Meat: the Staple Diet for Arctic Peoples

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Abstract

Communities of hunters and herders living near the Arctic circle eat meat as a staple diet. They consume impressive quantities of meat, which in their cultures assume considerable symbolic importance. Curiously, inuit traditional cultures suffer little from cardiovascular disease, raising questions for medical research. Changing economic patterns have altered tendencies in hunting, with corresponding changes in these cultures' pathology.

Introduction

In numerous Inuit ethnic groups, one single word, *neqe*, carries the meaning for both meat and food. It illustrates the high value bestowed on meat both from a nutritional and a symbolic point of view. The same propensity to favour a meat-based diet has been observed in different socio-cultural models: among sea mammal hunters of eastern Greenland (Ammassalik and Scoresbysund) on the one hand, and reindeer herders in north-eastern

Siberia (areas of the Lower Kolyma) on the other; their average consumption of meat has been estimated at around one kilogram per day, per individual, for adult males in these two groups.
In this article, we will consider the ways in which meat is consumed in Arctic regions, why it is more highly valued than any other food, and what part it still plays today in these societies, where values and life styles have changed considerably.

Aspects of the Preference Shown for a Meat-Based Diet by Arctic Populations

Nutritional aspects

Regions that surround the North Pole are characterised by their harsh climate and their scarcity of animal resources and, even more strikingly, vegetable resources.

Of all foods available to Arctic populations, hunter-gatherers and nomadic herders say that the meat of sea or terrestrial mammals is the most filling, and that it is the food that best helps them keep warm. Its nutritional properties are an appropriate solution to the energetic demands of the body in cold regions where it is, additionally, necessary to exert a great deal of physical energy. In order to combat the rigorous climate, the hunter or reindeer herder will consume such enormous quantities of meat, either raw (in dried, frozen or fermented form) or boiled, that foreign travellers have always been impressed by this fact and never failed to comment on it. These feeding habits are established from the earliest stages of life, when the mother, while still breast-feeding, gives the infant some cooked meat to suck on, and then gradually gives him small portions that she has pre-chewed, until the child comes to partake of the same food as adults, though in smaller quantities.

Symbolic aspects

For the native populations of the far north, meat from mammals is considered to be the real food. It is considered by them to be the best and most nourishing

food of all, whether for its taste or for its health-enhancing qualities. To be hungry is actually "to hunger for meat". This fundamental notion is confirmed semantically, since both meat and food are designated by the same term in the vernacular language of most Inuit groups as shown in Figure 1.

FIGURE 1
Map of the Arctic showing the areas of use of the word *neqe*
– meaning both food and meat – in most of the Inuit ethnic groups

SOURCE: Fortescue *et al.*, 1994

To feel full is to have eaten meat (and fat which inevitably accompanies it); other foods such as plants, fish and even the flesh of birds, which bring an appreciated variety to the diet, are generally thought of as snacks, as appetisers before a real meal, or as make-shift food while waiting for the time

when hunters actually catch their game. A meal is one of the most precious gifts a person can give a relative or someone to be honoured, a meal where meat is especially prepared for the occasion and shared in a communal spirit; alternatively chunks of meat are sent for later consumption.
This idealised conception of a good diet based essentially on meat is traditionally transposed to the afterlife. In Greenland, the personal destiny of a deceased person could take him to different places, the most enviable one being at the bottom of the sea, where the dead had unlimited access to sea mammal meat; whereas the other netherworld, in the sky, would only offer its occupants flesh from young crows and berries, and was considered far less desirable (Victor and Robert-Lamblin, 1993: 336).

As for the nomadic herders of the Siberian far north, to this day they still perform sacrifices of domesticated reindeer for their celebrations (weddings, funerals, and various reindeer festivals), during which the collective consumption of the sacrificed animal's flesh retains a ritual character of great symbolic importance. This act of incorporation represents a genuine act of communion with nature, and communion between the living and the dead.

The Diet of Sea Hunters and Nomadic Herders of the Tundra

In this section, I will describe the diet of two Arctic populations among whom I did field work, for which we also have data gathered in the past by anthropologists, physicians and administrators.

