

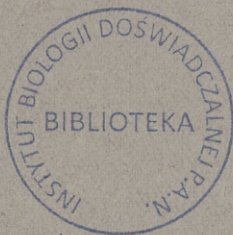
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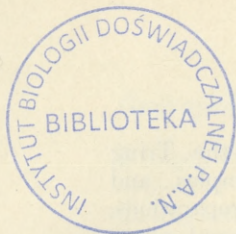
*On the Forms and Geographical
Distribution of *Acraea lycoa*,
Godt., and *Acraea
johnstoni*, Godm.*



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TRANSACTIONS
OF THE
ENTOMOLOGICAL SOCIETY
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FOR THE YEAR 1911.

- I. *On the Forms and Geographical Distribution of Acraea lycoa, Godt., and Acraea johnstoni, Godm.* By HARRY ELTRINGHAM, M.A., F.Z.S.

[Read June 1st, 1910.]

PLATES I, II.

AT a meeting of this Society on June 6th, 1906, a paper was read by Professor Poulton, in part dealing with the mimetic forms of *Acraea johnstoni*, Godm.* In this paper the author sought to show that judging from the outward characteristics, *Acraea lycoa* of West Africa gradually merged by intermediate gradations into *Acraea johnstoni* of the east and south, the subject being considered with special reference to the remarkable series of mimetic modifications presented by the latter species. The final conclusion then attained emphasised the extreme probability that the whole series of forms then associated under the names of *A. johnstoni*, *A. proteina*, etc., must be regarded as specifically identical with *Acraea lycoa*.

In order that the true affinities of this complicated association may be more accurately established, I have, at Professor Poulton's suggestion, undertaken a microscopical examination of the minute structure of the forms. I have examined the whole of the material in the Hope

* "Mimetic Forms of *Papilio dardanus (merope)* and *Acraea johnstoni*," E. B. Poulton. Trans. Ent. Soc., p. 281 et seq., 1906.

Department, the National Collection, and the Tring Museum, comprising some hundreds of examples, and have made a large number of microscopical preparations, with results which it is the purpose of the present paper to describe.

As a preliminary it seems desirable to give some account of the known forms and the present state of their synonymy.

ACRAEA LYCOA.

Acraea lycoa was described by Godart in 1819 (Enc. Meth.) from a female example, and the author stated that it was not known whether the sexes were alike. The first reference I can find to the male is in Staudinger's "Exotische Schmetterlinge," where the difference between the sexes is mentioned. Fig. 2 on Plate I shows the typical western female drawn from an example received from Sierra Leone, whilst fig. 1 shows a male from Oguta, Nigeria. In the female the depth and richness of the ground-colour varies somewhat, though it is in practically every case paler than in more eastern forms. The male is frequently semi-transparent, and the forewing spots may be only very faintly discerned. Examples from Accra and Nigeria present no distinct modifications from the extreme western forms. The first recognisable change is observable in males from Fernando Po. These resemble fig. 1, but the spots on the forewings are now quite distinct, and of the same pale reddish colour as the discal area of the hindwings, and the whole ground-colour is somewhat darker. The females are still like fig. 2, but with darker ground-colour. These forms persist over a large area, extending without marked variation from Fernando Po, through the French Congo, and across the Congo State to Toro in S.W. Uganda. At Toro several varieties may be found, since it is here that three geographical races appear to meet. From this point the species spreads north and south. Between Lake Victoria Nyanza and Lake Kivu (Mt. Niragonwe) the males resemble fig. 3, whilst fig. 4 shows a female from the same locality. To the north of Toro in the Unyoro Region the male is modified in a somewhat different manner. As fig. 5 shows, the forewing spots have become much smaller and more clearly defined, though there is much less development of the hindwing patch than in the

