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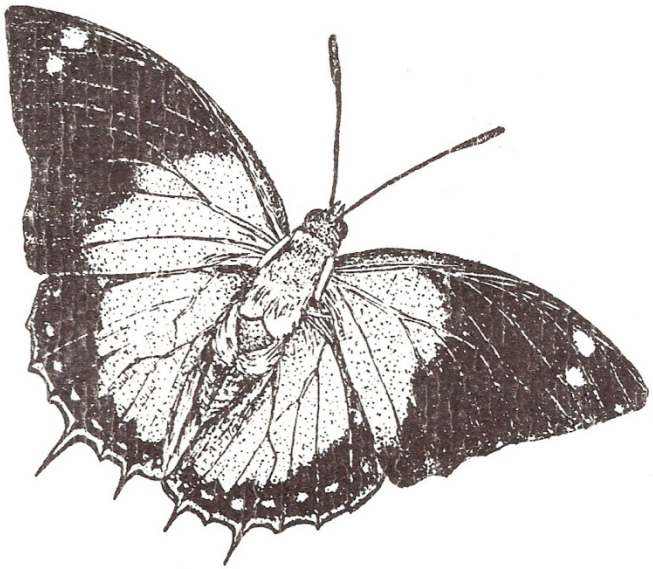

Charaxes bohemani (Nymphalidae) male
(Forewing length 40–48 mm) (Del. S.E. Woodhall)

LEPIDOPTERISTS' SOCIETY OF SOUTHERN AFRICA

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The **aims** of the Lepidopterists' Society of Southern Africa are to promote the scientific study and conservation of Lepidoptera in Southern Africa; and to promote the publication of original scientific papers as well as articles of a less technical nature in the journal, *Metamorphosis,* or other publications of the Society.

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CORRESPONDENCE

The Hon. Secretary, P.O. Box 470, FLORIDA HILLS, 1716

All drawings, unless otherwise stated, are by S.F. Henning.

EDITORIAL

As you will have noticed, Metamorphosis took on quite a scientific slant towards the end of last year. This was mainly due to the type of papers submitted to us. If you prefer more popular articles it is up to you, the member, to send us suitable contributions. We can only publish what is submitted to us. So put pen to paper and tell us about the field trips you went on this year, anecdotes and so on.

Having introduced scientific papers to Metamorphosis it was felt that contributors needed certain guidelines to follow when writing their papers. All scientific journals decide on a particular style and format for their papers which then have to be followed strictly by all the contributors. Rolf Oberprieler has kindly drawn up a set of instructions to authors of Scientific Papers (see page 45) complying fully with the 3rd edition of the *International Code of Zoological Nomenclature* (ICZN) and its recommendations. All scientific papers submitted will be evaluated by at least one reviewer. I must point out that these instructions only apply to authors of scientific papers (i.e. descriptions of new species and so on). All contributors of more popular articles will follow the guidelines laid down in the Editorial Policy.

W.H. Henning

Colotis doubledayi angolanus male underside

COMMENT BY THE PRESIDENT

Conservation has again been preoccupying me over the past few months. I attended a most interesting talk by Tony Ferrar, Executive Director of the Wildlife Society, on the future of St. Lucia. From the data presented it appears that if the mining does go ahead, the side effects on the ecology of the area could be disasterous. At face value the areas to be mined are not very important being just disturbed grassland or pine and cedar plantations. If these were just removed and replanted as Richards Bay Minerals have done with their other strip mining sites, it would be a great improvement. However, the high dunes themselves are being mined and in the process are changed from being dunes to mine dumps. These dunes are thousands of years old and consist of numbers of layers of sand which have become hardened and calcified over time. This has given them rather unique properties involved with the drainage of water which a heap of sand (vegetated or not) does not have.

It appears the catchment area for the St. Lucia Estuary has on average about 700 mm of rain a year. During our regular dry years the rainfall in the catchment area is lower so less fresh water flows into the estuary. In periods of drought this lessened inflow of fresh water leads to an increase in the salinity of the estuary which at times in the past has been higher than that of sea water. However, the eastern high dunes (some of which are to be mined) between the estuary and the sea have an extremely high annual rainfall approx 1400mm which supplements the flow of fresh water into the estuary. Often in drought periods the only fresh water inflow into the estuary is from these dunes and provide areas of fresh water along the eastern side where fresh water animals like hippos can survive even when the average salinity of the estuary is higher than that of the sea. This has allowed St. Lucia to become one of the richest wetlands in the world. The mining activities would affect the drainage patterns of these dunes leading to long term changes in the ecology of the area which could be disasterous for certain species. Let us hope that the various campaigns to prevent mining of these dunes is successful.

The Ruimsig Entomological Reserve has also become the centre of attention again. The Nature Club of Florida Park High School has been building an Information Centre on the reserve and it is finally reaching completion. It is now at roof height and funds to complete the roof are now being raised. What has rather distressed me is the invasion of alien plants in the reserve. Before the area was fenced certain inconsiderate individuals dumped garden refuse at the base of the koppies introducing kikuyu grass, blackjacks, seringa and other undesirable species into the area. The Roodepoort Parks Department does not appear to have the manpower to deal with the problem. However, something must be done in the near future before it starts affecting the *Aloeides dentatis* colony. The Florida Park High School Nature Club hopes to try to organise a clean up sometime this year but will certainly welcome help from anyone who feels like getting involved in the project. As far as I know this is the only butterfly reserve in the Southern Hemisphere so it is up to us to turn it into a showpiece.

Stephen Henning

REGIONAL ROUNDUP

The Golden Gate Highland National Park in the OFS has been at the centre of the recent collecting activities from the Witwatersrand. Almost every weekend from late December to early February there were expeditions to this region. Collectors involved were Chris Ficq, Steve Collins from Kenya, Alf Curle, Bill Steele, Steve Woodhall, Martin Lunderstedt, Nolan Owen-Johnston, Dave and Andrew Upshon and myself. The park was burnt last year and the vegetation has come away beautifully. The main catches were *Aloeides maluti* Pringle, *A rileyi* Tite & Dickson and an undescribed *Orachrysops* of which I had only two males for my type series. These species were all found in good numbers. The foodplants of all three were ascertained and are currently being identified. Both *Aloeides* are breeding on the same *Hermannia* while the *Orachrysops* is on *Indigofera*. The usual special inhabitants of the park were also in evidence, *T. orangica* Vári and *P. paragaika* Vári. *Thestor basutus* (Wallengren) was also recorded.

We were very pleased with the cooperation afforded us by Corrie Peypers and his staff. It is not often that we are made so welcome and the full results of these visits will be published in *Metamorphosis* for them. I was also very pleased to hear of the recent enlarging of the park to almost double its size.

Lepidochrysops oosthuizeni Vári & Swanepoel was also out in good numbers near Clarens, a few kilometres to the west of Golden Gate.

I went with Herman Staude, Bill Steele and Steve Woodhall to the Blouberg in the northern Transvaal on the weekend of the 20-21 February. This mountain is superb, with not a road going through it, camping gear and collecting equipment must be taken to the top by foot along narrow paths through the forest. It is advisable to hire bearers unless one is fit. My own experience will not be forgotten quickly. I spent most of the two days in a state of exhaustion. The object of the trip, for me, was to collect *Charaxes drucearius solitarius* S.F. & G.A. Henning and perhaps a few *C. xiphares staudei* S.F. & G.A. Henning. We were going to keep females alive to breed from. However no *solitarius* were collected and only half dozen *staudei*. Hopefully a few bred *staudei* will result plus a complete record of the life history. *Dira swanepoeli isolata* Van Son was not seen, we were probably too early. A race of *Tarucus bowkeri* (Trimen) was found on one of the high peaks. There were many *Papilios* on the wing and *Acraea horta* was plentiful. An added bonus was a fine *Danaus chrysippus* (L.) form *klugii* which Bill collected on the way down, after having it pointed out to him by Herman. Herman went up for the moths and had a successful trip with about 100 geometrids recorded. A feature of this trip was the number of times we got lost or took wrong turnings!

Johan Greyling recorded *Andronymus neander* (Plötz) from Pietersburg and has also been active in the eastern Transvaal with some good records. At Sordwana Bay in Natal he found *lolaus diametra natalica* Vári and *I. pallene* (Wallengren). Staying in Natal Herman Staude reports *Anthene minima* (Trimen) at Mkuze and *Charaxes etesipe tavetensis* Rothschild, *Acraea satis* Ward and many *Sallya* at Ubomba.

From the Cape Jon Ball records *Durbania amakosa penningtoni* Van Son on the Zuurberg, *Cymothoe alcimeda alcimeda* (Godart) at Saasveld and on the Kammanassie Mountains; *Lepidochrysops balli* Dickson, *Aloeides pallida jonathani* Pringle, a subspecies of *Dingana bowkeri* (Trimen) and some interesting specimens of *Aloeides almeida* (Felder).

Chris Ficq visited the eastern Cape and found *Lepidochrysops grahami* (Trimen), *Durbania amakosa amakosa* Trimen and *Aloeides braueri* Tite & Dickson around

Grahamstown, *Thestor tempe* Pennington at Seweweekspoort, and *Poecilmitis henningi* Bampton at Calitzdorp. Back in the Transvaal Chris found *Dira jansei* (Swierstra) at Makapansgat during late February.

A report of this nature would not be complete without mentioning the myriad of migrations going on around the Transvaal. Paul Kruger has been making meticulous notes at Pietersburg and this and other information will have to be analysed. It would appear that most migrations consist of *Catopsilia florella* (Fab.) with other species being drawn into it. The annual *Belenois aurota* (Fab.) migration which passes over the Witwatersrand was weak and of short duration. *Belenois aurota* did pass over but from a south-easterly direction. It is possible that the good rains after the long drought have caused population explosions at various sites. This overpopulation has apparently initiated migrations from these widespread localities. Most of the reports indicate many migrations from the eastern Transvaal and Natal. Even *Papilio demodocus* Esper was seen migrating in enormous numbers over the Zoutpansberg. Paul Kruger records the following species migrating in the northern Transvaal; *C. florella, B. aurota, P. demodocus, D. chrysippus, Byblia ilithyia* (Drury), *Vanessa cardui* (L.), *Graphium angolanus* (Goeze), *Graphiurn antheus* (Cramer), *Hypolimnas misippus* (L.) *Junonia oenone* (L.), *Pinacopteryx eriphia* (Godart), *Coeliades pisistratus* (Fab.), *Acraea aglaonice* Westwood, *Acraea horta* (L.) and *Acraea natalica* de Boisduval.

This is quite an impressive list and not all records were at the same time or at the same place. If anyone can add to this list I would be very pleased to hear from you. Moths have also apparently had population explosions and are migrating. It is more difficult to assess a moth migration but if anyone has any records please let me know. The only records I have are *Agrius convolvuli* (L.) at Magaliesberg (Herman Staude) and Roodepoort (myself). Martin Kroger also recorded a migration passing through while on a moth survey in northern Natal.

Please keep me informed of your activities, my home phone number 768-1949 and work 474-1466, both 011. Happy hunting for the rest of the season!

Graham Henning

Lepidochrysops oosthuizeni male upperside

PHYLOGENETIC NOTES ON THE AFRICAN SPECIES OF THE SUBFAMILY ACRAEINAE - PART 2

(Lepidoptera: Nymphalidae)

By G.A. Henning

17 Sonderend Str., Helderkruin, 1724.

Abstract

The subfamily Acraeinae is analysed and an annotated phylogenetic arrangement of species is presented.

The Subtribe Acraeina of Tribe Acraeini is dealt with in this part while Subtribe Actinotina and Tribe Pardopsidini will be in Part 3.
Key Words: *Acraea*; taxonomy; phylogeny; species group.

Introduction

In Part 1 I changed the status of *Actinote, Bematistes* and *Hyalites* back to that of genera. I described two new subgenera under both *Acraea* and *Hyalites*. The phylogeny presented in Part 1 is herein analysed to the species level.

Method

A detailed phylogenetic analysis of species is presented with taxonomic codes as well as codes to habitat and distribution.

The Taxonomy of the Subfamily Acraeinae is as follows:

Auracraea nom. nov.
I propose the replacement name *Auracraea* for the subgenenc name *Aurora* Henning 1992, *Metamorphosis* **3**: 101, which is a junior homonym of *Aurora* Ragonot, 1887, *Diagnosis of North American Phycitidae Galleriidae:* 18.
Type species: *Aurora longipalpella* Ragonot by monotypy. Ref. *Generic Names of Moths of the World* **5**: 18 Pyraloidea. 1984. Fletcher, D.S., & Nye, I.W.B.

FAMILY NYMPHALIDAE
SUBFAMILY ACRAEINAE TRIBE ACRAEINI

SUBTRIBE ACRAEINA

GENUS *Acraea* Fabricius 1807
Subgenus *Acraea* Fabricius 1807
Subgenus *Rubraea* Henning 1992
Subgenus *Stephenia* Henning 1992

GENUS *Bematistes* Hemming 1935

SUBTRIBE ACTINOTINA

GENUS *Actinote* Hübner 1819

GENUS *Hyalites* Doubleday 1848
Subgenus *Hyalites* Doubleday 1848
Subgenus *Pareba* Doubleday 1848
Subgenus *Auracraea* nom. nov
Subgenus *Alacria* Henning 1992

TRIBE PARDOPSIDINI

GENUS *Pardopsis* Trimen 1887.

