ARCTIC
VOL. 33, NO. 3 (SEPTEMBER 1980), P. 487-504

Aspects of Thule Culture Adaptations in Southern Baffin Island

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ABSTRACT. An archaeological sequence of Neo-Eskimo occupations, based upon excavations of eight Thule winter houses near Lake Harbour, Baffin Island, is outlined, beginning around A.D. 1100 and extending into the present century. Relationships between past climatic events, local environmental characteristics, and the organization of Neo-Eskimo subsistence-settlement systems are traced throughout this period of time, based on analysis of artifactual, faunal, and midden deposit data. A rescheduling of procurement systems, coupled with a shift in the emphasis of fall/winter settlement options, is seen in response to climatic/ecological changes, commencing after A.D. 1250, which affected the accessibility of bowhead whales, ringed seal, and caribou. It is suggested that flexibility in the organization of domestic units and demographic arrangements was an important cultural mechanism permitting Thule and recent Inuit populations to respond effectively to changes in their biophysical environments.

RÉSUMÉ. Les auteurs schématisent une séquence archeologique des occupations des Esquimaux "Contemporains", basée sur la mise à jour de 8 maisons d'hiver de l'époque de Thulé, près de "Lake Harbour", sur l'ile de Baffin. Cette séquence s'étage de 1100 ans de l'ère chrétienne jusqu'au siècle actuel. Ils analysent les types de relation entre le évènements climatiques passés, les caractèriques locales d'environnement et l'organisation des systèmes "colonies-subsistence" des Esquimaux contemporains. Cette analyse est basée sur les artifacts, la faune et les débris archéologiques. Les auteurs soulignent la remise en cause des systèmes d'approvisionnement, les changements dans la motivation pour fixer les colonies d'automne - hiver, en rapport avec les changements climatiques et écologiques, depuis l'an 1250 environ, qui affectaient les possibilités de chasse aux baleines à tête arquée, ans troupeaux de phoque et aux caribous. Les auteurs suggèrent l'importance de la souplesse dans l'organisation des cellules familiales et dans celle de la population. Les mécanismes culturels permettaient aux populations de l'époque de Thulé et aux Inuits actuels de réagir avec efficacité aux changements dans les environnements biophysiques.

Traduit par Alain de Vendegies, Aquitaine Company of Canada Ltd.

INTRODUCTION

In 1977 and 1978, a team from Michigan State University carried out excavations at the Okivilialuk Site (KeDr-7), the Talaguak Site (KeDq-2), and the Itinapik Site (KeDr-13) in the vicinity of Lake Harbour, Baffin Island, under the direction of M. S. Maxwell and George Sabo III. The purpose of these excavations was to acquire information on Thule and Historic period occupations in the region; these were the only remaining periods not well known in an archaeologically and ethnographically reconstructed sequence of occupations extending over the past 4000 years, known through the studies of Maxwell (1962, 1973, 1976), William Kemp (1971, 1976), Albert Dekin (1975) and Wendy Arundale (1976).

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During the 1977 field season Dr. John D. Jacobs and Mr. Armand Bode of the Department of Geography, University of Windsor, joined the M.S.U. archaeological team. Jacobs and Bode spent one month at the Talaguak Site, surveying and mapping the area and conducting microenvironmental investigations including meteorological, geological, and palynological studies.

The archaeological and paleoenvironmental data acquired by these investigations permit analysis of the relationships between past climatic events, local environmental characteristics, and the organization of Thule and recent Inuit subsistence-settlement systems in the region during the past 900 years. In this paper, we present some of the results of this analysis.

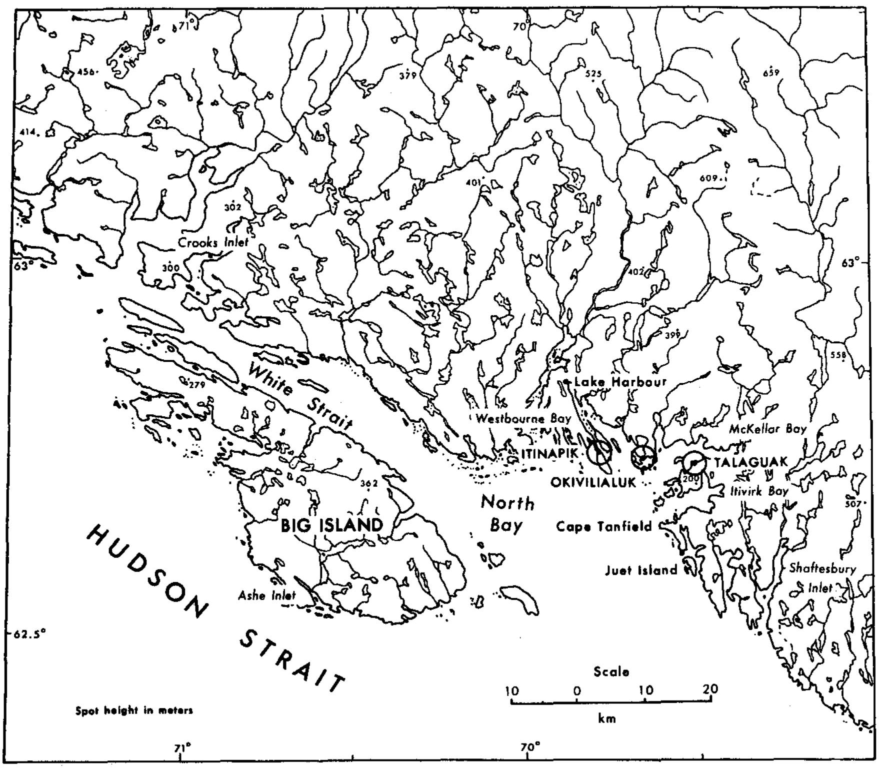

FIG. 1. Study area along south coast of Baffin Island and location of archaeological sites.

