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WITH 6 FIGURES AND 14 TABLES

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## Preface

The present work was carried out as part of a major investigation into Human Adaptation under the IBP, International Biological Program. Other results of these investigations have been published in *Meddelelser om Grønland* (Volumes no. 202.2, 203.1, 203.2).

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## Contents

## Introduction

Because of the rapid population increase in the world, especially in developing societies, it has become important to study population structure and changes in population structure in Greenland. In this area, the population growth coincides with violent changes in technique and culture, and this will eventually lead to a dangerous depletion of the area's natural resources.

A demographic survey of population structure and development in West Greenland in general was conducted in connection with comprehensive studies of human biological adaptation in the Upernavik district in 1968 and 1969.

For the present study, two villages in the northern part of the Upernavik district were selected. Subsistence in these villages is still based on sea mammal hunting in the traditional manner. Since this way of life may only last for a limited number of years, and since strong measures have been implemented in order to control family sizes, it seems worthwhile to provide a description of the populations at that particular point in time.

The demographic data were collected as follows:

1. Detailed family histories for all inhabitants were worked out on the basis of interviews. These interviews were conducted (in privacy) by a team consisting of a Danish physician, a Danish eskimologist (who had lived in the villages for two years), and the local village midwife (Oluffa Petersen in Augpilagtoq, and Elisabeth Jensen in Kraulshavn).

2. The verbal information was then combined with data from medical records and census lists.

3. Finally, church books, death certificates etc. were checked, and definite genealogies were worked out.

For most of the populations, the genealogies go back four or five generations, i.e., to the middle of the 19th century.

## General Description of the villages

Upernavik district on the northwestern coast is one of the few remaining districts in Greenland where the traditional subsistence economy, sea mammal hunting, is still the most important means of subsistence. The district is geographically isolated, to the north by Melville Bugt and to the south by the great Svartenhuk Halvø. The winter night lasts from November to February, while there is midnight sun during May, June and July. Connections with the outside world are made very difficult during spring and autumn because of innumerable sea currents which make the ice too thin for the dogsledges. The hunting communities are usually isolated from the supply center in Upernavik town a third of the year, except for daily radio communication with the town.

Augpilagtoq lies about 30 km east of Upernavik town itself, at 72° N and 55° W. The settlement is protected from the sea by a number of larger and smaller islands, and is located on the west side of an island, facing the productive Upernavik Isfjord. The climate here is much better than further out on the coast, with more sunny days and less fog and precipitation. Ecological conditions are also different from those of the more exposed settlements like Kraulshavn.

Kraulshavn, called Nûgssuaq by the Greenlanders (i.e., the great promontory), is located in the northern part of the district, at 74° N and 57° W, farthest out in the groups of small islands by Baffins Bugt. In the summer months the Kraulshavn hunting families travel 170 km south to Upernavik by boat, in the sledging season the distance is 270 km.

The two populations were much more spread out before the Royal Greenland Trade Department set up a store and a warehouse. In Augpilagtoq this happened in 1850, in Kraulshavn in 1923. The families in both settlements therefore moved relatively late to their present locations, drawn by the store and later by the church and the school, and they also discovered a need to live in larger communities. But they have had to learn that this meant adaptation to an entirely new way of life.

In the settlements there are, besides the hunters and their families, a manager, a cathecist (Lay preacher/teacher), a Danish teacher and a Greenlandic midwife, who, besides assisting at births, also keeps a small medical depot. Kraulshavn is the only place in the district which has a small infirmery, which is in the charge of a Danish nurse. During summer and winter, all settlements are visited by a physician, a dentist, a parson, a school principal, police and others from the city.

Most families now live in wooden houses, which have been constructed by The Technical Organization of Greenland. Financial aid is available for such houses. However, there are also some selfconstructed

houses. Both types are heated by small coal stoves. Only the manager, the cathecist and the teacher have oil burners. In especially good hunting areas there are several hunting cabins, where the hunters can stay for shorter or longer periods.

The most important animal to be hunted in the district is the ringed seal *(Phoca hispida)*. This variety of seal is stationary and breeds in the icy fjords. It is hunted throughout the year. In the spring it is caught when it crawls up on the ice (utoq hunting) or in crevisses and cracks in the ice. During the summer, kayaks and motorboats are used. During the dark winter months (December, January and February), it is caught in seal nets which are set out under the ice near promontories or near icebergs which are frozen in.

The harp seal (Grønlandssælen) *(Phoca groenlandica)* migrates from the sea into the fjords at the end of June, disappearing in December or January.

The hooded seal (Klapmydsen) *(Cystophora cristata)* comes in August and leaves in October.

The bearded seal *(Erignathus barbatus)* may be hunted from October to January.

The walrus *(Odobenus rosmarus)* is occasionally found all year round, as is the polar bear *(Ursus maritimus)*.

