

THE PENGUINS OF MARION ISLAND

by

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Four penguin species inhabit Marion Island. During the summer of 1951/52, a six-month stay on the island gave the writer an opportunity of examining the various populations. Bennets (1948), Crawford (1952), Rand (1954), King (1954) and others have already noted these penguins. The present account deals with further aspects of their taxonomy, habitat preferences and moult.

CLIMATE AND TOPOGRAPHY OF THE ISLAND

Somewhat oblong in shape, Marion Island is about twelve miles long, nine miles wide and surrounded by a distinct coastal plain from 20 to 100 feet a.s.l. High cliffs break into this plain at three points (Crawford, Goodhope and Trichaardts Bays). The island extends inland as a central cone about 4,000 feet high. The coastal plain is a soggy layer of moss and grass cut in parts by stony ridges and jagged lava fields. Streams from the mountains flow out onto the beaches which with few exceptions (Ships Cove, Goodhope Bay), are covered with large boulders or pebbles. Numerous ponds and lakes are scattered over the coastal plain.

Wind, rain and fog are the dominant meteorological conditions affecting the island. These are not excessively severe. Winds may reach a force of 45 knots in April, and it is customary to have several gales per month. The mean monthly maximum force is about 37 knots but gusts of 108 knots have been recorded (June 1948). The winds come from the north-west in summer, west in winter, striking the low lava cliffs where few penguins can land. (The main penguin rookeries are on the sheltered lee of the east side). The annual rainfall is about 80 inches. December and January have the heaviest fall (8.67 and 8.21 inches in 1951/52). Precipitation, however, varies greatly. Freezing rain, soft hail, sleet and snow may fall at close intervals. Rain, hail and sleet affect the coastal plain only slightly but snow persists for a few days. There is a permanent mantle of snow on the high ground above 3,000 feet. After a heavy snowfall the whole island is covered, thick drifts forming in all depressions. The big lakes occasionally freeze (July) but the smaller pools are invariably covered with thin ice after a snowstorm. During the summer the snow disappears from the coastal cliffs and beaches a few hours after the storm. The constant precipitation attributable to the peculiar topography and location of the island, results in relatively few hours of sunshine each day. The average monthly amount of sunshine is just over 100 hours in the summer and 30 hours in mid-winter. Nevertheless some very bright days occur after storms.

Sea-surface temperatures at the island edge do not vary very much, being lowest in August (37.6 °F), highest in March (42.44 °F). Air temperatures range over 40 degrees, from 24.8 °F in July to 64.8 °F in March. The respective

minimum, daily mean minimum, daily mean maximum and maximum temperatures for each month were as follows (these figures were obtained through the courtesy of the Weather Bureau, Pretoria):

MONTH	TEMPERATURES °F			
April	32.3	37.7	46.7	53.2
May	29.2	36.2	44.7	55.3
June	28.5	36.9	45.5	54.6
July	24.8	34.3	41.5	51.9
August	28.0	35.3	43.4	50.4
September	26.7	32.5	42.1	47.2
October	27.3	35.0	44.0	63.8
November	30.2	36.0	46.2	63.4
December	31.3	37.1	47.1	64.0
January	32.0	38.3	48.7	57.0
February	32.9	39.2	49.6	55.8
March	33.4	40.1	49.3	64.8

Rain has peculiar hazards for the penguins. Apart from the flooding of part of the beach rookeries with ineffectual drainage (much of the King penguin rookery is swamped after heavy rain), erosion and washaways affect slope-side colonies. There are occasional landslides, earthslips and rockfalls, all of which may affect birds nesting below. Thus at Blue Petrel Bay in February, part of the hillside collapsed onto the beach near nesting Kings (the damage, if any, was not assessed). Deep mud-holes may trap penguins, their struggles making escape more difficult. Chicks are occasionally drowned. Nevertheless there are seldom permanent quagmires on the beaches and nesting penguins do not have to contend with serious flooding or adverse ground conditions.

