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BLACK-FRONTED TERNS WINTERING IN THE BAY OF PLENTY

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ABSTRACT

The habits, feeding and plumage variations of the Black-fronted Tern (*Sterna albostrata*) were studied during their April to August wintering period in the Bay of Plenty, from 1977 to 1981. Their migration to and from, and occurrence in, the North Island is discussed. The possibility of numbers visiting the Bay of Plenty being on the decline is raised. The study of the plumage variations led to the conclusion that two age-groups are present and readily recognisable during their entire stay in the Bay of Plenty and a third is recognisable for at least 3 months of the wintering period. The extent of time over which the autumn-winter moult of the adult takes place is discussed.

INTRODUCTION

The Bay of Plenty, and in particular the small coastal area between Matata and Whakatane, is the northernmost known regular wintering ground for the Black-fronted Tern (*Sterna albostrata*). It is present in varying numbers from the end of March to early August, at rest at the mouths of the Rangitaiki and Tarawera Rivers, foraging over the flat low-lying Rangitaiki Plains, or feeding at sea. The following pages record observations made during my frequent visits to this wintering ground from 1977 to 1981.

OCCURRENCE

That the Black-fronted Tern has been wintering in the Bay of Plenty for at least a century is evident from Buller's record of a flock at Maketu in about 1880 and from two birds collected by Liardet at

Whakatane in the winter of 1897 (Sibson 1948). Unfortunately the size of the flocks occurring at this time is not known.

The next Bay of Plenty records are of two immature birds seen at the Rangitaiki mouth on 8 September 1940 and four birds seen near Thornton on 15 May 1947 (Sibson 1948). From 1950 to 1960, winter records exist for every year except 1956; 1952 and 1953 being particularly well detailed by Sladden (1953, 1954). Except for six birds seen at the Tarawera mouth in April 1968 (Jackson, CSN 1972), I am not aware of any sightings between 1960 and my first visit to the area in 1972. Winter records exist for every year from 1972 to 1981, although the only 1974 record that I know of is of a single bird seen by me off Mayor Island. I did not revisit the Matata-Whakatane coastal area until 1977.

The birds are difficult to count accurately because the flock is usually fragmented, some birds being at sea, some perhaps at roost on the beach, and some feeding inland. I had to make frequent and lengthy visits to the places they occur, during a winter season, to obtain an accurate total. Recently I have formed the opinion that the Black-fronted Tern to some extent uses the Rurima Islets, 8 km offshore, as a day and a night roost. Some days very few birds are to be found on shore, particularly when periods of fine, calm weather coincide with heavy human disturbance on the beach, especially by dune buggies and trail bikes.

Annual numbers are very variable. The following is a list of the highest number seen each year in which any were recorded. Those marked with an asterisk are probably close to the correct winter totals for the district.

8/9/40	2 (imm) Rangitaiki mouth (Sibson 1948)
15/5/47	4 near Thornton (Sibson 1948)
1950	"The odd bird or two" (Sladden 1953)
1951	"A few more than last year" (Sladden 1953)
*19/7/52	129 Matata (Sladden 1953)
*21/7/53	83 Matata (Sladden, CSN 1954)
*26/6/54	60+ Matata & Rangitaiki mouth (Sladden, d'Auvergne & Blomfield, CSN 1955)
2/9/55	8 (imm) Rangitaiki mouth (Sibson, CSN 1956)
10/5/57	31 Tarawera mouth (Merton, CSN 1958)
28/3/58	12+ Tarawera mouth (Black, Blomfield & McKenzie, CSN 1959)
23/5/59	18 Rangitaiki mouth (Sibson, CSN Jan. 1960)
8/3/60	4 Tarawera mouth (McKenzie & McKenzie, CSN Dec. 1960)
4/68	6 Tarawera mouth (Jackson, CSN 1972)
13/8/72	20+ Rangitaiki & Tarawera mouths combined (pers. obs.)
18/8/73	2 Tarawera mouth (Jackson, CSN 1974)

- 30/6/74 1 off Mayor Island (pers. obs.), the only recorded sighting for the Bay of Plenty this winter. The Matata-Whakatane coast was not visited by me and apparently not by others.
- *Winter 1975 38 Rangitaiki mouth (Palliser, CSN 1976)
- 12/6/76 2 Tarawera mouth (Weston, CSN 1976)
- *15/7/77 29 Rangitaiki & Tarawera mouths combined (pers. obs.)
- *13/5/78 58 Tarawera & Rangitaiki mouths combined (pers. obs.)
- *20/5/79 14 Tarawera mouth (pers. obs.)
- *18/5/80 48 Tarawera mouth (pers. obs.)
- *6/6/81 35 Tarawera & Rangitaiki mouths combined (pers. obs.)

In addition, there are the following sightings in other parts of the Bay of Plenty.

- 21/2/53 2 Mt Maunganui beach (Hodgkins, CSN 1954)
- 23/3/54 1 Waiaua River mouth, near Opotiki (A. J. Goodwin, pers. comm.)
- 28/2/54 1 Mayor Island (Watson, CSN 1955)
- 28/5/58 2 Pongakawa (Black, Blomfield & McKenzie, CSN 1959)
- 12/12/59 12 Rurimu Rocks (= Rurima Islets?) (Parham, CSN Dec. 1960)
- 30/6/74 1 five kilometres NE of Mayor Island (pers. obs.)
- 12/11/77 1 Sulphur Point, Tauranga (H. D. Anderson, pers. comm.)
- 28/3/81 1 Matahui Point, Tauranga Harbour (pers. obs.)

These records show that, although its numbers vary, the Black-fronted Tern is in the Bay of Plenty, particularly the Tarawera-Rangitaiki area, every autumn and winter. Years with few or no recorded sightings reflect, in my view, a lack of observers rather than of birds.

Before Sladden's visits to the Matata area in the 1950s, we know nothing of the numbers of Black-fronted Terns visiting the Bay of Plenty. Almost the same is true of the years 1955-1976, when no one visited the area and counted Black-fronted Terns regularly and most of what visits were made were in off-peak months, i.e. months other than May, June and July, the peak months. See Fig. 1.