The narwhal *(Monodon monoceros)* and the white whale *(Delphinapterus leucas)* migrate to the north in May, and to the south again in October.

In both settlements some sharks are caught during summer and winter, mainly the Greenland shark *(Somniosus microcephalus)*, the dry meat of which is used for dog food.

At Kraulshavn, other fishing is without importance, while at Augpilagtoq halibut and catfish are caught. Both reach a good size because of the favorable location near the ice fjord. An effective utilization of this resource, however, is made difficult because of the many icebergs and flakes, and the presence of sharks which often cut the fishing lines.

Among the birds, the most important are the eider duck and the guillemot (lomvie). Both are hunted in great numbers when they come looking for food in the fjords during the summer. Quite a few eggs are also collected from the great guillemot cliffs in May and June.

In the past there were herds of reindeer inland, but as far as is possible to ascertain, none have been seen for many years. During the winter a small number of grouse and foxes are caught, mostly by boys.

Plants are still being gathered in the mountains, but on a much smaller scale than in the past. Today such food is of very little importance in the diet. Although quite a number of edible plants are

known, only blueberries and blackberries are picked in larger quantities (from August to October).

The hunting families are now very dependent on the local store. The larger part of the seal skins are sold here, and rifles, ammunition, flour, sugar, margarine, coffee, tobacco. European clothing etc. are also bought here.

The figures for the trade in the stores from the time they were started until today show that the stores sell much more than what they buy from the hunters. In Augpilagtoq, this is because some of the products are sold in Upernavik. The freeze store there buys seal meat, birds and fish, while seal skins and handcrafts are sold to the Danes. For many years it has also been the custom of the Royal Greenland Trade Department to send for men from Augpilagtoq to pilot the Atlantic steamers into Upernavik during the summer months. In addition to this, the manager, cathecist, teacher, midwife and others are salaried. Finally, some hunters act as sledge-drivers during the winter on the institutional journeys throughout the district.

A money economy, both in Kraulshavn and in Augpilagtoq, has thus come to replace part of the traditional reliance on natural resources. This is the case in all other settlements in the hunting districts.

## Generations and Origins

Breaking down the populations into generations may give some information on their origins and structure. This procedure, however, is not easy, since the demarcation between generations are necessarily fluctuating. This is because the definition of a generation is inconsistent. There are especially two conditions to consider:

1. The *chronological* age might give very exact figure, but would in some instances be misleading; e.g., with individuals over 14 years of age considered as adults, some children would be placed in the parent generation.

2. On the other hand, if the actual status of an individual in the family is chosen as a criterium, some adults will be classified as children.

In Table 1a, chronological age groups are used as the basis for the distribution of the generations. In Table 1b, the existence of children and grandchildren has determined to which group a person belongs. In the case of adults without children, the relation to parents and siblings has been the decisive factor.

Figure 1 is a graphic representation of the overlapping of the generations. It is seen that this overlapping is in fact rather small.

Table 1a. *Age distribution.*

| | 0–14 years | 15–64 years | over 65 years |
|---|---|---|---|
| Augpilagtoq | 89 | 63 | 9 |
| Kraulshavn | 77 | 48 | 10 |

Table 1b. *Generations.*

| | Children | Parents | Grandparents | Total |
|---|---|---|---|---|
| Augpilagtoq | 103 | 49 | 9 | 161 |
| Kraulshavn | 88 | 35 | 12 | 135 |

| | Children | | Parents | | Grandparents | |
|---|---|---|---|---|---|---|
| | ♂ | ♀ | ♂ | ♀ | ♂ | ♀ |
| Augpilagtoq | 64 | 39 | 25 | 24 | 5 | 4 |
| Kraulshavn | 51 | 37 | 19 | 16 | 6 | 6 |

Table 2. *Matrimonial status.*

| | | Augpilagtoq | Kraulshavn |
|---|---|---|---|
| Grandparents generation | Married couples | 2 (4) | 5 (10) |
| | Widower (♂) | 2 | 1 |
| | Widow (♀) | 2 | 1 |
| | Unmarried ♂ | 1 | |
| Parents generation | Married couples | 18 (36) | 15 (30) |
| | Widower (♂) | 1 | 1 |
| | Widow (♀) | 1 | |
| | Unmarried ♂ | 6 | 3 |
| | Unmarried ♀ | 5 | 1 |

Table 2 shows the matrimonial patterns in the two populations. According to this, marriage has until now been a fundamental institution both in Augpilagtoq and in Kraulshavn.

