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ORDINARY MEETING.*

H. CADMAN JONES, Esq., M.A., in the Chair.

The Minutes of the last Meeting were read and confirmed, and the following Election was announced :—

ASSOCIATE :—G. W. Lonsdale Barraclough, Esq., London.

The following Paper was then read by the Author :—

*THE BUTTERFLIES AND MOTHS OF AFRICA.** By
W. F. KIRBY, F.E.S., Assistant in the Zoological Department, British Museum.

AFRICA, the southern continent of the Old World, is quite as interesting, in many respects, as regards its natural history, as the northern continent of Asia-Europe. The northern continent cannot be divided, except artificially; and, speaking roughly, we may regard it as possessing three distinct Faunas, though they mingle on the boundaries. There is the Northern Fauna, extending from the west to Japan, and including the Arctic and Alpine species; there is the Steppe Fauna, or Western Fauna, extending from Central Asia to the western shores of the Mediterranean; and the Tropical Fauna, including South-eastern Asia, from India to Japan.

Africa has two distinctive Faunas of its own; on the Eastern and Western coasts; and the various Faunas of Asia-Europe likewise impinge upon it on the north and north-east. The islands to the east, especially Madagascar, have a distinctive Fauna of their own, allied to that of East Africa, but with more decided East Indian affinities.

It is generally recognised that Northern Africa belongs to what is called the Palæarctic Region,—*i.e.*, its productions have little or no resemblance to those of Africa south of the Sahara, but are related to those characteristic of the Northern and Steppe Faunas of Asia-Europe, and more especially to the latter. This is evidently due to the former geographical conformation of the Old World. There is not much doubt

that at no very remote period, geologically speaking, the Mediterranean only existed in the form of two or three landlocked lakes, continued by a series curving north-east through Asia to the Arctic Ocean. At the same time, the country now occupied by the Sahara Desert was probably covered by a broad sea, similar to the Mediterranean, and possibly open on the west, and landlocked on the east in the same way. Even now, many of the lakes of Central Asia are rapidly drying up, and thus the geographical changes in the character of that country are still in progress.

It will, perhaps, be better to consider the relationship of the various Northern Faunas to Africa, before discussing the character of the more characteristic African Faunas.

In the first place, the strictly Northern Fauna, including the Alpine, hardly touches North Africa at all. Many of our most characteristic Central European insects become mountain insects in the extreme south of Europe, and many others do not cross the Mediterranean. Thus, our familiar Peacock Butterfly (*Vanessa Io*), though common from Ireland to Japan, is a great rarity in Sicily, and is quite unknown in North Africa. Two of the most characteristic of the Europeo-Asiatic Alpine genera of butterflies, *Parnassius* and *Erebia*, are each represented by a single species only in the mountains of South Spain, and I am not acquainted with a single representative of any truly Alpine species which occurs in the mountains of North Africa, though the genus *Erebia* is replaced in Southern Africa and Madagascar by the closely-allied genus *Pseudonympha*. The genus *Colias*, which includes the Clouded Yellows, is represented in Northern Africa by the two common European species *C. Edusa* and *C. Hyale*. *C. Edusa* occurs throughout the deserts of North-Eastern Africa, but disappears in Central Africa, though in Southern Africa we meet with it again under the slightly modified form of *C. Electra*. And, what is perhaps more singular, *C. Hyale*, though less widely distributed in Northern Africa than *C. Edusa*, likewise reappears in South Africa, where, however, it is far from common. And here I may say that I believe that the reputed occurrence of our common Small Cabbage White Butterfly, *Pieris Rapæ*, on the West Coast of Africa, requires confirmation. Hewitson, indeed, received two specimens from thence; but I am inclined to think that they were either mixed with African species in error, or else were simply derived from some missionary's garden.

The disappearance of the Northern and Alpine Europeo-Asiatic Fauna renders the Fauna even of South Europe much poorer than that of Central Europe, and that of North Africa

is naturally poorer still. This would seem to indicate that the Northern Fauna spread originally from north to south in comparatively recent times.

