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Walruses of the region of Wrangel Island

by

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The paper discusses the results of a study of walruses conducted /266
in the area of Wrangel island in 1972 and 1973. It has been established that the cape Blossom rookery on Wrangel island is the largest walrus rookery in the world. Its walrus population in favorable years is as high as 36,000 animals. The function of the rookery varies sharply with the activity and number of animals present. The density of the walrus population in the rookery depends on hydrological and ice conditions, which in turn are determined by the prevailing winds and the average summer air and water temperature. The composition of the cape Blossom walrus population is mixed, comprising all age groups. The paper notes some characteristics of walrus behavior, nutrition and reproduction on Wrangel island. Temperature readings

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*The numerals in the right-hand margin indicate page numbers of the original (Tr.).

obtained with a thermistor indicate that walrus flippers play a lesser role in regulating the temperature of the animals than the fins in whales.

The walrus occurring in the area of Wrangel island belongs to the largest migratory group of the Odobaenus rosmarus population. We conducted several observations of these animals between March and September in 1972 and 1973 in the little-known cape Blossom rookery, which is located in the southwestern part of Wrangel island. Some observations were also conducted in ice-floe rookeries during walrus hunting expeditions with local hunters. The first contemporary information on walrus rookeries of Wrangel island can be found in the work of Nikulin (1941), and information on the cape Blossom rookery has been provided by Bel'kovich and Yablokov (1961).

> "The Blossom rookery is located on cape Blossom, which is on the southwestern tip of Wrangel island. This rookery is a pebbly bar whose narrow spit stretches toward the west. The outline and size of the bar changes annually under the influence of currents and surf: its width varies from 150 to 250 m and its length, from 300 to 450 m. The southern shore of the bar is a sandy-pebbly beach, with a uniform slope and deeper parts along the shore; during conditions of drifting ice, under the influence of wind and currents, a large number of hummocks (large stationary ice floes) settle on the inundated portion of the bar and stretch 2-3 km out to sea. Such hummocks also tend to accumulate about 5 km to the south of the bar and almost parallel to shore; these hummocks can be seen long after the sea has become clear of ice. This ice quay stretches for a distance of 6-7 km to the east up to the Burunnaya lagoon. To the west and northwest, the shoreline of cape Blossom is shaped into the form of a concave arc with deep water. Another pebbly bar stretches

in an almost northerly direction and forms the Vaigach lagoon."

The cape Blossom rookery affords temporary shelter (Gol'tsev, 1968) for walruses during autumn migrations. The animals go ashore there only when the sea is ice-free (which is the reason the rookery is not functional every year). In 1972 we observed walruses persistently trying to get onto a small ice floe (the shore rookery was already functional); but the ice floe kept turning in the water under the animals' weight, causing them to slide off, and the animals continued climbing onto the ice floe only too see the latter turn over again (this indicates that the walruses prefer to rest on ice rather than on dry land). The number of walruses coming ashore, and leaving it, is determined by ice conditions: it increases as the area of ice-free water around Wrangel island expands (the animals then collect from a greater area of ice-free water). 267

During the last 22 years the rookery has functioned on ten different occasions: in 1953, 1958, 1959, 1960, 1962, 1964, 1966, 1968, 1972 and 1974. We compiled data on ice conditions and average water and air temperatures during the third quarter in 1963 to 1973 and correlated these data with the animals' visits to the rookery (see Table).

The animals' appearance at the rookery reveals a certain pattern: in average below-freezing water and air temperatures during the third quarter, which have a determining effect on ice conditions, the walruses, as a rule, remain on ice floes, but if there are no ice floes the animals come ashore.

Depending on the direction of the gales, the walruses usually appear on the leeward side of the cape. Thus in 1968, when there were strong northwesterly winds, the animals appeared on the southern side of the bar, and, conversely, in 1964, when a strong wind blew from the east,

Relationship of presence of walruses at the cape Blossom rookery to ice conditions.

a - average temp. during the third quarter (C^{o}); b - of water; c - of air; d - presence of ice, + ; e - presence of walruses, + ;

Годы years	Средн. температура за III квартал, °С (a)		Присутствие льда, +	Выход моржей из лежбища, +	Годы years	Средн. температура за III квартал, °С (a)		Присутствие льда, +	Выход моржей на лежбище, +
	воды (b)	воздуха (c)	(d)	(e)		воды (b)	воздух (c)	(d)	(e)
1963	—1,0	—1,0	+	—	1969	—0,6	—0,1	+	—
1964	+0,1	+0,6	—	+	1970	—0,6	+0,2	+	—
1965	—1,1	—0,8	+	—	1971	—0,6	—0,5	+	—
1966	+0,2	+0,7	—	+	1972*	—0,5	+0,6	—	+
1967	—0,5	—0,4	+	—	1973	—0,7	—0,7	+	—
1968	+1,0	+1,4	—	+					

* В 1972 г. температура воды была отрицательной, море—чистым непродолжительное время, и лежбище функционировало только 12 дней.

