XV. *Contributions to the Knowledge of the Genus Anaphe, Walker.* By LORD
WALSINGHAM, M.A., F.L.S.

(Plates XLIV., XLV.)

Read March 20, 1884.

FOR the specimens described in the present communication, I am indebted to the kindness of Colonel J. H. Bowker, of Durban, Natal. In a letter dated July 4th, 1883, he wrote to me as follows:—"I am sending by the 'Moor,' Union steamship, a little box with a nest of the congregating moth. The larvæ are most interesting, often denuding a tree of its foliage; they move in a body, sometimes ten or even twenty yards long, in search of 'pastures new,' and when the time comes, form into a cluster, and form the nest covered with a brown silk. Unless the change of climate has an effect, they will come out about September next. I should suggest the nest being set up in a green-house, not too hot, with a view towards the *morning sun*. A small nest which I sent to the Cape Town Museum produced about 80; judging from the size of the two, the one I send ought to produce about 300. The natives use the silk for medical purposes, somewhat as we use oiled silk." The box reached me at the beginning of August 1883, and I was much surprised to find that the larvæ were alive and apparently healthy. Many of them remained in the so-called nest, but bodies of from twenty to forty constantly came out and moved about, always keeping close to it. They moved in a closely packed mass, following a slightly curved line, much in the same position as that in which the small cocoons may now be seen arranged in the interior of the large one.

On the 9th of August I sent them to the Insectarium in the Zoological Society's Gardens, in Regent's Park, where they have been under the attentive care of Mr. Arthur Thomson until about the middle of March. Mr. Thomson informs me that about 250 moths emerged from the large cocoon. The first on December 3rd, the last on February 14th. One pair copulated and produced eggs. The eggs hatched, but although the name of the food plant had been ascertained from Mr. G. Baker, at Kew, to be *Bridelia micrantha*, Baillon, the dead leaves attached to the nest having enabled him to identify it, it was found impossible to obtain, there or elsewhere, any thing sufficiently nearly allied to it to induce the young larvæ to feed, and they soon all died. Mr. Thomson was successful, at my request, in finding in the glass case a few of their bodies, much shrivelled, but, nevertheless, most interesting, as indicating the probable affinities of the genus to which they belong. The appearance of the moths was followed by the emergence of a number of dipterous parasites. The larvæ did not finally enclose themselves in the large cocoon until about a fortnight after they reached the Insectarium; they must therefore have been about 50 days without food. Some of them died, probably from this cause, without entering the cocoon at all; and I find that one or more have spun themselves up in the outer covering of the main cocoon, without coming to maturity. It will be seen that Colonel Bowker's estimate of the number sent was remarkably correct.

In the British Museum are at least four described species of the genus ANAPHE, viz.—

Anaphe venata, Butler, from Old Calabar; *Anaphe ambrizia*, Butler, a small species from Angola; *Anaphe reticulata*, Walker, from Natal; and *Anaphe panda*, Boisduval.

The single typical specimen of *Anaphe panda*, from Natal, is precisely similar to those from Colonel Bowker; but placed under the same name is a considerable series of specimens which differ from these in the absence of any transverse dark bar crossing the pale triangular or wedge-shaped space beyond the middle of the anterior wings. In those specimens that space is clear and unclouded, the longitudinal brown lines being confined to the outer side of the oblique fascia, and connecting it, as in the Natal form, with the dark fringes of the apical margin. The brown markings are also somewhat darker than those of *A. panda*. These specimens are from Monga-ma-Lobah, in the Cameroons, and although probably only a local race, are at least as much entitled to specific distinction as is the species named by Walker, *Anaphe reticulata*. The entire absence of variation throughout the large colony sent by Colonel Bowker seems to indicate that the slight differences observable in these local races are constant and reliable, and that there is little or no individual variation.

ANAPHE INFRACTA, sp. n. (Pl. XLV. fig. 8).

