SOCIAL ORGANIZATION AS AN ADAPTIVE REFERENT IN INUIT CULTURAL ECOLOGY: THE CASE OF CLYDE RIVER AND AQVIQTIUK

By

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ABSTRACT

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This dissertation examines the position of Inuit (Eskimo) kinship and its associated behavioral concomitants as they effect the patterning of Inuit ecological relations. The study seeks to demonstrate the role such features, functioning as one component within the cultural ecological system, play in organizing and maintaining the observed pattern of man-land interactions. In so doing, it focuses on particular internal attributes, such as task group formation and decision-making networks, which contribute to the material substance of the local adaptation.

The approach employed in the research may be termed that of systems-oriented cultural ecology. Within this approach, social-cultural features of the society are seen as forming a knowledge set which, along with data derived from the environment, contribute information necessary for the inplementation of specific strategies of resource exploitation. Social organization elements, therefore, provide a framework for the arrangement of environmental, as well as sociological, relations. Inuit subsistence activities, then, are perceived not simply in terms of isolated actions, but as a process which encompasses a broad range of societal components.

RÉSUMÉ

L'ORGANISATION SOCIALE: UN POINT DE RÉFÉRENCE COMMODE DANS L'ÉCOLOGIE CULTURELLE DES INUIT LE CAS DE CLYDE RIVER ET AQVIQTIUK

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La présente dissertation étudie la position de la parenté des Inuit (Esquimaux) et des problèmes accessoires de comportement qui affectent la structuration des relations des Inuit. L'étude vise à démontrer le rôle que ces aspects, qui s'exercent comme un élément au sein du système écologique culturel, jouent dans l'organisation et le maintien du schéma des rapports observé entre l'homme et la terre. Ce faisant, elle se concentre sur les attributs internes particuliers tels que la formation des groupes d'études et les réseaux de prise de décision qui contribuent aux relations d'ordre matériel de l'adaptation locale.

L'approche utilisée pour la recherche peut être qualifiée d'écologie culturelle axée sur les systèmes. Selon cette approche, on considère que les aspects socio-culturels de la société forment un ensemble de connaissances qui, combinées aux données dérivées de l'environnement, fournissent l'information nécessaire à l'implantation de stratégies propres à l'exploitation des ressources. Les éléments de l'organisation sociale offrent donc le cadre de la structuration des relations sur le plan de l'environnement ainsi que sur le plan sociologique. Les activités déployées par les Inuit pour assurer leur subsistance sont alors perçues non pas simplement comme des actions isolées mais comme un processus qui enblobe une vaste gamme de composantes de la société.

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Last, I wish to note the contribution of my parents, George and Jennie Wenzel, who did more than they ever knew. And Ann, my wife, who coaxed me, critiqued my work, and just managed to persevere.

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CHAPTER I

INTRODUCTION

The meaning of a message is the change
which it produces in the image.
Kenneth Boulding in The Image.

The Problem

This dissertation examines the internal patterning of the present day ecological adaptation exhibited by Inuit hunters in the Clyde River area of eastern Baffin Island (See Fig. I-I). The central element of the analysis is the role that socially prescribed patterns of behavior play in organizing the subsistence activities of the Clyde River Inuit and their contribution to the material component of the general human adaptation. The basic question which underlies the study is concerned with the effect that those features, which are generally perceived as regulators of interpersonal relations, have in structuring material exchange operations between hunters and the resource environment. While the structural elements of culture have been widely interpreted as functional mechanisms of social control (see Radcliffe-Brown, 1952; Eggan, 1954, 1955), the thesis proposed here is that such internal organizational mechanisms have a much wider role which effects the economic and ecological activities of the local unit. The primary concern of this analysis, therefore, shall be to demonstrate the interrelationship between the structural and material components of the Clyde Inuit adaptive system.

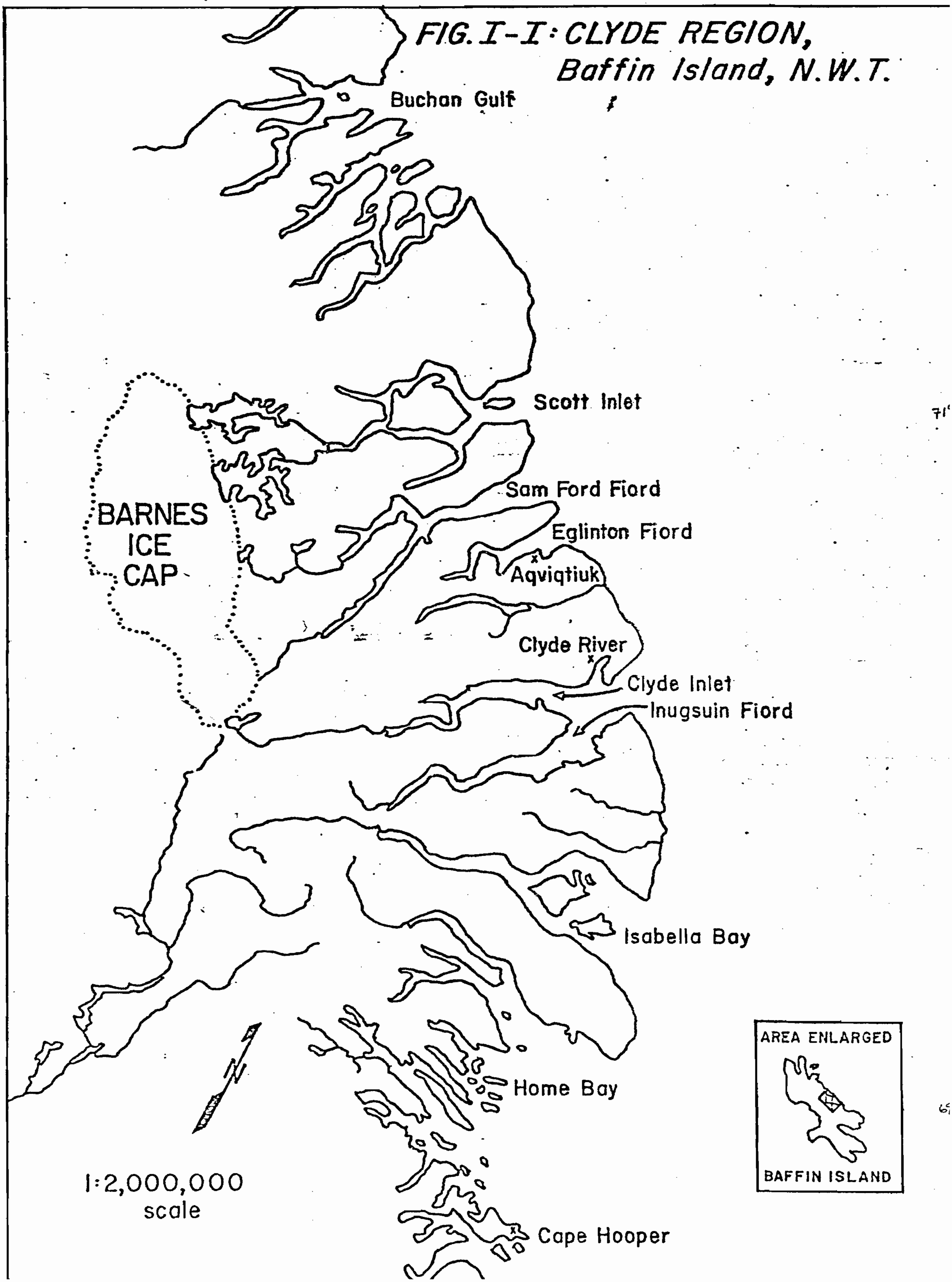


FIG. I-I: CLYDE REGION,
Baffin Island, N.W.T.
Buchan Gulf
Scott Inlet
BARNES
ICE
CAP
Sam Ford Fiord
Eglinton Fiord
Aqviqtiuk
Clyde River
Clyde Inlet
Inugsuin Fiord
Isabella Bay
Home Bay
Cape Hooper
1:2,000,000
scale
AREA ENLARGED
BAFFIN ISLAND
71°
65

The perspective adopted for the study may be categorized under the heading of cultural ecology. However, since cultural ecology is appropriately considered a broad brushed tool, and not a single theoretical or empirical path, this claim requires exposition as to what exactly is intended. As Steward originally formulated the cultural ecological approach in 1955, and has more recently elaborated, cultural ecology seeks to demonstrate

> . . . the cause and effect relationship in the evolution of different cultures . . . it is necessary to distinguish causes, processes, and effects or manifestations.
> (Steward, 1968:321-2)

A major feature of this approach has been to emphasize the externally directed dynamics of the culture-environment relationship with the general focus centered on time-space and environment-material culture relations. The problem set which has emerged, therefore, is oriented towards the material connections between resources and users within the framework of environmental constraints.

The direction which will be taken in this study, while ultimately concerned with Inuit-environment relations, is more directly focused on the manner in which this adaptive pattern is organized and maintained. As such, the central focus shall be the internal operations of the Clyde adaptation, rather than the causal links between the human and non-human subsystems. In order to carry out this analysis--stressing organizational and integrative attributes within the cultural subsystem which facilitate the adaptive process--a systems-type approach will be employed.

The rationale for applying that methodology follows from the perception that cultures are integrated, whole systems and are not composed of independently active components. The view that cultures operate as organized entities, both in their internal and external relations, is a major assumption of this study and one (See Bertalanffy, 1968; Boulding, 1956, 1970; Clarke, 1968) which will not be defended at length. For the moment, therefore, a system will be simply defined as any,

> . . . regularly interacting or interdependent group of items forming a unified whole.
> (Webster's Seventh Collegiate, 1965)

What is important here--both in reference to natural, mechanical, and cultural systems--is that, by definition, a system acts to organize, maintain, and regulate relations within its boundaries, along with its linkages with its environment. It is suggested here, therefore, that for an ecological analysis of a culture to be tenable, it must recognize and include those processes which occur between internal components, as well as externally directed interactions.

What this analysis seeks to avoid through such an approach is the creation of: (1) a dualistic model of Inuit ecological adaptation; and (2) a linear causal explanation of the Clyde adaptive pattern. By identifying those cultural attributes which organize and regulate interactions at a number of levels, it is possible to analyze cultural adaptation in terms of internal processes. In so doing, an important step is the recognition that adaptation--whether at the level of the organism, species, or society--requires the filtering and ordering of the raw data received from the environment. Bertalanffy (1968:16) recognized this when he noted that the data which originate from outside the cultural system are unorganized vis à vis the requirements of the culture. Without the processing imposed by the cultural system's structure such input would remain as noise, rather than utilizable information. The components which interact in organizing newly acquired data, while highly varied, all function to maintain the internal harmony of the system and to channel these data to meet the needs of the system.

The central research problem of this dissertation, may be stated in the following terms: the structural features associated with Clyde Inuit social relations also function as a discrete set of regulators which bring about, on a wider scale, the interactions occurring between the cultural system and the environment. Integral to this is the question of whether these internal mechanisms function solely for the organization of personnel in time and space or do they also regulate the acquisition and allocation of resources within the cultural system, thereby reinforcing advantageous adaptive patterns and damping deleterious effects of the local environment.

Before continuing, a brief comment is appropriate on the scope and concern of this dissertation in its broadest aspects. This analysis will address questions associated with cultural ecology in particular and the adaptive structure of hunter-gatherer society in general and will, therefore, concern methodological and theoretical problems of greater relevance than the study of 300 Inuit in Baffin Island. While these problems are of importance, the central focus of this study is northern. The methodological and intellectual frameworks in which this discussion is set are intended to demonstrate the integrative and interactive structure which exists within the Inuit cultural system and which forms the basis of the adaptation.

The Cultural Ecological Approach

The direct causal perspective in culture ecology, focusing on the dynamics of culture-environment relations, is tracable at least to the early work of Boas (1888) on Baffin Island Inuit. Boas (Ibid:417) observed, at that time, a relationship between the winter location of Inuit settlements and campsites to the seasonally varying sea ice conditions necessary to support local ringed seal populations. His observation of a "sea ice-ringed seal-hunter" causal association was one of the first attempts to link the physical, biological, and human components of the northern ecosystem into a single integrated framework. More importantly, Boas did not rely on the simple determinist or reductionist explanations, which were so common in late 19th century anthropological writing, in reaching his conclusions. His reluctance to frame a specific methodological approach for the analysis of cultural causality led to a pronounced relativist trend among his immediate and sizeable body of followers.

The relativist approach formulated by Boas was continued by followers both in anthropology and, through Sauer, in geography. Relativism, however, was unsuccessful in aiding students (among whom were Kroeber, Wissler, and Steward) in establishing a coherent and generalized set of laws regarding man-environment relations. There were, however, efforts of extreme importance. One of the foremost was the work of

Forde (1934) who, while firmly steeped in Boasian relativism, observed that culture acted not only in response to environmental factors, but also as a regulator which reinforced or modified human behavior relative to ecological circumstances. It was Forde, along with Sauer (1931) and Kroeber (1939), who contributed heavily to Julian Steward's development of the concepts of cultural ecology.

Steward's pioneering formulations on cultural ecology were set forth in his Theory of Culture Change: The Methodology of Multilinear Evolution published in 1955. In this work, Steward rejected the ideographic methods of the Boas/Sauer relativists and revived, within the social sciences, the principle of nomothetic research. The most critical element of this proposed methodology (Ibid:36) was the inclusion of local environmental conditions as a major "extracultural" factor influencing cultural behavior. Given this factor, Steward saw the central investigative problem facing anthropologists as centered on whether the adaptations followed by particular cultures required specific modes of behavior or whether there was a wide range of possible behavior sets.