*In 1972 the water temp. was below the freezing point, the sea was free of ice for only a brief period and thus the rookery functioned for only 12 days.

the animals appeared on the northern side. The area where the animals bed down in the rookery depends on the point where they first emerge from the water. From this point they usually bed down up to 100 m inland and up to hundreds of meters to both sides along the shore.

Walruses appear in the area of Wrangel island in large numbers in June and July. In 1973 the first animals were observed in Predatel'sky Bay on 18 July. It is possible that individual animals winter in the De Long Strait, which has been reported by tourists who crossed the ice from the continent to the island in April of 1972. The walrus population in the area of Wrangel island is most dense in August, which is also the time when local hunters are allowed to hunt these animals (the 40 animals taken in 1973 were bagged between 1-27 August).

Let us examine the ice floe rookeries in the area of Wrangel island and the formation of the cape Blossom rookery. The Chukchi Sea in the area of the island has strong easterly currents. The ice drift is especially

intense along the southern shore of the island in the De Long Strait, where it reaches a speed of 4 km/hr. Thus the ice floe rookeries of walruses drift in a westerly direction. Based on our observations, the animals in the island area form rookeries, mixed by sex and age, consisting of 2 to 200 - 300 animals per ice floe, but the average is from 25-30 animals, with females predominating. Krylov (1966) has observed rookeries consisting of adult males only, but we have not come across such assemblages.

Rookeries with a distance of 100-200 m between them are quite common in the area. Apparently the large rookeries and assemblages are formed in the following manner: the walruses resting on ice floes roar from time to time; this roar resounds through the air and attracts the attention of other /268 walruses. The roar may be far enough away as to be still inaudible to the human ear, but the animals have perceived the call and head for the meeting points, orientating themselves by the direction from which the roar came. It may be that roars emitted from an ice floe are propagated through the water and thus perceived by those animals that are in the water. Upon hearing the call, feeding walruses interrupt their activities and head toward the assembly point (hunters note this direction when they are searching for walrus assemblages). Upon arrival at the floe from which the roar came, the new arrivals climb out of the water and join the others. If there is insufficient room on that ice floe, they climb onto the next one. We recorded several such assemblages, numbering from 2-3 animals to 10-15. Large rookeries contain herds of 1,000 or more walruses. The animals prefer small ice floes less than 25-30 meters in diameter. On larger floes over 50-60 m in diameter the animals are either absent altogether or can be found only along the edges close to the water.

A walrus crawls onto the ice in the following manner: after swimming up to the ice floe he places his tusks on the edge of the floe and, bending his neck, draws himself up and at the same time throws his rough front flippers onto the ice. By a further pull with the aid of his flippers he heaves the front portion of his body on the ice and in the process pulls up the rear portion as well.

Small assemblages of 2-5 animals usually contain an adult male and a female with calves of varying ages[1] (it is possible that these are families). The animals in small assemblages are peaceful, those in large rookeries frequently fight, but these fights most likely have a symbolic meaning (probably hierarchical). The animals raise themselves on their front flippers, trying to strike the opponent in the neck with the tusks. The winner is the one with the longest tusks and the one that can raise them higher than the opponent. The winner is usually content when his opponent bows his head. We conducted the following experiment in one of the rookeries. A thick stick was brought up to the head of a walrus which the latter furiously attacked. But as soon as the stick was higher than the animal's head the animal bowed its head toward the ground. The walrus fears any movement that is above its head, even that of a glaucous gull.

On the ice rookeries, the walruses frequently sleep in the most varied positions: on the back, on the side, and sometimes even in the water after clamping their tusks against the edge of the ice floe. The calves frequently sleep on the backs of the adults. In one of the rookeries during

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[1]The age-sex composition in rookeries was arrived at by using tentative age tables based on the length of tusks measured at the time the animals were bagged. (Krylov, 1966).

the daytime the animals remained motionless for a whole hour. When the ice-floe rookeries are far out at sea, the animals frequently come feeding along the shoreline and often they can be observed 20-50 m from shore.

In the area of the island the animals feed in such preferred traditional places as Rogers Bay, Somnitel'nyi Bay, Nanaun lagoon, and others. They have not deserted these places even after villages were built on the shore of Somnitel'nyi and Rogers Bays. During feeding observations we recorded various diving rhythms of the animals. Here are some of them.