The only meaningful comparison possible is therefore between the period 1952-1954 and the period 1977-1981. The difference in numbers between these periods suggests a decline in the numbers of Black-fronted Terns wintering in the Bay of Plenty. This may reflect a continuing decline of the total population, as Hutton & Drummond (1923), Stead (1932) and Oliver (1955) reported a noticeable decline in numbers. Buller's remarks, too, seem to indicate that the Black-

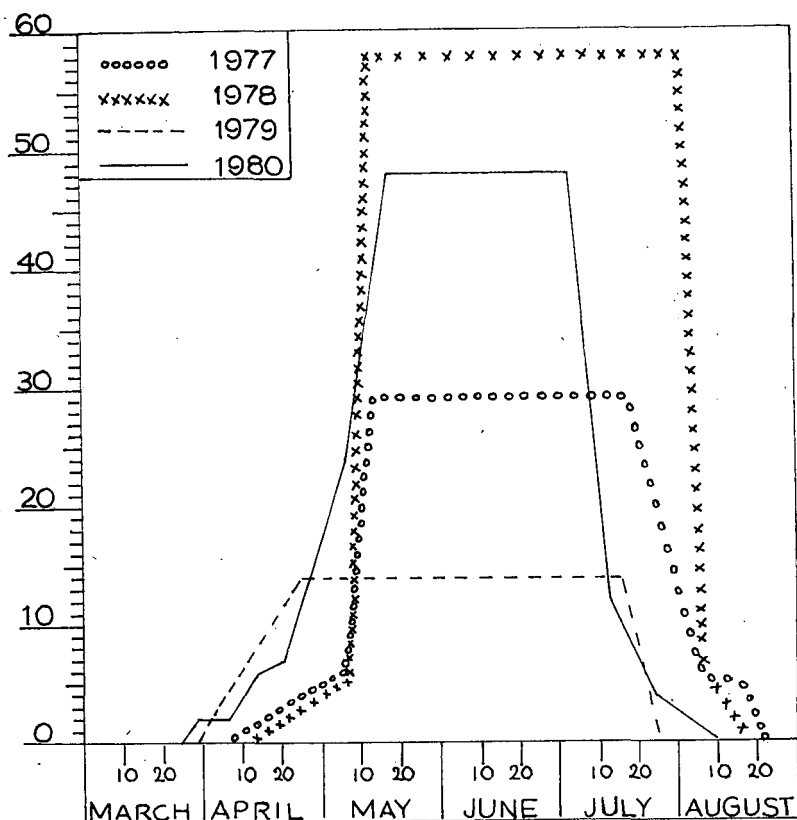


FIGURE 1 — The arrival, stay, and departure of the Black-fronted Tern in the Bay of Plenty, 1977 to 1980.

fronted Tern was, in his day, far more common in the North Island than it is today.

Other points of interest arise from these records. It is evident that, occasionally at least, birds arrive in Bay of Plenty waters earlier than late March, when the first arrivals are usually recorded. Parham's sighting of 12 birds in December 1959 and Anderson's one in November 1977 are the second and third records of Black-fronted Terns over-summering in the Bay of Plenty. Sladden was the first to note this (CSN 1955), when he found 14 near Matata in the summer of 1953-54. One is tempted to speculate on whether these over-summering birds were immature. Parham's flock seen on the Rurimu Rocks, which I take to be the Rurima Islets off the Rangitaiki River mouth, lends support to the idea that the Black-fronted Tern makes some use of these

islets when disturbance is heavy at the rivermouth roosts, as it would be in summer.

The route they use to and from the Bay of Plenty is not known, although sightings suggest along the east coast. The Black-fronted Tern has been recorded from Palliser Bay-Onoke Lake (Stidolph 1971), Whakataki, near Castle Point (Stidolph 1971), Porangahau (Cunningham 1957), the Napier area, where very similar numbers to those found in the Bay of Plenty spend the winter (K. V. Todd, pers. comm.), Wairoa (Cunningham, CSN 1954), Gisborne (Blackburn & Henley, CSN 1979), and the Waipatu River mouth, near Tikitiki (A. J. Goodwin, pers. comm.). It then presumably passes round East Cape and Cape Runaway into the Bay of Plenty.

They almost certainly come from the South Island, even though Buller and Stead recorded the Black-fronted Tern from the central North Island. Indeed, Buller quoted Capt. Mair as saying that in Nov-Dec 1879 he found young up the Wangaehu River, which has its origin on the southern slopes of Mt Ruapehu. Sibson (1948) raised the possibility that a few pairs may still nest on the Volcanic Plateau, but Black-fronted Terns have not been recorded, however, any distance inland for at least 50 years.

In no area north of the Bay of Plenty has the Black-fronted Tern been recorded often enough to show regular wintering, although Lalas (1979) shows Kaipara Harbour as a wintering site on his distribution map. As it has been recorded from this harbour on at least nine occasions, twice a flock of over 10 birds, the inclusion of Kaipara on the map is acceptable. However, I do not agree with the inclusion of the stretch of coastline from Tauranga to Whitianga. The only Black-fronted Tern seen on this piece of coast, to my knowledge, is the one seen by me at Matahui Point, near Katikati, on Tauranga Harbour in March 1981.

The Black-fronted Tern was recorded from the Manukau on at least three occasions between 1879 and 1886, but not until 10 November 1921 was another recorded in the Auckland area, in the Waitemata Harbour (Sibson 1948). Since 1921 the following are the records of Black-fronted Terns north of the Bay of Plenty:

10/3/40	5 Muriwai (Sibson 1948)
17/11/40	1 (imm) Muriwai (Sibson 1948)
6/5/41	1 (imm) Poutu, Kaipara (Sibson 1948)
5/5/43	1 Te Henga, Kaipara (Sibson 1948)
16/5/48	1 (imm) one mile off Clevedon coast (Urquhart, Murray & McKenzie, CSN 1949)
3/7/49	4 Kawakawa Bay, Clevedon (McKenzie, CSN 1950)
23/4/55	16 Tangaihi, Kaipara (A. & J. Prickett 1956)
15/6/57	14 Tangaihi, Kaipara (Prickett, Kidd & McKenzie, CSN 1958)
11/11/62	1 (imm) Kaipara (Sibson 1963)

30/3/63	1 Kidd's, Manukau (McKenzie & Sibson 1963)
1964-70	South Auckland coast, a few winter reports: not every year (McKenzie, CSN 1972)
1/3/75	1 Miranda (pers. obs.)
28/10/76	1 (imm) Rangiputa, Rangaunu Harbour (Edgar & Seddon, CSN 1977)
11/2/77	2 off Ruawai, Kaipara (Cooksey, CSN 1977)
26/3/78	3 Kaipara (Veitch 1979)

Note that most of these sightings were on or near the Kaipara Harbour but that only three of these were of flocks. The rest were mostly singles and immatures. However, considering the vastness of Kaipara Harbour, perhaps just more observers are required to prove regular wintering there.

Among the above records are three single immature birds seen in late spring, October and November. As this is the height of the breeding season on the Black-fronted Tern's South Island nesting grounds, these must be young of the previous season, i.e. birds beginning their second year, over-summering in the north.

