

# South Australian Ornithologist.

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VOL. XII.]

1ST JULY, 1934.

[Part 7.

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## The Hawks of South Australia.

By J. Neil McGilp.

(Part 1.)

The writer has often noted observations such as "Three Hawks were seen, but not identified," and having had a good deal of experience with most of our Hawks in the interior of the State, he decided that an attempt to give some clues to identification would be worth while, and perhaps helpful to observers who are not conversant with these birds. Descriptions of the species feather by feather, and so on, have often been published, but this is not very helpful, unless the bird can be secured. This paper does not attempt to treat with the subject in a scientific sense, but rather to place on record what the bird looks like in flight, as this is most often their position when seen.

In endeavouring to assist others to identify the Hawks the writer has found great difficulty in placing upon paper what he sees when a bird is in flight. It has proved almost impossible to compare contour of form, peculiarities in flight, and general behaviour of our Hawks. For instance, the writer will frequently use the word "volplane" when he wishes to convey the manner of flight when a bird shoots along with outstretched wings; other observers may refer to this as gliding or soaring. "Soaring" in this article will refer to a bird, which in flight, and without any movement, retains its altitude. I have endeavoured when using some of my favourite expressions, possibly inapt, to give some idea of the meaning of such expression in the initial pages of this paper.

A general knowledge of the contour of our Hawks is necessary for effective observation. It is well, therefore, to give careful

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study to the skins of the Hawks in Museums, or the live birds in our Zoological Gardens. In this way one can form an idea of the general characteristics of the body, tail and wing of each genus of the family. After such a study an observer will be able to identify with certainty one or more Hawks, and this will prove of great assistance in the field and be a help in the deductive identification of more of our Hawks.

There should be little difficulty in definitely naming such birds as the Wedge-tailed Eagle and the Kestrel. It is more confusing when one has to separate such birds as the Fork-tailed Kite from the Square-tailed Kite, the Black-shouldered Kite from the Letter-winged Kite, the Australian Goshawk from the Sparrowhawk, and perhaps others.

The observations given are those of the writer, unless reference to others is made. It might be pointed out that practically all of the observations have been made in the interior of South Australia, and these may not be general or even known with Hawks in other parts.

No detailed description of the birds, other than a general note of the more prominent features, is attempted, and those who are unable to handle skins or visit the Zoo will find great assistance in such works as Gould, Mathews, North, and others, while the "Australian Bird Book," by the late Dr. Leach, and "What Bird is That?" by Caley, are very useful.

A few notes on the habits of the birds, the plumage of young birds, and the nests and eggs are added, as these often help to identify correctly any species attending to nests.

It is with great pleasure that I offer my thanks to Mr. H. T. Condon, of the South Australian Museum, for a series of fine drawings depicting the tail of each species when seen from beneath the bird in flight. These drawings show the relative size of the tails and any prominent feature that can be detected when the bird is in normal flight.

*Circus assimilis*, Spotted Harrier.

The Spotted Harrier, until the last few years, was always considered an inland or interior bird, but there are now many references to it having been seen by competent observers in the more southern portion of this State, such as in the Clare, Riverton, Aldinga, and Pinnaroo districts. It is usually to be found in districts with a rainfall of less than 12 inches per annum, it being

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more frequently noted in the dry arid regions in the interior, and but seldom in the better rainfall country nearer our coast-line. In the latter areas its place is taken by the Swamp Harrier, a bird of very similar habit and character.

The Spotted Harrier may be briefly described as follows:—All the upper surface, excepting the shoulders of the wings, dark grey or slaty colour. The shoulders are a bright chestnut, most of the feathers being marked near the tip, with two large white spots on each side of the shaft, which give a most beautiful spotted effect. The face and cheeks are darker in colour, each

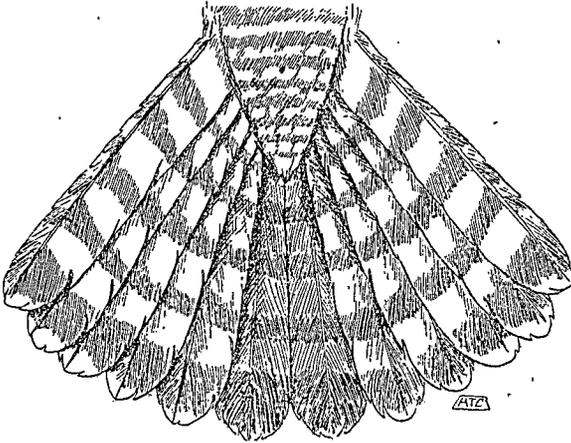


Figure 1. Spotted Harrier, ♂.

One-fourth natural size.

Tail, grey barred with dark brown; Coverts, light chestnut with broken bars of white.

feather having a brownish streak down its centre. The upper breast is dark grey, but the abdomen, under tail-coverts, thighs and under shoulder feathers are beautiful chestnut, each feather being spotted with white, producing a fine mottled appearance. Most of the wing-feathers are regularly marked with bands of dark brown, these bands being separated by a similarly-sized area of grey. The tail feathers are marked in much the same way as the wing feathers, except that the tips are almost pure white, which is conspicuous enough when the bird is in flight to help in the identification of this very fine bird. The legs (tarsus) are bare and yellow, as also is the cere and bare space near the eye,

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the irides are of a beautiful orange colour, and the bill is black at the tip, shading to blue at the gape. One could hardly imagine a more handsome Hawk. This, together with the fact that it does very little damage, should be sufficient to prevent its destruction.

In its flight the Spotted Harrier has much in common with the Wedge-tailed Eagle. The points or "fingers" of the wing are well separated and carried at a higher plane than the main wing. It also gets up high in the heavens, where it soars magnificently in wide circles. When seen from below this Harrier is very easily identified by the well-pronounced alternate bands of dark brown and light grey across the wing and tail; the lighter patches towards the hinder part of the wing; the black upturned "fingers" mentioned previously; the end of the tail not wedge-shaped, like that of the Wedge-tailed Eagle; and the rump dark grey. The bird that may more nearly be compared with the Spotted Harrier and may cause some confusion in identification is its near relation, the Swamp Harrier, generally referred to as the "Swamp Hawk." This latter bird has a very definite white rump, the upper tail-coverts and base of the tail feathers being white. This is an infallible sign of the Swamp Hawk, as even in young birds there is a suspicion of lightness in this region.

The plumage of the Spotted Harrier varies greatly, according to the age of the bird. In the immature state most of the feathers of the under surface have pear-shaped (streak with enlarged centre) markings along the shaft of the feather; these marks being much lighter than the rest of the plumage present quite a striped appearance. As the bird ages the pear-shaped markings diminish in size until they become spots, so that the plumage of the fully adult bird has a beautiful spotted effect. Young nestlings of the Spotted Harrier are clothed in greyish or smoky down with faint rufous marks on the tips of the feathers on the head and nape. Even at such a young age the bands on the tail are apparent. The female, as is usual with most of our Hawks, is a much larger bird than the male, which is about three inches shorter from tip of tail to the tip of the bill, and built in proportion.

The habits of the Spotted Harrier and the Swamp Harrier are very much alike; the latter bird is found more often over swamps and rush-covered flats, whereas the Spotted prefers more arid localities. It is often seen flying in a slow, lazy flapping manner close to the ground just above small bushes, ever and

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anon making a side-slipping manoeuvre or dropping down suddenly upon any prey it may see. It is also competent to take up the work of the Swamp Hawk should occasion arise, and when inland swamps become flooded it will attack above water. It soars well, reaching great heights, and comes earthwards in great spiral floats or in a series of side-slips, finishing with a dive, with its wings half-closed until near the ground, when it either descends upon its quarry, or, having decided it a hopeless proposition will flatten out by suddenly opening the wings and depressing the tail and volplane upwards to await a more favourable opportunity for attack. When the quarry is in the "squat" the Harrier has a peculiar falling or dropping motion which is used to land direct upon its prey. Much wing movement is noticed if the Harrier captures something that is too heavy for it to take up in its talons. As the captive struggles for existence the Hawk uses its wings in a cuffling sort of way, probably to confuse the victim. Its food consists largely of small animals, such as young rabbits, mice, rats, etc.; it also shows a great liking for insects, such as grasshoppers; not many birds are taken as food, unless there is a scarcity of other diet. Nearly all its food is taken from the ground. In attacking the larger game, such as full-grown rabbits, the Spotted Harrier seems to realize that it cannot expect to kill at the first attempt, unless it is very fortunate to strike the rabbit in a vital spot. It is usual to see the bird drop or dive down smartly upon its intended victim, strike with its talons at it, release and rise again; after several such strikes the bird drops fairly upon the, by this time maimed, rabbit. Should the rabbit or other attacked quarry reach cover between the "stoops" of the Harrier, the hunter will land upon the bush or cover, and by short upward leaps go through a performance of buffeting, working just above the bush until the hunted animal thinks it time for a hasty retreat; when it leaves cover the Spotted Harrier stoops again and helps further to weaken the poor hunted creature.

