PLATE VI.

Fig. 1. A piece of the fibre of the rigid skeleton of *Dactylocalyx Masoni*, magnified 108 linear.

Fig. 2. A view of the inner surface of part of the expansile dermal system of *D. Masoni*, with a portion of the rigid skeleton *in situ*, magnified 108 linear.

Fig. 3. One of the furcated attenuato-patento-ternate connecting spicula of *D. Masoni*, magnified 108 linear.

Fig. 4. A minute elongo-stellate retentive spiculum from the dermal membrane of *D. Masoni*, magnified 666 linear.

Fig. 5. A piece of the fibre of the rigid skeleton of *D. Bowerbankii*, magnified 108 linear.

Fig. 6. One of the furcated attenuato-patento-ternate connecting spicula of the normal form from the expansile dermal system of *D. Bowerbankii*, magnified 175 linear.

Fig. 7. A furcated attenuato-patento-ternate connecting spiculum with ramified terminations to the furcations of the radii. This form, with more or less ramified terminations, is frequently found in this species. Magnified 175 linear.

Fig. 8. Retentive spicula from the dermal membrane of *D. Bowerbankii*: *a*, *a*, the elongo-cylindro-stellate form, variable in size, and very numerous; *b*, the elongo-attenuato-stellate form, few in number: magnified 666 linear.

Fig. 9. A fragment of the fibre of the rigid skeleton of *D. polydiscus*, magnified 108 linear.

Fig. 10. A portion of the expansile dermal system of *D. polydiscus*, with the discoid expando-ternate connecting spicula *in situ*, magnified 108 linear.

Fig. 11. Two varieties in form of the connecting spicula of *D. polydiscus*, magnified 108 linear.

Fig. 12. A fusiformi-acerate tension-spiculum from the dermal membrane of *D. polydiscus*, magnified 666 linear.

Figs. 13 & 14. Two of the retentive spicula of the dermal membrane of *D. polydiscus*, magnified 666 linear.

4. Report on the Eared Seals collected by the Society's Keeper François Lecomte in the Falkland Islands. By JAMES MURIE, M.D., F.L.S., Prosector to the Society.

(Plate VII.)

An account of the Society's keeper Lecomte's expedition to the Falkland Islands for the purpose of collecting live specimens of Eared Seals, Penguins, &c., has already, in November last, been laid before the Scientific Meeting by our Secretary, Mr. Sclater (see P. Z. S. 1868, p. 527). It devolves upon me to add to that report memoranda concerning the skins and skeletons of the *Phocidæ* obtained during Lecomte's sojourn at the above islands. The specimens in question, owing to difficulties and mishaps in the way of transport, did not arrive in England until some time after the live stock, brought home by Lecomte himself. Furthermore, I regret to mention that, from a variety of causes, the condition of the objects is not so perfect as could be wished; but, under the adverse circumstances incident to the voyage, this is not to be wondered at. I am happy to add, though, that some points in connexion with the

C. BERJEAU LITH.

M. & N. HANHART IMP.

OTARIA JUBATA.

Otariidæ, which hitherto have been indefinite, receive elucidation, even from the imperfect supply now furnished.

The skins were preserved in a salted condition, the bones roughly dried. They have been compared and identified with those in the British Museum.

The total number of animals to which the specimens belong is sixteen: they comprise but two species, namely, the *Otaria jubata*, Foster, and *Otaria nigrescens* (*Arctocephalus nigrescens*, Gray). Of these, fifteen belong to the first, and but one to the second species.

I. Otaria jubata.

1. Skin and cranium (tolerably perfect) of an adult male, but not aged, Sea-lion, technically called by the traders a "Bull;" shot at Kelp Island, one of the eastern islets of the group of the Falkland Islands.

Lecomte states that there were altogether about 40 Seals composing the herd of which this male was a member. Another, much larger and maned male was wounded by a shot at the same time, but it managed to escape.

The above skin, in its present moist condition, measures 96 inches from the muzzle to the posterior end of the hind flippers as they are thrown backwards; from the muzzle to the tip of tail 73 inches; from point to point of the outstretched fore flippers $76\frac{1}{2}$ inches.

The pelage on the back and belly is worn and rubbed off, the animal evidently having been just shedding its coat when slain. There is a very slight tendency to development of a mane, the longish hairs here being of a brindled yellow-and-brown shade. The throat is lighter-coloured and with shorter hairs; but towards the mandible they are longer, darker, and beard-like. The upper surface of the head, almost as far as the nose, is of a light or yellowish-brown shade; the two cheeks dark brown; the muzzle black. The fresh undercoat of shorter hairs (not the underwool) all along the back inclines to a yellowish grey. The long and partially abraded hairs in scattered patches are dull brown, which becomes slightly redder and richer in tint at the buttocks and posterior tibial regions. This same hue is apparently the original one previous to the shedding of the outer coat; it is well seen in the axillæ. The belly, with very short and finely set hair, is of a brownish yellow. The flippers are black where bare of hair.

