

## The Rudimentary Wing-Spur in Birds.

By A. M. Morgan.

Very little appears to have been written about the wing-spurs of birds. In the somewhat limited range of literature to which I have access I can find only casual references to these structures and none at all to their appearance in rudimentary form. Moreover, in connection with ornithologists of my acquaintance I have found none who could enlighten me on the subject. So, although the matter cannot have passed unnoticed in ornitho-

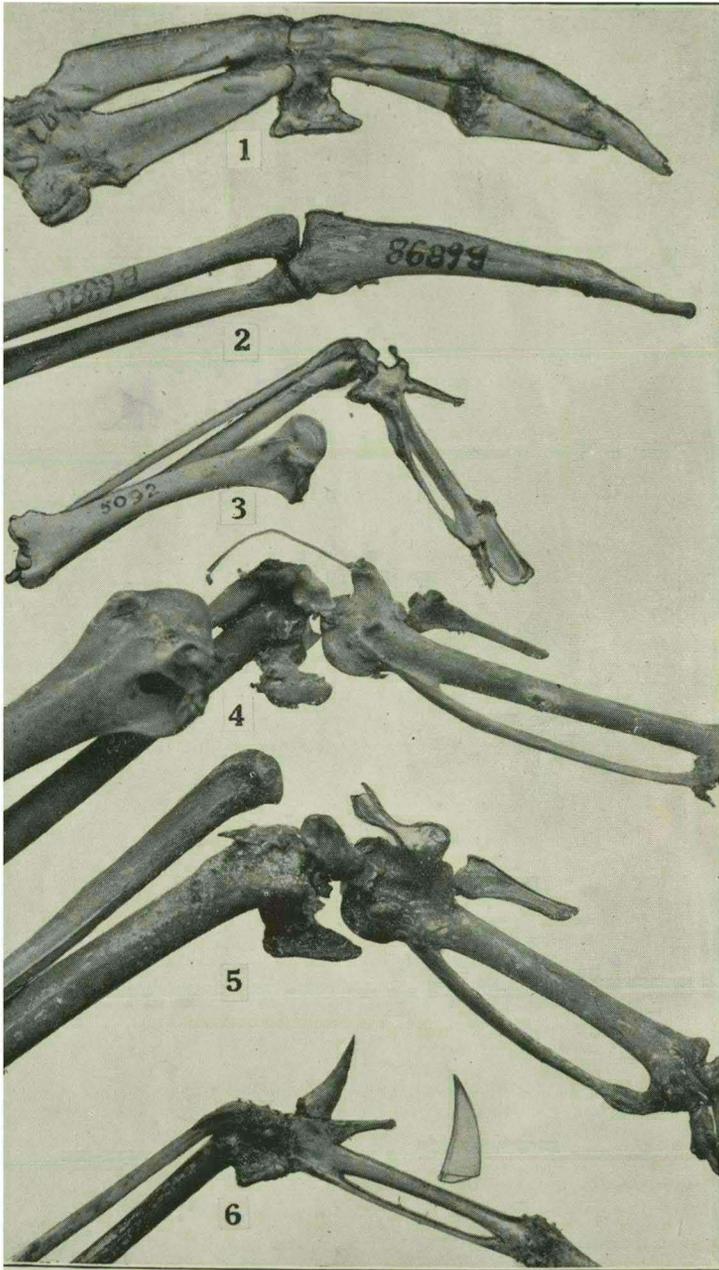
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*MORGAN—The Rudimentary Wing-Spur in Birds.*

logical literature, there must be many who have no acquaintance with it, and it is these I hope may find some interest in this paper.

Fully developed spurs occur in only two Australian birds, viz.:—*Lobibyx novae-hollandiae* and *Lobibyx miles*—the Spur-winged and Masked Plovers. In foreign birds spurs are present in several species of African and Indian Plovers, in an African Goose (*Plectropterus*), in the Torrent Ducks of South America (*Merganetta*), in a Pigeon (*Didunculus*), and a Jacana. The Crested Screamers of South America (*Chauna*) have two spurs upon each wing.

The fully developed spur when present is placed upon a process situated at the base of the first metacarpal to which is also attached the tendon of the *extensor longus pollicis*, but as the first metacarpal is ankylosed throughout its length to the second, the muscle no longer has any influence upon the *pollex*, but acts as an extensor of the whole *manus*. In the Screamers the second spur is placed upon the distal end of the second metacarpal. There is in many birds a bony process upon the inner face of the ulnar carpal, the skin over which is bare of feathers. It is especially prominent in the *Charadriiformes* and in *Chauna*, where it suggests a rudimentary third spur. Some time ago, while taking wing measurements of a number of birds of different families, I was struck by the occurrence of a prominence upon the site corresponding with that of the fully developed wing-spur. Further investigation revealed that it was present in all the birds I had an opportunity of examining, with the exception of the Penguins, the Emu, the Cassowary, and Kiwi; in the skeletons of the Ostrich and the Rhea there is an indication of a process. In dried skins this process, which I take to be a rudimentary spur, varies from a small rounded elevation devoid of feathers upon its summit to a well-developed horny knob. The prominence is especially well marked in the *Charadriiformes* and in *Burhinus* and *Orthorhamphus* definitely horny. A definitely horny cover also occurs in some Pigeons, especially *Goura*, and in some Ducks (*Casarca* and *Tadorna*). All other birds exhibit a larger or smaller knob, the summit of which is bare of feathers and is covered with skin which is usually somewhat thicker than that of the rest of the wing. Besides a base for a spur the bony process would serve as a lever for the stronger extension of the *manus*. When a complete spur is absent the tendon of the *extensor longus pollicis* is



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attached near or at the summit as shown in the Plate; when a horny knob is present it is attached somewhat below the summit, as in Figure 5, and when a complete spur is present it is attached to the base. In flying birds a powerful extension of the primaries would, of course, be a distinct advantage. In the Penguin, where no process occurs, the wing is for all practical purposes a rigid paddle in a permanent state of extension, and in the Struthious birds without the process there is little or no need for extension, for in none of those birds are the wings used in running, either as planes or flaps. In the Ostrich and Rhea which have a small elevation on the base of the metacarpal the wings are so used and so need to be extended.

Explanation of Plate—Skeleton of Wing of—

- (1) Penguin (*Eudyptula*).
- (2) Emu (*Dromaius*).
- (3) Satin Bower-Bird (*Ptilonorhynchus*).
- (4) Black Swan (*Chenopsis*).
- (5) Crowned-Pigeon (*Goura*).
- (6) Spur-winged Plover (*Lobibyx*) with horny sheath removed.

Nos. 3, 4, and 5 show the attachment of the tendon of the *extensor longus pollicis*.

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