There are about sixty bays and coves round the island. Of these, fifteen lie on the windward side, forty-five on the sheltered eastern side. The latter are all used for landing by elephant seals and penguins. Ten bays or coves provide beach space for nesting Kings which also roost on another nine. Nine coves are utilised by the nesting Macaronis and sixteen by the Gentoos. Unlike those frequented by the King penguins, these "gentoo" coves are in very different parts of the island. (see map).

SPECIES OF PENGUIN

Aptenodytes patagonicus (Miller)

King Penguin

King penguins are circumpolar in their distribution, being found at South Georgia and sub-antarctic islands from Marion to Macquarie, between 45°S. and nearly 65°S. latitudes. This vast range has prompted taxonomists to describe more than one race for the species. Two races suggested by Mathews (1927) were distinguished by the presence (*patagonicus*) or absence (*longirostris*) of blue tarsal feathers. The former typical race was assigned to the South Georgia arc, while the latter race came from islands south of Africa and Australia. More recent authors, however, finding few plumage characters of diagnostic value, tend to disregard the racial identity of the separate breeding populations but still admit the possibility of subspecific variation. On Marion Island, King penguins have no blue tarsal feathers and in size and colour seem to resemble those on other islands.

King penguins are big birds. The length of an adult female was 1,100 mm.

or nearly 43 in males were slight in the following

Female
Male
Male
Male

The adult lateral strip which may have a white The ear patch is which joins the tinge which fades black head and this colour extends flipper is heavily

Chicks are primary coat of A just-hatched is strongly recumbent to straighten at the tail. The chick grows older, a year later. The chick develops into a globular in appearance abdomen, later adults, may look like the older birds

FOOD

Two adult recently. They Both had green stones (male) Cave (April 2nd) also unemployed none were seen

HABITAT PREFERENCE

Kings have they do not do landing place of the sandy 1 Swartkop and Popular beach

or nearly 43 inches. A male reached 970 mm. or about 38 inches. Two other males were slightly smaller than the female. Additional dimensions are shown in the following table :

	FLIPPER	CULMEN	TAIL	TARSUS	TOE	CLAW
Female	335	95	93	50	108	29
Male	315	92	67	54	103	27
Male	330	85	74	47	117	29
Male	343	95	84	43	116	26

The adult culmen is black, the mandible the same colour but with an orange lateral strip which fades to a bluish-purple anteriorly. The tip of the mandible may have a white patch below. The black of the crown is tinged with green. The ear patch is bright orange continuing round the neck as a thin yellow necklace which joins the yellow of the throat. Here the yellow colour has a greenish tinge which fades away as it meets the white of the upper breast. Except for the black head and black line bordering the breast, most of the back is a light grey, this colour extending posteriorly to the tarsal feathers. The front edge of the flipper is heavily bordered with black on the underside.

Chicks are almost naked and dark grey in colour when hatched. A thin primary coat of down, thickest on the head and shoulders, soon covers the body. A just-hatched chick weighed 70 gms. and measured 235 mm. The beak (17 mm.) is strongly recurved and has a minute egg tooth dorsally (the beak only begins to straighten after the summer). Twenty-four minute threadlike feathers form the tail. The eyes are open. The claws are black, 8 mm. long. As the chicks grow older, a second coat of down replaces the first, persisting until moulted a year later. This secondary down is rusty brown (fading after the winter) and develops into a dense layer so that by their ninth month the chicks are almost globular in appearance. This down is cast gradually, at first round the legs and abdomen, later from the head and shoulders. Juveniles, almost as big as the adults, may loiter at the rookeries in late summer but can be distinguished from the older birds by their dull mandibles and ear patches.

FOOD

Two adults examined at Sea Elephant Cove (March 30th) had not taken food recently. They were unemployed adults standing on the outskirts of the colony. Both had greenish-yellow fluid with minute cephalopod beaks (female) and stones (male) in their stomachs. The stomachs of two other adults at Sealers Cave (April 2nd) held a similar fluid with small stones. These specimens were also unemployed adults. No King penguins were seen foraging off-shore and none were seen north of the island on the route to South Africa.

