

THE MORPHOLOGY, MOULT AND TAXONOMIC STATUS OF THE BLACK-FRONTED TERN

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ABSTRACT

The plumage stages and moult of the Black-fronted Tern (*Sterna albostrciata*) of New Zealand are described, largely from field observations, and measurements are given. The Black-fronted Tern is compared with the Whiskered Tern (*Chlidonias hybrida*) with the conclusion that they are not closely related. The characters of *albostrciata* are those of *Sterna* rather than *Chlidonias*. The possibility of relationship with the Antarctic Tern (*S. vittata*) and the Kerguelen Tern (*S. virgata*) is revived and discussed.

INTRODUCTION

The Black-fronted Tern (*Sterna albostrciata*) of New Zealand has recently (Kinsky 1980) been restored to the status of an endemic New Zealand species after several decades as a subspecies of the Whiskered Tern (*Chlidonias hybrida*).

Its previous position was hard to understand because, although the Black-fronted Tern undoubtedly has feeding habits reminiscent of the marsh terns, it differs from the Whiskered Tern in many ways and can easily be separated in the field in all plumages. Now that the Whiskered Tern has been recorded in New Zealand (Heather & Jones 1979, Brown & Habraken 1979), the distinction between the two terns needs to be clarified so that they can be recognised in the field and also so that the relationship of the Black-fronted Tern with *Chlidonias* and *Sterna* terns can be better examined.

We present here observations on the plumage and moult of the Black-fronted Tern made by CL during an 18-month field study of the bird's food and feeding behaviour in 1975 and 1976, together with information from museum skins. Measurements by CL of study skins in New Zealand museums are also given. This material is then compared with the plumage and available measurements of the Whiskered and other medium-sized grey terns with black crowns, particularly the Antarctic Tern (*S. vittata*) and the Kerguelen Tern (*S. virgata*). The Black-fronted Tern is compared and contrasted with the Whiskered Tern, the extent to which it shows the characteristics of *Chlidonias* or *Sterna* is examined, and its possible relationships are discussed.

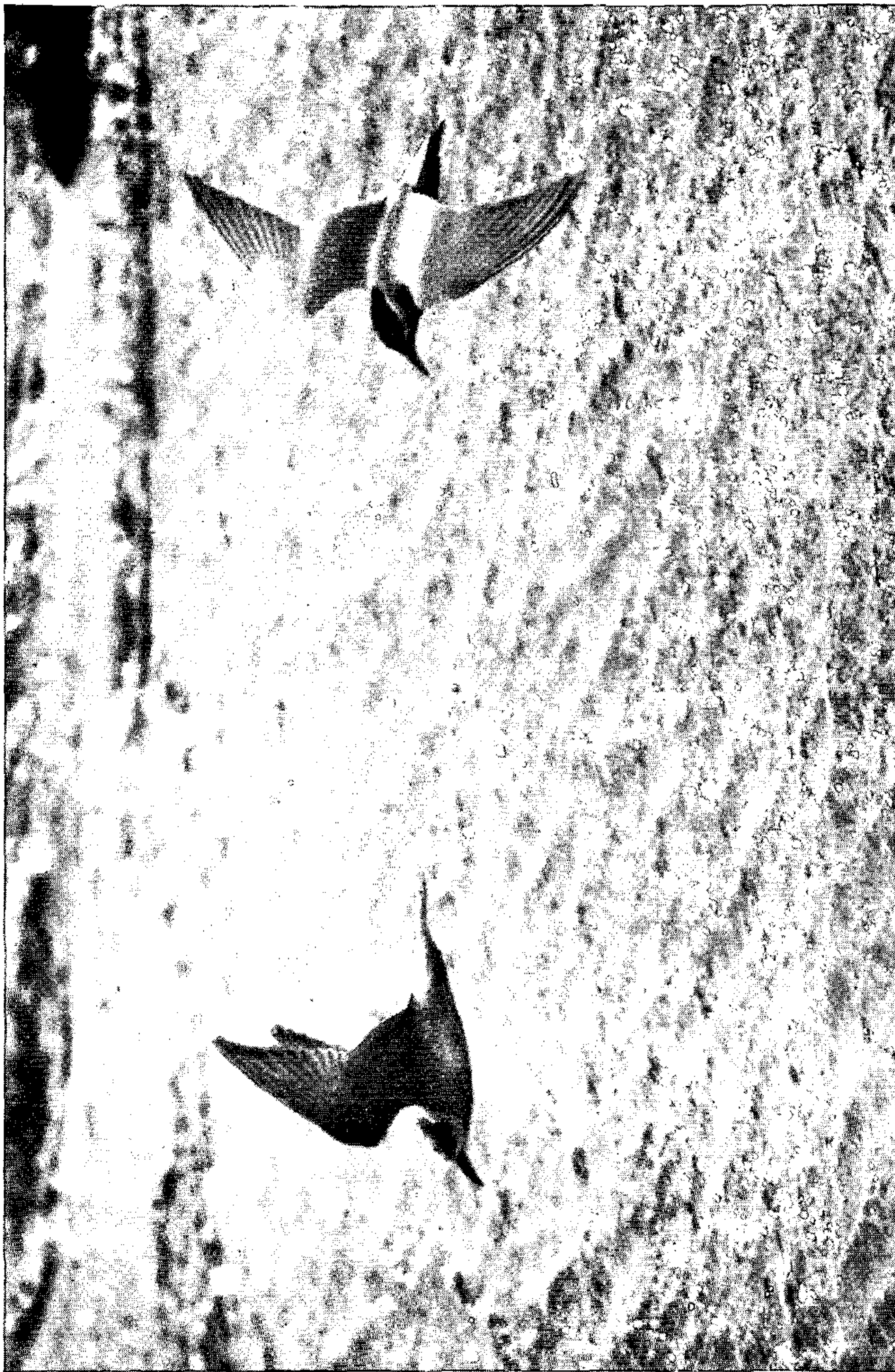


FIGURE 1 — Immature (left) and adult Black-fronted Terns, Otago Harbour, June. By June, all adults are in breeding plumage, whereas immatures remain in immature plumage all their first year.

