

of specialised and generalised forms of the same genus ; this is well seen in the *hyæna*. It will also be seen that the Siwalik carnivorous fauna fill up many gaps in the chains of relationship, such as that between the bears and dogs, the viverroids and *hyænas*, and these latter and the cats.

The rock series in which these fossils occur is therefore one of very great interest. From the Brahmaputra to the Jhelum, for a distance of 1500 miles along the base of the Himalayas, there extends with varying width a succession of ridges or ranges which are known as the sub-Himalayan hills. Physically and constitutionally they are readily distinguished from the ranges belonging to the mass of the Himalayas proper. The rocks forming them are all of Tertiary age, and they are divisible into an upper (the Siwalik) and a lower (the Sirmur) series ; these again are further divisible respectively into upper, middle, and lower groups. This is the principal and classic area of these rocks, but they occur also in Burmah, Perim Island, and in Sind.

With the Sirmur series, which in part consists of marine (Nummulitic) strata, we have no special concern at present. It is from the rocks of the Siwalik series alone that the vast harvest of remains of fossil vertebrates has been collected in the sub-Himalayan region during the past fifty years. The fossil-bearing beds are principally conglomerates of undoubtedly fresh-water origin, indeed, owing to their local development at the gorges of the existing great rivers, where they emerge from the Himalayas, it is clear that they were deposited at a time when, so far, the configuration had been established ; but, as the very highest beds exhibit signs of intense disturbance and crushing, it is no less apparent that, although the main drainage lines have not altered, there has been much movement and upheaval, which, however, appears to have been effected, not by sudden, but rather by slow and gradual action.

After much discussion as to the correlation of these fossiliferous conglomerates with the established order of sequence in Europe, it would appear to have been finally adopted that, in spite of a certain Miocene facies in the fauna, the general characteristics are such as to indicate a Pliocene age. Fossil-bearing beds of Post-Pliocene age occur, it may be here remarked, in other parts of India.

Numerous and varied as the fossils from these rocks are which are now preserved in the museums of Calcutta, London, Dublin, and elsewhere, they do not appear to be found anywhere concentrated in great quantities, the specimens having for the most part been found at widely separated intervals, where they lay more or less weathered out of the enveloping matrix. Though naturally mineralised, and with but a small percentage of residual animal matter, they are often beautifully preserved, but occasionally, owing to the hardness and tenacity of the matrix, it has required the utmost patience and skill to chisel out the details of structure, while sometimes it has been found impossible to do so.

Mr. Lydekker is to be warmly congratulated on the completion of this important volume, and we are glad to know that he is busy with volume iii., which is to include an account of the Siwalik Suina and Birds.

#### AN EARTHQUAKE IN ENGLAND

AT last the people of these islands have been enabled to realise the meaning of the term "earthquake," so terrible in its significance in many other parts of the globe. On Tuesday morning, at a time variously given from 9.15 to 9.30, a shock which was really alarming and did considerable damage was felt over the Eastern Counties and as far west as London and even Rugby. The centre of disturbance seems to have been at Colchester, and the wave apparently travelled from south-east

to north-west, though impressions vary on this point. At Colchester, in addition to the undulations of the earth, subterranean rumblings were heard, buildings rocked to and fro, the streets were strewn with debris of fallen chimneys, a chapel spire was thrown to the ground, and other signs of seismic disturbance were evident, familiar enough to those who have been in countries where such phenomena are common occurrences. The shock, when it was most intense, commenced with a rumbling sound, increasing in intensity for about twenty seconds, and then suddenly stopped. It extended to Chelmsford, Cambridge, Northampton, Ipswich, Sudbury, Rugby, Leicestershire ; it included London and the surrounding district in its sweep, and even caused some alarm in the Strand. At Woolwich it was so strong that some persons attributed the shock and noise to the bursting of a heavy gun.

