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ATTACUS DOHERTYI DAMMERMANI NOV. SUBSPEC., AND SOME NOTES CONCERNING THE GENUS ATTACUS L. (LEPIDOPTERA HETEROCERA, FAMILY SATURNIIDAE)

by

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1. **Attacus dohertyi dammermani** nov. subspec. (Plate II)

Large, apex of fore wing moderately produced, general coloration of wings, head, notum including patagia, and abdomen rather light reddish brown, several intersegmental folds between the abdominal tergites blackish. In both wings the terminal area somewhat lighter, more yellowish brown, in apex of fore wing grading into yellowish. Hind wing with the apical area markedly reddish. In fore wing the dark apical spot and red dash weak, submarginal line practically wanting, in hind wing a somewhat undulating submarginal dark line well developed. Postmedian band in both wings strongly serrate, but not bent inwards. Antemedian band in both wings less distinct, not serrate, in fore wing angled on base of v2, in hind wing curved inwards. The vitreous patches in both wings very large, guttiform by having the base curved outwards, the basal angles rounded, and the top elongated and pointed towards the postmedian band. In both wings with two additional vitreous patches which are in fore wing slightly larger than in hind wing. In hind wing the lower patch communicates with the interior black border of the postmedian band. All these spots bordered by a black margin. The interior orange yellow border, so obvious in many *dohertyi* specimens, is wanting or indicated by some inconspicuous traces only. Underside corresponding with upperside, the outer half very light, as in *atlas,* but the subterminal markings in both wings practically wanting or obsolete. Lateral markings of abdomen much less developed than in *atlas.*

1 ♀, 25 cm, holotype, W. Sumba, IV. 1925, labelled Dammerman, Sumba Exp., in Museum Leiden.

2. THE SPECIES OF THE GENUS *Attacus* L. IN THE FAR EAST.

There is no unanimity in literature concerning the number of *Attacus* species in the Far East. If we omit the species recorded from the Philippines, of which I have no adequate material at my disposal, we can state that a recent author as Schüssler (1933, p. 12 seq.) enumerates *atlas* L., *aurantiacus* Roths., *crameri* Feld., and *dohertyi* Roths. About the same time Bouvier (1936, p. 325 seq.) distinguishes *atlas, lorquini rotundus* Jurr. & Lind., *erebus* Fruhs., *crameri, dohertyi,* and *aurantiacus*. Seitz (1926, pp. 502-503) speaks of *atlas, staudingeri* Roths., *crameri, edwardsi* [sic] White, and *dohertyi*. This arrangement is not quite satisfactory in so far as *edwardsii* and *staudingeri* are nearly related representatives of a certain group which Watson (1914, p. 265) has correctly placed in a new genus *Archacoattacus,* considered valid by modern authors. Personally, I am of opinion that four species can be distinguished, viz. *atlas, crameri, aurantiacus,* and *dohertyi*. There may indeed be some difficulties to distinguish with certainty between the species of the genus, and these difficulties may become much greater when we have to deal with the many subspecies hitherto described. Furthermore, several authors have treated these insects rather carelessly, so that a good deal of regrettable errors have crept into this matter. Before going further it is advisable to correct these errors here, as far as possible.

Gschwandner (1920, p. 55 ♂, pl. 1 fig. 1 ♂) describes and figures an *A. banghaasi* n.sp. from the S. Philippines. Schüssler (l.c., p. 19) mentions this insect as a "f." of *crameri* Feld. Gschwandner (l.c., p. 56 ♂ ♀, pl. 2 ♀) describes and figures an *A. ruegeri* n. sp. from the Tenimber Islands (Timor Laut). This is certainly a *dohertyi* and is treated as such by Schüssler (l.c.).

Seitz (l.c., p. 503, pls. 54, 55A, 55C) has caused some confusion. Under *atlas taprobanis* Moore from Ceylon and *a. macmulleni* Wats. from the Andamans, he says "Java specimens, chiefly in ♀, show mostly a more yellow brown ground coloration though also dark ♂♂ occur there", and he omits that Fruhstorfer (1904, pp. 286, 287) has described *a. triumphator* and *a. roseus* from E. and W. Java respectively. As the habitat of *A. atlas gladiator* Fruhs. he gives Sumatra, whereas Fruhstorfer (l.c., p. 285) describes this subspecies from Singapore, adding that he has also a ♀ from Siam.

