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The avifauna of Haswell Island (East Antarctica) in summer of 1978/1979 *)

ABSTRACT: The observations carried out on Haswell Island on 20–24 January 1979 showed the occurrence of 7 species of nesting birds: *Pygoscelis adeliae* — about 36000 individuals including about 11300 young. *Stercorarius skua maccormicki* — 76 adults and 15 young, *Daption capensis* — 220 ± 10 nests, *Fulmarus glacialis* — 3150 ± 200 nests, *Thalassoica antarctica* — 250 ± 10 nests, *Oceanites oceanicus* — about 500 nests and *Pagodroma nivea* — about 10 nests. The time of hatching and moulting was found to be 15–20 days earlier, and the percentage of two-egg clutches in nests of *Procellariidae* was lower as compared with the literature data. More of the two-egg clutches were found for *Stercorarius skua maccormicki*. The krill dominated in the food of studied species of *Procellariidae*. Biometrical data for eggs of the majority of studied bird species were gathered.

Key words: Antarctic, birds, ecology

1. Introduction

Avifauna of the Haswell Island was already frequently studied. Korotkevič (1958, 1959) and Syroječkovskij (1959, 1966) described the species composition and evaluated the birds numbers. Pryor (1968) and Kamenev (1968, 1971), apart from publishing the quantitative data, published also a lot of information on phenology and nesting biology. The last census of numbers was by Kamenev (1978, 1979) in 1972.

The present paper aimed at the estimation of bird numbers, distribution and nesting phenology on Haswell Island. The results were compared with earlier data.

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2. Terrain of studies and methods

The Haswell Island (lat. S 66°32', long. E 93°00') is located about 3 km from Russian Antarctic Station Mirnyj which is situated on the continental shore of the Davies Sea. This is the largest rocky area within Haswell Archipelago, which consists of 17 islands, several hundreds to several thousands meters one from the other. The island has an area of 0.81 km², its highest point is 93.1 m above sea level. The dome of an island consists of granites and granite gneisses, in its western part it is covered by two small local glaciers. The southern and eastern shores are steep cliffs, northern and eastern ones are more gentle (Fig. 1). There are few fresh-water bodies on an island, their water quite polluted with penguins feces. The average temperature of January is -1.9°C, the winds are mainly eastern and south-eastern. Quite a part of birds nesting in the region of the Davies Sea makes nests on this island.

