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An Updated Catalogue of the Birds from the Carpinteria Asphalt, Pleistocene of California

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Abstract.—Published accounts of the Carpinteria avifauna, collected from an upper Pleistocene asphalt deposit near Carpinteria, California, were based on only a small portion of the collection. The present paper is a complete review of the avifauna, including information on previously unpublished and unidentified material. The avifauna contains 79 species, twenty-seven of which have been added to the published avifauna from the deposits. Included among these are the first fossil records of *Rallus limicola*, *Tringa melanoleuca*, *Tyrannus verticalis*, and *Piranga ludoviciana*. Specimens from the deposit previously assigned to *Corvus caurinus* are referred to *C. brachyrhynchos*.

In 1927, bones were found in an asphalt deposit near Carpinteria, California, that was being mined for paving material, and a collection was made in the same year by Chester Stock for the California Institute of Technology. This collection, from a limited area designated Pit 1, is now at the Natural History Museum of Los Angeles County (LACM). A second collection from a nearby area, designated Pit 2, was made for the Santa Barbara Museum of Natural History (SBMNH) in 1930 by David Rogers (L. Miller 1933). These collecting efforts removed all fossil material from the site and subsequent mining completely removed the asphalt deposit.

The birds from the deposit were described in three papers. The non-passerine material plus raven in both collections was the subject of a preliminary faunal list and later review by Loye Miller (1927, 1931). The passerine material at SBMNH was reviewed by Alden Miller (1932). Both authors listed the number of bones known for each species but indicated that there was additional identifiable material. Subsequent publications listing the Carpinteria avifauna (Miller and DeMay1942; Jefferson 1991) are based on these publications. Subsequent to 1933 Loye Miller and Hildegarde Howard identified additional material in the LACM collection and Ida DeMay and Hildegarde Howard identified additional material in the SBMNH collection, but none of these identifications were published.

In 2004, Paul Collins of SBMNH suggested I catalogue their Carpinteria collection. Examination of this collection and the material at LACM showed that both collections contained much additional identified material not listed in the Miller publications, as well as a large amount of hitherto unidentified material. Also, except for 9 specimens retained by Alden Miller and catalogued at the University of California Museum of Paleontology, Berkeley (UCMP), none of the collection has ever been catalogued (In a letter dated 1932 A. Miller stated that he was retaining 10 specimens, including a bone of *Cyanocitta*, but no such specimen exists in the UCMP catalogue). The current study involved cataloguing the SBMNH collection and examination and tabulation of all material in both the SBMNH and LACM collections. The LACM material is still uncatalogued. During this

study some additional material was identified and most earlier identifications were checked for accuracy. The following paper presents an updated catalogue of the Carpinteria material.

Table 1 lists the known avifauna from the Carpinteria asphalt deposit. Separate columns indicate the number of species and specimens identified by L. Miller in his 1927 and 1931 publications and by A. Miller in 1932. Alden Miller stated that 315 passerine bones had been recovered, but that only 169 were identifiable, of which he identified 94 (1932). Loye Miller's initial publication (1927) listed 80 identified specimens of non-passerine birds plus raven, while in his 1931 publication he stated that 540 bones had been identified, but he listed 704 specimens identified to species, plus 13 identified only to genus and 356 referred to unidentified raptors. The avifauna listed in the A. Miller and L. Miller publications contained 56 species. Included in this list were three specimens, referred to *Catharus (Hylocichla)* sp., *Empidonax* sp., and to an unidentified flycatcher, that could not be found in the collections. Also included were specimens referred to *Sayornis* and *Dryobates* that I have reclassified as *Tyrannus* and *Sphyrapicu*s.

The current study adds 27 species to this list, 9 identified subsequent to the earlier publications by Loye Miller, Ida DeMay and Hildegarde Howard, and 18 identified by me, giving a total avifauna of 79 species. Most of the identifications by previous authors have been confirmed, and are mentioned here only in Table 1. Comments on species not previously listed for the Carpinteria asphalt, or where there is some question as to previous identification appear below. The number of identified bones is near 2000 (Table 1) and there are an additional 800 unidentified passerine bones, mostly broken, and nearly 1000 bones of raptoral birds unidentified as to species.

Pelicaniformes

A left scapula in the LACM collection was identified as *Pelicanus occidentalis* by Loye Miller.

