

# Ecological Observation on the Breeding Behaviour of Adélie Penguin (*Pygoscelis Adélie*) at Ongulkalven Island near

Syowa Base, Antarctic Continent

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## オングルカルベン島におけるアデリーペンギンの 繁殖についての生態学的観察

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### 要 旨

1961年10月から1962年1月まで第5次の越冬中、オングルカルベン島のアデリーペンギンルッカリーにおいて、その生態を観察した。10月下旬になると北の海からルッカリーにやってくる。ここでは約110羽のアデリーペンギンが営巣する。つがいのペンギンは交互に石を拾ってきては巣をつくる。11月の初旬には交尾が盛んに行なわれ、11月の中旬頃からは産卵が行なわれるようになる。卵は2つずつ生まれる。生んだ雌は北の海の開水面へ餌とりに行く。雄だけが後にのこされて抱卵を続ける。20日位して再び雌が帰ってくるまで待ちきれずに卵をおいて巣を去っていく雄のペンギンがいる。放置された卵はまもなく Giant

Petrel やうろつきまわっているアデリーペンギンに食べられてしまう。結局、雌とうまく交代してヒナがかえったものはわずか33%だけだった。これはルッカリーがリュッツォホルム湾の奥にあるということ、すなわち、ちょうど抱卵期に開水面がオングルカルベン島の近くになく、遠くまで餌とりに行かねばならないということが孵化率を低下させたものであろう。

雌雄交代で抱卵するが、抱卵期間は約35日であった。ヒナを育てる時期にはオングルカルベン島西のタイドクラックに開水面ができ、雌雄交代で餌をとってきてヒナに食べさせる。1月14日で観察は中止したが、一人立ちするヒナの数は産卵数の15%位のものであろう。

### Introduction

Ecological observation on the breeding behaviour of Adélie penguin (*Pygoscelis adélie*) was carried out on Ongulkalven Island (about 6 km from Syowa Base) during the period from October 1961 to January 1962 (Fig. 1).

Unfortunately the present observation was limited to the first half of the breeding season, because the writer had to return the research vessel "SOYA" on January 17th 1962.

During the stay at Syowa Base the writer visited Ongulkalven Island about 30 times by a snow car to undertake the research work at the penguin rookery (Photos. 2 and 3).

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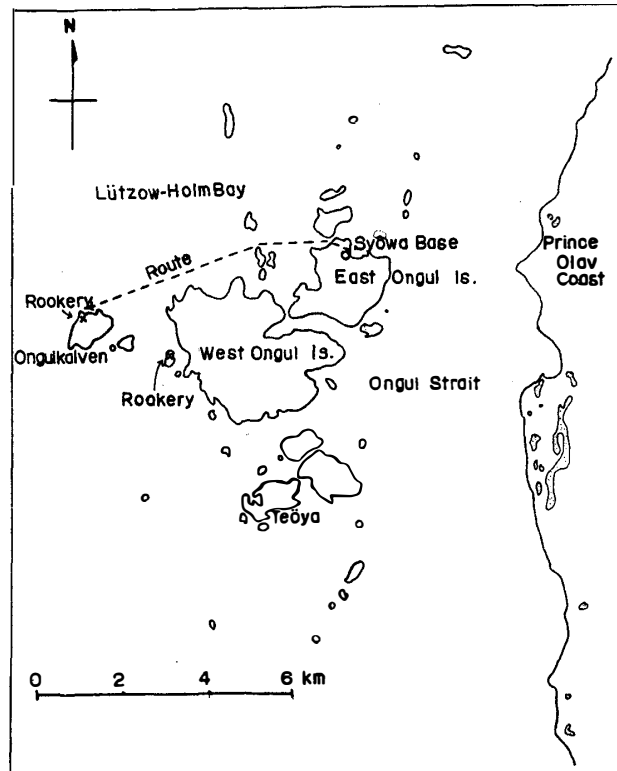


Fig. 1. Map showing Ongulkalven Island and East and West Ongul Islands.

Many studies on the behaviour of Adélie penguin had been done by the biologists of the Antarctic Expedition of various countries (FALLA, 1937; GOLDSMITH and SLADEN, 1961; SLADEN, 1953, 1958; SLADEN and OSTENSO, 1960; etc.). Since the present penguin rookery is characterized by being situated at a great distance from the open water, because of the fact that fast ice zone in Lützow-Holm Bay covers 100 km or more, some interesting results were obtained concerning the breeding behaviour.

The writer is indebted to Dr. MUTSUO KATO, professor of Tohoku University, for his valuable advice. Thanks are due to Mr. MASAMI MURAYAMA, leader of the fifth Japanese Antarctic Research Expedition, and other members of the wintering party for their assistance during the present work.