As mentioned in the introduction, Kraulshavn is a new settlement. Augpilagtoq is older, but in the past few years it has developed from being a rather small settlement into one of the larger villages in the Upernavik district. Both settlements have received a large number of immigrants from other villages. These population movements are illustrated in Table 3. All grandparents in Kraulshavn and more than half of the grandparents in Augpilagtoq were born in other places. Most of the parents in both villages were also born outside the villages. With the children's generation, however, the situation is quite different. By far most of the children have been born in Augpilagtoq and in Kraulshavn,

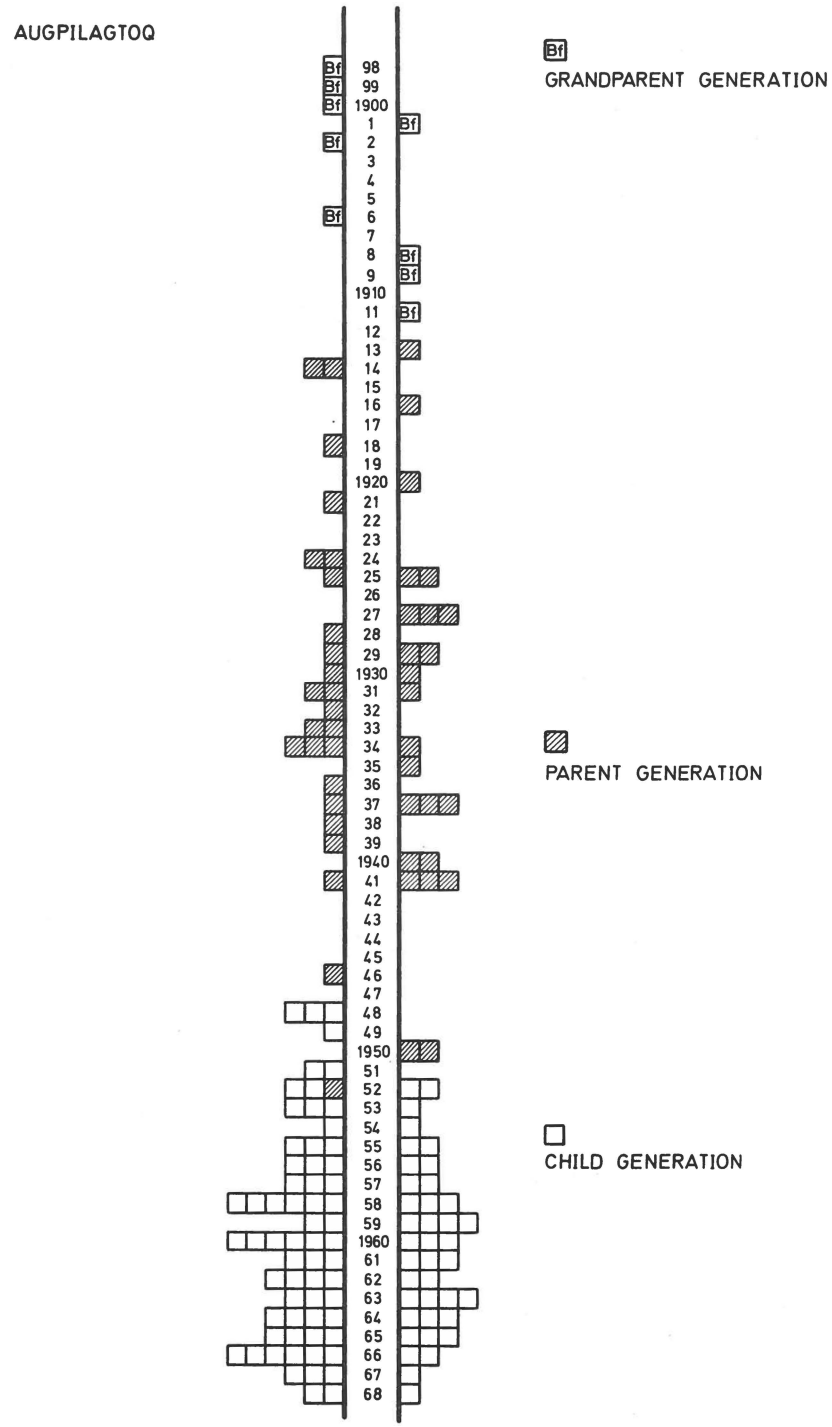


Fig. 1a. The populations according to ages and generations.

