making a detailed survey of all the superficial accumulations lying in a line (say) from Plymouth to Carlisle, and the ground would have to be traversed to-and-fro, as the drifts of one district have been found to throw much light on those of another. One great and fundamental question to be solved would be the age of the "Head" relatively to that of the Pinnel of the Lake District. The former overlies the raised beaches of the South-west of England.

D. MACKINTOSH.

GLACIATION OF THE SOUTH-WEST OF ENGLAND.

SIR,—The subject of the Glaciation of the South of England is gaining more and more attention, and Mr. Lucy's observations in West Somerset, as recorded in the June Number of your MAGAZINE, will be read with interest, particularly in reference to the identification of glacial striæ on a mass of sandstone near Porlock. In regard to the gravelly deposits in the lowlands near Minehead, I was led, during a short excursion to the neighbourhood in the Spring, to assign to them an alluvial, or possibly estuarine, origin; at the same time it is not unlikely that the gravels on the high grounds, as those in the neighbourhood of Tiverton, may be of glacial derivation. Mr. Poole has recorded the occurrence of tusks and teeth of the Mammoth in a deposit of clay and gravel at St. Audries, and he remarked that "originally the whole skull was there."

On my return a few days since from a short holiday trip in Norfolk to the Black Down hills in Devonshire, I was conducted by my colleague, Mr. Ussher, F.G.S., to see some "rum stuff" on the high ground between Little Down and Manning's Common, about two miles N.N.E. of Yarcombe, and between Honiton and Chard. Here the surface of the ground is of a clayey nature, and the formation beneath is the Greensand. Mr. Ussher pointed out one or two places where pits had been sunk for marl, and the presumption was that there was a trace of chalk not noticed in the previous survey of the district. On careful examination we found traces of chalky and chloritic marl and true chalk (one piece contained a small fish tooth), but the whole deposit was interbedded with clay. The clayey and sandy deposit, which covered the surface of the ground adjoining to the depth of eight or ten feet, contained numerous large and well-worn boulders of Greensand chert, large pebbles of quartz (one to three inches in diameter), numerous small pebbles of quartz, rolled flints, and a few smooth and good-sized boulders of quartzite. There were also a few pellets of Chalk, besides traces of Fuller's Earth, and nodules of "Race." A pit recently opened showed about seven feet of greenish-yellow carbonaceous clay with a seam of gravel, resting upon an irregular surface of coarse reddish-brown and pale-coloured sand. The nature of these deposits led me to class them as Boulder-clay, and as such they seemed to possess more than merely local significance.

The great deposits of flint and chert found on the summits of the Greensand hills of Dorset and Devon have been noticed by De la

Beche, Buckland,[1] and others, but their origin has never been clearly explained. Much material, no doubt, is due to the disintegration of the Chalk *in sitû*, in helping to form a sort of "Clay-with-flints," which is everywhere conspicuous on the Chalk hills, and in some cases where the Chalk has been entirely removed, the flints have become mixed with the disintegrated chert of the Greensand. This, too, as Mr. Whitaker has pointed out, is partly due to the attenuation of the Lower Chalk and the consequent nearness of the Upper Chalk with flints to the Greensand. The Greensand itself has been partly broken up by the action of the weather, and partly by the not-to-be-overlooked action of the plough. There is still, however, much to account for in the amount of chert detritus, and also in the occurrence of quartz pebbles. The smaller quartz pebbles may be derived from the "Chalk with quartz grains" at the base of the Chalk series, described by De la Beche, but the larger ones have not been so locally derived.

When we look to this probable Boulder-clay near Yarcombe, we may admit an agency which will account for the dispersion and wearing of the superficial deposits now found on the hills, and which certainly can no more be attributed entirely to atmospheric agencies in action in the area, than to river action. It seems rather premature at present to call in the agency of a "South of England Ice Sheet," as might be inferred, perhaps, from Mr. Croll's patient investigations, and I should prefer attributing the formation of the deposits to marine agency during the Glacial-submergence, with the assistance of an occasional iceberg. However, until the country is worked out in detail, it is not well to theorize further.

HORACE B. WOODWARD.

STOCKLAND, NEAR HONITON,
10th June, 1874.

P.S.—June 25th—Subsequent investigations have confirmed my opinion as to this Boulder-clay. Deposits similar to those at Little Down, have been found by Mr. Ussher and myself between White Staunton and Howley, and in other localities in this district. H.B.W.

THE SANDWELL PARK TRIAL SINKING.—The success of this important sinking having now been fully achieved by the finding of the *thick coal* at a depth of 418 yards, and of a thickness 20 feet 6 inches, it is proposed to furnish some account of the fossils met with and the general character of the Red rocks passed through before reaching the reputed Coal-measures. Prof. Ramsay, LL.D., F.R.S., Mr. Carruthers, F.R.S., and the Editors of the GEOLOGICAL MAGAZINE, will take part in the proposed work, which will be brought out under the patronage of the Right Hon. the Earl of Dartmouth, upon whose estate the sinking has taken place. Further particulars will shortly be published by Mr. Henry Johnson, the Engineer and Secretary of the Company, Trindle-road, Dudley. The shares of the Company are now worth a thousand guineas each, with one hundred guineas paid up.

[1] Dr. Buckland noticed the presence of Grey wethers—"Siliceous breccia, like Hertfordshire puddingstone"—at Sidmouth and Black Down. Trans. Geol. Soc., 2nd series, vol. ii. p. 126.