KEY TO THE AFRICAN GROUPS OF TRIBE ACRAEINI

1. Aedeagus narrow and pointed, needle-like.....2
   - Aedeagus not needle-like.....3
2. Uncus large and generally elongated; Valves subtriangular, pronounced dorsally; hindwing underside with basal black confluent area generally with white spots.....Group I - *horta*
   - Uncus not large and elongated; valves not subtriangular, hindwing underside without basal black confluent area.....Group II - *quirina*
3. Aedeagus narrow or distally acute, anteriorly bifid.....4
   - Aedeagus not narrow, distally acute or bifid anteriorly.....7
4. Aedeagus short, distally thin and acute, anteriorly broad and truncate; usually with modified 8th tergite.....Group III - *acrita*
   - Aedeagus pencil-like; no modified 8th tergite.....5
5. Aedeagus anteriorly bifid.....Group IV - *egina*
   - Aedeagus not anteriorly bifid.....6
6. Forewing radials stalked; cell of hindwing short.....Group VI - *epaea*
   - Forewing radials not stalked; cell of hindwing not short.....Group V - *caecilia*
7. Valves elongated, generally extend beyond tip of uncus.....8
   - Valves not elongated.....9
8. Aedeagus elongated and distally pointed.....Group VII - *encedon*
   - Aedeagus short and broad, distally truncate.....Group XI - *parrhasia*
9. Valves broad basally, narrow over distal half; uncus distally Bifid.....Group IX - *cerasa*
   - Valves broadly sickle-shaped; uncus not bifid distally.....10
10. Forewings spotted, rudimentary vein present.....Group X - *rahira*
    - Forewings not spotted, rudimentary vein not present.....Group VIII – *bonasia*

PHYLOGENY OF THE AFRICAN SPECIES OF ACRAEINAE

Habitat and Distribution

The following code serves to annotate each species and indicates in many instances the isolating factors responsible for the development of the species.

Habitat,

F = forest	A = arid scrub
S = savannah	M = marshland
T = thornveld	W = woodland
G = grassveld	H = high altitude

Faunistic regions (main populations not peripheral populations),

SA = South Africa (South Africa, Botswana etc.)
SW = Namibia & Southern Angola
SC = Zimbabwe, Zambia, Malawi & Moçambique
EA = East Africa (Tanzania, Kenya etc.)
NE = North East Africa (Ethiopia, Sudan etc.)

CA = Central Africa (Zaire, RCA, Uganda etc.)
WC = Western Central Africa (Northern Angola to Cameroon)
WA = West Africa (Nigeria westwards)
MA = Madagascar
TH= Throughout

Taxonomic code

A – Aedeagus:
The primary synapomorph used in the division of the genera. Sizes range from short and broad to long and thin. The cladistic analysis is arranged in gradations from very long and thin 'needle like' in the type species (*horta*) to very short and broad in the final group. The symplesiomorphic form is probably between *Actinote* and *Bematistes*.

B - Uncus:
Usually beak-shaped, sometimes bifid at the tip, can be elongated.

C - Valves:
Variously shaped from long and elongate to short and rounded, can be bilobed and can have processes extending from it.

D - Saccus:
Sizes range from very short to extremely long and prominent.

G - Hindwing underside basal area: Many species have black spots at the base. These spots may be confluent, separated or practically absent.

H - Hindwing spots configuration (excluding basal spots):
H1 = A row of four spots below the apex, three across the centre and two across mid-cell. ie 4:3:2 configuration. (As on many forewings).
H2 = An arrangement whereby the row below the apex is joined to the central row creating a discontinuous arrangement of spots. i.e 7:2 configuration.
H3 = An arrangement whereby the central row of spots is joined to the distal row (as in H2 (7:2)) but with all these spots in a curved or angled row.
H4 = Hindwing unspotted or spots coalesced thereby not allowing a clear association with the three primary groupings H1 to H3.

TRIBE ACRAEINI

SUBTRIBE ACRAEINA
GENUS *Acraea* Fabricius

SUBGENUS *Acraea* Fabricius

(Pierre 1987a - *Acraea* group 4)

A - Aedeagus narrow and pointed; needle-like.

GROUP I – *horta*

A - Aedeagus very long, narrow and pointed; needle-like,
B - Uncus large and generally elongated.
C - Valves subtriangular, pronounced dorsally.
G - Hindwing underside with basal black confluent area generally with white spots.
H - A row of four spots below the apex, three across the centre and two across mid-cell. i.e. 4:3:2 configuration. (H1 + H4)

SUBGROUP IA
Modified 8th Sternite without modified 8th Tergite.

SPECIES GROUP 1. *horta* - (Van Son group 1, Henning 1986) (H1 +H4)
Male genitalia: Modified 8th sternite present without modified tergite, uncus and valves not bilobate.

Foodplants: Passifloraceae, Turneraceae, Malvaceae, Theaceae, Flacourtiaceae, Violaceae, Vitidaceae.

Subgroup 1 a.
No spots beyond cell of forewing.

subgroup 1a1.
Hindwing spots clearly separate or absent.
A. *(A.) horta* (L. 1764) [W,SA]
A. *(A.) punctimarginea* Pinhey 1956 [F,EA]
A. *(A) eugenia* = 1893 [F,WC]
A. *(A) camaena* (Dr. 1773) [F,WA+WC]
A. *(A.) turlini* Pierre [H + F,CA]

subgroup 1a2.
Hindwing spots coalesced basally into 1 or 2 large patches.
A. *(A.) insignis* Dist. 1880 [F,EA]
A. *(A.) eltringhami* J. & T. 1921 [F,CA]
A. *(A.) hamata* J. & T. 1922 [F + H, CA+ EA]

subgroup 1a3.
Hindwing spots coalesced distally into 2 patches.
A. *(A.) igati* Boisd. 1833 [MA]

Subgroup 1b.
Spots present beyond cell of forewing.

A. *(A.) neobule* Dbl. & Hew. 1848 [S+T+W,TH]
A. *(A.) mahela* Boisd. 1833 [W,MA]
A. *(A) matuapa* S. 1889 [F,EA]
From its location on the Kenya coast this species apparently invaded from the east.
A. *(A.) brainei* Henning 1986 [A,SW]
The female of this species has been found to have very loose scaling on the forewings, specimens have also been recorded with small submarginal hyaline patches on the forewings.

Similar loose scaling is found in *chilo* of species-group 3.

SPECIES GROUP 2. *dammii* - (Van Son group 7) (H4)
Male genitalia: Modified 8th sternite present without modified tergite, uncus and valves bilobate.
The genitalia shows certain similarities to subgroup 1 but also has decidedly distinctive characteristics of its own. Pierre 1987a includes this subgroup with *igati* and *eugenia* in a subgroup of the *horta* group.

Foodplants; unknown.

The species in species group 2 show a remarkable similarity in facies to *igati* of Sub- group 1, while differing in genitalia.
It is possible that this is a result of parallel biological development on Madagascar. This trend can also be seen in other groups such as *silia* where the corresponding spots on the hindwing are greatly enlarged, and also, to a certain extent, to the Madagascan subspecies of *obeira.*

The two species in species group 2 are possibly the best examples of Madagascar to mainland invasions. It is probable that *dammii* developed on Madagascar, invaded the mainland and developed into *cuva* which then returned to Madagascar and has subsequently developed there into a distinct subspecies.

A. (A.) dammii Voll. 1869 [F,MA]
A. (A.) cuva S. 1889 [F, EA + SC + MA]

SUBGROUP IB
No modification of 8th Sternite.

SPECIES GROUP 3. *zetes* - (Van Son group 18) (H1)
The genitalia of the species in this group are all very similar.
Male genitalia: Valves elongate and sharply truncate; juxta large, narrow and elongated.

Foodplants; Passifloraceae, Flacourtiaceae, Acanthaceae, Vitidaceae

A. (A.) zetes (L. 1758) [W + S,WA + WC + CA]
A. (A.) acara Hew. 1865 [F + W, SA + SW + SC + EA]
- *A.(A.) acara melanophanes* Le Cerf 1927 stat. nov. M,SW] This subspecies was considered to be a form of *acara.* A long series of specimens shows quite clearly genetic consistency both in ground colour and markings. It is apparently not geographically isolated from *trimeni* in the southern portions of its range. It is isolated from nominate *acara* by the Okavango marshlands in Botswana and Angola. This subspecies has also been found sympatrically with *zetes* in northern Namibia.
A. (A.) trimeni Aur. 1898 stat. nov. [A,SA + SW]
Formerly regarded as a subspecies of *zetes*, as was *acara* and *barberi*. A good series shows a consistency over a considerable geographic area. It is apparently not geographically isolated from *acara melanophanes* in the northern areas of its range.
A. (A.) barberi T. 1881 stat. rev. [W,SA]

A distinct species which is restricted to the bushveld of the western Transvaal. It occurs sympatrically with *acara* in the north of its range.
A. (A.) hypoleuca T. 1898 [A,SW]
A. (A.) oscari R. 1902 [G + H, NE]
A. (A.) chilo G. 1880 [A + S, NE + EA + Arabia]

SPECIES GROUP 4. *anemosa* - (Van Son group 19) (H1 +H4)
The species in this subgroup have very similar genitalia.
Male genitalia: Similar to species group 3 but with valves not truncate distally.
Foodplants; Passifloraceae.

A. (A.) anemosa Hew. 1865 [W + S,CA + EA + SC + SW + SA]
A. (A.) pseudolycia B. 1874 [W+ S,WC + CA + EA + NE + SC]
A. (A.) turna M. 1877 [MA]

GROUP II – *quirina*

A - Aedeagus narrow and pointed, needle like.
B - Uncus not large and elongated.
C - Valves not subtriangular.
H - Hindwing spots in an arrangement whereby the row below the apex is joined to the central row creating a discontinuous arrangement of spots.ie 7:2 configuration. (H2+H4)

SPECIES GROUP 5. *rabbaiae* - (Van Son group 3) (H4)
Male genitalia: Uncus not apically bifid, valves with inner projection on ventral margin.

Foodplants; Passifloraceae

From current distribution *zonata* probably developed in the north and *rabbaiae* in the south. Both *rabbaiae* and *zonata* fly sympatrically in Kenya and Tanzania. The development of the pale brownish scales in the northern race of *rabbaiae* is indicative of development in parallel with that feature in *zonata*.
A. (A.) rabbaiae W. 1873 [F, EA + SC]
A. (A.) zonata Hew. 1877 [F +W,EA]

SPECIES GROUP 6. *satis* - (Van Son group 6) (H2)
Male genitalia: Modified 8th sternite and tergite, genital structure proportionally very small.

Foodplants; Unknown (unconfirmed record of Urticaceae)

A. (A.) satis W. 1871 [F, EA + SC]

SPECIES GROUP 7. *admatha* - (Van Son group 50) (H2)
Male genitalia: Juxta large and well developed, basally connected to the valves by a transtilla.

Foodplants; Violaceae, Celastraceae, Flacourtiaceae, Passifloraceae (*hova*).

Subgroup 7a. (revised Pierre 1985b)
A. (A.) admatha Hew. 1865 [F,WA+WC+CA]
A. (A.) boopis Wichgraf 1914 [F,SA+SC+EA]
A. (A.) endoscota Le Doux 1928 [F,WC+ CA]
A. (A.) leucographa Ribbe 1889 [F,WC +CA]
A. (A.) kappa Pierre 1979 [FIFA] Kigoma province of Tanzania.
A. (A.) kinduana Pierre 1979 [F,CA]
Subgroup 7b.
Hindwing with a series of sub-marginal spots.
A. (A) hova Boisd. 1833 [F,MA]

SPECIES GROUP 8. *ranavalona* - (Van Son group 2) (H2)
Submarginal spots on hindwing slightly or clearly separated from wing margin, forewing without spots.
Male genitalia: Valves strongly incurved, aedeagus anteriorly truncate.

Foodplants; Passifloraceae.

Subgroup 8a.
Submarginal spots slightly separated from margin.
A. (A.) ranavalona Boisd. 1833 [MA]
A. (A.) machequena S. 1887 [S,SC]
It cannot be determined whether *machequena* invaded Madagascar or *ranavalona* invaded the mainland. The former is a well known migrant and has been found many kilometres from its normal habitats.

Subgroup 8b.
Submarginal spots separated from margin by wide hyaline area.
A. (A.) quirina (F. 1781) [F,WA + WC +CA]

SUBGENUS *Rubraea* Henning
(Revised Pierre 1988; Pierre 1987a - subgenus *Acraea* group 3a)

A - Aedeagus narrow but not needle-like, anteriorly bifid.

GROUP III – *acrita*

A - Aedeagus short, distally thin and acute; anteriorly broad and truncate, bifid.
B - Uncus short.
C - Valve large, distally obtuse with distal process.
H - Hindwing spots in an arrangement whereby the row below the apex is joined to the central row creating a discontinuous arrangement of spots ie. 7:2 configuration. (H2)

SPECIES GROUP 9. *acrita* - (Van Son group 12, revised Pierre 1987b) (H2)
Male genitalia: Modified 8th tergite generally conspicuous, without modified sternite. Aedeagus broadened basally and needle-like towards the tip.

Foodplants; Passifloraceae.

Subgroup 9a1.
Uncus narrow, point of aedeagus laterally flattened, valve short with distal process.
A. (R.) acrita Hew. 1865 [W,SC+ EA]
A. (R.) guluensis Le Doux 1932 [NE]
A. (R.) pudorina St. 1885[W+S,EA] North-Eastern Tanzania & eastern Kenya.
A. (R.) bellona Weymer 1908 [SW]

Subgroup 9a2.
Uncus narrow, point of aedeagus dorsally flattened and subtriangular, valve short with dorsal process.
A (R.) utengulensis Thur. 1903 [W,EA] Central Tanzania.
A. (R.) eltringhamia Le Doux 1932 [W, SC +CA]
A. (R.) manca Thur. 1903 [G + H, EA]

Subgroup 9a3.
Uncus narrow, valve elongate and narrow basally.
A. (R.) loranae Pierre 1987 [CA]
A. (R.) chaeribula Ob. 1893 [W,SC]

Subgroup 9b.
Uncus narrow, valve broad basally and narrowing distally.
A. (R.) lualabae N. 1910 [W,SC]
A. (R.) annonae Pierre 1987 [CA]

Subgroup 9c.
Uncus broadly bifid.
A. (R.) periphanes Ob. 1893 [G,SC]

Subgroup 9d.
Uncus broad, not bifid.
A. (R.) bailundensis Wich. 1918 [SW +CA]
A. (R.) guillemei Ob. 1889 [W,CA]
A. (R.) diogenes Suff. 1904 [W,CA]

GROUP IV – *egina*

A - Aedeagus moderately long and narrow, anteriorly bifid.
B - Uncus short, basally broad.
C - Valve elongate, not narrowing distally.
H - Hindwing spots in an arrangement whereby the row below the apex is joined to the central row creating a discontinuous arrangement of spots.ie 7:2 configuration. (H2)

SPECIES GROUP 10. *egina* - (Van Son group 17) (H2)
Male genitalia: Valve large elongate and distally truncate. F

Foodplants; Passifloraceae

A. (R.) egina (Cr. 1775) [F+W,WA+WC+CA+EA+SC]
A. (R.) niobe Sh. 1893 [Sao Thorne]
A. (R.) medea (Cr. 1775) [Principe]

SPECIES GROUP 11. *nohara* (H2)
Male genitalia: Valve elongate and distally truncate with prominent dorso-apical hook.