THE REGIONAL ENVIRONMENT

The study area is centered on North Bay, one of several major bay and estuarine systems along the south coast of Baffin Island (Fig. 1). The coastline here is complex, with numerous inlets and nearshore islands. This complexity is enhanced by a tide of some 10 m range, which causes islets, mudflats, and narrow passages to vanish and reappear on a twice-daily schedule. A major feature of the area is Big Island, which significantly affects currents and ice conditions in this part of Hudson Strait.

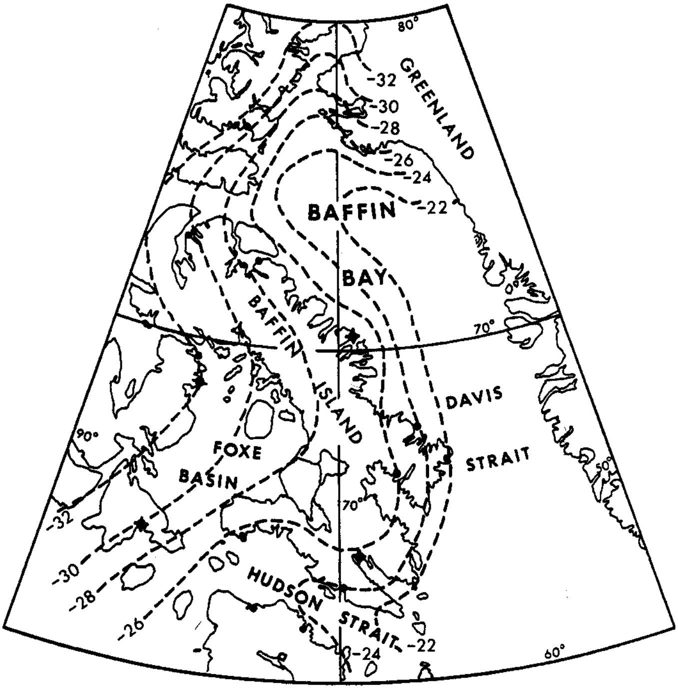

FIG. 2. Average daily temperature (°C) January (1941-70).

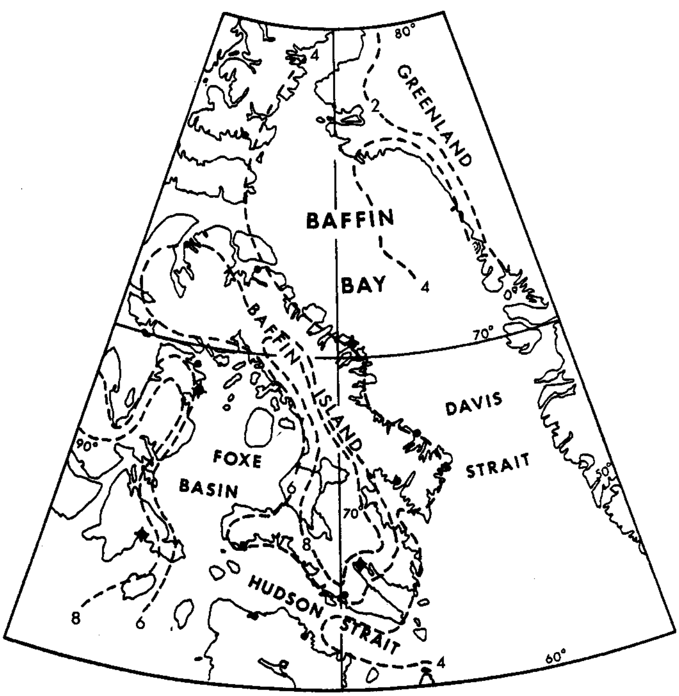

FIG. 3. Average daily temperature (°C) July (1941-70).

Relief in the vicinity of the coast is on the order of 100 to 300 m. Naked metamorphic rocks rise to about 800 m in the interior of Meta Incognita Peninsula, the ancient surface of which is cut by deep through-valleys giving relatively easy access overland to upper Frobisher Bay, 100 km to the north.

With the exception of the Labrador Coast and lower Hudson Bay, the south Baffin coast has the mildest climate of any part of the Inuit ecumene. Temperatures in the North Bay area average −24°C in January (Fig. 2) and 6°C in July (Fig. 3) with an annual mean of −8°C, compared with −10°C for Cumberland Sound and the Davis Strait coast.

Drift ice is present in Hudson Strait from late November through August in most years. Although winters are sufficiently cold for abundant ice growth, stable landfast ice develops only in the relatively protected bays and interisland areas, due to the relatively great depths and strong currents offshore. North Bay and White Strait, in the shelter of Big Island, support a fast ice floe which in some years has an area of more than 1000 km² (Fig. 4).

It has become evident over some thirty years of regular meteorological observations on Baffin Island and Hudson Strait, and over the much longer period of seasonal navigation through the Strait, that large year-to-year varia-

