fied through field glasses at close range, near the Inn, long after the migration of the Gambels. On March 3, 1935, an immature bird with definitely dark lores was trapped near the Inn.

Gambel Sparrow. *Zonotrichia leucophrys gambelii.* A winter visitant, present in large flocks. Between February 2 and March 27, 1934, 54 individuals were trapped and banded in various parts of the oasis. Observations were then interrupted, and the date of emigration was not determined; but Gambel Sparrows were no longer present when trapping was resumed on April 24. Dates of arrival for the fall of 1934 were rather late. A single immature was seen October 23, and 2 or 3 individuals October 30. A small flock was reported at the palms November 17. By February 9, 1935, large flocks were present. In April the song was heard continuously, and the last record is of the song heard in the pasture May 6.

Fox Sparrow. *Passerella iliaca,* subsp. November 4, 1935, a Fox Sparrow, of the type with gray head and back, was seen feeding in the drifts of fine dust and leaves about the foundations of the cottages and at the bases of the mesquites. A few moments later it was captured by either a Sharp-shinned or a Cooper hawk.

Lincoln Sparrow. *Melospiza lincolnii,* subsp. Was first identified February 25, 1934. From March 6 to April 26, 18 were banded, many repeating consistently. They were caught in a sparrow trap, placed on a tongue of dry ground beside a sedge-filled pool. There is one later record, a single individual trapped and banded May 6.

It may be of interest to add a list of birds seen at Barker's Dam, in the Little San Bernardino Mountains (fig. 60). This region is now included in the Joshua Tree National Monument. It is about 25 miles from Twentynine Palms and has an elevation of nearly 4000 feet. The dam, built by cattle men across the outlet of a natural basin, impounds a lake of considerable size after seasons of heavy rainfall. Granite boulders and high cliffs practically surround the lake. The characteristic plant associations are the pinyon or single-leafed pine, scrub oak, manzanita, catalpa or "desert willow," and *Yucca mohavensis. Nolina parryi,* a rare plant of the lily family resembling the yuccas, is found here in abundance. The principal cactus is the "beaver tail" or "deer's tongue", *Opuntia basilaris.*

At this place on May 21, 1935, at least nine species of birds were observed within a few hours, at mid-day. Mourning Doves were very numerous. One female hummingbird was unidentified. Several species of swallows, including the Tree Swallow and the Cliff Swallow, were in continual flight high in the air or skimming the surface of the lake. Songs of the Say Phoebe, Western Mockingbird and an oriole, probably the Arizona Hooded, were heard. Linnets abounded, and one goldfinch of undetermined species was glimpsed. Unforgettable in that magnificent setting was the song of the Canyon Wren. Further observation there should yield some interesting records.

Berkeley, California, May 16, 1937.

SKELETAL STUDIES OF THE TROPICAL HAWK *HARPAGUS*

By LOYE MILLER

While collecting in the densely forested lands along the Caribbean shores of Panama, I was so fortunate as to secure a specimen of the peculiar little tropical hawk, *Harpagus bidentatus fasciatus.* (The following week Mr. Frank Richardson obtained a second specimen in the same area.) The general appearance of the bird when I picked it up was that of an *Accipiter* with an abbreviated tail, but I was completely mystified on close scrutiny to find two corneous denticles on each side of the bill. These "teeth" are even better developed than the single tooth of typical falcons. I had never before met such a bird, and the only books available in the field contained no record of it. He had to appear in my field record under the pseudonym of "Double-toothed Hawk."

On my return to California the generic and specific identity of the hawk was determined from Carriker's paper on the Birds of Costa Rica (Ann. Carnegie Mus., vol. 6, no. 7, 1910, pp. 314–915) and the Catalogue of Birds of the British Museum (R. Bowdler Sharpe, vol. 1, 1874). Both these publications place the genus *Harpagus* in close proximity to the falcons and to the kites. Sushkin (Nouv. Mem. Soc. Imp. Sci. Nat., Moscou, vol. 16, pt. 4, 1905) states that such an allocation of the genus is based upon the denticulation of the bill which he considers not fundamental. His opinion is that *Harpagus* is not to be assigned to the Falconidae. Peters, in his Birds of the World (Harvard Univ. Press, vol. 1, 1931), places the genus in the family Accipitridae and in the subfamily Milvinae immediately adjacent to the Accipitrinae.

My own immediate reaction, having only the fresh bird in hand, was that the kinship was with the accipitrids and not the falconids in spite of the denticulate bill. It was with much interest, then, that I looked forward to a study of the bird's skeleton.

