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Aspects of Early Thule Culture as Seen in the Architecture of a Site on Victoria Island, Amundsen Gulf Area

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ABSTRACT. The early Thule culture site Co-op, situated at the east end of Amundsen Gulf, along the route to the eastern Arctic, offers excellent conditions for documenting the Thule expansion from Alaska, across the area of western Canadian Thule, and as far as the High Arctic. Whereas the markers most often retained to define cultures and their respective areas of expansion are movable artifacts, this paper focuses exclusively on unmovable architectural features. Detailed analyses of data obtained at the Co-op site yielded significant information about the techniques of thermoregulation of the semisubterranean dwellings. Comparisons with other Thule dwellings revealed greater stability in the architectural concept during the early phases of the Thule expansion than one would expect, given the technical constraints imposed by local raw materials and their fluctuating availability. Dwellings may therefore constitute one of the most useful identifying cultural elements.

Key words: Early Thule culture, Thule expansion, architecture, semisubterranean dwellings, kitchen extension, roofing, building materials

RÉSUMÉ. Situé à l'extrémité est du golfe d'Amundsen, sur la route de l'Arctique oriental, le site Co-op, du Thulé ancien, offre des conditions idéales pour documenter l'expansion thuléenne de l'Alaska jusqu'en Haut-Arctique, en traversant l'aire du Thulé occidental canadien. Alors que les marqueurs les plus souvent retenus pour définir une culture et ses aires respectives d'expansion ressortissent généralement au matériel mobilier, cet article retient les seuls éléments architecturaux immobiliers. L'analyse minutieuse des données du site Co-op a permis d'obtenir des renseignements importants sur les techniques de thermorégulation des habitations semi-souterraines. Des comparaisons avec d'autres habitations du Thulé ont révélé une stabilité du concept architectural pendant les phases anciennes d'expansion thuléenne plus grande que celle à laquelle on était en droit de s'attendre, vu les contraintes techniques liées aux matériaux de la région et à la fluctuation de leur disponibilité. Par conséquent, les habitations ont vocation à être des éléments culturels identitaires privilégiés.

Mots clés: culture du Thulé ancien, expansion thuléenne, architecture, habitations semi-souterraines, cuisine annexe, toiture, matériaux de construction

INTRODUCTION

> …some like myself might have liked more information on how the roofs of Thule houses were built. But we should not ask for the moon. (de Laguna, 1979:21)

Since the beginnings of coordinated Thule culture research in the Central and Eastern Arctic, archaeologists have assumed an expansion of the Thule culture from somewhere in North Alaska to Greenland (Mathiassen, 1927b). When in the early 1960s archaeological research finally focused on the greater Amundsen Gulf area (Manning, 1953, 1956; Harp, 1955; MacNeish, 1956; Taylor, 1964a, b, 1972; McGhee, 1972), the Alaskan stamp on the sites in this "blank area," such as the wooden rectangular house type and the general abundance of wood artifacts, pottery, and slate blades (Taylor, 1972:26), clearly indicated links with "Western Thule"—i.e., Alaskan Thule—described earlier by Larsen and Rainey (1948).

The motives of this expansion (which is thought to have taken place in several stages), its origins, the migration routes, and the chronological frame of these events have been major research subjects (e.g., McGhee, 1969/70, 1975, 1984b; Arnold and McCullough, 1990; Morrison, 1999; Mason, 2000; Whitridge, 2000). Many questions about the Thule expansion remain, but since Taylor's pioneering publication (1963), it has been generally accepted that the population movements passed through the Amundsen Gulf area.

It is precisely in this transit area, at the Thule site Co-op (Victoria Island, Fig. 1), that archaeological research began in 1980, with the aim of filling in parts of the "blank area" that was still largely unexplored. This research confirmed the strong links between Amundsen Gulf and Alaskan Thule sites: the Co-op site proved to constitute a component of a western Canadian Thule facies (Le Mouël and Le Mouël, 1980, 1986, 1987; Arnold, 1994; Morrison, 1999), with its characteristic highly developed woodworking

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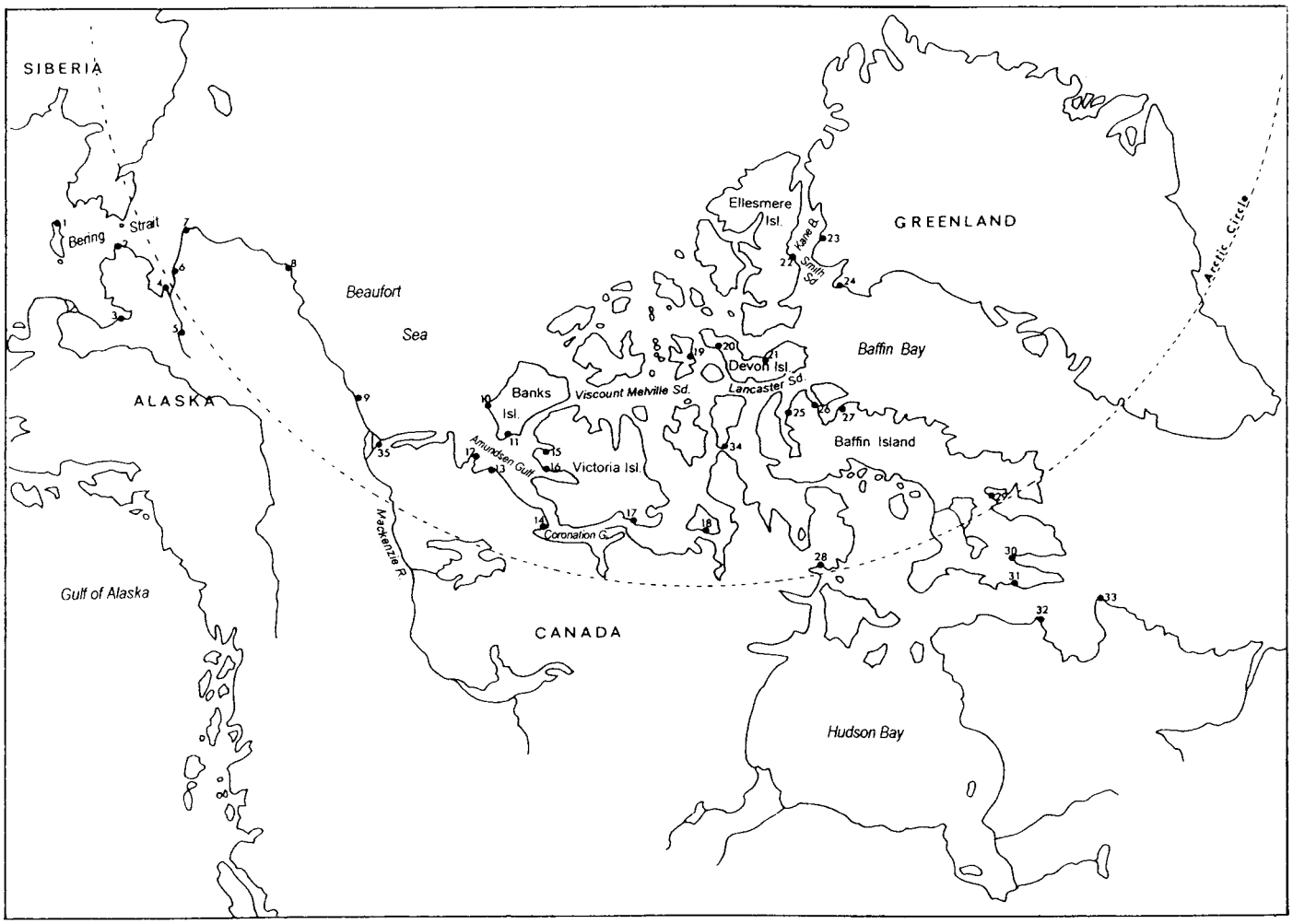

FIG. 1. The sites mentioned in the text. 1 – Miyowagh, Ievoghiyoq; 2 – Kurigitavik; 3 – Nukleet; 4 – Kotzebue; 5 – Ahteut, Onion Portage; 6 – Cape Krusenstern, Sisualik; 7 – Jabbertown; 8 – Walakpa, Birnirk; 9 – Washout; 10 – Cape Kellett; 11 – Nelson River; 12 – Vaughn, Jackson; 13 – Pearce Point; 14 – Clachan, Nuvuk, Beulah; 15 – Nichol, Buliard; 16 – Co-op, Memorana; 17 – Pembroke, Bell; 18 – Malerualik; 19 – Brooman Point; 20 – Porden Point; 21 – Truelove Lowland; 22 – Sverdrup, Skraeling Island; 21 – Ruin Island, Cape Kent; 24 – Nûgdlît; 25 – Uluksan; 26 – Nunguvik; 27 – Qilalukan, Mittimatalik; 28 – Naujan; 29 – McDl-1; 30 – Peale Point; 31 – Talaguak; 32 – DIA. 4; 33 – Staffe Island; 34 – Qariaraqyuk; 35 – Cache Point.

technology, intensive use of copper (replacing slate), and pottery (Arnold, 1981, 1994; Franklin et al., 1981; Arnold and Stimmell, 1983; Charpentier, 1984; Morrison, 1987; Jegaden, 1988; Trénard, 1992; Alix, 2000). But was the Co-op site a stopover only during the Natchuk phase, presumed to be the initial stage of the Thule expansion, or during several eastward thrusts? And does this probable transit site reflect the remarkable capacity of the Thule culture for adaptation (cf. for instance McGhee, 1984a; Park, 1988, 1994), or does it contain elements of constancy likely to be markers of the Thule expansion route?

This article attempts to answer these questions through analyses based on the architecture of the semisubterranean dwellings at the Co-op site. There is a fundamental difference between unmovable features, such as massive dwelling remains, and movable items. The context in which the archaeologist finds movable items does not necessarily correspond to the place and specific cultural context of their use, and it almost never corresponds to their exact place of production. The movable article may radiate across space and time, and possibly even generations, until it is finally abandoned or discarded. This is definitely not the case with a semisubterranean habitation, for which the places of production (= construction), use (= occupation), and abandonment coincide. Any population movement, especially during such a wide-ranging event as the initial Thule expansion, implies the construction of an entirely new dwelling in the new location with locally available materials. It was not the object "house" that accompanied the Thule people, but simply the idea (or the mental concept) of how a house had to look. One might conclude that dwelling forms changed very quickly with changing natural conditions and with growing distance from the starting point. Was this the case?

Compared to movable articles, however, these dwellings are not easy to interpret: they are collapsed (i.e., never intact), and most of them were refurbished, or their construction elements were scavenged. These factors may explain why detailed descriptions of architecture are so rarely published except for historic dwellings (e.g., Taylor, 1960;

Slaughter, 1982). Establishing chronologies and typologies is therefore very difficult (although this has been tried in the past, e.g., Schledermann, 1975). The lack of published descriptions did not facilitate comparisons of the Co-op site data with data from other Thule dwellings. Slaughter (1982:142) noted the inherent limitation: "House form, like other artifact forms, is susceptible to culture-historical analysis and therefore of interest to archaeologists. However, the acuity of the culture-historical analysis of house form is directly related to the level of detail of the data utilized" (Slaughter, 1982:142). Leroi-Gourhan (1945:255–257) recommended that "We should try to distinguish technical forms, i.e., to set down the elements of a general [and meticulous] description." As Burch (1979:203) claimed, "The demonstration would require sophisticated, extremely detailed, and perhaps not particularly dramatic research…but the gain in our understanding of human population dynamics and long-term culture change that would result surely would justify the effort." This is what we attempted for the Co-op site, in the hope of defining the place that architecture occupies within the Thule culture.