We have received the following communications with reference to the earthquake :—

ONE of the most severe earthquake shocks which has occurred in England for many years took place this (Tuesday) morning in the Eastern Counties. The area of its chief operation lay over South Suffolk and North Essex, and the principal focus of the disturbance seems to have been the neighbourhood of Colchester. A great deal of harm has been done to property there : houses are partially unroofed, many chimneys and gable-ends of the very old houses in Colchester have been demolished, part of the spire of the Lion Walk Congregational Chapel (a well-known building), to the amount of twenty feet from the apex, was thrown down, and other details of mischief done are fast coming in. Langenhoe Church, about twenty-four miles from Colchester, is said to be all but demolished, the entire eastern end being shaken down. The Rectory also severely suffered, so that little more than the walls are standing. At Wyvenhoe, near Colchester, the church steeple is thrown down and many houses are much damaged. Other villages around Colchester have more or less suffered : Lexden, Abberton, Greenstead, Hythe, &c., all show evidences of the disturbance in their more or less shattered buildings. The shock was severely felt here at Ipswich. I was sitting down at 9.18 a.m. when the first shock occurred, and it nearly overbalanced me. I felt it must be an earthquake, oscillation, although I had never experienced anything like it before, and accordingly waited and watched for the next. The oscillations followed each other for about three seconds, and apparently travelled in a north-north-easterly direction. I underwent quite a new experience, so vivid that I am not likely to forget it. The sensation approached that of nausea. In the town of Ipswich many people were alarmed, for the bells were set ringing, the pictures on the walls shaking, &c. The occurrence is too recent, however, to carefully note the direction of the oscillations. The London Clay in Suffolk and North Essex, when cut into, abounds with small faults and creeps, and this shock may be leaving another such token behind it.

J. E. TAYLOR

Museum, Ipswich, April 22

AT about 9.20 this morning I distinctly felt a slight earthquake. The motion though slight was unmistakable, the chair on which I sat, and the whole house, seemed to move to and fro for the space of, as near as I could judge, ten seconds. I regret I cannot give the exact time when I felt the shock, as I had omitted to put my watch in my pocket.

A. PERCY SMITH

Rugby, Tuesday, April 22

THIS morning the earthquake was very perceptible here at exactly 9.22. It was travelling from north to south in short rapid undulations. It lasted for thirty-three seconds. My chief object in writing is to draw attention to the fact that this is the second earthquake which has shaken

London this year. On Sunday afternoon, January 13, about 4.5 p.m., while sitting in my rooms here along with my wife and my brother, I was suddenly sensible of a severe earthquake; I pulled out my watch to take the exact time, and while I was in the act of drawing their attention to the phenomenon, my wife, who has experienced with myself, numerous shocks in the Malay Archipelago, exclaimed also that an earthquake was occurring. My brother distinctly felt the shock, but was unaware what it was. It was composed of two severe shocks, with an interval of short duration between them. The house was quite still, and nothing was passing in the street, nor for more than twenty minutes did any carriage come along it. Being accustomed for several years to observing earthquake movements, I am perfectly confident of the occurrence of an earthquake at that time; and in the hope that some other observer has noted the fact, I have sent this note to NATURE.

HENRY O. FORBES

87, Queen's Crescent, Haverstock Hill, N.W.,  
April 22

MR. E. B. KNOBEL, F.R.A.S., F.G.S., writes to the *Times* from Bocking, near Braintree:—"A sharp shock of earthquake was experienced here at about 9.18 a.m. this morning. A slight trembling was first felt, followed by an oscillation sufficient to make one stagger and cause some alarm. Among the incidents which resulted, house bells were set ringing, one or two doors of cottages burst open, and clocks stopped. The safety-valve of a boiler was lifted and steam blown off for an instant. The phenomenon lasted from two to three seconds, though perhaps the latter estimate is slightly in excess of the true duration of the oscillation. The following facts may be useful in determining the direction of the wave. Three pendulum clocks in different houses stopped, the line at right angles to the plane of oscillation of the pendulum being in all cases north-west and south-east. Pendent gaslights in a factory were caused to sway in the same direction, north-west and south-east. A door was burst open, the position of which when closed was north by west and south by east. These facts would indicate a south-easterly origin of the earthquake wave."

A CORRESPONDENT at Southend states that the wave seemed to travel from north to south, while in the neighbourhood of Oxford Street the direction seemed east to west, and so also at Gray's Inn, where a correspondent felt as if the bed were slipping from under him. Doubtless by next week we shall have fuller and more precise details.

#### NOTES

THE final meeting of electricians to determine the practical units of electricity and light assemblies in Paris on the 28th inst., when England will be represented by Sir William Thomson, Messrs. Preece, Hughes, Adams, Jenkin, Foster, Graves, and Hopkinson and Capt. Abney. The Congress is expected to last or several days.

DR. KOCH and the members of the German Commission sent last autumn to Egypt and India to investigate the cause of cholera have left Alexandria on their return to Europe.

