

uferbewohnenden Arten, welche nicht am Boden nisten und deren Nahrungserwerb auch nicht auf den Boden oder seichtes Wasser beschränkt ist, bildet das Hochwasser keine besondere Gefahr.

Die vertriebenen Vögel können sich zunutze machen, daß das Hochwasser nicht überall zugleich auftritt, sondern vom Süd- und Westrand des Gebietes her beginnend zum Zentrum hin und nach Norden fortschreitet. Unter anderem kommt es dabei zu einem regelmäßigen Austausch von Vögeln des Amazonasgebiets und des Orinoco. Vergleichbare Verhältnisse herrschen im Pantanal in Mato Grosso (Zentralbrasilien) und am Kongo in Afrika. Unmittelbar nach Abflauen des Wassers kehren die Vögel zurück und legen ihre Eier. Es stehen manchmal nur drei Monate für einen durch Wasser ganz ungehinderten Aufenthalt auf den Sandbänken zur Verfügung.

Die im Amazonasgebiet durch Hochwasser erzwungene Vertreibung der Vögel führt zu keiner „planlosen“ Flucht, hat vielmehr als regulärer, sich immer wieder gleich abspielender Ortswechsel zu gelten, welcher in die Zeit der sexuellen Ruhe der Vögel fällt. Wir haben es hier mit *einer speziellen Kategorie periodischer Vogelwanderungen* zu tun, welche sich an die Seite anderer regelmäßiger Wanderungen stellt, wie sie von nicht wenigen Tropenvögeln bekannt sind. Zum Beispiel verbringen afrikanische Bienenfresser, die nördlich und südlich vom Äquator nisten, eine halbjährige Ruhezeit in Äquatornähe (CHAPIN aus SCHÜZ 1952: 97).

So wenig klar oft die Gründe für solche innertropischen Wanderungen wie diejenigen der Bienenfresser sind (ähnliche Wanderungen kommen auch in Südamerika vor), so klar sind natürlich die Gründe für die geschilderten hochwasserbedingten Wanderungen. Diese wie jene sind als eine besondere Art von Vogelzug zu bezeichnen. Nur Beringung, die bisher noch kaum begonnen hat, wird zeigen, was sich bei diesen Wanderungen im Amazonasgebiet im einzelnen abspielt.

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Bird Migration in the Most Southern Part of the African Continent¹

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Introduction

Africa is the most important wintering territory for the majority of palaeartic migratory species of birds which breed on the European Continent during the northern summer. Africa, therefore, is potentially very well suited for any investigations concerning bird migration. In fact in some respects it seems even more suitable than Europe.

¹ This paper was read at the Deutsche Ornithologen-Gesellschaft Tagung at Göttingen 25—27 October 1966.

Any ringing project concerning the long distance migrants carried out in Africa will give a better chance for a higher recovery rate of the rings put on than when carried out while the birds are staying in their European summering territory. The chances that a dead ringed bird will be reported are still much bigger in Europe than in Africa.

Further, a considerable number of the palaeartic migrants which breed in the northern parts of Europe and Asia where the spring and summer conditions are short spend a much longer time in their southern wintering territories in Africa. Waders like Curlew Sandpiper, *Calidris ferruginea* (Pont.), Little Stint, *Calidris minuta* (Leisl.), Greenshank, *Tringa nebularia* (Gunn.), and Marsh Sandpiper, *Tringa stagnatilis* (Bechst.), just to mention some, start arriving in their wintering quarters in the most southern part of Africa at the end of August-beginning of September. Many stay until the beginning of April before departing for their northern summering quarters (BROEKHUYSEN, 1955, 1956). This means that most of these birds each year spend about seven and a half months in their wintering quarters in the south. If we assume that during two months the birds will actually be migrating between the summering and wintering quarters, it leaves only three months for their stay in the summering quarters. We can, therefore, safely say that many of the sub-arctic migratory species spend almost twice as long in their southern wintering quarters than in their northern summering quarters. This fact is often not realised by ornithologists working in Europe.