Head and palpi ferruginous; antennæ black. Thorax creamy white anteriorly, ferruginous posteriorly, the white divided by a ferruginous streak along the middle, reaching to the head. Fore wings creamy white, with narrow brown margins, the fringes also brown, two narrow brown transverse bands; the first, arising before the middle of the costal margin, tends obliquely outwards to a point slightly beyond the middle of the dorsal margin, where it joins the lower extremity of another narrow brown band, which runs to the costa parallel with the apical margin, the two enclosing a plain wedge-like space of the pale ground-colour of the wing. The outer of these bands is connected with the apical margin by two shorter brown streaks from above and below its middle, the upper one slightly depressed outwardly, the lower one more depressed, reaching the margin slightly above the anal angle. Hind wings creamy white, tinged with ferruginous at the base, and about the abdominal margin, with a very faint indication of a transverse median shade of the same colour, more visible on the under side. Abdomen pale ferruginous, with darker lines at the junction of the segments.

Expanse of male 47 mm.; of female 58 mm.

Monga-ma-Lobah, Cameroons (*G. Thomson*).

Anaphe reticulata, Walker, figured by Herrich-Schäffer (*Sammlung ausser-europäischer Schmetterlinge*, f. 434), under the name *Arctiomorpha euprepiaeformis*, has two distinct transverse bars across the wedge-shaped pale space, the lower one of the two being continued to the base of the dorsal margin. Two cocoons, said to belong to this species, are in the British Museum, and differ from the one now under notice, so far as I can ascertain, only in their rather smaller size and more irregular shape, and in the colour of the silk of which the small cocoons in their interior are composed. These (which in my specimen are white, with scarcely any brownish tinge) are, in those cases,

f a rich brown, almost exactly the same colour as the external covering of the aggregate mass.

A sixth species was kindly given to me about three years ago by Mr. G. T. Carter, collected by him at Aburi, on the Gold Coast. The single specimen (a male) is now in the British Museum.

The colouring is precisely similar to that of *A. panda*. It differs from all the described species of this genus in having a single band only, crossing the anterior wings; moreover, this band, instead of being somewhat curved outwards, as is the first bar in all other known species, is curved slightly inwards towards the base. The costal margin is brown throughout; the dorsal margin also brown, except a very short space near the base. The fringes of the anterior and posterior wings are also brown. On the underside the upper portion of the central band of the fore wings is visible, and there is a distinct costal spot on the hind wing, which is not visible above.

ANAPHE CARTERI, sp. n. (Pl. XLV. fig. 9.)

Face and palpi ferruginous; head creamy white above; antennæ black. Thorax creamy white in front and at the sides, with a ferruginous blotch behind projecting forward in the middle, in an obtuse wedge-shaped form, but not reaching to the head. Fore wings creamy white, the margins narrowly ferruginous, with a narrow transverse median band of the same colour, which is slightly bent inwards; the fringes also ferruginous. Hind wings creamy white, with ferruginous fringes, except on the abdominal margin.

Expanse 36 mm.

Aburi, Gold Coast (*Carter*).

I find in the Proceedings of the Entomological Society, June 5th, 1878:—

“Mr. D. Greig Rutherford exhibited a series of large cocoons sent by Mr. George Thomson from Mount Camaroons, West Africa, formed by the caterpillars of a species of *Bombyx* allied to *Anaphe panda*, Bdv. They were taken at an elevation of 5000 feet above the level of the sea, and, judging from the nature of certain twigs and pieces of native cord fastened to their exterior covering, appeared to have been found attached to fences or to the eaves of houses. The cocoons are light brown in colour, and very irregular in shape, rather flattish, and vary in diameter from four to seven inches.