Foodplants; Passifloraceae, Turneraceae

Subgroup 11a. - (Van Son group 20)
A. (R.) nohara Boisd. 1847 [W,SA + SC]
A. (R.) dondoensis Stev. 1934 stat. rev. [W,SC]
Found in the coastal forests of Moçambique. The constant ground colour plus the black infuscated forewings, broader hindwing marginal band and dark grey cilia clearly separate this taxon from any form of *nohara.*
The male genitalia is similar to that of *nohara* but with the valve being narrower basally and the dorsal process longer. The uncus is shorter than the tegumen (longer in *nohara*). The anterior portion of the aedeagus is longer than that of *nohara*.
A. (R.) chambezi N. 1910 [W,SC]
A. (R.) pseudatolmis Elt. 1912 [G + H,SC]
A. (R.) punctellata Elt. 1912 [H,SC]

Subgroup 11 b - (Van Son group 21)
A. (R.) mansya Elt. 1911 [W,SC]
A. (R.) onerata T. 1891 (=*A. aureola* Elt. 1911) [A,SW]
Syntypes in S.A. Museum generally agree with the Type of *aureola* but for a couple of missing spots on *aureola*. The apparent 'Type' pictured by D'Abrera 1980 is not *onerata* but *bailundensis* (as per Pierre 1988). Eltringham when describing *aureola* did not have S.A. Museum syntypes but probably had the same specimen pictured by D'Abrera from the B.M. Trimen based his description on three specimens, two males and a female, all of which are in the S.A. Museum in Cape Town. All the syntypes are pictured in Pennington's Butterflies 1978, Pl.63 figs 124i-iii and two are in Van Son 1963 plates VII-VIII figs 20 & 21. Rudebeck 1955 indicates that many of Eriksson's 'Ovamboland' localities were in fact in what is now southern Angola. The type locality for *aureola* is Bihe, Angola.

Subgroup 11 c. (Van Son group 16)
A. (R.) atolmis West. 1881 [W,SC]

Subgroup 11 c.
A. (R.) lofua Elt. 1911 [W,SC]
A. (R.) lapidorum Pierre 1988 [CA]

SPECIES GROUP 12. *violarum* - (Van Son group 23) (H2)
Male genitalia: Valves short and broad, uncus bifid.

Foodplants; Passifloraceae

A. (R.) violarum Boisd. 1847 [W,SA + SC]
A. (R.) asema Hew. 1877 [W,SC]
A. (R.) omrora T. 1894 [W,SW + CA]
A. (R.) overlaeti Pierre 1988 [CA]

SPECIES GROUP 13. *cepheus* - (Van Son group 22) (H2)
Male genitalia: Uncus straight and acute, vinculum broad.

Foodplants; Flacourtiaceae

A. (R.) petraea Boisd. 1847 [F, SA + SC + EA]
A. (R.) cepheus (L. 1758) [F,WC +CA]
A. (R.) bergeriana Pierre 1979 [F,EA] stat. nov.
Considered by the author to be a subspecies of *cepheus* due to the similarity in genitalia. However the spots and margin of the hndwing show distinct differences being closer to *rohlfsi* and *petraea.* There are also small but clear differences in the valves (Pierre 1988).I believe that this taxon should be treated as a full species. It inhabits forests in central Tanzania, further inland than *petraea* and further south than *rohlfsi*.
A. (R.) rohlfsi Suff. 1904 [F,CA + EA]
A. (R.) abdera Hew. 1852 [F,WA + WC + CA]

SUBGENUS *Stephenia* Henning
(Pierre 1987a - *Acraea* group 2 & 3b)

A - Aedeagus long and narrow but not needle-like, anteriorly bulbous.

GROUP V – *caecilia*

A - Aedeagus narrow but not needle-like, anteriorly bulbous.
B - Uncus short.
C - Valves comparatively short and angular, distally broad.
D - Saccus pronounced.
H - Hindwing spots in an arrangement whereby the row below the apex is joined to the central row creating a discontinuous arrangement of spots.ie 7:2 configuration. (H2)

SPECIES GROUP 14. *rogersi* (H2)
Male genitalia: Aedeagus with a large distinctly oval shaped anterior plate.
Hindwing with a complete (or partial) row of submarginal spots.

Foodplants; Passifloraceae

A (S.) rogersi Hew. 1873 [F,WA+WC+CA]

SPECIES GROUP 15. *caecilia* - (Van Son group 13) (H2)
Male genitalia: Aedeagus and saccus elongated.

Foodplants; Passifloraceae, Turneraceae, Malvaceae, Flacourtiaceae, Tiliaceae

Subgroup 15a.
Very strong black nervules, on upperside apex of forewing without internervular lines.
A. (S.) buettneri Rog. 1889 [F+ W,SW + CA]
This species shows a number of similarities to the *petraea* species group. It was placed in that group by Pierre 1987a and 1988. It does not key in with this group due to the fact that the aedeagus is not anteriorly bifid. Pierre 1988 explains this away as a 'reversion'.

Subgroup 15b. - broad marginal band on hindwing underside.

subgroup 15b1.
Marginal band on hindwing upperside broad and regular.
A. (S.) natalica Boisd. 1847 [W + S,SA + SC + EA + CA]
A. (S.) caecilia (F. 1781) [A+ S,WA + WC + CA + EA]
A. (S.) lygus Druce 1875 [A + W,SW + CA + EA]

subgroup 15b2.
Base of forewing upperside broadly black.
A. (S.) pseudegina West. 1850 [W,WA + WC + CA]
A. (S.) asboloplintha Karsch 1894 [F+ H, CA + EA]
A. (S.) stenobea Wall. 1860 [A + W,SW + SA + SC]

Subgroup 15c.
Usually broad black apex without internervular black lines.
A. (S.) caldarena Hew. 1877 [W + S, SA + SC + EA]
A. (S.) marnois Rog. 1889 [EA]
A. (S.) intermedia Wich. 1908 [W,CA]
A. (S.) pudorella Aur. 1898 [W + S, SC + EA]
A. (S.) leucopyga Aur. 1904 [W,SC + EA]
A. (S.) rhodesiana Wich. 1908 [W,SC]

Subgroup 15d.
Saccus and aedeagus very elongated.
A. (S.) doubledayi Guer. 1847 [A, NE]
A. (S.) sykesi Sh. 1902 [A+ S, EA]
A. (S.) braesia G. 1885 [A+ S, EA]
A. (S.) regalis Ob. 1893 [A+ H, EA]
A. (S.) atergatis West. 1881 [W, SW + SC]

Subgroup 15e.
Saccus and aedeagus not very long, aedeagus straight.
A. (S.) oncaea Hop. 1855 [W,NE+EA+SC+SA]
A. (S.) equatorialis N. 1904 [W + S, EA]

Subgroup 15f. (Van Son group 14)
Saccus and aedeagus not very long, aedeagus curved.
A. (S.) axina West. 1881 [W,SA + SC]
A. (S.) ella Elt. 1911 [W,SW]

Subgroup 15g. (Van Son group 15)
Male genitalia: Valve with long process on the basal half, uncus bilobed apically.
A. (S.) aglaonice West. 1881 [W,SA+SC]
Subgroup 15h.
Hindwing underside with clearly defined transverse lines.
A. (S.) miranda Riley 1920 [A, NE + EA]
A. (S.) mirabilis B. 1885 [A, NE]
A distinct subgroup which shows affinities in its hindwing underside markings to the *bonasia* group. The foodplant is Turneraceae.

GENUS *Bematistes* Hemming

(Pierre 1987a - *Acraea* group 5)
A - Aedeagus long, straight and narrow.

GROUP VI – *epaea*

A - Aedeagus narrow but not needle-like, anteriorly narrow.
B - Uncus very short and bifid.
C - Valves comparatively short and angular, claw-like.
D - Saccus and vinculum pronounced.
H - Hindwing unspotted or spots coalesced thereby not allowing a clear association with the three primary groupings (H4). All spots at base forming a tight grouping.

SPECIES GROUP 16 – *epaea*

Foodplants; Passifloraceae

Subgroup 16a
Forewing band moderately broad and evenly wide, hindwing without indication of bands and strongly rayed interneurally.
B. elongata (B. 1874) [F,WA]
B. pseuderyta (G.&S. 1890) [F,CA]
B. persanguinea (Rbl. 1914) [F + H,CA]
B. consanguinea (Aur. 1893) [F,WA+WC+CA]
B. excisa (B. 1874) [F,WC]

Subgroup 16b
Forewing bands narrow, hindwing without clear bands.
B. vestalis (FId. 1865) [F,WA+WC+CA]
B. macaria (F. 1793) [F,WA+WC+CA]
B. alcinoe (FId. 1865) [F,WA+WC+CA]
B. umbra (Dr. 1782) [F,WA+WC]
B. indentata (B. 1895) [F,WC]

Subgroup 16c
Forewing band very broad. Hindwing bands narrow and not distally defined.
B. macarista (Sh. 1906) [F,WC+CA]

B. poggei (D. 1879) [F,WC +CA]
B. obliqua (Aur. 1913) [F,WC +CA+ EA]
B. formosa (B. 1874) [F,WC+ CA]

Subgroup 16d
Forewing and hindwing bands broad and evenly defined.
B. leopoldina (Aur. 1895) [F,WC+CA]
B. adrasta (Weym. 1892) [F, EA]

Subgroup 16e
Subapical spots angled towards the outer margin
B. aganice (Hew. 1852) [F, SA + SC + EA]
B. quadricolor (Rog. 1891) [H + F, EA]
B. scalivittata (B. 1896) [H + F,SC]
B. epaea (Cr. 1779) [F,WA+WC+CA+EA+NE]
B. tellus (Aur. 1893) [F,WC+CA]
B. epiprotea (B. 1874) [F,WC+ CA]

Discussion - Part 2.
The phylogenetic relationships presented here for the Subtribe Acraeina are a tentative attempt to bring some order to a very complex Subfamily. The publications by Pierre have been invaluable in this study and between us I hope we can shed some light on this fascinating group of butterflies.

Errata - Part 1. *Metamorphosis* **3** 3:
Page 104; final paragraph 'The following cladogram' should read 'The following diagram'
Page 105; sixth line from bottom '8th tergite and sterigma. possibly perform copulatory function therefore no sternite present' should read '8th tergite and sternite possibly perform copulatory function therefore no sterigma present'
Page 111: seventh line from bottom 'some symplesiomorphic characters' should read 'some synapomorphic characters'.

Acknowledgments
My thanks to my brother Stephen Henning for his assistance, and to Steve Collins and Alan Heath for their generous help. My thanks also to my father Bill Henning and Ivan Bampton for advice.

The abbreviations of the authors' names are those used by Carcasson 1981 in his check-list.

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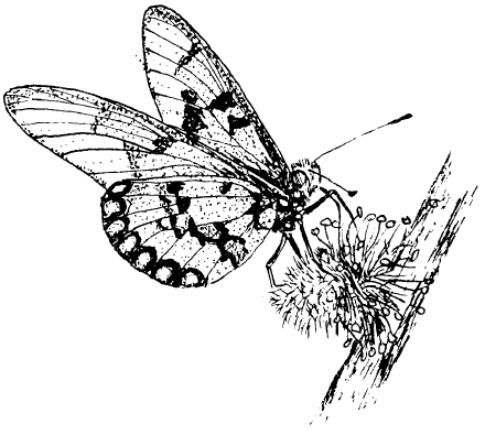

Acraea satis male underside and part of upper-side

BUTTERFLIES AND MOTHS OF PILANESBERG NATIONAL PARK

By Mark C. Williams
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This is an interim report on the Lepidoptera collected in Pilanesberg National Park by members of the Lepidopterists' Society of Southern Africa from the 6th to the 8th of November 1992. This forms part of a survey of the Lepidoptera of this Park, with a view to compiling a check-list of the species in the Park.

The report is in two sections:

A) Butterflies (superfamily Papilionoidea)
B) Moths (families Geometridae, Zygaenidae and Agaristidae)

A) **Butterflies**

Nymphalidae

Danaus chrysippus (linnaeus)
Hypolimnas misippus (Linnaues)
Junonia hierta cebrene Trimen
Catacroptera cloanthe cloanthe (Stoll)
Vanessa cardui (Linnaues)
Byblia ilithyia ilithyia (Drury)
Charaxes vansoni Van Someren
Charaxes jahlusa rex Henning

Lycaenidae

Myrina silenus ficedula Trimen
Spindasis natalensis (Westwood)
Spindasis phanes (Trimen)
Crudaria leroma (Wallengren)
Axiocerses amanga (Westwood)
Iolaus pallene (Wallengren)
Iolaus bowkeri tearei Henning
Leptomyrina henningi Dickson
Lampides boeticus (Linnaeus)
Tarucus sybaris sybaris (Hopffer)
Azanus jesous jesous (Guérin-Méneville)
Azanus ubaldus (Stoll)

Pieridae

Catopsilia florella (Fabricius)
Pinacopteryx eriphia eriphia (Godart)
Colitis vesta argillaceus
Colotis danae annae (Wallengren)
Colotis aurora

Colotis antevippe gavisa (Wallengren)
Colotis evippe omphale (Godart)
Colotis subfasciatus subfasciatus (Swainson)
Belenois aurota aurota (Fabricius)
Pierus helice helice (Linnaeus)

Papilionidae

Papilio demodocus demodocus Esper
Notes: 1) Eggs and larvae of *I. pallene* and I. *bowkeri* were collected from *Ximenia caffra* (Olacaceae) as well as a single larva of *A. amanga*. Several larvae of *S. natalensis* were found on the same plant by M. Williams and G. Henning. This is a new foodplant record for *S. natalensis*.