SITE TOPOGRAPHY AND EXTENT OF THE EXCAVATED ZONES

The Co-op site (OdPp-2) had been established at the eastern foot of the peninsula of Naoyat (or Bold Bluff), a steep gabbro plateau at the northern threshold between Prince Albert Sound and Amundsen Gulf (Victoria Island, Northwest Territories, near the village of Holman, Fig. 2). At this spot, marine and ice conditions (strong tidal currents, polynyas in early spring and late fall, ice cracks) favour the year-round presence of ringed seals. Seals were indeed the principal food resource during the Thule occupation, representing approximately 76% of the consumed mammals, versus 11% for caribou (calculation based on minimum number of individuals [MNI]; Lamy and Spitery, 1991). Seasonal occupation probably lasted from September/October to May/June (approximation by Lamy and Spitery, 1991, who observed the degree of fusion of the distal epiphysis of ringed seal humeri, and the presence of seal fetuses).

Besides numerous structural remains of the Neoeskimo period (caches, a hearth, four tent rings, T1 to T4, and on the plateau, a stone-fall fox trap, two rectangular stone graves, and a driftwood depot), the site comprises eight semisubterranean dwelling structures (H1 to H8), which are situated along the edge or on top of well-drained ancient gravel beach terraces. The underground entrance passage of these habitations is oriented towards the sea, i.e., southward, perpendicular to the terrace edge. H1–H4, H7, and H8 form an alignment (Fig. 3), whereas H5 (the double house) and H6 stand isolated. Dwellings H1 and H2 appear to have been built over an older construction (H7), and H8 had possibly served as a quarry for the construction of the other houses.

During five field seasons (from 1980 to 1986), H1, H2, the double house H5 (H5-W and H5-E), and the small tent ring T3 were partly or completely excavated (for a detailed documentation, cf. Le Mouël and Le Mouël, 1999). Extensive excavations at structures H1 and H5 exposed the interior living space, the walls, and the annexes, as well as the area in front of the dwellings. The data resulting from the investigations of H5 form the most complete and coherent assemblage. At H2, excavations focused on the living space with its surrounding walls, but were restricted to scanty investigations of the entrance passage and kitchen area, where an ice wedge extending between H1 and H2 and pothunting had disturbed the original archaeological context.

At the end of the 1984 field season, a fire totally devastated the field lab and with it the artifacts ready for shipment. Also lost were all data, field notes, and pictorial recordings concerning the western living space of H1, its adjacent central passage zone, the area between the entrance passage and the kitchen, and part of the vast midden area in front of this structure. We immediately attempted to reconstruct the findings from memory, referring to the architectural elements still in situ (Le Mouël and Le Mouël, 1985). The results of this reconstruction completed those obtained from the detailed investigations to which the eastern living space, the entrance passage, and the kitchen were submitted during the two following years.

INTERPRETATIVE DESCRIPTION OF THE ARCHITECTURE OF H5

There can be no doubt that the foundations of both parts of the double house H5 (Fig. 4) were built simultaneously, as can be deduced from the continuity of their contours, their general symmetry, and the orientation of the two buildings in relation to the common entrance.

An east-west oriented alignment of stones, situated outside the dwelling in front of the entrance, could be the remains of a windscreen. The 0.6 m deep cold trap entrance consists of a porch and its two diverging passages. Large boulders seem to have once formed a wall ca. 0.5 m high on top of the eastern edge of the porch. Thick dolomite and gabbro stones flank the sides of the entrance passages, creating a difference in level of about 0.8 m between the top of these stones and the floor of the corridors. A flagstone consolidates the threshold leading into each central room. A semicircular alcove (east alcove) enlarges the central space of H5-W, making the contours of this dwelling bilobate, whereas the central space of H5-E is merely widened by a small niche in the east wall. Each of these habitations is equipped with a kitchen extension, situated in the corner between the innermost end of its corridor and its central room. The annex in H5-E is reached directly from the central room, whereas in H5-W it is connected to both the central area and the entrance passage by a short narrow passage. The importance of this difference will be discussed below.

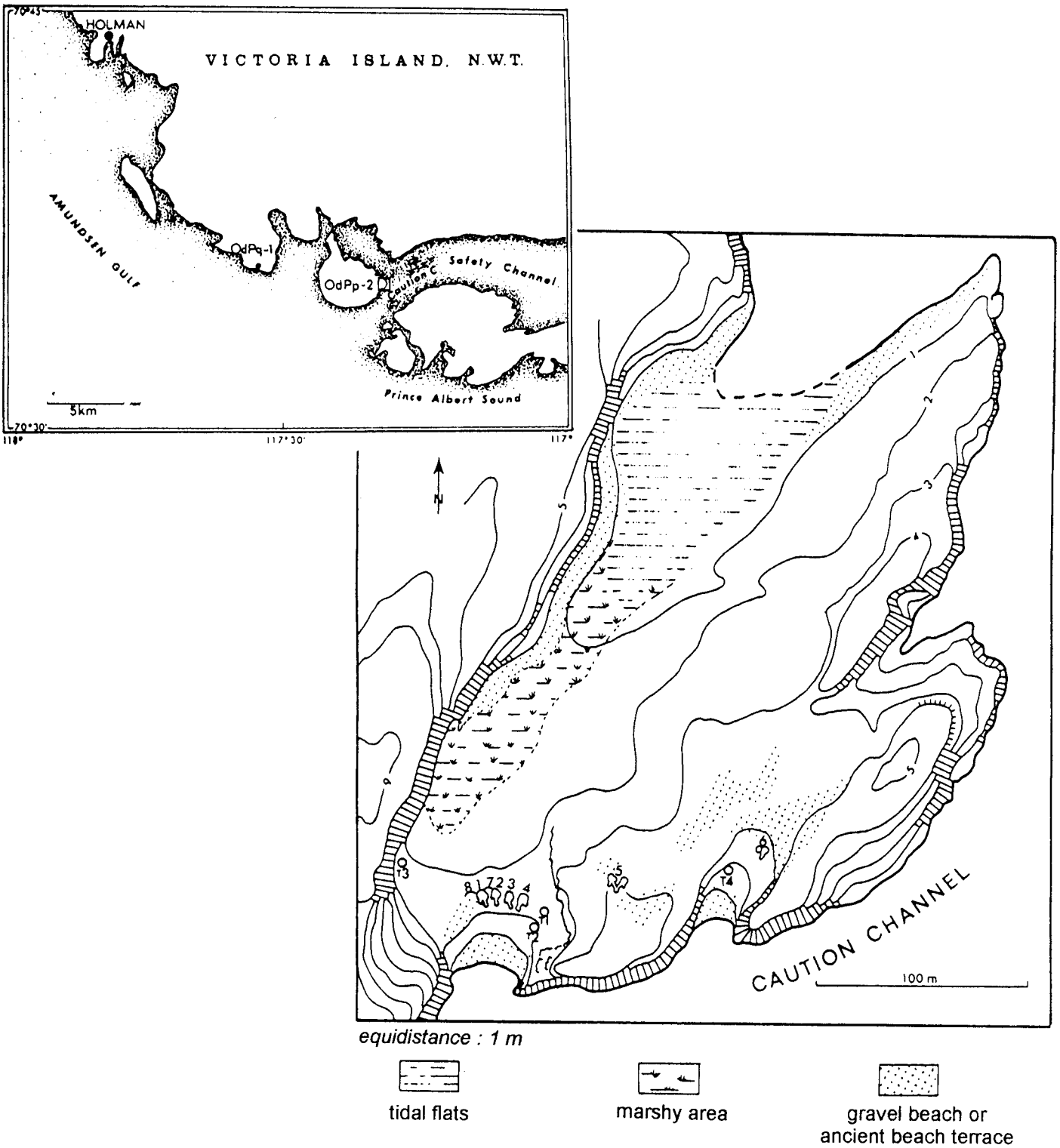

FIG. 2. Map of the Peninsula of Naoyat (Bold Bluff), showing the Co-op site (OdPp-2), the Memorana site (OdPq-1), and the village of Holman. Detail: the semisubterranean habitations and tent rings.

Apart from a large, erratic block that is integrated into the north wall of H5-W, the 0.7 m high wall surrounding both central rooms is composed of compact slabs of silt, fine sand, and peat stacked upside down, with the vegetation side placed underneath. Piles of earth and gravel are banked up against the wall's periphery, partly burying some consolidating stones placed around the sod wall. The inner edge of the fairly abrupt north wall of H5-W seems to be consolidated by some vertical posts and stakes, unless these are the remains of roof supports. In H5-W, both the east alcove and the kitchen extension are surrounded by stones and tightly packed sediment, whereas in

FIG. 3. Aerial view of the alignment of H1-H4, H7, and H8. Note the fissure created by the ice wedge, between H1 and H2 crossing H7.

H5-E, freestanding, unjoined boulders placed on edge encircle the kitchen annex.

In both central rooms, only the passage zones are paved with some thin flagstones (Fig. 5), and the uninterrupted, trampled litter scattered over the entire ground proves that this pattern did not result from scavenging of some floor slabs or planks. The rear and partly lateral sleeping platforms were raised and had probably consisted of wooden planks placed on boulders or thick vertical slabs (Fig. 6), which, in two cases, were incorporated into the rear wall. Other in situ boulders could have been used as seats or as stands for tools or a lamp.

Techniques of Thermoregulation

The hearths in both kitchen extensions consisted of small slabs laid on the floor and against the rear wall. A second fireplace (or lamp stand) in the kitchen annex of H5-W was apparently built of a flat stone placed on top of two vertical slabs. The high degree of calcination of the bone ashes in both kitchens and the heat-altered hearth slabs give evidence of high temperatures, implying a good supply of oxygen. The interstices between the unjoined stones surrounding the east kitchen would have created the necessary draught. In contrast, the west kitchen had a sod-insulated, airtight wall around it. It must have drawn oxygen from the entrance passage, which had direct lateral access to the kitchen, thus preventing the extraction of air from the central space.

The installation of open fires in an annex space avoided an accumulation of smoke in the living area and ignition of the wooden superstructure by sparks (Arnold and McCullough, 1990), but it necessitated an additional source of heat and light inside the living space. In H5-W, a lamp was found to the right of the threshold. An additional lamp (turned over) and fragments of a third one, both discovered in the middle of this same central area, could originally have been placed on the platform. In H5-E, a small lamp was found at the corner of the central area and the kitchen. Finally, the lamp in the porch—besides lighting and heating the entrance, which might also have served as an additional sleeping space (Spencer, 1959:55)—must have functioned as a convector between the cold air in the low-access parts of H5 and the flow of air from the living space.

In summary, the prevention of smoke development inside the living space, the installation of complementary sources of heat and light, the control of the draught, and the creation of three levels, of which at least the two lower ones (but possibly also the raised bench) were equipped with a source of heat, guaranteed optimum comfort on the sleeping platform. These features reflect a practical knowledge of thermoregulation and were certainly a determining, integral part of the architectural plan itself.

Proposals for a Reconstruction of the Superstructure of H5

Indications regarding the superstructure of the porch and the entrance passages are scanty. The porch may have been covered by a tent. The numerous stones that filled the first three-quarters of the western passage, among them a large flagstone and two probable lintel stones, could have been elements of the superstructure. The total absence of stones along the last 0.8 m before the threshold, i.e., the section that corresponds to the lateral access to the kitchen annex, could indicate a different type of roofing. Several pieces of wood found in the eastern entrance passage were probably part of the superstructure.

