ART. XXXVIII.—*Note on the Fœtal Membranes of* Mustelus antarcticus.

By Professor T. J. PARKER, F.R.S., University of Otago.
With an Analysis of the Pseudamniotic Fluid, by Professor A. LIVERSIDGE, F.R.S., University of Sydney.

[*Read before the Otago Institute, 11th June, 1889.*]

Plate XIX.

SEVERAL years ago I communicated to the Institute a paper on the gravid uterus of the common dog-fish, or smooth-hound (*Mustelus antarcticus*),* in which I showed that at the end of pregnancy each fœtus is contained in a separate compartment of the uterus, the chambers being separated from one another by complete partitions of mucous membrane, and each being lined by a thin transparent membrane, the *pseudamnion*, and tensely filled with a limpid fluid, the *pseudamniotic fluid*, in which the fœtus floats freely. I considered the pseudamnion to be a cuticular secretion of the mucous membrane.

Although I have dissected a large number of specimens since the time referred to, only one of these has thrown any light on the development of the membranes. It was caught about the middle of December, 1884: the examples containing ripe fœtuses were obtained in the spring (October).

When the oviducts were injected with alcohol from the cloacal end they became filled, showing that the partitions did not exist. On opening, each was found to contain seven eggs of a long-oval form, about 43mm. (1⅔in.) in long and 16mm. (⅔in.) in short diameter.

Each egg (Plate XIX., fig. 1) was surrounded by a distinct structureless membrane of a light yellow colour, adhering closely to the egg except along one meridian, where it passed off at a tangent to the surface, its two closely-applied layers forming a greatly folded sheet fully 30mm. (12in.) long when stretched out. The membrane is thus a closed sac, the sides of which are in contact except in the centre, where they are kept apart by the contained egg (fig. 2).

The membrane was found to adhere so closely to the uterine wall that the eggs retained their position when the uterus was suspended in a jar of spirit, instead of falling to the lower end, as would have been the case if they had been quite free; indeed, they did not fall out even when the uterus was opened.

It appears clear that this membrane is the pseudamnion

* "Trans. N.Z. Inst.," vol. xv. (1882), p. 219.

before distension by fluid, and that it corresponds with the horny egg-shell of oviparous forms. The fact of its being formed before the partitions, to which in later stages it adheres so closely, is worthy of notice.

One very striking feature in the development of *Mustelus* is the extensive growth of the embryo (including the yolk-sac) taking place during intra-uterine life. As stated above, the impregnated egg is only about 43mm. long by 16mm. in diameter, while the ripe fœtuses are fully 220mm. (9in.) long, and 25mm. (1in.) across the head. As there is no vascular connection between parent and offspring, and as the latter is separated from the wall of the uterus by the pseudamniotic fluid, this fact is one of considerable interest.

In the paper already referred to it is stated, as the result of a rough analysis, that the pseudamniotic fluid contains a large proportion of urea, but little or no proteid matter. The following extract from a letter from my friend Professor Liversidge gives a more accurate account of the composition of the fluid. The sample sent to him was mixed with an equal volume of rectified alcohol.

"I have at last given your pseudamniotic fluid of *Mustelus antarcticus* a little attention. When you sent it last year I was afraid that it had been so long bottled (since the 10th October, 1883) as to be not worth examination; but as I got a crop of crystals almost at the first experiment I went on.

"There was a good deal of flocculent sediment, but the fluid above was fairly clear.

"1. To litmus the fluid was faintly alkaline.

"2. On slow evaporation it left crystals somewhat resembling urea, and a few isolated crystals of triple phosphate.

"3. It yields crystals with oxalic and nitric acid resembling the oxalate and nitrate of urea; but I do not attach much importance to crystals formed in complex organic fluids—*i.e.*, to their form.

"4. With fuming nitric acid, CO_2 (and probably N) is given off; did not test expressly for N gas: = urea.

"5. With $Hg2NO_3$ = white ppt. = urea.

"6. With $Hg2NO_3$ and excess of NaCl, no ppt. = urea.

"7. With Hg and HNO_3, from which coloured fumes were being evolved, the addition of some of the pseudamniotic fluid rendered the gases colourless; ∴ CO_2 and N were evolved: = urea.

"8. Uric acid was found to be absent.

"9. Phosphoric acid abundant.

"10. Magnesia abundant, and probably present as triple phosphate.

"11. Lime present.