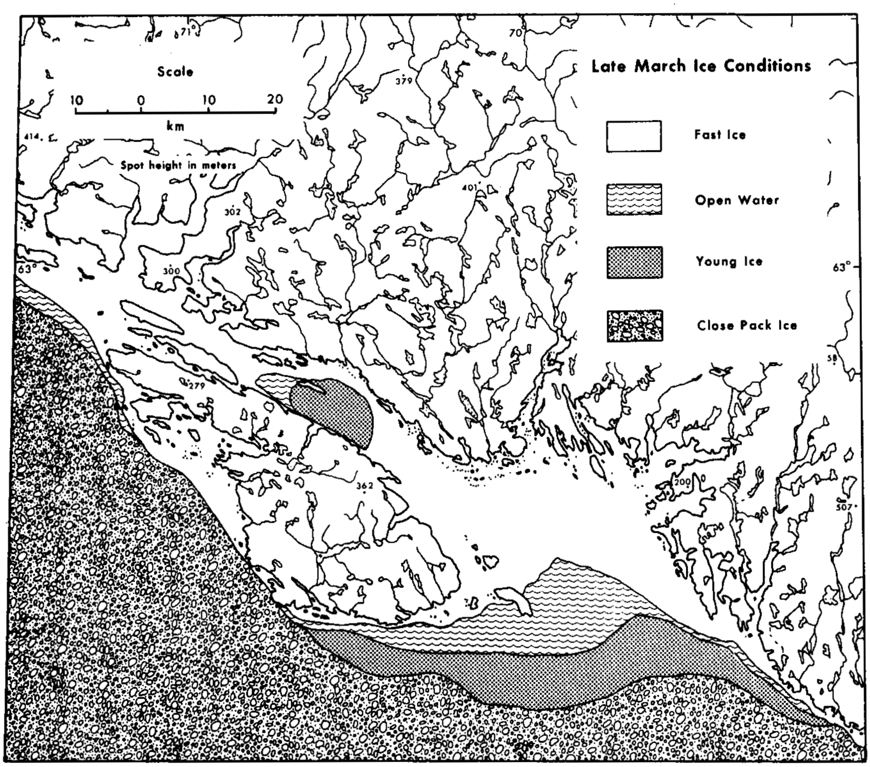

FIG. 4. Late March ice conditions.

tions in climate and sea ice are the rule. Our own field experience, with quite contrasting conditions in successive years, has borne this out. There is, for example, a standard deviation of 1°C in summer temperatures and 3°C in winter temperatures over the region (Jacobs and Newell, 1979). Dates of sea ice break-up may vary by two to three weeks from one year to the next.

A variety of animal species are present along the south coast of Baffin Island. For our purposes it is useful to identify species important to Inuit subsistence with reference to the habitats in which they occur. In the offshore marine habitat, four species of seals are hunted in addition to walrus, beluga, and (at least in the past) bowhead whales. The ringed seal (*Phoca hispida*), the harbour seal (*Phoca vitulina*), and the square flipper or bearded seal (*Erignathus barbatus*) are present throughout the year. Harp seals (*Pagophilus groenlandicus*) pass along the south coast during their summer migrations from the Labrador and Newfoundland area (Mansfield, 1967), but are very rarely taken at Lake Harbour. On the land, a number of species occupy a typical tundra habitat; those of economic importance include caribou, wolves, foxes, weasels, hare, and a variety of birds. Rivers and lakes connected to the sea comprise a third major habitat. In these are found two important species of fish, arctic char (*Salvinus alpinus*) and cod (*Boreogadus sp.*), and migratory waterfowl (ducks and geese) are also seasonally present.

In addition to the faunal resources, other local materials contribute either directly or indirectly to Inuit subsistence. A thorough investigation of Inuit plant use in this region has not been made, but we do know that several plant species are gathered for food, bedding, lamp wick material, and other purposes. Driftwood was traditionally an important commodity for making tools, weapons, transportation devices, and other implements. Local sources of slate, chert, soapstone, and a wide variety of quartz and quartzite were also utilized.

The paleoclimatic sequence in the eastern Arctic has been adequately reviewed by Barry *et al.* (1977), among others. In the present context, it is sufficient to note two extreme periods, that between about A.D. 800 and A.D. 1250, somewhat warmer than present, and the Little Ice Age period from about A.D. 1550 to 1850. Average seasonal temperatures during these periods were probably within 1 to 2°C of present means, that is, within the standard deviation of the current record. Thus, individual years of the 1960's and 1970's may be taken as analogs for past epochs, at least as far as weather and ice conditions are concerned. Effects of climate on faunal resources are cumulative, however, and extrapolations from present to past periods must be done with caution. Quite apart from any long-term climatic trends, it is certain that the large interannual variability of the climate of this region has a significant influence on faunal resources and human occupation.

NEO-ESKIMO CULTURE HISTORY

In all, we excavated eight house structures in 1977 and 1978 that yielded a sizable collection of artifacts and faunal remains. These houses were all of the semi-subterranean sod and stone-walled variety with tunnel entrances characteristic of the Thule Culture as originally described by Mathiassen (1927). There was, however, considerable variability in the size, outline, and depth of these houses. Since two houses each contained two distinctly stratified occupational components, there were ten cultural components represented in all. Comparison of artifact styles with other dated assemblages and consideration of architectural details permit us to estimate chronological date ranges for these components. We have combined the ten components into three successive time periods and associated cultural phases, beginning about A.D. 1100 and extending into the present century.

The earliest period of Neo-Eskimo occupation along the south coast of Baffin Island is represented by three components at Okivilialuk (House 8-Lower Component) and Talaguak (House 2-Lower Component and House 9). Representative harpoon heads include the Thule type 2 variety with prominent, angle cut basal spurs, lashing slots on either side of rectangular open foreshaft sockets, and grooved lateral basal edges with squared shoulders at the juncture of the base and midsection. One specimen from Talaguak has an incised design above the line hole. A type 3 harpoon head, also from Talaguak, has a rectangular open foreshaft socket with a slit for a reinforcing bar across the top of the socket; it also has lashing slots and a lashing bed across its upper face. Harpoon heads with these attributes are commonly found at Thule Culture sites considered to be relatively early in Canada and Greenland, including Mathiassen's classic Naujan Site and several contemporaneous sites (i.e. Mitimitalik, Crystal II, Cape Smith, and Silumiut). However, the earliest Thule sites in Canada and Greenland, recently discussed by Stanford (1976) in relation to his Walakpa Site sequence, also have the Sicco and Natchuk type harpoon heads present in their assemblages. These types were not found in our early components. On the other hand, House 9 at Talaguak exhibited several architectural features, including interior kitchen alcoves, characteristic of the earliest Thule occupations at Ruin Island and Nûgdlît (Holtved, 1944; cf. Jordan, 1979). Moreover, at Okivilialuk and Talaguak we found wedge-tanged harpoon dart heads, which have not been found at Naujan-age Thule sites in Canada but do occur at the Memorana Site (McGhee, 1972), which Stanford includes among the very early Thule sites (Stanford, 1976:105).

