

the Midland Bunter must have extended over a large part of Staffordshire (interruptions being mainly due to faulting or denudation), and they have trespassed on the neighbouring counties. Their thickness sometimes come near, if it does not exceed, 300 feet, and very commonly is over 100 feet.

(2) How he explains the fact that the Triassic pebble beds present such a close resemblance to the *nagelfluh* of the Alps, and to the great gravel beds of later date which overspread the lowlands on both sides of that chain, while it is difficult to find a parallel for them among beds undoubtedly marine. I asked these questions in 1890, but failed to obtain an answer, so I am obliged to repeat them.

T. G. BONNEY.

#### THE SOUTHERN DRIFT.

SIR,—In this month's number of the Journal of the Anthropological Institute, p. 45, there is a statement of so misleading a character that I cannot pass it over without comment. In speaking of the Hill Gravels of Berkshire, Mr. O. A. Shrubsole says: "this extensive deposit is composed of the Southern Drift of Phillips and Prestwich." Anyone reading this would suppose, as he gives precedence to the late Prof. Phillips, to whom I have not referred in my paper on the Southern Drift, that I had failed to make acknowledgment to him as the discoverer thereof. Such an impression I am anxious at once to remove. I was at a loss to conceive what foundation Mr. Shrubsole had for this statement. On turning to Phillips' "Geology of Oxford and the Valley of the Thames, 1871," I find at p. 460 the following paragraphs. After speaking of the "operation of a great flood, a deluge, coming from the north, north-west, and north-east," bringing down spoil of the Midland Counties into the Valley of the Thames at Maidenhead and at Kensington, Prof. Phillips says: "Looking at the distribution of foreign drift in the country under review, we find evidence of abundant currents from the north, which brought plenty of gravels on the western side, but no Boulder-clay; and plenty of Boulder-clay with some gravels on the eastern side; while in the middle space there are traces of currents from the south transporting *flints and Sarsen-stones*." A diagram accompanies this description showing flints and *Sarsen-stones* from the Chalk hills, apparently of Kent, striking in between the north-west and north-east drifts. He then goes on to say how this might have been effected by the agency of ice. This is all that Professor Phillips says of the composition of this drift. He does not even mention the term "southern" in the text; but in the index attached to the word "drift" are the words "northern" and "southern," used, I presume, merely as antithesis. No definition of age nor superposition is attempted; and, be it observed, surrounded as the Thames basin is on all sides by Chalk ranges, flints and *Sarsen-stones* are of themselves no sufficient evidence of direction of their source.

Long before I had formulated my ideas respecting the Southern Drift, I often had the opportunity of discussing with my old friend

and predecessor, Professor Phillips, the Drift beds of the neighbourhood of Oxford and the Thames Valley. Beyond the fact of the occurrence of flints in the Thames Valley, he was not aware of the widespread distribution of *chert* from the Lower Greensand on the higher hills of the Thames district, on which I mainly based my hypothesis of the Southern Drift. In fact, at that time, no one had recognised this *chert débris*, or if it had been noticed the fragments were spoken of as *Sarsen-stones*.

So far back as 1847, in "The Ground Beneath Us," after speaking of the flint gravel of the Thames Valley, I say: "It must have been from some distant spot that the materials of this gravel had been derived. . . . The nearest place . . . is in the range of hills passing by Croydon and Epsom, a distance of six to ten miles southward from Clapham." Again, "Whatever may have been the cause of this exceptional phenomenon the great and preponderating mass of flint *débris* from the Chalk hills, and of *sandstone* and *chert* from the Greensand hills of Surrey, leaves no reasonable doubt that the main bulk of the gravel of Clapham and of London has been derived and transported from the *Surrey downs* and *Sussex hills*."

Mr. Shrubsole sees a difficulty in the existence of a Wealden dome, which he considers open to question. But how, without higher ground than any in the Thames Valley, could *débris* from the Lower Greensands have drifted over the ground to the northward of it?

These remarks are not intended to convey any disparagement of Professor Phillips' excellent work, which I have often had occasion to study with advantage.

JOSEPH PRESTWICH.

#### BOULDERS OF ELÆOLITE-SYENITE IN EAST YORKSHIRE.

SIR,—The absence of the well-known elæolite-syenite (laurdalite of Brøgger) from the Norwegian boulders hitherto identified in Holderness has more than once been mentioned, and is cited by Sir Henry Howorth in your August Number as in some way supporting his theory that the boulders were brought artificially as ballast. Why laurdalite should be less suitable for ballast than laurvikite does not appear. The non-recognition of the former is, of course, easily explained by its resemblance to the latter, which occupies a much larger area in the Christiania basin, and is correspondingly more plentiful among the boulders. Nevertheless it is satisfactory to be able to record the occurrence of the Norwegian elæolite-syenite on the Holderness coast. Visiting Dimlington a few months ago, I selected from the profusion of syenitic boulders on the beach eight which seemed worthy of closer study. These and the slices cut from them are now before me. Two contain abundant elæolite, and are identical in every respect with specimens of laurdalite from its original home; one or two others have accessory elæolite and sodalite.

Since these boulders were collected on the beach, the facts mentioned do not appeal to those who find comfort in the ballast theory. Indeed, it is not easy to see how Sir Henry Howorth can