

and partly overlapping migration routes, the aggregation of resident forms along the coast of California, and the Lower California birds of *rostratus* affinities and peculiar reverse migrations, all as units in a linear row of subspecies, may be observing the rules of the game that classification tends to become, but it does not help much toward an understanding of the development and relationships of the birds themselves.

Only occasionally is one fortunately enough placed to seize upon a bit of information such as I am here recording, but it is the sort of knowledge that should be sought and applied. Any general classification of the Savannah Sparrows, to be at all satisfactory, must have some basis of field work. In this particular case, anyone working from specimens alone, with no personal knowledge of conditions, might easily conclude that Savannah Sparrows from coast and interior were all alike. With birds that are as difficult of classification as these it is likely that every extensive collection contains specimens just as apt to yield misinformation with uncritical acceptance of surface appearances.

In a report upon a collection of Alaskan birds (Univ. Calif. Publ. Zool., 7, 1911, p. 84) I stated my belief that *Passerculus s. sandwichensis* might migrate across the Gulf of Alaska rather than follow the coast line. There is an old record that I had not seen at that time nor until much later, that bears directly upon this point. W. H. Dall, in a paper entitled "Notes on the avi-fauna of the Aleutian Islands, from Unalashka eastward" (Proc. Calif. Acad. Sci., 5, pt. 1, 1873, p. 27) under *Passerculus sandwichensis*, remarks: "When about five hundred and fifty miles from land (the Shumagins being nearest) in latitude 47° N., and longitude 152° 03' W., one of these birds flew aboard, and being secured, lived several days in an extemporized cage. This was on the 13th of September, 1871."

*California Academy of Sciences, San Francisco, October 10, 1935.*

## FURTHER STUDIES UPON THE BIRDS OF THE PLEISTOCENE OF RANCHO LA BREA

By HILDEGARDE HOWARD

During the last two years I have spent some time going over a small collection of birds excavated from the Rancho La Brea Pleistocene under the auspices of the Southern California Academy of Sciences. This material collected by the Academy many years ago, was given to the Los Angeles Museum in 1911, two years before the Museum began its own extensive excavations at Rancho La Brea. While the Museum collections have long since been cleaned and catalogued, the greater part of the Academy bird material has only recently been put in condition to study. For the cleaning and preliminary sorting of this material I am indebted to Mr. Irving Brown, who generously gave his time to this work.

In the course of studying the bones in this Academy collection, I have had occasion to make comparisons with specimens in the main Museum collection as well. The result is that I now find myself in possession of a few new facts concerning the birds of these deposits. Though I have found some scantily represented species in the Academy material which do not appear to be present in the other collections from Rancho La Brea, there is no marked difference in the variety of species. However, there is considerable difference in their relative abundance, which makes this assemblage worthy of mention.

The following major differences may be noted when comparison is made with

the census of Rancho La Brea birds as previously presented by this writer (Howard, Condor, 22, 1930, pp. 81-88).

	So. Calif. Acad. excavation	Previous census
Anseriformes .....	22.1 per cent.	2.5 per cent
Charadriiformes .....	6.6	1.3
Ciconiiformes .....	4.0	0.9
Falconiformes .....	40.3	60.3

These comparisons may not be entirely accurate because of the unnaturally scant representation in this pit of passerine bones. Only 2 per cent of the total number of individuals are of passerines as against 8 per cent in the census of the Museum localities. Undoubtedly many bones of these small forms were overlooked in collecting. Even allowing for a greater total number of individuals, however, the difference in relative abundance in the orders noted is marked.

A comparison has been made of the waterbird content of the individual Museum pits with that of the Academy excavation. This comparison shows that pit 16, from which one of the largest collections of bird bones was obtained, surpasses the Academy pit in actual number of individual waterbirds (Academy excavation, total 99; pit 16, total 126). However, relative to the total number of birds, the percentage is far less in the Museum pit. Although I have not made a complete count of the number of bird bones in pit 16, the combined totals for only two species (*Parapavo californicus* and *Coragyps occidentalis*) are slightly greater than the total number of bones of all species in the Academy pit. Pit 4, another locality in which bird remains were unusually abundant, contained less than half as many aquatic birds as were taken from the Academy locality (total of 41 individuals in pit 4). Pits 3, 13 and 36 contained, respectively, 21, 20 and 18 individual waterbirds; the ten other Museum pits in which aquatic birds were represented, included from one to nine individuals only.

