

very colour of the clay (as reported) being different from the clays of the immediate neighbourhood; all pointed to this conclusion. He therefore urged that this Chapelhall clay should no longer be cited as a proof of submergence.

An interesting discussion followed.

CORRESPONDENCE.

THEORY FOR "CLEAT" IN COAL-SEAMS.

SIR,—It must surely be admitted by students of the Coal-measures in every country, where coal-mining is carried on to any extent, that coal-seams are the most persistent in extent of area, most uniform in composition and in homogeneity of any strata of the series; and therefore may justly be considered the *typical* beds of it. The *master-joints* or "cleat" of coal are much more regular than those of any other strata; and I think Coal-beds were much more likely to shrink and crack *evenly* than the less persistent and ever-varying associated shales, clays, and sandstones. The least-disturbed Coal-areas exhibit the best-developed or most regular and typical "cleat." Thus, if "cleat" was formed or produced by shrinkage of the mass in cooling, due to elevation following deep subsidence (which I think is the generally accepted opinion as to what caused "cleat"); why, it may, and has often been asked, does the "cleat" (the direction of the main joints) usually run roughly N.N.W. and S.S.E., this being the general trend, not only in England but in the United States, and probably in many other countries? I have not come across any good reason in explanation of this fact, but reflecting on the point it occurred to me that possibly the following theory might account for it.

As the Coal-measures were upheaved or elevated at the end of the Coal period, the rocks would cool and consequently contract to some extent, and in contracting would crack, and thus the joints would be formed; but the cause of the joints taking lines roughly parallel with the earth's axis, or closely corresponding with *polarity* or *longitude*, I venture to think may have been due to the increased rotary velocity or greater centrifugal force acting upon the coal-seams as elevation proceeded—as they got further and further away from the earth's centre and so became more liable to open, split, and expand: in other words, *the tensional strength of the coal gave way along approximate N. and S. lines due to increased velocity of travel as a consequence of elevation and cooling.*

Mathematicians and physical scientists may possibly demonstrate my theory to be contrary to the laws of natural science. If they do, we must then look for some other explanation of the phenomenon of "cleat." At any rate it is hoped that this communication will be accepted or rejected on its merits or demerits, and that it will call up some criticism.

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