Photo: C. Lalas

MORPHOLOGY AND MOULT

Plumage

The breeding and non-breeding plumages of adults, as seen in the field, are defined by the colour and pattern of the head, the only region of change noticeable in the field.

Adult breeding: Black crown approximately 70 mm long, extending from bill to nape and surrounding the eye, bordered below by a thin line of white. Rump, upper and under tail-coverts white. Wings and rest of body grey, slate grey above, paler below. Underwing pale grey. Primaries with darker tips; outermost primary with dark leading edge and a prominent white shaft. Rectrices pale grey with darker tips. Bill and feet bright orange. Iris black. See Figures 1, 10B and 12.

Adult, non-breeding: Like the breeding plumage, except that the head is pale grey with black feathers forming a rough U round the eyes and the base of the nape. See Figure 2A. A light scattering of black feathers on the rest of the head is visible only at close quarters. The bill and feet remain orange, but the tip of the bill may darken. Intermediate stages are shown in Figures 2B, 3A and 3B.

First winter and second summer (immature): Crown grey mottled with black; nape and ear-coverts black; chin white. Upper and lower body surfaces as in adults. Median wing-coverts pale brown, greater and lesser wing-coverts slate grey. Remiges and rectrices pale or mid-brown. Primaries and rectrices with darker tips. See Figures 1, 4A, 5A and 5B. The bill colour varies: it is usually very dark brown, reddish at the base, but may be at an intermediate stage towards the adult orange. Feet bright orange.

Juvenile: Crown and nape greyish brown mottled with black; lores and ear-coverts black. Lesser wing-coverts and feathers of the mantle and back brown, darker towards the tips but margined with yellow, giving the upper surface a mottled appearance. Throat, fore-neck, upper and under tail-coverts white; the rest of the underparts grey. Greater and median wing-coverts pale brown. Remiges, rectrices, and feet as in first-winter plumage. See Figures 4B and 6B. Bill very dark brown, reddish at the base. Feet bright orange.

Nestling: Covered with long down. Upper surface either greyish brown or pale olive-green, in each case with dark speckling. A dark patch on the lores and cheeks but not extending forward to the bill or back beyond the eye. Throat dark but not mottled. Rest of under surface white. See Figure 6A. Bill dark yellow with a black tip. Feet bright orange.

Moult

These notes are drawn from CL's field observations and photographs and so cannot be fully definitive. Most adults are in full breeding plumage by late May and all from the beginning of June to early



FIGURE 2 A — Black-fronted Tern adult in non-breeding plumage, Tasman Valley, January 1976. Note grey head, dark round and behind eye; primary moult in progress.

Photo: C. Lalas



FIGURE 2 B — Adult tern showing an early stage of head moult into non-breeding plumage. Tasman Valley, January 1976. Note head speckled with white feathers; new inner, worn outer primaries; pointed outer tail feather.

Photo: C. L alas

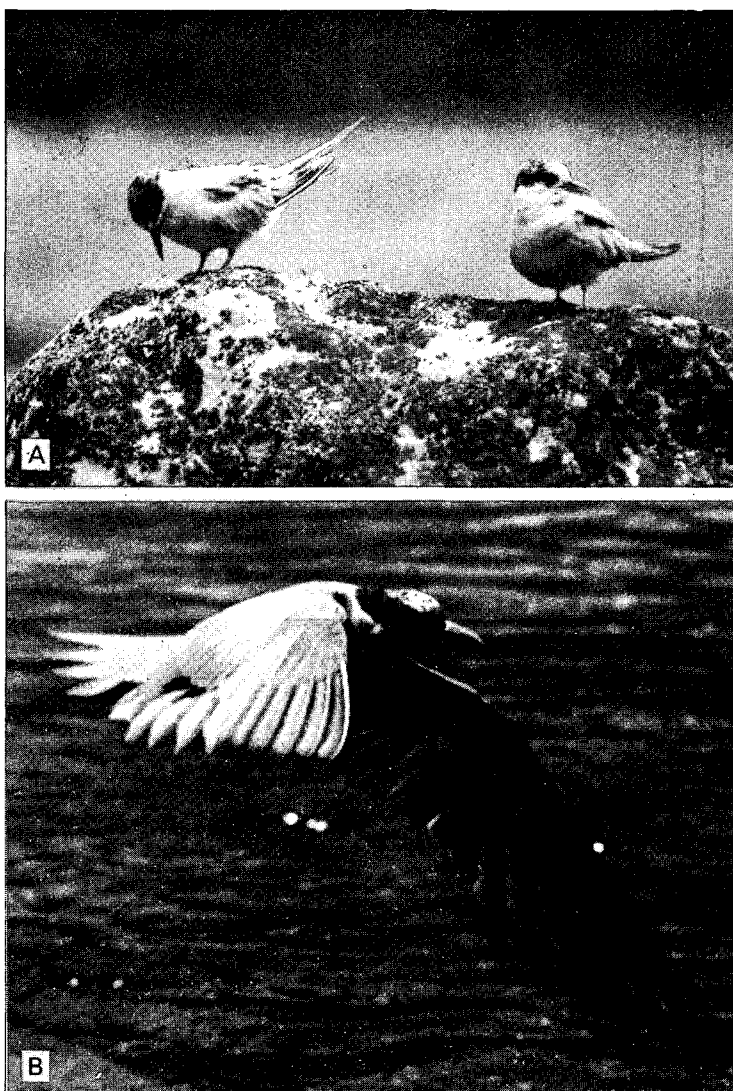


FIGURE 3 — Adults showing head moult into non-breeding "winter" plumage. A — Tasman Valley, March 1975. Unlike immatures, bill remains orange. B — Tasman Valley, January 1976. Crown is approaching the pale grey of winter plumage; black remains from eye to eye round the nape. Note prominent white shaft on leading primary.