The orders represented in this comparison included the Colymbiformes, Ciconiiformes, Anseriformes, Gruiformes and Charadriiformes. The grebes are known with certainty from pit 16 only; none was found in the Academy material. The ciconiiforms were better represented, with 12 individuals and 7 species in the Academy locality, surpassing even pit 16. Of the anseriforms of the Academy pit, the ducks were most abundant both in number of individuals and number of species (six or more species and 31 individuals) and included two diving ducks of the subfamily Nyrocinae. The number of individuals was equalled in pit 16, but the two nyrocine forms appear to be absent. The geese in the Academy pit total 29 individuals, exceeding by 7 the number in pit 16 or pit 4. The number of species is doubtful. Except for a questionable occurrence in pit 81, the Academy locality is unique in including one swan.

The gruiforms of the Academy pit include *Grus canadensis* only, with four individuals. This number is exceeded in three Museum pits, each of which contained two species and five or six individuals. The shorebirds are scantily represented in all pits with the exception of the Academy and pit 16. In the former there were 22 individuals representing 9 species, in the latter 55 individuals of 10 or more species. It is because of this large representation of charadriiforms that pit 16 surpasses the Academy excavation in number of waterbirds.

The Academy pit was located on the north bank of what is now the "lake" near Wilshire Boulevard. This area was so rich in asphalt that it was extensively excavated for commercial purposes before the importance of the contained bones was recognized. Later, scientific work was lucrative along the borders of the lake and

included (beside the Academy locality) excavations by the Los Angeles High School and the University of California. The Los Angeles Museum still later reworked some of the old diggings and sank a new shaft in the center of the lake as well. Practically all material found at this time, however, was thoroughly rotted by contact with water. None of the bird material in the Museum collections, and referred to in this paper, was taken in this area.

The depression left by the commercial and scientific excavations covers an area of roughly 150 by 350 feet. A good portion of it still contains considerable seepage of asphalt, covered shallowly with water and bordered here and there with tules, giving the appearance of a pond or small lake, in which small birds are even now frequently entrapped. The situation may have been similar during the Pleistocene, with the greater asphalt accumulation producing a more effective trap. Such a situation, though possibly attractive to diving birds on sight, would not be expected to bring the fish-eating forms in any large numbers. The evidence supplied by the avifauna fits into this picture. Three species of typical deep-water birds are scantily represented, the swan and two members of the Nyrocinæ. All other species are such as would be attracted to shallow ponds or marshes.

The discrepancy in the number of falconiforms in the Academy pit is due largely to a lesser number of individuals of *Aquila chrysaëtos*. Why this should be, it is difficult to explain. The other large eagles are well represented, including two individuals of the rare *Wetmoregyps daggetti*, hitherto taken in but two other excavations (L. A. Museum pit 4, and a University of California locality). There is a decrease also in the number of cathartid and teratornithid vultures, though less marked than with the Golden Eagle. This may possibly be accounted for by the habits of the vultures in the matter of approaching their food, walking up to it, rather than alighting upon it. The presence of water thus would be a deterring factor. There can be no doubt that this pit contained as old a fauna as any other Rancho La Brea locality. With the exception of *Cathartornis gracilis* (a rare species) and *Euphagus magnirostris* (a passerine) every extinct species recorded from Rancho La Brea is present in the Academy material.

Mention has been made of a few species occurring in the Academy collection which have not been recorded from Rancho La Brea before. These species, together with several other unrecorded species from the Museum collections, are listed here.

*Podilymbus podiceps*. Femur no. F5741 from L. A. Museum pit 16. This record is in addition to the humerus recorded by Miller (Carnegie Inst. Wash. Publ. 349, 1925, p. 71) as *Colymbus* ? sp., with the remark that it might be found to belong rather with *Podilymbus*. I have carefully checked this humerus, also, and find it definitely to belong to *Colymbus*, though I will not attempt to make the species identification.

*Butorides virescens*. Tibiotarsus no. F1824 from Museum pit 61.

*Casmerodius albus*. Tibiotarsus no. F560 from Museum pit 67, and coracoid no. H3695 from Museum pit 28.

*Cygnus columbianus*. Carpometacarpus and femur from the Southern California Academy excavation, and possibly tarsometatarsus no. G6273 from Museum pit 81.

*Chen hyperborea*. Identified from femora and tarsometatarsi from the Academy material and pit 4, and may be present in other Museum pits as well. Identifications are based upon characters defined by Alden Miller (MS). Two specimens measure 93.5 and 94.5 mm. in length, thus exceeding the longest available *C. h. hyperborea* or even *C. h. nivalis*. Possibly this species, like others noted in the Rancho La Brea deposits, attained a larger size in the Pleistocene than now.