Niragonwe specimens. This form of the male is very typical of Western Uganda. The females are not, however, distinguishable from those of the more southern Urundi District, all being characterised by the extreme paleness of the hindwing patch. Passing round the north shore of Lake V. Nyanza and on towards the south to the Tiriki Hills this hindwing patch becomes more distinctly yellow, whilst the males have developed the same feature, accompanied by a darker ground-colour and greater distinctness and depth of colour in the forewing spots. The male of this region is shown at fig. 6. Passing southwards and eastwards we find at Kilimanjaro the two sexes present much the same pattern, but the ground-colour in both sexes is now very dark, the forewing spots in the female are smaller, and the hindwing patch is slightly expanded again. The sexual dimorphism is still well marked. Fig. 7 shows a female of this form which is equivalent to the "*Planema*" *fallax* of Rogenhofer, and the *Acraea kilimandjara* of Oberthür. The species has developed to its maximum extent in mimetic approach to *Amauris echeria* and *A. albimaculata*. Northwards, in the district of Mt. Kenia, examples still resemble *fallax*, but in several specimens the hindwing patch has a slightly edentate distal outline between the third median and the radial, giving the insect a marked resemblance to *A. johnstoni* f. *confusa*. In two males from this district the forewing spots are distinctly paler than the hindwing patch, and up to this point in the geographical range of the species this is the only sign of departure from a hitherto consistent sexual dimorphism. This Kenia form resembles fig. 7 on the upperside with the exception of the slight difference in the hindwing patch, but the insect is generally somewhat smaller. I have figured it in monochrome on Plate II, fig. 7. On the underside the difference is more marked. In *fallax* the ground-colour of the forewings is dark sepia from the base to the inner side of the white subapical spots, the whole apical area being dusted with pale ochreous. In the Kenia form the dark colour extends beyond the first three subapical spots, and the whole of the underside has a generally blacker appearance than in *fallax*. These forms are of exceptional interest, and are amongst the many valuable specimens for which the Hope Department is indebted to the generosity of the Rev. K. St. A. Rogers and Mr. and

Mrs. S. L. Hinde. The species further extends northwards into Abyssinia, and there we find that both sexes are alike, not having, as the Kenia specimens might lead us to expect, white forewing spots, but having all the lighter markings dark ochreous. This form is the subspecies *A. lycoa aequalis* of Rothschild and Jordan, represented at figs. 8 and 9. It is worthy of note that the Abyssinian form *steckeri* of *A. echeria* is specially characterised by dark ochreous markings and an entire absence of white spots. It is doubtless in mimicry of this form that the female *lycoa* of this region has lost its white markings.

With regard to the existing nomenclature of the above forms, the *lycoa* of Godart applies to the species throughout its range until we arrive at Entebbe, and from thence eastward and southward the forms approach more and more closely to the *fallax* of Rogenhofer, which is identical with Oberthür's *kilimandjara*. In his catalogue of the African Rhopalocera Aurivillius makes the queried suggestion that *fallax* may be a form of *johnstoni*, but this I hope to show is an incorrect surmise. The same author refers to an example described as a variety of *lycoa* by Butler, and names it ab. *butleri*. The supposed identity of this variety with *lycoa* must be regarded as an error. From an examination of the specimen there can be no doubt that it is a female example of the form subsequently described by Grose-Smith as *Acraea toruna*, the position of which will be considered later.

ACRAEA JOHNSTONI.

Acraea johnstoni was first described by Godman in 1885 (P.Z.S., p. 537) from a male example, and the type agrees with the form subsequently described by Oberthür as *Acraea proteina semifulvescens*. Now that long series of the forms of *A. johnstoni* are available, it is seen to be somewhat regrettable that this form should have acquired the position of the type, since it is in reality a rather rare variety. In 1889 Butler described an *Acraea*, which he assigned to the type of *Acraea johnstoni* as its female, and this arrangement was confirmed by Dr. Holland in 1893 (Ann. Nat. Hist., p. 248). In 1891 Rogenhofer described his "*Planema*" *telekiana*, which, however, is only a form modified but slightly from Godman's type of the male *johnstoni*. The hindwing patch is somewhat

tawny in *telekiana*, whilst it is whitish in the male type of *johnstoni*. The same author described at the same time "*Planema*" *confusa* and "*Planema*" *fallax*. The latter has already been referred to in connection with *lycoa*. *Planema confusa* is described by Rogenhofer as the male of Butler's type female. In Baumann's "Usanbara" (supplement) it is stated that both the male and female were taken. No difference is specified, and the figure subsequently published is stated in the text to be that of a female, though the description facing the plate states it to be a male. In 1893 M. Oberthür described a number of forms under the name of *Acraea proteina*, the type of which appears to be a male,* and resembles the insect previously described by Butler as the type female of *johnstoni*, and is also similar to Rogenhofer's *confusa*. The four varieties described by Oberthür are (1) *proteina flavescens*, which appears to be an ordinary yellow-spotted example of the commonest form of *johnstoni*; (2) *proteina semialbescens*, sex not stated, an example of which in the National Collection has white spots on the forewing, and tawny hindwings marked with dark inter-nervular rays and exhibiting no trace on the upperside of the quadrate patch, though the latter is clearly outlined on the underside; (3) *proteina semifulvescens*, sex not stated, a form which agrees with Godman's male type; (4) *proteina fulvescens*, a form which has nearly lost the spots in the forewing and the patch in the secondaries, though they are more obvious on the underside, and all four wings are tawny. It is the peculiar variety which appears to have developed in a mimetic direction synaposematic with *Danaida chrysippus* f. *dorippus* and *Acraea encedon* f. *daira*.

