

Article IX.—THE CLASSIFICATION OF THE WEAVER-BIRDS.¹

BY JAMES P. CHAPIN.

Plates VI-X.

CONTENTS.

	PAGE.
Current Views	243
Mouth-markings of Young Estrildinæ	246
Taxonomic Value	248
Skeletal Characters	249
Textoridæ	250
Ploceidæ — Ploceinæ and Estrildinæ defined	251
<i>Philetairus</i>	252
Position of <i>Parmoptila</i>	254
General View of the Whydahs	256
Dry Season or Winter Plumages in the Ploceinæ	259
Summary	260
Proposed Classification of the Ploceidæ	261
Classifications of Reichenow and Shelley	262
Appendix (Notes on Nesting, etc.)	265
Family Textoridæ	265
Family Ploceidæ	266
Subfamily Ploceinæ	266
Subfamily Estrildinæ	273

The one external character which enables us to distinguish the Ploceidæ, or Weavers, from the Fringillidæ at a glance is the condition of the tenth or outermost primary. In the latter this feather is always very small and rotated to a concealed position on the dorsal surface of the wing, whereas in the Ploceidæ, with possibly one exception, it always lies in plain view on the under side of the wing. This distinctive feather, however, shows great diversity in size among the different genera of Weavers, in accordance with which it has long been the custom to separate the family into two or three subdivisions.

CURRENT VIEWS.

All the well known ornithological works recognize such subfamilies, sometimes two: the Viduinæ (to quote the Cambridge Natural History), in which this quill is small and falcate, and the Ploceinæ, in which it is

¹ Scientific Results of the Congo Expedition. Ornithology, No. 4.

larger. By Professor Reichenow the first group is called the *Spermestinae*, and by Captain Shelley, in *Birds of Africa*, it is divided again into the *Viduinæ*, most of which have elongated tails, including the Whydahs and Bishop Birds, and the *Estrildinæ*, comprising the Waxbills and their allies.

Turning back to the '*Conspectus Generum Avium*' of Bonaparte, 1850, we find these same three subfamilies already recognized. Though the distinguishing characters were not enumerated it is perfectly clear that the divisions were not based upon the size of the tenth primary, but rather on the general form and style of coloration.

Professor Newton, too, was in favor of three subfamilies, for in his '*Dictionary of Birds*,' p. 1029, he wrote: "Following Sundevall,¹ Dr. Sharpe (*Cat. Birds Br. Mus.*) divides the *Ploceidæ* into two subfamilies — *Viduinæ* and *Ploceinæ* . . . — a proceeding that is confessedly artificial and not to be recommended, since it obscures the very natural group of *Viduinæ* proper by associating with them a promiscuous company far better left as it was by Gray and others in a distinct group as *Spermestinae*, or more correctly *Estrildinæ*, composite though this group may be, and requiring the separation of its Australian members *Donacilda* and *Poophila*, . . . to say nothing of . . . *Pyrenestes*, *Euplectes* or *Pyromelæna*."

It will be shown later that the group of *Viduinæ* is not at all a natural one, but we shall first consider the tenth primary as a basis of classification. A convenient standard of comparison is the length of the upper primary coverts. According to Reichenow the members of the *Spermestinae* have the outer primary scarcely as long, or shorter than the primary coverts, the *Ploceinæ* have it distinctly longer.

This would surely be a convenient means of distinguishing them, but it does not express real relationship, and such subfamilies are not wholly natural divisions. There are numerous exceptions, and it is my belief that we should have a much better idea of inter-relationships in the *Ploceidæ* if we paid more attention to the other characters.

For example, the genus *Spermospiza*, which has a relatively long tenth primary, resembles in most respects certain genera of the *Estrildinæ*, especially *Hypargos*, *Pytilia* and *Pyrenestes*, and there Bonaparte placed it. Captain Shelley, also, in '*The Ibis*,' 1886 (Review of the *Ploceidæ* of the Ethiopian Region), frankly included it in that subfamily. Other authors, however, have since transferred it to the *Ploceinæ* on this one character, and Shelley himself later reversed his decision.

Clytospiza monteiri, as pointed out by the same authority (*Birds of Africa*, IV, p. 296), is in the same predicament; but Reichenow boldly refers

¹ *Methodi Naturalis Avium Disponendarum Tentamen*, 1872.

it to *Hypargos* (in the Estrildinæ) ignoring the fact that not only his *H. monteiri*, but *H. dybowskii* as well, have the outer primary as long as in many of the Ploceinæ, whereas in *H. schlegeli* it is minute, shorter than the primary coverts. (See Fig. 1, B and C). Even in *Nesocharis capistrata* this feather is slightly longer than the primary coverts, though nobody has yet placed it in the Ploceinæ.

On the other hand, *Brachycope anomala*, among Ploceinæ, has it scarcely

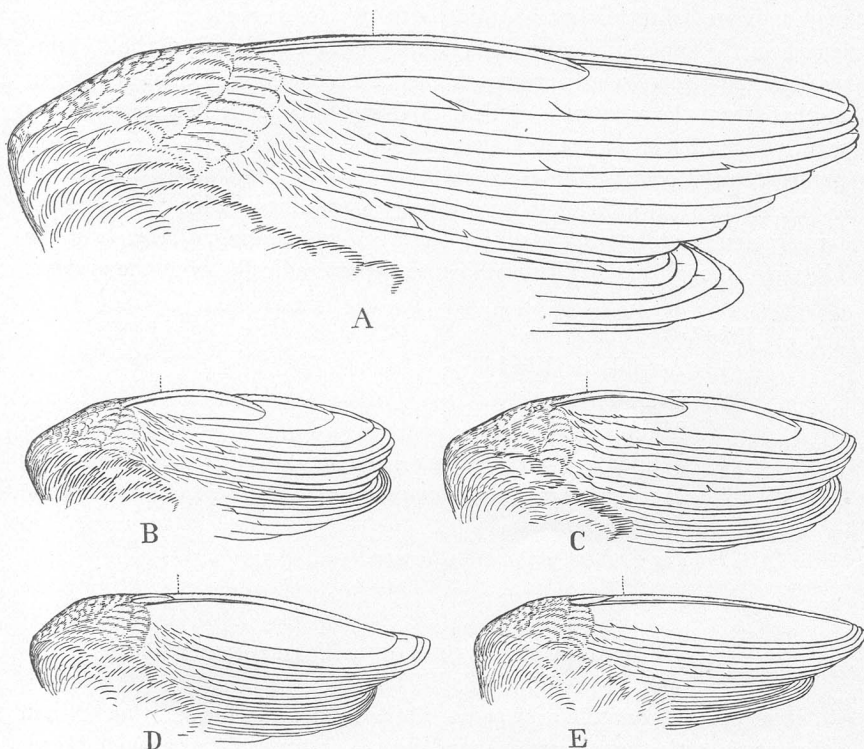


Fig. 1. Wings of: A. *Dinemellia dinemelli*; B. *Hypargos dybowskii*; C. *Clytospiza monteiri*; D. *Parmoptila jamesoni*; E. *Nigrita fusconota*. All natural size; the dotted line marking the length of the primary coverts.

longer than the coverts. This genus is rare in collections, but it deserves attention, for it furnishes an excellent link between *Ploceus*, or the group of genera included under that name by conservative writers, and *Pyromelana*, including the Bishop-birds.

Why, then, are the latter, along with *Quelea* and *Coliuspasser*, considered as allies of *Vidua* and kept in the Estrildinæ? Simply on account of the

small size of this one feather. Yet, in other ways, the form of the bill and feet, the manner of constructing their nests, they agree much more closely with the Ploceinæ, and it is to this subfamily I am sure that they belong.

Dr. A. G. Butler, whose long experience with Weavers as cage-birds is summed up in his 'Foreign Finches in Captivity,' seems to have shared a few of my doubts. On page 303, we read: "That this distinction [the length of the tenth primary] is a real one, important as an aid to 'classification, cannot be questioned; it is also probable that the length of this primary may indicate affinity; but as this particular feather evidently varies in length in the same subfamily, it is equally clear that some of the Viduine weavers must more nearly approach their Ploceine cousins than others do; so that, from the view of a student of living birds, it is necessarily to be regarded as of less importance than a total dissimilarity of habits, winter plumage, song, etc."

Dr. Butler's classification, accordingly, as outlined in his table of contents, attempts to show the affinity between *Pyromelana*, *Quelea*, and the Ploceinæ, though he is still unwilling to depart radically from the systems in vogue.

I. *Whydah-like Weavers*.

1. *Astrilds* or *Waxbills*.
2. *Grass-finches*.
3. *Mannikins*.
4. *Whydahs* (= *Hypochera* + *Vidua* + *Coliuspasser*).
5. *Weavers* (= *Pyromelana* + *Quelea*).

II. *Typical Weavers*.

Foudia + *Nesacanthis* + *Ploceus*.

MOUTH-MARKINGS OF YOUNG ESTRILDINÆ.

It is partly from the viewpoint of the field ornithologist that I shall attempt to settle these questions, and I am sure we can find a much better basis of classification, founded upon a combination of characters, instead of a single one. In the Congo basin, where my acquaintance was made with this the commonest family of African birds, certain important genera usually referred to it, such as *Textor*, *Dinemellia* and *Philetairus*, do not occur, but it is nevertheless well represented, our collection from that region containing eighty-two different forms. Because of their abundance and the fact that their nests are easy to find, and frequently brought to us by natives, we had an opportunity of examining the young of many species. I had not spent three months in Africa before I began to notice the curious spotting

and swellings about the mouth of the young *Pyrenestes* and *Estrilda*. This was in 1909, and from then till early in 1915 I continued to examine and note these decorations of the mouths in nestlings of the Estrildinae.

In the meantime, Mr. G. L. Bates described and figured in 'The Ibis' (1911) the mouths of a number of young Weaver-finches from the Kamerun. As long ago as 1874, it is true, Dr. Sharpe discovered lobes at the corners of the mouth in the young of *Parmoptila*; and in 1898, Dr. A. G. Butler (Avicultural Magazine, Vol. V, p. 27) had recorded similar markings and swellings in *Poephila gouldiae*, an Australian Weaver-finch; but of all this I was ignorant. In 'Foreign Finches in Captivity' (1899) Dr. Butler frequently mentioned the "beak-warts" or "wax-skin" in young Weaver-finches, noting their color, but not their form.

Still more recently, Mr. C. F. M. Swynnerton has examined the mouths of many African birds, old and young, and published a beautiful plate in 'The Ibis' (April, 1916, p. 264) including, however, only two Estrildine nestlings.

The first type of buccal decoration in the Weavers to attract my attention was that which Swynnerton has aptly named the "domino" mouth, consisting, as he says, of "symmetrically arranged black spots on a pale palate." In its most typical form, as in *Estrilda* (see Plate VII) there are five such spots, but frequently the posterior pair is lost, though the three remaining retain their position, one in the mid-line, in front of the internal nares, the other two laterally. In addition there is often a blackish ring around the tongue, or two black spots; and a dark crescent on the mandible beneath the tongue, while the corners of the mouth are provided with swellings of regular form and number, often colored yellow or blue and associated with other black spots. But the gape is never so greatly swollen as we are accustomed to find in most young Passerine birds, Woodpeckers and others.

The second type I shall call the "horseshoe" or *Spermestine*, for I have found it in *Spermestes* and the allied genus *Amauresthes*. (See Plates VI, 1, 4, and VII, 7.) The gape is little swollen or not at all, and instead of spots on the palate we find one or two horseshoes or inverted U-shaped lines. There is a black line around the tongue and two crescents beneath it.

In view of the striking resemblances of these two genera to *Uroloncha* and *Munia*, it seemed probable that the latter would have similar markings when young. Thanks to the generosity of Mr. A. G. Ibbeken, who has presented to me a young Java Sparrow (*Munia oryzivora*) hatched in captivity, my suspicion was confirmed. This bird, about four days old, was the offspring of a pair of the white variety, and interesting for its total lack of down. The yellowish palate bore a single black crescent, but the throat

and tongue were pinkish and unspotted, while the white skin of the commissure was considerably swollen. The skin of lores and cheeks was heavily pigmented with black. (Fig. 2.)

Unfortunately for the naturalist, all these curious markings are lost in the adult. The swellings of the gape are absorbed, and the spots in the

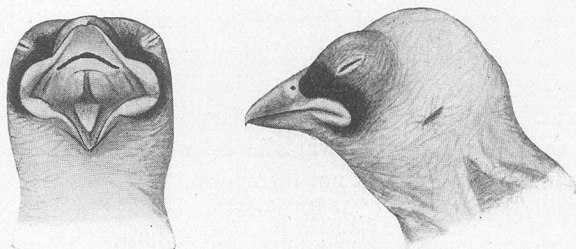


Fig. 2. Mouth and head of young white Java Sparrow (*Munia oryzivora*), about 4 days old. $\times 2$.

mouth disappear almost completely, being as a rule obscured by increased pigmentation.