Steward, having squarely focused on the influence of external elements on culture, looked to the material aspects of economy, especially technology, as the area which would most readily mirror these extracultural influences. This materialist approach is present in much of his work (Ibid: Murphy and Steward, 1956; Steward, 1968) and is evident in his conceptualization of: (1) the culture core, and (2) sociocultural integration. Steward's ideas, in this regard, are delineated particularly clearly in his description of the culture core (Steward, 1955:40-41), in which he emphasized the dominance of exploitative features over non-material aspects of the culture.

> First, the interrelationship of exploitative or productive technology and environment must be analyzed . . . Second, the behavior patterns involved in exploitation of a particular area by means of a particular technology must be analyzed . . . The third procedure is to ascertain the extent to which the behavior patterns entailed in exploiting the environment affect other aspects of culture.

It is this culture core perception with its subordination of non-material culture features relative to subsistence activities and technology that has become the key element in cultural ecological analysis today (See Service, 1962; Lee and Devore, 1968; Lee, 1976).

As a result of Steward's initial construct, cultural ecology has continued to maintain an overall orientation toward the substantive and quantifiable aspects of culture and economy. This has resulted in an abundance of studies concentrating on technology, subsistence and techniques, resource strategies, and settlement patterning (for example, Chang, 1962; Helm, 1969; Nelson, 1969). Helm (1969:151-152) has been most explicit in arguing that the foci of cultural ecology are limited to questions pertaining to the arrangement of human groups in time and space. Both Helm (Ibid.) and Chang (1962) have drawn a clear distinction between subsistence and settlement patterning as the stuff of central concern in cultural ecology, and the internal dynamics of culture which, in their view, relates to social rather than ecological relationships. Helm (1969:151) has posed this difference as follows:

> I find useful Chang's conceptual distinction between the settlement pattern of a society,

> the physical occupation of a locale in space, and the community pattern, the social group aspects of the people occupying the locale. A society's complex of human aggregates in their time-space dimension is its settlement pattern. The relationship and arrangements, based in cultural convention, among occupants of locales are community patterns.
> (Emphasis Helm's)

Further, Helm states, along with Chang, that a primary objective of cultural ecology is:

> . . . distinguishing phenomena that can be "assumed or demonstrated to be related to cultural ecological forces from phenomena that can be attributed to efficient causes in the sphere of sociology and social psychology".
> (Chang, 1962:28)

In light of these statements, it becomes clear then that the central problem to be addressed in this dissertation, in light of its stated systems orientation, concerns the establishment of an integrated view of Inuit adaptation in which the recognized mechanisms of adaptation are not limited solely to material culture processes but, rather, one in which socio-cultural variables are seen as playing a role in the maintenance of Inuit ecological relations.

It is evident that cultural ecology, as it was formulated and has been generally applied, has taken a distinctly substantivist view of cultural adaptation. Evidence to support this interpretation comes not only from Steward's statements on the culture core (1955:40-41), but also from his observations on the function of what he termed sociocultural integrators (Ibid:61-62) within cultures. As Steward (Ibid.) explained:

> The concept of levels of sociocultural integration is a conclusion about culture change only in the sense that these do appear to be phenomena which cannot be explained by any other frame of reference. Any aspect of culture - economic, social, political, or religious - has different meanings when viewed in terms of its national function and its special manifestations in different subcultures.

It appears from the above that Steward was concerned with the way such cultural structures assisted in the physical maintenance of the individuals who comprised the social aggregate. It is equally apparent, however, that the essentially extracultural orientation of cultural ecology, as originally stated, could not account for such internal constructs. That this internal-external dicotomy exists is shown in several recent studies (Meiklejohn, 1974; Williams, 1974) which draw heavily on the sociocultural integrator concept as a means of explaining certain aspects of band level organization.

It is only recently that geographers and anthropologists have removed themselves from the constraints of the direct causal perspective in an attempt to explore the array of non-material features found in cultural systems which were de-emphasized within the Stewardian rubric of cultural ecology. Barth (1969), Sahlins (1968, 1972a), Rappaport (1968), and Vayda and Rappaport (1968) are a few of the investigators who have questioned to varying extents the methodology and goals of cultural ecology. The widening focus of their efforts has been a concern with the process and vehicle of adaptation as opposed to the form of adaptation.

Sahlins' (1972) work is of particular interest given the general emphasis formerly placed on the material aspects of adaptation (See Steward, 1955; Helm, 1969; Lee, 1968). He has put forward a view which differs not only from the substantivist approach present in cultural ecology, but also to the strict formalist or rationalist approach current in one school of economic anthropology (See Le Clair and Schneider, 1968; Schneider, 1974, 1975). Sahlins (1972:187), in contrast to the formalist view that all peoples are essentially rational economic beings in their response to new opportunities or innovations, has focused upon economic operations which he feels "are not predicated on the satisfaction of human material needs". Rather, cultures function to maintain and reinforce societal structures and internal social relations. This perspective, which Cook (1974) has termed structural substantivism, although admittedly rigid, is of importance here precisely because it shifts the analytical emphasis away from material aspects of adaptation toward the examination of the structural components of culture.

The relationship between Sahlins' views in economic anthropology and the central question of cultural ecological methodology harkens back to Steward. Although Steward (1955:40-41) clearly emphasizes the importance of what he referred to as the techno-environmental aspects of adaptation, there is foundation within his work for pursuing a less material culture-oriented view of human ecological relations. Most important were Steward's (<u>Ibid</u>:37) efforts to point out the place of economic arrangements within culture:

> Cultural ecology pays primary attention
> to those features which empirical analysis

> shows to be most closely involved in the utilization of environment in culturally prescribed ways.

Steward's (Ibid.) statement on the culture core concept sets out the relationship between economy and culture as:

> . . . the constellation of features which are most closely related to subsistence activities and economic arrangements. The core includes such social, political, and religious patterns as are empirically determined to be closely connected with these arrangements.

On the basis of these observations, it appears that Steward, while arguing a techno-environmental interpretation of adaptation, saw need for the inclusion of non-material cultural features.

While it may be justifiably argued that, in the final analysis Steward's conception of culturally adaptive relations was predicated on culture working as a complete entity, in his elaboration of the methodology of cultural ecology this view is not emphasized. Further, although Steward, in part, accounts for internal cultural adaptive features through the concept of sociocultural integrators, in his methodological construct these integrators are seen as operational (Ibid:43), and important only in the case of "developed" social systems. They are not integrated into the general framework of cultural ecology.

Although Steward's formulation of the sociocultural integrator concept recognized the need to look beyond techno-environmental causes of adaptation alone, his relegation of this concept to the study of "complex" societies has left a methodological void in the analysis of hunter-gatherer cultural ecology. There has, therefore, been a continuing tendency to place undue emphasis on the external or purely technological aspects of human adaptation (See Carstens, 1969; Lee, 1969, 1976). This view of hunter-gatherers has however, been misleading. Steward's (1955: 117) discussion of the Great Basin Shoshone illustrates an apparent internal contradiction. Steward (Ibid.) observed that within Shoshone society:

> . . . each family was at liberty to associate with whom it please.

However, later (Ibid.) he states that kinship structure,

> . . . supplied the knots and made a fabric of what otherwise would have been a skewing of loose threads, each of which shifted about somewhat randomly.

Although Steward, in later writings (1968:321) persisted in his view that kinship, along with other structural features of culture, had no more than an empirical importance in relation to the requirements of subsistence activities, it can be argued that the perspective exists that these features serve a central integrative function in binding together what is otherwise a mass of loose threads. It is, therefore, the principal argument within this dissertation that non-material features serve an important culturally adaptive function and that it is impossible to approach an explanation of human adaptation solely on the basis of the environment-technology-subsistence position which has generally formed the central thesis of cultural ecology.

In light of this background, a systems oriented approach in cultural ecology is attractive for several reasons. First, it serves to broaden the non-material avenues of inquiry within cultural ecology.

With several notable exceptions, the general strategy of cultural ecological research has been limited to direct man-environment causal relations and, with very few deviations, this has meant a preoccupation with external or material forms of adaptation. Second, the suggested systems approach does not alter the basic mode of cultural ecological investigation; that is, the identification and explanation of culturally adaptive mechanisms. Third, it is consistent with the meaning of cultural ecology in so far as it also seeks to demonstrate the wider ecological nature of the structural elements within cultural systems, as well as the areas of interaction between cultures and their environments. Last, this systems approach seeks to identify not only the limited aspects of interaction between component units, but also the mechanisms which regulate and modify behavior between these components in terms of overall systems adaptiveness. This last element is critical in regard to clarifying the multi-component complexity of cultural systems within the framework of ecology.

Concentration on Inuit social organizational features in the analysis also is intended to fill the gap which clearly exists between the approach of the structural-functionalist school, with its emphasis on kinship and interpersonal relation, and Steward's concept of socio-cultural integration. The work of Watson (1970) and Waddell (1975) on the cultural response of New Guinea Highlanders to situations of high ecological stress suggests that the inclusion of non-material cultural elements adds an important dimension to our understanding of human adaptive relations.

The traditional perspective taken by cultural ecology has been that adaptive features are predominantly material responses to the cultural systems' external universe. As a result, while culture has been viewed as a component of the ecosystem, little attention has been given to cultural elements which do not appear to directly effect environmental relations. The morphology of the systems concept, with its interdependency of internal components, suggests, however, that adaptive behavior within culture is regulated by internally-derived, as well as environmental, factors. The objective here, therefore, will be to demonstrate the role social structural features play in the organizational regulation of Inuit ecological activities. Further, the connectivity between these two aspects of Inuit culture are exhibited not only in the organization of personnel in time and space, but also in the critical area of economic arrangements which complete the flow of material and information back into the cultural system.

The Systems Approach in Cultural Ecology

One of the principal accomplishments of Steward's cultural ecological methodology was its shift in focus, at least in part, from concentrating on specific and single cultural elements to the processual relationship between various components. However, as originally formulated, this research strategy focused too narrowly on technological and material aspects of cultural adaptation. Nevertheless, Steward's adoption of the ecosystem, as a central tenet of his methodology provided an opening for wider application of systems approach in the study of culture.

In the last decade, the utility of systems type analysis as a facet of cultural ecology and related research areas has been demonstrated with varying success. In terms of cultural ecology, perhaps the most notable work has been done by Kemp (1971) and Waddell (1972) in the field of human geography and by Lee (1969, 1976), Rappaport (1968, 1971), and Thomas (1973, 1974) in cultural anthropology. Generally, the work of Kemp, Rappaport, and Thomas can be characterized as focusing on the biological relationships between cultural systems and their environments, while Lee and Waddell have concentrated on the spatial relationships between human groups and local resources.

Each of these investigators, along with archaeologists, such as Flannery (1968), Plog (1974), and Jochim (1976), has approached the problem of human cultural adaptation through systems analysis. However, a serious criticism of each of these studies arises in relation to their continued emphasis on the links between the cultural system and its environment and on the material aspects of adaptation. In general, little or no concern is given to the relationship between specific adaptive patterns and the non-material cultural processes which are encompassed in these. This has led to a continued separation of subsistence behavior from social behavior and begs the essence of an inclusive systems approach.

Generally, those who have applied systems-type approaches to the study of culture have retained as their focus operations which are material in nature; either exchanges between the human subsystems and the environment or exchanges between internal cultural components. This is brought out by the heavy emphasis placed in most such studies (Kemp, 1971; Rappaport, 1971; Thomas, 1974) on energy/matter transactions. While such elements are quantifiable they, by definition, deflect the analytical scope from the non-material components of cultural systems.

The element which all such studies have lost is that of information. While it is as much a part of cultural adaptation as materially quantifiable energy transfer it is, as Bertalanffy (1968) has noted, much more difficult to isolate. Clarke (1968:88) has observed:

> . . . cultural systems are primarily behavior information systems. . . . Cultural systems are open systems coupled in complicated processes of interchange with environmental systems.

As the literature shows the vast bulk of cultural and human ecological studies from Steward onward have focused on exchange occurring between culture and the environment. This external focus, which encompasses both material and information transfers, has not been very effective in explaining how internal cultural components operate in human ecological adaptation.

Clarke's observation that cultural systems are open systems is extremely important in terms of the systems-type approach proposed here. As Boulding (1970:6) observed, it is not adequate to describe cultures as simply open systems; rather, they are defended systems capable of searching for and processing information to maintain their organization within certain (empirically) internally-perceived parameters. As such, it is argued here that it is the internal non-material components which maintain what Boulding has termed (Ibid:6) a culture's "image" in relation to its environment.

This view differs substantially from that delineated by Helm (1962:633) in which she states that the aims of cultural ecology are limited to the arrangement of human adaptive behaviors in reference to a space/time framework and to maintain contact with, ". . . the social cultural resources, and groups beyond the society, but within its experiential field". In reference to information flow, therefore, Helm's statement narrowly limits cultural ecological analysis to the interactions of a culture with the human and non-human elements which comprise its environment. In contrast, this dissertation, drawing on Boulding's concept of cultural systems as a composite of internal and external information integration, takes the view that what is visible as adaptive behavior in human ecological relations is the product of specific environmental information selected and structured through an established body of internally-generated cultural directives.

