A NOTE ON SPECIES OF ANOPHELES FOUND AMONGST MOSQUITOS SENT FROM SHANGHAI AND JAVA.

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THE demonstration that all the species belonging to the genus of mosquito known as *Anopheles* which have been found in Italy are potential hosts of the parasite of malaria renders it interesting to inquire regarding the distribution of *Anopheles* in various parts of the tropical world. Major Ross, who had observed the first stage of the development of the parasite in a "dapple-winged" mosquito—a species of *Anopheles*—in India, has recently found that *Anopheles* is also the host of the parasite in Sierra Leone.

Through the kindness of two friends I have had a number of mosquitos sent me from Shanghai and from Java. Dr. Marshall, of Shanghai, sent me about 150 mosquitos, and out of this large number I found only two *Anopheles*. These mosquitos were collected in a house in which a patient was suffering from tertian ague.

My friend, Mr. Stephen, of the Hong Kong and Shanghai Bank at Batavia, had mosquitos collected for me in a fever district about 15 miles from that town. Out of about 800 mosquitos I only found nine *Anopheles*. The two *Anopheles* in the lot sent by Dr. Marshall had the like external characteristics of wings and head, and the nine sent by Mr. Stephen also resembled each other in the head and wings. The *Anopheles* of both lots were all females. It is probable that both these mosquitos belong to undescribed species.

For purposes of classification entomologists desire to have mosquitos mounted dry, and as these mosquitos came to me in solution of chlorate hydrate and in alcohol, I did not think it would be of any use to trouble entomologists with their examination. On the whole, they have not suffered so much in transmission as might have been supposed considering the delicate structure of these insects. A good many legs had become detached, and some scales had been loosened from the body and wings. My description of these mosquitos cannot,

therefore, be satisfactory to entomologists, and my own knowledge of entomology is of such a rudimentary nature that even if the mosquitos had been in a state of perfect preservation I should not have attempted their description. But if with the little knowledge of insects I possess I have been able to identify specimens of *Anopheles* amongst many other mosquitos, it is evident that any practitioner of medicine who chooses to take a little preliminary trouble will be able to acquire sufficient superficial knowledge of the subject to be able to know *Anopheles* when he sees the genus, and it is

clear that to any medical man practising in the tropics this small amount of knowledge may be of interest and importance.

Both the Shanghai and the Java mosquitos are evidently species of *Anopheles pictus*, and, as will be seen by the accompanying figures, they differ from each other. The four figures of mosquitos which illustrate these notes will convey to the reader what the points of difference and resemblance are better than any description which I can give.

It should be noted that the only parts of these figures which are drawn from Nature are the appendages of the head and the markings on the wings. The head, abdomen, and legs have been drawn after the same pattern, simply as the framework on which the head appendages and wings are placed, and are copied from a drawing of *Anopheles claviger* which appeared in the BRITISH MEDICAL JOURNAL of July 1st, 1899.

Fig. 1 is a drawing of *Anopheles claviger* made from a specimen sent me by Dr. Macdonald of Rio Tinto, and is placed beside the others for the purpose of comparison. I draw attention specially to the spots on the wings, which represent very faithfully the characteristic appearance

of that species. With a little familiarity and the use of an ordinary hand lens, this species is easily made out by these marks.

Fig. 2 is a drawing of *Anopheles pictus* from Spain, this specimen being also kindly sent me by Dr. Macdonald. Dry mounted specimens and specimens preserved in alcohol were compared, and found to present exactly the same appearances. There are four well-marked spots on the upper border of each wing, the two outer spots being smaller than the two inner ones. The

palpi have four characteristic markings produced by the absence of pigment at four points on their length. These colourless spaces divide each of the palpi into four clear divisions, and the striking appearance they produce affords a point of distinction between this mosquito and that from Java.

Fig. 3 shows the appearance of the wings and head of the Shanghai *Anopheles*. The two black spots on the wings will, I believe, warrant its being considered a species of *Pictus*. In the two specimens I examined the palpi seemed to be very slightly longer than the proboscis, and were characterised by being closely covered with very minute hairs, which were distinctly thicker in the proximal third.