HABITAT PREFERENCE

Kings have landed at the heavily-bouldered Transvaal Cove. Ordinarily they do not do this, but scramble out on small, pebbly beaches only. A good landing place is Kildalkey Bay. No nesting Kings are at Goodhope Bay in spite of the sandy beach, but a handful of roosting birds are always loitering there. Swartkop and Kaalkop coves, favoured by other penguins, are disregarded. Popular beaches are floored by stones partly embedded in mud and guano

PLATE A



1. Rockhopper Penguins moulting at Mixed Pickle Cove.



2. Kildalkey Bay. The penguins in the foreground are King Penguins.



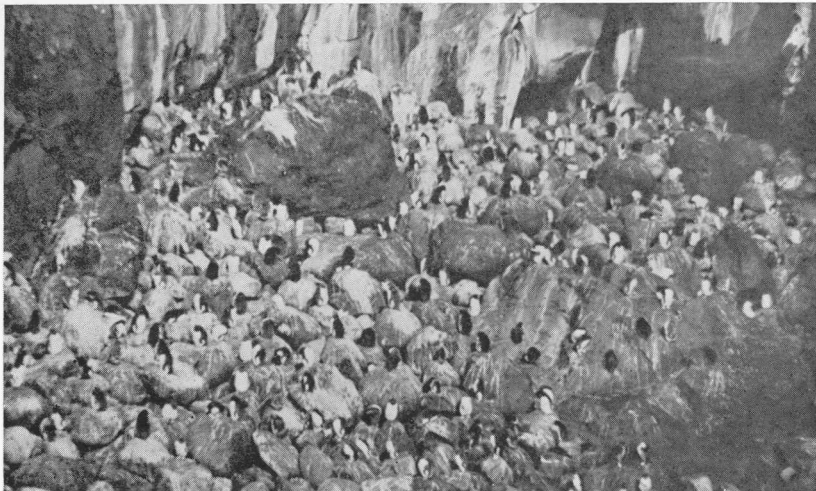
3. Typical Gentoo Penguin nest.

King

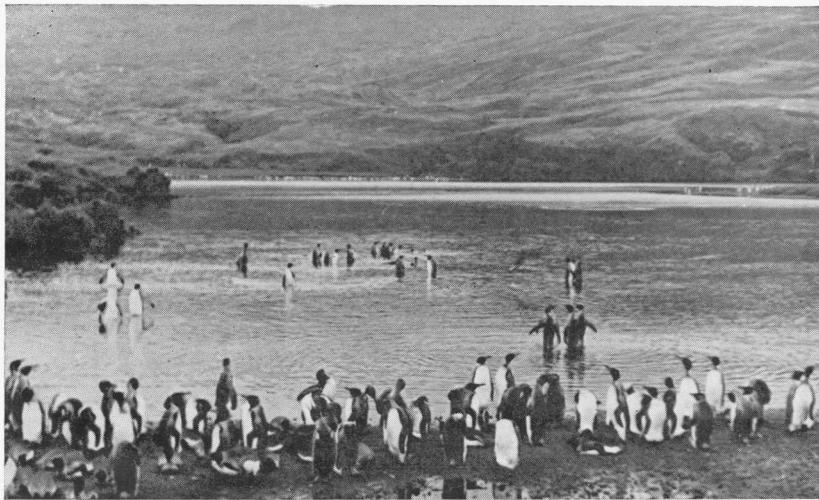
Macaroni

Gentoo

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1. Part of a Macaroni Penguin colony, showing the typical habitat.



2. King Penguin Lake.

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(Kildalkey, King Penguin Bay and Log Beach). In most places the stones form a solid matrix from which the water easily drains. Nest scrapes are mapped out on this flat ground (Plate A, fig. 2). No nesting birds resort to the grass slopes or inner plain, selecting instead the level ground just beyond high water mark.

Elephant seals play a minor role in determining the position of the nesting section of a King penguin rookery. The seals are mostly absent when egg-laying starts (December) but a few animals may remain on the lower part of the beaches for some weeks after the others have gone. Early nesting penguins need to avoid these stragglers. Later, when they return to moult, the seals haul up to mud wallows far beyond the beaches. Fur seals are only found near Rockhopper penguins and these two species have a harmonious association unaffected by competition for breeding space.

