EXPERIENCES KEEPING AND BREEDING THE WHITE-FRONTED BEE-EATER *Merops bullockoides* IN THE ZOOLOGICAL GARDEN COLOGNE

by Theo Pagel

Introduction

In one section of the pheasantry in the Zoological Garden Cologne we keep African birds. In one of the combined indoor/outdoor aviaries, made to look like an African riverbank, live White-fronted Bee-eaters *Merops bullockoides*, Baglafecht Weavers *Ploceus baglafechi reichenowi* and Egyptian Plovers *Pluvianus aegyptius*.

This article summarizes our experiences keeping and breeding the White-fronted Bee-eater.

General

There are 25 species of bee-eaters. They vary in size from 14cm-35cm (5½in-13¾in) long. Most have colourful plumage and a curved bill. The tail has 12 feathers and in some species the central tail feathers are longer than the others. Bee-eaters live in the warmer regions of the Old World, where most prefer open landscapes. They are mainly insectivorous and catch most of their prey in the air, especially bees. Bee-eaters breed in holes which they excavate themselves. Often you find their nest holes in riverbanks. Some species, such as the Rosy Bee-eater *M. malimbicus*, breed in large colonies of up to 25,000 birds.

Systematics

Bee-eaters are in a family of their own - the *Meropidae*. The White-fronted Bee-eater is a member of the genus *Merops*. There is just the nominate form, which has no known races.

Description

The White-fronted Bee-eater is 21.5cm-23.5cm (8½in -9¼in) long and weighs 31g-35g (Fry and Fry, 1992). Its forehead is dirty white, its crown is mealy and the nape, breast and belly are buff. It has a black mask, a white chin and cheeks, and a silky scarlet throat. Its wings and tail are green, and the vent, under and upper tail-coverts are midnight blue.

Distribution

West Gabon, Zaire and Kenya, south to Okavango, northern Botswana, and Transvaal and Natal, South Africa.

In the wild

Open country, bushland and woodland along rivers are the habitat of the White-fronted Bee-eater. There you can find them at altitudes of up to 2,000m (approx. 6,500ft) (Fry, 1984).

This species breeds in colonies usually of ten to 20 nests. Occasionally you will find colonies of up to 450 birds. Interestingly, about 60% of the breeding pairs have helpers (Emlen, 1981). Helpers are young birds from the previous breeding season but experienced adult birds will also cooperate in rearing the young. There are one to five helpers per nest.

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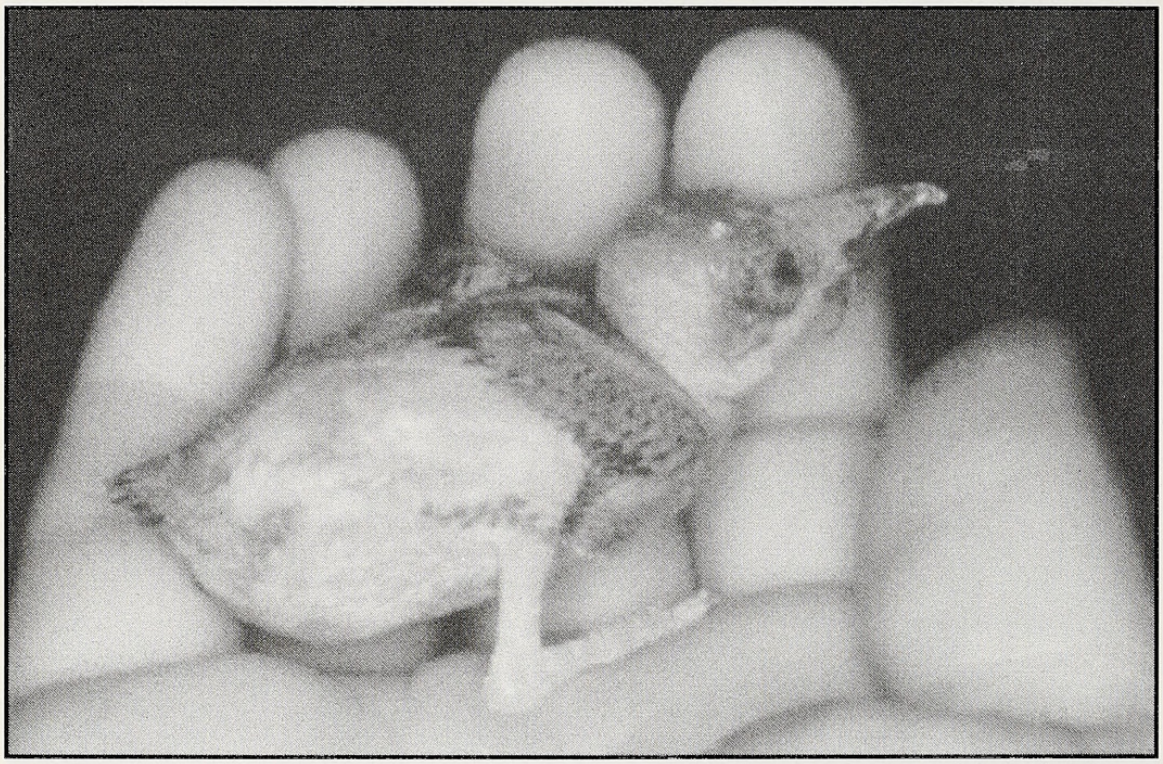
Adult White-fronted Bee-eater