The so-called Mediterranean Fauna is clearly identical with the Steppe Fauna of Western and Central Asia, where it seems to have originated, and to have spread westward. At present it extends from North-western India and Central Asia to the Western Mediterranean. Of the species belonging to the Mediterranean, or Steppe Fauna, some are met with on both sides of the Mediterranean, like the white silver-marked *Euchloe Belemia*, the genus *Thais* in the *Papilionidæ*, *Thestor*, a *Lycænide* genus allied to the Coppers (*Chrysophanus*), and various remarkable species of brown butterflies (*Satyrinæ*). Others, like the curious yellow group of *Euchloe*, represented by *E. Charlonia* and allies, do not enter Europe, but extend along the southern shores of the Mediterranean, and the group which I have mentioned extends from North-western India even to the Canaries. Others, again, like the desert genus *Idmais*, which is allied to our genus *Colias*, take a more south-easterly direction, avoiding North Africa proper, but curving round from North-western India into Arabia, and sometimes crossing the Red Sea to the opposite African coast.

The Indian Fauna does not greatly affect either Europe or Africa. A few insects belonging to characteristically Indian genera (*Neptis*, for instance) extend to South-eastern Europe, and two wide-ranging species, *Danaus Chrysippus*, and *Hypolimnas Misippus* which mimics it in the female, are abundant both in Southern Asia and Africa. *D. Chrysippus* is found over the whole of Africa, except Morocco and Algeria, and in Europe extends to Greece, while *H. Misippus* does not extend to Europe or to any part of the north coast of Africa, though we find it again, probably introduced, on the north coast of South America, where *D. Chrysippus* does not occur. Again, there are one or two representatives of the green-striped group of *Danaus* so common in the East Indies, both in East and West Africa; but, as a rule, characteristic Indian genera are represented in Africa by allied but distinct African genera, or at least by species belonging to different groups of a large genus, such as *Charaxes*, when it occurs in both countries.

The Fauna of Western Africa is by far the richest and most characteristic of that continent. Perhaps the species of *Nymphalidæ* may be considered the most remarkable. Many genera peculiar to the African continent abound in very handsome species on the west coast, but are only sparingly represented, if at all, on the eastern coast. The Western Fauna,

however, extends eastwards almost to the highlands of Abyssinia; and some years ago a traveller brought back a large collection of butterflies from the Bahr el Ghazal which contained nothing but well-known West African species and a small admixture of Abyssinian forms. Unfortunately, he had fallen into the usual error which besets all collectors except those of considerable scientific knowledge and experience, and had limited himself to collecting only the largest and handsomest species. His collection was of great interest as showing the range of the West African Fauna, but if he had collected smaller and less conspicuous species as well, not only its scientific but even its money value would have been tenfold greater.

Among the most characteristic forms of *Nymphalidæ* which predominate on the West Coast we may mention the genera *Euphædra*, *Cymothoe*, and *Aterica*. *Charaxes* is also very richly represented, though this genus is not exclusively African. The Indian forms, however, represent different sections to those of Africa. A single species, *Charaxes Jasius*, is one of the few insects belonging to typical African forms which have reached the Palæarctic Region. It is not a native of tropical Africa, but is found in most of the countries bordering on the Mediterranean Sea, where its caterpillar feeds on the arbutus. It is most nearly allied to an Abyssinian species, *C. Epijasius*, and may possibly have originally reached the Mediterranean from that country.

Hamanumida Dædalus is a very characteristic African Nymphalide. It is brownish grey with white black-edged spots, and its colouring has been compared to that of the Guinea fowl. The shade of the under-surface is said to vary according to the character of the soil in the localities where the butterfly is found.