A Proposed Model of Systems Relations

Brodbeck (1959:373) has warned of the general tendency in social science research for the misuse of models, especially as all encompassing "Good Things". It will be useful, however, to introduce here two diagrams in order to support the discussion of cultural ecology presented earlier and to prepare a foundation for the examination of Inuit social organization as a fully interactive component of the overall human adaptive system in the Clyde area. As has been mentioned, the stand taken in this thesis is that such structural elements contribute an important and necessary information function within the overall strategy of Inuit ecological activities.

In contrast, the cultural ecological approach, as originated by Steward and generally followed by his students, has as its primary concern the effects of stress and external constraints which are imposed on the cultural system by its environment. Within this approach, the regulation of adaptive behavior is provided in several ways. Flannery's (1968) work on subsistence changes in highland Mexico, although from an archeological perspective, is worthy of note since his approach closely coincides with much recent cultural ecological thought.

Flannery (Ibid:74-5) approaches the question of change from subsistence hunting to incipient cultivation in his area through a systems methodology based on an open systems model suggested by Maruyama (1963). In his view, such a change was brought about through an "initial kick", (Flannery, 1968:79) which established a new information framework derived from the local environment, namely the greater potential of plant collecting as opposed to the uncertainties of hunting. Under conditions of incipient cultivation, the conflicts and constraints imposed by the seasonal availability of resources and the scheduling of exploitative activities were lessened and produced consequent transformation in the structural aspects of highland Mexican culture.

Flannery's analysis of change in exploitative strategies differs very little from the work of Helm, Vayda, Lee and Steward. The focus is on the imposed effects of environment, either through physical, biological, or extra-cultural constraints. This perspective is modelled in Figure I-II; however, even in such an oversimplified model, it is clear that the adaptive mechanisms focused upon in the Stewardian approach are restricted to technological and environmentally derived responses and

Fig. I-II: Human Ecology - Direct Causal Model

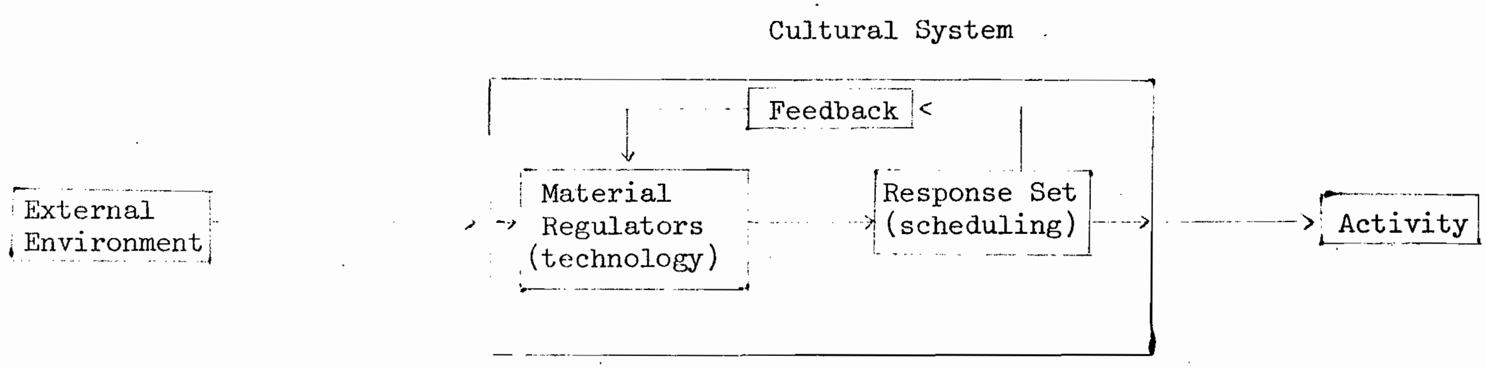
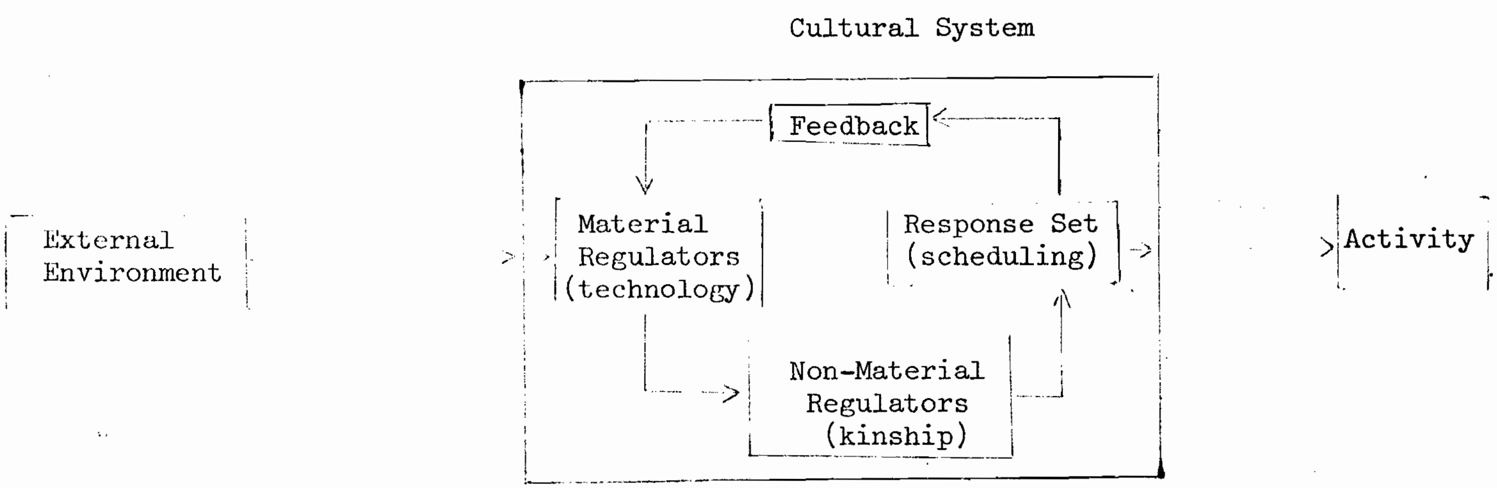


Fig. I-III: Human Ecology - Information Model



which do not encompass internally maintained mechanisms. An example is the questions which arise around the scheduling and selection of several resource options in Flannery's analysis. One problem might entail the organizing of sufficient personnel for a cooperative hunt; as such, cooperative hunting would most likely involve not only specific environmental information, but also patterns of leadership, structured decision-making processes, and mechanisms for the proportionment of resources, all of which are based on information provided from within the cultural system.

It should be noted that in the first model no provision is made for any information component within the cultural system. In the second (Fig. I-III) however, the role of cultural information forms a major component of the model. In terms of the problem raised from Flannery, it is the structural information component in the figure which is of central importance. This is interpreted as encompassing the behavioral information derived from the societal features, such as kinship.

As will be shown, it is this information which originates in the social structural component of society, which acts as one of the regulatory mechanisms in the population's economic and ecological interactions at a variety of organizational levels. In fact, it is the presence of this informational component which provides the means for organizing individuals and household level units into the required larger behavioral units that are generally seen as forming the adaptational base of man-environment relations. While general support for this view is noticably scant from within cultural ecology, it is interesting that allied areas, such as economic anthropology (McHale, 1962), have long viewed social structural aspects of culture as an effecting element in economic relations.

In light of the problem orientation of this dissertation, material relevant to the question at hand will be presented as follows. Chapter Two will serve as a review of the literature pertinent to the problem. Within it, four areas will be discussed: first, the approaches and schools of thought which have arisen in cultural ecology since the formative work of Julian Steward; second, the place of systems methodology in cultural ecology; third, recent critiques of the uses of systems in cultural ecology; and lastly, the general framework in which this analysis will be conducted, in light of other approaches and criticisms.

The bulk of this chapter focuses on the various subsystemic aspects of culture with its emphasis on non-material components, specifically, information structuring and organization. Its purpose is to show the importance of structural-functional studies in cultural ecological analysis. A simpler model is formulated of hunter-gatherer band organization and its applicability to the field situation in the Clyde region is discussed.

Chapters Three and Four detail the material and non-material components which effect human ecological relations in the study area. Chapter Three examines the non-human environment, while Four is concerned with the internal organization of information relevant to Inuit adaptation. Chapter Five examines the substantive and social organizational material essential to Clyde Inuit success in terms of the subsystems which form the Clyde "adaptation". As such it is the core chapter of the dissertation. It demonstrates how information from within the cultural system and from the environment are synthesized through the social organizational component of the local group as a flexible mechanism for meeting ecological needs.

Finally, Chapter Six draws together the methodological and data elements of the study as a concise review of the central argument presented. Within this review, the emphasis will be clarification of the integrative nature of Inuit social organization, not only as a means of internal ordering, but, also, as an organizer of Inuit external relations.

A Note on Terminology

Before proceeding to the review of the literature as it concerns the development of this research approach proposed here, some elaboration must be made in regard to the meaning, whether formal or operationalized of various generic terms which will be used in the study. Obviously, this is necessary in order to avoid misunderstanding caused by my usage of a term which may differ from either its formal definition or the manner it is generally used in the literature.

Brodbeck (1959) has pointed out the general misuse of ideas such as concept, theory, law, and model in scientific writing in general. Likewise, Nagel (1968) and Kuhn (1962) have elaborated on the meaning of paradigm and theory. In general, such words have been avoided, except where absolutely necessary, in the body of this thesis, primarily because of the writer's doubts concerning their applicability to the work of social scientists. Rather, this section is intended to serve to a small degree as a lexicon of terms, which, as is the eclectic nature of social science, have been borrowed from disciplines which may have very different ideas of their usage.

Two of the most important of these are approach and system. The former is generally used in somewhat the same way as methodology. However, as it has been applied here, approach is meant as a more encompassing term; rather its intended meaning is closer to the concept of strategy or a definite direction in how one thinks about a problem. On the other hand, system, as I have used it deviates very little from the meaning it carries in general systems theory; that is, as a set of parts coordinated to accomplish a goal or set of goals.

The terms subsystem and set are employed as synonyms for each other. As such, they refer to an ordered collection of living or non-living elements. These elements or components may be: (1) human; (2) non-human; (3) non-animate material configuration; (4) conceptual; (5) a combination of two or more. In Steward's methodology the techno-environmental system may be said to combine human, technological (non-animate but human material formations), and environmental (non-human living and non-animate material) elements.

There are also a number of terms drawn directly from the subfields of systems analysis, specifically cybernetics and information theory, and which are used in their formal sense. Thus, my usage of homeostasis and morphogenesis coincides with their defined meanings (respectively, negative and positive feedback) and refer to the behavioral aspects of systems (See Maruyama, 1962; Langton, 1972). Feedback is also a cybernetics concept and is generally used here, as suggested by Tustin (1962:48), to mean a simple interdependence between components. The distinction between structural and specific information is roughly analogous to Brillouin's (1950) terms, absolute and distributed information. However, in the context of this thesis, structural information refers to the information carried in the non-material elements of Inuit culture, such as kinship information. Specific information refers to information which is selected and filtered from the environment which surrounds the cultural system.

Hopefully, terms, such as ecosystem and environment, are relatively self-explanatory. In general, specific modifiers have been used to set such terms in their exact context. In addition, the specialized terminology used in the social sciences to describe particular socio-cultural phenomena and schools of thought are used as close to their original meanings as I have been able to understand.

The one area which may present some confusion in my usage of terms such as material culture, substantive relations, material transactions, and so forth. To the anthropologist or geographer, these have reference to particular cultural features or phenomena, whether a tool assemblage, subsistence activity set, or bio-energetic relationship. In general, however, they all refer to some condition of man-environment interaction and have dimensions which can be concretely expressed. In this regard, I have taken the view that all may be loosely regarded as components of Steward's culture core insofar as they directly involve behaviors which directly effect non-human attributes of the ecosystem.

Likewise, I have made reference to non-material components and relations. This has been done to encompass those elements of the cultural subsystem which, while inherently part of cross-boundary processes, are often interpreted as being restricted to the maintenance of interpersonal relations. Within the methodological framework employed here, this component set is seen as including those features which function wholly within the structure of the human subsystem, such as kinship relations, but at the same time effect the organization of ecological activities.

CHAPTER II

A REVIEW OF SYSTEMS APPLICATIONS IN CULTURAL ECOLOGY WITH AN OPERATIONAL MODEL FOR THE CLYDE INUIT

Initial Statements on Cultural Ecology

Cultural ecology, while no single methodology, has come to form the main analytical approach for the study of man-environment interactions. As a centralizing perspective, it has particularly come to the fore in anthropology and geography, while its importance in other areas of the social sciences is mixed. Young (1974) presents a valuable synthesis of cultural ecology as an interdisciplinary approach in this regard.

Cultural ecology, as an identifiable methodology, arose during what Harris (1968) has termed the nomothetic revival in the social sciences. As has been noted, Julian Steward was the central figure in the development of the approach, the central tenet of which was the view that culture had to be analyzed in a context which included the environment which it occupied. Steward's formalization of this perspective (1955), while not entirely new (See Sauer, 1931; Forde, 1934; Kroeber, 1939; Murdock, 1949), was clearly a divergence from the two dominent methodologies of that time, historical-particularism and structural-functionalism. The former had developed in North America around Boas (1896) and emphasized the uniqueness of individual cultures. In contrast, structural-functionalism or the British school of anthropology centered around Radcliffe-Brown (1952) and Eggan (1955) and stressed the need to identify socio-cultural regularities in different societies.

