Gender and Spatial Analysis: An Eastern Thule Example

Thesis submitted to the Faculty of Graduate Studies
in partial fulfillment of the requirements of a Master of Arts Degree

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ABSTRACT

This thesis explores the utility of spatial analysis, specifically K-means spatial analysis, as a means for examining the physical manifestations of gender relationships. The contexts in which this was explored was two Eastern Thule houses, Staffe Island House 10 in Labrador and Tungatsivvik House 6 on Baffin Island. The Thule were chosen as a test case because of their ancestral and material culture relationship with the Inuit, a group for which information about gender roles and their relationship to material culture is abundant.

This research develops two possible models of gendered spatial relationships, and compares the results of the K-means analysis with those models to create a picture of Thule gender interactions.

The K-means analysis, and subsequent significance tests of the artifact clusters identified, indicated that no gender exclusive space were present hence workspace must have been shared. This has been interpreted to mean that Thule gender roles were co-operative, hence expressing gender difference was not as important as completing the tasks necessary for survival.

K-means is therefore a useful means of identifying gender space use patterns in households and can be applied widely on other sites for this same purpose.

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Finally, I would like to dedicate my thesis to my Uncle Gerald (Lyn) Hennebury (1948-1998) who, through example, reminded me that a full life includes at least as much play as work.

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ABBREVIATIONS

blk	black
bld	blade
drld	drilled
endbld	endblade
frshft	foreshaft
frag	fragment
gr	grey
grn	green
hlder	holder
mpiece	mouthpiece
p	piece
plshd	polished
pt	point
s-barb, sbrb	side barb
scp	scoop
scrpr	scraper
soapstn	soapstone
wrkd	worked

Chapter One - Introduction

1.1 Introduction

The overarching goal of this research is to explore the utility of spatial analysis as a means of identifying gender related spatial patterning in households. The specific context in which this is explored is Baffin Island and Labrador Thule households. The Thule, the ancestors of the Inuit, lived all across the Canadian Arctic and in Greenland. They entered Labrador around seven hundred years ago (Fitzhugh 1994:239), and pursued a subsistence strategy that included the exploitation of both sea and land resources (Schledermann 1971) (chapter three). These households will be examined and interpreted using an analogy based on both cross-cultural gendered spatial patterning and Historic Inuit gender roles related to subsistence.

One of the primary problems with conducting engendered research in archaeological contexts is that there are no clear methods for doing so. Thus, despite the importance of gender as an analytical category (Conkey and Gero 1991), few researchers explicitly consider gender. Research that does explicitly consider gender can be subjective and difficult to apply on more than one site. In order to be widely applicable, any method for engendered interpretation that is developed must meet at least three criteria. The method must be applicable to a number of sites, with varying degrees of preservation. It must have no area or collection size limitations. Finally, it must incorporate our current understanding of gender and have the potential for incorporating new information, as it becomes available. This research outlines one such method (for specifics see chapter five).

For the present, the method developed in this thesis is useful only on sites with ethnographically known counterparts. However, once it has been used successfully on a number of sites it may be possible to establish a frame of reference for studying sites not linked to ethnographically known groups. This frame of reference could be used to open inquiry about the explanatory value of gender constructions when interpreting prehistoric sites.

1.2 Gender and Gendered Use of Space

One of the most basic issues when developing a method to study gender is how to establish a connection between the gender concepts of the past and the material culture excavated at an archaeological site. This is normally achieved by examining grave goods or artistic representation to identify men's artifacts and women's artifacts. The differential distribution of those engendered artifacts on a site is then used to determine the nature of gender relations among its occupants (Hastorf 1991:133). Unfortunately, some archaeological sites do not have accompanying graves and for those that do, assuming a relationship between the potentially symbolic function of grave goods and more mundane uses of artifacts introduces a potential source of error into the discussion.

Therefore, a method for studying gender should not rely on features (or artifact types), such as graves or grave goods, which are not present on every site. A successful method should be based on more mundane evidence present at every archaeological site, namely, the spatial patterning of artifacts. Our discussion must begin by establishing a connection between gender constructions and artifacts, features and their spatial distribution. These connections will be explored in chapter two.

An example of the use of spatial analysis to study social relationships can be seen in Grier and Savelle's (1994) study of Thule whaling sites in the Canadian Arctic. Grier and Savelle (1994) hypothesise that the internal structure of Thule living sites was influenced by the communal nature of whale hunts. They tested their hypothesis through a spatial analysis of a sample of sites and discovered that sites located in areas with the strongest dependence on whaling displayed more internal spatial cohesion than sites outside those areas. This illustrates how the social organisation necessary for economic survival can be reflected in a site's spatial organisation. The authors recommend the use of spatial analysis as a tool for studying other aspects of Thule social organisation (1994:96).

Grier and Savelle's research suggests that the Thule are a good potential group for studying gender through the analysis of gendered space as outlined above.

1.3 Division of Labour and Spatial Correlates

The social organisation of any culture includes many different categories of behaviour that allow a group to maintain itself, physically, socially and culturally (Murphy 1986:46-47, Kus 1983:281). It includes conceptual categories such as gender, which is a cultural construction of appropriate roles and behaviours for males or females (Conkey and Gero 1991:8). It also includes more tangible categories such as subsistence behaviour (and economic roles). Effective exploitation of any environment requires a great deal of organisation, and decisions about labour division and location are vital to a group's survival (Conkey and Gero 1991; Hastorf 1991; Oswald 1987).

One common means of organising a group's economic activities in hunter-gatherer societies is to assign tasks by gender. A gendered division of labour is one in which a particular activity or set of activities is considered the domain of a particular gender (Conkey and Gero 1991:8-10) (for further discussion see chapter two). Assigning tasks in this manner ensures the completion of necessary tasks, by making them part of the fabric of gender identity. Meaning is therefore attached to the economic activity above and beyond its basic function in subsistence.

Having established a connection between the organisational categories of subsistence and gender, it is possible to begin establishing the connection between spatial organisation and those categories and this is explored in chapter three. As mentioned above, when a group's labour is organised it is also (consciously or unconsciously) assigned to a particular area. In groups with a gendered division of labour, tasks are assigned based on gender, and space is assigned accordingly. This means that the space assigned to a particular activity is also related to the gender performing that activity.

By determining the size and location of the space utilised for a particular, gender specific activity (this space may be exclusive or non-exclusive), a researcher can determine the spatial location of a particular gender while performing the activity. If a number of such activities can be located, this information can, in turn, be used to discuss the gender relationships within a particular cultural group through an analysis and comparison of the extent, dimensions and nature of its gendered spaces.

Ethnographic information is a vital tool when attempting to determine the gender constructions of a cultural group (Conkey and Gero 1991:18). It is, therefore, necessary for a researcher using the method outlined above to obtain ethnographic information about the group under study, or of a closely related group, in order to establish a connection between a particular gender, its activities and the spatial location of those gendered activities. Only after this connection has been revealed can such a discussion of gender relations take place.

1.4 Methodology for the Study of Gendered Use of Space

To avoid a haphazard use of spatial evidence to study gender it is important to establish a clear and replicable method for its use. This research establishes one such method. The research begins with a discussion of the relationship between gender and space (chapter two), which concludes that it is possible to define gender relationships through analysis of the spatial patterning of artifacts within sites. This is followed (in chapter three) by a brief description of the Inuit cultural attributes that relate to the information available about the Thule. The description of these cultural attributes allows the researcher to develop models of gendered use of space on Thule sites. Chapter four outlines the different spatial analysis techniques available for this research and establishes that K-means is the most suitable for this research problem. Chapter five discusses the methodology followed in testing the models of Thule gendered space use. The test results are described in chapter six, and interpreted in chapter seven. Chapter eight concludes with a statement of the implications of this research, the limitations of the method, and the k-means technique and finally gives suggestions for further research.

Thule sites were chosen for this research because a close relationship exists between the Thule and their ethnographically known descendants, the Inuit. The links between these two groups, described in chapter three, enable the researcher to establish the connection between gender constructions, gendered tasks and gendered tools necessary for studying gender on prehistoric Thule sites. The primary and secondary ethnographic sources consulted for this research mention that the gendered division of labour was very clear among the Historic Inuit, with men and women each having very specific and co-operative economic roles to perform. Thus, information regarding gender roles among the Inuit is readily available. The Thule tools from each site are assigned a gender based on analogy with Inuit tools with similar functions.

The spatial distribution of the Thule tools in the two target sites is examined using the K-means technique. K-means is a heuristic spatial analysis technique that examines point data for clustering (Kintigh and Ammerman 1982). The use of an objective, statistically based technique for identifying spatial relationships is recommended because visual inspections are not always reliable or replicable (Kintigh 1987).

1.5 The archaeological sites

Staffe Island (Fitzhugh 1994) is located in Northern Labrador, near Killenek Island and Cape Kakkiviak (Figure 1.1). It was test pitted in 1978 and was fully excavated by Fitzhugh in 1989. This site contains one of the largest Neo-Eskimo sites in Northern Labrador and the only published, fully excavated, Thule house in Labrador (Fitzhugh 1994:240). This house, referred to as House Ten by the excavators, is a fairly typical Thule semi-subterranean dwelling which appears to have been occupied in the late winter and early spring (Fitzhugh 1994:258).

Tungatsivvik is located on Southern Baffin Island (Rigby and Stenton 1995), at the head of Peterson Inlet about ten kilometres west of Iqaluit (Figure 1.1). The site was excavated by Douglas Stenton and Bruce Rigby beginning in 1994 and contains one hundred features. This research utilises the collection from House Six, a semi-subterranean Thule house (Rigby and Stenton 1995:49). Tungatsivvik would have been a vital location during both summer and winter, according to the archaeologists (Rigby and Stenton 1995:49-51), House Six is one of the winter dwellings.

1.6 Conclusion

The analysis does not end with the identification of spatial relationships of gendered tools but is followed by an interpretation of the implications of the spatial arrangements (Kintigh 1987). In this case, the interpretation of gendered use of space on the sites which is explored in chapter seven.

The interpretation of spatial patterning in the target sites is conducted with the understanding that the archaeological evidence has undergone post-depositional processes that may have altered the original distribution and associations of tools (Carr 1984: 117,191). Discrete activity areas, or even gendered areas containing many activities are unlikely to be intact: thus interpretation must proceed with caution and include a consideration of post-depositional processes.

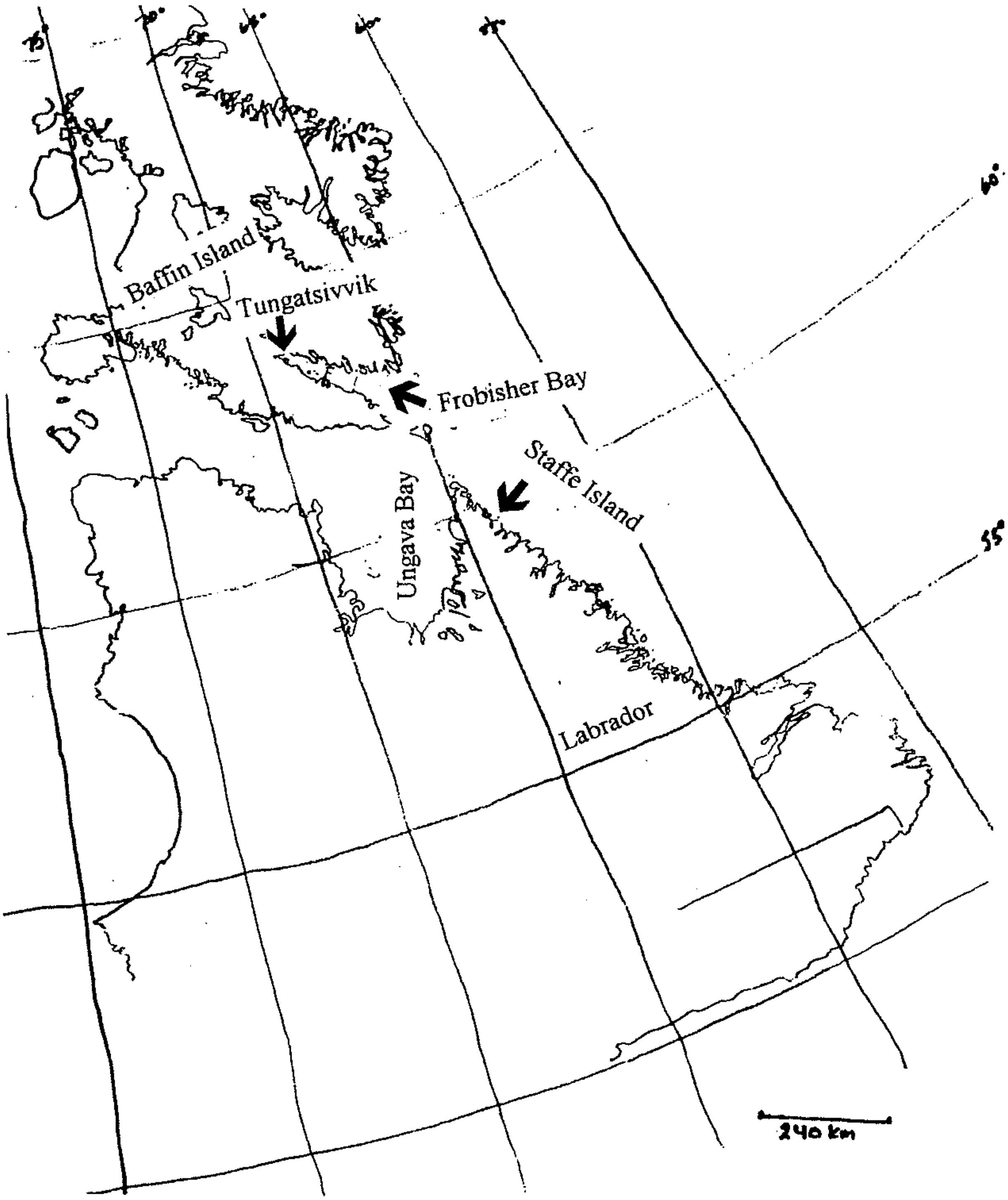

Figure 1.1 Geographical Location of Staffe Island and Tungatsivvik
Britannica Atlas 1987

Chapter Two - Gender and Spatial Patterning

2.1 Introduction

The primary theoretical approach in this research is an engendered one. Gender researchers differentiate between sex, which is a biological fact, and gender

> "[...] a constitutive element of human social relations based on culturally perceived and culturally inscribed differences and similarities between and among males and females." (Conkey and Gero 1991:8)."

Gender theory is an entry point for examining archaeological materials that allows the researcher to have a unique perspective on the social systems of past peoples (e.g. Brumfiel 1991; Hastorf 1991; Tringham 1991; Wright 1991; Wright 1997). Gender is probably one of the most valid conceptual categories for the examination of human societies in prehistoric contexts because we can be certain that both men and women were part of any given cultural group (Conkey and Gero 1991:7). Gender, therefore, is an important aspect of human social organisation in all known human groups, but gender is constructed in different and culturally specific ways. For example, Inuit society incorporates economically complementary roles for men and women into its organisation and the ideological categories that this creates are important keys to understanding Inuit culture (Ager 1980; Bodenhorn 1990; Briggs 1974; Driscoll 1980; Guemple 1986).

This research is based on the premise that spatial divisions do exist, have meaning within a social structure and can be related to the gender concepts of a site's inhabitants.

The goal of this project is to assess the utility of spatial analysis as a means of studying gender relationships.

A study of the structuring of space on prehistoric sites must begin with an appreciation of how and why space is structured, and the patterns of spatial use that result from different activities (c.f. Koetje 1987). Researchers must choose a location where the activities they wish to study are likely to take place, and they must understand the meaning those activities may have within the society and how their location reflects that meaning.

2.2 Gender Relations and Social Structure

Every society organises itself by placing its members into certain categories, and ascribing certain characteristics and tendencies to those social categories (Murphy 1986, Sanday 1990). The three social categories common to every cultural group are those based on differences in age, gender and kinship (Murphy 1986:46-47). That does not mean, however, that the characteristics and tendencies ascribed to the people in these categories are identical in every society. In fact, even the means of assigning people to these categories and the nature of the categories themselves may vary between, and in some cases within, societies (Murphy 1986:48, Sanday 1990:1-17).

On the most simplistic level, social divisions help a society to be more efficient by allowing the assignment of economic and social tasks to each of the categories (Kus

1983:281) based on the characteristics and tendencies each category of people is understood to have. However, these divisions also help to structure a society's understanding of the way the world works by assigning various rights and privileges to its members based on the categories to which they have been assigned (Kent 1990b: 149, Moore 1986:281). Thus, social divisions are significant to the members of the society.

The present research is particularly concerned with those social categories which are directly related to gender. Gender concepts are socially constructed and therefore have to be legitimated and enforced (Moore 1982:191, Kus 1982:54). Spatial patterning can reflect this sort of social construct; hence it should be possible to see spatial evidence of legitimation and enforcement processes (Kent 1990b: 149, Kus 1982:54, Lyons 1989, Moore 1982, 1986). This is demonstrated by Lyons (1989:33) whose work among the Mura, Urza and Wandala in Doulo, North Cameroon, illustrates how houses are designed to reinforce gender perceptions and regulate relationships between men and women.

Lyons' model of spatial organisation states that within households co-operative relationships are expressed in shared work, disposal and storage space while competitive relationships are expressed in "territorial" space (Lyons 1989:28). The Mura and Urza groups utilise shared space (a co-operative model) whereas the Wandala have discrete space (a competitive model).

This research uses Lyons' model, and an analogy based on Inuit ethnohistoric/ ethnographic information to examine Thule spatial patterning, to suggest which sort of gender relationship may have existed for the Thule. At this point it is necessary to draw a distinction for use throughout this research. Inuit gender relationships are frequently described as complementary, which, in this research, is used to refer to their economic relationship. However, this does not fully explain the nature of Inuit/Thule gender relations. Therefore this research distinguishes between two status related aspects of the gender relationships. Thus while it is accepted that Inuit (and by extension, Thule) gender relationships are complementary, whether they are competitive or co-operative (Lyons 1989) must be determined. A competitive relationship refers, in this research, to a hierarchically organised gender situation in which the spatial expression of gender is very important. A co-operative relationship refers to a more egalitarian relationship in which the spatial expression of gender is less important.

2.3 The Centrality of Gender in Inuit Society

Gender should be a particularly interesting approach for studying the Thule because it is crucial for understanding the social organisation of their descendants, the Historic Inuit. Information about gender relations among the Historic Inuit is available from two different types of sources. Ethnohistoric accounts describe the roles of men and women and the centrality of the gender division in Historic Inuit society (e.g. Hall 1865; Taylor 1972). More recent ethnographies expand on this and discuss the social implications of the gender division. Many sources (Burch 1960:119; Taylor 1968:238;

Balicki 1970; Graburn 1969; Graburn and Strong 1973; Taylor 1972; Boas 1974; Guemple 1986) indicate that different tasks were considered the exclusive domain of a particular gender. Many sources (Bodenhorn 1990; Guemple 1986), also indicate that the Inuit society were very much concerned with having persons of the appropriate gender perform particular tasks.

Clearly, gender is ideologically very important to the Inuit generally, and therefore must have been important to the Labrador and Baffin Island Inuit groups discussed here. The centrality of the gender division in Inuit society indicates that there is great potential for identifying the material and locational manifestations of gender concepts. A cautious researcher can use ethnohistoric data to connect a particular gender with a set of tasks and by extension the tools used in these tasks with a particular gender. The spatial distribution of those tools, therefore, allowing for post-depositional disturbances, should permit the researcher to inquire about the influence of gender concepts on spatial organisation. This should all be undertaken tentatively since the factors surrounding cultural change resulting from contact are far from well defined.

2.4 Understanding Gender Relations and Use of Space

Kent (1984:195) suggests that when differences between the genders are emphasised, gender-specific areas increase and space becomes more structured. Among Inuit groups gender is an important structuring principle (see chapter three), and an awareness of the differences between the genders permeates their society. Following from Kent it would be logical to expect Inuit dwellings to be very structured and contain a number of gender specific areas. However, the Inuit gender system, as described in the ethnographies, is composed of complementary economic roles (see chapter three). It must be determined, therefore, if the differences between the genders are sufficiently important for men and women to be in competition with each other or if awareness of difference does not play a large role in the daily lives of the Inuit. To use Lyons' (1989) terms, it must determine whether or not the Inuit had competitive or co-operative gender roles. This will affect how the model of Thule gendered space use will be developed.

Various researchers (Ager 1980; Bodenhorn 1990; Graburn and Strong 1970; Guemple 1986) have stressed that, overall, Inuit society was very much a complementary system. Each gender generally relied on the other perform the complementary tasks essential to maintaining the group (Burch 1960:119). There was some flexibility within the system to allow men or women to perform the other's tasks when necessary (Bodenhorn 1990:60; Guemple 1986:14). This flexibility is demonstrated by men's use of travelling lamps while on men-only hunting trips (generally tending lamps would be the woman's responsibility) (Saladin D'Anglure 1984:481) or women participating in hunting activities and using hunting tools as necessity or skill dictated (Guemple 1986:13). While cultural ideals dictated which gender was appropriate for a particular task, this was not necessarily based on biological aptitude, nor was it inflexible. The gender system was an efficient way of allocating tasks but it allowed for situational variation. Therefore, in the Eastern Arctic, gender relations were more likely to have been co-operative than competitive. Whitridge (n.d.) suggests that this may have not been the case for the whale hunting Inuit in the Western Arctic and the possibility of a competitive relationship is taken into account in the models of gendered space use outlined in chapter three.

From the discussion above it is obvious that gender roles can be both strictly divided (as discussed by Kent) and either complementary/co-operative (as discussed by Lyons) or complementary/competitive (as discussed by Whitridge). It seems likely that Eastern Inuit gender roles were co-operative rather that competitive and Thule gender roles may be similarly oriented, hence a co-operative model of gendered space use in the household is developed for the Thule. However, to account for possible changes between the Thule time period and that of the Inuit, a competitive model based on Western Inuit gender roles is also developed. These models are assessed in chapter seven.

2.4 Spatial Patterning and Social Structure

Spatial patterning is the "most obvious dimension of patterning in the archaeological record" (Kus 1983:277). Since space is the common element in all living sites and as such it is important to learn how to make the most of the information available from spatial patterning (Kent 1984:1). A site's inhabitants make thousands of spatial decisions every day and those decisions are based both on their personal understanding of the meaning of space as well as on their society's conceptions of the meaning of space (Kus 1982:53-53). Furthermore, and quite obviously, space is the setting for all cultural activity and the representation of cultural identity (Moore 1986:189). The organisation of space reflects the way the social group believes the world is organised (Moore 1986: 88-89). In fact, the organisation of space is probably the most visible evidence for the social organisation of a site's inhabitants. The study of spatial patterning can provide the researcher with a means of interpreting the social organisation of the group they are studying. Unfortunately, it is not possible to interpret space in a straightforward way - archaeologists have to determine how social relations are reflected in spatial organisation for the target group. Furthermore, if gender is the object of study, they have to learn to "decode" the ways in which gender relationships are expressed spatially in different societies (Cannon 1991:144).

"Decoding" the spatial expression of gender relationships is usually achieved through the use of analogy, which gives the researcher a range of suggested interpretations to examine. The use of analogy assumes that because two groups are similar in a number of ways they should be similar in others.

This research makes use of two different types of analogy. One, which is covered in chapter three, involves a comparison between an ethnographic group (the Inuit) and a prehistoric group (the Thule) to establish a basis of similarity (economic strategies and dwellings) for extrapolation about a known aspect of the ethnographic group (gender roles) to the prehistoric group. The second establishes a large (cross cultural) body of evidence regarding a specific type of behaviour (the expression of gender relationships in space) to allow examination of that behaviour in a group (the Thule) for which it has not, as yet, been identified. Establishing a connection between spatial organisation and gender relations in many different cultural contexts indicates that such connections should be valid in other specific cultural contexts, in this case in Thule households. Moore (1983:75) and Hodder (1982:25) support such endeavours when they suggest that interpretation of analogous situations must be based on structural or organisational similarities. The structural and organisational similarities between the Thule and the Historic Inuit will be discussed in chapter three.

According to Ardener (1981:11-13), social groups organise space based on their own particular rule systems and gender is one of the most frequent bases for creating spatial boundaries. Furthermore, Ardener asserts that behaviour and space are mutually dependent. Other researchers have established a connection between the spatial organisation of a living site and the social organisation of the site's inhabitants (e.g. Binford 1991; Brumbach and Jarvenpa 1997; Grier and Savelle 1994; Hastorf 1991; Hodder 1984, 1987; Kent 1984, 1987, 1990a, 1990b; Kramer 1982; Kus 1982, 1983; Lyons 1989, 1991; Moore 1986; Oswald 1987; Spector 1983).

When members of a group take part in any activity, economic or otherwise, they must decide where that activity will take place (Oswald 1987:297-97). That decision is based on a number of things, including such mundane factors as: the number of people required, how much space the activity requires; the amount of debris it produces; and the location of necessary resources (e.g. hunting must take place off site!). The decision is also based on factors such as the perceived importance/prominence of the activity or of the actors (Moore 1982:77-79). In fact the "proper" placement of any activity may be predetermined by social rules and conventions rather than more pragmatic issues. The more divisions that are present in a social group (divisions of gender, age or social position) the more potential spatial divisions will be present (Kent 1990b:149).

Binford's (1991) research among the Nunamiut of Alaska clearly reflects the necessity for archaeologists to understand the meaning behind a society's spatial organisation. Binford's (1991) research lead him to conclude that the interdependence of two generations of men was reflected in the placement of houses on Nunamiut sites. In the winter, when older men were dependent upon their younger counterparts for meat, the older men's houses would be placed close to those of the younger men. In the summer, the huts would be placed further apart, reflecting both, the reluctance to share the less fruitful summer hunt and, the fact that the older men were able to venture further in good weather. In the case of the Nunamiut, the spacing of the houses reflected the social dynamics of an important relationship between generations of men.

A study of spatial organisation is important for understanding the way in which gender orders economic and social relations (Lyons 1989:28-33). Lyons' research demonstrated that competing genders used separate space and co-operative genders shared their space. Moore's (1982, 1986) research among the Marakwet of Kenya determined that the roles of men and women, while complementary, were separate in space and in "value". Each gender's activities took place in separate areas, and the rubbish from those activities was also disposed of separately. The placement of activities and the disposal of rubbish could be linked to Marakwet concepts of appropriate behaviour for men and women and indicates what Lyons (1989) would term a competitive relationship. Whitridge (n.d) models such a competitive relationship for the whale hunting Thule, based on North Alaskan Inuit ethnographies. This is discussed in detail below.

Spatial divisions are not merely functional - they do not simply serve to separate different groups of people - they separate people for a reason. Their "most important function may be to convey meaning" (Rapoport 1990:12)(Donley 1979:76), which is expressed and perpetuated by the choices actors make in remaining in or moving outside their prescribed space (Moore 1986:190). Kent (1991:149) notes that the way in which a society organises itself will affect the organisation of behaviour and spatial patterning. The space assigned to particular individuals is reflective of their position, role and power within their social group (Harvey (1990:49) quoted by Rose 1993:18, Lyons 1989:33).

This aspect of spatial organisation is an important factor in the present research which attempts to determine how gender is related to spatial organisation within two Thule houses and whether we can say anything about the nature of Thule gender relations as a result.

2.6 Gender and Households

Conkey (1991:65) suggests that gender research begin by examining contexts in which gender is likely to be played out. The context chosen for this research is the household and surrounding area because both genders are likely to interact there (Chilton 1994:12, Lyons 1989:33). In many archaeological contexts, such as hunting blinds, it might be possible to argue that only men were present. However, domestic sites are likely to be fruitful avenues for the study of gendered use of space because people of "all ages, standings, genders use them for all life processes" (Donley 1982:63). The specific "life processes" to be investigated here will be the complementary exploitation of the environment that resulted in a division of labour between men and women. As Hastorf (1991:132-33) suggests, the organisation of food getting and preparation is likely to be an area of gender negotiation.

The household area may be a micro-example of the larger spatial concerns of a social group, so people can be reminded on a daily basis of the way in which the world is organised (Goffman (1979:1) quoted in Ardener 1981:12). This is particularly true for organisation along gender lines. Lyons (1989:28) has suggested that

> "..the spatial organisation of households is a sensitive material indicator of that society's social and economic organisation."

Since the fundamental economic unit in Inuit (and by extension Thule) society is a "married" man and woman, their use of space within the household should be instructive (Burch 1960:119)

Meaningful spaces take many forms. They may be architectural (e.g. Kent 1990 a and b), in which the shape and number of rooms reflects the social meanings to be conveyed. They may be sequestered space for particular groups within the whole society (Donley 1982) or specific architectural features may be "owned" by a specific gender. Or the space may be understood within the society as having internal meaning and may be marked by the activities that take place there or by symbolic markers: artifacts that have special meaning within the group itself (Donley 1982:73; Lyons 1989; Moore 1986). The gendered areas for the first may be larger than required for gendered specific activities (i.e. they may reflect other principles such as prestige), whereas the second groups' areas are delimited by the activities that take place there and may only be identified through in an examination of these activities. This could be seen as an distinction between formal gendered space and informal gendered space. Formal gendered space would be studied through an examination of room design and function, whereas a study of informal gendered space would be undertaken by identifying gendered activities and their locations.

Inuit or Thule houses tend to have uncomplicated designs with few internal divisions (Park 1988; Schledermann 1971). This may be a reflection of the potential scarcity of building materials or the need to build tighter spaces due to the cooler temperatures of the arctic or subarctic, rather than a social decision. Social organisation (and gender) is likely to therefore have been expressed in the placement of activities, which can be related to the architectural features (e.g. hearth locations/platforms) rather than in the creation of distinct rooms. As is mentioned in chapter three, Inuit homes do have gendered areas, at least on a conceptual level, indicated by activity placement and potentially, by gendered ownership of specific features. For example, women were considered the owners of the oil lamps and slept nearby in order to tend them, so the general area surrounding the lamps - the "kitchen", was considered to be theirs (Balicki 1970:63; Crowe 1969:57). If Inuit homes have such areas, it is likely that Thule homes do as well.

The question of the existence of formally and informally gendered space on Thule sites will be pursued in this study through an examination of the spatial distribution of various gendered tools and gendered tool "sets" to determine if activity areas, as identified by clusters of tools, meet the modelled expectations of Thule gendered use of space, based on Historic Inuit ethnohistoric/ethnographic information.

2.5 Identifying Gendered Space

As mentioned above, gendered space can be represented either formally or informally. Aside from lamp stands, and platforms Inuit/ Thule houses have little formal (architectural) space, hence it is also necessary to explore a means of identifying informal gendered space. This can be achieved through the examination of the distribution of gendered tools on Thule sites. (The assignment of gender to tools is based on ethnohistoric/ethnographic data (chapter three).)

2.6 Gendered Use of Space Among the Inuit and Thule

The general nature of Thule/ Inuit gender roles has been examined by other researchers (e.g. Gullason 1999) but several archaeological studies have examined the relationship between Inuit/Thule gender roles and space. Scheitlin (1980) and Whitridge (1999, n.d.) have both dealt specifically with Thule gender roles and use of space. Boismier (1991) focuses gendered use of space among Alaskan Eskimos. All of these studies are discussed below.

Scheitlin's (1980) examination of Thule gender roles at Silumiut, NW Hudson Bay also utilises Inuit ethnohistory/ethnography and spatial analysis. His models were developed with an expectation of the existence of strictly gendered, discrete space corresponding to ethnographically described women's/men's areas within the house. These models were tested using Nearest Neighbour Analysis, a technique described in chapter four. Scheitlin (1980) concluded that discrete gender space was not present in Thule houses, instead Thule men and women shared internal house space. His conclusions are used in developing the models outlined in chapter three and are compared to the results of this research in chapters seven and eight.

Whitridge (1999) examines the relationship between inter-household and gender based status differences at the Classic Thule winter village at Qariaraqyuk, Somerset Island. The author established through the use of multi-variate analysis, the spatial separation of women's activities and men's activities. This may not be applicable for the research undertaken here however since his research centres around the Western Thule (and analogies from the Alaskan Eskimo). Gender roles among the Western Thule may have been more competitive than similar roles in the Eastern groups.

The competitive nature of Western Thule gender roles is also discussed in Whitridge's (n.d.) earlier investigation of the same site which suggests a connection between myth and architecture that places men's work in prominent household spaces (the platform) and women's work in less prominent spaces (the floor). He argues that as men's roles increased in value with the advent of whaling the value of women's roles decreased. This can be characterised as a situation in which men's and women's roles were complementary but not co-operative. It is important to note, however, that the date for this site is AD 1100-1450, making it contemporaneous with the sites discussed in this research. This indicates that the differences are related more to location and related economic differences (i.e. presence of whale hunting) rather than changes over time.

Boismier (1991) examined ethnographic accounts of the Ingalik Eskimos in Alaska to identify their gendered division of labour and the tools related to each gendered task. The location of similar tools were then used to study the spatial range of men's and women's activities (gendered use of space) among the Kusquqamiut, another group of Alaskan Plateau hunter-gatherers. Boismier concluded that it was possible to use ethnographic information to identify various types of houses and work areas on an archaeological site. This was achieved by comparing the artifacts found on the site with those artifacts associated (through the use of the ethnographic evidence) with a given type of house.

2.7 Conclusion

The method used in this research is similar to the methodologies described above in that it begins with the use of ethnohistorical information to identify gendered tools, activities and their expected locations.

This research fulfils all of Hodder's (1982:12, 18-25) criteria for building reliable analogies. As will be demonstrated in chapter three the Thule and the Inuit share a direct historical connection. The fact that they have common subsistence practices, house shape and technology suggests, through the principles of analogy, that they have similar gender roles.

This chapter has established a system of meaning related to the expression of gender through spatial organisation. Searching for patterns of gendered spatial organisation on Thule sites using the location of gendered tools is a reasonable way of searching for Thule gender expression. It is, therefore, possible to state that social organisation can be reflected in the spatial organisation of a site and that a study of households may be particularly fruitful for studying the nature of gender relations in Thule society. Furthermore, this chapter has established that it should be possible to use the spatial relationships between tools related to different genders to examine the relationship between Thule men and women. This will be achieved by determining if women and men had strictly defined spatial spheres or if their space was shared. Determining how space was used will reveal if the Thule had a competitive gender relationship (separate spheres) or a co-operative gender relationship (shared space) in the context of their complementary roles.

Chapter Three - Inuit Ethnohistory and Ethnography

3.1 Introduction

The preceding chapter established two important aspects of the study of gender in archaeological contexts: spatial patterning can reflect the gender relationships that were (or are) present on a given site and ethnohistoric and ethnographic information can be used to suggest interpretations of the relationship between spatial patterning and gender on a culturally related site.

For this research, ethnohistoric and ethnographic information about the Inuit and archaeological information about the Thule is examined for similarities that can allow the researcher to use analogy to suggest interpretations of Thule culture based on what is known about similar practices among the Inuit. The use of analogy in this research is strengthened by the fact that the Thule and the Historic Inuit are not only similar in many ways but the Thule are also the ancestors of the Historic Inuit. It is important to remember, however, that a direct application of Inuit information is not possible because cultural groups are not static. Therefore the models developed here must be tested against actual Thule data rather than assuming identical patterning from the outset.

There are many sources of information available about both the Thule and the Inuit. There is a lot of excellent ethnohistoric and ethnographic information about modern Inuit groups all across the Arctic (Ager 1980; Balicki 1970; Bodenhorn 1990; Briggs 1970; Briggs 1974; Burch 1960; Graburn 1969; Graburn and Strong 1973;

Guemple 1986; Hawkes (1916); Kemp 1984; Saladin D'Anglure 1984). Some of these data are used sparingly to expand on ethnohistorical information. For example, early ethnohistorical accounts detail the work of men and women but do not generally discuss the social implications of the division of labour. The later ethnographies will be used to carefully flesh out the early accounts. Ethnohistoric information about Labrador Historic Inuit is readily available but the most reliable source is the work of Taylor (Taylor 1972, 1974, 1977) who has translated information from a number of Moravian diaries. Other ethnohistoric sources including Cartwright (1792); Curtis (1774); and Packard (1877) are available and the information available from them is reliable but limited. There are also a number of ethnohistoric accounts of Baffin Island Inuit (Bilby 1923; Hantsch 1909-11; Hall 1864) but this research relies heavily on the information available from Hall (1864) because the author is very thorough and checks the reliability of his information with a number of other sources. Boas (1888) will also be used in this research because as a reliable, ethnographic account of the Central Eskimo (*sic*), including both Labrador and Baffin Island Inuit[1]. The information presented for the Thule, aside from a general introduction, will be limited to a discussion of gendered subsistence practices and related tool use and the similarities between them and Historic Inuit as evidenced on the sites in question.

[1] Labrador Inuit are not typically included in the categorisation of Central Inuit.

One major complication of using ethnohistoric and ethnographic information about Inuit spatial patterning to suggest interpretations for Thule spatial patterning is assessing the impact of European contact. European contact obviously brought about a number of cultural changes as a result of disease (e.g. McGhee 1994), religion (e.g. Kennedy 1985) and trade (e.g. Kaplan 1985) and it is difficult to determine what changes came about as a normal part of a dynamic culture and which were adjustments to European contact. A number of researchers deal with this issue in detail (Cabak 1991; Gullason 1999; Kaplan 1985; Kennedy 1985; McGhee 1994) and concur that post-contact information cannot be directly related to pre-contact sites and comparisons must be undertaken carefully.

Many of these researchers indicate, at least for Labrador, that many of the changes in Inuit did not become firmly ingrained until the latter part of the nineteenth century, however. For example, Taylor (1974:38-39) notes that some Inuit continued to use skin boats well into the nineteenth century despite easy availability of wooden European boats. Some aspects of Inuit culture, particularly aspects of subsistence unrelated to trade, remained very similar to traditional practices. Thus there is still some value in using early accounts to identify subsistence tools and their users. The most intense areas of European contact were in central Labrador. Northern areas, such as are studied here, were among the last to be affected. On Baffin Island, while some aspects of life (e.g. whale hunting) changed very early in the history of contact (Kemp 1984) other practices remained traditional. Archaeological investigation (Sabo and Jacobs 1980) documents the continuation of most traditional subsistence methods on Southern Baffin Island from the Thule period to the early part of this century. As mentioned above, it is important to note that analogy is limited since change within cultures is ongoing and for that reason all interpretation must proceed carefully.

