HUNTER-GATHERER VARIABILITY: DEVELOPING THE MODELS FOR THE NORTHERN COASTS

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ABSTRACT. Hunter-fisher-gatherer variability has received a lot of attention. We review the key developments in the theories of variability, which have usually resulted in binary classifications. We argue that a range of variation based on the degree of territorial ownership is preferable to these classifications. HFGs of the northern coasts have only been partially explored in this way with regard to variability. A major reason for this is that such groups are coastal and use boats, so normative models of inland terrestrial foraging are not immediately applicable. We suggest that the Saxe-Goldstein hypothesis, the cautious linking of territoriality to funerary behaviour, may be a useful avenue to explore. Much work has been done by scholars of the northern coasts on boats and maritime transport, and some conclusions could be extrapolated to regions farther south.

KEYWORDS. Hunter-fisher-gatherers variability foragers collectors delayed return Saxe-Goldstein hypothesis cemetery mobility

INTRODUCTION

The socioeconomic organisation of hunter-fisher-gatherer (HFG) peoples varies greatly between different groups. This is true both among groups living on the northern coasts, and also between these groups and others in the rest of the world. A comparative approach is essential if we are to understand the reasons for such diversity. We undertake such a comparative approach here, using both the archaeological and the anthropological records.

We will argue that the implications of HFG variability on the northern coasts have not been fully integrated into more general discourses on HFGs elsewhere. It is also true that some particular aspects of theory developed elsewhere have only been partially explored with regard to the northern coasts. We will try to point out some of the benefits of cross-fertilisation. Renouf (1984, 18) defined the northern coasts as those in the temperate, subarctic and Arctic environmental zones, and we follow that definition here.

ANTHROPOLOGY: THE DEVELOPMENT OF VARIABILITY

The Nomadic Style

Since the mid-20th century, archaeology and anthropology have been faced with two conflicting ideas about HFGs. Though they overlap to some extent, their unreconciled differences have been very influential throughout the discipline.

On the one hand, Julian Steward (1955) argued that small mobile bands were the best way for HFGs to exploit areas with scattered and unreliable resources. Such areas occur in various places round the world, and HFGs organised themselves in broadly similar ways in all of them. Steward therefore rejected the 'culture area' scenario, in which degree of cultural similarity revealed ancestral relationships: since band-living HFGs in the Great Basin, the Kalahari, and Australia were patently *not* descended from a common origin, relatedness could not account for the fact that they all lived in bands. What linked them was their similar ecological setting. Economy and society had thus adapted to deal with the similar problems they faced. Steward coined the term 'culture core' to cover the aspects most closely linked to economy: these were technology and subsistence, and some social arrangements closely linked with subsistence activities. Other social arrangements were less closely linked, while religion was much less closely linked and displayed more variability (Steward 1955).

On the other hand, Elman R. Service (1962) argued that band society was the most simple and rudimentary form of human society. Service saw the global ubiquity of bands as a sign not of adaptation, but of primitiveness, stressing the:

> "…important, even astonishing, fact that we find this social structure in all major quarters of the earth and in such tremendously varying habitats as deserts, seacoasts, plains, and jungles, in tropical, polar, and temperate zones, with great variations in kinds and amounts of food, and with seasonal and yearly alterations in the supplies. This is an even better reason for thinking that the patrilocal band is early; it seems an almost inevitable kind of organization" (Service, 1962:107-8).

Steward thus took an *adaptive* view, in which band society was interesting for its own sake. Service in contrast took a *progressive* view, in which bands were interesting more for what they would change into. Service dealt with variability by ignoring it: his introductory text *The Hunters* (Service, 1966) explicitly excluded Northwest Coast societies. The definitive volume *Man the Hunter* reinforced this picture. In the introductory chapter the editors defined the 'Nomadic Style': "We make two basic assumptions about hunters and gatherers: (1) they live in small groups and (2) they move around a lot" (Lee and DeVore, 1968:11). Stemming from this was a low level of personal property – and thus an egalitarian society; fluid group membership and an absence of territoriality; and an absence of food storage. (We capitalise 'Nomadic

Style' and other definitional terms introduced below to avoid confusion with the use of these words when not referring to the designated HFG category).

The Nomadic Style definition ignored even the variability described within the *Man the Hunter* volume: Suttles (1968) and Watanabe (1968) considered the Northwest Coast and the Ainu respectively, both very different. The Nomadic Style in fact bore an uncanny resemblance to the !Kung as described by Lee in his own chapter later in the book (Lee, 1968). If the Nomadic Style played a disproportionate part in generalisations about hunter-gatherers, the !Kung played a disproportionate part in the generation of the Nomadic Style itself.

The Nomadic Style provided a simple uniformitarian view of what HFGs were like. It was adopted by many archaeologists, perhaps more enthusiastically in Europe where prehistorians are less exposed to cultural anthropology as students.

Collectors and Delayed Return

The 1980s saw the dethronement of the normative Nomadic Style. Two major typologies of HFG variability were put forward in the early 1980s. Each of these regarded the Nomadic Style as just one end of the range, the other ends comprising Collectors (Binford, 1980), and Delayed Return societies (Woodburn, 1980; 1982).

Binford (1980) coined the fundamental distinction between 'Foragers' and 'Collectors'. Foragers correspond to the Nomadic Style, involving high levels of mobility, food collection on a daily basis, and no food storage. Apart from the residential base, the only other sites created are what Binford termed 'locations', very short-lived extraction sites seeing little artifactual discard. The Collector category grew from Binford's own observations among the Nunamiut of northern Alaska. Collectors usually move to a new residential base less frequently. They are found in environments with greater spatial and temporal variation in resources. Food storage mitigates temporal variation, while logistic procurement trips mitigate spatial variation. The logistic trips involve task groups targetting a particular resource, often using outlying camps and conserving the resource in the field before transporting it back to the base. Three additional site types may thus be found: 'field camps', lived in by the task group while away from the residential base; 'stations', including observation posts, ambush points and hunting stands; and 'caches', for temporary field storage (Binford, 1980). Simplified models of these strategies are presented in Figure 1.

Woodburn (1980; 1982) divided HFG societies into 'Immediate Return' and 'Delayed Return'. The Immediate Return type corresponds to the Nomadic Style. Woodburn stressed the flexible nature of their social groups; changeable membership allows people to move to resources, and there is no mechanism such as territoriality whereby

any individual can be denied access to resources. Delayed Return groups in contrast are not egalitarian – "people hold rights over assets of some sort" (Woodburn, 1982:432), whether food stores, technological facilities such as traps, or female kin who may be bestowed in marriage on other men. This category includes groups like the Northwest Coast and the Ainu (Woodburn, 1980:98).

These classifications are not congruent. The Nomadic Style equates clearly with Binford's Foragers and Woodburn's Immediate Return, but the Collector and Delayed Return categories differ substantially. Binford stressed the logistic transport and storage of food for his Collectors, also part of Woodburn's Delayed Return scenario. Woodburn stressed social hierarchies and territorial lineages, but these played no part in Binford's definition of Collectors.

Woodburn's typology failed to deal very well with two major groups: Australian Aborigines, and (more importantly for the northern coasts) Inuit. Woodburn categorised Aborigines as Delayed Return because of their organisation into territorial lineages and male control over women, while admitting that their simple technology and lack of food storage were more similar to Immediate Return strategies (1982:108). Binford did not consider the Aborigines directly, but the lack of food transport and storage clearly identify them as Foragers. Woodburn hardly considered the Inuit; they fit very poorly into his system, being egalitarian and non-territorial and yet depending on the transport and storage of food.

It was left to Layton (1986) to tidy up the situation and provide a comprehensive categorisation. He resolved the Eskimo and Aborigine anomalies by stressing one thing: degree of control over land and its unharvested resources, and in particular the adaptive aspects of territoriality, storage and sharing.