Fig. 4, the *Anopheles* from Java, is also a species of *Pictus*, but differs from the Shanghai *Pictus* by having four spots on the wings, the outermost one on each wing being smaller than the three inner ones, and being situated in the curve of the wing, in this respect differing from the Spanish *Pictus*, in which all the four markings on each wing are on the upper border. The difference between the Java *Pictus* and the Spanish *Pictus* was most marked in the head appendages. The palpi in the Java mosquito are comparatively thick, very hairy, particularly in the middle and proximal third. The minute hairs at the end of the palpi are white, and also at a part about the middle and at the proximal end, giving the appearance of alternated dark markings broken with white. The segments of the antennæ appear to be rounder than those of the Shanghai *Pictus*, in which they are fairly cylindrical. The palpi of the Java and the Spanish *Pictus* differ considerably. In the Spanish species the palpi are more delicate and marked by three colourless intervals, and are not covered densely with hairs like the Java *Pictus*. These differences are well shown in the drawings.¹

No notice has been taken in the drawings or descriptions of the relative size of these mosquitos. The figures represent a magnification of about 5 diameters. The appearances drawn can be distinctly seen with an ordinary hand lens, and can be still more readily and better discerned under a very low power of the microscope, when the head appendages and wings can be well observed.

Under the microscope it is at once seen that the spots on the wings are due to the minute hairs which outline the nervures being at these spots darker in colour, thicker, and more closely set. The intermediate double marking in *Claviger* is caused by these thickened and dark patches being situated on two nervures which almost touch each other.

The very small proportion of *Anopheles* amongst the mosquitos caught at Shanghai and near Batavia is striking, especially as regards Java. Malarial fevers are not severe nor widely prevalent in Shanghai, although mosquitos are very numerous, but in the part of Java in which the mosquitos were caught Mr. Stephen informs me that malarial fevers are frequent and severe.

NOTE.

¹ My friend, Dr. Copland, who during the past summer devoted a considerable amount of time to examining the external characters of the numerous mosquitos sent me from various parts of the world, has left the following note regarding the Java mosquitos. Size: With the exception of one which was larger than the others, all were medium-sized mosquitos, and were dark brown or blackish in colour. Proboscis: Of good length, dark brown in colour. Palpi: The same length as the proboscis, and very hairy, the hairs being specially thick on the lower one-third of the palpi. Antennæ: Slender, nodular, or segmented with scanty hairs at the division of the segments, light in colour. Head: Well-defined from body by a slender neck. Thorax and abdomen: Dark brown or black in shade, the segments of the abdomen well defined, especially towards the tail. Legs: Long, slender, and light brown in colour.

A CASE OF MALIGNANT MALARIAL FEVER WITH CEREBRAL SYMPTOMS TERMINATING FATALLY IN ENGLAND:

WITH A RECORD OF BLOOD EXAMINATIONS AND NECROPSY.

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I AM indebted to the kindness of Dr. Manson for permission to publish the notes of the following case:

C. R. T., aged 60, a ship's master, was admitted to the Seamen's Hospital, Royal Albert Dock, on the evening of November 15th, 1899, under the care of Dr. Manson. He was said to be suffering from malaria. He was not quite conscious, and only a very imperfect account of the patient's illness

was obtainable. The following facts were ascertained. He had always enjoyed good health. He was not a heavy drinker, and there was no evidence of syphilis. He had never suffered from malaria before. He left England on September 13th, in charge of a ship for Dakar, Senegal, West Africa. He reached this port on October 20th, and remained there for five days. He embarked on the ss. *Chiswick* on October 25th in perfectly good health; but some days after (the exact date could not be ascertained) he became ill. He arrived at Hull on November 8th, and was then suffering from fever; he came to London the following day. His wife states that she called in a local practitioner, who thought he was suffering from influenza, but on November 12th he was treated for malaria. Whilst at home he had no rigors, or vomiting, or hæmoglobinuria. He had severe headaches, was "feverish" and on one occasion delirious. His mental condition was not satisfactory, and he hardly ever spoke.

Fig. 1, from blood taken about two hours after admission, November 15th, 1899.

Fig. 2, from blood taken about six hours before death, November 16th, 1899, showing the leucocytosis which occurred. (These drawings were made by Staff-Surgeon Bassett-Smith, R.N., whilst working at the London School of Tropical Medicine, and by his courtesy I am permitted to reproduce them. They represent typical fields, not selected ones.)

On admission his temperature was 102.4°. He was not quite sensible, but could be got to answer a question with difficulty; articulation was indistinct. Respiration was a little laboured. The pulse was weak and rapid; the skin and conjunctivæ icteric. The pupils were contracted and equal, reacting imperfectly to light and on accommodation. The tongue was furred and dry. The liver was enlarged, and could be felt three fingers-breadth below the costal margin. The spleen was just palpable but not tender. A blood examination was made immediately on admission, and revealed an extreme degree of malarial infection. The parasites were very numerous, some fields containing 50. They were of the malignant type, and multiply-infected corpuscles were the rule,