*Chen rossi* ? Several tarsometatarsi in the Museum collection, similar in character to the above, but of smaller size, are tentatively assigned to this species. However, the size variation of *hyperborea* may have included these smaller specimens.

*Anabernicula minuscula*. This species was described as *Branta minuscula* by Wetmore (Proc. U. S. Nat. Mus., 64, 1924, pp. 6-7, figs. 3-4) from a proximal end of humerus taken in Upper Pliocene (Lower Pleistocene) beds near Benson, Arizona. According to communication

with Dr. Wetmore by letter, paleontologists are not in agreement regarding the age of these deposits. See also: Hay, Carnegie Inst. Wash. Publ. 322 B, p. 10. Twenty humeri in the Academy material and three from pit 16 are similar to this species. To determine this fact, comparisons were made with a cast of the type, for which I am indebted to Dr. Wetmore and the United States National Museum. To clear up one or two questionable points which the cast could not show, Dr. Wetmore kindly compared a representative series with the type itself. He concurs in the opinion that the Rancho La Brea bones are *minuscula*.

In addition to the humeri there are several coracoids, ulnae, carpometacarpi, femora, tibiotarsi and tarsometatarsi too small to be assigned to any living species of goose, and unlike any species of duck. These may undoubtedly be assigned to the same species as the humeri. The tarsometatarsi, however, are identical with the newly described species from McKittrick, *Anabernicula gracilentia* (Ross, Trans. San Diego Soc. Nat. Hist., 8, 1935, pp. 107-114, text figs. 1-6). We appear to have, therefore, a single species described under two different names from separate elements, an occurrence which cannot always be avoided in dealing with isolated fossil specimens. We are fortunate in this instance, however, in having in the asphalt material this large series of small goose-like bird bones, including nearly all of the principal skeletal elements. A study of this assemblage leads to but one conclusion: that a single species is represented.

The possibility of relationship of *gracilentia* to *minuscula* was noted by Ross, though he evidently considered the difference in age of the deposits too great to admit of identity. He says (*op. cit.*, p. 111): "*Branta minuscula*, described by Alexander Wetmore from a proximal half of a humerus, presents characteristics which might be expected in humeri of *A. gracilentia*. If the geologic position of *Branta minuscula* is Upper Pliocene, as determined by J. W. Gidley, considerable difference in age prevails between these two similar forms from Arizona and Southern California."

Regardless of age, however, the bones from Rancho La Brea and the type of *minuscula* are alike, remarkably alike considering the great variability which exists within one species among the anserines. I do not feel that so striking a similarity can be disregarded just because there appears to be a discrepancy in age. On the basis of our present knowledge, therefore, I can see no alternative but to assign the asphalt species to *minuscula*, in which case *gracilentia* must fall into synonymy.

Regarding the generic status of this species, the characters of the tarsometatarsus as given by Ross (*op. cit.*, pp. 108-109) are certainly sufficient to warrant the erection of a new genus. This fact I have found to be indicated by several of the other elements of the skeleton, as well. Even the humerus, as studied from the larger series now available, shows differences from *Branta*. It seems proper, therefore, to accept the new genus name of *Anabernicula* for the species *minuscula*, and it is here so recorded.

The largest representation of this species is from the Academy excavation (135 specimens representing fifteen individuals) with scattered specimens in a few of the Museum pits.

*Querquedula*, sp. Several specimens in both Academy and Museum collections.

*Nyroca valisineria*? A tibiotarsus, coracoid and carpometacarpus from the Academy excavation appear to belong either to this species or to *N. americana*. Available specimens of the latter, however, are too small. Another species of nyrocine duck is also present in the Academy material, represented by a coracoid and humerus smaller than *Nyroca marila*.

*Egretta thula*? Several specimens from the Academy excavation compare favorably with this species, though with scanty comparative material it is impossible to make definite distinction between this species and *Florida caerulea* and *Hydranassa tricolor*. A tarsometatarsus from Museum pit 61 was previously recorded as *Florida caerulea*? (Howard, Condor, 31, 1929, p. 251). This may possibly belong to the same species as the bones in the Academy pit, though it seems proportionately somewhat more slender.

✓ *Buteo lagopus*. Two tarsometatarsi and a femur from the Academy excavation. I have been unable to find this species in the collection from the Museum pits.

✓ *Buteo regalis*. Well represented in both Academy and Museum pits.

*Fulica americana*. Tibiotarsus no. F142 from Museum pit 4.