Anseriformes

Chen caerulescens

Loye Miller (1931) referred a proximal left tarsometatarsus in the LACM collection to *Chen*, but did not identify the specimen to species. Now that Snow and Blue Geese have been merged into a single species, this specimen can be safely identified as *C. caerulescens*.

Anas platyrhynchos

Several bones in the LACM collection have been referred to this species, even though they vary widely in size. Mallards in modern collections also vary widely in size. Part of this is due to sexual dimorphism, but part also may be due to a difference in size between migrant populations from northern areas and resident non-migratory populations.

Anas sp. *cf. A. strepera*

A right distal tibiotarsus and complete left tarsometatarsus (SBMNH 750) agree in all respects to bones of this species. Both bones are too large for *Anas acuta*, *A clypeata*, *A Americana*, *Aythya americana* and *A.affinis* and are slightly small for *Anas platyrhynchos*, to which the tarsometatarsus was originally referred.

Table 1. Counts of bones from the Carpinteria asphalt deposits. Names in parentheses were used in original papers.

	Number of bones				
	Loye Miller counts	1931	A.Miller	Current counts in collections	
Species	LACM	SBMNH	1932	At UCMP LACM	SBNMH
Pelecanus occidentalis	0	0		1	0
Ciconia maltha	14	3		16	4
Chen caeulescens (Chen?)	1	0		1	0
Anas platyrhynchos	2	1		5	1
Anas strepera	0	0		0	2
Anas americana	0	0		0	1
Anas crecca	0	0		0	5
Cathartes aura	1	3		14	11
Gymnogyps amplus (californianus)	4	5		1	4
Coragyps (Catharista) occidentalis	2	0		0	4
Teratornis merriami	6	3		4	34
Haliaetus leucocephalus	0	7		15	57
Circus cyaneus (hudsonius)	0	1		0	2
Accipiter striatus (velox)	0	1		0	9
Accipiter cooperi	2	3		50	32
Accipiter gentilis (Astur atricapillus)	7	0		10	0
Buteogallus (Geranoaetus) fragilis	5	1?		51	54
Buteo lineatus	12	0		52	23
Buteo jamaicensis (borealis)	50	39		137	208
Buteo regalis	0	0		68	11
Buteo cf. *B. lagopus*	0	0		0	13
Buteo sp.	1	5		0	0
Amplibuteo (Morphnus) woodwardi	0	0		0	1
Wetmoregyps daggetti	4	1		24	12
Nephrontops americanus	0	0		8	2
Neogyps errans	3	9		120	77
Aquila chrysaetos	1	5		50	65
Spizaetus (Geranoaetus) grinnelli	3	12		44	43
Caracara (Polyborus) plancus	2	7		33	49
Falco sparverius	4	22		42	49
Falco cf. *F. columbarius*	0	0		0	1
Calipepla (Lophortyx) californica	11	24		44	78
Meleagris (Parapavo) californicus	136	112		228	155
Patagioenas (Columba) fasciata	1	1		3	3
Zenaidura macroura				1	
Rallus limicola					1
Tringa melanoleuca					1
Tyto alba (Aluco pratincola)	1	0		3	
Strix brea				10	8
Asio otus (wilsonianus)	0	5		5	8
Otus kennicottii (asio)	0	4		12	24
Bubo virginianus	20	27		72	87

Table 1. Continued.

	Number of bones					
	Loye Miller counts	1931	A.Miller	Current counts in collections		
Species	LACM	SBMNH	1932	At UCMP	LACM	SBNMH
Glaucidium gnoma	0	19			3	23
Phalenoptilus nuttalli					2	1
Melanerpes formicivorus						12
Melanerpes lewisi					10	6
Colaptes auratis (cafer)	2	23			19	80
Sphyrapicus sp.						11
Picoides villosus						1
Dryobates sp.	0	6			0	0
Geococcyx californianus	27	10			49	37
Sayornis			1			0
Empidonax			1			0
Tyrannus verticallis						1
indet flycatcher			1			
Lanius ludovicianus					1	2
Cyanocitta stelleri			4		15	3
Aphelocoma californica			30	1	45	108
Pica nutallii			3			6
Corvus corax	17	17			46	42
Corvus brachyrhynchos (caurinus)			21 or 30	1	59	38
Tachycineta sp. cf. *T. bicolor*					1	
Petrochelidon pyrrhonota						1
Poecile sp. *(Penthestes)*			2			1
Sitta canadensis			1			3
Sitta pygmaea			3	1		2
Regulus sp.			3	1		2
Sialia mexicana			12	1		11
Catharus sp. *(Hylocichla)*			1			
Turdus migratorius			11			8
Ixoreus naevius						5
Chamaea fasciata			2	1		1
Bombycilla cedrorum			2			1
Dendroica sp.						1
Piranga ludoviciana						1
Pipilo maculatus			1			1
Pipilo crissalis (fuscus)			5	1		6
Pipilo sp. cf. *P. angelensis*						1
Passerella iliaca			1			
Zonotricha sp, cf. *Z. leucophrys*						2
Sturnella neglecta			4	1	4	5
Xanthocephalus xanthocephalus						8
Loxia curvirostra			5	1		4
Carduelis (Spinus) pinus			1			
unidentified raptoral bird bones	160	196			400+	400+
unidentified passerine bones					106	800
total of identified bones.	499	571	94	9	1484	2374