The sub-family *Acraeinæ* is peculiarly characteristic of Africa, though a few species are met with in India, Australia, &c., and South America. These are long-winged butterflies, generally reddish or semi-transparent and spotted with black. Among the most remarkable species of *Papilio* which inhabit the West Coast of Africa are two which much resemble species of *Acraea*, both in form and colour. One of these is *P. Ridleyanus*, which is very like *Acraea Egina*, and the other is the famous *P. Antimachus*, which is eight or nine inches in expanse of wing, and much larger than any known *Acraea*, or indeed than any other butterfly found in Africa. Although figured by Drury as long ago as 1782 from a specimen which is now in Australia, no second individual was obtained till 1864. This butterfly, though still rare, has since been obtained at inter-

vals, and can now be bought by those who are willing to pay a high price for it, which was not the case a few years ago. I am not aware, however, that anything authentic has yet been recorded respecting its habits. Smeathman's observations on the subject, quoted by Drury, are said to have been intended to apply to *Charaxes Pollux*, and not to *Papilio Antimachus*; and one account of a later capture, which I remember reading, looks as if it were only an imitation of Mr. Wallace's well-known account of his capture of *Ornithoptera Cræsus*.

I have already mentioned *Danaus Chrysippus* as an inhabitant of nearly the whole of Africa. This insect is very remarkable for the number of butterflies and moths belonging to other groups more or less resembling it. Among these are the females of *Hypolimnas Misippus* and *Papilio Trophonius*, as well as *Euphædra Eleus*, and *E. Ruspina*, *Aletis Helcita*, &c.

Among the *Lyceuidæ*, Africa possesses many species of Blues similar to European species, and also various genera of Blues, Coppers, and Hairstreaks, either peculiar to itself or found elsewhere only in South-western or Southern Asia.

Besides these, there are many genera peculiar to Africa, which have no close allies elsewhere, such as *Axiocerces*, *Pentila*, *Liptena*, *Epitola*, &c.

Turning to the *Pierinæ*, or White Butterflies, we find many genera which are almost peculiar to Africa. Orange Tips of the genus *Teracolus* are extremely numerous, and one species is even found in Algeria. They are not quite confined to Africa, however, for a few species are met with in India. The delicate satiny-white or pale yellow butterflies belonging to the genus *Belenois* and its allies, are likewise very characteristic of Africa and Madagascar.

The *Papilioninæ* are only represented in Africa by the genus *Papilio*, of which, however, many interesting species are met with, both on the East and West Coasts. We have already referred to *P. Ridleyanus* and *Antimachus*; but among the most remarkable species are those allied to *P. Merope*. The males are cream-coloured butterflies with black markings, and long tails on the hind wings,—true swallow-tail butterflies, in fact; but the females are tailless, and both in shape and colour much resemble various African species of the genera *Danaus* and *Amauris*, belonging to the sub-family *Danainæ* of the *Nymphalidæ*, which have structurally no very close relationship with the *Papilionidæ*. However, in the case of some species of the *Merope* group found in Madagascar and Eastern Africa, the females closely resemble the males in shape as well as in

colour. It should, of course, be mentioned that the *Danaïne*, as is usually the case in such instances, is a group which is protected from some of its enemies by the toughness of its integuments and its disagreeable smell.

Among the Skippers (*Hesperiidæ*) the West African *Ismene Iphis* (one of the largest of the family) and a few allied species may be mentioned. There are also one or two genera such as *Leucochitonea*, which are peculiar to Africa.

Turning to the moths, I have only time to allude to a few, for they are far more numerous than the butterflies, and are much less known at present. Among the *Sphingidæ*, the peculiar dull green species of *Nephele* are rather numerous, more so than in India, though the genus is likewise represented there. One or two wide-ranging and probably more or less migratory species which are common throughout the warmer regions of the Old World are found all over Africa, such as *Acherontia Atropos* and *Daphnis Nerii*.

Two of the most beautiful moths in the world, *Chrysidia Rhipheus* and *C. Cræsus*, are natives of Madagascar and East Africa respectively; and their nearest allies, though not very closely related, are species of *Urania* which inhabit the West Indies and Tropical America. A smaller form of *Chrysidia* is said to have been taken in St. Helena; but this is very doubtful, and if the genus ever occurred there it has probably long been extinct. The small family, *Uraniidæ*, to which this genus belongs, is of doubtful position, and was originally referred to the butterflies; now, however, it is generally considered to be allied to the *Geometridæ*.

