

On the Aptychus.

BY MR. CHARLES MOORE.

IN the present advanced state of scientific knowledge, it does not often happen that any object in Natural History remains long, without being assigned its position in the animal kingdom. This however has not been the case with a curious body called the Aptychus, respecting which there have been various speculations. For some time it was supposed to belong to the Cirripides. Professor Forbes refers it to the Holothuriadæ ; and Mr. Strickland, in a paper read on this subject before the Geological Society of London, believes it to belong to the ammonite, to which shell he considers it an *operculum* ; or else, he suggests that, like the Nautilus, the animal of the Ammonite may have required horny supports, and that these bodies may have performed that office.

It has been noticed that the Aptychus is rarely found except in beds of the secondary formations, in which the ammonite is obtained ; consequently it has not been obtained higher than the chalk, in the beds above which the ammonite is supposed to have become extinct, and not

lower than the blue lias. But it is not always the case that, where ammonites abound, the *Aptychus* is in equal abundance; on the contrary, there are many beds containing ammonites in great numbers, in which the *Aptychus* is rarely, if ever, found. This may have been accidental, or depending upon the circumstance, that the character of the beds in which they are absent was not such as to tend to their preservation, as in the case of others deposited under more favourable circumstances. In the beds of the lower lias it is occasionally found symmetrically placed in the *impressions* of ammonites, having a somewhat semicircular form, thin and wrinkled in its appearance, and of a very dark colour. In the upper lias, the *Aptychus* differs in form. It is there striated, and formed of two valves, somewhat resembling a bivalve shell, but without the hinge, which is always possessed by these shells. It is generally of a brown colour, and horny in its structure, but still occasionally shewing the deep carbonaceous black tint possessed by those in the beds below. In the green-sand it again alters its character, and becomes punctured and porous in appearance. The conclusion that the *Aptychus* might belong to shells of the *Cephalopoda*, was arrived at, from its association in the same bed with the ammonite, and from its being frequently found in its outer chamber. Now the mere circumstance of its being so found in the chamber of the ammonite, although presumptive evidence, I do not consider sufficient to establish the fact of its having anything to do with the animal inhabiting that shell; because we are aware that many parasitic creatures take possession of the shells of other animals and make them their place of abode. From my own observation, I repeatedly find this to be the case, and that with the *Aptychus* are associated many such para-

sitic shells; consequently other evidence is necessary to establish their connexion, and a few links in that chain of evidence I hope to add.

In the upper lias of the neighbourhood of Ilminster the Aptychus is frequently found, and in a condition and state of preservation which probably allows of its being better studied than in many other beds. Interposed between some beds of clay, containing a very interesting group of organic remains, there occurs a thin bed of yellow limestone, in the breaking up of which it often happens that a section of some small ammonites are obtained, and a fortunate fracture occasionally gives a view of the Aptychus lying in the outer chamber. It is also occasionally found in another way in the same bed. Now and then ammonites of a larger size were imbedded; and when this was the case, they appear to have been acted upon by water, which passing gently over them, (probably before the bed had become much hardened,) tended to facilitate the decay of the shell, leaving in many instances nothing but their casts. Curiously enough, in these casts the Aptychus is frequently left in the most perfect preservation, lying in that part of the cast that would answer to the outer chamber of the ammonite, generally symmetrically placed, and always corresponding to the size and growth of the shell they appear to have inhabited, or in which they are found. These casts also shew that before the ammonites were covered up, there were attached to them the parasitic shells I mentioned; oysters and other shells appear at times to have covered all parts of them. But there is this to be noticed, that these shells are not so often found in the interior of the chamber, as attached to the outside of the shell; and that whilst there may be a hundred oysters, there is never more

than one Aptychus ; a fact which, I think, will help to establish the connexion of this body with the ammonite. Some of the ammonites containing Aptychi are so small as to be nearly microscopic, and it is not likely that shells so diminutive and young, would be selected by any parasitic creature for a habitation ; or that they would by accident be washed into the deserted chambers of these shells, which with larger specimens might have happened.

I am still further strengthened in the conclusion that the Aptychus must belong to the ammonite, by the fact that I have been able to make out about ten forms or species of Aptychi from the upper lias ; and I find that a particular form of Aptychus is always allied to a particular species of ammonite, a circumstance which cannot be accidental, and which has not hitherto been noticed. This latter fact will I think be considered conclusive, that this body performs some as yet unascertained functions in connexion with it. That it is an *operculum* I am inclined to doubt. The principal reason for its being so considered is, that when the valves of the Aptychi are expanded, they would cover about a transverse section of the chamber. We know that the nautilus, the animal nearest allied to the ammonite, does not possess an operculum. This animal has continued through most of the world's changes to the present time, and consequently its organization can be studied. The ammonite, although presented to us as "Medals of Creation," of many hundred species in the rocks which surround us, has no living representative ; for which reason we can only speculate as to the office this body had to perform in its economy. Both these shells are chambered, and possessed of a beautiful provision for regulating their specific gravity in their native element. By means of the syphuncular tube, which passes through

all their chambers, they were able to adapt themselves to any circumstances, and sink or swim at pleasure. The difference in the two shells is not great, the principal being in the position of the syphuncular apparatus—that of the nautilus being central—that of the ammonite being situated on the outer margin of the chambers. In the casts containing Aptychi to which I have referred, there are always some traces of this syphuncular apparatus ; and in some instances the tube is in nearly perfect preservation, passing along the outer edge of the whorls of the shell until it reaches near to the position where the Aptychus is imbedded, and it appears to be of the same horny texture as is presented by the Aptychus. In the fractured sections of ammonites, where the Aptychus lies in the chamber of the shell, it is frequently with its dorsal margin pointed to, or near where the syphuncle passes ; and from this, combined with the preservation of the syphuncular tube with it, I am rather inclined to the opinion that the body has something to do with the curious but beautiful provision with which nature has furnished these shells, and which further observation will probably more clearly demonstrate.

Since reading my paper at the Weston meeting, I have learnt that Von Buch has noticed the discovery of the Aptychus in a Scaphite, in a paper published in the Bulletin of the Geological Society of France ; and T. Rupert Jones, Esq. the zealous assistant secretary of the Geological Society of London, mentions the occurrence of an Aptychus holding its proper place in an Orthoceras, in their museum. Thus it has been found in three genera of cephalopida, in each of which it was destined to perform the same office.