TAXONOMIC VALUE.

Markings of these two patterns are common among members of the Ploceidæ, but have never been noticed in any other family. Yet the true Weaver-birds (Ploceinæ), as well as certain genera usually placed in the other subfamily — *Coliuspasser* and *Pyromelana*, for instance — lack them, agreeing closely in the swollen yellow or white gape of their young with the Fringillidæ, Turdidæ, and other families.

This character of the nestlings, my field experience has taught me, will furnish a valuable key to the relationships of the different genera of Weavers. I should remove from the Estrildinæ all those forms whose nestlings show no trace of such mouth markings, for they are better placed in the Ploceinæ, as is shown by their nesting habits. This applies especially to the *Pyromelana-Coliuspasser* group. Conversely, species that show the mouth-markings, even though they have a long outer primary are to be considered Estrildine.

In a letter to 'The Ibis,' July, 1916, Captain Collingwood Ingram questioned the constancy of such marks, but a glance at the descriptions or figures of Bates, Swynnerton and myself ought to dispel any doubts at once. I am convinced that such markings offer very important evidences of relationship. It is found, for instance, that the nestlings of many of the Sylviidæ have two black spots on the back of the tongue; one genus currently

regarded as Flycatchers (*Chloropeta*) resembles them, but it is well worth investigation. Furthermore, Swynnerton figures the tongue of the young *Centropus burchelli*, bearing a U-shaped black mark. In nestlings of two other African Coucals, *Centropus neumanni* and *C. monachus*, I have found similar markings on the tongue, and even *Coccyzus americanus* and *C. erythrophthalmus* have black-tipped tongues. The hair-like down of these young American Cuckoos recalls the remarkable covering of nestling Coucals, but the interior of the mouth is even more highly decorated, the red palate bearing no less than nine raised yellow spots, with one more such spot on the back of the tongue.

It is not my intention to consider the theories which have been advanced as to the possible advantages of such markings. I wish only to use them as showing relationships in the Weavers, for the mere size of the outer primary, as I have already shown, is often misleading. A rearrangement of the groups in accordance with the decorations, or lack of them, in the mouths of their nestlings, is also supported by many other characters such as resemblances in form or structure, and even in color pattern, between various genera, the coloration of the eggs and, as already stated, the habits in nest-building.

SKELETAL CHARACTERS.

The skeletons of *Sitagra*, *Xanthophilus*, *Pyromelana*, *Stictospiza*, *Estrilda* and *Vidua* show no differences by which the Ploceinæ can be distinguished from the Estrildinæ. Moreover they even agree closely with those of Fringillidæ, such as *Passer*, *Pinicola* and *Paroaria*. *Textor albirostris*, however, differs markedly from all the foregoing, both in its skull and its sternum. The fenestræ associated with the orbital foramina are different in extent and number, and an obliquely ascending median bar is present which all the others lack (see Fig. 3). Even Starlings (*Sturnus*, *Sturnopastor*, and *Spreo*) and Jays (*Garrulus* and *Perisoreus*) resemble the ordinary Ploceid type.

Furthermore, *Textor albirostris* differs from the Ploceids cited above in the form of the sternal rostrum (see Fig. 4) which is less forked and squarer in outline (as viewed from the side). But of far greater weight is the fact discovered by Mr. W. DeW. Miller that this is composed of a *spina interna*, as well as a *spina externa*, the two processes fusing at the tip, and connected lower down by a bony bar. This is the first Passerine bird in which a *spina interna* has been found (see Gadow, Bronn's Thier-Reich, Vögel, II, p. 85).

Such important differences certainly entitle *Textor* to distinct family

rank;¹ *Dinemellia* is apparently nearly allied to it, examination of its skull and sternum would tell; and perhaps even other genera will be found to resemble them.

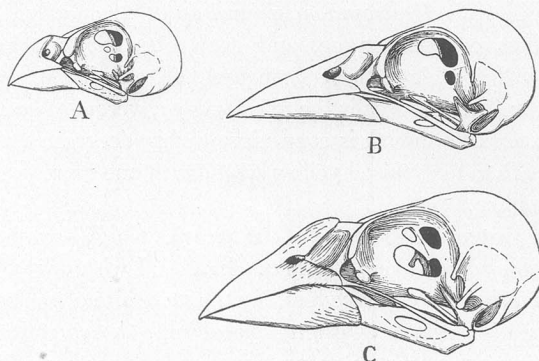


Fig. 3. Skulls of: A. *Vidua serena*; B. *Xanthophilus capensis*; C. *Textor albirostris*. (Natural size.)

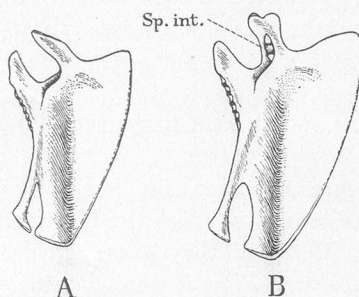


Fig. 4. Sterna of: A. *Xanthophilus capensis*; B. *Textor albirostris*. (Lateral view, natural size.)
Sp. int. = spina interna.

TEXTORIDÆ.

For the present I shall refer to this family only *Textor* and *Dinemellia*. Their nesting is remarkable, the great collective abodes being constructed of thorny twigs and grass. The outer primary is large; longer in *Dinemellia* than in any member of the Ploceidæ, and measuring .43 of the total length of the wing (see Fig. 1, A). The eggs are spotted, and so far as known the young show no mouth-markings. In *Textor albirostris* the back of the tarsus, on the inner side, is often scutellate (see Fig. 5).

¹ This conclusion had already been reached by Mr. H. C. Oberholser from its external characters alone.

Mr. H. C. Oberholser has kindly called my attention to a passage in Lesson's 'Traité d'Ornithologie' (1831), page 433, where the male of the "Alecto" (*Textor albirostris senegalensis*) is described as possessing an external copulatory organ 9-13 mm. in length, which is especially noticeable in life. Mr. L. S. Crandall, of the New York Zoölogical Park, assures me, however, that such an organ, though very small, is to be seen in certain of the Fringillidæ.

The peculiarities of the "Buffalo Weaver-Birds" have often been alluded to, and usually they have been compared to Starlings, from which they differ internally just as they do from the Weavers. Mr. W. T. Blanford, in Bartlett's 'Monograph of the Weaver-Birds' (page 25), is quoted as follows: "It [*Textor albirostris*] is quite Starling-like in its habits and flight, and belongs to this family rather than to the Fringillidæ. I frequently saw it associating with *Lamprocolius æneus*, *L. chalybæus*, and *L. chrysogaster*. The massive nests were not unlike those of *Sturnopastor contra*."

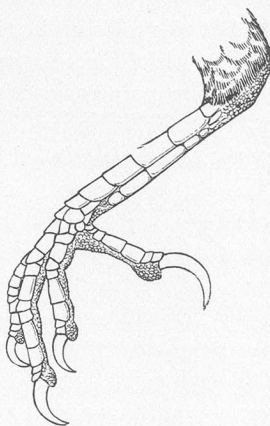


Fig. 5. Foot of a female *Textor albirostris* in the Am. Mus. Nat. Hist., from inner side, to show scutellation. (Natural size).

PLOCEIDÆ — ESTRILDINÆ AND PLOCEINÆ DEFINED.

The two subfamilies Estrildinæ and Ploceinæ will be retained; for convenience we may distinguish them in English as Weaver-finches and Weaver-birds (or true Weavers), respectively, just as Professor Reichenow calls them Webefinken and Webervögel. The name Estrildinæ is to be preferred to that of Viduinæ (both seemingly of equal age) since the latter has often been used expressly to associate *Vidua* with *Coliuspasser*.

As will be seen from the annotated list of genera (see below, page 266), the Ploceinæ are those that really weave their nests, using strands of vegetable fiber, often from the leaves of grasses, palms, or bananas, pulling them in and out, through and through. Their nests are pensive, the typical form rounded, retort-shaped, or like an inverted sock with the entrance opening downward. *Philetairus*, which I refer provisionally to this subfamily (see page 252) departs widely from this type in building a large communal structure of grass.

So far as known all the nestlings of the Ploceinæ lack dark spots in the

mouth, and have the gape simply swollen, and yellow or whitish, as is usual in the young of Passerine birds. The interior of the mouth is frequently red, but this color is due to the blood-supply, not to pigment.

The eggs of Ploceinæ are usually colored or spotted, though in a few cases pure white, as occasionally in *Hyphantornis cucullatus*, *Sitagra mariquensis* and *Ploceëlla javanensis*, and regularly in *Sitagra monacha*, *S. cabanisi*, *S. luteola*, *Icteropsis pelzelni*, *Ploceus baya* and *P. manyar*.

The outer primary is often longer than the primary coverts, but in *Brachycope* and *Foudia* it is only slightly longer, and usually does not exceed them in *Quelea*, *Pyromelana*, *Euplectes*, *Urobrachya*, *Coliuspasser*, *Drepanoplectes* and *Diatropura*.

The Estrildinæ (see page 273) are to be distinguished by the fact that their nestlings exhibit dark pigmented spots or lines in the mouth, often with small colored wattles or lobes at the gape. These latter are lacking in *Spermestes*, *Amauresthes* and *Munia*, which have lines on the palate instead of spots. These three genera, with others no doubt still to be ascertained, are thus rather distinct from the rest of the group.

The Weaver-finches can scarcely be said to merit their name, for they build nests which are not pensive, nor really woven, their most typical form being flask-shaped, built mostly of flowering or seed-bearing grass-heads tightly packed, but pulled through at most only once or twice. The entrance opens at the side. Many of the Weaver-finches simply build covered, sparrow-like abodes, using dry leaves and feathers as well, and not infrequently, as in the case of *Clytospiza*, they have been found to appropriate abandoned nests of other species to which they may or may not add a lining. A striking thing about their nesting-habits — in many species, at least, — is that the parents neglect to clean the nest of excrement, with the result that it becomes extremely foul before the young are ready to leave it. This is rarely the case with the Ploceinæ, though I have noticed it in *Amblyospiza*.

So far as I can ascertain, the Estrildinæ in every case lay pure white eggs, generally in larger numbers than those of the true Weavers.

The tenth primary is usually, but by no means always, as short or shorter than the primary coverts. The principal exceptions have already been cited. In view of the condition of the mouth of their nestlings, *Spermospiza*, *Clytospiza* and *Nesocharis* are plainly Estrildine, their large outer primaries notwithstanding.

PHILETAIRUS.

The famous sociable Weaver of South Africa (*Philetairus socius*) is a remarkably sparrow-like bird, which has sometimes been placed in the Ploceidæ, sometimes in the Fringillidæ. Some descriptions give the im-

pression that the tenth primary is visible and it is so figured in Gray's 'Genera of Birds' (1849); but specimens in the Philadelphia Academy of Natural Sciences and the Museum of Comparative Zoölogy show it to be very small, and concealed by the ninth, just as it is in Fringillidæ (see Fig. 6). Why not include it, then, in that family, as Reichenow does? After careful examination of these specimens I came to the conclusion that as far as the form of the compressed bill, of the feet, and other parts were concerned, *Philetairus* might be a Finch; yet I prefer to keep it in the Ploceidæ, for the following reasons.

We believe that the evolutionary tendency among Oscines is from the ten-primaried to the nine-primaried condition. Practically all the Fringil-

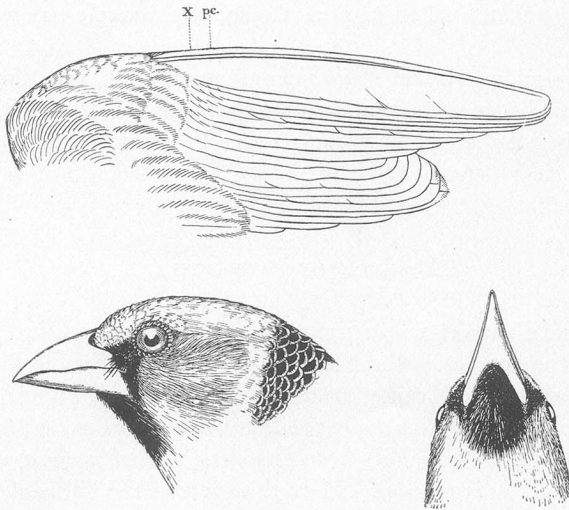


Fig. 6. *Philetairus socius*. Natural size. X marks the tip of the 10th primary, pc. that of the longest primary covert.

lidæ have already attained the latter condition, but in the genus *Emberizoides* of South America, at least, the tenth primary is frequently visible from the under side of the wing.