The earliest Thule components at Talaguak and Okivilialuk thus seem to occupy a position intermediate in time between those sites thought to represent the very earliest Thule migrants from Alaska into Canada and Greenland, and the somewhat younger Naujan-age sites. Stanford has suggested that the earliest group dates to about A.D. 1000 (Stanford, 1976:112), while McCartney's northwest Hudson Bay sites have been radiocarbon dated to about A.D. 1205, a figure which McCartney accepts as a reasonably good approximation for the upper limit of Naujan-age sites in general (McCartney, 1977a: 220-21). Based upon these estimates, the Okivilialuk and Talaguak components most probably date to around A.D. 1100, certainly no later than A.D. 1250. In general, these components may be classed with other early Thule sites in Canada and Greenland which as a group represent a fairly homogeneous material culture complex. We therefore refer to this period as it is represented in south Baffin as the Classical Thule Phase.

Three components from Talaguak (House 5 and House 11) and Itinapik (House 1) are somewhat younger in age than those discussed above. Characteristic harpoon heads are later Thule type 2 varieties with double-barbed blades (one is slotted at the tip for an endblade) and rounded, open foreshaft sockets with drilled lashing holes. Similar harpoon heads have been recovered by Schledermann from sites in the Cumberland Sound region of Baffin Island, radiocarbon dated between A.D. 1220 and 1650 (Schledermann, 1975: 85-93). The remaining artifacts from Talaguak and Itinapik are also similar and therefore probably date to the same time period. These represent Thule Culture populations who have begun adaptive adjustments on a specific regional level, in contrast to the more generalized expression of earlier Thule migrants; hence, we refer to this as the Developed Thule Phase. Comparable cultural phases are also represented by McGhee's (1972) Thule sites in the Copper Eskimo area, the proto-Netsilik Eskimo collections from the Boothia Peninsula region analyzed by VanStone (1962), and the Inugsuk Culture in western Greenland (Mathiassen, 1930; Jordan, 1979).

The remaining four components, excavated at Talaguak (House 2-Upper Component and House 7) and Okivilialuk (House 8-Upper Component and House 9) represent the Historic Phase. In these we find imported Euro-Canadian goods along with traditional items. The historic artifacts suggest a 19th to early 20th century date. These components represent the more recent cultural and

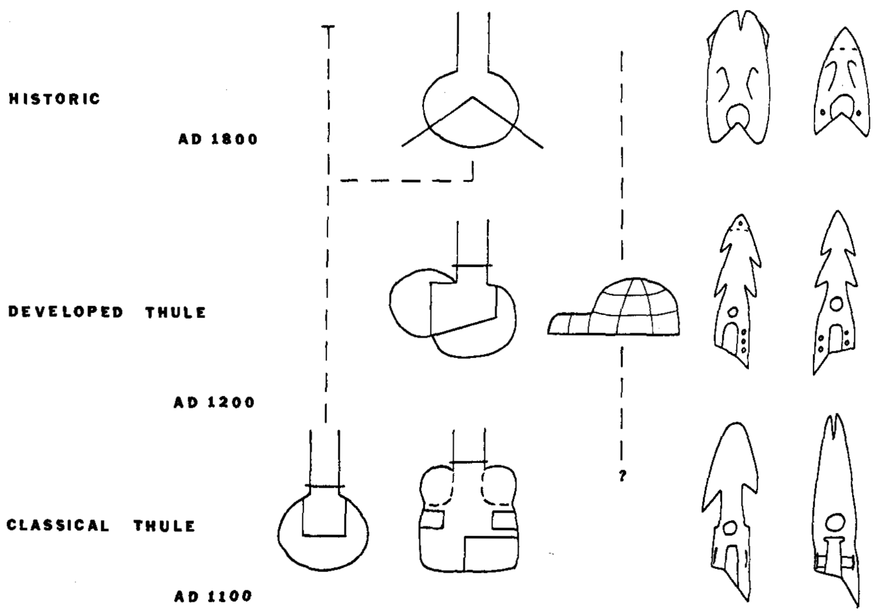

FIG. 5. Cultural phases, time periods, house styles, harpoon head styles (Λ indicates the tent-covered *qarmat*).

genetic descendents of local Thule populations, and reveal some effects of western contact not well represented in the historical literature. Figure 5 illustrates the three successive cultural phases described above, along with associated house styles and harpoon head styles.

ANALYSIS OF ARCHAEOLOGICAL AND PALEOENVIRONMENTAL DATA

To synthesize the archaeological and paleoenvironmental data and examine adaptive developments in the south Baffin region, a model of procurement systems was used, following the applications of Flannery (1968) and McCartney (1977b). In this approach, several features of the local environment and related aspects of the cultural system are identified in relation to primary subsistence activities, and the integration of these variables is traced through time. The major procurement systems for the south Baffin region are summarized in Table 1.

The basic seasonal schedule of these procurement systems is shown in Figure 6. The point we wish to emphasize here is that during any season a variety of resource procurement options exists.

Using data mainly from Kemp (1976) based on interviews concerning recent Inuit subsistence practices in the Lake Harbour area, we have mapped the spatial extent of the main procurement systems (Fig. 7). While the ecological basis for these systems may have varied slightly during the successive Thule