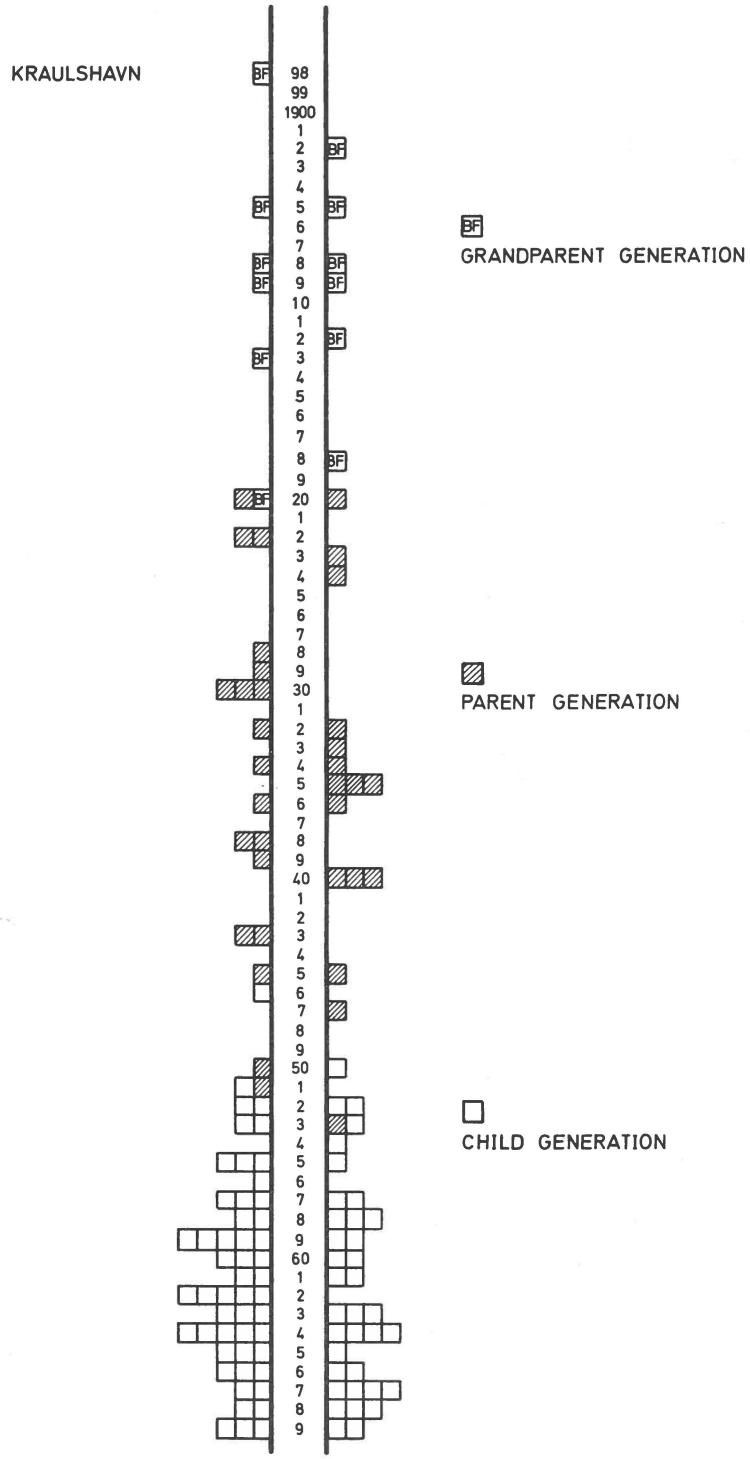
KRAULSHAVN
BF
GRANDPARENT GENERATION
PARENT GENERATION
CHILD GENERATION

Fig. 1b.

Table 3. *Place of birth for the two populations.*

*Augpilagtoq:*

| | ♂ | | | ♀ | | |
|---|---|---|---|---|---|---|
| | Grand parents | Parents | Children | Grand parents | Parents | Children |
| Augpilatoq ..... | 1 | 12 | 55 | 3 | 7 | 31 |
| North district ... | 1 | 4 | 4 | 1 | 11 | 5 |
| Upernavik town . | | 2 | 1 | | 1 | |
| South district.... | 3 | 6 | | | 4 | |
| Outside district . . | | 1 | 4 | | 1 | 3 |
| Total ..... | 5 | 25 | 64 | 4 | 24 | 39 |

*Kraulshavn:*

| | ♂ | | | ♀ | | |
|---|---|---|---|---|---|---|
| | Grand parents | Parents | Children | Grand parents | Parents | Children |
| Kraulshavn ..... | 0 | 5 | 38 | 0 | 4 | 27 |
| North district ... | 6 | 12 | 6 | 5 | 11 | 5 |
| Upernavik town . | | 1 | 6 | | | 3 |
| South district.... | | 1 | 1 | 1 | 1 | |
| Outside district . . | | | | | | 2 |
| Total ..... | 6 | 19 | 51 | 6 | 16 | 37 |

where they still live. The settling pattern thus seems to have stabilized, even though some movement in and out of the villages is still evident.

Table 3 shows whether or not people live in their native village, and also from where the immigrants have come. Four possible origins are considered: Villages in the northern part of Upernavik district, villages in the southern part, Upernavik town, and places outside Upernavik district. It is obvious that the major part of the immigrants come from other northern villages, some come from the southern villages, and very few come from the town. In Augpilagtoq, the only two adults not born in the Upernavik district are the schoolteacher and his wife. Most children born outside the community were born during their mothers' stay in other towns for medical care or special education.