It is difficult to decide if there is much competition for beach space among the penguins themselves. Within the species, territory has the effect of patterning the beaches during egg-laying and incubation. The aggressive nesters demand permanent sections of the beach, make trespass difficult for other individuals, and so cause unemployed birds to filtrate beyond the present limits of the colonies. In this way new nesting ground is eventually formed. The unemployed birds wander up streams (Plate B, fig. 2), congregate on the valley sides or hike further afield onto adjacent ridges. The intertidal zone also provides accommodation for birds not at nests. Nevertheless prior occupation by the elephant seals (only four Kings were seen at Trypot in late October) and the situation of the nesters compels late nesting birds to drift from the beaches. A more fluid state exists after the summer when adults and yearlings continually move to and fro. It is only at Kildalkey Bay that Kings and Macaronis consort in large numbers on the same beach. But here the Macaronis occupy the northern half of the bay, landing and moving on their side of the bay only. Elsewhere a few Kings and Gentoos may be seen at the waters edge among Macaronis and Rockhoppers. There is little interspecific resentment at this temporary association but where there are a few of one species among a large number of another, the former are usually grouped together, e.g., Kings huddling together in the riverbed at Killer-whale Cove in March.

A liberal estimate was made of the adult King penguin population by using field counts, a ratio of eight birds per square yard on rough area measurements and direct counts from photographs. The unit of eight birds per square yard is somewhat arbitrary, allowing for uneven and unoccupied ground within an area. The results are: Goodhope Bay 50, Kildalkey Bay 20,000 and adjacent coves 500, Gentoo Bay 100, Sealers Cave 300, Macaroni Bay 10, Trypot 200, Waterfall Cove 50, Ships Cove 500, Sealers Beach 2,000, King Penguin Bay 25,000, Log Beach 3,500, Archway Bay 200. Total estimated population 52,410.

Pygoscelis papua (?) *papua* (Forster)

Gentoo penguin

Another circumpolar species ranging between 45° S. and 65° S. latitudes. Although not on Bouvet Island (Holgerson 1945), it occurs as a year-round resident on most other subantarctic islands. In the extreme south (Sandwich Islands), however, these penguins perform a northward migration after breeding (Holgerson op cit).

Peale (in Mathews 1929) records Gentoo penguins on Macquarie Island, his name *taeniata* being applied by Peters (1931, 30) to a race from that island and also from Heard, Kerguelen and Marion. Falla (1937, 30) comments on the

larger size of individuals from the low-latitude islands. Though not allocating sub-specific rank to his specimens, he suggests that a valid race might be found on the Crozets. Subspecific differentiation has, in fact, been described for Gentoos in other parts (Deception Island), mostly on the grounds of smaller size. Marion Gentoos are about as large as those on the Crozets. Some comparable dimensions of two females from these localities are given in the following table (partly from Falla) :

		FLIPPER	CULMEN	TAIL	TARSUS	TOE
Marion	19 March ...	250	60	64	33	83
Crozet	2 November ...	255	60	132	32	83

As many descriptions (except Murphy 1947) emphasise dimensions rather than structural details, it is difficult to separate possible races. I have kept to the typical subspecies but agree with Falla that valid races may yet be demonstrated for the Marion-Crozet and Kerguelen-Heard-Macquarie areas.

A very young chick was 254 mm. long and weighed 174 grams. Culmen (20 mm.) was dark horn colour with a prominent egg-tooth on the recurved tip. The mandible was almost completely yellow with a faint brown sheen near the tip. Down was dark brown above, silvery below. Flipper measured 50 mm., tail 5 mm., toe and claw together 27 mm. (with the horn coloured claw 7 mm.).