The Ploceinæ, on the other hand, show every stage from a wing with a large tenth primary (*Malimbus* and *Hyphantornis* for example) to what is practically a nine-primaried wing, as in *Pseudonigrita*, with only a very small acuminate tenth, still visible on the under side of the wing. If we consider *Philetairus* as the final stage of this series, the step from *Pseudonigrita* to it is extremely slight. Captain Shelley, indeed, united these two genera, and I can see at present no reason why we cannot keep the Sociable Weaver among the Ploceinæ.

In its nesting it is certainly very far from the Finches, the huge communal nest reminding us in a way of those of Textoriidæ; but it is made of grass. Brehm¹ and Grant,² among the authors consulted, state that the materials are really woven, and it is hard to see how the structure could be held together otherwise. We can thus compare it better with nests of Ploceinæ, which so often build in large colonies. Furthermore, the way that a Weaver may have arrived at this stage in architecture, starting from the ordinary colonial habit, is at least suggested by Grandidier (*Histoire Naturelle des Oiseaux de Madagascar*, I) in the case of *Ploceus sakalava*, which has much the same habits as *Nelicurvius nelicourvi*, but the nests differ in being constructed so closely together that they form but a single mass. Even *Hyphantornis abyssinicus* has been seen by the writer to attach as many as three nests together, though in such a case only a single one was actually utilized.

But if we decide to retain *Philetairus* among the Weavers, the last clear-cut distinction between Fringillidæ and Ploceidæ is lost. Still I scarcely need to remind the reader how many other Passerine families are equally incapable of clear definition.

POSITION OF PARMOPTILA.

Among the Ploceidæ we find much the same variation in the size and stoutness of the beak as in the Fringillidæ; and similarly the Ploceinæ and Estrildinæ parallel each other to a great extent, both groups containing rather slender-billed as well as exceedingly heavy-beaked representatives, ranging in the former subfamily from *Icteropsis* to *Amblyospiza*, in the latter from *Parmoptila* to *Pyrenestes*. Mere thickness of the bill is of little systematic value.

Parmoptila has never before been referred to the Ploceidæ; but my investigations prove this to be its proper place, in spite of former opinions about its systematic position. In the 'British Museum Catalogue of Birds,' X, p. 63, Dr. Sharpe, following Cassin, included the genus in the Dicaeidæ, but in the 'Hand List of Birds,' IV, p. 233, referred it to the Sylviidæ, where Captain Shelley (*Birds of Africa*, I, 1896) had already placed it (along with *Pholidornis*) near *Hylia* and *Eremomela*. Professor Reichenow considers both genera as Titmice.

From my first acquaintance with *Parmoptila jamesoni*, I have felt that

¹ Bird Life, p. 314.

² Guide to the Gallery of Birds (British Museum), 1905, p. 132.

it really belonged with the Ploceidæ, probably near *Nigrita*. Fig. 7 shows the resemblance in the form of the bill and the curve of the cutting edge of the maxilla. Their small outermost primaries are much alike (see Fig. 1, D and E), and only the color pattern seems really very different, yet even in this *Parmoptila* does not approach either the Dicæidæ, the Sylviidæ or the Paridæ.

This opinion, based at first on the external form of the adult, was confirmed by the spotting in the mouth of the young bird, which is essentially the same as in a young Waxbill or Negro-finch. In *P. jamesoni* the skin at the corners of the mouth is black, bearing three small yellowish balls, the interior of the mouth light yellow, with five black spots on the palate — a typical "domino" mouth — and a black crescent beneath the tongue.

These three lobes at the gape were first noticed by Dr. Sharpe in a young bird preserved in alcohol, which he described as *Lobornis alexandri* (Ann. Mag. Nat.

Hist. (4), XIV, 1874, p. 63), but which has since proved to be the young of *Parmoptila woodhousei*. They are well shown in the 'British Museum Catalogue of Birds,' Vol. X, plate ii. In view of these markings and wattles I think there can be no doubt of its affinities.

In its nesting, too, *Parmoptila* agrees with the Weaver-finches rather than with the Flower-peckers, Warblers, or Titmice. I was not fortunate enough to discover a nest of *P. jamesoni* — it is a rather rare forest bird — but that of *P. woodhousei* has been described by Bates (Ibis, 1908, p. 329; 1909, p. 67) as a large dome-shaped pile of dried leaves and grass, 200 mm. high, lined with fine fibers of dry plantain leaves, with the entrance at the side; or a rough mass as big as a half-gallon measure, composed of dry grass, with a quantity of green moss thrown loosely over the outside, placed on a horizontal twig. The eggs number three to four and are pure white. Such nests compare very well with those of *Nigrita canicapilla* and *N. fusconota*. (See p. 275).

Pholidornis is evidently a near ally of *Parmoptila*, its bill is similar though much slenderer, and the form of the nostril is the same. But here again we have an indication of the slight importance that is to be attached to the

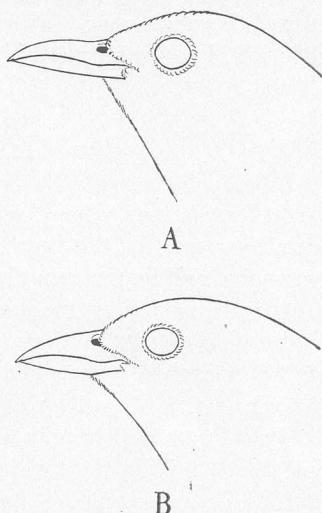


Fig. 7. A. *Parmoptila jamesoni*. $\times \frac{3}{2}$.
B. *Nigrita fusconota*. $\times \frac{3}{2}$.

tenth primary. In *Parmoptila jamesoni* this narrow, pointed feather is shorter than the primary-coverts, whereas in *Pholidornis rushiæ*, as measured from two specimens in the Philadelphia Academy of Natural Sciences, it exceeds the primary-coverts by 5 to 5.5 mm., and its length equals .28 of that of the whole wing. When the nest and young of *Pholidornis* are found they will, I feel sure, justify its inclusion among the Estrildinæ.

GENERAL VIEW OF THE WHYDAHs.

In Dr. Sharpe's 'Hand List of Birds' all the Ploceidæ the males of which have long tails in the breeding season, are placed close together at the beginning, and by Captain Shelley and others they were even taken to form a separate subfamily (Viduinæ) to which the Bishop-Birds were necessarily added. But Professor Reichenow, though including them all in his *Spermestinæ* (= Estrildinæ) does not associate *Vidua* so closely with *Coliuspasser*.

I shall go still further, and separate them in different subfamilies. The lengthened tails in the two groups of Whydahs — let us take *Coliuspasser* and *Vidua* as examples — have nothing in common but their length and seasonal molt. They are of fundamentally different pattern (as shown in Fig. 8); in *Vidua* and the three very closely allied genera *Tetrænura*, *Linura*, and *Steganura*, it is only the two median pairs of rectrices that are renewed at the prenuptial molt, and they are the only ones elongated. In addition they are often rotated so as to press their lower surfaces together, forming a sort of tube in *Vidua serena*.

In *Coliuspasser*, on the other hand, all twelve rectrices are renewed, and all are lengthened, the outer ones often more so than the median; and all of them may be twisted in just the opposite sense, so as to form the carinate tail so conspicuously displayed by the courting male in flight. That of *Diatropura* is built on precisely the same plan, though complicated by the prolongation of some of the under coverts. The striking development of the tail in the two different groups of Whydahs is simply a case of parallelism, the young *Vidua* having a "domino" mouth, that of *Coliuspasser* not. They are all typically birds of the open grass country, where the seasonal change in weather and vegetation is very pronounced.

Widow-birds of both these types are usually held to be polygamous, because the proportion of adult males in breeding plumage is usually small as compared with the birds in streaked brown dress accompanying them. I am not convinced, however, that this is true, as in the case of *Vidua serena*, I have found that many of those resembling females, even among flocks

with a few long-tailed escorts, are actually immature males — they can be recognized in life by their orange-red beaks. The evidence against *Coliuspasser* is even less conclusive.

Besides the Widows among the true Estrildinæ I know of only one genus,

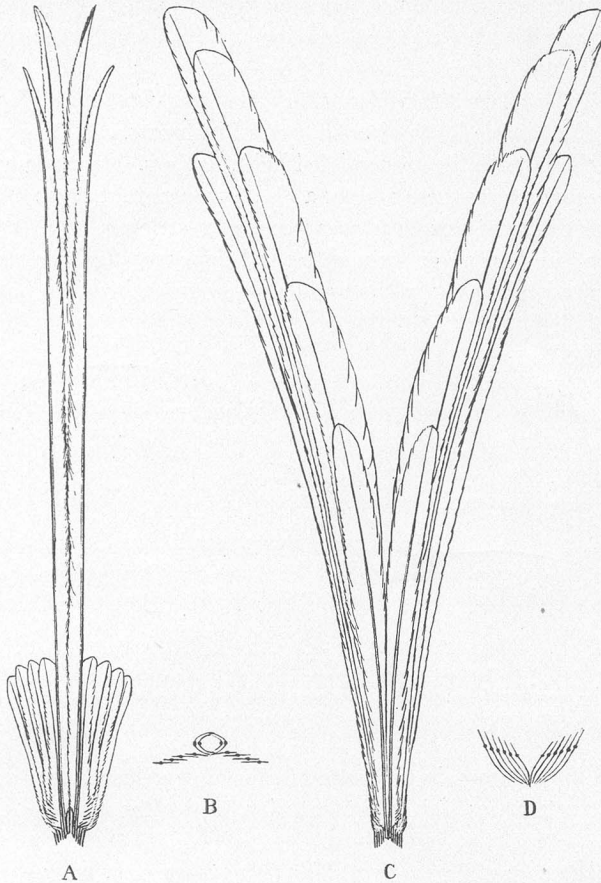


Fig. 8. Tails of Whydahs, with diagrammatic cross-sections. $\times \frac{1}{2}$. A and B. *Vidua serena*; C and D. *Coliuspasser concolor*.

Hypochera, which has a dull winter plumage. *Hypochera*, however, is nothing but a short-tailed *Vidua*, its similarity in color to *V. hypocherina* being well known. Besides resemblances in outward form we may even note certain striking similarities in habits. I have observed the black males

of *Hypochera*, or even brown immature individuals hovering in the air beside their mates in the same way as cocks of *Vidua serena*.

One other very important character linking the genera *Hypochera*, *Vidua*, and *Steganura*¹ is the peculiar ossification of the brain-case. For many years it has been my custom to determine the age of Passerine birds I skinned by an examination of the skull, a method I learned from Mr. W. DeW. Miller, and which has been described by Dr. Jonathan Dwight (*Plumages and Moults of the Passerine Birds of New York*, p. 77). In almost all adult Oscine birds, the roof of the brain-case (frontals and parietals) is composed of a double layer of bone, united by numerous little rods, which appear on the outside, by transmitted light, as dots. In their nestlings, as every collector knows, there is only a single transparent layer of bone. As the young bird grows this clear area becomes restricted, though traces of it may still be seen for five or six months and sometimes longer (see Fig. 6 B). It usually persists longest in the middle of the frontal region, but not infre-

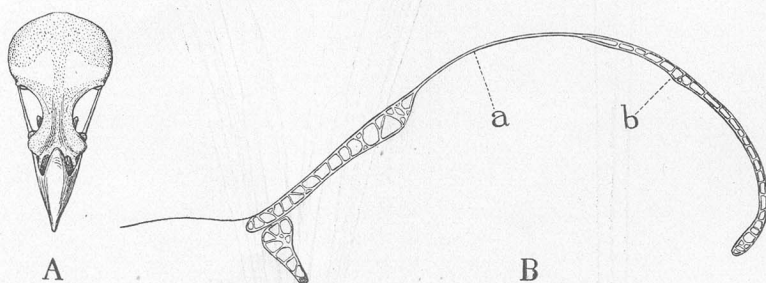


Fig. 9. A. Skull of *Steganura paradisea*, ♂ ad., with areas of thin bone (without dots), on top of the braincase. $\times 1$. B. Sagittal section through roof of braincase of a young warbler, *Dendroica striata*, about $2\frac{1}{2}$ months old. a, thin posterior part of frontal, a single layer of bone. b, parietal and occipital regions, composed of a double layer with connecting rods. $\times 4$.

quently, as in Swallows, in the parietals, forming a clearer spot at each side. This is a trustworthy sign of immaturity, and often outlasts the characteristic plumage of the young bird.

But in the case of *Hypochera*, *Vidua* and *Steganura*, I have never found a single example, male or female, in spite of the large number of undoubted adults examined, where the skull had reached that stage of ossification, with a complete double layer of bone, which characterizes practically every mature Oscine bird. There is always a large clear area in the frontal region, which remains throughout life. (See Fig. 9 A).