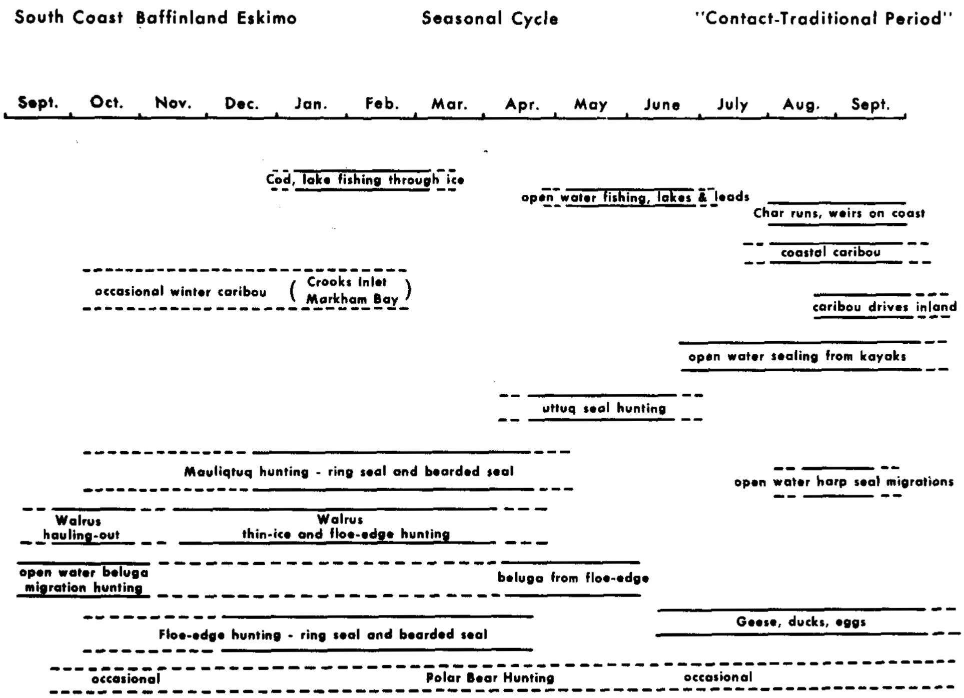

FIG. 6. South coast Baffinland Eskimo seasonal cycle (contact-traditional period).

Table 1. South Baffin procurement systems

1. System: breathing hole seal hunting (*mauliqtuq*).
   Habitat: expanses of smooth, landfast sea ice in bays and inlets.
   Organism/Material: ringed seal and less commonly bearded seal.
   Implements/Facilities: winter ice hunting harpoon, breathing hole probe, seal indicator, harpoon supports, snow knife, wound plugs and pins, toggle or nose plug with line and drag handle, knife.
   Personnel: cooperative groups of 6-12 hunters.
   Season/Time: winter season (primarily from January to March) during limited period of daylight, which is utilized to the fullest extent.
2. System: floe-edge sea mammal hunting.
   Habitat: open water off edge of landfast sea ice.
   Organism/Material: ringed seal, bearded seal, walrus, beluga, polar bear.
   Implements/Facilities: winter ice hunting harpoon, lance, occasionally seal skin float.
   Personnel: hunters either individually or in small groups.
   Season/Time: during winter from the time the floe edge is thick enough to support hunter, until spring break-up.
3. System: basking seal hunting (*uttuq*).
   Habitat: expanses of smooth, landfast sea ice, especially areas where breathing holes have been kept open during the winter.
   Organism/Material: ringed seal and infrequently bearded seal.
   Implements/Facilities: winter ice hunting harpoon, skin pads, small sledge (optional), white screen (historic).
   Personnel: usually two hunters working together.
   Season/Time: late spring, from early April to break-up; hunting is carried out during the day when seals are out basking in the sun.
4. System: open water sea mammal hunting.
   Habitat: open water area along coast, usually fairly close to shore.
   Organism/Material: ringed seals, bearded seals, harp seals, harbour seals, walrus, beluga, bowhead, polar bear.
   Implements/Facilities: summer harpoon with float(s) and drag, bladder dart with throwing board, lance.
   Personnel: seals, walrus and beluga may be hunted by individuals in kayaks; often several hunters will cooperate in driving walrus or beluga or in hunting bowhead whales by kayak; the umiak whale hunting crew consists of several hunters.
   Season/Time: during summer from the time there is enough open water to manoeuver kayaks until freeze-up in late fall; hunting may continue for long periods of time because of continuous daylight.
5. System: bird hunting on water.
   Habitat: open water along coast, especially in inlets and in lakes.
   Organism/Material: ducks, geese, murres, guillemots, and other birds.
   Implements/Facilities: bird dart and throwing board, kayak, stone wall traps along the shores of lakes.
   Personnel: usually individual hunters except on lakes, where two hunters will team up to drive geese ashore and into the traps.
   Season/Time: during the summer, open water months.
6. System: onshore caribou hunting.
   Habitat: interior tundra uplands, occasionally along the coast.
   Organism/Material: caribou.
   Implements/Facilities: bow and arrow, quivers, lance, kayaks, inuksuit, snow pit traps.

Personnel: stalking and kayak hunting may be done by hunters singly or in groups; inuksuk drive systems require large numbers of individuals, frequently including women and children.
Season/Time: most caribou hunting is done during the late summer and early fall when the meat and skins are prime; some stalking and trapping may be done during winter.

7. System: onshore small game and bird hunting.
Habitat: onshore areas along coast and up river valleys.
Organism/Material: wolves, foxes, hare, various birds including ducks, geese, and ptarmigans.
Implements/Facilities: bow and arrow, snares, traps, bolas, knives, baleen "wolf killers", slings.
Personnel: small game is hunted by anyone, singly or in groups.
Season/Time: year-round, whenever animals are available or a change in the diet is desired; most small game hunting seems to occur during the summer, however.

8. System: lake ice fishing.
Habitat: lake ice on inland lakes not too far from the coast.
Organism/Material: arctic char.
Implements/Facilities: leister, line and hook with lure, gill net, fish gorge, ice pick, fish stringing needle with line and toggle, net floats and sinkers, wood pole for setting gill net, wood fishing pole.
Personnel: usually individual hunters or families.
Season/Time: fall through late winter (especially late winter).

9. System: coastal lake and river fishing.
Habitat: leads or open water in lakes, rivers or outlets into bays and inlets.
Organism/Material: arctic char, cod.
Implements/Facilities: leisters, gill nets with floats and sinkers, lures, weirs, fish stringing needles with line and toggle.
Personnel: fishing may be carried out individually or in groups, the latter being especially common at weirs.
Season/Time: during migrations in late spring and summer.

