

SHALLOW WATER DEPOSITION IN THE CAMBRIAN
OF THE CANADIAN CORDILLERA.*

BY LANCASTER D. BURLING.

During the field season of 1915, the writer was engaged in a stratigraphic study of the Cambrian rocks along the Canadian Pacific and Grand Trunk Pacific railways in British Columbia and Alberta. One of the most striking features observed was the very considerable evidence of shallow water conditions of deposition in the limestones of the region.

The Stephen formation (1) occupies a central position in the Middle Cambrian and forms a two or three hundred foot shelf between cliffs of massive limestone each a thousand feet or more in thickness. In the vicinity of Mounts Stephen and Field, on the Canadian Pacific Railway, it includes those striking Middle Cambrian faunal horizons to which the terms *Ogygopsis* shale and Burgess shale have been applied. Here the limestones and shales of which it is composed betray no evidence of shallow water conditions of deposition; in fact it is hard to see how the jelly fish, sea cucumber, sponge, worm, crab, and pteropod fauna of the Burgess shale (b) could have been preserved in strata deposited outside of the most sheltered of habitats. In Castle Mountain, 30 miles southeast of the locality to which these faunas appear to be confined, however, the limestones of the Stephen formation, which are both coarse and fine grained and apparently purely calcareous, are very largely mud-cracked and ripple-marked. The areas outlined by these mud-cracks vary from one inch to three or four feet in diameter, and the distance between crests of the ripple-marks varies from one inch to two or more feet, some of the larger ripple-marks being impressed upon layers carrying limestone conglomerate pebbles two inches or more in diameter. Nearly all of these limestones carry an abundant trilobite and brachiopod fauna. Pure limestones carrying what we have been accustomed to regard as marine faunas thus bear unimpeachable evidence that they have not only been deposited under shallow water conditions, but that in many cases they have suffered prolonged exposure to the air. *Glottidia*, *Kraussina*, *Terebratulina*, *Lingula* and *Discina*, among recent brachiopods, are known (c) to live at or above low tide, and there is no reason

* Published with the permission of the Deputy Minister of Mines.

(a) Walcott, 1908, Smithsonian Misc. Coll., vol. 53, No. 5, pp. 209-212.

(b) Walcott, Smithsonian Misc. Coll., vol. 57, 1910-1912.

(c) Davidson, British Fossil Brachiopoda, vol. 5, 1883, p. 357.