### Observation

With the reappearance of the sun the penguins come from the north across the fast ice. The writer was able to observe some small flocks of only several individuals of Adélie penguins which had been migrating southwards at a rather rapid speed (about

10 km per hour) on the fast ice off the Ongul Islands.

The first penguin came on the 22nd of October (Photo. 3). There were two penguins on the following day, and after daily increase in number about 110 penguins were observed at the rookery on 11th September (Photo. 4).

As soon as the penguins arrive at the rookery, they begin to carry stones in their beaks to build their nests (Photo. 5).

MARIO MARRET (1955) says that; "During the period of nidification the whole Adélie population seems to be subject to a sort of collective madness. Individual birds hurry around with stones in their beaks and deposit them on their nest, but as soon as their backs are turned other birds steal the stones. The community is not divided into honest birds and bad birds: they're all thieves, and there is an incessant round of stolen stones from nest to nest."

During the building of the nest one of a pair is occupied in carrying the stones,

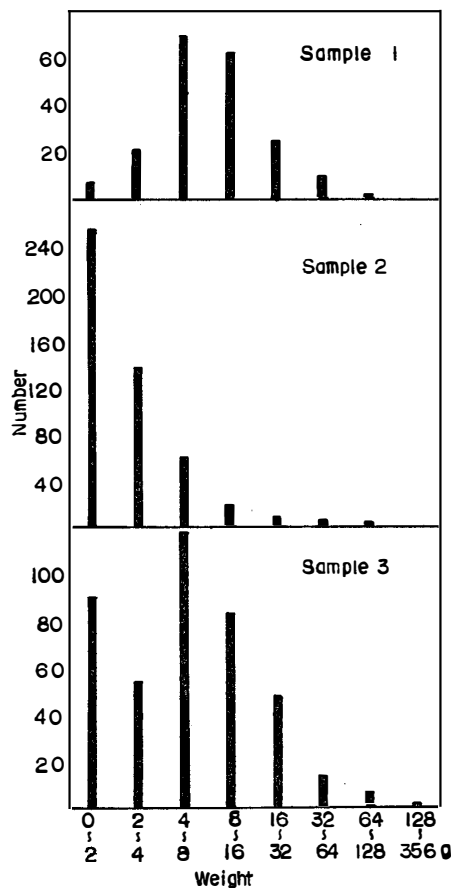


Fig. 2. Frequency distribution of the stone weight.

whereas the other bird stays at the nest to protect it from the stones being stolen by other birds. They collect and carry the stones successively until the nest is constructed by arranging the stones.

Fig. 2 shows the stone weight obtained from some nests. From this figure it is known that the frequency distribution of stone size is characteristic in respective nest and the number of stones varies widely with each nest.

During the later period of the nidification the paired birds copulate several times (Photo. 6). According to ANDREWS and ROBERTS (1952), the mated pairs of the Adélie penguin were known to remain intact for three consecutive seasons as in the yellow-eyed penguin (RICHDALÉ, 1957).

On 11th September there were about 110 birds nesting in the rookery (Photo. 7), and therefore about 50 nests. The first egg-laying was observed on 12th November. Each penguin lays two eggs to the clutch in the nest (Photos. 8 and 9). All species of penguins lay also two eggs to the clutch except the King and Emperor penguins, which produce only one (RICHDALÉ, 1957). LEVICK (1915) describes that in the case of the Adélie penguin, the number of days between the appearance of the first and second eggs varies from three to four days.

After the egg-laying, only one parent, the male bird, sits on the eggs in every case throughout the day (Photo. 10) and the female bird goes to the open water in the fast ice zone for feeding from rookery to open water covering about 100 km (Photo. 11).

In any way, the males have to brood on the eggs until the females return to their nests. As the females are away from the rookery to collect the food the males are predominant in number from the 1st to 8th of December, and few pairs remain at the nests (Photos. 12 and 13).

LEVICK (1915) pointed out that any time during incubation one of the partners may be away for ten days. But the case is different in the present rookery. The females are away from the rookery for a long time, about 20 days, after the egg-laying, because the feeding area is far from the rookery, about 100 km. Therefore, it happens that some males leave the eggs in the nests to feed at the open water before the females return to their nests (Photo. 14). Within several hours after the male left these eggs, they were eaten by the Giant Petrels or wandering penguins (Photos. 15, 16 and 17). The first females returned on December 7th. With the progression of time the open water of the tide crack begins to appear near Ongulkalven Island and therefore the penguins are able to take food easily in this open water (Photo. 20). After the females returned the male and female incubate the eggs alternately.

The first chick was recognized on 17th December (Photos. 18 and 19). The writer was able to know by some marked eggs in the present rookery that the incubation period is five weeks (35 days).

The last hatching occurred on 28th December 1961. The parents alternately go to the tide crack in search of food (Photos. 20 and 21) which is brought to the nest in the stomach and given to the young by regurgitation, as is usually known in other kinds of penguins (Photo. 22).