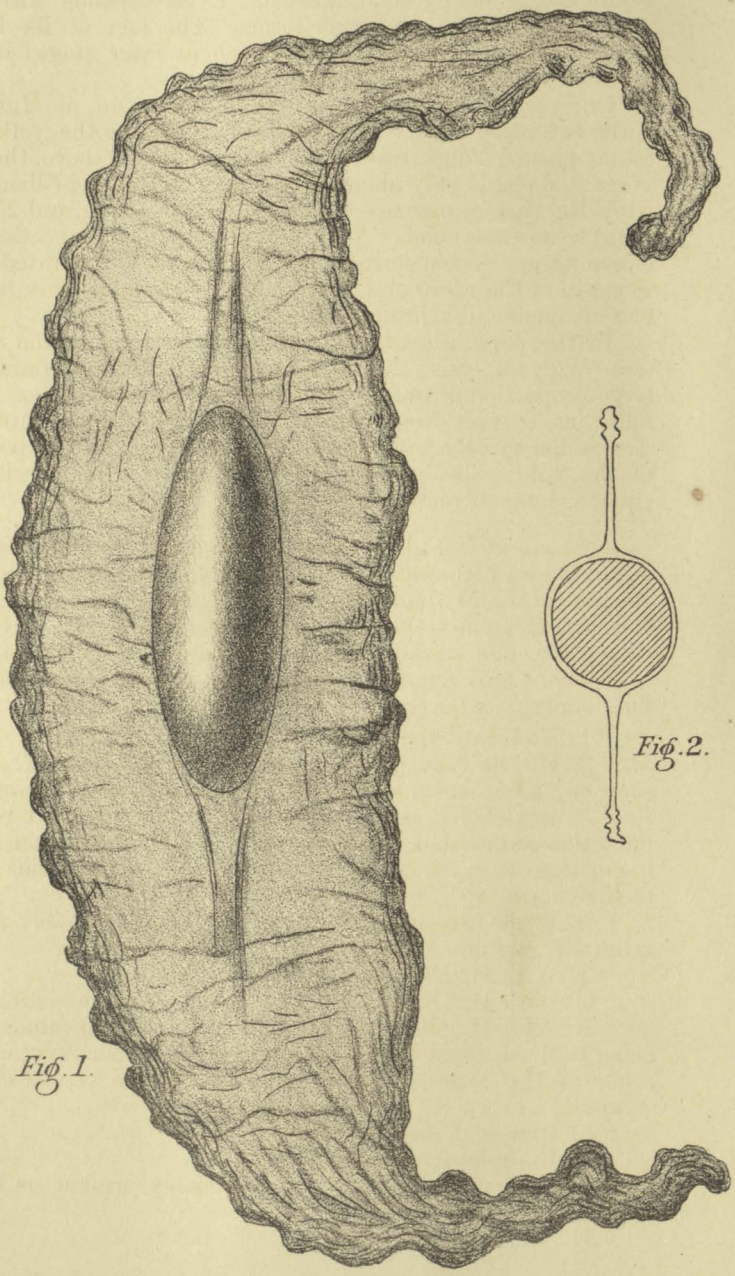

Fig. 2.

Fig. 1.

UTERINE EGG OF MUSTELUS ANTARCTICUS.

T.J.P. ad nat. delt. C.H.P. lith.

"12. On evaporation, 25cc. of the spirit-solution gave 1·135 grammes of extractive matter dried at 100° C., or 2·270 grammes for 25cc. of your original fluid. On incineration the mass swelled up and formed an enormous balloon of coke, but the carbon burnt off readily with a strong sodium flame, and left 0·248grm. of fixed salts, = 0·496grm. on original fluid.

"13. Tested for uric acid = no result.

"14. Tested for allantoïn = no result.

"Hence, taking all the reactions into account, this fluid seems to contain a very large percentage of urea; but a change may have taken place since it was collected."

DESCRIPTION OF PLATE XIX.

Fig. 1. Uterine egg of *Mustelus antarcticus* removed from the uterus, and with the surrounding pseudamniotic membrane spread out (natural size).

Fig. 2. Ideal transverse section of the same.

ART. XXXIX.—*On a Specimen of the Great Ribbon-fish* (Regalecus argenteus) *taken in Nelson Harbour.*

By R. I. KINGSLEY.

[*Read before the Nelson Philosophical Society, 5th November, 1889.*]

Plate XX.

THE fact that a capture of a specimen of the genus *Regalecus* is of very rare occurrence—no doubt partly owing to their inhabiting the deep parts of the ocean,—and the fact also that it cannot be studied, like many other fish, in its native element, create more or less interest in every specimen that may by chance be secured—an interest that affects even such of the general public who care nothing for genera or species, whose first anxiety is, perhaps, "Is it good for food?" To any one, however, who is the least inclined towards natural history or science there should be additional interest in the fact that (I think I am correct in so saying) there has not yet been a single perfect specimen captured; consequently all existing descriptions are either more or less compiled from imperfect or mutilated examples. It therefore becomes a duty to watch for opportunities such as the one I have made the subject of this paper, in order not only to add to our stock of knowledge fresh items of information, but to check and, if need be, correct the published descriptions.