

It will be noted that I failed to observe any peculiarity in respect either of the muscular or of the respiratory organs which would serve to explain the power which the Penguins possess of remaining submerged for a considerable period of time. This faculty is more probably due to a physiological adaptation of these birds to the necessities of their peculiar mode of life, rather than to any structural modification of the organs which are affected thereby. Mr. Murray¹ states that a rock-hopper Penguin (*Eudyptes chrysocome*), placed in a basket and submerged, "was dead in one minute and thirty seconds," from which we may conclude, considering the great vitality of these birds, that the period during which they usually remain under water when diving is considerably less. From observations made by myself with regard to the length of time which the diving birds of our own coasts (Guillemots, &c.) remain under water, it seems that the duration of each submersion varies from one minute thirty seconds to one minute forty-five seconds, and the length of time during which the Penguins can remain under water is apparently somewhat less. In the Guillemots, as in the Penguins, there is a total absence of any structural modification which would account for the possession of this faculty, which therefore in both cases appears rather to depend upon functional than upon structural modification.

In respect of the urinary and genital organs, the Penguins have their kidney divided into two lobes, while the male and female organs resemble those of birds in general, the latter presenting the usual atrophy of the ovary and oviduct of the right side.

The cutaneous system of the Spheniscidæ is thoroughly characteristic of the group, and differs from that of every other group of birds, in respect of the uniform distribution of the feathers over every part of the integument, and in the consequent absence of the bare tracts or apteria met with in other birds. The feathers each possess an "aftershaft," the structure of which is similar to that of the feather itself. The "remiges" or quill feathers are not distinguishable from the surrounding feathers; but the "rectrices" or quill feathers of the tail are clearly differentiated. These cutaneous peculiarities were long since recognised in *Aptenodytes patagonicus* and in *Spheniscus demersus*, by Nitzsch,² and I have now confirmed and extended the observation to every species of Penguin which I have dissected. The oil glands in the Spheniscidæ are of large size, and the duct of each terminates on the cutaneous surface by means of a single orifice.

Along with the skin it is convenient to direct attention to the great development of the subcutaneous fatty layer of the Penguins, as compared with other birds. This layer far exceeds in thickness that of the corresponding structure in the members of any other group of birds, and recalls to mind the fatty deposit or "blubber" of the Seals and Cetaceans. In the Penguins, as in the mammals just named, this deposit of fat appears to act as a non-conductor of heat, and serves to equalise the temperature of the bird,

¹ Sclater, Challenger Reports, Zoology, part viii. p. 132.

² Pterylography, Ray Soc., edited by P. L. Sclater, F.R.S., p. 154.