Any capture, that can be carried by the Harrier, is removed to the first available tree before the feast commences. This burden, as usual with all our Hawks, is carried in the bird's talons. If the prey is too large to carry away, the Harrier feasts on the ground, and on many an occasion loses its meal to a Wedge-tailed Eagle, which is a great robber of the smaller Hawks, so much so that I consider the greater percentage of the rabbits, which are thought to have been killed by the

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Wedge-tailed Eagle, are stolen from smaller birds and animals. When attacking the Spotted Harrier utters a short shrill squeal, much like that of a dog in agony. One can sometimes see the Spotted Harrier drop suddenly to the ground and jump along with flapping half-spread wings, as if "shooing" something in front of it, much in the same way that humans spread out their arms when trying to yard up sheep, fowls, etc. This is done, I consider, to drive the quarry into such a position as would give the Harrier an opportunity to effect a kill.

I have never seen or heard of the Spotted Harrier attacking sheep or lambs, and it does not often feast upon carrion, preferring to capture its own food. When grasshoppers are prevalent the Harrier spends much of its time after these destructive insects. I believe that the claws are invariably used to secure the grasshoppers, as I have never noticed them secured in the beak. It is interesting to watch the short leaps after the insects, and the suddenly outstretched leg as a capture is made. From my experience I am inclined to think that little, if any, food, is caught in the Hawk's bill. The talons are used for this purpose, whereas the beak is used to rip and tear up the food once it is caught. I have never seen anything being carried in any Hawk's bill, but I have seen references to some Hawks having done so.

The Spotted Harrier probably takes several years to reach maturity, if such can be judged from its plumage. One rarely finds two birds in full adult colour paired off for breeding purposes, and frequently both birds of a nesting pair have not attained the beautiful spotted dress.

At nesting time and during the hot summer days, when it seeks shelter in trees, the Spotted Harrier can be approached very closely for examination, but it is otherwise a very wary bird, taking flight at the least suspicion of danger.

The nest of this beautiful Harrier is invariably placed in the fork of a tree, in this differing from the Swamp Harrier, which, so far as the writer knows, never nests up from the ground or water. The Spotted Harrier often uses any suitable old nest, but I am of opinion more frequently creates a new nest for itself. The material used is composed of large sticks as a base, and smaller sticks, twigs, and rootlets for the egg cavity; this is then lined with a substantial layer of green leaves until the nest becomes almost a level platform. The nest is a large flat structure, sometimes of as great a diameter, but not as high or deep, as the nest of the Wedge-tailed Eagle. I have never

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observed the Spotted Harrier carry any nesting material in its beak, its talons being the means of transport; I have many times seen sticks fall from the bird's talons and from the nest as building proceeded, but not once did the bird attempt to rescue them. The lining is carried in short leafy branchlets, and the leaves are stripped off into the nest. The nest is completed a good while before the bird has any thought of laying; in the meanwhile it is jealously guarded by the birds. Both birds share in the building of the nest, but the female does by far the most work.

The clutch laid in a sitting is from two to five eggs, three or four being the usual number, this being increased or decreased in accordance with the food supply available. The nesting period is from July to October in the Interior, and probably somewhat later with the more southern birds. The eggs vary in size, but an average egg would approximate two inches by one-and-a-half inches. They are oval to rounded-oval in shape, though some very pointed eggs are occasionally noted. In colour the eggs are white to a bluish white; they are sometimes much stained through contact with green leaves in the lining of the nest. When nest stains occur at first glance the eggs appear to be smeared with a rusty or tan colour. The texture of the shell is rather inclined to be coarse, close-grained, and without gloss upon the surface. If held up before a light and examined through the hole used in blowing the contents out of the shell, a dark green colour will be seen as the inner lining of the shell.

Anyone who takes the trouble to study the habits of the beautiful Spotted Harrier will be satisfied that it is well worth while to protect it, but the fact that it is a Hawk is sufficient warrant for its destruction with people who do not stop to consider if its service is of any value to them. In this way one of our most beautiful and valuable birds is not allowed to continue its work of ridding us of many of our pests, such as rabbits, mice, rats, and grasshoppers.

*Circus approximans*, Swamp Harrier.

There are only two Harriers to be found in South Australia, or in fact, in Australia. They have much in common and a great deal that has already been written under the Spotted Harrier applies with equal force to the Swamp Harrier, which, as previously mentioned, is more or less confined to the better

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rainfall localities, where sheets of permanent water and swamps are numerous. This bird seldom visits the dry open country in the interior, and then only after heavy rains. It is, however, noticed along many of our rivers. Its true habitat is in the vicinity of swamps and reed-clad regions.

It may be as well here to give a brief description of the plumage of the Swamp Harrier, not in detail, but touching upon the more prominent features in the adult male. All the upper surface is reddish brown. The under surface is whitish buff, which is deeper in colour on the lower breast, abdomen, and

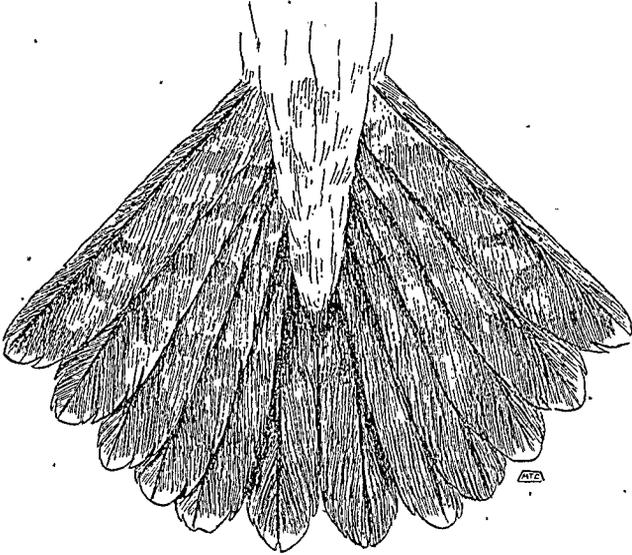


Figure 2. Swamp Harrier, ♀.

One-fourth natural size.

Tail, grey with indistinct darker bars; Coverts, buff with brownish stripes.

thighs, but every feather has a darker stripe down the shaft line. The rump and the base of the tail feathers are pure white. The tail feathers are greyish brown, with broken and more or less indistinct darker bars. There is a lightening of colour about the face and also on the nape, where sometimes an indistinct collar can be noted. The irides are yellow; the legs are bare and greenish-buff coloured with black talons; the bill is almost black at the tip, shading off to blue at the

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gape. The regions about the eye are very pale greenish yellow. The female is much larger than the male bird, but is dressed in similar fashion.