The next published reference occurs in Butler's note on the forms in Proc. Zool. Soc., p. 113, 1896. Butler was unaware that the pattern of Godman's male type also occurs in the female sex, and therefore he regarded Godman's type and his own female type as constituting a sexually dimorphic variety. He describes Oberthür's *fulvescens* as synonymous with Rogenhofer's *telekiana*, whereas the latter is practically the same as Godman's male type, and further he

* Butler appears to have thought that Oberthür's *proteina* was a female. Though the sex of the specimen figured is not definitely given as male, the author states, after describing it, that his collection contains three males, quite similar to one another. I cannot take this to mean otherwise than that the example figured is one of the three males in question.

makes Oberthür's *flavescens* synonymous with the same author's *kilimandjara*, Rogenhofer's *confusa* and *fallax*, and Karsch's *octobalia*. The latter appears to be an aberration of *johnstoni*, in which the yellow spots are ringed with a darker colour.

I have lately examined in the British Museum a very curious example of *johnstoni* from Kilimanjaro. It resembles the *fallax* form of *lycoa* so closely that I hesitated to decide its identity from the external features alone. Mr. Heron kindly allowed me to examine the genitalia, and it proved to be *johnstoni* as above indicated. The quadrate appearance of the hindwing patch is almost lost on the upperside, though rather more developed beneath. Placed side by side with the forms of *lycoa* from Kenia above described, the two species would certainly be difficult to distinguish.

The last form of *johnstoni* which I have seen described is the *Acraea toruna* of Grose-Smith. It presents certain peculiar features, and will be considered apart from the other forms.

I have endeavoured throughout the foregoing somewhat tedious explanation to distinguish between forms which appertain to *lycoa* and those which are conspecific with *johnstoni*, because, as the result of my investigation, I am convinced that *lycoa* and *johnstoni* are separate species, and remain so throughout the length of their geographical range. That of *lycoa* has already been outlined. *Acraea johnstoni* occurs in the Tiriki Hills and extends as far south as Chirinda in S.E. Rhodesia. In this latter locality all the examples I have seen, some twenty in number, are of the *confusa* form (including *flavescens*). The spots and hindwing patch vary from yellow to white. In some cases the specimens have all white markings. Plate I, fig. 15, shows a female from this region.*

* Since the above was written I have had an opportunity of examining a fine series of *Acraea johnstoni* taken in Nyassaland by Mr. S. A. Neave. There are forty-five of the *confusa* form, varying from yellow to white spotted, the only combination not represented being white hindwing patch and yellow forewing spots. One example has white forewing spots and dark yellow hindwing patch (= *semialbescens*). There are, in addition, four examples of a peculiar form of *semifulvescens* in which the forewing spots are not obsolescent as is usual in this form, but are as white and distinct as in *confusa*. The examples are all males. They have a striking appearance and form an interesting connecting link between *confusa* and *semifulvescens*.

The specific identity of all the forms of *A. johnstoni* would, I think, with the exception of the *toruna* form, be quite satisfactorily established on the external features, but apart from my own examination of the genitalia, we have still further direct proof. In the Tring Museum there is a family of *A. johnstoni* bred from ova at Nguelo, Usambara. To which variety the parent belonged I have been unable to ascertain, but the nine offspring consist of the following :—

Three examples of the type form (= *semifulvescens*), two males and one female. The latter is shown at Plate I, fig. 12. The males are slightly smaller, and have the hindwing patch very faintly ochreous, and one has the forewing spots much paler.

Four examples of the *fulvescens* form, two males and two females. One of the latter is shown at Plate I, fig. 11. The males resemble this female, but the remaining female is somewhat intermediate, having the spots paler, and a considerable powdering of black scales at the base of the wings and about the inner angle of the hindwings.

