BREEDING THE BLACK SPARROW HAWK *ACCIPITER MELANOLEUCUS* IN CAPTIVITY

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During the spring of 1979, a pair of the African Black Sparrow Hawk (*Accipiter melanoleucus*) bred in my aviaries in Paris. Events from building of the nest to fledging of the young were followed, with a television camera in the aviaries.

Tropical Accipiters have rarely, if ever, been bred in captivity. In the present case, the parent birds were not taken from a nest but were trapped as free-ranging individuals; at least the female had probably had previous breeding experience in the wild. Thus artifacts due to captivity were minimal in the behaviour of this pair. Finally, thanks to the television camera, it was possible, without disturbing the birds, to see in detail sequences of behaviour that are extremely difficult to observe in the field from a blind.

Origin of the birds

The two birds were caught near Makokou, northeastern Gabon (1 lat. N.—12 long). The species is not rare in this area of heavy rain forest, and as elsewhere, is notorious as a poultry-thief. To protect their farmyards, the natives trap these hawks and, during the past 15 years, 14 specimens, dead or alive, were brought to me.

I saw this bird quite often in the field, but always briefly. In Gabon, as in east Africa (Leslie Brown, pers. comm.) the species feeds mainly on pigeons. I observed a male catching a large dove (*Turtur brehmeri*) and another one a pigeon (*Columba unicincta*) as big as itself. A female was seen carrying a large pigeon, and another pursuing a group of green pigeon (*Treron australis*). The pigeons were attacked from high trees, on the border of abandoned cultivations, while feeding on the fruits of low bushes of *Solanum torvum*. In one case, a group of pigeons was attacked above a large river by a female stooping from the sky, like a peregrine. The pursuits I saw were longer, more persistent, and probably faster than those observed in European accipiters.

In the unbroken rain forest of Gabon, the nests of four species of local *Accipiter*—*A. melanoleucus, A. tousseneli, A. castanilius* and *A. erythropus*—are especially difficult to find, and although nuptial displays were observed on several occasions, in 15 years we found only a single eyrie of *melanoleucus* containing a downy young in November 1979.

History of the parent birds

Among the 14 individuals brought to me, six were alive. They were exported to France, and trained for falconry. One pair was kept in a double aviary, for an attempt at reproduction.

The female was trapped in April 1971. The bird was at least 4 years old, having the breast plain white without black streaks, characteristic of the second and third plumages (pers. obser. on individuals taken in juv. plumage, and kept for more than 3 years in captivity).

After 18 months of captivity, the moult, which was synchronized with the Gabon austral cycle (November–April), became, in Paris, synchronized with the boreal cycle (April–September) and was maintained for 6 years.

From 1971 to 1976, this hawk was used for falconry, catching pheasants, and even, though rarely, attacking mammals. She caught a domestic cat. This bird was shy, of irregular temper and not as efficient as another female of the same origin, that, after a brilliant career in falconry, escaped and became a Wood Pigeon (*Columba palumbus*) catcher on her own from June to December 1970 in the small wood near Paris where she established her territory.

The male was trapped while eating a chicken in February, 1976, when about 3 months old. After 14 months, timing of the moult was synchronized with the boreal cycle. He was not trained for falconry but became rather tame.

Successive attempts at reproduction

During the spring of 1977, the male and the female were put in twin aviaries, separated from each other by a piece of net. Early in June, both birds were carrying twigs, in spite of the fact that the male was far from being adult (he still wore some feathers of the juvenile plumage). As the female was not aggressive toward the male, we removed the net. Good relations were established between the two, which cooperated in building a nest. It was probably too late in the season and no clutch was laid. From this time, they were maintained together continuously.

In March 1978, a new nest was built by both birds, although no other sexual activities—vocal or behavioral—were noticed. The female laid a clutch of 3 eggs (first egg on the 1st, second egg on the 6th, third egg on the 9th of April). After 21 days of incubation, the eggs, all infertile, were removed. The female laid a second clutch of 2 (17th and 20th of May) that were also infertile.