HABITAT PREFERENCE

Gentoos nest away from the beaches. They usually forsake the stones, spreading beyond the immediate coastal edge (Plate A, fig. 3). Nesting birds, however, never travel very far and may be seen on the coastal cliffs after a fifty feet climb from the waters edge (Macaroni Bay), above or in stream beds (Killer-whale Cove) or simply on the grassy flats bordering convenient landing-places. At Gentoo Lake (Transvaal Cove) they nested on *Cotula* plants alongside the stairway (Bennet 1948) but no longer do so. Nests on the tussock clumps or leafy *Cotula* mounds are well-raised off the ground (Sealers Hut 1, Archway Bay, Kaalkop Cove). More often small colonies of ten or more nests are spread out on the flat ground, the nests hardly raised above the surface (Goodhope Bay). Although they are the only penguins nesting near swampy ground, their nests (unlike those of the Wandering Albatross of the "goney plains") are always constructed on a hard surface. The predilection to establish nests away from the immediate vicinity of the beaches is a common trait among Gentoos generally (Murphy 1935, 371) but is less noticeable among the Marion birds (in some lava flows the Rockhoppers nest much further away from the waters edge). Nests among the grass or on mounds, invariably have a layer of material (dried grass, *Acaena*, *Cotula*) at the base. Climatic conditions during the winter would supposedly demand that nests be well insulated against the cold ground (*Pterodroma macroptera* nesting in the same places, crams dried grass into its burrows). Gentoos on their well-padded nests contrast rather vividly with the summer-breeding Macaronis, Rockhoppers and Kings that usually fail to accumulate much material in their nests.

The Gentoos are the least numerous of all the penguins on Marion. A similar state of affairs seems to exist on the other subantarctic islands although

populations appear to be much larger further south. Direct counts of adults ashore on Marion during the summer gave the following figures: Trypot 28, Macaroni Bay 150, Waterfall Cove 33, Blue Petrel Bay 3, Ships Cove 11, Goodhope Bay 68, Sealers Beach 16, Archway Bay 18, Kaalkop 15, Kildalkey Bay 4, adjacent coves 20, Killerwhale Cove 120, King Penguin Bay 75. Estimated total 561.

Eudyptes chrysolophus (Brandt)

Macaroni penguin

Macaroni penguins also breed on the subantarctic islands between 45° S. and 65° S. latitudes except at Macquarie where their place is taken by the Royal Penguin *Eudyptes schlegeli*. The close resemblance of Gentoos to the latter species and the occurrence of individuals with intermediate plumage has prompted the claim, first by Mathews & Iredale (1935, 102) supported by Falla (1937, 101) and recently by Jouanin & Prevost (1953, 281) that *schlegeli* may, indeed, have close racial affinities with *chrysolophus*. Plumage of the Marion birds was of the *chrysolophus* type and no individuals with the colour aberrations described by Falla (op cit) for *schlegeli* were noticed among the Macaroni rookeries.

The young chick has very dark brown down above a white-fronted neck and abdomen. The bill is black, feet pink in front, lighter behind. New plumage is dull blue-grey under the moulting down. At this stage the bill becomes horn-coloured and short orange plumes appear. The immature birds (those in their second summer) differ from adults in having shorter plumes and grey chins. They do not have the white tail spot of the adults. Patterns of the underside of the flipper in three species of *Eudyptes* are shown in figure 2.

FIG. 2

Pattern on under-flippers in the species of *Eudyptes*.



HABITAT PREFERENCES

Unlike the Gentoo, Macaroni penguins form well-defined colonies. Three of the largest colonies (Swartkop, Bullard Beach and Kildalkey Bay) are on sloping sandy or pebbly ground in widely different parts of the island. Smaller colonies occupy old landslides at Trichardts, Goodhope and Rooks Bays. A peculiar grotto, open at the top, contains a large mixed colony of Macaronis and Rockhoppers at Camps Bay. The amphitheatre at Swartkop caused by movement erosion of the soft sand has a peculiar half-moon shape. It is exceeded in size by the two other colonies at Kildalkey Bay and Bullard Beach. The latter colonies are partly subsurface, excavation of the subsoil being brought about by rain and the movements of birds on the outskirts of the colony. Marginal activity by

unemployed birds or others passing to and from the nests is particularly important in driving erosion outward and so increasing the dimensions of the colonies. Stones from the subsoil are trampled to form new nesting ground. During this slow lateral expansion, small gullies and pot-holes develop in the sidewalks and pathways to the rookery and may be a great hazard to the walking birds. There were many examples of this at the Waterfall Rookery (Bullard Beach), a bulging colony that had almost reached the adjoining cove. Sloping (talus) colonies have fewer permanent features but appear to be younger than the larger horizontal ones. One such colony at Trichaardts Bay had budded off a smaller one which spread out beside it. These almost vertical colonies, however, are strictly limited by the area of the rubble cone (Goodhope Bay). Macaronis regularly nest in Sealers Cave, the floor of which is littered with their feathers.

