Art. XXXIV. *On some particulars connected with the Natural History of the Kangaroo.* By A. Collie, *Esq., F.L.S., Corr. Memb. Z. S.* *In a Letter to* N. A. Vigors, *Esq., F.R.S., F.L.S., &c., Sec. Z. S.*

H. M. Sloop Sulphur,
Cockburn Sound, Western Australia,
26*th January*, 1830.

My dear Sir,

As so much has recently been done to illustrate the history of the very peculiar mode of generation in the Kangaroo, the following observations on this subject may not be unacceptable: I had not the pleasure of seeing Mr. Morgan's paper before leaving England, and I therefore do not know precisely how far these observations will be found to coincide with his.

Buache, or Garden Island, which forms the best side of Cockburn, is covered, in addition to its trees, with a thick underwood and low shrubs, which are penetrated with some difficulty. Among these, a small species of Kangaroo, perhaps the *Didelphis Brunii* of Gmelin, and what is said to be the Wallabee or Bush Kangaroo of Sydney, is found in very great numbers. The males weigh about 14lbs., and the females considerably less. It is brownish above, and greyish beneath.

In the months of July and August last, I had an opportunity of seeing several females with their young (one to each) of that season, so far advanced as to be nearly in a state fit for living independent of the mother. They were nearly half the height and length of the mother, and tolerably covered with hair. One teat only of the four was in any instance enlarged, and it was only at the base of this that the lacteal gland could be felt.

From that time to the present, I have occasionally looked at the abdominal sac, and found it empty, dry, and exceedingly contracted, with, however, the enlarged papilla and very perceptible gland at its base, the former certainly much shortened, and the latter a little diminished. More recently, my attention was very closely directed to this subject, and on the 23rd instant, I was informed, to my no small delight, that a Kangaroo

had been caught with its little young in the sac at the teat. This young one, which has not obviously increased since, is of nearly the size of the last and half the middle joint of one's little finger; its integuments of a flesh colour, and so transparent as to permit the higher coloured vessels and viscera to shine through them; whilst all its extremities seem completely formed, and its muscular power is fully testified by its evident efforts in sucking, during which it puts every part of its body into action. According to the testimony of the person who preserved the mother with this little one for me, the latter by no means passes the whole of its time with the lacteal papilla in its mouth, but has been remarked, more than once, without having hold of it. It has even been wholly removed from the sac to the person's hand, and has always attached itself anew to the teat. Yesterday, on again looking at it, I gently pressed, with the tip of my finger, the head of the little one away from the teat of which it had hold, and continued pressing a little more strongly for the space of a minute altogether, when the teat that had been stretched to more than an inch, came out of the young one's mouth, and shewed a small circular enlargement at its tip, well adapting it for being retained by the mouth of the sucker. The opening of the mouth seemed closed in on both sides, and only sufficiently open in front to admit the slender papilla. After this I placed the extremity of the teat close to the mouth of the young, and held it there for a short time without perceiving any decided effort to get hold of it anew, when I allowed the sac to close and put the mother into her place of security. An hour afterwards the young was observed still unattached, but in about two hours it had hold of the teat and was actively employed sucking. On examining the sac of another Kangaroo I found a still smaller young one in it than the preceding. This one is about one half larger than the body of the common Wasp, *(Vespa vulgaris)*. Its extremities, even to its toes, are evidently developed, and its skin is still more transparent than the before mentioned. The papilla to which it is attached, and from which its body hangs suspended without any other support than the hold which it has of the papilla, (a position into which I purposely placed it,) is, like the young, delicate, smooth and purplish, exhibiting a high degree of vascularity, and is about $\frac{7}{16}$ of an inch long. The gland, however, at its base is very little enlarged, so little indeed as to be scarcely perceptible; whilst that at the base of another papilla which

is larger than this one, of a pale unvascular appearance, and circularly corrugated, is large and firm. This appears to be the teat and gland which afforded the milk to the young of last season, not yet restored to its wonted size.

An officer of H. M. S. Success at present here, observed a Kangaroo in the act of parturition. When the fœtus was expelled from the vagina per anum, the mother was lying partly on one side and partly on her back, resting against the side of the cage where she was confined. She kept her hind legs apart, and the very diminutive young, when brought forth, crept among the fur of the mother towards her belly and towards the opening of the abdominal pouch; whilst she, with her head turned towards her tender offspring, seemed to watch its progress, which was about as expeditious as that of a snail. After it had made some advance, my informant, unconscious of the remarkable œconomy of generation in this class of Quadrupeds, removed the newly born animal before it had reached its destination, which must have been the mouth of the sac. The parturition took place two days ago.

I have just now procured two gravid uteri in which the fœtuses seem to be arrived at, or very near to, the termination of the period of gestation. One of them, which is about the size of the smallest young already mentioned as being in the abdominal sac, has protruded through an opening inadvertently made in the uterus, and is distinctly seen through its transparent membranes and the liquor amnii.

Another Kangaroo was caught three days ago with a young one twice the size of the largest I have described, but on going to see it on the 25th the young was dead, lying in the sac unattached to any teat.

The eyes of these three are covered, or perhaps I ought rather to say, the eyelids are united by an opaque whitish membrane. The nostrils, however, even of the smallest are very evidently perforated for the purpose, it would seem, of admitting air to the lungs whilst the mouth is closely embracing the teat. To see how closely the sac embraces the young, that is sometimes retired deep in its bottom, one would be apt to think that even the little air that so small an animal requires, could scarcely reach it unless by some peculiar mechanism.

At a future period I hope to be able to communicate more positive information on this subject, and to transmit or bring you something

worthy of your so useful Society. Unless the Sulphur moves to some other part of New Holland, I fear I shall add little to your Australian Ornithology.

Believe me, &c. &c.

A. COLLIE.

ART. XXXV. *Analytical Notices of Books.*

Untersuchungen ueber die Bildung und Entwickelung des Flusskrebses: von HEINRICH RATHKE. *Mit* 5 *Kupfertafeln. Leipzig,* 1829. *Fol. pp.* 97.

Researches on the Formation and Developement of the Crawfish.

THE zoologists of this Country have been of late years so accustomed to direct their attention almost exclusively to animals in their perfect state, that to the greater number of our readers, the analysis of a work devoted to their illustration in the earliest stages of their developement will in all probability present an altogether novel subject of contemplation. It is for this reason especially incumbent on us to put on record some account of one of the most valuable contributions to animal physiology that we have met with for a considerable time. Any analysis of a work, chiefly remarkable for its minute details on the minutest objects, must necessarily be very imperfect; but we shall endeavour, as far as possible, to select its leading features, so as to give a general, if not a complete, idea of its contents.

While the comparative anatomists of France and England have been for the most part content to follow in the beaten track of observation, those of Germany have been exploring a new path, in which they have already made discoveries of the highest importance, with the promise of a much more ample harvest for the future. In common with the philoso-