The skull is a good representative of the species during middle life—that is, before the extraordinary high occipito-parietal and longitudinal parieto-frontal crests peculiar to very old age are developed. These elevations have just commenced to show themselves in a raised narrow plate of bone. The surface of the cranium is altogether rough. The palate is broad, and but moderately deep (see fig. 1, p. 103).

The teeth exhibit a most remarkable condition, and such as I have only witnessed (and that but slight in comparison) in one other specimen of the genus. Not only the whole of the smaller-sized molars and premolars, but also the great canines of both upper and lower

jaws, in the specimen under consideration, are worn in a circular grooved manner, as if compassed by a ring in their middles. The canines are not so grooved round about, but rather deeply excavated behind. The crowns of the canines and the grinding-teeth are likewise ground down and flattened; but this is of less moment than the way in which the dentine is grooved. The worn surface is blackened, but smooth.

Three reasons may be given for the wearing of the teeth in this uncommon way:—

(*a*) It is possible for the dental apparatus of the upper and lower jaws to effect a wearing away of the softer dentine by their unequally fitting and rubbing against each other. Examination, however, of the maxillæ when approximated proves this to have been unlikely—in fact, impossible.

(*b*) Again it may be suggested that granules of sand and pebbles, which these animals swallow, as I shall afterwards mention, may have ground down the teeth at the gums. This also is a most unlikely circumstance, if we attentively consider the nature of the polished surfaces and the apparent mode in which they are eroded. Besides, it would be too good a joke to admit that the Sea-lion possessed a bad dentifrice and tooth-brush.

(*c*) In the human being, cases do come before dentists where circular abrasion occurs such as we have here. This has been proved beyond doubt to be effected by an altered condition of the glandular fluids ejected into the mouth. The tongue, laving the surfaces of the teeth with the changed secretion, by degrees abrades the dentinal surface, wears irregular grooves, and leaves the harder enamel comparatively unchanged. Such may likewise happen even to an Eared Seal for aught I know to the contrary.

2. Skin and skeleton (the cranium considerably injured) of a pregnant female Eared Seal (termed "Clapmatch"). This was killed by the stroke of a baton at Kelp Island on the 8th June 1868. The sex is well authenticated, inasmuch as Lecomte extracted a fœtus of about a foot long from the womb. This fœtus, curious to say, was pounced upon and carried off by a Chimango (?), which had been hovering overhead watching the operation.

Greatest length of skin, including hind extremities, 80½ inches; from muzzle to end of tail 66½ inches; tip to tip of fore limbs outspread 58 inches.

Teats well developed, 4 in number; front ones 2 inches from the middle line of abdomen, and distant 5 inches behind the axillæ; hinder ones 1 inch outside the median line, and 9 inches distant from the pectoral ones.

From the forehead, along the whole line of the back and the upper sides of the body to as far as the tail, the colour is blackish mingled with grey, the tips of the hairs being grey, their bases black. There is a black streak from the muzzle to the forehead, on either side of which and above the eye is a light grey patch, the cheeks outside of that being of the same shade as the back. A light and longer-haired beard is partially developed; behind is a moderate-sized darker patch;

and then the throat and the whole of the abdomen posteriorly is of a yellowish-grey or light drab tint. Around each eye is a narrow circlet of brown. The hair on this skin, as well as on those of the next three females, is much shorter than the outer coat of the male No. 1; indeed it resembles, both in colour and texture, the inner coat of the said male.

The skull of this female being considerably injured in the maxillary and premaxillary regions, I shall make no comments on it further than to mention the size—namely, greatest length 10·3 inches. The skeleton agrees with that of specimens of *Otaria jubata*.

Fig. 1.

