

There are various models of perception which are familiar to ethologists. The Gestalt model sees perception as an all-or-nothing process, while heterogeneous summation views perception as the summation of various influences in the patterns concerned. The disparity between the number of approaches and the number of matchings to foreign song types suggests that Gestalt does not apply here. However, the data as such do not permit any conclusion on the applicability of heterogeneous summation, although the results of the presentation of models, as by Falls (1963), might be interpreted as support. Bower (1966) presented an interesting case of visual perception by infants which also leads to conflicting interpretations. Another model, the motor theory of speech perception (Lane 1965), views perception as the comparison of sound patterns heard with those that the individual uses. Again, the discrepancy between the number of approaches and matches sheds doubt upon the applicability of this model to Cardinal behaviour.

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THE STATUS, DISTRIBUTION AND DIET OF THE SEYCHELLES KESTREL *FALCO ARAEA*

Few attempts at an objective assessment of the status of birds endemic to Seychelles have been made, and yet phrases such as 'very rare' and 'threatened with extinction' have been used in reference to several of them. Such a bird is the Seychelles Kestrel *Falco araea*. This species formerly occurred on most of the granitic islands of Seychelles (Veszy-Fitzgerald 1940a), and it has certainly undergone a contraction of range during the last 30 years. Newton (1867) regarded it as 'tolerably common', but other visiting scientists have since considered it to be uncommon (Nicholl 1908, Crook 1960, Gaymer *et al.* 1969). Loustau-Lalanne (1962), a resident Seychellois, said that the Kestrel was 'fairly well distributed all over Mahé and on some of the nearby islands', and regarded it as one of the common endemic birds. Gaymer *et al.* (1969), however, concluded that there were probably 'less than 30 birds' confined to Mahé, and Vincent (1966) listed the kestrel as a 'critically endangered' species.

The aim of this work was to assess the present status and distribution of the Seychelles Kestrel, and to obtain information on its ecology for comparison with other insular species of kestrel in the Indian Ocean.

HOME RANGE

Gaymer *et al.* (1969) suggested that kestrels occupied large territories. In an attempt to verify this and to estimate the probable carrying capacity of the island, we determined,

the home ranges of five pairs on Mahé. Birds were caught using *bal-chatri* traps baited with lizards, and individually colour-ringed. The movements of each pair over a one month period were plotted on a map, and the peripheral sighting points were joined by straight lines to create an everted polygon, the area of which was measured (Table 1). Compared with other species of kestrel (Brown & Amadon 1968), the Seychelles Kestrel occupies a relatively small home range and Mahé, with a total area of 14 250 ha, could probably support over 100 pairs.

TABLE 1

The home range sizes of five pairs of Falco araea on Mahé, Seychelles

Pair number	Hours of observations	Home range (ha)	Habitat type	Breeding status
1	28	90.0	airport, coconut plantation	courtship, mating
2	19	90.3	urban, secondary forest	post-breeding
3	17	103.2	primary forest	courtship, mating
4 ¹	24	80.8	secondary forest	mating with fledged young
5 ¹	20	49.8	secondary forest, coconut plantation	courtship, mating
Average	21	82.8		

Note: ¹ Adjacent pairs.

DISTRIBUTION AND STATUS

We did not find kestrels on the islands of La Digue, Frigate, Felicité, Cousin, Cousine, Curieuse or Aride. They were found on Silhouette (probably at least 10 pairs) and Praslin (one or two individuals) during brief visits in July 1970, November 1972 and May 1973, but interpretation of sightings on these two islands is uncertain owing to the difficulty of movement imposed by the terrain.

On Mahé, where the kestrel is most abundant and where roads enabled us to undertake a strip census, the distribution of 'established pairs' was plotted between January 1972 and May 1973.

An 'established pair' is defined as a pair of birds that was regularly seen in a given area and that was almost certainly distinct from adjacent pairs. Most of our observations on Mahé were made while driving slowly along roads, and observations of kestrels were usually 5–15 min apart, ample time for birds to move from one point to the second. Adjacent pairs were therefore regarded as 'established' only if they were seen regularly in their respective areas, and were also seen at least once in these areas on the same journey along the road. In addition to our observations of established pairs, we also obtained numerous sightings of single birds which were seen only occasionally at any given locality.

Large areas of Mahé that are not accessible by roads were not surveyed during the present study, and the 49 established pairs on this island (Fig. 1) therefore represent a minimal estimate. Visibility from the roads varies from a few yards to several miles, at which distance kestrels would not be seen even if they were present, and any attempt to assess the population of Mahé by extrapolation from the strip census data would be

unreliable. However, the finding of 49 established pairs along the roads suggests that the carrying capacity of Mahé, estimated at over 100 pairs from the size of the home range, may in fact be approached at the present time.

