slight pressure of the abdomen in the fresh specimen. This opening extends back about an eighth of an inch, and, on being carefully pried open, shows two closely folded tufts of fine blackish hair. Pressure upon the abdomen will generally force out these tufts, and, if rightly applied, will result in the extension of two orange tentacle like structures, fully half an inch in length, united at the base, and spreading backward and outwardly in a gentle curve. The tufts of hair diminish as the tentacles are extended, the individual hairs occupying small but distinct papillae on the sides, until, when fully extended, they are evenly distributed around them, and no trace of the brush-like tuft remains. If the pressure be removed, the tentacles contract, the hairs again forming a tuft.

Specimens of Pyrrharctia isabella, when closely examined, showed a similar abdominal structure; but here there were four tufts extended instead of two, and in color they were snow-white. Properly applied pressure resulted in the inflation, first, of two basal sacs, which, when fully dilated, could be compared to nothing better than the ends of two thumbs pointing in opposite directions, the hairs of two of the tufts arranged rather densely on the convex outer surface. From the middle of the lower edge of these sacs there extended two tentacles similar to those in acraea, but not so long; and instead of being evenly clothed with hair, in this species the lower portion only has the papillae and hairy surface. The sacs and tentacles here are whitish, instead of orange, as in acraea. The processes of the latter species have a most remarkable resemblance to the tentacles of the larva of the common Papilio asterias, both in color and in shape. In both species an intense odor, somewhat like the smell of laudanum, is apparent when first the tentacles are exposed; and there is no reasonable doubt but that they are odor-glands, though exactly what purpose they serve is not so clear. In closely allied species no trace of this structure has been detected. Several fresh specimens of Arctia, Spilosoma virginica, and Hyphantria textor showed no trace of it; and no dry specimens of any other species thus far examined have a similar structure.

JOHN B. SMITH,
Assistant curator.

U. S. national museum.
Washington, D.C., May 28.

Muscles of the hind-limb of Cheiromeles torquatus.

I desire to place on record some observations I have recently made on the muscles of the hind-limb of Cheiromeles torquatus. This bat is one of the most interesting of the Cheiroptera. It is to a great extent arboreal in its habits. The wings are small, the body heavy and uncouth, and the wing-membranes are so arranged as to accommodate the young within a pouch on the back instead of on the front of the chest, as is the case in most of the bats. As a consequence, I expected to find in the musculature of the hind-limbs structures recalling those of other orders of mammals rather than those of the bats generally. In the main these anticipations have been met. It has always been supposed that the popliteus, the biceps, the soleus, and plantaris muscles are absent in the bats. It is true that Macalister finds in Vampyrops a few oblique fibres 'like a rudimental popliteus,' and Humphry identifies a small fascicle in Pteropus as biceps; but with these exceptions, as Macalister says, "there is no trace of biceps, popliteus, soleus, or plantaris in any." There is no doubt that the popliteus, the biceps, and the plantaris are present in Cheiromeles. The soleus is the only one of the absentees which is unaccounted for.

The maintenance of this group of muscles in a bat which is specialized for a tree-life, and scurries about the trunk after a fashion much like that of Pteromys, suggests the conclusion that the muscles named (excepting the soleus) are essential to the simplest expression of a true act of walking. They are absent in the volant bats, since they are of no use in flight; but they at once re-appear when the limbs are used for walking, or for the movements which are similar to this act. The assumption here taken that Cheiromeles is a true bat, which has been specially modified from the typical bat, is, I believe, tenable, and need not be here discussed. Occasion will be taken in due time to present arguments to sustain it. I will be content now to record the existence of the muscles named, and to give brief descriptions of them.

The popliteus is a well-defined muscle which slightly overlies the origin of the tibialis posticus. It does not create an oblique line on the tibia, which is so characteristic of the muscle in the mammals generally.

The plantaris is a conspicuous muscle, and is larger and heavier than is the gastrocnemius. It is distinct from the gastrocnemius its entire length. The muscle passes down to the sole of the foot, where it is continuous with the plantar fascia. Traction on the muscle flexes and abducts the foot.

A single muscular mass attached to the ischium represents the semi-membranosus and the biceps. The biceps becomes free at the upper fourth of the thigh, and is inserted into the head of the fibula.

The muscle which represents the tibialis posticus and flexor longus digitorum arises from the upper part of both the tibia and the fibula. It remains fleshy until it reaches the neighborhood of the tarsus, when two distinct tendons appear. One of these may be said to represent the flexor longus digitorum. It passes superficially over the ankle, and is lost on the plantar surface. Traction on the tendon abducts the foot, but does not flex the toes. The tendon of the tibialis anticus is lost on the tarsus. Traction on this muscle exerts no apparent influence on the movements of the tarsus.

HARRISON ALLEN.

Philadelphia, May 25.

Double vision.

In your issue of May 14, p. 440, Mr. Keller describes some phenomena of binocular vision, and asks an explanation. It would be impossible to do this in a short communication, but he will find the subject explained in any work on binocular vision. Perhaps the most accessible to him is my own little volume, entitled 'Sight' (International scientific series, vol. xxxi.). For explanation of phantom images, I would refer him to the chapters on 'Single and double images,' and on 'Superposition of external images,' and especially to the diagram on p. 116; and for explanation of inequalities of surface of such images, to p. 141 and preceding pages.

JOSEPH LECONTE.

Berkeley, Cal., May 24.