

THE PELAGE OF THE ROSS SEAL

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AN adult male Ross seal (*Ommatophoca rossi* Gray 1884) was captured in the Weddell Sea at lat. 65°43'S., long. 10°18'W. on 26 January 1963 by members of the British Antarctic Survey, and preserved by freezing soon after death. The specimen, which measured 201 cm. (6 ft. 7 in.) in length from nose to tail was examined at the British Museum (Nat. Hist.) on 27 January 1965. Skin samples approximately 10 cm. square were cut from different sites on the specimen, pinned out to their original dimensions and then fixed in 4 per cent formaldehyde neutralized with hexamine. Skin pieces were dehydrated, cleared in cedarwood oil, embedded in paraffin wax or celloidin, and sectioned. The sections were stained with Ehrlich's haematoxylin and eosin or using the P.A.S. reaction.

Thermoplastic impressions of the sheared skin surface were made (Scheffer, 1964a). The hairs were first clipped with hair clippers, then the remaining stumps cut off as short as possible with spring scissors. Skin discs approximately 1 cm.² in area were cut out with a cork borer, dehydrated, cleared in cedarwood oil overnight and washed in acetone to remove any grease or dirt. Two pieces of acetate sheeting 0.5 and 0.254 mm. thick were placed on top of each other against the pelage surface, the thinner sheet being in direct contact with it. The skin and acetate layers were then clamped between two pieces of hardboard and heated in an oven at between 90° and 100°C for 10 min. On removal, the acetate sheeting was stripped off and a clear impression of the skin surface remained on the thinner sheet, the thicker sheet having prevented blurring due to overheating. The same method was employed to obtain impressions of the surface scale patterns of vibrissae and individual body hairs (Hardy and Plitt, 1940).

DESCRIPTION

According to King (1964) the Ross seal is dark grey, slightly darker along the mid-back and shading to a whitish colour ventrally with paler grey streaks and lines running back from the sides of the neck and shoulders. The colour of the specimen examined, however, was a sandy brown, though much obscured by blood and dirt.

The entire skin is pigmented, melanin deposits being more intense on the dorsal surface. Melanin-containing cells form a band 120 microns wide in the dorsal epidermis and 80 microns wide in the ventral epidermis.

THE VIBRISSAE

The general hair cover extends over the whole snout, there being no distinct rhinarium. The vibrissae are rather slightly developed compared with other phocid species, and are represented by the mystacial elements only; their distribution is shown in Fig. 1. There are about five principal vibrissae on each side, the longest being 42 mm. long and spanning 138 mm. between the tips. The vibrissae have a regular outline; they are considerably abraded particularly at the tips and on the outward-facing surfaces. The scale pattern proximally resembles that of the primary pelage hairs but it becomes obliterated in the distal third.

COMPOSITION OF THE PELAGE

The hair pattern was studied at four main sites:

- i. Top of the head.
- ii. Mid-dorsal surface.
- iii. Ventral surface between the fore flippers.
- iv. Mid-ventral surface.

The hair pattern is composed of units, each unit comprising either a single primary hair (Fig. 2b) or a primary hair with one or, very rarely, two secondary hairs associated with it (Fig. 2a). The primary and secondary hairs emerge from the same pilary canal, the primary

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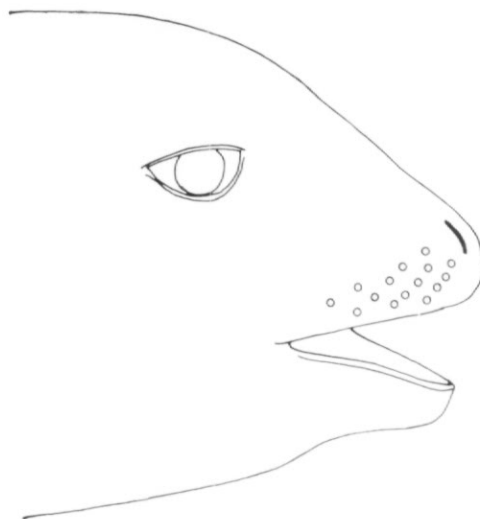


Fig. 1. Head of a Ross seal to show the distribution of the vibrissae.