10. System: intertidal and beach zone collecting.
Habitat: intertidal beach zone along coast.
Organism/Material: clams and mussels, seaweed, driftwood, stone (i.e. soapstone, slate, and chert).
Implements/Facilities: digging stick or scoop for clams, hammerstone for quarrying stone, containers and carrying devices.
Personnel: anyone singly or in groups.
Season/Time: spring through late fall; at low tide.

11. System: onshore collecting.
Habitat: onshore areas along coast of mainland or offshore islands.
Organism/Material: duck and goose eggs, berries and occasionally other plant foods, plants for bedding, wick material, etc., stone and wood for manufactures.
Implements/Facilities: containers and carrying devices, hammerstones for quarrying.
Personnel: anyone singly or in groups.
Season/Time: during the warmer months from spring through fall when there is little or no snow cover; some gathering (e.g. eggs) is limited to specific periods of time.

References: Boas, 1888; Munn, 1922; Bilby, 1923; Manning, 1944; Kemp, 1971, 1976.

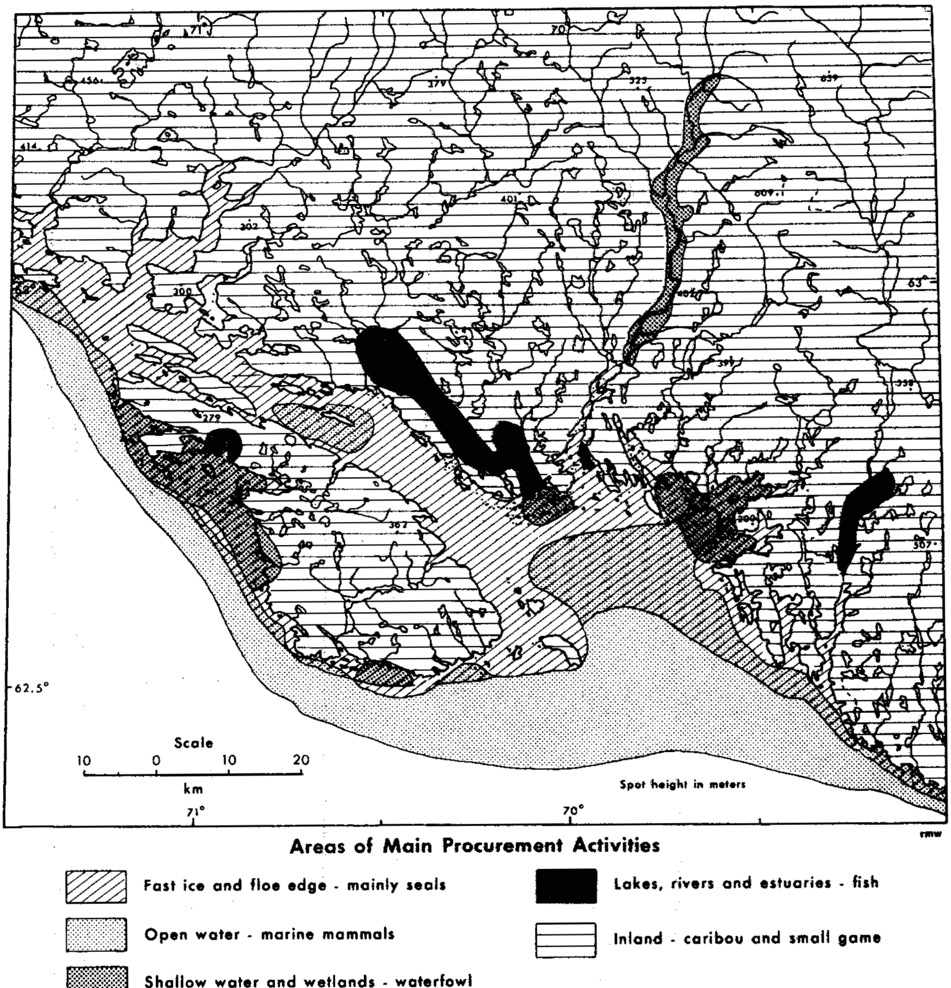

FIG. 7. Areas of main procurement systems.

cultural phases, there is no paleoenvironmental evidence to suggest that the total area in each category would have changed greatly. As illustrated in this figure, there is a considerable degree of choice as to where critical resources may be obtained at various times during the year.

In examining the distribution of artifacts associated with the hunting and fishing procurement systems, it appears that the subsistence technology remains virtually unchanged in the south Baffin region throughout the entire period of Neo-Eskimo occupation represented in the archaeological sites (Table 2). This subsistence technology consists of a basic set of weapons and associated gear: primarily, the winter sea ice hunting harpoon and associated ice hunting gear, the summer open water harpoon and float gear, lances, harpoon bladder darts and bird darts, throwing boards, bows and arrows, and a variety of fishing and

Table 2. Artifacts representing major subsistence implements/facilities by cultural phase

	Classical Thule	Developed Thule	Historic
Winter ice hunting harpoon (System 1, 2, 3)	8	2	2
Summer harpoon (System 4)	6	2	2
Lances (System 2, 4, 6)	2	1	2
Dart gear (System 4, 5)	7	1	4
Seal float gear (System 2, 4)	11	5	12
Ice hunting gear (System 1)	12	4	1
Bow and arrow equipment (System 6, 7)	16	2	16
Fishing equipment (System 8, 9)	3	10	0
Bird/small game equipment (System 7)	10	0	5

small game hunting equipment including leisters, fish hooks, gull hooks, bolas and slings. It is significant that but for two minor exceptions (fishing equipment in Historic components and small game hunting equipment in Developed Thule components), artifacts representing all of these hunting weapons and implements are found in each cultural phase, thus indicating their continued importance in the Lake Harbour area. Other than stylistic changes in harpoon heads, there are no significant changes in the form, and presumably the function, of these items.