Some small posts (the smaller ones grouped together) at the extremities of the central space, notably in H5-E and in the east alcove of H5-W, were apparently the stumps of corner posts. In each habitation, a log one metre long, lying immediately beyond the threshold stone perpendicular to the entrance passage (cf. Fig. 4), could have served as a lintel or crossbeam. In H5-E, some of the logs, among them a bifurcated specimen, were probably supporting elements of the framework. The roof of both central rooms had been covered by an insulating layer of sod, which attained 30 to 40 cm at H5-W, but only 15 cm at H5-E, whereas the roof of the east alcove of H5-W seems to have been covered with blocks of silt and fine sand.

A tent-like superstructure separated from the central spaces must have covered the kitchen extensions. In H5-W, thick sods of earth insulated the base of this superstructure, whereas in H5-E, the unjoined boulders encircling this annex are surrounded by a semicircle of stones, which most probably anchored the hide flaps of the superstructure.

Very few attempts have been made to reconstruct Thule habitations. For a long time it was supposed and accepted that the roof must necessarily have been in the shape of a

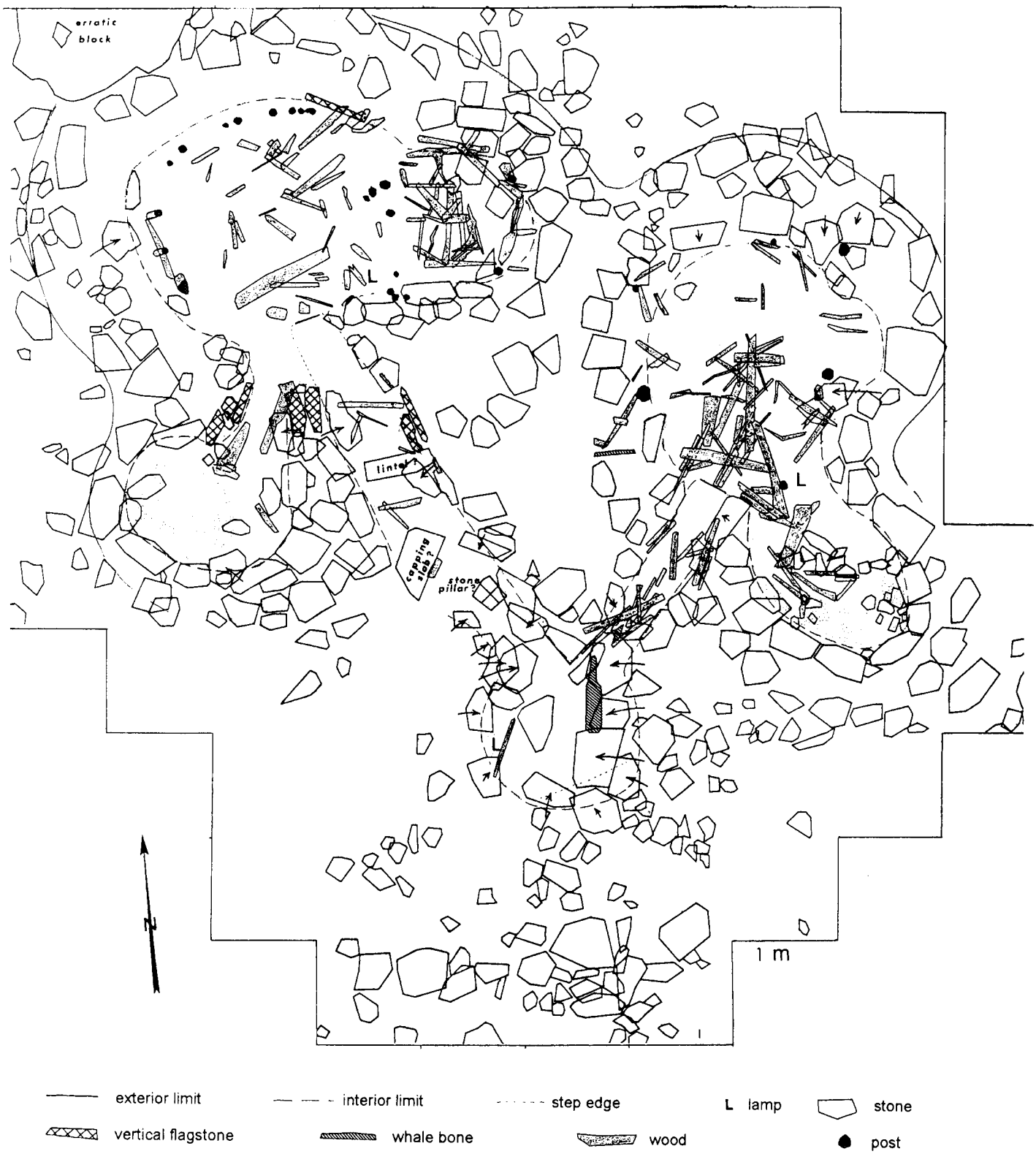

FIG. 4. H5: in situ stones, boulders, posts, and collapsed structural wooden elements (Pirot and Legrand: LISH-CNRS; M. Le Mouël).

dome, as suggested by the round contours of the floor and moreover imposed by the natural curve of the whale bones, particularly the maxillaries and ribs. Yet though this shape may have existed in Late Classic and Developed Thule (Maxwell, 1985:284; McCartney and Savelle, 1993:5) and elsewhere (McCartney, 1979a:305–306), more recent research on early Thule houses at Brooman Point on Bathurst Island and at Porden Point on Devon Island has shown that the roof could have been of the shed type, almost flat or slightly sloping, even though it was entirely built of whale

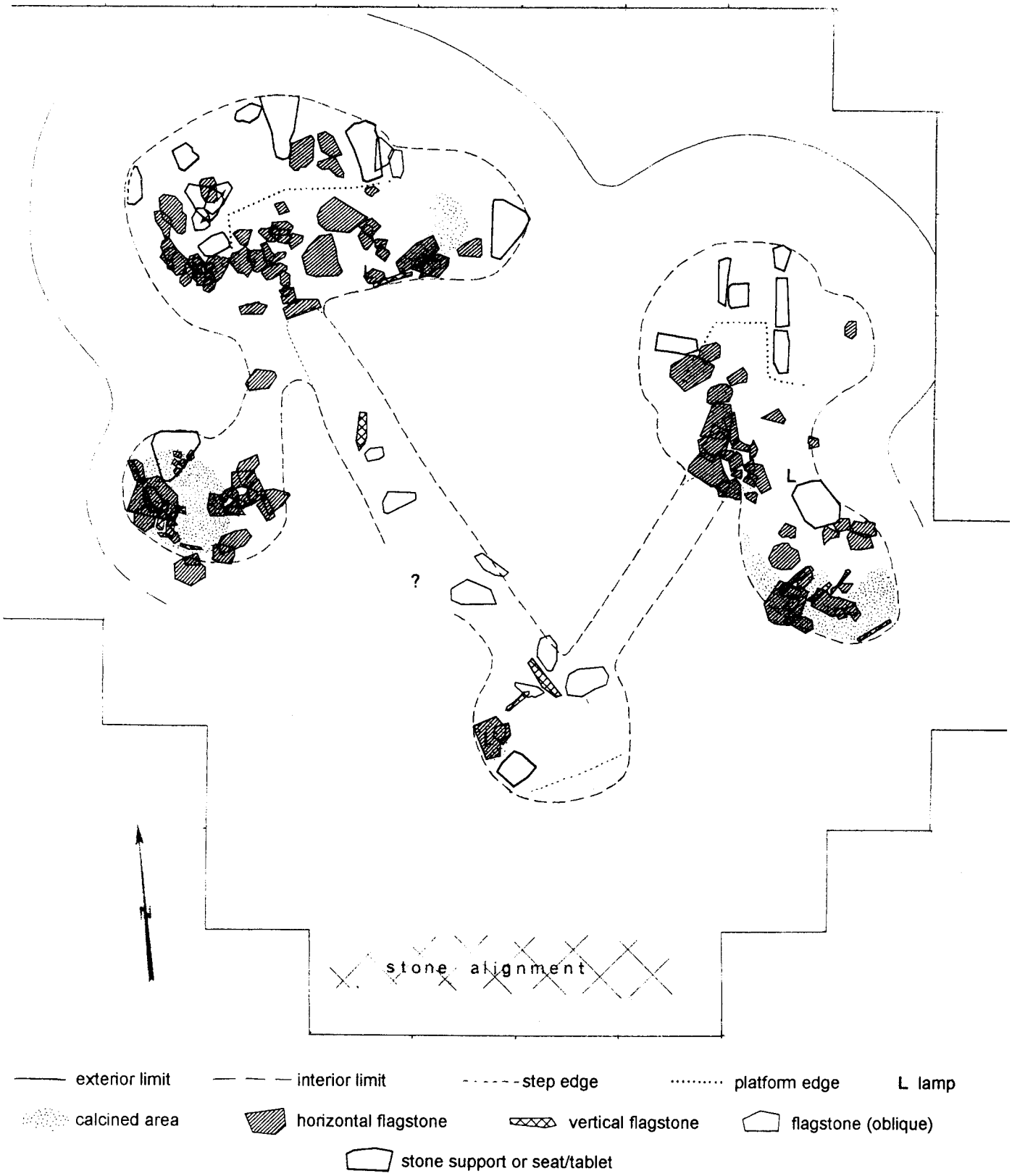

FIG. 5. H5: in situ flagstones and stone supports, seats, or tablets (Pirot and Legrand: LISH-CNRS, M. Le Mouël).

bones (McGhee, 1984a: Figs. 14, 15; Park, 1989: Figs. 9, 13). In this case, a bowhead whale mandible, which is a nearly straight bone (average length: 2.5 to 3 m; cf. McCartney and Savelle, 1993:Table 4), would have been placed across the central area just beyond the threshold, supported left and right by stone pillars forming a kind of large portico. Two bones would have been laid obliquely against this frame from the front, thus partly covering the

FIG. 6. H5-W as seen from NNW; foreground: the exhibited living space before removal of floor litter, the stone supports, the lamp placed against a vertical slab, and the threshold; to the left: the eastern alcove; to the right: the kitchen extension; due SSE: the entrance passage.

access, while one or two other mandibles would have been placed perpendicular to and on top of the first one, one end resting on the portico and the other end on the rear wall. Finally, whale ribs would have been laid on this T-shaped construction to serve as rafters. This type of superstructure could be erected on foundations with either round or quadrilateral contours.

Another reconstruction, of a very early Thule dwelling on Banks Island (Nelson River; OhRh-1), where wood seems to have been the exclusive solid building material, suggests a flat log roof over the living area and a small tent over the kitchen annex (Arnold, 1994).

A pictograph on a late Classic Thule drill bow of walrus tusk, from Uluksan, North Baffin Island, illustrates the portico roof construction (Mary-Rousselière, 1960:12–13). This very precise engraving represents hunting scenes in open water. The dwellings, grouped in small "villages" of two to five units, cannot therefore be winter dwellings, but must be tents, or perhaps *qarmat* (i.e., light dwellings on low foundations, with or without a short, cold trap entrance) occupied during fall (Savelle, 1987). A lintel is apparently fixed to two long vertical poles about halfway up. The whole device forms a frontal portico that supports the front ends of two to five very long poles, placed either parallel to each other or fanning out. The rear ends seem to rest on a fairly similar but much lower arrangement. A similar, though less detailed, representation is known from a Cumberland Sound site of the Modified Thule phase (Schledermann, 1975: Fig. 44a). The architectural principle of these tents is identical to that of the historical Greenlandic *erqulik* tents (Birket-Smith, 1924:154–158, Figs. 117–119; Gessain, 1969:174); the only difference is that in the Greenlandic habitations, the vertical elements of the doorframe do not extend above the lintel.