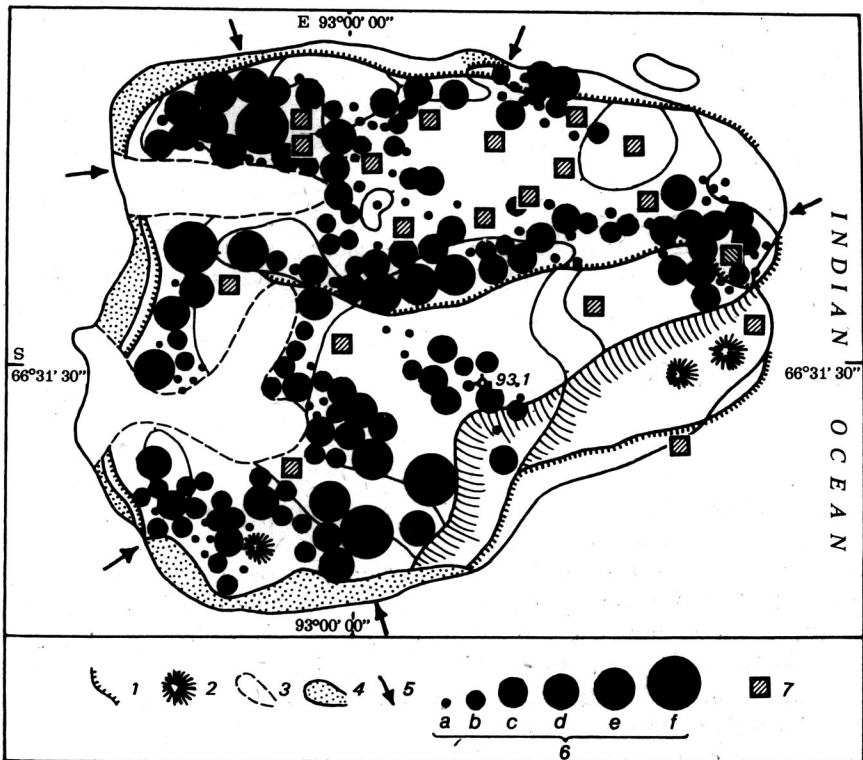


Fig. 1. Distribution of nesting colonies of *Pygoscelis adeliae* and nests of *Stercorarius skua maccormicki* on Haswell Island in January 1979

1 — faults of the terrain, 2 — steep hills, 3 — boundaries of local glaciers, 4 — planes of permanent snow, 5 — descents to the sea used by *Pygoscelis adeliae*, 6 — colonies of *Pygoscelis adeliae* with: a — 1—10 nests, b — 11—25 nests, c — 26—50 nests, d — 51—100 nests, e — 101—250 nests, f — more than 250 nests, 7 — nests of *Stercorarius skua maccormicki*

The observations were carried out non stop during a bivouac on an island from 20 to 24 January 1979. The whole area of an island was penetrated on foot many times. The spotted birds were counted, as well as nests, number of eggs and young, eggs were measured and weighted. Several nests were marked and controlled few times for determination of the moment of hatching.

The times of the most intense hatching of particular species were evaluated judging the number of nests with eggs, with young in down, moulting and moulted. This was not difficult, as the lengths of particular periods of development of studied species in the area are known (Pryor 1968, Kamenev 1978, 1979). Some nestlings of several species were ringed with Polish rings. The distribution of nests and nesting colonies was mapped during the observations. The number of nests in unaccessible spots was evaluated by binocular observations. The size of adelic penguins (*Pygoscelis adeliae*) colonies was evaluated by separate counts of adults and young. Experimentally determined error of counting was not more than 3%.

3. Results

Pygoscelis adeliae Hambron and Jacquinet

The count performed on 24 January 1979 showed the presence of 36000 ± 500 individuals including 11300 nestlings on an island. 34000 birds formed 155 groupins — nesting colonies. A colony was estimated as a group of nests not further than 1.5 m one from another (Penney 1968). Apart from that 1815 adult birds were spotted outside the colonies territory — they were resting on the snow or traveled between colony and the sea. Only the single nest was found. 66.2% of colonies had more than 50 nests, 32.3% — 51—250 nests and 4.5% — more than 250 nests. The largest colonies were located on broad rocky slopes not far from the sea (Fig. 1). Smaller colonies were located on rocky shelves or among the rocks, at least a little protected from winds. About 80% of places suitable for establishment of a penguin colony was occupied by these birds. The most frequent were colonies of several tens of adult birds (Fig. 2). Such size of a grouping makes possible to ensure the safety of nestlings — the protection against attacks of *Stercorarius skua maccormicki* is possible even when several adult birds are absent. Penguins nesting in small groupings (up to 10 individuals) showed higher alertness and reacted more rapidly to the appearance of an intruder (*Stercorarius skua maccormicki* or a man — Fig. 3). Sexually not matured nomadic birds were nearly never found in small groupings. One the 24 January 1979 the nestlings were still covered with down and were in the 3—6 week of life. The moulted young were met sporadically. A bird brooding eggs was noted only once.

The young did not depart yet from the colonies during the studied period. The adults kept them in groups, the so called schools, and standing around them efficiently protected them against the flying over individuals of *Stercorarius skua maccormicki*. The attacks of these predatory birds on

