

TABLE I

Numbers of species of landbirds absent from Kangaroo Island that are also absent from south-western Australia and Tasmania.

Category*	(i)	(ii)	(iii)	(iv)
No species absent from Kangaroo I.	16	20	20	15
No of these species absent from Tasmania	9	15	13	9
No of these species absent from SW Australia	11	6	9	3

* After Ford and Paton (1975).

(i) = vagrant or very restricted habitat; (ii) = open country or more arid lands; (iii) = savanna woodland; (iv) = sclerophyll forest.

the categories in their Table I is indeed correct, then this proves my contention because species in these categories do not have their major populations in them in Victoria, Tasmania or south-western Australia. For example, *Myzantha melanocephala*, *Cracticus torquatus* and *Dacelo novaeguinae* are species of mallee or sclerophyll forest rather than savanna woodland.

Finally, *pace* Ford and Paton (1975), I did not attribute 'the absence of some seventy-one species of bird from Kangaroo Island to a low rate of immigration from the mainland'. On page 128 I (1974) argued that twenty-five species were missing from Kangaroo Island probably as result of becoming extinct there and that their *continued* absence is probably because they seldom migrate to the island.

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6 October 1975.

PLUMAGE CHANGES AND MOULT PATTERN OF THE BROWN GOSHAWK

Between 1965 and 1968 three individuals of the Brown Goshawk *Accipiter fasciatus* (one male and two females) were closely studied in captivity at Camberwell, Melbourne. Their moulting sequences and the resulting changes in coloration of plumage were photographed and recorded. The birds were observed daily as to their plumage condition and any alteration in the feathers by fraying, moult and replacement noted. Each bird was taken from a different nest when a late fledgeling and reared to maturity in the manner of falconry. The nests were all in southern Victoria within a fifty to sixty kilometres radius of Melbourne. The records for each bird began from the completion of full growth of juvenile feathers, i.e. when forty-two to forty-five days old.

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Juvenile plumage (Plate 1a)

Generally browner than that of adults. Creamish white breast and belly streaked dark brown; thighs and under tail-coverts, ginger barred white. Juvenile impermanent colours. Bill, blackish; cere, dark greenish yellow, often marked greenish black; orbital skin, greenish yellow; iris, pale yellow; legs, dull yellow.

Moult

The juvenile plumage began to show signs of deterioration of the feathers by fraying and loss of colour at ten months. Fraying first occurs on the edges of the mantle and scapulars where the mantle overlaps the back and where the scapulars meet the upper wing-coverts. This forms a distinct 'V' pattern

