ADDITIONAL NOTES ON CALIFORNIA BATS; WITH OBSERVATIONS UPON THE YOUNG OF EUMOPS

By A. Brazier Howell and Luther Little

[*Plate 30*]

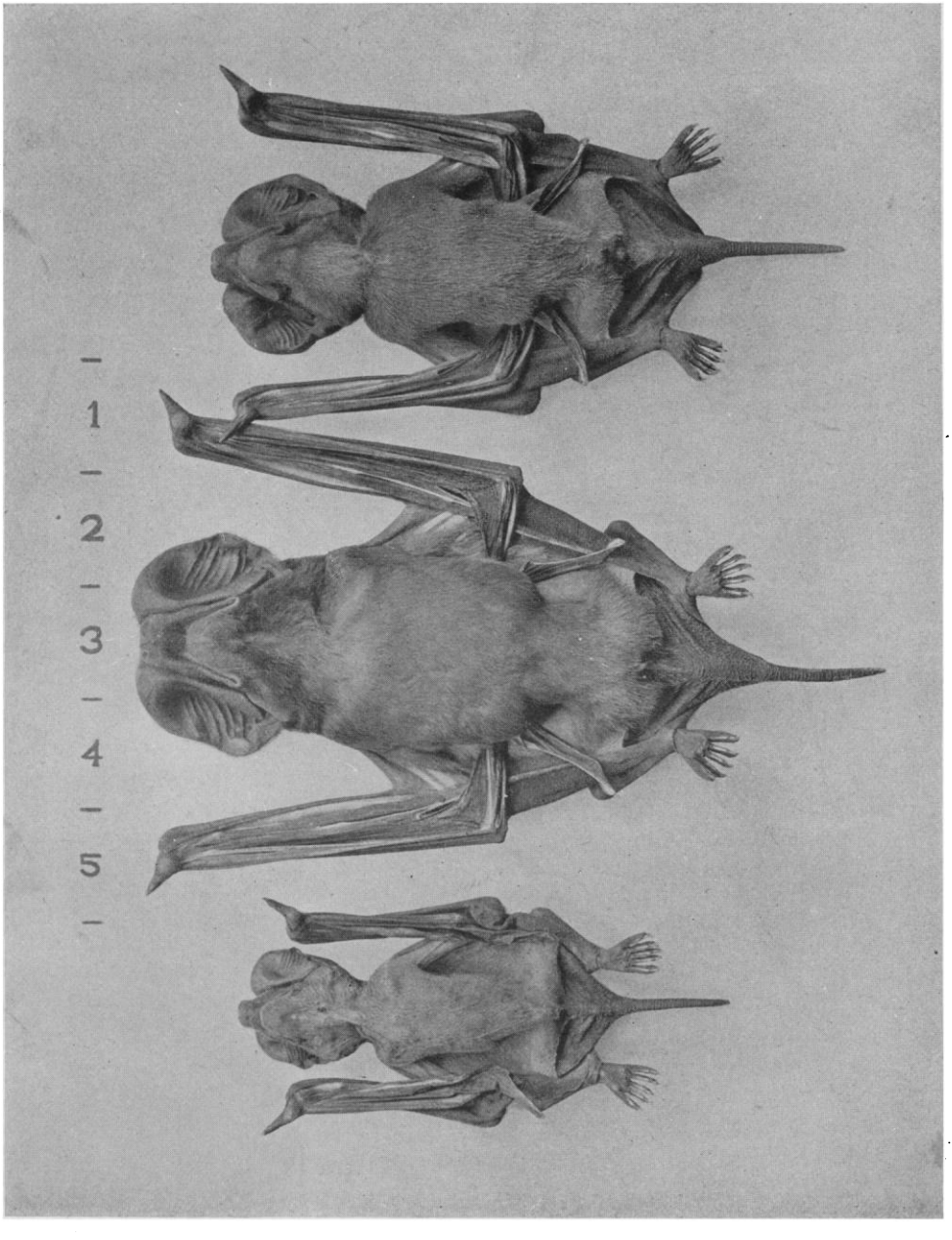
On June 16, 1923, we visited several colonies of bats in the San Gabriel Valley of Los Angeles County, California. Investigation in the loft of a certain garage near Covina disclosed about three dozen females of *Eptesicus fuscus fuscus*, most of them with small young, well hidden behind the sheathing of one of the gables. About a dozen of these were secured in a somewhat desultory fashion—for they were not really needed as specimens—and thrust into a sack with scant ceremony. It was not until they were being extricated from this, after we had returned to Pasadena, that we discovered two of these individuals bore Biological Survey bands numbers 11556 and 11557 upon the hind legs. One of these bands was so much scratched, as if from being worried by the teeth of the bat, that the numbers were with difficulty deciphered; but it was in proper place—almost meeting around the tibia without piercing the surrounding membrane. The other band was not abraded to any extent but it had penetrated through the membrane on both sides of the leg. The membrane fitted the band snugly, however, and the latter was evidently of no inconvenience to the wearer. Reference to the notes of the senior author showed that these bats were two of five which were captured in this same loft July 20, 1921, taken to Pasadena some twenty miles away, banded, and there released the same evening. Hence, these bats had returned to what we may call their original home, and were occupying it two years after having been first caught. A different portion of the loft was being occupied during 1923 than on the previous occasion, however, and there are no bats at all to be found here during the winter months, when they evidently migrate southwards. After being examined, these two banded bats were once more liberated—in South Pasadena this time.