In the *Zygænidæ* several beautiful species of *Euchromia*, a genus which likewise occurs in India, are common, as well as transparent-winged species allied to our European *Zygæna Phegea*, but smaller. There are several species of Burnets (*Anthrocera*) in South Africa, very similar to our European Burnets, but, although ours are gregarious, and if you take one you can take any quantity, they are scarce in South Africa, and are still very imperfectly known. It appears that at some period or other, these Burnets, like the *Pseudonymphæ*, the African representatives of *Erebia*, must have found their way to Southern Africa, where they are now isolated. In America, too, isolated species of butterflies and moths which resemble northern forms occur in Chili. Burnets are abundant round the Mediterranean, but I believe that none occur in Equatorial Africa.

There are many other beautiful species of day-flying moths belonging to genera characteristic of or peculiar to Africa, such as *Eusemia*, *Phægorista*, *Aletis*, &c.; but I will now

turn to the splendid group of the *Saturniidae*, or ocellated Silk-worm Moths, allied to our Emperor Moth (*Saturnia Pavonia-minor*). These are represented in Africa by a great variety of species, and though gregarious, are in many instances very scarce in collections, owing perhaps to their nocturnal habits, and to many of the larvæ feeding on forest trees. Natal is rich in peculiar species, not found further north. Among these is *Actias Mimosa*, a green species with long tails. All the other species of this genus are found in South-Eastern Asia and North America, except *A. Isabella*, which occurs equally isolated from its allies in Spain. At Sierra Leone we meet with two very remarkable tailed brown species, the nearest allies of which are found in South America. These are *Eudæmonia Argus* and *E. Argiphontes*, the latter of which has a tail on the hind wings of the male which measures nearly six inches in length, the expanse of the fore wings being only about three inches. Both these insects are very rare, although *E. Argus* has been known for more than a century; but I believe that there are more species of this peculiar group to be found in Western Africa than have yet been discovered. I am glad to add that one of the most beautiful species of the African *Saturniidae*, *Hemucha Grimmia*, which has hitherto been only known from a figure published fifty years ago, was rediscovered last year in an out-of-the-way district in South Africa. It is not a large insect, but has brown fore wings mottled with white, and ornamented with zigzag white markings, and the hind wings are red at the base.

The Fauna of East Africa possesses many remarkable species of butterflies and moths peculiar to itself, but comparatively few peculiar genera. As I have said, it is much poorer than that of the West Coast, and its affinities with India are stronger. Madagascar, too, is richer in peculiar species than in peculiar genera.

And now I have only to thank you for the attention with which you have listened to what I fear has been far too much a mere catalogue of names. I have endeavoured to make my subject interesting, but unless you have a full series of illustrative specimens before you, it is difficult to make the best of any technical subject. I might perhaps have extended my paper to a greater length; but I fear you have found it quite long enough already.

The CHAIRMAN (H. Cadman Jones, Esq.).—I am sure we are all much obliged to Mr. Kirby for his paper, and if there are any present who have studied the subject and would desire to offer criticisms, we shall all be glad to hear them.

Rev. F. A. WALKER, D.D., F.L.S.—I will just make a few remarks on Mr. Kirby's most interesting paper.

Page 225.—The affinity here mentioned between the Fauna of Madagascar and that of East Africa is an undoubted fact, but surely a certain relationship between the butterflies of West Africa and those of Madagascar is equally evident. Of the three species of genus *Godartia* that I possess, two, *Eurinome* and *Trajanus*, are from West Africa, *Trajanus* being from the region of the Cameroons, and the third, as its name *Madagascariensis* imports, from Madagascar. I note that Mr. Kirby, in his synonymic catalogue of "Diurnal Lepidoptera," styles this genus *Euxanthe*, and only enumerates two species,—*Eurinome* and *Madagascariensis*,—but in the appendix to the same work mentions a third,—*Ansellica*,—from Kinsembo. I may add that there is greater similarity of marking between the West African species, *Eurinome*, and the Madagascar ditto, *Madagascariensis*, than between the two West African species, *Eurinome* and *Trajanus*.

Again, in the tribe of *Papilios* known as the "Nireus" group, the West African species, *Erinus* from the Gaboon, *Bromius* from the Cameroons, and *Charopus* from Calabar, are as closely allied to the species *Oribazus* and *Disparilis* from Vohama, in Madagascar, as are the East African kinds, *Hornimani* and *Nireus*, which is the commonest of the tribe.