Although in the past considerable information on the occurrence of migratory species in Africa has been collected by visiting ornithologists, it was only in 1948 that the first large scale organised Bird Banding Scheme in Africa was started by the South African Ornithological Society. During the period 1948—1961 a total of 184 629 birds were ringed and with the recent development of the use of mist nets figures are increasing rapidly and the scheme is going from strength to strength (MCLACHLAN, 1966). Year reports on the results of the ringing activities are published at intervals in *The Ostrich*, the scientific journal of the South African Ornithological Society and have revealed some interesting recoveries.

Bird Migration in the Cape Province

In the present paper we shall only deal with the movements of migratory species in the southern Cape Province, which is the most southern part of Africa, and with which the author is especially familiar. Further more being the most southern part, the southern Cape is rather unique and extreme and shows interesting aspects and developments concerning certain migratory species.

Methods Applied to study the Movements of Migratory Species

The arrival and departure of migratory species are determined mainly by three different methods of observation:

1. Random and direct observations

In this case the presence or absence of migratory species during the critical periods e. g. March to June representing the autumn, and August to December representing the spring and early summer, is each year recorded whenever an opportunity arises. Observations by different observers are collected and filed by the Migration Record Keeper, appointed by the South African Ornithological Society. These filed data now cover a period of 13 years.

2. Regular Censuses of bird populations at suitable spots

In this case certain areas which attract and, therefore, accumulate wintering migrants are regularly visited and during each visit a bird census is made. When continued over a long enough period this method gives accurate information on arrival and departure of certain migrants and any local movements during their stay in the wintering quarters. Such regular censuses have been carried out at different suitable areas in the surrounding of Cape Town (BROEKHUYSEN and MEIKLEJOHN, 1941; BROEKHUYSEN, unpublished; WINTERBOTTOM, 1960) and at the Langebaan Lagoon about 100 miles north of Cape Town (LIVERSIDGE et al., 1958).

3. Regular road counts

During a period of 16 years (1947—1962) the author, whenever travelling by car on a long or short trip always recorded the numbers and species of migratory birds together with the miles covered. During these 16 years a total of 48 947 miles (about 73 000 km) was covered in these bird road counts. Although at first one may be tempted to doubt the usefulness of this method, the obtained results show that this method can be applied with sufficient accuracy. The results concerning the European Swallow, *Hirundo rustica* L., have recently been published (BROEKHUYSEN, 1964). In Table 1 which has been taken from BROEKHUYSEN (1964) all the combined European Swallow counts for the period 1947—1962 in the southern Cape have been tabulated. As can be seen this table gives quite a clear idea of the presence and absence of the European Swallow in the area concerned. These road counts also give an indication of the density of the population of the species concerned and as such different years can be compared.

Table 1. The combined European Swallow road counts for the period 1947—1962 broken down in months of the year and expressed as the mean of swallows encountered per 10 miles.

1947—1962 Months	Birds per 10 miles	Number of miles covered
January	13.4	7363
February	14.6	3318
March	8.5	2600
April	3.0	3592
May	0	1677
June	0	2217
July	0	5101
August	0.01	3500
September	0.09	5826
October	0.06	4192
November	6.6	3455
December	11.8	6106

In Table 2, also taken from BROEKHUYSEN (1964), the density of European Swallows during the period December to February (this is the period when all swallows are back in their wintering territories), for 13 consecutive years based on road counts has been tabulated:

Table 2. Density of European Swallow population during the period December to February for 13 consecutive years as revealed by road counts.

1948—1962 Summer months	Number of swallows per ten miles	Total milage covered during three months period
1948—1949	11.1	883
1949—1950	9.8	2783
1950—1951	10.9	1760
1951—1952	21.9	1010
1953—1954	13.5	1243
1954—1955	10.1	266
1955—1956	17.0	1092
1956—1957	29.6	982
1957—1958	17.1	668
1958—1959	20.1	807
1959—1960	6.9	1028
1960—1961	7.2	2380
1961—1962	11.7	1543

From these figures one gets the strong impression that the summers 1949—1950, 1959—1960 and 1960—1961 were bad swallow years for the south western Cape.