How does this affect the use of analogy for this research? A number of sources (Kaplan 1983; Sabo and Jacobs 1980; Schledermann 1971) indicate that basic subsistence activities and organisation continued at least until the nineteenth century and in some cases until the twentieth century. Also, with regards to subsistence, there is agreement between the oldest sources (Frobisher 1576-78; Taylor 1972) of Historic Inuit information and the information about traditional Inuit groups this century (e.g. Balicki 1970; Graburn 1969). This suggests that descriptions of these practices should be useful in interpreting earlier material. For Labrador, Taylor, who has done extensive work in this area outlines many subsistence practices as they took place before 1784, a date prior to which the most traditional practices are described.

Ethnohistoric information has to be treated carefully anyway. A researcher cannot assume that such information is exact even without a major source of change like European contact. Any research that involves the past should not assume that a cultural group remained unchanged through time: cultures are not static. How much **more** of a problem does contact play for the use of analogy? The use of analogy for this research is based on observed similarities between what is described in ethnohistoric accounts of the Inuit and what has been discovered archaeologically for the Thule. Despite their ancestral connection, it is not assumed that the two groups were identical but that they are similar enough to suggest interpretations for the Thule spatial patterning. However there are limits to the analogy, material culture is likely to be related but its cultural meaning must be considered carefully rather than assumed. Thus while European contact caused great changes over time for the Inuit it does not negate the use of analogy in this case. Any interpretation will have to be put forward carefully but that would be the case even without the impact of European contact.

The rest of this chapter will include a description of the Historic Inuit in Labrador and Baffin Island, focusing on the areas of similarity with the Thule namely subsistence practices. This will be followed by a description of the archaeological evidence for the Thule, particularly in Labrador and Baffin Island.

3.2 The Historic Inuit

The Inuit living in Arctic areas of Canada, the United States, and Greenland are descendants of the Thule people, who originated in Alaska and migrated across the North American continent between seven hundred and one thousand years ago during an interglacial period. While all Inuit groups share many cultural characteristics, each group has changed to adapt to life in their particular environment.

Inuit people, or their ancestors, have inhabited Labrador since at least seven hundred years ago[2]. They first encountered Europeans in the sixteenth century but the earliest European ethnohistoric accounts date from the eighteenth century. It is presumed that many changes took place in Inuit culture in the intervening years, both as a result of contact and of their natural cultural development. According to Richling (1993), the Labrador Inuit (and presumably the Baffin Island Inuit) would have had many mechanisms for adapting to external change. The earliest changes that came about after European contact were probably met with traditional sorts of coping mechanisms. Some of the more fundamental changes did not generally take root until the nineteenth century (e.g. Kennedy 1985).

Inuit have inhabited Baffin Island for approximately eight hundred years (Rigby and Stenton 1995). Their first sustained contact with Europeans was with whale hunters in the eighteenth century (Kemp 1984:466) but these hunters did not settle on the island so the changes they potentially caused may not have been as profound as in other locations. Different groups of Baffin Island Inuit would have been visited by (and hence traded with) various explorers (e.g. Davis, Frobisher, Franklin), some of whom were searching for the Northwest passage. European goods became common among the Inuit but most of these would be used in place of a traditional tool while still performing a

[2] Fitzhugh (1994) has dated House 10 at Staffe Island in Northern Labrador to A.D. 1250.

traditional task (e.g. caribou hunting strategies and timing would remain the same but the animals would be killed by rifle instead of bow and arrow.)

Like other Inuit groups, the Labrador and Baffin Island Inuit had a seasonal round of economic activity that reflected the availability of key resources. Over time, shortage or surplus of certain resources may have caused changes in the seasonal rounds - one species or another may have been emphasised at different times. Generally though, the Labrador Inuit focused on sea mammal hunting (seals, whales and walrus) when the various animals were in season, Caribou were hunted in the fall when skins were at their best for clothing (Taylor 1974:51-58). Other animals, such as fish, birds and bears, were utilised in season. A more complete description of the seasonal round can be found in Table 3.1. The seasonal rounds of the Baffin Island Inuit tended to alternate between an emphasis on caribou and an emphasis on sea mammals, depending on climatic conditions, but like the Labrador Inuit they utilised a variety of other animals depending on availability. A more complete description of their seasonal rounds can also be found in Table 3.1.

Labrador and Baffin Island Inuit show similarities to other Inuit groups in their division of labour as well (Kemp 1984; Burch 1960; Turner 1979; Briggs 1970). According to Boas (1888: 579-580), a typical breakdown of Inuit labour would be: a woman is responsible for childcare, household work, including sewing (bedclothes, tents and boat covers) and cooking, tending the lamp, preparing skins, preparing the inside of

	Autumn (mid-October to mid-December)	**Winter I (mid-December to March)**	**Winter II (March - April)**	**Spring (May - June)**	**Summer (July - August)**	**Late Summer / Early Fall**
Labrador	Kayak sealing Inland salmon fishing Whaling	Breathing hole sealing Seabirds Ice fishing (January and Februrary) Walrus (February)	Basking seals Walrus Bow and arrow caribou Mussels and sea grass	Kayak seal Seabirds - kayak Eggs Beluga whale Walrus	Kayak seal and Beluga whale	Inland caribou Some fishing on coast seals, Beluga, black bear, polar bear, and berries
Baffin Island		Jan - March Breathing hole seals	Floe edge seals	April breakup basking seals	Summer / Fall Open water sea-mammal hunting (seal, walrus, beluga, bowhead, polar bear) Summer Bird hunting on water	
	Some caribou all year but mostly late summer - fall					
	Small game - mostly in summer but year round (fox, rabbit, hare, birds)					
	Fishing (lake ice)				Coastal lake and river fishing	
					Beach collecting, mussels, clam, seaweed, driftwood, stone	
					Eggs, berries, some plant foods for bedding, etc., stone and wood	

Sources : Labrador Sources : Taylor 1972, 1974, 1984
Baffin Island : Boas 1888, Hall 1864, Sabo and Jacobs 1980

Table 3.1 Historic Inuit Subsistence Activities - Seasonal Rounds the house (smoothing platforms and organising the "kitchen" etc.) and rowing umiaks while travelling. A man is responsible for providing food through hunting, driving the sledge, feeding the dogs, building the exterior of winter/fall houses and the frame of summer tents, building boat frames, making and maintaining all tools (including women's tools). Boas' (1888) list is supported by a number of other sources.

Hawkes' (1916:113) description of the Labrador Inuit suggests that a good hunter might need two wives to care for the meat and skins he provides. Curtis (1774:385) mentions that women do everything but obtain food but often assist hunters, and he notes that Inuit women sew with sinews and their needlework is very tidy. Cartwright (1792) describes a woman scraping skins and feeding scraps to her baby.

For Baffin Island Inuit, Hall (1864) frequently mentions the activities of women, including sewing, cooking, tending the lamp and preparing skins. Hall (1864) also describes the various hunting activities of men as well as the construction of dwellings. Bilby (1923) offers similar evidence of the complementary roles of men and women.

The similarity between these ethnohistories and recent ethnographies of Inuit groups who have follow traditional lifeways more recently (Ager 1980; Balicki 1970; Bodenhorn 1990; Briggs 1970; Guemple 1986; Graburn 1969) is striking and suggests a continuity of gender roles throughout time. These researchers describe complementary gender relationships between men and women in which each gender is valued for its contribution to survival. This relationship is alluded to in ethnohistoric accounts such as in Hall's (1864) description of an Inuit wife as indispensable because of her sewing, cooking and lamp tending talents.

The research undertaken here is based upon the assumption that the similarity in economic gender roles through time indicates the probably continuity in the nature of gender relationships through time. This will allow the researcher to suggest interpretations, based on Inuit ethnography, of the patterns discovered on the Thule sites. If the above assumption is false none of the suggested interpretations should fit the patterning or explain it adequately.

3.3 Inuit Gender Roles

As a general characterisation, Inuit people consider the work of men and women to be complementary parts of a unified whole. Each gender depends on the other to do the work that is culturally assigned to them. This is, at base, an efficient means of ensuring that all necessary work is done. In fact, young people were not even allowed to marry until they could complete the work expected of a person of their gender (Boas 1888:578). The social implications of this division, for which it is necessary to rely on modern ethnographies, were discussed in chapter two.

Complementary roles does not necessarily mean co-operative roles, however, since as Whitridge (n.d. b) notes, one genders' tasks can take on more importance and value due to societal changes. This is taken into account during model development at the end of this chapter.

A specific breakdown of women's and men's roles per activity can be found in Table 3.2. As discussed in chapter two, late Historic and modern Inuit groups consider certain activities to be the sole domain of a particular gender. The tools required for those activities can also be considered to be owned by the gender performing the activity. A list of tools utilised by traditional Inuit groups are divided by gender and listed in Table 3.3. This list is the key to establishing the gendered tool categories used through this research.

3.4 The Inuit House Model

All activities require a setting and aside from those that must take place off site (e.g. hunting) many of those activities take place within houses. A typical one or two family dwelling similar to the houses studied at both archaeological locations is represented in Figure 3.1. In the proto-contact[3] period in Labrador the Inuit began living in larger houses up to 16m in length and with an average of three sleeping platforms (Richling 1993). These houses averaged about twenty inhabitants (Taylor 1974). The explanation for this change is subject to debate with some researchers advocating an environmental explanation (Schledermann 1971) and some advocating a "response to

[3] The period immediately before and after contact.

Activity	Season	Location	Man's Role	Man's Tools	Woman's Role	Woman's Tools
Breathing Hole Sealing	Winter	Baffin Island and Labrador	Wait to harpoon seal at hole	Harpoon	Drive seals to hunter Guarded hole by hitting seals with stick Distribute meat	Stick
Kayak Seal / Walrus Hunting	Spring / Fall	Baffin Island and Labrador	Harpoon seal from kayak	Kayak harpoon / lance Sealskin float	-Distribute meat	-
Basking Seal / Walrus Hunting	Spring	Baffin Island and Labrador	Creep up on basking animals and harpoon them	Harpoon	-Distribute meat	-
Caribou Hunting	Primarily Fall (but all year round)	Baffin Island and Labrador	Kill caribou with bow and arrow or "spear" either at drives or by stalking. Baffin Islanders sometimes set snow traps	Bow and arrow Spear	Drive caribou into water or fenced area Distribute meat	-
Bird Hunting	when available	Baffin Island and Labrador	Stalk and kill birds	Bow and arrow	-	-
Bear Hunting	when available	Baffin Island and Labrador	Stalk and kill bears	Bow and arrow Knife and lance	-Distribute meat	-
Fishing	when available	Baffin Island and Labrador	Fish (possibly at a weir)	Spears / Hooks	Fish (possibly at a weir)	Spears / hooks
Clean and Prepare Skins	as necessary	Baffin Island and Labrador	-	-	Remove fat and flesh from skins Dry skins for use	Ulu / scrapers
Cooking	as necessary	Baffin Island and Labrador	When on male only hunting trips	-	Cook for household	Lamp Cooking pot Wick Oil
Whaling	-	Baffin Island and Labrador	Paddle umiaks and harpoon whales	Large harpoon sealskin float drag anchor	Possibly provide symbolic role in ensuring a good hunt	If so, special gloves and ritual pot needed
House Construction Winter / Fall	Winter	Baffin Island and Labrador	Construct outer bone / wood frame over house pit. Cover with sod or skin	Building Material Knives	Preparing inside, chinking holes	?
Sewing Clothes / Tents	as necessary	Baffin Island and Labrador	Only when necessary	-	Creating clothing, tents	Needles Needle Cases Sinew Raw Materials Thimble Awl Graver Tool?
Travelling	as necessary	-	Make boat frames paddle kayak steer umiak make sleds care for adult dogs make and repair snowshoes	-	Make boat cover row umiak care for pups	-
Tool Making / Repair	as necessary	-	make and repair all tools	bow drills raw material	-	-

Table 3.2 Historic Inuit Activities Divided by Gender

Table 3.2 Historic Inuit Activities Divided by Gender (continued)

General Maintenance	-	-	-	wooden beater to get snow off clothing bone implement for squeezing water from clothing	-	wooden beater bone implement for squeezing water from clothing - chewing boots
Tending lamp	as necessary		only when on men only hunting trips		get wick mat.s chew blubber for oil	flint (teeth?) bag for wick materials lamp

Sources : Baffin Island : Bilby (1923); (Boas 1888); Gullason (pers. comm.);Hall(1864); Sabo and Jacobs (1980); Scheitlin (1980). Labrador: Cartwright (1792); Curtis (1774); Hawkes (1916); Stopp (pers. comm.); Taylor (1972,1974,1984)

Women's Tools (Type 1)	Men's Tools (Type 2)	Neutral Tools (Type 3)
lamp sticks wick dishes cooking pot lamp ulu / scrapers fish spears and hooks possible spiritual material for whale hunting needles needle case thimble awl graver tool (?) raw materials (soapstone) umiak	harpoons of various sorts sealskin float bow and arrow spear knife / lance fish spears and hooks drag anchor snow knives bow drill raw materials for tools kayak	wooden beater to get snow off clothing bone implement for squeezing water from clothing fishing equipment

Rules

1. Tools in preparation or repair stage would all be male.
2. Broken tools may or may not be assigned a gender category depending on how identifiable it is.
3. Tools will be assigned gender prior to spatial analysis so context cannot determine gender.
4. Tools that are broken but tentatively assigned a function will be assigned a "probably" gendered status.
5. Tools for which no gender, and/or function can be assigned are labelled unknown.
6. Tools used by either gender or both are assigned neutral status.

Table 3.3 Historic Inuit Typical Gendered Tool List stress" explanation (Jordan 1978). These larger communal houses obviously cannot be used to interpret spatial patterning in a single family dwelling such as described for the Thule (see below). Therefore, the depiction of a typical Central "Eskimo" *(sic)* house will be used to interpret both sites (Figure 3.1).

The only source of information for smaller dwellings is Packard's (1877) description who seems to describe a single family dwelling matching the information available from outside sources. Information about other aspects of Labrador Inuit life should still be reliable since subsistence activities such as sea mammal, caribou hunting and fishing were maintained despite the change in architecture.

3.4.2 Formally Gendered Space

The internal organisation of the household includes some areas that are described as belonging to one gender or another. Some sources (Balikci 1970:61-63; Crowe 1969:57; Graburn and Strong 1973:149-151) suggest that the interior of Inuit dwellings are gendered, with specific locations for the lamps (which belong to women and may be restricted to use by women) and for the storage of women's materials. Furthermore, Balikci (1970:63) suggests that the woman owned the "kitchen" area of the home, which would be on and near the lamp platform. Both Crowe (1969: 57) and Graburn and Strong (1973: 149) indicate that the woman of the house had a designated sleeping area, located near her lamp so she could tend it. This is supported by Packard (1877: 68) who

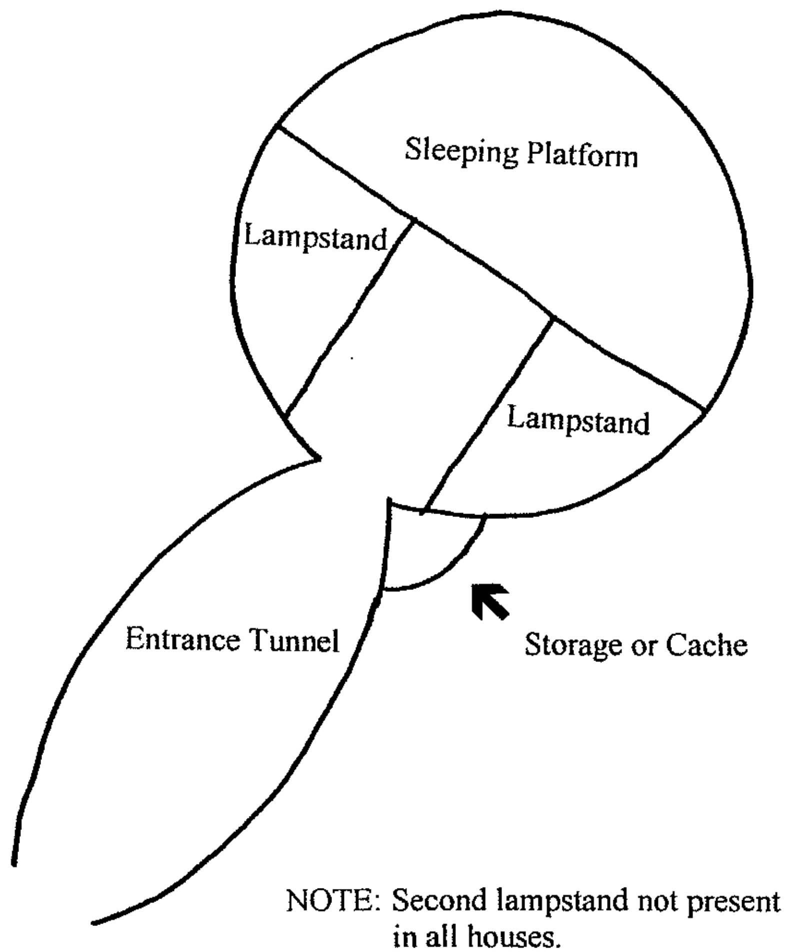

Figure 3.1 Typical Central Eskimo *(sic)* House (Boas 1888:546)

describes a woman sitting on a "divan" in a Labrador Inuit semi-subterranean house with a shelf within her reach holding a soapstone lamp and needles and other "housewifery". Furthermore, since most activities took place inside the house in fall and winter it may be possible to identify evidence of men's work, such as tool repair, in a particular area of the houses. Balicki (1970:63) suggests that the edge of the sleeping platform may be one such "men's" area. Whitridge (n.d.) extends this to suggest that men owned the entire platform, a high status area.

3.4.3 Informally Gendered Space

According to Turner's (1979:62) description of the Inuit of Labrador and the Ungava Peninsula all of the work done by a family in winter took place within their home, with the exception of hunting and heavy butchering. However, the tools for these activities and others would have been made, repaired and likely stored in the houses. Thus, in winter, most all other activities would take place inside the house including the preparation of skins (Taylor 1968:239), the cooking and sewing. Meat would also be stored inside. The interior of a winter house should contain a great deal of material from these activities and the Thule houses used in this research do contain evidence of similar activities. Scheitlin's (1980) conclusion that the Thule houses he examined contained a great deal of shared work space supports this. However, Scheitlin's (1980) spatial analysis technique was not as refined as the one used here and may not have revealed gendered patterning within larger mixed assemblages. Thus Scheitlin's (1980) conclusion must be tested rather than assumed. In the event that the complementary roles described are not also co-operative, a model based on Whitridge's (n.d.) research will also be developed.

Due to the mobile nature of Inuit settlement and subsistence patterns, it is unlikely that many tools indicative of their activities would be left behind. It is likely however that some debris, including perhaps broken and forgotten tools, will have survived the sort of maintenance activities that may have taken place upon re-use of semi-subterranean dwellings. Those remaining tools may not be located directly in their use context, however. They may, instead, have been tossed to one side after use, stored in particular areas, or may have been swept out of the way of a person at work. This does not necessarily affect an interpretation of the gendered use of space in this context, since (as mentioned in chapter two) even disposal patterns can reflect gender relationships. Other formation processes are discussed in chapter five.

3.5 The Thule Houses at Staffe Island and Tungatsivvik

The purpose of the above description of the Historic Inuit was to set up a basis of comparison with the Baffin Island and Labrador Thule who are the foci of this research. This basis of comparison is strengthened by Mathiassen's (1927:163) assertion that Thule culture has been preserved more in Baffin Island and Labrador than in the more central regions. Mathiassen (1927:160) bases this on the large number of artifacts of similar style common to early Thule sites and both Baffin Island and Labrador. The artifacts of similar style include whalebone houses, umiaks, lamps and cooking pots (Mathiassen 1927:160).

The archaeologically identified features of the two Thule houses in Labrador and Baffin Island utilized in this research are described below. According to the researchers (Fitzhugh 1994; Rigby and Stenton 1995) these houses are fairly typical Classic Thule[4] and the results of the analysis of these sites will have important implications for sites elsewhere. Once the nature of the gender relationships present on these two sites has been examined suggestions for examination of other sites will be outlined.

The Staffe Island site represents the winter/spring phase of a regional settlement pattern and as a result, the primary subsistence activities included walrus hunting (hunted while walrus were basking or swimming (Taylor 1974:47)), seal hunting (either by the breathing hole method, by creeping up on basking seals (Taylor 1974:45-46)) and bird hunting (likely done with bow and arrow (Taylor 1974:36; Fitzhugh 1991:255-258)) . Little or no whale hunting would have been done here since large whales do not visit the area. Caribou hunting would also not have taken place here since caribou are not generally present in the area in winter and spring (Fitzhugh 1991: 245-246). Some of the winter/spring subsistence activities are reflected in the tools found on site which are

[4] Staffe Island is dated to A.D. 1170 - 1277. Tungatsivvik is dated to A.D. 1020 - 1260.

listed by gender in Table 3.4. The house style was very similar to early Thule houses in the eastern Arctic (Figure 3.1) and has parallels to houses from eastern and southern Baffin Island (Fitzhugh 1991:253-257). Staffe Island House 10 is depicted in Figure 3.2. Tungatsivvik House 10 on Baffin Island was a winter house (Rigby and Stenton 1995:47). The associated faunal assemblage indicates that the Thule food sources at this site included Ringed seal, which were hunted either at breathing holes or at the floe edge (Sabo and Jacobs 1980:495), caribou, primarily hunted in the late summer and fall, but which could be stalked in winter (Sabo and Jacobs 1980:495-496)[5] and whale (*B. mystecus*), which may also have been cached since whale hunting was primarily a summer activity (Sabo and Jacobs 1980:495) (Rigby and Stenton 1995:52). Rigby and Stenton (1995:52) note that it is difficult to assess the importance of whaling at this site since whale bone may have been recycled. Some of the activities necessary for hunting and processing these animals are represented in the tool assemblage and are listed by gender in Table 3.5. House Six was a typical Thule stone, sod and bowhead whale bone house (Rigby and Stenton 1995: 47) and the basic floor plan is depicted in Figure 3.3.

The only striking difference between the two sites is the possibility that the Thule living at Tungatsivvik may have been taking part in whale hunting. This may indicate differences in the social organisation of the two groups, depending on the scale at which

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[5] The presence of caribou bones could indicate cached food.

Women's n=7	Men's n=4	Neutral n=5	Probably Women's n=2	Probably Men's n=15	Unknown n=9
graver tip	harpoon endbld	butcher knife	boot creaser	endbld	mica
vessel	lance tip	butcher knife	boot creaser	pocket knife	blk chert
ulu	harpoon pt	butcher knife		endbld	slate
ulu	harpoon endbld	bead		endblde frg	slate
ulu		whetstone		blade	bone
ulu				endbld frag	gr slate
ulu				endbld	red slate
				core	knife
				piece esquillees	bone
				core/axe	
				endbld	
				st. edge flake	
				endblade	
				endbldpreform	
				endbldpreform	

Table 3.4 Staffe Island House Ten (and surrounding areas) Gendered Tool List

Women's n=8	Men's n=19	Neutral n=10	Probably Women's n=5	Probably Men's n=8	Unknown n=58
vessel frag	harpoon head	drldpendant	marrowscp?	mattock	soapstn frag
thimble	bola	drldpendant	scapula scrpr	harpoon bld?	soapstn frag
rim shard	harpoon tip	pendant	awl	knife (?) bld	soapstn frag
vessel frag	harpoon head	peg	scapula scrpr	endbldfrag	soapstn frag
lamp	lance head	drldpendant	scrpr frag	endbld	wrked antler
ulu blade	harpoonfrshft	whetstone		endbld base	soapstn frag
rim shard	kakivak sbrb	bead		endbld base	wrkdantler
	drill mpiece	whetstone?		endbld	bone
	harpoon head	whetstone?			wrkd antler
	harpoon head	snow beater			wrkd antler
	bola				frshft
	bola				wrkd bone
	bola				drld bone
	bola				drld ivory
	arrowhead				frshft
	drill bit				wrkd antler
	lance tip				shaft
	pick				soapstn frag
	uqsiq frag				soapstn frag
					wrkd antler
					drld bone
					soapstn
					soapstn frag
					soapstn frag
					drld ivory

Table 3.5 Tungatsivvik House Six (and surrounding areas) Gendered Tool List

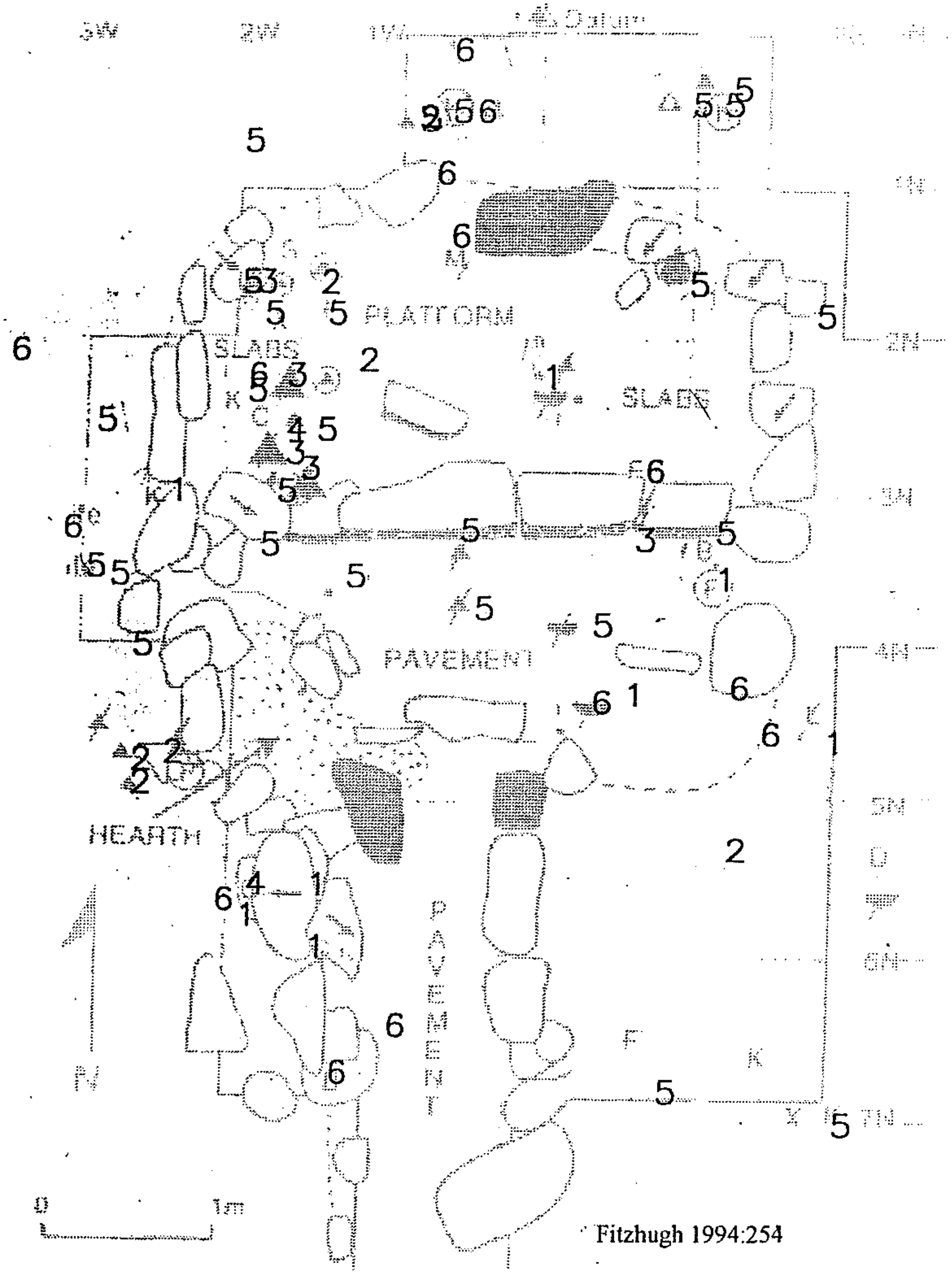

Figure 3.2 Staffe Island House Ten Floor Plan

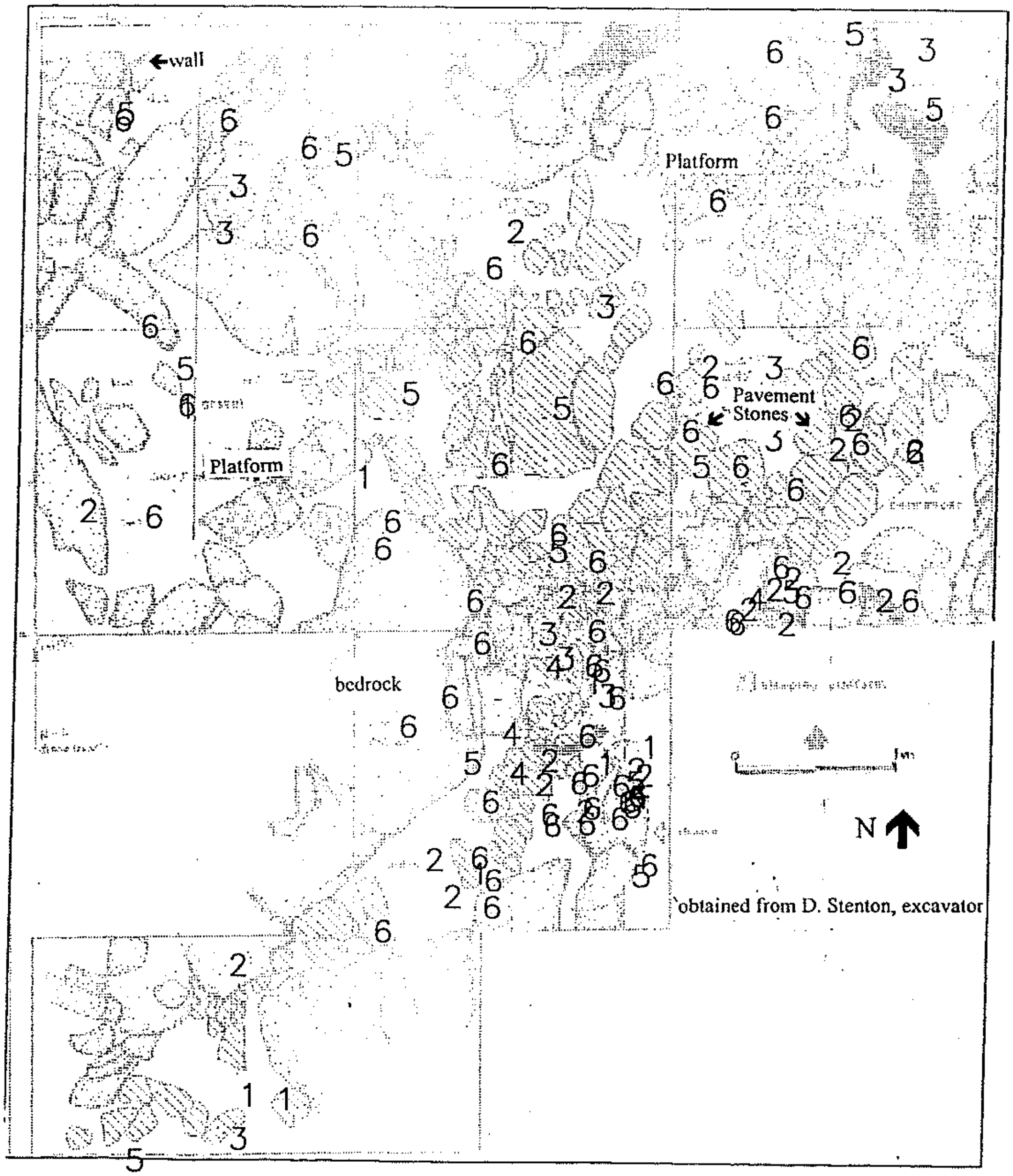

Figure 3.3 Tungatsivvik House Six Floor Plan

whale hunting was undertaken. The possible effect of whale hunting on gender relationships is addressed in Whitridge (n.d.) and is modelled in model one.

There are obviously many similarities in the basic features of ethnohistorically and ethnographically described Inuit and archaeologically identified Thule both on Baffin Island and in Labrador. The use of analogy to suggest interpretations of Thule spatial patterning based on known characteristics of Inuit society is therefore warranted.

3.6 The Inuit Analogy Applied to Thule Sites

The analogy developed in this research is that based on the similarities between Thule and Inuit material culture, houses, subsistence and seasonal rounds. By analogy, there should also be similarities in their social organisation, namely the gendered division of labour. Hodder (1982) suggests that this should be especially true in situations where the social characteristic being extrapolated is related to the features that are similar in both cultures. In other words, since Historic Inuit subsistence practices are similar to Thule subsistence practices and the division of labour and related gender roles of the Inuit are related to those practices, it is a logical next step to suggest that Thule gender roles may also be similar. The locations of tools related to those similarly gendered activities will be used to assess gendered use of space and its implications for Thule gender relationships.

The Thule houses examined in this research were likely used by their occupants as follows:

The amount of debris, broken tools and whole tools found in each house (See Tables 3.4 and 3.5) suggests that the Thule, like their descendants, used the house structure to perform many of their daily activities. These could include skinworking, lamp tending, cooking, tool manufacture/maintenance and (possibly) butchering. However, the Inuit ethnographic information does not specify that individual activities would be segregated from one another, so the existence of "activity areas" (See chapter four) has to be tested.

3.7 Models for the Spatial Manifestations of Thule Gender Relationships

Ethnographic and ethnohistoric accounts of the Inuit reveal that some areas are considered the property of a particular gender (e.g. the "kitchen" area belongs to the woman). This type of gendered space should be visible in the Thule houses if such areas exist. For example, Whitridge (n.d.) suggests, based on Alaskan Inuit ethnographic information, that in Thule groups where whaling was important, a shift in the gender relationship may result in elevated value for men's work. This could result in segregation of gendered activities. this would result in the following pattern : Tools belonging to women would hypothetically be clustered at the hearth and tools belonging to men may be absent from that area. Evidence of men's tool making and repair tasks may hypothetically cluster on the platform, a high status location in Inuit/Thule houses in whaling areas. These areas may not include women's tools.

In locations less focused on whaling, Inuit gender divisions are described as complementary and may also be co-operative (See discussion, chapter two). Assuming that Thule gender divisions were similar (complementary and co-operative gender roles), the women's area described above might be only conceptual and in reality may overlap with men's areas and vice versa.

Following from the analogy with Inuit space use, Thule households can be expected to contain evidence of a number of activities that are unlikely to be represented separately in the household space. However, if these activities and related tools are divided according to gender some spatial differentiation may be visible. This may take the form of hierarchical spatial organisation, as suggested by Whitridge (n.d. b) or may represented by overlapping work spaces.

Overlapping gendered areas, such as those found by Scheitlin (1980), would indicate co-operative gender relationships for the Thule. A hierarchically organised pattern may indicate competitive gender relationships for the Thule. This will be assessed in the spatial analysis of house use based on gendered tool location.

In Lyons's (1989) competitive model, gendered space is kept separate and maintains the perceived differences between the genders. This model can be adapted to the Thule context (following Whitridge n.d.) and suggests that while gender roles may be complementary they may not be co-operative. This results in a hierarchically organised house in which the dominant gender has exclusive access to a high-status area of the house, identified as the platform. The spatial manifestations of this are clusters of artifacts belonging to the higher status men located primarily on the platform and clusters of artifacts belonging to the lower status women are primarily located on the floor or in the tunnel.

The co-operative model (Lyons 1989) suggests that use of space by both genders is integrated and equal. Adapting this to the Thule context by suggests that relations between the genders were co-operative as well as economically complementary. This results in shared house in which there are no high and low status areas within the household, or, they are used equally by women and men. The spatial manifestation of this model is that cluster contents are mixed throughout the house with no exclusion areas for either gender.

Chapter Four - Spatial Analysis

4.1 Why Study Spatial Organisation?

Archaeologists have long acknowledged the importance of understanding the way in which human societies utilise their living and working space. Space is the context for all human activity (Moore 1986:189), thus a careful study of the manifestation of social concepts in spatial patterns is of the utmost importance to the anthropologist.

As the single common element of all archaeological sites spatial patterning is an obvious factor in any archaeological analysis (Kent 1984:1). A study of the use people make of space can provide the archaeologist with significant information that might otherwise be unavailable such as the organisation of activities (e.g. Gnivecki 1987), work-group relationships (Binford 1991; Grier and Savelle 1994) and gender/power relationships (Boismier 1991; Hastorf 1991). However, spatial analysis is anything but straightforward. Schiffer (1987) argues extensively that the patterns created by people utilising a particular area can be obscured or altered over time through the activities of natural and human agents. Hence, any interpretation of archaeological patterns must be done carefully, and must accommodate these factors of change.

4.2 General Approach to Spatial Analyses

Spurling and Hayden (1984:225) have identified one of the key problems with many spatial analyses: the connection between specific human behaviours and site patterning is often assumed rather than demonstrated. This problem could also be characterised as the search for "toolkits" and activity areas.

Naturally, the assumptions regarding "toolkits" and activity areas are linked because activity areas are generally identified based on the locations of "toolkits" and associated debris. It has been generally assumed that on any given site an excavator would be able to locate groups of tools used to perform a particular activity or groups of activities and that the activity (and hence the necessary tools and resulting debris) would be located in a fairly discrete area. Furthermore, it is assumed that these discrete groups of artifacts are direct evidence of past activities. That is not the case, however, and Schiffer (1987), Kent (1984, 1987) and Carr (1984) address this concern thoroughly. Schiffer (1987:10) reminds us that archaeologists cannot "read" these patterns directly since the physical remnants of any activity have been altered by subsequent cultural and non-cultural events. It has been suggested (O'Connell, Hawkes and Blurton Jones 1991) that the search for activity areas has little basis in reality, particularly on hunter-gatherer sites, and hence should be abandoned.

