

the intestine is of greater length than in the carnivorous, so in the case of different specimens of one and the same species of Penguin, the length of the gut may vary in accordance with the more or less nutritive quality of the food at the disposal of different specimens of one and the same species inhabiting different localities. In support of this view, I may refer to the difference in length of the intestine in two specimens of *Eudyptes chrysocome*. In one of these from Tristan d'Acunha, the gut measured 11 feet 8 inches in length, while in another specimen from Kerguelen the intestine was 23 feet in length. Both of these birds are considered by ornithologists to belong to one and the same species, and yet the length of the intestine of the one is nearly double that of the other. This difference, as well as the smaller differences in the length of the alimentary canal in various specimens of the same species which inhabit approximately the same locality, appears to me to be only explicable on the supposition above enunciated. Be this as it may, difference in length of the alimentary canal cannot *per se* be considered a reliable factor in the determination of species.

THE LARGE INTESTINE.

The large intestine (Pl. XIII. fig. 6 and Pl. XVII. figs. 5, 6, 7, 8) includes the cæca, rectum, cloaca, and anal passage.

In *Eudyptes chrysocome* from Tristan d'Acunha, each of the cæca measures $\frac{1}{2}$ an inch in length, and is somewhat dilated at its blind extremity. They are closely applied to one another in front of (below) the termination of the small intestine, the gut passing backwards above them.¹ Their apertures of communication with the great gut are free and unprovided with any valve. Their mucous membrane presents a reticulated appearance, and, unlike that of the small intestine, is altogether devoid of villi.

The rectum, from the cæcal apertures to its opening into the cloaca, measures 1 inch in length. Its calibre is of uniform size throughout, and does not exceed that of the small intestine. Its mucous membrane is provided with villi, which, however, are less numerous and more sparsely distributed than in the small gut.

The cloacal chamber is globular in form, and when distended measures $1\frac{1}{2}$ inches in diameter. When opened, its mucous membrane is seen to be thrown into slightly marked longitudinal rugæ, which are most abundant in the neighbourhood of the rectal aperture. Its surface otherwise is smooth, and presents no trace of villi. On the upper wall of the cloaca there is a well-defined transverse fold of mucous membrane, the posterior border of which is free. This fold indicates the separation of the cloacal chamber into two parts, an anterior larger, and a posterior smaller, which, however,

¹ Both Garnot (*Annales des Sciences Nat., Zoologie*, 1826, p. 53) and Meckel (*Anatomie Comparée*, vol. viii. p. 214) note the close adhesion of the cæca to one another in the Penguins examined by them. Meckel, moreover, states that the cæcal cavities communicate directly with one another. Such was not the case in any species which I have examined. In all, the cæcal cavities communicated only with the rectum, each by means of a separate aperture.