Under *staudingeri* he omits that Van den Bergh (1915, p. 227 ♂, pl. 9 fig. 2) has already recorded and figured this species from Sumatra. His figure (pl. 55Ab), which he calls *dohertyi,* is distinctly the common *edwardsii* from India!

Schüssler (1933) is also not free from errors. For his "f. *simalurana*" (cited under subsp. *erebus*) he mentions "Simalur (Celebes)" as a habitat. Simalur, however, is the most northernly island in the chain of islands off the N.W. coast of Sumatra. These islands to which, e.g., belong Nias and Engano, are geologically very old.

Concerning *atlas gladiator* Fruhs. he makes the same error as Seitz by noting Sumatra and Singapore as a habitat, whereas for "f. *sumatranus*" he mentions, besides N. W. Sumatra, Singapore. Fruhstorfer (1904) has described this subspecies from "Sumatra, Padangse Bovenlanden".

For "*Crameri caesar* ab. *bifenestratus* Gschw.", he mentions the Philippines as a habitat. Gschwandner (l.c., p. 59) records his specimens, 2 ♀♀, from India, therefore this aberration certainly belongs to *atlas* and not to *crameri*.

Attacus atlas ab. *trifenestratus* Gschw. from N. India and Borneo was also recorded by Schüssler under *crameri*, with the erroneous habitat "Philippines".

Now we have to clarify Bouvier's work (1936, pp. 325-327). On p. 326 he gives "Batavia" instead of "Batjan" as a habitat for *lorquini* [sic!] *rotundus* Jurr. & Lind. The Celebes subspecies *erebus* Fruhs. is considered by him a separate species, which opinion is not shared by all other authors. On p. 328 he cites *banghaasi* Gschw. as an "*atlas*", whereas Schüssler (l.c.) has correctly ascribed it to *crameri*. It is, at least, not an *atlas*. The Ceylon subspecies is called by Bouvier *taprobanensis* Moore; the correct name is *taprobanis* Moore. The subspecies from Simalur is called *simularana*; the correct name is *simalurana*. On the same page he describes an *atlas opaca* (rect. *opacus*!) noting as a habitat "Sumatra?, Philippïnes", and adding "c'est peut-être le vrai *sumatrensis*". We wish to abstain from criticism!

On p. 329 Bouvier describes an *atlas varia* nov. (rect. *varius*) from Annam, Tonkin, Cochinchina, Java. It can hardly be expected that the three first mentioned regions and Java are inhabited by one and the same subspecies; moreover from Java already two subspecies were described by Fruhstorfer (1904), and several others were added by Bouvier himself (see below).

On p. 330 he records *atlas gladiator* Fruhs. from Singapore, Siam, and Tonkin. But he describes also an *atlas varia* (rect. *varius*) and an *atlas tonkinensis* from Tonkin!

On the same page he describes an *atlas javanensis* nov. from Java, overlooking that he had already used the same name in 1932 (p. 43) for 2 ♂♂ from Wonosobo, C. Java! On the same page he introduces an *atlas pallida* (rect. *pallidus*) nov. ♂ from Java.

In order to summarize the present situation as far as concerns *Attacus atlas*, we arrive at the following arrangement:

3. THE DESCRIBED *Attacus atlas*-"FORMS", GEOGRAPHICALLY

A. China
   1. *A. atlas atlas* L., 1758, probably from the W. coast.
   2. *A. atlas talas* Hübn., 1820, very doubtful; "Kwantung" sec. Schüssler (l.c., p. 16).
   3. *A. atlas chinensis* Bouv., 1936, p. 330 ♂♀: Hong Kong. Probably the same locality as that of Linnaeus' *atlas*.

