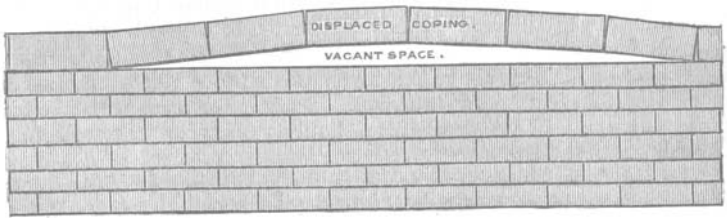
at Candren, two at Walkingshaw, five at Blythswood, and one in the bed of the Clyde at North Barr House, went through Boulder-clay alone, by which we learn that, as the ground is flat, they were sunk in what are now subterranean hillocks, but which were once submarine islands or shoals in a sea, depositing mud around them. Seventeen bores—two at Candren, nine at Walkingshaw, one at Blythswood, three at the Barns of Clyde, and one at Blairdardie, went through sand and mud only, the silt of the glacial sea filling up the hollows between the submerged hillocks or shoals. The deepest of these bores are at Walkingshaw, one being 152 and another 159 feet deep; and one, at Shiels, above Renfrew, 144 feet deep, and the remainder from 80 to 100 feet deep. Nineteen bores have more or less Boulder-clay, sometimes only a few feet, at other times more than half. At Craigielee, near Paisley, and Garnieland, near Renfrew, rocks come above ground, and these must have been sunken rocks at that time, against which, doubtless, many an ice-berg struck. From these facts it is clear that the bottom of the glacial sea was extremely undulating, as much so as any modern land surface. Into the hollows of the mud of the glacial sea the washings of these very hillocks were deposited, and in them lived the boreal shells which have made this region so famous in Post-Tertiary geology. J. A.

CORRESPONDENCE.

I.—HORIZONTAL PRESSURE AND VERTICAL DISPLACEMENT.

Sir,—In the March number of the Magazine I made a few observations on the probable connection between the vertical force of gravitation in a sphere with the horizontal force that appears to have produced slaty cleavage.

The converse of this proposition is well illustrated in the distortion of an old brick wall at Shiffnal, in this county, represented in the accompanying engraving, in which the coping has risen from



its vertical support and ranged itself into an arch, leaving a vacant space underneath. The mortar joints had evidently been expanded by frost, the length of the coping thereby increased, and the expansion being horizontally resisted, the increased length was compelled to expand itself as a curve.

The case seems strictly analogous to what might take place in the

crust of the earth, and seems to bear out the views of the late D. Sharp, on the direction of slaty cleavage.

The applicability of this illustration was first suggested to me in a note from the Rev. O. Fisher, referring to my recent letter in the Magazine, on "Gravitation and Horizontal Compression," in which he observes, "I find that if you take into consideration a spherical shell, of moderate, say a few miles, thickness, and conceive it for a moment unsupported by the matter within, then the horizontal pressure upon any two sides of a cubical element of this shell will be equal to the weight of a column of rock of the same density and half the length of the earth's radius. This would be sufficient to crush any strata, and is, I believe, the force to which the elevation of mountains is due."

If you also take into consideration the effects of even the slightest inequality of local horizontal expansion, due to heat, its resolution vertically, in an arched form (bulging), would account for the fullest amount of displacement observed in the earth's crust. Take a segment of, say, only a hundred miles; an expansion of but $\frac{1}{1000}$ part of its length would produce a vertical elevation of several hundred feet at its centre.

The late D. Sharp's observations (Quart. Journ. of the Geol. Soc., vol. iii., p. 74,) tend to show the relation between the dip of slaty cleavage to areas of elevation in its apparent radiation from the axis of upheaval. If the slightest abnormal expansion is superadded to the uniform horizontal pressure within a sphere due to gravitation, it appears probable that the direction of the force would determine the dip and direction of cleavage plains.

As Mr. Fisher informs me he has recently communicated a paper on a kindred subject to the Cambridge Philosophical Society, I forbear, till it appears in print, to do more than give the drawing of the displaced wall-coping in further illustration of the suggestion I threw out in the March number of the Magazine. GEORGE MAW.

BENTHALL HALL, BROSELEY.
May 2nd, 1868.

FOSSIL PALM-LEAF FROM THE EOCENE OF THE ISLE OF WIGHT.

SIR,—In Room I., Wall-case 6, of the Geological Gallery of the British Museum is a fossil Palm-leaf in a nodule to which the following label is attached:—"*Flabellaria lamanonis*, Brogn. Eocene, Isle of Wight. From Dr. Mantell's Coll$^{n.}$ fig$^{d.}$ at p. 52 of Mantell's fossils of the Brit. Mus. 1851." The locality given in Dr. Mantell's book is White Cliff Bay. On the back of the specimen is written in pencil "Upper Bembridge or Lower Hempstead."

Can any of your readers state the exact locality and bed from which this specimen came, and whether any other specimens have been found in White Cliff Bay?

May 14, 1868. W. STEPHEN MITCHELL.