HABITS

Arrival and departure

The first birds usually arrive in late March/early April. The numbers slowly increase in the Bay of Plenty until the main body arrives in late April/early May, and a peak is reached by mid-May (Fig. 1). Departure is more sudden, most of the flock leaving in the last week of July or the first week of August. These arrival and departure times, the same in Hawke's Bay (K. V. Todd, pers. comm.), coincide with the times of departure from, and arrival on, the breeding grounds in the area studied by Lalas (1979). Lalas gives December-March as the main departure period, and so Black-fronted Terns arriving in the Bay of Plenty and Hawke's Bay in April-May would have a fairly leisurely journey north. However, the return to the breeding grounds would be more hurried as Lalas's return date is August.

The earliest arrivals are usually adults, although first-winter birds may arrive early also, as in 1979 when two adults arrived with a first-winter bird. The last to leave are usually first-winter birds, sometimes weeks after all the adults have left. K. V. Todd (pers. comm.) found that from 11 to 19 August, 1981, only immature birds were present in the Napier area, most of the adults having left some time in July. Black-fronted Terns seen in the Bay of Plenty in late August or later are usually first-winter birds, still visibly different from the rest, which by then are all in adult breeding plumage. My own records show the following events:

- 1977 Adults left during the first week of August and five first-winter birds remained until the second half of the month.
- 1978 Most birds left during the first week of August, leaving

two first-winter birds with six adults. These had all gone by 19 August, except for one first-winter, which left a week later.

1979 All birds gone by 22 July.

1980 All birds had gone by 26 July, except for three adults and one first-winter, which had left by 23 August.

1981 The last birds I saw were an adult and two first-winter birds, on 25 July.

The ratio of first-winter birds to adults varies from year to year but they are usually few, as can be seen from the following:

1972 7 first-winter birds in a flock of 21. As this count was made on 13 August, many of the adults may have left already.

1977 5 out of 29 were first winter.

1978 8 out of 58 were first-winter.

1979 1 out of 14 was first-winter.

1980 3 out of 48 were first-winter.

1981 2 out of 35 were first-winter.

Feeding

During the early part of their winter sojourn, March to early June, the Black-fronted Terns feed mostly at sea, sometimes some distance from the shore, for example, twice recorded from Mayor Island waters, 35 km from the mainland at its nearest point but 100 km from the Matata area. As winter progresses, they spend more time feeding inland.

Where they feed seems largely to depend on the weather. In autumn and early winter, March-May, the fields are often very dry and do not seem to be attractive to Black-fronted Terns. This part of the year often brings calm settled weather in the Bay of Plenty, the conditions that suit them best for feeding at sea. For example, the bird I saw off Mayor Island could not have chosen a finer and calmer day.

During stormy weather and after heavy rain they forage in and over the low-lying Rangitaiki Plains, although never, in my experience, more than 2 or 3 km from the coast. Virtually the same inland feeding grounds as those marked on Sladden's (1953) sketch map were used by the Black-fronted Tern during the winters of 1977-1981. A marked preference is shown for short sward and often the company of cattle. For example, I found them on 18 May 1980, after two days of heavy rain, foraging mainly over a field newly sown with grass and an adjacent field occupied by cattle. Large numbers of Red-billed Gulls (*Larus novaehollandiae*), Pied Stilts (*Himantopus himantopus*), Welcome Swallows (*Hirundo tahitica*) and Starlings (*Sturnus vulgaris*) and a flock of Cattle Egrets (*Bubulcus ibis*) were also present; a scene of great activity, particularly when a Harrier (*Circus approximans*) flew

over. That day I did not see a single Black-fronted Tern venture out to sea to brave the stiff north-easterly wind and choppy waters.

In general, when the fields are wet and the sea calm, the terns feed both at sea and inland. They do not move about as a flock but, seemingly, according to individual whim. The following are the details of two short periods of movement, on different days, to and from the beach roost at the Tarawera River mouth. They are given to show the individuality of movement of the birds as well as their preference of feeding sites in certain weather. Awaiti refers to the pasture-land adjacent to the stream and wetlands reserve of the same name, near Matata.

18/5/80: Day overcast with the occasional light shower; north-easterly wind; sea rough; fields sodden from previous two days of heavy rain.

12 noon — 36 Black-fronted Terns roosting at the Tarawera mouth

12.01 — 1 bird flew inland towards Awaiti

12.06 — 1 flew inland towards Awaiti

12.10 — 6 arrived from inland, from the direction of Awaiti

12.15 — 4 left for and one arrived from Awaiti

12.18 — 6 arrived from the direction of Awaiti

12.20 — 3 flew towards Awaiti

12.25 — 1 left for and two arrived from Awaiti

12.30 — 2 arrived from the direction of Awaiti

12.35 — 3 arrived from the direction of Awaiti

15/6/80: A fine clear day with a cool southerly breeze; sea calm; fields still wet from previous rain.

11.45 — 3 Black-fronted Terns at the Tarawera River mouth

11.47 — 3 arrived from at sea

11.53 — 4 arrived from at sea

11.55 — 2 arrived from at sea but continued on over the beach roost, heading inland in the direction of Awaiti. One of those on the beach went with them.

12 noon — 3 arrived from at sea, one continuing on inland while two alighted at the beach roost.

12.05 — A Harrier passed overhead, putting everything on the beach to flight, 6 of the remaining Black-fronted Terns going inland, 5 gradually dropping back to the roost.

The birds feed over water either by dipping down gracefully to pick food such as floating insects, planktonic crustacea (Lalas 1979), or small fish deftly from the surface or by shallow diving like that of the White-fronted Tern (*Sterna striata*). I have also watched Black-fronted Terns hawking insects on the wing over the surf when an offshore wind is blowing.

Inland feeding is done almost entirely on the wing. I have seen them hawking flying insects, sometimes to a height of 200 metres

and more. Even when taking food from the ground the terns dip down to pick up their prey, usually without touching down with their feet. They do, however, quite often touch down, sometimes for as much as 3 seconds, almost always keeping their wings held aloft. Several times I have seen a bird settle for 5-6 seconds, fold its wings, and tug at something on the ground, probably an earthworm. Earthworms form at least a part of their diet, as I found when one of a flock roosting at the Tarawera mouth regurgitated a meaty gobbet, which on closer examination proved to be four earthworms, each about 80 mm long.

During the second half of June and early July 1980 I found that some of the Black-fronted Tern flock, including two first-winter birds and some first-winter White-fronted Terns were feeding on tiny elvers, 60-80 mm long, which were making their way up the Tarawera River. Whitebait, too, are taken in August by late-staying birds.

