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ON THE MODE OF BIRTH OF THE KANGAROO, COMMUNICATED BY THE HON. L. HOPE, WITH REMARKS ON THE ECHIDNA AND PLATYPUS.

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THOUGH the peculiarities of the generation of marsupials have been studied for about fifty years, there are yet many points that require elucidation before the whole process is clearly comprehended. The reproduction of placental mammalia has been under the eye of civilized nations for ages, and so presents no difficulties, so to speak; but on the exploration of Australia the fauna of this continent show forms of life, new and strange, that require special study before their life history can be understood.

Professor Owen did much to clear up the strange anomalies of marsupial generation, between the years 1830 and 1840, since which little has been added; and, in a conversation with him some five years ago, he remarked that many material points yet remained in the history of the Echidna, the Platypus, and the Kangaroo, which he did not expect would be discovered during his life. I take this opportunity to bring before the Philosophical Society some observations made by the Honourable Louis Hope, of Cleveland, of the efforts made by the embryo kangaroo to arrive at the pouch of its mother.

As Professor Owen was unable to witness this act, he "*was led to believe that the mode of removal of the young from the vulva to the pouch was by the mouth of the mother.*"—*Encyclopædia of Anatomy and Physiology; Article, Marsupialia.*

Though the observations now submitted do not go far enough, they may lead to further examinations of this interesting point. Referring to the article above quoted, the Honourable L. Hope writes to me:—

"I had seen the account long ago, and expected that since that time more definite information had been elicited on the subject. My observations have reference only to the mode of transference of the embryo to the pouch, which I now believe to be effected by the embryo itself; or, at any rate, with very little assistance from the mother, and that almost unconsciously given.

"I heard lately of an instance of the same appearances having been observed by a kangaroo hunter, and was pleased to find the confirmation of his story by my own experience.

"His opinion was that the embryo had been extruded by the dam in its dying agonies, and described almost exactly what I afterwards saw—viz., that the embryo was working its way through the fur straight towards the orifice of the pouch.

"The dam that I shot had been dead, perhaps, five minutes before I noticed what was going on, but I don't think sufficient time had elapsed for the young one to have made its way so far. It was then within about five inches of the orifice of the pouch, or where that should have been, as on examination this appeared to be closed, being surrounded by folds of shrunken skin (not open, as in Professor Owen's case).

"The embryo looked like—and, in fact, at first I took it to be—a piece of raw flesh, which I supposed had been driven out by the bullet; but closer inspection showed it to be working actively with its fore legs—arms, in fact—which were considerably developed, with the claws apparent. It was about one and one-third inches in length, the tail and hind legs undeveloped, and giving the hinder parts of the animal the appearance of a red 'grub.' After watching it a few minutes, and not having much time to remain, I took it from the fur, to which it seemed to adhere pretty firmly, and placed it on the closed orifice of the pouch. It soon left this, however, and commenced travelling through the fur, which was pretty long, with considerable energy: as, however, it began to describe circles, and appeared, as I may say, rather to have lost its way, after a few minutes more I placed it again on the supposed orifice of the pouch, taking care that the head sunk among the folds of the skin I have mentioned. It then seemed to endeavour to burrow in. At this stage I had to leave it, as the day was advancing, and I had an engagement elsewhere. Had I had the means of preserving it I would have removed the skin of the abdomen, including pouch and the embryo, and brought it away; but it appeared to me that, as after death no assistance could come from the dam, no further reliable observations could be made. My theory is that in life the irritation produced by the burrowing of the young one causes the pouch to open for its reception; and this is just what can only be observed in the captivity of the animal. What struck me was the marvellous energy and apparent endurance of the embryo in its course, and the small chance there seemed to be of its falling from the fur, which, while producing adherence, did not seem to impede its progress materially.

"I can quite believe that it may work in this way for hours before effecting an entrance."

Now we have sportsmen who kill scores of marsupials daily, the above communication may lead to further observations on this interesting point.

With regard to the form in which the young of the Echidna and Platypus are born, nothing is certainly known—whether included in an egg, or more probably as an egg bursting on extrusion, much as one witnesses in the little British lizard kept in vivaria.

The protection given to the young by the Platypus differs from the Echidna. The former has a nest in the river bank, and has no pouch in which it can carry its young.

I am not aware that the Echidna ever makes a regular nest; it can form a pouch in which to carry its young, though of this latter more observation is required.

The abdominal integument in the quiescent state is generally flattened out, but by an effort on the part of male or female a pouch can be formed much like that of the kangaroo. This I have seen when giving these animals chloroform, to enable me to unroll them, and when experimenting on them with the Pituri of the aborigines.

In this pouch the apertures of the milk glands are found. The glands themselves are of immense size, occupying the whole of the side of the body from the front to the hind leg. They are placed under the muscular layer which enables the animal to roll itself in a ball, by the contraction of which muscle the milk is also pressed out at the will of the mother, as there are no nipples.

It would be interesting to find out what attitude the Echidna assumes in suckling its young. In lying on its back the milk would fill the pouch referred to as a cup.

The tongue of the Echidna is a long skewer-like organ, which moves with surprising swiftness. A tame Echidna I once had was very tractable, and would feed under observation—a thing that rarely happens with these timid creatures. It would thrust its tongue out about three inches, passing it through and through the milk given to it, like a small eel. As the fluid was reduced bits of chopped egg in the milk were as if hooked into its mouth. The most remarkable observation I made was on an Echidna recently killed by a wood-carter. On dissection its stomach was full of milk. Though of adult size it was a young animal; its claws being perfect and uninjured. The claws of old Echidnas are more or less deformed by digging, at which operation no animal of its size is so able. I am of opinion that the young Echidna takes milk from its mother until it is full-grown. On confining an Echidna in a box one is astonished to find that the animal invariably breaks loose through wood or wire—even a zinc-lined case is not proof against its powers of penetration. Persons trying to tame Echidnas, and render them tractable, should first have constructed a well-made movable cage of inch-thick boards, the front of which may be closed with wire of half-inch mesh, made very strong, with fencing wire woven through every two inches of its area. As the excretions are very offen-

sive, a layer of dry earth an inch thick should be used every few days to the bottom of the cage. The feeding cup should be placed outside the wire, so that the vessel may not be upset. The Echidna swims very well when put into water. A specimen of Echidna setosa (an albino) has been recently presented to the Museum by Baron Von Müeller.

The observations of Dr. Bennett, and of his son, Mr. Bennett, of the Lands Department, at Toowoomba, have done much to explain the mode of life of the Platypus.

The Platypus and Echidna being intermediate in their anatomy between birds and mammals, and the only surviving animals in this group, the particulars of their mode of generation are especially interesting to naturalists.

By Authority: James C. Beal, Government Printer, William street, Brisbane.