Sea mammal hunters of Ammassalik in eastern Greenland

The region of Ammassalik lies just below the polar circle. However, its climate is particularly harsh and creates extreme living conditions not to be found at the same latitude on the western coast of Greenland, which is favoured by the warmth of the Gulf Stream. In Ammassalik, the yearly average temperature is -2° C; the average temperature of the coldest month (February) is -9° and the warmest (July) is +7°. Roughly speaking, 260 days of the year the ground is covered with snow, and a great ice

pack, caused by the presence of the Glacial Arctic Current, prevents any navigation or contact with boats for nine months of the year. This fact explains the high degree of isolation from other Eskimo groups of the small population of Ammassalik until its late discovery by Westerners in 1884, when it was found to have 413 members (Robert-Lamblin, 1986).

In the area of Ammassalik, land fauna is limited to a very few species (polar bears and foxes), each of them with just a few individuals. The sparse vegetation is covered with snow for most of the year. The basis for survival of nomadic families established in this environment has come from the sea: mostly seal meat and, to a lesser degree, narwhal, walrus, some fish, shellfish and crustaceans. The traditional diet of this human group was mainly sea mammal meat and blubber. This has been the theme of several studies that describe the variety of techniques used for the hunting, transformation and conservation of these animal resources, as well as the rules for sharing, distributing and consuming them. For a description of this food and its preparation, we can refer to the very complete ethnographic study by Paul-Emile Victor, conducted in 1935-37 (Victor, 1995).

However, quantitative aspects of consumption have always been particularly difficult to record in a group of hunter-gatherers, whose diet varies enormously according to the seasons of the year and from one year to another, depending on the hunting grounds they adopt, the migration of the game they hunt, and the state of the ice, besides the hunters' ability to catch game, their state of health, and the number of mouths they have to feed in their restricted or extended families.

P.E. Victor stresses the extreme irregularity of eating patterns, and the capacity of the Ammassalik people – much to the surprise of westerners – to swallow meat until, in their own words, "their tongues stand up in their mouths". In 1936 Victor noted: "When there is an abundance of food, the Ammassalimiut eat as if they would have nothing more to eat the next day, or for days afterwards [...] their stomachs can stand fantastic binges. But they are equally able to have a colossal meal as spend several days without consuming more than a tiny piece of blubber".

The memory of terrible famines is still quite fresh in the collective memory of the East Greenlanders (Victor, 1993: 109-146) and even today, certain families experience difficult periods of want.

The Norwegian physician A. Höygaard was the first to quantify the Ammassalimiut diet, between November 1936 and May 1937. According to him, it contained an average of 76% sea mammal meat (mainly seal), 16% fresh fish (mainly cod), 5% imported vegetable products, 2% local plants and 1% birds (Höygaard, 1941: 55). He demonstrates, by weighing all foods for several days, how much the diet can vary in the same area, depending on habitat location and the period of the year; such was the case among hunters in one location, during a given period of the year (*ibid*: 151-168). We can thus see (*ibid*: 167-168) that for three hunters of the village of Sermiligaaq followed between the 7th and 12th of November 1936 – a good period for hunting – the mean caloric input in their daily diet was of 4023 calories (with individual variation of between 2370 and 5180 calories) and that the diet was composed of 65% protein, 30% animal fat and 5% carbohydrates.

In another study, the Danish administrator E. Mikkelsen, and P. Sveistrup, attempted to record changes over time in mean annual consumption of meat and blubber by inhabitants of this region. Their calculations were based on the number of seals hunted each year, estimated by counting the number of pelts sold at the commercial base or kept for domestic use. This calculation of the quantity of meat consumed took into account game species and estimated weight. Furthermore a deduction had to be made for feeding dogs or heating and lighting homes.[1] By their reckoning (Mikkelsen and Sveistrup, 1944: 117 and 165), the yearly consumption of meat and blubber per individual in Ammassalik was:

- 521 kg of meat and 287 kg of blubber in 1897-1898/1899-1900;
- 369 kg of meat and 184 kg of blubber in 1900-1901/1904-1905;
- 299 kg of meat and 150 kg of blubber in 1905-1006/1909-1910.