B) **Moths**

The following list was compiled by Herman Staude, a member of the Society who specialises in moths belonging to the Geometrid family. Most of the moths were collected by means of light traps positioned at three different sites in the Park viz.:

1) In and around the Caravan Park (<1200m) [27°8'30"E; 25°11'23"S]
2) On the northern slopes of Bankenkop (1200m) [27°7'54"E; 25°12'20"S]
3) In the Wilderness area, near the house of Mr Herbst (>1200m) [27°1'25"E; 25°10'38"S]

Geometridae

Geometrinae

Acidaliastis bicurvifera Prout. (Site 1; one specimen)
Acidaliastis curvilinea Prout. (Site 1; plentiful around campsite)
Allochrostes impunctata Warren. (Site 2; plentiful)
Prasinocyma scissaria Felder. (Site 1; one specimen, badly damaged)

Sterrhinae

Scopula picta Warren. (Site I; one specimen)
Scopula dissonans Warren. (Site 1 +2; plentiful)
Scopula minorata Boisduval. (Site 1 +2; plentiful)
Scopula rufisala Warren. (Site 2; one specimen)

Ennominae

Cabera elatina Prout. (Site 1; one specimen, collected by P Roos)
Zamarada consecuta Prout. (Site 1; a few specimens)
Coenina poecilaria H-S. (Site 1; one specimen at light trap; one in veld)
Petrodava subapicata Warren. (Site 2; a very pale form with rudimentary markings)
Plateoplia acrobelia Wallengren. (Site 2 + 3; one female)
Nassunia pretoria Prout. (Site 2; plentiful)
**Semiothisa brongusaria* Walker. (Site.2; a few specimens)
Semiothisa furcata Warren. (Site 2; very common)

Semiothisa inconspicua Warren. (Site 2; a few specimens)
Semiothisa tecnium Prout. (Site 2; a pair of specimens)
Tephrina pulinda deeraria Walker. (Site 1 +2; plentiful)
Tephrina inconspicuaria Hübner. (Site (1 + 2; plentiful)
Tephrina arizeloides Kroger. (Site 2; one specimen)
Orbamia octomaculata Wallengren. (Site 1 + 2; abundant)
Aphilopota subalbata Warren. (Site 2; one male)
Mauna ardescens Prout. (Site 2; one specimen)
Omphalucha albosignata Janse. (Site 1 + 2; plentiful)
Omphalucha indeflexa Prout. (Site 2; one female)
Sicyodes biviaria Guenée. (Site 2; one male)

Oenochrominae

Petovia dichroaria (H-S). (Site 3; specimen seen flying but not collected)

Zygaenidae

Arniocera auriguttata Hopffer. (Site 1 + 2 + 3; diurnal. Common on flowering trees all over the Park)

Agaristidae

Heraclia superba (Butler). (Site 1; a few specimens feeding from flowers in the campsite)

Notes:

1) Two larvae collected on *Ximenia caffra* Sonder. (Olacaceae) by S Woodhall were of *Plateoplia acrobelia* Wallengren. The larval foodplant was previously unknown.

2) Two green larvae with a yellow lateral line, belonging to the subfamily Geometrinae, were collected on *Rhus leptodictya* Diels (Anacardiaceae). Identification of species will only be possible once the adults emerge. Collected at Site 3.

3) One *Semiothisa sp*. larva was collected on *Acacia caffra* Thunb. (Fabaceae). It will be identified once it emerges from the pupa. Collected at Site 3.

*[It is of interest that the Genus *Semiothisa* **sensu stricto**, routinely used for South African moths is incorrect, and that these moths in reality belong to another genus, *Macaria.* Ed.]

SWING WITH VARIATION/SINGING THE COPPER BLUES

By J. E. Terblanche

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During the spring of 1991 my brother, wife and I undertook several collecting trips, as a group or individually, up the southern slopes of Mt. QwaQwa. My house is situated at the foot of this strange and beautiful mountain.

On one such climb we took our eight-month-old little daughter along. Sitting underneath a solitary *ouhout* tree amidst the dazzling green grass covering the seemingly endless upper slopes, and wearing a little white hat, she looked like a veld flower when seen from the corner of one's eye, while we were netting some fascinating coppers and blues. One comes to realize that one is a speck of sensual life, up there.

Some of our captures have been noted previously in *Metamorphosis* **2** (4). More profoundly, in the course of this year, my brother (R.F. Terblanche) came across an interesting colony of *Durbania* on the steeper southern slopes, below a sandstone face dominating our view daily. About this, one cannot mention more at present.

Roughly and vertically speaking, Mt. QwaQwa (2 117 m) can be divided into three "parts": the first being, from the foot up to the beginning line of the sandstone face. This consists of a fairly steep climb along the lower ridges, then up a steeper slope, until the height has been reached where the sandstone begins its perpendicular rise.

The second being the tall sandstone face itself, neatly dividing the other two parts - and the third part consisting of renewed slopes above the sandstone, leading up to the flattish, grassy summit (with rocks loosely strewn about)... leading up in a more gradual fashion, generally speaking, than the steeper slope immediately below the sandstone which, by then, has become an awesome drop.

The "first part" is in a poor state, due to overgrazing, dry weather and erosion. In some areas, in fact, people are building their shacks already half-way up the slope. One should remember that in the approximately 160 000 hectares of bulgy land called QwaQwa, an estimated half a million people are trying to live. Nevertheless, the "third part" is, essentially, and despite fires and grazing., in a pristine condition.

It is an everchanging and breathtaking garden of veld-flora, with a spectacular all-round view to al of Mt. QwaQwa's bigger sisters: Generaalskop roughly to the West, Sentinel (not to be confused with its namesake at Golden Gate) and Mt. Aux-Sources roughly to the South-East, and, even closer by, the lesser known Mt. Mechachaneng: a huge, frowning block slanting head and shoulders deep into the Lesotho sky. (Apparently, nobody has as yet collected there - however, an old-fashioned expedition in a Pennington-Swanepoel vein would have to be undertaken in order to do so). All these mountains lie within 20-40 km of Mt QwaQwa, reminding the collector that the world is still young, that where and when to go collecting can still be cause for a headache.

Another enticing headache is the colony of *Aloeides oreas* Tite & Dickson I found on Mt. QwaQwa, and their identification. To be more exact, they were flying along a rounded, rocky ridge on the upper slopes, in "the garden" (or 'third part"). They were found all along this rocky ridge, which gently curves sideways and upwards towards the summit - on which they were flying more sparsely.

In retrospect , with the twenty-odd little orangy shapes in one of my collecting drawers, it

is easier to see the colony in perspective than at the time, when I cautiously expected at least two species to be involved - the "other" species flying, according to the best of our knowledge, on the summit itself, even though hardly at a distance from their "counterparts"! Our encounters with *A. oreas* began in later September 1991 when my brother went to show my family and I a spot where he had previously collected a striking *A. oreas* specimen: this spot being on the Oliviershoek Pass (which, also, is not far from our present home!). On that day my brother was able to procure yet another interesting specimen. These *A. oreas* are darker, with a deep rusty (sepia) underside, and the hindwing underside markings more densely clustered. This was my first encounter with the species. This resulted in mother nature's first subtle move in a game called Confusion, for, when I came across the Mt. QwaQwa colony, I found it difficult to believe that they did belong to the same species. A consultation with *Pennington's* and my brother eventually convinced me. (We are here dealing with a - and the pun is intended - *typical* "habitat", as any good *Aloeides*-student would be quick to inform you.)

On 6 October, my wife and I undertook another investigation of these Oliviershoek *A. oreas*, taking turns to carry our daughter right up to one of the bulges topping that lowish escarpment. Here, on a flat, stony surface, one or two *A. oreas* every now and again alighted (with long intervals in between): we took six good specimens home.

Thirteen days later (19 October) I discovered the first of the Mt. QwaQwa colony, being two "summit" specimens, one damaged beyond recognition, and the other with a most unlikely median band*. Subsequent climbs were made with my brother during October and November in search of, especially, these "summit" butterflies, which seemed to us rarer (on every occasion only two or three were found, and to my inexperienced eyes they .were faster and of a paler orange on the upperside ... all of which proved to be optical/optimistic illusions). On every climb we also collected from an abundant colony (discovered only after those first two "summit" butterflies) on the rocky ridge slightly below, knowing that some of those were doubtlessly *A. oreas.* These "lower" *A. oreas* set the cat amongst the pigeons, for, not only did we find the most amazing diversity of hindwing underside patterns from a greyish-buff ground colour,right up to (in the case of my brother) a striking red ground colour female.

Amongst these, we found the odd specimen looking rather like the so-called summit butterfly (which, at that stage, we were investigating possible *A. merces* S.F. & G.A. Henning - Wakkerstroom being not too far off, the altitude being exactly right (2 000 plus metres).

Thus it came about that we found ourselves staring at undersides: until one had the notion that either all *Aloeides* were essentially one and the same species, or, to the contrary that every individual was a separate species. This is an experience typifying Africa, as my brother and I agreed - she is such a vast intricate and metamorphosing continent.

It took an older *Aloeides* guru, Graham Henning, to alleviate some of our fears and expectations. According to him, after seeing a substantial number of specimens, the "summit" species were but an extension of the same colony of *A. oreas*. In retrospect, how easy it was to see. Gone were my notions of "paler orange" uppersides and "faster flight" - and there was the recognition: do not under- estimate the extreme in extreme variation.

In the course of our trial and error, I consulted some literature and from this it becomes manifest that a diagnostic feature (or features) for *Aloeides* calls for some rigorous thinking.

In a paper entitled "*Notes on the genus* Aloeides *Hübner* (*Lepidoptera: Lycaenidae*) *with a Description of a New Species from the Transvaal*", the Henning brothers mention: "Research [....] has indicated that the extent of [....] apical patches is a highly variable feature and [....] not a reliable diagnostic feature" (1986: 337). Which provides one of the reasons why *A. taylori* Tite & Dickson cannot be considered a separate species from *A. rileyi* Tite & Dickson. It is, at the same time, why the original description of these two species on evidence of one specimen each, was a long shot.

The Hennings subsequently state: "Our studies indicate that the hindwing underside markings are a more important diagnostic character" (ibid.) - but, as should be unmistakable, one has to keep variation in mind, especially since the different suffusions of colour and/or ground colour can play havoc with these patterns and make them difficult to discern, as is the case with the *A. oreas* colony under scrutiny here. The essential problem is that of consistency of diagnostic feature, i.e. of making a rule without implying *too much* of a hard-and-fast rule, to put it in the layman's terms (hence, moreover, the Henning's strikingly careful formulation of their findings and insights throughout this and other papers - and that, with an enviable economy of terms).

One could, then, come across two extreme poles of variation which seem like two separate species, as in the *A. taylori/A. rileyi* case (*A. taylori* was sunk, in this instance) - the Hennings: "they represent only different examples of a highly variable species" (1986:339).

But this (literary) "survey" leads to more intricate possibilities. The ground colour, a highly variable feature amongst the *Aloeides* in general, is one of the characteristics used in order to separate *A. merces* as a new species, in the same paper - it is "much paler" (ibid) than that of *A. rileyi*. Even the apical patch is mentioned in order to separate *A. merces* (1986:340): the apical patch of the latter being more rounded, as opposed to that of *A. rileyi* (being more pointed). This indicates that these individual characters, although not in themselves diagnostic, together can help build up a picture of the differences between closely related species.

All of which serves to demonstrate how involved the identification of *Aloeides* can become. Firstly, it seems; one has to separate consistent features *from* inconsistent ones - therefore, one has to acquire, through experience (and, nowadays, with the aid of literature, where the experience of others bears fruit), the ability to separate "good" (consistent) features from "bad" (not to be trusted/highly variable) features: such as the hindwing underside patterns in preference to the extent of the apical patch. However, this is not enough. There is a more complex dimension to this activity. For, on the one hand, one should not trust the extent of the apical patch to be consistent in a given species (as is the case, too, in the Mt QwaQwa *A. oreas,* the extent of the upperside orange/apical patches varying considerably within one colony, as well as from one colony to another**) -whilst on the other hand, this very same untrustworthy phenomenon in one species can be trusted as part of the features which separate a different new species - again, in the same paper. From this it appears the thing to keep in mind is that a character inconsistent in one species need not be inconsistent in another species. All this seems like an unfathomable anomaly, unless one keeps swinging with variation.

This more complex dimension requires simultaneous decision between "good" and "bad" diagnostic features for identification purposes, but it goes a step further, because: *within* the variation of a given diagnostic feature there might be a consistency which, *given* the variation,

is consistently different from (or, the same as) the consistent variation in another species /specimen! Such as, *given* the variation/untrustworthiness of the extent of the apical patch as a diagnostic feature in general, the consistent roundness of the apical patch of *A. merces* as opposed to the usually consistent (but variable!) pointedness of that of *A. rileyi*.

Nevertheless, the above is what is assumed with the phrase "swing with variation" - swinging, not unlike an irregular pendulum, within the extremes of variation of a given feature/species/specimen, in order to determine that which remains consistently different or the same.

In view of the above, I believe, the extent of one small remark in *Pennington's* will be fully appreciated (Dickson & Kroon, 1978:118): "Mr C.W. Wykeham found [*A. oreas*], not uncommonly, in Lesotho in December 1974; and considerable individual variation is apparent in some of these specimens".

Admittedly, this article is the amateur's version of a highly complex affair, but I thought the insights gained, thanks to my brother, the Hennings, *Pennington's* and (last but not least) *A. oreas*, were well worth relating.

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* The uniqueness of such a median band is best described with reference to the median band of an Oliviershoek *A. oreas*. In the latter (and I am referring throughout to the hindwing underside) the median band is situated closer to the basal markings, almost merging with these, the result being that the ground colour is more conspicuous, i.e. there seems to be simply more of the ground colour in these Oliviershoek *A. oreas*. In the case of the Mt. QwaQwa *A. oreas*, on the contrary, there is a tendency for the median band and basal markings to be less clustered: sometimes - in extreme cases - even to be slightly separate. Of course, these differences go together with the median band of an Oliviershoek *A. oreas* being more crooked (in most specimens), whereas that of the Mt. QwaQwa *A. oreas* can be very much "straightened out". The undersides displayed on the relevant plate of *Pennington's* belong to Loteni and Elandspeak *A. oreas*, and adding, in this instance, to the mounting confusion by showing a median band/basal marking merger approaching a crux-like structure (these being closer to the Oliviershoek *A. oreas*, of course). However, the specimens in each colony represent characteristics combining both colonies.

