

## THE GREAT PLAINS.

A great area, including many diverse features, lies to the east of the Rocky mountains. The portion that is included under the term Great Plains extends from the southwestern edge of the ancient surface forming the Canadian Shield, to the eastern edge of the mountainous region of the Cordillera. This area for long periods was below sea-level; but in its earlier history a large part belonged to the pre-Cambrian continent. To the west there may have been narrow land areas or reefs and into the troughs between was swept the great mass of debris derived from the disintegration of the old pre-Cambrian surface. The amount of material found in the beds representing these early periods of denudation is enormous; and at the time represented by the oldest rocks in which evidences of life are preserved, the land area which formed the western part of the continent had become worn down to an uneven plain such as we now have on the Laurentian plateau. The shifting of the edge of the continental area by the sinking or rising of this old surface can be traced in this area through a part of its history in Palaeozoic and Mesozoic time. It seems certain that in early Ordovician time there was an advance of the sea from the Pacific; but in the part of the continent here considered there was a subsidence, and the advance of the sea was from the south. During Cambro-Silurian and Silurian times the sea covered an area reaching from the present mountains to the Winnipeg basin, as well as that now occupied by Hudson bay, the two seas being probably connected by an arm extending through the depression through which the Nelson river now flows. The subsidence during Devonian time carried the sea across to the Arctic by way of the present Mackenzie valley and the whole area under the Great Plains was beneath the sea. A recovery of elevation took place during Carboniferous time, and it is supposed that the sea retreated southwestward leaving a narrow shallow-water channel separating the new land area from the old British Columbia ridge. This received the debris from the new land but in the part underlying the area under consideration no great amounts were accumulated till the beginning of Jurassic time when the coastal disturbances in British Columbia were reflected in the inauguration of another downwarping movement that deepened the trough and admitted the sea from the north across northern British Columbia. The deposits carried to this basin in general went to form fine-grained black shales. Sandstone members appear in the lower parts at intervals, but generally the source of the material is believed to have been at some distance. At the close of the Jurassic, sedimentation became periodically rapid. Sands were washed into the basin and the surface elevation was maintained at or near sea-level, so that continental drainage replaced saline water in the basin. The higher land surfaces that were suffering erosion may have supported a land flora, but no evidence of this remains; the lowland, which was near sea-level during this period of slow subsidence, maintained an abundant vegetation which is consolidated into coal beds of great economic importance.

Mid-Cretaceous time is marked by mountain building, or other disturbances in British Columbia, and the movement eastward of large amounts of coarse material which covered the early forested regions in the lowlands. This was followed by rapid sinking of the crust and the sea advanced to cover nearly as large an area as it had in Devonian time. The western margin was subject to fluctuations; and one retreat of the sea, caused by an elevation of the country to the west, probably reduced the submerged area by half. This period of uplift lasted for a short time only and the sea soon resumed its former size. The close of the Cretaceous is marked by a general, slow uplift and this area rose, to remain above sea to the present time. The new land as it appeared above the sea passed through the first stages of erosion and the newly risen coastal plain, underlain by soft rocks, was rapidly worn away to the harder floor of older rocks beneath. These shore deposits which probably covered a wide strip of the Arc'ean old land to the northeast, were carried back into the shallowing brackish-