Inuit are obliged to store. The Nunamiut for example procure 70% of their annual food supply in 30 days, and would not survive without large-scale storage (Binford, 1979). Complex technology is required to achieve this (Torrence 1983; 2001). Using the theory of territoriality put forward by Dyson-Hudson and Smith (1978), Layton points out that territorial defence is not viable in an Arctic environment with high spatial and inter-annual variability in resources. As a result territorial descent groups are absent and group membership is fluid. Food sharing is widespread, whether shortly after the kill as among Netsilik seal hunters (Balikci, 1970:133-8) and Nunamiut caribou hunters (Gubser, 1965:81-2; Binford, 1978:141-2), or after meat has been stored by individual families but some have run low (Binford, 1978:140).

Layton also dealt with the Aborigines, pointing out that the territorial lineage and the actual foraging unit are not the same. Membership of foraging bands is flexible, and there is no exclusive control over food resources. The territory claimed by the lineage is restricted to a number of sacred sites, often with a water source but far too small in area to provide all subsistence needs; what is exclusive is the ritual knowledge that

pertains to a particular part of the landscape. Ecological factors by themselves do not explain all the differences between the Aborigines and the !Kung (Layton, 1986:28), but the ritual knowledge associated with place in Australia:

> "…allows people to navigate in the bush: the mental map of criss-crossing tracks left by the heroes, each a string of sacred sites, provides a framework within which to navigate from the few visible hills to invisible water supplies" (Layton, 1986:23).

Thus settlement flexibility and food sharing are what is expected in an environment without much regular seasonal variation, while the exclusive ritual knowledge of the lineage is one way of coping with the sequential drying out of water sources.

The upshot is a four-fold typology of HFGs, expressed by Layton (2005) on a graph (fig. 2). Where there is not much seasonal variation (the lower part of the graph), groups like the !Kung, Hadza and Aborigines use simple technologies and consume food immediately. More seasonal variation, as among the Inuit and the NW Coast, requires more complex technologies to procure temporarily available resources in bulk and preserve them. On the horizontal axis, territoriality is linked to resource predictability and productivity. Towards the left, resource availability is evenly spread through the year (!Kung, Hadza), or concentrated in bursts unpredictable in time and space (Inuit). Territorial defence under either circumstance is unviable, and local descent groups therefore do not control areas of the land. Towards the right, resources occur in predictable bursts that can be harvested and stored (NW Coast salmon runs), or in hidden locations whose whereabouts are preserved in ritual knowledge (Australian water). In these areas property-owning lineages control parts of the land (Layton, 1986; 2005).

Thus (ignoring the Aborigines) both Collectors and Delayed Return collect and store food. But only among Delayed Return groups do hierarchical lineages control particular resource points, and the stores of food therefrom.

Variability on the northern coasts

Archaeologists dealing with the northern coasts have quite rightly been wary of adopting 'off the peg' models from anthropology, especially dichotomous anthropological ones such as those of Woodburn and Binford described above, or more diffuse archaeological concepts such as 'simple' versus 'complex' (e.g. Olsen, 1994:20-22; Hood, 1995). Territorial ownership by lineages emerges as of major importance among higher latitude groups in Layton's synthesis (Fig. 2). If this is treated as an axis of variation rather than a dichotomous classification, the discussion of variability can be taken further.

We start by considering groups at the extreme ends of the range of variation. The Nootka of Vancouver Island are heavily dependant on maritime resources (Drucker, 1951). The seasonally productive and predictable nature of these resources were the basis for a sophisticated Delayed Return system. The social hierarchy went from chiefs at the top to slaves at the bottom. The lineages of whom the chiefs were the heads were the land-owning units. The situation of one sub-group, the Kyuquot, is shown in fig. 3. Everyone assembled at an aggregation site for the summer, hunting sea mammals. In autumn each of the 13 lineages moved to the salmon fishing camp it owned, where large quantities of fish were harvested and preserved. At the end of the salmon season these stores were moved to the winter village, where several lineages collected. Major freight canoes could be 11-13 metres long; two could be combined into a raft, using the wall planks from the houses, and used to transport large quantities of people and goods (Drucker, 1951:83, 88). Drucker (1983:90) suggests that each lineage numbered in the region of 80-200 people. If so, the 13 lineage camps in fig. 3 would have contained between 1040 and 2600 people – a remarkable density for an area of land so small.

The Netsilik of Pelly Bay povide the antithesis. They were similarly heavily dependant on marine resources and storage (Balikci, 1968; 1970). The movements of the Arviligjuarmiut subgroup in 1919 are plotted in fig. 4. Fish from the rivers was stored and cached, as was caribou meat from the autumn hunt. The caches were revisited during winter and spring, when people were camped on the ice for seal hunting, to supplement the seal meat. Seal blubber from the spring hunt was preserved for the next winter. Extended families usually cached fish and caribou meat together. No territoriality appears to have existed, and no social hierarchy is evident (Balikci, 1970). The entire Netsilik group, not just the Arviligjuarmiut, numbered 259 people in 1923; around Pelly Bay there were just 54 people (Balikci, 1970:xxiii, 129). Resources were too scattered and unreliable to enable a Delayed Return system to emerge; the Netsilik were classic Collectors.

The two groups described could hardly be more different, even though both collected, stored, and transported food. To underline that we are considering a range of variation, it is useful to consider a group intermediate between them. The Twana are a subgroup of the Coast Salish, like the Nootka and the Netsilik heavily dependant on the storage of marine resources. Elmendorf and Kroeber (1960) state that for six to eight months of the year, people lived in dispersed campsites practicing a variety of subsistence activities. At this time there was no territoriality, and people from any winter village were free to intermingle, camp and fish anywhere. In the fall, the salmon arrived. Villages owned particular fishtraps, and individual men owned fishing places on these. Much food went into storage in the winter village, and the winter village operated as a territorial unit. The social hierarchy was well developed, and each winter village had a chief. Elmendorf's map and list of place names (Elmendorf and Kroeber, 1960:32-55) allow an impression of the settlement pattern to be gained (fig. 5). Only on the Skokomish River did a group have more than one

winter village. Elmendorf (1993:xxix) estimates the total population in 1800 as some 2600, divided up between the winter villages as shown in fig. 5. The Twana therefore display the attributes of Delayed Return, but for part of the year only.

In these three examples territorial ownership by particular lineages is, with the attendant social hierarchy, the major social variable. The range between Collectors and Delayed Return emerges clearly. Variation throughout this range has been persuasively argued by Richardson (1982) to follow the quantity and reliability of resources. Fig. 6 plots the degree of lineage ownership of resources on a north-south axis on the west coast of North America, from California to the Arctic, developed from Richardson's (1982:fig. 2) chart. Resource availability is greatest in the Coast Salish region. Storage of the productive and reliable salmon is vital for winter survival, but marine resources are productive enough during summer for lineage-based territoriality to be relaxed in this season (the Twana are in this group). To the north, resource points become less frequent but remain productive and reliable; territorial ownership therefore becomes more pronounced among the Nootka, culminating in the classic northern Northwest Coast groups: Tsimshian, Tlingit, and Haida. As resource reliability then starts to decline, the Aleut place less emphasis on the ownership of resource points, the Inuit little or none (Richardson, 1982).

Richardson's scheme is very effective in calibrating social structure against resource reliability and productivity. It provides a good starting point for the next section, in which we consider HFG variability in the archaeological record.

