

LITERATURE CITED

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THE SIGNIFICANCE OF THE NUMBER OF TOES IN SOME
WOODPECKERS AND KINGFISHERS

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THE presence, reduction, or absence of one toe is of no very great importance as to the relationship of birds otherwise quite closely allied. It apparently does not indicate more than specific distinction in many cases. This has already been stated by E. Mayr and by me as regards: 1) the Black-bellied Plover (*squatarola*) which we united with the Golden Plovers in the genus *Pluvialis*; and 2) the Sanderling (*alba*) which we considered a species of *Calidris*, notwithstanding the presence of a very small, non-functional hallux in some species, and its absence in all the others. It certainly seems unreasonable to base genera entirely on such an obviously recent and unimportant character as a vanishing organ (*Zoologica*, 30: 106, 1945). Similar presence or absence of the hallux is also noticed among tropical plovers.

The same consideration applies to woodpeckers. Peters has recognized it in uniting in the genus *Dinopium* the species *benghalense*, which possesses a reduced hallux, with *shorii*, *javanense*, and *rafflesi*, which have only three toes, making *Brachypternus* a generic synonym (*Birds of the World*, 6: 143-146, 1948). If such an action is accepted, however, it seems logical to carry it further. The Aethiopian Bamboo Piculet (*africana*), a very peculiar bird, differs only slightly in color and not at all in structure, pattern of plumage, and habits from the Asiatic and Malaysian *ochracea* and *abnormis*. Although *africana* has four toes and the others three, I propose to place them all in the genus *Sasia* Hodgson 1836, and to consider *Verreauxia* Hartlaub 1856 a synonym.

The Pied Woodpeckers stand in a similar position. As it has been so far accepted, the two northern species in which the hallux is lacking (*tridactylus* and *arcticus*) have been assigned to the genus *Picoides*,

while those with four toes make up the genus *Dendrocopos*. There is however no other important difference in the color pattern, the structural features, or the life habits of all these very similar birds.

The excellent work by W. H. Burt, 'Adaptative Modifications in the Woodpeckers,' has not revealed any striking anatomical or biological distinction between the species of Pied Woodpeckers that he studied (*Picoïdes arcticus*, "*Dryobates*" *villosus* and "*D.*" *pubescens*). They vary within narrow limits. *Picoïdes* represents an extreme adaptation to arboreal habits. The food habits of the two three-toed species, according to Beal (1911), are completely similar; they subsist almost entirely (85%) on insects obtained by pecking wood, either dead or alive. "*Dryobates*" *villosus*, however, gathers only 45% of its food by pecking wood, 30% on the surface of trunks and 25% from other places. It would be interesting to find out exactly how the numerous Asiatic species feed. It does not appear that generic distinction between three-toed and four-toed Pied Woodpeckers can be upheld from Burt's data.

K. H. Voous has not studied the relationship of the two groups in his 'History and Distribution of the genus *Dendrocopos*' (Wageningen, 1947) and has left out *Picoïdes*.

The head of the males of *tridactylus* and *arcticus* is marked with golden yellow while red is shown in the other species, but two of them, *marhattensis* and *auriceps*, also have a yellow crown. The hallux is variously developed; it is small in *cathpharius*, *hyperythrus*, *macei*, *atratus*, *minor*, and *pubescens*. I therefore believe that all species of Pied Woodpeckers should be placed in the genus *Picoïdes* Lacépède 1799, and I consider *Dendrocopos* Koch 1816 a synonym.

I am well aware that such an action will be a shock to some ornithologists because it affects several well known European and North American species. But the present generic name *Dendrocopos* has only recently been in use, having replaced *Dryobates* on a nomenclatorial technicality. It seems preferable to make a new change with the shortest possible delay, as there is little doubt that it will soon be proposed and accepted by many workers. Mr. H. E. Wolters has recently written from Germany suggesting its necessity.

We are facing a related if slightly different problem with the small kingfishers, all fairly closely related, that constitute the subfamily Alcedininae. Some have four toes and others three, but here the medial front toe, not the hallux, is reduced or absent; at best it is but a non-functional relict. There are numerous species inhabiting the Old World—Europe, Asia, Australasia, and Africa—and they have so far been generically sorted out according to the number of their toes.

This appears to be unsatisfactory as there are older and more deeply rooted characteristics to be taken into consideration which do not accord with it.

One group of species is decidedly aquatic, living along rivers, streams, and ponds, and feeding on water insects, fish, etc. Another group lives in forest, often far from water, and feeds on terrestrial invertebrates. The aquatic group has a narrow, compressed, mostly black bill, or at least black at the base; the upperparts are blue of different shades; the underparts are never very bright and are blue, white or rusty red, usually with blue on the sides of the breast and sometimes a more or less complete blue belt. The members of the second group possess a comparatively broad and flat bill, generally entirely red; the upperparts may have little or no blue, and often much shiny mauve and reddish chestnut; the underparts are vividly colored, generally tinged with yellow or mauve; there is never any blue on the sides of the breast, nor any tendency to a pectoral belt. The mauve gloss on the crown and the ear coverts is typical of most species. The great similarity in the coloration of the head in the species *picta* from Africa and *fallax* from Celebes and Sangir is very interesting.

It seems advisable to disregard the number of toes and to assign the various species of Alcedininae to two genera as follows:

1. *Alcedo* Linné 1758, WATER KINGFISHERS:

Synonyms: *Corythornis* Kaup 1848, *Alcyone* Swainson 1837.

Species with four toes: *hercules*, *atthis* (*semitorquata* included), *quadribrachys-meninting* (superspecies), *euryzona*, *coerulescens*, *crinata*, *leucogaster*.

Species with three toes: *cyano-pectus*, *argentata*, *azurea*, *pusilla*.

2. *Ceyx* Lacépède 1799, LAND KINGFISHERS:

Synonyms: *Ispidina* Kaup 1848, *Myioceyx* Sharpe 1871.

Species with four toes: *lecontei*, *picta*, *madagascariensis*.

Species with three toes: *lepidus*, *erythacus*, *rufidorsum*, *melanurus*, *fallax*.

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