Photos: C. Lalas



FIGURE 4 — A — Immature, Tasman Valley, November 1975. Note dark patches from lores to ear-coverts, not extending to nape; mottled crown; dark bill (dark brown in life). Much of wings and tail is brown. B — Juvenile, Tasman Valley, January 1976. Note white forehead, heavily mottled crown, mantle and back; black patches on lores and ear-coverts (black on "nape" is shadow); dark edge and white shaft of leading primary.

Photos: C. Lalas

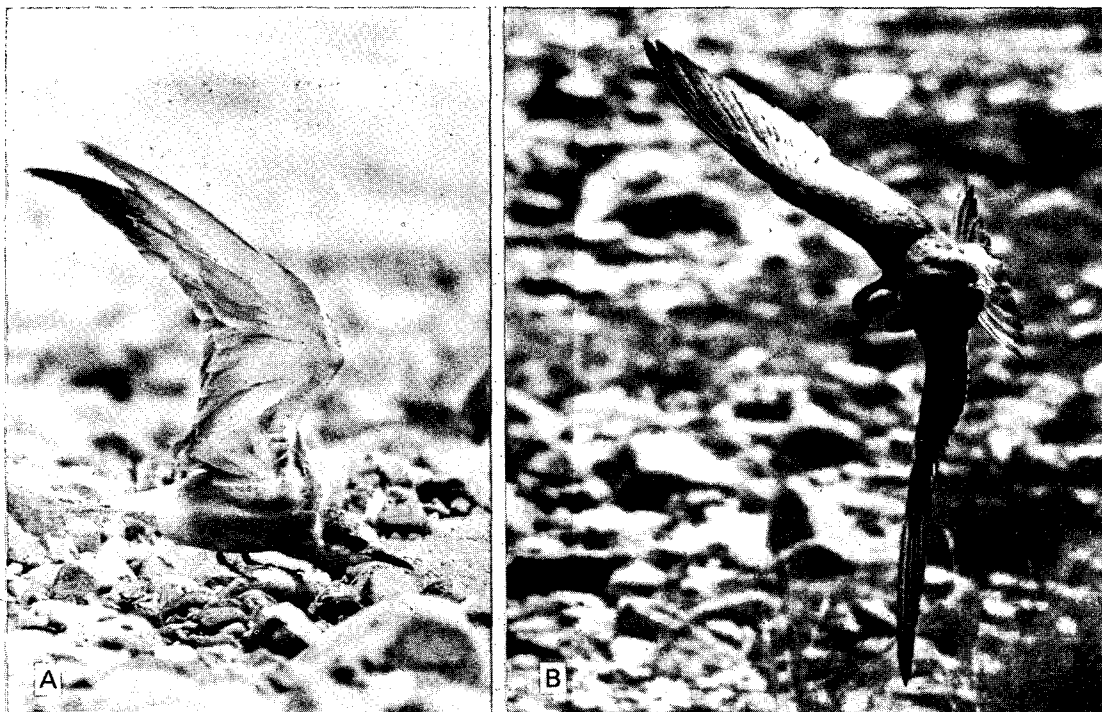


FIGURE 5 — Immatures, Tasman Valley. A — November 1975. Note head pattern; white rump and upper tail-coverts, characteristic of the species; grey underwings and underparts, as in adult. Bill is brown, legs orange. B — January 1976. Note shape of fully extended tail.