The conclusions to be drawn from this evaluation are:

The mobility within the northern part of the district has been considerable, but during recent years there has been a tendency towards stabilization.

There has been some influx from the hunting communities south of Upernavik.

The biological links with Upernavik town are few, and almost no connections with people outside Upernavik district have been found.

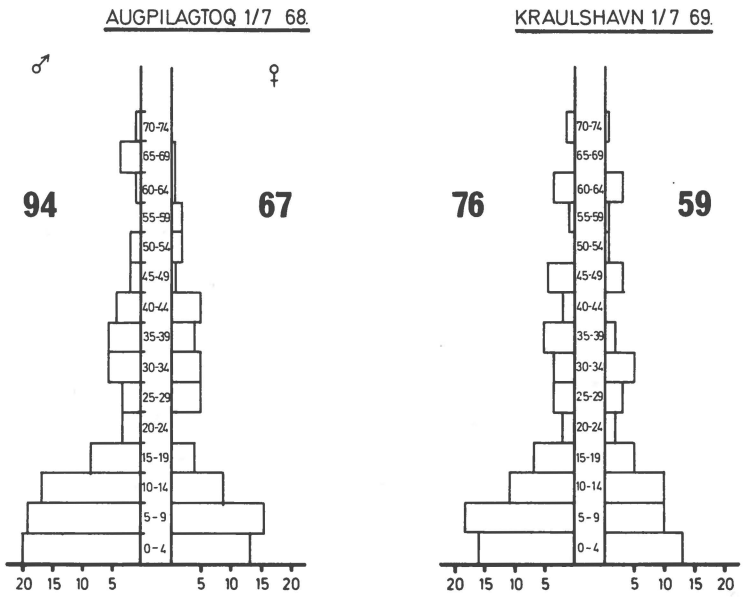


Fig. 2. Population structure in Augpilagtoq and Kraulshavn.

Table 4. *Age distributions in different parts of the world (per cent).*

| | 0–14 years | 15–64 years | over 64 years |
|---|---|---|---|
| Augpilagtoq (1968) | 58 | 39 | 3 |
| Kraulshavn (1969) | 58 | 40 | 2 |
| Denmark (1960) | 25 | 64 | 11 |
| U.S.A. (1960) | 31 | 60 | 9 |
| Chile (1960) | 40 | 56 | 4 |
| Mexico (1960) | 44 | 52 | 4 |

## Population Structure

Figure 2 shows the age and sex distributions of the present two populations. The populations include all inhabitants, also temporarily absent family members, and exclude temporary visitors. The Danish nurse and her husband are also excluded.

The age distributions in both villages are characteristic of developing societies, and are different from older, industrialized communities. A population explosion was obviously occurring in the Greenland villages in 1968 and 1969. The figures given in Table 4 clearly illustrate that the population increase exceeds even the conditions in countries like Mexico and Chile.

Such a population increase in a society dependent on sea mammal hunting and fishing was unacceptable, considering the natural resources

Table 5. *Age distribution in Augpilagtoq and Kraulshavn (per cent).*

| | | 0–14 years | 15–64 years | 65 years |
|---|---|---|---|---|
| ♂ | Augpilagtoq (94) | 59 | 36 | 4 |
| | Kraulshavn (76) | 59 | 40 | 1 |
| ♀ | Augpilagtoq (67) | 55 | 43 | 2 |
| | Kraulshavn (59) | 56 | 42 | 2 |
| ♂+♀ | Augpilagtoq (161) | 58 | 39 | 3 |
| | Kraulshavn (135) | 58 | 40 | 2 |

of the area. Therefore, measures were taken to reduce the birth rate, in Augpilagtoq and Kraulshavn as well as in the rest of Greenland. The results of these measures became evident during the years following their implementation, and will be discussed later on.

The figures in Table 5 give a more detailed picture of the age structures in the two populations. The similarity between the two villages is conspicuous. This similarity may be attributed to the nearly identical life conditions. In other words: the life condition may have a very large influence on the population structure.

In regard to sex, the shapes of the diagrams (Figure 2) clearly show that the sex ratios are unique, with a large surplus of males in all age groups. Table 6 further illustrates this. There are striking ratios of respectively 140 and 129 in favor of males in Augpilagtoq and Kraulshavn.

Since such unbalanced sex ratios are found in both populations, it seems unlikely that it could be a random phenomenon. Possible reasons might be a higher mortality rate for girls, or that more girls than boys are adopted out of the villages. In order to investigate these possibilities, Figures 3 and 4 were worked out. In Figure 3, all deaths are listed in relation to time of birth. I.e., the deaths are registered at the age the individual would have had at the time of the present investigation. In Figure 4, emigrated individuals are accounted for in the same way.

