

ON SOME BUTTERFLIES OF THE KALAHARI GEMSBOK NATIONAL PARK, WITH DESCRIPTIONS OF THREE NEW FORMS

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INTRODUCTION

The present paper is the outcome of a short collecting expedition to the Kalahari Gemsbok National Park, undertaken under the auspices of the National Parks Board and partly sponsored by a subsistence grant from the C.S.I.R., to which institutions the gratitude of the writer is hereby extended.

The collecting took place from the 11th to the 20th of February, 1958, and was mainly carried out within a 20 mile radius of Twee Rivieren. Many thousands of insects were collected, of which the butterflies constituted a very small part. Nevertheless, the material collected proved of considerable importance, as it comprised new records of species, some of which were represented by forms new to science.

The object of this paper is the recording of the species collected and the description of the new forms.

GENERAL CONSIDERATIONS

The Kalahari Gemsbok National Park presents certain ecological features which differ rather strikingly from those of the adjoining areas, and which may perhaps be regarded as unique in Africa south of the Sahara. This applies more particularly to the red dune country situated in the southern portion of the Park.

The dry river beds of the Auob and Nossob contrast very strongly with the open country through which they run, both in the character of the soil and in the vegetation.

The largest trees of the Park, the Camelthorn (*Acacia giraffae*) are found almost exclusively in the river beds where they provide the only shade. The soil is dense and compact, composed mainly of fine silt permeated to a large extent by lime.

This soil, during the infrequent rainy spells, becomes sodden and carries at certain periods a rather dense cover of annuals. The slopes, particularly the

eastern ones, are covered with calcrete gravel derived from the broken down edges of the calcrete band underlying the surface of the veld, which in some places presents a rock-like surface combed with cracks and holes which serve as hiding places to a variety of animals, large and small.

Occasional mud-holes along the river beds provide some open water for variable periods after rains and, together with the flowering plants growing in their vicinity, attract numerous insects, mainly bees, wasps and butterflies. Here and there, the most typical of the Kalahari shrubs, the Driedoring (*Rhigozum trichotomum*), invades parts of the slopes, although its main habitat is on the plains above the river beds and in the valleys between the dunes.

Groves of dense and comparatively low-growing thorn trees are occasionally bordering the river beds.

The country outside the river beds is of a quite different nature, consisting of more or less parallel red sand dunes, partly overgrown with tall grasses, but occasionally bare, particularly along the crests. The stretches of country lying between the dunes are sandy, the sand, however, being more compact, and are covered with tufts of grass of varying size and density, with groves of *Rhigozum* here and there, more especially closer to the dunes.

Colonies of rodents are often found along these valleys, causing a considerable amount of denudation.

The main peculiarity of the climate of the Park is the usually extremely low relative humidity of the air, coupled with very high day temperatures, in the summer months. In this respect the Park differs very considerably from most other low rainfall regions of Southern Africa, such as the western Karoo, Bushmanland, Namaqualand and the southern portion of South-West Africa, where the relative moisture, particularly at night, is sufficiently high to provide copious falls of dew, thereby supporting a considerable amount of succulent vegetation which hardly exists in the Park.

Another feature of the Park, at least of its southern portion, is the scarcity of tree vegetation of the dune country, as compared with the conditions obtaining in the more northerly and easterly parts of the Kalahari where no shifting dunes occur, and where the immobilized old dunes are clothed with a greater variety of vegetation, including trees and shrubs, than the hardened "pans" which are surrounded mainly with thorn trees, and the slopes of which are often covered with groves of the Driedoring's relative, *Catophractes alexanderii*. The reasons for this difference in vegetational features may be the higher rainfall of these areas, often coupled with the absence of calcrete which allows a larger amount of water to penetrate to a greater depth, therefore retaining the moisture essential to the growth of sand-loving, deep rooted tree

species such as *Terminalia* and *Combretum*, for a much longer period than could be the case in the southern Kalahari. Moreover, the average relative humidity of the northern and eastern parts of the Kalahari is much higher, and as the relative humidity is an important factor in the growth of many trees, the usual extreme dryness of the air in the Park may have some relation to the scarcity of the tree flora, as it undoubtedly has contributed to the absence or extreme scarcity of succulents.