White-fronted Bee-eaters are monogamous. They stay together for their lifetime. There is something like a social structure with one to five pairs forming a clan. Only members of the clan are allowed to visit the nest holes. A study of this species at Nakuru, Kenya, revealed that 80-140 nest holes were used by about 62 different clans (Hegner et al., 1982).

The White-fronted Bee-eater breeds in the dry season. The colonies are often found near colonies of (Nubian) Carmine Bee-eaters *M. nubicus*. Nest places are changed yearly. Normally the birds breed only once a year. In Zimbabwe the normal clutch is 2-5 eggs, with the average being 3.23 eggs. In Kenya clutches are smaller (Hegner et al., 1979). The average egg size is 22.7mm x 18.8mm. Copulation occurs several times a day. The incubation period varies from 19-21 days and the nestling period is about 32 days.



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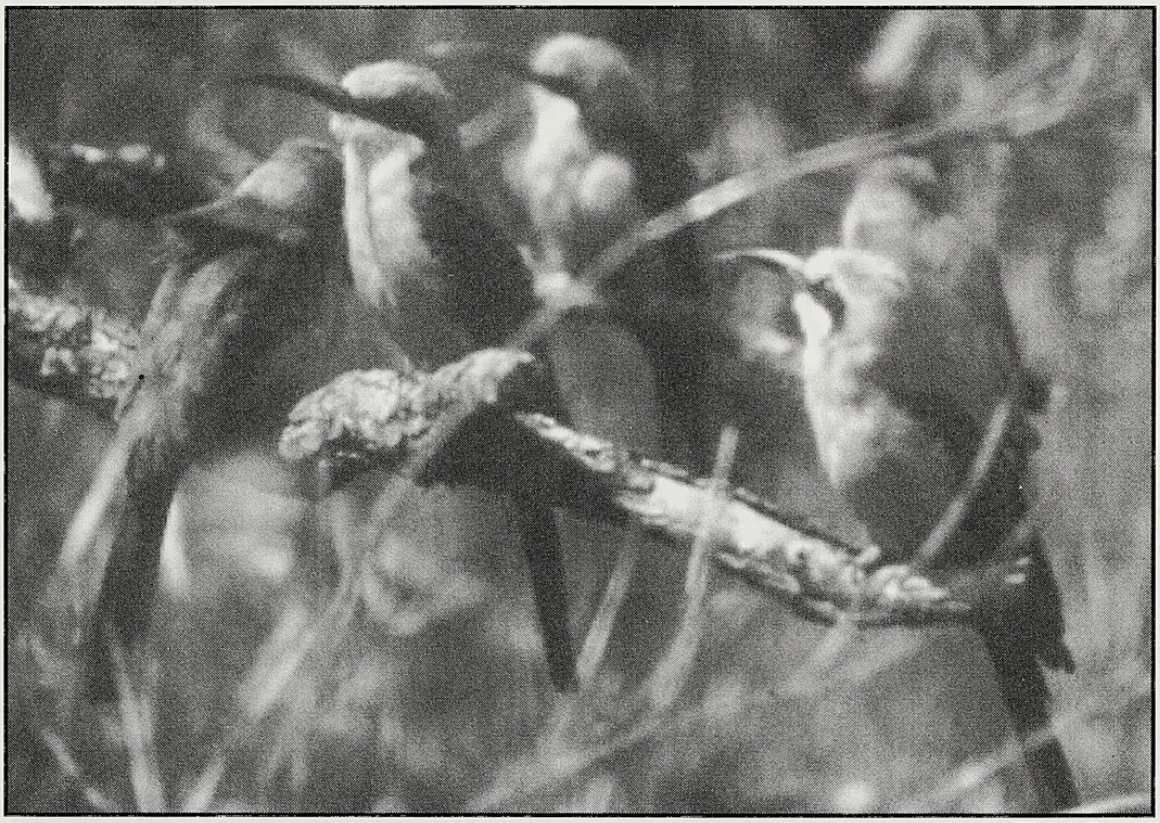
Chick at seven days old

