

## THE FALCONS OF THE MCKITTRICK PLEISTOCENE

WITH ONE ILLUSTRATION

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THE PRESENT writer's paper on the McKittrick birds, published in 1925,<sup>1</sup> embodied the results of an extended study of the collections taken from the excavations up to that time. Falcons were rare, as were most raptors other than *Aquila*. *Falco sparverius* was fairly abundant, but only two specimens represented any larger species of the genus. At the time that report was published, excavation had been discontinued and the fauna of the deposit was supposedly fairly well represented in the collections. A new asphalt lens was, however, opened up by later excavations, during 1925, and from this pit, removed but a few feet from the former, there has come quite a different bird fauna.

Water birds are less in evidence and raptorial species are greatly increased both in numbers and in variety. This addition to the collections bears a strong resemblance to the Rancho La Brea assemblage, although there are some markedly outstanding differences. *Teratornis*, represented in the previous collection by only two bones, becomes abundant; and yet *Cathartornis*, *Gymnogyps* and *Catharista* are entirely wanting. *Neogyps* and two species of *Geranoaëtus* are present. *Neophrontops* is abundant. *Asio* appears, and *Bubo* becomes fairly abundant. *Parapavo* remains unrepresented. Thus there appear some interesting similarities, and at the same time contrasts, with Rancho La Brea and with the previous McKittrick collections.

The larger members of the genus *Falco*, rare among the thousands of birds from Rancho La Brea, come very much to the front in this new McKittrick collection. But two specimens, representing *Falco peregrinus*, constituted the total material from the former collection that is ascribable to the so-called noble falcons. Now there is at hand a fair series of well preserved remains, the study of which yields some interesting results. A series of tarsi now under scrutiny falls readily into three groups representing, respectively, two surviving species, *mexicanus* and *peregrinus*, and one species heretofore undescribed.

Since the previous publication, also, there has come to hand a number of Recent specimens for comparison. The tarsus and tibia of the aplomado falcon from Mr. H. S. Swarth, the same parts of the white gyrfalcon from the collection of Mr. D. R. Dickey, and skeletons of *Falco fulvigularis*, *Herpetotheres*, *Ibycter* and *Elanus*, with other less closely related species from the tropics, have been added to the writer's collection. With this increased representation both of Recent and of fossil material, one feels at liberty to speak with greater assurance in assigning fossils to their proper specific positions. The results of close scrutiny of the "noble" falcons are here offered.

The great majority of specimens in the McKittrick series belong to the species *Falco mexicanus*. The tarsus is larger on the whole than it is in *F. peregrinus*, although the latter is designated as the "great-footed hawk". Such designation is in a way justified when the relative lengths of the digits are considered; for a comparison between the tarsi of a large duck hawk and a small prairie falcon shows the shorter bone of *peregrinus* to have the larger trochleae. Further differences in the trochleae are as follows.

The middle trochlea is not only larger in *peregrinus* but its proximo-distal diameter is greater in relation to its dorso-ventral diameter. This condition results in a greater portion of the arc being visible when viewed from directly in front (dorsal

<sup>1</sup> Univ. Calif. Publ., Bull. Dept. Geol. Sci., vol. 15, no. 9, pp. 307-326.

aspect). The plane of the groove in the middle trochlea is less obliquely inclined to the sagittal plane of the shaft. The outer trochlea appears to be raised to a greater degree above the level of the middle trochlea. Proximally, as viewed from in front, the bone is less excavated, the papilla of the tibialis anticus is nearer the inner profile, and it is lower down on the shaft. The head is more expanded; the inner cotyla is dropped farther below the level of the outer, and its inner border is extended into a thinner saucer edge of bone. Viewed from the axial aspect, *peregrinus* is seen to have a broader fossa on the axial side of the plantar ridge, for the flexor muscle of the hallux. Viewed from the proximal end, there appears a recognizable difference in the tuberosity