ARCHAEOLOGY: THE CHALLENGE OF VARIABILITY

We contend that there has been something of a disjunct between the northern (particularly the subarctic and Arctic) coasts, and much work on HFG archaeology elsewhere. There are two main reasons for this. First, most of the theoretical developments discussed above resulted from the study of subtropical savanna-zone HFGs such as the !Kung, Hadza and Aborigines. Only the category of Collectors (Binford, 1980) emerged from work in the Arctic. All too often the impression grows from this that northern coastal HFGs are 'different'. Second, northern coastal HFGs are of course just that: *coastal*. Normative models of HFG behaviour are much easier to construct for terrestrial groups – see for example fig. 1 – and even the Arctic Nunamiut are an inland group. Null hypotheses are usually based on human walking speeds and circular distributions of material. Thus while for example Kelly (1995:111-160) and Binford (2001) do consider aquatic mobility, most of their discussions are based in interior groups. Specific considerations of aquatic mobility such as that by Ames (2002) are less common. Raw material frequencies are assumed to decrease uniformly with distance from the source, unless some factor counteracts this (Renfrew, 1977). Northern coastal groups, however, living as they do on irregular coastlines and offshore islands, and moving about them and carrying raw materials in

boats, conflict with these null hypotheses from the start. The result has been that northern HFGs are often considered a category apart.

Territoriality, cemeteries, and the Saxe-Goldstein hypothesis

Territorial ownership by lineages has emerged as the most crucial social aspect of Delayed Return groups, being the major feature that distinguishes them from Collectors. Few archaeologists have however considered territoriality among HFGs on the subarctic and Arctic coasts, a major exception being the discussion of Varanger Fjord by Hodgetts (1999) based on the markedly different frequencies of dolphin and ringed seal in the various houses at the settlement of Gressbakken Nedre Vest. Since some houses have many while others have very few, this does suggest differential access to these resources.

Another approach with potentially wide application involves the treatment of the dead. Saxe (1970) defined his hypothesis 8:

> "Hypothesis #8: to the degree that corporate group rights to use and/or control crucial but restricted resources are attained and/or legitimized by means of lineal descent from the dead (i.e. lineal claims to ancestors), such groups will maintain formal disposal areas for the exclusive disposal of their dead, and conversely" (Saxe, 1970:119).

Formal disposal of the dead thus characterises territorial lineages of the kind found in Delayed Return societies (see above). The corporate local group is in effect using the presence of its ancestors in a cemetery to justify its occupation of a particular area of landscape. Goldstein (1981) tested Saxe's hypothesis against a large body of ethnographic instances, demonstrating that the correlation worked only in one direction: the presence of a cemetery indicates the presence of a unilineal descent group, but the absence of a cemetery does not necessarily mean that such a group did *not* exist. The group may legitimise its occupation by other means.

This has come to be known as the *Saxe-Goldstein hypothesis*. Keeley (1991) demonstrated a major divide between (1) HFGs in stable resource areas, with greater sedentism and higher population density; and (2) those in areas of less predictable reources, with greater mobility and lower population density (op. cit.:fig. 17.1). Only those in group 1 have corporate ineages (op. cit.:fig. 17.6). The Saxe-Goldstein hypothesis suggests that only group 1 societies will create cemeteries – though as mentioned, Goldstein (1981) shows that not all of them will do so.

The Saxe-Goldstein hypothesis has been applied to the archaeological record in various parts of the world. Pardoe (1988) considered the Late Pleistocene and Holocene cemeteries along the Murray River in Australia. The river zone has rich and relatively

stable resources, while in the surrounding scrubland they are unpredictable and scattered. Population density along the river was probably 20-40 times that of the surrounding area. Cemeteries are found only along the river, and Pardoe (1998) argues that this indicates the presence of territorial lineages. Chattopadhyaya (1996) argues similarly about the cemeteries on the River Ganges in India. Likewise Elder (2010) concludes that Late Mesolithic cemeteries in southern Scandinavian indicate a stable territorial regime.

These archaeological cemeteries all occur where the Saxe-Goldstein hypothesis predicts: where resources are stable and predictable. We therefore believe that the Saxe-Goldstein hypothesis, used with due circumspection, provides a useful tool for seeking territorial lineage groups on the northern coasts.

Archaeological cemeteries appear and also disappear in the record. The disappearance of cemeteries in a particular culture might be due to a decrease in resource reliability – which would be difficult to detect archaeologically if the resource spectrum remained unchanged – or alternatively to a change in the symbolic practices of the culture, for example choosing to legitimise terrirotiality by some means other than a cemetery.

One implication of the Saxe-Goldstein hypothesis is that even if HFGs are partially sedentary but do not claim territorial rights, they will not practice formal deposition. Some Inuit groups in North Alaska achieved a degree of permanence on the basis of marine resources, although population was fluid depending on circumstances, and no lineages exercised territorial rights (Spencer, 1959). The non-formal methods of disposal of the dead make strange reading to modern sensibilities. Ray described the situation in the 1880s:

> "The dead are carried out and laid out on the tundra without any ceremony other than the near relatives following the body to its last resting place…. With but few exceptions I never knew them to pay any attention to their dead after they were carried out…. The bodies are usually eaten by the dogs, especially in the winter, and it is no uncommon site to see them gnawing the bones on the roofs of the iglus" (Ray, 1885, in Murdoch, 1892 [1988:xcvi]).

Describing the same period, Murdoch states that:

> "The bodies are laid out upon the ground without any regular arrangement apparently, though it is difficult to be sure of this, as most of the remains have been broken up and scattered by dogs and foxes" (Murdoch, 1892[1988]:424).

By 1880, rudimentary grave boxes had recently come into use round Norton Sound, but on Kotzebue Sound "the Malemut still throw out many of their dead" (Nelson, 1899[1983:312]). At Razbinsky on the lower Yukon the graveyard was just behind the village, and became so offensive in summer that it was impossible to camp near it (op. cit.:247).

These decidedly casual disposal practices would leave no trace in the archaeological record. Alaskan mortuary behaviour has not always been so casual – there are hundreds of burials at Ipiutak, many in log coffins containing elaborate grave goods (Larsen and Rainey 1948). Could this represent a major Delayed Return society? The site remains unique; might resources have been unusually productive and reliable for the relevant period? This was certainly the case in Late Mesolithic southern Scandinavia, with cemeteries such as Skateholm (Larsson, 1989) and Vedbæk (Albrethsen and Brinch Petersen, 1976), which have been argued to reflect territorial lineages (Elder, 2010; Rowley-Conwy; 1998). Cemeteries on the other side of the Atlantic could be considered in the same way. Port au Choix (Tuck, 1976) contains 93 individuals, and there are two other areas of burials and a field camp for mortuary activities (Renouf and Bell, 2011). Rattlers Bight in Labrador has nine burial features (Fitzhugh, 2006, 58-63). Further south, Cow Point in New Brunswick has 60 (Sanger, 1973). In all there are 40 formal cemeteries from Maine and New Brunswick, just five being known from the rest of New England (Robinson, 2006). This hotspot in the Gulf of Maine suggests an area of Maritime Archaic Delayed Return, an avenue of examination that would repay further study.

Discussion of the Saxe-Goldstein hypothesis has usually focussed just on cemeteries, but there are other types of formal disposal of the dead. Stone burial mounds occur well to the north, on both sides of the Atlantic. There are two at Ballybrack, Labrador, dating from the earliest phase of the Labrador Maritime Archaic (Fitzhugh, 1978), and the major example at L'Anse Amour is similarly early (McGhee and Tuck, 1977). In the Varanger Fjord there are three burial cairns at Nyelv Nedre Vest; there are, more on other sites, and at Barsnjarga a group form a cairn cemetery separate from any settlement (Simonsen 1959:6). Like the ones at Ballybrack, the Nyelv Nedre Vest are sited prominently in the landscape, on a raised beach overlooking the sea. Renouf (1989) excavated a flat burial just below two of them. Fig. 7 plots this in relation to the nearby houses and cairns. Other Varanger Fjord sites have the bones of dismembered individuals scattered outside the entrances to the houses (Torgersen et al., 1959). It remains to be demonstrated that all these forms of corpse disposal are contemporary, but the multiplicity of forms calls to mind those of the Aleut: some people were buried in compartments off houses, others in caves, sometimes in canoes or boxes, while chiefs were embalmed (Lantis, 1970:214-17).