This bee-eater is insectivorous. We know that about 87.3% of the insects which it catches are *Hymenoptera*. About 50% of them are Honey Bees *Apis mallifera*, 20% are bees of the genus *Trigona* and 17% are other *Hymenoptera*. The other insects are 6% beetles (*Coleoptera*), 5% flies (*Brachycera*) and bugs (*Heteroptera*), as well as moths (*Tineidae*), butterflies (*Lepidoptera*), crickets (*Saltatoria*) and others. White-fronted Bee-eaters have special territories where they hunt. About 50% - 70% of hunting flights are successful.

Keeping and breeding

Bee-eaters are seldom kept. Most of those which are live in zoological gardens and bird parks. There are only a few private aviculturists who keep these birds, maybe because of their biology and specialised feeding habits. In the early days of aviculture the idea of breeding such birds was just a dream. In recent years however there have been articles about keeping and breeding various species, such as the Little Bee-eater *M. pusillus*, European Bee-eater *M. apiaster* and White-throated Bee-eater *M. albicollis*. Lilly Koenig, Winged World (UK), Zoo Cologne, Zoo Krefeld, the Birdpark Metelen (all in Germany) and some private breeders are known to have successfully bred the White-fronted Bee-eater.



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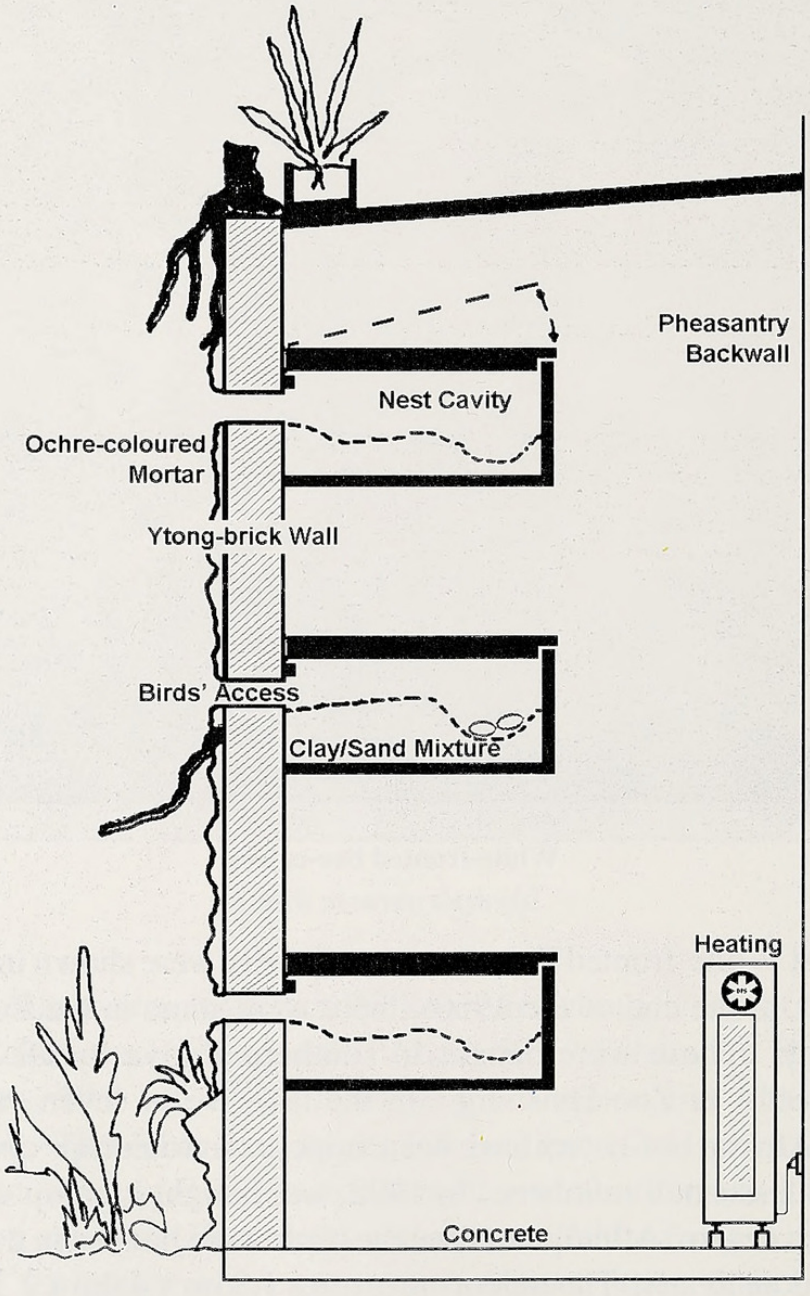
White-fronted Bee-eaters

The first White-fronted Bee-eaters in captivity were shown in the London Zoo. Later, at the end of the 1960s, there were some in the Zoo Duisburg in Germany. These were caught in southern Kenya by Dr W. Gewalt, former director of Zoo Duisburg. In the last five to seven years various species of African bee-eaters have been imported into Europe quite regularly in more or less small numbers. In 1992, we bought a group of 12 from a well-known dealer. After quarantine the birds were housed in the combined indoor/outdoor aviary. The indoors measures 1.85m x 4.0m x 2.3m (approx. 6ft x 13ft x 7ft 6in) and the outdoors 7.2m x 7.0m x 2.2 - 2.5m (approx. 23ft 5in x 22ft 9in x 7ft 2½in - 8ft 2in). The outdoors section is well

