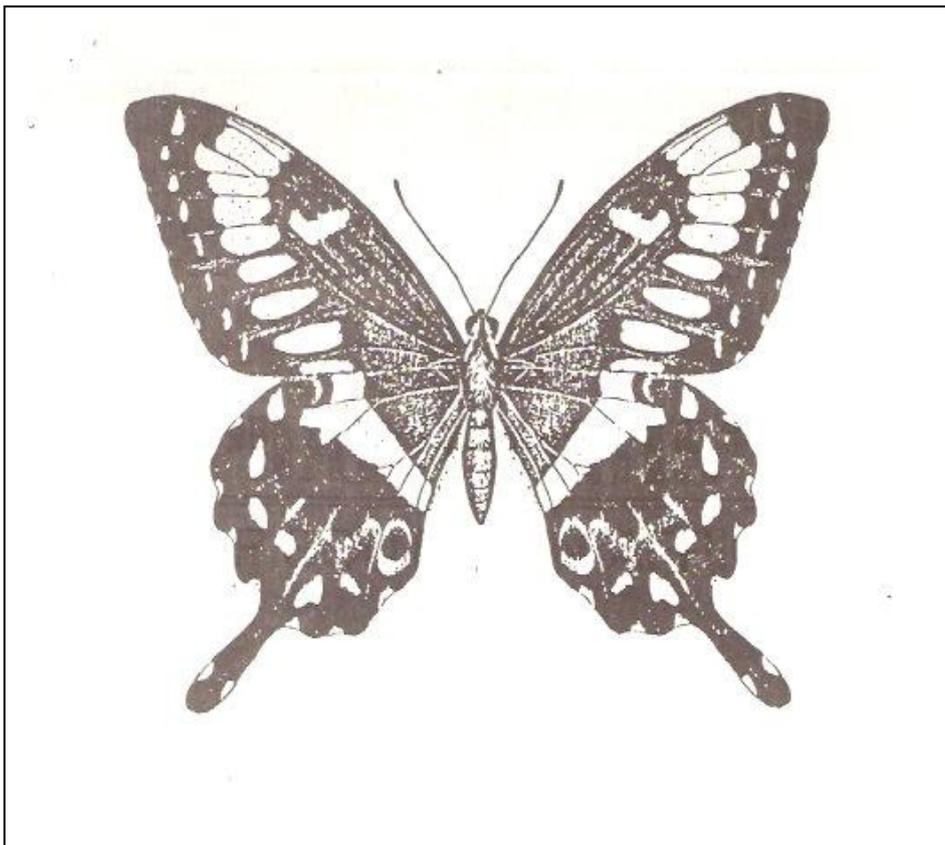


**LEPIDOPTERISTS' SOCIETY**

**OF SOUTHERN AFRICA**

## **METAMORPHOSIS No. 20**

Editor: N.K. Owen-Johnston



## From the editor

It is always a daunting task to undertake a new venture. When the Committee requested me to become editor of *Metamorphosis* I must confess to some very mixed feelings. Firstly, a feeling of honour and accomplishment that they should feel that I am worthy to take over from Dr Williams. This was followed by a feeling of trepidation at my lack of journalistic skills. However, I trust that you will forgive any shortcomings as I will try to make up with enthusiasm for any lack of literary expertise.

Please remember that *Metamorphosis* is your newsletter. If you have any suggestions to improve it, please don't hesitate to let us have them. We will try and use any suggestions made. Whilst we have a good supply of 'scientific' type material available, we are very short on articles and comments of a more general nature. I hereby extend an invitation to you, the reader, to submit material for inclusion in *Metamorphosis*. This may take the form of either a report or article for inclusion or short notes for use in the editorial or regional round-up. If you would prefer to make your report verbally, my telephone number is Johannesburg (011) 7876859. I am at home most evenings. Please contribute. Remember, it is only through your contributions that we can make our newsletter a success.

