GENERAL NOTES

Tarsal scutellation of song birds as a taxonomic character.—In arranging the shrikes (*Laniidae*) for a forthcoming volume of Peters' "Check-list," I found it necessary to evaluate the type of scutellation on the back of the tarsus as a taxonomic character. This quickly led beyond the shrikes and their near allies, to a hasty survey of the tarsal covering and its scutellation in all the oscine or song bird families.

Of necessity the dried feet of museum specimen skins were used, and distortion due to drying may have obscured certain points. However, some aspects of tarsal scutellation as an indicator of relationship did emerge.

The larks (*Alaudidae*) are distinctive in having a latiplantar tarsus. That is, the tarsus is rounded posteriorly and the covering of the front is separated from the scutellate covering of the back by a narrow groove on the inner side of the tarsus. This sets them off from the rest of the oscines and they are not considered further.

The tarsal envelope of the song birds, exclusive of the larks, is characterized by a single series of scutes, or a single plate, presumably of fused scutes (the booted condition) covering the front of the tarsus (the acrotarsium); a pair of plates, one on each side, covering the posterior or plantar part of the tarsus and being in contact with the acrotarsium in front, and meeting behind to form a ridge. This gives the diagnostic triangular cross section of the song-bird tarsus called acutiplantar.

There are modifications of this condition. The booted condition may not be complete, a few scutes being present at the distal end of the acrotarsium, or there may be obscure lines indicating nearly obliterated scutes along its length. On the plantar surface the "heel" and an area on the distal end of the tarsus are covered with skin that may be more or less rugose, papillose or even furnished with small scutes. These areas of skin may vary in extent and extend a short distance between the plantar plates and rarely may even meet, completely separating the plates.

A less common condition is for the outer surface of the plantar aspect of the tarsus to be scutellate. Sometimes these scutes are fairly regular. Sometimes they decrease in size distally and irregularly, and this condition is usually associated with lack of fusion between the elements. Then areas of skin, that may be rugose or papillose or carry small scutes, may be conspicuous between the inner plantar plate and the outer scutes, or even between the scutes. The least common condition is to have the inner plantar surface broken up into scutes. Despite the acutiplantar shape of the cross-section of the tarsus, the name taxaspidian might be applied to these plantar-scutellate tarsi, which are very similar to those in the non-oscine passerine family, Rhinocryptidae, of South America.

As one might expect, intermediate types occur, and also individual variation exists, making any finely divided and ironclad classification impractical.

However, the distribution among song bird groups of some clear-cut examples of each of the three main types, booted-laminiplantar, scutellate-laminiplantar, and scutellate-scutellate plantar, and the further modifications of the separation or fusion of the plantar scutes or plates, is illuminating.

The scutellate-laminiplantar condition predominates in most families of song birds, from cuckoo–shrikes (Campephagidae) to sparrows (Fringillidae) in Wetmore's arrangement.

The booted tarsus, always accompanied by the pair of plates on the plantar surface, predominates in the Turdidae (restricted sense), but also appears commonly in the related flycatchers (Muscicapidae, restricted sense). This booted condition also occurs occasionally elsewhere in widely separated groups, for example in Corvidae (*Pyrrhocorax*=*Coracia*), Timaliidae (*Orthonyx*), Sittidae (*Rhabdornis*), Meliphagidae (*Melipotes*), and it is approached at least in some members of such groups as Paradiseidae, Cracticidae, Callaeidae, and Mimidae. Occasionally, perhaps as individual variation, the booted condition appears in Parulidae (*Peucedramus, Chamaethlypis*).

The scutellate outer plantar surface is a less common condition and characterizes no one group held together by other characters. Regular scutes on the outer plantar surface are present in some Laniidae (*Eurocephalus, Lanius* [part]), some Bombycillidae (*Hypocolius*, variable in *Ptilogonys*) ; and less regular scutes are present in some members of Corvidae (*Corvus*), Sturnidae (*Mino, Galeospar*), Oriolidae (*Sphecotheres*), Laniidae (*Lanioturdus, Nilaus, Prionops* [obscure, variable], *Tchagra* [part, variable]), and Ptilonorhynchidae (*Scenopoeetes*), and may be obscurely indicated in such diverse groups as Campephagidae (*Tephrodornis*) and Troglodytidae (*Salpinctes*), and occasionally as a single division of the plantar plate in many others.