Other researchers (Carr 1984; Kent 1984, 1987; Simek 1989:60) do not hold this view, instead they recommend that activity area research proceed carefully. As Carr (1984:111) notes: "ethnoarchaeological and experimental studies support the existence of toolkits". Hence we should not abandon the search for them and, by extension, the search for activity areas. We should instead find out more about "toolkits" (and their composition and use) and activity areas so we can ensure our methods are suitable for revealing them.

The goal of the archaeologist, therefore, is to ascertain the nature of the relationship between archaeological evidence and the activities that may have taken place onsite, rather than assuming that a specific behaviour and a particular pattern are connected. Despite the fact that some mono-functional (and gender-specific) areas exist in all modern human living spaces, there are also multipurpose (and non-gender-specific) areas and the ratio of one type of area to the other also cannot be assumed (Kent 1990b: 128). In fact, as mentioned above, one cannot assume that there is any connection between specific behaviours and the patterns in the archaeological record (Kent 1984:267; Simek 1989:60). Any such connection must be demonstrated rather than used as a base assumption for research. Removing this assumption will affect the design of spatial research.

Ethnographic or ethnoarchaeological data is generally used to establish a conceptual link between toolkits and/or activity areas and specific behaviours on a given site. Contributors to Kent (1987) reiterate this point and make much use of ethnohistoric and ethnographic material. Kent (1987:3) indicates that understanding space requires the researcher to study "how it is used and organised and what influences this behaviour and the connection between cultural material and aspects of culture." Once this has been done we should be able to develop methodologies and theories that will facilitate discussion and interpretation of spatial organisation. Such methodological and theoretical advances would allow us to better understand the meaning and implications of our interpretations (Kent 1987:1). Kent (1987:10-11) has suggested that the development of spatial studies also depends on excavating some sites entirely in order to get a better picture of how space is used on a site-wide basis. This will help researchers to assess whether or not the samples upon which their theories are based are actually representative.

Once the presence of activity areas and the "toolkits" which signal their presence has been established behaviourally, Carr (1984) suggests that archaeological deposits be examined methodically for physical evidence of their existence. Whallon (1979) reminds the researcher that activity areas may vary in size, shape, density and composition. Researchers must remember that space requirements are different for different activities, and that the location, resulting debris and potential repeated use of an area will affect the resulting patterning (Carr 1984:126-27).

Activity areas may also have overlapped, making individual activities difficult to distinguish in the archaeological record. When the artifact composition of the activity areas identified on an archaeological site is examined, it may be complicated by the existence of "polythetic sets" (Carr 1984:120-121; Clarke 1978:36-37,493). A "polythetic set" refers to sets of tools which may vary in composition despite being used for similar activities. This occurs because a single tool may have been multi-purpose or because many different tools could have been used to perform the same function. In some cases one or more tools from a set may have been curated by the owner and hence would not be present in an archaeological deposit (or in a "toolkit"). Therefore, areas with very different artifact composition may have been the locations of similar activities or conversely, areas with very similar artifact composition may represent different activities. The duration of occupation or area use might also affect the resulting patterning, debris might be more concentrated or it may have been cleared away so the activity could be repeated. Finally, a site might contain activity patterning on many different levels with many related activities located within what appears to be a large co-mingled area (Carr 1984:121-31). Obviously, the identification and interpretation of activity areas from the spatial distribution of artifactual remains must be undertaken carefully.

It is important that intrasite spatial analysis take all of the points mentioned above into account. A technique for the investigation of spatial organisation should not assume that all areas of a site will be identical and should be consistent with the researcher's understanding of the nature of the archaeological record (Carr 184:113,132-33).

The goals and design of this research are intended to avoid the pitfalls described above. The aim of this project is to use individual tools (and groups of tools) to identify gendered areas which may contain any number of activities. Since it is not vital to pinpoint and identify individual activities in order to locate gendered areas the difficulties presented by polythetic sets or post-depositional shifting have less of an impact on the analysis. Also, the spatial analysis technique used in this research is chosen with the above pitfalls in mind. In fact, these pitfalls (and others) are used as criteria in selecting an appropriate technique.

4.3 Methods of Spatial Analysis

While spatial analysis is recognised as an important means of understanding the past, there has been much debate about the best methodology (for general discussion see Carr 1984; Kintigh 1991; Wandsnider 1996). Generally, two approaches are possible. One can examine the distribution of artifacts on a site visually (subjective appraisal of mapped artifact distributions). If the observer has sufficient previous experience and knowledge of the site, they should be able to discover spatial patterning in the distribution. Alternatively, one can utilise quantitative methods to objectively identify patterning on the site.

Unfortunately, both of these approaches have their drawbacks. Visual examinations may have "intellectual sophistication" (Kintigh and Ammerman 1982:33) but they are not rigorous and cannot deal with large amounts of information. Also, the human eye tends to locate patterns where none actually exist (Kintigh 1987:136) which, of course, skews one's results. Varying experience levels between researchers will cause them to identify different patterning on the same site; there is no way to judge which one is the more likely interpretation since the method is subjective. Frustration with visual methods has therefore led to the introduction of statistical methods of spatial analysis.

Unfortunately, early statistical methods tended to be borrowed from other disciplines and were not necessarily well suited to the study of archaeological data (Carr 1984:133; Kent 1987:6; Wandsnider 1996:320). Among their other problems, archaeological samples are not as controllable as those of other disciplines. That is, due to factors such as differing rates of preservation, archaeologists cannot assume that they have a random sample of artifacts (Kent 1987:7).[6] Furthermore, these statistical techniques borrowed from other disciplines do not generally allow the researcher to incorporate the knowledge accumulated through experience into the interpretative process (Kintigh and Ammerman 1982:32; Kintigh 1987:131).

Gradually, archaeologists have begun to develop their own methods of spatial analysis - most of which are based on existing methods but have been adapted somewhat to fit archaeological problems. The refinement of statistical methods has allowed archaeological researchers to produce more replicable and reliable results. Occasionally,

[6] They can assume, however, that they have a random sample of spatial content (Koetje 1998: pers. comm.).

however, it has lead to a restriction of research designs to those questions which can be easily addressed using existing methods or to the use of the same methods repeatedly, regardless of their suitability to a particular research question (Kintigh 1987:129).

A variety of recent approaches to the statistical analysis of spatial organisation on archaeological sites which attempt, with varying success, to resolve these difficulties are described below.

4.4 How can these project design flaws be reduced?

Aside from improving the actual statistical tools used, researchers can improve their analyses through careful project design. For example, as mentioned above, ethnohistoric and ethnographic material can (and should) be incorporated into spatial analysis. Researchers can use information about a particular cultural group to develop a model of expected tool types and their spatial distributions, as has been demonstrated in the preceding chapter. Or conversely, they can use the patterns observed ethnohistorically and ethnographically to model expected patterns of tool distributions for the activities known to have taken place on the site they are studying.

Project design should include the choice of a statistical method that is suited to the type of data being studied and to the research questions being addressed. That is, one's method should reflect a clear understanding of the way in which the archaeological record is structured. The selection of an appropriate statistical tool requires the researcher to identify his or her goals (helping to make biases explicit) in order to avoid selecting research goals that are based solely on available methods. Explicit descriptions of the researcher's goals allow other researchers to compare different analyses and to evaluate available techniques.

The most important part of using a spatial analysis technique is not merely the identification of patterning. The application of statistics to identify spatial patterning is not the final step in spatial analysis (Gregg, Whallon and Kintigh 1991:195, Kent 1987:1). Rather, it is one of the first steps and must be followed by analysis and interpretation if the research is to be of any value.

4.5 Technique Selection Criteria

In this research spatial analysis is used to identify patterns in the distribution of gendered tools in house structures from two Thule sites and to discuss the relationship between the location, the relative distribution and the gender concepts of the Thule. To that end, a spatial analysis technique must be selected which is replicable, reliable and able to pinpoint the physical location of the clusters (containing gendered tools) that it identifies. The resultant artifact clusters must be examined on multiple levels to accommodate the possibility that large areas of one type (i.e. gendered or non-gendered) areas contain multiple, smaller, potentially overlapping areas of another type (i.e. gendered or non-gendered). The method chosen must be able to identify the individual constituents of each artifact cluster, and therefore the location of gendered artifacts. Also, the technique must meet the criteria established for the selection of a gender analysis method, it must be applicable on any site, it must have no collection or size limitations and it must allow the accommodation of the knowledge of gendered artifacts gained from my ethnohistorical and ethnographic research. Only a method that incorporates all of the above features could allow a proper comparison between the models of space use developed here (chapter three) with the distribution of artifacts within the Thule houses.

4.6 Available Spatial Analysis Techniques

There exists a substantial body of published research in spatial analysis (Dacey 1973; Pinder, Shimada and Gregory 1979; Whallon 1973, 1974 and 1984) that explores the applicability of particular statistical techniques in given archaeological contexts. Many of these studies are also based on the identification of "toolkits" (Spurling and Hayden 1984).[7] Simek (1989:39) notes that global searches for the co-occurrence of artifact classes ("toolkits") is an ineffective method of locating supposedly discrete activity areas, however. Furthermore, Spurling and Hayden (1984) contend that lack of ethnographic information could result in the identification of spurious "toolkits", i.e. clusters of tools that are statistically related but not behaviourally relevant (Spurling and Hayden 1984:225).

As mentioned above, this research attempts to avoid the pitfalls encountered by some researchers. This is achieved by using ethnohistoric and ethnographic information about the Inuit in the development of interpretative models of Thule spatial organisation and by searching for gendered areas rather than areas related to a specific activity.

[7] The debate about the connection between these "toolkits" and actual behaviour is discussed above.

4.7 Grid Count Methods

All spatial analysis techniques based on grid counts operate, for the most part, on the same basic principle. Raw counts of artifacts or artifact type counts per square (an arbitrarily defined unit, typically 1m x 1m) are compared to the counts expected if the distribution of artifacts was random (null hypothesis) and tested for significance. The expected values are generated by assuming a Poisson distribution (Carr 1984:140-144), and the distributions are tested using Chi-Square or Fisher's exact test.

A drawback in grid count methods is the arbitrary nature of the grid size selected for use in the analysis which can influence the results of the statistical method. This is especially true in the case of a dimensional analysis of variance (Whallon 1973) where the grid superimposed on the site area has to be square or rectangular and must be only twice as long as it is wide. This problem can be overcome to some extent by inserting "dummy" squares into irregularly shaped site areas, but this also alters the results of the analysis. Furthermore, the square grid units can obscure irregularly shaped clusters of artifacts.

Grid count methods are replicable but only if the same size grid is used. These methods can identify the cluster locations, at least to within a grid square, or series of squares. It is also possible to identify the constituents of a particular cluster, if the researcher selects appropriate artifact types to examine together. The final criterion, the incorporation of ethnohistorical/ ethnographical information into the analysis, can be achieved in a limited way - by organising the tool types into ethnohistorically or ethnographically identified groups before the analysis.

Overall, grid count methods are useful in a limited way, but they do not meet all of the selection criteria. Furthermore, the influence of grid unit size on a particular collection is difficult to assess and generally these methods require the researcher to sort artifacts into groups before an association between those groups of artifacts is identified. In addition to these problems, grid counts are an imprecise means of approaching the study of spatial patterning when point provenience information is available (as it is in the present study).

One example of the use of a grid count technique is Spurling and Hayden's (1984) research in the Western Desert of Australia. The authors' goal was to determine whether or not statistically correlated artifact types are related to actual behaviours by using a recently occupied site and interviewing some of the occupants. Through the use of grid counts of artifact types and Fisher's exact test (at a relaxed rejection level) Spurling and Hayden were able to identify some behaviourally relevant associations of tools. However, some artifacts that were statistically associated were not proved to be related behaviourally. These non behaviour-related clusters may be the result of site formation processes (chapter five) or other non-human activities. If the ethnographic information had not been available for comparison some spurious "toolkits" would have been identified.

4.8 Nearest Neighbour Analysis

Nearest Neighbour Analysis is based on point provenience information. Detailed descriptions are available in Pinder, Shamada and Gregory (1979), Carr (1984) and Kintigh (1991). The basic methodology involves measuring the distance from each artifact to its nearest neighbour; those measurements are used to produce a summary statistic of the degree of clustering of the distribution as compared to a random pattern, either on a type-by-type basis or for all types across the site as a whole. Whallon (1974) successfully applied Nearest Neighbour Analysis to his study of a proto-Magdalenian occupation floor at the Abri Pataud, France. He found that the four tool types identified in his study were significantly clustered enabling him to identify a potential "toolkit". Unfortunately Nearest Neighbour is a global measure of association and does not provide locational information for clusters (one of the selection criteria applied here). Furthermore, this technique has a number of methodological problems outlined below (and see Carr 1984; Hodder and Orton 1976; Kintigh 1991).

One of the most common problems with Nearest Neighbour Analysis involves what are known as boundary problems (Carr 1984 ; Hodder and Orton 1976; Kintigh 1991). Boundary problems occur because outlying artifacts may not have nearest neighbours that are closer than the boundary, this tends to artificially inflate the nearest neighbour statistic. This affects the measurement of the strength of the observed clustering (Carr 1984:156-167).

Some boundary problems can be overcome by cutting off the analysis area within the artifact distribution, rather than outside it. This, however, requires the researcher to make a decision about acceptable levels of cut-off which can be based on one of the following two approaches: Hodder and Orton (1976:41) suggest placing a border of randomly distributed artifacts outside the study area to solve the boundary problem. Carr (1984:159) however, prefers to generate expected values based on the expected number of problem artifacts on the edge of the analysis area edge. This may be unnecessarily complicated.

Nearest Neighbour also suffers from "framing" problems. Framing problems refer to the fact that the size of the area analysed affects the summary statistic and the indication of clustering. Researchers must be careful to use behaviourally meaningful areas rather than an arbitrary part of the site surface. Unfortunately few sites are completely excavated so choosing meaningful areas is difficult.

Finally, Nearest Neighbour Analysis does not allow the researcher to take into account varying degrees of clustering within a single artifact type - e.g. if knives are clustered tightly in one part of the site but are distributed more widely in another part - it would average out in the nearest neighbour calculation. This could be overcome by dividing the site into smaller analysis areas (Koetje 1998 pers. comm). Overcoming this problem does not make Nearest Neighbour Analysis entirely suitable for this analysis however, since it does not allow examination of multi-level patterning in general. This is largely due to the fact that it does not pinpoint the actual location of individual clusters, which also makes it difficult to draw conclusions about the importance of the location of various artifacts or artifact groups.

Kintigh (1991) has suggested that the nearest neighbour technique would be better used to identify the relative degree clustering on a site rather than to establish a measure of absolute clustering. Two artifact types could be examined together, with constraints on the measurements of their Nearest Neighbour so each artifact would have a nearest neighbour of the opposite type. This type of modification would allow some degree of comparison between artifact types, which would be useful in some research situations but is, again, not specific enough for the purposes of this thesis.

Overall, Nearest Neighbour Analysis does not meet my selection criteria. It is replicable and reliable (to some extent) but it produces only a global measure of clustering rather than pinpointing cluster and artifact locations. It does not allow for examination of multiple levels of patterning and cannot incorporate the contextual information that would permit comparison with modelled expectations of Thule spatial organisation. In fact, the limitations of the Nearest Neighbour technique greatly affected the results of Scheitlin's (1980) analysis of gendered space use, described in chapter two.

Nearest Neighbour Analysis is an excellent technique for assessing global clustering on a site or within a given area but it will not allow a researcher to pinpoint the location of given artifacts or small groups of clustered artifacts within a larger more random group which may have been the case in the Thule houses examined in his research. This research will utilise a different technique which allows a more precise analysis of the location of individual artifacts.

4.9 Other Spatial Analysis Techniques

There are many other techniques of spatial analysis (Blankholm 1991; Carr 1984; Hodder and Orton 1976; Kintigh 1991; Wandsnider 1996). For example, Hodder and Okell's A (Hodder and Okell 1978) measures aggregation but is a global measure and does not meet the selection criteria of providing the locational information necessary for this research. Johnson's Local Density (Johnson 1984) measures artifact class associations but is again global (and has boundary problems). Whallon's (1984) Unconstrained Clustering is an analytical approach which is supposed to avoid the difficulties of dealing with cluster size, shape and density, it indicates location and allows multi-level patterning but it assumes homogeneity site-wide (Carr 1984:209-210) and does not allow for overlapping clusters.

4.10 K-means Analysis

The most promising spatial analysis technique which meets all of the selection criteria and has been used quite extensively in model based studies is k-means analysis.

One of the drawbacks of many of the techniques for spatial analysis described above is their inability to incorporate contextual information. In most archaeological situations, the context (e.g. environment, topography and features) can greatly affect the location of activities (including refuse disposal) and hence the distribution of the related artifacts in the archaeological record (Kintigh and Ammerman 1982:32, Simek 1984b: 406).

Although Kintigh and Ammerman (1982:33) note that visual examination of a site allows a researcher to incorporate information of this sort, such an approach is limited by the human mind's ability to process large amounts of data systematically. Furthermore, many statistical approaches require the researcher to make assumptions about activity area organisation in order to structure the analysis. K-means avoids these assumptions and allows the incorporation of context into the analysis.

K-means analysis was originally used in archaeology for typological studies but in their quest for a heuristic means of spatial analysis Kintigh and Ammerman (1982) found that K-means works quite well. K-means combines the data processing capabilities of other quantitative methods with the visual method's ability to incorporate contextual information (Kintigh and Ammerman 1982, Kintigh 1991, Koetje 1987, Simek 1984).

The goal of the K-means program is to reduce what is referred to as the Sum Squared Error (SSE) (Kintigh and Ammerman 1982: 39) for any particular distribution of artifacts. The SSE is the sum of squared distances from each artifact to the centre point of the cluster it is assigned to. This will be at its lowest for a given set of clusters when each artifact has been assigned to its closest cluster centroid. The program begins with all artifacts assigned to one cluster, a centroid (mean x, mean y, for all points in a given cluster) is computed. The point that is furthest from the centroid is determined and assigned to a new cluster, for which a new centroid is determined, the program then reassigns all points to the cluster defined by the nearest centroid. The program then checks if this configuration generates a lower SSE than the previous configuration. If the SSE is not lower the program returns to the previous configuration. This process continues until either the maximum number of clusters (determined by the user) is reached or until there is no improvement of the SSE with the new configuration (Kintigh and Ammerman 1982:39-47). Thus, while most techniques are agglomerative, K-means is divisive.

The K-means program provides the user with statistical information about each individual cluster (e.g. content, size and location) at each cluster level as well as statistics (including maps) concerning the configuration of all clusters at each cluster level[8]. The researcher can determine which configurations bear closer examination through use of a graph produced by the program (see Appendix B). This graph represents the SSE of each of the cluster configurations as a percentage of the SSE of the one

[8] The number of clusters generated in a particular configuration is referred to as the 'cluster level'.

cluster (entire distribution) solution. Those points on the graph that show clear inflection represent significant cluster configurations (Kintigh and Ammerman 1982:39-47).

Contextual information can be incorporated into this process in several ways. The user can specify the maximum number of clusters that are of interest. Such a choice could be based on knowledge of the limited area, the nature of activities present or general ethnohistoric and ethnographic knowledge of the group under study. The program reports the actual location of each of the clusters (it provides the co-ordinates of each centroid), so the potential influence of site features or other constraints upon the artifact distribution can be determined. K-means does not provide a single best configuration for a particular distribution, instead, it identifies several significant configurations. This allows the researcher to choose which of the significant solutions is most intuitively satisfying given the contextual information.

K-means analysis allows the researcher to examine multiple levels of patterning. Clearly many activities may have taken place in any one area of a site. By presenting both coarse and fine grained patterning, K-means allows the researcher to examine which individual activities may have taken place within a large, co-mingled area of a site.

K-means is an objective approach to spatial analysis. It is not based on behavioural models and activity areas, at least initially, as it only identifies artifact clustering that may or may not relate to specific human behaviours. The onus is on the researcher to explain the patterning, and interpret the clusters using previous, independently determined behavioural models.

There are, of course, some criticisms of the technique. The K-means program tends to form circular clusters (Kintigh and Ammerman 1982:48; Wandsnider 1996:337), which is a drawback since it may result in the imposition of arbitrary cluster shapes but researcher awareness should help avoid incorrect interpretations. Gregg, Kintigh and Whallon (1991:182) have noted that K-means did not help them to identify co-occurring artifacts and features in their analysis of simulated !Kung sites. K-means was, however, designed to identify clustering, not co-occurring artifacts and features. Such an analysis of cluster contents would have to be undertaken separately. The present study does not require the identification of artifact co-occurrence.

The most extensive critique of K-means made by Wandsnider (1996) who indicates that K-means is another example of a non-standardised spatial analysis technique that makes comparison between sites difficult. Wandsnider (1996:336) notes however, that Koetje (1994) was able to compare the results of a number of K-means analyses on French sites. According to Wandsnider (1996:337), since K-means depends on the archaeologist to define an appropriate clustering level for interpretation, an element of subjectivity is introduced into the analysis. However, this is not strictly true since the program provides the researcher with an indication of the most statistically sound cluster configurations. The fact that K-means does not provide a single best solution but instead provides a number of potential solutions for the researcher to choose from can also be seen as the main strength of the method. The multiple solutions allow the archaeologist to view different levels of patterning and lets her/him choose which best fits the ethnohistoric and ethnographic information about the site.

Wandsnider (1996:332) also notes that the "partitive" nature of K-means (and other clustering methods) weakens the method because the partitions (clusters) are assumed to be behaviourally significant. However, assumptions of that sort are not inherent in the method, they are a weakness of the researcher (as discussed above). Wandsnider also critiques the use of unevaluated ethnographic information in the interpretation of clustering patterns. Again that is a reflection of a researcher's weakness rather than a methodological one.

Wandsnider (1996:332) also contends that the user-friendliness and easy availability of the K-means program, rather than any inherent value of the method, is the principal reason for its popularity. This is a very weak criticism. Just as user-friendliness and accessibility are not reasons for selecting a particular method, they are not reasons for rejecting it either. Statistical methods do not have to be difficult to obtain or difficult to use in order to be effective. Furthermore, K-means has been proven to identify significant patterning in a wide range of studies (below), and has been independently verified by subjecting the same databases to analyses based on other techniques (e.g. Gregg, Whallon and Kintigh 1991; Kintigh and Ammerman 1982; Simek and Larick

1983). This suggests that K-means has methodological integrity and reliability, which results in its popularity.

Wandsnider also indicates a few other methods that are "less demanding in their assumptions" (Wandsnider 1996: 337). She has not, however, demonstrated clearly which assumptions (aside from a tendency to form circular clusters) of the K-means method are highly demanding. Her failure to do so weakens the impact of her critique.

A simulation experiment designed to test the ability of K-means analysis to identify discrete spatial clusters of artifacts was conducted by Gregg, Kintigh and Whallon (1991). The researchers utilised data from a !Kung site at which activity patterns were known (c.f. Yellen 1977), and demonstrated that K-means was capable of identifying almost all of the spatial patterning. The only error produced was the combination of two households into one but the members of those households were closely related. The authors then proceeded to apply K-means to three different simulations of the !Kung site increasing the level of simulated disturbance with each application. The program was least successful on the most heavily disturbed simulation but was still able to identify many of the household groups (Gregg, Kintigh and Whallon 1991).

4.11 Examples of K-means Analysis

K-means has been used extensively, notably on several French Upper Palaeolithic sites (Kintigh and Ammerman 1982; Koetje 1987; Simek and Larick 1983; Simek 1984a, 1984b; Rigaud and Simek 1991). Researchers in this area generally use hunter-gatherer models such as those developed by Binford (1983) and Yellen (1977) to develop their interpretative models of spatial patterning. Kintigh and Ammerman (1982) tested K-means on the well-documented site of Pincevent, and determined that this technique revealed spatial patterning similar to that subjectively identified by the initial excavators Leroi-Gourhan and Brezillon (1972). In other words, K-means produced quantitative, reproducible results which confirmed the visual interpretation of Pincevent which is widely regarded as excellent, having been painstakingly undertaken by very experienced researchers (Leroi-Gourhan and Brezillion 1972). Thus if less experienced researchers using K-means can reproduce the same high quality results as the most experienced researchers, Kintigh and Ammerman were successful in their design of a cluster analysis program.

Simek and Larick's (1983) examination of the Magdalenian open air site at Pincevent (France) also produced useful results similar to those produced by the visual examination of the site by the original excavators, Leroi-Gourhan and Brezillon.

Simek (1984) used a K-means analysis to test his models of expected homogeneity of work areas at the Magdelenian site of Pincevent (France), and in

Aurignacian levels from the site of Le Flagolet I. Simek examined the clusters present in each artifact class, overlaying the cluster maps of different artifact types to determine "zones" - areas where artifacts of different classes were grouped together. His statistical examination of these zones allowed him to identify and interpret a variety of sites.

Simek has also undertaken a number of different K-means analyses (1984b, 1987, 1989) at other locations. In these studies, K-means is used, along with a variety of supporting statistics, to test the assumption that spatial patterning reflects human behaviour (Simek 1989) and to indicate that factors such as site features may influence spatial patterning (1984b). Overall, he has found that many factors (including, but not limited to human behaviour) can influence site patterning and he reminds us that we must first determine that specialised use areas actually exist before we can expect sites to reflect them. Simek (1989) has also determined that K-means can be used successfully to quantify differences in the way prehistoric sites were used.

K-means cannot always identify discrete activity areas, however. Simek's and Rigaud's (1991) use of K-means to identify spatial patterning at Grotte XV, Couche VII, was relatively unsuccessful. The researchers found that, despite the combination of visual analysis, K-means and a refitting study, activity areas in large deposits cannot always be identified because it is difficult to distinguish between debris piles and overlapping activities.

Koetje (1987) utilised K-means and an index of diversity to test his models of site use in the Isle Valley, (France). He examined the collection in its entirety rather than on a class by class basis and applied an index of diversity to determine the degree to which observations matched expectations generated by his models. In this case, K-means enabled Koetje to ascertain that the sites in question conformed to two of the site-use models.

Koetje (1992) has also used K-means analysis to successfully identify archaeological levels on a site in which the levels were not clearly defined during excavation. Grimm and Koetje (1992) using K-means, a diversity index and a complementary refitting study, determined that the Upper Perigordian site of Solvieux was used repeatedly for different stone tool manufacturing events and that the resulting lithic distribution became mixed over time.

4.12 Conclusion

It is obvious at this point that, despite some drawbacks, K-means analysis has a number of advantages over other quantitative techniques of spatial analysis and that it is the only techniques that meets all of the selection criteria chosen for this research. It allows for the incorporation of contextual information; it identifies the cluster location and it provides a good means of evaluating models while avoiding the pitfalls of analyses based on behavioural assumptions. Finally, it allows for the examination of multiple levels of spatial patterning and is non-hierarchical (i.e. assignment of artifacts to clusters at one level of clustering is not contingent upon its assignment in a previous level). It will allow both small and large-scale examination of the sites' patterning

K-means analysis, therefore, is used in this research to identify spatial patterning of gendered artifacts in Thule house structures for comparison with the ethnohistorically and ethnographically derived models of expected gendered spatial organisation on the two Thule sites.

One of the goals of this research is to assess the utility of spatial analysis in studying gendered space use, and gender relationships, in archaeological contexts. This research, therefore, will allow me to assess the usefulness of K-means for that purpose.

Chapter Five - Site Descriptions and Research Methods

5.1 Introduction

The preceding chapters established that a) gender relationships can be reflected in use of space b) the Inuit have strong gender concepts and a gendered division of labour which can be used to engender tool types, c) the distribution of these gendered tool types can allow examination of the use of space by each d) that a technique applicable to the study of these concepts, K-means analysis, is available for use. This chapter will describe the sites used in this research, discuss the formation processes that may have affected the artifact distribution on each site and, finally, will outline the methodology employed in this study to examine models of Thule space use. The specific archaeological contexts examined in this research are one house from each of two Thule sites, one in Northern Labrador, -Staffe Island, and one on Baffin Island, -Tungatsivvik (see Figure 1.1).

5.2 Staffe Island

Staffe Island is located between Cape Kakkiviak and Killinek Island (Northern Labrador), at the western end of a shallow bay. The chief resources in this area are marine mammals, seabirds and water fowl, although large whales and caribou may have been available at other times (Fitzhugh 1994:244) (see Figure 3.2 - House Ten).

The house selected for study is House Ten located at the Staffe Island One site (JaDb-2), perhaps the only fully excavated Thule dwelling in the area (Fitzhugh 1994:256). House Ten was test-pitted in 1978, with one 1m x 1 m test pit dug into the entrance passage and another dug in front of the sleeping platform (Fitzhugh 1994:248). The site was fully excavated in 1989 by Fitzhugh.

Staffe Island House Ten has been radiocarbon dated to A.D.1170-1277, based on a charcoal sample. Its floor plan is very similar to Thule houses of similar age from other Eastern Arctic areas (Fitzhugh 1994:253-254). The single room measures four by four meter, with a 2.5m long flagstone paved entrance tunnel. The interior of the house was also lined with pavestones. The paving stone sleeping platform is located at the back of the house, and in the southwestern corner of the dwelling a charcoal-stained soil platform may represent a hearth or lampstand (Figure 3.2). A pile of rocks and bone outside the east wall of the passage may have been a meat cache (Fitzhugh 1994:254).

Low tool densities, a small midden and a thin floor deposit on the house floor suggests that House Ten was likely occupied only for a season or two, by a single small family (Fitzhugh 1994:255,258). Fitzhugh (1994:255) suggests that House Ten may represent a winter/spring occupation of a skin-covered *qarmat* rather than a sod and earth covered early winter house. Unlike most Thule settlements, House Ten was found to be quite undisturbed and contained little evidence of rock scavenging or other post-occupational disturbances (Fitzhugh 1994:254). Unfortunately, House Ten contained some late Dorset artifacts (Fitzhugh 1994:249) in addition to the Thule material used in this analysis. This Dorset material may result from Thule excavation into a pre-existing Dorset midden during construction. The effect of these extraneous artifacts on the analysis will be addressed below.

5.3 Tungatsivvik

The Tungatsivvik (KkD0-3) site is located on the Northern shore of Peterhead Inlet about ten kilometres west of Iqaluit (Rigby and Stenton 1995:47). This site contains about one hundred features which include summer and winter dwellings, meat caches, kayak stands and burials indicating that the site would have been logistically important both in winter and in summer(Rigby and Stenton 1995:47). House Six was chosen for this analysis (Figure 3.3).

Tungatsivvik was excavated by Douglas Stenton and Bruce Rigby as part of the Community Based Heritage Education Training and Research Program. Interestingly, Stenton and Rigby (1995:49) found that the Inuit excavators working with them were able to recognise many of the Thule artifacts, which strengthens the argument made in chapters two and three regarding the close connection between Thule and Inuit cultures.

House Six is dated to AD 1020-1260 based on calibrated radio-carbon tests and stylistic attributes of harpoon heads and other artifacts (Rigby and Stenton 1995:51). This dwelling is one of four Thule winter houses excavated at the site. Like them, House

Six is a semi-subterranean house constructed of stone, sod and bowhead whale bone, and contains a single circular/oval living area with a narrow entrance passage. The living area is approximately 4.5m by 4m and the entrance passage is approximately 3m long. A sleeping platform is located at the rear of the house and a lampstand is located on the northwest side of the structure (Rigby and Stenton 1995:47).

The site of Tungatsivvik, in general, exhibited moderate levels of disturbance (Stenton 1998 pers. comm.) and the house contained a large number of boulders that had originally been part of the structure's walls. The artifacts found within House Six included artifacts used in hunting, travel and domestic activities (Rigby and Stenton 1995:47). The faunal remains found on site are dominated by ringed seal and caribou but there are some whale bones in the assemblage and whale bone was used in the construction of winter houses (Rigby and Stenton 1995:53).

According to the excavators (Fitzhugh 1994; Rigby and Stenton 1995) the houses chosen for analysis are fairly typical examples of Thule architecture. Tungatsivvik contains a large number of bone and ivory artifacts, suggesting that preservation was generally good at this site. Unfortunately, Staffe Island is not so well preserved (Fitzhugh 1994:247) and contains mostly stone artifacts and very few bones. This probably affected the variety of artifacts present at the site, particularly women's artifacts (see table 3.2) and the products of women's labour (i.e. lamp oil, skin clothing), which tend to be made of more biodegradable materials. It is entirely possible that some of these artifacts were not present in the first place so my discussion will take this into account.

5.4 Assessing the Impact of Formation Processes

The nature of the formation processes that may have affected these sites is assessed below.

The Decay of Organic Artifacts:

This appears to affect Staffe Island, House Ten, more than Tungatsivvik, House Six. While the Tungatsivvik collection contains a variety of bone and ivory artifacts, the Staffe Island collection contains very few. This would have affected the number of tools that were present (n = 61), reducing the strength of the significance tests and hence the statements based on those tests. At Tungatsivvik organic decay may have affected artifacts preservation to a lesser extent but this would not generally affect the analysis unless the broken pieces were so small as to be labelled "unknown". This is unlikely, given the variety of identifiable artifacts excavated.

Removal of Construction Materials/Roof Collapse:

This appears to have affected Tungatsivvik, House Ten more than Staffe Island, House Six. A number of rocks from the walls had fallen inside House Six (Rigby and

Stenton 1995:49). This probably explains the high number of artifacts in the unknown category (category 6, n= 61) for this collection, as the rocks may have broken some whole artifacts such as vessels. The impact of this type of formation process will be assesses when the artifact clusters are examined both with and without tools of unknown gender affiliation.

Roof collapse may have also affected the locations of the artifacts on both sites. That is why the potential gendered work areas are been treated as large units (see below), to account for possible movement related to this formation process. Roof collapse may also explain why some artifacts appear to be located slightly outside the structure walls, although these artifacts could conceivably have been left in that location by the sites' inhabitants. Although outside artifacts are not included in the initial analysis, their distribution and possible relation to other aspects of the site is dealt with in the discussion.

Curation, Loss and Discard:

This appears to have affected both sites since some items, such as whole lamps, were not found at either of the sites. It the objects were not broken during roof collapse they may have been lost, discarded elsewhere, or curated. Obviously since an example of every tool type used by the Thule was not found at the sites, curation, loss and discard has to have affected the composition of the assemblage. Artifacts may have also been scavenged from either site by later occupants.

Scavenging:

While this post-depositional process may have affected both sites, Fitzhugh (1994), indicates that Staffe Island-House Ten did not seem to be disturbed. Rigby and Stenton (1995) suggest that Tungatsivvik-House Six was in-filled with boulders from the walls but do not mention scavenging. The presence of these boulders may have even prevented scavenging since it may not have been worth moving the boulders to access underlying materials.

How might formation processes have affected spatial patterning? A researcher must always account for the possibility of formation processes affecting the distribution of artifacts on a site. In order to minimise the impact of these processes the internal house space (in both cases) is deliberately examined in large units in the initial interpretation of the spatial distributions to accommodate some shifting of artifacts, e.g. the cluster levels analysed were kepted within a plausible range.

5.5 Research Method

Chapter four outlined a number of potential spatial analysis techniques that could be applied to the research problem, and the K-means technique was selected as the most promising. However, K-means is only a tool for analysis and before it can be used, it is necessary to select a methodology in which to use it. Artifact collections are prepared and sorted into gender categories, and entered into the K-means program as follows.

5.5.2 Sorting and Entering Artifact Assemblages Into the Database:

On both study sites the collections from the houses to be analysed contain a number of artifacts that were "unusable" in the analysis, and these have been removed. For the purposes of this discussion, unusable artifacts are defined as artifacts intrusive to the Thule occupations, or any artifacts which have not been point-provenienced[9]. Artifacts located outside the houses were initially removed for the spatial analysis of the house interior and were examined separately.

As mentioned in section 5.2 above, the house at Staffe Island contained both Thule and Dorset artifacts. According to Fitzhugh (1991), the Thule dug into a Dorset midden when constructing the house and some Dorset artifacts were incorporated into the walls. It is possible to distinguish between these late Dorset artifacts and those related to the Thule occupation, however (Mathiassen 1927, Stopp 1998 pers. comm.). Fitzhugh (1994:248-249) asserts that the location of the Dorset artifacts within the structure is consistent with such intrusion into a pre-existing midden. For this reason, and because

[9] Fitzhugh(1998 pers. comm) has indicated that these non-point-provenienced artifacts were recovered, for the most part, from the backdirt. Hence, they cannot reliably be included in the analysis. The Tungatsivvik Thule occupation database has three non-point provenienced artifacts, which are also not included in the analysis.

they are not relevant to the discussion of Thule gender roles, the Dorset artifacts are not included in the k-means analysis. Finally, artifacts recovered from two test pits dug at Staffe Island could also not be included in the analysis because their point-provenience information was recorded separately. Fortunately, most of the artifacts that are ineligible for the analysis fall into the "unknown" category (see below) and would not have contributed much to the discussion on gendered patterns of spatial organisation.

There are also intrusive artifacts in the Tungatsivvik collection but they are Palaeoeskimo artifacts and were found in secondary contexts on site, such as within house walls (Rigby and Stenton 1995:50). These artifacts obviously do not present a problem for this research since they cannot be considered to have been part of the collection of tools used by the inhabitants and are readily identifiable.

5.5.3 Sorting the Remaining Collection:

The two collections of artifacts from Staffe Island House Ten and Tungatsivvik House Six were sorted into six "gender" categories: women's (1), men's (2), neutral (3), probably women's (4), probably men's (5), unknown (6) (see Tables 3.4 and 3.5). Ethnohistoric/Ethnographic information about the Inuit (see chapter three) was used in assigning artifacts to gender categories. Fragmentary artifacts were assigned to the appropriate categories where possible. Tools that were unidentifiable as to function or gender were assigned to the "unknown" category.

Women's artifacts (category 1) include all of those artifacts that could be clearly related to ethnographically defined women's activities, such as lamps and *ulus* (a woman's knife used for skin working and food preparation). Fragments of definite women's artifacts (*ulu* blade fragments, etc.) are also included in this category.

Men's artifacts (category 2) include all definitely men's artifacts, such as harpoons and snow knives, and fragments of such definitely men's artifacts.