## Regional Round-up

**Natal** – Ivor Migdoll reports that the recent heavy rains have had a beneficial effect on the butterfly populations in Natal. He visited a lucerne field near Muden recently and was amazed at the numbers of butterflies flying and feeding on the flowers. Seven species were recorded, the commonest being *Belenois aurota*. He estimates the average number of specimens at about 20/m<sup>2</sup>. This gives about 200,000 per Hectare or 2,000,000 in the 10 Hectare field. A very impressive sight! He had occasion to visit the field two weeks later, only to discover the lucerne had been cut and there was not a butterfly in sight! He reports that his various trips around the Province show that the increase in population levels is widespread. The bush is looking greener than at any time since the onset of the drought and the butterflies are returning to their old haunts in numbers. A very interesting observation was made by Ivor on a hill between Bulwer and Richmond. He found *Durbania amakosa natalensis* and *Durbania limbata* flying together. This observation was made during December 1987. This is the earliest observation of *D. limbata* being on the wing to come to our attention. As *Poecilmites lycegenes* was flying at the same locality it must have been a most fascinating excursion. *Durbania amakosa* appears to have enjoyed a most successful emergence. Clive Quickelberge of the Natal Museum reports that the subspecies *flavida*, which flies at Shongweni Dam, was out in numbers this season and Ivor reports seeing *Durbania amakosa natalensis* feeding on flowers near the pool at the Ashtonvale guest farm, "Miles away from their typical rocky hillside habitat." Ed Hannon from Mkuzi reports that Zululand is "going mad again". We trust this means a return to the type of numbers and species recorded in the pre-drought years. A visit to Balgowan showed large numbers of butterflies present. Of particular note were *Charaxes xiphares penningtoni*, *Papilio ophidicephalus phalusco*, *Papilio echerioides*, *Acraea horta* and many pierids, mainly *Belenois creona severina* and *Belenois gidica*. The beautiful skipper, *Metisella metis paris*, was out in vast numbers.

**Transvaal** – The spring emergence is now history and we can report that it was a very successful season. The first high note was struck when Mr Steve Woodhall, together with Mr Graham Henning, visited some of the peaks in the Magaliesberg mountains west of Pretoria. A number of *Aphnaeus hutchinsonii* were recorded, including no less than four females. Steve succeeded in photographing these female specimens – a truly noteworthy achievement. *Anthene millari*, both male and female, were recorded from these peaks. A visit to the hills above Sheba Mine in the eastern Transvaal showed the *Lepidochrysops* were out in numbers. In all, four species, *L. swanepoeli*, *L. jefferyi*, *L. tantalus* and *L. patricia* were observed and photographed. It was a great pleasure to find these colonies thriving in their mountain home. During December Mr P. Liversidge of Port Elizabeth visited the area north of the Soutpansberg and reports that the area is still in the grip of the drought. Butterflies were very scarce and only one *Colotis celimene amina*, a male, was observed. [Dr Kroon and Neville Duke of Umtata noted that butterflies of several varieties were, however, swarming in vast numbers

in the precincts of Wyllie's Poort late January, while in the Entabeni Forest the swallowtails were two-a-penny, notably along the road verges in the lower reaches of the exotic pine plantations]. *Alaena margaritaceae* is still present in its haunts near Haenerstburg and an attempt at breeding it was unfortunately unsuccessful. Various localities visited included Kowyn's Pass near Graskop – the colony of *Poecilmitis aethon* is still thriving. And on the Long Tom Pass, *Neita neita* was present in reasonable numbers as were *Durbania amakosa ayresii*. *Metisella aegipan* was flying in fair numbers. Mr Graham Henning spent a week at the Blydepoort Nature Reserve and reports that rainy weather put paid to most of his activities. In the Western Transvaal *Harpencyreus notoba* was present in large numbers. Examination of the *Salvia* plants next to the road in the Bloemhof area showed the eggs, all stages of larvae and adults in abundance. *Acraea lygus* has been turning up in the most unexpected places: Recent records include Die Berg near Dullstroom, a kopje just south of Johannesburg and a further record from near Nylstroom.