The scutellate condition of the inner plantar surface does not always agree with that of the outer plantar surface, and seems equally variable. In the Laniidae, subfamily Prionopinae (helmet shrikes), the inner plantar scutellation is regular and compares well with that of the outer in *Eurocephalus*. However, in *Prionops*, in which the outer plantar scutellation is variable, that on the inner surface is still more so. In *P. retzii*, the only species in which I found inner plantar scutellation regularly, it occurred only about half the time. I did not find it in *P. plumata* (in which outer plantar scutellation is obscure, incomplete or absent), nor in the very similar *P. poliolopha* (outer surface obscurely to distinctly scutellate), nor the more different *P. caniceps* (outer surface not scutellate).

In the Malaconotinae (bush shrikes) *Nilaus* has the inner and outer plantar surfaces regularly scutellate; *Lanioturdus* (monotypic) may have them non-scutellate (i.e. laminar) or irregularly scutellate; in *Tchagra* I found no inner plantar scutellation though in some species, i.e., *T. cruentus*, the outer surface was regularly scutellate as an individual variant.

In Laniinae (typical shrikes) the outer plantar surface may or may not be scutellate, but I did not find it so on the inner.

A scutellate inner plantar surface also occurs in the Ploceidae, (weaver birds), in the genus *Bubalornis*.

The separated condition of the plantar plates or plates and scutes along the posterior mid-line occurs occasionally in such diverse groups as Laniidae (*Lanioturdus* [individual variation]), Vangidae (part: *Falculea*, distinct papillose skin, 1 specimen; *Leptopterus*, indistinct, 1 specimen), Sturnidae (part: *Mino*, distinct), Oriolidae (part: *Sphecotheres*, 2 lines of small scutes), Ptilonorhynchidae (part: *Scenopoeetes*, 2 lines of small scutes), Corvidae (part: *Corvus corax*, in which separation of plantar scutes from acrotarsium may be pronounced), and this condition is probably approached in many others.

Presumably a primitive condition of the song bird tarsus was to have the front of the tarsus scutellate and the back covered with numerous small scutella or granules (pycnaspidean condition) as seen today in some members of the family Cotingidae. From this the scutella on the back enlarged and coalesced into two plates and the frontal scutes coalesced, and the whole form a well fused, booted tarsal envelope, the most advanced condition.

On the other hand, part of the problem in deciding on relationships in the oscines is that there are really no primitive song birds. They are, so to speak, not twigs but leaves on the top of a postulated phylogenetic tree. So many other characters seem to appear and disappear sporadically (in shape of bill, color pattern, etc.) throughout the group that it comes as no surprise to find the same to be true of the types of tarsal scutellation.

That the condition of the tarsal scutellation is adaptive seems doubtful. We find the booted tarsus in semiterrestrial thrushes, arboreal honeyeaters of the twigs, and creepers of the tree trunks. We find booted tarsi on slender-footed thrushes and a coarse-footed Timaliidae; on large choughs and small chats.

From the sporadic occurrence of various types of scutellation among song birds, and the individual variation they sometimes exhibit, the conclusion seems inescapable that the pattern of scutellation of the tarsal envelope is of limited importance as a character indicating relationships within the oscines, once the larks, Alaudidae, are excepted, nor will it separate oscines from nonoscines in all cases. The three main types of scutellation occur in one family (Corvidae). Even when a booted tarsus predominates in a family (as Turdidae, restricted sense), it does not separate its members from some of its near relatives (as the Muscicapidae), nor does its lack in other groups (as Sylviidae) preclude associating them with it (as in the family Muscicapidae in a comprehensive sense).

The well-defined scutellate plantar surface and the separation of the inner and outer plantar plates or scutes is a condition that occurs in obviously distantly related species. Individual variation in a species is such that the type of plantar scutellation may not even be a specific character.

One generalization that emerged from this survey was that the tarsal scutellation of the nine-primaried New World oscines is less variable than that of the Old World groups. Neither the extremes of the booted condition, nor of the scutellation of the plantar surface occurs in a well defined condition in the vireos to finches and their allies, which presumably had a common origin in the New World.

In regard to the shrikes, which started this survey, it is interesting that the least typical genera, whose relationships are most debatable, show the most distinct plantar scutellation (*Eurocephalus*, *Nilaus*), and the greatest variability (*Lanioturdus*, [monotypic, i.e. individual variation] and *Prionops* [individual and from species to species]). However, there is complete intergradation in this character with some more typical *Tchagra* and *Lanius*. Thus the presence or absence of tarsal scutellation in this group cannot be used, as was done in the past, to mark either family or subfamily limits.

Since the above was written an exceptional situation was found in some vireos of the genus *Hylophilus*. The tarsus of *H. ochraceiceps* is not acutiplantar but is latiplantar, with the back of the tarsus smoothly rounded, non-scutellate, and without a break at the midline. This is very different from the normal acutiplantar condition in *H. decurtatus* and in the rest of the oscines (except the larks), and recalls the condition in some tyrant flycatchers (Tyrannidae) and in the larks.