Page 226. "Slightly modified form of *C. Electra*."—The white variety of this, the only specimen that I possess of the species, is smaller than *Helice*, the corresponding pale variety of *C. Edusa*, and of a dusky white, *Helice* being more of a creamy tint. Also the orange spot in the lower wings of *Helice* is replaced by a white ditto in those of the variety of *C. Electra*.

Page 227. *Anthocharis Belemia*.—Two specimens of this pretty little species were captured by me towards the end of March, between Jaffa and Latroon, probably on the plain of Sharon; and a third in the second week of April in the outskirts of Beyrout. It resembles our *A. Cardamines* in the green markings of the lower wings on the under side, but has stripes, whereas *Cardamines* has spots of that colour.

"The desert genus *Idmais* striking across from North-western

India."—Most species of this genus are of a rich fawn colour, inclining in some instances to orange.

All the kinds that I possess are Asiatic, e.g. :—

Idmais fausta, Syria.

„ *amata*, Trincomalee and Bombay.

„ *dynamene*, India.

Page 228. *Papilio Antimachus*.—The late William Chapman Hewitson, Esq., who bequeathed his magnificent collection of butterflies,—unequaled by any amateur during his lifetime,—to the British Museum, informed me respecting this extremely rare West African species, that he calculated that its acquisition cost him from first to last not less than £500, which he accounted for as follows :—The pay and keep of a number of negroes for a considerable time sent into the forests to search for and capture this particular butterfly. Ditto of armed guard to protect these negroes meanwhile. Also because, though these negroes captured and transmitted to him many other species as well, he had all the other kinds before. When resident at Notting Hill six or seven years since a splendid specimen of this insect was brought round to me by a well-known dealer, in the hope that I should purchase it for £30, and since that date I could have bought a very tattered representative, nearly half of the wings of which were replaced with coloured paper to match, for less than as many shillings. I need hardly say that my collection is still minus this species. Those familiar with the *Acræidæ* of Africa and Madagascar will be of the opinion that in colouring and markings it resembles nothing so strongly as an *Acræa*, only of gigantic size compared with that genus, for *Papilio Antimachus* with its long and narrow wings measures more than any other butterfly from tip to tip.

Page 229. Genus *Teracolus* or *Anthocharis*.—The African species of this tribe in my collection outnumber the Asiatic ditto by about three to one.

For example :—

<i>Ione</i> ,	}	<i>Evippe</i> , Congo.
<i>Evarne</i> ,		} Natal.
<i>Achine</i> ,		
<i>Eupompe</i> ,		} Unnamed sp. Madagascar.
<i>Omphale</i> ,	<i>Etriia</i> , Bombay.	
	<i>Danaë</i> , India.	

Most of these are orange-tips, but the Indian *Danaë* has crimson patches, and the Natal *Ione* purple ditto in the extremity of the fore wings.

As examples of small *Lycanida* resembling our own British kinds in general appearance,

Lycæna hintza, Natal.

„ *palemon*, Cape.

„ *acca*, Kuysua River,

may be mentioned among the African species in my collection.

And also *Bæticus*, which, to my certain knowledge, has a very wide distribution over Europe, Asia, and Africa. I have purchased specimens of this insect from India, and taken it myself in Egypt and Nubia. It was not known in England even as a summer visitant till about thirty years since.

Page 229.—Small species of *Chrysophanus*, all more or less nearly allied to *C. Phlaeas*, are numerous in South Africa. For instance, I possess

<i>Zeritis</i>	...	{	<i>Orus,</i> <i>Mars,</i> <i>Lara,</i> <i>Harpax,</i> <i>Alpheus,</i>	}	...	Natal.
„					...	South Africa.

And an unnamed species from Kaffraria.

Mr. Kirby records that *Danaïs Chrysippus* is found all over Africa. I can testify to its abundance in and about Cairo in the first half of December, when it frequents the poinsettias, zinnias, &c., in the palace grounds, public gardens, &c. It is probably the most widely distributed of all the *Danaidæ*, its range extending even to Australia.