**Cape Province** – Several visits to the northern Cape this season have failed to show any sign of *Acraea zetes trimeni*. It was flying in limited numbers last year. *Castalius melaena griqua* was out in small numbers on the Vaal River at Windsorton. A discovery of note is the presence of a large colony of *Castalius hesperis* on the Orange River near Groblershoop by Dr I. Coetzer and Mr R. Mijburgh. This is a most noteworthy discovery as the species was previously only known from Vioolsdrift, some 700 km downstream. I undertook a two week visit to the western Cape in the company of Mr Ivan Bampton during the first two weeks of October and have the following observations to report: Generally speaking butterflies were scarce, the only notable exceptions being *Lepidochrysops badhami*, which was present in numbers near Springbok and *Poecilmitis aridus*, which was present at virtually every stop we made in Namaqualand. At Vioolsdrift we found larvae of *Castalius hesperis* and *Colotis doubledayi*. These were bred through successfully and a photographic record was made of the early stages and pupae. *Thestor protumnus aridus* was out in numbers, very pale specimens being recorded from the desert north of Steinkopf. The species in this area is very variable and there were a number of more typical darker specimens flying together with the pale coloured ones. *Stugeta subinfusata reynoldsii* was scarce in the imago form but the early stages were very abundant and eggs and larvae were recorded from north of Steinkopf to Springbok. *Poecilmitis lyndseyae* was flying in numbers at the locality near Wallekraal. A visit to the *Poecilmitis kaplani* locality showed only one newly emerged male specimen. *Lepidochrysops wykehami* was flying in quantity and several females were observed. *Spindasis namaqua* were scarce and not more than half a dozen were seen. *Chrysochrysis chrysochrysis* was another scarce species, only three specimens being recorded. A visit to the Bloubergstrand showed us *Chrysochrysis zonarius* out in numbers. Nothing of particular interest was seen at Sutherland, although, in fairness it must be said that our visit was very short and we did not visit the usual localities. *Poecilmitis stepheni* was just starting to emerge on the Hantamsberg near Calvinia. *Poecilmitis wykehami* was not in evidence.

**Zimbabwe** – Mr R. Paré of Bindura, Zimbabwe has submitted the following report: "The past year has been one of mixed fortunes for collecting in Zimbabwe. The drought left us wondering if we'd ever see butterflies again, especially the *Charaxes*, which seemed to have become extinct! However, as the rainy season progresses, the bush recovers, and butterflies reappear in increasing numbers and where have they come from? Collectors here are few and far between, but we maintain fairly good contact with one another, and are a fairly dedicated bunch. We are very fortunate to have Ivan Bampton resident here – his wide knowledge is a legend. The scarcity of collectors these days means one can go to a favourite spot and not find it festooned with trapnets and infested with collectors! There is a bit of a problem with cross-border security in some of the popular areas of the Eastern Highlands, but by and large it is safe to collect all across the country, and huge areas have never seen a net yet. Various of our collectors have been doing some very interesting work breeding some little known lycaenids and hesperiids – hope 1988 holds all manner of discoveries."

I visited Zimbabwe during September and fully agree with his report. The object of my trip was specifically to study the Lycaenidae. We found *Aloeides molomo coalescens* out in numbers at Headlands. The *Lepidochrysops* were just starting to emerge at Inyanga and we had the distinct pleasure of finding some very fresh *Lepidochrysops ruthica*. This magnificent green butterfly is one of the true gems and was a highlight of the trip. We found *Deudorix magda* breeding on *Ulapaca kirkiana*

(mahobohobo). So far as we know this is the first record of the breeding of this scarce lycaenid. Material was collected and a good photograph of the final instar larva was secured. Other observations of note were the emergence of *Aphnaeus erikssoni barnesi* and *A. e. mashunae* in fairly large numbers. Mr Ian Mullin of Harare had the good fortune to see a female of *Aphnaeus erikssoni mashunae* laying her eggs. He tells me that the larva is now in its final instar. So far as we can ascertain this is the first record of the early stages of this species.

