CORRESPONDENCE.

ON THE FORMATION OF THE DIAMOND IN THE TERTIARY DRIFTS OF NEW SOUTH WALES,[1] ETC.

After referring to the recent artificial production of the diamond by Mr. Hannay, the writer adds:

"When examining the New England and Mudgee Districts in New South Wales, I came to the conclusion, as did Mr. Norman Taylor also, that the diamonds (of which hundreds were found in the gold and tin drifts) had been chemically formed in the Miocene and Pliocene Cements, which are very ferruginous and sometimes siliceous, the waterworn pebbles being found coated with a film of silica. The recent alluvium only where derived from the Tertiary drifts is diamond-bearing; and the Tertiary drifts themselves contain diamonds; but the older rocks, Silurian, Devonian, or Carboniferous, do not contain them, or rather, the recent alluvium derived from them does not, although the Tertiary drifts themselves have also been derived from the same Palæozoic rocks; therefore, we can only conclude that the diamonds have been formed in the drifts.

"These drifts are nearly always capped with basalt. I believe from the nature of the rocks that water containing some carbonate in solution, and also silica, was present, a chemical reaction taking place and setting free the carbon in a crystallized form. In the same way, I believe, the minute scales or crystals of graphite have been formed in our Hawkesbury Sandstone (Triassic). This sandstone consists of (originally) rounded grains of quartz sand, coated now with silica in a crystallized state, and with the scales of graphite scattered through it. The sandstone, when broken, has quite a glittering appearance, from the silica coating the rounded grains of sand with the graphite occurring at intervals through the mass. I mentioned this to Prof. A. Liversidge, but he thinks the scales of graphite were deposited with the sand; I think not, however, for the sandstone, so false-bedded, etc., bears evidence of deposition by strong and variable currents of water, which would have destroyed the small graphite grains by attrition. On this account I think the graphite must have been chemically formed during the slow transmutation which the sandstone has undergone.

We shall be much interested to hear of Mr. Hannay's process for making the diamond."

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ECCENTRICITY AND GLACIAL EPOCHS.

SIR,—Mr. Greenwood's demonstration in the July Number (p. 332) looks clear, but is, I think, not quite sound. The error is rather subtle, and not easily made out. I believe it to consist in attributing to the sun's heat only the actions of melting snow and raising temperatures, which tacitly neglects its primary action of supplying the place of that heat which the earth and its atmosphere are

[1] In a letter to R. Etheridge, Jun., dated "Sydney, 9th April, 1880."

perpetually radiating away. When this is brought into the reckoning, there is no such decrease in available energy as Mr. Greenwood's argument supposes. The reason for expecting that the winter snowfall will be increased with increased eccentricity is that the heat-receipt during winter will be then diminished. Some vapour which the sun's heat might have maintained as vapour during the winter, will then radiate off its heat without compensation; will be chilled and fall as snow. But the summer's receipt of heat is increased, increased to the exact extent of the winter decrease, and so to the extent required for the dissipation of the supposed additional snow. The heat thus spent in dissipating Mr. Greenwood's extra foot of snow would before the increase of eccentricity have been spent in preventing that snow from being formed. There is no increase of work to be done.

Mr. Greenwood's argument would become correct if the snow were supposed to be generated in some different region, and thence brought to the region considered. Obviously a room will be chilled if a block of ice be introduced.

I find it difficult to reconcile the language of Mr. Greenwood's second paragraph with the article which it criticizes. He says that I argue from "increased radiation being greater in proportion to the increase of temperature." He probably means, "greater *than* in proportion." He says that I ignore the fact that if radiation is increased in greater proportion by a rise in temperature, it is decreased in like proportion by a fall. This fact is only roughly true, just as when a conical vessel contains water, it is true that whether the water level be raised or lowered an inch, the quantities to be poured in or poured out are nearly the same. But only roughly, not quite. The equality is not perfect. This is pointed out at some length in the article considered, and the argument questioned by Mr. Greenwood was built on this absence of equality. The words "ignore" and "fact" seem incorrectly applied.

The question is at present scarcely worth discussion. Mathematical calculation of the effect is environed with apparently insuperable difficulties. But the rough attempts at calculation which I have made lead me to suspect that its amount is insignificant, and not even inadequate to alter mean temperature by a degree.

St. John's College, Cambridge, *Aug.* 10. E. Hill.

SCLEROTIC BONES OF COAL-MEASURE REPTILES.

Sir,—Would you kindly permit me to inform your readers that I have obtained from the Northumberland Coal-measures a perfect ossicular sclerotic ring of a Carboniferous reptile? It consists of eight ossicles of a quadrate form which slightly overlap each other and produce a perfect ring, the central opening of which is $\frac{5}{16}$ths of an inch in diameter; and the extreme diameter of the ring of ossicles is $\frac{5}{8}$ths of an inch.

I have also obtained a series of six sclerotic ossicles lying in regular order. The ring, if complete, indicates the existence of about 24 ossicles, and the central opening about $\frac{5}{8}$ths of an inch in diameter.