BODY MEASUREMENTS AND COLOUR PHASES OF THE McCORMICK SKUA
Catharacta maccormicki

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While body measurements have been used in an attempt to elucidate the taxonomy of the stercorariidae (for a review see Murphy, 1936) a lack of standardized and accurate methods has hampered comparisons of skua and jaeger forms. Colour phases and their geographical distribution have also caused some confusion in this family and there is no extensive quantitative study of the southern hemisphere *Catharacta* colour phases.

This report does not purport to be a substantial contribution and is simply a presentation of some data collected at opportune moments during an ecological study of the McCormick Skua *Catharacta maccormicki*.

MATERIALS AND METHODS

McCormick Skuas were trapped at the Canterbury University Field Station at Cape Royds, Ross Island, Antarctica, during the three summers 1963/64 - 1965/66. The birds were immobilized (Spellerberg, 1969) with pentobarbital sodium or thiopental sodium while measurements and colour phases were recorded. Linear measurements were taken either with vernier callipers accurate to .01cm. or a steel rule accurate to .1cm. Weights were determined with a spring balance calibrated to 2.0gms.

After a preliminary examination of the colour phases a colour chart was prepared which could be used to determine the phase of each bird after matching the nape, breast and scapular feathers. Samples of each of these feathers were collected and a further check of the allocated phase was made later in the laboratory at Canterbury University. This check resulted in rejection (2.1%) of some doubtful colour phase identification.

RESULTS AND DISCUSSION

1. Body Measurements.

Delineation of the linear body measurements (Table 1, 2) were as follows: Culmen — tip of bill to base of maxilla horny covering; Ear to bill tip — centre of aperture to end of bill tip; Gape — tip of bill to corner of closed mouth; Tarsus — distal end of upper side of web to articulation with tibio-tarsus; Third digit — ventral surface and excluding claw; Claw — exposed base to tip; Wing length — axilla to tip of largest primary feather with wing extended; Wing span — maximum length obtained with bird supine; Body length — tip of bill to tip of largest rectrice while bird suspended by neck.

Web and wing areas were calculated from weighed paper cut-outs and included the total area of each of the paired limbs. Wing areas were taken from the maximum area that could be obtained while the wing was laid out on a flat surface.

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Table 1. External measurements from live McCormick Skuas.

Measurement.	Mean. mm.	Standard deviation.	Number in sample.
Culmen.	49.3	2.3	285
Ear - bill tip.	92.3	2.4	285
Gape.	69.1	1.9	285
Tarsus.	63.1	4.2	285
Third digit.	74.0	1.3	285
Second claw.	5.3	0.5	199
Third claw.	7.2	0.8	199
Web area (Total)	62.4 cm^2	-	6
Wing area (Total)	1640 cm^2	-	48
Wing length.	40.5 cm.	1.1	285
Wing Span.	139.3 cm.	-	9
Body length.	59.0 cm.	0.98	285
Body weight.	1263 gms.	128 gms.	285

Table 2. External measurements from 21 males and 24 females before dissection.

	Male.	Female.
Measurement.	Mean. (Range)	Mean. (Range)
Culmen.	49.4mm (48.1-51.3)	50.9mm (47.0-53.6)
Ear - bill tip.	90.4mm (87.0-96.0)	92.3mm (89.1-95.0)
Gape.	68.3mm (65.7-71.2)	69.3mm (63.7-74.3)
Tarsus.	62.4mm (58.6-68.0)	64.8mm (58.0-76.0)
Third digit.	69.9mm (61.0-76.2)	71.6mm (65.0-75.3)
Wing length.	41.0cm (39.0-42.0)	41.5cm (40.0-43.0)
Weight.	1228gms (899-1392)	1366gms (9660-1619)
Body length.	59.5cm (58.0-61.0)	60.0cm (58.0-62.0)

Sixteen percent of the birds examined (included in Table 1) were smaller than the average breeding birds and as they lacked the paired brood patches during the summer they were identified as juvenile birds (2 - 5 year olds) and not yet breeding. Thirteen of these were caught in the first summer and again two years later. Over this period all linear measurements increased: the culmen showed a mean increase of 2.5mm. (R.=2.2-3.4mm.), the third digit showed a mean increase of 1.2mm. (R.=1.1-1.3mm.) and the tarsus a mean increase of 1.4mm. (R.=1.1-1.5mm.).