These representations and the reconstruction of the superstructure of the semisubterranean habitations mentioned above provide us with clues to reconstruct H5. The position of the long elements described as possible lintels, as well as that of some long logs and of post stumps in H5-E, suggests the existence of a sort of doorframe. Thus the framework would have been similar to that of the houses at Porden and Brooman Points, except that in our case the wooden elements had supplanted the cetacean bones and stone pillars. It can be supposed that a hide roofing was spread over this framework and covered by a thick insulating layer of sod.

OTHER SEMISUBTERRANEAN HABITATION STRUCTURES AT OdPp-2

House 1

The entrance passage of this feature is approximately 4.5 m long and its fur-covered floor is only slightly deepened. It rises from a circular porch towards the central area, which was scantily paved (Fig. 7). The bilobate living area has quadrilateral contours and is partly flanked by some horizontal logs and a vertical slab. The walls around the west alcove are made of stacked sterile peat and silt, some stones, and a sediment that may have been scavenged from the ruins of H8. The sediment contained many bones and some middle and late Dorset culture artifacts. In the western alcove, a carefully adjusted plank floor was laid directly on the beach gravel, over a surface of 3.75 m^2 (Fig. 8). This floor was entirely covered by a thick, insulating layer of wood shavings (Charpentier, 1984), to which some manufacturing debris may have been added during the time of occupation. Immediately in front of the northeast edge of the plank floor, traces of blubber and burnt fat indicate the probable place of a lamp.

The front and rear edges of the east alcove were delimited by a low row of oblong stones. Its floor was covered with scraps of fur, wood shavings, twigs, numerous artifacts, and an occasional flagstone. Two larger stones in this zone were tentatively interpreted as supports. To the north were two shallow pits, the external one containing various debris. Opposite the entrance and between the two alcoves was a large pit, which extended northwards beyond the limits of the living space and contained a great quantity of wood-carving debris.

A stone lintel covered the access from the living area to the kitchen. Several bear skulls placed on the south edge of the kitchen could have anchored the flaps of the kitchen tent, unless their presence is the result of a social or symbolic act, as is assumed for the use of whale crania as architectural components (Savelle, 1997).

The remaining supporting elements of the superstructure consisted of post stumps, some of them split from logs originally about 40 cm in diameter (cf. Jenness, 1922:51). Unlike the peripheral posts, which were held in place by the permafrost, the two posts placed in front of each alcove, as well as a post at the rear of the west alcove, were propped up by stones. No thick, continuous roof insulation

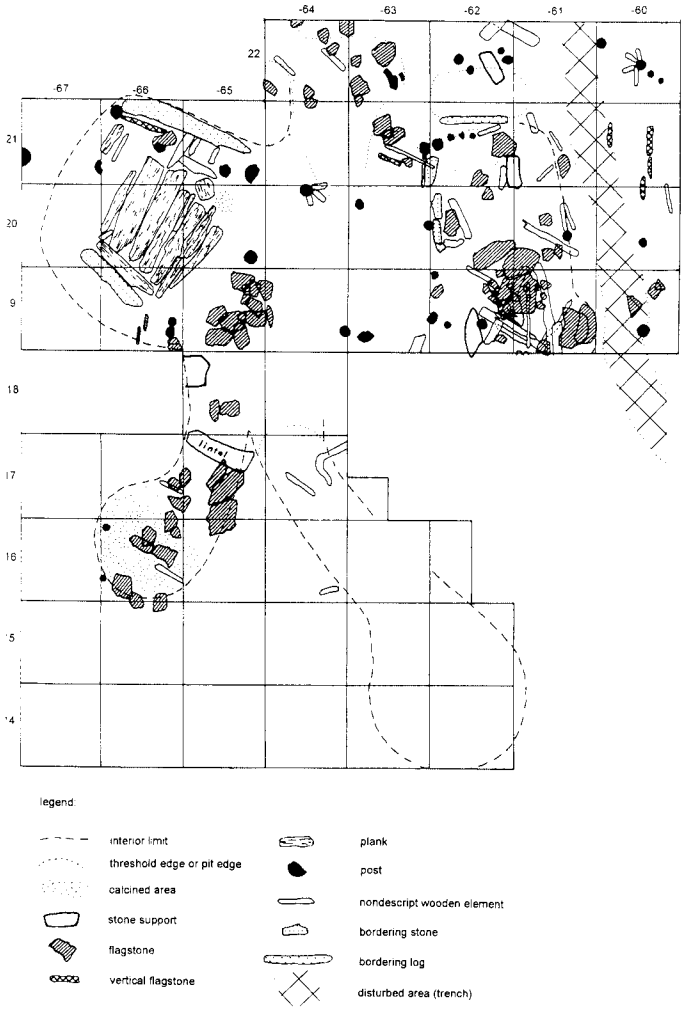

FIG. 7. H1: The structural wooden elements, flagstones, and stone supports (Pirot and Legrand: LISH-CNRS; M. Le Mouël).

was apparent, but merely some sod and stones that seemed to have been piled against the framework and later fallen down inside (cf. Fitzhugh, 1993:122–123, Fig. 15; Park, 1988:167).

In the disturbed zone beyond the east alcove of H1, a stratigraphy of three levels was detected. The loss of data in the fire made it impossible to reconstruct the original extent of the most recent, upper horizon towards the central area of H1. The second level belonged obviously to the main occupation of H1 described above, whereas the lowest, earliest horizon was in fact a small section of a complete structure named H7, partly overlapped by H1 and H2.

House 2

At this dwelling, the porch is no more than a slight widening of the short entrance passage. It is partly flanked with stones and seems to have been spanned originally by one or two stone lintels, which had obviously been recently removed.

Originally, an alcove on the east side enlarged the living space of H2, but later access to this area was walled up with

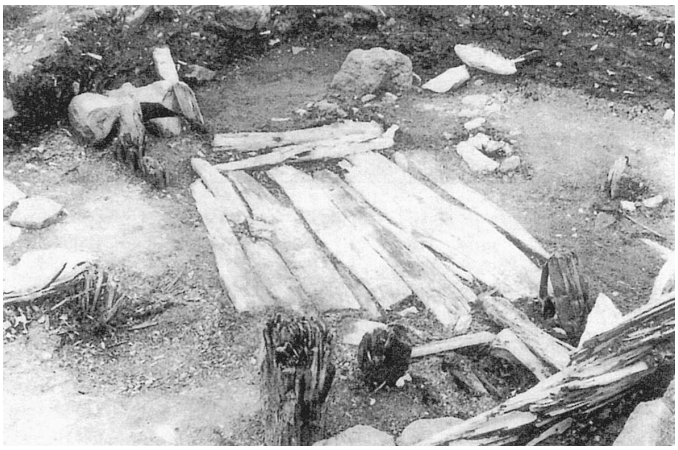

FIG. 8. The in situ plank floor of H1, seen from the north.

stones and sod, thus reducing the living space to a single room. As to the kitchen extension, situated SSW close to the entrance passage, destruction makes it impossible to define its architectural plan. A low wall made of stacked compact clods of silt and decayed vegetation, reinforced by two or three layers of stones, surrounded the rear and the northwest side of the central area. The west wall near the kitchen formed a shallow niche. Some sediment was then piled around the entire outer surround.

The central passage zone behind the threshold was covered in part by two superimposed layers of planks (Fig. 9) and elsewhere by a few flagstones. Below the planks, a fairly large pit dug into the gravel contained dismembered bones of about 100 foxes, a phenomenon that has not so far been elucidated. Burnt lamp grease and potsherds were discovered close to the entrance passage. The level of the floor rises gradually from the threshold to the rear sleeping area. Its front edge was bordered by a sort of storage box of stone, which contained a small vessel made of sewn baleen and wood. The platform consisted of several layers of fur scraps alternating with thin scatters of wood shavings and heather. Some intact artifacts and bones were also found among the layers. Below the platform layers, a flagstone covered a small pit in the gravel floor. A similar but uncovered pit was dug against the east side of this sleeping area. Both contained detritus, and the uncovered pit also contained some artifacts.

The superstructure, which seems to have included a lintel log 1.2 m long, must have rested on corner posts. Two very large gabbro slabs apparently collapsed from the house front. As in H1, only a thin layer of sediment and some stones covered the floor of the living area, precluding a thick roof insulation.

Finally, a light dwelling was set up on top of the collapsed roof of H2; it is clearly documented by the presence of some artifacts littering a trampled floor. No construction element from this secondary occupation was identified. A synoptic table of the dwellings excavated at OdPp-2 (Table 1) allows a comparison of their architectural characteristics.

TABLE 1. Synoptic table of the architectural elements and the techniques applied to the semisubterranean dwellings of OdPp-2.

Architectural Features	H-1	H-2	H-5-W	H-5-E
ACCESS	shallow semisubterranean entrance passage preceded by a porch	semisubterranean entrance passage preceded by a porch	two separate semisubterranean entrance passages preceded by a common porch; porch equipped with boulder seat (?) and lamp; (additional windbreak in front of porch?)	
LIVING SPACE				
central passage zone	sparse flagstone paving	plank floor and sparse flagstone paving	sparse flagstone paving	sparse flagstone paving
main sleeping area	**position**: lateral (west) **level**: at floor level **floor insulation**: planks covered by layer of wood shavings	**position**: opposite to access **level**: on slightly raised floor; front edge delimited by some stones **floor insulation**: gravel covered by several layers of fur	**position**: opposite to access **level**: raised platform **floor insulation**: (planks?)	**position**: opposite to access **level**: raised platform **floor insulation**: (planks?)
additional space (sleeping area, alcove or niche)	**position**: east (alcove) **level**: on slightly raised floor, (perhaps raised?); front edge delimited by some stones **floor insulation**: fur and sparse flagstones	**position**: east (alcove); west (niche) **level**: on slightly raised floor **floor insulation**: fur alternating with some fine gravel and occasional small slabs	**position**: east (alcove) **level**: at floor level **floor insulation**: ?	**position**: east (niche) **level**: on slightly raised floor **floor insulation**: without
arrangements on the floor	pit opposite to entry (wooden manufacturing debris); pit at northern edge of eastern alcove (detritus)	2 pits under main sleeping area (diverse articles, covered by slab); pit below central passage zone (ca. 100 fox skeletons, covered by plank floor); "stone box" in front of main sleeping area (vessel and diverse articles)	without	without
KITCHEN	kitchen extension with distinct access, open hearth	kitchen extension (no further information: destroyed)	kitchen extension with short, distinct entrance passage, open hearth	kitchen extension, open hearth
SUBSTRUCTURE (WALL)				
central living space	wall of stacked peat, interior partly consolidated by vertical flagstone and log; earth banked upon outside	wall of stacked peat and sod, surrounded by wall of piled stones; earth banked upon outside	wall of stacked sod (lined by some sparse posts?); exterior consolidated with some stones; earth banked upon outside	wall of stacked sod; exterior consolidated with some stones; earth banked upon outside
additional space	uncertain (overlapping of several occupation layers and partial destruction); earth banked upon outside	uncertain (overlapping of several occupation layers)	wall consisting of stones and soil; earth banked upon outside	*a*niche dug into sediment wall; stones and earth banked upon outside
kitchen	low surround of small stones, no surrounding earth	no information (destruction)	solid wall of piled stones surrounded by earth, earth banked upon outside	surround of large upright stones; no surrounding earth
SUPER-STRUCTURE (ROOF)				
central living space	central ridge beam resting on 2 posts? (two-panel roof ?); portico uncertain; light roof cover (sod and stones near periphery)	frontal portico; 1 center post and 4 corner posts (panel roof resting on portico); light roof cover (sod near periphery)	frontal portico; 4 corner posts (panel roof resting on portico); thick sod insulation covering entire roof	frontal portico; 4 corner posts (panel roof resting on portico); light insulation (thin sod cover)
additional space	uncertain: roofing resting on several posts planted at periphery (type?), light roof cover (sod and stones near periphery)	uncertain: no supporting element preserved; light roof cover (sod and stones near periphery)	4 corner posts (panel roof resting on lintel separating central space from alcove); insulation covering entire space (sods of silt, sediment, and stones)	niche covered by roofing of central space (?)
kitchen	door lintel above access; separate roof construction (light tent?)	no information	door lintel above access (?); separate roof construction (tent, with sod insulation around periphery)	door lintel above access (?); separate roof (light tent)
CONTOURS				
central living space	sub-angular	rounded	rounded	rounded
additional space	angular	uncertain	angular	rounded

Other Houses

Among the semisubterranean dwellings not excavated is H8, situated west of H1. This dwelling, of which only the rear wall is visible, has not undergone recent destruction.