** In the Oliviershoek *A. oreas*, the orange seems to be slightly more reduced, on the whole, pertaining to the upperside. In the Mt. QwaQwa colony, which varies extremely, quite a few specimens show almost no apical patch on the hindwing upperside (henceforth referred to as the sub-apical patch), whilst other specimens do, indeed, reveal the Oliviershoek tendency towards a relatively conspicuous sub-apical patch. On top of which, some Mt QwaQwa *A. oreas* show some rather deeply sunk sub-apical patches. In short: the extent of the sub-apical patch is extremely variable when both colonies are taken into account. In any event, it should at this point be stated unequivocally that the Oliviershoek and Mt. QwaQwa colonies represent the same species - albeit with (taxonomically speaking) ghastly variation.

LIST OF BUTTERFLY SPECIES COLLECTED IN MWINILUNGA REGION,. NORTH WESTERN ZAMBIA 18-26 DEC. 1991

By R.F. Terblanche & G.A. Henning

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In December 1991 R.F. Terblanche, G.H. Butler and E. Viviers undertook a collecting trip to Zambia. Their main objective was to collect butterflies in the Mwinilunga region in North Western Zambia. They arrived there on the 18th of December and collected in the area until the 26th of December. The following is a list of the butterfly species collected during their nine day stay in the region.

Collectors: R. F Terblanche (= R), G.H. Butler (= G) & E. Viviers (= E)
Marked "E", "G" or "R" means collected by each respective collector
(species only seen are not included since their identity may then be in doubt)

Localities:
- Mwambeshi Mission = Ma (18,19/12/1991)
- Mwinilunga (township) = Mi (20,21/12/1991)
- Nyangombe Bible School = Ny (23,25/12/1991)
- Zambesi Sources = Zs (22,26//12/1991)
- Zambesi rapids = Zr (24/12/1991)

Family: Hesperiidae

Subfamily: Pyrginae			
Celaenorrhinus galenus (Fabricius, 1793)	R		Ny
Eagris lucetia (Hewitson, 1876)	R		Ma
Sarangesa astrigera Butler, 1893	R		Zs
Abantis arctomarginata Lathy, 1901	R		Ny
Subfamily: Hesperiinae			
Metisella medea nyika (Evans, 1937)	R		Mi
Metisella willemi (Wallengren, 1857)		E	Ma
Lepella lepeletieri (Latreille, 1824)		E	Zr
Astictopterus punctulatus (Butler, 1895)	R		Ma
Kedestes michaeli Gardiner & Hancock	R		Ny
Kedestes pinheyi Hancock & Gardiner		E	Ny
Gorgyra johnstoni (Butler, 1893)	R		Mi
Ceratrichia flava semlikensis Joicey & Talbot, 1921	R		Zs
Xanthodisca vibius (Hewitson, 1878)	R		Zs
Teniorhinus harona (Westwood, 1881)	R	E	Ma,Mi,Ny
Acada biseriatus (Mabille, 1898)	R		Ma,Mi
Paracleros biguttulus (Mabille, 1889)	R		Zs
Semalea arela (Mabille, 1891)	R		Zs
Platylesches affinissima Strand, 1920	R		Mi
Zenonia zeno (Trimen, 1864)	R		Mi

Family: Papilionidae				
Graphium angolanus Goeze, 1779		G		Mi
Graphium taboranus schaffgotschi (Niepelt, 1927)		G		
Family: Pieridae				
Pseudopontia paradoxa (Felder, 1869)	R	G		Zr
Colias electo hecate Strecker, 1900	R			Ny,Ma
Eurerna hapale (Mabille, 1887)	R	G		Mi
Eronia leda (Boisduval, 1847)		G	E	Mi
Colotis regina (Trimen, 1863)	R	G		Ny
Colotis evenina evenina (Wallengren, 1857)	R			Zr,Mi
Colotis eris (Klug, 1829)	R	G	E	Ma,Mi
Belenois rubrosignata (Weymer, 1901)	R			Mi,Ma
Belenois thysa (Hopffer, 1855)	R			Zr
Dixeia pigea (Boisduval, 1836)	R			Ny
Mylothris ruepellii rhodesiana Riley, 1921	R		E	Ny
Myllothris yulei yulei Butler, 1897	R			Mi
Leptosia marginea (Mabille, 1889)	R			Zr
Leptosia nupta (Butler, 1873)		G		Zr
Leptosia alcesta inalcesta Bernardi, 1959	R			Ny
Family: Lycaenidae				
Subfamily: Lipteninae				
Alaena interposita hauttecoeuri Oberthür, 1888	R	G		Ma
Pentila pauli elisabetha Hulstart, 1924	R	G	E	Ma,Zs,Mi
Pentila landbecki Stempfer & Bennet, 1961	R	G		Zr
Ornopholidotos peucetia peucetia (Hewitson, 1866)	R	G	E	Ma,Zs
Mimacraea marshalii marshalii Trimen, 1898	R			Ma
Baliochila hildegarda (Kirby, 1887)	R	G		Ma
Liptena homeyeri Dewitz, 1884	R		E	Ma
Liptena eukrines Druce, 1905	R			Ma
Subfamily: Miletinae				
Spalgis lemolea Druce, 1890	R			Zr
Lachnocnema bibulus (Fabricius, 1793)	R			Mi
Subfamily: Theclinae				
Myrina silenus silenus (Fabricius, 1775)	R			Ny
Aphnaeus orcas (Drury, 1782)		G		Zr
Spindasis apelles (Oberthür, 1878)	R			Ma
Spindasis homeyeri (Dewitz, 1886)	R			Ma
Axiocerces tjoane Wallengren, 1857			E	Mi
Axiocerses amanga (Westwood, 1881)	R		E	Ny
Oxylides faunus albata Aurivillius, 1895	R			Zr
Iolaus bolissus bolissus Hewitson, 1873	R			Ny
Iolaus pollux pollux Aurivillius, 1895		G		Zr
Iolaus sapphirinus Aurivillius, 1897		G	E	Zr

Iolaus violaceae Riley, 1928	R			Ma
Iolaus poecilaon fisheri Heath, 1983	R			Ma
Hemiolaus coeculus vividus (Pinhey, 1962)	R	G	E	Ma, Mi
Hypolycaena auricostalis (Butler, 1896)		G		Ma
Hypolycaena buxtoni Hewitson, 1874	R	G	E	Ma,Mi,Zs
Hypolycaena hatita japhusa Riley, 1921	R	G		Zr
Actis perigrapha (Karsch, 1895)		G		Zr
Hypokopelates kafuensis Neave, 1910	R			Ma
Pilodeudorix camerona katanga Clench, 1965	R			Ny
Pilodeudorix caerulea Druce ,1890	R			Ny,Ma
Pilodeudorix congoana Schultze & Aurivillius, 1923	R			Ny
Virachola caliginosa Lathy, 1903	R			Ny
Virachola lorisona lorisona Hewitson, 1862	R			Ny,Ma
Subfamily: Polyommatinae				
Anthene definita (Butler, 1899)	R			Ny
Anthene lasti (Grose-Smith & Kirby, 1894)	R			Ny
Anthene lunulata (Trimen, 1894)	R		E	Ma
Anthene crawshayi (Butler, 1899)	R			Ny
Pseudonacaduba sichela Wallengren, 1857	R			Ny
Uranothauma poggei (Dewitt, 1879)	R			Ny
Uranothauma heritsia virgo (Butler, 1896)	R			Mi
Cyclyrius ssp.	R			Ny
Tuxentius calice Hopffer, 1855	R			Ma,Mi
Azanus mirza (Plötz, 1880)	R			Ny
Thermoniphas togara togara (Plötz, 1880)	R			Zr
Family: Riodinidae				
Abisara rogersi dollmani Riley, 1932	R			Ma,Zs
Family Nymphalidae				
Subfamily: Charaxinae				
Charaxes varanes vologeses (Mabille, 1876)		G		Ny
**Charaxes protoclea catenaria* Rousseau- Decelle, 1934		G	E	Ny,Ma
Charaxes macclounii Butler, 1895	R	G	E	Ny,Mi
Charaxes castor flavifsciatus Butler, 1895	R			Ny
Charaxes pollux pollux (Cramer, 1775)		G		Zs
Charaxes druceanus proximans Joicey & Talbot, 1922	R	G	E	Ny,Zs
Charaxes eudoxus mechowi Rothschild, 1899	R	G		Zs
Charaxes achaemenes achaemenes Felder, 1866		G		Zs
Charaxes bohemani Felder, 1859	R	G	E	Ny
Charaxes ameliae amelina Joicey & Talbot, 1925	R	G	E	Ny,Zs
Charaxes guderiana guderiana (Dewitt, 1879)	R	G	E	Ny,Mi,Zs
Charaxes nichetes pantherinus Rousseau-Decelle, 1934	R	G	E	Ny

*The male from Nyangombe) agrees with the description of *C. protoclea* subsp. *catenaria* (Henning, 1989) while the female (from Mwambeshi) shows characterisitics intermediate between subsp: *catenaria* and subsp. *azota*.

Subfamily: Nymphalinae				
Cyrnothoe sangaris luluana Overlaet, 1945	R	G	E	Zr
Euptera hirundo lufirensis Joicey & Talbot	R			Zs
Euriphene incerta (Aurivillius, 1912)		G		Zr
Crenidominas concordia (Hopffer, 1850)	R	G		Ny,Mi
Bebaeria brunhilda (Kirby, 1889)	R	G		Zs
Bebaeria plistonax (Hewitson, 1874)		G		Zr
Euphaedra herberti (Sharpe, 1891)		G		Zr
Euphaedra medon vindioutata (Butler, 1871)	R			Mi
Aterica galene (Brown, 1776)	R	G		Zs
Pseudargynnis hegemone (Godart, 1819)	R	G		Ma,Mi
Catuna crithea (Drury, 1773)	R	G	E	Zr,Zs
Pseudoneptis ianthe Hemming, 1964		G		Zr
Pseudacraea poggei (Dewitz, 1879)	R	G		Ma,Mi,Zr
Neptis laeta Overlaet, 1955	R	G		Ma,Mi,Zs
Neptis kiriakoffi Overlaet, 1955		G		Ma
Neptis jordani Neave, 1910	R			Mi
Neptis alta Overlaet, 1955	R	G		Mi
Neptis conspicua Neave, 1904	R			Zs
Sallya boisuvalli Wallengren 1857	R			Ny
Sallya consors Rotschild &Jordan, 1903	R			Ma
Sallya umbrina Karsch, 1892		G		Ma
Sallya amulia intermedia Carcasson, 1961	R	G		Mi
Sallya pechueli pechueli Dewitz, 1879	R	G		Zr,Mi
Neptidoptis ophione (Cramer, 1777)	R			Ny
Kamilla cymodoce (Cramer, 1777)	R	G		Zr
Protogoniomorpha parhassus (Drury, 1782)	R			Ny
Junonia sophia (Fabricius, 1793)	R	G		Mi
Junonia touhilimasa Vuillot, 1892	R	G	E	Ma
Junonia artaxia Hewitson, 1864	R	G	E	Ma
Junonia natalica (Felder, 1860)	R			Ma
Precis octavia sesamus Trimen, 1883	R	G	E	Ny,Ma
Precis antilope (Feisthamel, 1850)	R	G		Ny,Mi
Precis ceryne (Boisduval, 1847)	R	G		Ma
Precis pelarga (Fabricius, 1775)	R	G	E	Ny,Ma
Precis tugela pyriformis (Butler, 1895)	R	G	E	Mi,Zs
Vanessula milca (Hewitson, 1873)	R			Ny
Subfamily: Acraeinae				
Bematistes macarista (Sharpe, 1906)	R			Ny
Acraea peneleos pelasgius Grose-Smith, 1900		G		Ny
Acraea pharsalus pharsaloides Holland, 1892	R	G	E	Ny,Mi
Acraea encedon (Linneaus, 1758)		G	E	Mi
Acraea ventura ventura Hewitson, 1877		G		Ma
Acraea egina (Cramer, 1775)	R	G		Mi
Acraea atolmis Westwood, 1881	R	G	E	Ma,Mi,Zs
Acraea atergatis Westwood, 1881		G		Mi
Acraea periphanes Oberthür, 1893	R	G	E	Mi
Acraea diogenes Suffert, 1904	R	G	E	Ma,Mi
Acraea neobule Doubleday & Hewitson, 1848		G		Zr
Acraea natalica Boisduval, 1847		G	E	Ma
Acraea zetes zetes (Linnaeus, 1958)	R	G		Mi

Acraea chaeribula Oberthür, 1893	R	G		Ma
Family: Satyridae				
Subfamily: Biinae				
Gnophodes parmeno parmeno (Doubleday, 1847)	R		E	Ny, Zs
Melanitis lybya Distant, 1882	R			Mi
Bicyclus mandanes (Hewitson, 1873)	R			Zs
Bicyclus angulosus angulosus (Butler, 1868)	R			Zr
Bicyclus trilophus (Rebel, 1914)	R			Zs
Bicyclus cooksoni (Druce, 1905)	R	G		Ma,Mi
Bicyclus sebetus (Hewitson, 1877)	R	G		Zr,Zs
Bicyclus cottrelli (Van Son, 1952)	R	G		Ma,Mi
Bicyclus dubius (Aurivillius, 1893)	R	G		Ma
Bicyclus moyses (Condamin & Fox, 1964)	R			Mi
Henotesia centralis Aurivillius, 1903	R	G	E	Zs
Subfamily: Satyrinae				
Ypthima simplicia (Butler, 1876)	R		E	Ma,Zs
Physcaeneura pione Godman, 1880			E	Ma
Neocoenyra cooksoni Druce, 1907	R		E	Ma
Family: Nymphalidae				
Family: Danaidae				
Amauris tartarea tartarea Mabille, 1876	R	G		Ny
Amauris tartarea tartarea f. *psyttalea*		G	E	Mi
Amauris dannfelti restricta Talbot, 1940		G		Mi

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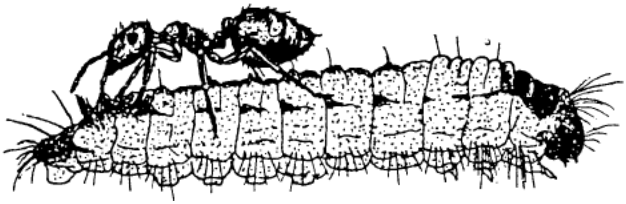

Poecilmitis aureus final instar larva with host ant.