Population lists, census lists and church books were scrutinized very thoroughly and checked in detail in connection with the interviews, so the figures for at least the young age groups are accurate beyond doubt. The figures for the adults are not quite as accurate, since memories of emigrations and immigrations may be lost, and stillbirths may also have been forgotten. For the old age groups exact figures can not be obtained.

Correcting for deaths and emigration (often adoption) gives more acceptable– estimated–sex ratios at birth. Even so, ratios of males to females of 121 and 111 respectively for both populations combined, and of 143 and 111 for the young age groups, are still extreme.

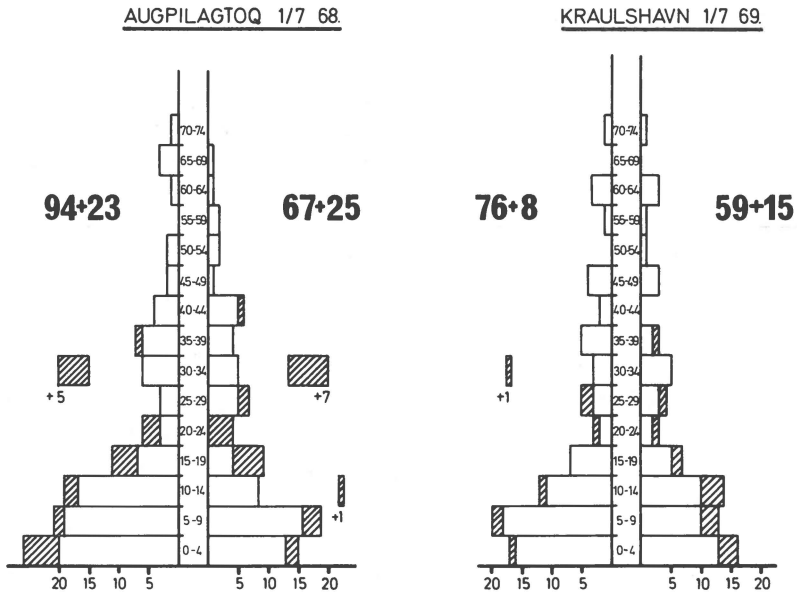


Fig. 3. Population structure, including deaths.

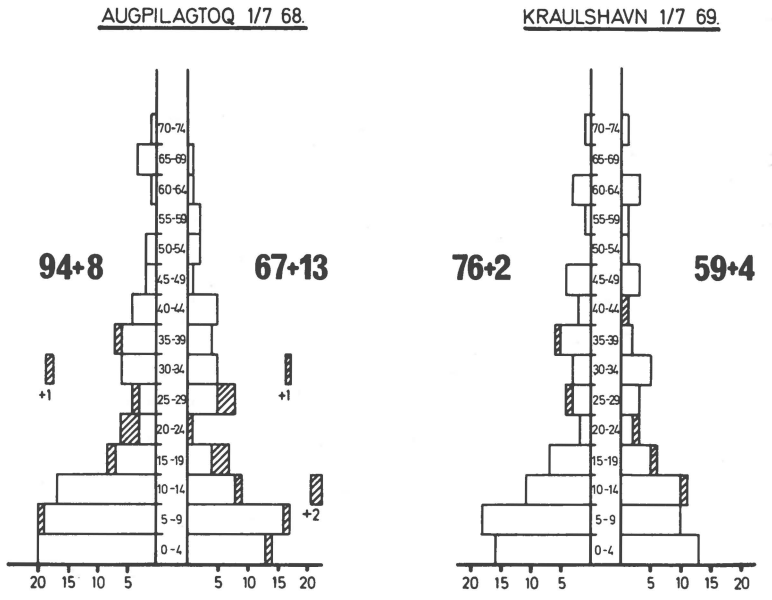


Fig. 4. Population structure, including emigrated.

Table 6. *Sex-ratios (males per 100 females).*

| | 0–14 years | 15–16 years | Average |
|---|---|---|---|
| Augpilagtoq | 151 | 118 | 140 |
| Kraulshavn | 136 | 120 | 129 |
| Augpilagtoq (corr.) | 143 | 100 | 121 |
| Kraulshavn (corr.) | 111 | 109 | 111 |

In Table 6, sex ratios have been calculated for both the actual and the corrected populations. The surplus of males is seen to decrease with age. A higher mortality rate for girls evidently accounts for some of the surplus of males in both age groups. The higher number of girls adopted out of the villages also contributes. However, it is difficult to explain the fact that the greatest ratio differences are found in the young and best investigated groups. There is no definite answer to this problem.

## Conclusion

The population structures in Augpilagtoq and Kraulshavn are identical, and are characteristic of a rapidly increasing, developing community.