Mr D. Whiteley of Durban captured a mosaic gynandromorph of *Belenois gidica*. This interesting specimen has the left forewing and right hindwing female. This unusual and interesting specimen was captured near Muden whilst on a trip with Mr Ivor Migdoll.

## The discovery of *Anthene crawshayi* (Butler, 1899) in Zimbabwe

R. D. Paré

In March 1974, I was lucky enough to be able to add this rather scarce and local lycaenid to our checklist. I was then manager of Nyamwonga Farm in the Shamva District of north-eastern Zimbabwe. The Mazowe River forms the southern boundary of the farm, at 3 000 feet (915 m) and is fringed by riverine forest. The cattle dip-tank is right at the outer edge of the riverine forest and the area where the cattle are penned before dipping gets very churned up during the wet season, forming a mass of puddles which attract large numbers of butterflies on hot days. I was in the habit of checking out this area almost daily during the rainy season, in case interesting species turned up amongst the hordes of pierids, lycaenids, *Charaxes* and papilios on the mud. I never carried a net, as I had long since discovered that one only comes across interesting butterflies on a farm when one is without a net – Murphy's Law!

This particular day, as I was squelching slowly through the butterfly encrusted mud, I noticed a dark purplish lycaenid, which seemed more wary than any *Anthene* I had ever seen, streak almost vertically up to disappear in the riverine treetops. Whereas most lycaenids could almost be trodden underfoot on the mud, this beast took fright when I was still five metres away. Definitely something interesting! A painful search of the whole area revealed no more specimens, but after about 15 minutes, I was amazed to see the same beast do a speedy low circuit, and plop back onto almost the exact spot he had left in such haste. I tried to get a better look at him, but no matter how quietly I approached, he again sped to the tree-tops. Hoping he would come down again, and imagining him making rude noises at me, I took a major policy decision – GET A NET! Several cross-country motorcycling records were broken in the next few minutes as I bounced and slithered three km to the homestead and back.

There was no sign of my little friend when I got back, and I prayed that he would return to this fragrant spot, positioning myself a couple of metres from it. Amazingly, after only a few minutes, a flash of purple circling at almost the speed of sound five cm above ground, to resume his twice-interrupted drink. I moved with the agonizing speed of a tree-stump, positioning the net for a drop-shot, sweat trickling into my eyes, hardly daring to breathe, trying to ignore the maddening flies. Down went the net in a flash as I went on my knees in the muck, expecting to see a final blur of purple as he disappeared for good, but no, there he was buzzing angrily in the folds of netting. Seconds later he was taking his last gasps of ethyl acetate as I peered in through the glass at this perfect male of what was definitely something new!

No more specimens turned up that year, but the next year produced another male, and – answered prayers – a perfect female. I had just checked out the dip-tank area without results, and was walking back to my motorbike when I saw a lycaenid with a pale underside feeding on some white Lantana flowers. A closer look showed she was a female *Anthene*, perfect, and definitely of the same species as the previous males. Another spectacle of world championship class motorcross followed, watched this time by the owner of the farm, who decided the sun had finally got to me! Sliding to a stop back at the dip-tank, still in one piece, I found the female still obediently sipping nectar. A flick of the

wrist, a pop of the cork, and she was on her way to drawer No. 15. The next couple of years were a blur of military activity with a bit of farming here and there, as the war situation intensified, and 1978 saw us negotiating to purchase Uronga South Farm, in spite of a rather uncertain future. The farm is about 15 km upstream on the Mazoe River from Nyamwanga. In the final days of December of that year, while plodding around the farm on my motorbike, inspecting the germination of our first crop, I noticed two lycaenids fluttering about the branches of a small thorn tree about 400 metres from the homestead, rather in the manner of *Lachnocnema* looking for a drink. I nearly passed them by, but the old law that everything is rare until proven to be common made me take a closer look. Sure enough, two females of the same *Anthene* were ovipositing on the young shoots. This time it was Claire who thought I had run into an enemy patrol, as I broadsided in through the security gates, reappearing seconds later with, not a rifle, but a butterfly net! One of the females had left, but her friend was brought in to hopefully continue laying, although she refused to part with a single egg, not even in the interests of scientific progress! A search of the tree produced quite a few eggs and first instar larvae, so I set her free, somewhat tattered by her confinement. In great excitement, I phoned Kit Cottrell with the news, and he agreed to come out and take a look.