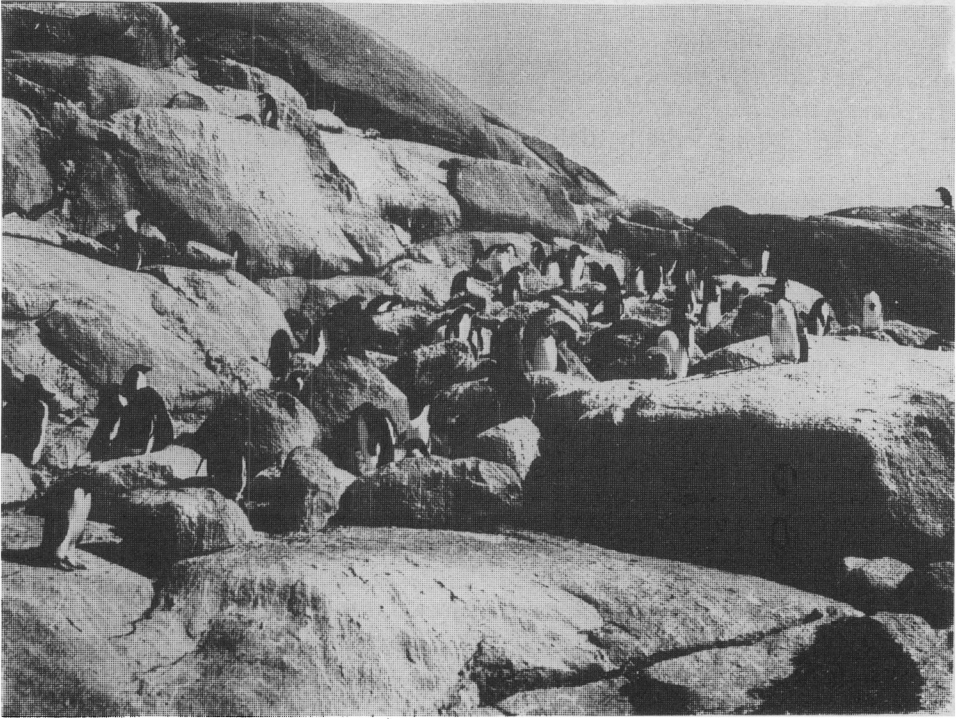


Fig. 2. Typical colony of *Pygoscelis adeliae* on Haswell Island

Photo W. Starck



Fig. 3. *Pygoscelis adeliae* nesting in small groupings (up to 10 nests) react very rapidly on the intruder

Photo W. Starck

colonies of *Pygoscelis adeliae* or on single resting or walking penguins were noted very rarely. However, 9 recent year remains of adult adelic penguins and 3 of young ones were found with clear marks of feeding of *Stercorarius skua maccormicki*. There is, though, a lack of evidence that the dead and torn up penguins were killed by these predators. It should be rather assumed that those penguins were already dead when predators fed on them. The remains of adelic penguins were twice found floating on the sea — this was perhaps result of leopard seals actions, these seals were sporadically observed near the island shores. Long lasting observations of feeding the youngs by adult penguins allow to state that the basic food brought by adults is a krill pulp, partially digested in the stomach, with still visible eyes of euphasia. About 600 g of this pulp was found directly after feeding in the stomach of four weeks old penguin. The feeding takes place 2—3 times per day. It could be roughly calculated, that young penguins from the Haswell Island consumed in January 1979 about 6.8 tons of krill. The daily food ration of adult birds was not studied.

Stercorarius skua maccormicki (Saunders)

The counts performed few times at various time of a day showed the presence of 76 adult birds on the island. There were 20 nests found (Fig. 1). 14 of them were located nearby adelic penguins colonies, on unsheltered dome like tops of hills, usually in small rocky holes. Three of the found nests were placed on smooth, few meters long, rocky shelves running across the cliffs. Three nests were on large flat rocks, not protected at all. In 8 nests two eggs were found (Table I). The gathered data suggest about two weeks delay of hatching as compared with one egg nests. Similar results were obtained by Trillmich (1978). The two egg clutches were observed usually in places further from adelic penguin colonies than one egg nests. An average weight of eggs and linear measurements for one egg nests was significantly larger (χ^2 , $p = 0.05$). The second eggs in two

Table I.
Results of the control of nests of *Stercorarius skua maccormicki*
on Haswell Island in period 21—24 January 1979

Nest content	Number of nests	
	with 1 egg	with 2 eggs
Eggs	2	3
Nestlings in down	1	1
Moulting nestlings	7	3
Moulted nestlings	2	1
Total	12	8

egg nests were slimer than the first ones, i.e. the former had larger value of the product of length and width (Table II).