Anas americana

This species is represented in the collection by a right humerus (SBMNH 751), complete except for its proximal end. The humerus is too short for *Anas Acuta*, *A strepera*, *A. platyrhynchos* and *Aythyra americana* and too slender for *Anas clypeata*. A well defined brachial depression separates this bone from those of *Aythya americana*..

Anas crecca

A small duck is represented by two proximal humeri, two distal coracoids and a carpometacarpus (SBMNH 752). The humeri lack the ridge posterior to the pectoral attachment that is found in *Oxyura jamaicensis*, are too short for *Bucephala albeola* and *Anas cyanoptera* and not as robust as *Anas discors*. The coracoids are small and fit this species better than other teal.

Falconiformes

No attempt was made to check identifications of extinct species. Loye Miller's original list of specimens listed over 300 bones not referred to species. Most of these were subsequently identified to species by Loye Miller and by Ida DeMay and labeled in the collections. Two additions were made by these researchers to the original list. These were *Nephrontops americanus* and *Amplibuteo* (*Morphnus) woodwardi*, both of which occur at Rancho la Brea. Two bones of *Coragyps occidentalis*, reported by Miller (1931) to be in the LACM collection, could not be found, although four bones referred to this species are in the SBMNH collection (no. 748). Reassignment of bones after publication may account for small decreases in numbers of bones for *Gymnogyps* and *Teratornis*. Recent work by Syverson (2007) indicates that *Gymnogyps amplus* is the correct name for the Rancho La Brea Condor.

The original publications listed only *Buteo lineatus* and *B. jamaicensis* within *Buteo*. Subsequently, many bones were identified as *B. regalis* at LACM by L. Miller and at SBMNH by Ida Deay. *Buteo regalis* is clearly larger than *B jamaicensis*, but some of the specimens assigned to *B. regalis* are even more robust than this species and have been provisionally assigned to *Buteo* sp., cf. *B. lagopus*. A distal ulna of a falcon (SBMNH 770) seems slightly large for *Falco sparverius* and is here tentatively assigned to the slightly larger species *F. columbarius*.

Most of the unidentified accipitrine bones listed by Miller (1931) were major limb and shoulder girdle bones which have subsequently been identified. However, both the LACM and SBNHM collections still contain many elements of raptoral birds, both Falconiformes and Strigiformes that have not been identified. These consist mostly of the smaller foot bones (phalanges, claws) as well as pygiforms, quadrates and smaller wing bones. The total number of unidentified elements is about 1000.

Gruiformes

Rallus limicola

A proximal right humerus (SBMNH 771) is identical to modern material of this species and represents the first fossil specimen of this species other than material from Florida (Conway, 1995).

Charadriiformes

Tringa melanoleuca

A complete right coracoid (SBMNH 772) is identical to modern material of this species. This is the first fossil record for this species, which was previously known only from archeological sites (Elphick and Tibbitts 1998).

Columbiformes

Zenaida macroura

A humerus in the LACM collection was identified as this species by Loye Miller.

Strigiformes

Tyto alba

A complete right tibiotarsus, a right coracoid and a fragmentary furcula in the LACM collection were identified as this species by Loye Miller.