Photos: C. Lalas

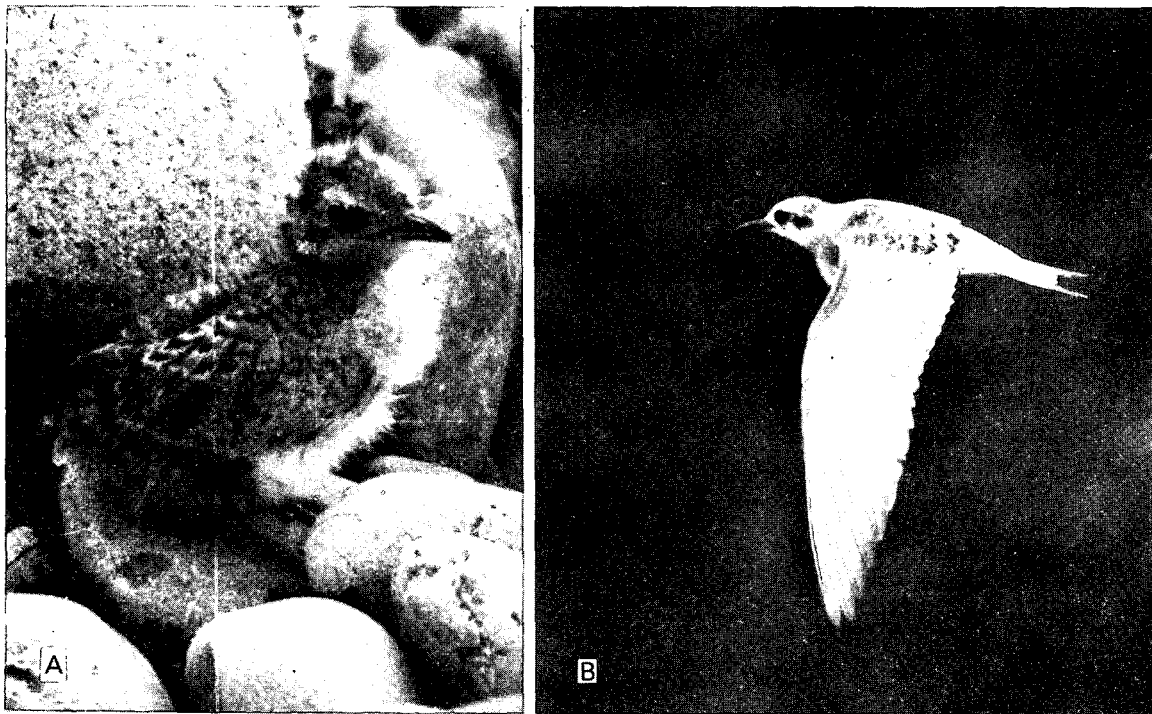


FIGURE 6 — A — Nestling, showing some growing back-feathers. Note down pattern of dark eye-patch, speckled upper surface, white below. B — Juvenile, Tasman Valley, January 1976. Note mottled upperparts, dark-tipped primaries, dark bill, forked tail. Wing-coverts are pale brown; lesser coverts mottled.

Photos: C. Lalas

November. They are in full non-breeding plumage from February to late April, only 2-3 months. Visible post-nuptial moult is confined to the head and begins with pale grey feathers replacing the black ones at the base of the upper mandible (Fig. 3A). Stead (1932) stated that the black cap starts to be lost before March, and CL has found from field observations that, more exactly, it starts in most birds between mid-December and mid-January. The roosting sites are littered with contour feathers from January to early May.

As with Charadriiformes in general, adult terns moult twice a year (Dwight 1901). The post-nuptial moult is always complete, and in the Black-fronted Tern, the moult of adult remiges and rectrices starts in January. The underparts of most grey-bodied terns, including the Whiskered Tern, lighten after the post-nuptial moult and the bill and feet darken to almost black in species with brightly coloured soft parts. By contrast, the colour of the body plumage of the Black-fronted Tern does not change visibly during the year, and the bright orange bill and feet of adults do not change colour.

Plumage changes distinguish in the field three age groups of immature Black-fronted Terns:

1. After first flying during December and January, the young are in juvenile plumage until March.
2. During March, the speckled wing-coverts and back feathers are lost, and by April, the back is uniform grey like that of adults. A post-juvenile head moult begins visibly in March or April and is completed by June or July. The change of bill colour from dark brown to the adult orange, which seems to be highly variable in its timing, may occur as early as August in some but in many others as late as the start of their second year.
3. Immatures begin their first complete moult at 14-15 months old, during March of their second year.

Note that the feet of Black-fronted Terns of all ages and at all times of year are bright orange.

Measurements

Table 1 gives the measurements made by CL of study skins in New Zealand museums. The totals include birds that had not been sexed. Tarsus and tail lengths were not taken, but Oliver's (1955) values are given in Table 3. The bill-length range of 24-28 mm is similar to Oliver's range of 25-28 mm, but the wing-length range of 230-257 mm differs slightly from Oliver's range of 240-260 mm.

Unlike the Whiskered Tern, no sexual dimorphism of size is apparent. The average lengths of male and female bill and wing are almost identical. The gonys, a feature of the lower mandible of Laridae, is not prominent. The bill depth is not significantly different between the sexes (t-test: 19 samples; t-statistic = 1.06; probability > 0.2), which shows that, unlike Whiskered Terns, males do not have a "heavier" bill than females.

TABLE 1 — Bill and wing measurements of adult Black-fronted Terns. (Lengths in millimetres from museum study skins)

		Number	Mean	Range	SD
Bill length	male	10	25.4	24.6 - 26.5	0.7
	female	13	25.5	23.5 - 27.1	1.2
	Total	31	25.5	23.5 - 28.2	1.0
Bill depth	male	8	7.2	6.2 - 8.2	0.6
	female	11	7.0	6.4 - 7.5	0.4
Wing length	male	10	244	230 - 257	8.6
	female	11	244	235 - 251	5.0
	Total	27	244	230 - 257	6.9
Body length	Total	5	290	285 - 300	—

Bill length = tip to feathers. Bill depth = vertical measurement at feathers.

Wing length = length of flattened wing (with natural horizontal curvature) from carpal joint to tip of longest primary; specimens with feather wear or wing moult excluded.

Body length = lengths of fresh birds given with study skins.

Total = male + female + unsexed adults.

SD = standard deviation of mean.

Thirteen bill lengths (mean = 25.1 mm) and 14 wing lengths (mean = 251 mm) were taken from museum skins of fledged Black-fronted Terns less than one year old. These birds had a wing length significantly less than that of adults (t-test: 41 samples; $t = 5.42$; $p < 0.001$) but a similar bill length (44 samples; $t = 1.19$; $p > 0.2$).

BLACK-FRONTED AND WHISKERED TERNS COMPARED

The question of the Black-fronted Tern's supposed relationship to the Whiskered Tern was reopened by Mees (1977) who, after a full review of the *C. hybrida* races, concluded that *albostriata* was not a subspecies of *hybrida* and indeed was not related to *Chlidonias* at all.