Fourteen nestlings were ringed. Analysis of the stomach content of 4 nestlings, emptied under stress, showed the presence of fish, meat and large amounts of food remains from Mirnyj Station. During the whole January 20—30 individuals of *Stercorarius skua maccormicki* were observed at dinner time at the kitchen rubbish dump while feeding on the dumped food remains. It was observed from the Haswell Island that these predators fed on the remains of adelic penguin fished out from the sea—perhaps on the victim of leopard seal, and that they fed on recent and on exposed from under the snow last year caracasses of adelic penguins. Direct attacks of *Stercorarius skua maccormicki* on birds inhabiting the island were never noted.

Table II.

Measurements of eggs of *Stercorarius skua maccormicki* on Haswell Island in summer 1978/1979

Type of egg	Length (mm)	Width (mm)	Weight (g)
From 1 egg clutch	71.0	53.1	98.5
	71.4	51.1	—
First egg of 2 egg clutches	67.9	49.8	84.5
	68.2	52.9	94.5
Second egg of 2 egg clutches	66.3	49.8	83.0
	72.9	50.9	—
	67.6	50.7	87.9
Mean of all eggs	69.3	51.0	89.6

Fulmarus glacialis (Smith)

There were 3150 ± 200 nests of this species found on the island, and about 300 pairs of birds occupying nesting territories but without eggs or nestlings (Fig. 4). The nestlings covered with down were observed in 65% of nests, nine times the moulting birds were found. Two egg clutches were not found. The mean measurements ($n = 3$) of eggs were 74.2×51.6 mm, mean weight was 95.5 g. An average width of astragalus 7.67, maximum 8.00 mm. Analysis of the stomach content, spited out by disturbed birds on their nests, has shown in wet weight about 85% of krill, 10% of cephalopodes and 5% of unidentified mass. The time of the most intense hatching was evaluated as 5—8 January 1979. It was observed that frightened birds caught by their nests, when freed, immediately came back to an egg or a nestling and tried to frighten away an intruder by loud cries and spitting out gut content to a considerable distance.

Thalassoica antarctica Gmelin

A total of 250 ± 10 nests grouped in two nesting colonies was found (Fig. 4). In 80% of nests the nestlings were covered with down, in 10%