Using the same method as Mikkelsen and Sveistrup, I have also tried to calculate the decrease in hunting activities in Ammassalik over time. It clearly emerges that throughout the 20th century the volume of seal captures did not keep pace with demographic growth of the human population (Figure 2). During the period after the Second World War in particular, the spectacular development in this area that followed its opening to the outside world induced diversification of economic activities among the population. Besides

the traditional hunting activities, new ones were developed: commercial fishing, handicrafts and service industries gained importance, particularly in the small administrative regional capital of Tasiilaq.

FIGURE 2
Evolution of the annual average number of seals per Greenlandic inhabitant in Ammassalik, Eastern Greenland (seals of all species)

Periods	Average number of seals per Greenlandic inhabitant
1898-1910	12.2*
1910-1920	8.7*
1921-1930	8.8*
1931-1938	8.7*
1946-1951	5.5**
1952-1961	5.3**
1962-1971	3.6**
1972-1978	3.5**

SOURCE: * Estimations of Mikkelsen and Sveistrup (1944: 86)
** Personal estimations according to skin sales

Adopting the same criteria as Mikkelsen and Sveistrup, I calculated the meat consumption of East Greenlanders living in Ammassalik (Robert-Lamblin, 1986) and of those who had emigrated further north in 1925 to Scoresbysund, an area where game was even more abundant (Robert, 1971). My analysis shows that while nutrition has markedly changed due to ever-increasing imports of European goods through the multiplication of sea and air communications, meat consumption nevertheless remains very high among East Greenlanders, who essentially still live by hunting. We can see in Figure 3 that the inhabitants of small localities situated at the extremes of the district of Ammassalik, such as Sermiligaaq and Isertoq-Pikiiti, consume on average as much meat as their parents did at the beginning of the 20th century. And, if we take into account the fact that children do not consume the same quantities as adults, we estimate for those villages an average of 1kg of meat per adult per day. For the other

localities, the consumption is not as high, and the range of meat consumed varies by a factor of one to five when we compare the results for Kulusuk with those of Isertoq-Pikiiti. Tasiilaq, a town of administrative employees, should be considered apart.

FIGURE 3
Ammassalik 1976. Seal hunting yields by settlements. Global figures for various seal species and averages per active male and per East-Greenlandic inhabitant

Settlements	Tolal number of seals for the year *(1+2+3+4)*	Total kg of seal meat	Number of men aged from 15 to 59	Average number of seals per male between 15 and 59	Number of East Greenlandic inhabitants	Average numbers of seals per inhabitant	Seal meat: average quantity per inhabitant (kg)
Kuummiit	1541	39 390	120	12.8	461	3.3	**85**
Kulusuk	985	26 800	115	8.6	401	2.5	**67**
Tiileqilaap	1385	30 045	58	23.9	201	6.9	**150**
Isertoq and Pikiiti	2546	62 975	46	55.3	190	13.4	**331**
Sermiligaaq	2022	51 840	39	5.7	169	12.0	**307**
Tasiilaq (administrative centre)	1440	33 915	254	5.7	903	1.6	**38**
For all Ammassalik district	9919 *(1+2+3+4)*	244 965	632	15.7	2325	4.3	**105**

1 : Fjord seals, total: 9126. Estimated weight of meat per animal: 20 kg *
2 : Hooded seals, total: 553. Estimated weight of meat per animal: 85 kg *
3 : Greenland seals, total:137. Estimated weight of meat per animal: 30 kg *
4 : Bearded seals, total: 103. Estimated weight of meat per animal: 110 kg *