“Each cocoon contains from 130 to 150 separate cocoons, each enclosing a larva or a chrysalis in various stages of development, the least mature being near the centre of the aggregate mass. To some of the cocoons were attached a case containing what appeared to be the larvæ of some species of *Ichneumon* or dipterous parasite.* All the smaller cocoons are firmly bound together by layers of a coarse silken material, this aggregation being enveloped by a thin brown lining almost of the consistency of parchment, the whole forming a compact mass, which again is surrounded by a loose silken tissue, while a strong covering of the same material envelops the whole. From this it would appear that *A. panda*, like some other species of *Bombycidae*, is social, and that the caterpillars unite in considerable numbers in order to form an aggregate cocoon of sufficient strength

* These were subsequently proved to be Hymenoptera, sp. *Cryptus formosus*, Brullé.

to preserve the chrysalis from the attacks of enemies, and probably also against extreme changes of temperature."

It may be noticed that this description applies in almost every detail to the specimens under consideration, but I would point out one exception.

The plan adopted by the numerous members of this South-African insect republic appears to have been based upon a more perfect recognition of the equal rights of individuals. There is no necessity under their system to trust to the retarded development of those situated towards the interior of their habitation. There are two outlets, and the inhabitants have ranged themselves in two almost equal bodies in such a manner as to secure to each moth a ready means of egress from one or other of these openings. The points of the numerous cocoons are all directed as nearly as possible towards the nearest available outlet, and a separate silken passage seems to have been prepared for the accommodation of each occupant, so that the foremost ones in no way block the way of those situated behind them. Some few of the moths which appear to have been unable to get out, are probably those of which the larvæ were somewhat starved, and therefore imperfectly developed, and which were thus not upon equal terms with their more advanced companions. There are probably some Fellows of the Society who are better capable of judging of the quality of the silk than myself. It seems to me to be extremely strong and tough, although, except on the external covering of the colony, it is not particularly coarse. On winding a small quantity, it appeared to be perfectly continuous, but not easily run off. Although there is far less in quantity on each separate cocoon than on those of *Bombyx mori* and other silk-producing Bombyces, the immense number of cocoons in each colony might not impossibly render it of some economic and commercial value. A silk-plantation on the high lands of Natal would certainly be a pleasant and healthful field of enterprise, and might perhaps turn out to be a profitable one.

The only description I have been able to find of a larva of the genus *Anaphe* is given by Carl Fromholz in a paper in the 'Berliner entomologische Zeitschrift,' Bd. xvii., 1883, Heft i. pp. 9-13, which is illustrated by an octavo plate. This larva was supposed to be that of *Anaphe panda*, and the large cocoon figured on the plate was evidently made by this or some allied species, but the specimens came from the interior of Africa, 250 miles from Dara Salam, and the moth does not appear to have been actually identified. This larva was described from the dead and somewhat shrivelled specimens which reached the author, as "yellowish white," which by no means agrees with the colour of those now exhibited.

The examples now figured were preserved by a process which I have successfully applied to those of the majority of the British Macro-Lepidoptera, as well as to numerous exotic species. They have the head black, divided by a narrow pale line along the middle; the second segment, with two narrow transverse horny plates, separated from each other in the middle, and a narrow black horny plate on the anal segment. The body is of a purplish vinous colour, slightly paler between the segments, with a faintly indicated pale line above the black spiracles, and some pale yellowish white spots at the junction of the segments below them.

The whole body is covered with short black hairs. On the upper portion of each segment are two pale wart-like spots, situated to the right and left of the dorsal vessel. Behind these, and more widely separated from each other, are two smaller, but otherwise similar, spots, whitish hairs springing from all four. Other wart-like spots less distinctly paler than the surrounding skin are arranged on the sides of the segments in the following order; one above and one below, and a third behind and slightly below each spiracle. There is also one above each of the abdominal claspers, which are dull yellowish white, with black hooklets, as are also the anal claspers. The prolegs are black, with a whitish ring around the base of each. All the hairs have small, but sharp spines around them, arranged somewhat in a spiral form from base to tip, the points directed outwards. This formation, as in the case of those of many larvæ of the Lasiocampidæ and Liparidæ, notably in that of *Cnethocampa pityocampa*, W.V., renders them very irritating and difficult to eradicate if, by any means after detachment, they become lodged, with the base downwards, in the human skin.