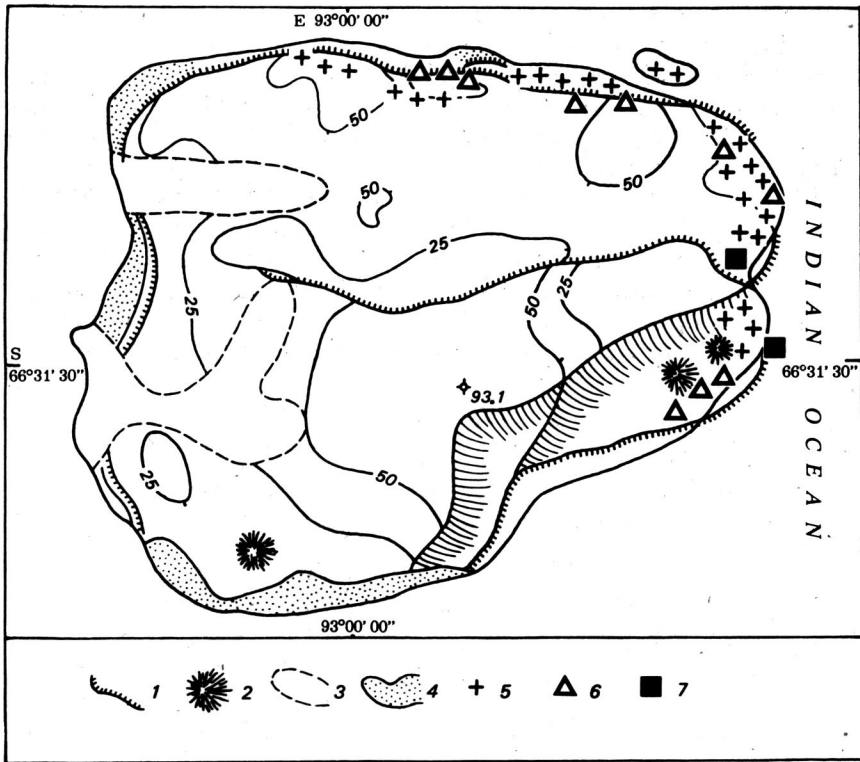


Fig. 4. Distribution of nesting colonies of birds from family *Procellariidae* on Haswell Island in January 1978/1979

1 — faults of the terrain, 2 — steep hills, 3 — boundaries of local glaciers, 4 — planes of permanent snow, 5 — nesting colonies of *Fulmarus glacialis*, 6 — nesting colonies of *Daption capensis*, 7 — nesting colonies of *Thalassoica antarctica*

of them young were moulting. One double clutch was found (an egg and a nestling).

The birds formed colonies more condensed than that of *Fulmarus glacialis*, choosing for their nests less steep and precipice places, better protected against winds. The date of the most intense hatching was evaluated as 1—3 January 1979. Four eggs of this species were measured (Table III). Behaviour of birds disturbed by man was similar to the one of *Fulmarus glacialis*. The nests of this species were frequently mixed up with nests of *Thalassoica antarctica*. Both nesting colonies (Fig. 4) were quite dense, the smallest distance between nests was about 0.3 m, mean distance about 1 m. The nesting biotope of *Thalassoica antarctica* was found to be similar to the one described at Ardery Island close to Wilkes Station (Orton 1968).

Daption capensis L.

A total of 220 ± 10 nests of this species was found on an island (Fig. 4). About 80% of nests had nestlings in down, 11 nestlings were moulting. Three two egg clutches were found. Six eggs were measured (Table IV).

Table III.

Results of egg measurements (mm) of *Thalassoica antarctica* on Haswell Island in summer 1978/1979

Measurement	Consequent No of egg				mean
	1	2	3	4	
Lenght	67.2	68.1	69.4	71.3	69.0
Width	47.0	49.0	48.1	48.0	48.2

Table IV.

Results of egg measurements (mm) of *Daption c pensis* on Haswell Island in summer 1978/1979

Measurement	Consequent No of egg						mean
	1	2	3	4	5	6	
Lenght	68.7	62.3	61.1	62.8	60.6	62.4	63.0
Width	45.1	42.2	46.1	43.9	40.6	45.2	43.9

An analysis of 6 samples of the stomach content, spitted out under stress, showed on an average about 80% of krill, 10% of cephalopodes, 5% of fish and 5% of unidentified mass. The birds nested usually in small and loose groupings, often in rock cracks and holes or among flints. The average width of astragalus was 6.42 mm, maximum 6.85 mm.

Oceanites oceanicus Kuhl

Nests of this species were fairly evenly spread on the whole area of an island, mainly on slopes, under stony slabs and in very narrow cervices. The majority of nests was unaccessible for man. At the time of observations the majority of nests was still without eggs. The number of nests was evaluated as 500 on the basis of several counts of birds showing territorial behaviour at the times of evening peak of activity.

Pagodroma nivea Forster

Five nest were found, located deep in rocky crevices at the area of *Thalassoica antarctica* colony. The number of nests was evaluated as 10 on the basis of observations of several individuals showing their territorial behaviour. Single nestlings in down were found in all found nests.

4. Discussion of results

The gathered data on numbers of particular bird species on Haswell Island, and the literature data from previous years make possible an introductory analysis of population numbers dynamics during few years (Table V). The numbers of the majority of species stays on constant level.

It seems that the distribution and size of adelic penguins colonies is conditioned by land coformation, amount of space and the degree of protection

Table V.