Strix brea

Several bones in the LACM collection were identified as this species by Robert McKenzie, a curatorial assistant to Hildegarde Howard. Howard (1933) described this species based on material from Rancho La Brea previously thought to belong to *Bubo virginianus*. Wing bones of *S. brea* are smaller than those in *B. virginianus*, while leg bones appear about the same size but are more gracile. Several bones in the SBMNH collection (No. 773) that were previously identified as *Bubo virginianus* are within the size range of *Strix brea* and are here referred to this species.

Caprimulgiformes

Phalaenoptilus nuttallii

Two proximal humeri in the LACM collection, (labeled as ?*Eudora (Charadrius) montanus* by Loye Miller) are referable here as is a proximal humerus in the SMBNH collection (No. 786).

Piciformes

Woodpeckers are well represented in the Carpinteria collections. Miller (1931) identified only *Colaptes auratus (cafer)* to species, but listed 6 bones as belonging to a small woodpecker that he referred to *Dryobates*. The LACM collection contains many specimens subsequently identified as *Melanerpes lewisi* by L. Miller, whereas, the SBMNH collection contains material identified as *M. formicivorous* (No. 781) by both Miller and Ida DeMay. Several mandibles and a cranium are clearly assignable to *M. formicivorous*. Although bones of *M. lewisi* are slightly more robust that those of *M. formicivorous*, confident assignment of elements to one or the other of these species must await a population study of the two species. Bones of smaller woodpeckers are referable to two species. A crania (SBMNH 783) agrees with *Picoides villosus* in size and configuration. Several other bones (SBMNH 784) are large for *P. villosus* and are tentatively assigned, primarily on the basis of size, to *Sphyrapicus*, but cannot be assigned to species within this genus. These include the bones assigned to Dryobates by Miller (1931).

Passeriformes

Alden Miller apparently only saw the passerines in the SBMNH collection as most of the bones of this group at LACM, although sorted, have not been identified. Miller also failed to identify much of the passerine material at SBMNH, in part, I suspect, due to a lack of comparative skeletal material [He noted (1927) that it was necessary to take bones out of skins in order to compare modern *Corvus caurinus* to fossil material]. My identifications are based on comparisons with extant species in southern California. The larger species, being fewer in number, were most easily identified. Many smaller bones, mostly broken and numbering about 800, still await assignment. The following are additions to or changes in the passerine list.

Tyrannidae

Tyrannus verticalis

A distal coracoid was identified by Alden Miller (1931) as *Sayornis* sp. It is definitely a flycatcher, but too large for *Sayornis nigra* or *S. saya*, and also too large for *Myiarchus cinerascens*. It appears identical in size and configuration to *Tyrannus verticalis*, and is too small to be referred to *T. vociferans*. This is the first fossil record of this species (Gamble and Bergin 1996). Miller (1931) also listed a carpometacarpus as *Empidonax* sp. and a lower jaw fragment as an indeterminate flycatcher. Neither specimen could be found in the collections.

Family Laniidae

Lanius ludovicianus

This species is represented by two mandibles and a coracoid in the SBMNH collections (No. 789) and by a tarsometatarsus at LACM. Loggerhead shrikes are also known from other Rancho La Brean sites in California and Wyoming (Brodkorb 1978; Emslie 1978).

Corvidae

This family includes the three most numerous passerine species in the Carpinteria asphalt. The Scrub jay (*Aphelocoma californica*) is the most common species in the collection. A few bones that seem slightly large for this species were referred to Steller's jay (*Cyanocitta stelleri*) by A. Miller. A magpie (presumably *Pica nuttallii* based on its location) is also represented by a small number of bones in the collections. Ravens (Corvus corax) are the second most common passerine in the collection and crows are the third most represented species.

Alden Miller (1929) identified two subspecies of crows from Rancho La Brea, *C. brachyrhynchos brachyrynchos* and *C. b. caurinus*. In his study of the Carpinteria passerines (1932) he found only the latter species and accepted the changes in taxonomy that elevated *C. caurinus* to specific level. Johnston (1961) and Rea (1986) doubted the validity of these reports of *C. caurinus* from the southern California Pleistocene. Miller (1929, 1932) had little available skeletal material of the two species and based his comparison mostly on measurements of bones in skins (tarsometatarsus). He stated that "The size difference between *C. b. hesperis* and *caurinus* is pronounced in the tarsometatarsi but is less distinct, even though appreciable, in the other elements of the skeleton." A Miller, 1932:175). Recent material of both *C. brachyrhynchos* and *C. caurinus* in the LACM Collections were measured and compared to the Carpinteria material. Measurements of the tarsometatarus from Carpinteria are closer to *C.*