The neutral category (Category 3) represents those artifacts for which ethnographic/ethnohistoric correlates exist but which could be used by either gender. An example of a neutral artifact would be a whetstone, which is assigned to this category because, although men were responsible for tool maintenance according to ethnographic accounts (Gullason 1998 pers. comm), whetstones were likely to have been used by either gender as the need arose. On Staffe Island, some butcher knives are also included in this category because as discussed in chapter three, depending on where butchery took place (at the dwelling site or at a kill site) such knives may have been used by either gender. The neutral category is considered as important as the women's and men's categories because these items are identifiable as belonging to both genders, as opposed to the unknown category which cannot be identified to either.

The "probably" categories (4 and 5) are tentative gender assignments and contain artifacts whose context of use among the Inuit suggests an association with a particular gender, based on ethnographic accounts, but which cannot be definitively assigned to a given gender. By this rationale, any tool probably associated with hunting is tentatively a man's tool whereas any tool probably associated with skin working is tentatively a women's tool. These categories are subject to re-examination throughout the analysis.

The "probably" categories are intended to create intermediate categories between those tools that are defined ethnographically as being gendered and the "unknowns" - the small pieces of raw material, tool fragments or generic tools which are not specifically mentioned at all and may have more than one use context. "Probably" men's and "probably" women's tools are tools which would be used for a task which is broadly defined as men's or women's, but which have not been well described ethnographically. This category also allows for typological uncertainty, e.g., in the Tungatsivvik collection an artifact that had only been tentatively identified as an awl, a skin working tool considered a woman's tool (Table 3.5), was placed into this category instead of the women's category.

The unknown category (category 6) includes artifacts for which gender is unknown or too tentative even for assignment to the "probably" categories, as well as fragments which have not been identified. This category may also be subject to revision in the course of the analysis.

One of these category numbers has been assigned to each artifact used in the spatial analysis. These gendered artifacts are used to locate men's and women's working spaces in each house and discuss the relationship between those spaces.

5.6 Running the cluster analysis:

Kintigh's Tools for Quantitative Archaeology[10] (Kintigh 1994) was used for this analysis and the databases were prepared according to the requirements outlined by the author of the program. Kintigh's program requires that the point provenience information, and (in this case) the gender code for each artifact, be included in the analysis. The artifact type is listed in a separate label file so it can be reconciled with the point provenience information and gender assignment in the results printout. This allows the researcher to easily determine which artifacts are contained in each clusters. After the program assigns artifacts to individual clusters, it then reports the proportion of each gender type per cluster as well as identifying the artifact composition of each cluster.

For each collection the program was requested to do twenty random runs because Langley (1970:140) and Thomas (1986:216) suggest that a solution produced once in twenty attempts is the standard for acheiving significant results.

In order to obtain information about the influence of the "probably" and the "unknown" categories on the clustering of artifacts the program is run on three modified versions of each database in addition to the unmodified runs. The first modification removes the unknown artifacts in order to see what patterning results when only gendered artifacts (Categories 1-5) are considered. The second modification removes the

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[10]This program is available directly from Keith Kintigh, Arizona State University. Email kintigh@asu.edu.

unknowns, the probably men's and the probably women's artifacts. A third modification removes only the probably categories (Categories 4 and 5) from the collection.

Results from the modified runs (see below) are compared to the results for the entire collection to determine if clearer gender patterning is revealed. The first modified run establishes whether artifacts to which gender could not be attributed overwhelm the distribution and hence cloud gender-patterning. The second modified run examines how the cluster patterning is affected when only the most definite category assignments are considered. The third modified run helps determine if the gender patterning is weakened or obscured when artifacts that could support gender relation interpretations ("probably" categories) are also removed. These modifications help clarify the relationship between the different categories and the spatial patterning on the individual sites.

5.7 Significance tests of individual cluster composition:

Significant clustering is revealed through the K-means analysis. Ascertaining whether clustering and cluster patterns are caused by gendered use of space involves close examination of the contents of individual clusters as well as some statistical tests of the cluster composition. The results of the K-means technique are counts of artifact types or classes within clusters, are on the nominal level, and are non-parametric, hence the tests available for use are limited to Fisher's Exact Test, Chi square and Binomial tests.

According to Thomas' (1986:298) guidelines for a two by two contingency table, Fisher's test is used if the total number of cases is less than twenty, or if the number of cases is between twenty and forty and if any of the expected values generated are below five. Chi-Square is most appropriate when the total number of cases is above forty, or if the number of cases is between twenty and forty and none of the expected values are below five.

A two by two contingency table is not appropriate for the categories described here because there are six different categories of artifacts to compare and there may be more than two clusters to consider.

There exists an alternative, however. For tables with more than four cases (i.e. r x c contingency tables), Thomas (1986:298) indicates that Chi-Square can be used if the data meets at least one of the following criteria: all expected values generated are higher than five; no expected value is lower than one and less than twenty percent are less than five; more than twenty percent of the expected values are less than five but none are less than two (See Appendix D, Tables 1, 2, 5 and 6 for examples).

A r x c contingency table allows the original six tool categories to be maintained. However, if a Chi-Square test cannot be performed on the assemblage when it is divided into 6 categories, the women's and probably women's are combined into a single category and the men's and probably men's are combined into a single category. This will produce four larger categories and these allow a second Chi-Square test to be performed. If a

Chi-Square test of the entire cluster solution is unable to reject the null hypothesis each cluster will be examined separately using a Binomial test.

The Binomial test compares the number of total count for a given category per cluster given the proportion of that category of artifacts in the entire assemblage, to determine if the cluster's proportion could occur by chance. In this research, for example, the test will determine if the proportion of women's artifacts in a given cluster could have occurred randomly. If there are no women's artifacts in a given cluster the proportion of men's artifacts will be examined instead. The expected value for women's tools is based on the proportion of women's to men's artifacts in the entire collection. Since there are fewer women's artifacts, this should provide an accurate measure of the probability of a women's artifact occurring in a given cluster. For examples see Appendix D, Tables 3, 4, 7,and 8.

Before any significance test can be undertaken, a null hypothesis must be created. For significance tests on the results of the k-means analysis the null hypothesis is:

The assignment of gendered tools to a given cluster is due to chance.

The .05 significance level is the standard level for rejection of null hypotheses. However, Orton (1980:203) notes that rejection of a null hypothesis is not only related to differences with a sample but also the size of the sample. He suggest that within small samples, differences between categories will have to be large before the null hypothesis can be rejected (Orton 1980:203). Both sites used in this research have small collections that could affect rejection of the null. To offset the effect of sample size in this a lower rejection level of .10 will be selected for the significance tests performed in this research. If the null hypothesis is rejected, the relationship between gendered tools and cluster assignment can be discussed. Results are presented in chapter six and their interpretation (in terms of use of space) in chapter seven.

5.8 Conclusion

Kintigh's K-means program is used in this analysis to identify patterning in artifact distributions in two Thule houses. The results of this analysis will be used to establish the role that gender relations played in structuring the spatial patterning in the Thule houses, allowing the researcher to assess the utility of spatial analysis for examining gender relationships in a household context.

Chapter Six - Results

This chapter will describe the results of the K-means spatial analysis of artifact distributions from Staffe Island House Ten and Tungatsivvik House Six . The results for the Staffe Island House Ten collection and the corresponding outside artifacts will be described first, followed by the Tungatsivvik House Six collection and corresponding outside artifact results.

6.1.1 Staffe Island House Ten Assemblage

The Staffe Island House Ten collection consists of forty-two artifacts (Table 6.1). The Sum Squared Error (SSE) graph (Appendix B -Figure 1)for the entire collection of Staffe Island artifacts indicates significant clustering at the three, nine and fourteen cluster solution levels. The contents for each cluster at each of these solution levels are described below.

6.1.1.1 The Three Cluster Solution

Cluster contents per gender category are listed in Appendix A - Table 1. In this

Women's n=7	Men's n=4	Neutral n=5	Probably Women's n=2	Probably Men's n=15	Unknown n=9
graver tip	harpoon endbld	butcher knife	boot creaser	endbld	mica
vessel	lance tip	butcher knife	boot creaser	pocket knife	blk chert
ulu	harpoon pt	butcher knife		endbld	slate
ulu	harpoon endbld	bead		endblde frg	slate
ulu		whetstone		blade	bone
ulu				endbld frag	gr slate
ulu				endbld	red slate
				core	knife
				piece esquillees	bone
				core/axe	
				endbld	
				st. edge flake	
				endblade	
				endbldpreform	
				endbldpreform	

Table 6.1 Staffe Island House 10 Assemblage
Gendered Artifacts List

cluster solution (Appendix C - Figure1), cluster 3.1 contains nineteen artifacts and is located on the western portion of the sleeping platform, north of the hearth with two artifacts on the floor and one in the northwest wall.

Cluster two is located mostly in the wall of the entrance tunnel and the wall behind the hearth and contains nine artifacts.

Cluster three contains fourteen artifacts and is located in the southeast platform and on the southeast floor opposite the hearth.

6.1.1.2 The Nine Cluster Solution (Appendix C - Figure 2)

The list of artifacts by gender is presented in Appendix A - Table 2. Three single category clusters are present at this solution level. Cluster five, located behind the hearth contains three men's artifacts. Cluster six, in the northeast platform wall, contains two probably men's artifacts. Cluster seven contains three probably men's artifacts and is located on the centre of the house floor. Of the remaining clusters, Cluster one is located on the northwest platform and contains no women's or probably women's artifacts. Cluster two is located on the southwest platform and contains no men's or probably men's artifacts. The more evenly mixed clusters (containing both female and male objects) are located as follows: cluster three is located on the southeast floor; cluster four is located in the centre of the platform; cluster eight is located on the southwest platform and cluster nine is located on the southeast platform and northeast floor.

6.1.1.3 The Fourteen Cluster Solution (Appendix C - Figure 3)

The gendered artifact list per cluster for the fourteen cluster solution is presented in Appendix A - Table 3. This solution level produces five single category clusters. Clusters six (n= 1) and seven (n=3) contain only probably men's artifacts. Cluster ten contains a single women's artifact. Clusters eleven and twelve each contain two unknown artifacts. Of the nine remaining clusters, clusters one, seven, and fourteen contain no women's artifacts. Cluster five contains only men's and probably men's artifacts. Clusters two and three contain only women's and probably women's artifacts. Cluster thirteen contains representatives from all categories except men's or probably men's artifacts. Clusters eight and nine contain artifacts representative of all categories.

6.1.2 Significance Testing: results

As outlined in the methods chapter, a Chi-Square test (Appendix D - Table 1) was performed for the three cluster solution at Staffe Island, none of the categories rejected the null hypothesis at the required .10 level. A second Chi-Square test (Appendix D - Table 2) was run which combined category 1 (women's) with category 4 (probably women's) and category 2 (men's) with category 5 (probably men's) and was also unable to reject the null hypothesis at the .10 level. Given the decreasing number of artifacts at the nine and fourteen cluster solution levels, Chi-Square testing was not undertaken.

A binomial test was performed on the proportions of women's artifacts per cluster at the three (Appendix D - Table 3) and nine (Appendix D -Table 4) cluster solution levels for Staffe Island. At both solution levels cluster two was the only cluster to successfully reject the null hypothesis at the .10 level.

6.1.3 Staffe Island Assemblage without Unknowns (Category 6)

When the unknown artifacts are removed, the Staffe Island collection contains thirty-three artifacts (Table 6.2). This subset of the collection exhibited significant patterning at the three cluster solution (Appendix B - Figure 2).

6.1.3.1 The Three Cluster Solution (Appendix C - Figure 4)

The three cluster solution for the Staffe Island assemblage without "unknowns" produces three mixed category clusters. The gendered artifact list per cluster is presented in Appendix A - Table 4. This cluster solution was not tested for significance due to low artifact counts.

Cluster	Women's n=7	Men's n=4	Neutral n=5	Probably Women's n=2	Probably men's n=15
1	graver tip vessel ulu ulu ulu ulu ulu	harpoon endbld lance tip harpoon pt harpoon endbld	butcher knife butcher knife butcher knife bead whetstone	boot creaser boot creaser	endbld pocket knife endbld endbld frag blade endbld frag endbld core piece esquillees core/axe endblade st edge flake endbld endbld preform endbld preform

Table 6.2 Staffe Island House Ten Assemblage without Unknown Category Gendered Artifacts List

6.1.4 Staffe Island Assemblage without Probably Categories and Unknowns (Categories 4,5 and 6)

When the "probably" categories and the unknowns are removed, there are sixteen artifacts remaining in the Staffe Island collection (Table 6.3). This sub-sample did not exhibit any significant clustering (Appendix B - Figure 3).

6.1.5 Staffe Island Assemblage without Probably Categories (Categories 4 and 5).

The Staffe Island collection including unknowns but without the "probably" categories totals twenty-five artifacts (Table 6.4). This analysis revealed significant clustering (Appendix B - Figure 4) at the three, six and ten cluster solution levels.

6.1.5.1 The Three Cluster Solution (Appendix C - Figure 5)

The gendered tools per cluster are listed in Appendix A - Table 6 . The three cluster solution produced all mixed category clusters. Cluster one contains two women's and two men's artifacts. Cluster three contains three women's and two men's artifacts. Cluster three contains two women's artifacts but no men's artifacts. This cluster solution was not tested for significance due to low artifact counts.

6.1.5.2 The Six Cluster Solution (Appendix C - Figure 6)

The gendered tools per cluster are listed in Appendix A - Table 7. The six cluster solution produced five mixed clusters but, except for cluster one which contains artifacts representative of both genders, most of those clusters have only one gender represented within them. Clusters two, three and six do not contain and men's artifacts. Cluster five does not contain any women's artifacts. Cluster four, the only single category cluster at this solution level, contains only men's artifacts. This cluster was not tested for significance due to low artifact counts.

Cluster	Women's n=7	Men's n=4	Neutral n=5
1	graver tip vessel ulu ulu ulu ulu ulu	harpoon endbld lance tip harpoon pt harpoon endbld	butcher knife butcher knife butcher knife bead whetstone

Table 6.3 Staffe Island House Ten Assemblage without Probably and Unknown Categories Gendered Artifact List

Cluster	Women's n=7	Men's n=5	Neutral n=5	Unknown n=9
1	graver tip vessel ulu ulu ulu ulu ulu	harpoon endbld lance tip harpoon pt harpoon endbld	butcher knife butcher knife butcher knife bead whetstone	mica blk chert slate slate bone gr slate red slate knife bone

Table 6.4 Staffe Island House Ten Assemblage without Probably Categories Gendered Artifact List

6.1.5.3 The 10 Cluster Solution (Appendix C - Figure 7)

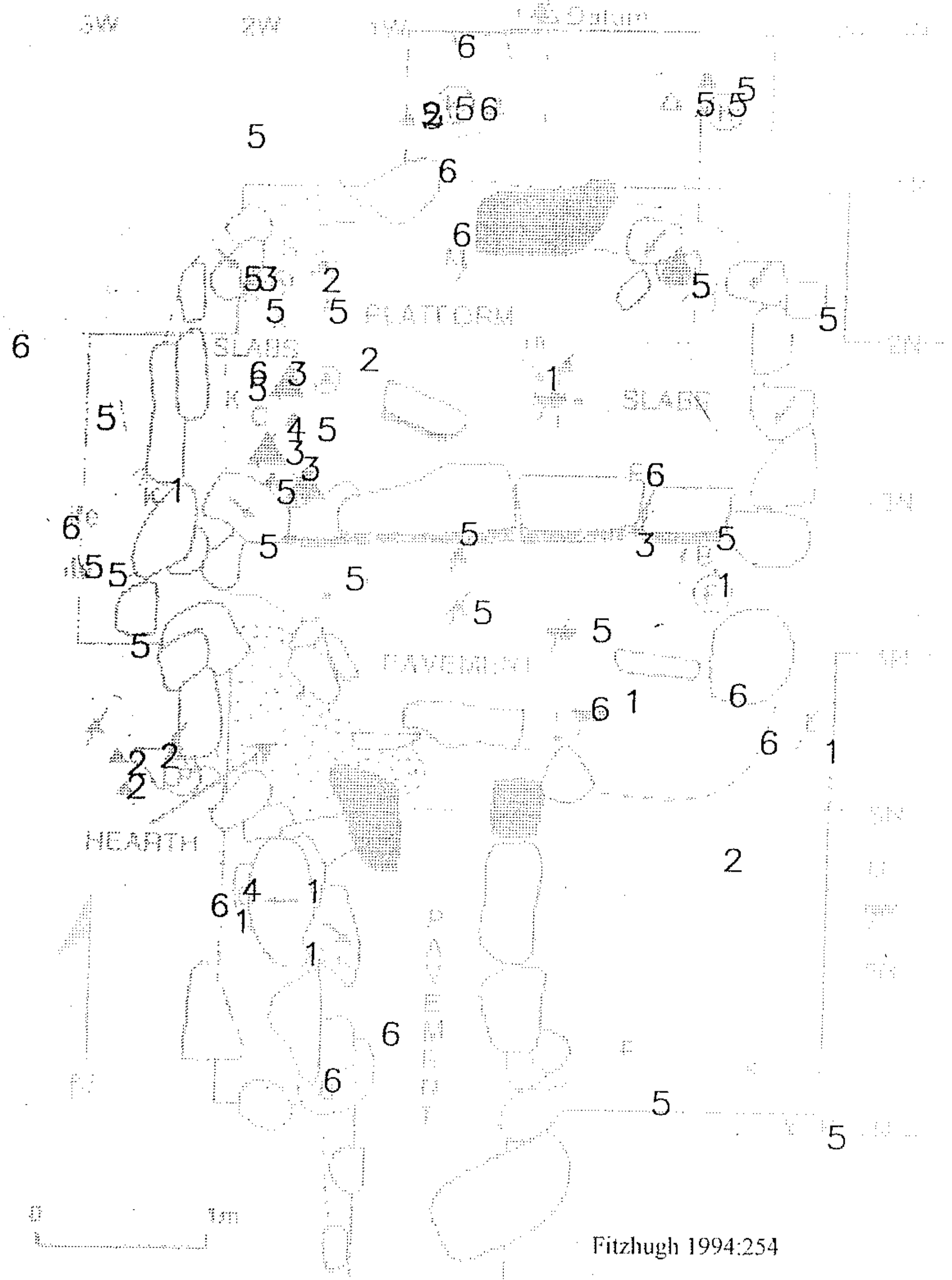
The list of gendered tools per cluster is presented in Appendix A - Table 8. In the ten cluster solution men's and women's artifacts do not occur in the same clusters. Cluster four contains only men's artifacts, clusters two and eight contain only women's artifacts and clusters seven, nine, and ten contain only unknown artifacts. Clusters one, three and six are mixed but do not contain any men's artifacts. Cluster five is mixed but does not contain any women's artifacts. This cluster was not tested for significance due to low artifact counts.

6.1.6 Staffe Island - Outside Artifacts

The outside collection at Staffe Island contains nineteen artifacts (Table 6.5). Significance testing could not be carried out because these artifacts are all located within 0.5 metres of the house structure and, subjectively, do not appear to represent separate activity/storage areas. As can be seen in Figure 6.1 which depicts both the outside artifacts and the rest of the collection, the outside artifacts are distributed around the exterior of the house singly or in small groups. This is suggestive of artifacts being randomly dropped or tossed outside by the house occupants, either during its use life or during a move. A K-means analysis was not run on this assemblage because of the low artifact counts and because it was not possible to instruct the program to avoid creating clusters across the house interior.

Women's n=1	Men's n=3	Neutral n=0	Probably Women's n=0	Probably Men's n=10	Unknown n=5
lamp/pot	harpoon point burin/drill harpoon endbld	-	-	pocket knife endbld endbld stemmed knife side-notch biface arrowhead drilled endbld pocketknife axe or core flk knife	point wrkd piece mica knife grn slate

Table 6.5 Staffe Island House Ten
Outside Gendered Artifact List



Fitzhugh 1994:254

Figure 6.1 Staffe Island House Ten Outside Artifacts

6.2.1 Tungatsivvik House Six Assemblage

The Tungatsivvik collection consists of 107 artifacts (Table 6.6). The SSE graph (Appendix B - Figure 5) for these artifacts indicates significant clustering at the three, nine, and fourteen cluster solutions. The cluster contents for each solution level are described below.

6.2.1.1 The Three Cluster Solution (Appendix C - Figure 8)

The specific breakdown of gendered artifacts per cluster for this solution is presented in Appendix A - Table 9. For this solution, cluster one, containing twenty-three mixed category artifacts is located on the western side of the house, surrounding and behind the lampstand.

Cluster two (thirty-nine artifacts), is located on the eastern side of the house and includes the "cooking area" described by the excavator.

Cluster three contains forty-seven artifacts and stretches the length of the entrance tunnel, concentrating in the tunnel alcove.

6.2.1.2 The Nine Cluster Solution (Appendix C - Figure 9)

The list of gendered artifacts per cluster for this solution level is presented in Appendix A - Table 10. Clusters one (northwest corner of platform) and nine (southeast corner of house) at this solution level contain only men's and probably men's artifacts.

Women's n=8	Men's n=19	Neutral n=10	Probably Women's n=5	Probably Men's n=8	Unknown n=58
vessel frag	harpoon head	drldpendant	marrowscp?	mattock	soapstn frag
thimble	bola	drldpendant	scapula scrpr	harpoon bld?	soapstn frag
rim shard	harpoon tip	pendant	awl	knife (?) bld	soapstn frag
vessel frag	harpoon head	peg	scapula scrpr	endbldfrag	soapstn frag
lamp	lance head	drldpendant	scrpr frag	endbld	wrked antler
ulu blade	harpoonfrshft	whetstone		endbld base	soapstn frag
rim shard	kakivak sbrb	bead		endbld base	wrkdantler
	drill mpiece	whetstone?		endbld	bone
	harpoon head	whetstone?			wrkd antler
	harpoon head	snow beater			wrkd antler
	bola				frshft
	bola				wrkd bone
	bola				drld bone
	bola				drld ivory
	arrowhead				frshft
	drill bit				wrkd antler
	lance tip				shaft
	pick				soapstn frag
	uqsiq frag				soapstn frag
					wrkd antler
					drld bone
					soapstn
					soapstn frag
					soapstn frag
					drld ivory

Table 6.6 Tungatsivvik House Six Assemblage Gendered Artifact List

Cluster eight contains only unknown artifacts and is located in the northeast corner of the platform. The remaining clusters are mixed and are located as follows : cluster two in the southeast corner of the house; cluster three in the mid-tunnel/alcove; cluster four in the external tunnel entrance; cluster five in the internal tunnel entrance; cluster six in the centre of the house, northeast of the lampstand and north of the cooking area; cluster seven in the southwest corner of the house.

6.2.1.3 The Fourteen Cluster Solution (Appendix C - Figure 10)

The gendered artifacts per cluster are listed in Appendix A - Table 11. The fourteen cluster solution produces only one single gender cluster: cluster ten, near the east wall, contains three men's artifacts. The other clusters are mixed category to varying degrees. Cluster one, which is located in the northwest corner of the house contains no women's/probably women's artifacts. Cluster six, in the centre of the house, also contains no women's/probably women's artifacts. Cluster two, located in the southeast corner, is mixed, as is cluster three in the tunnel alcove. Clusters four (tunnel external entrance) and five (cooking area and internal tunnel entrance) are also mixed. Cluster seven, in the southwest corner is mixed, as is the lampstand cluster nine Cluster eight contains only neutral and unknown artifacts. Clusters eleven (mid-tunnel) and twelve (just outside the tunnel alcove) are also mixed. Cluster thirteen contains only one probably men's and one unknown artifact. The final cluster, fourteen, to the west of cluster ten, is mixed. This cluster solution was not tested for significance because the artifact count per cluster was low (also see discussion in chapter seven).

6.2.2 Significance Testing

A Chi-Square test (Appendix D - Table 5) was performed on each category per cluster for the three cluster solution at Tungatsivvik and did not reject the null hypothesis at the .10 level. A second Chi-Square test (Appendix D - Table 6) which combined category 1 (women's) with category 4 (probably women's) and category 2 (men's) with category 5 (probably men's) was also performed and was unable to reject the null hypothesis at the .10 level.

A binomial test was performed on the proportions of women's artifacts per cluster at the three (Appendix D - Table 7) and nine (Appendix D - Table 8) cluster solution levels for Tungatsivvik. At the three cluster solution level, cluster three was the only cluster to successfully reject the null hypothesis at the .10 probability level. At the nine cluster solution, clusters three, four and five successfully rejected the null hypothesis at the .10 level.

6.2.3 Tungatsivvik House Six Assemblage without Unknown Category

When the "unknown" artifacts are removed, the Tungatsivvik collection consists of fifty artifacts (Table 6.7). This collection produced significant clustering at the ten and twelve cluster solutions (Appendix B - Figure 6).

6.2.3.1 The Ten Cluster Solution (Appendix C - Figure 11)

The breakdown of gendered artifacts per cluster is listed in Appendix A - Table 12. The ten cluster solution produces all mixed clusters. Cluster twelve contains only neutral and unknown artifacts. Clusters four, six and nine contain no women's/probably women's artifacts and cluster five contains no men's/probably men's artifacts. Clusters one, three, seven and eight are more evenly mixed. This cluster solution was not tested for significance because of low artifact counts.

6.2.3.2 The Twelve Cluster Solution (Appendix C - Figure 12)

The gendered artifact list for the twelve cluster solution is present in Appendix A - Table 13 . This cluster solution produces eight mixed category clusters (clusters one, three, four, five, seven, eight, ten, eleven). Clusters two, six, nine and twelve contain no women's/probably women's artifacts. This cluster solution was not tested for significance because artifact counts were low.

Women's n=8	Men's n=19	Neutral n=10	Probably Women's n=5	Probably Men's n=8
vessel frag	harpoon head	drldpendant	marrowscp?	mattock
thimble	bola	drldpendant	scapula scrpr	harpoon bld?
rim shard	harpoon tip	pendant	awl	knife (?) bld
vessel frag	harpoon head	peg	scapula scrpr	endbldfrag
lamp	lance head	drldpendant	scrpr frag	endbld
ulu blade	harpoonfrshft	whetstone		endbld base
rim shard	kakivak sbrb	bead		endbld base
	drill mpiece	whetstone?		endbld
	harpoon head	whetstone?		
	harpoon head	snow beater		
	bola			
	bola			
	bola			
	bola			
	arrowhead			
	drill bit			
	lance tip			
	pick			
	uqsiq frag			

Table 6.7 Tungatsivvik House Six Assemblage without Unknown Categories Gendered Artifact List

6.2.4 Tungatsivvik House Six Assemblage without Probably Categories and Unknowns

When categories 4, 5, and 6 (the probably categories and the unknowns) are removed from the Tungatsivvik collection contains thirty-six artifacts (Table 6.8). This collection exhibits significant clustering at the four cluster solution (Appendix B - Table 7).

6.2.4.1 The Four Cluster Solution (Appendix C - Figure 13)

The list of gendered artifacts per cluster for the four cluster solution is presented in Appendix A - Table 14. The four cluster solution produces four mixed clusters. Cluster one, however, contains no women's artifacts. Clusters two, three, and four contain artifacts from all three categories. This cluster solution was not tested for significance because artifact counts were low.

6.2.5 Tungatsivvik House Ten without Probably Categories

When categories 4 and 5 (the probably categories) are removed, the Tungatsivvik collection contains ninety-three artifacts (Table 6.9). This sub-sample exhibits significant clustering (Appendix B - Figure 8) at the thirteen cluster solution.

Women's n=7	Men's n=19	Neutral Artifacts n=10
rim shard	harpoon head	drld pendant
vessel frag	bola	drld pendant
lamp	harpoon tip	pendant
vessel frag	harpoon head	peg
rim shard	lance head	drld pendant
thimble hldr	harpoonfrshft	whetstone
ulu bld	kakivak sbrb	bead
	drill mpiece	whetstone?
	harpoon head	whetstone?
	harpoon head	snow beater
	bola	
	bola	
	bola	
	bola	
	arrowhead	

Table 6.8 Tungatsivvik House Six Assemblage without Probably and Unknown Categories Gendered Artifact List

Women's n=8	Men's n=19	Neutral n=10	Unknown n=58
vessel frag	harpoon head	drldpendant	soapstn frag
thimble	bola	drldpendant pendant	soapstn frag
rim shard	harpoon tip	peg	soapstn frag
vessel frag	harpoon head	drldpendant	soapstn frag
lamp	lance head	whetstone	wrked antler
ulu blade	harpoonfrshft	bead	soapstn frag
rim shard	kakivak sbrb	whetstone?	wrkdantler bone
	drill mpiece	whetstone?	wrkd antler
	harpoon head	snow beater	wrkd antler
	harpoon head		frshft
	bola		wrkd bone
	bola		drld bone
	bola		drld ivory
	bola		frshft
	arrowhead		wrkd antler
	drill bit		shaft
	lance tip		soapstn frag
	pick		soapstn frag
	uqsiq frag		wrkd antler
			drld bone
			soapstn
			soapstn frag
			soapstn frag
			drld ivory

Table 6.9 Tungatsivvik House Six Entire Assemblage without Probably Categories Gendered Artifact List

6.2.5.1 The Thirteen Cluster Solution (Appendix C - Figure 14)

The gendered artifacts per cluster for this solution level is listed in Appendix A-Table 15. Clusters eight and twelve contain only unknown artifacts. Clusters two, four, five, seven and ten are mixed. Clusters one, three, six, eleven, and thirteen contain no women's artifacts. Cluster nine contains no men's artifacts. This cluster was not tested for significance because artifact counts were low.

6.2.6 Tungatsivvik Outside Artifacts

The outside artifact assemblage at Tungatsivvik contains fourteen artifacts (Table 6.10). As was the case for the Staffe Island collection, the outside artifacts at Tungatsivvik (which are presented in Figure 6.2 with the rest of the assemblage) do not appear, upon subjective analysis, to represent outside activity areas and may represent dropped or otherwise casually discarded artifacts. A K-means analysis was not run on this assemblage because of the low artifact counts and because it was not possible to instruct the program to avoid creating clusters across the house interior.

6.3.1 Conclusion

This chapter has presented the results of the K-means analysis, chapter seven interprets those results. Specifically, chapter seven will interpret and discuss the three

Women's	Men's	Neutral	Probably Women's	Probably Men's	Unknown
awl awl	bola harpoon head harp, endblade harpoon head	whetstone bead	-	knife handle bladder inflator endblade frag red blade endblade frag	drlled ivory wrked antler soapstone frag

Table 6.11 Tungatsivvik House Six
Outside Gendered Artifacts List

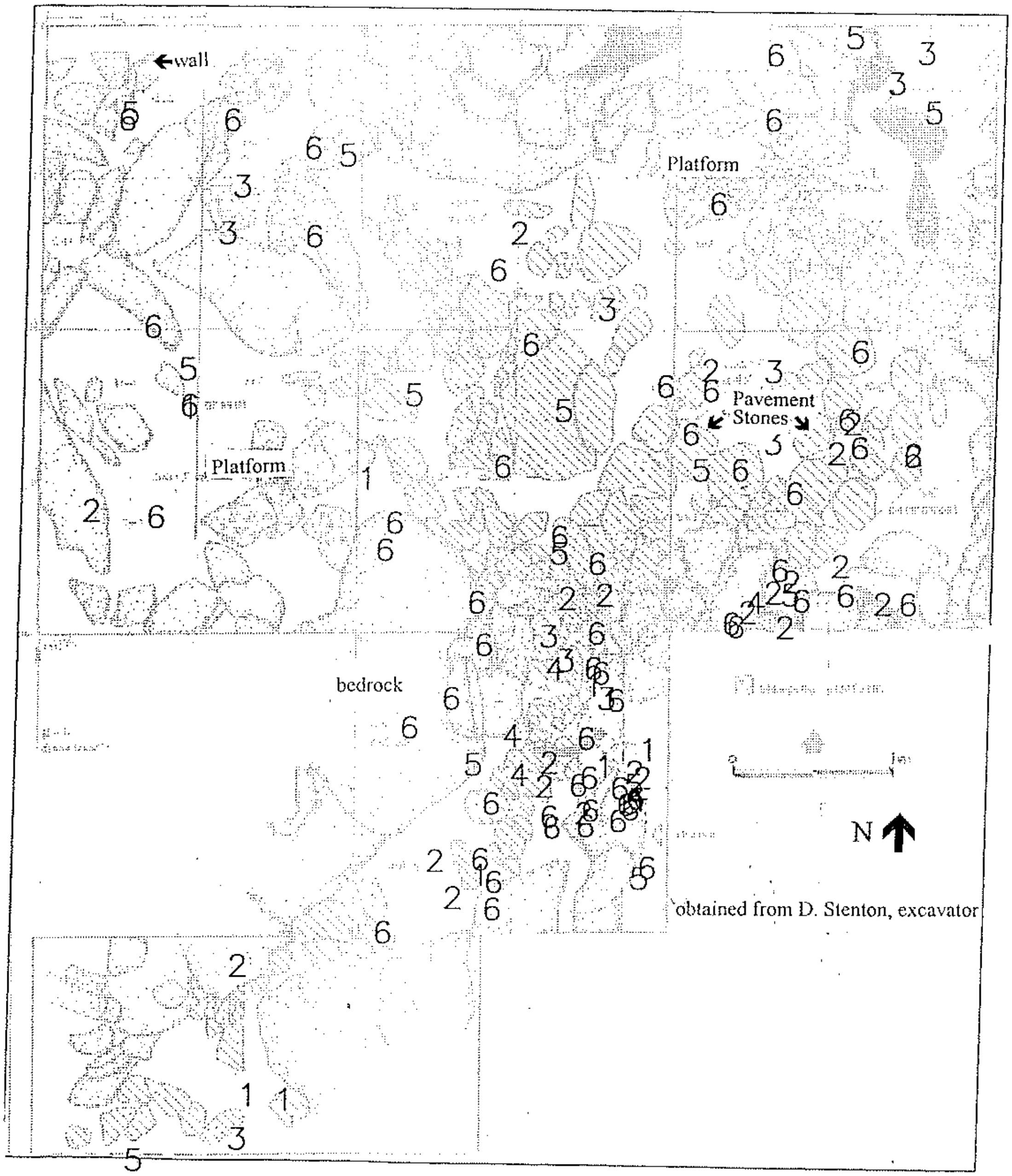


Figure 6.2 Tungatsivvik House Six Outside Artifacts

and nine cluster solutions at Staffe Island House Ten and the potential gender relationship implications of the rejection of the null hypothesis by clusters 3.2 and 9.2, as well as the three and nine cluster solutions at Tungatsivvik House Six and the gender relationship implications of the rejection of the null hypothesis by clusters 3.3, 9.3, 9.5, 9.4. The remaining clusters at each site will be interpreted spatially with only subjective interpretations of the gendered use of space.

Chapter Seven - Interpretation and Discussion

7.1 Introduction

The previous chapter presented the results of the K-means analysis, the goal of this chapter is to provide an interpretation of the information presented in chapter six. As was noted in chapter four, a description of the results of an analysis is only the first stage of an archaeologist's work and must be followed by interpretation and explanation of the information revealed.

The first step in interpretation is to ensure that a connection exists between the behaviour being considered and the material culture available for interpretation. Chapter two provides evidence of the connection between gender and spatial organisation in general and chapter three illustrates the nature of that connection in Inuit and by extension, Thule contexts. This information is used to develop models for the interpretation of the spatial organisation in the Thule houses used in this research.

Since K-means analysis identified significant clustering at three levels the researcher was able to test the models developed in chapter three, against the data from both sites. Model one outlined the spatial patterning expected if the Thule had highly competitive gender relations - with men's artifacts located on the (high status) platforms and women's artifacts located on the (lower status) floor areas. Model two described the spatial patterning that might result from a co-operative gender relationship for the Thule, i.e. shared workspaces with no exclusion areas. The following discussion determines which model best explains the spatial patterning visible within the Thule houses at Tungatsivvik and Staffe Island, and outlines the implications of that model for Thule gender relationships.

In order to account for the influence of formation processes two levels of clustering are discussed for both Staffe Island House Ten and Tungatsivvik House Six. The lower level (three cluster solution) allows the researcher to examine broad areas of the house in which cluster contents may have been mixed or altered by formation processes. The higher level of clustering (nine cluster solution) allows a more detailed examination of small concentrations of artifacts that may represent discrete work areas or storage spaces. The highest level of clustering (fourteen cluster solution) was ignored as it seemed implausible that such a high level of resolution could exist given depositional and post-depositional processes in such a small space.

7.2 Staffe Island

The Staffe Island House Ten collection consists of forty-two inside artifacts and nineteen outside artifacts, which will be dealt with separately. The results of the K-means analysis on the inside artifacts indicated significant clustering at the three, nine and fourteen solution levels. The fourteen cluster solution level created additional clusters chiefly by isolating artifacts within clusters that had already been defined (in the nine cluster solution) as loosely affiliated. Furthermore, it is unlikely that fourteen separate spatial events took place in a structure less than $16m^2$. Thus the fourteen cluster solution will not be discussed. The three and nine cluster solutions will be examined together since the nine cluster solution occasionally clarifies the results of the nine cluster solution, subdividing the original clusters. Only two of the new clusters created by the nine cluster solution actually contain artifacts from more than one of the original three clusters.

The three cluster solution (Figure 7.1) subdivides the house and its contents in the following way. Cluster 3.1 is dense and occupies the western northwestern third of the house, primarily the western part of the platform. Cluster 3.2 is located in the tunnel near the western wall and in the (western) wall behind the hearth. Cluster 3.3 is sparsely distributed and occupies the eastern two-thirds of the house floor and platform. Only one of the three clusters (cluster 3.2) contained gendered artifacts that, in the binomial significance test, rejected the null hypothesis. However, the two remaining clusters contained mixed categories which may be the only possible manifestation of shared space in low count situations.

Cluster 3.1 is very dense and would be easily identified in a visual inspection. As outlined in chapter six this cluster contains a boot creaser and an *ulu*, both of which are used by women working with skins. Cluster 3.1 also contains several (four) endblades and other knives used by men as well as a core/axe and some assorted chert and slate.