SOURCE: *Statistics department of the Ministry for Greenland

Reindeer herders of north-eastern Siberia

The Russian ethnologist Bogoras described the foodways of the Chukchee (in north-eastern Siberia) at the end of the 19th and beginning of the 20th centuries. In the same vein he stresses the importance of meat for these people, whether they were "maritime" – that is sea mammal – hunters

or nomadic reindeer herders of the interior tundra. Bogoras thus notes: "The staple food of the Reindeer Chukchee is reindeer meat, and that of the Maritime people 'sea meat' – the meat of sea mammals" (Bogoras, 1904:193). And the ethnologist not only observed this marked preference of the locals for meat, as opposed to fish, but also mentions the enormous quantities they are capable of ingesting: "The principal meal of the Chukchee is in the evening… At this time the Chukchee eats much and ravenously. They swallow large quantities of meat, gnaw the bones, and try to outdo each other in quickness... There are some exceptionally great eaters among the Chukchee. I was told about one Reindeer Chukchee of the Telqä'p tundra who was able to consume at one eating a two-year-old reindeer buck… He could stay without food for two or three days. Then, after a sumptuous meal, his stomach would be enormously distended, so that the skin would look quite smooth, and he would spend a whole day motionless, digesting" (*ibid*: 200).

One century later, during fieldwork among nomads of the tundra in the region of the Lower Kolyma (eastern Yakutia), we researched certain aspects of the reindeer herders' nutrition. Sharing the life of several camps of nomadic Chukchees, Evens and Yukaghirs, during the course of several days we could observe the importance of their consumption of wild or domesticated reindeer meat, to which was added the occasional elk in the more forested areas. Apart from the qualitative study I was conducting (Robert-Lamblin, 1998), we managed to establish a quantitative estimate of daily consumption of reindeer meat as an average of between 800g and one kilo per adult male (Malet *et al.*,1999: 407). This estimate was based on the consumption of reindeer carcasses freshly slaughtered during our stay, whose weight we could calculate. It must be pointed out however, that on the scale of an annual cycle these quantities can vary and present a pattern where periods of plenty and periods of lesser abundance alternate. In the ordinary seasonal cycle, we know that the end of winter is generally a difficult period as far as food is concerned, whereas autumn is more favourable. Moreover, various other parameters need to be taken into consideration, such as the presence or absence of game and the increase or decrease of domestic reindeer herds. For example, the fragile balance between men and natural resources is submitted to climatic hazards, such

as a brutal change in temperature, which can produce a coat of ice on the ground, that deprives the animals of access to vegetation, or a drought often accompanied by fires in the tundra, or again an epizootic, attacks by hungry wolf packs, and so on. All these phenomena have strong repercussions on the populations which depend directly on these resources for their survival. Periods of want also exist in these areas.

CONCLUSION: THE "PARADOX" OF ESKIMO DIET

The hyper-proteinic diet of Arctic populations has long raised discussion among nutritionists and physicians. "Obviously, without Western contact, Eskimos were totally carnivorous and their food was almost free from carbohydrates, except for a few berries, roots and leaves in summer" (Bang *et al.,* 1980: 2659). However, despite the prevalence of meat and fat in their diet, the incidence of cardiovascular disease was observed to be low among communities that still followed a traditional way of life, particularly in the small communities of sea mammal hunters. Among the more "acculturated" on the other hand, whose life-style and foodways had undergone profound changes, an increase of these diseases was observed.

Dyerberg and Bang (1981) pointed out the great difference observed between Greenland, Denmark and the United States in the mid-1970's in male mortality rates due to ischemic heart disease (Figure 4). After close examination of the composition of lipids from fish and sea mammals frequently eaten in north-west Greenland, these researchers and one of their colleagues (Bang *et al.,* 1980) drew attention to one essential characteristic: these foods appear to be rich in polyunsaturated fatty acids of the n-3 family, that give heavy consumers of these products protection from cardiovascular disease. Bjerregaard and Dyerberg (1988) have also shown that for the same period 1968-1983, mortality by ischemic heart disease was certainly lower in Greenland than in Denmark – regardless of gender –, but also that death from this disease was particularly low in the small Greenland communities (who still have a traditional life style and consume great quantities of foods coming from the sea).