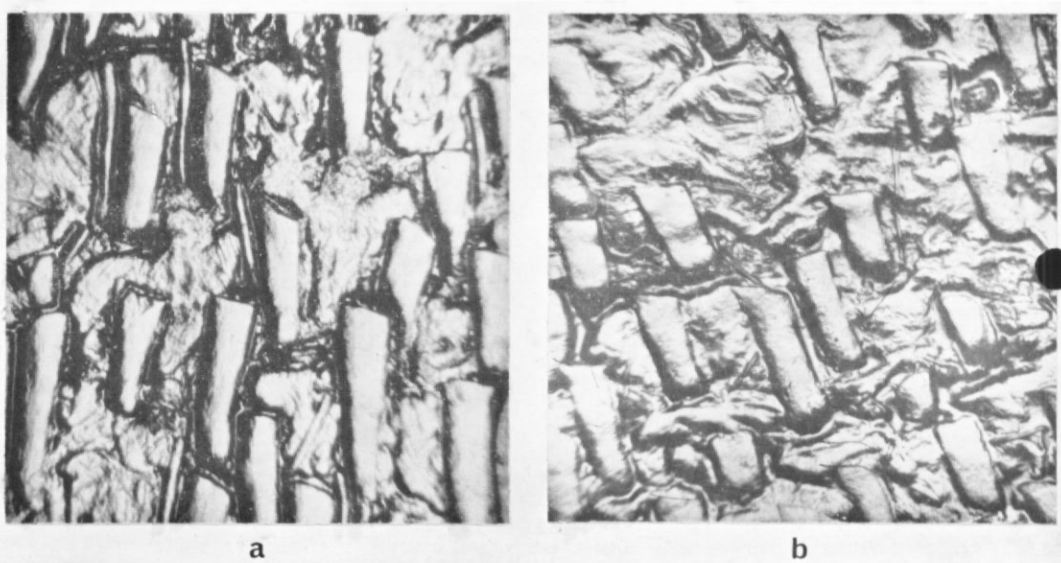


Fig. 2. Thermoplastic casts of skin of:
a. Mid-dorsal surface.
b. Top of the head.

hair always lying anterior to the secondary one. The units appear to be arranged randomly, the spacing between individual units differing considerably, and there is no distinct grouping (cf. Scheffer, 1964b, table 3). The secondary hairs have a mean basal diameter of 50 microns compared with 120 microns in the primary hairs. Both primary and secondary hairs show a distinct cuticular scale pattern of the mosaic type (Fig. 3).

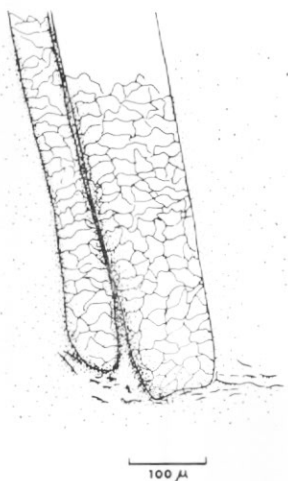


Fig. 3. *Camera lucida* drawing of the scale pattern of hairs from the mid-dorsal surface of the body.

The lengths of the primary hairs vary, being longer on the ventral surface, with an average length of 10.6 mm., than on the dorsal surface where the average length is 6.5 mm. But all the hairs showed some signs of abrasion at the tips so this difference may not be significant. The hair lengths were compared with hairs from the dressed skins at the British Museum (Nat. Hist.) and they were found to be similar.

The density of hair populations at the four selected sites was studied. The primary and secondary hairs were counted in a series of samples from each selected site and the means were calculated. The number of primary hairs was highest in the samples from the top of the head with a mean of 3.6 per mm.² and lowest at the ventral surface between the fore flippers with a mean of only 1.9 per mm.², the numbers at the mid-dorsal and the mid-ventral surfaces lying between, with means of 3.0 and 2.6 per mm.², respectively. Differences in the numbers of secondary hairs associated with the primaries were also observed. Very few secondary hairs are present on the ventral surface, whereas they are quite numerous on the dorsal surface, particularly in the mid-dorsal region, where 90 per cent of the primaries have secondaries associated with them. The number of secondary hairs varies much more from sample to sample than does that of the primaries.

Unlike most seals (Sokolov, 1960), the skin is thicker on the ventral surface than on the dorsal surface. From sectioned material, it can be seen that the primary and secondary hairs arise in separate follicles, the primary ones penetrating deeper into the dermis than the secondary ones. The skin is deficient in glandular structure at the sites studied. The sebaceous glands are small, paired and open into the pilary canal near the top. No sweat glands were seen in any of the material observed, although the strings of fat cells, which in other species are found in the sinuosities of the sweat glands, can be seen associated with the follicles. As in other seals, no *stratum granulosum* or *arrectores piles* muscles are present. The *stratum corneum* is thin and seems to be a persistent layer, mitoses in the epidermis not being observed.

The hair is shorter and sparser on the flipper. Both primary and secondary hairs are present but secondary hairs are rare in the interdigital web of the hind flipper.

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REFERENCES

- HARDY, J. I. and M. PLITT. 1940. An Improved Method for Revealing the Surface Structure of Fur Fibres. *Wildl. Circ.*, 7, iv, 1-10.
- KING, J. E. 1964. *Seals of the World*. London, British Museum (Nat. Hist.).
- SCHEFFER, V. B. 1964a. Estimating Abundance of Pelage Fibres on Fur Seal Skin. *Proc. zool. Soc. Lond.*, **143**, No. 1, 37-41.
- . 1964b. Hair Patterns in Seals (Pinnipedia). *J. Morph.*, **115**, No. 2, 291-301.
- SOKOLOV, W. 1960. The Skin Structure in Pinnipedia of the U.S.S.R. Fauna. *J. Morph.*, **107**, No. 3, 285-96.