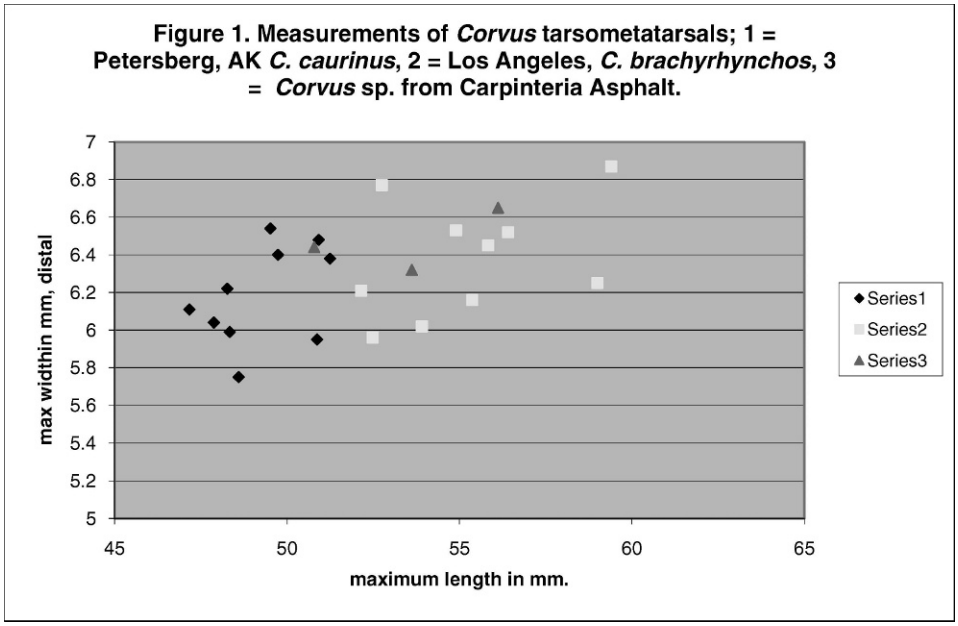

Fig. 1. Measurements of *Corvus* tarsometatarsals; 1 = Petersberg, AK *C. caurinus*, 2 = Los Angeles, *C. brachyrhynchos*, 3 = *Corvus* sp. from Carpinteria Asphalt.

brachyrhynchos from southern California than to *C. caurinus* from Petersburg, Alaska (Fig. 1). As both *C. brachyrhynchos* and *C. caurinus* were reported in the Rancho La Brea collections (A. Miller 1929), humeri of these specimens were also compared to Recent material (Fig. 2). The La Brea sample contains two species, based on size, but the smaller of the two is close to both living *C. brachyrhynchos* and *C. caurinus*, which are not differentialted based on the size of the humerus. The larger species from Rancho La Brea is bigger than living material of either of these species and probably represents a different taxon. Whatever the correct taxonomy of these two species, it seems clear that the Carpinteria sample of crows contains only one species, best referred to *C. brachyrhynchos*.

Hirundinidae

Two complete humeri in the collection are referable to swallow. The humeri of the different species of southern California swallows are very similar in form, differing only slightly in size. The two humeri are too large for *Riparia riparia* and *Stelgidopteryx serripennis* and too small for *Hirundo rustica*. The SBMNH specimen (No. 795) is identical to comparative material of *Petrochelidon pyrrhonota*. The LACM specimen is slightly smaller and the shaft is not as robust. This specimen may represent *Tachycineta*, probably *T. bicolor*. *Petrochelidon pyrrghonota* is known from the McKittrick Pleistocene of California (Miller and DeMay, 1942. There are no previous fossil records of *Tachycineta*. (Robinson et al. 1992; Brown et al. 1992).

