

3. Descriptions of two new Species of Butterflies from the Andaman Islands. By W. S. ATKINSON, M.A., F.L.S., &c.

[Received September 29, 1873.]

(Plate LXIII.)

1. *PAPILIO MAYO*, n. sp. (Plate LXIII. fig. 1.)

Black, exterior fringes of the wings white between the extremities of the nervures. The hind wings dentate, crossed *above* by a broad band of bright azure-blue, divided by the black nervures; *below* the azure band reduced to a series of blue lunules, tinged with red, terminating at the anal angle in a blind eye-like spot surmounted by a red lunule; beneath this at some distance another red lunule placed convexly to the spot. The base of wing marked with some red blotches.

Expanse of wings 5 to 5½ inches.

*Hab.* Andaman Islands.

Named in memory of the late Earl of Mayo, Viceroy of India, who was assassinated at Port Blair in the Andamans on the 8th of February, 1872.

2. *EUPLŒA ANDAMANENSIS*, n. sp. (Plate LXIII. fig. 2.)

Pale fuliginous with white spots. Fore wing with a white spot between the extremity of the cell and the costa; another within the cell near its extremity; two others below the cell, one between the first and second, the other between the second and third median nervules; beyond these a curved series of nine white spots from the anterior margin to below the exterior angle, of which the three last are the largest; followed by a submarginal series of smaller elongated spots, extending from the first discoidal nervule to the exterior angle. The interior margin much rounded in the male, in which sex there is a single vitta of dark adpressed scales between the lowest median nervule and the submedian nervule. In the female the vitta is replaced by a white streak. Hind wing with two somewhat irregular series of elongated white spots, corresponding to the two series in the fore wing.

Expanse of wings 3½ to 3⅝ inches.

*Hab.* Andaman Islands.

4. Notes on Entozoa.—Part I. By T. SPENCER COBBOLD, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

[Read October 10, 1873.]

(Plate LXIV.)

The present communication is the first of a series of papers in which I propose to bring together many scattered observations made from time to time in the intervals of more sustained scientific work. Of necessity these notes will exhibit an incomplete and fragmentary

character; but I have felt that it were better they should be presented in this form rather than remain altogether unemployed. The Society is aware that I am indebted to several of its Fellows, as well as to many other persons, for contributions of Entozoa; and I therefore embrace this opportunity of explaining that it has hitherto been quite impossible for me to do justice to these various gifts. In individual instances, as, for example, in the case of the Nematodes obtained by Prof. Flower from the Aard Wolf, I have made a single species of parasite the subject of lengthened comment (Zool. Soc. Proc. 1870); but to do so in all future and similar cases would require more undivided time and attention than is again likely to be at my disposal; moreover, in the majority of single and separate contributions the parasite rarely demands more than a passing remark serving to confirm, to verify, or it may be to refute statements made in some previous record.

The classification of the Entozoa is confessedly in a very unsatisfactory state; and I regret to observe that the more extended one's examinations become, the greater are the difficulties which one has to encounter in this respect. The geographical distribution of the Entozoa is a subject of increasing importance; and it is one towards the elucidation of which I conceive that such notes as these may eventually help to contribute their quota. It would be a work of supererogation to express the sum of my indebtedness by mentioning *seriatim* the names of all my friendly contributors, most of whom have transmitted solitary specimens. However, in the case of sets of specimens or collections, small and great, my acknowledgments are especially due to Mr. Charles Darwin, F.R.S., to Mr. Charles W. Devis, to Mr. Robert Swinhoe, H.M.B. Consul at Chefoo, to the late Dr. William C. Pechey, who brought me an interesting series of Helminths from India, and to Prof. Murie, M.D., formerly Prosecutor to this Society. Lastly, in these prefatory remarks, it is only necessary to add further that in this serial record no particular order of description will be observed beyond that which a mere general group-affinity may occasionally suggest as natural, convenient, or suitable.