HAZARDS OF BUTTERFLY COLLECTING

THE TAMPAN TICKS OF GEMSBOK

Botswana, 1991

By Torben B. Larsen
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In February, 1991 we set off for a month to the furthest southwestern corner of the Kalahari, the Gemsbok National Park. That is some thousand kilometres from our Gaborone base, much of it through the worst possible sand, where even our sturdy Toyota Hilux four-wheel drive can get stuck. Our aim was to see whether any of the special Cape and Karroo fauna could be found, in addition to the two beautiful 'Coppers', *Tylopaedia sardonyx* and *Argyraspodes argyraspis*. We also saw vast numbers of *Catopsilia florella*; we did not know at the time that they were the parent brood for a subsequent migration containing at least 1.5 billion individuals (1992. *Tropical Lepidoptera*, 3: 2-13).

The Kalahari is often referred to as a desert, but that is incorrect, since rainfall is usually much higher than the upper limit for real desert. In fact, most of the Kalahari is a well developed savannah, but it is true that during the dry season you may drive nearly a thousand kilometres without meeting any trace of surface water. However, the southwestern corner of the Gemsbok National Park begins to approach real desert, with rainfall of less than 200 mm a year in places.

Heading off into these parts basically means that you pack up for all eventualities - 150 litres of extra water, 250 litres of petrol, food for a full three weeks, and as many of life's little luxuries as can be crammed into the Toyota. If you have the space there really is no need to rough it more than necessary, especially when you will be camping out for nearly a month (some of our friends do think that bringing chopsticks for the occasional Chinese meal is excessive, but why not?). And the splendid thing about the Kalahari is that you travel in perfect safety. Any time you wish, leave the sandy track that counts for a road, drive 300 m. into the bush, and you are effectively lost to the rest of the world. There are precious few places left where this kind of thing is possible. And where else would a pride of five lions walk past your breakfast table, their body language clearly stating: 'We're OK! You're OK!'.

No Paradise is complete without its snake (of which there are plenty in Botswana, though they are rarely seen). On reaching the far southwestern desert corner of the country, suitable trees under which to camp became increasingly hard to come by. We found a lovely Shepherd's Tree (*Boscia albitrunca*) in an otherwise featureless waste and stopped for the day - even though it was a bit early to camp. This tree is revered in the Kalahari for its dense shade. Both the San people (also known as Bushmen) and the Batswana have tribal rules that forbid its felling.

We set up camp with practised ease, uncapped a beer and a coke, and went about entering field notes on the portable computer and reading up on what had to be read up. After fifteen minutes Nancy said: 'Hey .... there's a wood-tick on your leg'. There is indeed. I get hold of one the cigarettes I always carry in case flight attendants discover me smoking my pipe on aircraft, ready to do the thing in. It drops off well before I can zap it .... curious behaviour for a wood-tick. But, never mind.

Suddenly Nancy went: 'Eeek!', pointing accusingly at the ground between her feet. Literally thousands of ticks are milling about, ranging in size from the European wood-tick to monsters of six centimetres or more. Nancy is not a natural 'outdoorsy' type, and this is definitely the kind of thing that gives the outdoors a bad name. As we flee out into the open sunshine, dim memories of something I have read begin to surface. And, yes, we have the book in our mobile library. They are Tampan Ticks (*Ornithodorus savignyi*). I have previously had occasion to write about leeches (1989. *Entomologists' Record and Journal of Variation*, **101**:183-184;). Tampan Ticks are even more primevally and atavistically horrible. 'One Kalahari farmer reported collecting over 13 litres of engorged Tampans beside the bodies of three dead cows which had been killed by exsanguination or the draining of blood', reported my book drily. This was not a bit of information to pass on to Nancy immediately. Always accentuate the positive, and that was that Tampans only live in the shade of trees. And at 15.30 the Toyota Hi-Lux was throwing enough shade for comfort, so we were not unduly inconvenienced.

But, they really are awful creatures. Most humans react violently to their anti-coagulants. As with leeches, their bite is not felt initially. They can lie in wait for the unsuspecting camper (or, more likely, oryx and gnu) for up to eight years without a meal. The moment they feel the vibrations of footsteps, they emerge to do their dirty work. Anyhow, we now knew what faced us, and staying out in the open was only a minor inconvenience.

However, again to accentuate the positive, our brush with this set of Tampan Ticks was about the worst misfortune to befall us during more than 25,000 kilometres of 'bundu-bashing' in the Kalahari. If such a low disaster level could be maintained everywhere, the world would be a better place.

Thestor strutti male upperside

MISCELLANEA FROM THE UNITED KINGDOM

By John McFeely

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Since the mid 1960's, when I saw for the first time England's only representative of the Apaturinae (*Apatura iris* Linnaeus), I have made an intensive study of the larger Nymphalidae. I have concentrated my attention mainly on the life history and breeding, particularly captive pairing and subsequent breeding of further generations those genera usually regarded as somewhat "difficult" from the captive breeding aspects. Over the years, I have been able to discover and refine techniques which enable me to maintain these larger Nymphalid species for several generations.

I would like to share some of my experiences with you to try and encourage more of you to breed and study these fascinating insects.

A first encounter with the Purple Emperor (*Apatura iris* [Linnaeus]) in southern England

Every butterfly enthusiast has his favourite memories ..... their first Grayling (*Hipparchia semele* [Linnaeus, 1758]), first Chalkhill Blue (*Lysandra coridon* [Poda, 1761]) or, if they are lucky, even their first special favourite which in my case is the Purple Emperor (*Apatura iris* [Linnaeus, 1758]).

Back in the 1960s, my experience of this fine butterfly was restricted to what I had read about it in the usual books and magazines. Apart from the odd photograph, the only specimens I had ever seen were those in the collections of museums or the short series in the collections of more experienced lepidopterists. I decided that I had to find it for myself.

A little while later, in late July, I found myself in an area new to me, some little- known woods on the Hants-Wilts border. I had broken my journey there whilst on route for a holiday in Devon and Cornwall. Luck always plays a part in life and I had chosen to stop at one of the best woods for Purple Emperors although I did not know that at the time. I had a blue MGB drop-head in those days and driving it with the hood down along beautiful wooded lanes is one of the finest ways to enjoy motoring. I stopped at the first track and parked the car. The weather was dull but warm and as soon as I got out of the car, I was aware of a large dark butterfly flying behind me and around the other side of the car. Not getting a clear view of it, I decided that it was probably a fresh and large White Admiral (*Ladoga camilla* (Linnaeus)). There it was again - it was no White Admiral, this time I distinctly saw a flash of rich purple as it flew around me and the car. A second or two later my eyes followed it as it rocketed up to and alighted on the uppermost leaves of one of the largest beech trees I've ever seen. There it stayed for at least ten minutes, its very distinctive profile clearly visible.

Using my binoculars, I watched it for the whole time it was resting there, not even daring to blink in case it should fly off and I not be able to follow it. When it did fly off, it did a very unusual thing. From the top of that tree, it flew straight at me. It was a deliberate manoeuvre, and it circled around me and the car several times before returning to the tree tops again. A few minutes later, it repeated the flight down to me only this time I was ready for it. Who was I kidding, it gave me no chance.

However, each time it came down to me, it must have decided that it needed a closer look and on about the fifth "sortie" I had the chance I had waited so long for!

I still have that specimen. It is in fact a variety having considerably less white than a typical example. The underside is even more distinctive.

Stories like these often surround this superb butterfly. It is a well known fact that there is something about motor vehicles that is attractive to Purple Emperors. However, in my case it was to prove a "one off' as it has never happened to me since that first time. I have often been to that same spot but several MGs and many visits later it has always drawn a blank.

How's this for a coincidence? When I returned from the memorable holiday to Devon and Cornwall, I found a small scratch on my lovely MG. Visiting my local dealer for some "touch in" paint, he asked what colour I needed. I was not sure so we stepped outside to check the colour match. As soon as he saw my car he said "it's iris blue sir" ..... I suppose it just had to be!

The breeding of *Charaxes jasius jasius* **(Linnaeus, 1766)**

Twenty years ago - 1972 - when I moved back to Gloucester, one of the first things I bought for my garden was a Strawberry Tree (*Arbutus unedo* Linnaeus [Ericaceae]. This small tree or bush is an attractive evergreen. It is also the foodplant of Europe's largest butterfly; *Charaxes jasius jasius* (Linnaeus, 1766) or Two-tailed Pasha.

The opportunity, however, to breed *Ch. jasius* only presented itself in 1984. This was due to the kindness of Ken Halfpenny a fellow member of the Gloucester Entomological Group. He was able to bring me some pupae in February 1984. Towards the end of the month these pupae coloured up and some fine examples of both sexes emerged.

Using a modified version of the well-known butterfly hand-pairing technique, two pairings were obtained. One lasted only half an hour during which time the female was reluctant to settle down and I felt that this pairing was not successful. The other was rather better and lasted for over three hours. This second pairing was successful and a few days later, the female started to lay. Only one ovum was laid on the first day, forty-five on the second and eighteen ova on the third day. A total of sixty-four. By the way, the first ovum laid proved to be infertile and I've observed this with other butterflies.

The ova are quite large even allowing for the fact that this is such a large butterfly. When first laid, they are a uniform bright yellow. Infertile ova remain this colour but, fertile ova develop a thick dark zone around the top of the shell after two days, as shown in this simple diagram.

1 = Infertile. 2 = Fertile

Soon after the ova started to show this dark zone, I was very alarmed to see that each egg had small dents at the top of their shells. As any experienced butterfly breeder will confirm, such dents are usually a bad sign. More often than not, any dented eggs progressively deteriorate until they totally collapse. You can imagine my great disappointment when a week later they looked even worse - bigger dents and pockets of void spaces in each ovum. They looked so bad that I nearly threw them away there and then. For some unknown reason I did not.

Two weeks after they were laid, just before going away for a few days, I made a quick inspection round of my various livestocks. I was amazed to see a newly hatched larva in the box containing the *Ch. jasius* ova. Examining all the ova using a x5 handlens, I was delighted to see larvae in about half of the ova. I had to make hurried arrangements for the larvae. The leaves on my bush, an evergreen remember, were all nearly a year old or more and consequently as tough as old boots. Using scissors to trim away the hard edges of each leaf, I was pleased to see the young larvae feed without much difficulty.

Despite a prolonged period of dull, cold and sunless weather (even for March) these larvae made rapid progress. Foodplant was a problem. I had no alternative but to buy some potted *Arbutus* - they are not cheap - from local garden centres. It was far too cold to sleeve them outside. When the fine weather of April looked like lasting, I divided my larvae into two groups. One group was kept inside whilst the others were sleeved on the bush outside. Those indoors started to pupate after six weeks. When freshly formed, the pupa is in no way like the smooth beautiful "bomb" shape it later becomes. Those outside where conditions were probably more unfavourable, took much longer to complete their life cycles.

On emergence the adult butterfly took some ten minutes to fully expand its wings although at this stage they were still limp.

The problems of rearing butterflies which use foodplants not indigenous to the United Kingdom, only a small number can be reared at any one time; unless you are prepared to spend a small fortune on expensive plants.

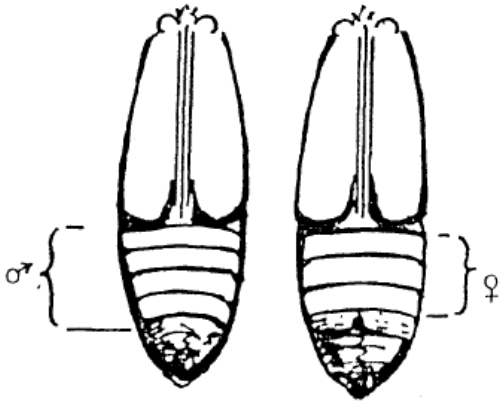
I would be delighted if any Southern African collector could supply me with eggs or pupae of *Ch. jasius saturnus* (or other *Charaxes* species) so that I can continue with my hand rearing studies.

Sex and the Entomologist - sexing pupae

There will be many times when the serious butterfly breeder needs to know the sex of his livestock well before his larvae and pupae become imagines (adults). With some species of butterfly, for instance the Apaturinae, it is possible to correctly sex the final or even the penultimate instar larva. However, in this note I will concentrate on the pupae.

The pupae of many butterflies and moths can be sexed simply on size - bigger or fatter examples usually produce females and slimmer ones the males. This cannot be 100% reliable but there is a method which gives the breeder the certainty he needs.

This simplified diagram shows the main differences. All you need to check for a positive determination are the first three or four segments next to the wing cases of the pupa. In the case of the male the first four segments will be quite clear but, in the female, only the first three are without marks.



Male Female

A hand lens is very useful. I use a x5 which I have had for many years. When I first started using this method, I found it quite difficult to examine segments on the pupa. With practise it became much easier. It's a good idea to get a little practise and a simple experiment will be a great help. Next time you have a dozen or so fairly large pupae, *Charaxes* for example, use them to check the sexes in the way described above. As a direct comparison, why not try to sex the pupae visually in the first place and then use the segment method. As with most things, practise makes perfect.

Useful tips for the Entomologist

Try to leave set specimens on the setting boards as long as possible. At least a month for large specimens. Otherwise, specimens will "spring" or "droop" in time and not look so well as when first removed from the boards. Specimens which required relaxing prior to setting are particularly prone to "spring" so leave these much longer than other set specimens.

Never kill bred specimens for the cabinet until at least 24 hours after emergence. For most moths and larger butterflies 48 hours is advisable. The reason for this is simple. The fluid used "hydraulically" by the insect to expand its wings takes at least a full day to dry out. Attempts to set a specimen still with this fluid present, even a very small quantity, usually results in damaged wings when the time comes to remove it from the board.

For those without a greenhouse or heated cage, the inside of a car on a sunny day can provide a very useful substitute. In this way, stubborn individuals can be persuaded to pair or lay. Do experiment and record temperatures before however, otherwise it is very easy to "cook" your livestock. Even in January in the United Kingdom (mid winter) in-car temperatures get very high in the sunshine.