planted. The birds can use it all year round. Only when the temperature falls below -5°C (23°F) do the birds have to remain inside.

On one side of the aviary outdoors there is the artificial riverbank. It is built with a 10cm (4in) thick wall of Ytong-bricks. The front of the wall looks loamy. It is made of mortar which is an ochre colour. In this wall we have holes 5cm (2in) in diameter. Behind these are 11 wooden nest-boxes 20cm x 20cm x 40-55cm deep (approx. 8in x 8in x 15¾in - 21¾in deep). We can open the nest-boxes and control what happens inside. In the first two years we had problems with the material for the nest-boxes. We tried different mixtures of sand and clay. If too much clay is used the sun dries it out so fast and so hard that the birds are unable to burrow into it. Nowadays we form the holes out of pure clay. These are then filled with 2cm-3cm



Cross-section of the artificial riverbank

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White-fronted Bee-eater chicks at 18 days old

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Chick at 24 days old

(approx. ¾in- 1¼in) of sand. At the beginning of the breeding season the entrance holes are closed with a mixture of one part clay and three parts sand. It seems as so the closing of the entrances, combined with warm sunny weather, provide the impulse for the birds to start burrowing and making their nest holes.

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Artificial riverbank with bee-eater nest holes

We did not know the age of our birds when they were imported nor did we know their sexes.

