechsig's subject was "Die Localisation der geistigen Vorgänge"; Prof. Edinger's "Die Entwicklung der Gehirnbahnen in der Thierreihe"; and Prof. Ewald's "Ueber die Beziehungen zwischen der motorischen Hirnrinde und dem Ohrlabyrinth." The closing general meeting was held in the same room on Friday morning, when Dr. Max Verworn discoursed on "Erregung und Lähmung"; Dr. Ernst Below, on "Die praktischen Ziele der Tropenhygiene"; and Prof. Carl Weigert, on "Neue Fragestellungen in der pathologischen Anatomie."

Not the least important features of the Congress were the facilities afforded for inspecting the technical high schools, and the chemical and other establishments in the neighbourhood. Praise is due to the several local committees for the excellent manner in which they carried out their duties, the entertainments having been arranged on a most liberal scale, every night being devoted to recreation. At the close of the Sectional meetings on Friday, Profs. von Ziemssen, König, and the principal members of the Society proceeded to Friedrichshof, by command of the Empress Frederick, while the general body broke up into some half-dozen parties, who were conveyed to as many places in the country—to Darmstadt, to inspect the Technical Institute; to Hochst, to see the Serum establishment, &c. About 500 members accepted the invitation of the town of Homburg to proceed there on Saturday to breakfast, drive to the ruins of the Roman fortifications of Saalburg