The attraction of Steward's cultural ecology methodology for geographers and anthropologists rests strongly on the contextual relationship Steward saw as existing (1955:30) between culture and environment. Steward identified adaptation, as meant in the biological sense (Ibid.) , as a rationale approach for explaining the "similarities in form, function, and developmental processes in certain cultures of different traditions" (Ibid.:28). In explaining what he meant by cultural ecology, Steward (Ibid.:30) referred directly to the biological meaning of ecology as applicable to the study of culture.

Steward viewed the key to his methodology as the explanation of the functional interactions which occurred between environmental and cultural features. Accordingly, Steward (Ibid.:37, 40-1) focused on material and, particularly, technological activities as the appropriate point of analysis for the understanding of these adpative relations. Socio-cultural features which were not direct contributors to these material operations were seen as "non-adaptive secondary" cultural elements (Helms, 1978:172).

An important result of Steward's stated approach was that, while avoiding the trap of environmental and economic determinism, he was instead postulating a linear causal model for explaining the relationship of non-material cultural features to the core of specific adaptations; that is, such elements arose as a result of "behavior patterns entailed in exploiting the environment" (Steward, 1955:40) or through historical factors. In essence, in defining an effective environment (Netting, 1965) for human adaptive interactions, Steward (Ibid.) hypothesized that technology and environment "prescribe" all such secondary features of culture.

Steward's methodology has, needless-to-say, been the primary current followed as cultural ecology has grown almost to the status of a paradigm in the social sciences. The breadth of this influence is evident when the various sub-currents subsumed under this approach are reviewed. Among these are studies dealing with settlement patterning and subsistence (Chang, 1962; Helm, 1962, 1969; Lee, 1969, 1976); bioenergetics (Kemp, 1971; Rappaport, 1971; Thomas, 1973, 1974; Moran, 1979); stress response (Watson, 1970; Waddell, 1975); archeology (Flannery, 1968; Jochim, 1976); social relations (Damas, 1969a, 1969b; Rappaport, 1968; Wiessner, 1977). While the above listing touches on a wide variety of investigations which have been conducted under the rubric of cultural ecology, a unifying feature of all is the emphasis placed on environment and/or material aspects of adaptation as regulators of socio-cultural behavior.

The difficulty of the Stewardian approach to analyzing culture-environment interactions, as well as in many counter-proposals, such as those of White (1949, 1959), Bateson (1958, 1972), Sahlins (1964, 1972), and Godelier (1977), lies in the paradox presented to the investigator by the inclusiveness of the ecological method. For the social scientist, culture must, by necessity, be the primary analytical focus. Steward attempted to alleviate this double bind by concentrating on the area where culture and environment interact most closely--the material means of adaptation, subsistence and technology. Bateson, in contrast, has attempted to virtually sublimate the material aspects of human ecology. The single major result of this has been that the mechanistic approaches adopted by both sides has allowed researchers to expand their data base, particularly in regard to how specific adaptive formations function, but at the same time have limited the usefulness of cultural ecology in understanding how such material functions are regulated and adjusted.

Systems Thinking in Cultural Ecology

The ecological frame of reference adopted by Steward was one borrowed from biology (Steward, 1955:30) to explain the concept of adaptive interaction in culture. A logical extension, therefore, would be that Steward was seeking a method to explain the systematic interactions which occur between cultural systems and the environment, both of which are, in reality, components of a larger system of ecosystem (Odum, 1959:10). An important feature of ecology, and systematics in general, is that they have as their focus the organization of relationships and that within, this organizational structure, no feature is more or less important than any other (Ibid.:7). This perspective, however, is one which is not limited to biology alone, but has found interdisciplinary application as a general theory of systems (Bertalanffy, 1968:11). While its formulation has rightfully been attributed (Odum, 1959; Bertalanffy, 1968, 1972; Young, 1974) to the need by biologists to explain questions of evolutionary change, organization, and behavioral regulation, it has come to have far wider applications in many fields of inquiry.

In the social sciences, similar needs, as those mentioned for biology, are evident if questions concerning culture are to be explained. In particular, questions of cultural adaptation, which concern specific behavior and social phenomena, are unresolvable by deterministic causal trains, since emphasis placed on one aspect of the cultural system, requires the subordination of other cultural features. This is the dilemma associated with Steward's approach.

The systems approach offers important application to the problems of cultural ecology because analysis is carried out at the level of structure, in which the system is seen as an entity, rather than the reduction of the entity to a cause and effect relationship between components (Battista, 1977:65). The unity concept inherent in "systems", as well as the implication of purposiveness and organization of behavior associated with adaptation, require the more holistic analytical framework offered by the systems approach. That the approach is more holistic, and therefore of more utility in the study of human adaptation, is confirmed when the linear and hierarchical constructions of Steward and White, respectively, which rely on the reduction of relational associations within culture to a cause-and-effect interaction, are weighted against the structural and monistic perspective inherent in the systems method (Battista, 1977:65-6). Proof that Steward's original formulation does not completely encompass such a unified view of culture comes from his observation (Steward, 1955:7) that,

> All aspects of culture are functionally interdependent upon one another. The degree and kind of interdependency, however, are not the same with all features.

This is a distinctly different view of ecological relations than that offered by the unified structure approach espoused in systems analysis.

Hall and Fagan (1956:18) are among the many who have offered a generalized definition of a system. In their view a system is composed of a set of objects together with the relationships between these objects and their attributes. Of critical importance in this definition are the concepts of "set" and "relationship". The former indicates that the system contains an organized structure and is not a random grouping of objects. Further, set implies that these objects share some common properties within the groupings. The inclusion of relationships between sets indicates the dynamic status of the system, since relationships are a function of some form of flow or process. The overall morphological properties of any system, therefore, include both organized structure and meaningful exchange between the system's components.

It should be noted that the dominant feature of the systems approach is the emphasis which is placed upon order or organization. In much of the literature pertaining to systems formulations this concept of order is expressed as stability or equilibrium as the preferred state of any system. As a result, the behaviors exhibited by systems is generally interpreted as functioning to maintain stability or orderliness between parts. However, such heavy emphasis placed on equilibrium appears antithetical to the notion of change in systems.

The apparently incompatible notions of stability and change within systems is resolvable when the relationships between parts of a system are analyzed in terms of feedback between the various systems elements. Feedback may be generally understood simply as interdependence of parts. The stabilizing process which systems undergo follows the description offered by Langton (1972:143-5),

> Given a constantly fluctuating environment, and thus continual change in the constraints acting on this system and continual stimulus, feedback operates between the subsystems to cause mutually adaptive change within them. . . . If feedback occurs to maintain a set of relationships which already exists within the system, either by reducing further inputs if these rise . . . or increasing inputs if they tend to fall, then those relationships must represent the goal of the system, with feedback operating to keep them steady.

In essence, what Langton describes as the stabilizing mode of operation available to systems, either through increasing or dampening change, are the morphogenetic (positive) and homeostatic (negative) responses which systems make to stress (Maruyama, 1963). The appropriateness of either response depends on the ability of the system to maintain order.

The importance of change and order is amplified by the fact that a system is never entirely in an undisturbed state, since some form of stress is always present. However, a system may only be interpreted as breaking down when the coherence between components is negated. Under conditions of homeostasis, component or set interdependence remains approximate to its original ordering (although, as Davis [1958:11-12] has noted, some adjustment may be admitted in negative feedback), while in positive feedback the relational order between parts is changed.

In cultural ecology, the concept of systematic ordering between man and his environment is inherent. However, unlike biological ecology, where man is part of the living, as opposed to the abiotic, component of the ecosystem, cultural ecology incorporates man as a distinct subsystem within the ecosystem. This view is at least traceable to Barrows (1923:3), who observed that definite relationships exist between environment and the pattern of human activities. However, although Steward attempted to systematize the pattern of these relations, the emphasis which he placed on the separation of core from secondary cultural features was antithetical to the balance of components within any system.

More recent syntheses concerned with cultural ecology have attempted to modify the emphasis placed by Steward on causally-linking so-called secondary features with material means of adaptation. Keesing (1974:75-7) enunciated this reapproachment by reiterating the adaptive importance of all features of culture. In his view (Ibid.), cultural ecology encompassed the view that: (1) culture change is an adaptive system; (2) energy, technology, economy, and social organization are all linked adaptively; (3) spatial and population factors may have adaptive significance; (4) the ideological elements of cultural systems have adaptive significance. While such a perspective stresses that cultural ecology need no longer be bound to strictly substantive adaptive phenomena, it does not demonstrate how the interdependence of such multiple variables is accomplished.

Reversion to dualistic causality remains central to much of the systems-type analyses which have been attempted within cultural ecology. Perhaps the two areas where these have been most consistently attempted are archeology (Flannery, 1968; Plog, 1975; Jochim, 1976) and human bioenergetics and adaptability (Kemp, 1971; Rappaport, 1971; Thomas, 1973; Moran, 1979). In the former, environmental change is generally seen as initiating material culture and subsistence-related adaptations. The latter, on the other hand, examine adaptation as it is reflected in the means of adaptation employed by cultures to acquire and maintain particular biological states. Neither, however, adequately examines the relationship between material adaption and social organizational features of culture in order to better understand the way particular adaptations are structured. Thus, while systems approaches have been used in cultural ecology, they have not been applied outside the reductivistic constraints derived from White and Steward.

In general, whether cultural ecological studies have been systems-oriented or more causally directed, there has been repeated concentration on the means used in particular adaptations, usually interpreted through the appropriateness of the response, rather than on the processes which form and regulate adaptation. Sommerhof's (1968) work on purposeful behavior in systems is quite useful in clarifying this area. To elaborate briefly, Sommerhof (Ibid.:282) assumes that adaptations are produced as a result of some form of environmental or other stimulus. Any response, if it is to be judged as appropriate, must be made in relation to a desired outcome to which it contributes effectively. This outcome, in systems terminology, is its goal. The occurrence of the goal is an effect of the interaction between the stimulus and the organism's response. The broken wing display used by grouse to lead potential predators away from nesting sites is the result of environmental stress; this adaptation is also, however, the product of genetic adjustments which, in turn, effect the nesting bird's behavior.

In cultural ecological adaptation, it is necessary to make a similar point. Technological and economic responses by culture are not automatic adjustments to external stimuli, since, if such deterministic causality were applicable, cultures would effectively correspond to closed systems. Instead, such change operates within the framework of the larger cultural entity in which the experience of past events provides a broad ranging response set based upon knowledge stored within the cultural system and, furthermore, does not limit culture's effective response set to material actions alone.

This can be clarified in Churchman's (1968:29-30) discussion of the basic considerations of systems operations. He observes that it is not only a system's material goals, resources, and environment which are important when examining adaptive responses, but also the internal management of the system. In reference to cultural ecology, this point is cogent since it implies that the external condition of cultural systems is produced by its internal structuring, as well as the environment it exists in. Boulding (1970:54, 60) has restated this in regard to open systems (that is, systems amenable to ordered change) by noting that the state condition of such systems is, to a large degree, the results of the images they hold of themselves.

According to Boulding (Ibid.:54), the concept of image encompasses the structural relationship between the system and its environment at a particular moment in time, based upon the results of all previous inputs and outputs between the two. A system's ecological relations, therefore, are a result not only of its recognition of its immediate internal and external environments, but also its evaluation of all relevant events which constitute the system's history. An important proposition of this internalized image, then, is that the system's behavior is dependent upon it (Boudling, 1956:6) and that apparent adjustments to outside stimuli depend on the consistency and arrangement of this internal knowledge structure (Ibid.:13).

Churchman's (1968) inclusion of internal management as a system's component has its analoge in economics, the behavioral science discipline most amenable to systems thinking, in decision-making. In particular, Boulding and Ciriacy-Wantrup (1965) have attempted to expand the systems approach to economic relations to the larger framework of whole societies. The specific vehicle, which they have used, is the principle of equilibrium between systems components. Although the concept of equilibrium or stability in cultural systems has been challenged by some human ecologists (Bennett, 1975; Vayda and McCoy, 1975; Waddell, 1975; see the following section for a discussion of these criticisms) as static and mechanistic, equilibrium, as applied by Davis (1958), Maruyama (1963), and Langton (1972), has definite utility in understanding the connectivity of socio-cultural features in the formation of human ecological adaptations.

Equilibrium, especially in its usage in biological ecology, implies long-term stability between subsystems through the self-regulating characteristics of the ecosystem (Odum, 1959:46). Boulding, in drawing an analogy between biological systems and societal systems, notes that this tenet of stability, although it implies homeostatic tendencies within systems, is, in cultural units, only temporary. The dichotomy between equilibrium and change, when applied to an apparently homeostatic system, is clarified, however, through the introduction of feedback flows in open systems. Davis (1958:11-12), in elaborating on this condition, noted that,

> A process entitled to the name of homeostasis . . . would not necessarily return the organism to its undisturbed state. Being a negative feedback, it would tend to lessen the departure from such a condition, but need not be so powerful as to prevent it.

If the implication that even negative feedback carries with it a cumulative effect trending toward change in "stable" systems, then it is admissable that the process of adaptation in open systems, like culture, cannot be explained by the mechanism of externally-imposed stress, but also through less drastic adjustments which may occur in the relationship between non-material components.