### 1. FILARIA HORRIDA (Diesing).

The first number and private reference on the list of a series of parasites which I received from Mr. Darwin in August 1869 refers to a set of worms obtained by him "from the stomach of an American Ostrich at Bahia Blanca, North Patagonia, in 1832." Having already identified a similar series of Nematodes that had long lain concealed in the Museum stores of the Hunterian Collection, I had no difficulty in recognizing the species. There were, in all, ten specimens—seven females and three males. The latter were in good condition, and varied in length from 5 to 5½ inches. Five of the seven females were perfect, the shortest measuring 20 inches, and the longest 29 inches, this latter worm having a breadth of exactly  $\frac{1}{8}$  inch. I may mention that one of the Hunterian specimens measured 35 inches; but examples have been referred to as extending

beyond 3 feet. I believe this entozoon was first described anatomically by Prof. Owen, from the College specimens above mentioned; but the only original remarks on the subject that I have seen from his pen are some few contained in the article "Entozoa" in Dr. Todd's 'Cyclopædia of Anatomy,' and others given in his 'Lectures on Comparative Anatomy.' From the published dates of these contributions (1839 and 1843 respectively), I am led to conclude that the first discovery of this worm actually rests with Mr. Darwin, since the late M. Diesing's specific description and nomenclature was evidently based on an examination of specimens obtained by Natterer in Brazil, the date of which would probably be about 1833, or perhaps a year later. However, as Natterer was many years previously resident in Brazil, and no special date of his particular "find" is given by Diesing, it is impossible for me to speak with certainty on this point. It is perhaps of little moment; and under any circumstances the systematist's specific title must be allowed to stand.

My examination of the females confirms Prof. Owen's statement respecting the simple character of the uterine organ and the forward position of the reproductive outlet. To be precise, I find that the vulva is placed  $\frac{1}{25}$  inch below the points of the labial papillæ. Of these papillæ I think there are ten or twelve, two of which project conspicuously beyond the rest, forming, as Diesing well observed, conical spines. Their length from base to apex is scarcely more than  $\frac{1}{250}$  inch; but their appearance suggests a structural affinity with the similar oral spines occurring in the Guinea-worm. In *Dracunculus*, however, according to Bastian, the two large spines are placed before and behind the mouth, not laterally.

This parasite from the Ostrich does not reproduce viviparously; at least there were no free embryos in the uterine duct. The eggs were chiefly of two sizes, those in which yolk-segmentation was going on measuring  $\frac{1}{250}$  inch in length, whilst the perfectly mature ova, containing coiled embryos, gave an average of  $\frac{1}{450}$  inch, being at the same time proportionally broader than the smaller eggs, whose transverse diameter was not more than  $\frac{1}{1000}$  inch.

As this worm has probably never been figured, I append a representation of the male (Plate LXIV. fig. 1), also an outline of the head and tail of the female (fig. 2), of the natural size, with a separate outline of the oral spines of the latter magnified sixty diameters (fig. 3). I likewise represent the egg in two stages of growth (fig. 4). Lastly, I may remark that this worm has not hitherto been recorded from the cavity of the stomach. That on this particular point there is no error in Mr. Darwin's MS., I think highly probable, not only from the distinguished collector's known accuracy, but from the circumstance that the parasites were so much coiled round one another that it took me nearly half an hour to unravel and separate them. I further presume that the tangled state was the condition in which they were originally found in the bird's stomach.

## 2. FILARIA IMMITIS, Leidy.

During the autumn of 1869 I received from Mr. Swinhoe the heart

of a dog, the animal, according to the statements of the donor, having died at Shanghai in the spring of the year, "after three days of great suffering."

During the month of February 1872 I also received, through Mr. Walsh, a second preparation of the heart of a dog which had died at Yokohama, Japan, under similar circumstances. This second specimen was transmitted by Mr. Dare, together with a communication which was published in the pages of the 'The Field' for February 24, 1872.