Table 2 lists the points of difference that are known to us. Some of these points were made or suggested by Mees from the small amount of material available to him and are confirmed and extended by us from our more extensive material. The only aspect we have not been able to consider is the colouring of the eggs.

The differences between many accepted species of tern are small, but the differences between these two are many and some are strong; indeed, the two birds are so distinctive that if they *are* related, the relationship must be distant.

TABLE 2 — Differences between Black-fronted and Whiskered Terns.

Black-fronted Tern (<i>Sterna albobriata</i>)	Whiskered Tern (<i>Chlidonias hybrida</i>)
Bill orange — all year in adult	Bill dark red — blackish in winter
Legs always orange	Legs dark red, blackish in non-breeding dress
White rump	Grey rump
Underparts always uniform grey	Underparts grading from grey on neck to blackish on belly in breeding plumage; white in non-breeding
Underwing grey	Underwing white
Cheeks grey, leaving only a thin white line below cap	Broadly white across cheeks and sides of neck
Bill of ♂ and ♀ alike; gonys not prominent	Bill of ♂ longer and heavier; gonys prominent
Short-legged; awkward on land	Longer legged; agile on land
More or less sedentary, dispersing to coasts	Strongly migratory or nomadic
Breeding and non-breeding plumages alike, apart from head	Breeding and non-breeding plumages very different
Non-breeding-plumage head grey; some black from eyes to nape	Non-breeding-plumage head white streaked blackish, especially on nape; blackish round eyes and on ear-coverts
Tail forked (Figs. 6B, 8, 11)	Tail square or almost so
Feet almost fully webbed; toes short	Webs deeply incised; toes long (Fig. 7)
Hind toe rudimentary	Hind toe well developed
Chick down speckled above and on chin and throat	Chick down with dark blotches above and prominent dark pattern across forehead, throat and sides of neck; chin white (Fig. 9)
Breeds on bare river shingle; nest a shallow scrape, usually unlined	Breeds on shallow lakes and marshes; nest floating, built of vegetation
Feeds typically over fast-moving rivers	Feeds typically over still or slow-moving fresh waters
In winter, largely coastal seas, harbours, rivermouths	In winter, largely inland fresh waters

Both birds are associated with inland fresh waters and adjacent fields, but Whiskered Terns frequent lakes and marshes, where they build floating nests, and migrate toward the equator to winter mainly in similar habitat, whereas Black-fronted Terns frequent swift-flowing rivers, where they build shallow nest-scrapes on the bare shingle, and

most winter on the seas, rivermouths and lagoons of the coasts, a small number moving to some North Island coasts (Lalas 1979).

Both birds have fairly short bills and have a similar freshwater diet mainly of aquatic insects, small fish and crustaceans. Both hawk over water or land and can take flying insects on the wing; but the largely marine diet of the non-breeding Black-fronted Tern has not been described. Both birds feed typically by diving at a shallow angle with the wings partly extended and usually only the bill touching the water. However, both may also drop to the water in a gentle dive, the Whiskered apparently in conditions of clear water to take fish and the Black-fronted at times when insects are in short supply and also to get food used in courtship displays and to feed the nestlings.

These points of partial similarity do not seem to outweigh the many points of difference between the two species.

CHLIDONIAS OR STERNA ?

The marsh tern genus *Chlidonias* includes three species, the Black Tern (*C. niger*), the White-winged Black Tern (*C. leucopterus*), and the Whiskered Tern (*C. hybrida*). It is largely a genus of convenience to accommodate those species which ornithologists recognise as a group apart by their feeding and breeding habitat and habits.

Some of the characters that define the genus seem rather arbitrary, the first two being probably the most meaningful:

1. The webs of the feet are deeply incised or indented;
2. The nest is a floating structure built of aquatic plants or twigs;
3. The toes, especially the mid-toe, are long and slender;
4. The hind toe is well developed; and
5. The tail is short and only slightly forked, the outermost feathers therefore having rounded tips like the rest.

The Black-fronted Tern fits none of these characters. It nests only on bare or sparsely vegetated river shingle, the nest being the simplest of scrapes and usually unlined (Fig. 10B, 12).^{*} The feet are almost fully webbed, in the manner of *Sterna* terns (Mees 1977; F. C. Kinsky, pers. comm.; Fig. 7). The toes are not unusually long or slender. The hind toe is almost rudimentary. The tail, although shorter and much less deeply forked than that of typical *Sterna* terns (slightly under the defined minimum of 50% of the wing-length, a rule broken anyway by the small terns such as the Little and Fairy Terns *S. albifrons* and *S. nereis*), is clearly and distinctly forked (Fig. 6B, 8 & 11), quite unlike the tail of the *Chlidonias* terns, the outermost feathers being much more pointed than the rest.

* Note, however, that the pair of White-winged Black Terns that nested in New Zealand in 1973-74 (Pierce 1974), the only Southern Hemisphere record, did so on shingle beside a freshwater coastal lagoon, in association with Black-fronted Terns.

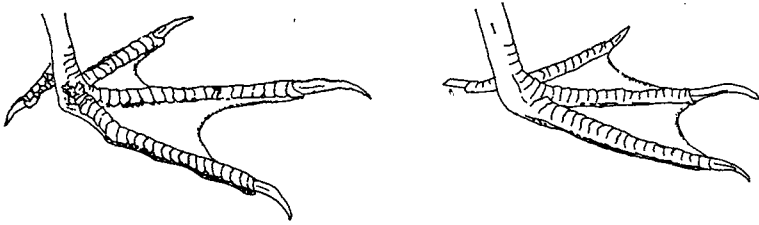


FIGURE 7 — Feet of (left) Whiskered Tern and (right) Black-fronted Tern; after Mees (1977). Note the difference in proportionate length of functional toes and hind toe, and in size of webs.