This genus has been placed among the Liparidæ. In the *Annals and Magazine of Natural History* (4), xix. p. 462, Mr. Butler assigns to it a position between *Marana* and *Numenes*, and suggests that *A. reticulata* and *A. panda* are probably varieties of one species.

The young larvæ above described have so much the character of Arctiidæ, with their clothing of long brown erect hairs, as to suggest the idea that the genus should more properly be included in this family. The most immature forms of larvæ may usually be relied upon to indicate their affinities and probable derivation. In this case it is a fair inference from the evidence they afford that *Arctia* is an older form than *Liparis*, and that the genus *Anaphe* occupies the position of a connecting link between the two families.

Herrich-Schäffer, in creating for this form the generic name *Arctiomorpha*, showed that he had observed its peculiar resemblance to *Arctia*; but he placed it in the family Notodontidæ.

Boisduval, in describing this same species in the 'Voyage de Delegorgue en Afrique Australe,' tom. ii. p. 600, 1847, mentions its resemblance to *Arctia villica*, which I confess I am unable to recognize. The large anal tuft of easily detached hairs on the body of the female is the point in which it most strongly resembles the typical forms of the genus *Liparis*, as well as in its neuration, the median vein of the hind wings having but three branches instead of four as in the Arctiidæ.

I am informed by Mr. Kirby that the dipterous parasites present in the cocoon from Colonel Bowker appear to be closely allied to *Tachina onchestus*, Walker (*List Dip. B. M.* iv. p. 773, 1849). [Two of these emerged on the day the paper was read, and one was shown alive at the Meeting of the Society, along with the series of specimens described in this communication.]

Fromholz, in the paper already referred to, describes under a new genus of Lepidoptera belonging to the Phycidæ, *Zophodiopsis hyænella*, as infesting nests of the species mentioned by him and believed to be *Anaphe panda*. We have therefore the Lepidoptera, Hymenoptera, and Diptera, each represented as parasitically attached to the larvæ or to the habitations of larvæ of this interesting genus.

EXPLANATION OF PLATES.

PLATE XLIV.

Fig. 1. Enveloping cocoon of *Anaphe panda*, Boisd., two-thirds natural size—outside view.

Fig. 2. The same cut open, showing internal texture and arrangement of small separate cocoons. o^1 , o^2 , twigs inserted into the openings.

PLATE XLV.

Fig. 1. Portion of inner surface of enveloping cocoon, showing lining between inner wall and exterior, with modification of smooth surface by introduction of foreign body. 1 *a*. Fibre of envelope, highly magnified.

Fig. 2. Diagram of cross section through the middle. 2 *a*. Outlet at back of same.

Fig. 3. Full-grown larva. 3 *a*. Spines of larva, highly magnified.

Fig. 4. Young larvæ.

Fig. 5. Separate cocoons from interior. 5 *a*. Empty pupa-shell.

Fig. 6. Single brown cocoon, from interior of similar colony in the British Museum.

Fig. 7. *Anaphe panda*, Boisd. ♂.

Fig. 8. ——— *infracta*, Wlsm. ♂.

Fig. 9. ——— *Carteri*, Wlsm. ♂.

Fig. 10. Dipterous parasite, *Tachina onchestus*, Walk. 10 *a*. Empty cocoon of same.

W. Purkiss lith.

Hanhart imp.

ENVELOPING COCOON OF ANAPHE PANDA. 1. Outside, 2. Inside view.

7 ANAPHE PANDA. 8A. INFRACATA. 9A. CARTERI.
1-2 Portions, Cross-section & fibre of enveloping Cocoon, A. panda. 3-4 Larva in
different stages & spines. 5-6. Separate interior Cocoons.
10 TACHINA ONCHESTUS, a Dipterous parasite & 10a its Cocoon.

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Grey,

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