Forty-five birds (24 females and 21 males) were also measured and dissected for sex identification. Females that were about to lay eggs were excluded from the sample as they weighed 200 - 300gms. more than the mean weight of females (Table 2). In this small sample females averaged larger than the males, which agrees with the report by Falla (1937), who examined several *C. maccormicki.*

Similar results showing the female to be larger than the male have been found for the Jaegers *Stercorarius pomarinus, parasiticus* and *longicaudus* (Murphy, 1936) although Brooks (1939) reported body measurements of *S. pomarinus* showing the male to be larger than the female.

Female Great Skuas *C. skua* are also larger than males (Perdeck, 1960) and a similar situation exists with *C. chilensis* and *C. antarctica* (Murphy, 1936). Measurements given by Murphy for the Brown Skua *C. lonnbergi* show the female to be larger only in the tarsus length while Falla (1937) has reported a slightly greater size in the tail, tarsus and culmen of the female Brown Skua.

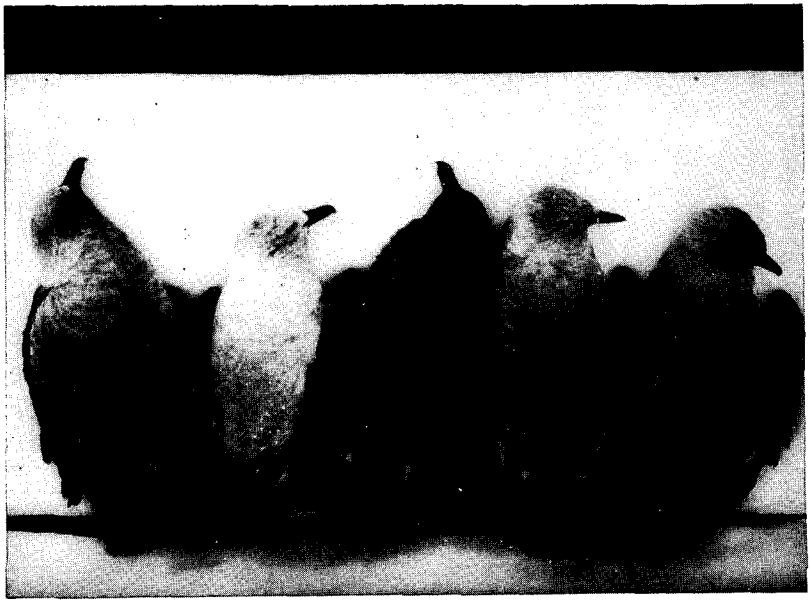

Plate XXXVI — The three colour phases of the McCormick Skua. From left to right: Intermediate, pale, dark, intermediate, intermediate.

2. Colour Phases.

There was considerable variation in the colour of the adult plumage (Plate XXXVI). Generally it was a paler brown than in either the northern Great Skua *C. skua* or other southern hemisphere forms and lacked the cinnamon-red or rufous colouring found in most other forms. The ventral surface was light grey with some white tipped or yellow tipped feathers and the dorsal surface was dark grey or black with a few white tipped feathers. The head and neck feathers were predominantly grey (tinged with light brown) and strongly marked with yellow or golden feathers on the nape and top of the head. The wings had a white band on the primaries which was displayed during 'Wing Raising' and flight. This band was seven to eight cm. wide narrowing to a point on the first primary when the wing was spread.

The adult plumage colour phases could be classified into three phases: pale, intermediate, and dark. As with the Arctic Skua *S. parasiticus* the greatest variation was found on the nape and head feathers (Table 3). The pale phase was characterised by feathers tipped with light yellow or white so that overall the plumage appeared light yellow. The dark phase was characterised by nape feathers which were dark brown and tipped golden yellow.

TABLE 3 — Colour Phases and Plumage Characteristics

Plumage	Pale	Intermediate	Dark
Head and Nape	Many feathers tipped with light yellow or white and generally plumage is grey and white.	Few yellow tipped feathers. Plumage generally light grey or white.	Many feathers tipped with golden yellow. Generally plumage is dark brown with some black tinting.
Ventral Plumage	Some feathers tipped with light yellow otherwise almost white.	Uniform grey and few feathers tipped white or pale yellow.	All feathers dark grey or dark brown. Yellow tipped feathers rare.
Scapulars	Feathers light brown or grey tipped white and yellow.	Feathers light brown or grey. Few feathers tipped white or yellow.	All feathers black or dark grey. White tipped feathers rare.