In addition, the marsh terns have dark-patterned nestlings, are strongly migratory, have short bills, and have very different breeding and non-breeding plumages. Of these points, the Black-fronted Tern has only the short bill, a feature of little significance on its own, particularly as its bill shape fits the classical shape of neither *Chlidonias* (stubby with distinct gonys) nor *Sterna* (longer than head, straight, and sharply pointed), being rather gull-like, abruptly curved at the tip (Fig. 12).

The upper half of Table 3 compares measurements of the Black-fronted Tern and the three species of marsh tern, including two subspecies of the Whiskered Tern. The two Whiskered Terns differ in size but have similar proportions. Much the same is true when the three marsh terns are compared, although some variation occurs, e.g. the Black Tern has a relatively short tarsus. The Black-fronted Tern is of roughly similar size to the Eurasian Whiskered Tern, much larger than the Australian Whiskered Tern, and yet its body proportions are different, having a shorter tarsus and longer tail proportionately than all the marsh terns.

Figure 9 compares the downy chicks of the Black-fronted with those of the Whiskered Tern and the Antarctic Tern. The Whiskered Tern chick has a prominent and precise pattern of blackish blotches on the back, black spots on the head, and black across the sides of the neck and the throat and on to the forehead. The chin is white, whereas the chin and throat of the other two are mottled. Apart from a dark patch that covers part of the lores and cheeks near the eyes, the Black-fronted Tern chick is very like the irregularly speckled chick of the Antarctic Tern, that is, typical of *Sterna* terns.

Because the Black-fronted Tern does not match the criteria for *Chlidonias*, it must by default belong to *Sterna*, some members of which it closely resembles. It thus returns to the generic status it originally had as *S. antarctica* (Finsch 1870, Saunders 1876, Sharpe 1879, Alexander 1928). The specific name *antarctica* was replaced by *albostrigata* because it was also a primary homonym of the South American Tern (*S. hirundinacea*).

TABLE 3 — Measurements of three *Chlidonias* species, *S. albostrigata*, and three other *Sterna* species.

Species Reference	Common name Breeding range	No. for means	Bill mean range	Wing mean range	Tail mean range	Tarsus mean range	Body mean range
<i>Chlidonias hybrida hybrida</i> Dementiev & Gladkov (1950)	Whiskered Tern Eurasia	14	- 27 - 34	223 223 - 247	- 80 - 90	- 22 - 25	- 270 - 280
<i>C. h. javanicus</i> Serventy <i>et al.</i> (1971)	Whiskered Tern Australia	12	29 25 - 32	222 208 - 231	77 70 - 82	21 19 - 23	- 240 - 265
<i>C. leucopterus</i> Dementiev & Gladkov (1950)	White-winged Black Tern Eurasia	46	- 23 - 27	208 196 - 222	- 65 - 75	- 18 - 22	≈255 245 - 270
<i>C. niger niger</i> Dementiev & Gladkov (1950)	Black Tern Europe, East Asia	122	- 25 - 29	213 200 - 227	- 80 - 90	- 15 - 18	≈260 245 - 280
<i>Sterna albostrigata</i> tail, tarsus Oliver. (1955)	Black-fronted Tern New Zealand	27	26 24 - 28	244 230 - 257	- 107 - 115	- 15 - 17	≈290 285 - 300
<i>S. vittata bethunei</i> Murphy (1938)	Antarctic Tern NZ subantarctic islands	14	36 32 - 38	258 250 - 270	134 119 - 138	19 18 - 20	- -
<i>S. vittata bethunei</i> Bailey & Sorensen (1962)	Antarctic Tern NZ subantarctic islands	10	35 33 - 39	267 262 - 275	135 125 - 145	19 18 - 21	≈355 340 - 370
<i>S. virgata</i> Murphy (1938)	Kerquelen Tern South Indian Ocean	14	28 28 - 31	257 253 - 270	129 118 - 136	18 14 - 19	- -
<i>S. striata</i> Serventy <i>et al.</i> (1971)	White-fronted Tern New Zealand	18	40 34 - 45	271 261 - 289	145 130 - 173	21 19 - 23	≈415 -



FIGURE 8 — Adult, breeding plumage. Note well-forked tail and pointed outer tail-feathers, though less so than the long streamers of many **Sterna** terns. Photo: M. F. Soper

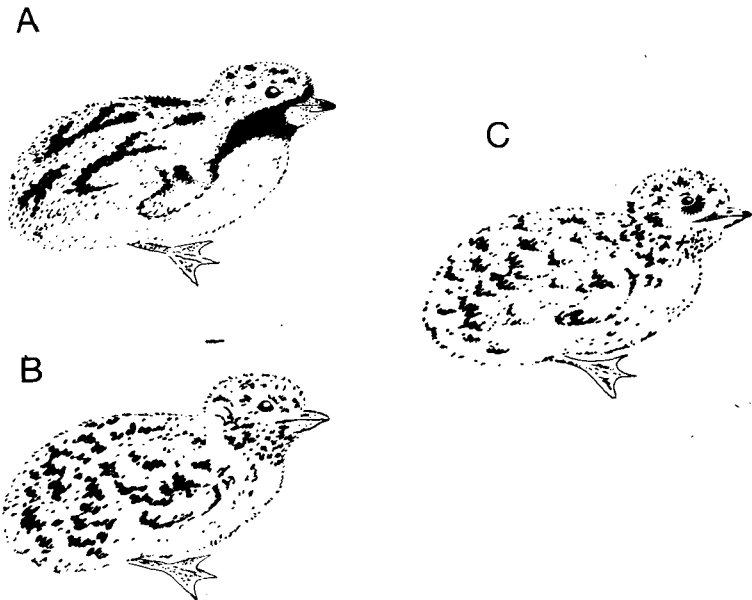


FIGURE 9 — Nestlings of three tern species. A — Whiskered Tern (after Volkens & de Vries 1946). B — Antarctic Tern (after Parmelee & Maxson 1974). C — Black-fronted Tern (from photographs).