Page 230. *Urania Rhipheus*.—This singularly handsome Madagascar species and a closely allied kind on the opposite coast of East Africa, are by far the most beautiful of all the *Uranidæ*. Other species of this tribe occur in the New World; for example, the *Urania Sloana* of the West Indies, and the *Urania Leilus* of South America. Mr. Bates records that during his stay at Caripi on the southern shore of the Pará River, the *Urania Leilus*, a strange and beautifully-tailed and gilded moth, whose habits are those of a butterfly, commenced to fly in flocks over the tree tops. It was the remembrance of this fact that gave rise to an idea for the mounting of seventeen specimens of *Urania Rhipheus*, which I endeavoured to carry out as nearly as possible to resemble its natural surroundings.

I first bought a specimen of a Madagascar orchid, *Angraecum viride*, in Covent Garden, and then had an exact copy of its flower and leaves taken in wax, while retaining the real root of the orchid, as not liable to wither. I then had the plant, thus formed, as one of a parasitic nature, affixed to the supposed topmost bough of a dead tree, round which *Uranias* are flitting, while the foreground, intended to represent a plateau on the summit of the hill in front of the tree ascending from the vale beneath, is covered with a mountain *Lycopodium* accordingly. I also directed the bird-stuffer as to the attitude and position of each of the insects thus enclosed in a glass case.

Page 231.—In reference to the particular species here mentioned as tending to illustrate my friend, Mr. Kirby's paper, I shall be happy to show them to any one interested in the subject. I possess, and would have brought with me to-night, the greater part of the kinds that he speaks of, only for the risk involved in removing them from cabinet drawers for the purpose.

Mr. W. J. SLATER, F.E.S.—Mr. Kirby will doubtless have noticed the beautiful modifications which *Daphnis Nerii* takes in South Africa. The pretty green which the European specimens have on their wings, is there more of an olive colour, so that certain English collectors, to whom I have shown specimens I have received from Zululand, have declared they were not *Daphnis Nerii*, but a totally different insect. The question is, whether this change depends on climate or on difference of food, for I have not ascertained whether it there feeds on the oleander or some different plant. I may mention in connexion with the subject that the moth is also found in Ceylon, and there feeds on the Peruvian bark tree, though it belongs, botanically and chemically, to a totally different group from the oleander.

A VISITOR asked a question in regard to the disposition of butterflies, and whether the different species were confined to different zones.

The AUTHOR.—With reference to Dr. Walker's observations respecting Madagascar, I did not intend specially to discuss the question of Madagascar in the present paper; but I may say that there is a considerable connexion between its Fauna and that of India. Only the other day I was looking over some dragon-flies from Madagascar, and to my surprise I found a new species of a genus which I thought to be exclusively Indian, and also a new genus very peculiar in form and nearly resembling two genera

found, I think, only in New Guinea and the Philippines ; there is nothing else among dragon-flies that it resembles in its denticulated wings, which is an exceedingly rare character in *O. donata*. With reference to what Mr. Slater has said, it is difficult to tell whether it is the difference of climate or the difference of food plants that affects insects ; but *Daphnis Nerii* is found from the south of Europe to the south of Africa, as well as in the East Indies, and is only an occasional visitor with us. With regard to the interesting question asked by another speaker, I may say there is a disposition of butterflies north and south as well as east and west, both in Europe, Asia, and America, and we find many Arctic species re-appearing far to the south on Alpine summits. Perhaps that is less strictly so in Europe than in some other countries. For instance, there is an Arctic species, *Colias Nastes* (Boisd.), which is confined, in Europe and Asia, to the extreme north ; but there are southern representatives in the Himalayas. One of the most famous of the North American butterflies is *Eneis Semidea* (Say), which belongs to an almost exclusively Arctic genus. There are one or two Alpine or Steppe species, but they are exceptions ; but *Æ. Semidea* is found in various localities in the extreme north of America, and then appears again on the summit of Mount Washington, and then again in a district to the west. I forget whether it is in Colorado, but you can see it referred to in the accounts given by Grote, Scudder, and other American writers.

The meeting was then adjourned.
