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Paper 3

Behavioral Aspects of the Polar Bear, *Ursus maritimus*

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The following aspects of the behavior of polar bears, *Ursus maritimus*, are examined in this paper: (1) relationship of parturient and lactating females to man and a few animals having contact with them; (2) interrelation between females during the gestation and lactation periods; and (3) relationship of lactating females to their young. The author obtained information during expeditionary work on Wrangel Island in the fall of 1970-1971 and each spring from 1971 to 1974.

Polar bears generally experience fear during contact with people, and more often than not even a brief encounter with man leads to disruption of the normal breeding rhythm or rearing of young. The consequences are still unclear, but undoubtedly they have a negative influence upon the life cycle of the polar bear.

In late November and early December of 1970, and again in mid-October of 1971, we noted that several female polar bears abandoned dens a day or two after disturbance (Belikov 1973), even though we had no direct contact with the denned animals. Since they were easily frightened away, they could obviously detect our presence by smell and possibly by sound. The haste with which one female left the den gave a good indication of her panic. Apprehensive females abandoned dens by breaking the ceiling, which at this time of year is not so structurally firm as in the spring. According to our observations, snow density at the den site averages 1.5 times less during the fall than spring.

Pregnant females in the initial denning period and lactating females with cubs during the opening of the dens behave especially dangerously when meeting with people. The closer a man approaches a den, the more restless the female bear becomes, especially if the den is near the surface. A female can break through the thinnest section of such a den to rush a man standing close by. We once underwent an attack by a female who rushed from her den and forced us to use our weapon. However, such instances are rare, and not characteristic of the behavior of lactating and especially of gestating females. After a threatening display, the female, as a rule, returns to the den or her cubs. In some instances, females attempt to conceal their presence despite the proximity of people, the more 'patient' among them behaving as though still hidden even after the den is open.

The females disturbed by man do not necessarily abandon their dens immediately, but may do so 1 to 3 days later. Occasionally after disturbance, they remain in the den up to 8 days and, in exceptional cases, for a longer period.

Observations of one female were made when she denned in the fall, and continued after she opened the den in the spring. Despite disturbance caused by observers, she did not abandon her refuge. She sometimes came out in the snow to exercise and to clean her hair of grease and dirt, but she quickly re-entered the den when disturbed. The denning period of this bear was 183 days—from 14 October 1971 to 14 April 1972.

One den, located by its ventilating opening, was used in 1974 to obtain temperature measurements by telemetry. During 13-16 March, observations were taken

round-the-clock. Between 18 March, when the bear enlarged the ventilation opening into an exit, until 2 April, when the occupants were marked, temperature readings were obtained several times a day. Our visits disturbed the bear, since sounds of steps carried a hundred meters through the compacted snow crust, and the temperature recorder stood only 40 meters from the den. The female still did not abandon the den. After immobilizing her, we discovered that the den was new, nearly equal in size to the maternal den. The den was abandoned 2-3 days later. This particular female and cub had spent 16-17 days (mid-March to early April) in the partially opened den, from which the cub peered out several times daily. We did not once see the female at the exit during the time the den was under observation.

A few bears abandoned their shelters after disturbance and dug temporary dens several hundred meters, or more rarely several kilometers, from the maternal den. Digging a new den takes a short time, usually 15-40 minutes. One female dug a temporary den 400 meters from her maternal den while only 3 meters away was an abandoned den still not covered with snow. On the other hand, another bear with three cubs occupied an abandoned den just 500-600 meters from her old one. It is interesting to note that the female did not enter through the passage leading to the maternal chamber, but through an opening she dug over the entrance to the chamber. The polar bear apparently can readily sense an old excavation under the snow, and locate it quickly.

We also found temporary dens in places where females had not been disturbed. In two cases, we encountered solitary female bears. Their reactions to immobilization did not differ from the normal behavior of lactating females, but afterwards, neither female left her den, but dug a new chamber whose entrance began from one wall of the former den. One of these females, immobilized 22 March, had poorly developed teats, although milk could be extracted from them. She had probably had young, but had lost them. The second female, immobilized 12 April, appeared to be pregnant. Milk was exuded from teats and the abdomen was significantly more elastic than those of the lactating females examined earlier.