A POSSIBLE *STERNA* RELATIVE

The Black-fronted Tern is very like two closely related Southern Hemisphere terns, the Kerguelen Tern (*S. virgata*), which breeds and is apparently sedentary at the Prince Edward, Marion, Crozet and Kerguelen Islands of the southern Indian Ocean, and the Antarctic Tern (*S. vittata*), which has a circumpolar breeding range, including the Antarctic Peninsula and the New Zealand subantarctic islands, that overlaps the Kerguelen Tern on the Crozet and Kerguelen Islands. Compare Figures 10A and 10B. Both Saunders (1876, 1877) and Sharpe (1879) thought *virgata* more closely related to *albostrigata* than to *vittata*, although both they and Falla (1937) observed that they differed in bill and foot colours and in shape of bill. However, the bills of all three, and particularly of *virgata* and *albostrigata*, are alike in being rather short and in curving fairly abruptly to the tip and, although the feet of *virgata* are dull red, those of the Crozet Island race of *virgata* are bright orange-red (Watson 1975).

The lower half of Table 3 compares measurements of Black-fronted, Antarctic, and Kerguelen Terns. Murphy's (1936) *vittata* measurements are for the Antipodes Islands and The Snares; Bailey

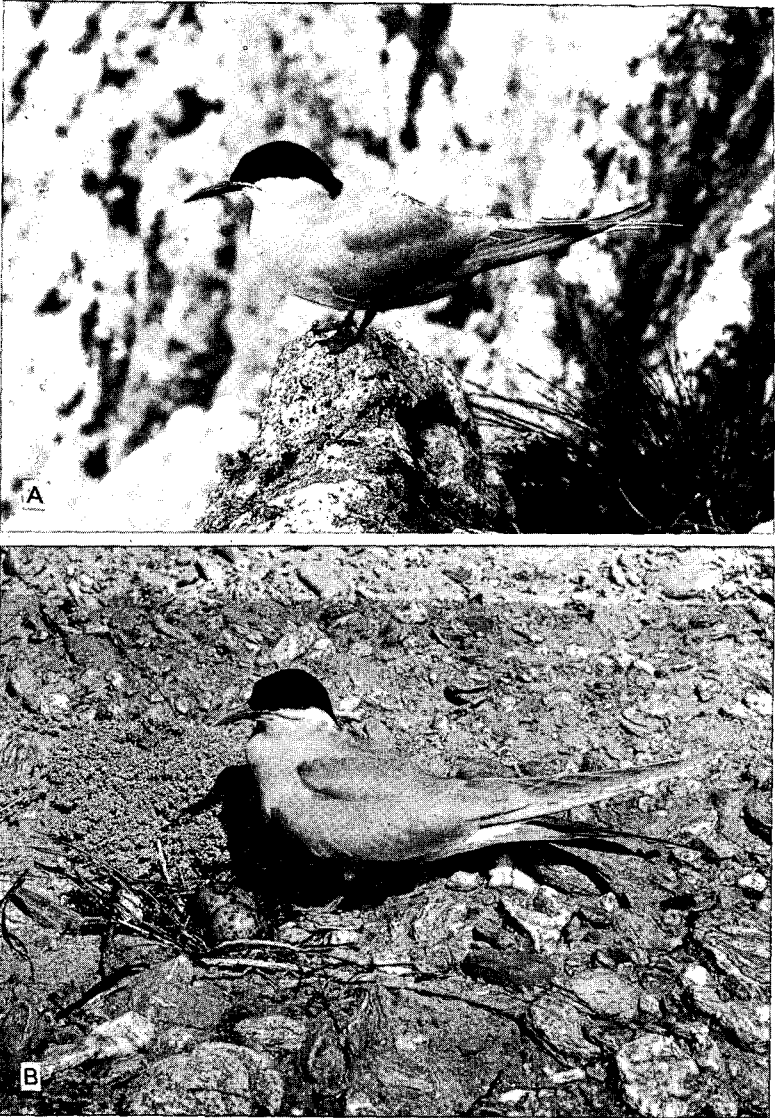


FIGURE 10 — A — Antarctic Tern (*S. vittata*) adult. The Snares, New Zealand, December 1976.

Photo: P. M. Sagar

B — Black-fronted Tern (*S. albostrigata*). Adult at nest, Otago.

Photo: M. F. Soper

& Sorensen's (1962) are for Campbell Island. The difference in wing-length values may reflect a difference in the populations or in the measuring techniques. For comparison, measurements are also given for the White-fronted Tern (*S. striata*) of New Zealand as an example of the medium-sized black-capped terns with long tails. The Black-fronted and Kerguelen Terns have a similar bill length, short compared with other *Sterna* terns. A progressive decrease can be seen in the relative length of the tail. The Black-fronted Tern has a wing length intermediate between *C. h. hybrida* and *S. virgata*, although it is overall of similar size to both.