On the other hand *Colinus passer* is normal in this respect, and shows no

¹ *Tetrænura* and *Linura* will surely be found to agree.

approach to *Vidua*. In fact I know of only one other similar case, *Salpornis salvadori*, also an African bird, but of the family Certhiidae.

DRY-SEASON OR WINTER PLUMAGES IN THE PLOCEINÆ.

The alternation of a bright nuptial plumage with dull dry-season dress, while comparatively rare in Estrildinæ, is more common among the Ploceinæ, particularly those inhabiting open country, for in the equatorial forests there is little change of season. Examples of this are *Ploceus*, *Ploceëlla*, *Anaplectes*, *Foudia*, *Quelea*, *Pyromelana*, *Urobrachya*, *Colius passer* and *Diatropura*, and among the typical Ploceinæ I can also cite, from personal observation: *Sitagra tænioptera*, *S. luteola*, *Hyphantornis cucullatus abyssinicus*, and *Othyphantes baglafecht*. As a rule only the males undergo a change of any extent, but in one species at least, *Pachyphantes superciliosus*, the female, too, has a very much brighter nuptial dress, differing from that of the adult male only by her black forehead.

FURTHER INVESTIGATION NECESSARY.

From the preceding remarks, it should be clear that in order to decide on the relationships of the various genera of Ploceidæ, the examination of nests and young is indispensable. Nestlings of *Uroloncha*, *Aidemosyne*, as well as of *Munia* will be found to resemble — I suspect — those of *Spermestes* and *Amauresthes*, in view of the external appearance of the adults. Bates's example should be followed by ornithologists in the East Indies and Australia. With *Paludipasser*, for instance, which has a minute tenth primary, I can only guess that it may be Estrildine, from a general likeness to *Sporæginthus subflavus*. Similarly the adult of *Anomalospiza* shows a decided resemblance to *Paludipasser* in its bill, and has a tenth primary of about the same size; but a knowledge of its nest and young would enable us to settle the question not only as to its subfamily, but as to whether Sharpe and Reichenow are right in transferring it to the Fringillidæ.

Closely related to *Anomalospiza* is *Heliospiza noomea*, described as a Fringillid by Dr. J. B. W. Gunning in the 'Journal of the South African Ornithologists' Union,' 1907, page 208. The culmen is a little more curved, the lower mandible narrower and less high; while the outermost primary is more distinct.

It is greatly to be hoped that South African ornithologists will investigate the nesting of these doubtful Ploceids, and examine the mouths of their nestlings, as well as those of *Philetairus socius*, *Pseudonigrita*, *Ploce-*

passer, and *Sporopipes*. The skeleton, and particularly the sternum, of the last-named genera are worthy of attention.

Important features of many other Ethiopian genera are still in doubt — not to mention the Oriental and Australian representatives — but enough has been said, I trust, to point the way to a far more satisfactory grouping of the Ploceidæ than any at present in vogue.

SUMMARY.

The classification of the Weavers now to be offered, and based both on field observations and on comparative study, divides them in two sub-families, not however according to the relative length of the tenth primary, but upon the coloration in the mouths of their nestlings, and the condition of the swellings or lobes at the commissure — characters which are found to be correlated with differences in the manner of nest-building and in the coloration of the eggs.

It commences with what are believed to be the less specialized forms, the Ploceinæ, for although they are so skilful in constructing their nests, they have for the most part retained the large tenth primary, and their nestlings have no spotting in the mouth; whereas, among the Viduinæ even the duller-colored, short-tailed forms show two specialized features, the great development of the mouth-markings in the young, and as a rule, a small tenth primary. Even their uncolored eggs may be a specialized character.

Neither of these divisions can be considered as leading up to the other; connecting links are lacking, and they parallel each other in the progressive reduction of the outermost primary, so that this feather is really of little systematic importance. In both groups, moreover, we find forms with greatly lengthened tails.

To aid in comparison, the systems of Reichenow and Shelley are also appended. In spite of an apparent similarity between that of Prof. Reichenow and my own, it will be seen that besides removing *Textor* and *Dinemellia* from the Ploceidæ, I have subdivided the family on a totally different basis, so that *Quelea*, *Pyromelana*, *Euplectes*, *Urobrachya*, *Coliuspasser*, *Drepanoplectes*, *Diatropura*, and *Pseudonigrila* are referred to the Ploceinæ, while on the other hand *Spermospiza* is transferred to the Viduinæ. *Phile-tairus* and *Anomalospiza*, which Reichenow placed in the Fringillidæ, and *Heliospiza* as well, are retained in the Ploceidæ. Finally, *Parmoptila*, referred by Reichenow to the Paridæ, and by others to the Diceidæ or Sylviidæ, is proved to belong among the Estrildinæ, where *Pholidornis* is also placed provisionally. Genera about the position of which there is still any doubt are enclosed in brackets.

Proposed Classification of the Ploceidæ.

<i>Ploceinæ</i>	<i>Estrildinæ</i>
Sporopipes	[Pseudospermestes]
[Histurgops]	*Spermestes
Plocepasser	*Amauresthes
Pseudonigrita	Aidemosyne
[Philetairus]	Uroloncha
*Amblyospiza	*Munia
*Pachyphantes	[Pholidornis]
Ploceus	*Parmoptila
Ploceëlla	*Nigrita
*Sitagra	*Clytospiza
*Hyphantornis	*Spermospiza
Hypermegethes	Cryptospiza
*Melanopteryx	*Pyrenestes
*Malimbus	†Tæniopygia
Xanthophilus	Amadina
Othyphantes	Ortygospiza
*Phormoplectes	[Paludipasser]
*Hyphanturgus	[Heliospiza]
Nelicurvius	[Anomalospiza]
Symplectes	*Hypargos
Notiospiza	Bathilda
Anaplectes	*Pytilia
Foudia	*Lagonosticta
*Brachycope	*Sporæginthus
Quelea	Ægintha
*Pyromelana	Coccopygia
Euplectes	Stizoptera
Urobrachya	*Estrilda
*Coliuspasser	*Nesocharis
Drepanoplectes	Zonæginthus
Diatropura	Emblema
	Stictospiza
	*Uræginthus
	Granatina
	Neochmia
	Staganopleura
	Reichenowia
	†Erythrura
	†Poephila
	*Hypochoera
	Vidua
	Tetrænura
	Linura
	Steganura

* The young have been examined by me.

† The young have been examined by Dr. Sharpe.

[] Position still in doubt.

‡ The exact affinities of this and the other Australian genera may not be very clear; but they are all surely Estrildine.

Reichenow's Classification (Die Vögel, 1914).

<i>Ploceinæ</i>	<i>Spermestinæ</i>
Textor	Pyrenestes
Dinemellia	Quelea
Histurgops	Pyromelana
Plocepasser	Euplectes
Sporopipes	Urobrachya
Malimbus	Coliuspasser
Anaplectes	Diatropura
Notiospiza	Drepanoplectes
Foudia	Amadina
Symplectes	Spermestes
Phormoplectes	Tæniopygia
Othyphantes	Amauresthes
Hyphanturgus	Oryzornis
Melanopteryx	Munia
Hyphantornis	Staganopleura
Hypermegethes	Neochmia
Sitagra	Hypargos
Xanthophilus	Emblema
Ploceus	Erythrura
Ploceella	Reichenowia
Nelicurvius	Pytilia
Brachycope	Nigrita
Amblyospiza	Pseudonigrita
Spermospiza	Cryptospiza
	Estrilda
	Stictospiza
	Lagonosticta
	Ortygospiza
	Neisna
	Uræginthus
	Hypochera
	Vidua
	Tetrænura
	Linura
	Steganura
	Philetairus
	Anomalospiza
	} Fringillidæ
	Parmoptila
	Pholidornis
	} Paridæ

Shelley's Classification (Birds of Africa, I, 1896).

<i>Viduinæ</i>	<i>Ploceinæ</i>
Hypochera	Spermospiza
Vidua	Clytospiza
Coliipasser	Sporopipes
Urobrachya	Amblyospiza
Pyromelana	Dinemellia
Quelea	Textor
	Histurgops
<i>Estrildinæ</i>	Ploceipasser
Pyrenestes	Sharpia
Amadina	Anaplectes
Munia	Malimbus
Uroloncha	Melanopteryx
Nigrita	Nelicurvis
Philaeterus	Pachyphantes
Cryptospiza	Ploceus
Coccopygia	Foudia
Granatina	Neshyphantes
Estrilda	Sycobrotus
Lagonosticta	Othyphantes
Pytelia	Heterhyphantes
Hypargus	Hyphanturgus
	Sitagra
	Xanthophilus
	Hyphantornis
	Cinnamopteryx
	Parmoptila } Sylviidæ
	Pholidornis }

Linear arrangements such as these are naturally inadequate to express inter-relationships within the subfamilies, so I have prepared a diagram illustrating their affinities and apparent development — as far as we can judge from living forms — beginning with those that have preserved a long tenth primary and a tail of normal shape, and culminating in the Whydahs, with greatly lengthened rectrices and tiny outermost primary. The old subfamily division is indicated by the horizontal dotted line separating the forms with a large tenth primary from those with a small one. The artificial character of such a classification is evident.

Strictly speaking this is not a phylogeny, certain genera are placed lower than others, not because they are believed to be actually ancestral, but because among the living representatives they approximate most nearly the probable ancestors. In order to avoid confusion, only a small number of generic names have been utilized, but the position of the remainder may easily be understood through comparison with the complete list.

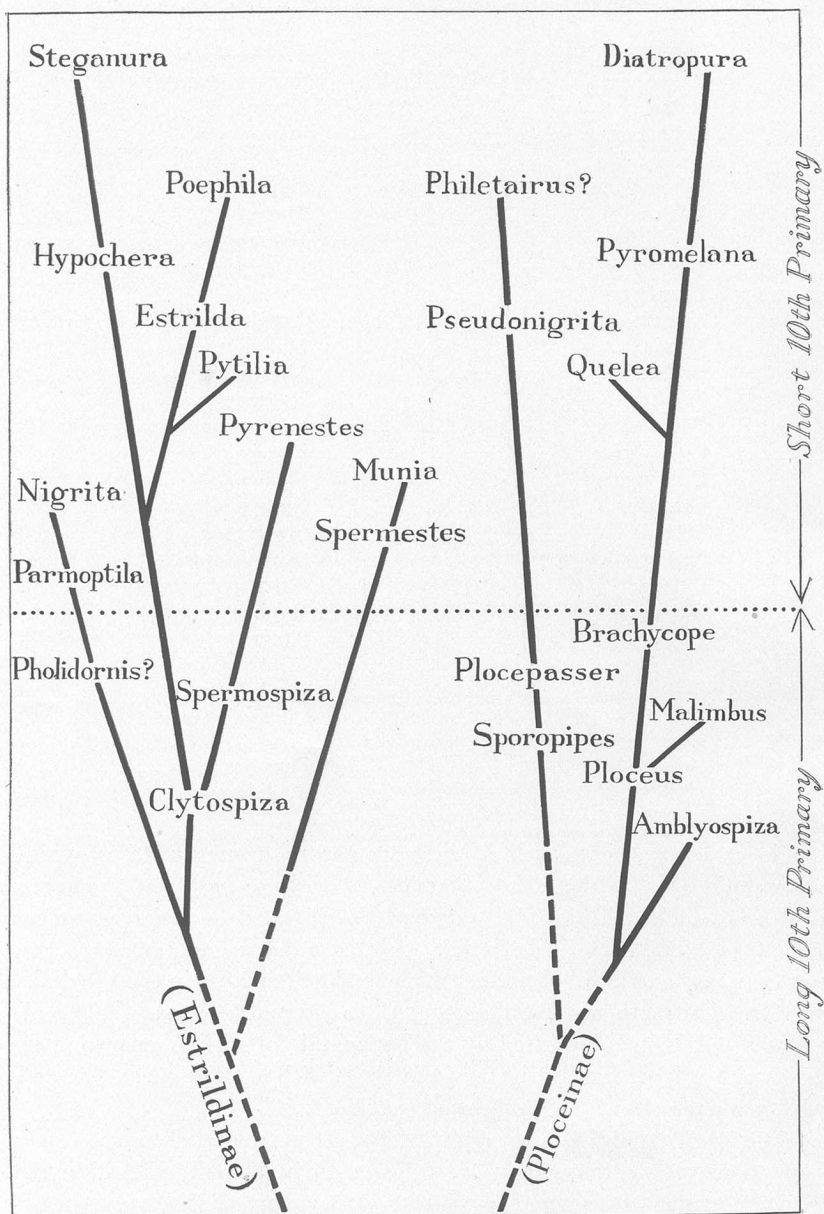


Diagram to illustrate the apparent development of the Ploceidae.