On 6 June 1981, I watched 32 Black-fronted Terns feeding in the early afternoon along a 500-metre stretch of coast on the west side of the Rangitaiki River mouth. They foraged about a large raft of loose *Ecklonia radiata* kelp floating within 200 metres of the shore. A moderate surf was running, light rain was falling, but only a light southerly breeze was blowing. The birds did not seem to be catching fish, but were delicately picking their prey from the surface. Perhaps they were feeding on the planktonic crustacea of which Lalas (1979) has written. I watched them for about 1½ hours, during which time each bird came inshore at least once for a drink of fresh water, which was taken on the wing, and a rest on the beach. From 2 p.m., single birds began to leave the beach roost and fly purposefully upriver. At 2.15 p.m., the main body of the flock, c. 20 birds, followed, leaving 9 still feeding at sea, including the two first-winter birds. By 3 p.m., they had all gone upriver. At about 4 p.m., the wind veered to the north and was soon blowing hard, accompanied by heavy rain.

A Black-fronted Tern feeding on pasture land tends to quarter the ground fairly methodically, as can best be seen when only a few are working an area. It flies into the wind, dipping down every so often to pick up something that catches its eye, then at the end of the run (determined by a fence or hedge, perhaps), it allows itself to be lifted by the wind and carried back to the start. Here it begins another run a little further from the first. If there is no wind Black-fronted Terns tend to fly in wide circles about the feeding ground.

Roosting

Although roosting Black-fronted Terns are normally found on the beach by day, they do at times roost in the fields. The preferred roosting place inland seems to be a fence post. Stead (1932) noted them perching on the fence wire as well as the posts. I once found all but two of a line of 30 posts of a fence without battens occupied by Black-fronted Terns, the other two being taken by Red-billed Gulls.

The birds were squabbling over these perches, dislodging one another by flying in from behind and below and giving a sitting bird a lift under the tail or settling on its back. At least ten of this flock were content (or resigned) to roosting together on the ground.

I have not found where the flock spends the night, but I suspect that they roost inland in the fields during bad weather and on the Rurima Islets in fine. They do not spend the night at either the Tarawera or Rangitaiki River mouths. Indeed, I have found the Tarawera mouth quite devoid of shorebird life after dark. The Rangitaiki mouth, on the other hand, has hundreds of roosting gulls and sometimes a few Caspian Terns (*Hydroprogne caspia*) and White-fronted Terns but no Black-fronted Terns. In 1972 most of the Black-fronted Tern flock roosted by day at the Rangitaiki mouth, but since then the Tarawera has become favoured owing to heavy human disturbance, much worse at the Rangitaiki mouth than at the Tarawera mouth. This despite the badly polluted condition of the Tarawera River caused by effluent from the Kawerau pulp and paper mill. Until 1981, when I saw two on 30 May and 32 on 6 June, I had not seen a Black-fronted Tern at the Rangitaiki mouth since 28 May 1978. On this occasion a single bird was present while the main flock of over 30 birds was roosting at the Tarawera mouth. K. V. Todd (pers. comm.) has found that, in the Napier district also, they change their preferred estuary in different years.

The rivermouth roost presumably provides the Black-fronted Tern with a number of facilities, especially an open area in which it can feel secure, the company of related species and a good bathing place; first-winter birds, in particular, seem to be very fond of bathing. In addition, they often feed over the lower reaches of the river, and usually when returning from a foraging trip, whether at sea or inland, they dip down to snatch a drink or two before settling on the beach to preen and rest. The roost also seems to be ideally situated midway between their two main feeding grounds.

Roosting Black-fronted Terns are very quiet and placid, in contrast to their behaviour on their breeding grounds, as described by Guthrie-Smith (1936) and Soper (1976). Indeed, at the Tarawera beach roost, they are usually so quiet and still and their grey colouring blends so well with the dark sand there that they are easily overlooked. The only calls that I have heard are a soft *tseek tseek*, usually given on the wing and not audible for any distance, and the occasional grating scolding when one is annoyed with another. Among the Red-billed Gulls and White-fronted Terns, the main species with which the Black-fronted Tern shares the roost, it is "bottom of the pecking order."

PLUMAGE

On arrival in the Bay of Plenty, in late March/early April, the Black-fronted Tern flock is a "motley group." Plumages range from

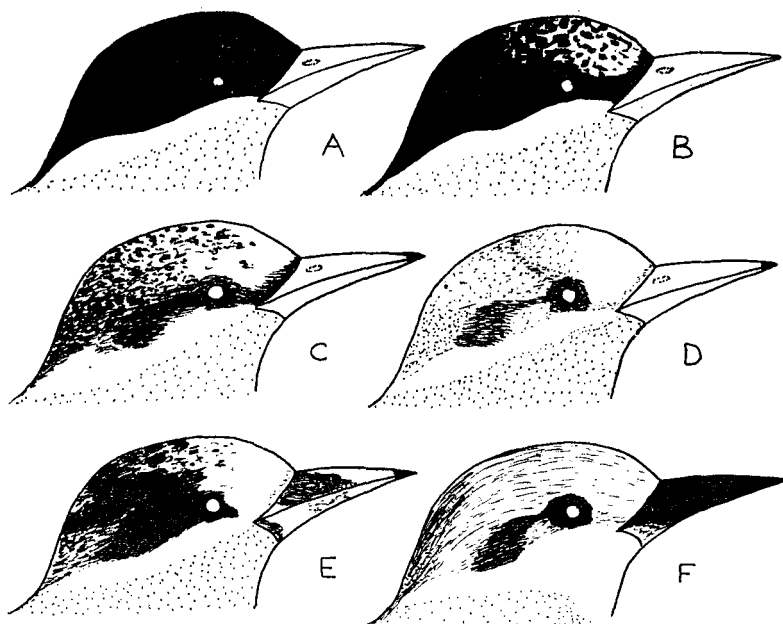


FIGURE 2 — Black-fronted Tern head patterns and bill colourings seen in the Bay of Plenty in autumn and winter. The unshaded areas of the bills are orange; the stippled neck and throat areas are dove grey.

A — Adult in full breeding dress with complete black cap and no dark bill tip; usually seen from May onwards but occasionally in April.

B — Adult within 10 days or so of completing the moult into breeding dress; usually seen in May and June, less often in April.

C — Adult beginning to regain black cap of breeding dress, still has dark bill tip. Based on a bird seen 29 March but birds in this plumage are usually seen in April and May, occasionally early June.

D — Adult in non-breeding dress with no black crown feathers and with dark bill tip. Even the nape is grey, not black as in most terns. Not common in Bay of Plenty as, on arrival, they are usually showing some black crown feathers; seen in March and April only.

E — Second-winter bird with blotchy black-and-white cap and dark-brown and dull-orange bill, in moult midway between F and A. Based on a bird seen on 15 May, but I have seen birds in this plumage in April, May and June.