Table 4 shows the measurements of *C. h. hybrida* and *S. virgata* expressed as percentage variations away from the *S. albobristata* measurements. They are calculated from Table 3 and so must be regarded as approximate only. All the Kerguelen Tern measurements are slightly longer than those of the Black-fronted, and their variations are not greatly different from one to another; whereas the Whiskered Tern measurements vary widely and most inconsistently. This comparison strongly suggests relationship to *Sterna*, to *S. virgata* in particular, rather than to *Chlidonias*.

TABLE 4 — Measurements of the Whiskered Tern of Eurasia and the Kerguelen Tern expressed as percentages of variation from the measurements of the Black-fronted Tern.

	Bill	Wing	Tail	Tarsus
C. h. hybrida	+17%	-5%	-24%	+47%
S. virgata	+ 8%	+5%	+15%	+13%

Of the Antarctic and Kerguelen Terns, the Kerguelen is remarkably like the Black-fronted, at least superficially. Of similar size, its plumage is very similar, although a shade darker grey, making its white cheek-stripe also narrow and even more prominent. The Kerguelen Tern, like the Black-fronted, has even-grey plumage, grey cheeks, contrasting white or whitish upper tail-coverts, and a short bill. Its underwing is grey, but, unlike the Black-fronted, is white in the juvenile, as in all stages of the Antarctic Tern. It is apparently non-migratory. Its non-breeding plumage differs from breeding plumage only about the head, which turns grey mainly on the forehead, but, unlike the Black-fronted, its bill darkens also. The feet of the Crozet Island race (*mercuri*) are almost orange, and the downy nestling is, from the description of Watson (1975), very like those of the Antarctic and Black-fronted Terns (Fig. 9).

Both the Kerguelen and Antarctic Terns build their nest scrapes away from the sea on rocky ground, often among mat plants, and sometimes on pebble or shell beaches but not sandy beaches. They are colonial but the nests are widely spaced. Kerguelen Terns start



FIGURE 11 — Adult Black-fronted Tern in flight, showing the prominent tail fork. Rakaia River, October 1977.

Photo: C. R. Veitch

nesting about the beginning of October, and the young are usually fledged by January, a period similar to that of the Black-fronted Tern. The Antarctic Tern is about a month later, and on Kerguelen, Heard and Crozet Islands, it is about 2 months later, after the Kerguelen Terns there have finished (Falla 1937, Watson 1975).

The adults of the Kerguelen and Antarctic Terns are sedentary, but the young possibly stay at sea for their first winter. The Antarctic Tern feeds inshore taking small fish and crustaceans, using both steep- and shallow-angled dives (Murphy 1936, Sagar 1978). The Kerguelen



FIGURE 12 — Black-fronted Tern on nest. Note shape of bill; narrow white line below cap. Rakaia River, Oct. 1977. Photo: C. R. Veitch

Tern feeds over inland freshwater ponds and marshy terraces taking spiders, insects, and insect larvae, and over the shallow water and beaches of the rocky shoreline taking mainly amphipods and isopods (Falla 1937). It is not on record whether the insects taken inland are aquatic or terrestrial and what the feeding habits are in winter. Fish are not an important part of the diet. The food and foraging habits of the Kerguelen Tern and its nest sites are not too dissimilar from those of the Black-fronted Tern and no great adaptive change would be needed from one to the other.

Murphy (1936) separated the *Sterna* terns of the Southern Hemisphere from their Northern Hemisphere equivalents by differences in the juvenile plumage. Young southern terns, including *S. hirundinacea* of South America, *S. vittata*, *S. virgata*, *S. striata* (White-fronted Tern), and *S. albostrigata* have a much more heavily barred and streaked upper surface than young northern terns. However, *striata* and *albostrigata* juveniles are pale grey on the under surface, lacking the speckled brown and grey throat and upper breast of the juveniles of the other southern terns. In this respect, they are more like northern terns. Unlike the downy-nestling plumage, therefore, the juvenile plumage of the Black-fronted Tern gives conflicting evidence of relationship.

CONCLUSION

From the information we have brought together, we are satisfied that the Black-fronted Tern is not a racial variant of the Whiskered Tern and that, despite some similarity of behaviour and plumage, it does not meet the criteria for *Chlidonias* either. As *Sterna albostrigata*, it has tempted us to speculate, as early writers did, on an affinity with the Kerguelen Tern. The resemblances seem to be close, even to sharing a shape and length of bill and tail that are not typical of *Sterna*. However, heeding Murphy's (1938) warning against jumping to conclusions on the relationships of the black-capped terns based on adults in breeding plumage, we have tried to examine other aspects and hesitate to give a firm opinion. Far too much is not known about Southern Hemisphere terns, and, in particular, a thorough review is needed of the Kerguelen and Antarctic Terns. We think, however, that there is a *prima facie* case to investigate of possible affinity between the Kerguelen and Black-fronted Terns.

The changed status of the Black-fronted Tern raises its importance to that of an endemic New Zealand species. The completed and planned construction of hydroelectric dams across the shingle riverbeds of the South Island not only drowns the upstream parts of the bed but, by promoting downstream the consolidation by plants of bare ground normally scoured by floodwater, deprives the Black-fronted Tern of the extensive bare shingle their breeding colonies use. As an endemic species, its case is strengthened to retain its habitat if the rivers are to be changed excessively.

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SHORT NOTE

UNIDENTIFIED TERNS

On 15 December 1979 at 26°41'S 176°03'W, I recorded three terns, which appeared about the size of, or slightly larger than, the White Tern (*Gygis alba*). They had grey upper surfaces, whitish under surfaces, black caps with white foreheads, and dark bills. The birds, which showed no interest in the ship, were flying directly on a course of about 190° true and at a height of about 100 feet.

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