In this special case of the European Swallow the road counts also make it possible to compare its density with that of other *Hirundinidae*.

T a b l e 3. Relative abundance of European Swallow in comparison with other *Hirundinidae*.

1948—1961 Summer months	Percentage European Swallows	Miles covered
1948—1949	89%	883
1949—1950	91%	2783
1950—1951	77%	1760
1951—1952	96%	1010
1953—1954	89%	1243
1954—1955	88%	266
1955—1956	95%	1092
1956—1957	91%	982
1957—1958	76%	668
1958—1959	96%	807
1959—1960	74%	1028
1960—1961	87%	2380

These figures clearly indicate the magnitude of the spring invasion of European Swallows in the most southern part of Africa.

The Migration Pattern in the most Southern Part of Africa

Because it is the most southern part of Africa, there is practically no "passage migration" Although an important phenomenon, migration in these regions is not a spectacular one in that one does not see at any time vast numbers of birds on the move. Only in very few cases has actual migration been observed (BROEKHUYSEN, 1964: 158 to 159).

What one usually notices in the Cape is a sudden appearance of a few individuals of a migratory species in spring followed up by a gradual increase in numbers. In the autumn numbers start to decrease until all birds of a migratory species have gone or numbers have decreased to a very low level.

In dealing with the migratory species which frequent the Southern Cape one soon becomes aware of the fact that they can be grouped in different categories.

Different Categories of Migrants

There are mainly three different categories which can clearly be distinguished and these are:

- 1) Palaearctic migrants
- 2) African migrants
- 3) Species which are only locally migratory.

In addition to these one should perhaps mention certain species of birds which relatively recently have extended their distribution southward.

1. Palaearctic migrants

These are the long distance migrants which normally breed in Europe or in Asia. Omitting any of the typical sea birds, there are in the Cape 48 species belonging to this category.

Their distribution over the different families is given in Table 4.

Table 4. Palearctic migratory species wintering in the Cape Province.

Family	Number of migratory species
<i>Ciconiidae</i>	1
<i>Anatidae</i>	1
<i>Threskiornidae</i>	1
<i>Falconidae</i>	4
<i>Arenaridae</i>	1
<i>Charadriidae</i>	5
<i>Scolopacidae</i>	17
<i>Sternidae</i>	2
<i>Phalaropidae</i>	1
<i>Glareolidae</i>	1
<i>Cuculidae</i>	1
<i>Caprimulgidae</i>	1
<i>Micropodidae</i>	1
<i>Meropidae</i>	1
<i>Coraciidae</i>	1
<i>Hirundinidae</i>	3
<i>Oriolidae</i>	1
<i>Sylviidae</i>	2
<i>Muscicapidae</i>	1
<i>Motacillidae</i>	1
<i>Laniidae</i>	1

Observations over the last ten years have shown that considerable numbers of palae-arctic migratory birds and especially palae-arctic waders (*Scolopacidae*) stay over in their southern wintering quarters and thus fail to return to their breeding quarters in Europe or Asia. Numbers seen during the southern winter months in one area on one occasion vary from just a few to sometimes more than 100 (BROEKHUYSEN & MEIKLEJOHN 1941; BROEKHUYSEN, 1955, 1956, 1964; LIVERSIDGE et al, 1958; SCHÜZ, 1960, and SKEAD, 1966). It has been suggested by some workers that these birds which fail to depart of the north during the southern autumn, are in a poor condition. This, however, seems highly unlikely in view of the relatively large numbers involved. Further we have records of Grey Plovers, *Pluvialis squatarola* (L.), and Turnstones, *Arenaria interpres* (L.), attaining full breeding plumage in June and July at the Langebaan Lagoon (BROEKHUYSEN, 1964). European Swallows seen in June and July and carefully observed through 10× field glasses appeared to be healthy and in full plumage.

It would be very interesting to know whether these birds, which stay behind, have lost the urge to migrate completely or whether this is only temporary. This can only be established on ringed birds and the chances are very small. If more and more palae-arctic migrants would lose the urge to migrate permanently and, therefore, become resident in what for the species is the southern wintering quarters, breeding in these regions could be expected.