At first it seemed that the unusual condition in *H. ochraceiceps* might necessitate removal of the species from the oscines and allying it with the Tyrannidae, characterized by an exaspidean tarsus. However, *ochraceiceps* has a typical oscine aftershaft, and has the general structure, and appearance of a vireo. Though its habits seem little known, it seems that *ochraceiceps* is a vireo, as Ridgway (1904. *U. S. Nat. Mus. Bull.*, 50:214–218) considered it.

The difference between the details of the tarsus in *ochraceiceps* and in *decurtatus* raised the question as to whether a generic separation was advisable to call attention to this difference.

In *decurtatus* the acrotarsium is lightly scutellate and the two plantar plates meet behind at a sharp angle. In *ochraceiceps* the acrotarsium has the scutellation lightly indicated and the outer plantar plate is closely fused with the acrotarsium, and curves around the back of the tarsus, past the midline, to be separated from the inner edge of the acrotarsium by a groove, which is broad proximally, narrow or lacking distally (lined with the remnant of the inner plantar plate?).

However, the difference between these two conditions is bridged by that in certain other species I have examined: *H. flavipes, H. thoracicus, H. poicilotis,* and *H. pectoralis.* It would seem that this latiplantar, quasi-exaspidean condition is best interpreted as a modification of the oscine acutiplantar condition. An attempt to divide *Hylophilus* into two genera would necessitate setting arbitrary limits and would be impractical.

In this case, an attempt to use tarsal scutellation as a "key character" for classification fails and recalls that Ridgway also had trouble (1907. *U. S. Nat. Mus. Bull.,* 50:336) when attempting to use the variations in the tarsal envelope for arranging the members of the Tyrannidae. He wrote, ". . . they have disappointed me . . . they seem of little value beyond the definition of genera (even sometimes failing here!) or minor supergeneric groups; indeed, it has been found that each of them is more or less variable within what appears to be proper generic limits."—A. L. RAND, *Chicago Natural History Museum, Chicago 5, Illinois, December 29, 1958.*

"Foot-paddling" feeding behavior in a Semi-palmated Sandpiper.—On August 5, 1958, I made the following observation on a mud flat in Newburyport Harbor, eastern Massachusetts. Together with several other species of shore birds, a number of Semipalmated Sandpipers (*Ereunetes pusillus*) were feeding approximately 20 yards from my position on the edge of the flat. As the incoming tide slowly covered the mud, a number of small, shallow pools began to form, and the sandpipers were observed to probe in these pools as well as in the surrounding mud. I focussed my binoculars on one individual which had stopped momentarily to preen. Shortly afterward, this bird waded into a small pool about two feet in diameter, and began to "foot-paddle." With its body held horizontally, bill pointed down, the bird began alternately to lift and depress its legs very rapidly. The entire body of the bird moved rhythmically with the alternating motions of the feet and tarsi. The bird would paddle for about ten seconds, peer at the surface of the water for a moment, then stab rapidly. The movements of the bill were stabs, not probes in the mud. Three such stabs appeared to be successful in securing prey, since the bird made brief swallowing movements after each stab. The food secured by the use of "foot-paddling" was not identified. The entire behavior lasted three minutes, and it appeared to be terminated by the incoming tide flooding the temporary pool.

A cursory review of the literature revealed no mention of this behavior for the Semipalmated Sandpiper, although similar feeding techniques have been observed in other species of sandpipers.—ANDREW J. MEYERRIECKS, *Hatheway School of Conservation Education, Drumlin Farm, South Lincoln, Massachusetts, September 25, 1958.*

Tarsal oiling by a banded Fox Sparrow.—On April 2, 1958, I observed a Fox Sparrow (*Passerella iliaca*) anoint its tarsi after manipulating its uropygial gland. Similar behavior of a Lark Sparrow (*Chondestes grammacus*) has been described by Whitaker (1957. *Wilson Bull.,* 69:179–180), apparently the only other published report of this behavior. My observations were made at the Drumlin Farm Sanctuary near Lincoln, Massachusetts, where I was studying the morphology and sequence of maintenance activities of emberizines upon release from banding. This Fox Sparrow was banded with one aluminum band, inspected for fat and molt, measured, weighed, and released at about 12:45 p.m. Maintenance activities, such as preening and shaking, are given quite readily after banding, and it is assumed that handling and ruffling the feathers during the process accentuate exteroceptive stimuli which release these motions.

Oiling was performed three times, once on each leg after manipulation of the uropygial gland, and once on the unbanded leg after preening the breast. The actual oiling movements were not elaborate. Having just manipulated the preen gland, the Fox