The sex ratios in the age groups 0–14 years are 151 and 136, respectively.

This high sex ratio depends primarily on a high ratio at birth and is exaggerated by a higher mortality rate for girls and by the high number of girls being adopted away.

## Observations on fertility

Because of the rather small sizes of the two populations, a thorough and traditional investigation of fertility cannot be conducted. However, some interesting conditions relating to the fertility pattern of these populations deserve consideration, and will be discussed.

There are 24 women of reproductive age in Augpilagtoq, and 16 in Kraulshavn. Table 7 shows the distribution in relation to child bearing.

Table 7. *Women in the reproductive age.*

| | Augpilagtoq | Kraulshavn |
|---|---|---|
| With children | 21 | 15 |
| Without children | 3 | 1 |
| Total | 24 | 16 |

Table 8. *Number af pregnancies.*

| | Augpilagtoq | Kraulshavn |
|---|---|---|
| Fertile women | 21 | 15 |
| Pregnancies | 150 | 118 |
| Average | 7,5 | 7,8 |

Table 9. *The Outcome of the Pregnancies.*

| | Augpilagtoq | Kraulshavn |
|---|---|---|
| Abortion | 7 | 10 |
| Dead children | 33 | 22 |
| Living children | 110 | 86 |
| Total | 150 | 118 |

Table 10. *The age at death.*

| | Augpilagtoq | | | | Kraulshavn | | | |
|---|---|---|---|---|---|---|---|---|
| | ♂ | ♀ | ? | ♂+♀ | ♂ | ♀ | ? | ♂+♀ |
| Stillbirth | 0 | 1 | 3 | 4 | 0 | 3 | 1 | 4 |
| 0–30 days | 6 | 3 | 0 | 9 | 1 | 3 | 2 | 6 |
| 1–12 months | 6 | 6 | 0 | 12 | 2 | 6 | 0 | 8 |
| 1–7 years | 3 | 4 | 0 | 7 | 2 | 1 | 0 | 3 |
| over 7 years | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| Total | 16 | 14 | 3 | 33 | 6 | 13 | 3 | 22 |

The ages of the four childless women (3 from Augpilagtoq and 1 from Kraulshavn) are 30, 18, 18 and 16. There is no reason to believe that they will not become pregnant eventually.

The number of pregnancies are shown in Table 8, and the results of the pregnancies are given in Table 9. Only about 2/3 resulted in children who were still alive at the time of the investigation.

The ages at death of 55 children are given in Table 10. As would be expected, the highest mortality occurs during the first year of life. For some of the stillbirths, the sex of the child is unknown. An interesting observation is the relatively high number of dead girls in Kraulshavn, in contrast to the nearly equal number of dead girls and boys in Augpilagtoq.

A detailed description of the reproductive history of all women is presented in Figure 5. The number of deaths is impressive. It also appears that nearly all families have suffered deaths, even if the distribution is unequal.

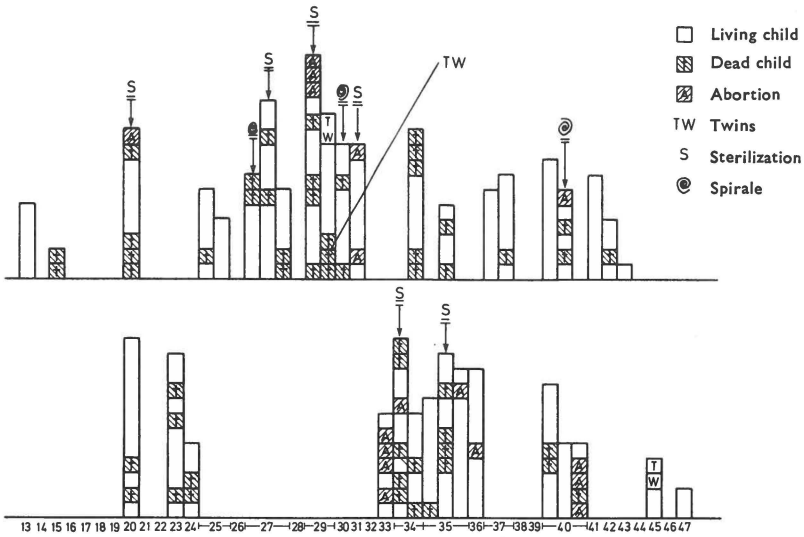


Fig. 5. Fertility of individual mothers, according to year of birth.

Since large numbers of children inflict heavy burdens, both on the single family and on society, some sort of reduction of fertility has been attempted for several years. In the beginning ,operative sterilization was offered to women with large families. Later on, intrauterine devices have been offered. The results of these measures can be seen in Figure 5. 7 out of 21 women in Augpilagtoq have been eliminated from the reproductive group. In Kraulshavn, the corresponding figures are 2 out of 15. Even if these figures may seem impressive, they do not indicate a large reduction in the overall group fertility. All defertilized women belong to older age groups, and they have already borne many children. This means that their residual contribution to the new generation would have been low in any case. The average number of pregnancies before sterilization was 10.1.