The female *Eptesicus* taken had only a single young in each case, varying in size all the way from newly born to nearly half grown. They were normally carried not clingling to the under surface of the female with feet and wings "spraddled" out, but in such position beneath the membrane as to face the same direction as the dam, strongly reminding us of the attitude assumed by a human mother when walking with an arm and a portion of her cape over the shoulders of her child.

Upon visiting our most populous colony of *Eumops californicus* in the attic of a three story house near Covina, we found at this date some twenty-five young, varying from individuals which we judged to be about one week old, to those three weeks or more of age. These youngsters clung to the studding of the roof closely herded and in such position that but few of them could be reached and these barely by means of the long forceps. Every adult had scrambled down between the walls far beyond reach. The young secured were preserved as spirit specimens and their subsequent study proved rather interesting. For this purpose the youngest and oldest juveniles were selected for photographing and comparing in detail with an adult. In the accompanying table the second set of figures in each column represents percentages of the total length for the various parts of the individual measured, such treatment of the measurements giving data that are much more significant when compared.

MEASUREMENTS—IN MILLIMETERS	AD. ♀	JUV. ♂	JUV. ♀
Total length	167 —100%	136 —100%	110 —100%
2nd digit—wrist to tip	139 — 83.2	113 — 83.1	63 — 57.3
Forearm	77 — 46	68 — 50	48 — 43.5
2nd metacarpal	77 — 46	63 — 47.7	39 — 35.4
Proximal phalanx—2nd digit	32.5— 19.4	23.5— 17.3	13.5— 23
Thumb	8 — 4.8	9 — 6.6	10 — 9.1
Tail	61 — 36.6	47 — 34.6	37 — 33.7
Tibia	26.5— 15.9	25.5— 18.8	20.2— 18.4
Foot	16 — 9.6	17 — 12.5	17 — 15.5
Length ear from notch	38 — 22.8	28 — 20.6	20.5— 18.6
Project. nose beyond lower lip	12 — 8.2	8 — 5.9	6 — 5.5
Project. nose beyond ear	2 — 1.7	4.8— 3.5	5.3— 4.8

A scrutiny of these figures discloses the fact that the development is more rapid from the smallest to the intermediate example, than from the latter to the adult, as might be expected. In the smallest specimen, the wing—especially the membrane—is proportionately very weak and undeveloped, but not to an equal extent in all portions of this member. The measurement from the wrist to the tip of the wing is especially short, the chief reason for this being the brevity of the metacarpals; but the proximal phalanx of the longest digit (the second) is proportionately longer in the youngest specimen than in either of the others. We were surprised to find that the thumb is actually longest in the smaller juvenile, and also that the nodular callosity at the base of the thumb



EUMOPS CALIFORNICUS

Ventral aspect of adult female and two young. Reduced

(Howell and Little: California Bats.)

is proportionately fully as developed, but of a finer texture, as in the adult. This state of affairs may indicate a tendency towards atrophy of this digit at the present day because of lessened use, and also that the callosity constitutes the modern degeneration of some sort of a suction disk which, in conjunction with a stouter thumb, enabled the distant ancestors of these bats to clamber about in precarious situations with greater surety and agility than their descendants are capable of showing. The proportionately longer tibiæ and feet of the immature are probably without significance in this connection, merely being in accordance with the tendency of the feet of most young mammals to develop with disproportional rapidity. As may be seen in the illustration, the unusually long snout of *Eumops* is developed at a very early age and must consequently be a deep seated character; but the large size and intricate pattern of the external ear is not so well developed in the juvenile, and this fact probably indicates that such constitutes a relatively recent specialization of the animal. Upon the adult female in the photograph there is no external sign whatever of a gland upon the lower throat, but the larger immature (a male) plainly shows this gland, and it is fully as large, relatively, as it is upon adult males that are sexually inactive. What is still more surprising is that there is such a gland, though decidedly small, upon the smallest juvenal female, possibly indicating that this gland was not originally merely a secondary sexual character of the male but was at one time present in both sexes. What may be its function, if other than a simple scent gland, or why it has been practically lost by the female while retained in an active condition by the male, is a problem difficult to solve.

Still another point of interest is the fact that although the body of the smallest bat illustrated is practically hairless, there is a row of long, curved hairs projecting about 5 mm. beyond the ends of the toes. In the example next in size these hairs are about 6 mm. in length, while in the adult, they are no longer, but, indeed, considerably shorter because of wear. It can hardly be doubted that these hairs are connected with special tactile nerves in the toes, serving a useful purpose when the bat is backing into and about dark crannies, and their development at such an early age indicates early and deep-seated specialization in this respect.

Pasadena, California.