

IX.—FROZEN MUCK IN THE KLONDIKE DISTRICT, YUKON TERRITORY, CANADA. By J. B. TYRELL, F.R.S.C. Trans. Roy. Soc. Canada, ser. III, vol. ix, pp. 39-46, with 3 plates, 1917.

THE valley floors of the Klondike District are the products of the third cycle of erosion since the last continental uplift of the region. In the Miocene period the Dome peneplain was produced by the first cycle of erosion. In Pliocene times the valleys in which the older White Channel gravels were deposited were carved out during the second cycle of erosion, while the present valleys and their alluvial gravels are connected with the third cycle, which lasted till the end of the Pliocene period. During this time the climate was temperate and the country was inhabited by a number of the larger mammals, but at the beginning of the Glacial period different conditions set in, and, though this region was not covered by an ice-sheet, the soil was certainly frozen all the year round. In consequence of this the alluvial gravels and the beds of the streams became impervious to water and resistant to erosion. When, therefore, the snow melted in the spring the water in the stream channels brought down, instead of sand and gravel, only vegetable debris from the hill-sides, which collected on the alluvial flats and was held fast and preserved by the large growth of bog mosses. In this way great thicknesses of this frozen bog or "muck" were accumulated, varying from 2 to 40 feet and even 100 feet in the narrower gulches, which have to be sunk through before the gold-bearing gravels can be worked. "Muck" is also found in the form of frozen bogs on the hill-sides, where it often contains layers of clear ice, tilted at steep angles by the slipping of the bog. The "muck" now forms the upper part of the valley deposits, which shows that little or no gravel has been transported since the beginning of the period of perennial frost, and that, therefore, the valley gravels are all pre-Glacial in age.

CORRESPONDENCE.

ON *TEREBRATULA GRAYI*, DAVIDSON.

SIR,—In a former paper in this Magazine (Dec. VI, Vol. III, pp. 21-6, 1916) I proposed the name *Thomsonia* for the *Terebratula grayi* of Davidson. This name, I find, has unfortunately been used for Insecta on two previous occasions, viz. in 1879 and 1884, and, therefore, cannot stand. In its place I now propose

COPTOTHYRIS, gen. nov.

Coptothyris grayi has been placed in *Waldheimia* (now *Magellania*) and in *Dallina* by various authors, on account of the loop having reached the highest developmental stage in the Terebratellidæ; but it is distinct from either of these genera on other grounds. The full details of these differences are reserved for a future paper on the cardinalia of the Dallininae in general. In this paper I hope to show that the cardinalia (or hinge-processes of the dorsal valve) of the sub-family Dallininae can be readily differentiated into, at least,

three distinct types, each being represented by forms which have attained the Dalliniform loop-stage of Beecher, viz. *Coptothyris*, *Macandrevia*, and *Dallina*. These three genera are also characterized by distinct types of beak characters, dental plates, etc. Thus three evolutionary stocks can be clearly recognized, in each of which Dalliniform loops have been attained by parallel evolution. There appear to be other stocks present, but in these there is as yet no evidence for the separate attainment of the Dalliniform loop.

The study of the hinge characters of the species of Dalliniinæ contained in my collection (comprising most of the known forms) has revealed many interesting features which have an important bearing upon the classification of both recent and fossil forms. For some of these forms it will be necessary to create new genera.

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THE CANINIA-SEMINULA HORIZON OF *PRODUCTUS*
HUMEROSUS.

SIR,—I have just received my copy of the Q.J.G.S., containing Mr. Parsons' most excellent paper "On the Carboniferous Limestone of the Leicester Coalfield". I want to ask him to reconsider the question of the horizon of the beds containing *Productus humerosus* (*P. sublevis*). Following Professor Sibly, who referred the Cauldon Low (Staffs) Limestones to D₁, he has not pointed out that *P. humerosus* is an important zonal fossil both in Belgium and the Clitheroe area, indicating a *Caninia-Seminula* horizon. Therefore, one must pause to think before beds containing it are assigned to a much higher zone. The palæontological evidence of the Cauldon Low beds is strengthened by the presence in them of other members of the C-S₁ fauna. Papilionaceous *Chonetes*, *Bellerophon cornuarietis*, and other members of that genus, and several large Gasteropods which can be matched in Belgium and Clitheroe. I note that *Cyrtina septosa* occurs with *P. humerosus*. This, too, indicates the lower zone.

Then, again, the barrenness of the beds and the absence of *Lithostrotion* and a *Dibunophyllum* fauna are very noteworthy. I have, no doubt, in my own mind that the Cauldon Low beds are of *Caninia* age, and the whole question will be more fully discussed in a forthcoming paper on the Clitheroe area.

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ON SERVICE.

September 7, 1918.

STRATIGRAPHICAL POSITION OF THE CORALLINE CRAG.

ERRATUM.—In Mr. F. W. Harmer's article in the September Number, "Stratigraphical Position of the Coralline Crag," p. 410, for Walton horizon read *Oakley* horizon = Poederlien, and for *Oakley* horizon read *Walton* horizon = Scaldisien—the names Walton and *Oakley* having been reversed.