Tarsus, tibia, coracoid and humerus were compared in detail, with the result that my first impression was greatly strengthened and I came to agree pretty closely with Peters' arrangement. He recognizes nine subfamilies of the Accipitridae which he lists seriatim with Accipitrinae as no. 4. The genus *Harpagus* is assigned to subfamily no. 3, the Milvinae, including the old world type, *Milvus milvus milvus*. The genus *Falco* is placed at the extreme end of the series of four subfamilies in the Falconidae. Assuming that Peters' arrangement is based upon his impression of the degree of kinship, *Harpagus* would appear almost as remote from *Falco* as it could well be. Even the aberrant *Pandion* lies between them! Peters' arrangement, exclusive of the cathartids and *Sagittarius* is as follows:

Superfamily	Falconidae		7. Circinae
Family	Accipitridae		8. Circaetinae
Subfamilies	1. Elaninae		9. Pandioninae
	2. Perninae	Family	Falconidae
	3. Milvinae	Subfamilies	1. Herpetotherinae
	4. Accipitrinae		2. Polyborinae
	5. Buteoninae		3. Polihieracinae
	6. Aegypiinae		4. Falconinae

This arrangement seems a smoothly flowing progression except that one might say it is necessary to "shift gears" to include Pandioninae in the itinerary.

A more detailed comparison of the several skeletal elements is as follows. *Harpagus bidentatus, Elanus leucurus, Accipiter cooperii,* and *Falco columbarius* are taken as typical forms.

Tarsometatarsus.—The proximal end of the tarsus, viewed from the anterior face, shows *Harpagus* to be close to *Accipiter,* less like *Elanus,* and far from *Falco.* The posterior and the articular views of the bone show exactly the same relationship. When the distal end is studied, there appears a more exaggerated inner trochlea than any of the other species. This throws the center of the foot farther toward the inner side than any of the others, though the degree is approached by *Elanus.* The outer trochlea is weak with little backward projection. This gives much less "transverse arching" to the foot. *Accipiter* approaches this character. The outer toe is less raised than in *Falco* or *Elanus,* but is much like that in *Accipiter.*

Tibiotarsus.—The tibia is strikingly like that of *Accipiter* in all respects except that the outer condyle is deeply cut away on the proximo-anterior sector of its arc. The outer condyle is thus reduced to a much smaller mass than the inner. None of the other genera has so marked a discrepancy between the condyles, though it is indicated in *Falco.*

The tendinal groove in *Falco* and *Elanus* is broad and deep; and, of course, in *Falco*, it is bifurcate. In *Accipiter* and *Harpagus* this groove is much constricted.

The width of the tibial shaft just proximal to the condyles is again suggestive of *Accipiter* in that the shaft is but little narrower than the condyles. In *Falco* and *Elanus* a marked widening through the condyles gives the impression of greater strength in the ankle joint. The posterior aspect of the condylar region is quite unlike *Falco* in its lack of a definite groove for the tendon of Achilles. It resembles *Accipiter* more than it does *Elanus* in that the internal condyle is not marked off by an obliquely transverse ridge.

Coracoid.—The coracoid of *Falco* differs very widely from that of *Elanus* or of *Accipiter*. *Harpagus* falls between these two latter genera in the characters of this bone. *Falco* has a long, slender procoracoid which is strongly flexed over the triosseal canal. This process is but moderately developed in the other three genera here compared. A coracoidal fenestra is complete in *Elanus*, is strongly notched in *Falco*, is faintly indicated in *Harpagus*, and entirely wanting in *Accipiter*.

The sterno-coracoidal imprint reaches far up the coracoidal shaft in *Falco*, is less extensive in *Elanus*, still less in *Harpagus*, and least in *Accipiter*. The sterno-coracoidal process follows the same sequence in respect to its breadth. The glenoid facet is broadest in *Accipiter* and *Harpagus*, is narrower in *Falco*, and narrowest in *Elanus*.

Humerus.—The affinities as displayed by the humerus all lie with *Accipiter*. *Elanus* has a long and almost straight humerus with subdued topography such as one finds in the sailing fliers. *Falco* stands at the opposite extreme with a short, sigmoidal humerus, widely expanded at the ends and very rugged in its contours. Such characters are found in birds of great speed and endurance on the wing. *Accipiter* and *Harpagus*, very much alike, occupy the intermediate ground that is correlated with the habit of a still-hunter who catches his prey by a quick dash from some place of concealment. Our much too brief observations in the field strengthen this latter deduction. Both specimens were taken in dense jungle from the jacaranda trees. Any bird, to be visible from the ground, must have come well down into the crown of the trees below the denser leaf zone, a typical accipitrine behavior. Insects constituted the only food identified in the stomach.

University of California at Los Angeles, April 17, 1937.