F — First-winter bird with pale throat, streaky crown and dark bill; ear-covert patches and eye patches tend to be darker than those of non-breeding adult. These birds retain this dress throughout their stay, i.e. April-August, occasionally September.

adult non-breeding and adult breeding to second-winter and first-winter subadult.

Since May 1977, when I took a series of colour slides of birds with various head patterns and bill colours, I have tried to relate these differing plumages to the birds' ages. I believe that there are three detectable age groups in the Bay of Plenty flock between March and the end of June; adult, second-winter and first-winter.

Lalas & Heather (1980) reached similar conclusions with Black-fronted Terns in the South Island though, as well as the adult, they describe the following three distinguishable immature age groups, the third of which, although a transitory stage, they described somewhat vaguely.

1. This is the *juvenile* speckled plumage, which I have not seen in the Bay of Plenty. As the juvenile plumage is moulted in March (Lalas & Heather 1980), first-winter birds would all have lost this plumage before their arrival in the Bay of Plenty.
2. These I have called *first-winter* birds, i.e. birds of the year that have lost the speckled juvenile plumage yet remain distinct from adults during their stay in the Bay of Plenty. See Fig. 8.
3. These I have termed *second-winter* birds as I believe they are recognisable from April to the end of June, their second winter, by the patchy black and orange of their bills and their patchy crown pattern. See Fig. 2E. B. D. Heather (pers. comm.) thought this third age group still recognisable at Farewell Spit in late May 1980.

The plumage of the second-winter bird is in a midway state between first-winter and adult breeding; in my experience its head moult is later than that of the majority of adults. From the end of June they become identical with adults in breeding dress. Lalas & Heather (1980) said that the change of bill colour, from first-winter dark brown to adult orange, seems to be highly variable in its timing. If this is so, it would be difficult to distinguish a second-winter bird that had an early change of bill colour, i.e. before its arrival in the Bay of Plenty in April, from adults midway between non-breeding and breeding plumages. Without the mottled black and orange bill to separate the second-winter bird from the adult in mid-moult, the only distinguishing feature is the mottled crown, patchy in the second-winter bird (Fig. 2E), speckled in the moulting adult (Fig. 2C, 4A & 4B), as they are otherwise identical in plumage. However, work would need to be done with ringed immature birds before one could be sure that this patchy crown pattern is a constant distinctive feature. It may be that only a percentage of second-winter birds are readily recognisable in May/June. P. M. Sagar (pers. comm.) has suggested that second-winter birds that have an early change of bill colour may be birds that fledged early as chicks.

Basically I agree with Lalas & Heather (1980) regarding adult

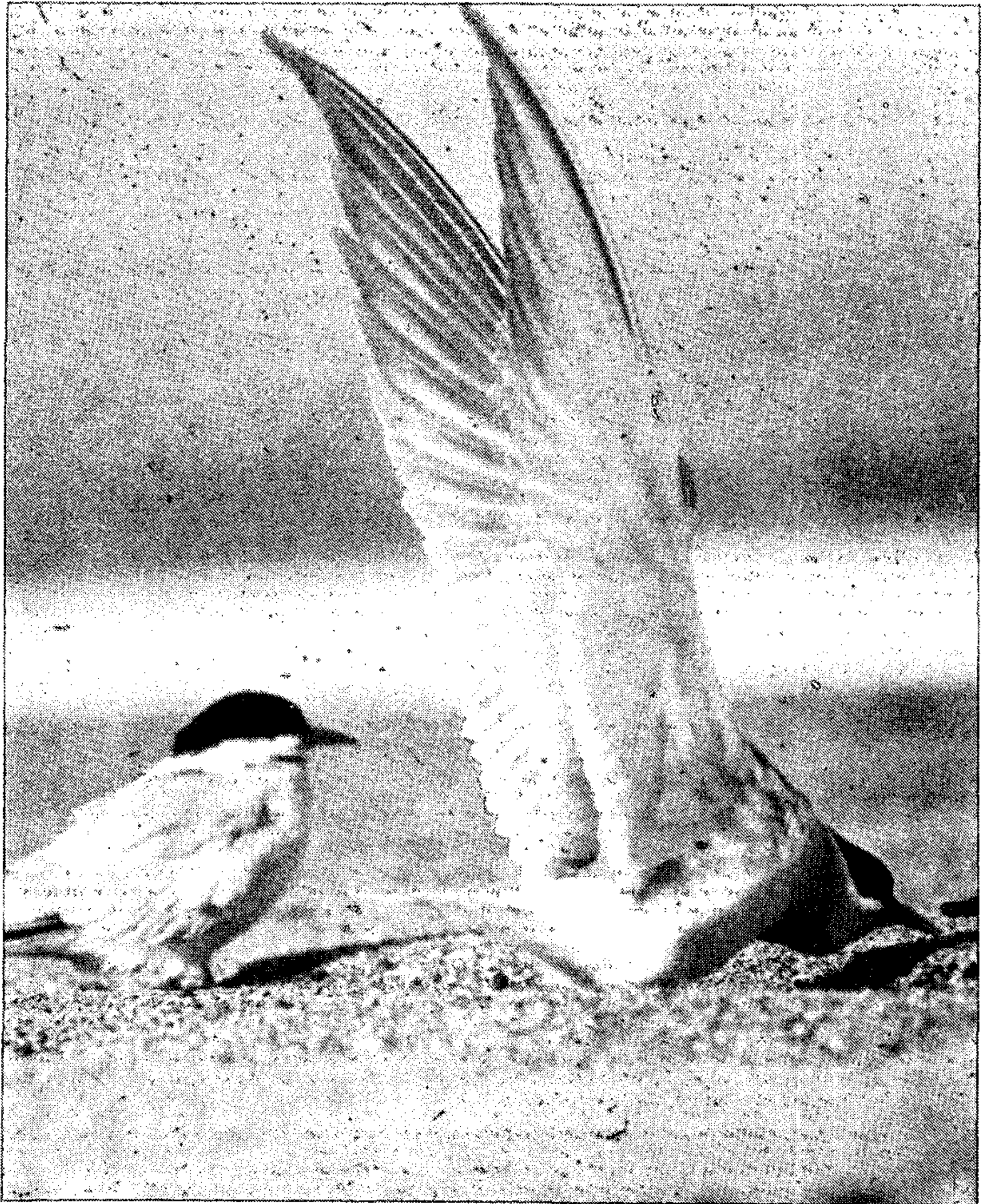


FIGURE 3 — Adults in full breeding dress with complete black cap and orange bill. Note fresh condition of secondaries and primaries, darker tips to primaries and white-shafted dark first primary. Note also white rump and upper and lower tail-coverts, a prominent feature in flight. Tarawera mouth, 15 June 1980.

plumages. The only disagreement is in the extent of time over which the autumn-winter moult takes place. Most Black-fronted Terns, on arrival in the Bay of Plenty in late March/early April, have begun their moult into breeding dress; for example, the first bird to arrive in 1981, on 29 March, resembled Fig. 2C. Both Lalas and Heather (pers. comm.) have suggested that this stage could equally well be moulting out of breeding plumage. That is so, but with so few birds present in the early autumn in the Bay of Plenty, it is relatively easy to keep individual birds under observation and to determine whether they are moulting into, or out of, breeding dress. Occasionally birds have arrived in early April in full breeding plumage, for example, four in April 1977. P. M. Sagar (pers. comm.) has seen Black-fronted Terns in full breeding dress in April in the South Island.