During March 1979, a new nest was built by them at the same place as the preceding one. A television camera was placed in the aviary, and their behaviour noted from 100 m. During March, much time from dawn to sunset was spent in building the nest. Most of the material, branches and twigs, was carried early in the morning. During the day they put the material in proper position, either with the beak or pushing the twigs with the breast against the wall of the nest cup. Finally the cup was furnished with large green leaves of cherry-laurel, cut from the small trees in which the nest was built. The two birds brought material during the entire nesting period, especially green leaves, but also large branches, till the time the young fledged.

A clutch of 4 was laid: sequentially on the 27th of March, 1st of April, 4th of April, and 9th of April. The last three eggs were fertile. The first chick hatched on the 9th of May, the second 13 hours later, the third 5 days later. The third chick, although vigorous, was not fed, was overpowered by its sibs and died when 5 days old. Frequent battles were observed between the two older chicks, which were the same size. Finally, one chick stopped growing when 20 days old, being overpowered by the other. He was ejected from the nest several times by his brother, and on the 6th of June was found dying on the ground with a bruised head. The last young—a male of small size—left the nest when 46 days old. A few days later, he killed chickens, rabbits and young pheasants in the aviary and two weeks later caught free-ranging prey such as large rats, blackbirds, magpies, crow, etc.

Behavior of female

The female was first placed in the part of the aviary where a suitable place to build a nest had been prepared. She accepted the place and began to build. After the male joined her, both were seen building at the same rate, and in the same manner.

Before laying, the female spent several days in a "prepositai" state. She stood quietly on the nest, the ventral plumage hanging vertically; she took practically no food during this time. Eggs were laid during the afternoon. She stayed on them after the first was laid, continuously during the night and by bouts during the day. The male guarded the nest when the female was absent. After the second egg, incubation became continuous. During the first 10 days the incubating female was very excited, changing position an average of 10 times an hour, rolling the eggs with the beak and perching on the border of the nest to arrange twigs and leaves in the nesting cup. During the last 3 weeks of incubation, the female became more and more lethargic.

The oldest young was fed by the female 13 hours after hatching. The rhythm of feeding during the first two weeks was, on the average, 4 times a day. The male brought prey (sparrows, doves, pigeons, quails) to the edge of the nest and remained perched on it during the time the female plucked the prey and fed the young. An unexpected behavior often occurred: the female fed not only the young but also offered food to the male who, at least during the first week, took much more food for himself from the beak of the female than did the young. Sometimes, the male offered to the young small pieces of meat given to him by the female.

From the prepositai to the end of the fledging period, alarm calls were given by both sexes when a potential enemy was in view. During incubation, the female left the eggs when disturbed, but after the young hatched I was savagely attacked by her and quite seriously wounded. Large rats, which were tolerated in the aviary before hatching, were killed systematically (but not eaten). These behaviors ceased completely after the young were removed from the aviary.

The behavior of the female toward the male was especially mild and friendly. Mutual facial greeting was observed. While incubating, the female was seen with the male perched on her back with wings extended in an attempt to shade her. When the female was off the nest, the male always incubated or brooded eggs or chicks. Within a few minutes the female returned and forced the male to leave the nest by pushing him carefully out of the cup with the bend of the closed wing. The only overt aggression between the two birds is described later.

Behavior of male

The behavioral role of the male was more important than expected, especially his role of watcher. He was often the first to give alarm at the approach of a potential enemy (his calls are more rapid, and higher pitched than the female). He took an extreme interest in the events of reproduction. He was seen inspecting for minutes, and touching carefully with his beak the first egg and the newly hatched young. When the female left, the male always came immediately onto the nest. His shading of the incubating female and of the fledglings was constant when the aviary was in sun. The male carried most of the prey to the nest.

During the first stage of the mating period he killed several young wild rats, which were not eaten but placed on the higher perches: offerings to the female?

