

Shufeldt (R. W.)

on a collection of fossil birds  
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#### GEOLOGY AND PALEONTOLOGY.

**On a Collection of Fossil Birds from the Equus Beds of Oregon.**<sup>1</sup>—Silver Lake is one of the alkaline lakes of Oregon, and lies somewhat to the southward of the middle part of the state, or, approximately speaking, in  $43^{\circ} .05'$  N. lat., and  $43^{\circ} 25'$  W. long. In a direct line it is a little more than sixty miles from Fort Klamath. It is a small lake, not over twelve miles long by some eight or nine wide. Fresh water passes into it from Silver Creek over a swampy delta near its northwestern extremity, and a smaller stream of pure water enters it from the westward. The topography of the country about it, as well as the geology of the vicinity, is interesting, and the fauna will well repay the further investigation of the naturalist. So far as at present known, there is but one species of fish that occurs in this lake, *Myloleucus formosus* of Girard, one of the Cyprinidæ. Numerous species of aquatic birds are found in numbers on the lake, and frequent its limiting shores and marshes. Chief among these are the swans and geese, the pelicans and the cormorants. *Æchmophorus occidentalis*, the western grebe, represents one of the constantly present podicipidine forms found upon this sheet of water; and there they may be

<sup>1</sup> Read before the Biological Society of Washington, March 21st, 1891.



seen at any time of the day, either singly or in pairs. Probably, although I have no authority for it, the larger waders and several species of the limicoline birds are also to be found upon the shores of Silver Lake during the vernal and autumnal migrations.

At various distances, and in nearly all directions from it, are to be found a number of other lakes more or less like the one we have been considering, though in most instances larger than it, as in the case of Abert's Lake, found some forty-five miles to the southward and eastward.

In the Oregon desert, about forty miles east of Silver Lake, lies Fossil Lake, so named from the rich deposit of fossil mammals, birds, fish, and so forth that have been found there. This lake has long since dried up, though water may yet be obtained by digging, and that at a depth of two feet or more, anywhere over its former bottom. This latter is a perfect mine of wealth for the paleontologist, as it is absolutely filled with the fossil remains of many of the former inhabitants of, or animals that resorted to, what at one time must have been a sheet of water considerably like Silver Lake. Unfortunately for science, when the cattle men first went into that country they gathered up as objects of curiosity the majority of the best fossils of this locality, and they have thus been forever lost to us. This will account, I think, for nearly the entire absence of bird skulls among that kind of material subsequently obtained there by naturalists.

Professor Thomas Condon, of the University of Oregon, was the first scientific man that visited Fossil Lake, and he made a very carefully selected and highly valuable collection there; and some of the fossil birds found by him are now in my hands for description. A few years afterwards, Professor Cope despatched one of his assistants there, Mr. Chas. H. Sternberg, of Lawrence, Kansas, who made an enormous collection on the same ground. Later, in the '80's, Professor Cope visited the region in person, and made another fine collection, including many forms previously found by both Professor Condon and Mr. Sternberg.

In the November number, 1889, of the *AMERICAN NATURALIST*, Professor Cope, in an article entitled "The Silver Lake of Oregon and Its Region," to which I am indebted for the information above recited, presents us with some of the results of his eminently important researches in that country.

Setting aside the mammals and other vertebrates, it is my intention to say only a few words here about the collection of fossil birds that were obtained by the authorities mentioned.

After these latter were safely transferred east by their distinguished

owner and deposited in his cabinets, he, in various scientific publications, described a number of them. They were the following species, viz.: Two forms of Podiceps, *P. occidentalis* and *P. californicus*, the first-named Professor Cope believing to be identical with the now-existing *Æchmophorus occidentalis* of that region, a species referred to above; *Podilymbus podiceps*, *Graculus macropus* s. n., *Anser hypsibatus* s. n., *canadensis*, *albifrons gambeli*, and another species near *Anser nigricans*; also a swan, which he named *Cygnus paloregonus*, and finally the fossil remains of *Fulica americana*. There were many other species still remaining, and a few years afterwards—that is, early in the present year—Professor Cope did me the honor to pass all this material into my hands for full description and illustration. Coming, as it does, just as I am about to undertake that volume of my "Osteology of the Birds of the United States" which has to deal with the water birds, now in course of preparation, this material is especially welcome to me, as the fossil forms can be conveniently compared with the existing species of birds which I shall describe in that work.

This beautiful collection of fossils consists of some fifteen hundred or more specimens of bones, many of which are perfect, many of which can be restored, and many fragmentary pieces.<sup>2</sup> They are all perfectly clean, the vast majority of them being of a deep leaden hue, almost black in some instances, and exhibit their characters admirably. My preliminary examination of this material leads me to believe that there are still over twenty species of fossil birds represented by it which still remain to be described. This is interesting in view of the fact that up to the present time there have been less than fifty fossil birds of the United States described by naturalists. As we all know, they constitute the rarest of all vertebrate fossil remains. So far as the birds are concerned, when the chapter is written and printed on the Equus beds of Fossil Lake, of later Tertiary times, it may prove that some of those forms still exist; others are undoubtedly extinct; while the general character of the whole agrees with forms that go to make up the existing avifauna of that region. But a close study of the departures therefrom is of the highest importance, and it is rendered the more interesting from the fact that we can compare it with the mammalian, reptilian, and ichthyian faunæ of the same horizon. I find that some of these bones must have belonged to rather remarkable types of birds, and different from anything now in existence. They were all found either on or in the loose, friable deposit, the sedimentary

<sup>2</sup> The writer here exhibited some fine selected specimens from the collection, and submitted them to the members of the society present for their examination.

remains of the former bottom of the lake. Furthermore, such comparative studies of this material as a whole is enhanced by the discovery of other relics found commingled with it. Of this Professor Cope has said that "Scattered everywhere in the deposit were the obsidian implements of human manufacture. Some of these were of inferior, others of superior workmanship, and many of them were covered with a patine of no great thickness, which completely replaced the natural lustre of the surface. Other specimens were as bright as when first made. The abundance of these flints was remarkable, and suggested that they had been shot at the game, both winged and otherwise, that had in former times frequented the lake. Their general absence from the soil of the surrounding region added strength to this supposition. Of course it was impossible to prove the contemporaneity of the flints with animals with whose bones they were mingled, under the circumstances of the mobility of the stratum in which they all occurred. But had they been other than human flints, no question as to their contemporaneity would have arisen. . . . The probability of the association is, however, greatly increased by the discovery, by Mr. Wm. Taylor, of paleolithic flints in beds of corresponding age, on the San Diego Creek, Texas." <sup>3</sup>

Should, in the future, sufficient evidence come to light to establish any such theory as this, then there will indeed be opened to us another important and interesting chapter upon the paleontologic history of man.—R. W. SHUFELDT, *Takoma Park, D. C.*