One important addition does occur. In the Historic Phase components, evidence of the introduction of firearms is represented by several spent cartridge cases and one gunflint. In the Lake Harbour area, the introduction of guns along with wooden boats brought about changes in certain hunting activities, the most important of which was an increase in the extent to which ringed seals were hunted in the open water during summer. This activity was formerly of limited importance (Kemp, 1976). It is quite notable, however, that even with the introduction of this new and highly efficient weapon, the traditional subsistence technology remained intact at least into the early part of this century, and to a lesser extent still does today. Many traditional procurement systems also persisted until quite recent times (see for example Manning, 1944).

Turning to the faunal data, Table 3 summarizes the distribution of major categories of species by cultural phase, using minimal number of individual

Table 3. Distribution of major categories of faunal species (MNI) by cultural phase

	Sea Mammals[1]		Land Mammals[2]		Birds		
	MNI	%	MNI	%	MNI	%	
Historic	89	74.8	26	21.8	4	3.4	119
Developed Thule	90	73.2	28	22.8	5	4.0	123
Classical Thule	40	54.8	27	37.0	6	8.2	73
TOTALS	219	69.5	81	25.7	15	4.8	315

counts for each species. During the Classical Thule Phase land mammals, particularly caribou, constituted a higher percentage relative to subsequent cultural phases. However, sea mammals, particularly ringed seals, were the dominant resource. The hunting of bowhead whales during the Classical Thule Phase is indicated by considerable amounts of baleen in addition to whale bones. Although we are unable to quantify the economic importance of bowhead whales in comparison to other animal resources, it is likely that this species provided an important food source.

In the subsequent Developed Thule and Historic Phases, a somewhat different pattern is seen, indicating that a rescheduling of procurement systems had taken place. Although the numbers and kinds of species found in the faunal assemblage does not change, the relative proportion of sea mammals to land mammals does. The importance of caribou in particular declines significantly as a food resource, while there is an equally significant increase in the amount of sea mammals, especially ringed seals. The amount of whale bone and baleen decline substantially during the Developed Thule Phase, indicating a reduction or possibly a cessation of whale hunting. The only apparent difference between the Developed Thule and Historic Phases is that the faunal assemblage of the Historic components contained somewhat more baleen. It may be that whale hunting lapsed during the Developed Thule Phase but later regained importance in the context of the commercial whaling industry.

The shift from an essentially mixed marine-terrestrial economy during the Classical Thule Phase to a strongly marine-oriented economy thereafter, in which the procurement of ringed seals in particular is emphasized, is consistent with environmental changes which occurred during the Little Ice Age period. Terrestrial primary productivity was undoubtedly reduced in what is already an area of low carrying capacity. If the present is any guide, the onset of the colder epoch would have been characterized by considerable interannual variability with consequent ecological instability. Thus, both the numbers and accessibility of caribou, as well as small mammals, birds, and waterfowl would have been reduced.

[1]ringed seal, harbour seal, square flipper seal, walrus, beluga, unidentified small seal.

[2]caribou, polar bear, canid, fox, rabbit, unidentified small land mammal.

On the other hand, the effects of the colder period would not have been so severe in the marine environment. One positive result would have been more extensive and stable landfast ice in places such as North Bay, and therefore an expansion of the ringed seal habitat. However, these same conditions would have been less favorable for species preferring an open water habitat. Increased amounts of summer drift ice and an earlier formation of landfast ice in fall may have inhibited open water hunting, thus accounting for the decline in bowhead whale procurement during the Developed Thule Phase. The substantial increase in ringed seal procurement may therefore be interpreted as an economic response to make up for the loss of bowhead whales as a food source.

As one possible indicator of settlement pattern, we examined the amount of artifacts and bones per cubic meter of fill from each of the components. Among the Classical Thule Phase components densities of faunal refuse as high as 1192 bones/m^3 are observed, and artifact densities are as high as 136 artifacts/m^3. Similarly, the Historic components have up to 1124 bones/m^3 and 61 artifacts/m^3. None of the Developed Thule Phase components has a high bone density, and all of the artifact densities are quite low: the highest figures from these components are 628 bones/m^3 and 15 artifacts/m^3. In fact, the Developed Thule Phase components in total account for only 14.5% of all of the artifacts recovered, compared to 43.2% for the Classical Thule Phase components and 42.4% for the Historic components, from a sample of 1008 recovered items. These differences indicate changes in the nature of house utilization through time. We suggest these changes were part of a shift in the fall and winter components of the annual settlement pattern, which occurred during the Developed Thule and Historic Phases.

Our interpretation is based in part upon Maxwell's (1979) settlement pattern model for the Thule and Inuit occupations of southern Baffin Island. This model is based on data appertaining to site types and locations obtained during preliminary surveys along portions of the south Baffin coast carried out by Maxwell during 1974 and 1976. The model consists of semi-permanent winter base camps and smaller, transitory tent camps occupied during the warmer seasons. The winter camps are located near major hunting areas along the south coast, which in the Lake Harbour area is the extensive landfast ice floe in North Bay and the floe edge extending from Big Island to Juet Island. During summer, the winter band breaks up into smaller units, and a series of tent camps is established as small groups move from place to place in pursuit of a wide variety of resources.

The artifact and faunal assemblages from the Classical Thule Phase components suggest that the semi-subterranean houses occupied during that period represent onshore winter base camps. However, by the time historical accounts of the southern Baffin region were written (e.g. Boas, 1888; Bilby, 1923), the winter camp had been moved out onto the sea ice, where the Inuit resided in snow house villages. The old Thule winter sites (and even some of the old Thule winter houses) were now frequently occupied as temporary fall - early winter *qarmats*, prior to the move out onto the sea ice. Thus at some point in time prior to contact there was a modification of the earlier winter onshore base camp -

summer tent camp settlement pattern, in which the winter sea ice locational option and the snow house dwelling type became much more important than they previously had been. We suggest that this shift began to occur during the Developed Thule Phase. As previously discussed, during this period climatic/ecological changes were associated with the rescheduling of resource procurement systems toward a greater reliance on ringed seals. This settlement shift would have provided Thule hunters greater access to winter sealing grounds, which undoubtedly were being used more intensively during this period. The utilization of semi-subterranean Thule houses as temporary fall - early winter *qarmats* during the Developed Thule Phase may also be hypothesized; this would account for the less abundant deposits of bone and artifacts found in these components.