Cultural systems, despite various objections to the use of equibilbrium and stability in reference to their dynamics, do maintain definite patterns of organization and structure (Odum, 1971:166) through the exchange of energy, information, and matter with the external environment. However, unlike other living systems, cultures not only receive information from the environment, but process it in order to facilitate the maintenance of these other flows. Sahlins (1960:20-1) has noted that an important aspect of material flow acquisition is non-material organization. The implication is that material culture shortcomings may be, at least, partially resolved by non-material organization. It is in these terms that Boulding (1970:6) has referred to social systems as defended open systems by drawing an analogy between living and non-living systems,

> When the candle is exhausted, the flame does not flit around the room looking

> for another candle. If an amoeba cannot find food in its present environment, it will go around looking for food. It can differentiate between food and non-food and when it meets food ingest it.

Boulding, in extending his analogy to sentient organisms and equating metabolic processes with economic production, has carried the formalist input-output analyses of Lee (1969), Kemp (1971), and Thomas (1974) beyond the evaluation of material interactions. The difficulty inherent in the latter studies is that while they have adequately identified how well specific adaptations are functioning, they do not explain the controls which contribute to the adaptation. In Boulding's (1970) view, anything else leaves the internal mechanisms, which contribute to cultural adaptation, as a black box.

In respect to the study of cultural adaptation, the production-metabolism analogy of Boulding is not entirely adequate. The central feature of input-output analyses, like the causal and hierarchical approaches of Steward and White, remain oriented toward the understanding of the means of adaptation. As such, they offer little opportunity for the inclusion of non-material effectors of adaptation.

However, cultural ecology's stated interest in economic arrangements within culture (Steward, 1955:37) offers the possibility of expanding this methodology in order to encompass socio-cultural phenomena, since, properly, economics includes within it the allocation of resources among alternative ends (Samuelson and Scott, 1966:5; LeClair and Schneider, 1968:455), as well as the process of production. The role of cultural features in human economic relations has been examined from the perspective of economics in terms of the levels people, either as individuals or as social aggregates, interact. Boulding (1970:9) has identified three relational forms: threat, exchange, and integrative. While the first two types of inter-human relations are well known from classical theories of economics and politics and are, in Boulding's words (Boulding, 1970:9), premised mechanisms of role creation because of the presence of an extraordinary variable, such as force or profit, the integrative relational level is dependent on social status as the role creating factor (Ibid.:10; also, Linton, 1936).

In the biological application of ecological theory, the dispersal of material inputs from the environment and the pathways for their distribution are dependent, to a large measure if not completely, on external conditions (Margalef, 1968:11). In cultural ecology, however, the networks for the acquisition and distribution of material inputs are regulated by features which may be completely internal to the cultural system. Under such a system, integrative mechansims of the type noted by Boulding are necessary unless the formation of human ecological relations is to be interpreted as the product of external causal constraints. In such a case, however, it is difficult to conceive how the orderly maintenance of the cultural system (that is, the organization of internal relationships) could be sustained and, therefore, contradicts the limited equilibrium principle which is a general feature of all systems.

Critiques of the Systems Approach in Cultural Ecology

Before continuing to a developmental framework concerned with systems organization as it applies to Inuit society, it will be useful to review the criticisms which its application to problems of cultural adaptation have drawn. Such a review is necessary, since these critical arguments pertain not only to questions of terminological usage, but also to the overall validity of the approach to cultural ecology. These critiques stem from a number of perspectives, the most important of which relates to the question of whether the systems approach is able to provide an explanatory, if not predictive, structure for the analysis of cultural ecological relations.

The counter-arguments which have been put forward cover four areas, although all are loosely related. The first concerns whether the systems approach to human ecology relies overly much on concepts lifted without sufficient operationalization from other disciplines, particularly biology, philosophy, and cybernetics. Second, as a result of this eclecticism, these concepts are generally employed naively to cultural relationships which they are not designed for. Third, the spatial, temporal, and social dimensions in which these concepts are used are framed too simply to answer larger and more meaningful questions related to culture. Last, and most important, acceptable explanations for the cultural behaviors under study are not forthcoming.

Generally, the first two of the above criticisms, which state that the systems approach, in its application to cultural ecology issues, is dependent on terminology and concepts borrowed from too wide a field and which are too little understood, is accurate. Bennett (1975:276-9) has presented the most cogent argument in this area. He has noted that the idea of equilibrium as a systems trait applicable to cultural ecology has been overemphasized and that, in the context of cultural operations, concepts, such as feedback, have been used far too indiscriminately. To illustrate his point, he (Ibid.:277) cites the use of homeostasis in cultural ecology as meaning the "return to a particular state". He also notes (Ibid.) that feedback has taken on a meaning which implies self-regulation and self-containment of cultural systems.

It is difficult to disagree with Bennett's objection to the manner in which systems terms and concepts have, at times, been applied in cultural ecology. Even systems proponents (Anderson, 1973: Young, 1974) have cautioned against careless transposition of such ideas. However, the other side of this coin is that it would be reckless to create new terminology for processes which have already been adequately described, and that careful use would alleviate to a large degree this problem. Flannery (1968) has demonstrated that tight adherence to systems concepts can be employed to enhance our perceptions of man-environment interactions and, in the context in which he dealt, provide insight into processual adjustments in culture. In his work on subsistence changes among prehistoric Meso-American peoples, he demonstrates persuasively the role of homeostatic feedback conditions in amplifying change, using the principles set out by Maruyama (1963) for explaining such behavior under general systems conditions.

In turn, Vayda and McCoy (1975) and Waddell (1975) have criticized the propensity of systems-oriented human ecological work to focus exclusively on small, autonomous social units, such as hunter-gatherers (See Lee and DeVore, 1968; Bicchieri, 1972) and the strong analytical bias in such studies toward nutrition, bioenergetics, and physiological adaptation (or as Vayda and McCoy, 1975:295, have coined, "caloric obsession"). In respect to the first of these two criticisms, it must be admitted that there has been a tendency among those using the systems approach to focus on small band-type groups; however, this criticism is equally applicable to the application of systems methodology in studies outside human geography and anthropology (See Odum, 1957). In addition, more recent systems work in human ecology has moved beyond the small band foci of earlier studies (Odum, 1971; Thomas, 1973, 1974; Jamison and Friedman, 1974). The second of this two-part criticism is probably directed at what sometimes appears to be a somewhat overzealous need for quantification in such studies. This latter condition is best explained by relating it directly to the materially-oriented methodology set forth by Steward (and White, although not himself directly concerned with cultural ecology) with social-cultural features, termed by Steward as secondary and non-adaptive, peripheral, if touched at all, because of this early established linear causal approach.

Such studies, while prodigously expanding the material data base for the societies they are directed at, do not answer questions pertinent to the role of non-material cultural attributes in cultural adaptation. The detailed studies of Kemp (1971), Rappaport (1971), and Thomas (1974) are rift with Boulding's proverbial "black boxes", labelled social environment and sharing rules. In this methodology, physical relationships, whether individual (Moran, 1979) or group (Kemp, 1971), are clearly analyzed, but the social behaviors which effect the adaptive processes under study are left unilluminated. Perhaps the clearest call for the inclusion of non-quantifiable factors in such systems studies comes from Adams (1974:31).

The final and most telling criticism comes from both Bennett (1975) and Vayda and McCoy (1975), who feel that cultural ecology, with or without the inclusion of the systems approach, lacks real predictive value. This charge is weighted with truth, but should not be leveled at cultural ecology alone. It, in fact, is a criticism which often blankets all social and behavioral science research. In reference to the systems approach in human ecology, this criticism arises from the eclectic course cultural ecology has followed, a fact not denied by its supporters (Young, 1974:3). Perhaps the fault here lies in the fact that cultural ecology, while freely assimulating ideas from seemingly all directions, has paid less attention to its original grounding in the study of culture. Cultural ecologists have consistently displayed a predilection for identifying the material relationships between man and the environment and the means by which they are maintained. This, as noted, has had serious effects on the cultural portion of cultural ecology.

Non-Material Properties of Cultural Systems

The foundation upon which most systems-oriented studies of cultural adaptation have been based has been the transformational relationship between cultural systems and the environment. These, as expressed in a variety of studies, have overwhelmingly concentrated on the movement of matter and/or energy (See Kemp, 1971; Rappaport, 1971; Thomas, 1974) from the external environment into the cultural system and their redistribution there into effective activity areas. An important aspect, therefore, of human adaptation is a culture's capacity not only to obtain needed material inputs, but also to organize these in order to optimize future transactions.

Transactions within the cultural system and between it and other components of the ecosystem form definite recognizable relationships, relationships which form the core of cultural ecological analysis. Since it is through these relationships that culturally adaptive responses to environmental circumstances are identifiable, it is useful to view culture as a complex of social, as well as material, behaviors. Within such a complex, this first behavioral set provides an organizational framework for the implementation of material relations, since, unless a closed system or a varient of sociobiological imprinting is imposed on culture-environment relations, the exchanges which are observed must be seen as the result of random cultural operations. An important attribute, therefore, of any analysis of human adaptive relations is the inclusion of how observed material transactions are organized and controlled.

Before continuing, it will be useful to backtrack somewhat in order to look at what culture is. Although myriad definitions are available (See Kroeber and Kluckhohn, 1952), the intent here is to present a general systems-related picture. Immediately, it should be noted that although culture, as an entity, has been termed a system for purposes of discussion, it is actually a component or subsystem within the ecosystem and, as a subsystem of this larger system, it is open to exchanges with other subsystems. In respect to intercomponent relations, the cultural subsystem is subject to the movement of energy, matter, and information across its boundaries. While energy and matter are concrete aspects of this movement, this information may be thought of as the general configuration of the material world outside the cultural subsystem.

While the above places the cultural component within the framework of the ecosystem, more specific comment may be made as to culture as an individual component. First, cultures exhibit recognizable structure and this structure reflects the relationships which exist between its internal elements. Second, although cultures experience exchanges with subsystems across their boundaries, the distribution and organization of these inputs within this structure implies behavior between components. Third, the relationship between the organization of inputs and these internal components gives meaning to each component. Last, the behavior displayed by the cultural component, both in regard to external and internal transactions, is both non-random and suggestive of definite goal-orientation.

Examples of these latter systemic attributes, while not widely emphasized in the literature of cultural ecology, are noted by Kemp (1971, 1974) and Rappaport (1968). Kemp's work on Inuit is particularly notable because, although its central focus lies on the conversion of potential energy into work in the arctic environment, it emphasizes that the distribution of energy within the human unit rests on non-material organizational structures. Furthermore, it suggests that the material relations which exist within the cultural subsystem are the product of a specific knowledge or information structure which is internally generated and which effects external relations.

The concept of information, as an attribute of culture, can be characterized, therefore, on two levels. The first entails the perspective received of the external environment as regards the physical and biological components of the ecosystem (See Freeman, 1976) (it should be noted that Burch [1971] has added what he terms a non-empirical component). The second encompasses the manner in which the cultural subsystem relates to the environment. The two are by no means the same and their difference relates to the goal orientation at each level.

Culture as an Information System

The inclusion of information, as a component of ecological analysis, is far from unique. Odum (1971:169), in assessing the information content associated with species composition, noted that,

> Where a system has many kinds of items, each present in different ratios such as letters of the alphabet in a message or species in a forest, there is a form of the information formula which gives the bits per individual (H) due to the composition in the system or in information messages used to describe and transmit it.

Such a formula, as that applied by Odum, may have utility when interpreting information exchange between the cultural subsystem and the environment, it appears, however, to be less applicable for understanding the internal informational processes referred to earlier. This is because, within the context of culture, while individuals are the receptors of particular informational stimuli, such information is rarely acted on directly, but, rather, is filtered in terms of the knowledge already held collectively.

Both Brillouin (1950) and Boulding (1956, 1970) are relevant to the question of information structuring as it applies to the organization of ecological behavior. Brillouin (1950:594), in comparing the movement of information within a system to the passage of energy, has identified the following set of relationships: negentropy → observation → information → decision → negentropy. In this process, Brillouin demonstrates that the acquisition of information, as in the capturing of energy, involves some movement toward instability, notably in the course of observation. However, the utilization of the information which results leads to decision-making which, at least, partially recovers the loss of negentropy. Most simply, the disorganized information obtained in observation, when evaluated within a wider known information set, becomes a part of that structure. Boulding (1970:2) has stated this principle of organizational filtering as follows, knowledge is gained by the orderly loss of information and this acquired knowledge forms the basis for the evaluating of new information.

An example of this process from Inuit ecology can be illustrated from observations made during spring seal hunts in the Clyde area. From mid-April until the break-up of sea ice, a number of factors in the physical environment, such as rising temperatures, long periods of sunlight, and the opening of holes and cracks in the ice from melt water, allows ringed seals to haul out onto the ice surface to moult and bask. For hunting at this time, information pertinent to the seal's reaction to sound, wind direction, and shadows are important to the hunter in order that he may approach as close to the animal as possible. A knowledge of how the seal reacts to odors carried on the wind or shadows cast on the ice is crucial and is possessed even by inexperienced hunters via word of mouth. However, other information, which hunters normally consider of importance in other types of seal hunting, such as the speed and direction of marine currents, are disregarded in spring hunting (See Nelson, 1969;

Beaubier, 1970; Wenzel, 1975). It is with the benefit of previously acquired knowledge that new information inputs are processed in order to determine their relevance to successful hunting.