The Varanger Fjord cairns have apparently not been discussed with regard to territoriality except for a mention by Olsen (1994:80). It has been considered for cairns associated with the "megastructures" of the Bothnian coast of Finland. These major stone enclosures have rubble walls up to 1.5 m high, and may measure 60 m in length. They date from 4000-2000 BC, when the coast was uniquely productive (Núñez, 2009). They are in settlements containing houses and cairns, but themselves have no internal features. The site of Kastelli is shown in fig. 8. Bone is not preserved, but some features suggest the cairns were funerary and may have been territorial markers (Núñez and Okkonen, 2005:31). Cairn burials clearly differ from cemeteries of flat graves, but their elaboration

and prominence suggests that, like cemeteries, they should be approached using the Saxe-Goldstein hypothesis.

Boats, colonisation, and mobility

It is axiomatic that the HFGs of the northern coasts made great use of boats. There are no physical traces of Early Holocene boats. However, the early spread of people up the Atlantic coast of Sweden and Norway, and the occupation of offshore islands, testifies to the existence of boats of some kind (Schmitt et al., 2009; Bjerck and Zangrando, 2013; Bjerck, 2008b; 2016), though their precise nature remains controversial (Glørstad, 2013, Schmitt, 2013). Similar evidence comes from the earliest occupation of the Baltic coast of Sweden (Petterson and Wikell, 2014). The coastal focus of the earliest occupation of Labrador also clearly testifies to the presence of boats (Fitzhugh, 1978; 2006). The regular killing of large pelagic species such as killer whale (at Lystrup in Denmark – Enghoff, 2011), white-beaked dolphin (at Huseby Klev in Sweden – Hernek and Nordqvist, 1995), and swordfish in the Gulf of Maine (Sanger, 2010; Bourque, 2012) could not have been carried out without boats. Long sea voyages are attested by the occupation of the Madeleine Islands, over 80 km out in the Gulf of St. Lawrence (Dumais and Rousseau, 1986), and stone raw materials crossing the Gulf of Maine to Nova Scotia (Sanger, 1991).

Various canoe voyages, ethnographic and experimental, are listed in table 1. Compared to walking speed, the distances that can be covered are enormous. Ames (2002:36) suggests that 15-30 km would be an easy daily foraging radius, with 60 km for a one-way trip. Table 1 shows that this should be achievable at least by birchbark canoe – dugouts may be more limited. Logistic transport is massively facilitated - “weights that are daunting on foot are trivial in many boats: what is 15kg in a boat that can easily carry 2000kg?” (Ames, 2002:39). These are the very features that have led to northern coastal HFGs falling outside the normative models of HFGs put forward for lower-latitude terrestrial groups.

Colonisation north up the sea coasts appears to have been rapid on both side of the Atlantic. In Norway the west coast was deglaciated several millennia before humans arrived. Although sometimes said to be for cultural reasons (Bjerck, 2009:119), the delay has recently been argued to be because a major glacier around Oslo Fjord blocked the way; as soon as this melted, people moved in during the early postglacial (Glørstad, 2014). Colonisation of the whole coast took just 200-300 years (Bjerck, 2008a). In Labrador colonisation was also blocked by ice until well into the postglacial (Clark and Fitzhugh, 1990). A key point is that colonisation was not just a rapid event followed by stasis and regionalisation. In both cases the archaeological record testifies to continued voyaging along the coasts after the initial colonisation. In Norway (except for the area of the Early Stone Age or Komsa culture in the far north) the earlier Mesolithic was culturally fairly uniform along most of the coasts (Bjerck, 2008a:101-2; Glørstad,

2013:65), argued to be caused by high human mobility (Bjerck, 2007:19). This decreased in later periods (Bergsvik, 2001; Bjerck, 1990). In Labrador, the distinctive Ramah Bay chert is found far to the south as soon as colonisation reached the source (Fitzhugh, 2006), also suggesting high mobility.

Continuous voyaging of this kind was necessary for demographic reasons. A small colonising group would not number enough people to be reproductively viable in the long term. Moore (2001) presents various simulations showing that groups numbering below 100 are unlikely to survive in isolation. Many of the members of such a group are likely to be closely related to each other, reducing mate availability due to incest prohibition. Stochastic variation in the sex of children born will further reduce it. Even a group of 100 people reduced in population in 50% of Moore's simulations; only when such a group exchanged mates with another one of the same size, thus increasing the breeding pool to 200 people, did population increase in 90% of cases (Moore, 2001:table 8). When settlements are arranged linearly, for example along a coastline, extensive travelling between settlements would be necessary to ensure demographic survival. This travelling is what accounts for Norwegian Early Mesolithic cultural uniformity and the wide spread of Ramah chert. One study has argued that colonising societies are often matrilineal (Keegan, 2010): women formed the residential core, and in-marrying males need to keep touch with their own social group and return frequently. "The mobility of disenfranchised males promoted trading, raiding, and the exploration of new territories" (Keegan, 2010:176).

The use of boats and the likely continuous nature of travel and contact between bands is an area in which the archaeology of the northern coasts has led the way, but which has yet to be fully applied in other regions. All small human groups will face the demographic problems touched on above. Boat travel is a way of hugely enhancing both distance and payload. We suspect that canoes are often a highly underrated aspect of HFG technology, even in interior regions where movement would be on rivers or lakes. There are of course groups in areas where lack of such waterways means that boats are ruled out – and here we reiterate the over-emphasis that HFGs occupying semi-desert areas have played in the construction of our general models of HFGs. A major lesson from the northern coasts is that boating technology, even though not directly visible in the archaeological record, is likely to have been far more sophisticated than we have tended to believe. The earliest penetration of the mid-continental zones of the Americas may have been facilitated by boat. Colonisers moving north across Europe as the glaciers retreated might have moved by boat along rivers, not on foot. Tromnau (1987) has suggested that curiously worked pieces of reindeer antler from Late Palaeolithic Stellmoor in northern Germany might have been elements of frames of skin boats; the site was on a lake across which the deer probably swam, so interception by boat would have facilitated hunting (Bratlund, 1991). If the late glacial hunters were adept in the use of boats, and were not just pedestrian HFGs, this would explain why they were able to colonise the skerries of the West Swedish coast in the late glacial (Schmitt and Svedhage, 2016).

CONCLUSIONS

This discussion of the HFGs of the northern coasts has identified some ways in which these people have been cast as different to many of the groups upon whom our standard models are based. Boats, transport, and long-distance logistic movement along convoluted coastlines and offshore islands are the major factors that have led to this.

One upshot of this difference in perspective has been that some aspects of HFG theory from more southern areas have not been exploited as fully as they might with regard to the northern coasts. We have highlighted the possibility of high-latitude Delayed Return groups, and suggested the use of the Saxe-Goldstein hypothesis as a way to detect such groups. Equally, the ubiquity of boats and canoes is a key element in the archaeology of northern HFGs that some studies of more southerly groups would do well to consider – boats can access a variety of waterways and solve a lot of logistic problems, and this is often not given due consideration. If this contribution results in these ideas becoming more widely applied different areas, it has served its purpose.