Numbers of studied bird species on Haswell Island in various nesting seasons

Nesting season and author of data	Number of birds or nests						
	<i>Pygoscelis adeliae</i> (ind)	<i>Stercorarius skua maccormicki</i>		<i>Fulmarus glaci loides</i> (nests)	<i>Thalassoica antarctica</i> (nests)	<i>Daption capensis</i> (nests)	<i>Oceanites oceanicus</i> (nests)
		nests	nomadic individuals				
1956/57 Syroječkovskij (1966)	18000	20	?	800	80	250	?
1962/63 Pryor (1968)	35600 ± 500	23	17	4215	1054 ± 50	?	200— —300
1966/67 Kamenev (1968)	?	20	30	?	?	125	?
1970/71 Kamenev (1978)	?	?	?	4000	?	?	?
1978/79 present data	36000	20	36	3150 ± 200	250 ± 10	220 ± 10	500

against wind, and the distance from convenient descents to the sea. The colonies with several tens of nests seem the optimal ones.

The fact of very similar distribution of nests of *Stercorarius skua maccormicki* to the one on previous years (Pryor 1968) is worth to be mentioned.

The time of the most intense hatching of young was in summer 1978/1979 about 15—20 days earlier than in previous years. This can be related with exceptionally mild climate in studied season. The shore-ice floated away on 13 December 1978, while the usual date of this event for period 1957—1973 is 14 February (Panov and Fedotov 1977). This means that climatic conditions enabling breeding of birds occurred much earlier than usually. Only the hatching of *Pygoscelis adeliae* was about 1 week late as compared with the literature data.

An observation that clutches of the majority of *Procellariidae* consisted of one egg seems interesting. Syroječkovskij (1966) and Kamenev (1978, 1979) stated much larger contribution of two egg clutches in the total number of clutches of this family of birds. Although the author did not observe nests while birds were brooding the eggs, the difference is too large to result from e.g. quick and mass mortality of one of the nestlings in two egg clutches, or from destruction of one of the eggs.

The data on the food composition for particular species of birds,

although quite rough and general, confirm the literature data (Kamenev 1978, 1979). The krill makes a basic food source of birds on Haswell Island in summer.

The utilization of the kitchen food remains as a main food source by *Stercorarius skua maccormicki* influences probably safety of broods of other bird species on Haswell Island, increasing thus the hatching success. The food remains from the Station, easily available in excess, undoubtedly discourage skuas from their natural food sources, i.e. from eggs and young of penguins and petrels (D. Müller-Schwarze and Ch. Müller-Schwarze 1973). Thus introduced in such a way an anthropogenic factor may result in an increase of the numbers of nesting birds of Haswell Island.

5. Summary

Monitoring observations of birds were carried out on Haswell Island (region of the Russian Antarctic Station Mirnyj, lat. S 63°32', long. E 93°00') in period 20—24 January 1979. Seven species of nesting birds were found. *Pygoscelis adeliae* — 36000 ± 500 individuals (including 11300 young) formed 155 groupings. The land confirmation and the distance from convenient descents to the sea determine the size and distribution of colonies (Fig. 1 and 2). *Stercorarius skua maccormicki* — 76 adults were observed, 20 nests with eggs and young were localized. In 8 nests two egg clutches were found (Table I). The dump of kitchen food remains was the main source of food of this species. There were also on an island: 3150 ± 200 nests of *Fulmarus glacialis*, 250 ± 10 nests of *Thalassoica antarctica*, 220 ± 10 nests of *Daption capensis* (Fig. 4), evaluated number of 500 nests of *Oceanites oceanicus* and 10 nests of *Pagodroma nivea*. The dates of hatching and moulting of young *Procellariidae* was found to be 15—20 days earlier compared to earlier literature data. Colonies of these species were distributed in similar way as in previous years. Measurements of eggs of studied birds were done (Table II, III and IV). A smaller percentage of two egg clutches of *Procellariidae* and larger one of *Stercorarius skua maccormicki* was found. The mean weight and linear measurements of one egg clutches of *Stercorarius skua maccormicki* were significantly larger than those of eggs from two egg clutches (Table II). The second eggs were slimer than the first ones (Table II). Krill dominated in food of all studied bird species except *Stercorarius skua maccormicki*.