The successful acquisition of prey, as in the above example, points out one aspect of Inuit goal orientation. This is the biological maintenance of the organisms which comprise the cultural subsystem's component set. However, success at this individual level does not take into account a second level of goal orientation related to the fact that culture is a structured aggregate of socially interacting individuals. At this level, the problem of maintenance extends beyond the survival of individual organisms and encompasses viability of the group through the continued orderly and normative functioning of the cultural unit.

In relation to these coterminus goals, knowledge acts somewhat as a filter. Through their retinue of past experience, cultures absorb new information, evaluate and organize it within their already existing knowledge structures, and utilize it in the most appropriate normative fashion. It is in this regard that Boulding's conceptualization of culture as a defended open system (1970:5) is premised on an experientially based world view, rather than on the requirements of individuals. This defended system concept of Boulding, in reality, differs very little from the more orthodox view put forward by Clarke (1968:88), who states,

> . . . cultural systems are primarily behavioral information systems; . . . the essential attributes conveyed are units of information. . . . These cultural systems are generated by countless individuals who act out sequences and patterns of behavior which imply a set of relationships held in an information system relating to every aspect of human activity recognized by that society.

With information acquisition and organization holding a critical, if not paramount, position in this methodological framework, a major problem arises--in information theory, the central concern is generally the measurement of the amount and rate of flow of information elements which move across a communication channel. However, cultures, by virtue of being composed of large numbers of individuals, have myriad lines, which are both verbal and non-verbal and which extend both across and within the subsystem's parameters. To identify all the channels, let alone the content, of this network is close to impossible. What does have value, in terms of understanding how the information needed for unit coherence is organized, is the identification of the sources and mechanisms which control information passage.

Payne (1966:295), expanding on the work of earlier investigators, especially Bertalanffy and Brillouin, has defined two catagories of information. The first, selective information, refers to information associated with the unexpectedness of specific information, refers to information associated with the unexpectedness of specific events. The second, termed structural information, refers to data contained in an event's structure. Payne's catagorization of types, while concerned only with particular events rather than processual sources, has relevance to human ecological relations, since cultures, as purposeful selection systems (Boudling, 1956; Rappaport, 1956; Ackoff and Emergy, 1972) are concerned with events which are coeval and value based.

The role of these types is important when considering the non-material aspects of culture in the adaptive process. If cultural systems purposefully select and discriminate for data relevant for societal, as well as biological, maintenance then the information base upon which decisions are made within the system cannot be limited exclusively to that collected outside their boundaries; that is, from the external environment alone. This follows from Sommerhof's (1968) work on directive correlation in which a response must be not only adaptive, but consistent and appropriate to its experiences. This notion of appropriateness is used here to mean confirmation of the aggregate normative structural relationship within the system, rather than advantageously effecting individuals.

The example of spring sealing practices, drawn earlier, is once again useful in crudely illustrating this point. The functional behavior of an individual hunter is guided by specific bits of data derived from the immediate environment, such as wind direction as opposed to current speed. However, the securing of the seal, while confirming the accuracy of this selective information, at the same time reinforces the structural bonding between hunters in confirming the communication channels within the system.

The role of structural information in ecological activities might appear to be of slight importance, if it were not for the constraints that are often presented by the local environment. Heinrich (1963:68), among many observers, notes that many everday Inuit subsistence tasks are often beyond the short-term capacities of nuclear family personnel, let alone individual hunters. Similar observations among other cultures have been made by Lee (1968), Bicchieri (1969), and Rappaport (1971). Structural information, therefore, has a dual role: first, it functions to maintain the processual relationship between system's components;

second, it also has relevance to fulfilling individual's requirements within the context of the system's framework.

Structural information, to follow Brillouin (1950:595), is information which

> . . . exists as soon as one person has it, and should be counted as the same amount of information, whether it is known to one man or millions.

As such, therefore, structural information, quite apart from selected information, appears to be institutionalized and integrated throughout the system's structure. An example of this within culture is the concept of status and role (Linton, 1936; Boulding, 1956; Levy, 1966), which form a recognizable component across a broad spectrum of societies.

Within the scope of the ecosystem and culturally adaptive relations, it is possible to delineate not only general components of the system, the physical, biological, and cultural subsystems, but also to organize these with reference to the information sets within. The following table (II-I), which draws substantially from the ideas of Kuhn (1971:124-7), presents a classificatory scheme for identifying such relationships. Its purpose is to show the differential attributes of information as a property of the ecosystem and its subsystems.

Within this framework, major differences are evident in respect to the organization of information in various parts of the system. The most important is that the ecosystem and its inanimate components lack specific goal-orientation in a controlled sense. In contrast, the living (human and non-human) components which do have limited goals, at the least, and may engage in coordinated activities for goal fulfillment.

Table II-I: Information as an Attribute of the Ecosystem

I. The Total System

A. The Ecosystem - An Uncontrolled System
Traits: 1) at least two components are living systems
2) one living system is human
3) communication between components is non-semantic
4) transactions between the components are not value-based

II. The Component Systems (Controlled and Uncontrolled Subsystems)

A. The Non-Living System - An Uncontrolled Subsystem

a) The Physical Subsystem (Climate, Geology, Hydrology, Etc.)
Traits: 1) no living components
2) communications are non-semantic
3) exchanges of matter-energy are not value-based
4) exchanges are non-informational

B. The Living Systems - Controlled Subsystems

a) The Biological Subsystem (Human and Non-Human)
Traits: 1) components may be system and non-system elements
2) communications are non-semantic
3) exchanges of matter-energy are not value-based
4) informational exchanges are selective

b) The Cultural Subsystem (Societies)
Traits: 1) all component levels are human
2) subsystems may be formal and informal
3) communications are semantic
4) exchanges of matter-energy are value-based
5) informational transactions with other subsystems are selective
6) organizational information is structural and universal

This latter point may appear inappropriate to non-human elements; however, as meant here, it refers to the movement toward a particular object, such as biological survival.

In terms of the material and non-material relations which occur between the elements outlined, the ecosystem, as the objective environment, acts as an effector on all component subsystems. This is true of information, as well as bioenergetic, exchanges. Thus, as Sommerhof (1968:282-4) observed, information exchanges between the ecosystem and its constituent biological elements are selective in nature. Appropriate environmental information is filtered by organisms in respect to its survival content (as in Boulding's example of an amoeba referred to earlier) with information of high survival value selected over information with a lesser such value.

The human component of the ecosystem, however, unlike other living elements, contains not only biological, but also cultural attributes which significantly alter the relationship between it and the rest of the system. First, information selected by an individual is not limited to him alone, but, via a range of possible channels, can be disseminated to other members of the subsystem. The inuk hunter stalking a basking ringed seal, need not, for instance, have directly made all the required observations from the environment needed to capture the seal. Many, if not all, may have been transmitted and stored before the hunter ever saw a basking seal.

A second difference is that the information present in the structure of the cultural component has been institutionalized so that it is available to all members of the aggregate. This universality provides cohesion which extends beyond the limited biological requirements of the subsystem. Structural information, as it is reflected in such elements as social organization, serves to organize the relationships within attributes of subsystem in a manner analogous to that of selective information in man-environment interactions. In fact, cultural adaptation cannot be interpreted as a product of selective scanning of the environment alone, since a wide range of socio-cultural behaviors, such as decision-making and authority patterns, which are rooted in the structural precepts of the social subsystem, form an intrinsic part of cooperative subsistence and economic activities. Rather, for a clearer picture of how cultural ecological adaptations function, selective indicators, like those most readily identified with material means of production, must be linked with those structural integrators which facilitate the organization of selective inputs within internally generated information framework of the cultural system. This integration is needed in order to maintain coherence between the limited (biological) and longer range (cultural) goals of the human subsystem.

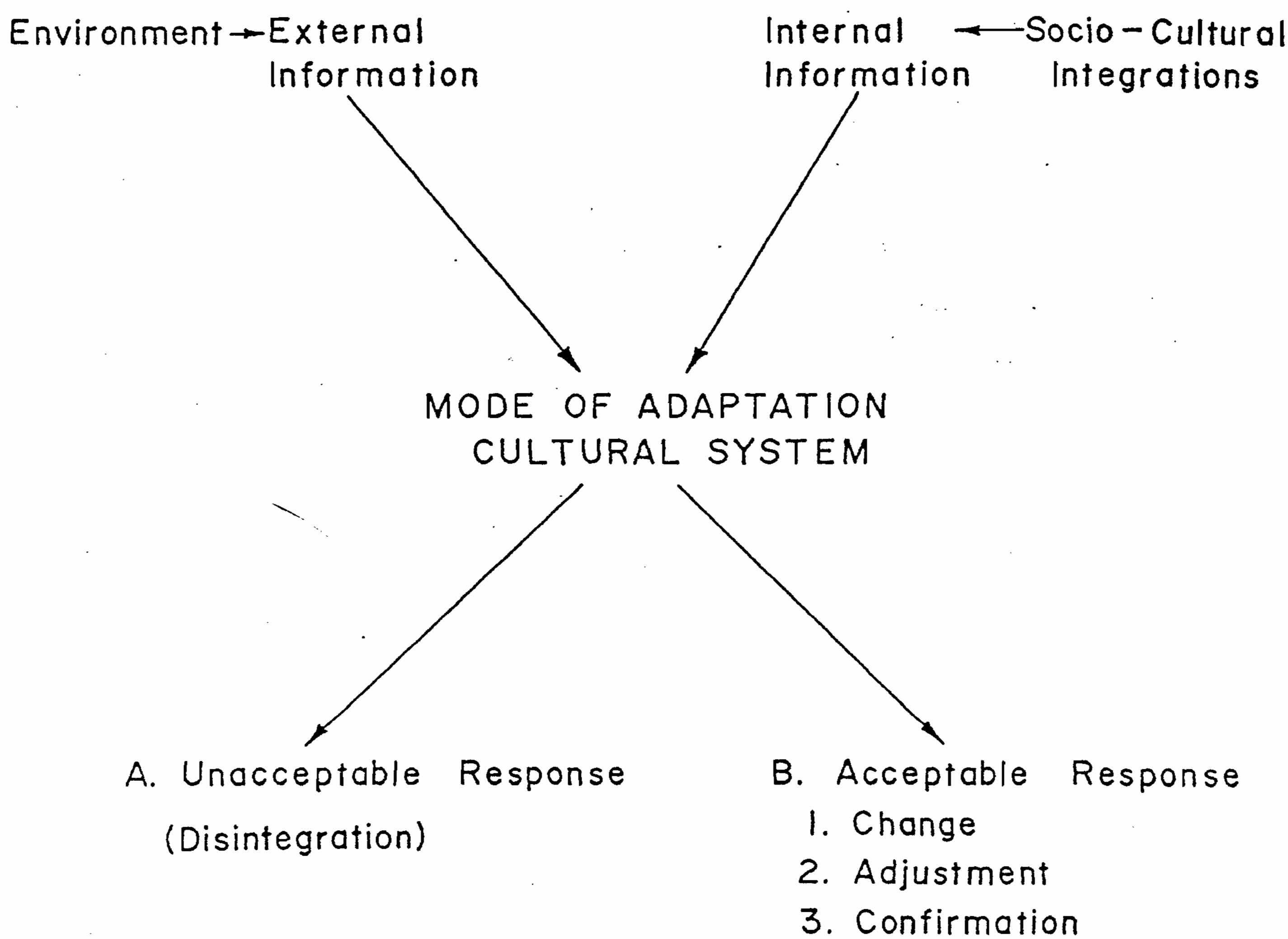
The essence of this integration of information elements is what Clarke (1968:89) termed a coupled system in which goal-orientation and outcome variety are restricted by internal, as well as external, constraints. In such a coupled systems view, the cultural subsystem scans external "facts" from a wide spectrum of the environment and from this information filters and selects data appropriate to its perceived situation. In this process, scanning and, to some degree, selection are performed by individuals; however, such information does not remain particularized, but is integrated into the structural framework of culture which provides generalized channels of communication between individuals. In this coupling or, more accurately, mixing, the information in the selective and structural information sets mutually effect each other. This is shown in Figure II-I. The central function, then, of this filtered knowledge set is the integration of the particular and collective goals of the cultural system.

In the figure, four possible responses are noted in relation to cultural ecological adaptation; of these four, three are seen as acceptable outcomes and one, disintegration or extinction, is unacceptable (although not impossible). While the field of acceptable outcomes is relatively large, the matter of probability must be examined in terms of each's applicability to human ecological circumstances.

The first and last of these possibilities, complete change and total confirmation, represent the extremes of the hypothetical adaptive spectrum. The former indicates powerful distortion in the cultural unit's internal relations, while the latter suggests redundancy in the system's relationships; in Davis' words (1958), morphogenesis and homeostasis. As has been pointed out already, neither situation realistically frames the adaptive loci followed by culture. One suggests total disintegration of internal coherence, while the other leans toward unreal equilibrium, such as that in closed systems.

The middle alternative, that of adjustment, most closely relates to Davis' (Ibid.:11-12) observations on conditions within general systems. Neither extreme change nor extreme stability mark the condition of open systems. Instead, such systems undergo regulated change in which discordance is modified, but not eliminated, through the information

FIG. II-1: INFORMATION AND CULTURAL ADAPTATION



framework which integrates the structural and selective relations of the system.