In the children's generation, there are 4 sets of *twins*, 3 in Augpilagtoq and 1 in Kraulshavn. In relation to the number of deliveries, Augpilagtoq has 3 out of 140 (1/43), whil Kraulshavn has 1/107.

Of the three sets of twins in Augpilagtoq, two occurred to the same married couple. In three cases, the twins were of different sex, in the last case, both were males.

## Population developments in the five years following these investigations

Since 1968–69 there has been a substantial decrease in the sizes of the populations. The exact figures are given in Table 11. One reason for

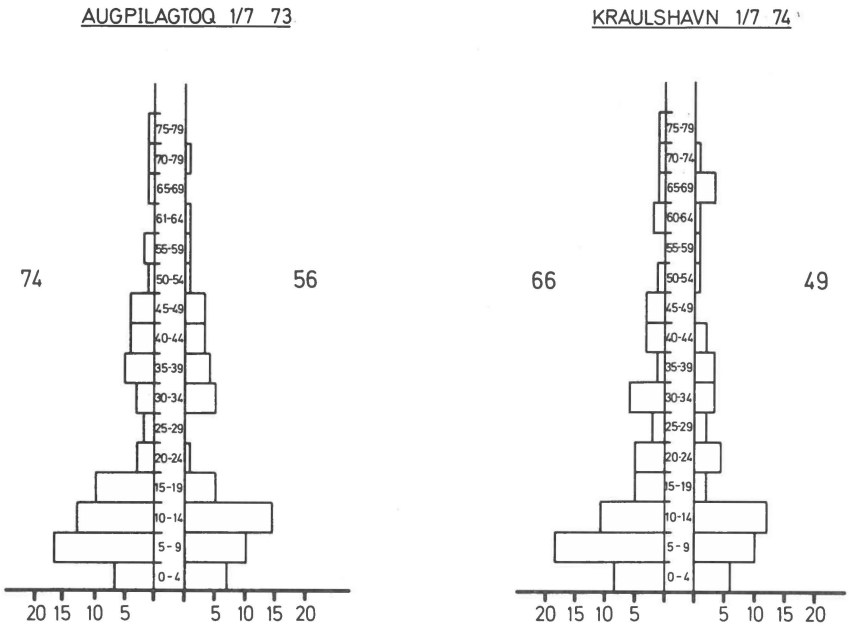


Fig. 6. Population structure in Augpilagtoq and Kraulshavn five year later.

Table 11. *Population sizes.*

| | Augpilagtoq | Kraulshavn |
|---|---|---|
| 1969/69 (Aug/Krau) | 161 | 136 |
| 1974/74 (Aug/Krau) | 130 | 113 |
| | –31 (20%) | –22 (16%) |

Table 12. *Populations in age groups.*

| | 0–14 years | 15–64 years | Over 64 year |
|---|---|---|---|
| Augpilagtoq 1968 | 89 (55%) | 63 (40%) | 9 (5%) |
| Augpilagtoq 1973 | 68 (52%) | 58 (45%) | 4 (3%) |
| Kraulshavn 1969 | 77 (57%) | 48 (36%) | 10 (7%) |
| Kraulshavn 1974 | 62 (55%) | 44 (39%) | 7 (6%) |

the decrease is a fall in the number of births. This is clearly demonstrated in Figure 6 (compare with Figure 2). The corresponding figures for the three age groups (generations) are given in Table 12.

However, falling birth rate only partly explains the decrease in population sizes. There has also been significant emigration from both villages. In Kraulshavn this has to some degree been balanced by immigration. In Augpilagtoq, however, a large number of young adults

Table 13. *Emigrations and Immigrations.*

| | Augpilagtoq | | Kraulshavn | |
|---|---|---|---|---|
| | Emigr. | Immigr. | Emigr. | Immigr. |
| Entire families | 5 | 0 | 5 | 4 |
| Young adults (single) | 19 | 5 | 3 | 1 |
| Children (single) | 2 | 6 | 0 | 1 |

Table 14. *Sexratios 1973/74.*

| | Augpilagtoq | Kraulshavn |
|---|---|---|
| 1968/69 | 140 | 129 |
| 1973/74 | 131 | 135 |

have left the village, while only a few children have immigrated (mainly to live with their grandparents) (Table 13).

The sex ratios in 1973–74 are given in Table 14. There is still a large surplus of males in both villages.

In conclusion it must be pointed out that a great reduction in the birth rate has been achieved during these five years, as was intended. The notable reduction in population size because of emigration of young adults (especially in Augpilagtoq) must be regarded as a dangerous indication for the future.

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