It is very interesting that such cases have been observed. The following are such cases:

White Stork, *Ciconia ciconia* (L.)

On 18. November 1940 a nest of this species was seen between Calitzdorp and Oudshoorn (ROBERTS, 1941) on a farm. According to the farmer the birds had nested

there for at least seven years. Soon after 1940 the nesting site was eventually destroyed because the tree fell down. On 29. November 1961 a nest containing three large nestlings was located in the Bredasdorp district (MARTIN, MARTIN & ROBINSON, 1962). During the period 1961—1964 a total of five nests were built by the storks in that area (BROEKHUYSEN, 1965). In 1965 another nest was located 12 miles from Mossel Bay (BROEKHUYSEN & UYS, 1966). These breeding records for the White Stork in the Cape are the only reliable ones, in fact they are the only ones for the whole of the southern part of Africa. It is interesting that they all occur in that part of the wintering quarters of the species which is the most southern one and where there is, therefore, no passage migration. Again it would be most interesting to know whether these breeding storks have permanently lost their migratory urge and become resident or whether they still to a certain extent migrate. We do know that the majority of storks occurring in the same area are still true migrants and leave the area in the autumn. It is further interesting that two of the three nestlings which occurred in the nest found in 1961, and which were all ringed, were recovered a long distance away from the nest area. The one was found dead at the northern boundary of Zambia and the other in the Orange Free State.

European Bee-eater, *Merops apiaster* L.

This species breeds in southern Europe and Asia and during the northern autumn migrates to Africa where it winters. In the Cape these birds arrive in the last half of September and the beginning of October. The majority of these bee-eaters wintering in Africa do not breed but in the most southern Cape there are considerable numbers which soon after their arrival occupy nesting colonies in river banks and quarries. During November and December these birds lay one clutch of eggs and rear the young which are usually ready to leave the nests at the end of December. As soon as the nestlings have left the nest, usually in or just before the first week of January parents and immature birds leave the nesting sites. In fact they leave the most southern part of the Cape all together as there are very few sight records of this species in the southern Cape after the first half of January. It is not known where they have gone to, but it can probably be assumed that they have moved northward and perhaps have joined those which have been wintering north of the Cape, without ever coming into breeding condition. Observations have shown that in the northern regions of South Africa and in Rhodesia the species stays until the end of March and the first half of April before departing for the north. Practically all bee-eaters have left South Africa in the southern winter. SKEAD's (1966) record of one seen at Port Alfred in the Eastern Cape 10. June 1966 is the only winter record for this species, which is very conspicuous and difficult to overlook.

The European Bee-eater is a most interesting case. It is another example of a migratory species of which a restricted number of birds come into breeding condition in what is for the majority of individuals the southern wintering quarters. However, those which do breed leave the breeding area while it is still mid-summer in their nesting area and, therefore, still have a very strong migratory urge. It seems that only two possibilities can be considered:

- a) Those birds which breed in the southern Cape are true palaeartic migrants with summering quarters in Europe and/or Asia and which perhaps have also nested there.
- b) The birds which breed in the southern Cape belong to a different population than those which nested during the northern spring and summer in Europe and/or Asia. They show the same tendency in that they move south during the southern spring and early summer and north in the mid-summer. They, however, move further south than the majority of migratory European Bee-eaters and probably not so far north, and have changed their breeding habits in that they breed while in the most southern quarters and are, therefore, different to all the others which breed in the northern part of their distribution area.

Which of these two possibilities is the right one cannot be established at present.² Again ringed birds and a lot of luck can only give the answer.

Common Sandpiper, *Actitis hypoleucos* (L.). This is a relatively common palaeartic migrant in the Cape, but no nesting has ever been observed yet. The bird is known to breed in small numbers in Kenya, Uganda and Tanzania.

Whiskered Tern, *Chlidonias hybrida* (Pall.). Another migrant from Europe which during the southern summer occurs locally in considerable numbers near and over vleis in the south Cape. Within the last six years small breeding colonies of this species have been observed at Faure, quite close to Cape Town and in the Bredasdorp district. During the southern winter this species is absent in the Cape and this, therefore, is a similar case as the European Bee-eater, where birds do breed but still migrate north.