Structural Regulation and Inuit Ecology

The question of structural regulation in the context of Inuit adaptation can only be pursued with reference to the parameters in which Inuit society exists. Generally, Inuit have been classed as a band-type society (Heinrich, 1963; Balikci, 1968; Damas, 1968, 1969b, 1969c, 1975a), but the meaning of band must be clarified before any analysis of the integrative operations of the structural and selective aspects of the society is undertaken. Some reconciliation is necessary because of the range of societies which have been assigned or denied inclusion under the band designation. Steward, for instance, made clear differentiation between Great Basin Shoshone, who he felt were at a "family level" of integration (Steward, 1955:101), and patrilineal groupings (Ibid.:122-7), which would encomplass Inuit, Bushmen, and more southerly Shoshonean peoples. The basis for this distinction for Steward (Ibid.:122) came from the fact that Great Basin Shoshone formed "loose aggregates of comparatively independent families", whereas patrilineal bands joined in multifamily groupings bound by kinship, cooperative hunting, common landownership, and joint ceremonialism. More recently, Murdock (1968:13-20; 1969:129-46) lumped all such groups as hunter-gatherers, a term which Slobodin (1969a; 197) has interpreted as meaning band societies. Although Steward (1969: 187) later advised that minimal importance be ascribed to band criteria, some characterization is required if only to differentiate what is meant by the term from recognized entities such as tribes and even, in some cases, subcultures.

As a minimal set of criteria, therefore, Slobodin's (1969b: 193-4) observations are useful because they reflect conditions which encompass both the internal and external aspects of band adaptation. The first of these is what Slobodin has called a lack of socio-economic complexity or an absence of tangible heritable property. (I would qualify this further by noting a general absence of institutionalized buffers of the kind emphasized by Levy (1966), but this point will be pursued latter.) Second, an established sodality based on a dual strata of kinship, the first level functioning at a recognizable formal level, while the second strata is interpreted as a condition of basic humanity. These may be taken as real and potential categories of kinship, respectively. Third is the lack of institutionalized authority and leadership components; rather, such elements, maintaining consistency with the material and affiliation aspects of band organization, are subsumed under the second characteristic. Last, band organizations are subject to a lack of control over the local ecosystem, a fact which is reflected in the low accumulation of material commodities.

With such a set in hand, it is possible to put forward some assumptions about the integrative mechanisms which effect band-like groupings. In this regard, Slobodin's comments on unit sodality at the band level of organization are particularly salient. Steward clearly distinguished between "primitive" or tribal culture and higher levels of societal structure at least partly on the basis of how cooperative units were composed. His comments (1955:122) on the independence of Great Basin families and multi-family patrilineal aggregates are an example. Resolution of this apparent gap, however, lies in the fact that, beyond the organizing capacities of kinship, there are no formal features in either the Shoshone or patrilineal examples for regulating behavior sociologically or ecologically. The essential question which follows is whether the same regulatory mechanisms affect these two realms of behavior.

In this regard, it is notable that both Steward and Radcliffe-Brown, although proponents of different approaches to cultural analysis, observed that a critical link in understanding relationships within the cultural subsystem, albeit both differently. Steward (Ibid.:37) viewed economic arrangements, along with subsistence activities, as the core of the cultural ecological method. As such, he felt that economy most closely showed societal links with environment. On the other hand, Radcliffe-Brown (1952:197-8) saw the economic component of culture as a "means of maintaining . . . a network of relations between persons and a collection of persons." As such, Radcliffe-Brown's analysis must be seen as more aligned with the perspective of social ecology (Young, 1974), while Steward's primary focus in regard to economic relations is primarily focussed on the external interactions between culture and environment. Neither perspective, however, precludes the possibility that a single regulatory set may affect both internal and external behavior patterns. What must be delineated is what form such a set may take, particularly in regard to band groupings with their decided absence of formalized institutions.

In terms of Inuit culture, all the elements cited by Slobodin correlate closely with the general ethnological view of the traditional society. Of particular importance is the apparent lack of structural organization among eastern arctic groupings other than that provided by kinship (Damas, 1963; Heinrich, 1963). At the same time, factors, such as small residential and population aggregations, low population density, high mobility spatially and demographically, and strong interdependence among group membership, all correspond to general observations of hunter-gatherer/band units (Lee and DeVore, 1968; Bicchieri, 1972; Williams, 1974). In terms of internal control, both Damas and Heinrich have noted that the central and most enduring feature is kinship. This is most evident at the level of Slobodin's first strata, that of real kinship, but potential kinship, particularly in respect to more ephemeral associations, provides secondary means of bonding. The inclusion of this second strata operates advantageously by preventing real kinship requirements from becoming overly restrictive; Meiklejohn (1974:134) has noted that the inclusion of potential, as well as real, kin allows a wider set of alternative responses to external stress (See also Waddell, 1975). Overall, therefore, kinship as an integrating mechanism provides flexibility beyond the limited resources individuals and nuclear family personnel.

Beyond their obvious role in structuring social networks within the cultural subsystem, the institutionalized controls embodied in the kinship framework have ramifications which touch on the areas of poor control over environmental pressure and Slobodin's implication of simple technological assemblages among band-type peoples. Slobodin (1969a: 191-6) points out that many of the exigencies which confront band organizations require responses which exceed the capabilities of these groups immediate material culture environments. Numerous investigators (Spencer, 1959; Heinrich, 1963; Damas, 1972a, 1972b) have made this analogous observation among Inuit. It appears, therefore, that the same features which affect social relations also play a role in Inuit ecological interactions and that the flexibility present in band social organization has function beyond the structuring of interpersonal referents. Rather, what is suggested here, is that among band level societies, including Inuit, kinship operates as the key mechanism for integrating a broad spectrum of behaviors, all of which interact to form the ecological configuration of the society. In a sense, what this means is a reapproachment between the views of economy, social organization, and ecology expressed by Radcliffe-Brown and Steward and that at the band level of organization kinship is integral to all facets of cultural maintenance.

An important step in this regard has been the reshaping which our general model of bands has undergone from those of Steward (1955) and Service (1962). In the last two decades, research on hunter-gatherer social structure in a number of geographic areas, including the arctic (Damas, 1963; Heinrich, 1963; Heinrich and Anderson, 1971; Kjellström, 1973; Burch, 1975), has shown that the narrow scope in which patrilineal bands were framed, while it may be an ideal structural format, does not conform to the overall reality of band groupings. Evidence now supports a model based on bilateral relations with a strong tendency toward virilocal residence. While far from startling, such a bilateral model offers the most flexible social formation under the conditions noted by Slobodin.

The logic for arguing that social organizational mechanisms form an integral element of cultural ecological response set of hunters has dual grounding. First, since, as Slobodin pointed out, control over material conditions of adaptation are minimal, flexibility in the organization of cooperative units allows some compensation for material cultural limitations. It should also be noted that it provides fluidity in terms of stress consistent with the high mobility associated with band societies. Second, as opposed to the strict patrilineal proscription found in earlier models, the avenues of group recruitment and the continued occupation of important role positions would be broader. Under conditions outlined by Slobodin, such as low population density and small group size, strict adherence to the ideal of patrilineality could conceivably jeopardize the viability of at least part of the band population.

In light of these elements, it is possible to postulate a number of relationships between the selective and structural information environments. The first is that ecosystem of which the group is a component requires a high degree of internal flexibility within the cultural subsystem because of material limitations in the selective environment. Second, because of the nature of selective environment, compensatory features are non-material. Third, kinship forms the primary basis upon which these internal features are structured. Fourth, the behaviors which are associated with this internal structure are regulated through the dyadic polarities established in the kinship system. Last, the roles which arise within this social behavioral system are relevant to ecological as well as interpersonal relations.

In this framework, the nuclear family unit forms the minimum social behavioral grouping. As Slobodin (1969a:193) points out, the local environment prohibits the viability of the household as the primary cooperative and economic unit, although the nuclear family is the primary unit of biological recruitment and individual socialization. It is also the main unit of resource consumption.

Rather than the household, the multi-family composite comprises the principal social formation among hunter-gatherers. The bonds between various associated households are based on agnatic links between members. Patterns of leadership, authority, and decision-making at this level are based directly on kinship, which forms the basis upon which status-role and interpersonal relations are framed. Through this interpersonal organization, a set of roles relevant to ecological and economic activities are created (albeit, one with a degree of flexibility as noted by Heinrich and Anderson (1971:545)).

For Clyde, the local unit is conceptualized within this structure as an extension of the extended family (much like Balikci's expanded or open ilagiit). It is qualified, however, as composed of an extended family (consanguinally-linked) core to which ancillary sub-units, with bilateral connections to one or more core members, are attached. It should also be noted that this residential and cooperative aggregate occupies a segment which is recognizable within a larger geographic and social area.

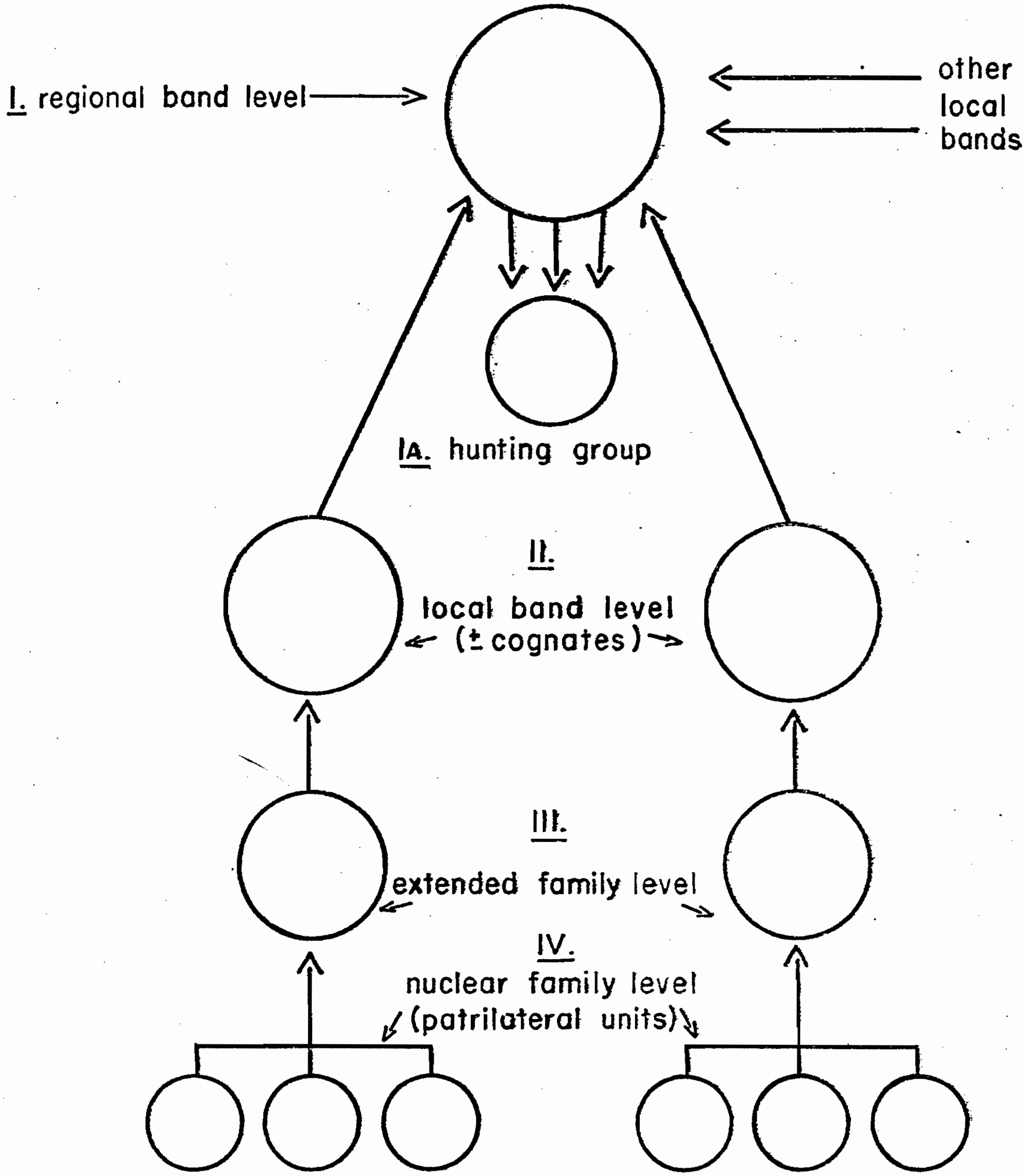
At this level, the Clyde construct resembles Guemple's (1972) analysis of Inuit bands. However, while Guemple (Ibid.:103) proposes an omnilateral system of recruitment into the local band, this model sees kinship bonds, even if somewhat weak, as critical to the ecological realities of band circumstances. If kinship is to be an effective adaptational regulator, then a high degree of interdependence is desirable between unit members. Under Guemple's omnilateral approach, the probability of weak or non-existent kin ties appears to mitigate against the formation of such a unit.

The regional band, similar to Damas' (1969c:126-7) tribe, is the largest formation in the model. The characteristics distinguishing such a supra-unit are linguistic links, preferred marriage universe, and recognizable social relational connections between at least some members of the various subunits. This last is important since it provides an important route for mobility in times of stress.

A sub-grouping within the regional unit, while not necessarily an established feature, is the hunting group. Such cooperative units are formed from members belonging to two or more local bands (and may, in some cases, be composed of complete multiple local groups) which unite for specific, ecologically oriented tasks. They are always of short duration. Investigators (Damas, 1969c; Lee, 1969) have noted such groupings as part of the regular fission-fusion cycle associated with hunter-gatherers. In reference to Inuit, Damas (1969c:129) observed that such hunting groups were usually established among individuals with some kinship-related connection and were coordinated by the same organizational structure operative at the level of the local band. Such activity-oriented groups would endure as long as it was ecologically advantageous.