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vessel type	distance (km)	time (hours)	speed (km/h)	notes	reference
(a) ethnographic					
dugout - cedar	64	'one day'	8?		Sproat, in Ames 2002:30
dugout - cedar	145	21	6.9	with wind	Eells, in Ames 2002:30
dugout - cedar	145	33	4.4		Eells, in Ames 2002:30
dugout - cedar	145	31	4.7		Eells, in Ames 2002:30
dugout - cedar	145	23	6.3	with wind	Eells, in Ames 2002:30
dugout - cedar	30	11	2.7	into gale	Kane, in Durham 1960:77
birchbark	80	'one day'	10?	average	Adney and Chapelle 1983:145
birchbark	120-130	'one day'	12-13?	exceptional	Adney and Chapelle 1983:145
birchbark	55-74	'one day'	7-9?		Marshall 1986:32
birchbark	80	'one day'	10?	sea crossing	Speck 1922:119
umiak	150	'two days'	9?	sea crossing	Petersen 1986:165
umiak	40	'one day'	5?	lake	Grønnow et al. 1983:24
(b) experimental/replicative					
dugout - elm	17	5	3.3	sea crossing	Christensen 1997:288-9
dugout - elm	15	5	3	sea crossing	Christensen et al.:1979, 94
dugout - poplar	28	5	5.6	outrigger, sail	Österholm 1997:169
dugout - poplar	50	11	4.5	outrigger	Österholm 1997:170
dugout - not stated	206	63.5	3.2	10 sea crossings	Tichy 1991:203
dugout - oak	603	161.8	3.7	36 sea crossings	Tichy 1991:203-4
birchbark	110	10	11	sea crossing	Cook 2007, 55

Table 1. Speeds and distances attained by specific ethnographic and experimental canoe voyages. For the purposes of the calculations, one day is assumed to involve 8 hours sailing.

Figure 1. Schematic maps contrasting foragers (top) with collectors (bottom), based on the discussion of Binford (1980).

Figure 2. Typology of HFGs, redrawn from Layton (2005, fig. 7.3).

Figure 3. Settlement patterns of the Kyuquot subgroup of the Nootka (redrawn from Drucker 1951:map 2). Dotted lines join the individual lineage salmon camps with the winter villages they shared.

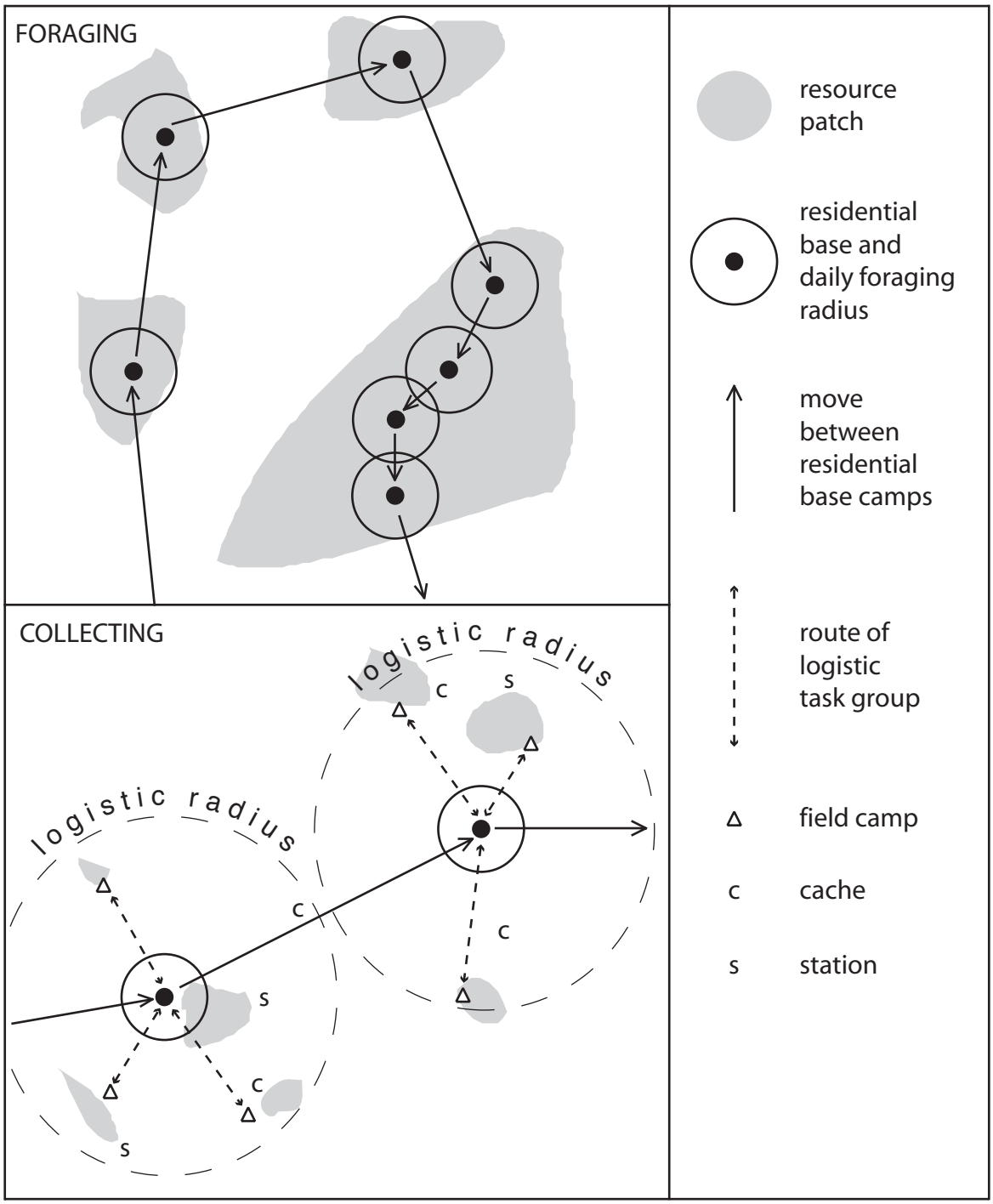
Figure 4. Settlement pattern of the Arviligjuarmiut subgroup of the Netsilik in 1919 (redrawn from Balikci 1968:fig. 1).

Figure 5. Settlement pattern of the Twana, based on Elmendorf's list and map (Elmendorf and Kroeber 1960:32-55, map between pp. 48 and 49). Population estimates for AD 1800 next to each winter village calculated from Elmendorf (1993:xxix), based on his statement that the population in 1800 would have been c. 33% greater than as recorded in 1850.

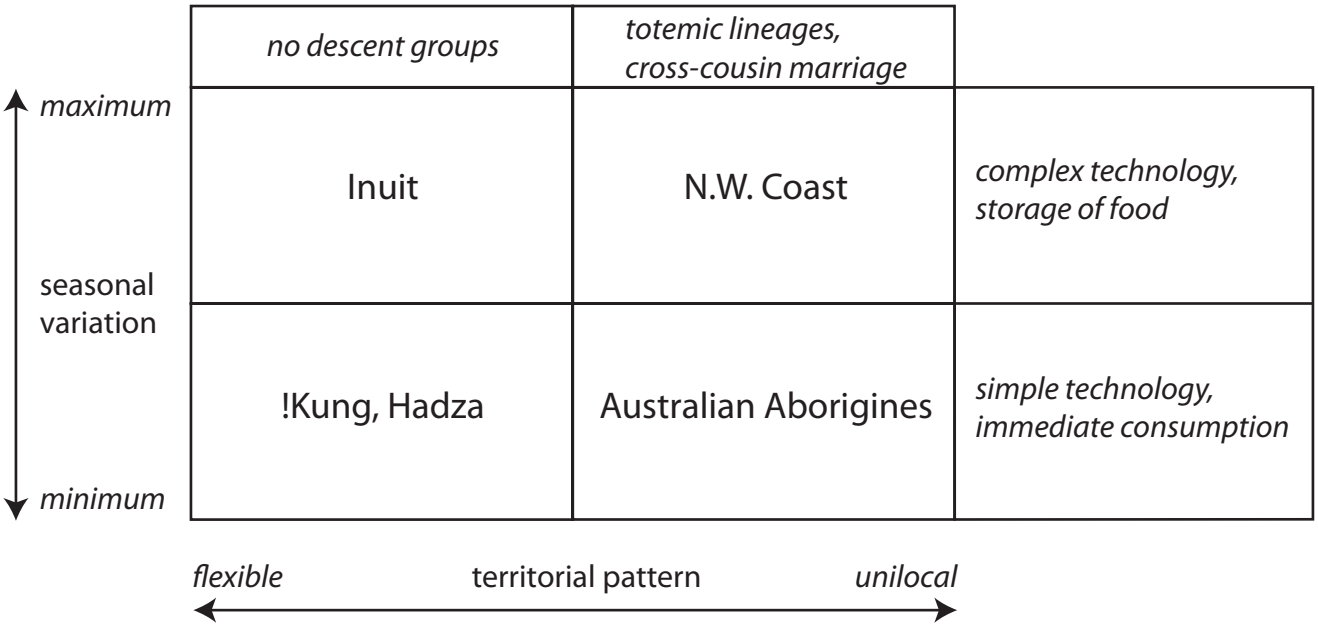
Figure 6. Graph correlating degree of resource ownership by descent groups, and latitudinal variation in resources. Based on Richardson (1982:fig. 2).