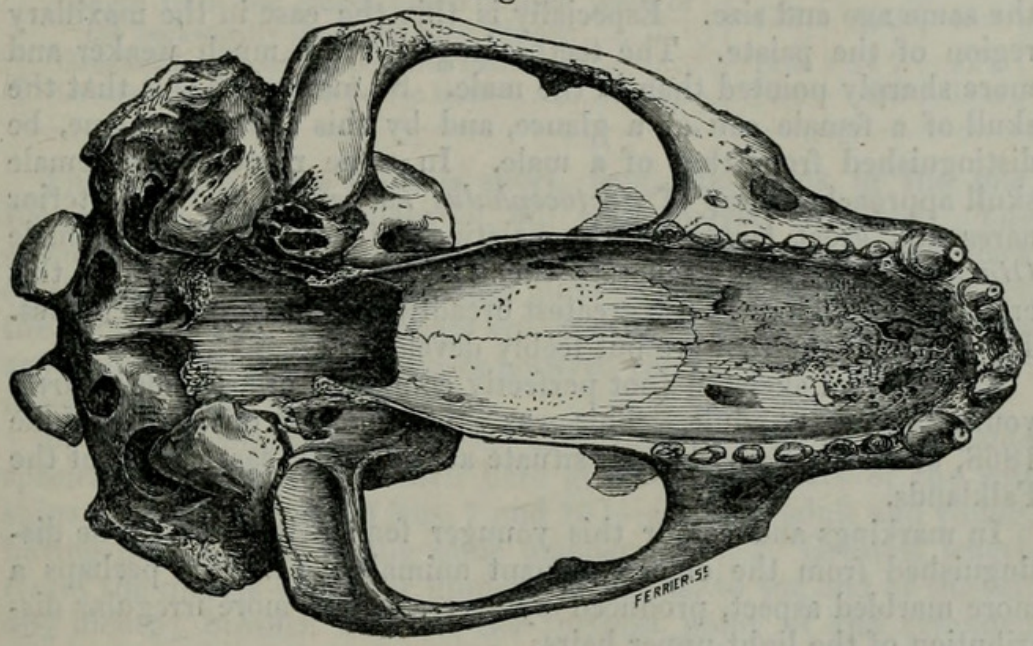
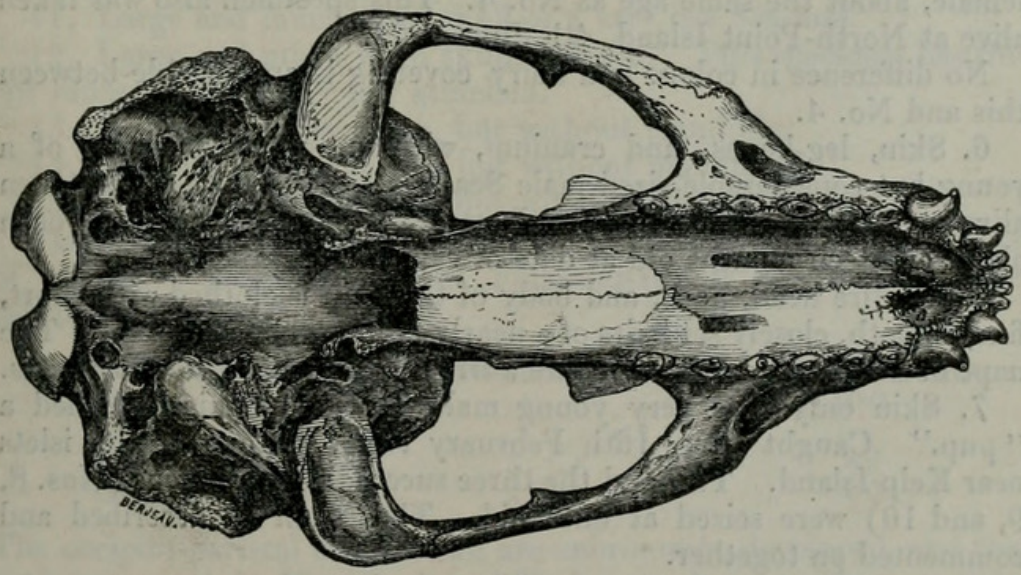


Fig. 2.



Under views of male and female skulls of *Otaria jubata*.

Fig. 1. Adult male, that described in text as No. 1.
2. Adult female, the specimen referred to as No. 3.
(Both reduced to one-third of nat. size.)

3. Another skin and skeleton (in better condition) of an adult and pregnant female, killed at the same time and place as the foregoing (No. 2). The fœtus found in this specimen corresponded in size to the other.

The colour of this skin corresponds in every particular with that described as No. 2, only it is not quite so dark.

The maxillary and premaxillary bones of this skull are also partly broken by the fatal blow with the baton. The palate, however, a good character of the species, is entire. This demonstrates, as does the whole inferior region (compare figs. 1 and 2), that the cranium of the female is much narrower and shallower than that of males of the same age and size. Especially is this the case in the maxillary region of the palate. The teeth altogether are much weaker and more sharply pointed than in the male. So marked is this that the skull of a female can at a glance, and by this character alone, be distinguished from that of a male. In some respects the female skull approaches that of *Arctocephalus hookeri*; but the posterior nares and great length of the palatines of both male and female *Otaria jubata* readily separate them. The greatest length of this cranium is 10·5 inches, the greatest breadth (at the zygoma) 6 inches. The crests of the roof are but feebly developed.