One black and white female shown at Plate I, fig. 13. This form occurs very commonly at Chirinda, and I have also seen a similar specimen from Mombasa.

One male shown at Plate I, fig. 14. This example is nearest to the commonest variety of the species (= *confusa*).

ACRAEA TORUNA, Grose-Smith.

We may now consider the position of *Acraea toruna* in relation to the foregoing species. The ground-colour, especially in the forewings, is more profoundly modified than in any of the other forms. Whilst the present position of the forewing spots may be traced from *johnstoni* f. *confusa* through the typical male *johnstoni*, the distal outline of the hindwing patch is much less angulated than in other *johnstoni* forms, at least on the upperside, a fact doubtless due to the close approximation of its pattern to that of its model *Planema latifasciata*. One feature stands out prominently, the palpi are nearly always entirely black,* whereas in all the forms of *johnstoni*

* I have to thank my friend, Mr. F. A. Heron, for first calling my attention to this feature. It is interesting to note that the genus *Planema* is distinguished by the possession of black palpi, though there is also in that genus a white lateral streak.

and *lycoa*, and in fact in all other African *Acraeas* which I have examined the palpi are yellow beneath. I have examined three interesting examples of *toruna* in the Tring Museum taken near Bukoba, between Lakes Kivu and Victoria Nyanza. In one of these the hindwing patch is pure white and the palpi have numerous yellow scales beneath, thus providing a transitional form from *semifulvescens*. The second of these specimens is very abnormal, and has the ground-colour of the wings brownish black with just a slight suffusion of the characteristic reddish chocolate colour in the neighbourhood of the distal end of the forewing cell. The hindwing patch is white, and bears on the upperside hardly a trace of the quadrate distal outline. The third is of the normal colouring, but the forewing spots are very much reduced in size, that between the first and second median being represented by a mere streak, and the subapical band of spots is only about a quarter of the usual width. All these examples are males. The second specimen above described has decidedly the appearance of a form intermediate between *toruna* and a female *lycoa*, and in the absence of an examination of the genitalia would provide a strong temptation to be regarded as a connecting link between the two species.

As will presently be described the male genital armature of *toruna* presents no features by which that variety can be distinguished from the other forms of *johnstoni*, and I am satisfied that *toruna* is merely a geographical race or subspecies of *A. johnstoni*.

THE DISTINCTION BETWEEN *A. lycoa* AND *A. johnstoni*.

It now remains for me to give some account of the features which lead me to assign all the forms of *A. lycoa* and *A. johnstoni* to two distinct species, albeit including certain subspecies or geographical races. In the first place *A. lycoa* is sexually dimorphic, and remains so throughout its range with the exception of the peculiar Abyssinian subspecies. In *A. johnstoni* all the numerous varieties occur in both sexes. The modifications of pattern which take place in *lycoa* as we pass from west to east tend in one definite direction only, viz. away from the resemblance to western black and white *Planema* and *Amauris* models and towards a superficial resemblance to the eastern and southern Danaines *Amauris*

echeria and *A. albimaculata*, together with a synaposematic approach to the *confusa* form of *A. johnstoni*, especially developed at Kilimanjaro and on the Kikuyu Escarpment. Throughout its range and variations *lycoa* presents a pale discal area in the hindwing, which, though varying from white to yellow and showing a very ill-defined outline in males from the extreme west, nevertheless has, except in some examples of the *fallax* and Mount Kenia forms, a well-rounded distal outline. In *lycoa* the basal spots of the hindwing underside are almost always smaller and less confluent than in *johnstoni*, though this feature is somewhat variable. A careful examination of the neurulation in *lycoa* and *johnstoni*, shows the following differences (see Plate II, figs. 4 and 5). In the forewing of the former, the lower discocellular nervule is nearly always rather shorter and lies in a more nearly transverse direction than in *johnstoni*. This feature is also subject to slight variation. The hindwing cell presents a difference in the two species, and owing to the pale colour of the scales in this area the difference can be more readily seen. In *lycoa* the cell has a generally broader and shorter appearance than in *johnstoni*. This effect is produced to a great extent by the fact that the middle discocellular nervule is outwardly more deeply concave in the latter than in the former. This feature is fairly constant, and is quite evident in the examples from Kenia referred to above. The most conclusive test of specific distinction is, however, to be found in the structure of the male genital armature. I have made a large number of preparations from examples occurring throughout the range of the two species and from the different varieties, and have also examined many others not actually dissected out and mounted. The accompanying plate gives outlines of the neurulation, and also drawings of the male genitalia of *lycoa*, *johnstoni*, and *toruna*. Fig. 1 shows the appearance of the first, and fig. 2 that of the second. The claspers are for the most part shorter and stouter in *lycoa* than in *johnstoni*. The penis is comparatively short, frequently showing a kind of bilobed structure, and is not a continuous tube, but is widely grooved towards its extremity. The uncus is comparatively very short, obtusely pointed, and bears a small process on each side. In *johnstoni* the penis is long and slender, it does not show a bilobed structure, and though it is grooved like that of *lycoa*, the