Houses H3 and H4 are each equipped with a sunken porch and corridor and a kitchen extension. A large alcove with subrectangular outlines widens the bilobate house H4 to the east, whereas only one platform seems to have been installed at the rear of the small dwelling H3. A large circular porch precedes the particularly long entrance passage to H4. Surface destruction makes it impossible to know whether the kitchen extension was entered from the living space or laterally from the entrance passage.

The architectural plan of the badly destroyed dwelling H6 does not include a kitchen annex, and the short passage is not preceded by a porch. It seems that a single sleeping area had been installed at the rear of the almost square living space. Large pieces of wood scattered around this structure indicate a log superstructure. Adjoining H6, an area encircled by a low sod and stone wall could have been a light dwelling structure without an entrance passage.

FIG. 9. H-2 seen from SSW: The lower living floor and the lowest excavated level of the peat wall with surrounding stone ring. Bottom right: the plank floor; center: the stone box in front of the platform.

THE CHRONOLOGICAL AND CULTURAL POSITION OF OdPp-2

Radiocarbon dating still constitutes about the most problematic point in Thule archaeology, despite intensified research during the last fifteen years. The first difficulty is to obtain uncontaminated samples from a clear occupational context, since dwellings have been reoccupied and refurbished. The other great difficulty is regional and local variations in the reservoir effect, caused by the absorption of fossil carbon (Tauber, 1979; Arundale, 1981; Morrison, 1989; Park, 1989, 1994; Morlan, 1999). At OdPp-2, we attempted to establish a correction factor that could be added to samples from marine mammals by comparing assays from the same archaeological level. The following results should be taken with the necessary reserve, however, until further research has settled this problem. If we allow that the age obtained for caribou bones is reliable, neglecting the absorption by caribou of fossil carbon through plants (cf. Park, 1994:31, Morlan, 1999), this deviation could be as much as 650 years for the seal and 550 years for the bear. Taking into account the maximum probability, as calculated by the radiocarbon laboratory (right column of Table 2), some of the corrected assays hint at an early occupation of the Co-op site around A.D. 1000 and before. The other assays range between A.D. 1200 and the early 15th century.

Typological, technical, and stylistic analyses on arrowheads and harpoon heads complement these results and allow us to establish cultural links: A harpoon head of the Natchuk type, found in the sediment wall of H5, indicates a Birnirk culture ancestry for the early occupants of OdPp-2 (cf. Morrison, 1999). Two Thule type 2 harpoon heads (one a blank) from the lowest level of H7 share stylistic and technical traits (raised ridge decoration, rudimentary spur, tendency to concave cross section) with specimens from Nelson River and place this level in a very early Thule context, preceding Classic Thule (Le Mouël and Le Mouël, 2001). Early Classic Thule is evidenced by a great number of Thule type 2 harpoon heads (open angular socket, narrow lashing slots, weakly shouldered) from the floor of H1 and the lower horizon of the main occupation of H2. But the upper horizon of H2 yielded a specimen with grossly drilled lashing holes, a technique that emerged in the final phase of Classic Thule. The same trait, but well executed, can be observed on two Thule type 2 harpoon heads from the floor of H5, confirming the presence of this Thule phase and the transition to Modified Thule. Links with the Clachan facies of Classic Thule (Morrison, 1983a) are evidenced by at least one Clachan open-socket harpoon head found in the porch of H1.

Arrowhead types include those with round shoulders and a swollen tang as well as those with angular, slanting shoulders and bilaterally knobbed or spurred tangs. (Square shoulders are absent.) The arrowheads confirm the harpoon head analyses, but these typological-technical analyses alone do not reflect the 200-year gap in the radiocarbon dates, between A.D. 1000 and 1200. Stylistic traits on Thule type 2 harpoon heads, however, reveal the hiatus between the initial phase of the Thule expansion and the Classic Thule phase: on the two specimens from the lowest H7 horizon, stylistic elements are an integral part of the harpoon head shape (cf. Le Mouël and Le Mouël, 2001). All other harpoon heads of this type at OdPp-2 are

characterized by surface decoration consisting in a narrow, elongate inverted V decoration incised above the line hole, a widespread trait of western Canadian Classic Thule. Finally, Nuwuk/Barrow, Thule type 4, and Tasik/Modified Sicco harpoon heads confirm occupation during Classic Thule, from its early period on.

The site probably had a first occupation around A.D. 1000 (i.e., in the Medieval Warm Epoch; Lamb, 1977) by a population that reveals a Birnirk ancestry, as attested by the rudimentary lower horizon of H7 and by an isolated Natchuk harpoon head. Consequently, the Co-op site must have had a part in the initial phase of the Thule expansion. After a time span of probably 200 years, H1 and H2 had an extensive occupation. It lasted throughout the 13th century A.D. until the end of the 14th or the beginning of the 15th century, i.e., from early Classic Thule until its late phase, a phase that corresponds to a period of deteriorating climatic conditions preceding the Little Ice Age (Lamb, 1977). It is the upper horizon of the main occupation of H2 and its secondary occupation, the upper level of H7, and the single occupation of H5 that announce the end of Classic Thule. Apparently the Co-op site was abandoned before the transition to Modified Thule was achieved. No remains of the phases developing in the Central Arctic, or of those that later characterized Alaska and the Mackenzie region, were found in the excavated habitations.

THE ARCHITECTURAL CHARACTERISTICS OF OdPp-2 WITHIN THE THULE CULTURAL CONTEXT

Having thus attempted to establish a chronological and cultural frame, we are left with this question: Are the architectural traits observed at Co-op site characteristic of the Thule periods bracketed by that frame, or do they reveal a regional or local adaptation?

The Porch

The architectural tradition of protecting the access to the entrance passage by a porch can be traced back to cultures on St. Lawrence Island that are ancestral to the Thule culture. The earliest example is reported from Miyowagh H3, a house of the Old Bering Sea culture, and from Ievoghiyoq H6 and H7, of the Punuk culture (Collins, 1937). On St. Lawrence Island, this tradition could have continued until historic times (Nelson, 1899). Again we find a porch at Cape Krusenstern and at Kotzebue, not only in late Western Thule but also during the Kotzebue period, an intermediate stage preceding the historical period (H26 and H31: Giddings and Anderson, 1986; H1 and H4: VanStone, 1955).

Outside Alaska, this feature is rare. It is mentioned only for two houses at Nûgdlît (H23, H28; northwestern Greenland), a site of the Ruin Island phase, i.e., the earliest dated Thule manifestation in the eastern High Arctic. The porches at Nûgdlît are rather light, superficial constructions, and one of them shows traces of a fireplace (Holtved, 1954). On the opposite (Canadian) coast, three structures (H6, H15, and H18) at the probably contemporaneous Sverdrup site could have had a porch, according to a sketch drawing of the site (McCullough, 1989). The sketched plan of the early Thule house H4 at Nunguvik, on north Baffin Island, displays a paved space in front of the entrance passage (Mary-Rousselière, 1979), and some houses in the Clyde area seem to have had a porch (Gardner, 1979).

It is on Victoria Island itself, near the village of Holman (Sandy site/OePr-4; pers. observation, 1978) and at Minto Inlet, about 100 km north of the Co-op site (Nichol site, probably also Buliard site, McGhee, 1971), that we find this trait once again in dwellings similar to those at OdPp-2. The porches on the Minto Inlet dwellings are of a lighter construction than those at OdPp-2.

The presence of a porch or "vestibule" is well documented in ethnographic descriptions of the historic Inuit of the Central, Eastern, and High Arctic (cf. Steensby, 1910; Mathiassen, 1927a, b; Holtved, 1967; Damas, 1984: Fig. 2). Yet none of the other Thule habitations so far studied in those areas presents a sunken porch situated in front of the entrance passage like those at OdPp-2—unless they have escaped the archaeologists' attention. It is remarkable that this feature, which finds parallels in the far Western Arctic, but which is rare in the Amundsen Gulf area and the eastern High Arctic, is associated with early Thule habitations.

The Kitchen Extension

The presence of a kitchen annex is a more frequent feature, though it is generally limited to regions where a porch has been reported: usually a dwelling with a porch also has a kitchen extension (except on St. Lawrence Island). Some reports mention the coexistence of a kitchen extension with its open fire and a lamp placed inside the dwelling (Holtved, 1954; Giddings and Anderson, 1986; McCullough, 1989; Arnold, 1994; Whitridge, 1999).

In the Western Arctic, an early example of a kitchen extension is reported from the Birnirk culture house H33 at Cape Krusenstern (Giddings and Anderson, 1986). This feature is found again throughout the Western Thule, both at Cape Krusenstern and at Point Hope. As at OdPp-2, the kitchen is usually situated in the corner between the entrance passage and the living area and is reached through a short passage leading off the living area (Cape Krusenstern H4-H8 and H25a; Sisualik H1: Giddings and Anderson, 1986; Jabbertown H2: Larsen and Rainey, 1948). Sometimes this passage diverges laterally from the entrance passage (Cape Krusenstern H26 and 29, early western Thule: Giddings and Anderson, 1986), an arrangement also observed in a habitation of a forest facies of Western Thule that is contemporary with H1 and H2 at OdPp-2 (Ahteut/Kobuk River: Giddings, 1952). Finally, a kitchen annex is reported from two early Thule habitations of the

TABLE 2. Co-op site (OdPp-2) radiocarbon dates. The analyses were carried out by the Centre de faible radioactivité, C.N.R.S. - CEA, Gif-sur-Yvette, under the direction of Georgette Delibrias and Michel Fontugne.

