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THE LINEAGE OF LAKE AGASSIZ.

BY PROF. J. E. TODD.

(Abstract.)

As Lake Winnipeg has succeeded Lake Agassiz, so the latter may trace its lineage back three ages, as follows:

First. When the ice sheet filled the basins of Lake Agassiz and blocked the valley connecting the Red River and James River valleys, Lake Dakota extended 140 miles long, ten to thirty miles broad from Oakes to Mitchell, Dak. A level plain 1300 feet above the sea now occupies its former basin.

Second. When the Ice Sheet occupied the second or Gray Moraine in the James Valley, filling the basin of Lake Dakota, there was a quite extensive White Lake, occupying the basin of a diminutive descendant of that name in Aurora County, Dak., its altitude about 1557 feet. Also, a smaller and more transient lake—James Lake—southwest of Mitchell, extending into Douglass County; the present altitude of its western border is about 1450 feet.

Third. Still earlier, when the ice occupied the first or Altamont Moraine, or as some leading glacialists would say far antecedent to that time, during the latter part of a first glacial epoch, a great body of water occupied all eastern Nebraska, western Iowa and adjacent parts of Minnesota and Dakota. Its most characteristic deposit is the lœss. This lake was named Lake Missouri about ten years ago (*vide Proc. A. A. A. S.* 1877, p. 291): The general level of the lœss slopes southward, two feet to the mile; and eastward three to five feet, west of the Missouri, and one to two feet east of it. Its altitude is 1800 feet in Wayne County, Neb., and 1000 feet at Marysville, Missouri.

Under the drift in the Missouri Valley are Lacustrine clays and sand, which, further west lie directly beneath the loess, strongly suggesting the conclusion that Lake Missouri may have been the direct successor of the line of grand Tertiary lakes, so ably outlined by King (Expl. 40th Paral., vol. I, p. 458).

Fourth. Lake Cheyenne occupied the plains from Texas to Manitoba and eastward well toward the Mississippi during the Pliocene.

Fifth. Sioux Lake in the Miocene covered the western portion of the Great Plains.

Sixth. In the Eocene, the surface of the plains was dry, but probably not so further north. If not, then this Eocene lake or bay would fill the gap and connect this royal line of lakes with the ocean. Possibly Lake Missouri may have done so much later with the Gulf of Mexico.

ON THE FOLDING OF CARBONIFEROUS STRATA IN SOUTHWESTERN IOWA.

BY PROF. J. E. TODD.

(Abstract.)

Most who examined the rocks along the Missouri River in the region under consideration have been constrained to record some folding, but such statements have been rather indefinite and have hardly expressed sufficiently the abruptness of the folds.

Before noting the evidence of foldings it will be well for us to briefly notice the character of the strata folded. They consist of a mixture of limestone, clays, marlites, slates and sandstone. The change from one to another is usually abrupt and frequent. Meek concluded that the nature of a stratum changed so much horizontally that lithological characters were of little importance in determining equivalence