Kestrels are widespread on Mahé. Of the 49 established pairs, 12 were found above the 250 m contour, even though only short stretches of road run above 250 m and our counting technique was thus biased to lower altitudes. Without knowing how Gaymer *et al.* (1969) made their estimate of numbers in 1965, it is impossible to say whether the present abundance of kestrels represents an increase during the past eight years, or whether the 1965 census was less complete than our survey.

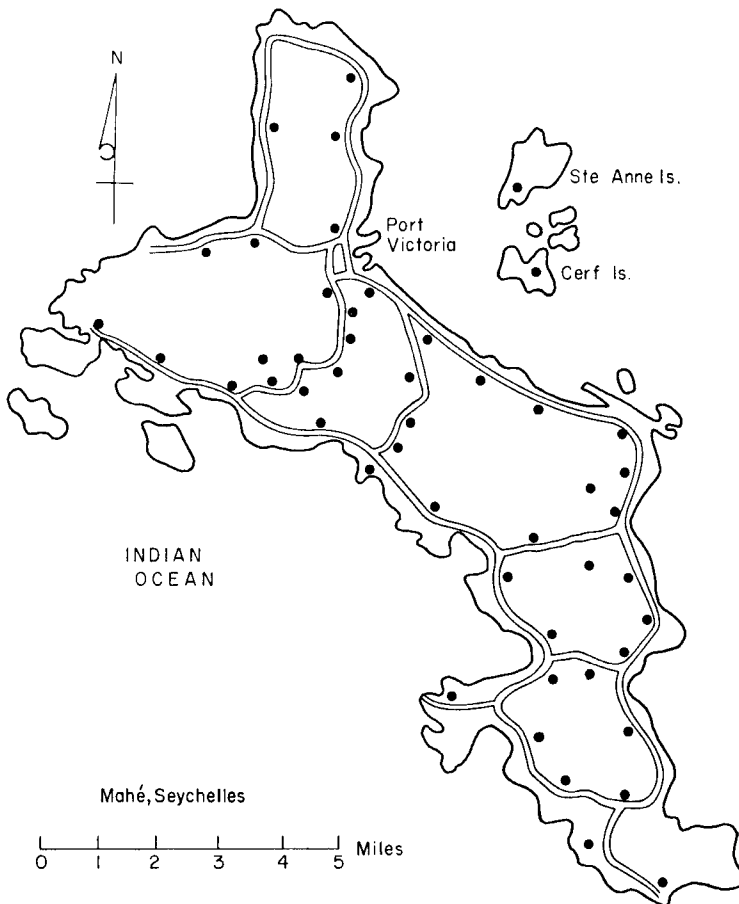


FIGURE 1. The distribution of *Falco araea* on Mahé, Seychelles. Points represent the approximate centres of observed activity for each established pair of kestrels.

DIET AND HUNTING BEHAVIOUR

Observations on the diet and hunting behaviour of the Seychelles Kestrel enable comparisons to be drawn with the closely related subspecies of the Madagascar Kestrel, *F. newtoni newtoni* of Madagascar and *F. n. aldabranus* of Aldabra, both of which are larger in size than *F. araea* (Benson 1967).

Loustau-Lalanne (1962) and Gaymer *et al.* (1969) considered the food of *F. araea* to be mainly lizards, as did Newton (1867) who examined stomach contents. During this

study the following prey were seen to be captured by Seychelles Kestrels: insects (8), skinks *Mabuya seychellensis* (13), geckos *Phelsuma* sp. (5), unidentified lizards (3), Madagascar Fody *Foudia madagascariensis* (1), and small rodents (4). In addition, the contents of 34 pellets collected from a single nest cavity were examined. The following identifiable remains occurred in the indicated number of pellets; millipede (1), insects (15), skinks *M. seychellensis* (19), unidentified geckos (6), small passerine bird (1), and rodent (1). Kestrels have been reported to take young chickens from the vicinity of houses, but we cannot confirm this. Rand (1936) found the food of *F. n. newtoni* to be mainly insects, but frogs, lizards, birds, and rodents were also included. Benson & Penny (1971) recorded mainly insects but also lizards and rats in the diet of *F. n. aldabranus*.

F. araea appears always to hunt from a perch. In this respect it resembles *F. n. aldabranus*, which rarely hovers (Gaymer 1967), rather than *F. n. newtoni* which usually hunts from a low hover but occasionally from a perch (Siegfried & Frost 1970). At higher elevations on Mahé we frequently saw kestrels hunting in dense forest, and the absence of hovering in the hunting behaviour of this species may be an adaptation to the forest habitat, its colonization of the more open 'plateau' areas being secondary. Before settlement by man in the eighteenth century, the granitic islands of Seychelles were probably covered to a large extent by forest (Vesey-Fitzgerald 1940b), in which case the more open habitats would have been much more restricted in area than today.

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