Probably one's first introduction to the Swamp Harrier is made when a reddish-brown bird is seen sitting sentinel-wise on some post, dry stump or any point of vantage near a swamp, or it may be that the bird is noted lazily flapping along just above the reeds or rushes, or again it may have been seen when it is attacking water birds at the swamp. This Harrier does not appear to soar in the true sense of the word. I would rather say it floats around, as its "soaring" generally reduces altitude very rapidly, and it is not apparently able to maintain its height for any length of time. It certainly can mount very high in the air, but does not stay up for long periods. It either comes earthwards in "floats" or uses a dropping side-slipping motion, ending in a dive when its wings are half-closed. Like the Spotted Harrier, this bird will "bank" or flatten out and shoot upwards when the onlooker expected it to crash to earth or into the water. When attacking, the Swamp Harrier is speedy in the dive and more adept in the swooping strike than the Spotted Harrier. Its attack is accompanied by a harsh screaming, which, together with the side-slipping action of the wings, helps to confuse its would-be victim. I have noticed the Harrier, apparently asleep, sitting on a fence-post at the edge of a swamp. Suddenly it hurled itself in a shuffling motion towards a short clump of reeds, screaming loudly; it did this twice before I noticed a half-grown duck swim away from its cover. Immediately the Harrier rose up and then with wings practically closed, stooped at terrific speed down towards the duck, which, at the first realization of danger, dived under the water a second before the Harrier could strike. Terrific as the stoop had been, I noticed that just when I expected a splash in the water, the bird had depressed its tail, opened out the wings, and shot upwards without disturbing the circle of ripples made by the diving duck. This is the nearest to an actual capture of a bird in water I have seen in relation to the Swamp Harrier, but I have seen many water-rats, small rabbits, etc., taken by this bird. I have not yet mentioned that the Swamp Harrier is equally at home over crops or grass-land as the Spotted Harrier; its falling side-slipping flight and its sudden drops to earth are in every way similar to the Spotted Harrier, as also is its method of attack.

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The nestlings of the Swamp Harrier are clothed in creamy down, the irides are brown, the cere yellowish, and the bill blackish blue, the legs and feet are of a yellowish colour. Semi-adult birds are practically in the same plumage, except that the rump is rufous, and not pure white as in the adults.

The pure white rump and base of the tail are certain clues as to the identity of the Swamp Harrier. This feature can be observed easily, as the bird is usually a low flyer, and does a considerable amount of turning and side-slipping, that is to say, it alternatively lowers one wing and then the other to the fullest extent below the body, as it falls towards earth in search for food.

The Swamp Harrier never nests in a tree, preferring to construct the home of its young upon the ground or on reeds, etc., in water. The nest is made of rushes or stems of plants, such as artichoke, thistles, etc.; it is very seldom that solid sticks are used in forming a nest, and then only when the nest is placed upon solid ground. The nest is often built up through the water or upon rushes or reedy growth, the bottom of the nest being more or less in the water. Old nests of Swans, if built amid reeds, are often used as a base for the nest of the Swamp Harrier. The nest is a large one, about twenty inches or more in diameter, usually very untidy; it is lined with finer material, which is broken into small pieces. The egg cavity is fairly deep, being sometimes six inches or more in depth. Some nests are found in the wheat, or grass, crops, but by far the greater number are situated over water in a swamp. The old nest is used year after year, the birds adding to or repairing it as thought necessary. I have on one occasion noted a Swamp Harrier's nest built on top of a small bush growing at the edge of the Hutt River on Bungaree Station, near Clare, this being the only instance where I have seen the nest above the ground, and then only about two feet. Usually the nest is fairly well hidden by herbage, grass or rush-like swamp vegetation. This Harrier is a fairly close sitter, and for this reason alone the nest is frequently not noticed.

The eggs are from three to six, five being the usual clutch; they are oval in shape; in some instances limy excrescences are found on the shell, especially at the smaller end. In colour the eggs are white, with occasionally a bluish tinge. The shell is rather coarse in texture; and pitted less deeply than the usual Hawk-eggs. While little lustre is present the surface is fairly smooth. The eggs are sometimes nest-stained, when they look

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unsightly. They vary greatly in size, but an average shell would measure barely two inches by one-and-a-half inches. When held before the light and viewed through the drill-hole, the inner lining of the shell has a bright green colour, but a much lighter green than one sees inside eggs of the Spotted Harrier. The nesting season extends from September to December, odd nests being occasionally noted outside that period.

The young birds show fight when one nears the nest; they turn on their backs and with their talons attack anything that interferes with them. The writer is not aware that this Harrier molests poultry in the farm-yard; much damage is hardly likely, as the Swamp Harrier is a wary bird, and does not hang around homesteads. It does not attack sheep or lambs, and as it does a fair amount of good work in destroying vermin it is worthy of protection, even though it does a lot of destruction amongst the swamp birds and small land birds, and is known to be a robber of eggs and young from the nest. Just recently I have heard from a reliable source that if the eggs of the Swamp Harrier are taken or destroyed, most of the eggs in nests of other species of birds in the vicinity are eaten by the Harrier, it is thought, as a reprisal; apparently the Harrier considers that its loss was caused by the action of some of these birds.

As a last word on identification, if a Hawk looks like a Harrier, has flapping, side-slipping action, flies usually close to the ground and has a *white rump* it is a Swamp Harrier. If no white is visible on the rump it is a Spotted Harrier.

*Astur fasciatus*, Australian Goshawk.

Here we come to a species which proves one of the problems of identification. It is so like the Collared Sparrowhawk, that the male Goshawk cannot with certainty be separated from the female Sparrowhawk unless the birds are handled. It is quite a problem to identify a skin of either of these Hawks; a close inspection of the toes is necessary, the middle toe of the Sparrowhawk being thinner and longer than the other ones, which is not the case with the Goshawk. In all other respects the two species are so much alike that one can only forecast an opinion as to the identity. It will therefore be realized that in the field it is hopeless to try to identify the Goshawk unless the female, which is much larger than the male Goshawk or the female Sparrowhawk, is present with her mate.

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It may be as well here briefly to describe those features of plumage that are prominent and readily seen in the skin of the bird or a live bird in hand. In the adult male Goshawk the colour of all the upper surface, except for an indistinct collar of rufous at the back of neck, is grey to greyish brown; throat, grey to brownish; all the rest of the under-surface and thighs reddish brown, each feather crossed by narrow white bands; wings and tail deep ashy brown, all feathers being crossed or barred with darker brown, the inner webs being a greyish colour, but also crossed with brown. The irides, bill, cere, and legs are of slightly different shades of yellow. The female is of the same plumage, but is about half as large again as the male bird.

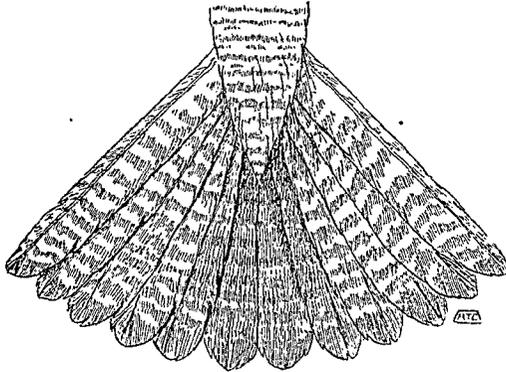


Figure 3. Australian Goshawk, ♂.  
One-fourth natural size.

Tail, grey with narrow brownish bars; Coverts, whitish with narrow chestnut bars.

As is usual with many of our Hawks, the Goshawk varies greatly in plumage, in accordance with the age of the bird. As nestlings they are found clothed in pure white down, the irides are brownish-red or hazel, the bill, cere, and legs are yellowish. When at a stage to be able to leave the nest each greyish brown feather of the upper surface is slightly marked with a fine arc or crescent of a reddish colour near the tip of the feather, the breast feathers are marked down the centre with a brown streak, and the flanks and tail-coverts are showing dark bars; the feathers of the tail and wings are very similar to those in the adult form.

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After a good deal of experience, the writer is not able to satisfy himself that he can identify the Goshawk male bird, because it is so much like the female Sparrowhawk. There is under suitable conditions of flight, a fairly reliable sign to allow more than a guess in naming the bird. As before-mentioned, one has to become expert at appreciating the contour of the Hawks; if this is done in flight, it will be noticed that the male Goshawk has a longer tail than the female Sparrowhawk. In fact, it is less than three-quarters of an inch longer, but in proportion to the body it looks much longer. One has to see the bird flying normally, straight ahead on even keel, to be able to detect this out-of-proportion feature. As a deal of practice is necessary to satisfy oneself in identification, I think it advisable to set the male Goshawk or the female Sparrowhawk down as both species? The female Goshawk and the male Sparrowhawk can readily be named by their size.

The Australian Goshawk is a very bold and dashing creature, and is found throughout the length and breadth of Australia, but prefers the lightly timbered country or the timbered fringes to the open plains. Its food supply, largely bird-life, is secured in the air, and is usually eaten during flight.

