

(*American Naturalist Extra*, July, 1886.)

ON THE FOSSIL FLORA OF THE LARAMIE SERIES OF WESTERN CANADA.¹—The Laramie series, formerly known as the Lignite Tertiary or Lignitic group, occurs in Canada, principally in two large areas west of the 100th meridian and east of the Rocky mountains, and stretching northward from the United States boundary. These areas are separated from each other by a low anticlinal of Cretaceous beds, over which the Laramie may have extended previously to the later denudation of the region.

These areas may be designated—(1) The Eastern or Souris River and Wood Mountain area; (2) the Western area, extending along the eastern side of the Rocky mountains and across the upper waters of the Bow, Red Deer, Battle and North Saskatchewan rivers.

In the southern part of the district of Alberta it has been found possible to divide the Laramie into three parts, which have been named respectively, in the Reports of the Geological Survey of Canada, (1) the lower or St. Mary River division, (2) the middle or Willow Creek division, and (3) the upper or Porcupine Hill division. Of these the lower and upper contain fossil plants, more especially the latter, and corresponding horizons can be

¹ Abstract of a paper read before the Royal Society of Canada, May, 1886, by Sir William Dawson, LL.D., F.R.S.

recognized by these in both of the great areas above referred to. The flora of the lower division has a close alliance with that of the Belly River group of the underlying Cretaceous, while that of the upper division is in the main identical with that of the Fort Union group of the United States geologists, as described by Newberry and Lesquereux.

In the Eastern area the lower beds of the Laramie rest on the Fox Hill group of the Cretaceous, and are in turn unconformably overlaid in the Cypress hills by beds referred, by Professor Cope on the evidence of mammalian remains, to the White River division of the Miocene Tertiary. Thus the geological horizon of the Laramie is fixed by its stratigraphical relations as between the Upper Cretaceous and Lower Miocene formations. The evidence of fossil remains accords with this position. The Lower Laramie has afforded reptilian remains of Mesozoic aspect, associated with fishes and mollusks, some of which are of Eocene types, according to Cope and Whiteaves, and its flora is akin to that of the Upper Cretaceous. The Upper Laramie has afforded a flora so modern in aspect that it has even been regarded as Miocene, though in reality not later in age than the Eocene. The Willow Creek or Middle Laramie division may therefore (as suggested by the author in his memoir of last year on the Western Cretaceous) be regarded as the transition from the Cretaceous to the Eocene.

The question of the correlation of the Laramie with other formations has been much complicated by the reference in the United States and elsewhere, of beds holding its flora to the Miocene period, and these difficulties cannot as yet be wholly overcome, though they are gradually being removed. In Canada, since the plants began to be collected and studied, there has been little doubt on the subject, and the author now, as heretofore, holds to the correlation with the Laramie flora of the so-called Miocene of Mackenzie river, Alaska, Greenland and Spitzbergen, and believes that they should be regarded as not newer than Eocene.

The greater part of the paper is occupied with the description of the fossil plants of the formation, including those collected in the Eastern area by Dr. Selwyn and Dr. G. M. Dawson, and those obtained from the Western area by the latter, Mr. Weston, Mr. Tyrrell and the author. These include a large number of exogenous trees, all belonging to modern genera, as *Platanus*, *Corylus*, *Populus*, *Salix*, *Viburnum*, *Carya*, *Juglans*, etc. There are also some curious plants allied to the modern trapa or water chestnut and coniferous trees of the genera *Taxodium*, *Sequoia* and *Salisburia*, as well as some ferns and equisetaceous plants of much interest, more especially in reference to their geological and geographical distribution.