Open ground without boulders allows the nests to be closely juxtaposed even if the slope is steep. On flat ground pairs may be twelve to sixteen inches apart but this varies on rough terrain (Plate B, fig. 1) where they may be much closer together (Macaroni Bay) or even further apart (Goodhope Bay). The huge sprawling colonies above Bullard Beach and Kildalkey Bay preserve the gregarious inclinations of the nesting Macaronis. The desire to be within sight of each other has apparently prevented spilling over of the Swartkop colony and may control the formation of small colonies elsewhere. Nevertheless the latter do form; thus at Macaroni Bay there are about 100 birds nesting on a heap of cliff rubble. As space is limited in the early summer by the rather stable pattern of nesting birds, moulting immatures are forced onto the valley sides or rocks near the beaches. In this way new colony sites are cleared and may be tenanted by nesters (as at Killerwhale Cove) so relieving pressure of numbers in the larger colonies. The Kildalkey Bay and Bullard Beach colonies are both capable of unlimited albeit slow, expansion further inland.

A rough estimate of the size of the Macaroni population was made by computing the area covered by nesting birds. Eight birds per square yard was chosen as the average unit. Estimates were made as follows: Kildalkey Bay 100,000 (250 × 50 yds.), Bullards Beach 80,000 (200 × 50 yds.), Sealers Cave 100, Macaroni Bay 100, Trichaardts Bay 4,000 (25 × 160 yds.), Goodhope Bay 4,000 (50 × 80 yds.), Camps Bay 5,600 (700 sq. yds.), Swartkop 12,000 (1,500 sq. yds.). Estimated total 205,800. This figure disregards moulting immatures and chicks.

Eudyptes crestatus interjectus (Mathews & Iredale) Rockhopper penguin

Rockhoppers are widely scattered over most of the subantarctic islands from 37° S. to 55° S. latitudes. Bouvet appears to be an intriguing exception.

Mathews & Iredale (1921, 11) suggest subspecies for each of three areas viz., Tristan (*moseleyi*), Kerguelen (*interjectus*) and Campbell Islands (*filholi*), basing their subdivisions on the degree of crest development. Although several authors have analysed this aspect (feather length) results are not entirely satisfactory. Hagen (1952, 16) cites only three birds in his take of crest measurements on Tristan. Nine Marion birds had longer yellow plumes than these Tristan birds, viz., 76.4 (7 ♂♂), 76 (2 ♀♀), average 76.2 mm., but Mrs. Rowan informs me that two Tristan males had plume lengths 83, 86 mm. Roberts (1940, 216) quotes three specimens from the same island with longer plumes (average 85.6 mm.) than the Marion birds. His Kerguelen series (four) had an average length

of 68 mm. Roberts emphasises the gradation from long plumes in the low latitudes to short plumes in the high latitudes. This is partly supported by Hagen (op cit) who cites figures from Murphy (1935, 318). Notwithstanding this, the number of plumes seems to give more support to racial distinctness than does their length. Roberts (op cit) claims that the massive crests of the low latitude Rockhoppers (40-70 plumes) contrast with the sparse crests (10-15 plumes) of the more southerly populations. Two Marion birds both only had twelve yellow plumes on each side of the head and in this respect were quite distinct from the Rockhoppers that I saw nesting on Tristan in November.

Three just-hatched Rockhopper chicks had the following dimensions:— weight 94, 64, 55 gms. respectively; length 175, 165, 155 mm.; culmen 16, 14, 14 mm.; flipper 35, 30, 31 mm.; toe and claw 24, 22, 22 mm. The down was dark brown above but white below from the throat to the abdomen. The bill was yellow in front, blackish-brown behind. Legs were almost yellow.