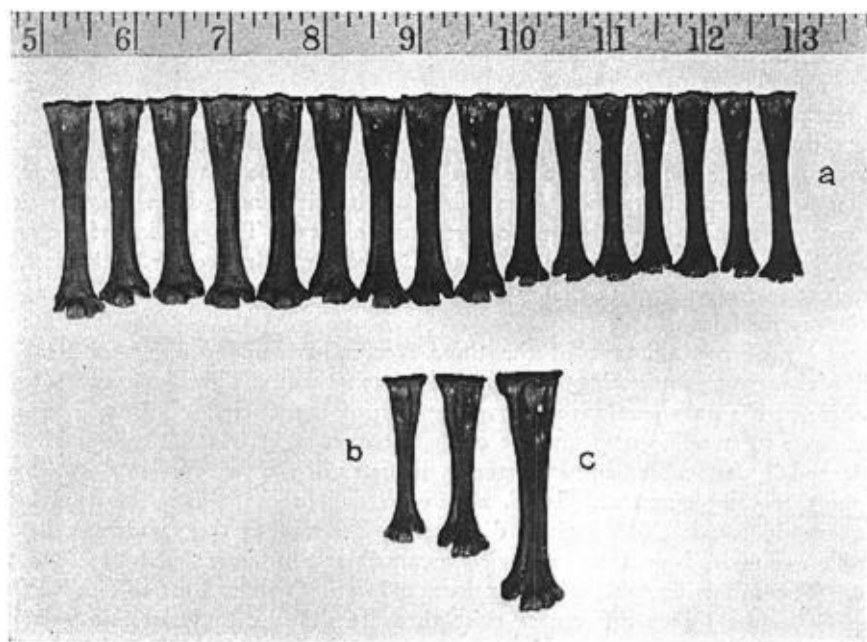


Fig. 54. Tarsi of Pleistocene Falcons.  $\times \frac{1}{2}$ .

- a. *Falco mexicanus*.
- b. *Falco peregrinus*.
- c. *Falco swarthi*.

on the ventral margin of the outer cotyla. It is heavier in *peregrinus*.

Separated upon the above characters the duck hawk is found to stand in the ratio of two in twenty-one with the other large falcons, and the prairie falcon stands eighteen in twenty-one. In size the fossil peregrine grades down below the smallest Recent specimen at hand, but the hiatus is not great.

The aplomado falcon (*Falco fusco-caerulescens*) has the same linear dimension as the smaller peregrines or even the smallest prairie falcon, but the other characters of the bone are quite at variance. The aplomado falcon is a long-legged bird with relatively slight lifting power of the foot and with weaker contours of the tarsus. Thus the bone comes to resemble that of the sparrow hawk. *Falco fulvicularis*, on the other hand, resembles a diminutive duck hawk, a truth naturally to be expected by anyone who has watched this midget "ace" in action above his native jungle tops.

*Falco swarthi*, new species

Type specimen, no. 27133, Museum of Paleontology, University of California. Complete tarso-metatarsus. Pleistocene asphalt of McKittrick, California. Size, gigantic, equalling that of *Falco islandus* but differing in the following characters. 1. The form of the hypotarsus differs. 2. Papilla of tibialis anticus shorter, broader, and nearer the axial margin of the bone. 3. Outer portion of hypotarsus heavier. 4. Middle trochlea different in shape. 5. Outer trochlea smaller. 6. Inner trochlea larger.

The middle trochlea is greater in its antero-posterior diameter and less in its proximo-distal diameter than is the case with the gyrfalcon, a ratio that results in a more open curve and would suggest a smaller amplitude of movement in the middle toe. The furrow in this trochlea is less deep and lies more obliquely to the sagittal plane.

Superficially, the Swarth falcon resembles a gigantic prairie falcon; but the great size sets it off at once from the series of eighteen perfect tarsi of the latter species. In addition to the size hiatus there are slight differences in the contour of the proximal end that are difficult to define. The habits of the birds must have been much the same, with differences only in degree of predatory ability. The position of the papilla of the tibialis anticus would indicate a relatively greater lifting power of the foot. In this respect *Falco swarthi* resembles the duck hawk and the gyrfalcon more than it does the prairie falcon.

Scrutiny of the tibiotarsi of the three species here under discussion from the asphalt shows some interesting differences between them. The distal two-thirds of the bones are the only portions preserved in two of the species. *Falco peregrinus* is at once seen to stand apart from the other two species in its relatively small outer condyle and in the smaller antero-posterior diameter of the two condyles as compared with the transverse diameter. In *F. mexicanus* and in *F. swarthi* the condyles are almost exactly equal. The sagittal diameter in relation to the transverse diameter across both condyles is greatest in *mexicanus*, much less in *swarthi*, and least in *peregrinus*. The following table of dimensions and ratios will express this character in numerical form. Other differences exist that are difficult of expression in mathematical terms but that appear to the eye on close scrutiny.

## TIBIAL CONDYLES OF FALCONS

	<i>peregrinus</i>		<i>mexicanus</i>		<i>swarthi</i>	
	mm.	%	mm.	%	mm.	%
Outer condyle	8.6	65	9.6	76.3	12	74.8
Inner condyle	9.3	72	9.5	76	12.5	77.5
Across both condyles	12.8	100	12.5	100	16.9	100

SUMMARY.—For some reason the noble falcons were entrapped in far greater numbers at McKittrick than at Rancho La Brea. These remains fall into three specific categories, of which *Falco mexicanus* is the most abundant, *Falco peregrinus* much less abundant, and a new and gigantic species, *Falco swarthi*, least numerous. This latter species in its osteological characters resembles *Falco mexicanus* perhaps more than it does any other species examined, but far exceeds it in size.

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