walls are less widely separated. It is in the uncus, however, that the greatest difference is shown. It is produced dorsally into a long curved extremity, somewhat hollowed beneath, and slightly widened laterally at its termination. Whilst all the forms of *lycoa* from its western type to its most extreme modification in the Abyssinian subspecies present no noticeable change in the structure of these organs, so all the forms of *johnstoni*, from the typical male to *confusa* and *fulvescens*, and the subspecies *toruna*, show the same form in the male genitalia, especially characterised by the extremely long uncus and slender penis. That these features are of specific value I have no doubt, since I have also made preparations of the genitalia of other nearly allied *Acrucas*, and find that they present features which I need not here specify further than to say that they are entirely different and characteristic.

The male genitalia of the *toruna* form shown at fig. 3 afford little or no distinction from those of *johnstoni*. The claspers appear to be more distinctly lobed, but this is a variable feature, and is found more or less developed in some examples both of *lycoa* and *johnstoni*. The details of the articulation of the claspers with the vinculum are apparently rather different, though this point is not at all reliable in a microscopic specimen, as the appearance often varies with the point of view. The penis certainly exhibits a similar formation to that of *johnstoni*, and differs in the same degree from that of *lycoa*. The uncus is similar to that of *johnstoni*. There can be no doubt that *toruna* is as distinct from *lycoa* as is *johnstoni*, and further, that so far as the genitalia are concerned, it is indistinguishable from other forms of *johnstoni*. It appears to be rare, and is certainly a local form, and, as already stated, I think it must be regarded as a geographical race or subspecies of *johnstoni*.

Finally, we are now acquainted with the larvae both of *A. lycoa* and *A. johnstoni*, and it will be of interest here to compare them.

The larva of *A. lycoa* is figured by Aurivillius (Ent. Tidskr., Plate 5, fig. 2, 1893), and is thus described:—

“The larva is yellowish without markings, with black head and black spines. The thorns are scarcely as long as the diameter of the body.” The figure shows the larva as having all the spines black, including those of the sub-lateral row, whilst the body has no rings or markings of any

kind. From a preserved specimen in the Tring Museum the larva of *A. johnstoni* may be described as follows:—

Body yellowish beneath and brownish black above, each segment with a ring of yellowish white, edged with brown and divided in the middle by a dark brown line widened somewhat at the base of each of the papillae which carry the spines. Head black, and the first and last three segments ventrally somewhat darker than the remainder. Twenty-four dorsal black spines arranged in a double row. Eleven lateral spines on each side, the last two projecting backwards. Eight sublateral *yellow* spines on each side, the first pair arising from the fourth segment (Plate II, fig. 6).

The principal differences distinguishing this larva from that of *lycoa* are the dark-coloured dorsal area, the alternation of dark and light rings and the colour of the sublateral row of spines.

SYNONYMY OF THE FORMS OF *A. lycoa* AND *A. johnstoni*.