Figure 7. Plan of the southeastern part of Nyelv Nedre Vest, showing the houses, cooking pits, burial mounds, and the location of Renouf's area eleven with its burial. This map is combined from Simonsen (1961:opposite p. 397) and Renouf (1989:fig. 2 p. 66). The two plans do not agree very closely so this should just be treated as a very approximate sketchplan.

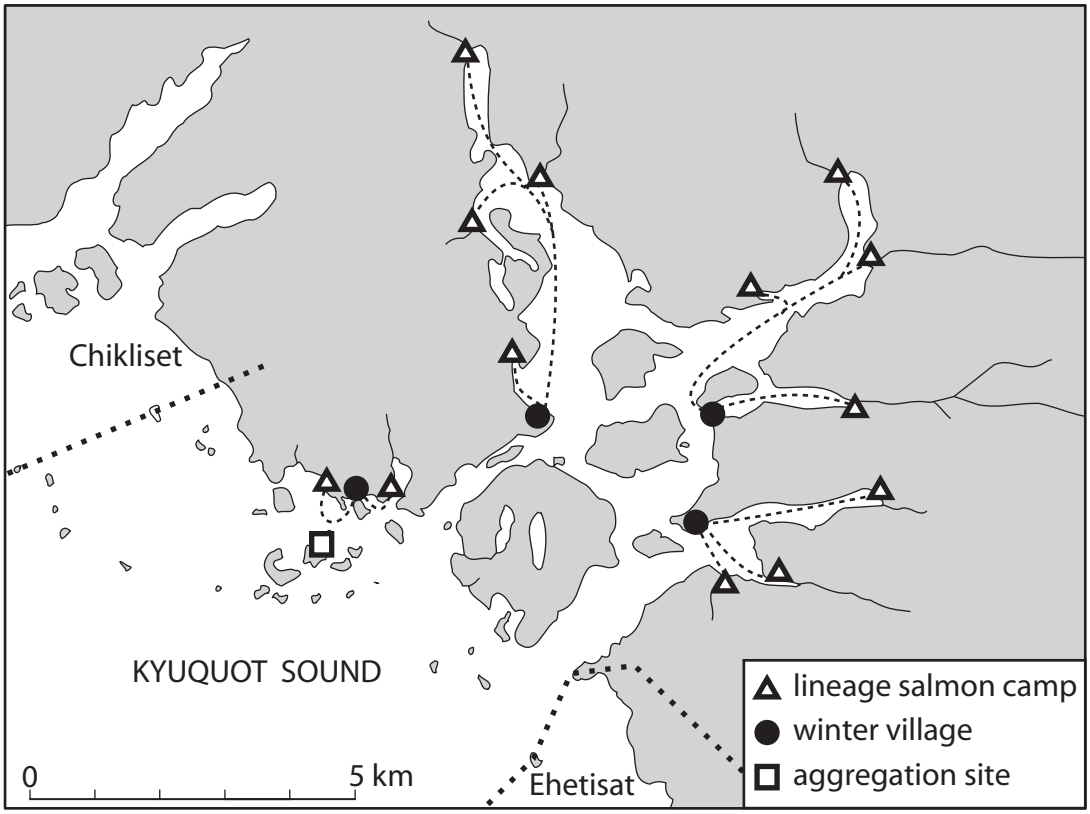
Figure 8. Plan of the Kastelli settlement in Finland, showing the numerus cairns and the contemporary seashore (redrawn from Núñez 2009:fig. 3).