Black-Necked Grebe, *Podiceps nigricollis* C. L. Brehm. This is a similar case of a migratory species which occurs in Europe and Asia and only inhabits the Cape during the southern summer. Fairly recently this species has been breeding in rather limited numbers in the Cape.

In addition to these species of which at least the majority, if not all, still show migratory movements, there are a number which were maybe originally migratory, but which now only show local, rather erratic movements or do not show any substantial movements at all. Examples are:

Black Stork, *Ciconia nigra* (L.). The species is not common in the Cape but there are at least nine known nesting sites in the Cape Province (SIEGFRIED in press). Observations by SIEGFRIED indicate that these birds are residents and that there is no influx of migratory birds from the north. — The question now arises, could it be that originally migratory Black Storks stayed behind in southern Africa and gradually formed a population of breeding and resident birds?

Avocet, *Recurvirostra avosetta* L. This is quite a common bird in the southern Cape and observations over a long period indicate that there is no distinct migratory movement although considerable local movements do occur frequently. This species, therefore, now seems to be a resident breeding species and this case is very similar to that of the Black Stork.

Black-Winged Stilt, *Himantopus himantopus* (L.). Also a common wader in the southern Cape and again no true migratory movements have been established. It, therefore, also is a resident breeding species.

2. African migrants

These are species which are limited in their distribution to the African Continent, but which are migratory. In the southern Cape there are 10 and they are limited to the swallow family — *Hirundinidae* —, the family of the swifts — *Micropidae* — and the family of the cuckoos — *Cuculidae*.

They are the White-throated Swallow, *Hirundo albigularis* Strickland; Larger Striped Swallow, *Cecropis cucullata* (Boddaert); Lesser Striped Swallow, *C. abyssinica* (Guerin); Cliff Swallow, *Petrochelidon spilodera* (Sundevall); Banded Sandmartin, *Riparia cincta* (Boddaert); Horus Swift, *Apus horus* (Heuglin); Red-chested Cuckoo,

² Herausgeber-Anmerkung: Siehe dazu E. SCHÜZ und P. BERTHOLD: Über das Brüten fernziehender Vogelarten an beiden Polen der Jahresverbreitung; hier 23, 1966, S. 233. Der hier ausgesprochene Einwand gegen die physiologisch sehr unwahrscheinliche Alternative a) wurde in der Diskussion zu diesem Vortrag am 26. Oktober 1966 in Göttingen durch eine Mitteilung von CL. KÖNIG gestützt, der an Käfigvögeln die Mauser von *Merops apiaster* verfolgt hat. Die von G. BROEKHUYSEN gezeigten prächtigen Aufnahmen von „Europäischen Bienenfressern“ am Nistplatz in Südafrika lassen erkennen, daß diese Vögel volles Gefieder trugen, während die Europäer um diese Zeit mausern.

Cuculus solitarius Stephen; Black Cuckoo, *Clamator glandarius* (L.); Jacobin Cuckoo, *C. jacobinus* (Boddaert); Emerald Cuckoo, *Chrysococcyx cupreus* (Shaw) and the Diederik Cuckoo, *C. caprius* (Boddaert).

All breed during the southern summer in the southern Cape and until quite recently their wintering quarters were unknown. Ringing, however, is now giving some result and recoveries of ringed Larger Striped Swallows and Cliff Swallows have come from the Congo. Although the number of especially Cliff Swallows ringed is large the recoveries are few. This can be expected if the wintering quarters of these birds are in tropical Africa which mostly consists of poorly developed areas where any dead bird with a ring on its leg will usually not be reported.

3. Species which are only locally migratory

In the most southern part of Africa there are eight species which fall in this category. They all belong to the families of the swallows — *Hirundinidae* —, swifts — *Micropodidae* — and flycatchers — *Muscicapidae*.