The foodplant was identified as *Acacia polyacantha*, a very common tree in this area, and several more eggs and larvae were found on other trees in the vicinity. Small green spiders were responsible for taking large numbers of the larvae in the early instars, which probably accounts for the scarcity of the species in this country. However, we both bred out small series of what Kit now confirmed to be *Anthene crawshayi*, hitherto only known from further north. It seems to be fond of staying high in the treetops, and is very seldom seen. There are still years between sightings here. Who knows what other species are awaiting discovery in the riverines here?

### Three years in South Africa

Alan Heath

(Submitted 12 December, 1987)

Having said goodbye to Zambia and Zimbabwe three years ago I also left behind a mode of collecting which does not exist here in the Western Cape. Whereas in Zambia, butterflies would be seen winter and summer in just about any locality – here one can walk through fynbos on a lovely summer's day and often find nothing flying at all!

This dearth of butterflies together with the gale force winds and the cold wet winters take some getting used to and I still yearn sometimes for the Zambian climate and its fauna. However, Zambia is no longer a pleasant country for butterfly collectors unfortunately. This being the main reason for me settling in the Cape.

My first collecting day here was in September 1984 on Signal Hill. I was surrounded by all sorts of wonderful spring flowers and the *Aloeides thyra* (new to me then) were darting about and dazzling me with their various shades of underside. As I lifted my gaze I was able to 'drink in' the fabulous view of mountains and sea; I could not imagine anywhere in the world I'd rather be. This was indeed a moment to treasure and I was 'hooked' on the Cape.

Butterflying is very much 'harder' here than it is up north it seems to me and like many a collector before me, I have often returned exhausted from a strenuous trip absolutely elated with a couple of worn specimens.

After my arrival here I had the good fortune to be able to discuss my progress and hare-brained schemes with Charlie Dickson and with Andre Claassens. During my first few months in Cape Town I was shown a few localities by Charles Wykeham and later by Jonathan Ball. Graham Henning and Ivan Bampton have also kindly provided localities; all this help has enabled me to do exceptionally well in the three years I have been here, however, we all have our 'special' interests and I have now chosen *Poecilmitis* as mine. I was intrigued at the outset by the relationship between forms *thysbe* and

*osbecki*, so I decided to breed them out to see for myself. The actual technique of breeding these insects (for full study purposes) has not been easy to establish but I think I am making progress now. I have decided to include the breeding of ALL *Poecilmitis* spp. as my main focus of activity; however, I need to get to know localities and obtain reference material at the same time.

Apart from determining the foodplant preferences of the various taxa, I would like to establish the ant with which it associates. To this end I have been working in conjunction with Dr Prins from the S.A. Museum here in Cape Town. I am not yet in a position to elaborate but it seems that there may be more than one species (or subspecies) within the *Crematogaster peringueyi* taxon. If this is the case, then the relationship between the taxa and the various *Poecilmitis* taxa could prove significant. If, as one would expect, the foodplant preferences were also an important factor in ovipositing – then the whole aspect could become quite complex.

If anyone within striking distance of *Poecilmitis* spp. would like to contribute to this study please give me a call or write; however, the ant aspect of the study can sometimes be very uncomfortable! My office telephone is: (021) 5093299, at home (021) 536840 and my address – 209 Ringwood Drive, Pinelands 7405.

## Butterfly migration

G.A. Henning

Migration is a phenomenon familiar to many people in the Transvaal, the periodic migration of *Belenois aurota* (F.) and *Catopsilia florella* (F.) perhaps being the only time most people notice butterflies at all. As such it is a subject often mentioned in newspapers at the time of these migrations.

The misconceptions surrounding this phenomenon are many and it is only fairly recently that some theories have been formed. Most of the information which is available only deals with recorded instances with little comprehensive information being recorded.