4. Skin and skeleton (not perfectly complete) of a female *Otaria*, young but nearly adult. This was captured alive on the 4th June 1868, at North-Point Island, situate at the south-east corner of the Falklands.

In markings and colour this younger female is hardly to be distinguished from the older pregnant animals. There is perhaps a more marbled aspect, produced by a greater and more irregular distribution of the light upper hairs.

5. Skin, disarticulated fragmentary skull, and leg-bones of another female, about the same age as No. 4. This specimen also was taken alive at North-Point Island, 4th June 1868.

No difference in colour and hairy covering is appreciable between this and No. 4.

6. Skin, leg-bones, and cranium, with imperfect dentition of a young but considerable-sized male Sea-lion. This animal was taken alive at Kelp Island on the 8th June 1868, and said to have been about eighteen months old at date of capture.

The entire head, neck, and body of this skin is clothed with short, fine, smooth, closely set hairs of a nearly uniform chocolate tint. The nape of the neck and the belly are a trifle lighter than the other parts.

7. Skin only of a very young male *Otaria*, technically called a "pup." Caught alive, 16th February 1868, on one of the islets near Kelp Island. This and the three succeeding specimens (Nos. 8, 9, and 10) were seized at one raid. They shall be described and commented on together.

8. Another skin, closely resembling the last.

9. A skin, vertebral column, leg-bones, and feet of a similar very young but female Seal.

10. Similar skin of another young female.

One of the females died on the 3rd of March 1868, the other three days after, namely, on the 6th. One of the males lived a month longer, to the 9th April; the last of the four specimens died on Good Friday (April 10th).

The accompanying admeasurements of three of their bodies were taken in centimetres by Lecomte immediately after their death. I have reduced these to inches and decimals.

	♀	♀	♂
Length from the muzzle to the tip of the tail.....	34·0	33·2	37·1
Length from the muzzle to the furthest point of the backwardly stretched hind flipper.....	47·7	41·3	46·7
Greatest length of the pectoral extremity	11·3	11·7	12·9
Greatest length of the pelvic limb	9·0	9·0	11·0

The hair on these skins is short, firm, and thick in the pile. Beneath is a reddish underwool, but very sparsely scattered. The colour of one and all is a very rich dark brown, approaching black on the upper parts, and appearing quite so under certain lights when the skin is moist. The flippers are black only where bare. Scarcely any appreciable difference exists between the males and the females; if any, the males are darkest.

By way of comparison with the adult male and female of the same species (Nos. 1 and 2), I shall here give the diameters of the soft skins of the young ones (Nos. 7 and 10)—all four, adult and young, having been pickled in the same manner. No. 7. Greatest length (from the muzzle to hinder flipper) 50 inches, to the end of the tail $40\frac{3}{4}$ inches; breadth between the furthest point of the extended pectoral members 32 inches. No. 10 gives these consecutive measurements as 47, 39, and $30\frac{1}{2}$ inches.

11. Large and much worn skull of a very old Sea-lion.

12. Large and much worn skull, also old. This specimen has the left ramus of the lower jaw attached.

13. Another aged cranium, but without mandible.

14. Another aged cranium, but without mandible.

15. Another aged cranium, but without mandible.

The respective proportions of the above venerable cranial remnants of the once plentiful race of Falkland-Island Sea-lions may be tabulated thus:—

No. 11.	Length	14·8	inches.	Greatest (zygomatic) breadth			10·0	inches.
12.	,,	14·1	,,	,,	,,	,,	10·0	,,
13.	,,	14·0	,,	,,	,,	,,	—	
14.	,,	13·9	,,	,,	,,	,,	8·7	,,
15.	,,	13·5	,,	,,	,,	,,	9·0	,,

The occipito-parietal crests of all are enormously developed, and the extra processes in No. 12 are peculiarly prominent. The mandible of the latter specimen measures 11·5 inches long, and it is 6·5 inches in vertical height at the coronoid process.

