there should be some other adaptation to compensate. Perhaps speed is that compensation. But on the other hand, to resort to an anthropomorphism, may not some birds, like some men, enjoy racing while others are content with a slower pace? It is only necessary to watch a flock of swifts, particularly the larger species, coursing in the wind to realize that there is no evident reason other than enjoyment for the tremendous rapidity with which they often travel.—ALEXANDER WETMORE, *Smithsonian Institution, Washington 25, D. C.*

The First Primary in Swifts.—The object of this note is to follow up in other swifts a point that I reviewed earlier in the species of *Apus* (Ibis, 98: 34–62, 1955). The first primary is about 5 mm. shorter than the second in *A. apus, A. caffer, A. horus, A. pacificus* (except one race), and *A. myoptilus* (5 further specimens seen); but the two feathers are about equal in length, giving a more rounded wing-tip, in *A. barbatus, A. pallidus, A. melba, A. aequatorialis, A. affinis*, and *A. pacificus cooki*. The forms of *Apus* with more pointed wings also have more forked tails, and in *A. caffer* and *A. myoptilus* the outermost rectrix is not only much longer than the next but is much emarginated on its inner web. In what follows, I have used my revised classification of the Apodiforms (Auk, 73: 1–32, 1956), but accepting the corrections by Bond (Check-list of Birds of the West Indies, 4th ed., 1956: 88–90) and Wetmore (Auk, 74: 383–385, 1957) to the effect that *Chaetura martinica, C. vauxi* and *C. chapmani* are distinct species.

Other Apodinae.—The first primary is about 5 mm. shorter than the second in *Cypsiurus, Aëronautes, Tachornis squamata*, and *T. phoenicobia*, and some 2 to 3 mm. shorter in *Panyptila cayennensis*. The difference is relatively greatest in the smallest species (*Cypsiurus* and *Tachornis*), perhaps for aerodynamic reasons. The tail is deeply forked, with a much emarginated outermost rectrix, in *Cypsiurus* and *Panyptila*, well forked in *T. squamata*, less so in *T. phoenicobia*, and but slightly forked in *Aëronautes* (to an extent which, in *Apus*, would be associated with first and second primaries of equal length).

Chaeturinae.—In *Collocalia*, the first primary is about 5 mm. shorter than the second in all 8 species that I examined (the average differing somewhat with the species); the tail is not, or barely, forked. In *Cypseloides* (*sens. lat.*), the first primary is shorter than the second (by about 4 mm.) in only one species that I saw, namely, *C. rutilus*. It is about 1 mm. longer than the second in *C. niger* and *C. fumigatus*, and 3 to 5 mm. longer in the large *C. zonaris, C. biscutatus, C. semicollaris*, and *C. senex*. I did not see the other species. The tail is not forked in most species, slightly forked in *C. rutilus, C. niger*, and *C. biscutatus*, and more so in *C. zonaris*.

In *Chaetura*, as in *Cypseloides*, the first primary tends to be longer, not shorter, than the second: nearly 5 mm. longer in *C. cassini*, about 2 mm. longer in *C. sabini* and *C. leucopygia*, and slightly longer in 9 or 10 other species, *C. ussheri, C. sylvatica, C. melanopygia, C. caudacuta, C. (c.) cochinchinensis, C. gigantea, C. pelagica. C. vauxi, C. spinicauda*, and *C. cinereiventris*. On the other hand, it is slightly shorter than the second in *C. boehmi* and *C. grandidieri*, some 2 to 3 mm. shorter in *C. novaeguineae* and perhaps *C. andrei* (only one specimen seen), and 5 mm. shorter in *C. brachyura*. These differences run counter to the natural subdivisions of the genus, in which, for instance, all the American forms come close together. The tail is not forked in *Chaetura*, and in five species it is extremely short. Three of these short-tailed species, *C. brachyura, C. novaeguineae* and *C. boehmi*, also differ from most other species in having the first primary shorter than the second; but in the fourth species, *C. cassini*, the first primary is markedly longer than the second. (The fifth species, *C. picina*, was not examined.)

Hemiprocnidae.—The first primary is some 3 mm. longer than the second in *H. mystacea* and slightly longer in *H. comata*, but in *H. longipennis* it appears to be slightly shorter than the second primary in most forms, and in *H. l. coronata* it is about equal. In all three species the tail is deeply forked, with the outermost rectrix strongly emarginated. These birds, unlike other Apodi, settle freely on trees and have much less modified wings.

Conclusion.—In all swifts, the first primary differs from the rest in having a pointed, not rounded, tip, due to some emargination of the inner web. Hence by fully spreading the wing, a small gap can be made between the first and second primaries, and I have just been able to see such an apparent gap in a Common Swift (*Apus apus*) in slow flight near me. Presumably this gap functions as a wing-slot, and the difference in length between the first and second primaries, reviewed in this note, is doubtless associated with it in some way. The emargination of the outermost rectrix, where present, may also help in giving greater control in slow flight. Presumably, the difference in length between the first and second primaries is an aerodynamic adaptation, and I had expected that its apparent correlation with the extent of the tail-fork in the species of *Apus* might be repeated in the other genera of swifts. The present survey shows, instead, that the condition is complex. A detailed study of the flight actions of different types of swift will probably be needed before the differences described in this note can be satisfactorily interpreted.—DAVID LACK, *Edward Grey Institute of Field Ornithology, Oxford University, Oxford, England.*

Two New Devices for Measuring the Shapes of Birds' Eggs.—I have described previously (Auk, 70: 160–182, 1953) a device for copying the profile of an egg and so obtaining a complete description of its size and shape. This apparatus yields information of great accuracy, but in too complicated a form to be useful in routine work. M. E. Gemperle and I have also described (Auk, 72: 184–198, 1955) an apparatus for measuring the length, maximum breadth, and curvature of the two ends. In the last application this is a special form of spherometer. The apparatus works well for fairly large and robust eggs, but the pressure exerted by the plunger of the dial gage is too severe for small eggs, which are distorted or even crushed by it. This happens even with the finest jewel-bearing dial gages. It is, however, in regular use at Carnegie Museum for measuring the eggs of the larger species.

To deal with the eggs of the majority of the passerines and other small species, two new devices were added to the battery of instruments. One of these is an optical spherometer for measuring the curvature of the ends of eggs; the other is an automatic electrically operated machine for measuring length and breadth. A brief description of each follows.

Optical spherometer.—The "key move" in any spherometer for measuring birds' eggs is to set the egg upon three hard steel ball bearings arranged in an equilateral triangle. Upon these very smooth, highly-polished surfaces the egg will seat itself correctly; it will not seat itself properly on an ordinary "ring" or "tripod" type of spherometer. The steel-ball seat was used in the instrument previously described and also in the present instrument. Plate 16 shows an egg (A) of the European Starling (*Sturnus vulgaris*) seated, pointed end down, on the three steel balls (B) and held in place by the weight of a light aluminum shaft (C) sliding freely in a fixed sleeve (D).

The gap between two of the three steel balls faces the microscope (E), which has a long "working distance," i.e. a long distance between the object glass (F) and the object under scrutiny, in this case the end of the egg. It has also a fairly long "eye-