APPENDIX.

The following series of short notes on genera of Textoridæ and Ploceidæ, particularly those of Africa, has to do with their nests and eggs, the size of the 10th primary (in refutation of the older basis of classification) and, among the Estrildinæ, the mouths of the nestlings. Some of this material is new, but a great deal with regard to nesting has been gathered from the work of reliable investigators, to whom credit is given in each case.

Family TEXTORIDÆ.

Textor.

Nest.—*T. niger*: Generally from four to seven pairs of the Buffalo Weaver-bird unite to build a common nest of closely interwoven sticks and thorny twigs, oval openings being left here and there, which are afterwards lined with dry grass, and used both as nesting and roosting places. The collective nest, which measures three or four feet across, is repaired and added to from time to time, and often lasts for many years. As many as six of the larger nests may be sometimes seen in a single tree, each inhabited by as many pairs of birds.—Stark and Sclater, *Birds of South Africa*, I, p. 80.

T. albirostris and *T. a. intermedius* nest in similar fashion, as described in 'Vögel Afrikas,' III, pp. 4 and 5, and Shelley's 'Birds of Africa,' IV, pp. 315-319.

Eggs.—*Textor albirostris*: Three or four, colored like those of a House Sparrow.—Reichenow, *Vögel Afrikas*, III, p. 4.

T. niger: Three or four, grayish white, streaked and marbled with several shades of gray and brown.—Stark and Sclater, *Birds of South Africa*, I, p. 80.

Outer Primary.—Large, about twice as long as primary coverts, measuring .35 of total length of wing.

Dinemellia.

Nest.—*D. boehmi*: The nests, several of which are usually built together, are generally placed at the top of a thorny acacia, and are rather untidy-looking structures of grass, a few feathers and leaves, with the entrances on the under side, and are carefully protected by a surrounding of thorny boughs, which encircle not only the nests themselves, but also all the branches leading up to them. A single nest, without the surrounding twigs, measures 9.6 inches.—Böhm, quoted in Shelley's *Birds of Africa*, IV, p. 314.

D. dinemelli: Said to nest in the same way.

Eggs.—*D. dinemelli*: Eggs green or pale blue, thickly speckled with dark brown (Lort Phillips).—Shelley, *Birds of Africa*, IV, p. 312.

D. boehmi: Eggs greenish-white, spotted and scrawled with blackish brown.—Shelley, *Birds of Africa*, IV, p. 314.

Outer Primary.—Very large, measuring, as already stated, .43 of the length of wing (see Fig. 1, A).

Family PLOCEIDÆ.

Subfamily PLOCEINÆ.

Sporopipes.

Nest.—*S. frontalis*: Large and oval, generally placed in the center of a most impenetrable thorn-bush. It is constructed of dry grass, with a small center chamber well lined with feathers, hair, roots and wool (von Heuglin).—Shelley, Birds of Africa, IV, p. 301.

S. squamifrons: Builds a similar large grass nest.

Eggs.—*S. frontalis*: Grayish-green, with darker lengthened blotches (Emin).—Shelley, Birds of Africa, IV, p. 302.

S. squamifrons: Pale blue-green, thickly marked with blotches and scrawls of brown and rufous (Stark).—Shelley, Birds of Africa, IV, p. 300.

Outer Primary.—*S. squamifrons*: Longer than primary coverts; about .24 of length of wing.

Plocepasser.

Nest.—*P. mahali*: Large, roughly built, kidney-shaped structures, usually placed near the ends of the branches of a mimosa or other thorny tree. They are constructed of long grass-stems, the blades and flowering tops being woven together, the stiff stalks project in all directions. During the winter each nest has two entrances from below, separated in the interior by a narrow bridge of grass on which the birds roost. At the beginning of the breeding-season, one entrance is stopped up with leaves and grass, a shallow cavity being left in which the female deposits two or three eggs. The nests are annually repaired, and last for many years.—Stark and Selater, Birds of South Africa, I, p. 84.

Eggs.—*P. mahali*: White, suffused with pink, thickly marked, especially at the broad end, with blotches and streaks of deep brown-pink.—*Ibid.*, Birds of South Africa.

P. superciliosus: Two, reddish-white, with rosy red spots inclining to form a zone near the thick end (von Heuglin).—Shelley, Birds of Africa, IV, p. 334.

Outer Primary.—*P. melanorhynchus*: About 6 mm. longer than the primary coverts, equalling .22 of the wing.

Pseudonigrita.¹

Nest.—*P. arnaudi*: A dozen nests often firmly attached to a single bough, these are strongly constructed of coarse grass with a short sleeve-like entrance-passageway hanging down; inside the nest is rounded and lined with seed-down and soft fibers. (Emin).—Shelley, Birds of Africa, IV, p. 133.

By Fischer they are said to resemble nests of *Plocepasser* and have two entrances, one of which is closed just before laying.

¹ United by Shelley with *Philetairus*; placed by Reichenow close to *Nigrita*, to some species of which it bears a superficial resemblance in color. I incline to Shelley's view of its affinity to *Philetairus*, on account of the shape of the bill.

Eggs.— *P. arnaudi*: Four, white, with brick-red dots, most numerous toward the thick end (Emin).

Greenish white, with yellowish and violet-brown spots, and a few streaks inclining to form a zone at the obtuse end (Fischer).— Shelley, *Birds of Africa*, IV, p. 133.

Outer Primary.— Narrow and pointed, shorter than primary coverts.

Philetairus.

Nest.— *P. socius*: Congregates in large flocks, and when breeding many pairs incubate their eggs under the same roof, which is composed by these birds of whole cartloads of grass piled on a branch of some camel-thorn tree in one enormous mass of an irregular umbrella-shape, looking like a miniature hay stack, and almost solid, but with the under surface, which is nearly flat, honey-combed all over with little cavities, which serve, not only as places for incubation but also as a refuge against wind and rain.— Anderson in Stark and Selater, *Birds of South Africa*, I, p. 116.

Eggs.— *P. socius*: Three or four, some shade of drab, more or less spotted all over with small dots of brown and grayish purple.— Stark and Selater, *Birds of South Africa*, I, p. 118.

Three to four, bluish white, freely mottled towards the large end with small brown dots.— A. Smith, *Birds of South Africa*.

Outer Primary.— Short, narrow and pointed, lying on upper side of the ninth, just as in *Fringillidæ*.

Amblyospiza.

Nest.— *A. capitalba saturata*: The most skillful weaver I know, in spite of its clumsy-looking bill. Its neat globular nest, found in patches of tall elephant grass (*Pennisetum purpureum*) is attached to one or two grass-stalks and beautifully woven of fine strips torn from the grass blades. New nests found before the breeding season commenced had rather wide entrances, opening on the side, not below; but in the case of nests with young, the opening was only 4.5 cm. in diameter.

The parents seem not to remove the dejecta from the nest.

Eggs.— *A. c. saturata*: Two or three. The ground-color varies from white or creamy-white to pale rufous and is sparingly marked all over with spots and dots of pale brown, light red, or dull maroon-red, which are more numerous towards the larger end, where they are often more or less concentrated into a zone.— Ogilvie-Grant, *Ibis*, 1909, p. 49.

Outer Primary.— .24 of length of wing, rather narrow; 8 to 12 mm. longer than primary coverts.

Pachyphantes.

Nest.— *P. superciliosus*: Does not nest in colonies, but builds usually on two tall stalks of grasses in or near marshes, at a height of five to ten feet, often making a second nest at a little distance, which serves as a roost for the male.

The nest which receives the eggs is roughly oval, a dozen centimeters from top to bottom, with a small round entrance on the side, high up. It bears a certain resemblance to that of *Amblyospiza* and is woven mostly of strips torn from a hairy grass, but its softness is increased by a lining of soft plant-down. (See Plate X.)

The empty nest is usually of more open texture, often incomplete, and has no soft lining. It may be finished before all the eggs are laid, or may only be commenced later. The tops of the grasses supporting the nests are stripped of seeds and often broken off by the birds.

Eggs.—*P. superciliosus*: Three to four, sometimes pale bluish green, thickly and finely spotted with grayish or dusky, sometimes bluish gray or gray-blue, unspotted.

Outer Primary.—Exceeds primary coverts, measures .27 of length of wing.

Ploceus.

Nest.—*P. baya*: Nest woven of strips from grass, plantain-leaf, and not infrequently of strips from the leaves of the date-palm or cocoanut; long, retort-shaped, with lower tube or entrance of variable length. Numbers of them are hung on palms, acacias or other trees, often overhanging a river or tank, or even from the end of a thatched roof. Clay is often put in the nest, possibly to balance it, sometimes as much as three ounces in six different spots (Jerdon).—Butler, *Foreign Finches in Captivity*, p. 313.

Eggs.—*P. baya*: Two or three; pure white (Jerdon).

Outer Primary.—*P. manyar*: 4 mm. longer than primary coverts; .22 of whole length of wing.

Ploceëlla.

Nest.—*P. javanensis*: A cylindrical structure, made entirely of grass with an opening at the side. The exterior of the nest, instead of being smooth as in the nests of the other Weaver-birds, is very rough, consisting of a series of loops and sharp angles. It is attached to several stalks of elephant-grass, or occasionally to a prickly tree.—Oates, *Birds of British Burmah*, p. 363.

Eggs.—*P. javanensis*: Two or three in number; varying very much in color; some are white, others are greenish white, gray, or purplish, and while some are unmarked, the majority are speckled with gray, greenish brown, or neutral tint.—*Birds of British Burmah*, p. 364.

Sitagra.

Nest.—*S. heuglini*: Nest typically Ploceine, without spout, woven of green grass and always lined with the white feathery flower-heads of a common grass (*Imperata cylindrica*); in small colonies, in trees near nests of *Buteo auguralis* and other birds of prey, or on bushes and reeds over water, or on thorn-trees (*Zizyphus*). Unlike most Weavers they breed in the dry season.

S. tænioptera: Globular, opening downward, without spout, hung in numbers on papyrus and tall reeds along streams, more rarely on lower branches of trees. Woven of grass and flower-stems of papyrus. (See Plate VIII.)

S. monacha: Suspended from tips of tall grasses in clearings or near water; peculiar in being woven partly of seed-bearing grassheads, as well as of strips from the leaves. They were rounded, without long spout.

S. luteola: Round nests, woven of strips of grass, and hung singly from the outer branches of thorny acacias. Old nests have long spouts.

Eggs.—*S. heuglini*: Two in set, light greenish blue, unspotted.

S. tanioptera: Two in set, varying from clear brown to light green, spotted with brownish.

S. monacha: Two or three, pure white.—Reichenow, *Vögel Afrikas*, III, p. 76.

S. luteola: Two, pure white.

Outer Primary.—*S. heuglini*: Only 2.5 to 3.5 mm. longer than primary coverts; .22 of length of wing.

S. tanioptera: Much longer, .31 of length of wing.

Hyphantornis.

Nest.—*H. cucullatus bohndorffi*: Abundant Weaver about villages, hanging its homes in scores or hundreds on palms or tall trees about villages. Nests rounded, with a slight downward-pointing tubular entrance, woven rather coarsely of strips torn from bananas or palms. (See Plate VIII.)

I have seen nests (Bumba, Dec. 12, 1914) built in a tree around a nest of *Gypohierax angolensis* as has already been recorded by Reichenow.

Eggs.—*H. cucullatus*: Two eggs found in a nest. They are of three types, *viz.* pure white; bluish green, sparingly marked all over with spots of umber-brown and blotches of lilac-gray, some of which are very pale; and lastly white, marked rather sparingly all over with small spots of dull maroon and pale gray.—Bates and Ogilvie-Grant, *Ibis*, 1909, p. 45.

Outer Primary.—Large, .29 of length of wing.

Melanopteryx.

Nest.—*M. nigerrimus*: Very similar to those of *Hyphantornis cucullatus bohndorffi*, typically Ploceine in shape, pensile and rounded, with entrance below, but without long spout. Builds in colonies in palms or tall trees, using strips torn from palm fronds, banana leaves or grass.

M. maxwelli: Like those of *M. nigerrimus*, and constructed of the same materials, for the birds are seen carrying strips of banana and palm leaves, and plucking other leaves to render its nests rainproof. Nests rather locally, in large trees near villages, sometimes in company with *Hyphantornis c. bohndorffi* and even *M. nigerrimus* and *Hyphanturgus aurantius*.

Eggs.—*M. nigerrimus*: Two, light blue.

Outer Primary.—.26 of length of wing.

Malimbus.

Nest.—*M. nitens*: Retort-shaped, with unusually wide "spout," woven and hung singly from the ends of boughs or creepers in open spaces in the forest, especially above streams, or on low branches projecting out over rivers.