The lack of atmospheric moisture appears to produce a peculiar effect upon the colouration of animals, whether mammals, birds, reptiles or insects, which in dry desert areas are almost invariably lighter coloured than their closest relatives living under moister atmospheric conditions.

In butterflies this phenomenon is easily observed in species of *Colotis* (Pieridae) and *Phasis* (Lycaenidae) occurring over wide areas exhibiting a variety of climatic conditions.

From a vast amount of material existing in world's collections, it has been found that specimens of these genera collected in naturally dry habitats, or in the dry season, exhibit a reduction of their black markings, when compared with specimens collected in humid regions, or in the wet season.

The paleness of certain colours, such as oranges and yellows, is another notable feature observed in specimens collected in arid regions. Certain colour changes of the underside of the hindwings of many species of *Colotis* appear to be definitely seasonal: in summer months, the underside of the hindwings is mainly white, while in winter months it is densely irrorated with reddish brown, giving a general appearance of pinkish-buff. As these changes do not appear to be regional in character, it can be assumed that they are influenced by temperatures rather than by differences of relative humidity.

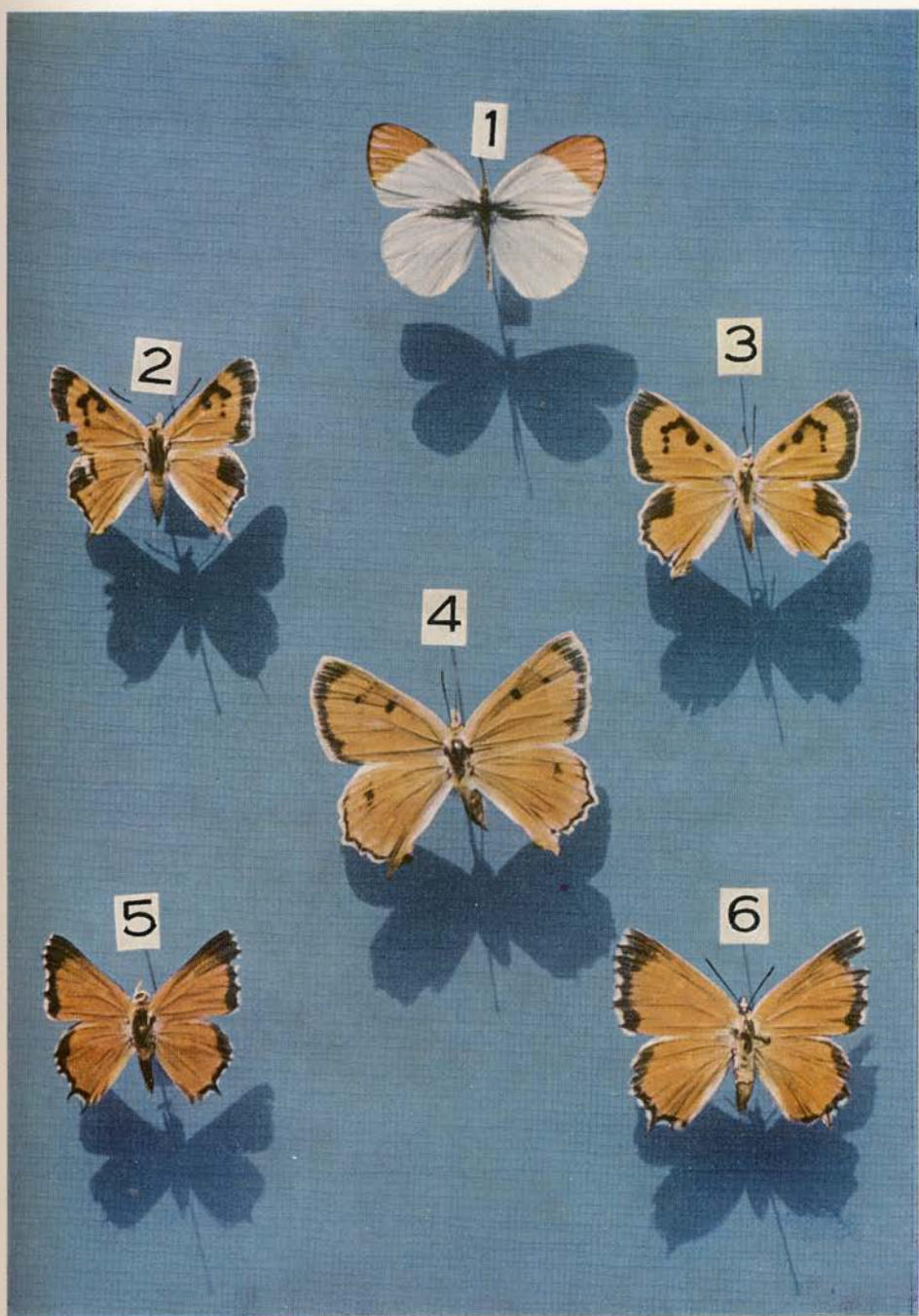
It is in the light of the above that the descriptions of new forms of Kalahari butterflies should be considered.