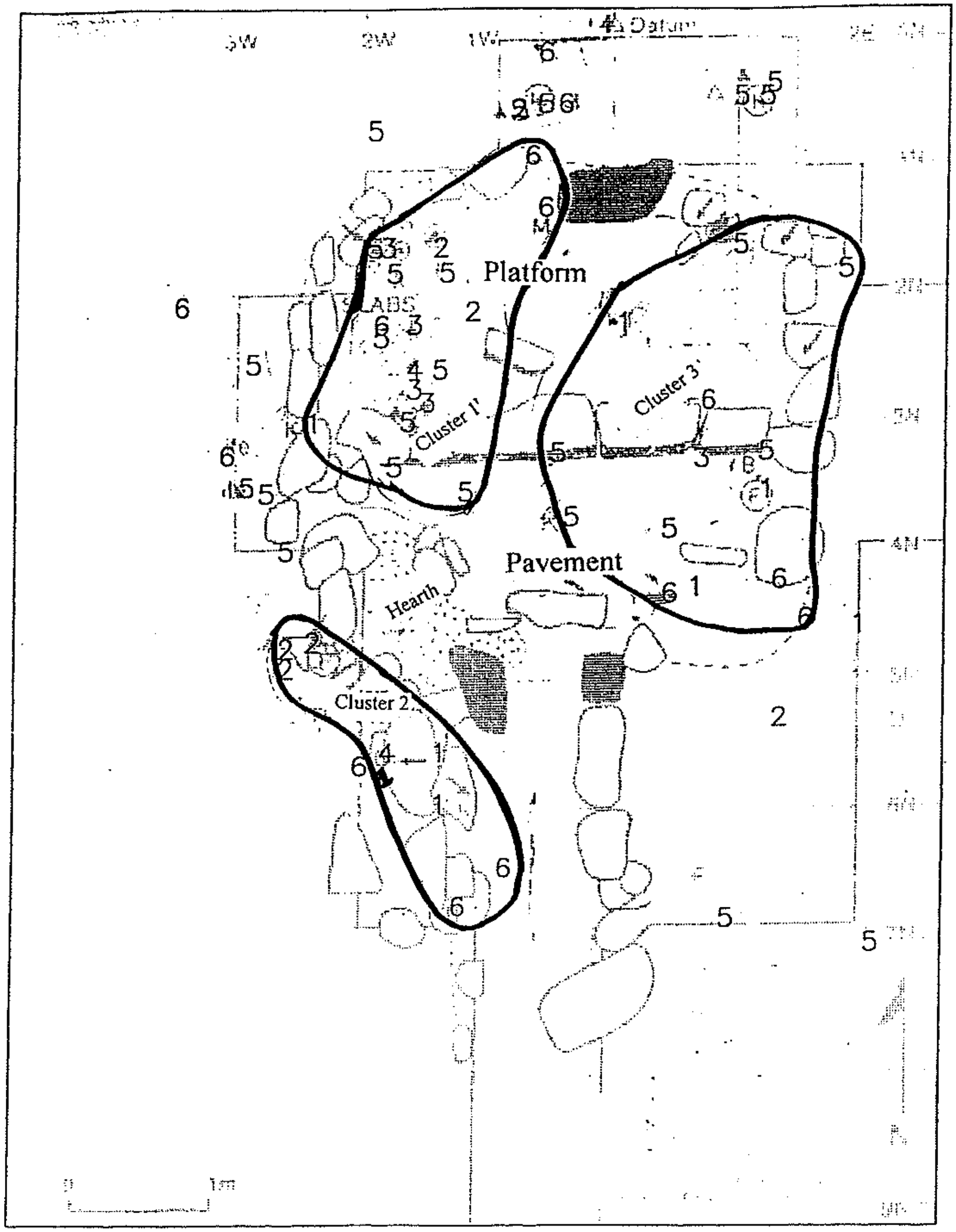


Figure 7.1 Staffe Island House Ten Assemblage Three Cluster Solution Map based on original map from Fitzhugh 1994:254

While this cluster was identified as significant by the K-means program a binomial test of its gendered contents did not reject the null hypothesis. In other words, there is a random distribution of gendered tools in this cluster.

A subjective analysis of cluster 3.1 (figure 7.1), however, suggests that this area may represent a shared workspace in which women and men worked side by side on the edge of the platform (a 'natural' place to sit inside the house near the source of light). It is also suggested that while the women worked skins (using the boot creaser and the *ulu*) in this area, the men may have been repairing tools, since the men's/probably men's tools in this cluster consist entirely of knives, blades and an axe. This is, in fact, the interpretation put forth by the excavator (Fitzhugh 1994:255-56) who suggests that the western platform (north of the hearth) was a site of tool maintenance. Alternatively, this cluster may represent the storage of these artifacts; ethnohistoric/ethnographic information suggests that the sleeping platform was sometimes used for storage. Sharing of a workspace (or shared storage space) in this area would result in randomly distributed gendered artifacts. Cluster 3.1 may also be the result of the blurring of separate workspaces by formation processes, however.

The nine cluster solution (Figure 7.2) divides the cluster 3.1 into two separate clusters (clusters 9.1 and 9.8) and three of the more easterly artifacts combine with artifacts from cluster 3.3 to form two new clusters (clusters 9.4 and 9.7). Cluster 9.1 contains primarily knives and blades while cluster 9.8 contains the two

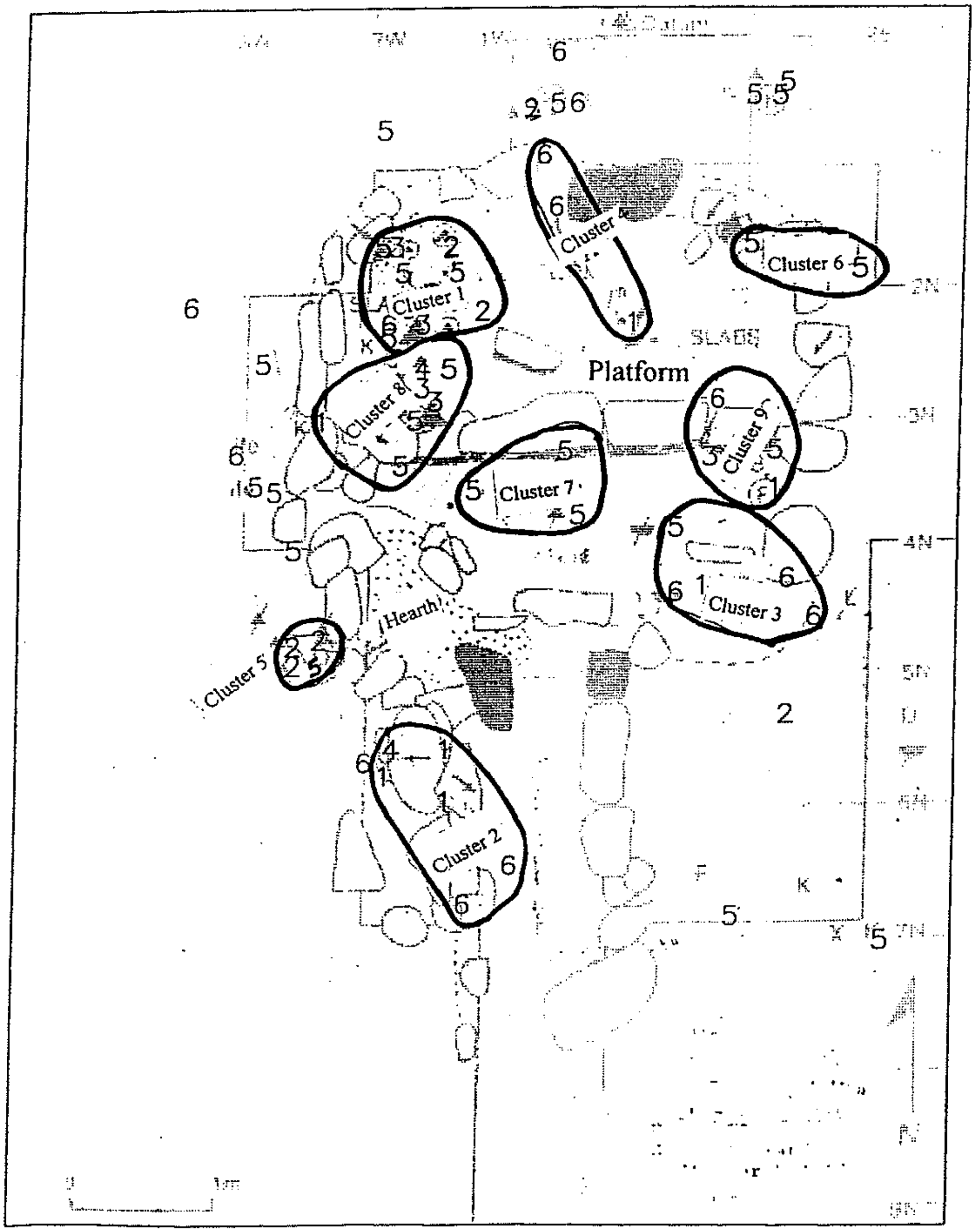


Figure 7.2 Staffe Island House Ten Assemblage Nine Cluster Solution Map based on original map from Fitzhugh 1994:254

women's/probably women's skin working tools and two endblades, two butcher knives and a *piece esquillees*. While it is interesting that the women's/probably women's tools are contained within a single new cluster, the contents of this cluster did not reject the null hypothesis and are therefore consistent with a random distribution. This solution level may indicate that cluster 3.1 encompasses several activity areas within a larger workspace, defined by the architecture of the house and the position of lamp.

Cluster 3.2 (Figure 7.1), the western tunnel/wall cluster, is not as intuitively obvious as Cluster 3.1. Yet it is the only cluster that rejects the null hypothesis in a binomial test indicating that the presence of gendered artifacts in this cluster is non-random. Since this cluster contains a mix of both genders' artifacts (four women's/probably women's, three men's/probably men's), cluster 3.2 provides support for a conclusion of shared space (i.e. non-segregated space) within this house at least in the house tunnel area. Yet, it is unlikely that the tunnel or the area behind the hearth was an activity area since the typical, low, cold-trap roof of a tunnel, or the presence of the hearth, would make working in these areas difficult. It is more likely that this cluster represents the shared storage and/or discard of these tools.

The 9 cluster solution suggests another possibility. At the nine cluster solution (Figure 7.2) the men's tools from cluster 3.2 are segregated in the western wall behind the hearth in cluster 9.5. The women's tools from cluster 3.2 located on the western wall of the tunnel are in cluster 9.2. A binomial test of the two clusters indicates that, for the nine cluster solution, cluster 9.2 containing the women's/probably women's tools rejects the null hypothesis whereas cluster 9.5 (containing three men's tools) does not. Therefore it appears that women have their own storage space in the tunnel. The potential implications of this single gender cluster (cluster 9.2) will be addressed in the discussion section below.

Cluster 3.3 is located on the eastern two-thirds of the platform and floor and is not intuitively obvious since it is sparsely distributed over a (relatively) wide area (Figure 7.1). Fitzhugh (1994: 255-256) indicates (based on bone remains and *ulu* fragments) that this section of the house appears to be a food processing area. An examination of the locations of artifacts in this cluster is suggestive of tools being tossed behind or to one side of a worker as she or he is working on the platform or by the hearth. The contents of this cluster did not reject the null hypothesis, i.e. they are randomly distributed.

A subjective analysis of cluster 3.3, however, reveals some interesting information. The assorted contents of this cluster include three *ulu*s, a whetstone, some slate, a piece of bone, and various blades and knives. In fact, nine of the fourteen artifacts included in this cluster are blades of some sort (including *ulu*s). Since the single whetstone present in the house is located here and the majority of the artifacts located in the cluster with it are blades, it seems possible that this cluster represents an area in which tools were sharpened. Alternatively, this cluster could represent both a sharpening area and a food processing area. This explanation would be consistent with the cluster's location (across from the hearth on the house floor) and would account for the type of artifacts represented. At the very least, the presence of both men's and women's tools here suggests this multi-use area was used by both genders.

The nine cluster solution (Figure 7.2) clarifies the above discussion of cluster 3.3 somewhat, although none of the distributions of gendered artifacts in the new (nine cluster solution) clusters proved to be of statistical significance. At this solution level cluster 3.3 is subdivided into five new clusters (one of which now contains three artifacts from cluster 3.1). Several of these clusters (clusters 9.4, 9.5, and 9.7) still seem to reflect artifacts that were tossed to one side while working. Clusters 9.4 and 9.6 are the likely result of work taking place on the platform.

Cluster 9.9 contains the whetstone, an *ulu*, an endblade preform and a (non-gendered) knife and may be the result of an individual (a man?) working on the southeast edge of the platform. Cluster 9.3, immediately south of cluster nine, contains (aside from an unidentified piece of bone) an *ulu*, an endblade preform, and two pieces of slate which may have resulted from a worker sharpening (or may be unsharpened blades) tools or processing food on the house floor. It could be suggested that these two clusters, which are located on the southeast floor of the house, are related and are the result of knife sharpening. Cluster 9.7 also appears to be the result of work taking place on the house floor (perhaps tool sharpening or food processing). The excavator

(Fitzhugh 1994) suggests that the latter may be the case. Alternatively artifacts from work activities could become entangled in the bedclothes, only falling out when they were re-arranged or removed, possibly forming clusters similar to clusters 9.7 or 9.3.

7.2.2 Examination of Modified Collections at Staffe Island

As is obvious from the results presented in chapter six, modifying the Staffe Island collection for re-analysis was not particularly informative. When analysed on their own, the gendered and neutral artifacts do not reveal significant clustering (Appendix C - Figure 3). This may be merely an effect of the low numbers of artifacts involved at this level. It is possible, however, that the weaker gender assignments (the "probably" categories 4 and 5) and the unknown categories (category 6) influence the significance of a given cluster solution. When either of the other two modified collections is examined they produced clustering at the three cluster solution (Appendix C - Figures 2 and 4). This suggests that this cluster solution is very robust and that the location of artifacts from categories 4 & 5 strongly influence the clustering at this site.

7.2.3 Examination of Outside Artifacts at Staffe Island

As indicated in chapter six, the distribution of the nineteen outside artifacts at Staffe Island appears random and a visual inspection does not suggest any external activity areas. It is suggested that these artifacts may have been dropped accidentally or deliberately by house occupants. The fact that the majority (thirteen of nineteen) of the artifacts are related to men's work rather than women's provides weak support for this since men were more likely to be working outdoors in preparing for hunting trips and moves (based on ethnohistoric/ethnographic reports). The location of the external artifacts does not suggest work areas, however. Alternatively, these artifacts could have been dropped by people scavenging the house after it was abandoned. This may be the more probable interpretation since the brief period of occupation suggested for this house (perhaps only a single season (Fitzhugh 1991)) meant a longer period of abandonment and hence greater opportunity for scavenging.

7.2.4 Summary Discussion and Interpretation of Staffe Island

Before discussing the interpretation of Tungatsivvik, the implication of the interpretation of Staffe Island will be outlined. A more detailed discussion is undertaken below.

The Staffe Island House Ten analysis produced a single cluster in which the proportion of gendered artifacts can be described as non-random. At the three cluster solution level this cluster (3.2) contains almost equal numbers of men's artifacts and women's artifacts. Although the nine cluster solution level divides cluster 3.2 into two separate clusters (9.2 and 9.5) their proximity allows them to be considered part of the same area. The other two clusters at the three cluster solution level were mixed, and contained random proportions of gendered artifacts. This resulted in a three cluster solution level that reflects broad internal divisions, with a dense western cluster above the hearth area, a sparse eastern cluster opposite the hearth area and a tunnel/hearth wall cluster. The nine cluster solutions produces a more focused picture of several different activity areas and probably storage areas within the major spatial divisions of tunnel and house lobe. No additional significant clusters were revealed at the nine cluster solution, hence none of the platform or floor clusters are gendered.

Which of the two models for gendered use of space represents the best explanation for the pattern observed at Staffe Island House Ten? Model one is suggested by Whitridge (n.d.) who argues that, for whale hunting groups, Inuit/Thule gender relations were competitive (male-dominated) rather than co-operative. As outlined in chapter three, Eastern Arctic Inuit ethnography and ethnohistory does not suggest a competitive gender relationship, nor does it suggest status differences between the tunnel and the platform. Also, Whitridge's conclusions suggest that there is only one means of gaining status in Inuit/Thule society whereas the ethnohistories/ethnographies discussed in chapters two and three suggest that status can be gained through a variety of means, including proficient needlework. Aside from its dismissal on theoretical grounds, model one does not adequately explain the patterning observed on Staffe Island since three of the nine women's/probably women's artifacts on site are actually on the "high" status platform. The three cluster solution, which reflects the large architectural divisions (i.e. hearth area, tunnel), for Staffe Island does not suggest an activity division between the platform and the floor. It does suggest a division between West (hearth) and East (non-hearth) sides of the house, and the tunnel. These divisions are not gendered, however, since men's artifacts and women's artifacts occur in each section.

Since there is no evidence for the sort of gendered use of space suggested by model one, it is necessary to evaluate model two, which provides a more satisfying explanation. This model suggests that a co-operative gender relationship could be indicated by shared use of space. At the three cluster solution level cluster 3.2 satisfies this model's predictions. This is not entirely satisfactory since the only cluster with significant gender contents at the nine cluster solution level (cluster two) is not a shared cluster. Since this cluster is spatially near cluster 9.5 however, they can be conceptually be considered the same area. If a competitive relationship was indicated by the women's tunnel storage cluster (9.2), there should be a corresponding, men's storage cluster on the platform. The shared space model does, in fact, allow for small single gender clusters, since at the nine cluster solution the artifact clusters could represent a personal tool kit or a single activity area

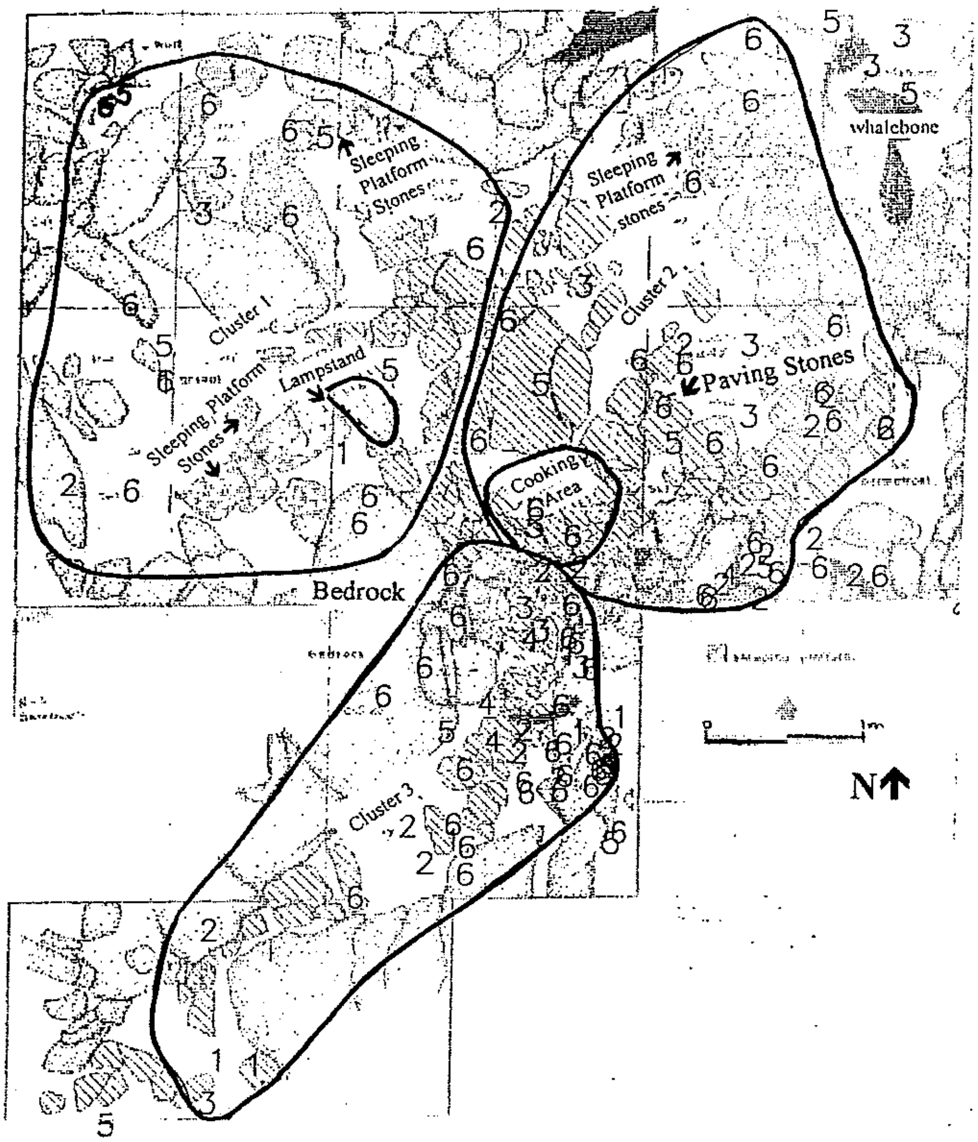
Based on the fact that main lobe of the house contains artifacts from both genders, a further, subjective, argument could be made for shared use of space. The randomly proportioned gendered artifacts within the internal clusters may represent the only possible manifestation of shared space when artifact counts are low. Even a single women's/probably women's artifact in a predominantly men's/probably men's assemblage could be indicative of a woman's working presence. This shared space suggests that in this case, gender does not need to be reinforced through spatial patterning. Instead, factors such as architecture or convenience influence the observed distributions.

7.3 Tungatsivvik

The Tungatsivvik House Six collection consists of one hundred and seven inside artifacts and fourteen outside artifacts, which will be examined separately. The results of the K-means analysis of the inside artifacts indicated clustering at the three, nine and fourteen solution levels. The fourteen cluster solution will not be examined for the same reasons as given in section 7.2.1. The three and nine cluster solutions will be discussed simultaneously.

The three cluster solution divided the house and its contents in the following way (Figure 7.3). Cluster 3.1 is sparsely distributed and is located in the western portion of the house including the floor and platform. The lampstand is on the eastern side of this cluster. Cluster 3.2 is more densely populated and is located in the eastern side of the house. The southern portion of this cluster contains an area identified by the excavator (Stenton 1999 pers. comm.) as a "cooking" area because it

Figure 7.3 Tungatsivvik House Six Assemblage Three Cluster Solution Map based on original map from D. Stenton, excavator

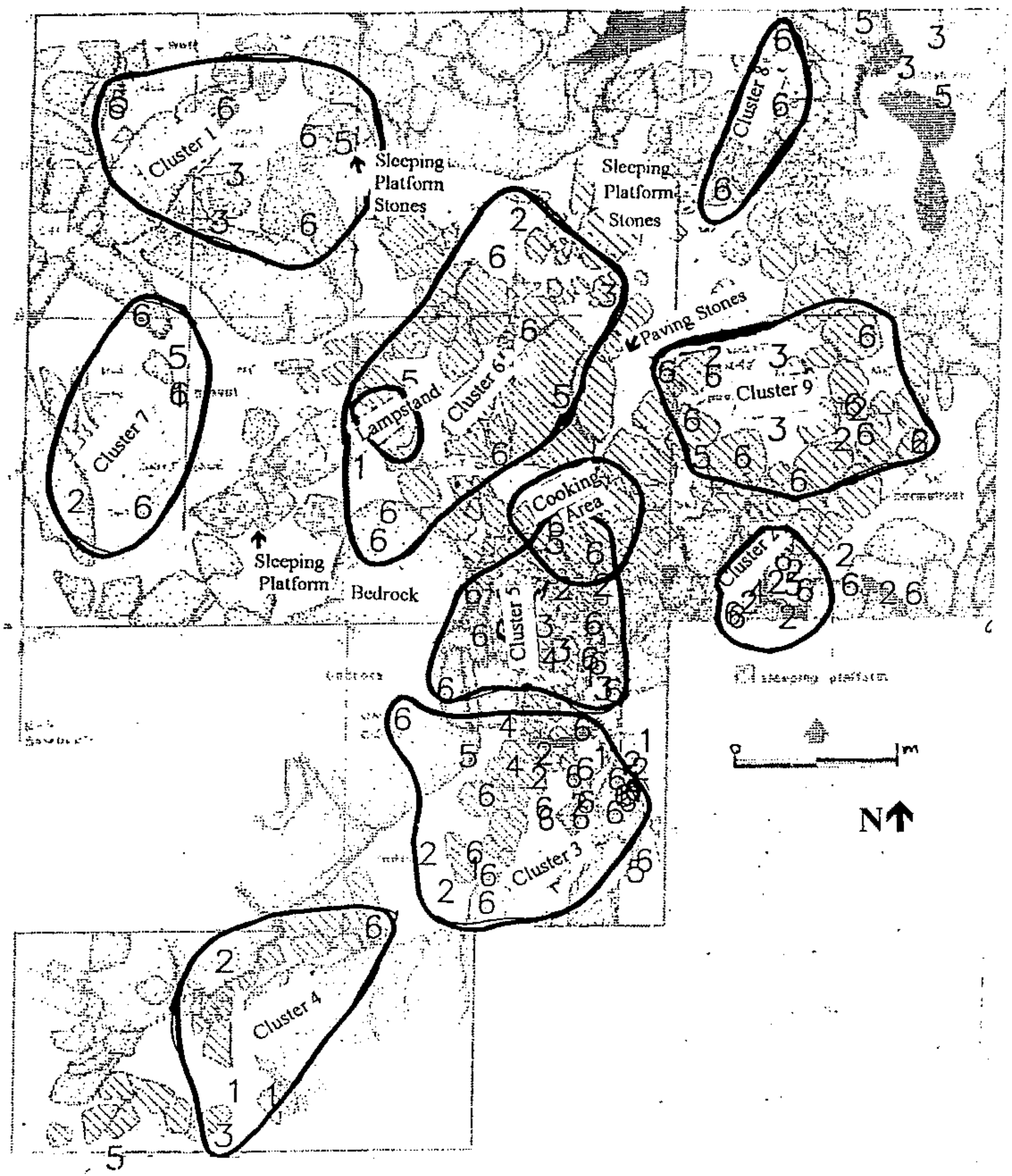


contains seal blubber and faunal material which were not all plotted as artifacts. The artifacts in this cluster are not related to cooking and may have been deposited when other activities took place directly in front of the hearth. Cluster 3.3 is located in the tunnel. Unlike the tunnel cluster on Staffe Island, which contained only nine artifacts, this cluster is the largest in the house and contains forty-seven artifacts. Significance tests revealed that cluster 3.3 contains significant proportions of gendered artifacts (i.e. it rejected the null hypothesis); clusters 3.1 and 3.2 contain random proportions of gendered artifacts.

Cluster 3.1 is not intuitively obvious. As outlined in chapter six, this cluster contains two women's/probably women's artifacts, a rim shard and another vessel fragment. The rim shard is located very close to the lampstand, as would be expected, but the other vessel fragment is more than a meter away. There are five men's/probably men's artifacts in this cluster, including a drill bit, a lance tip and several endblades. Aside from some knotted baleen, a bead and a possible whetstone, the remainder of cluster 3.1 consists of slate and soapstone fragments. This cluster is not immediately suggestive of any particular human behaviour and, as mentioned above, a binomial test of the proportion of the gendered contents did not reject the null hypothesis.

The nine cluster solution (Figure 7.4)subdivides this cluster three ways: two new clusters (9.1 and 9.7) are formed and six of the more easterly artifacts are included in a new cluster (9.6) which also includes four artifacts from cluster 3.2. Neither cluster 9.1

Figure 7.4 Tungatsivvik House Six Assemblage Nine Cluster Solution Map based on original map from D. Stenton, excavator



nor cluster 9.7 successfully rejected the null hypothesis in a binomial test of gender proportions. Cluster 9.1 contains a possible whetstone, but except for a single endblade (the only actual tool in this cluster) there are very few blades nearby. This cluster is located in the opposite end of the house from the possible tool sharpening area at Staffe Island but its location may be related to the differences in shape between the two sleeping platforms (see Figures 7.1 and 7.3) and the different internal organisation that this could produce. This cluster also contains knotted baleen, a bead and some slate and soapstone fragments, originally in cluster 3.1. The cluster contents do not suggest any particular activity and may be the result of objects being tossed out of the way while working, or again, may represent objects that fell off bedclothes when they were shaken or removed. Cluster 9.7 also does not suggest any particular activity, it contains a drill bit, an endblade, a vessel fragment, a worked slate fragment and two pieces of soapstone. This cluster may have also resulted from the processes described above. The cluster containing the remaining artifacts from Cluster 3.1 will be discussed below.

Cluster 3.2 (Figure 7.3) is densely concentrated in the eastern portion of the house lobe. This cluster contains only a single probably women's artifact: a scraper. The men's/probably men's artifacts include a bow drill, endblades, harpoon heads, four of the five bolas present on site and twenty-one unknowns which include fragments of soapstone, ivory, antler, slate and bone. Fourteen of the twenty-one unknown artifacts have been modified in some way (described by the excavators as "drilled" or "worked").

The significance tests performed on the contents of this cluster did not reject the null hypothesis for gender proportions. The presence of the scraper does, however, suggest that women had access to this area.

The nine cluster solution (Figure 7.4) creates three clusters within the original cluster 3.2 and utilises eight artifacts from the original cluster in new "joint" clusters[11].

Cluster 9.2 is very dense and would likely be identified by a visual analysis. This cluster contains four of the five bolas on site, a (probably women's) scraper, an endblade base and four fragments, three of which have been "worked". This cluster did not reject the null hypothesis, and contains both men's and women's tools. The contents of the assemblage suggest storage or production of the listed tools since they are tightly clustered and contain most of the bolas on site. Cluster 9.8 consists entirely of slate fragments and which suggests some sort of tool manufacture, repair or disposal tool place in that area. Cluster 9.9, which is directly opposite the hearth, contains harpoon heads, a bow drill mouthpiece, three soapstone fragments and six "worked" fragments. Subjectively, this cluster suggests a men's work area but it does not reject the null hypothesis. Cluster 9.6 was formed by six artifacts from cluster 3.1, and four artifacts originally from cluster 3.2. It is located in the centre of the house around the lampstand and near the "cooking" area. This cluster contains a rim shard, a (possible toy) lance tip, a whetstone fragment, a mattock, an endblade base, three soapstone fragments and a

[11]Clusters formed at the 9 cluster solution that include artifacts from two different clusters as defined by the 3 Cluster solution.

single worked antler fragment. These artifacts are not suggestive of a single activity, and a binomial test of the cluster contents did not reject the null hypothesis. The variety of artifacts in this area in fact represent the variety of both men's and women's activities that would take place in the area surrounding the lamp, the only source of light and heat.

Cluster 3.3 (Figure 7.3) stretches the length of the tunnel. The denser portions of this cluster would likely be identified by a visual analysis but it is unlikely that the more sparsely distributed artifacts to the south would be associated with them. This cluster, with forty-seven artifacts, is the largest in the house and contains the highest proportion of women's artifacts (nine of twelve women's/probably women's) and the second highest proportion of men's artifacts (nine of twenty men's/probably men's artifacts). When combined, the gendered artifacts in this cluster represent the largest grouping of artifacts of both genders in the house. Cluster 3.3 rejected the null hypothesis, which indicates that the tools in this cluster are not randomly distributed. The fact that this cluster contains significant proportions of both genders' artifacts is therefore an indication of shared use of space. It is possible that cluster 3.3 was a storage area, or that it was formed in part by artifacts tossed or swept out of the main lobe of the house. The latter suggestion is supported by the fact that except for two pieces of bone, the twenty-five unknown artifacts in this cluster are all soapstone, antler, ivory or slate fragments. Such a high number of fragments are more likely to be associated with debris from broken tools or tool-making/ repair rather than with storage. This will be discussed further below.

The nine cluster solution (Figure 7.4) subdivides cluster 3.3 into three smaller clusters, and the proportion of gendered contents in each rejected the null hypothesis. Cluster 9.3 is located within, and in front of, the tunnel alcove and contains five women's/probably women's artifacts (including a rim shard, lamp, marrow scoop and two scrapers/scraper fragments) and seven men's/probably men's artifacts (including three harpoon heads/blades, a lance head, a snow beater, a harpoon foreshaft and a bola). The importance of these tools and the fact that most of them are complete supports the suggestion of shared storage space. There is still a high number (eighteen) of fragments present in this cluster which may have been tossed or swept into the storage area during house maintenance or dropped during disposal.

Cluster 9.4, which would not likely be identified by a visual inspection, is located in the lower third of the tunnel near the outside entrance. This cluster contains a thimble holder and an *ulu* blade, as well as a harpoon head, a drilled polar bear pendant and a ground slate fragment. The location and appearance of this cluster makes it unlikely that it represents an activity area. The contents of cluster 9.4 were used to reject the null hypothesis in a binomial test. It is suggested therefore, that this cluster either represents a drop zone where women's artifacts and men's artifacts accidentally accumulated or that this area represents a storage area, just inside the tunnel entrance.

Cluster 9.5 which is located in the upper third of the tunnel and at the entrance of the house, incorporates the lower part of the "cooking" area identified by the excavator (Stenton 1999 pers. comm.) and includes four artifacts that originally belonged to cluster 3.2. This cluster contains a vessel fragment, a possible awl, a kakivak side barb, a pick and endblade, two pendants, a whetstone, six "worked" fragments, two soapstone fragments and a foreshaft. The variety of artifacts associated with both genders in this cluster suggests another shared space, and perhaps artifacts and debris being tossed behind or to one side of a person working in the cooking area or in front of the hearth. It also suggests a more complex use of this area than simply a cooking area.

7.3.2 Tungatsivvik Modified Assemblages

As was the case on Staffe Island, the Tungatsivvik House Six modified runs are not particularly informative. Each modification produces at least one significant level of clustering, however, indicating that the presence of these neutral or probably gendered artifacts influences the clustering patterns of the entire assemblage. The Tungatsivvik gendered and neutral artifacts exhibit significant clustering, however, at the four cluster solution (Appendix C - Figure 7). Aside from the additional cluster formed at this modification level, this four cluster solution is very similar to the three cluster solution for the entire collection. Perhaps the addition of the other three categories, 4, 5 and 6, merely serves to further define the patterning demonstrated in the gendered artifacts. The modified run that excludes the unknown category (6) exhibits significant clustering at the ten and twelve cluster solutions (Appendix C - Figure 6). The modification that excludes categories 4 and 5 (the "probably" categories) exhibits significant patterning at the thirteen cluster solution level (Appendix C - Figure 8). Both of these results neither support nor contradict the results of the analysis of the entire assemblage.

7.3.3 Examination of Outside Artifacts at Tungatsivvik

As indicated in chapter six the locations of the fourteen outside artifacts at Tungatsivvik are not particularly informative and a visual inspection does not suggest any external activity areas. The external artifacts at Tungatsivvik are more evenly divided among the various gender categories than at Staffe Island. Since no external storage or activities seem to be represented, these outside artifacts were likely dropped by the house inhabitants or by later scavengers (the excavator (Stenton pers. comm. 1998) having indicated that scavenging had taken place at Tungatsivvik House Ten).

7.3.4 Summary Discussion of Tungatsivvik

The three cluster solution at Tungatsivvik divided the house into three sections, the western section, the eastern section and the tunnel. The western side is sparsely populated and includes the area behind and north of the lampstand. The eastern side is denser and includes the cooking area but is not very close to the lampstand. The nine cluster solution presents a clearer picture. A cluster is located directly around the lampstand and is perhaps indicative of the multitude of activities that may have taken place there. Clusters that may be indicative of individual activities/toolkits are located on the Western platform (two clusters), on the floor (two clusters) and in the mouth of the tunnel (one cluster that incorporates the cooking area identified by the excavator). There are two additional clusters in the tunnel that appear to be related to storage.

Tungatsivvik House Ten provides much stronger evidence for use in selecting a model than does its Staffe Island counterpart. The proportions of the gendered contents of cluster 3.3 at Tungatsivvik could be used to successfully reject the null hypothesis, suggesting that the contents are not randomly distributed. This cluster seems to represent shared storage and/or disposal of artifacts and therefore meets the predictions of model two, non-exclusive use of space. The applicability of model two is further strengthened at the nine cluster solution, which creates three clusters (9.5, 9.3 and 9.4) whose proportional gender contents reject the null hypothesis and all of which contain both women's and men's tools. This suggests the robusticity of the above conclusion.

Subjective support of the shared space model is also provided by the randomly distributed gendered tools in the remaining clusters. The wide distribution of soapstone fragments also provides some weak support for an interpretation of shared space. Soapstone was used most frequently for producing women's tools (e.g. lamps and vessels), therefore at least some of these unidentified fragments must represent broken lamps or vessels which would have been disposed of separately if women were segregated in Thule houses. An equivalent argument could be made for segregation of fragments of other raw materials, such as slate, ivory and antler that are likely to be related to men and their work.

It is likely that the occupants of House Six shared their workspace especially in the vicinity of the hearth and it is demonstrated that they shared their storage space in the tunnel.

7.4 Comparison of Both Sites

The houses are very similar in their spatial organisation despite the differences in artifact count (n=45 and n=107) and slight differences in house and sleeping platform shape (compare Figures 7.1 and 7.2). This is likely due, in part, to the similar floor plans and the fact that there is limited space inside a Thule dwelling. There are only so many places where it is practical to perform a given activity or dispose of debris. Therefore, at both sites the three cluster solution level appears to reflect the general distribution of tools with respect to the architectural plan of the houses. For the three cluster solution at Staffe Island the most dense cluster (3.1) is located above the hearth, at Tungatsivvik the most dense cluster (3.2) is located opposite the hearth, but both clusters seem to reflect tool maintenance activities. At the nine cluster solution we can focus on certain activities and identify possible food processing/knife sharpening areas. Overall, it seems possible to isolate specific work areas that may relate to a single task but it does not appear that any single activity is tied to a given location and none of these potential work areas identified is specifically gendered.