The species concerned are: Pearl-breasted Swallow, *Hirundo dimidiata* Sundevall; Alpine Swift, *Apus melba* (L.) which incidentally is not limited to Africa only; Black Swift, *A. barbatus* (P. Sclater); White-rumped Swift, *A. caffer* (Lichtenstein); Little Swift, *A. affinis* (Gray); Black Flycatcher, *Melaenornis pammelaina* (Stanley); Dusky Flycatcher, *Muscicapa adusta* (Boie) and Paradise Flycatcher, *Terpsiphone viridis* (Müller).

All these species show distinct migratory movements in the most southern part but further north they seem to be resident. In the swifts considerable numbers may fail to migrate (BROEKHUYSEN, 1950) but numbers are very much reduced in the most southern part during the southern winter months.

There are indications that the small and handsome Namaqua Dove, *Oena capensis* (L.), shows migratory movements in the southern part of the Cape.

Discussion

The origin of innate migratory behaviour in birds will probably never be established with certainty but suggestions have frequently been made (LANDBOROUGH THOMSON, 1944; SCHÜZ, 1952; DORST, 1962). The most generally expressed opinion is that it has arisen through certain species extending their distribution area into parts which at the time were only suitable for occupation by the species during summer-conditions. The species was, therefore, forced to move out of the newly occupied area when winter approached, only to return at the next spring. When eventually general conditions had changed such that the climate had become so mild that the birds could also stay during winter-conditions, the migratory habit had become innate and, therefore, persisted. Thinking along these lines it seems reasonable to suggest that any clues as to the correctness or incorrectness of this hypothesis, if still apparent, would most likely be found in the most southern and most northern ends of the distribution area of the migratory species. The area with which this paper is concerned, i. e. the most southern part of Africa, is such an extreme end.

Having discussed the different types of migratory behaviour in this area, one can now consider whether they suggest any clues as regards the origin of innate migratory behaviour. It has been shown that as many as 48 different species of long distance palae-arctic migrants frequent the Cape — the most southern part of Africa — regularly during the southern spring and summer. Most of these do not breed during the time they are in their wintering quarters, although considerable numbers may stay over in the south and fail to migrate north. However, at least four, e. g. *Ciconia ciconia*, *Merops apiaster*, *Chlidonias hybrida*, *Podiceps nigricollis* do breed, while a fifth, *Actitis hypoleucos* does not breed in the most southern part of Africa but does further north in Kenya, Uganda and Tanzania.

There are further a number of species which are characteristically palaeartic and which are known to migrate in more northern regions, but which are resident in the Cape. Examples are: *Ciconia nigra*, *Recurvirostra avosetta* and *Himantopus himantopus*. None of these have speciated into separate sub-species yet. Although the Stone Chat in South Africa is the same species as in Europe e. g. *Saxicola torquata* (L.), this case seems to be more complicated because of the existence of distinct sub-species north of southern Africa.

There are two or three species which in Europe and Asia are partial or all migrants, but which in southern Africa are resident and undergone so much speciation that taxonomists consider them to be different sub-species. These are:

The Bittern, *Botaurus stellaris* (L.) of which in the Cape there is a local race or sub-species *B. s. capensis* (Schlegel). The Mountain Buzzard is probably another case. This bird which breeds in the Cape Province is considered to be the local sub-species of *Buteo buteo* (L.) and is called *B. b. oreophilus* Hartert & Neumann. *Buteo buteo* is a migrant from Asia. The Barn Owl *Tyto alba* (Blyth) with geographical races in many different parts of the world is in Eurasia not a true migratory species although local movements due to ecological factors may occur. The South African sub-species *T. alba affinis*, therefore, probably did not develop directly from the palaeartic form as a result of migratory behaviour.

In the most southern part of Africa — the southern Cape — there are, therefore,

I: long distance palaeartic migrants which only breed in their northern summering quarters but of which at times considerable numbers may stay behind in the wintering quarters e. g. *Calidris ferruginea*, *C. minuta*, *Tringa nebularia*, *T. stagnatilis*, *Pluvialis squatarola*, *Arenaria interpres* and many others.