We observed varied behavior of cubs while working at dens. When captured, some conducted themselves rather peaceably; others furiously defended themselves, but only when a man tried to handle them. If released, they sometimes ran, not to the den nor even to the nearby mother, but away from the intruders. Once we released a cub 5 meters from an immobilized female; the youngster did not notice the mother until she raised her head.

The female is unafraid of dogs as a rule. If a dog becomes especially disturbing, the female can rush from the den to catch it, but instinct of motherhood forces her to return to the den quickly. Cubs, however, are very much afraid of a dog and will even run to a man to save themselves.

In the period of den construction, the female's basic diet is plants which she digs from under the snow. On very rare occasions, she may succeed in catching some kind of animal. In 1974, a herd of 9 and a herd of 15 deer, *Rangifer tarandus*, continuously grazed a short distance from the dens in the small mountain pass of the Drem-Head Mountains. The sows did not attempt to catch them, apparently understanding the futility of such endeavors. If a deer does become food for a sow, then it is accidental and most often is a sick individual incapable of running from a predator.

Arctic fox, *Alopex lagopus*, are less cautious than deer, since they are accustomed to bears and have become fellow-eaters on the ice. But the bravery of the small animal does not always pass with impunity. In 1973, we witnessed

one such careless fox who entered a den where he was swiftly killed. The sow appeared with the fox in her teeth. She passed above us on a slope and stopped. Letting go of the crushed animal, she pushed it with her nose to a cub, who only smelled it. Evidently at this age, cubs are still unprepared to ingest meat. Only part of the cranium remained of the fox when we immobilized the sow the next day and uncovered the den.

A high concentration of dens occurs on Wrangel Island, particularly in the Drem-Head Mountains. On a few slopes the dens are situated a few meters from each other (Uspensky & Chernyavsky 1965), which indicates females passively or tolerantly relate to each other during the denning period.

The following incident is an example of this relationship. On 7 March 1974, we discovered two sows with four cubs in one den. The second family arrived from a den 3 kilometers distant where a telemeter had been set up. The arriving female conducted herself so secretively that we became aware of her presence only when we had almost dug out the roof of the den. The den consisted of a huge chamber about 2.5 meters in diameter and 4 to 5 meters long. The sows differed insignificantly from each other in size, weighing 182 kilograms each; the four cubs were also of similar size and weight.

Within 1.5 hours after immobilization, the newly-arrived female began to lift herself by the front legs (she was given a lesser dosage). We had pulled the 'rightful owner' from the den for morphometrical measurements and weighing. Soon she began to regain consciousness and tried to return to the den. At this point, the female inside the den grabbed her by the nose. Peace was restored only after we released the cubs which had been taken from the den for marking. We again visited the den in a week to find a single family—the one that had arrived most recently.

The lactating female is a very solicitous mother, often sacrificing herself to defend her young. But how she relates to orphaned young under natural conditions is largely unknown. The following incident sheds light on this question to a certain degree.

We marked a female and two cubs from one den on 23 March 1974. The female was immobilized for about 5 hours and had several convulsions similar to those observed in a few other females. During the following week we repeatedly saw this bear looking from the den. On 31 March, 8 days later, the female abandoned the den and cubs and headed toward the sea. On 4 April, we took the abandoned cubs from the den to a sow with two cubs of her own. After she was immobilized for this procedure and had recovered partial motor activity, we introduced the cubs one at a time. The sow accepted them as if they were her own. She smelled and licked her foster children and soon the four cubs were suckling the sow as she laid on her side. We did not observe any differences in the female's relationship with her own offspring and the foster young. She fed them either lying on the ground or standing, and hardly paid any attention to us. On the next day we brought her some deer, fox and walrus, *Odobenus rosmarus*, meat. She ate a little fox meat and the bear family left for the ice 2 days later.

To summarize the above:

Behavior of pregnant and lactating polar bears can markedly change under influence of a 'disturbance factor.' Disturbance is especially critical in the fall period when pregnant females begin to den, for, as a rule, females will abandon their dens prematurely if disturbed.

Protective measures for polar bear denning areas must first provide for the

creation of a 'zone of peace' where visits of people are limited as much as possible.

The interrelations of pregnant or lactating females and relationships of the latter with foster cubs evolved primarily from the laws of survival and success of the species as a whole. In this connection, it is fully understandable that lactating females will accept orphan cubs who for some reason have lost their mother. However, whether a single female can rear four cubs at one time is not yet known.

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