Sample	Archaeological Context	Nature of Sample (exclusively bone)	Age BP	σ	δ13C (‰)	Cal. AD (2σ)	Approximate AD date suggested (referring to max. probabilities)
Gif-8179	H7, rudimentary lower horizon with Birnirk affiliation	*Phoca*	1670	± 40	-16.01	262, 442	1000; 1040
Gif-8433	H7, rudimentary upper horizon (on sediment wall separating H1 and H2)	*Rangifer, Canis*	630	± 70	-19.00	1266, 1417	1300; 1365
Gif-8374	H1, eastern alcove, floor	*Phoca*	1430	± 90	-16.73	431, 767	1250
Gif-8181	H1, eastern alcove, floor	*Rangifer (seal oil contaminated?)*	1420	± 70	-16.66	460, 751	640; 1290 (+ corr. factor of 650 added)
Gif-8375	H1, northern pit containing wooden debris	*Phoca*	1470	± 80	- 14.16	420, 684	1220
Gif-8434	H1, northern pit containing wooden debris	*Ursus maritimus*	1350	± 40	-15.62	622, 761	1215
Gif-8435	H1, northern pit containing wooden debris	*Ovibos(predom.), Rangifer*	520	± 50	-20.86	1307, 1450	1330; 1415
Gif-7512	H2 ancient horizon outside living area, covered by sediment wall	*Ursus maritimus*	*1560	± 65	-	570–760	940
Gif-7550	H2, rear platform, main occupation, upper horizon	*Rangifer*	*610	± 65	-	1325–1430	1340
Gif-8182	H2, rear platform, main occupation, top of lower horizon	*Rangifer*	690	± 100	-21.38	1081, 1418	1280; 1370
Gif-8180	H2 rear platform, main occupation, lower horizon	*Rangifer*	750	± 60	-20.29	1124, 1373	1265
Gif-8373	H2, eastern alcove	*Phoca*	1480	± 70	-16.27	428, 658	1230
Gif-8807	H2 eastern alcove	*Rangifer (predom.), Alopex*	840	± 40	-17.14	1056, 1257	1200
Gif-8806	H5-E, floor	*Phoca*	1270	± 40	- 15.18	672, 856	1380
Gif-8178	H5-W, detritus near entrance	*Ursus maritimus*	1310	± 40	-16.04	657, 785	1230; 1320

* Normalized by Richard Morlan (cf. web site 1999: /localc14/action.lasso).

Mackenzie Delta area, at Cache Point (Friesen, 2000) and Washout H1 (Yorga, 1980). In these Western Arctic areas, the abundance of driftwood as a potential fuel might explain the survival of the kitchen annex in certain dwellings until historic times (e.g., Petitot, 1887; Murdoch, 1892; Spencer, 1959; Slaughter, 1982; Giddings and Anderson, 1986).

In the eastern High Arctic, kitchen extensions with an open fire are associated with the Ruin Island phase: in fact, this feature is considered to be its architectural marker (Holtved, 1944; Dumond, 1977; Schledermann, 1978; McCullough, 1989). Later, the cooking space seems to have been reduced progressively to a niche, finally taking the form of a small lamp platform inside the center room (McCullough, 1989). Kitchen extensions came back into use in this area during the Inugsuk phase of early contact times (Holtved, 1954). Some early Thule dwellings of three High Arctic sites located on Bathurst and Devon Islands, Brooman Point (H7 and H10: McGhee, 1984a), Porden Point (H1, H2 and H4: Park, 1989), and Truelove Lowland (H1: Park, 1997a), are also equipped with a small kitchen annex, although it is not separated from the main room by a corridor. In the Central Arctic, however, this feature is reported only from Qariaraqyuk on South Somerset Island, where it appears with a passage (Whitridge, 1999). At lower latitudes of the Central and Eastern Arctic, no distinct kitchen annex is reported; but a niche integrated into the wall or situated in the corner between the entrance passage and the central room is reported for more recent sites, belonging to the end of Classic Thule and to Modified Thule (Malerualik/King William Island, Qilalukan/North Baffin Island, Naujan H-V: Mathiassen, 1927a and b; H-9 at KeDq-2/South Baffin Island: Maxwell, 1981; H1 at McDl-1/Cumberland Sound: Schledermann, 1975; H11 at Peale Point/Frobisher Bay: Stenton, 1987; H-9 at Talaguak/South Baffin Island: Sabo and Jacobs, 1980; Maxwell, 1981; DIA. 4/northwest Ungava Bay: Plumet, 1979; H10 at Staffe Island/northern Labrador: Fitzhugh, 1994).

Once again, we have to turn to the Amundsen Gulf region to find this architectural trait. A kitchen extension with an open fire is described for Nelson River (SE Banks Island). This site, considered to be the earliest Thule site in the area (Morrison, 1999), shows affinities with both the Ruin Island phase and the early Western Thule of Cape Krustenstern (Arnold and Stimmell, 1983; Arnold and McCullough, 1990). Finally, a few dwellings on Victoria Island and on the south coast of Amundsen Gulf are equipped with a kitchen extension (Sandy site/OePr-4, pers. observation 1978; Pembroke site, probably Jackson site: Taylor, 1972; Pearce Point: Taylor, 1990).

Again, it is notable that east of Alaska the presence of kitchen extensions is limited to the early periods of the Thule culture, both in the High Arctic (including the northern Central Arctic) and in the Amundsen Gulf area.

Floors, Platforms, and Interior Storage Features

With growing distance from areas of abundant driftwood, this material is progressively replaced by flagstone for flooring. But the placement of flooring material also

changes. In early Western Arctic Thule habitations, planks could cover the entire floor surface, or only the passage zone, or even just the sleeping area. But the limitation of slab flooring to the zone directly behind the entrance threshold, as observed at the Co-op site dwellings, is recognized as specific to early Thule sites of the Central, Eastern, and High Arctic regions, especially to the Ruin Island phase, whereas in subsequent Thule phases, the entire living space was paved (Schledermann and McCullough, 1980:836; McCullough, 1989:82). Does the early Thule partial flooring reflect occupation of shorter duration than in later Thule sites, or a different use of the floor space?

Another architectural feature used to differentiate between the Thule phases is the layout of the sleeping area. During early Thule, the sleeping area spread directly onto the floor, or, at the most, was occasionally a little higher than the central passage zone. A plank floor (Larsen and Rainey, 1948; Giddings and Anderson, 1986; Arnold, 1994; Taylor, 1972, 1988, 1989, 1990), or a layer of organic materials (e.g., twigs, baleen, or fur), or both could insulate the sleeping area from the subjacent gravel, as observed in the Western Arctic and the Amundsen/Coronation Gulf region. However, a layer of wood shavings, as in H1, is reported only from an early Birnirk dwelling at Point Barrow (Ford, 1959). More recent Thule phases are characterized by raised stone platforms supported by whale vertebrae, stones, or vertical flagstones, which covered a series of "lockers" (e.g., Schledermann, 1978; Mary-Rousselière, 1979; McCullough, 1989).

The sleeping area on ground level, found together with an insulating partial plank floor, therefore relates H1 and H2 at OdPp-2 with the early High Arctic and the Western Thule phases. The raised sleeping platforms of H5 resemble those of more recent Thule phases, as do those of the nearby Memorana site (McGhee, 1972), the Jackson site (Taylor, 1972), and the Washout site on Herschel Island (Yorga, 1980).

The question remains whether the pits in the living space, such as those observed in H1 and H2, situated in front of or below the sleeping area, are specific to a certain Thule phase. Such pits are not a very frequent feature; they have been reported from the Ruin Island phase in the eastern High Arctic (Holtved, 1954), the early Thule at Devon Island (Porden Point/RbJr-1, H4 and H7: Park, 1989), and at the west coast of Coronation Gulf (Morrison, 1983a). These pits are not to be mistaken for oil-soaked blubber or meat bins, which are usually located near the kitchen or the entrance. In the case of the Coronation Gulf feature (Clachan H1), the pit is not filled with detritus (as are those at OdPp-2, except one), but with various artifacts, including a small vessel. The sort of stone box found in front of the platform of H2 at OdPp-2, which contained a baleen cup, is apparently a very rare feature. Only one possibly similar example has been reported: a stone case covered with a slab, also containing a small wooden vessel (H8 at Porden Point – Park, 1989; perhaps also in a Ruin Island tent ring, Holtved, 1954: Fig. 26). There could be a correlation between the presence of this type of storage case or pit and the absence of raised sleeping benches built above lockers, for in H2 at OdPp-2 and in H8 at Porden Point, as well as at Clachan, the sleeping area is level with the floor.

The Ground Plan and Superstructure

Attempts at reconstruction at Brooman Point and Porden Point have demonstrated that the superstructure, of whale bone, was formed of flat or only slightly sloping panels resting on a sort of large portico. At OdPp-2, the presence of logs (interpreted as lintels) in H2 and in both parts of H5, as well as the alignment of posts in H1, would argue for a similar structure, or at least might indicate a paneled roof, whereas a dome shape can be excluded. The type of roof with a portico or a median ridge of bone or wood could have been mounted on foundations describing quadrilateral just as well as round contours, as seen once again in the examples at Brooman Point and, in historic times, in Greenland (Holtved, 1944). Rounded contours could indeed support both types of superstructure, in panels as well as in the shape of a dome, without the building material having any incidence on one or the other. Quadrilateral foundations, however, could support only a roof consisting of one or several panels, but not a dome with its rounded base. This means that Ruin Island phase dwellings with subrectangular contours, as well as those of the early Thule at Igloolik and at Staffe Island in northern Labrador (McCullough, 1989; Fitzhugh, 1994; Meldgaard, 2000), must have supported a panel roof, although their reconstruction has not been attempted. Consequently, it can seriously be assumed that dwellings of the early Thule were quite generally covered by a panel roof rather than by a dome, and that this structure was independent of the building material.

It has also been suggested (Schledermann, 1975:260–268, Fig. 48; 1976:42) that semisubterranean habitations may have evolved from the single-platform, nuclear-family house to the larger multifamily dwelling, with several contiguous platforms grouped around a common passage zone and sheltered under the same composite roof, comparable to certain snow-house compounds of the historic Inuit. The single-platform dwellings were usually built in a row at the edge of a fossil beach, while the multi-lobed dwellings were frequently scattered. As to the reasons for gathering several families together under one composite roof, economic or ecological constraints have been put forward, notably lack of fuel of both animal and vegetal origin, as a consequence of the climatic conditions of the Little Ice Age between A.D. 1550 and 1850 (Weyer, 1969:184; Schledermann, 1975:266–267; McCullough, 1989:82). This supposition was contested by Mary-Rousselière, who believed that composite habitations were reminiscent of those of ancestral Western Thule (Mary-Rousselière, 1979:57–58). Indeed, that Thule period does

present both single-platform habitations and some rare houses with several living areas—though these are not grouped around a common central zone, but occupy distinct annexes leading off the entrance passage (Larsen and Rainey, 1948; Giddings and Anderson, 1986; Arnold, 1994). On the other hand, examples in the Canadian Arctic have shown dwellings integrating one or several platforms regardless of the Thule period they belong to (e.g., Peale Point/Frobisher Bay; Stenton, 1987).

The habitations of the Co-op site present some elements of each of these characteristics: on the one hand, the alignment of dwellings H1 to H4, H7 and H8, and on the other, the isolated double house H5 and habitation H6, though these latter may have been built apart as a response to topographic constraints. As to the lateral alcove enlarging the living area, it cannot necessarily be considered a supplementary sleeping area, and it is indeed difficult to determine whether the OdPp-2 habitations should be considered nuclear-family or multifamily dwellings. The surface occupied by the alcove is smaller than that of the main central space, and artifact analyses seem to reveal a functional difference between the two areas. Probably the alcove has to be considered as a space complementary to the central area and not as an additional habitation unit. An exception may be the large eastern alcove in H1, which could represent a second distinct dwelling unit. But the creation of distinct spaces, including the separate kitchen, could also reflect a gender-specific division of labour, as Whitridge (1999) has demonstrated for early Thule whaling communities. With regard to H1, artifact analysis seems to confirm this possibility: the household alcove would be situated to the east, and the men's workshop, to the west.

To conclude, the architectural characteristics of the semisubterranean habitations at the Co-op site clearly confirm the early Thule establishment in the Amundsen Gulf area. Almost all architectural features can be linked directly with the Alaskan Western Thule to the west and the High Arctic early Classic Thule and the Ruin Island phase to the east. At the present state of analyses, however, the excavated architectural features alone do not reflect the hiatus between the occupation phases that is suggested by radiocarbon assays and harpoon head analyses. Successive refurbishing of the dwellings disturbs the occupation sequence and leaves only the most recent features as a coherent entity for interpretation. H1, however, which partly overlaps the early structure H7, is the only dwelling with propped up (i.e., not embedded) posts, which could indicate a secondary establishment on an earlier, frozen-solid horizon (unless the posts were too short to be sunken). Could the quadrilateral, bilobate, two-platform ground plan of H1 and its plank floor correspond to a structure from that earlier, initial Thule occupation, on top of which early Classic Thule people settled during the 13th century? Finally, could excavations of H7, but also of the other features at the Co-op site, fill the chronological and cultural gap and reveal a continuous occupation of the site?