Having now established the specific differences between *A. lycoa* and *A. johnstoni* it remains to arrange the various forms in accordance with the facts enumerated. The varieties of *A. lycoa* fall naturally into several geographical races or subspecies, and it will therefore be convenient to give them subspecific names. In the case of *Acraea johnstoni* only one such geographical distinction can be clearly discerned, viz. that of the variety *toruna*. Since the form of *A. johnstoni* which must be taken as the type (= *semifulvescens*, Oberth.) occurs in both sexes, I would suggest that for the sake of uniformity, and without implying the slightest discourtesy to Mr. Butler, that the latter's female should be assigned to Rogenhofer's *confusa*. The *flavescens* and *semialbescens* of Oberthür are not conveniently distinguishable from his *proteina* and Rogenhofer's *confusa*. Oberthür describes the forewing spots in *proteina* as white or pale yellow, in *flavescens* as yellow, and in *semialbescens* as white. All these variations may be observed in long series, such as those from the Chirinda District collected by Mr. C. F. M. Swynnerton and Mr. G. A. K. Marshall. In this neighbourhood all the examples of *johnstoni* appear to be of the *confusa* form, whereas the latter occurs in company with the type

(= *semifulvescens*) and also with *fulvescens* at Kilimanjaro. Although at Chirinda *johnstoni* does not appear to produce some of the varieties which occur elsewhere, and as suggested by Prof. Poulton, appears to be influenced in its pattern by *A. lobengula*, I can find no constant features which would justify the separation of these southern forms as a geographical race. I therefore suggest the following synonymy for the two species under consideration:—

ACRAEA LYCOA, Godart.

Type: *Acraea lycoa lycoa*.

Godt., Enc. Meth. 9, p. 239 (1819); Staudinger, Exot. Schmett. 1, p. 85 (1885); Dewitz, Ent. Nachr., p. 104 (1889); Aurivillius, Rhop. Aeth., p. 115 (1898); Poulton, Trans. Ent. Soc., p. 305 (1906); Eltringham, Af. Mim. Butt., p. 47 (1910).

Sierra Leone to Nigeria. Plate I, fig. 1, ♂; fig. 2, ♀.

lycoa media, Subsp. nov.

Fernando Po to Toro.

= *lycoa*, Auriv., Ent. Tidskr., 14, p. 277 (1893).

Male distinguished by the clearer definition of the spots in the forewings, and the somewhat richer ground-colour. The female has a darker ground-colour and slightly smaller and more distinctly outlined hindwing patch.

lycoa bukoba, Subsp. nov.

Urundi Country between L. Tanganyika and L. V. Nyanza.

Male with dark ground-colour. Forewing spots medium size and ochreous. Hindwing patch ill-defined and ochreous. Female with dark ground-colour, forewing spots well defined. Hindwing patch very faintly yellow.

Plate I, fig. 3, ♂; fig. 4, ♀.

lycoa entebbia, Subsp. nov.

W. Uganda, Unyoro, Entebbe.

Male smoky grey. Forewing spots much reduced in size. Hindwing patch but little developed. Female with dark ground-colour. Forewing spots smaller and more distinct than in previous subspecies. Hindwing patch small and very faintly yellow.

Plate I, fig. 5, ♂. (Female resembles fig. 4.)

lycoa tirika, Subsp. nov.

Eastern Shore of L. V. Nyanza, Tiriki Hills.

Male resembles previous form, but forewing spots smaller and hindwing patch more distinctly developed. Female with very dark ground-colour, forewing spots small and very distinct. Hindwing patch very small and distinctly yellow.

Plate I, fig. 6, ♂.

lycoa fallax, Subsp.

Mt. Kilimanjaro.

Rogenhofer (*Planema*), Ann. d. k.k. Natur-hist. Hofmus. Wien 6, p. 459, Plate 15, fig. 6 (1891); Butler, Proc. Zool. Soc., p. 113 (1896); Auriv., Rhop. Aeth., p. 115 (1898); Poulton, Trans. Ent. Soc., p. 305, Plate 21, figs. 1a, 2a (1906); Eltr., Af. Mim. Butt., p. 47, Plate III, figs. 24, 25 (1910).

= *kilimandjara*, Oberth., Etud. d'Ent. 17, p. 26, Plate 2, fig. 17 (1893); Butler, *l. c.* (1896); Poulton, *l. c.* (1906).

Plate I, fig. 7, ♀.

lycoa kenia, Subsp. nov.

Mount Kenia, Kikuyu Escarpment.

Both sexes smaller than in other forms. Ground-colour nearly black. Hindwing patch slightly edentate between third median and radial nervules. Dark areas on underside smoky black. Male with spots and hindwing patch lemon ochreous. Female hindwing patch lemon ochreous. Forewing spots white.

Plate II, fig. 7.

lycoa aequalis, Subsp.

Abyssinia.

Roth. and Jord. Novit. Zool. XII, p. 184 (1905).

