

Astor Pass is mentioned in Russell's work on Lake Lahontan (Monogr. XI, U. S. Geol. Surv., p. 15, pl. xxix). It is the bed of a stream which formerly connected Honey Lake with Pyramid Lake. Russell says that it was never deeply excavated, showing that Honey Lake Basin must have contained an independent water-body during the greater part of the Lahontan period.

In 1915, Dr. John C. Merriam described (Bull. Dept. Geol. Univ. Calif., vol. XIII, pp. 379-382) remains of horses (p. 62), a camel (p. 84) and of *Felis atrox*, which had been collected at Astor Pass by Professor J. C. Jones and William Hood, C. E. In this paper remarks are quoted from Professor Jones. A railway cut was made in gravel deposits 4 miles west of the north end of Pyramid Lake. Here the gravel beds lie on the western slope of a narrow ridge of andesite. How thick the gravel deposit is was not stated, but the bones were found in the upper 20 feet of it. The gravels are overlain by 4 feet of dendritic tufa, similar to that in Lahontan deposits. Professor Jones concluded that the animals lived and died along the shores of Lake Lahontan and were buried in its sediment. The time of deposit of these sediments may with some confidence be referred to the first interglacial stage, the Aftonian. The following is quoted from Merriam's paper:

It seems possible that the Lahontan fauna may be representative of a period including the Fossil Lake and Rancho La Brea stages. On this basis it would appear that, whatever the more exact correlation, the Lahontan stage represents a time when life of this region and that of North America in general was made up of mammal types of which from 60 per cent to 70 per cent have since become extinct and are replaced by new types.

In 1925, Carnegie Institution of Washington published, under the general title *Quaternary Climates* (Pub. No. 352, pp. 1-212), four important papers dealing wholly or in part with the problems of the Great Basin. The author of the first of these (pp. 1-50, 6 pls.) is Professor J. Claude Jones and his paper is entitled *Geologic History of Lake Lahontan*. The author of the second paper (pp. 51-114, 3 pls.) is Ernst Antevs, of the University of Stockholm. He is also the author of the succeeding paper, *The Big Tree as a Climatic Measure* (pp. 115-153). The fourth production, *Tree Growth and Climatic Interpretations*, has as its author Ellsworth Huntington (pp. 155-204). The present writer will not have occasion to consider the last two papers, valuable as they are. Undoubtedly Professor Jones has made important additions to the knowledge of the region around Lake Lahontan and of the origin of the tufas; but, as regards the age of the lake, the writer can not agree with him. Various animals have indeed become extinct within recent times, but that camels and native horses, together with the animals which associated with them, existed in that region 1,000 years ago can not be accepted. Professor Jones still holds to the view that the lake had its beginning between 2,000 and 4,000 years ago and reached its maximum depth and extent about 1,000 years ago (his p. 47); also that Walker Lake began to form about 1,000 years ago (his p. 4).

In his communication on the Pleistocene history of the Great Basin, Doctor Antevs deals first with matters of wide application. He finds that the chief events in the basin ran parallel with the main events in the north; that the highest stands of the lakes coincided with the glaciations in the adjacent