B. India
   1. *A. atlas silheticus* Helf., 1837, p. 41.
   2. *A. atlas bifenestratus* Gschw., 1920, an aberration.
   3. *A. atlas mysorensis* Bouv., 1936 ♂: Mysore.
   4. *A. atlas similis* Bouv., 1936 ♂: Trichinopoly.
   5. *A. atlas taprobanensis* Bouv., 1936: S. India.

C. Ceylon
   1. *A. atlas taprobanis* Moore, 1882.

D. Burma, Siam, Indochina
   1. *A. atlas gladiator* Fruhs., 1904: Singapore; Siam.
   2. *A. atlas varia* Bouv., 1936 ♂: Annam; Tonkin; Cochinchina; Java.
   3. *A. atlas burmaensis* Jurr. & Lind., 1921 ♀: Tharrawaddy, Burma.
   4. *A. atlas tonkinensis* Bouv., 1936 ♂♀: Tonkin; Cochinchina.

E. Malaya
   1. *A. atlas gladiator* Fruhs., 1904 ♂♀: Singapore; Siam.

F. Andamans
   1. *A. atlas macmulleni* Wats., 1914: Port Blair, Andamans.

G. Simalur
   1. *A. atlas simaluranus* Wats., 1915 ♂: Simalur.

H. Sumatra
   1. *A. atlas sumatranus* Fruhs., 1904 ♂♀: Padang, W. Sumatra.
   2. *A. atlas opaca* (rect. *-us*) Bouv., 1936 ♂: Sumatra ?, Philippines.
   3. *A. atlas incerta* (rect. *-us*) Bouv., 1936 ♂: Sumatra.
   4. *A. atlas simplex* Bouv., 1936 ♂: Sumatra.

J. Java
   1. *A. atlas triumphator* Fruhs., 1904: E. Java.
   2. *A. atlas roseus* Fruhs., 1904: W. Java.
   3. *A. atlas* ab. *interruptus-conjunctus* Gschw., 1920 ♂: E. Java.

4. *A. atlas javanensis* Bouv., 1932 ♂: C. Java.
5. *A. atlas javanensis* Bouv., 1936 ♂♀ (nec Bouvier, 1932!): "Java".
6. *A. atlas pallida* (rect. *-us*) Bouv., 1936 ♂: "Java".

K. Borneo

1. *A. atlas mannus* Fruhs., 1904: Kina Balu.

L. Celebes

1. *A. atlas erebus* Fruhs., 1904; N. Celebes, Menado [1]).

M. Bali

1. *A. atlas baliensis* Jurr. & Lind., 1921 ♂♀: Bali.

4. Some general considerations and conclusions

The above compiled list of the many described "forms" of *Attacus atlas* L. needs some comment. In the first place the collective species *atlas* is distributed from Southern China over India, Ceylon, and the Malay Archipelago, including Celebes and Bali. Further Eastwards it is replaced by *crameri, dohertyi,* and *aurantiacus*. The species from the Philippines remain beyond consideration. It is to be regretted that no specimen from Palawan is known.

In the second place a considerable number of subspecies of *atlas* were described from its different areas. In order to form an opinion about the value of these many subspecies, we have to realize that *Attacus atlas* is a rather variable insect. Probably the Saturniids are of an old phylogenetical origin, but several genera, in their present constitution, like, e.g., *Attacus* and *Antheraea,* may be of a younger date. They are to be compared with young shoots originating from an old trunk. Their variability is due to the circumstance that they are not yet strongly fixed genetically. Therefore, local forms such as subspecies, or on a smaller area even "biotypes" or "ecotypes", may develop, the more as these large insects are weak and cumbersome fliers, not moving over great distances. Yet a number of well differentiated subspecies can be readily distinguished. For instance, *erebus* Fruhs. from Celebes is very distinct, even so that Bouvier treats it as a separate species. This may be an ambiguous question as it is the same case with many other insects from Celebes. Also *simalurana* Wats. is very obvious. Like *erebus,* to which it has some similarity, it may be an old constituent of the *atlas* group. *Baliensis* Jurr. & Lind. is quite conspicuous too, at least quite different from the Javanese *atlas* subsp. As already stated the variability of the Javanese *atlas* is considerable. The ground colour may be