In attack the Goshawk secures its prey on the swoop or pounce. It invariably gets above its quarry, and with closed wings swoops down at terrific speed and strikes or grabs with its talons. When attacking or protecting its nest it utters a shrill single note, much like that of the Kestrel, but sharper; this note is rapidly repeated, and may be likened to a shrill chatter.

Though small birds captured on the wing are preferred as food, the Goshawk appears to relish a stern chase for its meal. Other food, such as small rabbits, mice, rats, reptiles, and insects add variety to its menu. Even when capturing grasshoppers I have never seen the Goshawk use its bill for such purpose. It relies entirely upon its wonderfully effective claws.

The Goshawk, so far as the writer is aware, does not feast on carrion; if it did so some instances would be forthcoming from the many poisoned carcasses and baits laid for wild dogs (dingoes) and foxes.

Like all the Hawks that have terrific speed in attack, it is rather a slow flier when not properly in warlike action; it possesses the power to almost instantaneously arrest its powerful dive or stoop by simply opening out its wings and

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depressing its tail when it is able to shoot upward to a great height, thus often preventing collision with the ground or other object. When not hunting the Goshawk mounts very high into the air, where it floats around for a considerable time, every now and again volplaning upwards to retain its altitude.

The Goshawk will, when in full flight after a bird, dash through small bushes in its endeavour to effect a capture, but it usually depends on its speedy pounce or stoop to secure a kill. Pairs are often to be seen flying lazily at a fair height above a rabbit warren, carefully watching for a rabbit to appear. Should one leave the burrow the Goshawk male instantly dives at terrific pace, and with wonderful accuracy, and if the rodent is a small young one it picks it off the ground and flies to the nearest tree, where it is joined by its mate. If, however the rabbit is large, the male usually strikes, but makes no attempt to lift the quarry, appearing to realize that it is useless to do so; his attack is immediately followed by a similar onslaught by its mate; the attack continues until, by alternate swoops or dives from both birds, the weakened rabbit can be landed upon and secured. The carcass is then feasted upon, unless a Wedge-tailed Eagle, which has, perchance, witnessed the kill, floats down and takes possession, depriving the Goshawks of a well-earned meal.

Like most of our Hawks, the Goshawk takes possession of any old suitable stick-nest, usually well up in a thin horizontal branch of a tree; this is lined with green eucalypt leaves (if available) until it is almost a flat platform. However, I consider that they build nests very frequently, probably because nests built in such positions cannot withstand the high winds, and if not looked after soon come to grief. When erecting its own home, small sticks are carried in the bird's claws until the nest is somewhat larger than a Crow's nest, and then a thick layer of leaves is built up till there is an almost level platform. I have on occasions seen a suddenly-flushed bird dislodge one or more eggs out of its nest as it scrambled away. The same nest or position is used every year, unless the eggs or young have been interfered with.

Three or four eggs are commonly found in a sitting; they are elliptical to rounded-oval in shape, odd eggs being more pointed than typical eggs. The shell is close-grained with a smooth chalky surface, and little if any lustre. The eggs are white to slightly bluish-white in colour, and somewhat sparingly marked with reddish or rust-like stains, smears or spots;

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occasionally eggs with a large blotch of this colour will be noted. The eggs are sometimes almost devoid of markings on the surface, but indications of sub-surface stains are usually present. Few of the markings appear definite, and they give the impression of accidental smudges. Odd eggs are marked with very dark hazel or even purple brown colour, but these are rare types. I have never seen the markings so placed as to form a zone or a belt, the colour being distributed haphazardly anywhere on the shell.

The inside, when viewed through the drill-hole, is a greenish blue, a beautiful delicate colour. In size there is great variation in the eggs; a typical egg measures approximately 1.82 by 1.46 inch; much smaller and larger eggs than quoted are often seen; even in the same set the eggs vary in length, but rarely in the short axis.

When in attendance upon young the Goshawks become very daring, sometimes swooping down, screeching the while, upon or at anyone that attempts to inspect the nest. At other times, when eggs are in the nest, it will fly around over the nest, and beyond an occasional close approach and crying will make no defence.

The Goshawk is a real terror to the owners of poultry farms. I consider that most of the damage done by Hawks can be placed against its account. It is such a valuable agent in the destruction of Australia's greatest pest, the rabbit, that it is well-worth protecting in areas where poultry are not kept. In closing my account of the Australian Goshawk, I might mention that I saw a magnificent adult-plumaged female Goshawk on the South Park Lands, close to South Terrace, Adelaide, on Monday, 2nd April, 1934. I have watched out for her since, but without success.

There are three other Goshawks in Australia. The White Goshawk is confined to Tasmania and the southern portion of Victoria. The Grey-backed Goshawk inhabits Victoria and New South Wales; both these birds have been merged into the one species by students of the group after much argument and consideration. There is one record at least of its appearance in South Australia, but as it is not really a South Australian species I will not deal with it in this paper. The third Goshawk, a larger bird found in Queensland and North-East New South Wales, is known as the Red-legged or Radiated Goshawk; there is no record of it having appeared in this State.

*McGILP—The Hawks of South Australia.**Accipiter cirrocephalus*, Collared Sparrowhawk.

This little chap is the "Dandy" of our Hawk family, for he is just as fastidious about his dress and appearance as he is over his food. He is, moreover, a real expert in the art of hunting, his actions being businesslike, deliberate, and never flurried. Watch the little fellow as he slowly winds his way in and out of clumps of bushes, apparently unconcerned about anything; suddenly his manner changes, his wings beat so rapidly that they seem to disappear, and his small body is propelled at terrific speed after a bird that his keen eye has detected; and before one realizes it, he has caught the bird, and feathers are fluttering to the ground as he commences his meal while continuing his flight. So rapid is the attack that the Sparrowhawk seldom fails to

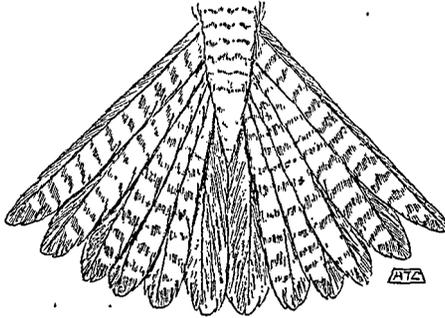


Figure 4. Collared Sparrowhawk, ♂.  
One-fourth natural size.

Tail, grey with narrow brownish bars; Coverts, whitish with narrow reddish-brown bars.

capture his quarry, which is struck or taken in his talons, and as he flashes past at lightning-like speed, one has a feeling that a missile of some sort has been hurled with great force through the air close to one's ears.

A general description of the adult male can be given in a few lines. Upper surface dark grey, the tail being indistinctly barred with brown; an indistinct rufous-coloured collar on the nape of the neck; all the under-surface reddish brown, each feather being crossed by lines of white, and the under side of the tail light grey and barred with brown. The bill is black; the irides yellow; cere and legs greenish yellow. The female is much larger than the male, which is little over twelve inches long; the sexes are alike in plumage.

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It may be said, that in all stages of plumage, the Sparrowhawk is a miniature Goshawk, for it differs only in the claws, where the middle toe is much thinner than the other toes; this does not occur with the Goshawk.

Although small, the Sparrowhawk is bold and courageous. It often attacks large birds, such as the Cockatoo, Pigeon, and Duck. During such onslaughts its movements are really astounding; its abrupt turning, its almost unerring aim, and the rapidity of its dive, whether in an upward or downward direction, call for much admiration. The writer has seen a male bird, single handed, so persistently attack a Galah—which finally fell to the ground, dead, and minus many feathers, which fluttered down after nearly every attack—that he sought rest in a nearby tree, until a little later he was joined by another bird, probably his mate, and both feasted upon the Galah. Both birds often attack in alternate dives when large game is being hunted, but as the menu more frequently consists of small morsels, single-handed combats are usually waged. Should grasshoppers, grubs or any insects be obtainable, they are greatly appreciated as food.

The Sparrowhawk is sparsely distributed throughout the State, but is more frequently seen in the higher rainfall areas. It is probably a more common bird than is generally supposed, for its activity, coupled with a keenness of sight, enables it to avoid detection, where a more sluggish bird would have been easily noted. At nesting-time, however, they become more venturesome, and they can be closely observed. Timbered country or patches of scrub in, or fringing, open or cleared land is the usual habitat of the species.