M. erythrogaster: Round, well woven of pieces of thin vines, with a long spout, which is sometimes lacking, for it is probably added after the eggs are laid. One nest seen in the same tree with a nest of *Corythaeola cristata*, and a number in a tree recently occupied by *Spizaetus coronatus*.

M. coronatus: Hangs its nests singly to thorny acacia vines in forest. One nest

collected was woven of spiral tendrils from some vine, with small dry twigs and leaf stems.

M. malimbicus: Nest hung from the long thorny rhachis of a Calamus or climbing palm, more roughly built than that of a *M. cassini*, and the downward pointing opening was short and ragged. The material seemed to be strips of the leaves of the palm on which it was hung.— Bates, Ibis, 1909, p. 41.

Eggs.— *M. nitens*: Brown speckled egg.— Bates, Ibis, 1909, p.

M. rubricollis centralis: An egg found in oviduct was white with a few rufous spots.

Outer Primary.— Longer than primary coverts, sometimes by as much as 18 mm.; .25 to .35 of length of wing.

Xanthophilus.

Nest.— *X. xanthops*: According to Boyd Alexander, "the tunnelled nests were hung from pendent branches of thick bushes near running water, and were never in colonies." — Shelley, Birds of Africa, IV, p. 485.

Eggs.— *X. xanthops*: The specimens examined by Mr. Nehrkorn were uniform bluish green, or spotted with light and dark gray.— Shelley, Birds of Africa, IV, p. 486.

Outer Primary.— .31 of length of wing.

Othyphantes.

Nest.— *O. baglafecht*: Builds its large, rather rough sac-like nest, not in colonies, of coarse green grass blades, on high trees, usually on stream banks, or at least not far from water (von Heuglin).— Reichenow, Vögel Afrikas, III, p. 41.

Eggs.— *O. baglafecht*: Two to four, the ground color varies between flesh-color and light blue-green, and they are sprinkled with rather large spots and points from rusty red to purplish brown (von Heuglin).— Reichenow, Vögel Afrikas, III, p. 41.

Outer Primary.— *O. baglafecht*: .32 of total length of wing.

Phormoplectes.

Nest.— *P. herberti*: A single nest found in the top of a small tree was composed almost entirely of grayish-green, moss-like lichen, bound together with strips torn from palm leaves, and fastened securely to the small branches, with entrance beneath, but not pensile, and without a "spout."

Eggs: Unknown.

Outer Primary.— *P. herberti*: Rather narrow, .23 to .24 of length of wing; and reaching only 4 or 5 mm. beyond the coverts.

Hyphanturgus.

Nest.— *H. aurantius*: Fond of rivers; usually hanging their round, coarsely-woven nests in colonies on bushes or trees over water.

H. ocularius: Retort-shaped, neatly woven of fine grass-strips, often with a long tubular entrance, wide enough to admit two birds at once. Hung singly from the ends of drooping boughs of thorny acacias. (See Plate IX.)

H. nigricollis: Woven of thin plant stems and a little grass, with a spout hanging down perhaps 20 mm. Suspended in trees, singly.

Eggs.—*H. aurantius*: Two, dirty whitish, faintly tinged with green, and finely speckled and blotched with brown; or light green, spotted with brown.

H. ocularius: Two, pale bluish with numerous small spots of brownish-gray.

H. nigricollis: Two, pale greenish blue, or white with small rufous spots. Reichenow describes them as grayish green with small lilac-gray and large gray-brown spots.

Outer Primary.—Exceeding primary coverts: .32 of length of wing.

Nelicurvius.

Nest and Eggs.—*N. nelicourvi*: Like many of their relatives they build in company; the nests, which are formed with art of stems of grass interlaced and even woven, have the form of a gourd, or rather of a retort, with long, slender neck, turned downwards, by which the bird enters. They are hung from thin flexible branches, so that they swing gracefully with the slightest breeze; and one can often count as many as thirty or forty on the same tree. The set is of four or five eggs, entirely green.—*Histoire Naturelle des Oiseaux de Madagascar*, I, p. 447.

Outer Primary.—Relatively long; .32 of wing.

Anaplectes.

Nest.—*A. melanotis*: Nests graceful and beautifully woven, suspended from twigs of high trees (Emin).—*Birds of Africa*, IV, p. 341.

Eggs.—*A. melanotis*: Uniform green.

A. rubriceps: Two, blue (Ayres); pale greenish blue (Guy Marshall).

Outer Primary.—Long, about .26 of wing.

Foudia.

Nest and Eggs.—*F. madagascariensis*: They do not build in society, and their nest has sometimes the form of a gourd with lateral orifice, sometimes that of a cup rather roughly fashioned of little roots and stems of grasses. The eggs, numbering four or five in a set, are of a pale greenish blue.—*Histoire Naturelle des Oiseaux de Madagascar*, I, p. 447.

Outer Primary.—*F. madagascariensis*: Much reduced, reaching only 1 or 2 mm. beyond the primary coverts. And yet the genus is usually placed in the neighborhood of *Ploceus*, in spite of this and other obvious resemblances to the Bishop Birds. The seasonal plumages of the male seem to be correlated with the open country they are said to frequent, whereas *Nelicurvius nelicourvi* and *Ploceus sakalava*, inhabiting the woods of Madagascar, undergo no such change. On the continent of Africa—in the same way—those Weavers showing markedly different breeding plumages are all birds of the open.

Brachycope.

Nest.—*B. anomala*: Nests about villages in coffee-bushes, small trees and young oil-palms, but not in colonies. Weaves well, but makes a lateral entrance reminding one of a Bishop Bird's nest.

Eggs.—*B. anomala*: Two, of a rather dark uniform gray.

Outer Primary.—*B. anomala*: Pointed, frequently exceeds primary coverts by only 2 or 3 mm.; measures only .14 to .17 of length of wing.

Foudia and *Brachycope*, in my judgment, are two excellent links between the most typical Weavers (*Ploceus*, etc.) and the Bishop Birds, groups which it is impossible to separate in distinct subfamilies.

Quelea.

Nest.—*Q. æthiopica*: In the gardens of Khartum, von Heuglin found them building their dainty, and rather shallow, purse-like nests of green grass blades artfully plaited, preferably on Parkinsonias; but they laid no eggs.—Vögel Afrikas, III, p. 110.

Q. cardinalis: Nests found in the high grass at Nuguruman by Fischer resembled those of *Pyromelana nigriventris*.—Vögel Afrikas, III, p. 112.

Q. quelea: The method of weaving, as observed by Dr. Butler in cage-birds (Foreign Finches in Captivity) is exactly the same as in the typical Weavers such as *Hyphantornis* and *Hyphanturgus*. "When building it always commences in the same way, forming either an oblique or perpendicular hoop of plaited hay or fibre, between two or more branches, or in the fork of a branch. From this hoop it works, starting from the bottom and gradually filling in the back, finishing off with the front, in the center of which it leaves a small hole to enter by."—Foreign Finches in Captivity, p. 229.

Eggs.—*Q. cardinalis*: Three (Fischer), grayish white, thickly and regularly spotted with purple and dark gray (Nehrkorn).—Vögel Afrikas, III, p. 112.

Outer Primary.—Minute and pointed, shorter than primary coverts.

Pyromelana.

Nest.—*P. flammiceps*: Well hidden in high grass, singly, woven of strips from grass blades, and lined with fine grass tips, but rather loosely constructed, so that sunlight penetrates from all sides. Attached to four or five slender stalks of grass and many of the adjacent blades. Entrance at side, high up. Bates (Ibis, 1909, p. 50) thinks that the use of grass-tops indicates Spermetine relationship, but even *Sitagra monacha* uses this material as a lining. I have not found nests set in forks. (See Plate IX.)

P. oryx: As a rule these birds nest in colonies, often of great extent, the nests, which are domed and woven out of grass, being attached to the stems of three or four reeds, about four or five feet above the mud or water.—Stark and Selater, Birds of South Africa, I, p. 127.

Eggs.—*P. flammiceps*: Two or three, light greenish blue, with small scattered spots of purplish brown, most numerous about the larger end.

P. oryx: Four or five, uniform pale greenish blue in color.—Stark and Selater, Birds of South Africa, I, p. 128.

Outer Primary.—Slightly shorter, equal to, or slightly longer than primary coverts, .13 to .16 of length of wing.

Coliuspasser.

Nest.—*C. macroura*: Built singly in high grass, well hidden, in shape and material exactly like those of *Pyromelana flammiceps*.

C. concolor: Spherical, woven loosely of strips of grass, lined throughout with grass-tops. These projected out over the circular entrance, which opened well up on one side.

Eggs.—*C. macroura*: Two, bluish green, rather heavily spotted.

C. concolor: Two, light bluish green, heavily spotted with dark greenish brown especially on the larger end.

Outer Primary.—Narrow, about equal to primary coverts.

Diatropura.

Nest.—*D. progne*: The nest is an oval domed structure with a side entrance, roughly woven out of fine grass, lined with the flowering tips of grass or reeds. It is generally placed a few inches off the ground, in the center of a tuft of grass, attached by its sides to many grass-stalks, the blades and tops of which are bent down and tied together to form an additional concealment and protection.—Stark and Sclater, *Birds of South Africa*, I, p. 141. See also W. E. Teschemacker, *Avicultural Magazine*, Third Series, I, p. 81.

Eggs.—*D. progne*: Usually four in number, white or bluish white, closely marked with small spots and dashes of dark brown and slate-gray.—Stark and Sclater, *Birds of South Africa*, I, p. 142.

Outer Primary.—Very short, only about .6 of the length of primary coverts.

Subfamily ESTRILDINÆ.

Spermestes.

Mouth of Young.—*S. cucullata*: Little swelling of the skin at gape; the interior of the mouth is largely yellowish, on the palate two black concentric horseshoe marks, around the tongue a black ring, and inside the mandible two curved black lines. The corners of the mouth are without papillæ or lobes, and whitish, the beak dark gray externally. (See Plate VI, 1.)

S. poensis stigmatophora: Very similar to the foregoing in color and pattern, as shown by Plate IV, 4.

Nest.—*S. cucullata*: A rough ball of seed-bearing grass-tips packed tightly together, with an opening at the side, not suspended, but firmly supported in forks in acacias, lemon, orange, mango and many other tree, between the bases of oil-palm leaves, close to the trunk beneath the eaves of grass-thatched houses, or even between the green fruit in growing bunches of plantains. Excrement of young not removed from nest by parents.

S. poensis stigmatophora: A covered globular nest, with dry leaves outside, and a lining of fine grass tips.

Eggs.—*S. cucullata*: Pure white, five or six in set.

S. poensis stigmatophora: Pure white — Reichenow, *Vögel Afrikas*, III, p. 153.

Outer Primary.—Narrow and pointed, shorter than primary coverts.

Amauresthes.

Mouth of Young.—*A. fringilloides*: Skin of gape not swollen into lobes, palate with a horseshoe-shaped yellow area, bounded inside by a black line, externally by a broader blackish area; a pair of black spots on the tongue, and a double black crescent beneath it on the mandible. (See Plate VII, 7.)

Nest.—*A. fringilloides*: Similar to that of *Spermestes cucullata*, round and covered, with opening at side, constructed of dry grass, lined with fine seed-bearing grass-heads.

Eggs.—*A. fringilloides*: Pure white, as many as six in set.

Outer Primary.—Narrow and pointed, shorter than in primary coverts.

Munia.

Mouth of Young.—That of a domesticated variety of *M. oryzivora* is described on page 247.

Nest and Eggs.—*M. oryzivora*: Sometimes at the summit of various trees, sometimes among the numerous creepers which cover the stems of the areng palms. They vary in size and form, according to their position; whilst those attached to trees are for the most part larger and possess, on the average, a fairly regular half ball-shaped form, those placed among creepers on the areng palms are smaller and of a less decided irregular form, only slightly hollowed out in the centre. All nests, however, are almost exclusively composed of the stalks of various grasses, which are not very firmly twined together, so that the whole build is of no great solidity. The number of the shining, white eggs varies between six and eight (Bernstein).—Foreign Finches in Captivity, p. 250.

Outer Primary.—Narrow, and shorter than primary coverts.

Parmoptila.

Mouth of Young.—*P. jamesoni*: Skin at corners of mouth black, bearing three small yellowish balls, interior of mouth yellow, five black spots on palate, and a black crescent beneath tongue.

Nest.—*P. woodhousei*: A large pile of dried leaves and grass, sometimes with moss, or a lining of fiber from dry plantain leaves, with entrance at side, supported on a horizontal branch.—Bates, Ibis, 1908, p. 324; 1909, p. 67.

Eggs.—*P. woodhousei*: Pure white, three to four.—Bates, Ibis, 1909, p. 67.