### What is migration?

This could be a rather controversial question. Many criteria have been given as regards migrations some of which, in my opinion, are incorrect. Various authors, such as Williams, Wiltshire and Shields, consider the following to be general rules for a migrant:

1. It has been observed performing a mass movement in a common direction.
2. It has been taken or seen on the wing at sea.
3. It shows no geographical variation over a wide area.
4. They occasionally occur far from their normal habitat.
5. The sudden abundance of a species.

The first two I consider acceptable as criteria for migration. The next two are, however, inconclusive and not solely attributable to migration. I would consider these to be the result of emigration. I would define emigration as “the slow dispersal of individuals into neighbouring habitats”. The dictionary defines it as a “change of residence”. Individuals involved in multidirectional flight with the objective of slowly infiltrating neighbouring habitats but with suitable conditions it can extend the range of a species quite considerably. An example is *Mylothris chloris agathina* (Cr.) in the western Cape. Emigration can be the result of prevailing winds or other climatic conditions. The final rule (i.e. no. 5) is often the basis for migration but not necessarily so. This I would categorize as a swarm. If a species is swarming it does not necessarily mean that a migration will follow. Many colonial species swarm as a safety outlet to prevent overpopulation, which would over-utilize the available habitat. The excess population is dealt with by normal predators in the environment. A swarm in a forest situation may result in an apparent migration as the swarming species moves away from the

hatching site in search of food. This should be classified as movement within its own habitat and not migration.

## **Theory of the principles of migration in Lepidoptera**

### Definition of migration

Migration is the deliberate movement of a group of individuals to or from a specific area out of their normal environment. The dictionary definition of migration is "a movement from one area to another".

### Migration types

The migration of Lepidoptera has been considered as a whole by previous authors. I believe this to be incorrect because of the opposing aspects of population preservation involved. Any theory of migration must therefore consist of a breakdown of the various migration types and from there theories can be formulated. For every biological action there is an objective so with this consideration in mind the breakdown into various migration types is based on the apparent objectives involved.

### Objectives of migration

1. Population preservation
2. Population dispersion
3. Population reduction

### Types of migration

Principal migration types:

1. Preservation (true migration). Mass movement of a population to a warmer climate to overwinter and returning the following season to breed. The objective is the preservation of the breeding population. An example is *Danaus plexippus* in North America.
2. Dispersion. Mass movement of surplus individuals from a stable population to create or reinforce temporary breeding populations. The objective is the dispersal of the breeding population. An example is *Cynthia cardui* (L.).
3. Reduction. Mass movement of the excess population from an over-populated habitat. The objective is the reduction of the breeding population. An example is *Belenois aurota* (F.).
4. Secondary migration type - Induction. Certain individuals of other species are induced to migrate with principle migrants.

## **Characteristics of migrating Lepidoptera**

1. Sexual immaturity. It would be inefficient for migrating Lepidoptera to engage in sexual activity either before or during a migration, therefore sexual immaturity would appear to be desirable for migrating insects. What is meant by sexual immaturity is the lack or ineffectiveness of the sex pheromone. Physical immaturity has been recorded by previous authors (Williams 1930) but could merely be the result of a lack of sex pheromone. Another possible cause could be the shorter duration of the pupal stage, the imago emerging before the complete development of the glands.

Preservation migration - Sexual immaturity would be desirable to delay mating until the individuals have returned to their breeding grounds in the new season. However, records exist of mating and developing eggs in ovaries, which may indicate that it may be only the maturation of the eggs which is delayed. This type of migration has no over-population stress exerted on it at the outset but during the course of the migration large numbers begin grouping as they converge on the overwintering sites. Sexual maturity may be delayed by the cold conditions prevailing at the time of the migration or even the length of the day. It is also possible that an inherent biological clock causes the sexual

immaturity and the resultant migration. This would also explain the return trip for those same individuals. The pheromone may be different from the other types.