In the South-East of the State, early settlers planted clumps or avenues of pine trees (*Pinus insignis*) as a protection against the wind around their homes. These trees form a favoured haunt of the Sparrowhawks, and they very often breed there. The settlers consider the birds very valuable, for until they took up quarters near the homesteads, many birds such as Starlings, Wattle-Birds, etc., practically depleted the gardens of fruit. The writer found that the settlers of today are encouraging these little Hawks, for they help to keep in check other birds, which do so much damage, even if, as freely admitted, they take an odd chicken or so from the fowl-yard.

After a fairly long experience, the writer does not think it possible correctly to separate the female Sparrowhawk from the male Goshawk when both birds are flying, or to determine which

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species it is, when one of them is seen in the field. They are so alike in size, appearance, and action that identification can only be satisfactory when either is accompanied by its mate. For those who are prepared to risk it, a reasonable guess can be made if the bird is in normal flight, that is to say, flying overhead on an even keel, for the tail of the male Goshawk is longer in proportion to its body than is the case with the female Sparrowhawk.

In selecting a site for its nest, decided preference is shown for a leafy tree with many branches, amongst which the nest can be well hidden. As the bird is a close sitter, its nest is frequently only found by noticing a bird carrying a morsel of food to its sitting mate or from hearing the shrill chattering call as it approaches the nest.

Rather a neat structure, about the size of the Magpies' home, is made of small sticks or branchlets, and it is well-lined with green leaves, preferably those of a Eucalypt, if available, until the egg-cavity becomes almost flat. Records prove that a nest is often relined and used continually for many years, but my experience leads me to think that a fresh nest is more frequently constructed in the same locality, sometimes in the very tree that was used in previous seasons.

If anyone attempts to interfere with the nest, the birds will so courageously attack from all angles, that one has a most unpleasant time; the rapid dashes and the threatening shrill shrieking call of the birds create a feeling that contact might be made at some critical moment during the climb.

Three or four eggs are usually found in a full setting, but two eggs occasionally form the clutch; they are almost miniature Goshawk's eggs, but are perhaps rather more rounded-oval in form; odd eggs or sets are decidedly pointed at the smaller end. The texture of the shell is close-grained, rather chalky and without a trace of surface lustre, and the inner lining of the eggshell is a dark green colour. Now and again some sets show a slight gloss on the surface of the shell, but this is probably due to their having been sat upon for some time, and, by contact with the sitting bird, have become somewhat greasy. In ground-colour the shell is bluish white to a dull white, and this is sparingly smeared, blotched or flecked with various shades from rust-red to brown. Some eggs are without any marking; others have quite large patches of deep colouring, but in all cases the markings appear to have been accidentally placed upon the shell. An unusual type of egg could be best described, as having a

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washed-out smeary stain of yellowish-rust colour spread over a large area of the shell. The eggs are very often nest-stained. A typical egg measures approximately  $1\frac{1}{2}$  inches long by  $1\frac{1}{4}$  inches wide.

The writer is satisfied that we can safely follow the example set us by our South-Eastern people, and profit by giving a full measure of protection to the beautifully-plumaged Sparrowhawk. It is regrettable that its diet mostly consists of birds, but it may be forgiven, for it does a lot of good work in the destruction of an enormous quantity of destructive insects.

*Uroaetus audax*, Wedge-tailed Eagle.

Once commonly known as the Eaglehawk, this bird is by far the largest Eagle in Australia; it is now more frequently spoken of as the Eagle, which name, for the sake of brevity, will be used when referring to it in my treatment of this species.

The Eagle is very easily identified, for, with one exception, it is the only one of the family with a prominent wedge-shaped tail, and its size is such that few people will fail to recognize it. It is practically all brown in colour, each feather of the body being margined with a much lighter shade of brown; the feathers of the wings and tail are almost black; the head, throat, and shoulders are of a lighter brown colour than the body; the bill is black at the tip, shading to a light horn-colour towards the gape, which is flesh-coloured; the irides are a deep golden brown; the cere and skin around the eye are whitish, tinged with blue, and the legs are grey. Nestlings are clothed in pure white down, with white hair-like feathers on the head and neck; all the fleshy or soft parts are of a bluish colour, and the irides are a sooty colour. For several years the young bird has a beautiful golden-brown head, and its body is generally more rufous than in the adult.

The immature White-bellied Sea Eagle is the only bird that might be mistaken for the Eagle, for it is brown and has a wedge-shaped tail, which, however, has a wide white band at the end of the feathers. The adult Sea-Eagle will cause no confusion, for its under surface is all white and it has a white head.

When in flight the chief characteristics to note are:—A black wedge-shaped tail; its large size; and the tips or fingers of the feathers upturned from the carpal joint of the wing are spread out well and carried at a higher level than the rest of the wing.

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The Eagle is really majestic when in the air, especially when it is soaring around at a great height without any visible movement in its wings. It is interesting to watch the perfect, spiral soaring of the bird as it ascends into the sky until it is almost out of sight, and to see it with its wings pressed tightly against its body, shoot, meteor-like, towards the ground and suddenly, by opening its wings and lowering its tail, "flatten" out and float around for a few minutes before, again, soaring upward in wide-sweeping circles. It is probable that such evolutions are made during play, but the writer considers that they are made

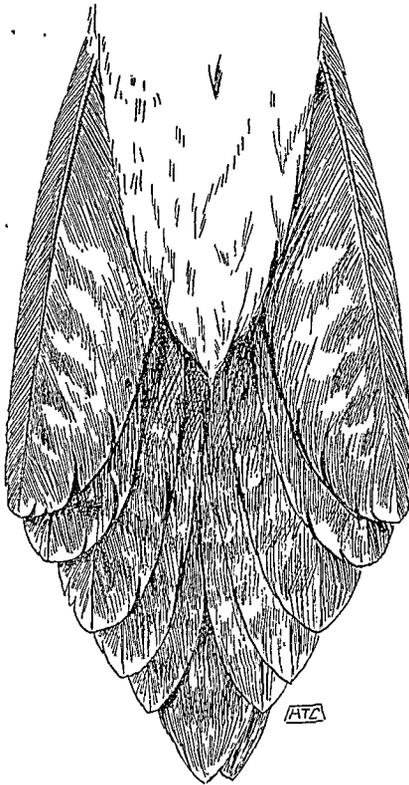


Figure 5. Wedge-tailed Eagle.  
One-fourth natural size.

Tail, brown with lighter mottlings; Coverts, buff.

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in response to a desire to more closely inspect some object, which had been seen from the higher level; frequently the downward action continues and develops into an attack on some bird or animal.

When floating or soaring the bird often utters a call, which resembles a high pitched "Wirra, leech," quickly repeated four or five times, but when it is attacking it gives forth a harsh scream.

For such a large bird—it measures up to three feet and more from head to tip of the tail—its flight is practically noiseless, more particularly so when it approaches its nest or perch, for it then flies down close to the ground, and at the last second floats silently up to its resting-place.

Though the Eagle often attacks its quarry in single-handed combat, both birds of a pair, and at times more, join forces, each taking its turn to dive at and strike their intended victim, until the latter falls from exhaustion or from loss of blood from many deep gashes inflicted by their powerful talons. If the kill is too heavy to lift, the feast takes place on the ground, but if it can be conveniently carried, it is taken to the top of a small bush, a large rock or to a feeding platform, if one is in the vicinity.

On account of it being necessary for the Eagle to take several running strides before it can rise from the ground, no great weights can be carried, as only the claws of one foot can grasp the load; consequently much of the food, whether it be carrion or freshly killed by the birds themselves, is eaten on the ground, when they often so gorge themselves that they can scarcely move. A great deal of its food is stolen from dingoes, foxes, cats, and the smaller Hawks. The writer has often caught a dingo through watching an Eagle flying close to the ground, when following some animal in the expectation of securing its kill. When a capture has been made it will land and, with outstretched wings, scare the animal, which usually takes cover in a nearby bush and becomes so intent in watching the feast and wondering if any will be left, that it can be closely approached and destroyed. The expected dingo has often turned out to be a fox or a cat.

