50. Chalcophaps indica.

Chalcophaps indica (L.); Sharpe, Ibis, 1890, p. 136; Everett, t. c. p. 194.

No. 48. Juv. Dulit, 4500 feet, October.

Fam. Phasianidæ.

51. Lobiophasis bulweri.

Lobiophasis bulweri, Sharpe; Everett, t. c. p. 198.

Several specimens of this fine Pheasant from Mount Dulit. Mr. Everett has also sent the egg, which is of a pale stone colour, and measures, axis 1·5 inch, diam. 1·6.

XXXVII.—*On the Rudimentary Hallux of the Kittiwake* (Rissa tridactyla). By W. Eagle Clarke, F.L.S.

The literature relating to our knowledge of the rudimentary hallux of the so-called three-toed birds is, I believe, not of a very extensive nature. Nor has the hind toe of the species under consideration received much attention. These facts must be my excuse for placing the following slight notes on record.

It is scarcely necessary to remark that the genus *Rissa* was founded by Leach mainly upon the rudimentary nature, or absence, of the hallux. This toe appears to be a variable quantity in the two species belonging to the genus, and is most developed in the race of the common species which inhabits the Pacific Region. This race has, mainly or entirely on this account, been promoted to subspecific rank by the American ornithologists under the name of *Rissa tridactyla pollicaris*. Even in this race, however, the development of the hallux would appear to be a variable character.

Regarding the status and appearance of the hind toe of the Common Kittiwake (*Rissa tridactyla*) little need be said here, since the published accounts of various ornithologists are so well known and so readily accessible.

The summer cruise, in 1891, of the yacht 'Shiantelle,' thanks to the kindness of my friend Mr. Harvie-Brown, enabled me to obtain a series of embryos in various stages of

development, from the great Kittiwake nurseries at the Shiant Islands. These embryonic specimens, and an almost full-fledged nestling and a mature bird, both in the flesh, kindly obtained for me by Mr. F. P. Johnson, together with a series of skins from the collections of Messrs. Feilden and Harvie-Brown, Mr. William Evans, and the Museum of Science and Art, Edinburgh, form the material upon which the following notes are based. From this material I selected certain specimens exhibiting as many stages of development as possible, and from these a series of preparations were made for microscopical examination.

An examination of the skins of the immature and adult specimens has resulted in my finding that in the great majority the hallux is present in a rudimentary state, usually from ·10 to ·13 inch in length; and in the minority of these specimens as a mere tubercle. I have only, however, noted the presence of a nail on the hallux in a single adult bird—an interesting specimen from Spitzbergen, obtained at Hecla Bay on the 14th of July, 1827, one of a small series of birds in the Edinburgh Museum obtained by Captain Parry in his celebrated attempt to reach the North Pole. In this bird the nail is very minute, is situated about the centre of the dorsal surface, and does not reach nearly to the end of the digit. Two immature specimens also had nails. One of these, six months old, had the nail extending almost to the apex of the hallux in the form of a thin narrow plate or scale.

The following notes refer to the microscopical examination of the embryos of various ages, and of the nestling and adult already alluded to as received in the flesh.

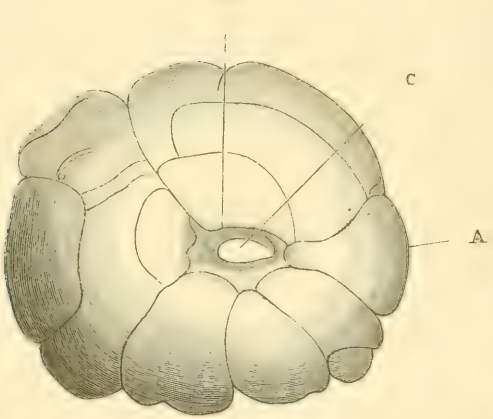
In three early embryos of twelve days and under, of which both transverse and longitudinal sections of the foot were prepared, there was not a trace of a nail to be found on *any* of the toes, or even a thickening of the epidermis in the future nail-area. The epithelium presented an unbroken surface, owing to the absence of scutes.

An embryo estimated to be eighteen days old had the nails on the second, third, and fourth digits well formed and kera-

tinized. There was not, however, a trace of a nail to be found on the hallux, or even a thickening of the epidermis in the nail region, in either series of transverse and longitudinal sections prepared from this specimen.

The next specimen was a ripe embryo estimated to be twenty-five days old. Before sections were prepared the hallux of this specimen was examined under a magnifying-power of 50 diameters, which showed this toe to be a mere papilla, clothed in scutellate epidermis, and furnished with a nail placed almost centrally upon the dorsal aspect, being at some little distance from the apex of the digit and from its lateral margins. This nail was small in size and oblong-oval, like a patella in shape (see fig. 1), its longest diameter

Fig. 1.