Dispersion and reduction migration – Except possibly the reduction type, the individuals which survive eventually become sexually mature. In the reduction type it is possible that individuals are permanently sexually impaired, which would prevent possible over-population in another locality at the end of the migration. It is also possible that sexual maturity causes the breakdown of the migration, in which case each individual would become sexually viable at its own rate, thereby spreading the end of the migration over a large area. In the case of specimens which are permanently sexually impaired, it is possible they will migrate until they die from exhaustion or are killed. The case of sexual immaturity is possibly the effect of the stress exerted on a normally non-gregarious species during over-crowding. The effect has been recorded in birds. Another possible cause is the effect of the chemical composition of stems and bark, which are also eaten during the swarm conditions.

2. Considerable fat reserve. As the specimens will be undertaking an extended flight, an energy reserve would be expected. A fat reserve has been recorded by various authors (Williams 1930, Shields 1974). This would be used up during migration.

### **Migration pheromone**

Chemical pheromones play an important part in the lives of all insects. It is only reasonable to assume that a chemical pheromone is responsible for migration. The adults of Lepidoptera are the reproductive stage of the insect and all major actions are therefore reproductively related. The sex pheromone is large and complex, and for migrating Lepidoptera has no initial purpose. Perhaps reactions to the pheromone are different due to the chemical changes in the insect, which have already retarded sexual development. The chemical reaction in immature imagoes possibly results in migration in certain species. It is also possible that the pheromone comes from the accumulation of droppings, which only stimulates the migration when it reaches certain proportions.

### **Multiple migrations**

If a pheromone is responsible for migration, the species which are going to migrate will react to it. Other species which would not normally migrate, are sometimes induced to do so by the pheromones of one or more migrant species. In multiple migrations it is difficult to determine which species is actually migrating and which are being induced to migrate. The 1966 migration is one of the most well documented multiple migrations, with eight species being involved.

### **Migrations in specific areas**

Some areas require migrations more frequently than others; the example of the pierids in the semi-arid regions occurs most frequently, being an annual event, and often more than once a year. Of course, the preservation type of migration to warmer climates, occurs annually. No migrations have been recorded in lowland forest, which covers a large portion of central and west Africa. Migrations seem to occur in the somewhat unstable climatic areas of south and east Africa. Migrations seem to occur on the boundaries of ecological areas.

### **Size of migrations**

As a percentage of the population, preservation migration includes almost all the breeding population. Some reduction migrations recorded were very large, one estimate for a migration in east Africa in 1926 was about 36 million per mile of front each day.

### **Direction of flight**

The direction of flight is still an enigma. The direction of flight could be imprinted on take off. *B. aurota* appears to fly towards the moist areas of the country, and away from the dry regions. A pheromone trail could be left for others to follow. How they keep on course is a point of contention. Orientation by means of the sun is favoured, as birds apparently migrate this way. There is also the interesting fact that migrating butterflies try to fly over obstacles and not around them. Another remote possibility are pheromone trails which exist for some time and are reinforced with each successive migration, much like many mammals which mark their territories. This could answer the question as to how *D. plexippus* finds particular roosting trees to overwinter in, even after two or three generations during the summer. It is also possible that this knowledge is genetically inherited and triggered by cold conditions.

### Species involved in migrations in Africa

Principal migrants - migrate regularly in large numbers, and often migrate alone.

Secondary migrants - usually only recorded migrating with principal migrants, or records inconclusive.

#### Migration by type

Preservation:

*Catopsilia florella* (F.) (Pieridae) - the only recorded possibility in southern Africa are the records, collected over a period of 24 years by G.F. Cockbill in Harare, Zimbabwe. These records show that every year there was a south or south-west flight in December or early January, followed about six weeks later, in March, by a movement much smaller in size, to the north or north-east. It is not known whether the same specimens are returning or where they have been.

Dispersion:

*Danaus chrysippus* (L.) (Danaiidae) - Periodic migrations of form *dorippus* in East Africa.

*Cynthia cardui* (L.) (Nymphalidae) - One of the best known migrants in the world. Not often seen migrating in large numbers in Africa.

*Hypolimnas misippus* (L.) (Nymphalidae) - Very widespread species but not often seen migrating in numbers.