When the Eagle was common in the settled parts of the State it was considered so destructive that it was declared "Vermin"; many attempts have been made in the last decade or so to remove this stain from its character, but, owing to vigorous objection from sheepbreeders, it still remains. Thousands of pounds must

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have been spent in destroying it, but, except in the more-populated areas, it is, at times, still numerous.

Though keenly interested in the preservation of useful birds, the writer, after almost a lifelong experience in sheep districts, cannot support any movement seeking protection for the Eagle; for he has suffered too often from the depredations of this bird in the Interior of the State, where it is, at times, not unusual to see fifteen to twenty, sometimes more, Eagles circling above a flock of breeding ewes, with murder aforethought. The writer has seen them actually killing lambs, and will attempt to describe their method of doing so. A mother ewe is usually able to protect her offspring from the attack of a single Eagle, but has little chance of doing so when two or more birds work conjointly; while the ewe is beating off one bird, another drops between her and the lamb, which seeing the Eagle, with outstretched wings, rushing at it, becomes confused, and rushes away from its mother; the Eagles, by strategic dives and striking the lamb from behind, continue to drive it on its headlong career, until, through exhaustion or mutilation, it drops and is slain before its mother, which has followed along in the rear, can reach it.

In the Interior, like most birds seen there, the Eagle is more or less nomadic, its movements being regulated largely by seasonal conditions, and when a food supply is plentiful it appears in such numbers that, if it be in the lambing season, great damage is done, and severe measures have to be taken against it. Where it is in fewer numbers and resides regularly in a district, there is no question about its killing large numbers of rabbits, which may outweigh any damage it does.

Probably everyone knows the huge stick-nest which is built by the Eagle; quite a cartload of fairly heavy sticks is used in its construction. To secure these sticks the bird simply alights on a suitable dry branch, which, when broken off by the weight of the bird, is carried off to the nest. It must not be supposed that in breaking off the limb the Eagle places its full weight upon it, for had the bird done so the material would be lost before the wings could support the burden. The branch or stick snaps off while the bird is more or less in flight. Many sticks are lost as they are being carried, in the talons, to the nest; others fall when they are being placed in position, but the writer has not seen them recovered; nor has he seen any sticks originally collected from the ground. This method of gathering heavy nesting-material is usual with many of the Accipitres. When

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the nest is nearing completion—it is a rough edifice and rather concave on the top—sprigs of gum leaves are then bitten off by the Eagles, carried in the claws to the nest, and used to make a bed for the eggs—one cannot call it a lining—until the whole is practically a flat platform. The nest is usually placed in a fork of a tall tree, but it is sometimes built close to the ground; one such nest was built in the spreading branches of a needle-wood with less than a foot between the bottom of the nest and the ground, when many tall Eucalypts were available within a distance of one mile.

A feeding-platform is sometimes noted; it is constructed of strong sticks; there is no lining, and it is usually placed fairly low down in a main fork of a tree. Food is carried to, and eaten on, the platform, which soon becomes a malodorous and repulsive affair, for the remains of flesh, in all stages of decomposition, are strewn all over it and the surrounding branches of the tree. Probably this is the reason why a feeding-platform is never converted into a nest.

Being such a substantial structure, the nest is rarely destroyed, except by human agency, so that all the Eagle has to do in future is to repair it when necessary, and reline or make a bed of leaves for the eggs; unless molested, the same pair will return to its nest year after year. The age of a nest can be estimated from the heap of sticks, intermingled with bleached and rotting bones, underneath it.

Many small birds, such as Whitefaces, Thornbills, and Finches, often build in the interstices of the underside of the huge nest of the Eagle, and are allowed to rear their young without being molested in any way.

Strange as it appears, the Eagle makes no attempt to defend the nest, and although it sometimes soars high overhead it generally clears right away when possible danger approaches.

Two, rarely three, eggs are laid before incubation commences; when three eggs are found it is noticed that they are usually much smaller and lighter in colour than typical eggs. The texture of the shell is coarse, slightly rough, deeply pitted, and the surface may show a slight gloss, though this is not usual, unless the egg has been incubated for some time.

The eggs vary greatly in shape, size, and colour; some are almost true oval in form; others are rounded-oval to almost globular, but a typical egg measures 2.85 inches in length and 2.38 inches through the shorter axis. In ground-colour there is

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much variation, all shades from buffy white to bluish white being found; sometimes the eggs in a set differ considerably in ground-colour, size, and markings, so that a description of a typical egg is not very helpful. Markings of minute spots, streaks, blotches, and smears of any colour from a lavender shade to dark reddish-brown are often observed. At times the markings coalesce to form zones, belts or large patches of colour on any area of the shell; other marks are light greyish purple, and appear as if below the surface of the shell. A well-matched pair of deeply-marked eggs is rarely found, though pairs with lavender-coloured markings are common. In the McGilp Egg Collection in the South Australian Museum, there is a setting of two eggs, one of which is lightly marked with purplish grey, and the other has more than half the surface very heavily blotched with deep reddish-brown; one can imagine that the mark was caused through it being partly submerged in blood and allowed to dry. Another very handsome pair, in the same collection, was taken in Victoria by Mr. W. J. Armstrong, of Hexham, and both are in colour and marking almost identical with eggs of the Brown Hawk. Odd sets of pure white eggs occur, but these have probably been laid by a bird, which had some misfortune with her previous clutch, for the writer has found that birds, which had been robbed twice in a season, always laid almost pure white eggs in the third setting. When a set contains one heavily marked egg it was invariably laid after the lighter-coloured one (this applies only to the bird's first set for the season). Only one brood of young is reared in a season, but if eggs are taken the Eagle will take possession of another nest and lay a second or third time if necessary. Only once has the writer found any eggs in a nest that was robbed that season; then the bird was seen to leave the nest, which was robbed of one egg two or three days previously; an inspection revealed another egg, so possibly the bird had completed its first set.

In closing, the writer deeply regrets that such a magnificent bird, the largest Eagle in the world in fact, does too much damage amongst breeding ewes and lambs to be worthy of full protection, for there is not the slightest doubt but that, as a carrion-feeder and destroyer of rabbits, it does a considerable amount of good, and, would it but change its diet from young lamb to rabbit, there would be no need of any law to give it protection.

*McGILP—The Hawks of South Australia.**Hieraaetus morphnoides*, Little Eagle.

This very fine bird is more often seen in the dry interior regions than in the better rainfall areas in the southern portion of the State. As its vernacular name suggests, it is a miniature Wedge-tailed Eagle, as the feathers continue down the tarsus to the feet, but instead of a wedge-shaped tail it has a very square-cut one.

Briefly, the Little Eagle may be described as having the back, rump, and wings brown; tail feathers brown, barred with blackish brown; head, throat, and breast brown, each feather being lined with lighter brown; the crown and nape feathers long, plume-like,

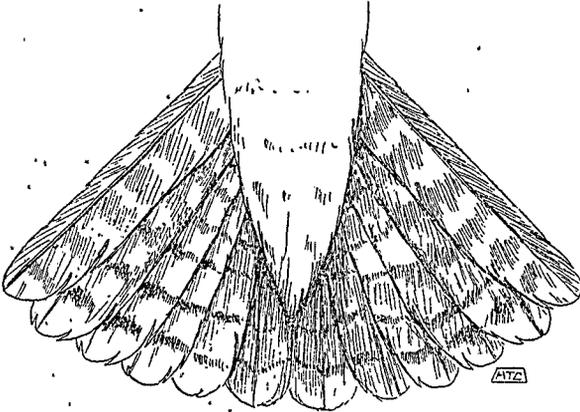


Figure 6. Little Eagle.

One-fourth natural size.

Tail, grey with indistinct bars of brown; Coverts, white with light chestnut patches.

and striped with black down the centre; the abdomen, under wing-coverts and thighs rufous, striped with black. When seen from beneath, the wing primaries are brown crossed with light brown bands, and the small underwing feathers are mottled with brown and rufous. The irides are bright hazel; the cere, bill, and feet are all bluish-grey colour. The plumage of the female closely resembles that of the male, but he is about four inches smaller, being, roughly,  $18\frac{1}{2}$  inches from the tip of the bill to the end of the tail.