II: A limited number of species of which a large majority are still migrants but of which a small number have taken to breed in what is for the majority the southern wintering quarters. This minority either still shows migratory movements like *Ciconia ciconia*, *Merops apiaster*, *Actitis hypoleucos*, *Chlidonias hybrida* and *Podiceps nigricollis* or has become resident like *Ciconia nigra*, *Recurvirostra avosetta* and *Himantopus himantopus*.

III. A few species which in the northern hemisphere are migrants but in the south are resident and have developed into a distinct sub-species undoubtedly due to prolonged isolation. Examples are: *Botaurus stellaris capensis* and *Buteo buteo oreophilus*.

Here, therefore, is a sequence which one might expect if one assumes that the innate migratory rhythm over a long enough period will deteriorate if not periodically enforced by climatical stimulation.

It has further been shown that among the species which are restricted in their distribution to Africa, some show migratory habits in southern Africa in practically their whole distribution area such as: *Hirundo albigularis*, *Cecropis cucullata*, *C. abyssinica*, *Petrochelidon spilodera*, *Riparia cincta*, *Apus horus*, *Cuculus solitarius*, *Clamator glandarius*, *C. jacobinus*, *Chrysococcyx cupreus* and *C. caprius*, while others such as: *Hirundo dimidiata*, *Apus melba*, *A. barbatus*, *A. caffer*, *A. affinis*, *Melaenornis pammelaina*, *Muscicapa adusta* and *Terpsiphone viridis* are only migratory in the most southern part of southern Africa. The last species does show, however, migratory movements in Rhodesia.

This latter category is especially interesting as this is what one could expect to happen if individuals of a species would have extended their distribution south during the tail end of a cold epoch, as in this case only those which moved furthest south would have to move north again with oncoming winter-conditions.

During the last 35 years a number of species have extended their distribution southward and come into the southern part of the Cape. In doing so they have not developed any migratory habits, most likely because climatic conditions in the south Cape are at present rather mild and winters are not severe and no objection for birds to stay.

Examples of species which recently extended their distribution area southward into the southern Cape are: Red-eyed Turtle Dove, *Streptopelia semitorquata* (Rüppell); Blacksmith Plover, *Hoplopterus armatus* (Burchell); Cattle Egret, *Bubulcus ibis* (L.); Ant-eating Chat, *Myrmecocichla formicivora* (Vieillot); Grey-headed Gull, *Larus cirrocephalus* Vieillot; African Spoonbill, *Platalea alba* Scopoli; Namaqua Sandgrouse, *Pterocles namaqua* (Gmelin).

The study of the behaviour of migratory species of birds in the southern Cape — the most southern part of Africa — has revealed certain trends which seem to support the hypothesis that at least in certain cases innate migratory behaviour was originally stimulated to develop by species extending their distribution into areas which were only suitable to live in for them at certain times of the year.

The observations also point at a certain amount of deterioration taking place in the migratory behaviour of certain long distance migrants.

Summary

1. The phenomenon of bird migration in the southern Cape — the most southern part of Africa — and methods of observations are discussed.
2. It is shown that as many as 48 different species of long distance palaeartic migrants frequent the southern Cape. Most of these breed in their northern breeding quarters although considerable numbers may stay over in the wintering quarters in the south. In the case of at least four species, a small number of birds do breed in the wintering quarters.
3. It is pointed out that there are a limited number of characteristically palaeartic species which are known to be migratory in the northern part of the distribution area of the species but which are resident in the Cape.
4. Two species are mentioned which in Europe and Asia are partial or all migrants, but which in southern Africa are resident and, probably owing to long isolation, have developed into a separate sub-species.
5. It is suggested that the study of bird migration in the most southern part of Africa has provided certain indications as how innate migratory behaviour originally developed in birds.