Sexes similar. Pale areas dull ochreous.

Plate I, fig. 8, ♀; fig. 9, ♂.

ACRAEA JOHNSTONI.*

Type: *johnstoni johnstoni*.

Godman, Proc. Zool. Soc., p. 537 (1885); Holland, Ann.

* I have followed the usual course in maintaining the first described form as the type, though in this case the form in question

Nat. Hist., p. 248 (1893); Butler, Proc. Zool. Soc., p. 113 (1896); Aurivillius, Rhop. Aeth., p. 114 (1898); Poulton, Trans. Ent. Soc., p. 300 (1906); Eltringham, Af. Mim. Butt., p. 47 (1910).

= *Planema telekiana*, Rogenhofer, Ann. d. k.k. Naturhist., Hofmus. Wien, p. 459, Plate 15, fig. 4 (1891).

= *Acraea proteina semifulvescens*, Oberthür, Etud. d'Ent., 17, p. 26, Plate 2, fig. 21 (1893); Butler, Proc. Zool. Soc. p. 113 (1896); Poulton, Trans. Ent. Soc., p. 302; Plate 22, fig. 2a; Plate 21, fig. 3a (1906); Eltr., Af. Mim. Butt., p. 47, Plate 8, fig. 13 (1910).

Plate I, fig. 12, ♀.

Kilimanjaro, Meru, Usambara, Taveta.

johnstoni, f. *confusa*.

Rogenhof. in Baumann. "Usambara," Suppl., p. 326 (1891), and Ann. d. k.k. Naturhist. Hofmus. Wien, p. 459, Plate 15, fig. 5 (1891).

= *johnstoni*, ♀, Butler, Proc. Zool. Soc., p. 91 (1888).

= *proteina*, Oberth., Etud. d'Ent., 17, p. 29, Plate 2, fig. 14 (1893).

= *proteina flavescens*, Oberth. l. c., p. 26, Plate 1, fig. 4 (1893).

= *proteina semialbescens*, Oberth., l. c., Plate 3, fig. 29 (1893).

Plate I, figs. 13, ♀; 14, ♂; 15, ♀.

Nyassaland, Usambara, Taita, Taveta, Tiriki Hills, Entebbe, Kilimanjaro, Chirinda, Kikuyu, Nguelo.

johnstoni, f. *fulvescens* (= *proteina fulvescens*).

Oberthür, l. c., p. 26, Plate 2, fig. 21 (1893); Poulton, Trans. Ent. Soc., p. 304, Plate 21, fig. 4a (1906); Eltr., Af. Mim. Butt., p. 47, Plate 3, fig. 26 (1910).

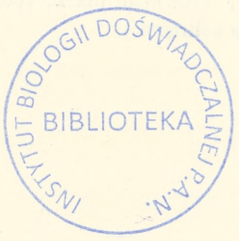
Plate I, fig. 11, ♂.

Taita, Kilimanjaro, Nguelo.

is a comparatively rare variety and there can be little doubt that *confusa* is the ancestral form, and that systematically speaking this form should be the type. In cases of this kind it would, I think, be a great advantage if there were some agreement amongst naturalists by which the commonest form of a variable species might be allowed to take the place of the type in spite of its later discovery.



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EXPLANATION OF PLATES.

PLATE I.

- FIG. 1. *Acraea lycoa lycoa* ♂. Oguta, Nigeria. (Tring.)
 2. " " " ♀. Sierra Leone. (Hope Dept.)
 3. " " *bukoba* ♂. Urundi District. (Tring.)
 4. " " " ♀. " " "
 5. " " *entebbia* ♂. Monyouyo, Unyora. (Tring.)
 6. " " *tirika* ♂. Tiriki Hills. (Hope Dept.)
 7. " " *fallax* ♀. Kilimanjaro. " "
 8. " " *aequalis* ♀. Banka, Malo, Abyssinia.
 (Tring.)
 9. *Acraea lycoa aequalis* ♂. Daretta Mts., Abyssinia (Tring.)
 10. *Acraea johnstoni toruna* ♀. Mt. Niragonwe. (Tring.)
 11. " " f. *fulvescens* ♂. Nguelo, Usambara. Bred.
 (Tring.)
 12. *Acraea johnstoni johnstoni* ♀. Nguelo, Usambara. Bred.
 (Tring.)
 13. *Acraea johnstoni* f. *confusa* ♀. Nguelo, Usambara. Bred.
 (Tring.)
 14. *Acraea johnstoni* f. *confusa* ♂. Nguelo, Usambara. Bred.
 (Tring.)
 15. *Acraea johnstoni* f. *confusa* ♀. Chirinda. (Hope Dept.)