The tunnel clusters (Cluster 3.3 - Tungatsivvik and Cluster 3.2 - Staffe Island) contained significant distributions of both women's and men's artifacts. Both of these clusters are probably related to storage, indicating shared use of the tunnels for storage and/or disposal. At the three cluster solution for each site, the inside of the house is divided almost equally into two sections. This may reflect the fact that when both wife and husband are working in the house they probably worked side by side, depending on their activities, and the available space. The internal clusters contain random proportions of gendered artifacts and support the notion that these areas were used for a variety of gendered activities that were not segregated and that men and women had equal access to all areas of the house. Mixed clusters may be the only possible manifestation of shared space, whether or not the proportioned contents of those clusters reject the null hypothesis, due to the small number of artifacts available for study and formation processes, which will have displaced objects. Significantly, the internal clusters did not confirm the prediction, generated by model one, of separation of floor and platform. This is especially significant for Tungatsivvik House Ten since its occupants may have participated in whale hunting, perhaps in ways similar to that of the ethnographic groups used by Whitridge in developing his model of hierarchical gendered space in Thule houses.

7.5 Formation Processes

A glimpse inside House Ten, Staffe Island or House Six, Tungatsivvik, when they were occupied would have revealed a busy scene. Assuming that the men of the house were not on a hunting trip they would perhaps have been seated on the edge of the platform close enough to the lamp to make good use of it. They would be repairing or manufacturing tools, inspecting the tools used on the latest trip or the tools to be used on the next one. The women would be sitting on the platform near the lamp next to the men or kneeling in front of it. She (or they) would be preparing a meal, melting ice for water, and keeping the lamp alight. Or, if these tasks were not required, she might be on the floor in front of the lamp butchering meat[12], preparing skins with her *ulu* or sewing clothing or bedding. Each of these activities would be placed according to convenience or the presence of other workers rather than by rules governing the

[12]This activity may have taken place outside depending on the season.

placement of gendered activities. The children of the house would be further back on the sleeping platform, perhaps playing games or practising for their later roles, with the girls sewing small projects or caring for dolls and the boys working on small toy tools for use in practice hunting. One possible toy lance tip was found at Tungatsivvik and is located in cluster 3.1 on the house floor.

Tools would be stored in the entrance tunnel, where people entering the house might pause to brush snow off their clothing. Alternatively, some tools used frequently inside the house might be stored on the sleeping platform. A lot of debris probably gathered on the bedding on the sleeping platform during daily activities; shaking the bedding to prepare for a night's rest might send a shower of tools and small debris flying onto the floor or near the platform base. This debris would mingle with the detritus tossed off the platform or away from the hearthside by women and men working at various other tasks taking place in the house, from tool manufacture to meal preparation. Perhaps, once this debris got too uncomfortable underfoot, the women of the house (who would be responsible for household maintenance) would "sweep" some of it out from underfoot and into the mouth of the entrance tunnel. Of course, some debris would be left behind in the "corners" and between the paving stones on the floor.

The occupants of the house might have related families living nearby[13]. Families could gather in one of the houses to socialise and play games, plan the move to the next location or to plan a hunting trip. The women would likely be in charge of packing the interiors of the houses, while the men prepared the sleds and dogs for the trip.

All of these activities would contribute to the spatial patterning within the house and in combination with various formation processes, would produce patterns similar to those observed archaeologically. The day-to-day activities carried out in the house could result in much of the spatial patterning observed. This is particularly true if the placement of those activities is not governed by social rules, as the lack of gender exclusion areas on the sites seems to suggest. Further post-depositional human activities as well as natural formation processes could also contribute to, or alter the patterning produced by the house occupants.

In preparing to move, the house structure might be partially dismantled (Hood 1998 pers. comm.) which would cause some of the household debris to be moved around. Women would roll up the bedding to be brought along, and any material left in the bedding might fall onto the floor or back onto the platform during this process. If there was a skin covering on the house (as was likely for Staffe Island - see chapter five), that too might be taken apart (probably by the men) to be brought

[13] There are seven houses at Staffe Island that may be contemporary to House Ten (Fitzhugh 1994) and three potential contemporaries for House Six - Tungatsivvik (Rugby and Stenton 1996).

along. This could result in shifting of debris and artifacts inside the house frame. Finally, depending on the speed of departure and whether or not the occupants intended to return to this dwelling, some tools might be left behind for future use.

Once the house was abandoned, other/later occupants of the site might remove some of the original building materials and may even scavenge tools that were (or appeared to be) abandoned. This appears to have happened at Tungatsivvik (Stenton 1998 pers. comm.) but does not seem to have had a great effect on the distribution at Staffe Island (Fitzhugh 1994:254). Thule houses were frequently re-occupied (Hood 1998 pers. comm) which could also disturb the original spatial distribution of material inside the house, since the houses would be swept out before re-occupation. As mentioned above, this does not appear to have occurred at Staffe Island (Fitzhugh 1994:254) but did occur at Tungatsivvik.

Natural forces would also play a part in disturbing house contents as roofs and walls would eventually collapse, which occurred at Tungatsivvik (Rigby and Stenton 1996:47) resulting in the presence of large boulders in the house interior. Frost heaving might further displace small tools and artifacts.

The spatial patterning in the archaeological contexts examined in this research is the result of all of the above processes. This could explain the random distribution of artifacts in most of the clusters. It is likely that Eastern Thule households operated similarly and that this similarity is reflected in the spatial organisation of the houses at Staffe Island and Tungatsivvik (e.g. at cluster solution level three).

Identical formation processes would not have operated on both houses to produce the patterns visible archaeologically since Staffe Island is a fall/winter house and Tungatsivvik is a winter/spring house. Thus the natural collapse and disintegration of the structures likely took place differently. The similarity of both sites is therefore an indication that the artifact distributions likely reflect the internal cultural organisation of space within the houses and therefore can be studied and interpreted in terms of gendered use of space.

7.6 Gender Interpretation: Conclusions

As discussed in chapters two and three, gender relationships are not easily categorised. In the above assessment of the gender relationships modelled in chapter three, it was possible to eliminate model one the competitive gender model for the Eastern Thule. Arguing from negative evidence (gender divisions tied to platform/floor status divisions are not present), it is possible to suggest that the observed patterning supports an interpretation of shared workspace, and hence a co-operative relationship for the people who occupied both sites. This would mean that a Thule person entering their house to work would not have to chose a work location based on proscribed rules but rather on convenience, the location of their tools or the location of another worker who had been there previously. This conclusion is supported by Chang (1988) who determined that, for the Alaskan Inuit in her research, the logistics of work, rather than gender, may be the overriding factor in the spatial organisation of activities.

In this research the only conclusive, statistically significant evidence for shared/non-exclusive space did not occur within the house interior but rather (at the three cluster solution) in the entrance tunnel of Tungatsivvik House Six and in the tunnel/hearth wall at Staffe Island House Ten. The nine cluster solution at Staffe Island revealed a significant single gender cluster (9.2) but its location does not suggest segregation. The nine cluster solution at Tungatsivvik subdivided did not identify any single gender clusters.

If gender roles were competitive, storage of materials related to gendered work would likely take place separately (Lyons 1989) as would disposal of related waste (Moore 1986). The interior house patterning does not support or contradict this conclusion and the fact that most clusters contained a mix of gendered artifacts indicates that men and women had equal access to the house interior. Furthermore, the non-rejection of the null hypothesis in the significance tests done on the contents of the two house lobe clusters in each house only suggests that the cluster contents are not organised by gender. This negative evidence translates into a conclusion of shared workspace with spatial assignments relating to convenience or architectural design.

Therefore the assemblages at both Staffe Island and Tungatsivvik most closely match the predictions of model two (the co-operative model). What are the implications of model two for the gender roles of the Thule? In order to examine the implications of shared house space thoroughly this discussion will revisit the two questions brought up in chapter two: if space is the most visible evidence of social organisation, what does this pattern of shared space within the household tell us about Thule social organisation? What sort of gender negotiation took place with regards to obtaining food?

Most of the Inuit ethnohistories/ethnographies (discussed in chapter three) suggest that complementary gender roles are typical of Inuit groups. Determining what the pattern of shared space reveals about Thule gender relations beyond economic complementarity depends on the co-operative model developed by Lyons (1989). She determined that when gender roles are co-operative (ideologically equal and complementary), with both genders working toward the good of the household, space would be shared. This includes living space, storage space and disposal space. The alternative to this model was one of competitive gender roles that is discussed in chapter two developed by Whitridge (n.d.). The shared use of the tunnel as storage space and the observation that both genders had access to all areas of the house is consistent with Lyons' co-operative models and Sheitlin's (1980) conclusions.

This conclusion ties into the suggestion (Devens 1991) that rigidity of gender roles increased in the post-contact period. Devens (1991) argues that for proto-contact peoples pre-contact gender roles were likely to have been more co-operative, with each genders' work contributing to the whole. The expectations and biases of the Europeans and, the ways in which trade took place (the traders dealt primarily with men) (Devens 1991:510-11; Gullason 1999.), caused a shift in gender roles. This resulted in increased rigidity of gender conceptions and (possibly) diminished roles for women and the reduction of the value of those roles. Cabak (1991) supports this interpretation of increased gender role rigidity and inequality in her discussion of Labrador Inuit adaptations to Moravian missionary influences. She found that over time, the new tools available to men increased their leisure time while adaptation to European lifestyles and European house actually increased women's work and reduced their participation in life outside the house.

If we interpret the results of this research using Lyons' model, and with the supporting evidence from Sheitlin (1980), we see that it would have been relatively unimportant for either gender to demarcate a spatial "territory" through their activities, or to restrict the other gender's activities to a given area of the house. Shared use of house space by both genders is indicative of co-operative gender roles, in which both women and men are more concerned with providing for the household than in proving themselves equal to or superior to the other gender. This indicates a certain degree of gender equality within Thule society, which is consistent with the majority of the evidence for Inuit ideology and social relations presented in chapter three.

This pattern has further implications for social organisation as a whole since Inuit (and by extension Thule) gender roles are closely tied into the economics of their society. This relates to the question of the gender negotiation that takes place with regard to obtaining food. The possible sharing of space in the houses used in this research suggests that there was little gender tension involved in the organisation of subsistence in Thule society since the contribution of both genders was highly valued. Therefore, the negotiation of the roles each gender should play in subsistence activities would be minimal since the work of one gender would not be considered inferior to the other.

Chapter Eight - Conclusions

8.1 Conclusions

Inuit ethnography and ethnohistory was used in the construction of two models for an engendered interpretation of the internal spatial organisation of Thule houses. These models were tested through a K-means analysis of the distribution of the gendered tools in Staffe Island House Ten and Tungatsivvik House Six. The internal spatial patterning, revealed by the K-means program, was interpreted as the result of the number of activities carried out by members of both genders who had equal access to all areas of the house. How does the organisation of house space reinforce and legitimate Thule gender roles? Since the Thule have been determined to have co-operative gender roles it would not be necessary to reinforce and legitimate the individual gender roles as long as all the work could be done. Therefore there would be no reason to have demarcated areas for gendered work. The open interior plan and multi-use areas of the Thule house (visible at the three cluster solution) would reinforce the sharing of space and their small size and the single light source would further encourage the sharing of workspaces (individual workspaces may be more visible at the nine cluster solution). This could in turn serve to remind the Thule that women and men must co-operate in order to survive. In this way, the microcosm of the house would not only reflect the values of Thule society as a whole but would also help to perpetuate them. This would ensure the survival of both the household and the larger group.

It is suggested that at the "macro-level" the distribution of activity areas within Eastern Thule houses is related to architectural constraints, not gender hierarchies. The relationship between the house architecture and the spatial patterning is most evident at the three cluster solution level at both sites. At that level, each house has one tunnel cluster, and a western cluster and an eastern cluster each of which incorporates both platform and floor space. The nine cluster solution at both sites subdivides the larger clusters or multi-use areas into smaller clusters that may be related to individual activities or individual toolkits. These clusters are not, for the most part, gendered and clusters located on the floor do not appear to differ greatly (in gender or content) from those on the platform.

Ethnographic and ethnohistoric evidence suggested that a women's area might be located directly in front of the hearth. This was not supported by the K-means analysis. Ethnographic data suggested to Whitridge (n.d.) that men had exclusive use of the platform as a working area. No exclusively men's area was identified in this analysis, however. Instead, an interpretation of shared workspace and co-operative gender roles among the Thule at Tungatsivvik and possibly at Staffe Island is advanced, based on evidence for shared storage space/use of tunnel, similar disposal of working debris/refuse and the probability that the presence of both men's and women's tools in all remaining areas of the house indicates equal access to space.

This research indicates that extending Inuit gendered division of labour and gendered tool categories into the Thule period allows the interpretation of the nature of gender roles among the Thule as co-operative (as defined by Lyons).

8.2 Assessment of the Utility of Spatial Analysis for the Study of Gender.

The primary goal of this research was to assess the utility of spatial analysis as a means of investigating gender relations in a household setting. Spatial analysis was chosen as the means of investigating gender relations because as the common element of every archaeological site.

It was necessary to choose an appropriate technique for the spatial analysis of Thule houses. Four criteria were established which potential methods of spatial analysis must meet: replicability; incorporation of contextual information; physical location of clusters and listing of contents; an ability to evaluate multiple levels of clustering. The only method of spatial analysis that met all of these criteria was K-means analysis, developed by Kintigh and Ammerman (1982)[14].

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[14] Part of the "Tools for Analytical Archaeology" package available from Keith Kintigh. email - kintigh@asu.edu

8.3 Utilising K-means Analysis

Obviously, K-means analysis could not be used successfully if it was not incorporated into a logical method for analysing gender relations in a given cultural context, in this case, the Thule. For this research, the method hinged on the identification of gendered tools, relationships between those tools and the physical location of those tools with regard to house features. This required the input of ethnohistorical/ ethnographic and theoretical information regarding the general nature of gender role expression via spatial patterning, and the nature of that patterning among the Inuit, the descendants of the Thule. Gender played an important role in organising Inuit subsistence practices (see chapter three), and since some of those same subsistence practices were evident on the Thule sites, it was suggested that they might have been gendered similarly. This information was used to gender the tools related to those subsistence practices.

As established in chapter two, gender roles are a part of a society's organisation, and are reflected in its spatial organisation. Two opposing models of spatial organisation developed by Lyons (1989) suggest that co-operative gender roles result in shared space whereas competitive gender roles result in discrete gendered use of space. These models were used to develop two new models for Thule spatial analysis. Model one outlined the spatial manifestation of hierarchical gender relations, as described by Whitridge (n.d.), with men's artifacts concentrated on the high status platform area and women's artifacts concentrated in the lower status floor and tunnel areas. Model two described the spatial manifestation of co-operative gender relations, as indicated by Lyons (1989) and suggested by Sheitlin (1980), with shared workspaces and no gender exclusion areas.

K-means analysis proved successful in identifying interpretable clusters of gendered artifacts in the Thule house structures examined in this research. These clusters were consistent with one of the models of spatial behaviour discussed in chapter three: the co-operative model.

8.4 Conclusion and Suggestions for Further Research

Spatial analysis proved a useful approach for studying gender in the household context despite the low artifact counts. The K-means analysis provided more detailed interpretation of the use of house space than previously available. The nature of gender relations among the Thule was tested successfully using spatial evidence. As mentioned above, the interpretation rejects Whitridge's (n.d.) model of a hierarchical and segregated use of space.

The approach outlined here shows promise for interpreting gender relations through the analysis of gendered spatial patterning on prehistoric sites. Unfortunately, at present, it can only be undertaken on sites with ethnographic counterparts. Further research, however, should include the creation of a large database of potential patterns of gendered use of space that could be used in interpreting prehistoric sites. It would be interesting to analyse a variety of Inuit sites using the method established here to see how well ethnohistoric/ethnographic descriptions match actual patterns of Inuit use of space. Finally, as mentioned in chapter three, some eighteenth century Labrador Inuit lived in communal houses. An analysis of these houses would provide a valuable complement to this research and allow discussion of the impact of increased group size on gender relationships.

Appendix A
Gendered Artifact Lists

Cluster	Women's	Men's	Neutral	Probably Women`s	Probably Men's	Unknown
1 n=11	ulu	harpoon endbld harpoon endbld	butcher knife butcher knife butcher knife bead	boot creaser	pocketknife endbld endbld frag endbld frag core pieceesquilles endbld st edge flake	mica blk chert bone
2 n=7	graver tip vessel ulu	lance tip harpoon pt		boot creaser	blade	slate gr slate
3 n=7	ulu ulu ulu		whetstone		endbld endbld core/axe endbld endbldpreform endbldpreform	slate red slate knife bone

Table 1 Staffe Island House Ten Assemblage
Three Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Probably Women's	Probably Men's	Unknown
1 n=9		harpoon endbld harpoon endbld	butcher knife bead		pocket knife core endbld st edge fl	blkchert
2 n=6	graver tip vessel ulu			boot creaser		slate gr slate
3 n=5	ulu				endbldpreform	slate redslate bone
4 n=3	ulu					mica bone
5 n=3		lance tip harpoon pt			blade	
6 n=2					endbld core/axe	
7 n=3					endbld endbld frag endbld	
8 Total n=7	ulu		butcher knife butcher knife	boot creaser	endbld endbld frag p esquillees	
9 n=4	ulu		whetstone		endbld preform	knife

Table 2 Staffe Island House Ten Assemblage
Nine Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Probably Women	Probably Men's	Unknown
1 n=5		harpoon endbld	bead		core endblade st edge fl	
2 n=4	gravertip vessel ulu			boot creaser		
3 n=3	ulu				endbldpreform	slate
4 n=2						mica bone
5 n=3		lance tip harpoon pt			blade	
6 n=2					endbld core/axe	
7 n=3					endbld endbld frag endblade	
8 n=5			butcher knife butcher knife	boot creaser	endbld endbld frag	
9 n=4	ulu		whetstone		endbldpreform	knife
10 n=1	ulu					
11 n=2						slate gr slate
12 n=2						bone redslate
13 n=2	ulu				p esquillees	
14 n=4		harpoon endbld	butcher knife		pocketknife	blkchert

Table 3 Staffe Island House Ten Assemblage
Fourteen Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Probably Women's	Probably Men's
1 n=16	ulu	harpoon endbld harpoon endbld	butcher knife butcher knife butcher knife bead	boot creaser	pocket knife endbld endbld frag endbld frag core p. esquillees endbld st edge flake
2 n=10	ulu ulu ulu		whetstone		endbld endbld core/axe endbld endbld preform endbld preform
3 n=7	graver tip vessel ulu	lance tip harpoon pt		boot creaser	blade

Table 4 Staffe Island House Ten Assemblage Without Unknown Category
Three Cluster Solution Gendered Artifact List

Cluster	**Women's n=7**	**Men's n=4**	**Neutral n=5**
1	graver tip vessel ulu ulu ulu ulu ulu	harpoon endblde lance tip harpoon pt harpoon endblde	butcher knife butcher knife butcher knife bead whetstone

Table 5 Staffe Island House Ten Assemblage Without Probably And Unknown Categories Gendered Artifact List (No Significant Clustering Was Revealed For This Assemblage)

Cluster	Women's	Men`s	Neutral	Unknown
1 n=11	ulu ulu	harpoon endbld harpoon endbld	butcher knife butcher knife butcher knife bead	mica blk chert bone
2 n=7	graver tip vessel ulu	lance tip harpoon pt		slate gr slate
3 n=7	ulu ulu		whetstone	slate red slate knife bone

Table 6 Staffe Island House Ten Assemblage Without Probably Categories
Three Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Unknown
1 n=5	ulu		butcher knife butcher knife butcher knife	blk chert
2 n=5	graver tip vessel ulu			slate gr slate
3 n=5	ulu ulu			slate red slate bone
4 n=2		lance tip harpoon pt		
5 n=5		harpoon endbld harpoon endbld		bead mica bone
6 n=3	ulu		whetstone	knife

Table 7 Staffe Island House 10 Assemblage Without Probably Categories
Six Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Unknown
1 n=3	ulu		butcher knife butcher knife	
2 n=3	graver tip vessel ulu			
3 n=2	ulu			slate
4 n=2		lance tip harpoon pt		
5 n=5		harpoon endbld harpoon endbld	butcher knife bead	blk chert
6 n=3	ulu		whetstone	knife
7 n=2				mica bone
8 n=1	ulu			
9 n=2				slate gr slate
10 n=2				red slate bone

Table 8 Staffe Island House 10 Assemblage Without Probably Categories
Ten Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Probably Women's	Probably Men's	Unknown
1 n= 21	vessel frag rim shard	drill bit toy?lancetip	bead whetstone?	scapula scrpr	endbld frag endbld base endbld	soapstn frag soapstn frag soapstn soapstn frag soapstn frag soapstn frag baleen soapstn frag wrkd slate bld frag drld slate
2 n=38		drill mpiece harpoon head harpoon head bola bola bola bola arrowhead pick uqsiq frag	peg drld pendant whetstonefrag		mattock knife (?) bld endbld endbld base	wrkd antler drld bone soapstn frag drld ivory wrkd antler drld bone socket (?) soapstn frag wrkd antler soapstn frag soapstn frag drld bone wrkd ivory wrkd ivory drld ivory wrkd antler wrkd antler soapstn frag slate frag drld slate wrkd slate

Table 9 Tungatsivvik House Six Asemblage
Three Cluster Solution Gendered Artifact List

3	thimblehldr	harpoon head	drldpendant	marrow scp ?	harpoonbld?	soapstnfrag
n=47	rim shard	bola	drldpendant	scapula scrpr		soapstnfrag
	vessel frag	harpoon tip	pendant	awl ?		soapstnfrag
	lamp	harpoon head	whetstone	scrpr frag		wrkd antler
	ulu blade	lance head	snow beater			soapstnfrag
		harpoonfrshft				wrkd antler
		kakivak s-brb				bone
						wrkdantler
						wrkdantler
						foreshaft
						wrkd bone
						drld bone
						drld ivory
						foreshaft
						wrkd antler
						shaft
						soapstnfrag
						soapstnfrag
						plshd slate
						plshd slate
						slate frag
						drld slate
						drld slate
						groundslate
						blade frag

Table 9 Tungatsivvik House Six Asemblage
Three Cluster Solution Gendered Artifact List (continued)

Cluster	Women's	Men's	Neutral	Probably Women's	Probably Men's	Unknown
1 n=9			bead whetstone?		endbld	soapstn frag soapstn frag soapstn frag baleen drilled slate
2 n=11		bola bola bola bola uqsiq frag		scapula scrpr	endbld base	wrkd ivory drld ivory wrkd antler soapstn frag
3 n=29	rim shard lamp	bola harpoon tip harpoon head lance head harpoon foreshaft	snow beater	marrow scp ? scapula scrpr scrpr frag	harpoonbld?	soapstn frag soapstn frag soapstn frag wrkd antler soapstn frag bone wrkd antler wrkd antler foreshaft wrkd bone wrkd antler foreshaft plshd slate slate frag drld slate drld slate bld frag
4 n=5	thimblehldr ulu blade	harp head	drldpendant			ground slate
5 n=17	vessel frag	kakivak s-brb pick	drldpendant pendant whetstone	awl ?	endbld	wrkd antler drld bone drld ivory foreshaft soapstn frag drld bone soapstn frag drld ivory plshd slate

Figure 10 Tungatsivvik House Six Assemblage
Nine Cluster Solution Gendered Artifact List

6 n =10	rim shard	lance tip (toy?)	whetstonefrag		mattock endbld base	wrkd antler soapstn soapstn frag soapstn frag bld frag
7 n=6	vessel fragment	drill bit			endblade frag	soapstn frag soapstn frag wrkd slate
8 n=3						slate frag drld slate wrkd slate
9 n=17		drill mpiece harpoonhead harpoon head arrowhead	peg drld pendant		knife (?) bld	wrkd antler drld bone socket (?) soapstn frag wrkd antler soapstn frag soapstn frag drld bone wrkd ivory wrkd antler

Figure 10 Tungatsivvik House Six Assemblage
Nine Cluster Solution Gendered Artifact List (continued)

Cluster	Women's	Men's	Neutral	Probably women's	Probably men's	Unknown
1 n=6			bead whetstone?		soapstn frag	soapstn frag soapstn frag baleen drld slate
2 n=11		bola bola bola bola uqsiq frag		scapulascrp r	endbld base	wrkd ivory drld ivory wrkd antler soapstn frag
3 n=18	lamp	harpoon lance head harpoon fshft	snow beater	scrpr frag		wrkd antler soapstn frag wrkd antler wrkd antler foreshaft wrkd bone wrkd antler shaft plshd slate slate frag drld slate drld slate
4 n=4	thimble hlder ulu blade	harpoon	drld bear			
5 n=16	vessel frag	kakivak sbrb pick	drld pendant pendant whetstone	awl ?	endbld	drld bone drld ivory foreshaft soapstn frag drld bone soapstn frag drld ivory plshd slate
6 n=6		toy?lance tip	whetstonefrag		mattock	soapstn frag soapstn frag
7 n=6	vessel frag	drill bit			endbld frag	soapstn frag soapstn frag wrkd slate

Table 11 Tungatsivvik House Six Assemblage
Fourteen Cluster Solution Gendered Artifact List

8 n=3						slate frag drlld slate wrkd slate
9 n=5	rim shard				endbld base	worked antler fr soapston bld frag
10 n=9		harpoon head harpoonhea d arrowhead				soapstn frag soapstn frag soapstn frag drld bone wrkd ivory wrkd antler
11 n=7	rim shard	bola harpoon tip				soapstn frag soapstn frag ground slate bld frag
12 n=6				marrow scp scapula scrpr	harpoon bld?	soapstn frag wrkd antler scarfed bone
13 n=2					endblade	
14 n=8		drill mpiece	peg drilled tooth peg		knife (?) bld	wrkd antler drld bone socket (?) wrkd antler

Table 11 Tungatsivvik House Six Assemblage
Fourteen Cluster Solution Gendered Artifact List (continued)

Cluster	Women's	Men's	Neutral	Probably women's	Probably Men's
1 n=8	vessel frag	kakivak s-brb pick	drilled pendant pendant whetstone	awl ?	end blade
2 n=3			bead whetstone		endblade
3 n=4	thimble hldr ulu bld	Type 2 harpoon	drilled polar be		
4 n=7		bola bola bola bola uqsiq frag		scapula scrpr	endblade base
5 n=2	rim shard				endblade base
6 n=7		drill mpiece harpoon head harpoon head arrowhead	peg drilled tooth		knife (?) blade
7 n=9	lamp	harpoon head lance head harpoon frshft	snow beater	marrow scp? scapula scrpr scrpr frag	harpoon blade?
8 n=3	vessel frag	drill bit			endbld frag
9 n=3		toy? lance tip	whetstone frag		mattock
10 n=3	rim shard	bola harpoon tip			

Table 12 Tungatsivvik House Six Assemblage Without Unknowns
Ten Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Probably women's	Probablym en's
1 n=8	vessel frag	kakivak s-brb pick	drlld pendant pendant whetstone	awl ?	endbld
2 n= 3			bead whetstone		endbld
3 n=4	thimble hldr ulu bld	harpoon head	drld polar bear		
4 n=7		bola bola bola bola uqsiq frag		scapula scrpr	endbld base
5 n= 2	rim shard				endbld base
6 n=4		drill mpiece	peg drilled tooth		knife (?) bld
7 n=9	lamp	harpoon head lance head harpoon frshft	snow beater	marrow scp? scapula scrpr scrpr frag	harpoonbld?
8 n=3	vessel frag	drill bit			endbldfrag
9 n=3		lance tip (toy?)	whetstone frag		mattock
10 n=3	rim shard	bola harpoon tip			
11 n=1					endbld
12 n=3		harpoon head harpoon head arrowhead			

Table 13 Tungatsivvik House Six Assemblage Without Unknown Category
Twelve Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral
1 n=12		drill mpiece harpoon head harpoon head bola bola bola bola arrowhead uqsiq frag	peg drld tooth whetstone frag
2 n=14	rim shard vessel frag lamp	bola harpoon tip harpoon head lance head harpoon frshft kakivak s-brb pick	drld pendant pendant whetstone snow beater
3 n=6	vessel frag rim shard	drill bit toy? lance tip	bead whetstone?
4 n=4	thimble hldr ulu blade	harpoon head	drld polar bear

Table 14 Tungatsivvik House Six Assemblage Without Probably or Unknown Categories - Four Cluster Solution Gendered Artifact List

Cluster	Women's	Men's	Neutral	Unknown
1 n=9		bola bola bola bola uqsiq frag		worked ivory wrkd ivory drld ivory wrkd antler
2 n=17	lamp	harpoon head lance head harpoon frshft	snow beater	soapstn frag worked antler scarfed bone wrkd antler wrkd antler frshft frshft wrkd antler wrkd slate plshd slate slate frag drld slate
3 n=7			bead whetstone?	soapstn frag soapstn frag soapstn frag wrkd slate drld slate
4 n=4	thimble hldr ulu bld	harpoon head	drld polar be	
5 n=12	vessel frag	kakivak s-brb pick	drld pendant pendant whetstone	wrkd bone drld bone shaft wrkd antler soapstn frag plshd slate
6 n=4		toy? lance tip	whetstone frag	soapstn baleen
7 n=5	vessel frag	drill bit		soapstn frag soapstn frag slate frag

Table 15 Tungatsivvik House Six Assemblage Without Probably Categories
Thirteen Cluster Solution Gendered Artifact List

8 n=3				soapstn frag bld frag drlld slate
9 n=4	rim shard			soapstn frag drld bone bld frag
10 n=8	rim shard	bola harpoon tip		soapstn frag soapstn frag wrkd antler drld slate ground slate
11 n=9		harpoon head harpoon head arrowhead		socket? wrkd antler soapstn soapstn drld bone wrkd antler
12 n=4				soapstn frag soapstn frag drld ivory soapstn frag
13 n=7		drill mpiece	peg drld tooth	drld ivory wrkd antler drld bone soapstn frag

Table 15 Tungatsivvik House Six Assemblage Without Probably Categories Thirteen Cluster Solution Gendered Artifact List (continued)

Appendix B
SSE Graphs

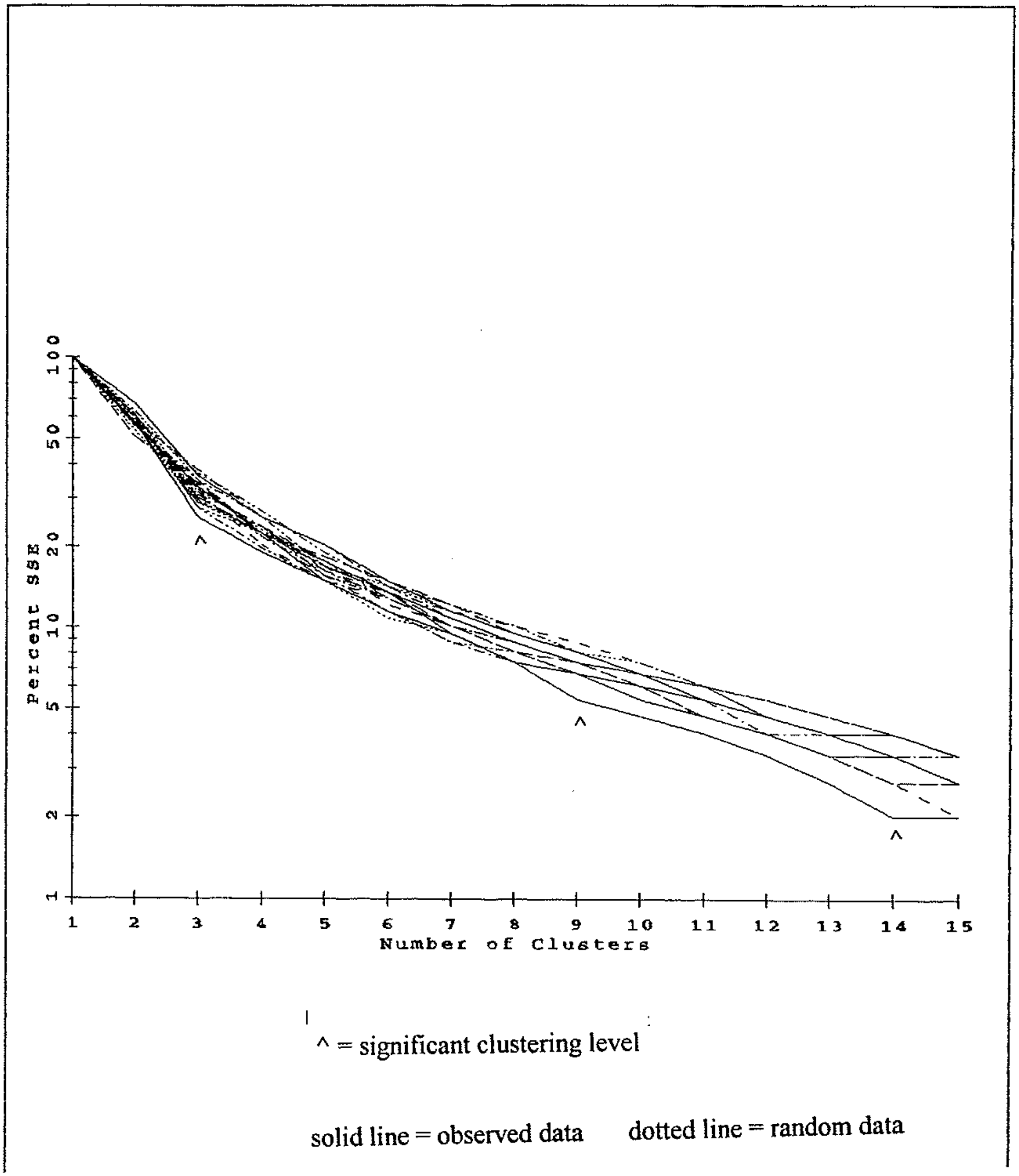


Figure 1 Staffe Island House Ten Assemblage
SSE Graph

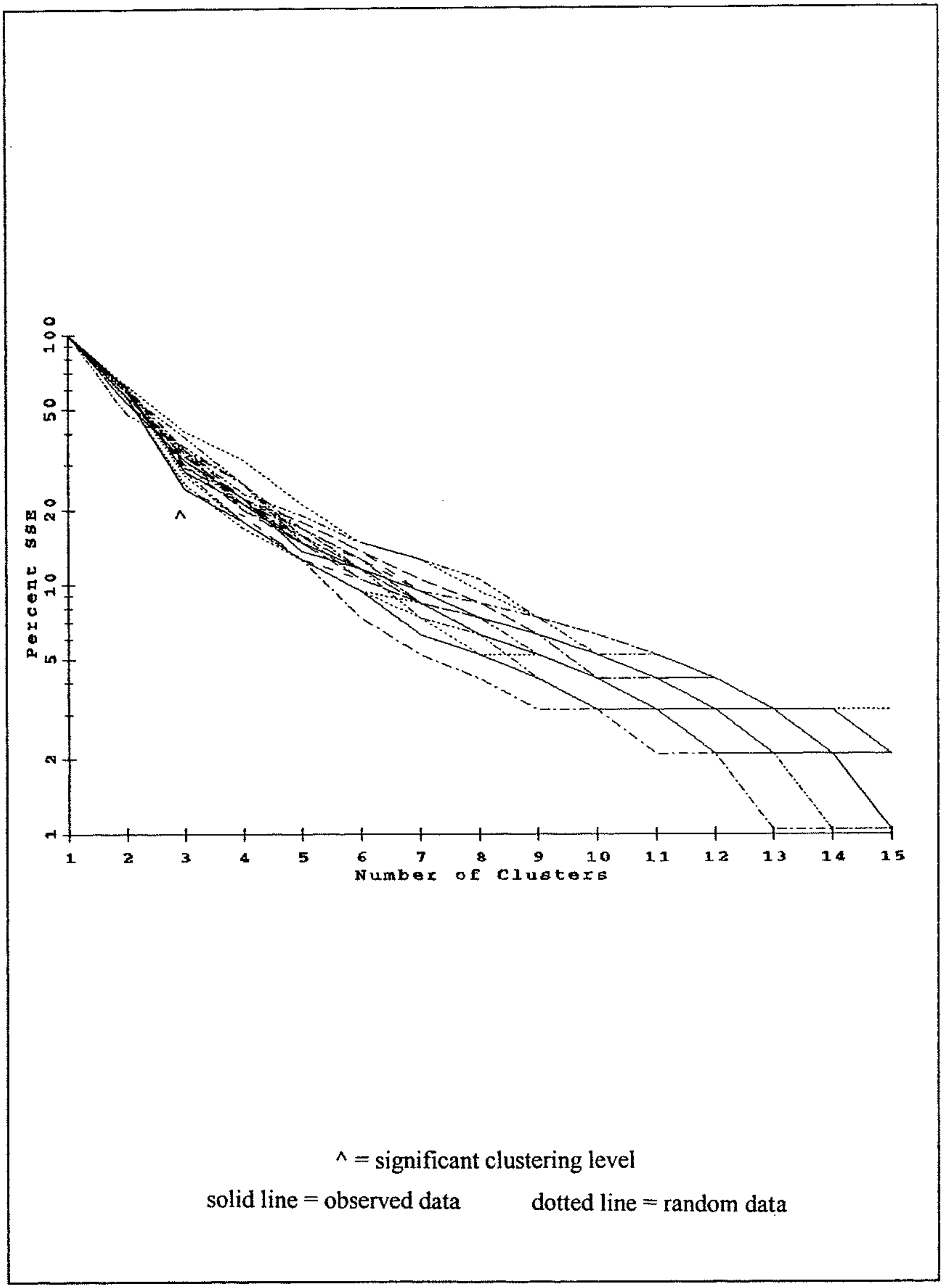
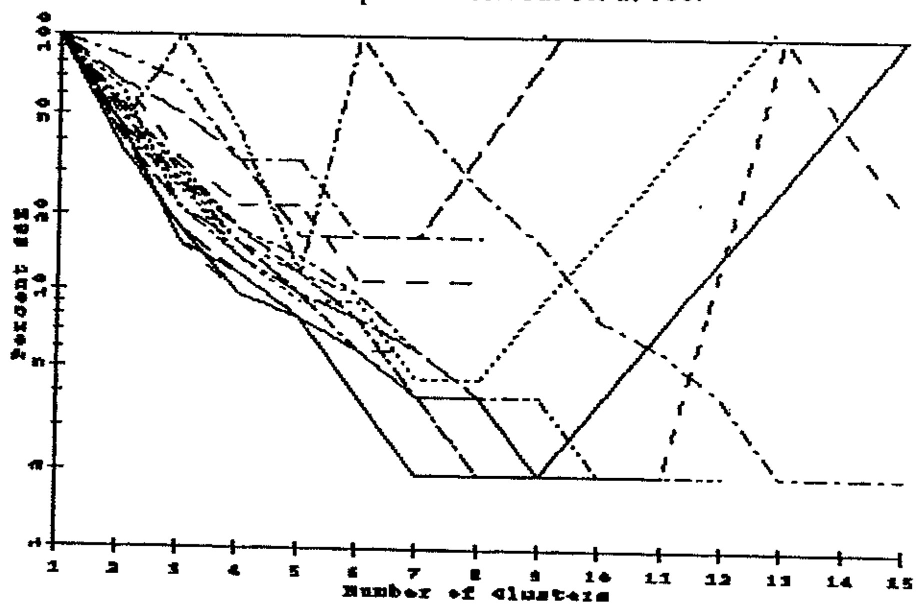


Figure 2 Staffe Island House Ten Assemblage without Unknown Category SSE Graph

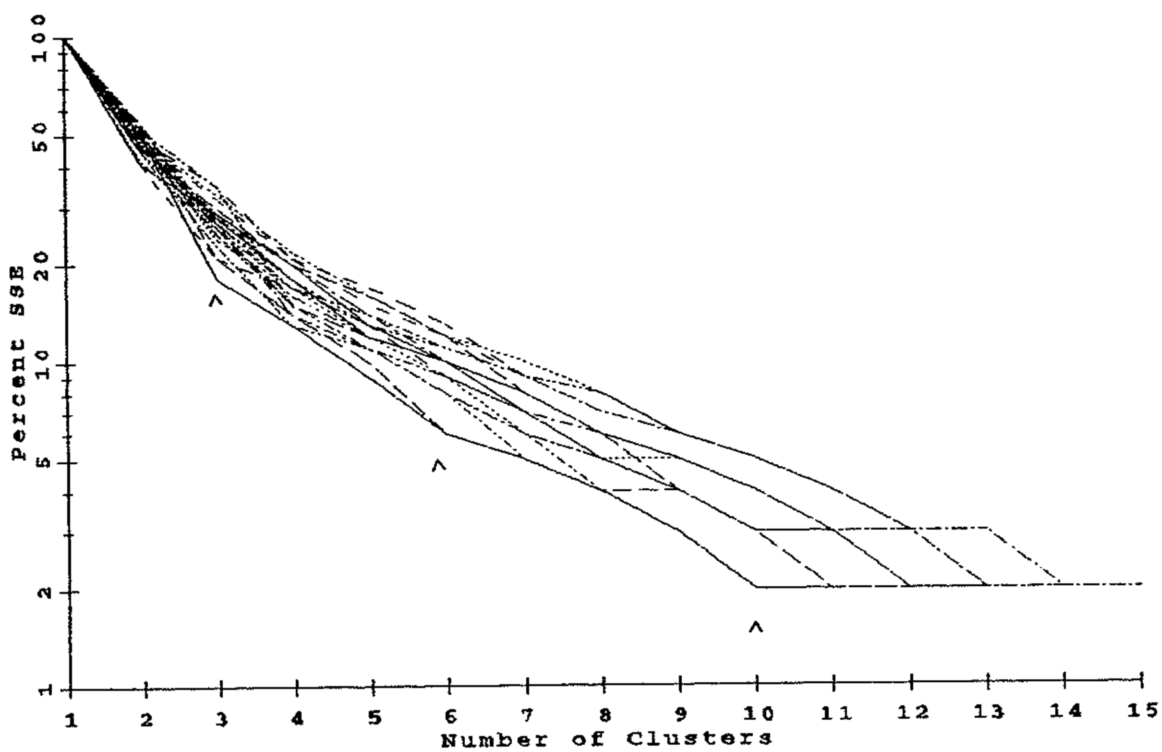
Graph has been cut off at 100.