These examples are at variance with Lalas & Heather's generalisation that, "They are in full non-breeding plumage from February to late April." They also say that all adults are in full breeding plumage from the beginning of June. In my experience, at least 10% of the adults in the Bay of Plenty flock still have considerable grey to lose from crown and forehead at the beginning of June, and one cannot safely say all are in full breeding plumage until the end of June. Of 32 adults seen on 6 June 1981, four still had very grey crowns and foreheads, i.e. at a stage midway between Fig. 2B and 2C, at least two weeks from completing the moult. A number of other birds were at a stage a little more advanced than Fig. 2B. Even if allowance is made for the possible confusion with some second-winter birds at this time of year (only one bird was recognisable as such on 6 June 1981), there would still be many adults left with the moult uncompleted. B. D. Heather (pers. comm.) found a similar percentage of birds with the moult uncompleted in the Black-fronted Tern flock at Farewell Spit in late May 1980.

The following are my descriptions of the three apparent age groups that I have seen in the Bay of Plenty.

Adult breeding: The breeding dress of the adult is very smart. The whole body is dove grey, except for the rump and upper and lower tail-coverts, which are white. The crown, from the gape through the lores and below the eyes to the nape, is jet black. The black crown is separated from the grey neck by a white cheek stripe. See Fig. 2A. The tail is as grey as the body, the upperwing is a little darker, and the underwing is a little paler. See Fig. 3. The legs, feet and bill are bright orange.

Adult non-breeding: This plumage differs from that of the breeding bird in two respects:

1. The crown is pale. At the nape it is as grey as the body but it becomes paler towards the forehead, which is white or very pale grey. There is a dark patch about each eye and another dark patch on each set of ear coverts. See Fig. 2D and Fig. 6.
2. The bill is a slightly duller orange with a dark brown tip.

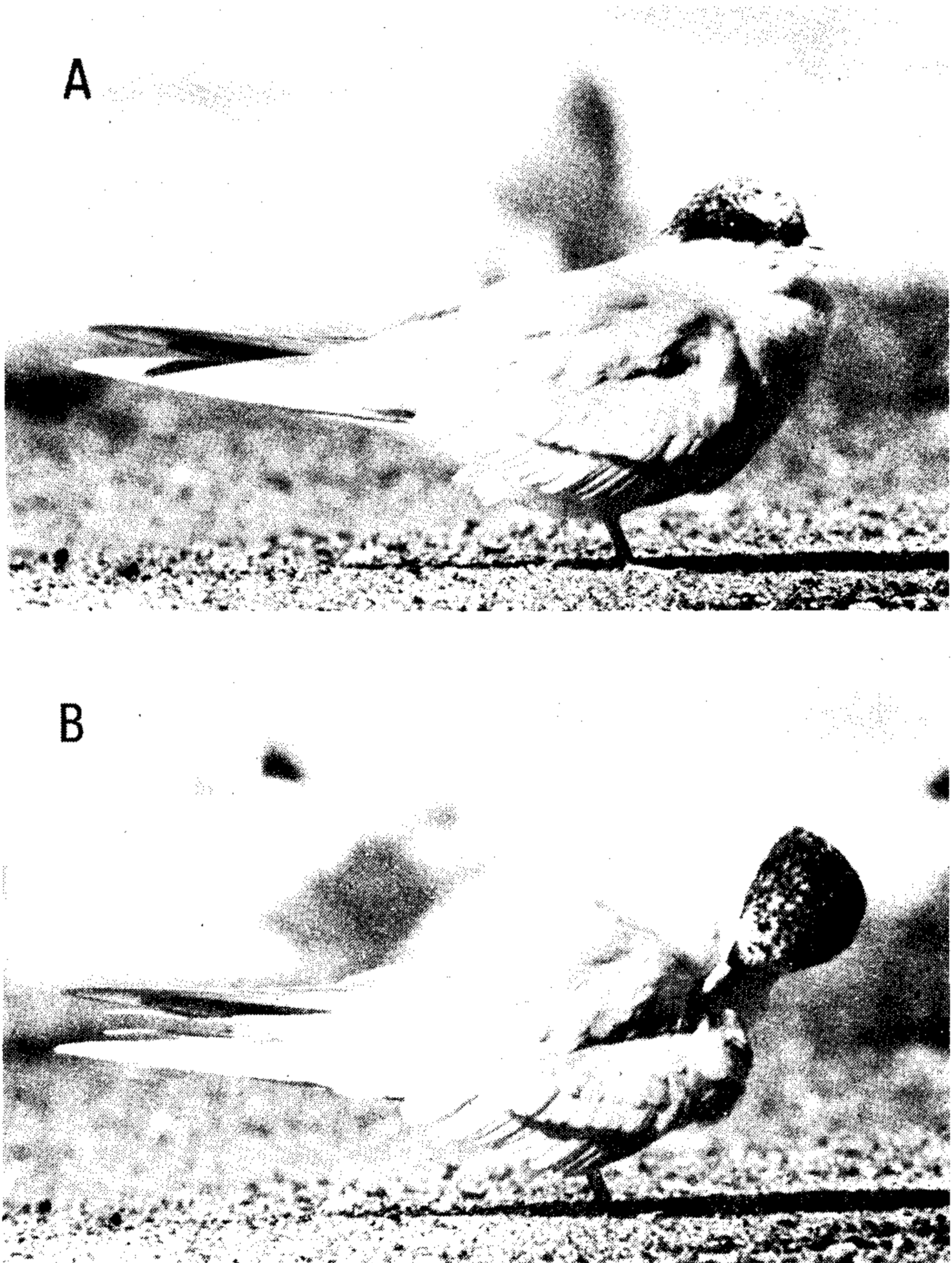


FIGURE 4 (A) & (B) — Adult regaining the black cap of breeding dress. This bird has all but lost the dark bill tip. Note the speckled appearance of the cap at this stage and that the dark feathers appear early at the base of the upper mandible. Tarawera mouth, 3 May 1981.