Outer Primary.—Narrow and pointed, shorter than primary coverts. (See Fig. 1, D.)

Nigrita.

Mouth of Young.—*N. canicapilla*: Four whitish papillæ in each corner of mouth, palate spotted with black.

N. brunnescens saturator: Markings similar to those of *N. canicapilla*, five black spots on palate, posterior pair small, and a black crescent beneath the tongue.

N. luteifrons: Margin of gape black, with four white warts or wattles, one just

at the angle of the gape, two above and one below this, there were spots on the palate and tongue like those of *Estrilda*.—Bates, Ibis, 1911, p. 592.

N. fusconota: Mouth-markings like those of *Estrilda*.—Bates, Ibis, 1911, p. 593.

Nest.—*N. canicapilla*: A rough, bulky mass of dry grass (not woven), dead leaves, and a little soft bark or green moss, with entrance at side, supported on leafy branches. Nest not cleaned of excrement.

N. brunnescens: Much like that of an *Estrilda*, but larger and composed of a loose mass of dried leaves, lined with a more compact structure of grass-tops, placed in a forked twig of a small tree.—Bates, Ibis, 1911, p. 592.

N. fusconota: A rough mass of brownish vegetable material, not woven in the least. Fine shreds of bark, dry grass, dry leaves, and a little moss used in its construction. A great deal of dried excrement in the bottom.

Eggs.—*N. canicapilla*: Pure white, four in set.

N. brunnescens: Five perfectly white eggs.—Bates, Ibis, 1911, p. 592.

Outer Primary.—Narrow and pointed, equal to or a little shorter than primary coverts. (See Fig. 1, E.)

Clytospiza.

Mouth of Young.—*C. monteiri*: Palate yellow, with five black spots, tongue flesh-color, with a dusky band across it, a blackish crescent on mandible beneath tongue. Soft skin at sides of mouth considerably swollen, but constricted at corners, so as to present a bilobate appearance. This is whitish externally, but yellow inside, with two black spots. (See Plate VI, 2.)

Nest.—*C. monteiri*: Uses abandoned nests of other birds, Weaver-finches, Coucals, and the like, adding a slight lining of matted hair and pieces of snake skin. Nest not cleaned by parents.

Eggs.—Pure white, six in set.

Outer Primary.—More than twice as long as the primary coverts, not pointed (See Fig. 1, C.)

Spermospiza.

Mouth of Young.—*S. poliogenys*: Has spotted palate characteristic of young Estrildinae, but the two posterior marks have disappeared, leaving only three rather large dusky spots on the yellowish palate. There is a dusky ring around tongue, broken above, and a dark crescent beneath the tongue.

S. guttata has the same number of spots, but no marks on tongue. (See Plate VI, 6.)

In neither of these forms were the specimens young enough to show the wattles at the gape, but a dried skin of another young *S. ruficapilla* shows such wattles, the same in number and position as in *Pyrenestes ostrinus*.

Nest.—*S. guttata*: Loose globular piles of ferns with a central portion of grass-tops, in shape like those of *Estrilda*, with an opening at the side, some soft white pappus was placed inside for lining, and in one case some feathers that were not the bird's own.—Bates, Ibis, 1911, p. 588.

Eggs.—*S. guttata*: White, devoid of gloss, three in set.—Bates, Ibis, 1911, p. 588.

Outer Primary.—Projecting about three times as far as the primary coverts, measuring .39 of total length of wing.

Pyrenestes.

Mouth of Young.—*P. ostrinus*: At each side of the mouth there are three little fleshy balls placed in an oblique line. The uppermost is like the interior of the mouth, rather bright yellow, the two lower are whiter, and between these two there is a small additional papilla, pale yellow. Between the first and second, as well as at the base of the third, there is a little black color in the skin. Five black spots on the palate, the posterior pair very small. A dusky ring nearly encircles the tongue, and beneath it, on the mandible there is a black crescent. (See Plate VI, 3.)

P. o. gabunensis: Exactly the same, but the bill much smaller.

Nest.—*P. ostrinus*: A large globular mass of dry, broad strips of leaves of the *Calamus* palm, laid or woven together loosely, with an opening at one side, and lined with a few fine grass-tops.—Bates, Ibis, 1911, p. 588.

Eggs.—*P. ostrinus*: Three, white, without gloss.—Bates, Ibis, 1911, p. 589.

Outer Primary.—Narrowly pointed, about equal to primary coverts in length.

Amadina.

Mouth of Young.—*A. fasciata*: Waxy skin-glands white, later blackish blue.—Foreign Finches in Captivity, p. 185.

Nest.—*A. erythrocephala* has been observed using old nests of Sparrows and Weavers (*Sitagra velata*), after relining them with feathers. The clutch consists of four white eggs. No nest was found which they had constructed throughout.—Austin Roberts, Journal S. Afr. Orn. Union, 1906, p. 10.

Outer Primary.—Very narrow, 3 to 6 mm. shorter than the primary coverts.

Hypargos.

Mouth of Young.—*H. schlegeli*: Five dusky spots on the whitish palate, two on the tongue. Throat flesh-color, wattles at gape bluish white, with two spots near their bases. (See Plate VII, 10.)

Nest and Eggs.—Unknown.

Outer Primary.—*H. schlegeli*: Very small, much shorter than primary coverts.

Pytilia.

Mouth of Young.—*P. phænicoptera emini*: Evidently of Waxbill type, but spots on palate obliterated. Roof of mouth, whitish anteriorly, becomes bright rose-color posteriorly, with a rather large, lighter and bluer spot at each side. Tongue flesh color at tip, rosy at base. Skin of gape bilobate as in *Clytospiza monteiri*, but a little less swollen, and bluish white in color, with two black spots at each side, in the same position. The rosy color of the interior of the mouth depends much on the blood, and fades rapidly after death. (See Plate VII, 8.)

Nest.—*P. p. emini*: Not woven, composed almost entirely of fine seed-bearing grass-heads, with a few feathers and some old crumpled blades of dry grass. Very dirty, excrement not removed.

P. melba belli: Domed and composed of fine grass and the down of some flower,

the entrance was a small hole on one side close to the top.—Woosnam, Trans. Zool. Soc. London, XIX (1910), p. 292.

Eggs.—*P. phænicoptera*: According to Kuschel the eggs are white.—Reichenow, Vögel Afrikas, III, p. 161.

P. p. emini: Egg from oviduct pure white.

Outer Primary.—Narrow and pointed, much shorter than primary coverts. Ninth primary emarginate towards tip.

Lagonosticta.

Mouth of Young.—*L. rara*: Tongue and palate cream color; throat flesh-color; five black spots on palate, lateral two largest; a blackish band, nearly divided into two spots, crosses the tongue; beneath this on the inside of the mandible, a black crescent. Skin at the corners of the mouth slightly swollen and purplish red, bearing two little white balls at each side, one close to the maxilla, the other near the mandible. (See Plate VII, 11).

L. rhodopareia: Five black spots on whitish palate, skin of gape with wattles, blue and white.—According to Swynnerton's Plate, Ibis, 1916, Pl. VII, p. 264.

Nest.—*L. rara*: A loose ball of soft seed-bearing grass-tops and feathers of a francolin with some dry grass-blades around the outside. Placed low down in a clump of grass.

L. brunneiceps: The simple nest, or often several together, is placed under rafters, in holes in walls in crevices about windows. A great irregular accumulation of grass blades forms the foundation for the small flat nest-cup, which is constructed of horsehair, feathers, grasses, wool and the like (von Heuglin).—Reichenow, Vögel Afrikas, III, p. 197.

L. rendalli: Placed in a small bush close to the ground. The nest was domed and composed of pieces of Indian corn-blades, and lined with fine grass-bents and Guinea-fowl feathers (Alexander).—Birds of Africa, IV, p. 261.

Eggs.—*L. rara*: Pure white, four in nest.

L. brunneiceps: Pure white, varying from three to seven (von Heuglin).—Vögel Afrikas, III, p. 197.

Outer Primary.—Narrow, pointed, about equal to primary coverts. Ninth primary emarginate.

Sporæginthus.

Mouth of Young.—*S. subflavus*: Five small black dots on the palate, two more on the back of the tongue, and a crescent on the mandible beneath it. (Skin of gape no longer swollen in this specimen).

Nest.—*S. subflavus*: On two occasions they adapted the nest of a totally different species to their needs. One pair took over an old nest of *Prinia mystacea* and lined it with flowering grass-heads, fitting a tubular entrance with the same material.—Van Someren, Ibis, 1916, p. 422.

Eggs.—*S. subflavus*: Pure white, four to six.—Van Someren, Ibis, 1916, p. 422.

Outer Primary.—Pointed, about equal to primary coverts, sometimes 2.5 mm. longer.

Estrilda.

Mouth of Young.—*E. astrild minor*: Five blackish spots on the flesh-colored palate, two on the tongue, and a black crescent beneath it, with bluish white swellings at the gape, in the form of a curved ridge and two little balls, separated by black skin, at each side. (See Plate VII, 9.)

E. nonnula: Five black dots on the pale yellow palate, two blackish spots at sides of tongue, towards base, and a small black crescent beneath it. Skin at corners of mouth black with two swollen curved lines, bluish white in color, at each side. (See Plate VII, 12.)

E. atricapilla: Mouth markings resemble those of the other species of *Estrilda*.—Bates, Ibis, 1911, p. 595.

E. melpoda: Mouth markings as in *E. a. minor*.—See figure, Bates, Ibis, 1911, p. 394.

Nest.—*E. a. minor*: Pyriform, with entrance at end, the nest material protruding around it as a short spout. Built entirely of seed-bearing tips of grasses not really woven, but put together very compactly and placed in a fork of a bush. Faeces not removed from nest.

E. astrild massaica: Two nests usually found side by side or one on top of the other; one only is used by the nesting bird, the other is simply a blind.—Van Someren, Ibis, 1916, p. 421.

E. nonnula: Rounded or oval, made of grass-tops, which stick out around the lateral entrance.

E. atricapilla: Nests of water-bottle shape, sometimes double, one part empty.—Bates, Ibis, 1909, p. 53.

Eggs.—*E. nonnula*: Pure white, four in set.

E. atricapilla: White, five in set.—Bates, Ibis, 1909, p. 53.

Outer Primary.—Narrowly pointed, often equal to primary coverts, but more frequently a little longer.

Nesocharis.

Mouth of Young.—*N. capistrata*: Five dark spots on palate, a dusky band across tongue. The little papillæ at the corners of the mouth were of the same shape and number as in *Estrilda astrild minor*, pale bluish green, backed up by black skin, but the upper edges of the mandible were not so light.

Nest and Eggs.—Unknown.

Outer Primary.—In *N. capistrata* often 3 mm. longer than the primary coverts, and not very sharply pointed.

Uræginthus.

Mouth of Young.—*U. bengalus*: The skin at the corners of the mouth has a swollen blue spot at each side. The throat is flesh-color, tongue and inner wall of mouth whitish with three black spots on palate, a narrow blackish ring around the tongue, and a black crescent beneath it, on the inside of the mandible, the ends of this crescent continuing back as dark lines to the angles of the mouth. (See Plate VI, 5.)

Nest.—*U. bengalus*: Closed above, with lateral entrance, built of soft seed-bearing grass-heads, not woven and rough on the outside. One had a few feathers

for a lining. Placed in forks of small trees, in one case close to a nest of large wasps (*Belonogaster*). (See Plate X.)

Another pair used an old nest of *Sitagra luteola*, without even adding a lining.

Eggs.—*U. bengalus*: Pure white, three or four in set.

Outer Primary.—Shorter than primary coverts, and pointed.

Poephila.

Mouth of Young.—*P. gouldiæ*: "Besides some bars on the tongue and palate, there were three bright little rounded warts, like beads, at the angle of the mouth. Two were emerald-green and one blue, and they all had a pearly or opalescent lustre." (The figure shows five spots on the palate and a bar across the tongue).—Sharpe, *Wonders of the Bird World*, p. 115. See also Butler, *Avicultural Magazine*, 1898, Vol. V, p. 27.

Nest and Eggs.—*P. gouldiæ* and indeed all the Weaver-finches of Australia build in the typical Estrildine style. In "Birds of Australia" by Lucas and Le Souëf, we read: "The nests of all the Finches (Ploceidæ) are dome-shaped and remarkably bulky, composed of grasses with long spout-like entrances, and placed in saplings or bushes. Clutch five or six white eggs." This agrees with Gould (*Introduction to the Birds of Australia*, 1848, p. 52). "All the species build, I believe, large grassy nests, with a spout-like opening."

In captivity at least, *P. gouldiæ* does not clean the nest. "Owing to its domed construction and the height of the aperture above the heads of the young, it was impossible for the latter to have ejected their excreta outside; and the parents did not help them after the manner of so many birds" (Reginald Phillips).—*Foreign Finches in Captivity*, p. 172.