These five skulls, evidently much worn by being rolled on the

shingle, were picked up on the beach at Elephant Island, on the east side of the Falklands. Lecomte and his companions believed these large old skulls of *Otaria jubata* to be those of the Elephant-Seal (*Morunga elephantina*), as it was stated by some of the party that these animals formerly did exist on this island. One of the pilots (Louis Despreaux by name) had resided thirty-two years on the Falkland Islands, and he distinctly remembered shooting many Elephant-Seals in the neighbourhood in bygone years; but about twelve years ago they began to get scarce and disappear. While Lecomte was absent on one of his excursions, a report was current on the islands that a young Elephant-Seal, about 8 feet long, had been killed with a baton by the lighthouse-keeper at Cape Pembroke. On his return Lecomte endeavoured to obtain the skeleton, but it had in the meantime been destroyed.

II. Otaria nigrescens.

16. Bones of the two pectoral extremities of an adult male Fur-Seal. Specimen shot by Mr. Cobb (the Manager of the Falkland-Island Company) on the Volunteer Rocks, north-east of the Falkland-Island group.

Habits and Economy of the Eared Seals.—Under this heading I append chiefly such observations as I have received verbally from Lecomte upon interrogating him respecting what he had witnessed of the daily life of these creatures.

He corroborates the statements of the older voyagers as regards the gregarious habits of the Eared Seals. At various times he has seen families of six, a dozen, and even up to twenty; but, generally speaking, he supposes from ten to fifteen to be the average number of a family group. Several families, again, congregate near each other in the same creek or islet, but, notwithstanding, they do not intermingle. In one instance he calculated there would be about forty individuals, old and young, in the herd. This was when the old male was shot and the four youngsters captured alive. On another occasion, that on which the two adult pregnant females were killed, he reckoned there would be as many as 100 in the herd, distributed, of course, hither and thither in clusters.

They seem to prefer (it may be through a wise precaution on their part) headlands or isthmuses, and choose the most southern locality thereon as a resting-place. One of the old males guards as a sentinel. Usually he is seen perched on an eminence, and invariably, as Lecomte affirms, with outstretched neck and upraised head, as if sniffing around for the slightest ominous warning. The signal of a grunt or growl sets the others on the alert; and on any real approach of danger they rush all helter-skelter towards the water, which they never wander far from.

Their daily occupation seems divided between sleeping and procuring food. They lie huddled together in a drowsy condition, or slumber, for a great part of their time, and this both during the day and night. At high tides, day and night, they take to fishing near

the entrance of the freshwater rivulets into the sea. At such times they will remain a whole tide dabbling about singly after food. This consists of fish and crustaceans. In capturing their prey they swallow it either above or below the water. Our live Sea-lion in the Gardens, as a rule, comes to the surface during the process of deglutition; the other Seals swallow underneath the water. Lecomte says the Eared Seals never drink water; and he substantiates the fact that he kept the first animal he brought to this country for a year without fluid, except such as adhered to the fish he fed it with. He tells me, moreover, he has noticed the common Seals in our own collection occasionally suck in water as a horse would, but the Otaria never. Another curious circumstance he assures me of is, that in the stomach of every one he has examined, with the single exception of a young animal, there existed a quantity of pebbles. The amount varied in individuals from a few to many. Indeed one of the Falkland-Island pilots told Lecomte in good faith that he himself had removed 28 lb. of stones from the digestive cavity of an Elephant-Seal, an old *Otaria jubata* (?). The common notion among the traders and hunters is that these Seals swallow the stones as a kind of ballast to enable them to dive quickly after their prey. For my own part I cannot at all accept this reason on the evidence.

The voices of the old and young animals differ in tone. The adult, and more particularly the old ones either growl in an undertone, or, when excited during the breeding-season, heighten this to a voluminous interrupted roar. The young cries with a kind of bleat like a sheep. In the first Sea-lion possessed by the Society the pupils of the eyes contracted and dilated to an enormous extent; and when enlarged, which took place towards sunset, they became of an opaline hue. The live *Otaria jubata* at present in the Gardens also manifests considerable dilatability of the pupils, but not quite the same change of colour. At night the eye of *Phoca vitulina* appears iridescent, as in some Carnivora. As regards this frequent change in the diameter of the pupil in Otaria, this may have relation to its nocturnal habits as much as to the difference of medium in which the animal lives.

The sexual season lasts for about a month, namely, between the latter end of February and that of March. As has been described by other observers, Lecomte remarks there are then regular pitched battles, the females looking on but not interfering. The males at such times are savage, and if attacked do not run away; but the females are rather timid and shy. After these matches are adjusted, a good deal of playing and gambolling in the water occurs, but the act of coupling takes place on the land. When a male, through age or otherwise, is driven away, he leads a solitary life, and then often goes further inland.

The females go with young about ten months, giving birth to a single one about Christmas or the end of the year, equivalent to our midsummer in this country. Lecomte says there is no great interval between parturition in the females of a herd, as the young range much of a size. They rear their offspring at a short distance from