FIGURE 4

Factors influencing mortality from Ischemic heart disease in Greenlanders

Age standardised death rates from Ischemic heart disease (*in percent of all deaths in males aged* 45-64). Figures in Greenland based on the years 1974-1976		The degree of saturation of fat in Eskimo and Danish food (*in percent of total fat*)		
	Mortality rate from Ischemic heart disease	Fatty acids	Eskimos	Danes
United States	40.4	Saturated (S)	22.8	52.7
Denmark	34.7	Monounsaturated	57.3	34.6
Greenland	**5.3**	Polyunsaturated (P)	19.2	12.7
		P/S ratio	**0.84**	**0.24**

SOURCE: J. Dyerberg and H. O. Bang 1981: 300

As far as the population of Ammassalik is concerned, on the eastern coast of Greenland, the physician P. Helms has shown that during the years 1967-80, the mortality rate from coronary disease (IHD) was 30 times lower in that area than in Denmark and eight times lower than in the population of Greenland as a whole.

However, an increase in this type of disease occurred in Ammassalik when its number more than doubled between the years 1948-60 and 1971-80 (Helms, 1981: 245 and 248). According to Helms, this is probably due to the changes in diet he could observe. He estimates that in 1945 Greenlandic traditional food accounted for 74% of nutritional needs, but later imports of sugar and cereals had a strong impact in that area (*ibid*: 248). This marked increase in the consumption of carbohydrates and sugar per inhabitant is illustrated in Figure 5.

FIGURE 5
Growth over time of average consumption per inhabitant
of imported European products in Ammassalik

Periods	Farinaceous food* (kg)	Sweetened food** (kg)
1899-1900 / 1904-05	2.24	0.54
1920-21 / 1924-25	12.37	3.25
1935-36 / 1938-39	28.44	10.99
1945	34.14	15.37
1978	58.42	52.60
* Rye flour, wheat flour, biscuits, various cereals ** Caster sugar or lump sugar, brown sugar, sweets, soft drinks		

SOURCE: For 1899-1939, according to Mikkelsen and Sveistrup;
for 1945-1978, according to Helms.

As a consequence, we can conclude that, despite their considerable consumption of animal meat and fat, low frequency of cardiovascular disease has been recorded among Arctic populations that still follow a traditional life style, that is, small communities of hunters and fishermen. As we have seen and as A. Hubert also pointed out, the explanation for this paradox resides in the characteristics of lipids that come from sea produce, which is rich in polyunsaturated fatty acids (Hubert, 1995). Changes in their diet involving fewer lipids and protein and more sugar, and the increasing use of margarine and butter (saturated fats), together with a more sedentary way of life, led to the appearance and development of new pathological conditions in these areas.

As I was able to observe[2] in the diet of today's Arctic populations, sugar and cereal products have been widely adopted, even in the most remote areas, and they have become absolutely indispensable. Nevertheless, meat consumption from local resources remains all-important for these hunter-gatherers of the far north and their families. This staple diet of meat retains for them symbolic value that is strongly related to their cultural identity.

NOTES

1. According to these authors, the fjord seal (Pusa hispida Schreb.), the species most commonly hunted in Ammassalik of the five species present in the area, yields an average of 20 kg of meat and 12kg of blubber. Some 25% of this has to be subtracted as lost or for dog food. A third of the blubber was used for food and two thirds for heating and lighting (Mikkelsen and Sveistup 1944: 100). The bearded seal (Erignathus barbatus), also found in the area, and the hooded seal (Cystophora cristata), a migrant animal, are larger game (Fig. 3), but less frequently captured.
2. In 1967, in order to spend eleven months of the winter far away from the commercial centre, a family of hunters in Ammassalik, consisting of two adults and six children, took with them 270 kg of sugar, 400 kg of rye flour, 100 kg of wheat flour, not counting cakes or other cereal products. (Robert-Lamblin, 1986: 49). These foods were just complements to the sea mammal diet, which would be their staple during their stay. Among reindeer herding nomads of the Siberian tundra, we also observed a very high consumption of sugar (up to five spoons per cup of tea) and bread (which

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