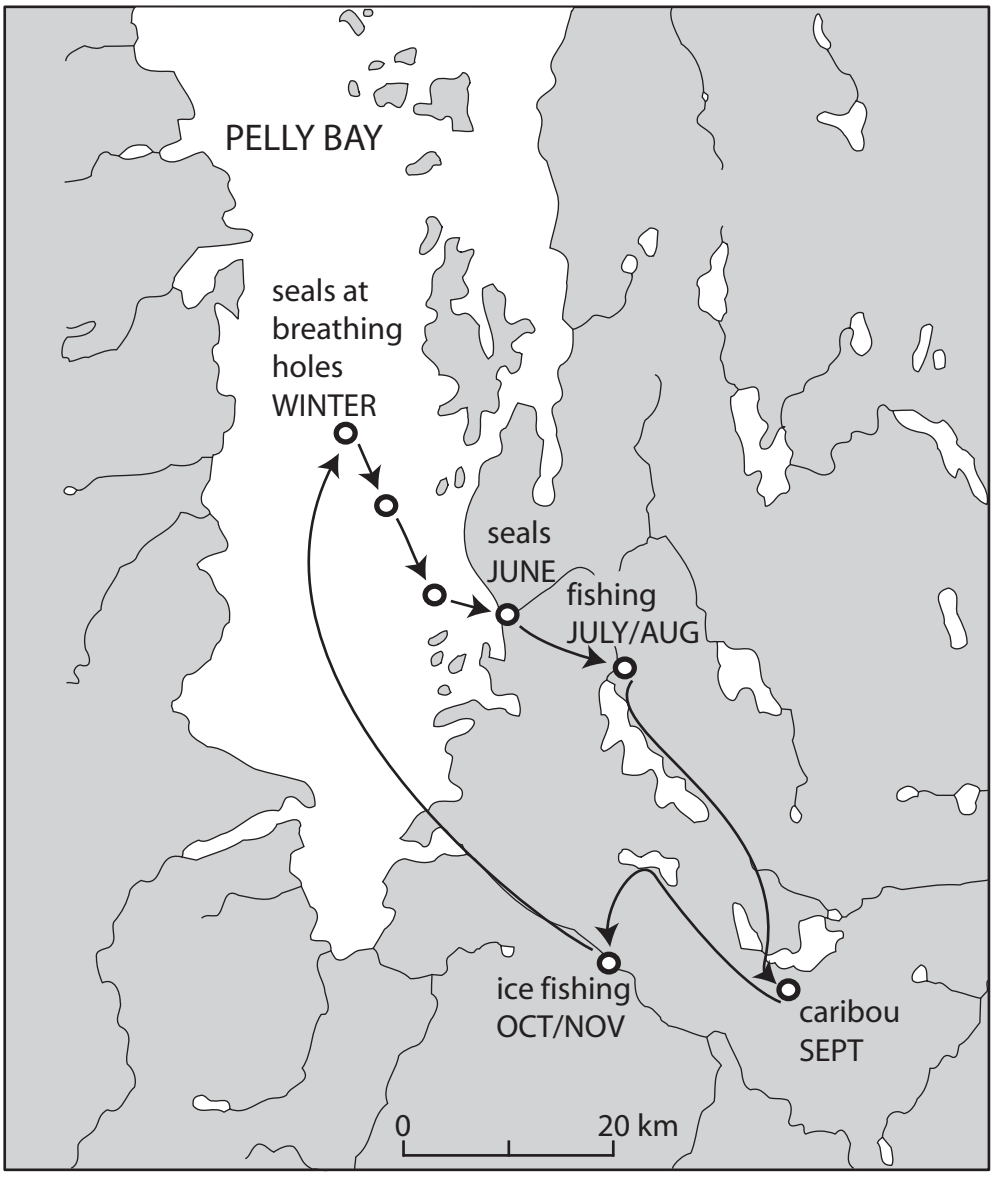
Rowley-Conwy & Piper FIG. 1



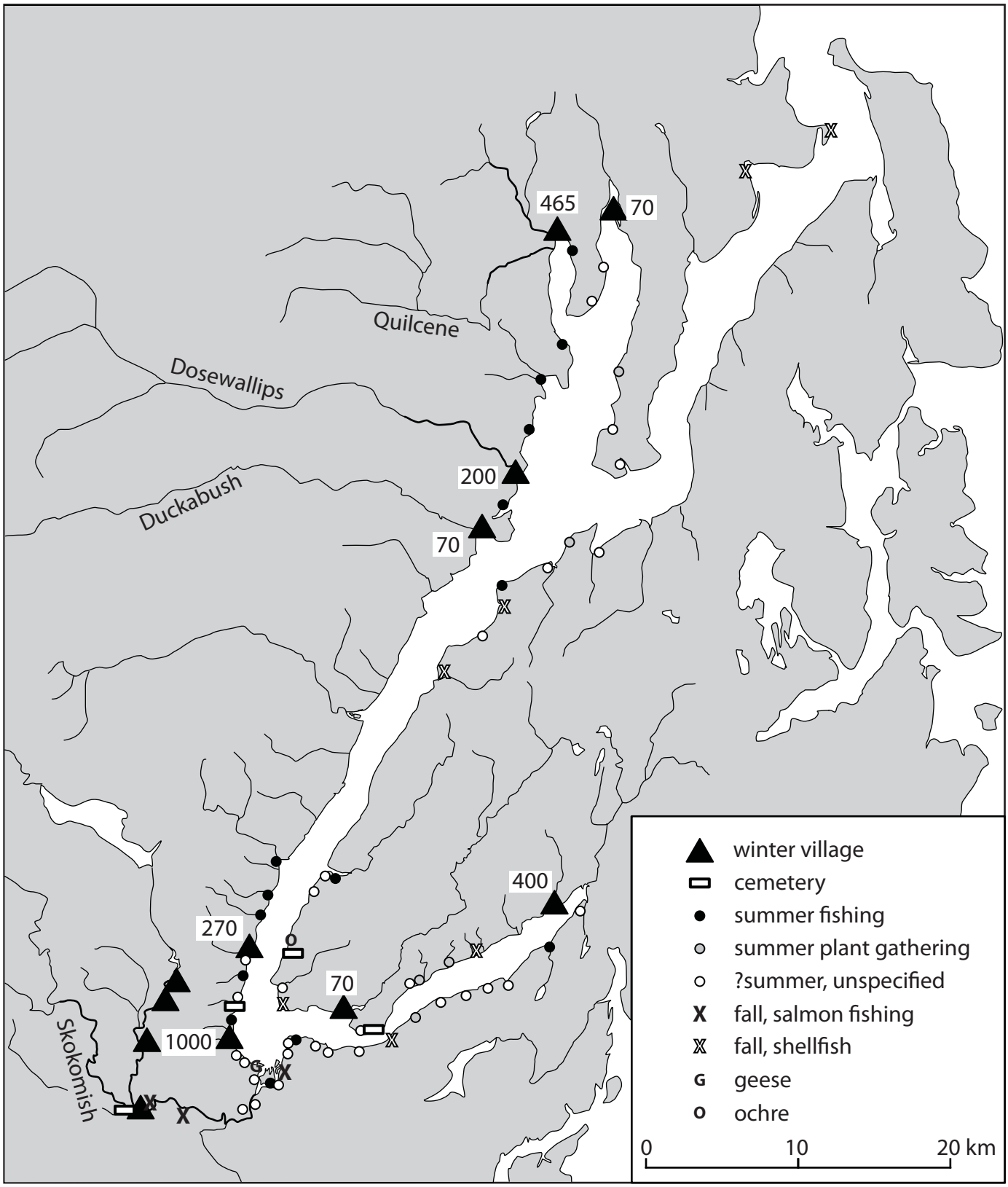
Rowley-Conwy & Piper FIG. 2



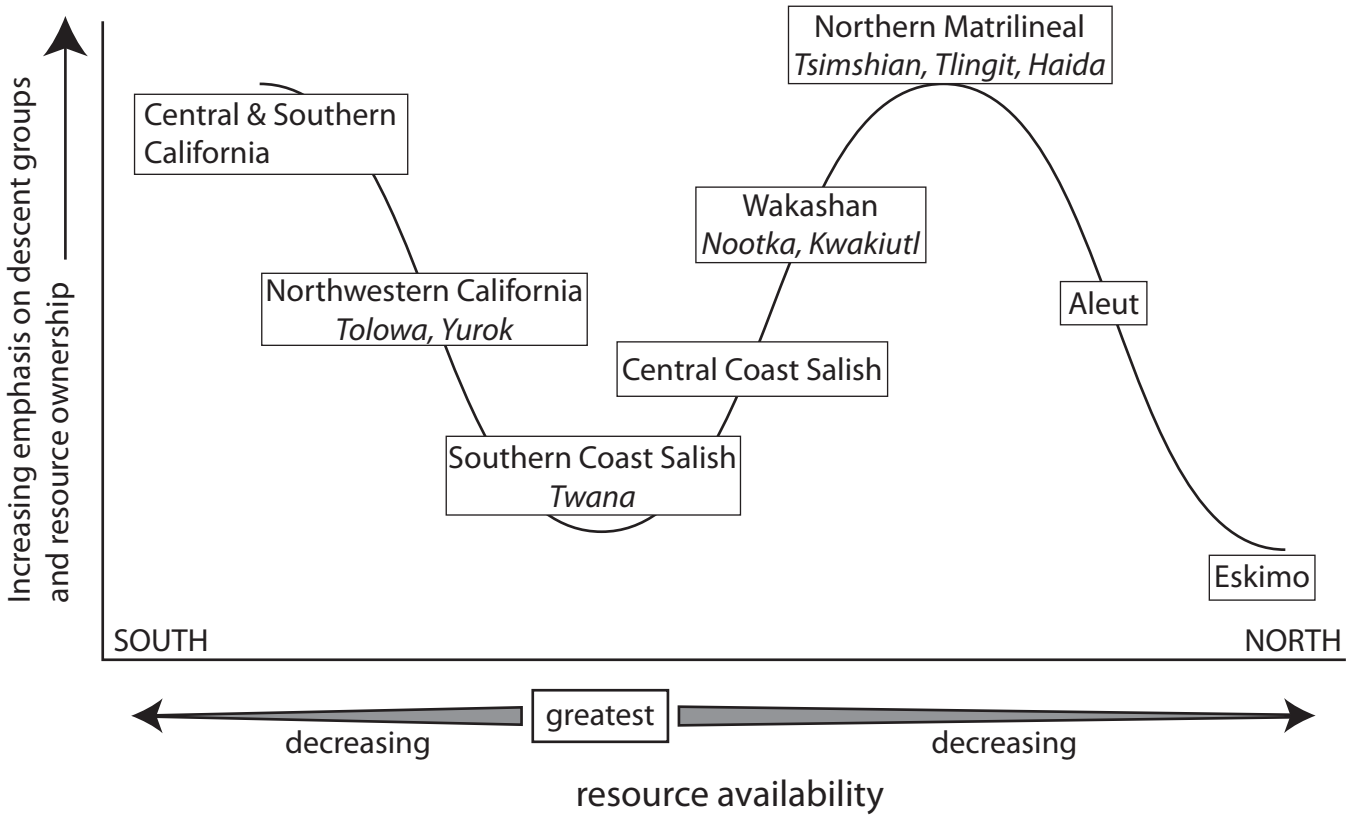
Rowley-Conwy & Piper FIG. 3