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The chief points to note are, the compact, rather squat, square-cut tail and the deeper shade of the wing, which is shorter and more rounded than that of the Whistling Eagle, which may be mistaken for the Little Eagle, for both birds have a whistling call; the under markings are fairly similar, and the species may often be seen together. The tail of the Whistling Eagle is rounded at the tip, narrow and in proportion to the body; its whistle is a long, drawn out "Chew, chew," frequently repeated, while the note of the Little Eagle is a plaintive, high-pitched whistle, something like "Fee," followed quickly by "Few, few," in a lower tone.

There are two phases of plumage with the Little Eagle, one being much darker than the other; but, as both phases interbreed, the writer considers that the darker form is the immature bird. Little work has been done with regard to this variation in plumage, and it is here suggested that some of my readers may elucidate this problem.

The flight of the Little Eagle closely resembles that of the Wedge-tailed Eagle, in that it soars finely at a great height, from which point, and probably from a desire to more closely inspect some moving object on the ground, it will, with its wings partly-closed, "drop" down a long way before opening its wings, and gliding or volplaning upward to its original height. In the "drop" the body is kept near enough to a horizontal position with an occasional headlong dive. If suitable quarry is noticed, instead of the "drop" being arrested, it will develop into a head-on dive until near its objective, when it will "flatten" out and "drop" with its wings held well up, directly upon its intended victim, which is grasped in its talons, and, in the ensuing struggle to get away, the captive often creates a considerable dust. Most of the food is obtained by means of the "drop," and it is usually eaten on the spot, unless a Wedge-tailed Eagle has seen the kill and arrives to secure a cheap meal. If the quarry is large, it will be struck several times, and thereby weakened to such an extent that it can be held, before the attacker will attempt to grab it at the end of a "drop" action.

Since the introduction of the rabbit, the Little Eagle has practically subsisted upon this form of diet, but other small animals, birds, reptiles, and insects are often on its "menu." When grasshoppers are thick much time is spent in catching them; this is done by short leaps or flights; the insect is taken in the claws and transferred to the beak.

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The nesting habits of the species are of more than passing interest, in so far that a single egg is very frequently laid in a setting, and, as far as can be ascertained, this is not due to the seasonal conditions in the locality. Two eggs is a maximum clutch, but frequently one of these is addled.

The nest is usually borrowed for the occasion; any suitable large stick structure, if fairly high up in a tree, is repaired and lined with fresh gum leaves weeks before laying commences; in the interim it is carefully guarded. The birds often sit in the nest long before there are any eggs, and it has been noticed that fresh leaves are added a day or so before the first egg is laid.

The eggs vary in shape from oval to rounded-oval, and seldom have pointed small ends; in size, also, great variation is seen, but an average egg measures  $2\frac{1}{4}$  inches long by  $1\frac{3}{4}$  inches wide or through the shorter axis. In colour they resemble those of the Whistling Eagle, being white to bluish-white in ground-colour and irregularly marked with smudges, streaks, and blotches of reddish-brown, some marks appearing to be below the surface of the shell. The egg is fairly smooth, although rather coarse in the texture of the shell, and there is little, if any, gloss on the surface. The inner lining of the shell is a bright green when seen against a strong light through the drill-hole.

The nestling is covered in creamy down, having a few long hair-like feathers attached to the head and nape; the irides are deep orange, eyelids black, and the bill and legs a bluish-grey colour.

The Little Eagle is a very valuable bird, most of its food being obtained from vermin; it does not touch lambs, and rarely attacks domestic fowls. It is well worthy of any encouragement we can give it.

*Haliaeetus leucogaster*, White-bellied Sea-Eagle.

One is not likely to notice this sea-rover far from the coast-line, but it is occasionally seen on the River Murray, and perchance, for a mile or so, up from the outlet of some of our other streams, though generally it is confined to the ocean. It is easy to identify the fully adult birds, for the head, neck, and all the under surface are pure white; the tail is dark brown for two-thirds of its length, but the rest of the tail towards the tip is pure white, and the mantle and upper surface are grey. It has bare, yellow legs, brown irides, and a slaty-coloured bill. As stated in notes, under the heading of Wedge-tailed Eagle, the

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immature Sea-Eagle is all brown, except for one-third of the tail from the tip being pure white. This latter feature offers the only clue by which we can distinguish it at this age from the Wedge-tailed Eagle.

The adult Sea-Eagle measures from 30 to 32 inches in length, and is the second largest Eagle in Australia. When it is soaring overhead its beautiful coat of grey and white distinguishes it from all other Eagles; it has rather a short tail, and the wing-primaries are upturned and spread out at the tips. It is generally seen in pairs, unless when accompanied by the young birds; these do not stay with the parents very long, for at an

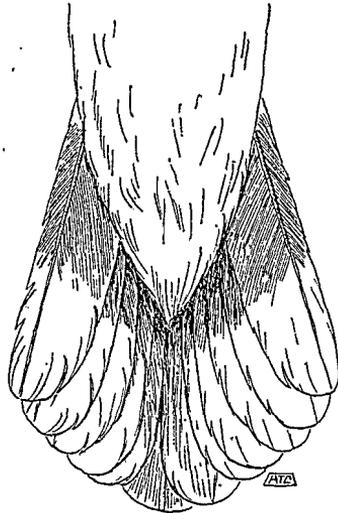


Figure 7. White-bellied Sea-Eagle.

One-fourth natural size.

Tail, white with slaty-grey base; Coverts, white.

early age they, like most young Eagles and Hawks, are hunted away to fend for themselves.

The Sea-Eagle is very local in habit, and can nearly always be found in the same quarters year-in and year-out for a lengthy period. Its food is mostly gathered from the sea, and includes all kinds of fish, sea-life, and birds. When diving down from a height the bird, in endeavouring to secure its intended victim, often completely disappears under water, from which it can be

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seen to emerge with a fish in its talons; its curved beak cannot be used, Tern-fashioned, to spear its prey. Food is usually eaten in the air, but is at times carried to any rocky peak or suitable tree before being eaten. When hunting on the land, which they often do along the coastline, the birds attack their quarry in much the same way as the Wedge-tailed Eagle, and, in swooping onslaughts, mutilate it before it is seized and killed. Such animals as dogs, cats, rabbits, hares, etc., are taken as food, and the carcase is either carried up into a tree or across the sea to its usual haunt on some small island.

The nest is often constructed on a knoll or a tree growing upon a small, sea-girt island; a pinnacle of rock, from which a wide view of the surroundings can be obtained, is a favoured foundation for the nest, which, as it is used year after year, grows to an enormous size; another favoured site is in the branches of a strong mangrove; such a one was found on a small island in Spencer's Gulf, and the writer well remembers the gigantic nest, and has often wondered if it is still there, or whether its, apparently insecure, support has given way and allowed it to fall to the muddy surface of the tiny isle; the nest was a fairly flat structure of mangrove sticks and lined with some dry mangrove leaves; the birds, though in the vicinity, had not laid eggs that season. On the mainland very tall trees are chosen as a nesting-site, and many of the nests are almost inaccessible, unless one has a suitable rope ladder for the climb.

Two, rarely three, eggs are laid before brooding commences; they are pure white in colour; rare sets with fine rufous spottings have been recorded; a typical egg measures about  $2\frac{3}{4}$  inches through the longer and 2 inches through the shorter axis; it may be a rounded-oval or almost globular in shape; the shell is coarse-grained and rather rough on the surface; sometimes a few limy nodules adhere to the shell; the surface gives off a musty or fishy odour. The egg is almost devoid of gloss when first laid, but, as incubation proceeds, it attains a greasy appearance and often becomes nest-stained. When held up against a strong light and inspected through the drilled hole, the inner lining of the shell is seen to be of a dark green colour.

It is hardly likely that the Osprey, another sea-ranger, could be mistaken for the Sea-Eagle, for its size is much smaller; its breast is mottled or striped with brown; it has a heavy flapping wing-action, and its tail is all brown.

*McGILP—The Hawks of South Australia.**Haliastur sphenurus*, Whistling Eagle.

The Whistling Eagle is fairly well distributed throughout South Australia, being, probably, more numerous along our inland lakes, creeks, and rivers, especially in good seasons, when it will congregate about the flooded areas. It is not usually noted far away from water, about which a plentiful supply of food is readily obtainable.