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1) The ♂ was figured by Bouvier (1936, pl. 3 fig. 6). — The life history of this Celebes subspecies was already described by Ver Huell (1836, pp. 29-30, pl. 3).

different, more reddish or brownish, and lighter or darker. It is highly susceptible to fading, by the influence of day light. It is more or less variegated with yellow, purple, and whitish; the vitreous spots may be larger or smaller, the cross bands may be more or less curved; even the shape of the wings is not contant, chiefly the apex of the fore wing may be more produced and more pointed, or broader and shorter. Local influences may play a role in determining the general feature, as the insect occurs from the sea shore up to about 1500 m. A dry season or a wet season may have some influence, during a dry season the pupa shows the tendency to undergo a diapause which may last up to several months. From the mountains of Java I saw very vividly coloured specimens as well as dark ones. Some of them are entirely dark, others have only the median area darkened. From this point of view the discrimination of "subspecies" within a certain geographical area, as for instance Java or Sumatra, becomes a risky matter, and I am convinced that the "subspecies" described by Bouvier are founded on individual variations only, such as just indicated here. Fruhstorfer (1904) was the first to describe two *atlas*-"races" (= subspecies) from Java, viz., *triumphator* and *roseus,* from E. and W. Java respectively. He says (1904, p. 287) that it was a "Hochgenuss" (high enjoyment) for him to state the occurrence of two "sharply contrasting races" in Java. Unfortunately I cannot share this "Hochgenuss", the differences, if there are any, between specimens from W. and E. Java, are so futile, that I can hardly appreciate them. For me it is even the question if the Javanese, Sumatran, Bornean, and Malayan *atlas* are sufficiently different; there is perhaps a possibility to unite them under the name *gladiator* Fruhs., 1904, from Singapore, which name has rule priority.

5. **Attacus crameri** Feld. (Plate III ♀)

The topotypical habitat of this species is Ambon. Schüssler (l.c., p. 19) ascribes several subspecies from the Philippines to this species, furthermore it was only recorded from Flores, as *crameri inopinatus* Jurr. & Lind. (1920, p. 94 ♂, pl. 11 ♂).

A short time ago I came into possession of 4 ♂♂ and 4 ♀♀ of this species by a collector in the interior of the island of Flores, at an altitude of about 1400 m. The two specimens of Jurriaanse & Lindemans came from Maumeri, a harbour place at the N. coast. The four males are rather variable, the ground colour is a rather dark and dull vinaceous red, the cross bands are not very prominent, the vitreous spots small and variable in size and shape, there are no accessory spots; the dark anteterminal line is obsolete or

wanting, the apex of the fore wing more pinkish. The females are more dark reddish brown with the cross lines more prominent, the vitreous patches large, guttiform, their outer point approaching or reaching the postmedian band, and with one or two additional spots in fore wing or on both wings. The terminal area in both wings towards the postmedian band light pinkish, more outwardly dark yellow, the dark anteterminal line more or less obsolete. In one female with two additional vitreous patches in each wing, the shape of the large vitreous patch in the hind wing is somewhat irregular. Exp. of ♂♂ 155-197 mm, of ♀♀ 170-200 mm.

Furthermore I have 1 ♂, about 175 mm, labelled Soë, Timor, 1929, ex coll. Walsh, in bad condition, which I ascribe to *A. crameri*. It has the ground colour more brownish, the vitreous spots of medium size, with their apical point reaching the postmedian band, and one additional spot in the fore wing. The pattern, chiefly the black anteterminal line on both wings, is more prominent. Possibly the specimen represents a distinct subspecies, but I abstain from giving a name on account of its bad state.

We may conclude, therefore, that the geographical distribution of *Attacus crameri* and its subspecies is as follows: Amboina (topotypical locality); Philippines (several subspecies ?); Flores (subsp. *inopinatus* Jurr. & Lind.); Timor (subspecies ?).

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EXPLANATION OF THE PLATES

Plate II

Attacus dohertyi dammermani Rpke. ♀, Sumba. Slightly reduced.

Plate III

Attacus crameri inopinatus Jurr. & Lind. ♀, Flores. Slightly reduced.