PLATE 1

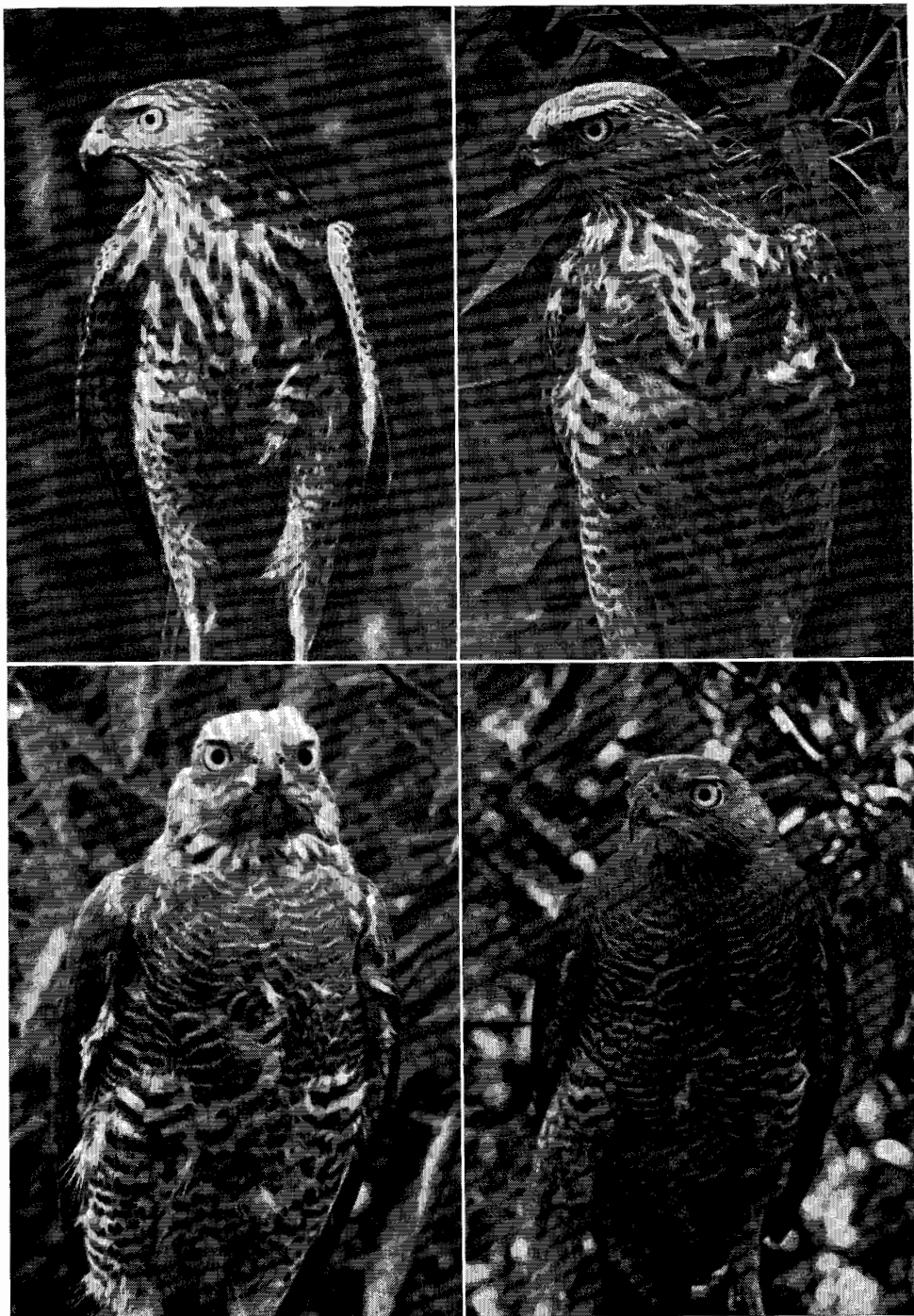


Plate 1 Stages of moult from juvenile to adult plumage in Brown Goshawk (a top left, b top right, c bottom left, d bottom right).

towards the back. These feathers gradually fray towards the hind neck, reaching its base during the following sixty days. At the same time the secondaries begin to fray from the inner feathers outwards. The colour of the feathers fades to greyish, replacing the normal brown, and their edges give the bird a ragged silhouette.

Actual moult begins at this stage. The first feather dropped is the first primary, counting from the inside out. Feathers are usually dropped as a pair, one from each wing simultaneously, closely followed by an adjacent secondary from each wing. Three days later the innermost secondaries are moulted. The primaries are moulted outwards and the secondaries outwards and inwards towards the centre during the next sixty days. Thirty days after the first primaries are moulted, the central tail-feathers are dropped. Next, the two either side of these are dropped about fourteen days later. The two outside tail-feathers are next and this continues from the outside towards the centre, until all are moulted.

By the time the outside tail-feathers drop, the new central tail-feathers have appeared and are about fifty millimetres long. The new first and second primaries on each wing have reached 75–100 millimetres and new secondaries are beginning to show. At this stage, sixty days after the start of moult, large gaps show in the wings and tail of the bird but are obvious only in flight.

Following this, the feathers on either side of the breast are dropped, forming two whitish patches of down. These are replaced by feathers showing the first signs of horizontal barring (Plate 1b). Loss of

of the feathers on the crown and forehead (Plate 1c) is next and again whitish down shows before replacements are grown. Then the upper and under wing-coverts are moulted. The feathers of the mantle and the scapulars follow and are moulted towards the hind neck. New neck-feathers are rich ginger forming the nuchal collar. The new barred feathers grow down over the belly (Plate 1c), then the feathers of back, rump and nape are moulted. Feathers on the legs and under tail-coverts are the last to be moulted and replaced. Plate 1d shows a bird that has virtually completed its moult.

The whole process takes 160–165 days and starts and finishes with amazing annual regularity—in some, almost to the day. One of the females studied began and finished moult as follows: 12 November 1965, 1 May 1966; 11 November 1966, 1 May 1967.

After the completion of the moult, the birds have a silvery sheen or bloom over the feathers, which remains until fraying begins again sixty days before the next moult. This sheen is absent in the plumage of juveniles.

Adult plumage

Greyish brown above with throat, breast, belly, thighs and under tail-coverts ginger barred white. Adult impermanent colours. Bill, black at tip, fading to bluish grey at base; cere and orbital skin, greenish yellow; iris, bright yolk-yellow; legs, yellow. In adult plumage, males are paler about the throat and greyer on the cheeks and crown than females. The barring is also generally paler.

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20 June 1975.