Turdidae

Alden Miller (1932) identified several bones of a large thrush in the SBMNH collection (SBMNH 801) as *Turdus migratorius*. A mandible, humerus, carpometacarpus and

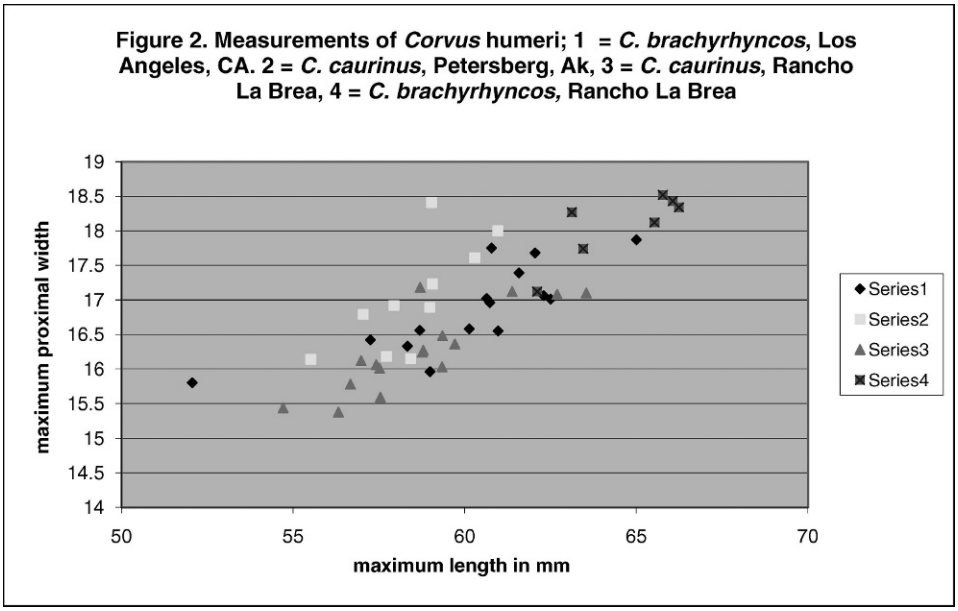

Fig. 2. Measurements of *Corvus* humeri; 1 = *C. brachyrhyncos*, Los Angeles, CA. 2 = *C. caurinus*, Petersberg, Ak, 3 = *C. caurinus*, Rancho La Brea, 4 = *C. brachyrhyncos*, Rancho La Brea.

coracoid, although nearly identical in configuration to *T. migratorius*, are small for this species and are here referred to *Ixoreus naevius*. Alden Miller (1932) also identified *Siala mexicana* and *Hylocichla* sp? within this family. The single specimen of the latter species could not be located.

Parulidae

A complete lower mandible (SBMNH 805) is identical to that of *Dendroica coronata*, but cannot be separated with certainty from other members of this genus that occur regularly in southern California.

Thraupidae

Piranga ludoviciana

This species is represented by a single maxilla (SBMNH 832). This is the first record of this species from the Pleistocene (Hudon 1999).

Emberizidae

Alden Miller (1932) identified *Pipilo maculatus* and *P. crissalis (fuscus)* in the Carpinteria material. Dawson (1948) recognized these two species at Rancho La Brea and described a third species, *P. angelensis*. Only maxillae and mandibles of these three species were identified in the Rancho La Brea collections, *P. angelensis* being larger than the two extant species. One tarsometatarsus (SBMNH 808) in the Carpinteria collection is slightly large for extant *Pipilo* and is here tentatively referred to *P. angelensis*. I have referred a mandible and tarsometatarsus to *Zonotricha* sp., cf. *Z.leucophrys* (SBMNH 810). This is the first record of this species from Carpinteria.

Icteridae

The only icterid identified by Miller (1932) was *Sturnella neglecta*. To the previously known limb material can be added a maxilla and mandible (SBMNH 811). A maxilla in the SBMNH collections and several limb bones (SBMNH 812) are identical in size to *Xanthocephalus xanthocephalus*. These bones are too big for other Californian icterids, including the blackbird described from La Brea as *Euphagus magnirostris*. *Xanthocephalus xanthocephalus* is known from other Pleistocene localities in California (Brodkorb 1978).

Discussion

The Carpinteria deposit has never been dated. However, the avifauna is similar to that found in the Rancho La Brea deposits, which date between 40,000 and 10,000 B.P. (Marcus and Berger 1984). Loye Miller's original analysis of the collection listed very few water birds. The current list of species, including pelican, several additional ducks, a rail, a shorebird, and a yellow-headed blackbird suggest a marshy area peripheral to the asphalt deposit. The large number of woodpeckers is consistent with a surrounding pine and oak woodland, as indicated by the preserved plant material (Chaney and Mason 1933). The non-avian portion of the Carpinteria collection, including amphibian, reptile and mammalian material was only reviewed through preliminary reports and awaits further review.

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