AVAILABLE RAW MATERIALS, ABANDONMENT AND SCAVENGING

The availability of building materials is of considerable importance, as it determines the technical possibilities of architecture. Bowhead whale bone and driftwood provided the principal building materials for the massive Thule dwellings, because they represent a high "frame utility," in which "length and shape will be of primary concern" (cf. Savelle, 1997:871), i.e., they are indispensable elements of the superstructure of the semisubterranean dwellings. Climatic events, however, affected the temperature, sea ice conditions, winds, and ocean currents, and consequently the migration range of the bowhead whale, as well as transportation conditions and the availability of driftwood (e.g., Charpentier, 1984; McCullough, 1989:82; Eggertsson, 1994; Dyke et al., 1996).

Although today whales are occasionally sighted in Amundsen Gulf some 40 km from Naoyat, it is probable that in early Thule times the Co-op site offered no direct possibilities of hunting the bowhead whale (cf. Dyke et al., 1996, Fig.19). The distance from the site to a hypothetical bowhead foraging zone would have exceeded the supposed 10 km radius suggested by Savelle (1987:68), or even the maximum foraging radius of 17 to 20 km attained under optimum conditions by an experienced kayak paddler or umiak crew, as observed in the 1960s in West Greenland (Le Mouël, 1978:119). Furthermore, the artifact assemblage contained neither specific whaling gear nor primary whale bone refuse. The principal building material with frame utility was therefore driftwood.

Transportation conditions of driftwood may have been particularly favourable immediately before and during the Medieval Warm Epoch. Indeed, recent research yields evidence of several stormy episodes for North Alaska, one between A.D. 750 and 950 and another between A.D. 1030 and 1200 (Mason and Gerlach, 1995:122; Mason, 2000). The effects of storms on surface currents like the Beaufort Gyre (possibly even causing a reversal), and hence on the transportation conditions of driftwood, are certainly not negligible. Simultaneously, the more frequent flooding that accompanied stormy episodes (Mason 1998:289) would have eroded riverbanks and uprooted trees. These factors could have intensified the flow of driftwood floating into the study area from the Mackenzie River system, along a coastal current flowing eastward into the Amundsen Gulf area (Eggertsson, 1994: Fig. 9; Dyke et al., 1997).

Numerous early Thule sites—from the Mackenzie Delta to the continental coasts of Amundsen Gulf and Coronation Gulf as far east as Melville Sound (south of Kent Peninsula), and along the southern shores of Banks and Victoria Islands—reflect driftwood occurrence in their architecture (Noice, 1922:612; Jenness, 1923:541, Fig. 1; McGhee, 1972; Taylor, 1972, 1988, 1989, 1990; Yorga, 1980; Morrison, 1983a; Arnold, 1994), although driftwood becomes scarcer with growing distance from the Mackenzie Delta (Jenness, 1922:56).

The driftwood accumulated around the Co-op site during the centuries preceding the initial Thule expansion may already have been partially exploited by some sporadic Dorset occupants. Even so, the initial Thule immigrants must have encountered more favourable conditions of driftwood procurement than exist today. Logs of all sizes and of various qualities probably allowed the early Thule people to select appropriate material for different architectural use, just as they did for artifact use (cf. Alix, 1998, 2000). Some logs (which may have exceeded the presumed average length of 1 m, attaining a length of several metres and a diameter of 30 cm; Dyke et al., 1997:7) were used to produce planks or served (intact, or split as in H1) as supporting frame elements, in addition to less massive logs. Quantities of small, crooked, short branches, twigs, and root parts, besides probably being used as rafters and to fill gaps in the roof cover, must have played an important role as fuel.

But the driftwood stocks were obviously insufficient to build those well-insulated, snug log dwellings characteristic of the Western Arctic as far east as the Mackenzie Delta. Those dwellings, which required up to 20 trees (Mason, 1998:290), were defined by a four-post construction, an architectural model that can be traced back to Punuk and Birnirk times and was still subjacent to historic dwellings (see, e.g., Nelson, 1899; Collins, 1937; Larsen and Rainey, 1948; Giddings, 1952; VanStone, 1955; Ford, 1959; Spencer, 1959; McGhee, 1974; Stanford, 1976; Slaughter, 1982; Giddings and Anderson, 1986; Morrison, 1988, 1990; Mason, 1998). This type of construction is quite visible at H2, but here driftwood was altogether replaced by stacked peat sods and stones in the substructure, and partially replaced by slabs in the flooring.

Sod walls do not seem to have surrounded any semisubterranean Thule dwellings in the Central and Eastern Arctic, though they may have done so at the High Arctic Nûgdlît site (Holtved, 1954:27–37) and more recently in historic dwellings like those of the Sadlermiut of the northern Hudson Bay area (Taylor, 1960). Sod walls are common in the Amundsen Gulf area, e.g., on Banks Island (Stefansson, 1914:161; Mathiassen 1927b:141; Manning, 1956:27), in the western Coronation Gulf area (Morrison, 1983a), and at the nearby Memorana site (McGhee, 1972). But the double wall found at OdPp-2, built of peat sods inside and of piled stones outside, appears to be a unique technique, unless this sort of construction is inconsistently reported in the literature. Also probably underreported is the technique of turning the peat sods upside down, mentioned only for a Birnirk house at Point Barrow (Stanford, 1976:92), but still practised in Greenland in recent times (Le Mouël, 1978).

Poles are another building material that deserves our attention. There certainly was a great need for poles in architecture, not only as roof rafters, but particularly as tent poles. The Thule type of the *erqulik* tent described above required several short poles and a minimum of four or five long poles: two frontal verticals and two or three top poles. A conical tent also required at least five poles. They had to be long and solid, but at the same time sufficiently light and slender to be easily conveyable during seasonal moves. Consequently, poles must have been obtained from the continent, either through trade or in expeditions south to the tree line, as described for the historic Copper Inuit (Jenness, 1922). However, procurement of poles from standing wood may have been easier around A.D. 1000, when the tree line stretched some 90 to 100 km farther north (Bryson et al., 1965; Nichols, 1976) than it does today. Certainly, poles were more highly valued with growing distance from this source and with the progressive retreat of the tree line during the following centuries.

If poles were used in the superstructure of the semisubterranean dwellings, which is probable, they were obviously always taken along for the summer tents: not a single pole, not even a medium-size fragment, was identified in any of the dwellings studied. This means that the roof had to be partly dismantled after each season and rebuilt upon return. Could the sparse remains of what is interpreted as a light roof insulation on many Thule habitations also be the result of dismantling to extract long elements from the framework (cf. Park, 1988:167)?

This discussion of dismantling leads us to the circumstances under which dwellings were abandoned and the subsequent possibilities for scavenging architectural elements. Scavenging, a common practice among prehistoric and historic Arctic populations (e.g., Taylor, 1960; McCartney, 1979b; Slaughter, 1982:141; Park, 1988, 1997b), was not without consequences for the interpretation of the archaeological record (McGhee, 1984a). Its effect was demonstrated at Porden Point, not only with regard to architectural whale bone, the building material used at that site, but also with regard to large flagstones (Park, 1997b, 1999).

Ruling out here the case of death on the site, abandonment could be organized either with the objective of nonreturn, or with the intention to return. Whatever the circumstances, architectural elements were left behind because they were either valueless, or not needed outside their context, or impossible to remove or convey. Unless totally dismantled, the abandoned structure finally collapsed, burying all remaining elements (including valuable floor planks and slabs, or fallen logs) under a jumble of sod from the roof insulation. Only protruding elements such as posts (cf. Cinq-Mars and Pilon, 1991, front cover; Nagy, 1994: Fig. 4), large slabs, or stone lintels, could have been subject to scavenging—and these only if they were extractable and if no restriction of a social order prohibited scavenging of abandoned dwellings (cf. Hehmsoth-Le Mouël, 1999:81–82; Park, 1999:123).

In this regard, it is remarkable that the quantity of wood abandoned in the houses at OdPp-2 does not change significantly from one habitation to the other, whereas the size of the wood does. The relative abundance of large wooden elements (including planks) in H1, compared to their scarcity and even absence in H5, could be interpreted as a direct consequence of climatic events, resulting in

more or less favourable transportation and stranding conditions for driftwood during occupation of the site (see above; cf. also McCullough, 1989:82). It is equally probable that the situation in H1 is due to driftwood accumulation that preceded the arrival of the Thule people. Removal of large elements from already abandoned dwellings may have been necessary only during the more recent occupations, when the driftwood stocks were exhausted, as suggested by Park (pers. comm. 1999). Quite probably, both hypotheses combined could explain these observations.

Independent of these proposals, however, the presence of valuable construction elements—large planks in H1 and large slabs and a long log in H2—could also confirm the results of analyses that had been conducted on the state of integrity of artifacts and their position inside these dwellings (Hehmsoth-Le Mouël, 1999). These elements suggested departure with the (ultimately unrealized) intention of return, whereas the absence of such elements in H5 seemed to indicate definitive abandonment of the site, as an act of deliberate decision. In either case, what elements were abandoned? Can the archaeological record differentiate between elements of architectural value only (e.g., large stone slabs and lintels) and those that also represent value either as raw material for producing artifacts (e.g., certain parts of the whale and high-quality wood, cf. Savelle, 1997:878) or as fuel (especially in the case of wood)? The circumstances of abandoning dwellings and the consequences for the archaeological record certainly remain a complex question to investigate.

DISCUSSION AND CONCLUSIONS

The Co-op site and, more generally, the early Thule sites of the Amundsen Gulf area occupy a transitional position. Geographically, they stand between the two extremities of the Arctic, the Western Arctic and the High Arctic. Climatically, they were occupied between the relatively mild Medieval Warm Epoch and the more severe conditions of the Little Ice Age. Culturally, they fall between early Western Thule and early Canadian Thule manifestations: "The Thule occupation of Amundsen Gulf may have been largely a function of the Thule migration, a matter more of in transit parties than a significant resident population" (Morrison, 1999:149). Thule peoples occupied the Co-op site (perhaps intermittently) from A.D. 1000 to 1400, either as in transit parties, or repeatedly over a period of several years as a more residential group. During these four centuries, the architectural concept determining the form of their semisubterranean dwellings did not change significantly. The most pertinent features of this concept certainly are the kitchen extension and the panel roof (probably of the shed type) built of long, approximately straight elements and, to some degree, the lateral alcove and the entrance porch.

The technical aspects of this concept seem to have their origin in the use of wood, not only as a building material, but also as fuel, indicated by the sub-angular dwelling contours supporting a panel roof and by the installation of an open hearth in a space separated from the living area. These aspects can be traced back to early Western Thule and even to ancestral Birnirk and, regarding the entrance porch, to Punuk. The concept accompanied the Thule people during their initial migrations and their expansion across the Mackenzie Delta area into the Arctic regions of the continental and insular coasts around Amundsen Gulf, and farther into the High Arctic regions of Canada and the area around Kane Basin (Fig. 10), where whale bone and rock seem to have entirely replaced the wood. The available raw materials obviously did not necessarily and exclusively determine the shape of the dwellings, as formerly supposed (Mathiassen, 1927b: 133, 151, 153; Schledermann, 1975:260–261). Rather, they were employed and adapted in a way to conform to a pre-existing concept. Thus, Frederica de Laguna's question (1979:21; cf. Introduction) about the way Thule house roofs were built may have found at least a partial answer.