At the entrance of an intruder in the aviary the male became very excited and on sev-

eral occasions redirected his aggression against his mate: an abnormal behavior, certainly due to captivity. The female was slightly wounded in this manner so I made no more attempts to enter the aviary.

The "deflection of attack" is one of the most significant aspects of human-raptor interaction (Olendorff 1971). Nevertheless, no instance of an irate hawk attacking its mate when a human is close to the nest has been recorded previously.*

Behavior of young

We clearly saw the newly hatched young taking small pieces of food from the beak of the mother (this is not the case in the genus *Falco,* where the newly hatched young begs food in a passerine manner, Brosset 1973).

Our observations of young at the nest were not significantly different from the numerous observations made on young raptors in the wild except for the extreme aggressiveness of the chicks toward each other. Furious battles, with blows on the heads of the siblings, were frequent from the first days after hatching. This resulted in the loss of two of three young. The young had much more food than they could eat and the lack of food had nothing to do with this "cainism."

This behavior is perhaps more developed in the western population of the species than in the eastern population, where L. Brown (pers. comm. and 1980) saw several broods of two and three young in *Accipiter melanoleucus.* By contrast, in 3 cases we saw in Gabon (one brood in the wild, one in captivity, and parents followed by a single young) only one young was fledged. At the same time we saw for several species of birds that the rate of reproduction seems lower in western Africa than in the east (Brosset, in press). Perhaps the case of the Black Sparrow-hawk follows the general rule not through a smaller clutch size, but through more frequent "cainism."

General remarks on this experiment

A single case does not permit generalization and we give here only rough selected data, their interest being that they have been rarely, if ever, recorded in the field.

Sexual maturity

We have no information on the attainment of sexual maturity in females, the only female we tested having been caught as fully adult.

We kept in captivity for more than 3 years 2 males caught as juveniles in Gabon. These two males became sexually adult when three years old. One was observed calling and carrying branches when about 38–40 months old; the other produced young for the first time when 40 months old.

Most species of raptors become sexually mature later in captivity than in the wild. On the other hand, the two males we observed had to resynchronize their moult cycle, which was initially austral, to the boreal cycle.

Perhaps wild individuals are adult earlier, when two years old. This would be easy to verify in the wild, since the second plumage following the first immature plumage is characteristic in the Gabonese population of the species.

We noticed considerable differences in the sexual calling of the two males at the onset of sexual maturity. One was extremely vocal, the other quite completely silent.

Nest building

A first autumnal bout of building took place in November 1978. Much material was brought onto the place of the nest within a week. Then building stopped completely till

*Ed. Note: Female peregrines (*Falco peregrinus*) have been seen to "chase" their mates away from eyries in an "aggressive" manner while investigators are at eyries.

the first days of March 1979 (autumnal carrying of nest material is common in certain palearctic species—such as the House Sparrow (*Passer domesticus*) in Paris).

The rate and technique of building was similar in male and female. We may insist on the important role of green leaves which were brought till the end of the fledging period. This role, subject to some speculation (Olendorff 1971) seems perfectly clear to us. A layer of large green leaves protects the eggs and the young chick against the risk of slipping between the interlacing twigs in the bottom of the cup (L. Brown 1953). This interpretation is not speculative at all. For example, during the first attempt at reproduction, in 1978, when we did not secure green leaves for them, two eggs became entangled in the body of the nest in a position in which the parent birds were unable to incubate or even to recover the eggs. I saw the same phenomenon in the wild. In eastern Morocco, on a "Betoum tree" (*Pistacia atlantica*) I discovered a nest of the Serpent Eagle (*Circaetus gallicus*) with a non-incubated egg encrusted in the body of the nest. The eagle was setting on a second egg, half incubated, laid in the same nest where the first was lost.

We saw the female several times taking away, from below the young, fouled green leaves, shaking those leaves outside the nest, and replacing the same leaves in the bottom of the nest under the young: sanitary behavior which has perhaps not been observed before in any species.

