

deposits formed a single series, which could be subdivided upon stratigraphical grounds. But although there was no evidence of unconformity between the strata, he thought that the fact of different groups of fossils succeeding each other in the same area showed that those groups existed in neighbouring seas, and had been driven by upheaval of the sea-bottom on which they lived, into the region in which they are found. Hence he maintained that a change in the forms of life is evidence of unconformity in an adjoining area.

Mr. Maw remarked that under the Cambrian rocks at Llanberis there are unconformable beds, which may be the equivalents of the so-called Greenstones of St. David's.

Mr. Hicks admitted that the subdivisions at present in use may need to be modified. He thought that the greatest break is between the Menevian and the Lingula Flags, few species passing from one to the other. He regarded the upper and lower portions of the Tremadoc as really distinct.

CORRESPONDENCE.

VOLCANIC ROCKS OF THE LAKE-COUNTRY.

SIR,—As much interest attaches to the question of the relation of the volcanic rocks of the Lake-country (the Green Slate and Porphyry series) to the older Skiddaw Slates, and as one of us formerly expressed an opinion on the subject contrary to what the subsequent researches of the Geological Survey have made out, it may interest some of your readers to learn that we have lately discovered in Swindale, near Shap, beds of volcanic ash of the Green Slate and Porphyry series clearly interbedded with the Skiddaw Slates, similar to the case discovered by Mr. Aveline near Black Comb.

J. R. DAKYNS, Kendal,
J. CLIFTON WARD, Keswick.

DEEP BORING IN PRUSSIA.

SIR,—I send you some particulars, with which I have lately been favoured by Professor A. von Koenen, of Marburg, respecting the deep boring made by the Prussian Government Engineers at Sperenberg, about 25 miles south of Berlin, and noticed by your correspondent J. P. at page 48 of the GEOLOGICAL MAGAZINE for January.

The boring for the first 956 feet (1297½ English feet) was made by manual labour, at a cost of about £1600.

Several accidents having happened, the borehole was then lined for a depth of 85 feet (115¼ English feet) with tubes of 15 inches diameter; beyond that, to the depth of 100 feet (135 English feet), with 14-inch tubes; and then to 363½ feet (493¼ English feet) with tubes of 12½ inches diameter.

The length of time occupied in the above-mentioned work was fifteen months—comprised between May, 1867, and July, 1868.

From the depth of 956 feet (1297½ English feet), for the remaining distance, the boring was carried on by means of a steam-engine. The length of time consumed in sinking this additional 3095 feet (4255 feet English), comprised between January, 1869, and the 15th September, 1871, was about 31½ months, or 2 years and 7 months; during which interval several accidents occurred.

The total expenditure upon the whole boring, 4051 feet (5570 English feet), both by manual labour and by steam power, was about £8717 14s.—making the average cost for every Prussian foot in depth about 2 guineas, or £1 11s. 4d. per English foot.

The whole time spent on the work was $51\frac{1}{2}$ months, or 4 years and $3\frac{1}{2}$ months; but as there was an interval of 5 months, between July, 1868, and January 1871, during which period the boring operations were suspended, the actual number of working months becomes reduced to $46\frac{1}{2}$.

The process of boring throughout was by percussion borers worked by rods; and the rocks bored through belonged to the Triassic series.

The progress of the work would have been much greater but for the accidents which took place, and for the delays which were caused by the observations that were made as to the increase of the temperature of the earth in depth, etc.

The measurements were taken in Prussian feet; these have been reduced to English feet—the Prussian foot being 12·357 English inches.

A memoir (“Die Tiefbohrung zu Sperenberg”) on the subject of this interesting undertaking will be found in the “Zeitschrift für das Berg- Hütten- und Salinen-Wesen in dem Preussischen Staate,” Band xx. 1872.

H. W. BRISTOW.

28, JERMYN STREET,
January, 1875.

THE GREAT RHÆTIC BONE-BED NEAR FROME.

SIR,—To those of your readers who make a special study of the Rhætic beds, it may be of interest to know that the great Bone-bed, situate in the Black Shales of the above series, and replete with its usual remains, has been met with at the depth of 310 feet, in a pit, at present being sunk by James Oxley, Esq., of Frome, to the Lower Series of Coals of the Somersetshire basin, about two miles N.W. of Frome, and on the S.E. flank of the Mendip Hills.

ALFRED C. CRUTWELL.

WEST HILL, FROME,
15 Jan. 1875.

MISCELLANEOUS.

ARTESIAN WELL AT TORQUAY.—The Diamond Boring Company are sinking an artesian well on the premises of the Torquay Brewing Company, in Fleet-street, Torquay. About 90 feet of solid limestone (Devonian) has been penetrated. It is anticipated that an abundant supply of water will be reached at a depth of about 200 feet; but although this may be regarded as very problematical, there is no doubt that if the work proceeds a very interesting geological section will be obtained.