In 1994 they started to breed in mid-April. Copulation was observed and three pairs laid eggs. To ensure that it was not too cold for the birds (in April and May it can be quite cold at night here) we put a heater in the artificial riverbank. The heater ensured that the temperature never fell below 18°C (64°F). The humidity inside the riverbank was about 65%. The eggs of one clutch measured 22.0mm x 18.5mm, 21.8mm x 18.4mm and 21.6mm x 18.1mm. That year one youngster was reared. The adults fed it with various kinds of livefood such as crickets, mealworms and bees. All livefood is prepared with Korvimin ZVT© (vitamins and minerals). Koenig (1969) wrote that during a nestling period of 32 days the young birds ate about 625-645 insects (275g live weight, 667kcal) per bird. We have observed helpers at the nest as in the wild.

In 1995 two pairs reared four youngsters without any problems. The White-fronted Bee-eaters prefer the high nest holes in our artificial riverbank (55cm-160cm/lft 9¾in-5ft 3in high). In the winter of 1995-1996 we lost two birds. We were unsuccessful in 1996. We found only four eggs in three nest holes and some broken eggs in another hole. We had problems with mice and even with rats. Probably the disturbance caused by these rodents was too great and they may have eaten eggs and young.

It seems as so the food we feed our White-fronted Bee-eaters is the reason for our success in keeping and breeding this species. We offer a choice of different livefoods such as crickets and also bees. In fact we keep a swarm of bees in the aviary. On one side of the exhibit behind some plants is a bee-hive at a height of 1.2m (3ft 11¼in). Beneath this the birds catch all kinds of insects which try to fly through the aviary. We also have different kinds of flowers in the aviary to help attract insects.

The birds have the opportunity to use the inside and outside enclosures all year round. At night there is a red light inside so that the birds can see their way around. Obviously because even in the wild the birds have to endure different - even minus degree temperatures - we have no problems in keeping them as we do indoors and outdoors.

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MY SWAN SONG

by W.D. Cummings

I retired four years ago after 50 years specialising in the breeding and the public display of birds and animals in zoological and botanical gardens. The public display of birds and animals with compatible plant displays has always appealed to me, as not only is it pleasing to the eye but stimulates the interest and health of the inmates. Each display has its own problems though for some inmates can be very destructive.

I have specialised with both temperate and sub-tropical displays both in the UK and overseas. In the early pioneering days of Keston Foreign Bird Farm we concentrated on adapting and breeding rare parrots, parrakeets, pheasants, softbills and a wide variety of seed-eaters, to introduce and supply for aviculture in the British climate. Mutations cropped-up and Keston was the first to start colour breeding the wild Budgerigar *Melopsittacus undulatus* from a blue Budgerigar taken from the wild in Australia, also the blue Ring-neck *Psittacula krameri* from single specimens taken from the wild in India, and the yellow Red-rump *Psephotus haematonotus* and yellow Plum-head *P. cyanocephala*, to name a few.

From these my interest continued after many years of line-breeding the more popular varieties of parrakeets and pheasants, etc., to investigate the fertility and development of other colour varieties. Even before I joined Keston I had in my youth investigated the possible fertility between different species of doves and pigeons. I paired a female Wood Pigeon *Columba palumbus* (reared under domestic pigeons) with a tame male pigeon and produced two hybrid males. Their display when adult was a bow with their smaller tails raised on completion of the display, but both males were infertile. I paired one hybrid to a Stock Dove *C. oenas* and though happily paired it proved infertile. Next I tried pairing a female Stock Dove with a domestic Ice Toy pigeon and the hybrid males were fertile with domestic pigeons but not with the females. My aim was to produce a small Toy pigeon that was not flock imprinted and would adapt to garden conditions. I even brought in wild Rock Dove *C. livia* blood but unfortunately the experiments were halted when I left Keston after one of my partners died.

Also at this time I was experimenting with the fertility of Budgerigars. When doubts were still being expressed about them being a distinctly different species, I paired a big male cobalt budgie to a female Bourke's Parrakeet *Neophema bourkii* and these were isolated together in a small aviary for the winter. When a nest-box was introduced in the spring immediate interest was shown in it and with each other, mating was frequent and several clutches of eggs were laid but all were infertile. I then tried a