On 21 September 1973 the number one pair (adults) was feeding for a period of 4 hours about 500-600 m from shore, where the depth was about 40 m. The diving rhythm of this pair was rather precise. The dive lasted an average of 8 minutes and 20 seconds, and the rest at the surface lasted 64 seconds. The longest dive lasted 9 minutes and 7 seconds and the shortest, 6 minutes and 3 seconds. The resting period at the surface varied from 55 to 75 seconds. A second pair of animals (31 August 1972) varied their dives from 4 minutes and 30 seconds to 5 minutes and 30 seconds, averaging 5 minutes. Their resting period at the surface of the water lasted an average of 55 seconds during which the animals breathed 16 times.

Walruses feed mostly in groups of 2-3 animals and surface almost simultaneously - only 10-15 seconds apart. According to our observations, the animals surfaced never more than one minute apart. The animals were observed feeding at various times of the day and even at night.

During the local hunting season with local hunters on the ice we 269
examined 29 walruses (9 males and 20 females, varying in age from 1.5 years to old specimens). This examination on the whole confirmed Krylov's figures on the animal's food composition, which consisted of predominantly Mya-type

bivalve mollusks and worms, Priapulus caudatus. Present also were Ampelisca macrocephala type crustaceans, and each walrus stomach contained many pebbles.

A visual examination of the animals' intestines, heart, lungs and liver indicated an absence of helminths, although Yurakhno and Treshchev (1972), after dissecting 95 walruses from the Chukchi Sea, discovered 11 species of helminths, including larvae of Trichinella spiralis. However, so far as we know, local inhabitants have not suffered from trichinosis, even though their diet includes raw and semicooked walrus meat.

Of ectoparasites, we discovered whale lice (Cyamidae) only in the axilla and in the groin. We found several dozen of these parasites but not on young animals.

We were able to observe walrus behaviour on ice during the hunting season. The animals reacted strongly in supporting a wounded animal in the water and in attempting to push wounded animals out of the water onto the ice. This reaction seems to be developed in all age groups. We frequently saw how two or three healthy animals would attempt to support a wounded animal on the side, attempting to nudge the wounded animal along the surface of the water away from the boat. Animals that had been killed by hunters were also being pushed out of the water by other walruses. A dead walrus usually floats, with his head hanging into the water under the weight of his tusks. The other animals, as a rule, make an attempt to lift the dead animal's head out of the water, which allows the air that is still in the latter's lungs to escape through his nostrils. When that happens, the animal sinks and is thus lost to the hunters. When attempting to push a dead animal out of the water, the walruses take a position so that their heads are "next to the dead animal's head" and the latter is being pushed out first. Does this behavior not represent the same mechanism which in whales has been described as an instinct to preserve

the species (Tomilin, 1961)? At any rate, a scene similar to the one described was clearly observed on 23 August 1973, involving a large wounded male that was nudged by other walruses away from the ice floe invaded by humans.

We had occasion to learn something of the sound signals of walruses out of the water. A large walrus gave several repeated roars "okh-okh-okh," and 15 captive calves that were being kept in an open-air cage, almost one km away, answered those roars with a friendly "okh-okh-okh-okh". Then, straining their necks, they awaited the return call and, having perceived it, they answered again in chorus. Captive walrus calves willingly respond to a human voice imitating a walrus roar.

One of the calves was released about 60 m from shore. He immediately began to emit loud cries of appeal similar to those described above. Adult walruses which were at the surface of the water several hundred meters away began to respond to these cries by swimming toward the area where the cries originated, and some even tried to go ashore. As soon as the pup heard the adults he began moving toward the sea. In the surf zone he was met by an adult walrus; the calf climbed on the adult's back and both swam away from shore accompanied by other walruses.

The calf, whose mother had been killed, continued to emit the "okh"-sounding cries whenever he surfaced. The walrus employs varied signals. Schevill et al. (1966) identified three distinct sounds in a captive female walrus-sounds that are emitted when the animal is submerged, with mouth and nostrils closed: a "chiming sound," a short gritting sound and a clicking sound reminiscent of the muffled clicks of a typewriter. The "chiming sound" is generated with the aid of a couple of pharyngeal pouches, which are not developed in calves and some females but very strongly developed

in males, reaching almost to the far end of the pharyngeal cavity and having a capacity of 25-50 liters (Fay, 1960). These pouches (60 cm in length, 45 cm in width and 20 cm in height) act as resonators when the animal emits the chiming sound. The only function ascribed to these pouches by Fay (1960) and Sleptsov (1940) was that of increasing the animal's buoyancy during rest and sleep on the water's surface. 270

The biological significance of these sounds has not yet been interpreted.

