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## SPECIFIC AND INDIVIDUAL VARIATION IN REDUCTION OF THE CLAVICLES IN THE PARROTS<sup>1</sup>

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It becomes increasingly evident, upon examination of the furcula or clavicles of birds, that this bony element is undergoing reduction in several genera of parrots, and that there may be reasonable variation in both length and heft of the bony elements which may remain.

In 1954, Glenny and Friedmann pointed out that there is no positive correlation between reduction in the clavicles and reduced flight function. A similar conclusion could be drawn from the study of the reduced clavicles of *Otidiphaps nobilis* (Glenny and Amadon, 1955). It may be concluded, however, that a factor for clavicle reduction or atrophy appears to be in operation in several orders and families of birds. Among the parrots, 19 of 67 genera studied show either instances of or major advances in the reduction of the clavicles.

In accordance with my former scheme of furcula classification (Glenny, 1954), Class 1 is complete (united clavicles); Class 2 is reduced to a ligament at the sternal end, but the bony element is retained for about one-half or more of the normal length of the clavicle; Class 3, the furcula is reduced to a ligament for the greater part of its length with the epicleidium remaining as a bony vestige (a relatively short portion of the *corpus claviculari* may or may not remain); and Class 4, the *ligamentum claviculari* alone remains and the epicleidium is entirely lost.

In genera of parrots showing constancy in reduction of the clavicles, Class 2 clavicles are found in *Strigops habroptilus* alone. It should be remarked, however, that Class 2 clavicles may appear in genera predominantly of Class 1. Examples of this are to be found in *Eos squamata guenbyensis*, *Brotogeris cyanoptera*, and *Psittacus erithacus*. Class 3 clavicles predominate in the following genera: *Micropsitta*, *Agapornis*, *Platycercus*, *Purpureicephalus*, *Northiella*, *Psephotus*, *Neophema*, *Cyanoramphus*, and *Melopsittacus*.

In *Forpus* Class 3 and Class 4 conditions are of about the same occurrence and one class is not to be regarded as offering value as a specific criterion over the other.

In addition, clavicles of Class 3 are found to occur in genera and species normally accepted as having Class 1 clavicles. Some examples of this condition may be cited: *Domicella garrula*, *Charmosyna papou stellae*, *Poicephalus senegalus senegalus*, *Polytelis anthopeplus*.

On the other hand, a Class 1 clavicle was found in a specimen of *Psephotus chrysopterygius*. Some other variations are in:

<i>Psittenteles flavoviridis meyeri</i>	Class 1
<i>Psittenteles versicolor</i>	Class 3
<i>Opopsitta diophthalma</i>	Class 1
<i>Opopsitta</i> sp.	Class 3

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*Geoffroyus geoffroyi aruensis*—showed a Class 4 clavicle, but *Geoffroyus* may well fall into a Class 3-4 complex, as is the case with *Forpus*.

This study included 67 genera, 221 species and subspecies, and 399 specimens of parrots. Among the Class 1 furcula forms, there are notable differences in the heft or thickness of the *corpus clavicali*. Of three skeletons of *Domicella garrula*, in the British Museum (N.H.) collection, one was strong or fairly heavy, one was of moderate heft, while the remaining one was of slight build. Among several other genera, there were noticeable individual differences in the heft of the furcula.

Variation in the length of the bony vestiges was also notable in several species. Four specimens of *Strigops* show some of the range in measurements of the clavicles: 2.3, 2.4, 2.5, and 3.3 cm. In *Agapornis pullaria*, 3 (2.5 mm), 2 (3 mm), and 1 (4 mm); *Agapornis cana*—1 (2.5 mm) and 1 (3 mm); *Platycercus caledonicus*—1 (4.5 mm) and 1 (5 mm); *Platycercus eximus*—1 (3 mm) and 2 (5 mm); *Platycercus zonarius barnardi*—1 (6 mm), 1 (6.5 mm), and 1 (8 mm); *Melopsittacus undulatus*—1 (2.5 mm) and 3 (2 mm).

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