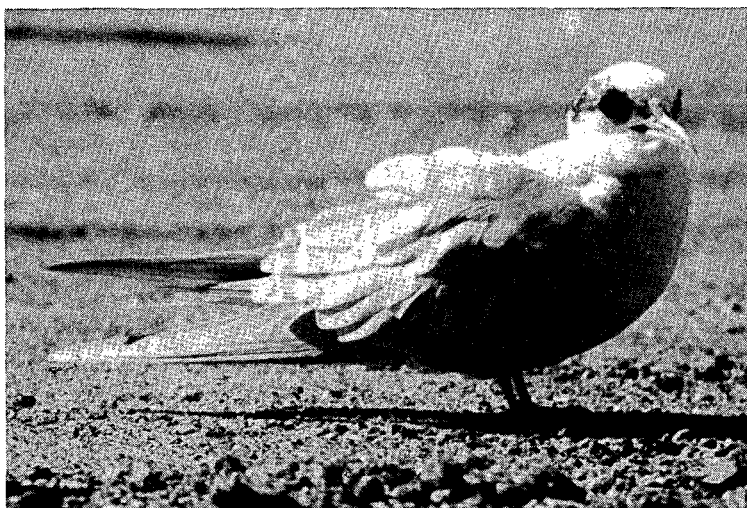


FIGURE 5 — Adult in early stages of moult from non-breeding to breeding dress. Note prominent dark eye patches; new black cap feathers are appearing about the eye patches, at the base of the bill and on the hind-part of the crown. Tarawera mouth, 3 May 1981.



FIGURE 6 — Adult in complete non-breeding dress except for the few dark crown feathers beginning to appear. The bill tip is dark. Note pale grey forehead shading to dark grey at nape. Tarawera mouth, 20 April 1980.

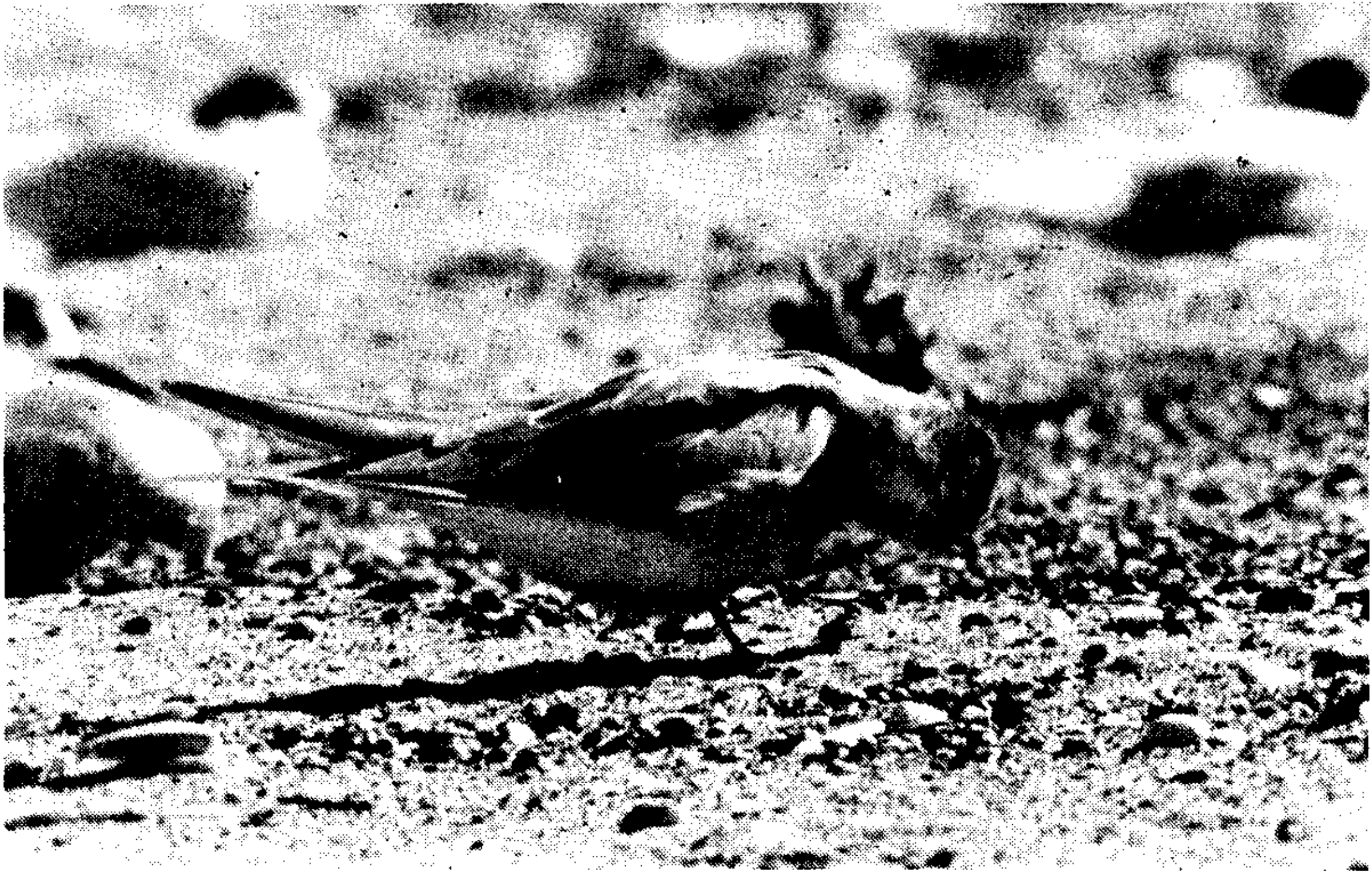


FIGURE 7 — Adult in complete non-breeding dress, showing the dark grey, not black, nape.

