

CORRESPONDENCE.

CUP-SHAPED JOINTS OF BASALTIC COLUMNS.

SIR,—It is clear (from Mr. Mallet's letter to you, see *GEOL. MAG.* Nov. 1875, p. 566, and also from his communication to "Nature" of this date) that no *facts* which may be adduced can be regarded as of any value, if they discountenance a 'cut-and-dried' theory on which a 'physicist' has made up his mind. He contents himself with simply reasserting his theory, and resolutely refuses to examine the appearances presented by the fine group of columns in the Hall of the Geological Society, to which I have referred him, as being totally inconsistent with it.

Mr. Mallet's theory presupposed, in his own words, that "the convex surface of the joint" should "always point in the same direction as that from which the cooling and consequent splitting proceeded" (p. 182 of Proceedings of Royal Society, No. 158). I ventured to submit this supposition, which did not agree with my experience, to the test of "facts." In the triple group of columns from the Giant's Causeway in the possession of the Society, in which there is every reason to suppose the cooling and splitting had proceeded throughout in one and the same direction, do the convex surfaces of their joints all point in the same direction? I found them, on the contrary, pointing in different directions. Nay, even in one column an articulation of little thickness showed two cup-shaped concavities pointing different ways, back to back, like those of a bi-concave lens. Now how does Mr. Mallet attempt to get over this difficulty? Why, by supposing, or rather asserting as a fact *proved by his theory*, that the cooling process in *this column* proceeded in opposite directions, from the top as well as the bottom, and met in the interval between the two opposite concave joints—that interval being an articulation only a few inches thick, and showing no sign of seam or separation across it! But, in addition to the obvious improbability of this supposition, Mr. Mallet has himself disposed of it in the following passage (page 183, Proc. Royal Soc. No. 158): "If the mass cools both from the top and the bottom, the prisms, vertical and straight, will meet in an irregular intermediate stratum of angular fragments."

I have already said that there is no appearance of any such intermediate fragmentary stratum within the very thin articulation in which Mr. Mallet, in order to save his theory, now chooses to place the separating plane between the portions cooled from above and from below.

In addition to the evidence furnished by the column in the Society's Museum, which, however, is quite conclusive on the question, I have the authority of my friend Mr. Judd, whose competency as an observer will not be disputed, for the fact that, in the platform of the Giant's Causeway, as well as at Staffa, there are to be seen at least as many concavities as convexities. And even Mr. Mallet will scarcely deny that in all these columns the cooling must have proceeded in the same direction; namely, from below upwards. Indeed

the very regular columnar ranges, to which Mr. Mallet's theory relates, have, one and all, evidently cooled from the bottom; the upper portions of the basaltic beds being nearly amorphous, or, if prismatic at all, composed of very imperfect groups of prisms.

Apart, indeed, from Mr. Mallet's ideal columns, I will state, as the result of my own observations, that in every natural section of a basaltic columnar range, the plane separating the portion in which cooling probably began below from that in which cooling began at the upper surface, is, as a general rule, horizontal; the two portions being as distinct as is the architrave in a Greek temple from the supporting columns (as may be seen in any good drawing of Staffa, or of the basaltic columnar ranges of the Vivarais, Auvergne, etc.). The upper portion is, indeed, generally amorphous, or nearly so, and so decidedly separated from the lower regular columnar range, as to have been usually mistaken for a separate lava-flow of later formation. If Mr. Mallet's notion could be realized anywhere, it would be in the horizontal columns of a vertical dyke, formed by contemporaneous cooling from both of its sides. I will, however, venture to say that no instance can be produced of a single continuous column passing unbroken, from side to side, of any dyke. Can Mr. Mallet produce any example of such a fact from his own observations? The columns, on the contrary, always terminate towards the centre of the dyke, either in a seam of amorphous lava, or an interval filled with rubble (and this Mr. Mallet himself admits, as in the former instance, p. 183), or sometimes they are separated by a still more recent vein of lava. Finally, I leave it to all geologists interested in the question, to examine the columns in the possession of their Society, and form their own opinion upon the point in dispute between Mr. Mallet and myself.

It is of the more importance from its having an indirect bearing on the main question as to the influence of concretion, no less than of simple contraction, upon the production of the columns themselves: a question upon which, likewise, I have the misfortune to differ with Mr. R. Mallet, who will not admit of any concretionary action at all—even, for example, in the case of the nearly globular articulations of the prisms of the Cheese-Cellar at Borrich. But upon this point, I will not here enlarge.

COBHAM, November 3rd, 1875.

G. POULETT SCOPE.

ON THE PRESENCE OF THE GENERA *PLICATOCRINUS*, *COTYLEDERMA* AND *SOLANOCRINUS* IN BRITISH STRATA.

SIR,—At the British Association Meeting a few weeks since, F. Longe, Esq., F.G.S., of Cheltenham, handed to me a very perfect example of the interesting but little known Crinoid *Plicatocrinus* which had been found by him on the coast near Bridport. He informed me he had shown it to Dr. Wright, who had referred it to the family *Cirripedia*, to which at first sight it bears some resemblance.

I explained to Mr. Longe that this was incorrect, as it belonged to the *Crinoidea*, at which group Dr. Wright had so long been working, and that I was already possessed of several of the above genera