Compared with the number of species recorded by the writer in the eastern, central and northern Kalahari (van Son, 1936, *Scientific results of the Vernay-Lang Kalahari Expedition, March to September, 1930*, *Ann. Transv. Mus.* XVII, 2:121-140), the butterfly fauna of the Park is very poor, but comprises species not previously known to occur in the Kalahari.

FAMILY PAPILIONIDAE

Papilio demodocus Esper.

Common in the Park, where it breeds on *Pituranthos aphyllus* (Umbelliferae), of which dense groves occur in the courses of the Auob and Nossob. The larvae are of the "Fennel" type, i.e. variegated, unlike the usual plain green form found on *Citrus* and other Rutaceous plants.



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| 1. <i>Colotis evenina</i> f. <i>lerichei</i> | 4. <i>Phasis sardonix</i> f. <i>knobeli</i> ♀ |
| 2. <i>Phasis sardonix</i> f. <i>knobeli</i> ♂ | 5. <i>Phasis argyraspis</i> f. <i>labuschagnei</i> ♂ |
| 3. <i>Phasis sardonix</i> f. <i>knobeli</i> ♀ | 6. <i>Phasis argyraspis</i> f. <i>labuschagnei</i> ♀ |

All specimens are $\frac{9}{10}$ of natural size.

FAMILY PIERIDAE

Pinacopteryx eriphia Godart

Common, the food-plants (Capparidaceae) being abundant.

Colias electo electo (Linn.)

Comparatively rare, probably on account of rarity of its food-plants in the area investigated. The species was observed in numbers along the course of the Kuruman River, on the way to the Park.

Catopsilia florella (Cramer)

Common and widespread. Numerous pupae were found hanging on branches of *Rhigozum trichotomum* which is possibly utilized as a food-plant. In most localities in the Union, the species breeds on *Cassia*, but no species of this genus have been observed by the writer in the area investigated. Countless thousands of this butterfly were encountered along the Kuruman River, sometimes rising from the ground in clouds and obscuring the view of the road.

Eurema brigitta (Cramer)

The only species of *Eurema* observed in the Park. The specimens were on average smaller than usual and belonged to the wet form *zoë* Hopffer.

Colotis evenina (Wallengren)

The specimens collected in the Park represent a clearly distinct form which is described below.

C. evenina f. *lerichei* forma nova (Fig. 1, male holotype).

Holotype and two paratypes, all males, Twee Rivieren, 11-20 February, 1958, (G. van Son), in the Transvaal Museum collection.

Description of male holotype.

Upperside like that of the dry form *deidamioides* Aurivillius, from which it differs in the strong reduction of the black suffusion at the wing-bases, especially in the hindwing, and the complete absence of any trace of black suffusion in the remainder of the hindwing.

Underside of hindwing white, the costa being orange from base to the middle of costal area, and there is a faint, inwardly diffuse orange bar from the end of the subcostal vein to vein M_1 , placed at right angles to the latter. There is a complete absence of brown irroration in either the hindwing, or the apical area of forewing, and no trace of dark suffusion along the lower half of cell and of area M_3 (which is always present in *deidamioides*). *Expanse*: 40 mm.