THE Senate of Glasgow University have resolved to confer the degree of LL.D. on Prof. Osborne Reynolds, Victoria University, and Mr. Thomas Muir, High School, Glasgow.

AT Ekhmeem, a large provincial town of Upper Egypt, situate about half way between Assiout and Thebes, Prof. Maspero, returning from his annual trip of inspection up the Nile, has just found a hitherto undiscovered and un plundered necropolis of immense extent. As far as has been yet ascertained, the necropolis dates from the Ptolemaic period; but as the work of exploration proceeds, it will probably be found that it contains more ancient quarters. The riches of this new burial field would

meanwhile seem to be almost inexhaustible. Five great tombs or catacombs already opened have yielded 120 mummies, and within the short space of three hours Prof. Maspero verified the sites of over 100 more similar catacombs, all absolutely intact. The necropolis of Ekhmeem, at a rough estimate, cannot contain fewer than five or six thousand embalmed dead. Of these perhaps not more than 20 per cent. will turn out to be of archaeological or historical value; but the harvest of papyri, jewels, and other funeral treasures cannot fail to be of unprecedented extent. Ekhmeem is the ancient Khemnis—the Panopolis of the Greeks. Its architectural remains are insignificant.

THE Granton Zoological Station was formally opened last week; the ceremony was to have been performed by Prof. Ernst Haeckel, but illness prevented him from coming to Edinburgh, as he had intended, to be present at the tercentenary celebration.

THE annual meeting of the Iron and Steel Institute will be held on Wednesday, April 30, and May 1 and 2, at the Institution of Civil Engineers, 25, Great George Street, commencing each day at 10.30 a.m. The list of papers and subjects for discussion is as follows:—Adjourned discussions: (1) On the tin plate industry, by Mr. E. Trubshaw, Llanelly; (2) on the coal-washing machinery used by the Bochumer Verein, by Mr. F. Baare, Bochum; (3) on the manufacture of anthracite pig iron, by Mr. J. Hartman, Philadelphia, U.S.A. Adjourned papers: (1) On recent results with gas puddling furnaces, by Mr. R. Smith-Casson, Brierly Hill; (2) on a new form of gas sampler, by Mr. J. E. Stead, F.C.S., Middlesborough. New papers: (3) On the use of raw coal in the blast furnace, by Mr. I. Lowthian Bell, F.R.S., &c., Rounton Grange, Northallerton; (4) on the behaviour of armour of different kinds under fire, by Capt. C. Orde-Browne, Lecturer on Armour at Woolwich; (5) on recent progress in iron and steel shipbuilding, by Mr. William John, Barrow-in-Furness; (6) on the most recent results obtained in the application and utilisation of gaseous fuel, by Mr. W. S. Sutherland, Birmingham. In addition we believe that a paper may be expected on the important subject of iron or steel sleepers, as now used largely in Germany, in place of the timber sleepers with which we are all familiar; and possibly papers on other subjects may be at the last moment forthcoming. It will be seen that the programme presents several features of interest. Mr. Lowthian Bell, we have every reason to believe, will exhibit the conditions attending the use of raw coal instead of coke in the blast-furnace in a clearer and more satisfactory form than has ever before been achieved. Again, the great duel being fought out between armour and guns is always a matter of keen interest, and Capt. Orde-Browne's position as a skilled and yet independent observer of the struggle gives him a special right to speak upon it. He will be able to give the last results obtained with the compound or steel-faced armour now coming so much into fashion. The ordinary business of the meeting includes the election of members, reading of the Council's report, and the presentation of the Bessemer gold medals to Mr. E. P. Martin, late of Blaenavon, but now General Manager of the great works at Dowlais, and to Mr. E. Windsor Richards, General Manager to Messrs. Bolckow, Vaughan, and Co., Middlesborough, to whom we are indebted for the practical realisation of the basic process of steel-making.

COL. KINCAID, Political Agent, Bhopal, writes to us under date March 30:—"We have had a renewal of the after-glow here lately, but not nearly so intense as we had in September October, November, and part of December. The natives of the country have naturally been much exercised by the prolonged phenomenon, and still believe it portends war and tumult." Col. Kincaid also sends us an extract from Malcolm's "History of Persia," referring to an "extraordinary change in the appearance of the sun" in the year 1721, which greatly alarmed the Persians of the period.