We were able to measure the rectum temperature in walruses and the temperature at various points on the body surface with the aid of a thermistor. The rectal temperature in four adult females that had just been killed and were lying on the ice varied from 36.5 to 37.6° (at a point 20 cm from the anus), and in a live female that had just surfaced from the water the rectal temperature was 37.3°. Very similar readings were recorded in 8 captive calves, less than a year old, and in one yearling female, varying from 36.4 to 37.4°. The body surface temperature in the four bagged females (at an air temperature of 4°), in the middle portion of the front flipper, varied from 31 to 34.5° and at the tip of that flipper, from 18 to 32.5°; in the middle part of the hind flipper, from 25 to 33° and at the tip, from 13 to 28°. In the central abdominal part the surface body temperature varied from 30 to 34° and in the central dorsal area, from 27 to 34.5°. In the calves the temperature on the surface of the front flippers varied from 17.5 to 29.5° (at an air temperature of 15°); on the hind flippers it varied from 19.5 to 29°, in the central dorsal area the temperature varied from 27 to 35.5° and on the surface of the central abdominal part it varied from 22.5 to 34°. These figures suggest that the flippers in walruses play a

much smaller role in regulating the animal's temperature than the fins in the whales. It is possible that the relatively high body surface temperature in walruses is linked to their lying closely together in groups, or to solar radiation.

In years when there is not much ice the walruses concentrate near the southwestern part of Wrangel island, which is due to the fact that the ice survives longest in this area. The ice lingers here along many banks and also because of turbulent currents skirting the island. A reduction in the amount of ice around the cape Blossom rookery is accompanied by behavioral changes in the walruses. The animals gather in groups of 20 to 100, swim around a short distance from shore, keep raising their heads high out of the water and looking toward shore. At this period any movement on shore seems to scare them. As soon as a man or dog appears on shore, the animals immediately submerge only to surface farther from shore. On 15 September 1972, two days before the walruses began coming ashore, we had a chance to observe them 20 m offshore. A 2-meter high swell had completely exhausted the animals. They had stopped feeding, assumed a vertical position in the water, kept their heads high above the water level and displayed their tusks. The animals were very exhausted; the females held their calves against their bodies by means of their front flippers. One female held a dead calf whose head drooped in the water.

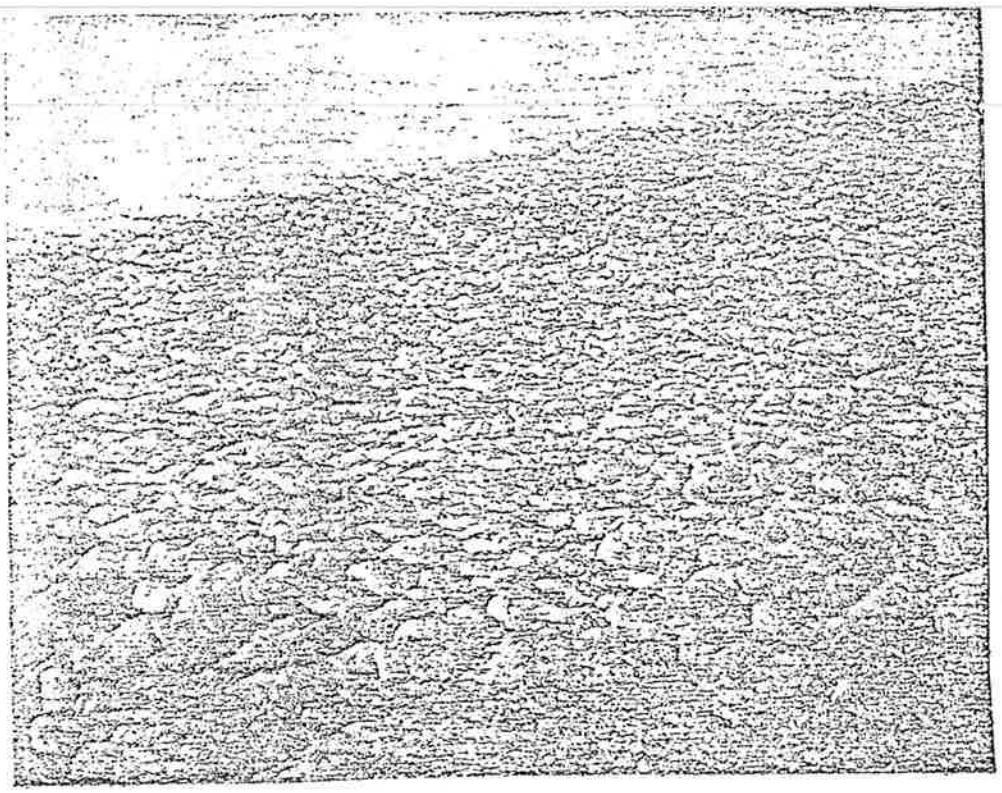
On 17 September, three days after the sea had become completely ice-free, the animals began coming ashore at the rookery (see illustration). The first animal to reach land was an old bull with broken tusks. He was followed by the others. The animals came ashore, seemed to collapse and fall asleep. The latecomers used their tusks to pressure the earlier arrivals to move on, and the latter had no choice but to rouse and move farther inland.