In both cases the *Filaria immitis* appears to have been the sole cause of the death of the dogs in question, the ventricles and auricles being completely blocked by the presence of a large number of these worms.

To Prof. Bennett of Edinburgh I am also indebted for a single specimen taken from another Chinese dog, the original preparation of the heart, as I saw it in 1850, resembling in all respects the specimens which I have now in my possession.

As, in my recently published 'Manual of the internal Parasites of our domesticated Animals,' I have already enlarged upon the symptoms produced by this parasite, and upon other practical points gathered from the statements of Mr. Dare, Dr. Lamprey, and others, I am here only concerned to add such scientific details as could not be published at any length in that small treatise.

In the interval which elapsed since the transmission of Mr. Swinhoe's contributions similar specimens of the worm were received at Netley and at the British Museum from Dr. Jones Lamprey. In the first instance they were briefly and very inadequately noticed by the late Dr. Baird in a paper communicated to the Linnean Society (May 2nd, 1867); but they have since supplied materials for the publication of an admirable paper by Assistant Prof. Welch of Netley ('Lancet,' March 8, 1873).

Although Mr. Welch's paper leaves little to be desired in reference to the facts of embryonal development, as far as can be gathered by an examination of the uterine contents of the female worm, yet there are some points well worth verifying in this matter; and there are others in connexion with the structure of the adult worm which appear to have escaped Mr. Welch's attention as well as Dr. Baird's. Unfortunately, I have had no opportunity of consulting the original paper by Dr. Joseph Leidy. As regards the specific name, for which, I believe, Dr. Leidy is responsible, nothing could be more to the point, as the term *immitis* expresses, metaphorically, the truly cruel character of the Entozoon.

Most of the following data have been gathered from an examination of the specimens supplied by Mr. Swinhoe, to whom I owe an apology for not having made an earlier record of the results. However, the dog's heart was exhibited at the Liverpool Meeting of the British Association in 1870; and a brief notice of it subsequently appeared in the published Reports of the Meeting for that year. It is the more incumbent upon me not to delay the publication of these few microscopic details, since Mr. Swinhoe, in a recent letter, informs

me that Dr. Little, of Shanghai, is diligently engaged in working out the structure and development of the parasite.

Dr. Krabbe, of Copenhagen, has likewise supplied some interesting particulars; but, in the absence of any references, I am led to conclude that the Danish author's observations are based on the previously published statements of Prof. Leidy ("Husdyrenes Indvoldsorme," Tidsskrift for Vet. 2den Række, ii. 1872).

On the 15th of April last I examined a number of these worms, two of which, male and female, are represented in the accompanying Plate. To the naked eye the sexual differences are readily discernible. The female (fig. 5) maintains almost throughout a uniform calibre of about  $\frac{1}{25}$  inch; but at the head it diminishes to  $\frac{1}{30}$  inch, and at the tail to about  $\frac{1}{100}$  inch, the caudal point being bluntly convex. The oviducts of all the females examined were crowded with eggs, and in certain situations the eggs were collected together in the form of large ovoid masses. The largest eggs had a long diameter of  $\frac{1}{850}$  inch, with an average breadth of  $\frac{1}{1100}$  inch. These contained coiled embryos; the diameter of their bodies varying from  $\frac{1}{3000}$  inch to  $\frac{1}{3500}$  inch.