HABITAT PREFERENCES

Rockhoppers are pre-eminently dwellers of the rough cliff sides (Plate A, fig. 1). They nest in high places in an almost continuous band round the island. The vertical cliffs (Crawford Bay, Goodhope Bay, Trichaardts Bay) have proved inaccessible but even so colonies may be seen clinging far up their sides. Steep boulder piles seeping over the cliffs afford good nesting places for this agile penguin. Every cove has its Rockhoppers and in three areas these penguins have spread far into the rough lava.

Nests are usually inconspicuous, being located under or between boulders. Nesting material varies in amount. Sometimes the eggs are incubated on bare rock but usually there are a few pebbles, the amount of debris that accumulates being determined by the position of the nest rather than the energy of the occupants.

Colonies on the island fall into three categories, viz.,

- (a) Those on the small boulder spillings (talus) breaking the continuity of the low coastal cliffs. Nest sites are here mostly unattainable by the other penguin species (Plate B, fig. 1).
- (b) Those on the arms of bays and coves. They may be pure or mixed colonies, the latter involving associations with the Macaroni penguins (talus colonies at Goodhope, Rooks, and Trichaardts Bays).
- (c) Inland colonies, partly subterranean, in lava fields at Trichaardts Bay, Cape Crozier, Natal Point and elsewhere. This type of colony is an overflow from the others. Similar nesting colonies have been reported from Heard Island (Falla 1937, 91).

The tenacity of the Rockhopper and its ability to nest under harsh conditions was well exemplified by small groups of the penguins on the deserted coast between Cape Crozier and Swartkop. This coastline receives the brunt of bad weather yet the Rockhoppers inhabit cliff side rocks just beyond reach of high tide.

Owing to their scattered distribution and partial concealment among the cliffs, no census of the Rockhoppers was attempted.

BREEDING CYCLE

Observations on the breeding cycle of the four species during the six months are outlined in the following table:—

MONTH	KING PENGUIN	GENTOO PENGUIN	MACARONI PENGUIN	ROCKHOPPER PENGUIN
October	Yearling chicks thronging the beaches.	A few nests contain eggs. (One egg was pipped October 31st). Adults guarding chicks of various ages.	Species is believed to return to the island at end of the month. Falla (1937, 94) notes that on Macquarie island they return by October 25th but eggs are not laid till November 2nd.	Males arrive to guard and renovate nests.
November	Chicks diminish in numbers. Adults begin moult and large numbers loiter near beaches. A few eggs are laid.	Disintegration of colonies occurs as fewer chicks remain at the nests. On the Crozets Falla (1937, 58) found many still laying and he stresses the protracted breeding season in more northern parts of their range.	Adults arrive and lay eggs.	Nest-occupation and egg-laying. Falla (1937) notes that they also start nesting in November on both the Crozets and Kerguelen.
December	Moulting birds exceed those nesting. Yearling chicks have almost all disappeared.	Many adults leave the island but return during the month to moult.	Chicks hatch out towards the end of the month.	Incubation of eggs.
January	Adults guard nests while others still moulting.	Moulting adults huddle in big groups in various parts of island.	Adults tending young chicks.	Adults tending young chicks.
February	A few adults still moult. Majority are guarding downy chicks. Some chicks are left unguarded as parents spend more time at sea. A few newly-laid eggs.	Moulting adults present during month.	Adults still at their nests. Chicks begin to lose their down.	Many chicks are left unguarded at the nests.
March	Most of the old chicks are alone at the nests.	Most adults return to the sea but appear a few weeks later to start desultatory nest-making.	Most nests are deserted but re-occupied again during the month by moulting adults.	As young birds leave the nests so there is a general exodus of adults. A few adults moult in mid-March but others are later.

MONTH	KING PENGUIN	GENTOO PENGUIN	MACARONI PENGUIN	ROCKHOPPER PENGUIN
April	Adults are concerned with the care of their large chicks which form the bulk of the beach populations.	Pairs are seen collecting nesting material or loitering at old sites. No eggs are laid during the month.	Breeding has ceased, adults finish their moult and disappear from the island at the end of the month.	Breeding ceases and after moulting, adults disappear from the island by the end of the month.

MOULT

Resident Gentoo and King penguins have a summer moult, the former species moulting slightly later than the latter. Rockhoppers and Macaronis moult simultaneously in the late autumn just before their exodus from the island.