6. Резюме

В днях 20—24 января 1979 г на острове Хасвель (район советской антарктической Станции Мирный, 63°32' геогр. шир., 93°00' геогр. длины) проведено мониторинговые наблюдения авифауны. Констатировано наличие 7 выводковых видов. *Pygoscelis adeliae* — 36000 ± 500 особей (в том 11300 молодых) — они были сосредоточены в 155 группировках. О величине и распределении колонии решили рельеф местности и отдалённость от схода в море (рис. 1 и 2). Проведено наблюдения 76 взрослых *Stercorarius skua maccormicki*, локализовано 20 гнёзд с яйцами и молодыми. В 8 гнёздах обнаружено двухяйцевые выводки (таблица I). Главным источником пищи для этого вида в январе была мусорная куча Станции Мирный. Кроме того констатировано 3150 ± 200 гнёзд *Fulmarus glacialis*, 250 ± 10 гнёзд *Thalassoica antarctica*, 220 ± 10 гнёзд *Daption capensis* (рис. 4) и оценено количество гнёзд *Oceanites oceanicus* на 500 а *Pagodroma nivea* на 10. На 15—20 дней раньше определено сроки вылушпвания и оперения птенцев *Procellariidae* в сравнении с литературными данными. Колонии этих видов были распре-

лены так как в предыдущих годах. Проведено измерения яиц исследованных видов (таблица II, III и IV). Констатировано меньший процент двухяйцевых выводков *Procellariidae* и большой процент *Stercorarius skua maccormicki*. Средняя масса и линейные обмеры яиц с единичных выводков *Stercorarius skua maccormicki* были десйтвительно больше яиц с двухяйцевых выводков (таблица II). Вторые яйца с этих выводков были более гибкими чем первые (таблица II). В пище все исследованных видов с исключением *Stercorarius skua maccormicki* преобладал криль.

7. Streszczenie

W dniach 20—24 stycznia 1979 na wyspie Haswell (rejon radzieckiej Stacji antarktycznej Mirnyj, szer. geogr. S = 63° 32', dł. geogr. E = 93° 00') przeprowadzono obserwacje monitoringowe awifauny. Stwierdzono obecność 7 gatunków ptaków lęgowych. *Pygoscelis adeliae* — 36000 ± 500 osobników (w tym 11300 młodych) — skupione były w 155 zgrupowaniach. O wielkości i rozmieszczeniu kolonii decydowały rzeźba terenu i odległość od zejścia do morza (rys. 1 i 2). Obserwowano 76 dorosłych *Stercorarius skua maccormicki*, zlokalizowano 20 gniazd z jajami i młodymi. W 8 gniazdach stwierdzono lęgi dwujajowe (tabela I). Głównym źródłem pokarmu tego gatunku w styczniu było wysypisko odpadków z kuchni Stacji Mirnyj. Ponadto stwierdzono: 3150 ± 200 gniazd *Fulmarus glacialis*, 250 ± 10 gniazd *Thalassoica antarctica*, 220 ± 10 gniazd *Daption capensis* (rys. 4) i oszacowano liczbę gniazd *Oceanites oceanicus* na 500, *Pagodroma nivea* na 10. Stwierdzono wcześniejsze o 15—20 dni terminy wykluwania się i pierzenia piskląt *Procellariidae* w porównaniu do wcześniejszych danych literaturowych. Kolonie tych gatunków rozmieszczone były podobnie jak w latach poprzednich. Wykonano pomiary jaj badanych gatunków (tabela II, III i IV). Stwierdzono mniejszy procent lęgów dwujajowych u *Procellariidae*, a większy u *Stercorarius skua maccormicki*. Średnia masa i wymiary liniowe jaj z lęgów pojedynczych *Stercorarius skua maccormicki* były istotnie większe niż jaj z lęgów dwujajowych (tabela II). Drugie jaja z lęgów dwujajowych były bardziej smukłe niż pierwsze (tabela II). W pokarmie wszystkich badanych gatunków z wyjątkiem *Stercorarius skua maccormicki* dominował kryl.

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