^ = significant clustering level

solid line= observed data dotted line = random data

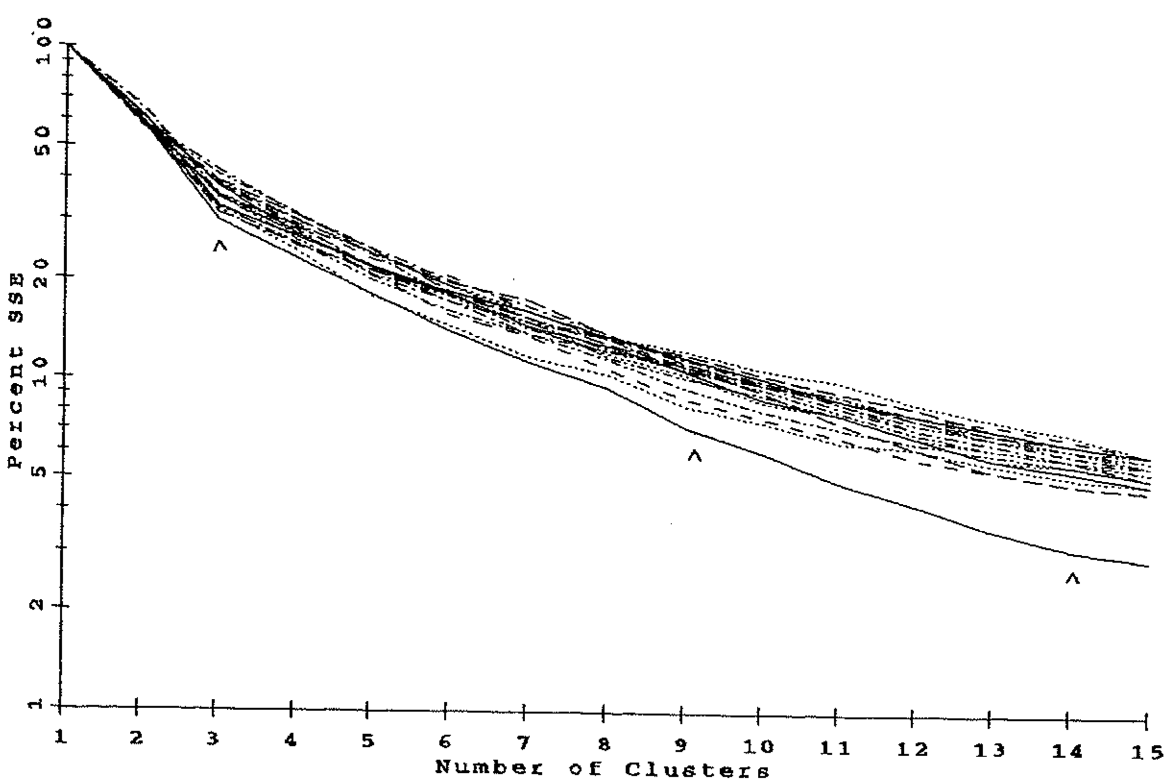
Figure 3 Staffe Island House Ten Assemblages without Probably and Unknown Categories SSE Graph



^ = significant clustering level

solid line = observed data dotted line = random data

Figure 4 Staffe Island House Ten Assemblages without Probably Categories SSE Graph



^ = significant clustering level

solid line = observed data   dotted line = random data

Figure 5 Tungatsivvik House Six Assemblage SSE Graph

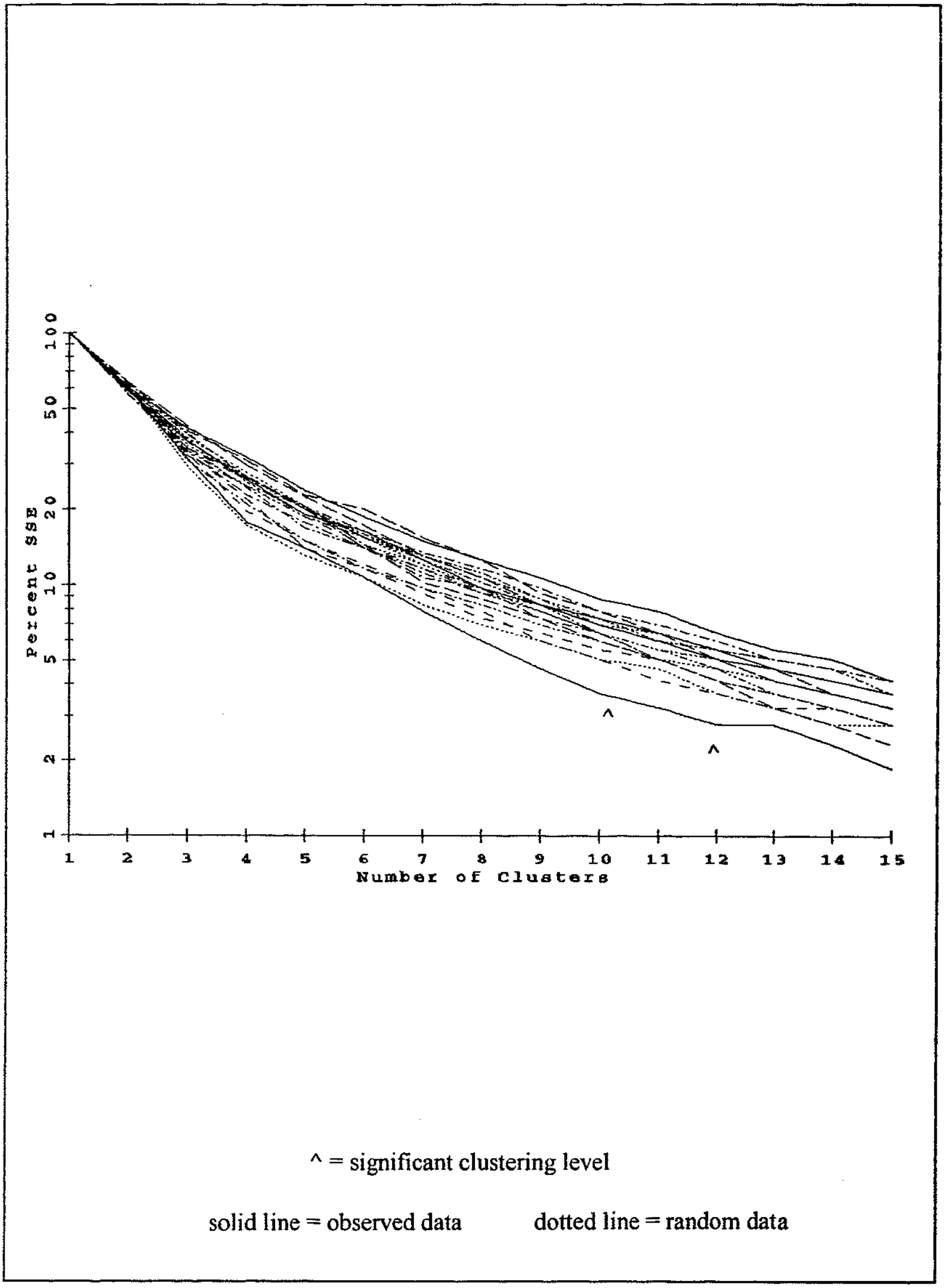


Figure 6 Tungatsivvik House Six Assemblage without Unknown Category SSE Graph

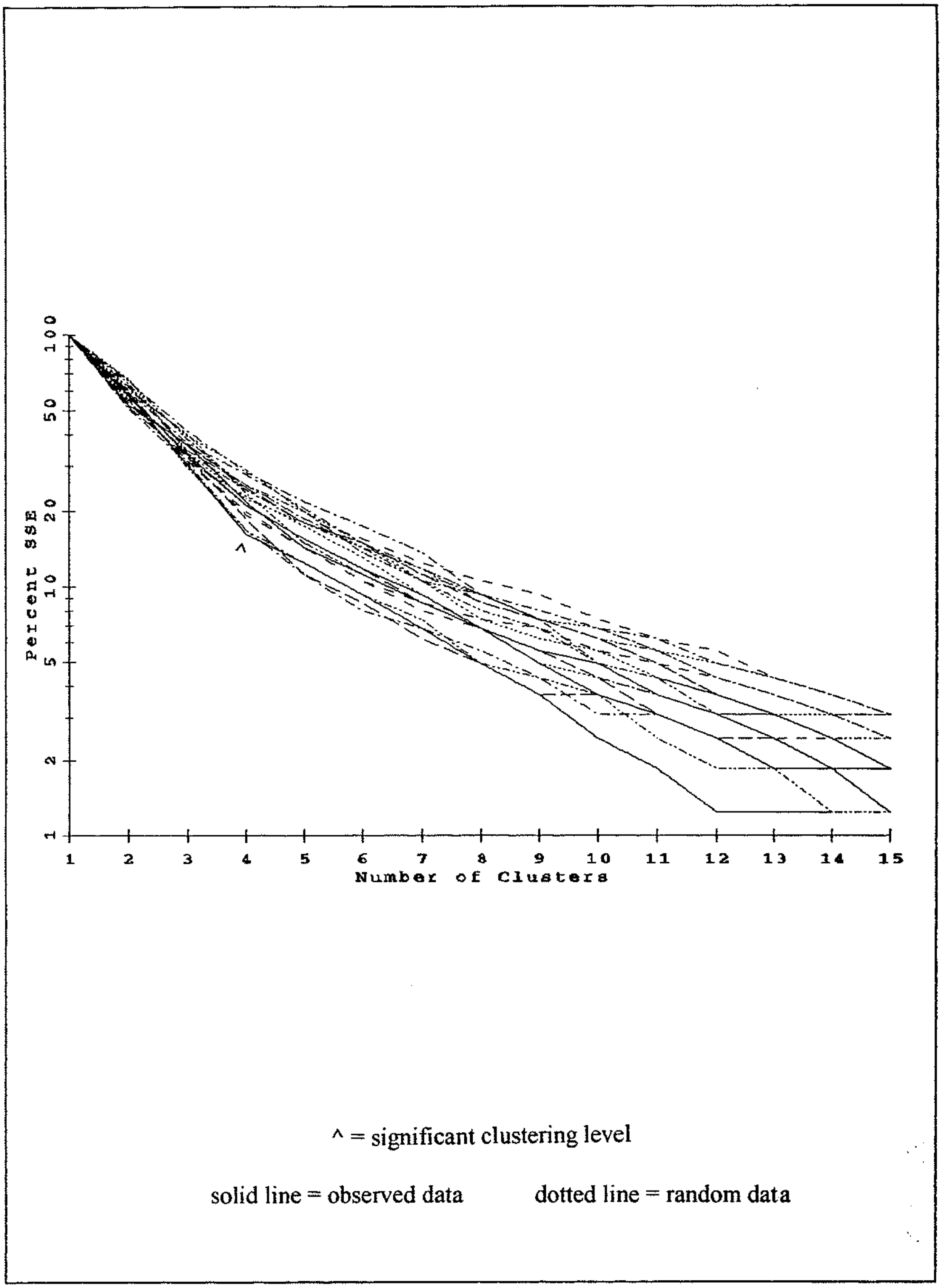
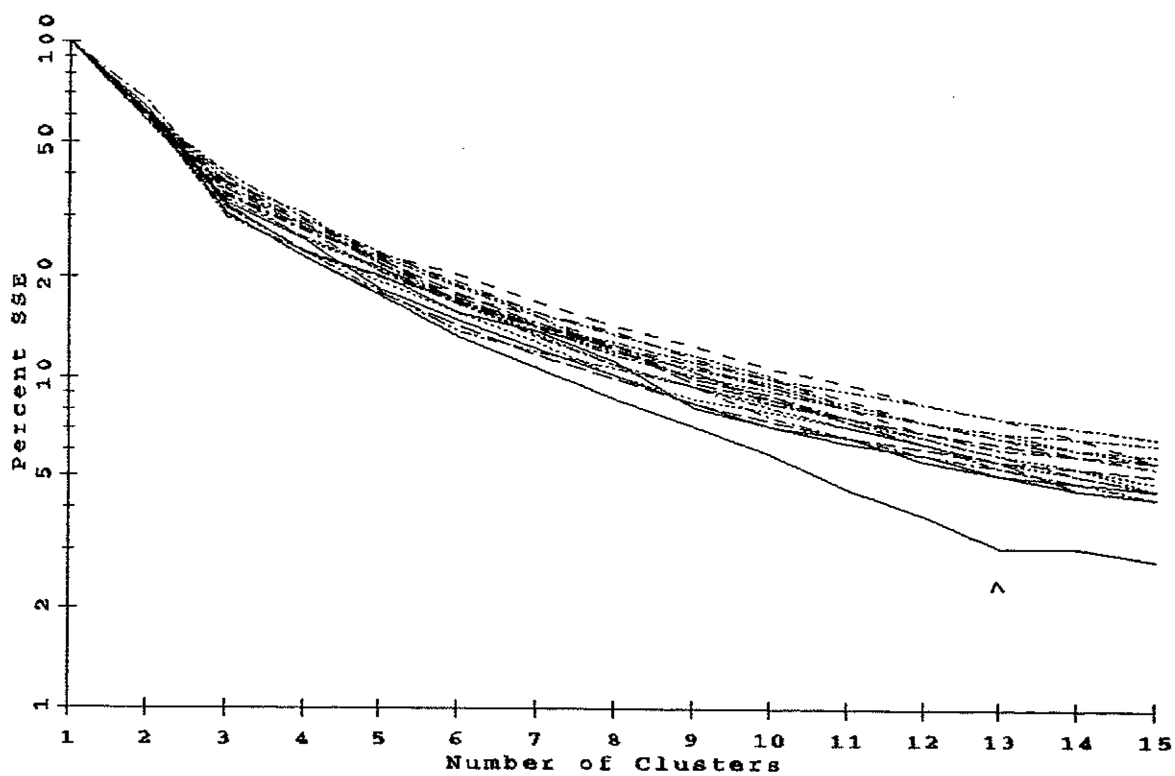


Figure 7 Tungatsivvik House Six Assemblage without Probably and Unknown Categories SSE Graph



^ = significant clustering level

solid line = observed data dotted line = random data

Figure 8 Tungatsivvik House Six Assemblages without Probably Categories SSE Graph

Appendix C
Cluster Configuration Maps

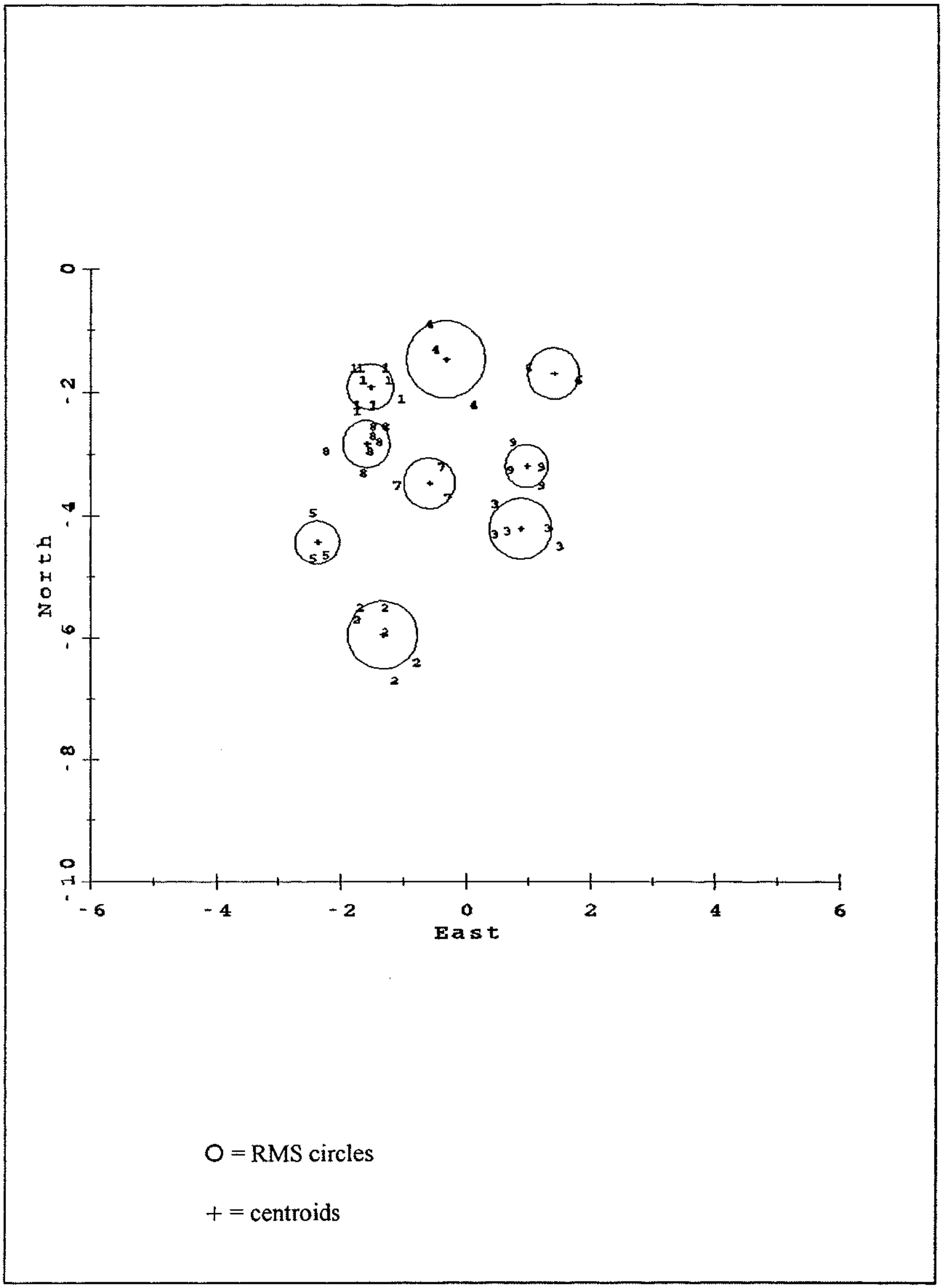


Figure 2 Staffe House Ten Assemblage
Nine Cluster Configuration

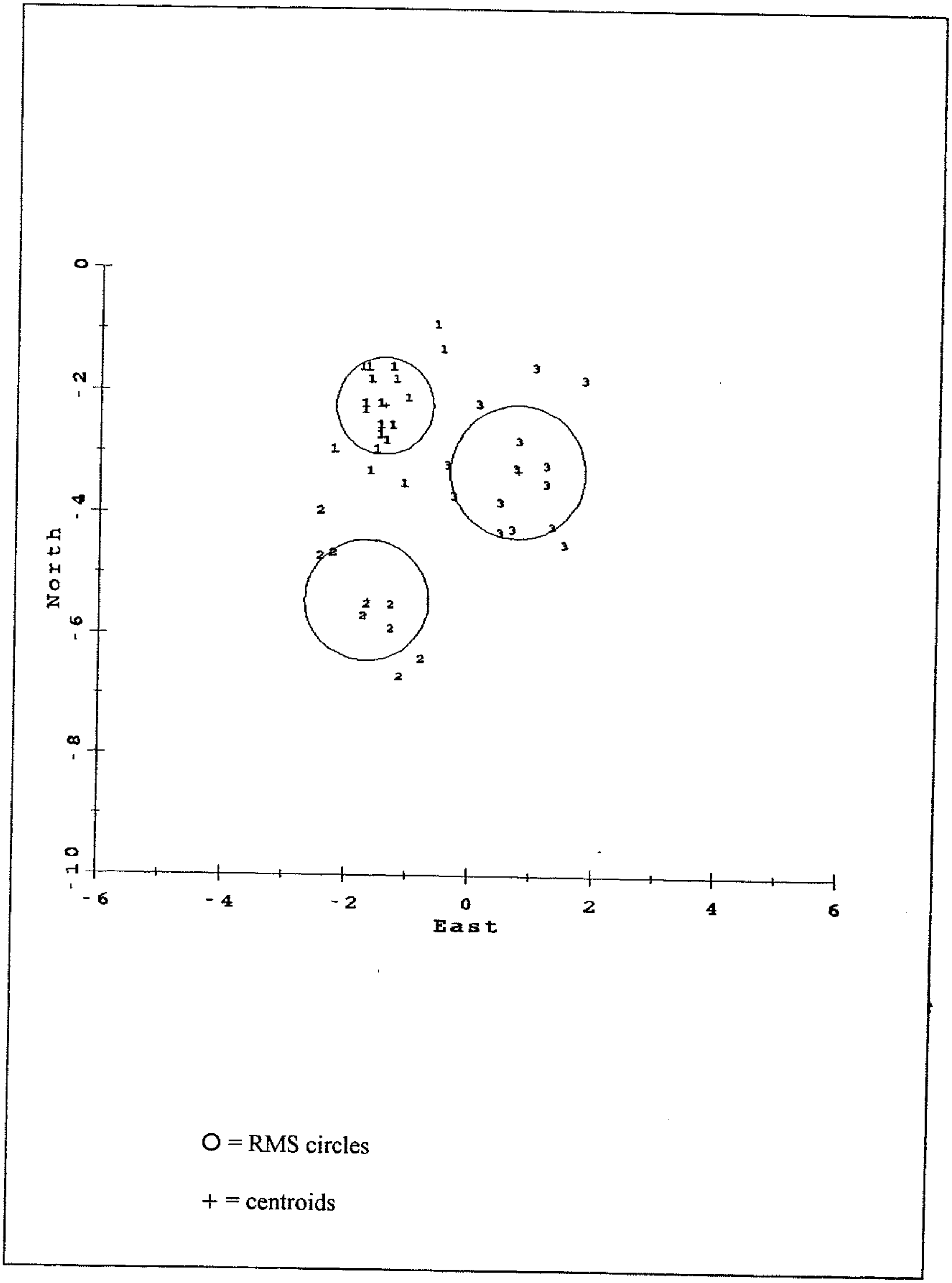


Figure 1 Staffe House Ten Assemblage
Three Cluster Configuration

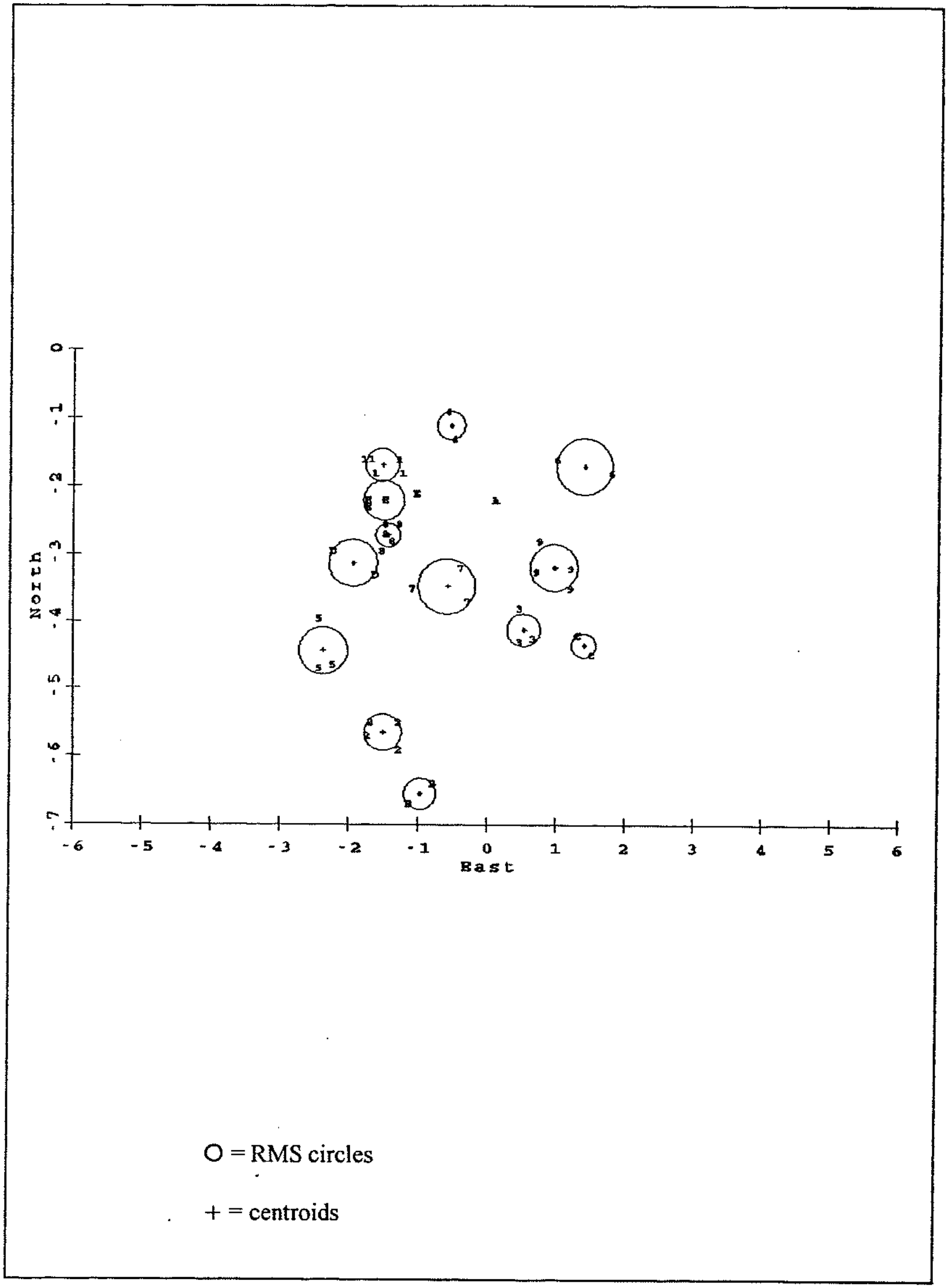


Figure 3 Staffe House Ten Assemblage
Fourteen Cluster Configuration Map

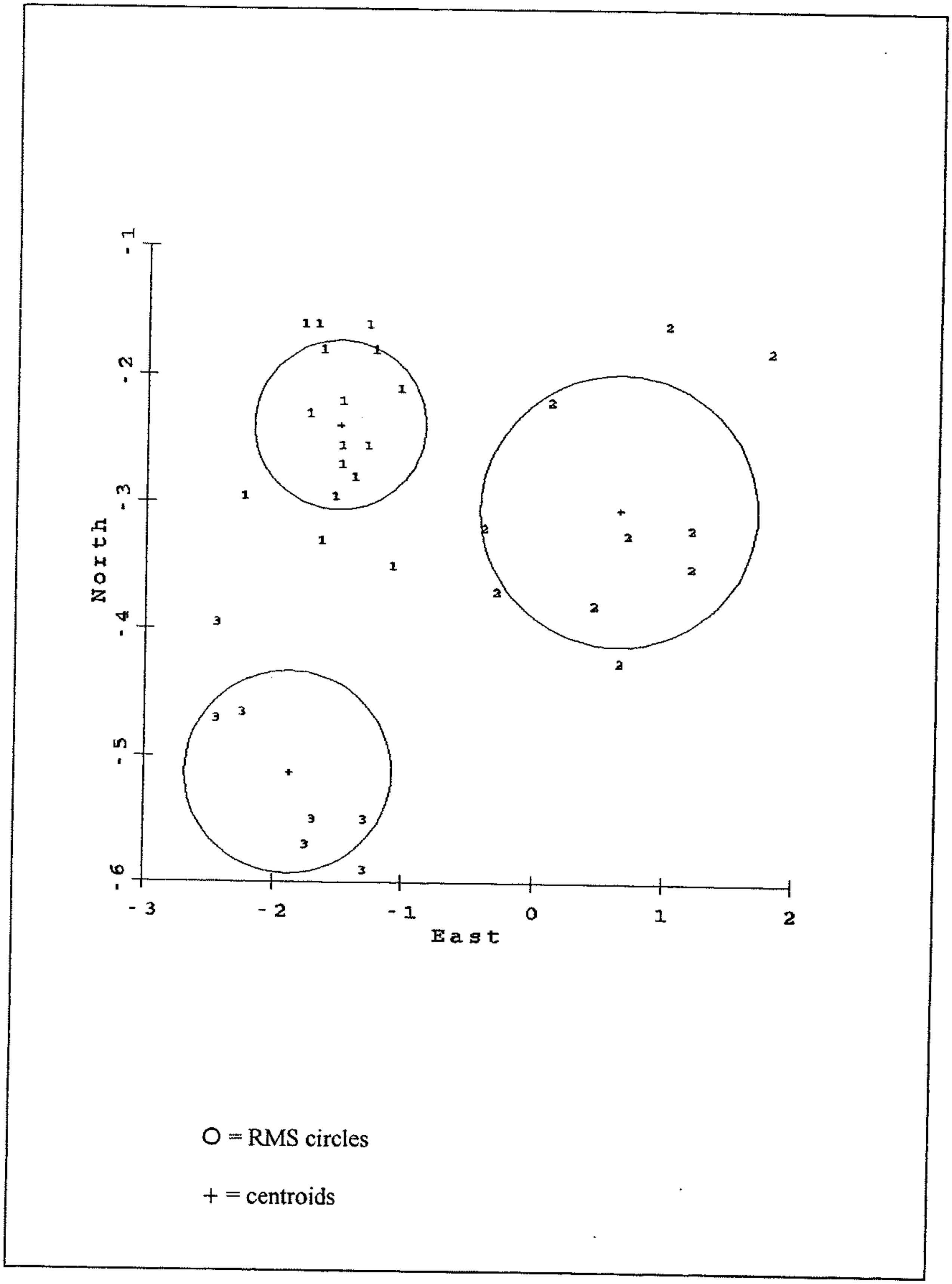
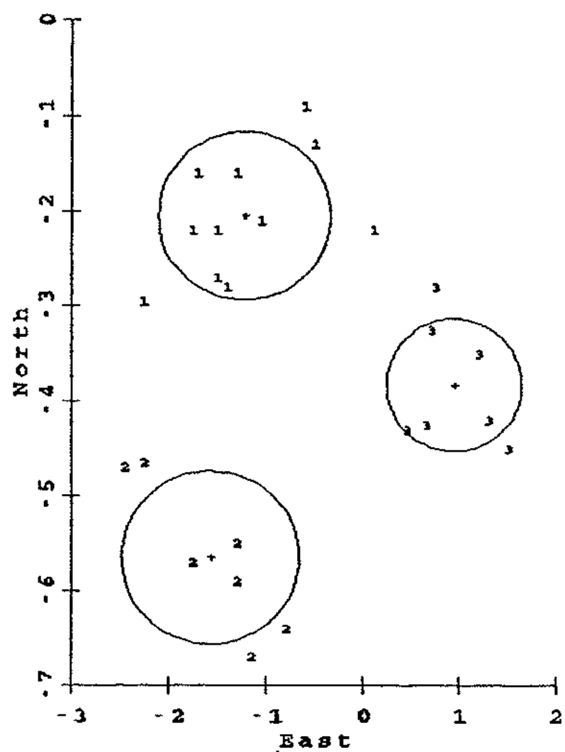


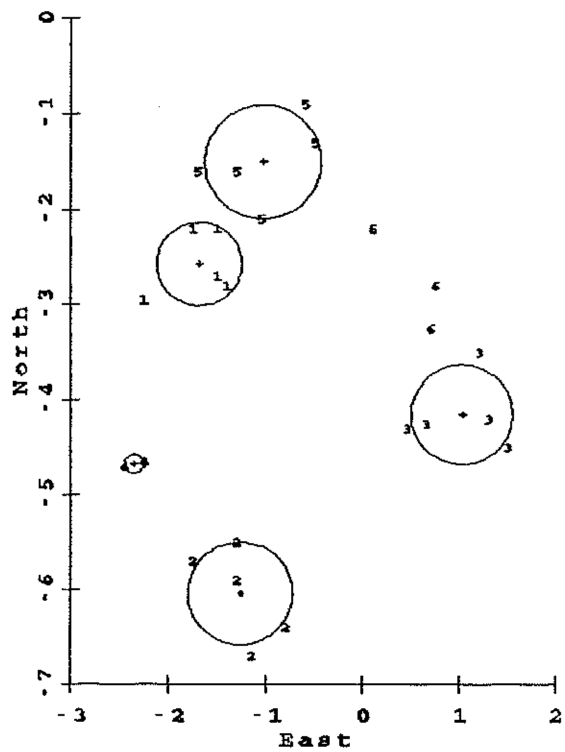
Figure 4 Staffe House Ten Assemblage without Unknown Category
Three Cluster Configuration Map



O = RMS circles

+ = centroids

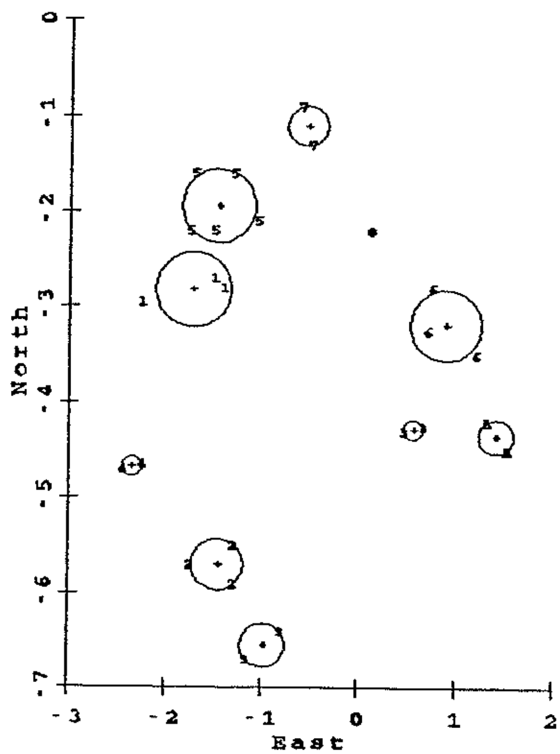
Figure 5 Staffe House Ten without Probably Categories
Six Cluster Configuration Map



O = RMS circles

+ = centroids

Figure 6 Staffe House Ten without Probably Categories
Ten Cluster Configuration Map