Most Gentoo penguins move inland to moult but an occasional bird stays on the beach (Trypot, Transvaal Cove). Often but not always, the moulting places are at old nests (Goodhope Bay). The penguins are noticeably restless when finding a place to moult and wander considerably. Thus on December 3rd a party of about twenty Gentoos was seen trudging over the moss and grass below a high ridge near Junior Kop some 300 yds. from the sea. They were about to moult. At Goodhope Bay two weeks later, there were sixty Gentoos roosting on the grass in front of a cave. These birds had also come ashore to moult. By January 3rd, another eight had joined this group. They were still moulting on February 10th. The group disappeared a week or so later but were back again on March 4th when seen loitering near old nests. At Waterfall Cove near the meteorological station on March 19th there were ten adults at new nests. One female in new plumage had recently returned from the sea: her stomach contained partly-digested fish and a few stones. No moulting Gentoos were seen after March 22nd. Crawford (1952, 75) notes that they lay two eggs in the first week of June.

Moulting King penguins were seen throughout the summer. They invariably kept away from the nesting grounds, preferring the waters edge or moving inland by roaming up streams until stopped by waterfalls or other obstructions. King Penguin Lake which communicates with the King Penguin rookery through a shallow stream, is a favourite moulting place (Plate B, fig. 2). At Kildalkey Bay moulting birds were walking onto the stony ridges below Green Hill to depressions near the lava field some 500 yards or more from the beach. Only two moulting birds stood among a group of three hundred and fifty-one adults at Ships Cove on October 29th. But more were moulting in coves further north. Moulting birds were seen regularly at the beaches until the beginning of March.

Moulting is more uniform among the Macaroni and Rockhopper populations. In the Macaronis, the sudden arrival of immature birds in late December and their stay till late February, is eclipsed by the departure of the breeding adults and their return in early March to moult (mostly in pairs) at old nest sites. Unlike the Rockhopper, the adult Macaroni is rather passive, standing immobile on the pebbly nesting ground as it sheds its old feathers. The Rockhopper indulges in elaborate nest-building during this period. However, like this species the Macaroni returns (as far as could be surmised) to the same nest sites until the new plumage appears.

Debarred from the big colonies, the immature Macaroni finds accommodation on rocks bordering coves or on the sides or river beds. There they form small colonies until the end of February. Macaronis were last noticed on April 9th at Goodhope Bay where adults were in full moult at the talus colony. By the end of the month the Bullard Beach colony had disappeared. There are few records of moulting Macaronis on other islands. Falla (1937, 111) records how the closely related Royal penguins of Macquarie end their moult on April 22nd and leave the island a week or so later. Bierman and Voous (1950, 27) captured a Macaroni at 65° S. latitude and this bird moulted on their ship immediately (February/March). It was thought to be an unemployed adult.

Moulting Rockhoppers were first observed at the Camps Bay colony which on March 12th was mostly deserted except for a few moulting adults. On March 14th at Mixed Pickle Cove there were only two moulting adults at one colony but by April 11th this colony was crowded with moulting birds. They were still abundant on April 22nd when it was obvious that they had nearly finished the moult. At this time many birds were seen collecting nesting material (mostly fresh green grass and moss) and packing this into nests. This activity during the moult, not as emphatic among the other three species, has been amply described by Richdale (1951, 287) for penguins elsewhere. Although there is a general diminution in numbers at all cliff side colonies by late April, moulting adults were still seen at Transvaal Cove on April 28th. Falla (1937, 94) states that on Macquarie the Rockhoppers had completely deserted the island by May 5th, some four weeks after they begin the moult. Immature Rockhoppers congregate on the beaches with the young Macaronis in early January but disappear again before March.

SUMMARY

Four penguin species frequent Marion Island but no special attributes were found to warrant new racial groupings. King and Gentoo penguins are at the island throughout the year, the former species laying eggs in mid-summer and rearing chicks for some ten months. The Gentoos nest in the winter but appear to rear chicks for only a few months. Rockhoppers and Macaronis spend six summer months on the island leaving abruptly after moulting in April.

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