

to discover that the granites have taken a circuitous sweep round two small hills: Housethwaite Hill and Haggs Hill, their base being on the same level with the Goldmire valley; and that, regaining the same valley, their course is ruled by it south-westward to the shore. Thus they have nowhere made an eastern divergence from my former line exceeding half a mile.

At Ireleth, the next village north of Greenscow, granite is not uncommon in the roads, but I am assured by the farmers that it is thrown from carts conveying shore sand, which is largely used throughout the country for horticultural, building, and other purposes. This at once accounts for the presence and destroys the value of any *isolated surface-pebble* wherever it may be found.

In conclusion, while recognizing these evidences of the submergence of West Furness, it by no means follows that the eastern ground has been depressed to the same extent. It must be borne in mind that at the period when icebergs floated past on their way south, Furness was not a peninsula; her southern and eastern escarpments, whether of erratic or still older deposits, attest the fact. In short, that which is seen in miniature at Lodge Green, in the Hawcoat cliffs, is simply repeated on a larger scale:—the land drainage has cut wide breaches, which have admitted the sea.

Again, at Ulverston, the sea's influx up the drainage courses can be no evidence of general depression; as while sea-arranged gravels, with some few marine shells, reach nearly 100 feet elevation, yet half a mile out of these courses it seems to be true untouched moraine matter down to between 30 and 25 feet, as shown by some late deep cuttings.

On the other hand, shore-lines are sometimes artificial. In the memory of old inhabitants, small traders rode up our serpentine Carter Pool fully half a mile within the Ordnance high-water mark. Small pieces of local evidence like this, ought surely to be taken into consideration in any attempt to correlate these deposits.

Cavendish Street, Ulverston,
1st March, 1870.

NOTICES OF MEMOIRS.

RECORDS OF THE GEOLOGICAL SURVEY OF INDIA.

Vol. III. Part 1. February, 1870.

This Part of the Records contains the *Annual Report of the Geological Survey of India, and of the Museum of Geology, Calcutta, for the year 1869*. By Dr. Oldham, F.R.S., Director.

Besides the absence from India of Mr. W. T. Blanford, who for ten months of this period was busily engaged in the preparation of his Report on the Geology and Natural History of Abyssinia, the temporary losses of two officers away on furlough, of one from illness (sunstroke), the Survey further suffered, during the year, the loss by death, in April, of Mr. Charles Oldham, Deputy Superinten-

dent for Madras. Notwithstanding these drawbacks, much progress has been made in the Survey, and a great deal of valuable geological information obtained from various parts of the country.

Attention was early drawn to a serious earthquake which was felt at Cachar and Sylhet, on the 10th of January, 1869; the evidence connected with which was examined into by Dr. Oldham, and briefly laid before the Asiatic Society of Bengal. A further report of the effects of this earthquake is in progress.

As few accurate records exist of the earthquake shocks felt in the country, Dr. Oldham has been led to prepare a catalogue of Indian earthquakes, and, aware of the difficulty attending the compilation by a single individual, he solicits the contribution of facts from others who have paid attention to the subject.

In the Central Provinces, Chanda and Berar, explorations by boring have taken place to test the continuity of the beds of coal which the river Wurdah has exposed in one or two places, and also to prove the nature, thickness, and contents of the coal-bearing formation generally.

This method is rendered the more necessary in this district from the fact that the rocks are, except at distant intervals, concealed by a thick covering of clays.

The presence of coal has been satisfactorily determined, by boring, at Telewassa,—41 ft. 7 in. of coal have been determined here, in a total depth of 138 ft.,—and also near the village of Nokora.

The results, so far as the explorations have been carried, point to the general continuity of the coals on a fixed horizon in the lower sandstones of the Barakar group.

Well-sinking has been attempted at Umballa—a large station which suffered much from insufficiency in supply of water. Mr. Medicott, from an acquaintance with the country, urged this method of obtaining the required article, and the very first trial confirmed the justice of his expectations.

Comparisons have been instituted by Mr. Medicott between the several series of sandstones, etc., associated with the coal in Bengal, and those in Central India.

The vast extension and great constancy in mineral character of the Talchir rocks (which form the base of the great coal-bearing series) has been more fully established, and the dying-out of the beds in passing to the west has received further support. The entire group of the Coal-formation, which in the east gives five well-marked subdivisions (in ascending order, Talchir, Barakar, Ironstone shales, Ranigunj, and Panchet), becomes, at a short distance to the west, only a three-fold series, comprising the Talchir, Barakar, and Panchet subdivisions.

Mr. Medicott has also brought forward additional proofs to show that, on the large scale, the present limits of these Coal-measures coincide approximately with the original limits of deposition, and are not the result of faulting, or even mainly of denudation.

Dr. Oldham re-states his opinion (announced by him at the meeting of the British Association in 1867) that the great drainage

basins of India were on the large scale marked out, and existed (as drainage basins) at the enormously distant period which marked the commencement of the deposition of this great plant-bearing series. In this point of view, local variations in the lithological type, and local variations in the thickness of the groups, and even their occurrence, or non-occurrence, are only necessary consequences of the mode and limits of formation.

The work carried on in Madras, Bombay, and Burmah, is briefly alluded to.

In regard to the Museum, it may be mentioned that during the year more than 20,000 specimens have passed through the hands of the Curator and his Assistant, and have been catalogued for reference; but many of these had to be packed up again, there being no place to keep them otherwise.

An Index-map is appended to this Report, showing roughly the present state of progress of the Geological Survey of India.

REVIEWS.

THE ORNITHOSAURIA : an Elementary Study of the Bones of Pterodactyles, made from Fossil Remains found in the Cambridge Upper Greensand, and arranged in the Woodwardian Museum of the University of Cambridge. By H. G. SEELEY. Cambridge : Deighton, Bell, & Co., 1870.

THIS volume is the second of a series of "Indexes and Memoirs" descriptive of the Palæontological remains in the Woodwardian Museum, in course of preparation by Mr. Seeley, and has followed closely upon his less pretentious, but useful, "Index" to the same collection published last year.¹ Although professing to be only an "elementary study of the bones of Pterodactyles," from a very limited geographical area, and as limited a geological era, yet the author has gathered and put together in a condensed form a large amount of information on the subject of which he treats, derived from many sources and from his own observations.

The work may be divided into four parts: 1st, the Introduction; 2nd, the Osteological details, in which the general character of each bone of this group of animals is fully described, without regard to genus or species; 3rd, their Classification; and, 4th, a Synopsis of the Species in the Woodwardian Museum.

The author enumerates, in the Introduction to his work, the material which he has had at his disposal; it comprised a series of more than 500 bones in one collection, and about 400 in another, and he computes that they could not have "pertained to fewer than 150 individuals—a remarkable quantity from so small an area, and a striking proof of the numbers in which this Order of Vertebrates abounded when this deposit was being formed. All the bones from the Cambridge Greensand are more or less broken, but their arti-

¹ See *GEOL. MAG.*, Vol. VII., p. 34.