GETTING TO KNOW MOTHS - MAIDENS, MATRONS

By Stephen Henning
5 Alexandra Street, Florida 1709

The maidens and matrons belong to the family Thyretidae (Superfamily Notodontoidea). These are generally small to fairly small moths with robust bodies. The forewings are narrow and the hindwings are sometimes very small (fig. 1). In the more typical *Thyretes* the body is slender and the forewings sometimes have clear hyaline patches. The females in some species are brachypterous (have reduced wings) such as in *Automolis meteus* (Stoll) (fig. 2). The antennae are denticulate or pectinate and the haustellum (proboscis) is normally very reduced or absent. The labial palpi are usually porrect but sometimes obsolete. The tympanum on the metathorax is directed downwards.

The larvae are short, cylindrical, with tufts of longish hair. The pupae are found in loose cocoons incorporating some of the larval hair.

The Thyretidae is a small family with some 34 species and 6 genera in Southern Africa. The largest genus is *Automolis* with some 24 species.

Kiriakoff (1953) separated off these species from the *Ctenuchidae* (Noctuoidea). Pinhey (1975) discussed the more common and interesting species. Vári and Kroon (1986) provide detailed lists of all the known species in Southern Africa.

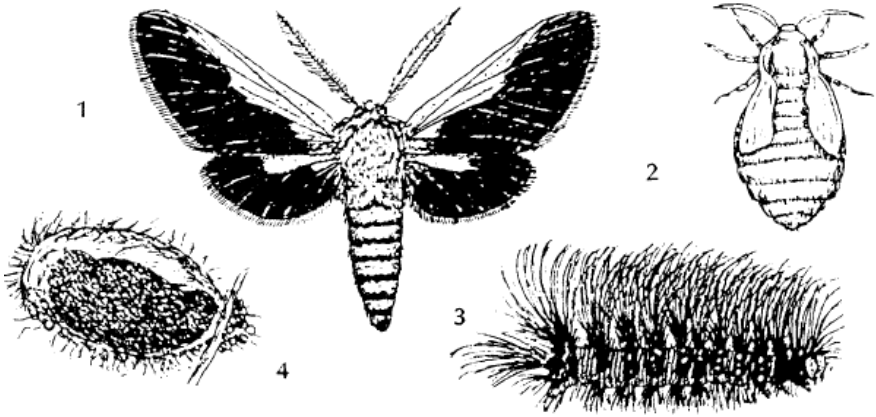
References

HENNING, S.F., 1983. Lepidoptera: Thyretidae. *In Insects of Southern Africa*, Edited by C.H. Scholtz & E. Nolm. Butterworths, Durban, p. 385.

KIRIAKOFF, S.G., 1953. Les Thyretidae du Musee Royal du Congo Belge (Lep.: Nymphalidae). *Annls Mus. r. Congo Belge* (8) *Ser. Zool*. **26**: 1-91.

PINHEY, E.C.G. 1975. *Moths of Southern Africa.* Tafelberg Publishers Ltd, Cape Town.

VÁRI, L. & KROON, D.M., 1986. *Southern African Lepidoptera: a series of cross- referenced indices.* Lepidopterists' Society of Southern Africa & The Transvaal Museum.



Thyretidae. *Automolis meteus*. 1. Male. 2. Female. 3. Larva. 4. Pupa.

NATAL BUTTERFLY ATLAS: PROGRESS REPORT

AND FURTHER CALL FOR ASSISTANCE FROM PRIVATE COLLECTORS

By Jason G. H. Londt
Natal Museum, P. Bag 9070, 3200 Pietermaritzburg

Members of the Lepidopterists Society may recall my announcement in 1991 that staff of the Natal Museum, Natal Parks Board (NPB) and Durban Natural Science Museum was to undertake a project aimed at the production of a Natal Butterfly Atlas. In 1992 a brief progress report was published (Londt 1992), and members of the society asked to assist the project by submitting data from their private collections. In this article I provide an up-to-date report on progress and once again call for participation by all owners of private butterfly collections.

Phase 1 of the project, the gathering of raw data from specimens in our national collections, is all but complete. Surveys of Natal collected specimens have now been completed for the Transvaal Museum (Pretoria), Natal Museum (Pietermaritzburg), South African Museum (Cape Town), Durban Natural Science Museum, National Museum (Bloemfontein), and the National Collection of Insects (Pretoria). The only major outstanding South African public collection is that of the Albany Museum (Grahamstown). In addition, in response to an earlier call for participation, a few individuals have submitted data from their private collections (ie. M. Lunderstedt, J. Nagle, S. Van Noort). A total of approximately 15 000 records have been accumulated.

Now that Phase 2, the computerised data capture, is being seriously contemplated (with a view to generating distribution maps and tables of seasonal incidence), it is necessary to once again appeal to all private collectors to consider submitting data from their collections to reinforce the information which has been gathered from museum collections. While many of their records may merely validate information contained in museum collections, all additional data is considered valuable. The objective is to produce the best indications of species distribution and seasonal incidence as is humanly possible.

The following points are meant to act as a guide to collectors who are prepared to assist us by submitting data from their collections:

1. Only Natal collected specimens are to be included.
2. Species identification must be accurate (if in doubt - leave it out!). Most of the Natal species are not problematic.
3. The minimum requirements for label information are - place and date of capture. All other information appearing on labels should, however, also be recorded. Should you believe it necessary to provide additional information not recorded on labels, kindly do so, but consider adding this data to the actual specimen too (even if it means relabelling or adding another label).
4. For series of two or more specimens of the same species with exactly the same collection data, only a single record is necessary
5. When submitting data make sure it is legible (an example of our standardised form is available on request - although use of it is by no means obligatory).
6. Send records to me (address above), making sure to include your full name, address and telephone number so that you can be properly acknowledged.

Although the majority of specimens in mgst collections are inadequately labelled they are

often all we have. Serious collectors are encouraged to upgrade their own labels where possible. The main ways in which you can improve labelling are as follows:

1. The date of collection should be written in full (eg. 20.iv.1988). Use of roman numerals for the month of capture eliminates possible confusion between day and month.
2. Locality names should be written in full and not abbreviated. If the name of the exact spot of collection is not known, it is necessary to provide a good indication of the straight-line distance and direction from the nearest centre (eg. 15 km SW Weenen). If possible the latitude and longitude should be given (in that order). If this is not possible consideration should be given to the useful practice of providing a simple quarter-degree grid reference. As many collectors are unfamiliar with this system I provide an indication of how it works (Fig. 1). Of considerable value is the fact that each quarter-degree square coincides with the 1:50 000 topographic maps available through the Government Printers.
3. Altitude. This may be useful, especially in mountainous areas or when collections are made at the tops of hills in otherwise flat country. Although simple altimeters are available, one can usually calculate altitude to the nearest 20 m using good topographical maps.
4. Habitat. It may be useful to provide an indication of the type of habitat in which the specimen was taken (eg. Forest or Grassland).
5. Name of collector. Although of limited value this can be useful information. Most collectors put their names on labels, but all too often the surname is reduced to an initial. This is pointless.
6. Other. Quite frequently useful additional data could be supplied (eg. Feeding on Lantana or Reared from Protea heads).

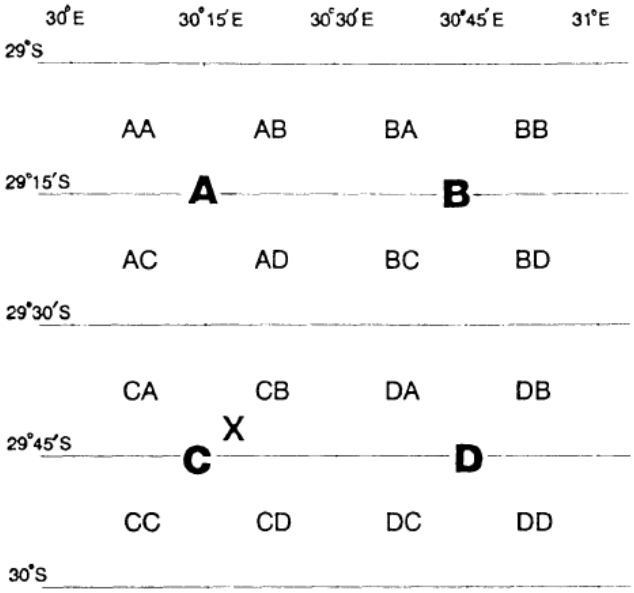
Remember, the labels you provide are meant to allow someone else to locate, exactly, the spot at which you found a specimen. The common complaint that long labels take a lot of writing cannot be justified. Apart from the ethical considerations attached to collecting living creatures, which demand maximum utilisation of the material (made possible by good labels), modern duplication techniques are available to most serious collectors.

As the success of the Natal Butterfly Atlas project is dependent on the quality of data input I urge all serious-minded members of the society to take the necessary steps to support this initiative. Should there be any enquiries, kindly direct them to me either in writing or telephonically (0331-451404) during business hours.

Reference

LONDT, J. G. H. 1992. Natal Butterfly Atlas: progress report and call for assistance. *Metamorphosis* **3** (2): 70.

Fig. 1. [See below]. The quarter-degree grid reference system. Each degree-square is divided into four sections (A-D) as shown. Each of the resulting squares are then divided into four, giving a total of 16 units, each labelled as shown. A locality X shown on the grid would thus have a grid reference 2930CB (ie. 29 South, 30 East, square CB).



NEW MEMBERS

Basilio G. Aguado, c/Enric 43 - 2 4 Cassa de la Selva, 17 440, Spain.
A. Boniface, P. O. Box 930, Ficksburg 9730.
Mark de la Hey P. O. Box 51, Mtubatuba 3935.
Mrs H.R. Holt, The Shieling, 24 Flat Street, Hermanus 7200.
Simon G. Joubert, P.O. Box 37378, Overport, Durban 4067.
Torben Larsen, 358 Coldharbour Lane, London S.W. 9 - 8PL, England.
I. Meyer, P.O. Box 1534, Tzaneen 0850.
David V. Molesworth, P.O. Box 91230, Auckland Park 2006.
Neil Naish, 105 Warminster Road, Chitteme, Nr. Warminster, Wiltshire BA12 OLH, England. Interests: African Saturniidae.
Shinichi Ohshima, Shimohideya 77-99, Okegawa, Saitama (363), Japan.
John E. Rawlins, Carnegie Museum of Natural History, 4400 Forbes Ave, Pittsburg Pa. 15201, U.S.A.
Patrick E. Sacco, 65 Carlmaries Road, Hydepark, Sat1dton 2196. Age 14.
Riaan Stats, Die Rooi Huys, Parkstraat, Hatfield, Pretoria 0083.
James D. Stewart, 45 Winchester Way, Cheltenham, Gloucester, GLS 1 - 5E2, England.
Simon van Noort, c/o South African Museum, P.O.Box 61, Cape Town.

CHANGES OF ADDRESS

Craig Shaw, 32 Kinnoull Road, Pietermaritzburg 3201.

FORTHCOMING EVENTS

The following are the major social events for the next few months. Various outings and meetings to discuss Lepidoptera. The dates and venues are as follows:

Easter Weekend 9, 10, 11, 12th April 1993
FUN WEEKEND AT BRANDWAG, HAZEYVIEW.
Accom for 14 Pax. Cost about R25 per day. Bring own food.
Peter Roos, Telephone (011) 683-5266.

Saturday 17th April 1993 at 14:30
SETTING SPECIMENS, ARRANGING IN CABINETS AND ALLOCATION OF DRAWER SPACE. Stephen and Graham Henning, 1 Harry Lawrence Street, Florida Park. Telephone (011) 672-1608.

Saturday 15th May 1993 at 13:30
VISIT TO THE NATIONAL INSECT COLLECTION, PHYLOGENETICS.
Rolf Oberprieler, National Insect Collection, Vredehuis, 590 Vanmeulen Street, Pretoria. Telephone (012) 285140.

Saturday 17th July 1993 at 11 :00
VIEW COLLECTION AT TRANSVAAL MUSEUM, PRETORIA
Entrance fee R2. Martin Krüger, Transvaal Museum, Paul Kruger Street, Pretoria. Telephone (012) 322-7632.

For further information or suggestions for Social Events phone Lindsay Durham (H) 011-788 3674 or (W) 011-880 1434.

CORRIGENDA

Metamorphosis, Volume 3, September 1992 - the diagram of wing venation on Page 99 shown as *Pontia helice* is in fact *Leptosia alcesta.*

ADVERTISEMENTS

BUTTERFLIES OF KENYA AND THEIR NATURAL HISTORY By Torben B. Larsen
This book is an illustrated identification guide to the 870 butterfly species recorded from Kenya. The text includes eleven introductory chapters on butterfly biology, ecology and behaviour, followed by the detailed species accounts.
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The first and only regional work on the butterflies and skippers of Tanzania. Fully illustrated in colour, treating all the known species (and new taxa) and many interesting races and infrasubspecific forms. A useful guide to the butterflies of East Africa including Kenya, Malawi and Uganda. Colour plates by Bernard D'Abrera.
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A PRACTICAL GUIDE TO BUTTERFLIES AND MOTHS IN SOUTHERN AFRICA: By the Lepidopterists' Society of Southern Africa. 1992.

This is the first work in which all the techniques of studying Lepidoptera are brought together in an easily read whole. Some of the topics covered are: population study methods, mounting and preservation of specimens, photography and methods of dissection. The construction of nets, setting boards, cabinets and other equipment is also covered. The general structure of the adult lepidopteran is illustrated and discussed with special reference to important taxonomic characteristics. All aspects of the life history are also covered with emphasis on practical breeding methods. All the lepidopteran suborders and families are discussed and many are illustrated by colour photographs. The latest on the conservation of Lepidoptera is also covered.
Extent 222 pages. 8 Colour plates, many line drawings and black and white photographs. Soft covered. Price R50.00 including S.A. postage. Add R2.25 additional if registration is requested.
Orders: The Secretary, Lepidopterists' Society of S.A., P.O. Box 470, Florida Hills 1716, South Africa.

IRANIAN BUTTERFLIES to swop for South African. Common ones will do. Hamid R. Bostanchi, P.O.Box 31375-378, Karaj-Mehrvila, Iran.

AMERICAN BUTTERFLIES to swop for South African. Write to Sargon Tamimi, 46 Landfair Ave, Los Angeles, CA90024. U.S.A.