O = RMS circles

+ = centroids

Figure 7 Tungatsivvik House Six Assemblage
Three Cluster Configuration Map

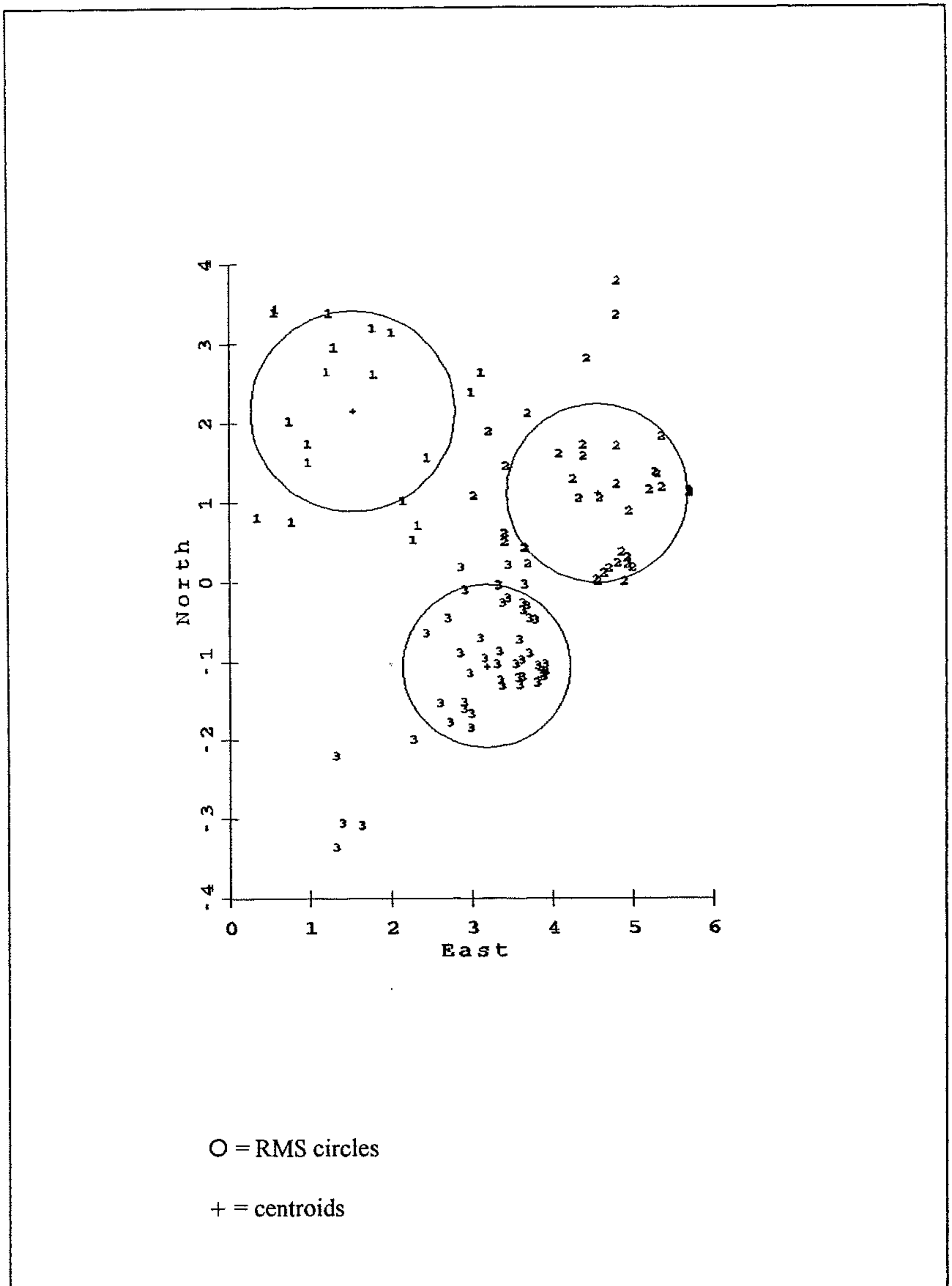


Figure 8 Tungatsivvik House Six Assemblage
Nine Cluster Configuration Map

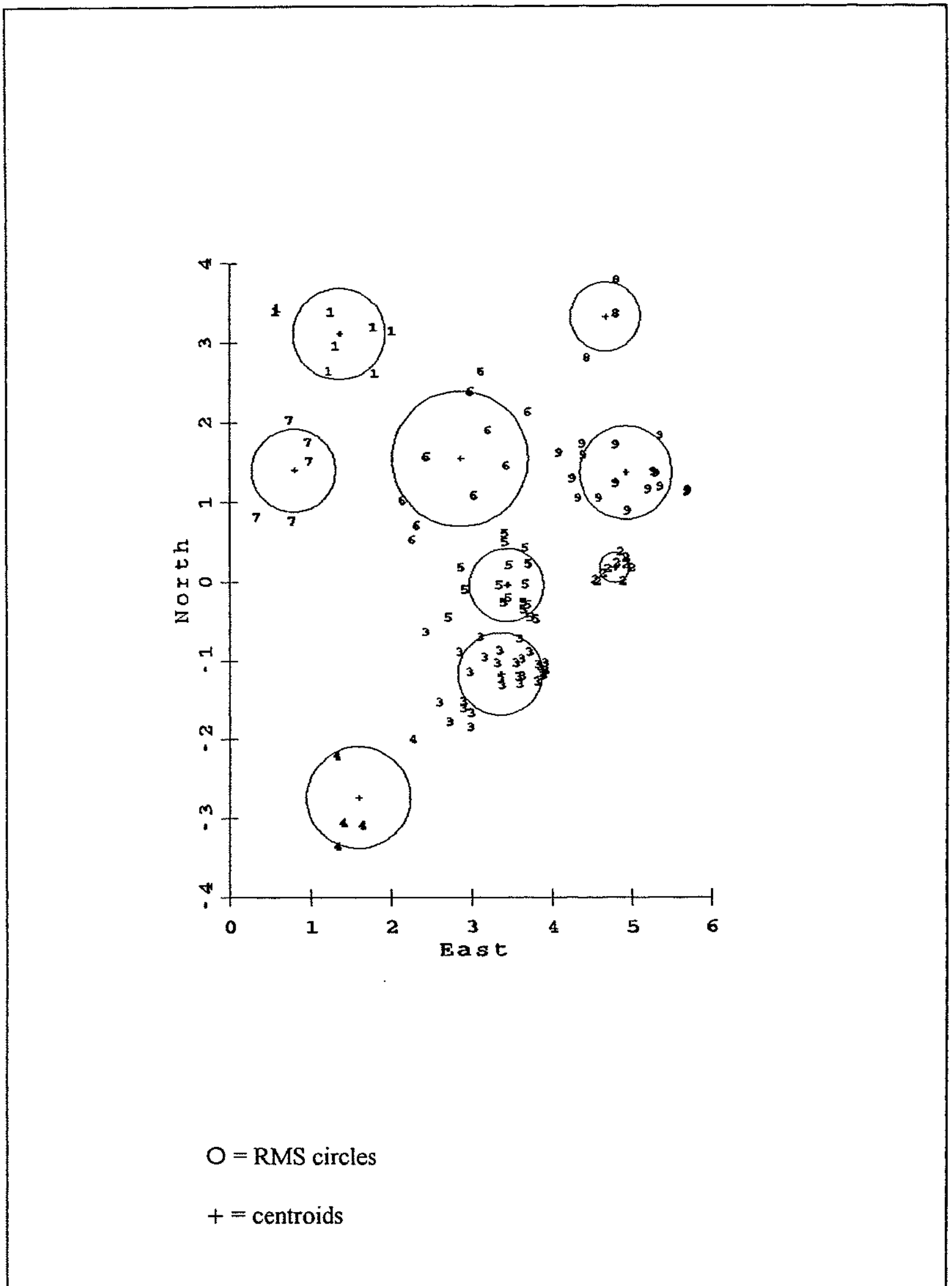


Figure 9 Tungatsivvik House Six Assemblage
Fourteen Cluster Configuration Map

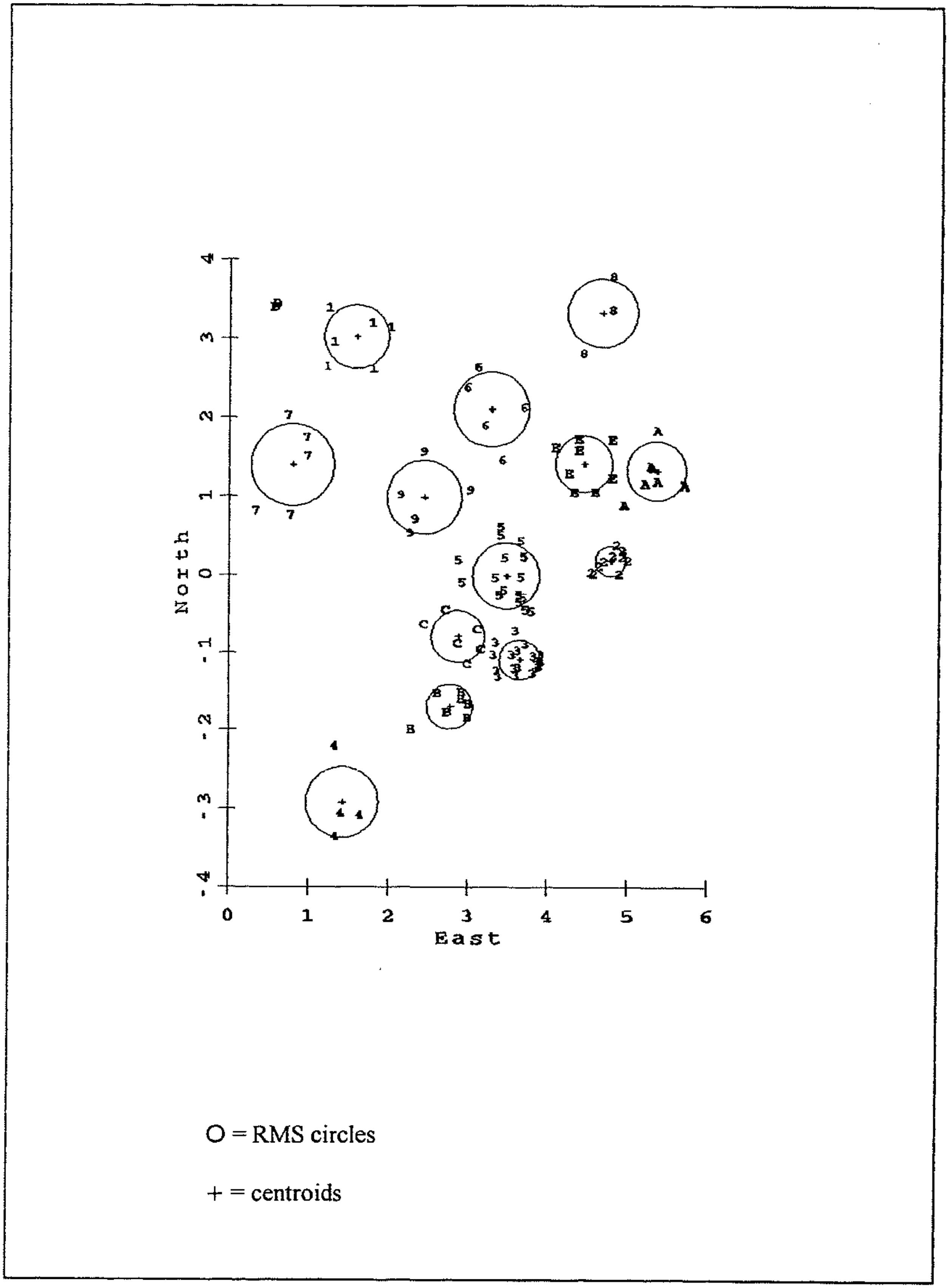


Figure 10 Tungatsivvik House Six Assemblage without Unknown Category Ten Cluster Configuration Map

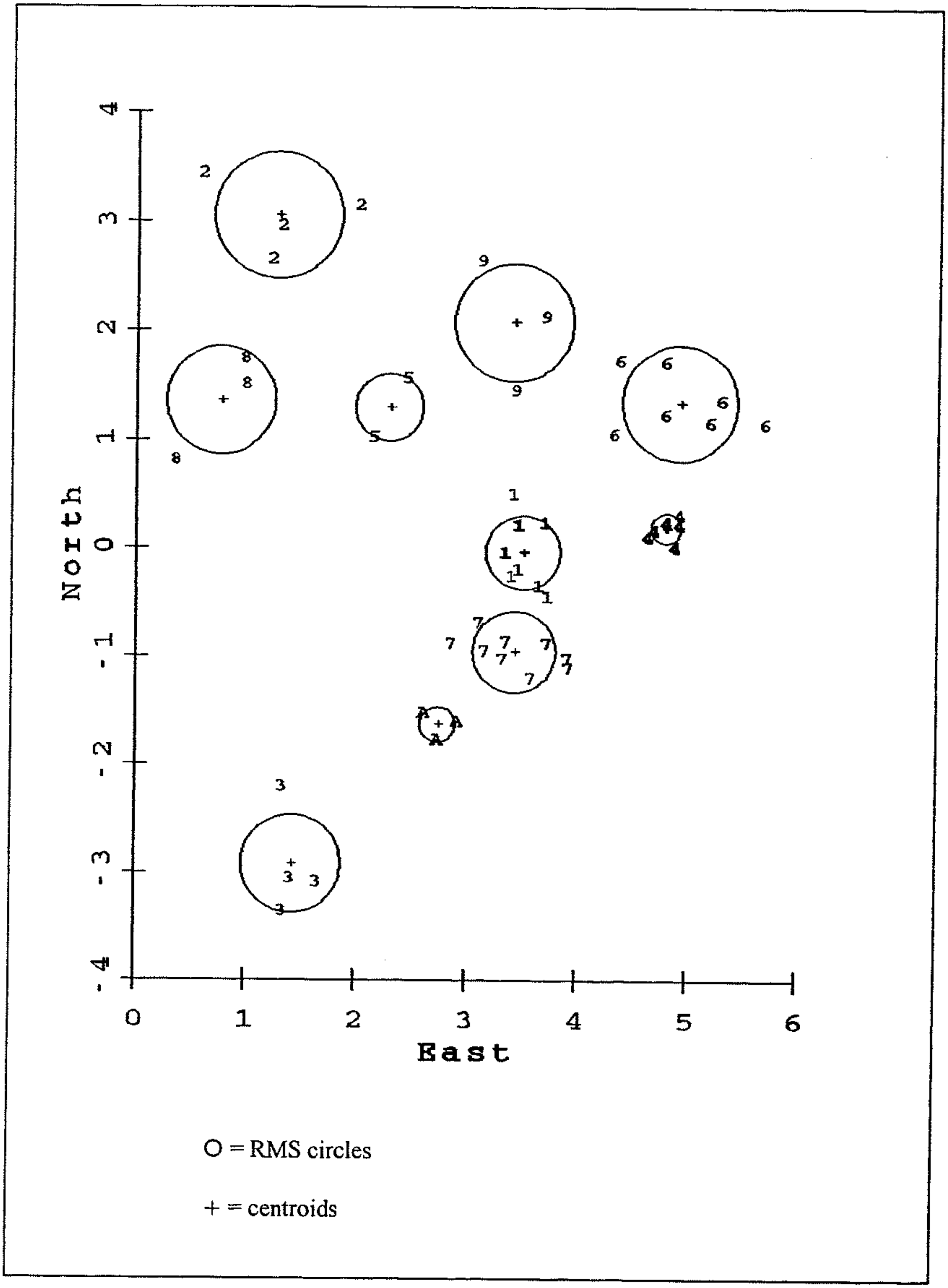
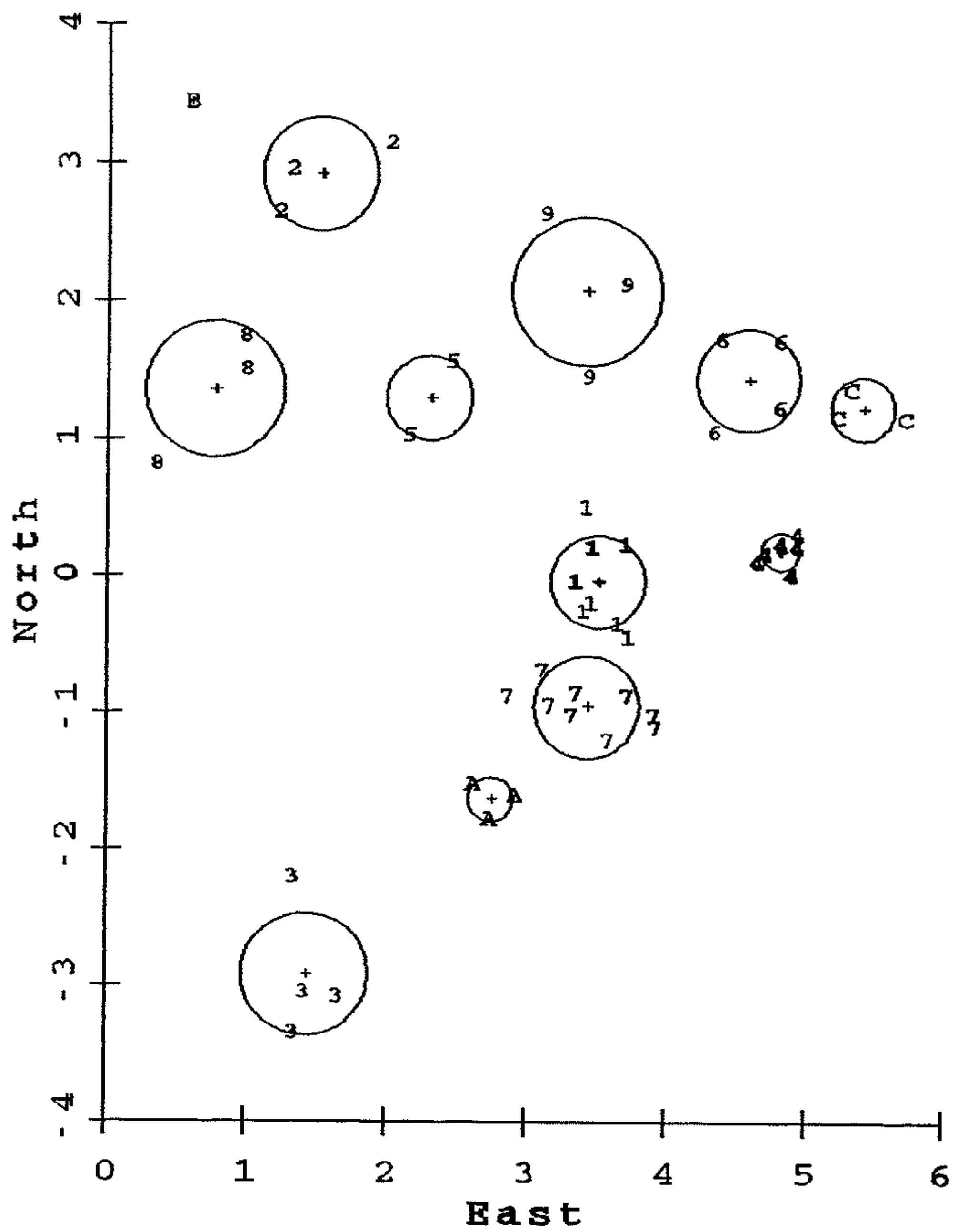


Figure 11 Tungatsivvik House Six Assemblage without Unknown Category Twelve Cluster Configuration Map



O = RMS circles

+ = centroids

Figure 12 Tungatsivvik House Six Assemblage without Probably and Unknown Categories Fourteen Cluster Configuration Map

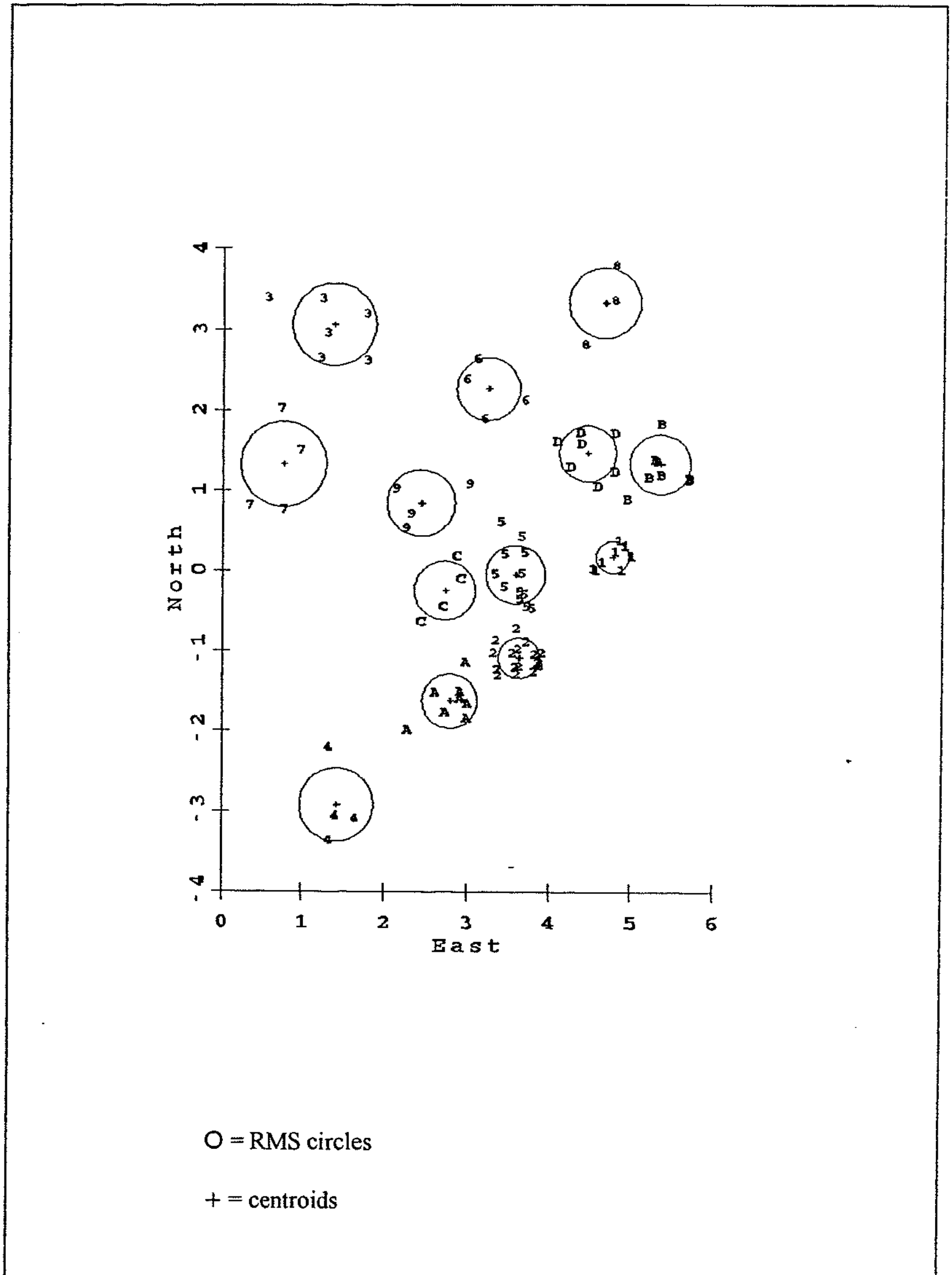


Figure 14 Tungatsivvik House Six Assemblage without Probably Categories
Thirteen Cluster Configuration

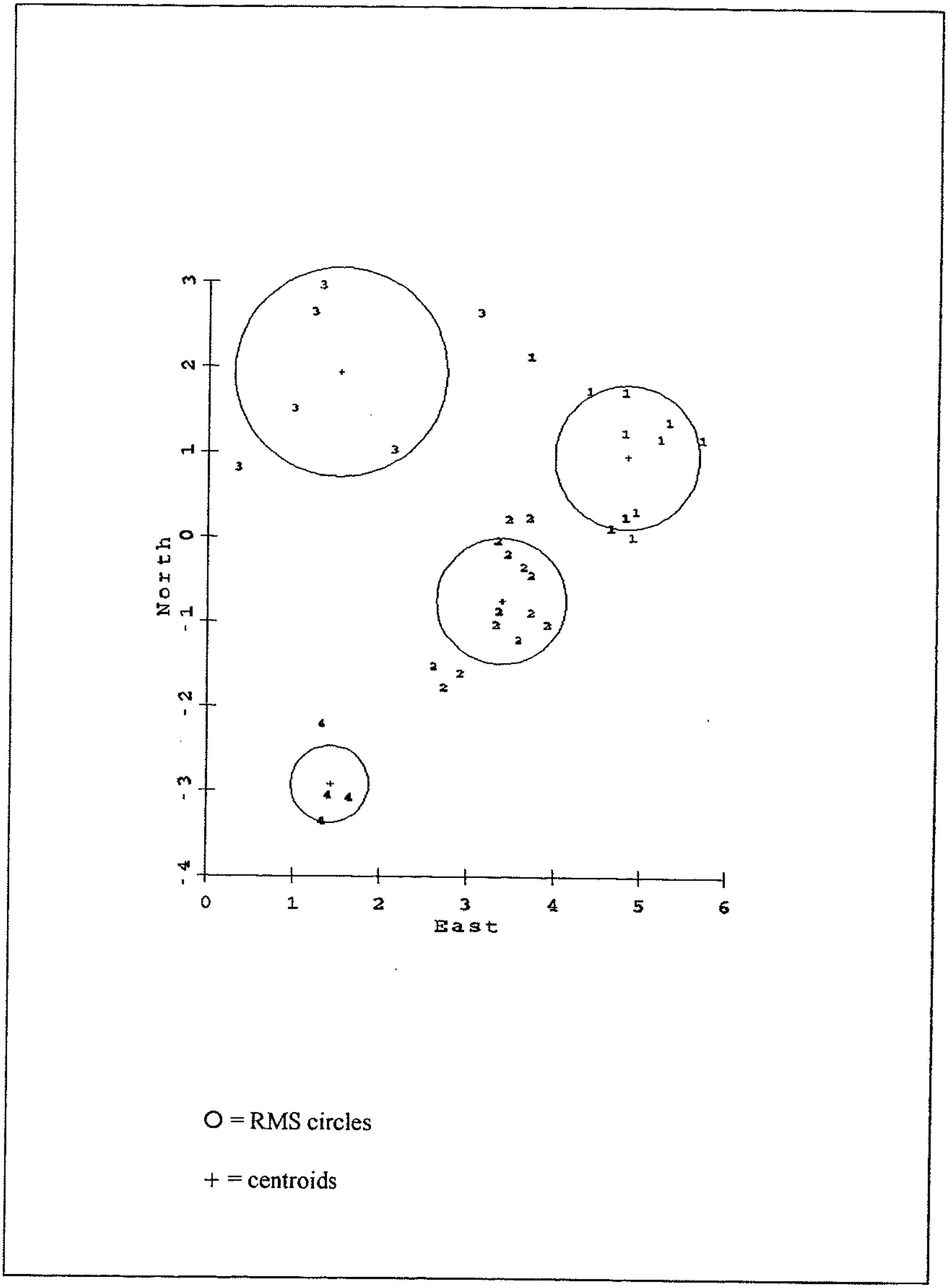


Figure 13 Tungatsivvik House Six Assemblage without Probably Categories
Thirteen Cluster Configuration Map

Appendix D
Results of Significance Tests

Cluster	Observed	Expected	O-E=D	D^2	D^2/E
Cluster 1					
Women	1	3.16	-2.16	4.66	1.47
Men	2	1.81	0.19	0.04	0.01
Neutral	4	2.26	1.74	3.03	1.34
P. Women	1	0.9	0.1	0.01	0.01
P. Men	8	6.79	-1.21	1.46	0.22
Unknown	3	4.07	-1.07	1.14	0.29
Cluster 2					
Women	3	1.5	1.5	2.25	1.5
Men	2	0.86	1.14	1.3	1.51
Neutral	0	1.07	-1.07	1.14	1.06
P. Women	1	0.43	0.57	0.32	0.74
P. Men	1	3.21	2.21	4.88	1.52
Unknown	2	1.93	0.07	0.0049	0.0025
Cluster 3					
Women	3	2.3	0.7	0.49	0.21
Men	0	1.33	-1.33	1.77	1.33
Neutral	1	1.67	-0.67	0.45	0.26
P. Women	0	0.67	-0.67	0.45	0.67
P. Men	6	5	1	1	0.2
Unknown	4	3	1	1	0.33
Result (10 d.o.f.)					12.68

This cluster solution does not reject the null hypothesis at the required .05 level.

Table 1 Staffe Island House Ten Unmodified Categories
Three Cluster Solution Chi-Square Results

Cluster	Observed	Expected	O-E=D	D^2	D^2/E
Cluster 1					
Women	2	4.07	-2.07	4.28	1.05
Men	10	8.6	1.4	1.96	0.23
Neutral	4	2.26	1.74	3.03	1.34
Unknown	3	4.07	-1.07	1.14	0.28
Cluster 2					
Women	4	1.93	2.07	4.28	2.22
Men	3	4.07	-1.07	1.14	0.28
Neutral	0	1.07	-0.07	0.005	0.005
Unknown	2	1.93	0.07	0.005	0.003
Cluster 3					
Women	3	3	0	0	0
Men	6	6.33	-0.33	0.11	0.017
Neutral	1	1.66	-0.66	0.44	0.27
Unknown	4	3	1	1	0.33
Result (6 d.o.f.)					6.025

This cluster solution does not reject the null hypothesis at the required .05 level.

Table 2 Staffe Island House Ten Modified Categories
Three Cluster Solution Chi-Square Results

Table 3 Staffe Island House Ten
Three Cluster Solution Binomial Test Results

Total Artifacts = 42
Total Women's = 9
P = 9/42 = .21
Q = 1-P = .79

Cluster 1 2 Women's 10 Men's

P(x) = Probability of finding x items of type W given twelve in a group and an overall P(w) = .21

Test: When $P(x) \le 0.10$, there is a significant departure from random expectations.

P(x) = (12!/(2!*(12-2)!)*.21^2*.79^10 = .28

Cluster 2 4 Women's 3 Men's

P(x) = Probability of finding x items of type W given seven in a group and an overall P(w) = .21

Test: When $P(x) \le 0.10$, there is a significant departure from random expectations.

P(x) = (7!/(4!*(7-4)!)*.21^4*.79^7 = .013

Cluster 3 3 Women's 6 Men's

P(x) = Probability of finding x items of type W given nine in a group and an overall P(w) = .21

Test: When $P(x) \le 0.10$, there is a significant departure from random expectations.

P(x) = (9!/(3!*(9-3)!)*.21^3*.79^6 = .19

Conclusion: Only Cluster 2 results are significant. Contents of Clusters 1 and 3 do not differ from random expectations given P and Q.

Table 3 Staffe Island House Ten
Three Cluster Solution Binomial Test Results

Table 4 Staffe Island House Ten
Nine Cluster Solution Binomial Test Results

Total Artifacts = 42
Total Women's = 9
P = 9/42 = .21
Q = 1-P = .79

Cluster 1 0 Women's 6 Men's

P(x) = Probability of finding x items of type W given six in a group and an overall P(w) = .21

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (1)*.21^0*.79^6 = .24

Cluster 2 4 Women's 0 Men's

P(x) = Probability of finding x items of type W given four in a group and an overall P(w) = .21

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (1)*.21^4*.79^0 = .001

Cluster 3 1 Women's 1 Men's

P(x) = Probability of finding x items of type W given two in a group and an overall P(w) = .21

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (2!/(1!*(2-1)!)*.21^1*.79^1= .33

Cluster 4 1 Women's 0 Men's

P(x) = Probability of finding x items of type W given one in a group and an overall P(w) = .21

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (1)*.21^1*.79^0= .21

Cluster 5 0 Women's 3 Men's

P(x) = Probability of finding x items of type W given three in a group and an overall P(w) = .21

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (1)*.21^0*.79^3 = .49

Cluster 6 0 Women's 2 Men's

P(x) = Probability of finding x items of type W given two in a group and an overall P(w) = .21

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(x) = (1)*.21^0*.79^2 = .62

Cluster 7 0 Women's 3 Men's

P(x) = Probability of finding x items of type W given three in a group and an overall P(w) = .21

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(x) = (1)*.21^0*.79^3 = .49

Cluster 8 2 Women's 3 Men's

P(x) = Probability of finding x items of type W given five in a group and an overall P(w) = .21

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(x) = (5!/(2!*(5-2)!)*.21^2*.79^3= .21

Cluster 9 1 Women's 1 Men's

P(x) = Probability of finding x items of type W given two in a group and an overall P(w) = .21

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(x) = (2!/(1!*(2-1)!)*.21^1*.79^1= .33

Conclusion: Only Cluster 2 results are significant. Contents of all other Clusters do not differ from random expectations given P and Q.

Table 4 Staffe Island House Ten
Nine Cluster Solution Binomial Test Results

Cluster	Observed	Expected	O-E=D	D^2	D^2/E
Cluster 1					
Women	2	1.37	0.63	0.40	0.29
Men	2	3.72	-1.72	2.96	0.8
Neutral	2	1.76	0.24	0.06	0.34
P. Women	0	0.98	-0.98	0.96	0.98
P. Men	4	1.96	2.04	4.16	2.12
Unknown	11	11.19	-0.19	0.036	0.003
Cluster 2					
Women	0	2.55	2.55	6.5	2.55
Men	10	6.9	3.1	9.61	1.39
Neutral	3	3.28	-0.28	0.08	0.024
P. Women	1	0.82	-0.82	0.67	0.37
P. Men	4	3.6	0.40	0.16	0.04
Unknown	21	20.78	0.22	0.48	0.002
Cluster 3					
Women	5	3.07	1.93	3.72	1.21
Men	7	8.35	-1.35	1.82	0.22
Neutral	4	3.95	0.05	0.0025	0.0006
P. Women	4	2.2	1.8	3.24	1.47
P. Men	2	4.39	-2.39	5.7	1.30
Unknown	25	25.04	-0.04	0.002	0.0008
Result (10 d.o.f.)					sum = 13.33

This cluster solution does not reject the null hypothesis at the required level of .05.

Table 5 Tungatsivvik House Six Unmodified Categories
Three Cluster Solution Chi-Square Results

Cluster	Observed	Expected	O-E=D	D^2	D^2/E
Cluster 1					
Women	2	2.36	-0.36	0.13	0.06
Men	6	5.69	0.31	0.096	0.02
Neutral	2	1.77	0.33	0.109	0.062
Unknown	11	11.19	-0.19	0.04	0.004
Cluster 2					
Women	1	4.37	-3.37	11.36	2.60
Men	14	10.57	3.43	11.76	1.11
Neutral	3	3.28	-0.28	0.078	0.024
Unknown	21	20.78	-0.22	0.05	0.002
Cluster 3					
Women	9	5.27	4.73	22.37	4.24
Men	9	12.74	-3.74	12.83	1.01
Neutral	4	3.95	0.05	0.0025	0.0006
Unknown	25	25.04	-0.04	0.0016	0.0006
Result (6 d.o.f.)					sum = 9.13

This cluster solution does not reject the null hypothesis at the required .05 level.

Table 6 Tungatsivvik House Six Modified Categories
Three Cluster Solution Chi-Square Results

Table 7 Tungatsivvik House Six
Three Cluster Solution Binomial Test Results

Total Artifacts = 107
Total Women's = 7
$P = 7/107 = .11$
$Q = 1\text{-}P = .89$

Cluster 1 2 Women's 6 Men's

P(x) = Probability of finding x items of type W given eight in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

$$P(x) = (8!/(2!*(8-2)!)*.11^{2}*.89^{6} = .17$$

Cluster 2 1 Women's 14 Men's

P(x) = Probability of finding x items of type W given fifteen in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

$$P(x) = (15!/(1!*(15-1)!)*.11^{1}*.89^{14} = .32$$

Cluster 3 9 Women's 9 Men's

P(x) = Probability of finding x items of type W given eighteen in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

$$P(x) = (18!/(9!*(18-9)!)*.11^{9}*.89^{9} = 4.02*10^{-5}$$

Conclusion: Only Cluster 3 results are significant. Contents of Clusters 1 and 2 do not differ from random expectations given P and Q.

Table 7 Tungatsivvik House Six
Three Cluster Solution Binomial Test Results

Table 8 Tungatsivvik House Six
Nine Cluster Solution Binomial Test Results

Total Artifacts = 107
Total Women's = 7
P = 9/42 = .11
Q = 1-P = .89

Cluster 1 0 Women's 2 Men's

P(x) = Probability of finding x items of type W given two in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (1)*.11^0*.89^2 =.79

Cluster 2 1 Women's 6 Men's

P(x) = Probability of finding x items of type W given seven in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (7!/(1!*(7-1)!)*.11^1*.89^6= .38

Cluster 3 5 Women's 7 Men's

P(x) = Probability of finding x items of type W given twelve in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (12!/(5!*(12-5)!)*.11^5*.89^7= .005

Cluster 4 2 Women's 1 Men's

P(x) = Probability of finding x items of type W given three in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (3!/(2!*(3-2)!)*.11^2*.89^1= .03

Cluster 5 2 Women's 3 Men's

P(x) = Probability of finding x items of type W given five in a group and an overall P(w) = .11

Test: When $P(x) \leq 0.10$, there is a significant departure from random expectations.

P(x) = (5!/(2!*(5-2)!)*.11^2*.89^1= .08

Cluster 6 1 Women's 3 Men's

P(x) = Probability of finding x items of type W given four in a group and an overall P(w) = .11

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(x) = (4!/(1!*(4-1)!)*.11^1*.89^3= .31

Cluster 7 1 Women's 1 Men's

P(x) = Probability of finding x items of type W given two in a group and an overall P(w) = .11

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(x) = (2!/(1!*(2-1)!)*.11^1*.89^1= .19

Cluster 8 0 Women's 0 Men's

P(x) = Probability of finding x items of type W given zero in a group and an overall P(w) = .11

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(X) = (1)*.11^0*.89^0 = 1

Cluster 9 0 Women's 5 Men's

P(x) = Probability of finding x items of type W given five in a group and an overall P(w) = .11

Test: When P(x) ≤ 0.10, there is a significant departure from random expectations.

P(X) + (1)*.11^0*.89^5=.55

Conclusion: Only Cluster 3, 4, and 5 results are significant. Contents of all other Clusters do not differ from random expectations given P and Q.

Table 8 Tungatsivvik House Six
Nine Cluster Solution Binomial Test Results

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