Outer Primary.—*P. gouldiæ*: Very small and narrow, much shorter than primary coverts.

Hypochera.

Mouth of Young.—*H. ultramarina*: Skin at corners of mouth pink, but no longer showed any swelling in our specimen. Interior of mouth whitish, with five dusky spots on its roof, two on the back of tongue, and a black crescent on the inside of the mandible beneath the tongue.

Nest.—*H. ultramarina*: Under rafters and gables, and in holes in walls. They consist, like those of the House Sparrow, of a great but nevertheless well arranged accumulation of grass, rags, cotton, and feathers, the shallow nest-chamber finely lined with hair, threads and the like (von Heuglin).—Reichenow, *Vögel Afrikas*, III, p. 214.

Eggs.—*H. ultramarina*: Pure white, three to five (von Heuglin).—Reichenow, *Vögel Afrikas*, III, p. 214.

H. chalybeata: White, three in number.—Van Someren, *Ibis*, 1916, p. 426.

Outer Primary.—Shorter than primary coverts, pointed.

Vidua.

Mouth of Young.—*V. serena*: Like that of young *Hypochera*, with five dark spots on the palate.

Nest.— *V. serena*: An openly woven, domed nest in a thick grass tuft, only a few inches from the ground.— Stark, Birds of South Africa, I, p. 147.

As Mr. van Someren says (Ibis, 1916, p. 427) "Much still remains to be found out regarding this bird's nesting habits." Both von Heuglin (Vögel Afrikas, III, p. 220) and Boyd Alexander (From the Niger to the Nile, II, p. 33) have surely been completely mistaken. This Whydah is common and widely distributed, but it must have a very short breeding season — in my experience, during the latter part of the rainy season — and hides its nest most successfully.

Perhaps indeed, as reported by Mr. Austin Roberts (Journal South African Ornithologists' Union, 1907, p. 9), it lays its eggs in nests of *Estrilda dufresni* and *E. astrild*. These eggs are said to be white, but the statement that the young differ from the young Waxbills in not having white spots at the gape adds an element of doubt. Such a habit would at least explain the present lack of knowledge about the nesting of a bird otherwise so well known.

Eggs.— *V. serena*: Pure white (Bocage).— Vögel Afrikas, III, p. 221. Nehrkorn is probably mistaken in describing them as grayish white with dark spots.

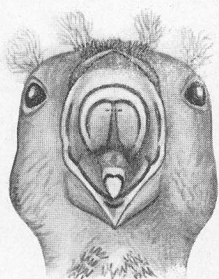
Outer Primary.— Very narrow and pointed, shorter than primary coverts.

Steganura.

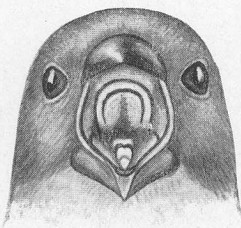
Nest.— *S. paradisea*: Apparently unknown, save in captivity. Described by Dr. Russ as an extraordinary nest...one cavity shaped like a baker's oven, roofed over and neatly rounded off, with fibres and long horse-hairs; the other a flat, loosely compacted hollow, the hinder margin of which scarcely stood up at all.— Foreign Finches in Captivity, p. 273.

Eggs.— *S. paradisea*: Dr. Russ failed to find the egg, but in Shelley's Birds of Africa (IV, p. 29) it is described as "grey, so very closely spotted with black that the pale ground color is scarcely visible." In my opinion this needs confirmation.

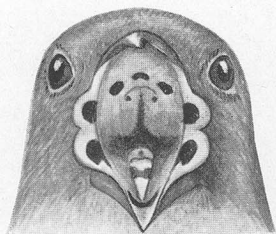
Outer Primary.— Decidedly shorter than primary coverts, narrow and pointed.



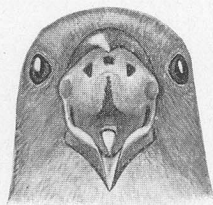
1



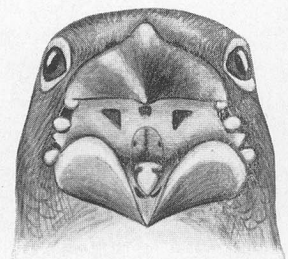
4



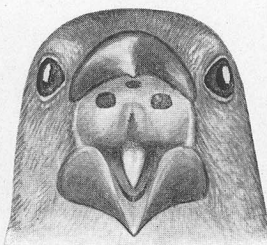
2



5



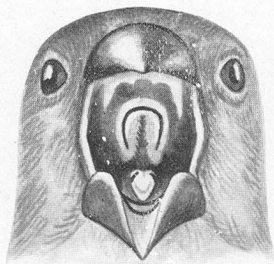
3



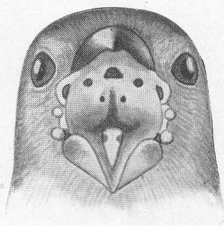
6

Mouth-markings in Young Weaver-Finches, drawn by the author from field sketches and specimens in alcohol.

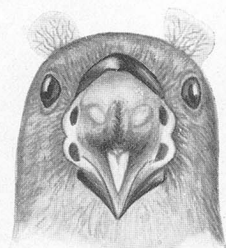
- | | |
|---------------------------------------------------|---------------------------------------------------|
| 1. <i>Spermestes cucullata</i> . × 3. | 4. <i>Spermestes poensis stigmatophora</i> . × 2. |
| 2. <i>Clytospiza monteiri</i> . × 2. | 5. <i>Uræginthus bengalus</i> . × 2. |
| 3. <i>Pyrenestes ostrinus</i> . × $\frac{3}{2}$. | 6. <i>Spermospiza guttata</i> . × 2. |



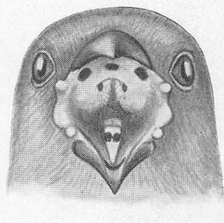
7



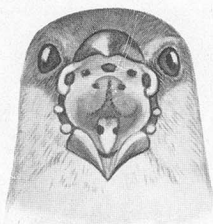
10



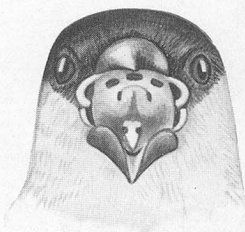
8



11



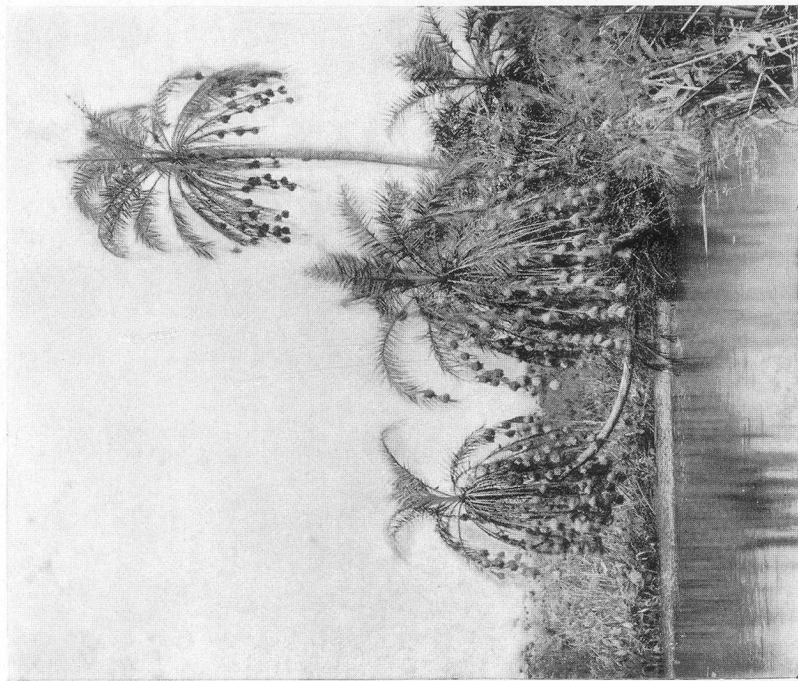
9



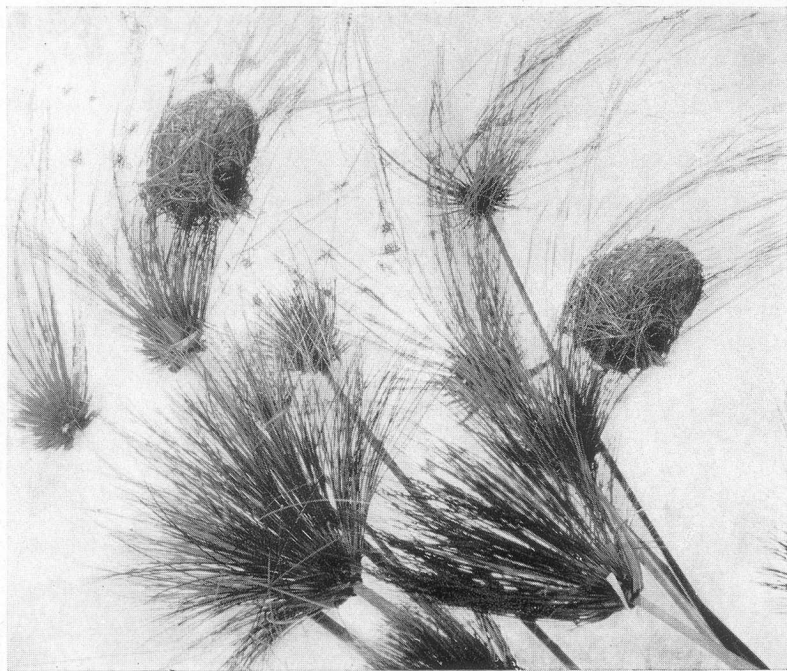
12

Mouth-markings in Young Weaver-Finches.

- | | |
|---------------------------------------------|---------------------------------------|
| 7. <i>Amauresthes fringilloides</i> . × 2. | 10. <i>Hypargos schlegelii</i> . × 2. |
| 8. <i>Pytilia phænicoptera emini</i> . × 2. | 11. <i>Lagonosticta rara</i> . × 2. |
| 9. <i>Estrilda astrild minor</i> . × 2. | 12. <i>Estrilda nonnula</i> . × 2. |



Nests of *Hyphantornis cucullatus abyssinicus*, on wild date-palms (*Phoenix reclinata*), over water. Near Yakuhuku, Belgian Congo. Oct., 1911. This and following photographs by Herbert Lang.



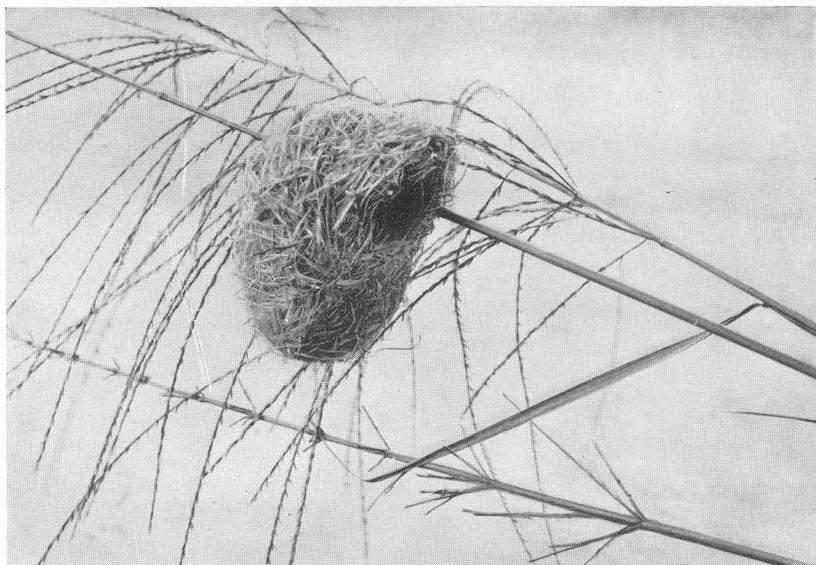
Nests of *Silagra tenuiflora* on *Cyperus Papyrus*, overhanging water. Faradje. Belgian Congo, Oct., 1912.



Typical Weaver nest, built by *Hyphanturgus ocularius*, on a thorny *Acacia*. The entrance opens directly downward. Faradje, Sept., 1912.



Nest of a Bishop-Bird (*Pyromelana flammiceps*), hung in tall grass: materials well woven, Faradje, Oct., 1912.



Nest of *Pachyphantes superciliosus*, with lateral entrance like that of a Bishop-Bird. Faradje, Sept., 1912.



Nest of a Weaver-Finch (*Uræginthus bengalus*), composed of grass-tops, not woven. Faradje, Sept., 1912.