I have the pleasure of naming this form in honour of the warden of the Kalahari Gemsbok National Park, Mr. J. D. le Riche in appreciation of his kind co-operation.

Colotis pallene (Hopffer)

A single female of this species was captured, which agrees essentially with the light summer form *seineri* Strand, though with the black markings considerably reduced. It is necessary to obtain males in order to determine the form with certainty.

Colotis agoye bowkeri (Trimen)

Only one female of this subspecies was captured, which shows a complete absence of orange apical markings, a feature not shown by any females in the long series in the Transvaal Museum collection. It is possible, therefore, that a new form is involved, which can be ascertained at a later date when further specimens, including males, are available.

Belenois (Anapheis) aurota (Fabricius)

This widespread species is among the commonest butterflies of the Park. It breeds, among other plants, on *Boscia* spp. which it occasionally completely defoliates. This butterfly is a well-known long distance migrant.

FAMILY LYCAENIDAE

Phasis sardonyx (Trimen)

The hitherto known range of this species was the Cape Province south of the Orange River, and the discovery of its occurrence in the Kalahari Gemsbok National Park came as a surprise.

The specimens captured in the Park differ so much from the large and rather uniform series in the Transvaal Museum collection that they are considered to represent a new regional form which is described hereunder.

P. sardonyx f. *knobeli*, forma nova (Fig. 2, male holotype, 3, female allotype, 4, female paratype).

Holotype male, *allotype* female and one *paratype* female, all from the Nossob River bed, 12 miles north of Twee Rivieren, 11-20 February, 1958, (G. van Son), in the Transvaal Museum collection.

Description of male holotype.

Upperside pale orange-yellow, with fuscous-black markings. Forewing: a short discocellular bar, a straight discal band from just below costa to vein M_3 , continued as two small transversely elongate spots in areas M_2 and Cu_2 ,

arranged in a straight line parallel with the outer margin, and a marginal band, slightly widened towards apex and in area A_2 . Hindwing: a marginal, sector-shaped patch bound posteriorly by vein M_3 , straight along its inner edge which intersects vein M_1 at its middle, and two minute discal spots on veins Cu_1 and Cu_2 , in line with the middle of the marginal spot. Cilia whitish.

Underside pale buff. Forewing tinged with pale orange-yellow from base to the discal spots except in area A_2 where this colour is slightly produced outwards. The spots are as in the typical form. Hindwing with the pattern as in the typical form, but very much paler. Cilia of the same colour as the wing-margin (distinctly lighter in the typical form). *Expanse*: 38mm.

Description of female allotype.

Larger than the male, with more rounded forewings, as usual in the genus. *Upperside*: ground colour a little lighter than in male, and there is a distinct spot at middle of cell of forewing, but no trace of discal spots on veins Cu_1 and Cu_2 of hindwing. *Underside* as in the male. *Expanse*: 41 mm.

Note. The female paratype is larger (*expanse* 50 mm.) and has the dark markings very much reduced: the discal spots of the forewing are barely visible in the upper half of the band and are obsolete in the lower half, and the sector-like marginal spot of the hindwing is only represented by a narrow blackish suffusion (its inner edge).

I have much pleasure in naming this interesting new form in honour of Mr. Rocco Knobel, Director of National Parks.

Phasis argyraspis (Trimen)

This species, like the foregoing, is widespread in the Karoo and Namaqualand and has been also taken by the writer in Aus, S.W. Africa. Its capture in the Kalahari Gemsbok National Park was, however, unexpected. Moreover, the series taken in the Park so strikingly differs from specimens in the Transvaal Museum collected in all the hitherto known habitats of the species that it must be considered to represent a new regional form.

P. argyraspis f. *labuschagnei* forma nova (Fig. 5, male holotype, 6, female allotype).

Holotype male, *allotype* female and two female *paratypes*, all from the Nossob River bed, 10 miles north of Twee Rivieren, 11-20 February, 1958, (G. van Son), are in the Transvaal Museum collection.

Description of male holotype.

Upperside pale orange (dark orange-red in typical *argyraspis*), with the black markings considerably reduced.

