

great lapse of time. Along the margin of the sea the waves and currents were breaking up and carrying away the loosened parts of the former land surface. The heavier material was left near the shore to form the lower rocks which are mainly of sand, while above are the deeper sea deposits; limestones.

That this sea remained for a long time is evident from the great thickness of the limestone beds laid down over its bed, for it is generally supposed that limestone is not formed very rapidly.

The commencement of an upward rise was probably about the time of the great coal period. Traces of rocks formed at this time are found in Minnesota but none so far in Manitoba. As this part rose above the water it probably presented a very even surface or that of a great plain sloping to the south-west, but the fact that near the shore the beds were thinner than elsewhere would cause them to be more easily fractured by any unequal movement of the crust in the general elevation.

There was a long lapse of time during which this part of the continent remained above the sea and it is probable that in this interval the surface of the limestone was worn away and brought near its present contour. Along the eastern margin there was probably a line of cliffs facing the east, and in front of this a line of lakes or a river system the fore-runner of the Lake Winnipeg basin.

The next evidence of change in the elevation shows that the next advance of the sea was caused by a much less depression than in the previous case. In this instance the sea was shallow and apparently the waters very muddy if we are to judge by the amount of silt that was left by this submergence.

A preliminary sandy deposit showing the advance of the sea is succeeded by a great thickness of shale or hardened mud which is characteristic of this later submergence. These shales not being here subject to any great pressure except the weight of the upper beds, are not hardened to any degree.

Above these dark shales there is a lighter coloured series of sands and clays holding a few seams of lignite, but as these deposits have been removed from most of the area in the vicinity of the Red River valley they are merely referred to; farther west they are better developed and are of great economic importance.