Thus, the chick grows gradually and on 14th January there were half-grown chicks with dark grey plumage (Photo. 23). However, some of the chicks died during the young period and their individual number decreases gradually. The number of chicks amounted to 18 individuals on 14th January.

On 14th January 1962, the writer made the final observation on Adélie penguin and left this rookery.

Photo. 24 shows the young Adélie penguin which was seen on East Ongul Island on 3rd March 1961. This penguin completed the moult of down but had some pinfeathers on the top of the head. It seems that this penguin is probably a stray.

### Discussion and conclusion

Fig. 3 shows the change in individual number of Adélie penguins during the breeding season. The number of penguins in the rookery increased from 22nd October to 13th November by successive immigration, but decreased from 13th November to 21st December.

The first half of the decreasing phase (Fig. 3-a) is caused by the females which go to the open water in the fast ice after egg-laying and corresponds to the increase

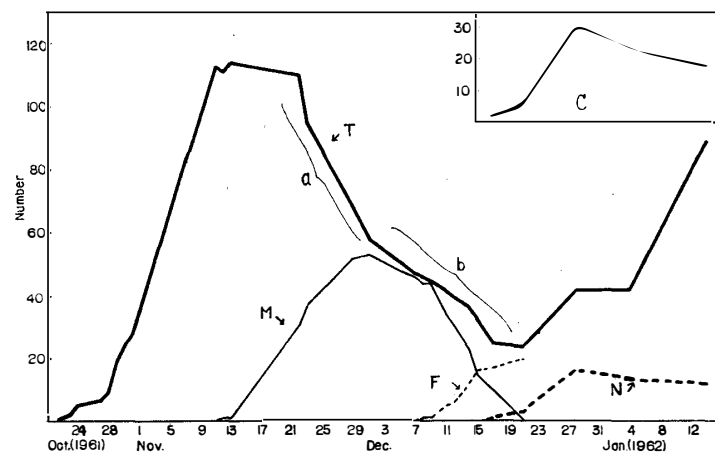


Fig. 3. Change in individual number of Adélie penguins at the rookery. T: Total number, M: Incubating male, F: Incubating female (in male's place), N: Nest number having chicks, C: Chick number

of the incubating males.

The second half of the same (Fig. 3-b) is caused by the males which go to the open water before and after the females return to the nest and by the increase of females returning to the nest. However, the individual number of penguins increased again late in December because they returned again to the rookery from the feeding area.

At first the eggs were laid in 55 nests and therefore there were 110 eggs at the present rookery (Fig. 4). It is noticeable, as is shown in Table 1, that the nests having eggs are more abundant in the early period of the breeding, before 7th November, than in the later period after 8th November; namely 91 per cent in the former and only 34 per cent in the latter.

The hatching ratio was 33 per cent of all 55 clutches (Table 1 and Fig. 4). It seems that the hatching ratio at the Ongulkalven rookery is less than in the rookery

Table 1.

	Egg-laying		No egg
	Hatched	Not hatched	
Nests built before 7th November	17	23	4
Nests built after 8th November	1	14	29

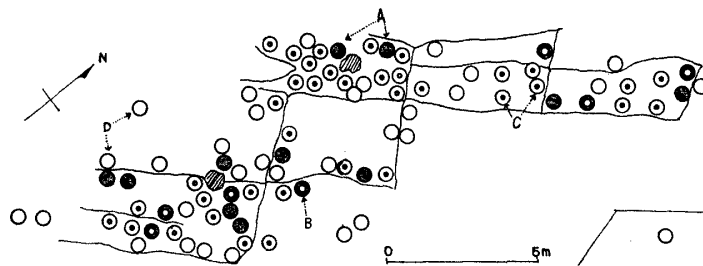


Fig. 4. Diagram of Adélie penguin rookery at Ongulkalven Island showing the nest arrangement.

A: Nest (egg-laying)—chick grew, B: Nest (egg-laying)—hatched only, C: Nest (egg-laying)—not hatched, D: Nest (no egg)

near McMurdo Station. It is known that in the case of the Emperor penguin, the abundance of food in the nearby waters may well be a key factor in the control of the rookery population (BUDD, 1962). As already mentioned, the Ongulkalven

rookery is situated at a great distance from the open water during the incubation period, and female penguins can not succeed sufficiently to incubate the eggs and to rear the females come back to the nests. From the above it may be considered that the male and female penguins can not succeed sufficiently to incubate the eggs and to rear the chicks. This phenomenon is also recognized in Fig. 3.

The predation by Giant Petrels (*Macronectes giganteus*) and blizzards may not strongly influence these phenomena, though the eggs left behind by the parent are all damaged by the Giant Petrels and wandering penguins and even young chicks are also often attacked.

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(Received May 25, 1963)