

BOULDER-CLAY IN IRELAND.

SIR,—I can assure Mr. Birds that he is perfectly correct in supposing that there is an Upper Boulder-clay in Ireland, resting on "Middle Sands and Gravels;" and these again on the Lower Boulder-clay or Till. The general series is precisely similar to that of the North-west of England, to which he refers in his letter in the *Geol. Mag.* for September last (p. 429). If former sections which I had examined had left any doubt on this question on my mind, it would have been removed on seeing the section of the Post-Pliocene beds laid open at the marble quarries of Kilkenny, shown to me this summer by Mr. Hardman, of the Geological Survey. This and other sections in the district tend to prove that the Upper Boulder-clay occupies a considerable extent of surface in that part of Ireland. As this fine section will probably be described in detail by Mr. Hardman himself, I shall not further allude to it, than to say that it puts out of court any future attempts to call in question the succession of the Drift series as given above.

The "Esker Drift" so-called, I consider to be later than the Upper Boulder-clay, and is only a remodelled form of the true Drift-beds.

5, RAGLAN ROAD, DUBLIN, 10 Sept. 1875.

EDWARD HULL.

MR. BONNEY ON GLACIAL EROSION.

SIR,—On this subject, in this month's Number, Mr. Bonney is as full of sound sense as usual. But as regards the *widening* of upland valleys I wish that I could persuade him that there is no necessity for "the volume of the stream being formerly greater," or for "the slow motion of the river from one side of the valley to the other," and to substitute "atmospheric and rain erosion" for "fluvial erosion." I never heard of what Mr. Goodchild calls "the spring theory" for forming cliffs and *widening* valleys. He indeed controverts the theory, in which I most cordially agree with him. But does any one hold it? If so, who? Springs cut channels, but what *widens* these channels into valleys is atmospheric disintegration and the erosion of rain. For this reason the same valley is always narrow directly as the hardness of the strata and wide directly as its softness. So in rocky strata cliffs and rock ledges will be formed; in soft strata smooth sloping sides; but if the widening of valleys resulted, as Mr. Goodchild says, from "mechanical means," the soft strata should form cliffs and ledges as well as the hard ones.

BROOKWOOD PARK, ALRESFORD,
15th September, 1875.

GEORGE GREENWOOD, Colonel.

GEOLOGICAL SURVEY OF INDIA.—We are glad to be able to announce the promotion of Mr. King to the first grade of this department, and of Messrs. Hughes and Willson (the latter formerly of the Geological Survey of Ireland) to the second grade. We are also glad to see that Dr. W. Waagen has succeeded to the separate appointment of Palæontologist left vacant by the lamented death of Dr. Stoliczka. With Dr. Waagen and the recent additions to the staff of Mr. R. Lydekker and Dr. O. Feistmantel, the Indian Survey may be congratulated upon its great palæontological strength.