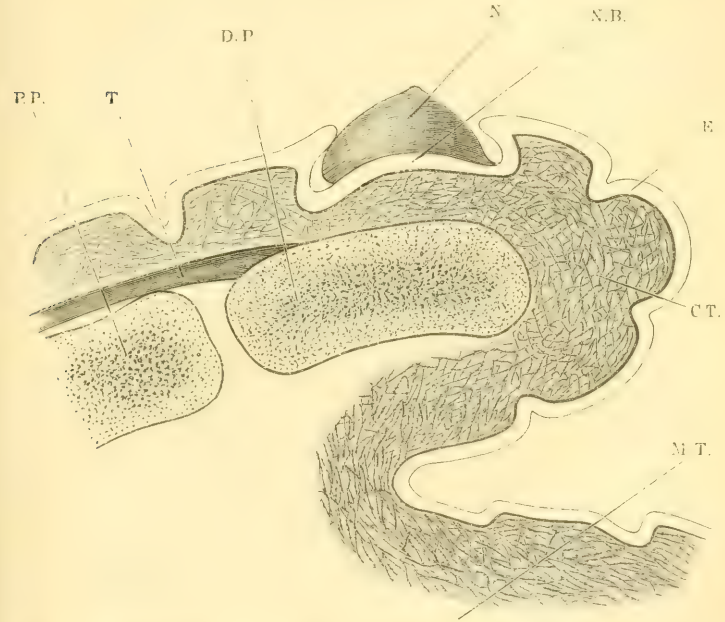
Dorsal aspect of hallux of ripe embryo of *Rissa tridactyla*, showing the position of the nail. × 50.

E, edge of nail; C, centrum of nail; A, apex of hallux.

corresponding with that of the toe. The sections cut show that the nail is embedded at its edge under a circular nail-fold, towards which the nail gradually tapers down from its somewhat raised, thickened, central portion. In structure it resembles an ordinary nail, and tends to divide into lamellæ, or "flake," when cut in a microtome. In position the nail

occupies a small area, and is placed two or three times its own length from the tip of the digit. It has not the appearance of a claw, for it does not project beyond the general surface, only presenting a slightly raised central portion, which represents the tip of the nail. This nail is very thin when compared with the corresponding structures on the other digits of the specimen. The possession by the digit of a *flexor longus hallucis* is indicated by the presence of the tendon shown in fig. 2, which gives details of the hallux of this specimen as seen in section.

Fig. 2.



Section (diagrammatic) of hallux of ripe embryo of *Rissa tridactyla*. ×70.
N, nail; N.B., nail-bed; P.P., proximal phalanx; D.P., distal phalanx; T, tendon; M.T., tarso-metatarsus; E, epidermis; C.T., connective tissue.

The phalanges of all these embryonic specimens were, of course, more or less cartilaginous, but it is notable that when compared with those of the other digits, of the same specimen, the phalanges of the hallux were uniformly less

advanced than those of the second, third, and fourth toes. In addition to the embryos alluded to I have others, amounting in all to about twenty specimens, and in the whole of these a rudimentary hallux was present.

In the nestling, which was well-feathered and would soon have left the nest, a nail was found on the hind toe. When sectioned this nail proved to be very hard, but similar in shape and position to that on the ripe embryo. It differed only in being larger and thicker, though very much thinner than the claws on the other toes.

In the adult, in which the hallux was well developed, the epithelial scutes were found to be very thick and had become considerably keratinized. No trace of a nail was found, not even remains or aborted tissue, in the section made.

The following is a summary of the main facts ascertained from the examination of this limited supply of material :—

All the embryo Kittiwakes, about twenty in number, possessed a hallux.

The great majority of the immature and adult specimens examined also possessed a rudimentary hallux, *i. e.* something more than a mere tubercle.

No nail, or traces of it, were found on the hallux or other digits of embryonic specimens estimated to be twelve days old, or less.

An embryo at eighteen days had nails well developed and keratinized on the second, third, and fourth digits, but possessed no signs of a nail on the hallux.

The youngest specimen with a nail on the hallux was a ripe embryo.

A well-fledged nestling and two specimens about six months old possessed small scale-like nails on the hallux.

In one case only was a nail—a very small one—found in an adult specimen.

The nail is imperfect in form and quite useless, and is thin in comparison with the other claws on the same bird.

Lastly, we have the ascertained position of the nail, when present. The position of the nail is, I believe, unusual

among other genera of the Larinæ, and is perhaps not a little remarkable in its relation to the phalanx. I found this almost central position occupied by the nail in all the specimens examined. In one the nail was longer than in the others, and consequently extended nearly to the apex of the digit.

A question implying important alternatives remains unanswered, as the result of the incompleteness of our knowledge relating to the nail on the hallux of this species, namely—(1) Is the possession of this nail an individual peculiarity, or (2) do all Kittiwakes possess such a nail during some period of their early life?

The former is *most probably* the case. The latter is, perhaps, *possible*, but its acceptance implies—from the ascertained facts—that this nail is developed very late in embryonic life, and that it disappears early in most cases.

A pleasant duty now remains, namely, to express my obligations and thanks. To my friend Dr. Carlier, of the Physiological Department of the University of Edinburgh, I am indebted for much assistance, which it affords me great pleasure to acknowledge. My thanks are also due and hereby accorded to the friends severally named in these notes, and to Mr. Herbert Goodchild, of Edinburgh, who kindly prepared the finished drawings from which the figures have been reproduced.

XXXVIII.—*Notices of recent Ornithological Publications.*

[Continued from p. 345.]

66. *Berlepsch on the Birds of Curaçao, W.I.*

[Die Vögel der Insel Curaçao, nach einer von Herrn cand. theol. Ernst Peters daselbst angelegten Sammlung. J. f. O. January 1892.]

Insular faunas, however small their area, are, as Darwin and Wallace teach us, always worthy of careful examination; and we are therefore deeply grateful to Graf v. Berlepsch for this excellent essay on what is known of the birds of Curaçao and its satellites, Buen Ayre and Oruba. The immediate occasion of the present paper was the receipt of a collection of