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Deutsche Inhaltsangabe

Vom europäischen Standpunkt aus wird oft übersehen, daß nicht wenige der 48 paläarktischen Afrika-Fernwanderer länger in Afrika als in ihrer Brutheimat verweilen. Diese Tatsache und die weit größere Aussicht, Ringvögel aus Afrika in der Paläarktis wiederzufinden als umgekehrt, weisen den Arbeiten in Afrika und gerade in Südafrika eine besondere Bedeutung zu. Sie werden — außer durch Beringungen — vollzogen als Feldbeobachtungen, als regelmäßige Bestandsaufnahmen an geeigneten Punkten und, besonders auf seiten des Verfassers, als regelmäßige Zählungen bei Überlandfahrten mit dem Auto; Tabellen 1 bis 3 geben dafür anschauliche Belege, die die beherrschende Rolle der paläarktischen Rauchschwalbe im Ruheziel Südafrika dartun. Die Zugvögel in Südafrika lassen sich einteilen in 1. Paläarkten, 2. afrikanische Zuggäste und 3. Arten mit nur örtlichen Wanderungen. Tabelle 4 zeigt die Verteilung der paläarktischen Gäste nach Familien; einen ganz hohen Anteil weisen die Limikolen auf, die in Scharen, sogar zum Teil im Besitz des Brutkleides, in Südafrika „übersommern“ Es erhebt sich die Frage nach paläarktischen Brütern in Südafrika: Der aufsehenerregende Fall des Weißstorchs ist behandelt (siehe auch hier 23, 1965, S. 5, und 23, 1966, S. 235), ferner der des Europäischen Bienenfressers. Handelt es sich um Vögel, die sowohl im N wie S brüten, oder um eine neu abgespaltene Südpopulation? (Die Herausgebernotiz betont die Wahrscheinlichkeit der zweiten Deutung.) Auch Weißbart-Seeschwalbe, Schwarzhalstaucher, Schwarzstorch, Säbelschnäbler und Stelzenläufer brüten in Südafrika; der Flußuferläufer ist allenfalls verdächtig. — Die 10 in Südafrika beheimateten Zugvogel-Arten gehören zu Schwalben, Seglern und Kuckucken. Sie brüten im Süd-Sommer in der südlichen Kapprovinz; die Ruheziele sind in den Tropen zu suchen. — Sodann gibt es im südlichsten Teil Afrikas 8 Arten von Schwalben, Seglern und Fliegenschnäppern, die zwar ausgeprägte Wanderungen zeigen, aber den Norden des Verbreitungsgebiets, wo die Arten nicht wandern, nicht überschreiten. — In der Erörterung wird als übliche Deutung erklärt, daß die Vögel einst bei der Ausbreitung ihres Brutareals in weniger wirtliche Gebiete gezwungen waren, nach der Brutzeit sich wieder zurückzuziehen, und daß dieses Zugverhalten als erblich herausgezüchtet wurde. Wenn dies stimmt, sind Ermittlungen in den Extremgebieten der Verbreitung — also gerade in Südafrika — von besonderem Interesse; lehrreich sind die erwähnten Ansiedlungen von Paläarkten in Südafrika. Die oben dafür erwähnten Arten lassen sich nicht subspezifisch abtrennen. Dagegen bilden Rohrdommel und Mäusebussard eigene Südrassen, und Schwarzkehlchen und Schleiereule zeigen von der Paläarktis bis zum Süden ein Mosaik von Rassen, so daß man die Südafrikaner nicht einfach als hängengebliebene Paläarkten betrachten darf, zumal die Nordrassen nicht so weit ziehen. Zugtrieb kann sich nicht nur entfalten, sondern er kann auch wieder verkümmern. Die Arten der Gruppe 3 sind beachtliche Hinweise darauf, daß innerhalb einer Spezies mit größerer Nordsüdverbreitung nur der am weitesten südwärts (nach dem Kap) vorgestoßene Anteil sich nach Zugvogelweise verhält. Im übrigen hat in den letzten 35 Jahren offenbar eine ganze Reihe afrikanischer Arten ihr Areal weiter südwärts (in das südliche Kap) vorgeschoben (siehe Artenliste). Das Zugverhalten der Vögel des südlichen Afrika ist ein lehrreiches Gegenbeispiel zu den seit viel längerer Zeit bekannten Verhältnissen an der Nordgrenze derselben oder verwandter Arten im paläarktischen Raum.

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