*Squatarola squatarola*. Several specimens in the Academy and Museum pits.

*Capella delicata*. Several humeri from Museum pits 3, 16 and 67.

*Totanus melanoleucus*. Several specimens from both Academy and Museum pits.

*Limosa fedoa*? Tarsometatarsus no. G4907 and tibiotarsus no. F8504 from Museum pit 28, and tibiotarsus no. F451 from pit 3, resemble this species closely, and size equals large specimens in skin collection. Both fossil and comparative material is incomplete, however, so identification is tentative.

*Recurvirostra americana*. Five specimens from the Academy excavation. In addition to the

shorebirds indicated, there are at least three more species of small size present in the combined Academy and Museum collections.

*Rissa tridactyla*? A coracoid from the Academy excavation compares perfectly with a modern specimen of this species, but in view of the overlapping which occurs among the species of gulls, the identification is tentative.

*Larus brachyrhynchus*? A humerus, no. G647 from Museum pit 16 previously mentioned by Loye Miller (Condor, 32, 1930, p. 117) as *Larus* sp., is found to coincide with *brachyrhynchus* in size.

*Cryptoglaux acadica*. Tarsometatarsus no. K1180 from Museum pit 36.

The following species which were previously recorded tentatively are now definitely identified.

*Anser albifrons*. Several very stocky tarsometatarsi and femora in the Academy and Museum collections are undoubtedly of this species. Judging from size, the full range of the species from *A. a. albifrons* through *A. a. gambelii* is represented.

*Anas platyrhynchos*; *Nettion carolinense*. Well represented in both Academy and Museum pits.

The status in the Los Angeles collections of species which have been recorded from University localities since the last general review of Rancho La Brea birds (Miller, L., Carnegie Inst. Wash. Publ. 349, 1925, pp. 63-106, 6 pls., 20 text figs.) is as follows.

*Spatula clypeata*? (Miller, A.H., Condor, 31, 1929, pp. 223-224). Unidentified specimens similar in size to the Shoveller, found in both the Academy and Museum material, may be of this species.

*Oxyechus vociferus* (Miller, *loc. cit.*). Found in Academy pit and Museum pits 16 and 36.

*Numenius americanus* (Compton, Condor, 36, 1934, pp. 221-222). Found in Academy pit and Museum pits 61, 67 and 37.

*Phaeopus hudsonicus* (Compton, *loc. cit.*). Found in Academy pit and Museum pit 28.

*Limnodromus griseus* (Miller, *loc. cit.*). Found in Museum pit 16.

*Astur atricapillus* (Compton, *loc. cit.*). Found in Museum pit 16.

*Asyndesmus lewis* (Miller, *loc. cit.*). Found in the Museum collection, pit unknown.

*Los Angeles Museum, Los Angeles, California, September 18, 1935.*

## FROM FIELD AND STUDY

**Clark Nutcrackers Invade Southwestern Utah.**—Between August 15 and October 1, 1935, there occurred an invasion of Clark Nutcrackers (*Nucifraga columbiana*) into southwestern Utah that was so noticeable as to be observed by many persons who had never seen the species, although it is fairly common in higher portions of this area. The more noteworthy of these observations are here listed.

August 15 to September 15. Large flocks were seen and reported frequently at Cedar Breaks National Monument, and at other points on the Markagunt Plateau within a radius of ten miles, from 9000 to 11,300 feet altitude. One observer estimated 200 individuals in one flock. Before and after the influx an observer would be fortunate to see over 20 individuals in a day.

September 1 to 10. During this period the Nutcracker population of Bryce Canyon National Park was apparently twice as great as normal, and the birds were much tamer than usual. Bryce is 35 miles east of Cedar Breaks and about 2000 feet lower.

September 16 to 21. Several Nutcrackers were seen by Wilbur Long in Zion National Park, in what is known as the "mountain sheep country" at an approximate elevation of 6500 feet. These were the first Nutcrackers seen in the park since 1932.

September 23. A single Nutcracker spent most of the day at the horse corrals, 4275 feet, in Zion Canyon. It was accurately described to the writer by Walter Beatty, cowboy guide, who had never before seen such a bird. These horse corrals are approximately 26 miles south from Cedar Breaks.

September 20 to October 1. At the Blake Ranch, on the south end of the Pine Valley Mountains, a small cornfield was invaded by over 100 Nutcrackers. They ate a considerable quantity of corn, in spite of some shooting by the man in charge of the ranch. He had lived in the vicinity for over 20 years, but had never before seen Nutcrackers. There was none on