There is no black suffusion at the base of the wings. Forewing marginal

band 1 mm. broad in areas Cu_1 and Cu_2 (twice that width in typical *argyraspis*). The black apical area only reaches the base of area R_3 , and its inner edge is diffuse (in typical *argyraspis* it reaches to well within the base of area R_2 , and its inner edge is clear-cut); costa not blackened from base to well beyond middle (blackened to base in f. *argyraspis*). Hindwing with the marginal band similarly narrowed and its anterior part (in area RS) not produced basad (produced in f. *argyraspis*). Underside with the ground colour of the apical part of forewing and the whole of the hindwing light buff with a few darker suffusions only. Forewing with the orange area much lighter than in f. *argyraspis* and with the silvery white spots in the cell and areas Cu_1 and Cu_2 conspicuously larger; the black submarginal spots in area A_2 to Cu_1 are widely separate from each other (fused together in f. *argyraspis*). Hindwing with the silvery white spots on average broader and rounder than in f. *argyraspis*. Expanse: 44 mm.

Description of female allotype.

Larger than male and with broader wings; costa of forewing not darkened except very near the apex; all black markings reduced as in the male. Underside of forewing with the silvery white spots in areas Cu_1 and Cu_2 well developed, as they are also in the two paratypes (absent in most females of f. *argyraspis*). Expanse: 57 mm.

I have much pleasure in dedicating this interesting new form to Mr. R. J. Labuschagne, Chief Nature Conservator of the National Parks Board, whose enthusiasm and whole-hearted co-operation have contributed very considerably to the success of the scientific investigations carried out in the Park.

Aloeides damarensis (Trimen)

This appears to be the commonest species of the genus in the Park. The numerous specimens captured show a strong reduction of the black markings and agree very well with the form *punctata* Aurivillius in which the marginal band of the hindwings is reduced to small spots on the vein-ends. This form occurs occasionally among the typical form, especially in semi-arid localities, but appears to be the only form occurring in the Park. One female has the hindwing margin completely unmarked.

Aloeides simplex (Trimen)

A fairly widespread species of the Kalahari and the adjoining areas, occurring from Niekerks Hope to Namaqualand and as far north-east as the Makarikari region in the north-eastern Bechuanaland. The specimens taken in the Park agree with Makarikari specimens in being on average smaller and somewhat lighter than Niekerks Hope or Namaqualand specimens. They

were captured in company with *Phasis argyraspis* f. *labuschagnei* while visiting flowers along the Nossob River bed, 10 miles north of Twee Rivieren.

Lampides boeticus (Linn.)

This extremely widespread species is common in the Park, where it has been previously collected by Dr. H. K. Munro.

It breeds on Leguminosae, including garden peas.

Brephidium metophis (Wallengren)

Not uncommon in the Park where specimens have been observed flying around small shrubs growing on the calcrete-covered slopes of the dry river beds. The species is widespread in the Union and South West Africa.

FAMILY NYMPHALIDAE

Subfamily *Danainae*

Danaus chrysippus (Linn.)

Exceedingly common in the Park. On very warm days, with temperatures well over 100°F, this species was observed to congregate in large numbers in the shade of Camelthorn trees, where the butterflies sat motionless on dry branches and grass stems, apparently stunned by heat and most unwilling to fly. No other butterflies were observed to behave in this way.

Subfamily *Acraeinae*

Acraea stenobea Wallengren

The only species of *Acraea* observed on this occasion.

It is widespread in the thorn veld of the Orange Free State, Cape Province, the Transvaal and Bechuanaland, but is seldom found in any numbers. A single male was captured at Twee Rivieren.

Subfamily *Nymphalinae*

Precis oenone cebrene (Trimen)

This very widespread butterfly is not uncommon in the Park where it can be observed patrolling the higher spots such as the dune crests, or coming down to mud spots in the river beds.

CONCLUSION

The species recorded in this paper do certainly not represent even a substantial part of the butterfly fauna of the Park, and it is hoped that further opportunities to study this fauna will present themselves in the future. It will be necessary to continue collecting in the Park over more extended periods before a reasonably complete list of species occurring there can be given.