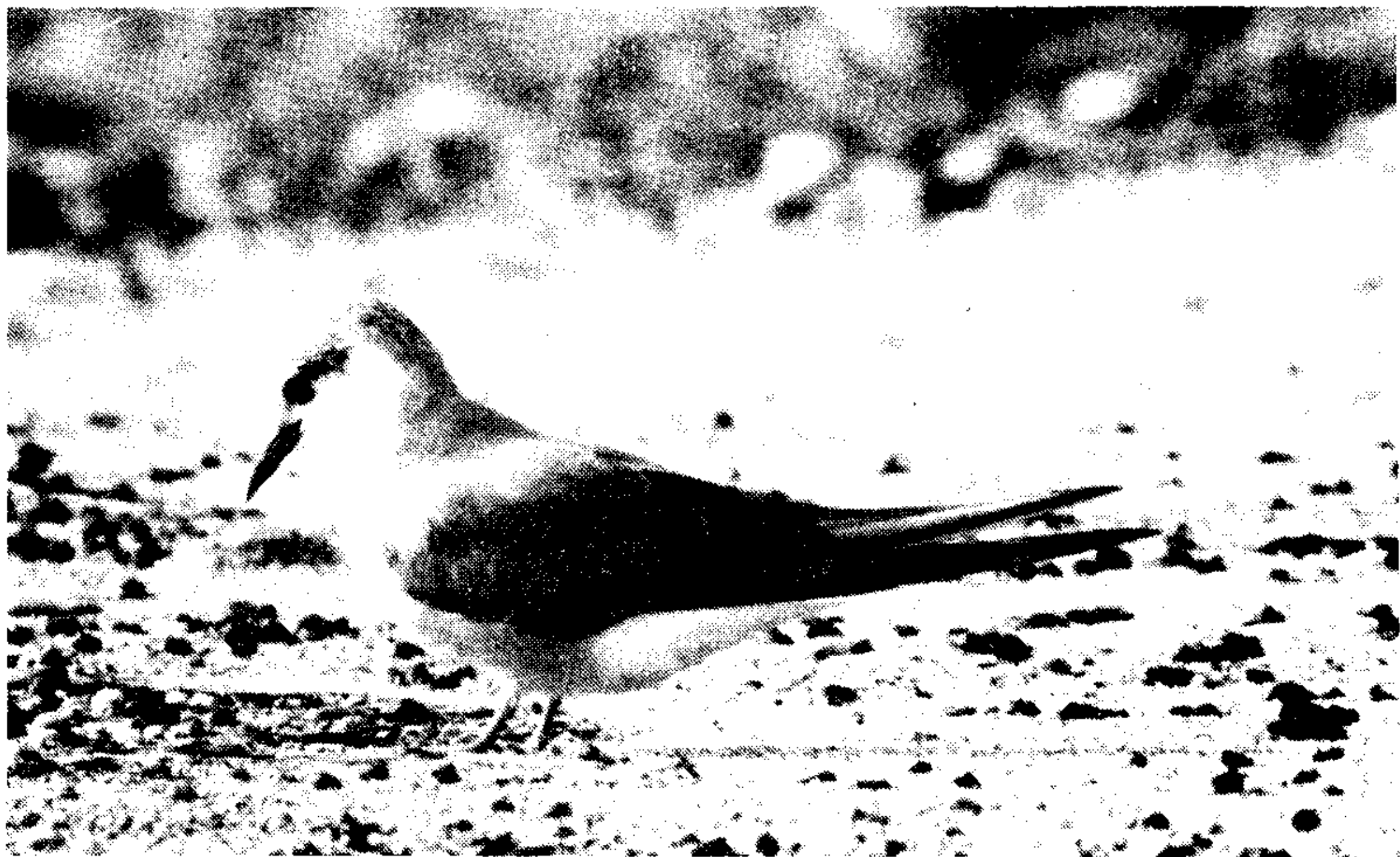


FIGURE 8 — First-winter bird with streaky crown, dark-brown bill and white throat. Tarawera mouth, 25 June 1978.

First-winter: These birds are very distinctive, being white on the throat and much paler grey on the breast than adults. The crown is like that of non-breeding adults but streakier. See Fig. 2F. The dark patches about the eyes and on the ear-coverts are similarly placed to those of non-breeding adults but tend to be darker. The body grey has a greenish tinge, as opposed to the bluish tinge of the adult, and the upperwing is a shade darker than that of the adult with an olive-brown tinge to the primaries and about the carpal joint. The bill is dark brown or black, often with a little dull orange showing at the base of the lower mandible. The legs and feet are as orange as those of adults. See Fig. 8.

Second-winter: Although in body plumage these are identical with adults, they can, I believe, be recognised by the patchy dark brown and dull orange of the bill and the patchy crown pattern. The adult, when midway between non-breeding and breeding plumages, assumes a more speckled crown pattern and has, except for a dark tip, a bright orange bill. Fig. 2E depicts the blotchy bill and crown pattern typical of the most recognisable stage of a second-winter bird's moult, whereas Fig. 2C is typical of the adult beginning to assume the black cap of its breeding dress. In my experience, second-winter birds are very slow to complete this March-June moult and can, therefore, be distinguished from adults from the time they arrive in the Bay of Plenty in April/early May until at least mid-June. By the end of June, with the moult completed, they become identical with adults. Birds displaying these patchy markings are by far the minority. I have not seen more than two in any one winter. For example, of 29 Black-fronted Terns seen at the Tarawera mouth on 15 May 1977, 22 were adults, 5 first-winter and only 2 were second-winter; of 35 birds on 6 June 1981, only 1 was second-winter.

To summarise, then: three apparent age groups are present, and recognisable, in the Bay of Plenty between the end of March and the end of June — adult, first-winter and second-winter. Adults may arrive in full non-breeding or full breeding plumage, or at any stage between. Not until the end of June have all adults and second-winter birds assumed full breeding dress. The presumed second-winter birds are among the latest to complete the moult, both their bill and crown colours often still being mottled in mid-June. If some second-winter birds do assume the orange bill of the adult earlier than April, they would be difficult to distinguish during their stay in the Bay of Plenty. Most adults have attained full breeding dress by mid-June, some even arriving thus attired in April. First-winter birds leave in the same garb as that in which they arrived. Because of this and their late departure from their winter quarters, and sometimes their over-summering there, I conclude that Black-fronted Terns do not breed before they are 2 years old.

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SHORT NOTE

WRECK OF KERGUELEN AND BLUE PETRELS

In September 1981 occurred the heaviest recorded wreck of Kerguelen Petrels (*Pterodroma brevirostris*) and Blue Petrels (*Halobaena caerulea*). Several hundreds of dead birds were found on many North Island west coast beaches. Some were blown into the harbours of Wellington and Auckland, a few were blown inland, and one Kerguelen finished up at Tapu in the Firth of Thames. More Blues than Kerguelens were found. Several Kerguelens came in alive, and various people and especially the Auckland Zoo tried to nurture them back to health. But as with most small petrels picked up starving and exhausted, all died after a few days. Larger seabirds such as mollymawks and giant petrels stand more chance of recovery, but members should beware of lightly taking on caring for them as it requires much time, patience and understanding.

Watching seabirds from the shore can be frustrating and eye-straining; but what excitement on 8 September at Muriwai, in a strong south-westerly and frequent heavy rain was the close view (10-15 m) of Kerguelen and Blue Petrels in flight over the surf and the shoreline.