*Sallya* species (Nymphalidae) - The principal migrant in forest areas of southern Africa and east Africa, more often seen swarming in numbers than migrating.

*Libythea labdaca* (West.) (Libytheidae) - The principle forest migrant in West Africa.

*Andronymus neander* (Pl.) (Hesperiidae) - Recorded migrating in large numbers in East Africa.

*Coeliades* species (Hesperiidae) - Several species recorded migrating, especially *C. libeon* (Druce).

These species are all widespread and can occur in various habitat types.

Reduction:

Mainly attributed to the Pieridae, with vast migrations regularly. The most regular migration is that which apparently originates in the northern Cape. This migration should provide valuable information in the future. The principal migrants in this type of migration are *Belenois aurota* and *Catopsilia florella*.

*Belenois aurota* (F.) (Pieridae) - The most consistent of all the migrants, migrating every year from the northern Cape in December or January and sometimes a second migration in April. Recorded with degenerate abdomens in a sparse migration in April 1984. Twenty per cent of recorded specimens were obviously sexually impaired.

*Catopsilia florella* (F.) (Pieridae) - A prolific migrant but not as consistent as *B. aurota*, and also part of the migration from the northern Cape.

*Belenois creona severina* (Stoll) – Not usually part of migrations in southern Africa but numerous records from East Africa.

#### Secondary migrants:

Very sparse records of migrating or only recorded in multiple migrations.

Dispersion or emigration – Due to the limited and incomplete records the following species are presumed to fall into one of these two categories:

*Papilio nireus lyaeus* D & LD (Papilionidae) – Odd records of this species in unfamiliar areas. Probably emigration, as it breeds on cultivated citrus.

*Graphium* species (Papilionidae) – A large migration recorded in Zambia, consisting of several species flying in a north easterly direction. Also occasional records of *G. angolanus angolanus* Goeze being found in unusual areas.

*Pinacopteryx eriphia* (Godart) (Pieridae) – One or two records of migrations.

*Mylothris chloris agathina* (Cr.) (Pieridae) – The spread of this species in the western Cape is under investigation. My opinion is that it is the result of emigration as no definite flights have been recorded.

*Charaxes varanes* (Cr.) (Nymphalidae) – Recorded migrating in fair numbers from Central Tanzania to Amani in the north, a distance of approximately 400 km. They were accompanied by the next species and were flying in a north easterly direction.

*Salamis parhassus* (P.d.B.) (Nymphalidae) – Recorded as above.

*Junonia hierta cebrene* (Trimen) (Nymphalidae) – Sparse records from south and east Africa.

*Junonia orithya* (Guenée) (Nymphalidae) – Apparently a regular migrant in north-east Africa.

*Byblia acheloia* (Wallengren) (Nymphalidae) – Recorded in east Africa.

*Phalanta phalantha aethiopica* (Rothschild & Jordan) (Nymphalidae) – Recorded with *C. florella* in Zimbabwe.

*Acraea machequena* Grose-Smith (Acraeidae) – A sparse migration from Mozambique into the Transvaal in 1978.

*Lampides boeticus* (L.) (Lycaenidae) – Apparently recorded regularly in north-east Africa.

*Deudorix antalus* (Hopffer) (Lycaenidae) – Recorded from the western Cape.

*Pelopidas thrax* (Bertoloni) (Hesperiidae) – Also recorded from east Africa.

#### Induction:

Always recorded migrating with one of the principal migrants in multiple migrations. Certain of these species may be true migrants but further research is necessary. Species of the following genera have been recorded in multiple migrations: *Colotis* (Pieridae), *Dixeia* (Pieridae), *Eurema* (Pieridae), *Colias* (Pieridae), *Pieris* (Pieridae), *Acraea* (Acraeidae), *Syntarucus* (Lycaenidae) – east Africa, *Azanus* (Lycaenidae) – east Africa.

These theories and records are certain to be incomplete but it is hoped that this information will inspire others to take an interest in this phenomenon and perhaps resolve some of the unanswered questions.

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