The other characteristic feature of the early Thule architectural concept, the kitchen extension with its Birnirk/Western Thule origin, seems to be the general architectural marker of the early phases of the Thule culture east of the Mackenzie Delta, comprising the initial and the early Classic phase—and not the Ruin Island phase only, as suggested in the past. At the Co-op site (and possibly also at Qariaraqyuk), this feature apparently persisted well into Classic Thule. It illustrates the mastery of thermoregulation, correlating to the lamp and other architectural features. A simultaneous but independent oxygen supply for both types of combustion was guaranteed by an interaction of certain technical parameters. These were 1) the entrance passage (taking into account the general shape, the length, breadth, depth and slope, cf. Giddings, 1952: 32); 2) the presence or absence of a double access to the living area and the kitchen extension; and 3) the way the kitchen wall and roof were insulated. Further parameters determining the quality of thermoregulation are the presence of a porch preceding the cold trap passage (at H5 even equipped with a lamp) and the creation of several levels inside the dwelling.

The installation of two functionally different, complementary modes of heating implied a selection of fuels: while any combustible matter, including detritus, was suitable to keep the open fire going (cf. Slaughter, 1982:154), only blubber could fuel the lamps. Does the coexistence of two types of heating indicate anything about the local availability of fuels? Was there abundance that favoured simultaneous, complementary heating at two different points? Or did scarcity oblige the sparing of sea-mammal oil for the lamps and the recuperation of all other types of fuel for cooking purposes, which necessitated an open fire in an annex space? Analyses of hearth residues should shed some light on these questions. Quite generally, the techniques of thermoregulation, lighting, and cooking, with regard to the availability of fuels,

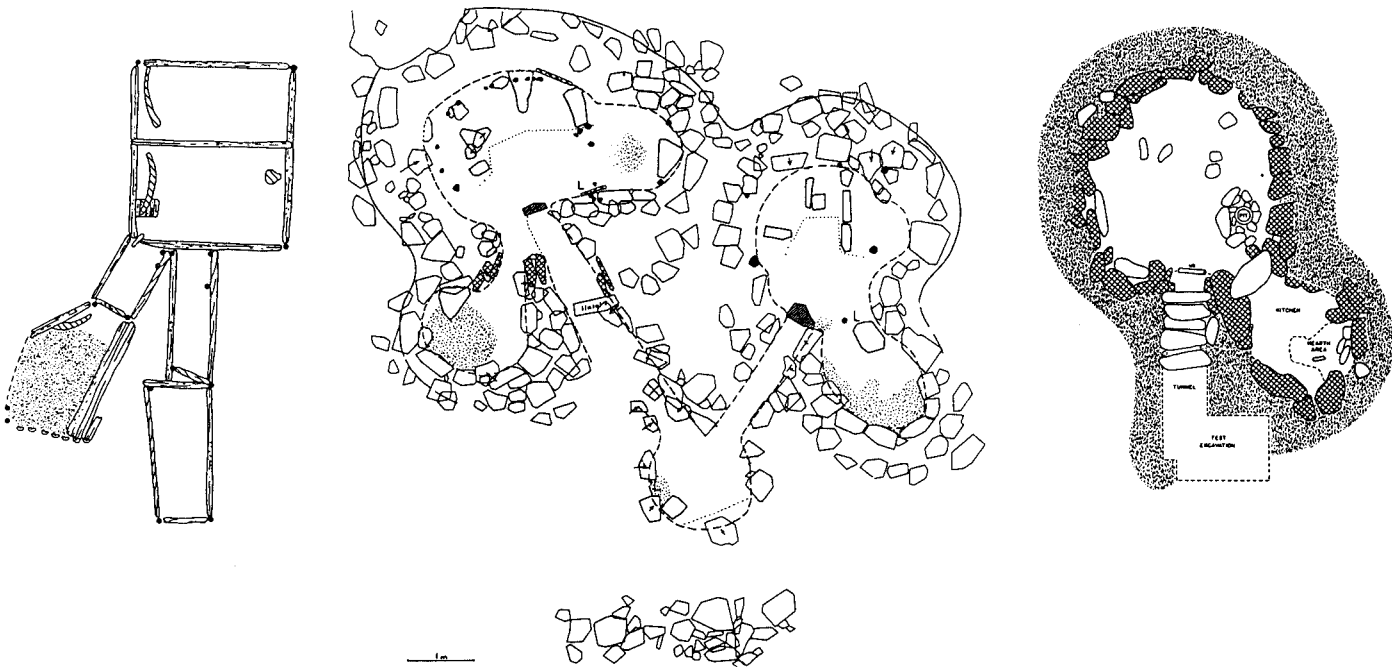

Fig. 10. Comparative representation of semisubterranean habitations of the early Thule culture. Left: Early Western Thule at Cape Krusenstern (H4 – Giddings and Anderson, 1986: Fig. 49); center: Early Thule of the Amundsen Gulf area (double house H5, Co-op site); right: Ruin Island phase of the eastern High Arctic (H6, Skraeling Island – McCullough, 1989: Fig. 22).

certainly deserve detailed and systematic analyses in the future: they may complement information about human adaptation to climatic conditions, taking local situations and seasonal variations into account. From a purely functional point of view, it indeed appears that the principal architectural plan was centred on the optimum possibilities of thermoregulation and lighting.

An interesting opposition to these technical considerations is Whitridge's proposition (1999:118–119) that the emergence of intensified whaling activities during late Birnirk-early Thule created social differences and led to gender segregation. According to him, it resulted in a spatial separation of gendered activities; that is, a displacement of the cooking area from the main living area into a separate annex, and the creation of a specific space for male labour. He yields evidence of this hypothesis through detailed artifact analyses of a Classic Thule whaling village (Whitridge, 1999, 2000). If Whitridge is right to suggest that the creation of the kitchen extension resulted from gender division within a social context of intensive whaling activities, its presence in the principally non-whaling Thule occupation of the Amundsen Gulf area (Morrison, 1983b) could demonstrate the persistence of tradition in social structures and hence in the symbolic substratum of habitation structures. Probably the separation of the cooking space from the central room during the early Thule periods reflects both a social structure based on gender division (or even segregation) and a practical solution to avoid smoke development in the living space and ignition of the driftwood structure.

Approaching the Little Ice Age and its increasingly rigorous climatic conditions, the kitchen extension was reduced to a simple niche. A decreasing supply of driftwood is thought to have forced the later Thule to depend on blubber lamps rather than on open fireplaces for cooking, heating, and lighting (McCullough, 1989:82; cf. also Eggertsson, 1994:136). The shape of the lamps apparently followed this evolution, developing from the early flat-bottomed types to those equipped with a small ridge or a row of bumps, which allowed a better control of the flame. Finally the lamp altogether replaced the open hearth as the exclusive source of heat and light. It was placed laterally near the entrance, in front of the raised sleeping platform at the rear, a spatial organization that marked the final step of this evolution.

Another consequence of the deteriorating climatic conditions and their direct effects on natural resources was the abandonment by the Thule people not only of the High Arctic, but apparently also of the whole Amundsen Gulf area. This had occurred by ca. A.D. 1400 and lasted for at least three centuries. During Modified Thule, semisubterranean habitations mark the Central and Eastern Canadian Arctic, but their type of roof remains uncertain, since no satisfactory reconstruction has been attempted. During that period, cone-shaped tents and the *erqulik*–like type may have coexisted (cf. McCartney, 1977: Pl. 35; Mathiassen, 1927a:260, Pl. 73.10; Mary-Rousselière, 1960; Schledermann, 1975: Fig. 44a), the latter persisting in Greenland until recent historic times. During the Little Ice Age, hunting strategies requiring mobility seem to have been the key to survival. They resulted in the *qarmat* and the snow house (cf. Taylor, 1972; Morrison, 1983a, b; Park, 1988). There is no evidence of the construction of snow houses at the Co-op site

(no implement for snow construction was identified), nor is there evidence of *qarmat*. These dwelling types are, however, attested in the Coronation Gulf region and on Victoria Island for the historic Copper Inuit and their immediate prehistoric ancestors.

Since the early Thule times, all these dwellings have exhibited the same spatial organization: a rear platform and a lamp placed near the entrance, a model that still determines modern Inuit tents. An anecdote may illustrate this. In 1986, at the end of the field season, the living space of H5-W was entirely exhibited, but the lamp near the threshold was protected by a large cardboard box and therefore invisible. A small group of Inuit from Holman came on a visit, among them Kuptana, an elderly man. None of them had ever seen a Thule habitation before. Arriving at H5, Kuptana positioned himself on top of the rear wall and immediately, without the slightest hesitation, started to give a very lively description of the entire house to his companions. Arriving at the cardboard box he exclaimed: "*qudleq maniipoq*!" (there is the lamp!). As to the kitchen extension, however, he wondered if this was a storage room.

The stability of technical elements (like the panel or shed type of roof, or the kitchen extension with its correlated aspects of thermoregulation) across thousands of kilometres over several centuries, and the persistence of a certain spatial organization within habitations over even a thousand years, contrast with the generally accepted idea that "migrations are strong causal factors promoting cultural change" (Arnold and McCullough, 1990:693). It rather confirms Leroi-Gourhan's remarks (1945:255–257) that "the habitation…evolves very slowly. There are two reasons for this. First, it is the environment which conditions to a great extent the structure of a house; second, due to technical inertia, for there is no point in changing the shape of a roof or a window which has proved satisfactory for centuries, unless it would be really worthwhile" (see also Giddings, 1952:33–34).

But a habitation is more than just a compound of technical elements (cf. Leroi-Gourhan, 1945:255–257) and therefore more than just a shelter: it is the intimate space of interaction of its inhabitants and, in a larger sense, a symbolic space for the social interactions of the group to which they belong (cf. Whitridge, 1999). This symbolic dimension is as much a component of the architectural concept as the technical elements. This is why a dwelling can perhaps tell more than any other cultural element about the matrix of a culture and provides an important testimony of the group's social system, even though solid evidence of a habitation is frequently reduced to its mere ground plan with its artifact scatter. Analyses of architectural features are therefore a most precious complement to other analytical methods and deserve our special attention.

On the other hand, dwellings alone will rarely, if ever, reveal anything about exchange and trade, and only exceptionally something about culture contacts, whereas analyses of movable artifacts such as harpoon heads or arrowheads are an important means (among others) to assess some aspects of the variability within the Thule cultural context, to demonstrate culture contacts, and to describe specific facies. But neither they nor radiometric analyses have to date provided a satisfactory answer to the final question. What are the connections and the chronological sequence between sites and dwellings along this route of at least 2000 km between the Amundsen Gulf area and the High Arctic, which passes through the Bathurst, Cornwallis, and Devon Island sites to the distant sites of the Ruin Island phase? Connections certainly did exist between the Amundsen Gulf area and the High Arctic, but did they operate in both directions? To date, no dwelling along this generally accepted route of the early phase of Thule expansion has proved the existence of direct links between these regions: is there a "blank area" still to be explored on the map of Thule archaeology, comparable to that of the Amundsen Gulf area almost 40 years ago? Are foot surveys indispensable, or could the techniques of remote sensing such as aerial photography (Sutherland and Roy, 1991) and satellite imagery (Houllier et al., 1998) be applied to detect the fugitive traces of a transient crossing of the 700 km that separate Victoria Island from Lancaster Sound? As Morrison (1999:147) emphasizes, it is a most inhospitable terrain.

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