The male parasite is readily recognized by its comparatively slender body, having a diameter of about  $\frac{1}{30}$  inch, and also by its elegant spirally curved tail, which is three or four times twisted upon itself with the regularity of a corkscrew (fig. 6). The coiled portion is much narrower than the body of the worm, and it finally tapers down to a breadth of  $\frac{1}{300}$  inch, its extreme point being blunt, as in the female. Within a short distance of the extremity the two apicules, of unequal length, may often be seen projecting from the closed outlet, this part of the worm being also furnished with a well-marked horseshoe-shaped bursa (fig. 7). This organ may be described as consisting of two transparent folds or extensions of the cuticle, each lateral division of the hood being supported by four oval glandular rays. The rays are apparently eight in number, and arranged in pairs. The uppermost pair is the largest, the other pairs gradually decreasing in size from above downwards. When viewed laterally, these oval rays present a beaded appearance, collectively forming a rather striking micrometric object. The diameter of the largest ray is only about  $\frac{1}{250}$  inch, while even of the smallest is not more than  $\frac{1}{2500}$  inch from side to side.\*

As seen in the drawing, the uppermost rays of the hood are generally found projecting more or less beyond the width of the dermis. I regarded this as a good sensitive protrusion.

\* Since this paper was read in the Academy no mention has been made of any much more detailed description of the worm or the structure of its appendages communicated to the 'Monthly Microscopical Journal' by Richard Owen. The author gives many particulars that have escaped my notice, and interprets some of the facts observed by us both in a very different manner than we have adopted. He recognizes but one apicule, and regards the hood as generative appendages, of the nature of *ovipositoria*, communicating with the seminal duct. He observed twelve of these oval appendages, and, among other things, describes the intestinal tube as being furnished by a spiral muscularity.—T. S. C.

I obtained very satisfactory evidence of the existence of a minute terminal papilla, whose breadth scarcely exceeded the  $\frac{1}{80000}$  inch. I have no doubt that this papilla is connected with a caudal gland; but I could not obtain a clear definition of the parts beneath the true skin. Lastly, I may add that immediately above the bursa I noticed a series of lines obliquely directed upwards, representing as many parallel foldings of the integument. The general character of these markings in all respects corresponded with the similar appearances figured and described by Eberth in *Enoplus*, *Enchelidium*, and other nematode genera.

### 3. FILARIA HEBETATA, sp. nov.

In the month of July of the present year I received from Mr. Millen Coughtrey (then acting as Demonstrator of Anatomy in the Liverpool School of Medicine) the heart of a Seal, together with a communication, from which I further learn that Mr. Coughtrey was himself indebted to Mr. T. J. Moore, the well-known Curator of Sir William Brown's Museum, for the opportunity of dissecting the animal in question. Mr. Coughtrey remarks that the Seal was an adult male example of *Stenmatopus cristatus*, or Hoodcap, the occurrence of which is very rare on the British coasts. The animal was captured in February at Frodsham, on the Cheshire side of the Mersey, and died at Widnes in the beginning of June, having been exhibited in the county during the interval. Mr. Coughtrey adds:—"I made a hurried, but careful *post mortem* examination, since it was suspected that it had died of poison. The dissection embraced every organ except the brain and spinal cord. The abdominal viscera were free from cysts or any appearance of worms. Within the stomach were three mackerel, in different stages of digestion. On removing the tongue and pharynx, with the larynx and trachea, I perceived a nematoid worm grasped by the *rima glottidis*, one half of it being within the posterior buccal orifice, and the other half within the larynx. I am sorry to say it was afterwards lost, through the carelessness of an attendant. The worm was about four inches in length, much thicker than those in the heart, and of a dusky hue. The thoracic viscera were removed *en masse*, when the lungs were found studded throughout with miliary tubercle. The worms were chiefly in the right ventricle of the heart, entwined and laced amongst the *columnæ carneæ*, being embedded and surrounded by blood-clot. The left side of the heart was quite free from worms; and there were none in the pulmonary artery or other large vessels. When fresh the worms were extremely elastic, so that they might be stretched to half their length beyond the natural size and yet would not break. The muscular system generally was healthy. I have sent you all the worms except two, which I preserved, and afterwards gave to a friend."