The clutch

In 1978, the first infertile clutch of 3 eggs was removed after 21 days of incubation. The female laid a second clutch of 2 eggs, also infertile, 20 days later.

In the three clutches laid, the first egg was the most elongated, slightly blotched with pale greenish-brown, the other one being plainly colored of pale grey-green: exactly the color of European Goshawk (*Accipiter gentilis*) eggs. In the third clutch of 4, only the first egg was infertile.

In each clutch, the interval between eggs was 3–5 days. The incubation period was 34 days for the 3 fertile eggs. Two chicks hatched in the afternoon, the other early in the morning.

We saw how egg shells disappeared from the nest. The birds did not take the shells away, as most birds do: the female crushed the shells with her beak and the small broken pieces fell and disappeared between the interlaced sticks of the nest.

The moult

In the 1979 breeding season, the moult began 3 weeks earlier than in preceding years. In both male and female, loss of the first feathers took place during the time the female was laying. Although food was given "ad libitum," the moult stopped completely for both during the entire rearing period, and started again when the fully fledged young were removed from the pen. The moult was completed two months later than the preceding years (an artifact due to captivity?—or a stop related to production of young?).

Feeding behavior

We saw nothing remarkable except during the first two weeks of brooding, the nest was kept perfectly clear of prey remains or non-consumed prey. Between bouts of feeding, prey remains were invariably carried away, usually onto perches and put again on the nest only during feeding time. When the young were able to feed themselves, this

behavior ceased completely and remains of prey, even rotten ones, were spread over the rim of the nest, without being removed by the parents.

This behavior is not special to tropical species of Accipiter (Olendorff 1971). In equatorial forest, where predacious animals are abundant, the remains of prey on the eyrie may attract some predators of eggs and young chicks, and the removal by the parents of non-consumed prey from the eyrie may be of survival value for the brood. When the young is capable of self-defense, the adult would cease to keep the nest clean of remains of prey.

Intersexual behavior

Literature concerning behavior of the Accipiter in captivity, especially as related to breeding attempts, is full of murder stories, the female killing her "husband." In fact, most of these attempts were made by falconers with eyesses imprinted on Man, birds that do not recognize the nest partner as belonging to their own species. In many birds, the knowledge of a conspecific is not innate but is precocially acquired through the view of the parents. For the imprinted large female hawk, the small male is no more than an item of prey, and is treated as a pigeon or a chicken.

We may believe that the intersexual behavior of individuals taken in the wild as adults or sub-adults would give a better picture of what really occurs under natural conditions. In fact, in this pair of Black Sparrow Hawks, where the male was a "passager" and the female a "haggard" (in falconers' terms) we did not see any fear behavior in the male nor any aggressive behavior in the female.

Conclusion

We are fully convinced of the lesser value of data obtained in captivity, compared with similar data obtained in the field. Nevertheless, where birds are kept in conditions as close as possible to natural, continuous observation in full view with the help of a magnetoscope or a television camera allow one to collect valuable data which would be very difficult to obtain otherwise in the wild from a blind. Comparisons between data obtained in the field and in captivity should permit one to perceive and to understand more fully the sequence of breeding behavior in the raptors.

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Fig. 1. The pair of Gabunese Black Sparrow Hawks at the nest.

ANNOUNCEMENT—MEETINGS COMING UP

International Goshawk Conference

The International Association for Falconry and Conservation of Birds of Prey is organizing a conference on *Understanding the Goshawk* at the Department of Zoology and Wadham College, Oxford, from September 29 to October 1, 1981. The conference will provide a review of recent research findings in sessions on *Systematics and Population Dynamics,* on *Predation and Management,* and on *Falconry and Domestic Breeding.* There will be half-hour papers by main speakers from Britain, Finland, Germany, Holland, Poland, Sweden and the United States and the proceedings will be published.

Booking forms may be obtained by sending a stamped, self-addressed envelope to:

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