PLATE II.

- FIG. 1. Male Genital Armature of *Acraea lycoa*.
 2. " " " " *johnstoni*.
 3. " " " " " *toruna*.
 4. Neuration in *Acraea lycoa*.
 5. " " *johnstoni*.
 6. Larva of *Acraea johnstoni*.
 7. *Acraea lycoa kenia* ♂. Ngondo R., Kikuyu. (Ground-
 colour brownish black, spots and hindwing patch
 lemon ochreous.)

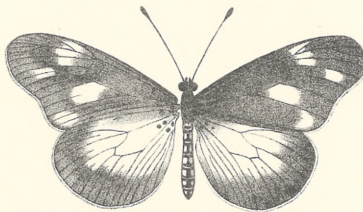
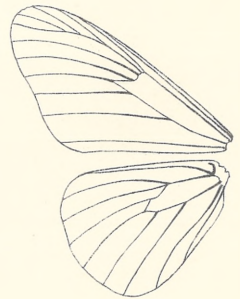
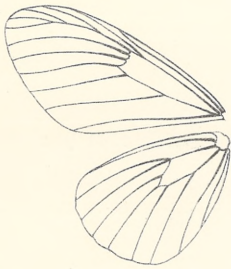
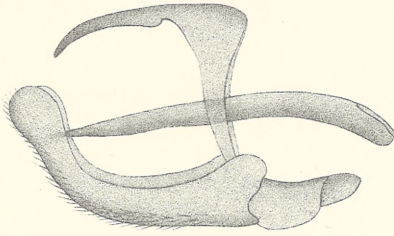
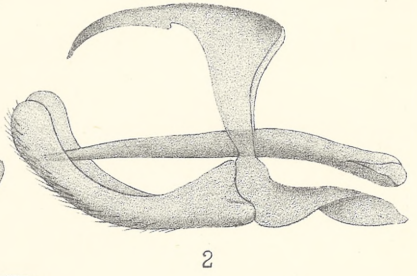
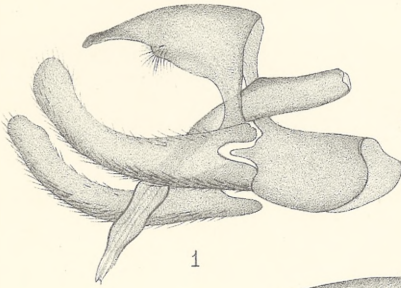


H. Eltringham del.

West, Newman chr.

FORMS OF *A. LYCOA* AND *A. JOHNSTONI*.





H. Eltringham del.

West, Newman lith.

A. LYCOA AND A. JOHNSTONI.



johnstoni ab. *octobalia*.

Karsch, Ent. Nachr., 20, p. 222 (1894), Mpwapwa.

johnstoni, Subsp. *toruna*.

Grose-Smith, Pt. 57, *Acraea*, Plate 8, fig. 1 (1901);
Poulton, Trans. Ent. Soc., p. 303, Plate 22, fig. 3a
(1906); Eltr., Afr. Mim. Butt., p. 47, Plate 3, fig. 28
(1910).

= *lycoa*, ♀, var. Butler, Proc. Zool. Soc., p. 731 (1895).

= *lycoa* ab. *butleri*, Auriv. Rhop. Aeth., p. 115 (1898).

Plate I, fig. 10, ♀.

Toro, Urundi.

I have to thank Prof. Poulton for kindly allowing me to make use of the material in the Hope Department for the purpose of this investigation, and also for much kind help. I am also indebted to Mr. F. A. Heron for kindly furnishing me with sketches and other information, and to Dr. Karl Jordan for permission to examine and prepare figures from the material in the Tring Museum.

EXPLANATION OF PLATES I, II.

[See *Explanation facing the PLATES.*]



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I have to thank you for the information provided to me by the Department of Health & Human Services regarding the purpose of this investigation and the role of the FBI in the investigation. I am also indebted to the FBI for the help and information provided to me by the FBI in the investigation and the information provided to me by the FBI in the investigation.

EXHIBIT OF PART I II
[Name]