The length of the shore section occupied by the animals kept increasing. Suddenly, for some unknown reason, the animals panicked and took to the sea and the rookery became empty; but then they started coming back again. The dense roar of many thousands of walruses hung over the rookery. This roar guided many new arrivals from the sea to the rookery. The animals seemed to approach the cape in family groups. The family group, comprising 3-5 animals, is usually headed by a bull followed by a cow with a calf on her back, and calves from earlier litters complete the formation. The calf on the mother's back holds himself tightly against her body, keeping that position even when the mother is diving, and appearing first when she is surfacing.

By 19 September the animals had gotten used to the presence of humans at the rookery and continued to come ashore. Suddenly an Il-14 aircraft crossed the rookery at an altitude of 150 m. This caused the animals to panic and to scramble for the sea. The result was lamentable, for 21 calves were crushed to death in the melee and 2 females aborted their young. On 20 September, a day after the incident with the aircraft, the animals came ashore again but in considerably fewer numbers. Their numbers on shore reached a peak on 23 September, and toward evening of that day the walruses that had been among the first arrivals began leaving the rookery, and by 29 September the rookery was empty. Thus in 1972 the rookery was functional only for a period of 12 days. But in other years, and more favorable conditions, the rookery functions for up to 3 months.

The abundance of these animals was determined by the following method. Photographs were taken from an elevated point in the rookery; then the number of animals in a specific section of the rookery were counted and the average figures were extrapolated to the entire rookery area which was estimated visually. The animal density at the cape Blossom rookery was

Cape Blossom rookery on Wrangel island at a time (Sept., 1972) when it was filled with walruses. Photo by A.A. Kibal'chich.



was very high. According to Krylov (1966), the animal density at a walrus rookery amounted to one animal per 1.2-7.4 m^2. But at cape Blossom each animal occupied not more than 1.6-1.8 m^2. Here the animals frequently lie on top of each other. We estimated the walrus population at the rookery in 1972 to amount to 36,000 animals, not counting those that were in the water (which would have increased our figure by several thousand).

When the animals began vacating the rookery (23 September) it became possible to inspect it. At the edge of the spit there were 149 bodies of dead walruses which were lying just as densely as the animals had been throughout the rookery. The dead bodies included animals of both sexes and all ages. The cause of death could not be established. The bodies of the dead animals were swollen to the point where the skin began to peel, split and hang down in fringes. The pressure of internal gases had caused the

sex organs and the nipples to turn inside out. Blood was discharging from 272
the nostrils. The dead walruses were overlain by live animals whose behavior was usual or somewhat apathetic (they reacted only to highly raised objects). On the following day they left the dead animals and withdrew to the sea.

On inspecting the rookery, even before the walruses left for the sea, in August, we discovered dead walruses, which had died the previous year, lying everywhere and numbering about 2,000. The skins were fairly well preserved (hard to cut with an ax), and the bones were completely or partly macerated. Some of the dead animals were lying in several rows, others lay scattered in singles and they included both sexes and all ages. About 400 dead walruses lay in the middle of the spit, being positioned in an almost straight line. The animals of this group may have died almost simultaneously. We could not establish the causes of death, but we can assume that they were probably identical in both cases described.

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WALRUSES OF THE WRANGEL ISLAND AREA

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Summary

A study of walruses in the Wrangel Island area in 1972 and 1973 showed that the Blossom Lair on the island is the largest for the world population of walruses. During the most favourable years the population density at this lair attains 36,000 animals. The lair functions not every year, and the time of functioning and the population density of walruses greatly vary. The functioning of the lair is determined by hydrological conditions and ice situation which, in turn, depends on dominating winds and the average summer temperature of water and air. By the composition of population, the Blossom Lair is mixed: all age groups of walruses were recorded here. Some data are given on feeding, reproduction and behaviour of walruses on the Wrangel Island.