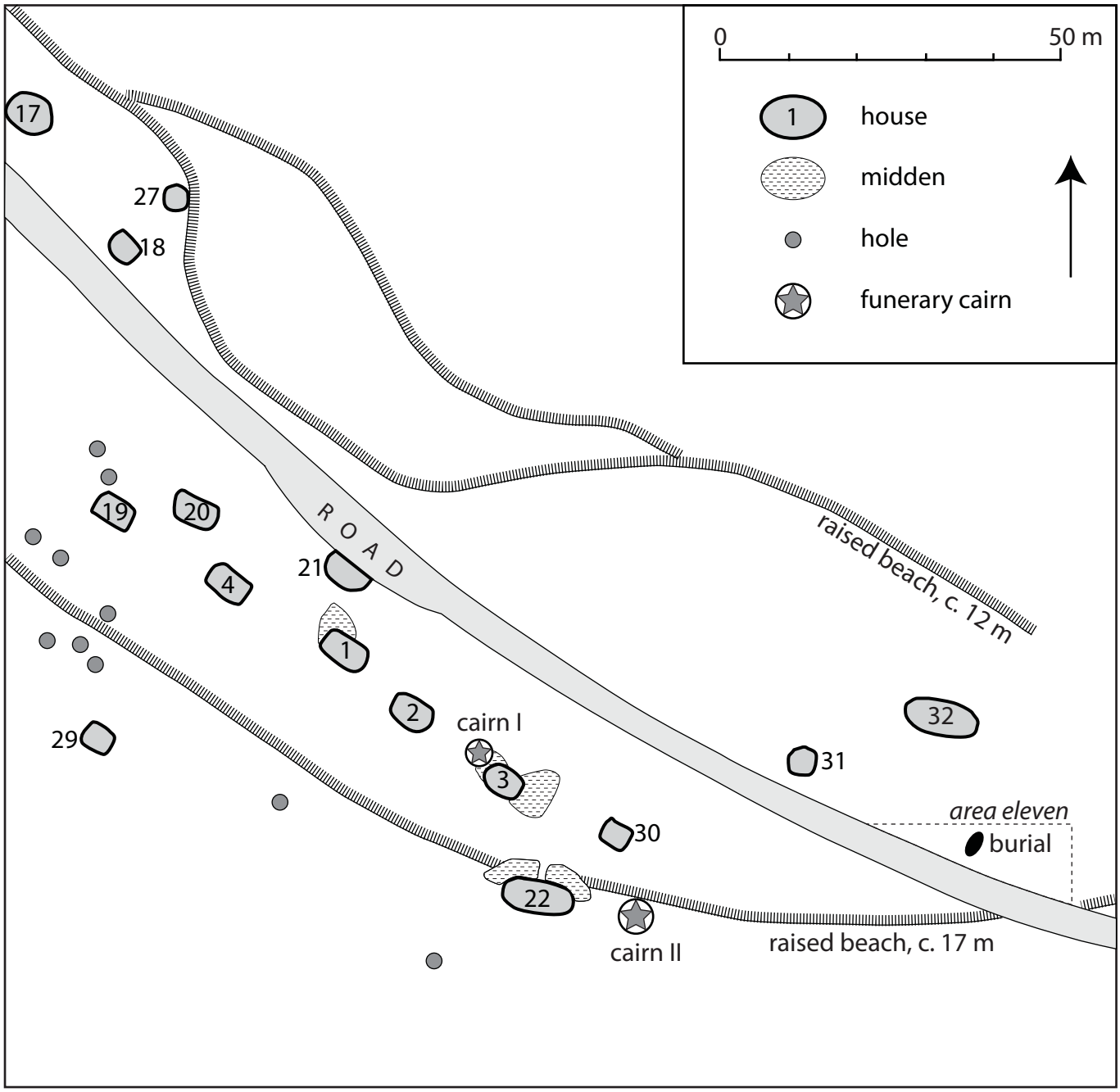
Rowley-Conwy & Piper FIG. 4



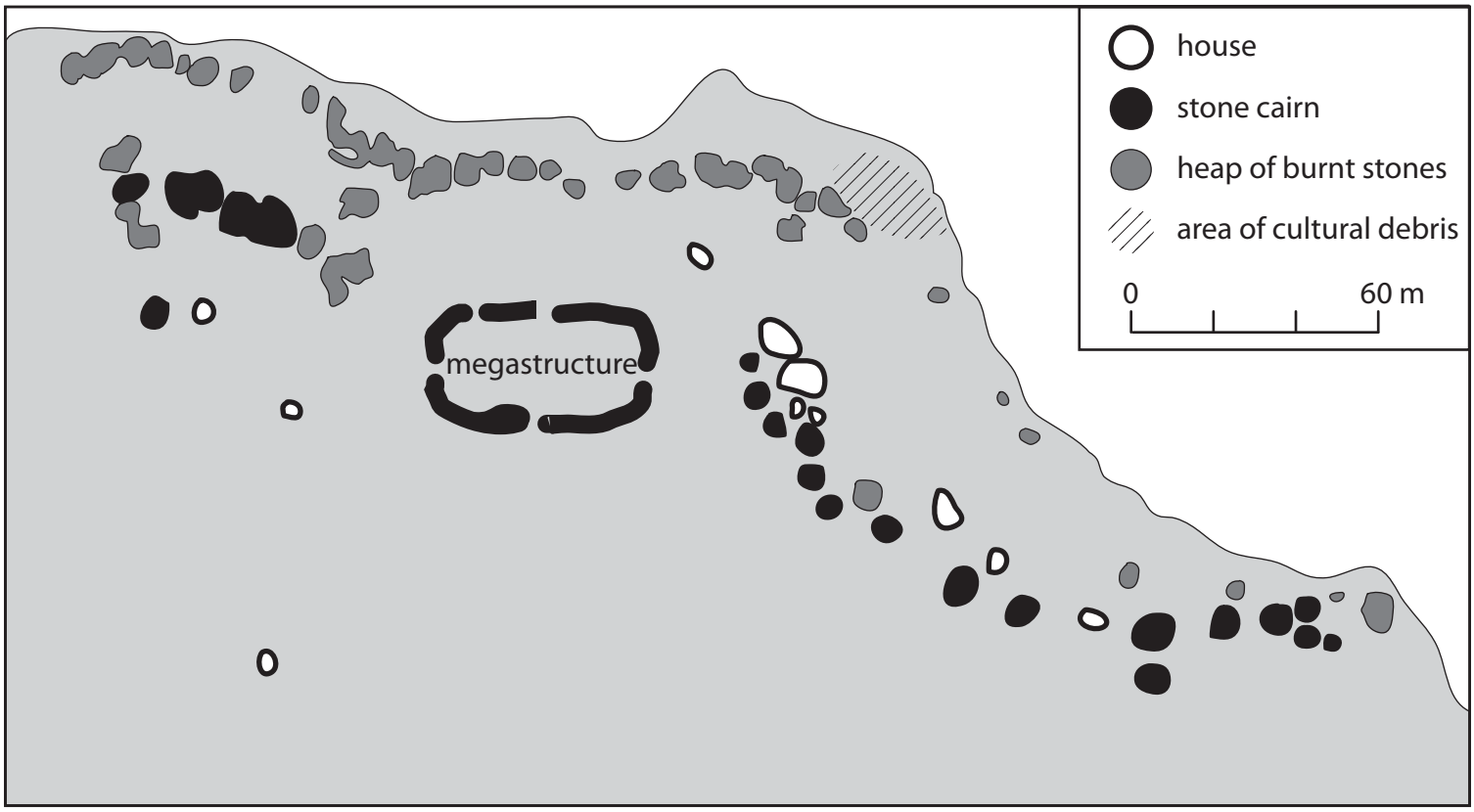
Rowley-Conwy & Piper FIG. 5



Rowley-Conwy & Piper FIG. 6



Rowley-Conwy & Piper FIG. 7



Rowley-Conwy & Piper FIG. 8