Information on the incidence of each phase (Table 4) was collected from the captures of two summers, from field notes on breeding birds, and from the 45 birds that were dissected for sex identification.

Both sexes were found to exhibit any one of the three phases and all the phases occurred in non-breeding juvenile birds (2 - 4 years old) as well as banded birds that were at least 6 - 7 years old (Friedman, 1945). No change in colour phase was detected during the summer months while the reverse has been reported to occur for *C. lonnbergi* (Stonehouse, 1956).

As it was considered that the three phases were quite distinct, that all bred in the Cape Royds area, and that the frequency of the rarest (dark phase) did not suggest recurrent mutation, it would appear that these phases indicate a colour polymorphism.

Other than reports of the melanic form (dark phase) off the coast of Japan (Kuroda, 1962) and at Cape Hallett, Cape Bird, and Cape Crozier (Falla, 1964) there is little information on the colour phases of *C. maccormicki.*

Southern (1943) has described two phases of *S. parasiticus* and illustrates the range of each phase. O'Donald and Davis (1959) have reported three phases for the same species and by using the numbers of the different phases suggest that a cline in these phases is a stationary one. More recently Forsten and Tuominen (1967) described three colour phases for *S. parasiticus* and contributed further evidence to the report of O'Donald and Davis showing that the pale phase predominates in the north while the dark predominates in the south of the Arctic.

An extensive literature survey was made by Southern (1944) on the distribution of the colour phases of *S. pomarinus* and it was

Table 4. Ratio of colour phases week by week for all McCormick Skuas caught at Cape Royds during two summers.

Week commencing.	No. 64/65	No. 65/66	Pale % 64/65	Pale % 65/66	Intermediate % 64/65	Intermediate % 65/66	Dark % 64/65	Dark % 65/66
1 7.11.64	-	19	-	21	-	69	-	10
2	24	19	9	36	62	54	29	10
3	12	58	16	25	68	46	16	29
4	8	5	25	40	63	20	12	40
5	12	12	33	8	50	59	17	33
6	16	13	31	38	50	55	19	7
7	15	28	13	17	67	76	20	7
8	19	35	15	25	75	67	10	8
9	14	58	28	27	72	65	0	8
10	32	20	21	40	58	60	21	0
11	25	16	20	25	80	75	0	0
12	31	32	0	72	87	22	13	6
13	40	-	18	-	72	-	10	-
14	21	-	4	-	72	-	24	-
Total.	269	315	16	31	69	56	15	13

Ratios.

	Pale.	Intermediate.	Dark.
1964/65	1.0	4.6	1.0
1965/66	7.4	4.3	1.0

concluded that this species was dimorphic with the dark phase evenly distributed throughout the breeding range.

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SHORT NOTE

SOME NOTES ON THE NESTING OF WELCOME SWALLOWS IN CENTRAL NORTHLAND

For some years the Welcome Swallow *Hirundo neoxena* has been a common bird in Central Northland and breeding seasons have been surprisingly long and successful.

At Waiotira, on the northern boundary of the Otamatea County and a little south of the area covered by Murray Munro (Notornis 16, 198-201), Welcome Swallows start breeding at the beginning of August. This year three nests were found containing eggs on 21/8/70. The clutches were 3, 3, 1 respectively. Several days later two of the nests contained four eggs, which is not an uncommon clutch in this area. As early as 31/8/70 one of the nests contained chicks. These three nests were located under wooden farm bridges, typical nesting sites, but recently two nests were found in more unusual sites.

In October a nest was found inside a large hollow totara tree. The birds entered the dark cavern inside the trunk by either of two natural holes. The nest when found contained four fully fledged chicks which left the nest on 25/10/70. The nest was firmly cemented to rotten wood about five feet off the ground.

Another nest was found under a large fallen log on an open hillside. Part of the log had fallen over a small undulation in the ground so that the nest, tucked away beneath, was about a yard above the ground. It contained one egg on 25/10/70.

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