ARIZONA PIERIDS to swop for African pierids - A 1 perfect papered specimens with locality data. Philip H. Krutzsch, Professor Emeritus Anatomy, Health Sciences Centre, The University of Arizona, Tucson, Arizona 85724, U.S.A.

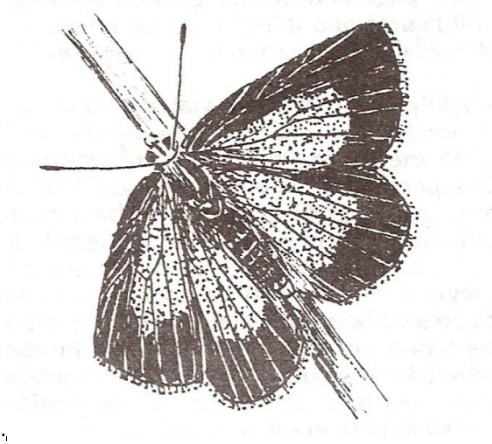
WANTED SATURNIIDAE - ova, cocoons and papered specimens - willing to buy or trade. Have *H. cecropia, A. juna,* A *io,* C. *promethia,* C. *angulifers, S. cynthia, E. imperialis,* C. *regalis,* C. *sepulcralis* and A *polyphemus.* Will try to get anything else you desire. Rob Mayo, Box 508, Great Milrs, Md 20634, U.S.A.

WANTED: Contact with suppliers/breeders of African Saturniidae. All species of interest! Please send me lists including species and prices. I can offer for sale or exchange many Asian, American and European species. I can refund your postage if required. Please write or fax with details to: Neil Naish, 105 Warminster Road, Chitteme, Nr Warminster, Wiltshire BA12 OLH, England.

WANTED: African specimens of Sesiidae and Zygaenidae. Will buy or exchange species of European origin. Please contact Hans Riefenstahl, Zoologisches Institut, Martin Luther King, Platz 3 - 2000 Hamburg 13, Germany. Fax: Int + 040-473865.

Ivan Willem of P.O. Box 1625, Margate, is interested in exchanging or purchasing A1 specimens of butterflies for his personal collection. Also actively involved in the collecting of beetles and wants to establish contacts with collectors with similar interests. Please send your desiderata lists, and lists of available material. All enquiries will be answered.

WANTED - A copy of Pennington's Butterflies of Southern Africa in any condition is desperately needed by an enthusiastic new researcher and collector. Prepared to pay the earth or even borrow on the understanding that it would be replaced at his cost with a copy of the new edition when published. If you own a copy that has been collecting dust on your shelf for the past few years here is an opportunity to further the interests of Lepidoptera and to make an enthusiast's day. Please phone Gordon Fraser-Grant 021 - 7884533 or write to 6 Cutter Close, Marina da Gama, 7945, Cape Town



Orachrysops niobe female upperside

INSTRUCTIONS TO AUTHORS OF SCIENTIFIC PAPERS

Metamorphosis publishes short scientific papers in lepidopterology, with special emphasis on biological, systematic and faunistic studies of the lepidopteran fauna of Arica. Only papers in English and reporting on original research are published, and submission of a manuscript is taken to imply that the work reported has not been published previously and is not being considered for publication elsewhere. Papers exceeding 20 printed pages are usually not considered, unless the author contributes towards the costs. Colour plates will usually only be printed at cost to the author(s). On publication of an article, the copyright of the text and figures is transferred to the Society.

Editorial procedure

Manuscripts not conforming with the Instructions below may be returned to the author before consideration. All manuscripts of scientific papers will be evaluated by at least one reviewer. Proofs will be returned to the author if necessary, and only printer's errors may be corrected. Twenty-five (25) offprints are provided free to the author or senior author on request and only if the manuscript has been submitted on computer diskette; additional offprint numbers can be ordered at cost at the proof stage. Only IBM/DOS-compatible word-processing software is acceptable for the computer version of the manuscript.

Presentation of manuscripts

Three copies of the manuscript and all tables and illustrations must be submitted to the Editor. The originals of illustrations and the computer diskette will only be requested once the has been accepted. The text should be typed on A4-size paper, with double line spacing and on one side of the pages only, leaving a margin of at least 2cm on all sides. The pages should be numbered consecutively, beginning with the title page and including those carrying references, tables and legends to figures. All figures and tables must be referred to in the text. If a computer diskette is not available then tables to be typed on A5, exactly as found in the printed journal.

Figures must be boldly drawn in black, waterproof ink and arranged in clear and logical plates of stiff, white, A4-sized board (or slightly smaller or larger but in the same proportions). All the figures must be numbered in a common sequence in Arabic numerals, irrespective of whether they are line drawings, photographs, diagrams, graphs or maps. Magnifications should be indicated by scale bars on the figures. Lettering on illustrations must be clear and legible and allow a reduction of plates to A5 size. Figure legends must be typed on a separate page, and each plate must have its own legend, which must be concise but completely intelligible and explanatory of the figures without the need to refer to the text.

Tables should be typed on separate sheets and in consistent style and letter type, and also numbered consecutively in Arabic numerals. Each table should be provided with a concise but fully explanatory title or caption above. The same data should not be presented in both graph and table form.

Manuscript format

Manuscripts must be arranged in the standard format of scientific papers: title, name(s) and address(es) of author(s), abstract, introduction, material and methods, results, discussion, conclusion, acknowledgements, literature references. In cases where these exact headings are not appropriate (e.g. taxonomic papers, short observations), the paper should be structured in a similar, logical fashion and divided into suitable sections with or without headings.

The **title** should be succint and include suitable attribution to the order and family of the genus or species treated but not the names of any new taxon.

The full **names and addresses** of all authors should appear underneath each of them.

The **abstract** should be concise (not exceeding 250 words) but complete and intelligible without reference to the text. It should cover the main results of the study, including (in taxonomic papers) all nomenclatorial changes or proposals of new taxa.

The **introduction** should include the aim and objectives of the study and a concise summary of the relevant previous work on the subject (unless this follows under a separate heading).

The **material and methods** should fully explain all abbreviations, except the standard taxonomic ones and those of measurements, for which the International System of Units (SI) must be used. In experimental and purely descriptive work, the deposition of voucher specimens must be stated.

The **acknowledgements** should be concise and simple.

The **literature references** must be in alphabetical order and adhere to the following format, with multiple authors linked by an ampersand (&) and the journal names in full and unabbreviated:

SMITH, J.K. & BROWN, A.B. 1985. New species of *Papilio* from southern Africa (Lepidoptera: Papilionidae). *Journal of the Entomological Society of Southern Africa* 72:112-123.

VAN DER MERWE, P.P.J. 1986. *The Swallowtails of Africa*. Bushveld Press, Pretoria.

SMITH, J.K, BROWN, A.B. & VAN DER MERWE, P.P.J. 1991. Migratory patterns of Pieridae in southern Africa. In: C. Black & F. Miller (Eds) *Butterfly Behaviour*, Bushveld Press, Pretoria, pp.234-256.

Citation of references in the text should appear in the following form: Smith (1990), Smith & Brown (1985), (Smith et al. 1991) for more than two authors, (Smith 1985a, 1987; Brown 1986, 1991) in chronological order for multiple references. References to unpublished sources should be cited as: Smith (in press), Brown (pers. comm.) or Miller (unpubl.); only the first of these is to be included in the reference list.

Taxonomic papers

Papers should constitute a comprehensive treatment of a group delimited taxonomic, geographic, ecological or other biologically meaningful criteria. Papers dealing with miscellaneous species having no such natural association or simply describing a single new species will only be accepted under special circumstances. The names of new taxa should not appear in the title, but all nomenclatorial changes must be listed in the abstract.

Authors must fully comply with the 3rd edition of the International Code of Zoological Nomenclature (ICZN) and its recommendations and with the published Opinions of the International Commission.

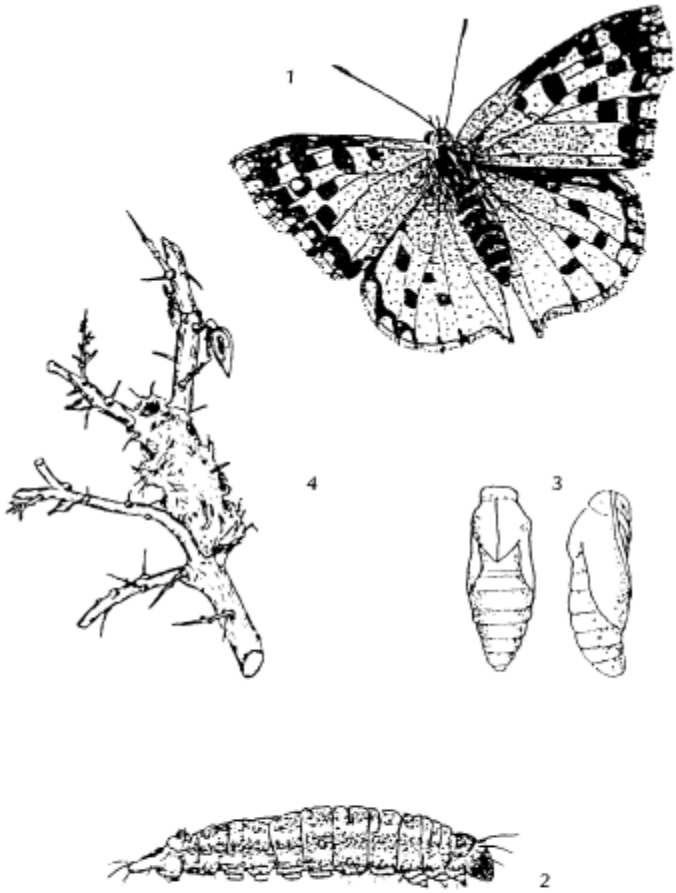
Headings of taxonomic categories above the species group should be centred and preceded by the name of the category (e.g. genus, family). When used as taxonomic headings and with their first citation in the text, all genus and species group names should be cited with their author in unabbreviated form. Nomenclatorial changes should be indicated by the standardized abbreviations gen.n., sp.n., stat.n., comb.n., nom.n. as recommended by the ICZN; all other abbreviations should be avoided or, if really necessary, explained in the section 'Material and Methods'. Under each taxon heading at least the most important references to the taxon must be stated, i.e. its original description, revisions, keys, synonymies; such references must be included in bibliography at the end of the manuscript. With genera, the type-species with its author and date must be listed after the synonymy.

Descriptions of taxa should be furnished consistently in telegramme style (i.e. without active verbs), and should be followed by a section indicating the main diagnostic characters of the taxon and giving a comparison with its closest relatives and other similar taxa. A formal diagnosis should normally not be given *in addition* to a description, but rather *in its place* when a full description or redescription is unnecessary. Descriptions of species should be based on the entire type-series, not only on the holotype, and new species should not be described from single specimens without some justification (e.g. stating the steps taken to locate/collect more). Names given to new taxa should be simple and euphonic, and species names based on geographic entities with complicated local names (e.g. *townbushensis*, *skoorsteenkopensis*) should be avoided.

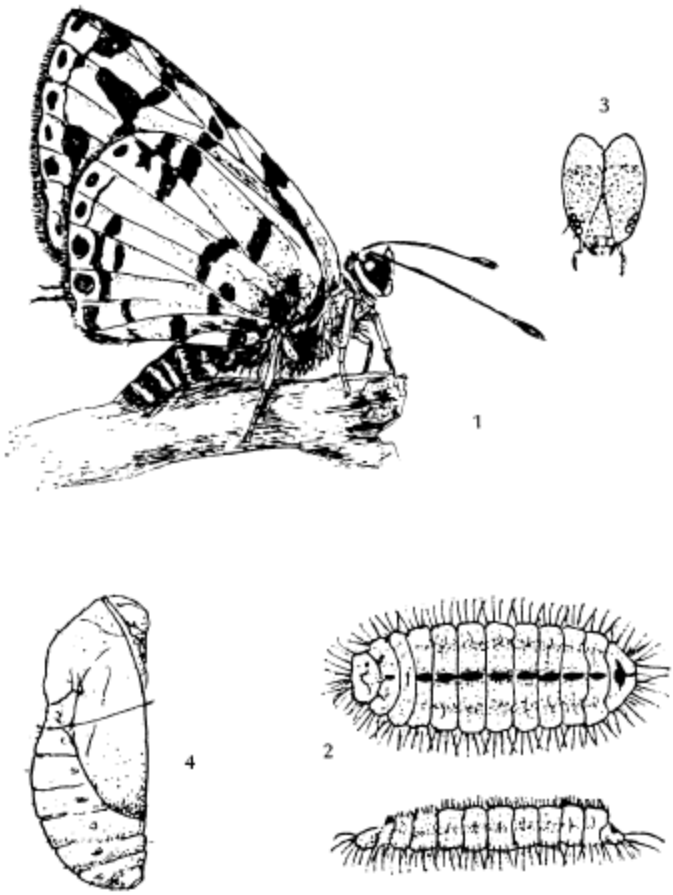
All nomenclatorial and taxonomic changes (synonymies, type designations, generic transfers, changes in status, replacement of names, etc.) must be briefly justified, and nomenclatorial ambiguities and interpretations must be fully explained. If a type cannot be traced, an account should be given of the steps taken to ascertain its whereabouts.

Type designations must be done in accordance with the ICZN, and types not recognized by the ICZN (homotype, metallotype, etc.) are not acceptable. The designation of allotypes should be avoided. Primary types (holotypes, lectotypes, neotypes) must be deposited in recognized public taxonomic institutions (not private collections) and, if at all possible in the country of origin of the species.

All specimens examined should be included in a section 'Material Examined', citing specimens and their depositories. The data on the specimen labels should be cited verbatim in the case of types but standardized for all other specimens examined, arranging the localities in alphabetical order within countries or provinces. Obscure localities should be identified by means of map co-ordinates.



Poecilmitis brooksi tearei 1. Male upperside. 2. Final instar larva. 3. Pupa (Del. S.F. Henning) 4. Structure on foodplant (*Aspalathus spinosa* L.) containing larvae and pupa (Del. Dickson, 1959).



Tuxentius melaena 1. Male underside. 2. Final instar larva, dorsal and lateral view. 3. Final instar head. 4. Pupa.

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