In two of the four Historic components we found evidence of winter occupation, as indicated by artifacts and faunal remains. This suggests that the utilization of onshore winter dwellings continued as a seasonal option in addition to snow houses on the sea ice. We assume that spring and summer components of Thule settlement patterns in south Baffin remained essentially unchanged; however, we lack specific data in support of this.

ECOLOGICAL RELATIONSHIPS

These findings permit us to speculate about some of the relationships between various ecological factors and Thule adaptations in southern Baffin Island. We stress the importance in this region of a diverse faunal resource base, which provides a variety of procurement options. These options derive not only from the variety of animal species present (at least seasonally) in the region, but also from the numerous distinct habitats across which these species are distributed. The resulting set of species/habitat configurations thus provides Inuit hunters with a wide variety of choices of hunting activities, in terms of the particular species pursued as well as the areas in which they may be hunted. It is this characteristic of the local ecology (Maxwell, 1979) that is most important in our identification of the specific "procurement systems" used in this paper. However, another important feature of these species/habitat configurations is that they provide an important measure of ecological stability, since any particular change in the physical environment will likely not affect all species and habitats in the same way; thus, while seasonal climatic deterioration might adversely affect some species and habitats, the same conditions may have no effects or even positive effects on others.

The archaeological and paleoenvironmental evidence summarized above indicates that these same general conditions and procurement options existed in the past (at least throughout the Thule period) much as they do today. The availability of these options, coupled with long-term continuity in major aspects of species/habitat interrelationships, are viewed as key factors influencing the kinds of adaptive responses that occurred in relation to environmental changes during the past millenium.

We have argued that climatic events commencing after A.D. 1250 brought about certain other changes in the south Baffin ecosystem. The tundra habitat was probably most significantly affected; here, the biomass of some species, particularly caribou, declined primarily because of greater year-round snow and ice cover and increasingly severe weather conditions. At the same time, the available biomass of ringed seals probably increased relative to expansion of the landfast sea ice habitat in North Bay. Conversely, the accessibility of bowhead whales was reduced through increases in the amount of summer drift ice in Hudson Strait and earlier formation of the landfast sea ice. A corresponding rescheduling of Thule procurement systems apparently responded to these changes, and was coupled with a shift in the emphasis of certain seasonal settlement options, mainly snow house villages on the sea ice in winter. These adaptive adjustments permitted local Thule populations to maintain an adequate level of resource procurement for support in times of increased environmental stress.

It is perhaps most significant that these adaptive adjustments required no major changes in subsistence technology, in the number or variety of procurement systems, or in the basic annual settlement pattern. Rather, strategic responses appear to have been made, as suggested above, by simply rescheduling available procurement systems and reorganizing settlement options already present in a long-established subsistence-settlement system. Because of this well-organized system, these adaptive adjustments were sufficient by themselves to allow Thule populations to cope effectively with the kinds of environmental changes that affected them in this region of the Arctic.

What cultural mechanisms might account for this adaptive orientation? We suggest that flexibility in certain aspects of social organization and demography associated with subsistence pursuits and patterns is important. This is characteristic of recent Inuit populations (e.g. Willmott, 1960; Balikci, 1968) as well as other hunter-gatherers adapted to rigorous and unstable environments (Yellen and Harpending, 1972; Yellen, 1976, 1977). Among recent Inuit populations each procurement system is associated with particular socio-economic or domestic units as well as with specific types of settlements within the annual cycle. For example, breathing hole seal hunting requires large numbers of cooperating hunters, and thus necessitates winter village aggregation, whereas open water sealing by kayak is usually an individualistic activity pursued by hunters camped in small coastal settlements. Rescheduling of procurement systems and reorganization of settlement options therefore implies some adjustment in the organization of domestic units and possibly in seasonal patterns of population aggregation and dispersal. The maintenance of flexibility in social organization and demographic arrangements would thus have allowed Thule populations to efficiently implement the subsistence-settlement responses noted above. Local groups could easily move about in relation to changing resource distributions, and domestic units of various degrees of extension (i.e. nuclear family households, extended family households, multi-family camps, etc.) could merge or break apart according to the requirements and possibilities of a modified procurement schedule.

The ability to periodically redistribute and reorganize people in response to changes in the availability, accessibility, and predictability of critical animal resources has positive adaptive advantages. In contrast to alternative adaptive strategies, such as technological change or other structural changes in subsistence-settlement systems, strategies based on the inherent flexibility of Inuit social organization would have ensured the persistence and continuity of Thule populations with the least disruption to their long established and effective socio-economic system. Adaptive flexibility in subsistence, settlement, and social organization, as exhibited so clearly by recent Inuit in the Lake Harbour region (Maxwell, 1979), may thus be viewed as a cultural pattern of considerable importance to their Thule predecessors. In relation to the ecology of the south Baffin region, which exhibits persistent diversity of resource procurement alternatives in a nearly continually fluctuating milieu, this adaptive orientation provides the necessary "resilience" to ensure maintenance of favorable cultural/environmental relationships in the face of both short-term as well as long-term environmental change.

ACKNOWLEDGEMENTS

The 1977 and 1978 excavations were made possible by two research grants to Dr. M. S. Maxwell from the National Science Foundation, whose support is gratefully acknowledged. The authors thank Ron Welch, of the University of Windsor Department of Geography, for preparing Figures 1-4 and 6-7. Dr. Richard Jordan and Dr. M. S. Maxwell reviewed an earlier version of this paper and provided many helpful comments. Any shortcomings of the present version are the sole responsibility of the authors.

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