In offering this abstract of Mr. Coughtrey's lengthened and interesting account of his examination, I have purposely selected only such remarks as seemed to bear more or less upon the question of parasitism; and in doing so I have adhered very closely to the actual

wording of his communication. Mr. Coughtrey has since left Liverpool for New Zealand, whence, in due time, I hope to receive from him further entozoal contributions. The nematode from the larynx was probably an example of *Ascaris osculata*; but the Hæmatozoa from the heart are, I believe, new to science. I have named the species as above, the specific title chosen having reference to the blunted extremity of the tail. In brief, the characters may therefore stand as follows:—Body of nearly uniform thickness, narrowing slowly in front and behind; head simple in both sexes, semi-circular in profile; tail of the female straight, rather suddenly narrowing to a fine rounded point; tail of the male spirally curved, furnished with two unequal spicules, blunt at the tip, where it forms a small knob. Length of the female 6 inches; male, up to 4 inches.

In addition to the above diagnosis, I may add that the head of the female suddenly curves forward from a point where it measures about  $\frac{1}{80}$  inch transversely, whilst the tail, at a corresponding distance from the extremity, does not exceed the  $\frac{1}{80}$  inch in diameter. The knob-like projection at the end of the tail of the male measures only  $\frac{1}{250}$  inch in breadth. As usual, in similar cases, I found the uterine ducts crowded with ova in various degrees of development, all of the most advanced embryos being included in a delicate chorionic envelope. The position of the vulva could not be made out; but the embryos (figs. 12 & 13) were taken from the oviduct at a distance of one inch from the head. The long diameter of the ova gave an average of  $\frac{1}{750}$  inch, the embryos having a length of  $\frac{1}{90}$  inch, or thereabout, the greatest breadth scarcely exceeding that of the human red blood-corpuscle.

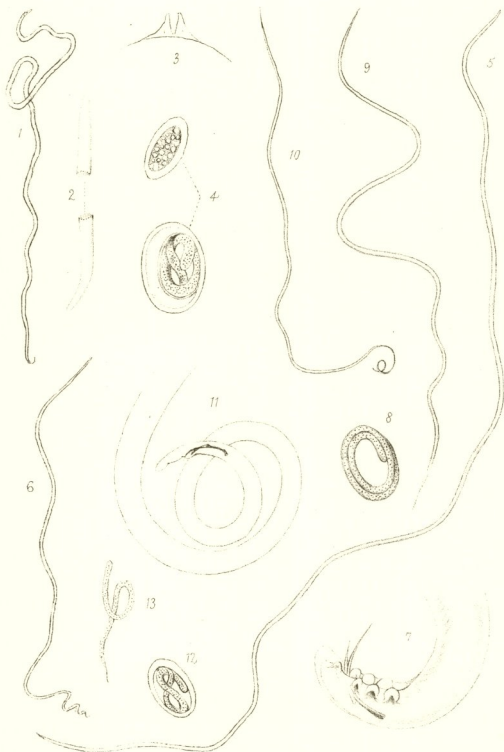
#### EXPLANATION OF PLATE LXIV.

- Fig. 1. *Filaria horrida*, male: nat. size.  
 2. The same, female: head and tail, nat. size.  
 3. The same: outline of the oral spines, enlarged.  
 4. Ova of the same, highly magnified.  
 5. *Filaria immitis*: female, nat. size.  
 6. The same: male, nat. size.  
 7. The same: tail of the male, enlarged.  
 8. Ovum of the same: mag. about 500 diam.  
 9. *Filaria hebetata*: female, nat. size.  
 10. The same: male, nat. size.  
 11. Tail of the same: male, enlarged.  
 12. Ovum of the same: mag. about 350 diam.  
 13. Embryo of the same, set free.

#### 5. Description of a new Bird of Paradise of the genus *Epimachus*. By EDWIN WARD, F.Z.S.

[Received October 18, 1873.]

About the end of September last I received from Singapore a collection of New-Guinea birds, amongst which there was a skin of a new species of the Paradiseine group. I have the pleasure of exhibiting



T. S. C. del.

M. N. Hanhart imp.