The adult male, which is smaller than its mate, has the head, neck, and all the under-surface a light buffy brown, each feather being margined with a deeper shade of the same colour; the back is brown margined with lighter brown or buff; the tail is light ashy brown; the wings brown, the feathers edged with whitish buff; the irides are bright hazel; the legs are bluish, and the bill and cere are a dirty yellowish or horn-colour. Young birds, at the age of a few days, are clothed in short white down with hair-like feathers attached to the nape and head; the irides are hazel; the cere, legs, and bill are the same as in the adults. Older, but immature, birds only differ from the adults in that they are darker in colour, and most of the feathers of the under-surface have a broad dark shaft line, giving them a very striped appearance.

The rather striking whistling note, resembling "Chew," rapidly repeated three or four times, is often heard floating down from a bird in flight; this, coupled with the fact that it has rather a thin tail, which is rounded at the end, and the points of the wings are so spread as to appear ragged, indicates that the bird is the Whistling Eagle, though at first glance one might have thought it a Little Eagle; no other bird is likely to cause any confusion.

It is little advantage to study the markings of the under-surface; these are so varied in both species that it is impossible to separate them in this way.

The flight of the Whistling Eagle is very sedate, slow, and deliberate; it soars finely in mid-air, but rarely gets up as high as the Little Eagle; it volplanes down, when prey is noted, but does not make the headlong dive, so commonly used by many of our Eagles. It will, for long periods, quietly, though giving a whistle now and again, rest on an exposed branch of a tree or on a stump, until something turns up, when it will swoop swiftly down upon its intended victim. It is a great carrion feeder, and in cleaning up old carcases does splendid work in destroying the breeding-places of the blowfly, which is

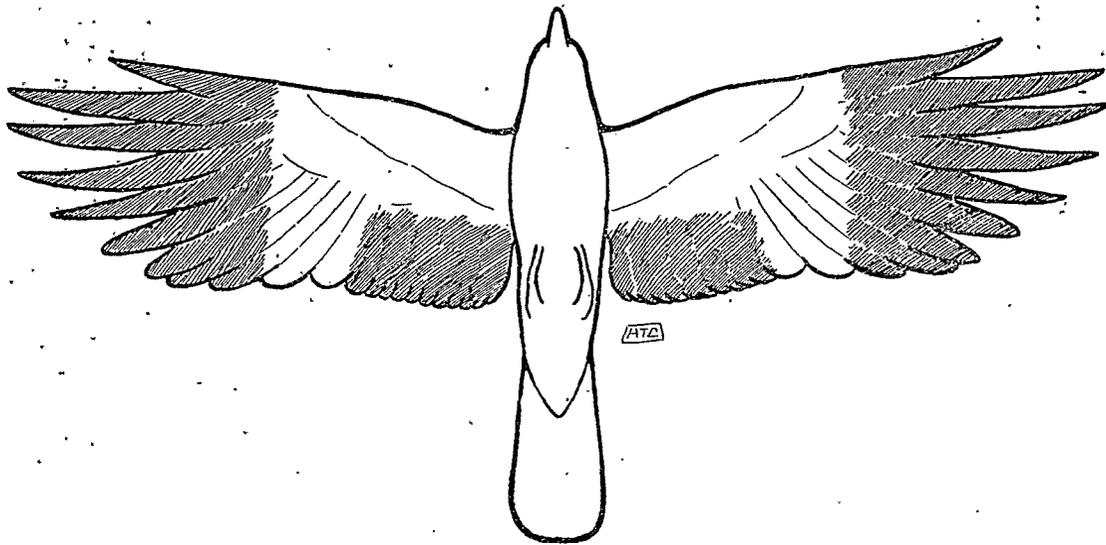


Figure 8. Whistling Eagle.

One-sixth natural size.

View from beneath showing the dark "fingers" and secondaries. The rest of the colour is very light brown.

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responsible for great loss to the sheepbreeders in Australia. It also enjoys a meal of grasshoppers and grubs, and, when these are plentiful, it spends much of its time on the ground. It is amusing to see such a large bird running a little distance or half-leaping, half-flying, in its endeavour to catch an insect that was more active than most. Many of these insects are picked up from the ground, but if they are in the air the claws of the bird are used to secure it before it is passed on to the bill.

The Whistling Eagle is very trusting, and it can be closely approached when it is perched, especially after it has had a heavy meal. It will be noticed that the tarsus is not feathered down to the talons, as is the case with the Wedge-tailed and Little Eagles; this clue may possibly assist in identification.

The food consists of many rabbits, which are more often caught when squatting, reptiles, insects, and occasional birds; it is all taken from the ground, for the bird is not able to secure anything, to speak of, in aerial attack; it is a slow flier, and not an adept at turning, which is essential for success in the air. The writer has noted that the tail is repeatedly fluttered and twisted when the bird is in flight, this peculiar feature occurs in the flight of the Black or Fork-tailed Kite, which is also a slow flier, and unable to catch birds in the air; this may possibly be merely a coincidence, but the writer thinks that probably such a tail cannot be held sufficiently rigid to effect a sharp turn to the right or left as is necessary when chasing quarry at full speed.

The Whistling Eagle rarely builds a new nest; when it does so, the site generally chosen is a substantial fork in a branch of a tree close to or in water, so that frequently the nest is above water; when such a site is not available, nests are built in gum-trees that line a creek or watercourse. Large sticks are collected from a tree, either by the bird lightly resting upon one for a fraction of a second, during which the wings remain open in readiness to lift the fractured stick, and to allow it to fall if it is too heavy to carry away in the claws, or, when perched, with the aid of one claw, the bird breaks off a suitable twig. All material is carried in the claws; sometimes pieces are dropped, but no effort is made to recover them, nor, so far the writer has observed, is any stick lifted from the ground. The bird takes quite a long time to finish off the nest, for the operations take place spasmodically, mostly in the early morning and rarely later in the day. Sprigs of green leaves are collected, carried in the claws, and the leaves placed separately in the nest, the bird using its beak to pluck them

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from the sprigs, which are seldom placed in the nest in their original condition, except as a foundation for the leaves. Generally an old, untenanted nest is borrowed; it is added to or scraped out as thought necessary, and finally a bed of leafy twigs and leaves is added until the whole is practically level; as the birds sit upon the nest for days before laying, quite a depression is made ready for the eggs. The nest is often placed in the fork of a dry limb or tree when it can, literally, be seen miles away.

Two eggs are more frequently found in a setting; but it is not uncommon to see a nest containing three eggs, but in this case the eggs are generally smaller. The ground-colour is white to bluish white; this is irregularly spotted, streaked, lined or blotched with every shade of colour, ranging from red to brown; sometimes these markings coalesce to form zones or bands of colour; these may be at either end or in the centre of the egg, and often some marks appear as if beneath the surface. Many eggs look as if they had been accidentally smeared or smudged with colour; others are practically white. The eggs vary considerably in colour, shape, and size. A typical egg would measure, approximately,  $2\frac{1}{8}$  inches long and  $1\frac{3}{8}$  inches wide, it may be fairly pointed at the smaller end, oval or rounded-oval in shape; the shell is close-grained, chalky, and has little, if any, gloss, and if held to a light and examined through the drill-hole it will be noticed that the inner lining of the shell is a beautiful green colour. A typical egg of the Little Eagle is more rounded-oval, not so well marked, and the inner lining usually darker than the eggs of the Whistling Eagle, but many sets of both species are so alike that it is impossible to separate them unless the rightful owner has been correctly identified.

Beyond flying about the tree and soaring overhead, calling the while, the Whistling Eagle makes no attempt to defend its eggs or young; this may be hardly necessary for, when quite young, the nestlings would probably be a match for any marauder, except it be a human being. It is no joke to have one's hand or finger scratched or grasped by the claws of quite young birds, which throw themselves on their backs when attempting to strike.

In giving a list of the food eaten by the Whistling Eagle, the item of fish should have been included, for, when living close to rivers, which contain fish, the birds take a good deal of it by swooping down close to the water and grabbing the fish in its claws, or by picking up dead fish washed ashore.

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The Whistling Eagle does not harm lambs, though during the lambing season they almost subsist on dead lambs, neither do they worry domestic fowls. Native birds are good judges of character, for they scurry to cover if a Goshawk or Falcon or a Sparrowhawk approaches, but take little notice when a Whistling Eagle soars overhead.