Taking the premise that bands exert little control over the ecosystem through attributes of their selective environments (Slobodin, 1969a; see also Steward, 1955; Service, 1962), then the manner in which structural arrangements within the cultural subsystem are organized takes on multiple importance. Kinship, as the only formally institutionalized mechanism of organization in Inuit band social relations, provides a means for structuring subsistence-related activities, economic interactions, and

FIG. II-II : A TYPOLOGY OF BAND STRUCTURE



role dynamics which effect the group's ecological relations. The flexibility provided by this structure for recruitment and demographic mobility, noted earlier, carries over to temporal/spatial relationships in the selective environment (See Fig. II-II). In a sense, this provides structural mobility in a selective environment for which the material limitations are well-known.

The figure presented (II-II) depicts a structure, which, while of general value, must be tightened relative to Inuit culture and, especially to the Clyde situation. This is particularly true in regard to the role played by structural features in regulating material selective relationships. The sources of informational variety in the eastern Baffin Island ecosystem of which the Clyde Inuit form the human component are two. The first is the external environment which includes all the non-human elements of the system. It is in this subsystem that the material stimuli which effect the human subsystem arise. The second source is the internal structure of the Clyde Inuit social environment. While cultural ecology generally recognizes the material contextual elements of the human subsystem, this internal environment includes a wide variety of non-material features, among which social organization is the most important. While the external, selective environment provides information which relates directly to material adaptive ineractions, the structural environment provides the cultural component with a means of measuring, evaluating, and implementing the data absorbed from across its boundaries. This structure is able to so function because of the knowledge set it has formed from past transactions. It is, therefore, necessary to determine what aspects of the immediate system contribute significantly to the knowledge set in which

Inuit ecological decision-making in the Clyde region is framed.

The data relevant to this need encompass those parts of the non-human environment with which the cultural system closely interacts, since this comprises the primary source of selective information abstracted from the environment. Second, and of equal importance, are the structural attributes through which the socio-cultural features of the Inuit subsystem are organized and which integrate the dual goal-orientation present in the subsystem. Third, the material contextual environment which, most simply, is the means of production employed by the Clyde Inuit. Because of its close attachment to the two preceeding adaptive components, this technological component will not be treated as other than an element of the second subsystem.

This lumping may be called into question, if for no other reason than the fact that, during the research period, much of the technology used in Clyde ecological activities was composed of non-Inuit material culture items. At both Clyde River and Aqviqtiuk, the material inventory of the Inuit included such items as rifles, snowmobiles, outboard engines, and imported foodstuffs and, while not all these items were universal when field work was initiated, only one or two exceptions remained by 1975. However, it must be argued that while such features have come into widespread usage, the fundamental linkages between hunter and environment remain essentially unchanged (See Kemp, 1971:115). It is my view that these new material elements have only influenced the circumstances, but not the essence, of Clyde Inuit ecological relations.

The components which will be examined in detail, therefore, before proceeding to the analysis of how the structural and selective subsystems interact in the Clyde region, are the physical, biological, and cultural integrative elements which directly effect Inuit adaptation. In the selective environment, important features are: (1) the physiographic aspects of the land and sea in the area; (2) the meteorological influences over the area; (3) the non-human biological components relevant to human occupation; (4) the seasonal variations which occur among these components and which influence human adaptive strategies. It should be noted that, to a large degree, data pertinent to the local selective environment has been drawn from observations made by the local people.

The elements of the structural or integrative environment will be concerned with those non-material features which effectively regulate material relationships between the Inuit and the environment. As has been stated, this approach will focus heavily on kinship, since it is seen here as the chief integrating mechanism in Inuit social, ideological, and material life. To establish this in a preliminary fashion, it is useful to note the observations of two students of Inuit social structure and organization on the role played by kinship within the society,

> Kinship, operating in a variety of ways, is the important other adjustive mechanism since there is very little in the way of integration at a higher level than kinship.
> (Heinrich, 1963:68)

and

> The kinship structure forms a framework within which a great deal of social interaction takes place . . . In addition, . . . group composition, individual relocations, and the network of authority and cooperation have important elements that seek explanation in kinship.
> (Damas, 1963:34)

While these do not establish the thesis proposed here, they do offer foundation for expanding on the place of such a mechanism in regulating relationships beyond the interpersonal.

CHAPTER III

THE SELECTIVE ENVIRONMENT IN THE CLYDE RIVER REGION

Introductory Description

The ecological composition of the Clyde region, like that of any complete system, consists of a vast array of organisms, processes, and relationships. Even when a single component of the regional system is considered in isolation, as for example the physical environment, the many interactions which occur between ice and land, permafrost and soil movement, wind and soil or snow deposition make for a wide-ranging set of relational arrangements. The difficulties are compounded as the various biological and cultural components of the system are included. This section, therefore, will necessarily be restricted to what has already been termed the Clyde system's selective environment; that is, those non-human attributes of the ecosystem which have direct implications for the ecological activities carried out by the Clyde Inuit. While these environmental factors are not seen as the single most important component in this activity set, it is obvious that such information is critical to the decision-making process which guides these activities.

Throughout this chapter, an effort has been made to relate data pertinent to this aspect of the cultural ecological subsystem as such information was related to me through discussions with local hunters and observation. In cases where there is a discrepancy between oral and published data, citations will be provided so the reader can distinguish the appropriate source.

An observer flying transects over the Clyde River region (hereafter referred to as the Clyde area or region or, simply, Clyde; see Fig. III-I) or who scans the National Topographic Service maps for the area (for example, Quadrangles 27 and 37, 1:500,000 scale) from south to north will first notice that above the Cumberland Peninsula and as one passes Broughton Island (67°31' N., 64°04' W.) the first feature which strikes one is the deeply indented and complex coastline of Home Bay. From Cape Hooper to Henry Kater Peninsula, small islands and deeply cut fiords mark the coast in its entirety. West of Home Bay and extending well inland are numerous mountains and glaciers ranging in altitude from 900 to 1,700 m. Further inland, an upland averaging rougly 650 m. of elevation trends toward the central spine of Baffin Island. The main feature of interest in this area are the Dewar Lakes which form the major watershed for a number of rivers which flow east into Home and Isabella Bays. While the waters of Home Bay support a variety of resident and migratory marine mammal species, this upland, particularly around Dewar Lakes, is an important caribou winter range area (Inutiq, 1973, personal communication). In addition, a number of the small lakes near the coast and several of the rivers support populations of arctic char.

North of Home Bay, up to the Kogalu River, which is just below Eglinton Fiord, the coastline becomes markedly more regular and the land-sea interface is backed by three broad lowland areas, dotted with a few hills 400-600 m. high. In summer, these lowlands are covered

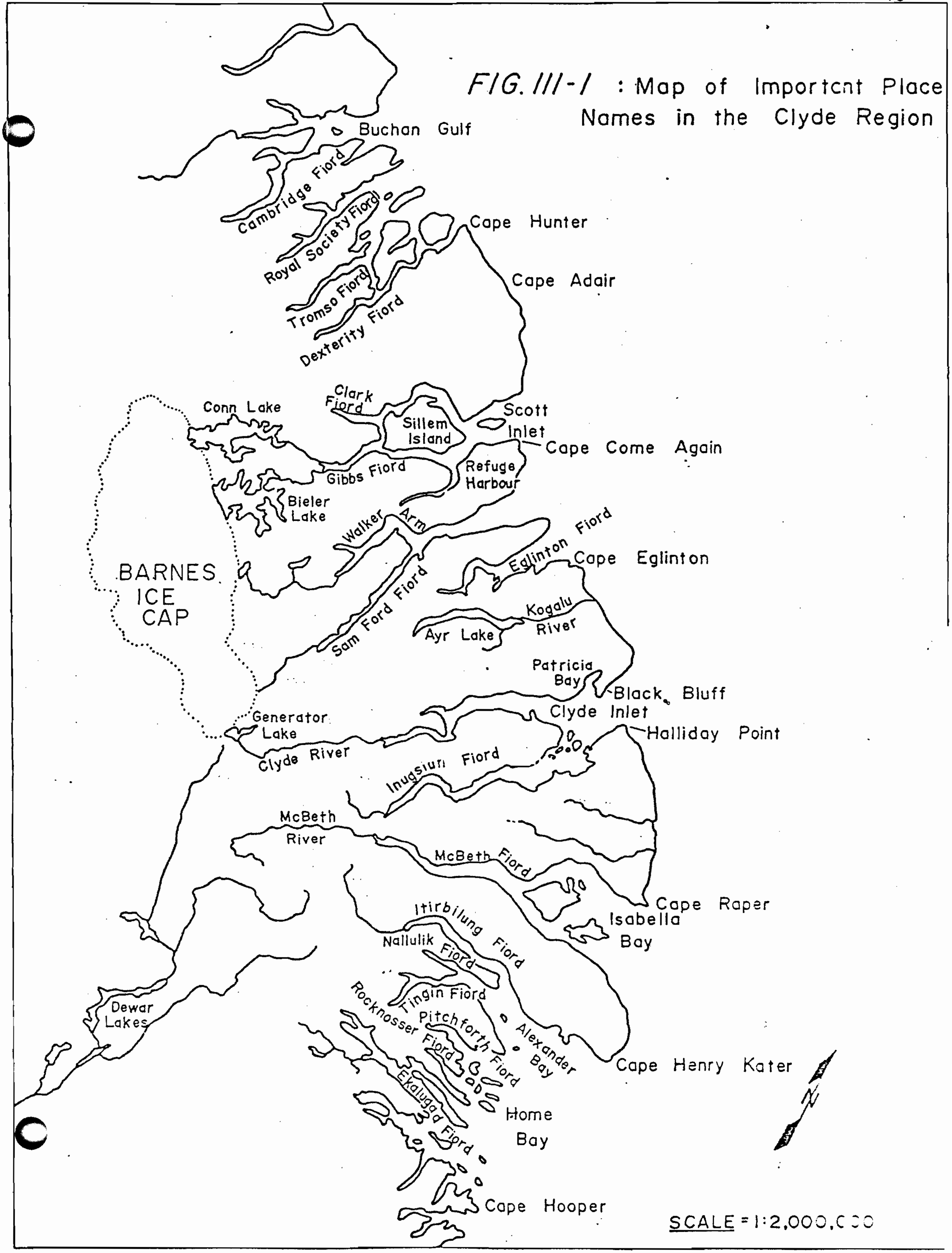


FIG. III-1 : Map of Important Place Names in the Clyde Region with extensive meltwater ponds and stretches of marshy tundra, separated by drier areas of boulder fields and glacier debris. Several rivers and a number of small streams cut across these lowlands from west to east, although the latter are usually dry by August. Henry Kater Peninsula is the southernmost of these lowlands, with the second or middle area extending from Isabella Bay to Clyde Inlet, and the northernmost from Clyde Inlet to the Kogalu. Outside of what fishing the main rivers provide, the most important biological element for Inuit on these lowlands are the small numbers of birds, particularly geese, ducks, and loons, which nest on the tundra. Beyond these summer species, only ptarmigan are of any real importance to Inuit on the lowlands.

The relatively simple configuration of the shoreline in this area is broken by two main features. The first is Isabella Bay and the other is the entrance to Clyde Inlet and Inugsuin Fiord; the first extends west for approximately 75 km., while Inugsuin Fiord extends in a south-westerly direction constricting the base of the lowland between Isabella Bay and Clyde Inlet. Inland these low plains are backed by high mountains and ice fields, which are cut by three rivers which drain the interior. The McBeth River, in the south, runs north and east from the Dewar Lakes to McBeth Fiord; the Clyde River flows from Generator Lake, below the Barnes Ice Cap, directly into Clyde Inlet; the Kogalu River, which forms the northern limit of the Clyde lowlands, empties directly into Baffin Bay from Ayr Lake. Although all three rivers have in the past been important for fishing, only the latter two are still used by Inuit living at Clyde River and Aqviqtiuk.

They are of great importance, however, because each provides a route of relatively easy access to interior areas which are dominated by the Barnes Ice Cap. This interior zone is a second important caribou winter range and several of the lakes near the northern end of the ice cap, notably Conn and Bieler Lakes, are major winter fishing areas for Inuit. Between the lowlands and the interior, the numerous mountainous areas which separate the two zones provide extensive suitable habitat for winter polar bear denning (Harington, 1968:7).

Above the Kogalu River, there is a resumption of the rough coastal-land physiography observed in Home Bay. This continues until close to Pond Inlet. The coast is complex with many deep fiords and bays, while the land is once again mountainous and covered with extensive glaciers and ice fields at upper elevations. The primary coastal features relevant to Clyde Inuit are Eglinton, Gibbs, and Clark Fiords, Sam Ford Fiord and Walker Arm, and Scott Inlet. These areas are still in wide use by the Inuit and infrequent forays are also made further up the coast to Dexterity Fiord. The coast beyond Scott Inlet (above Cape Hunter) is perceived by the Inuit at Clyde as part of the Pond Inlet administrative area, but many contemporary Clyde residents formerly lived all along this coast, including Buchan Gulf and Coutts Inlet. Needless to say, the waters of this area, as the rest of the Clyde coast, provide access to a large number of marine mammals.

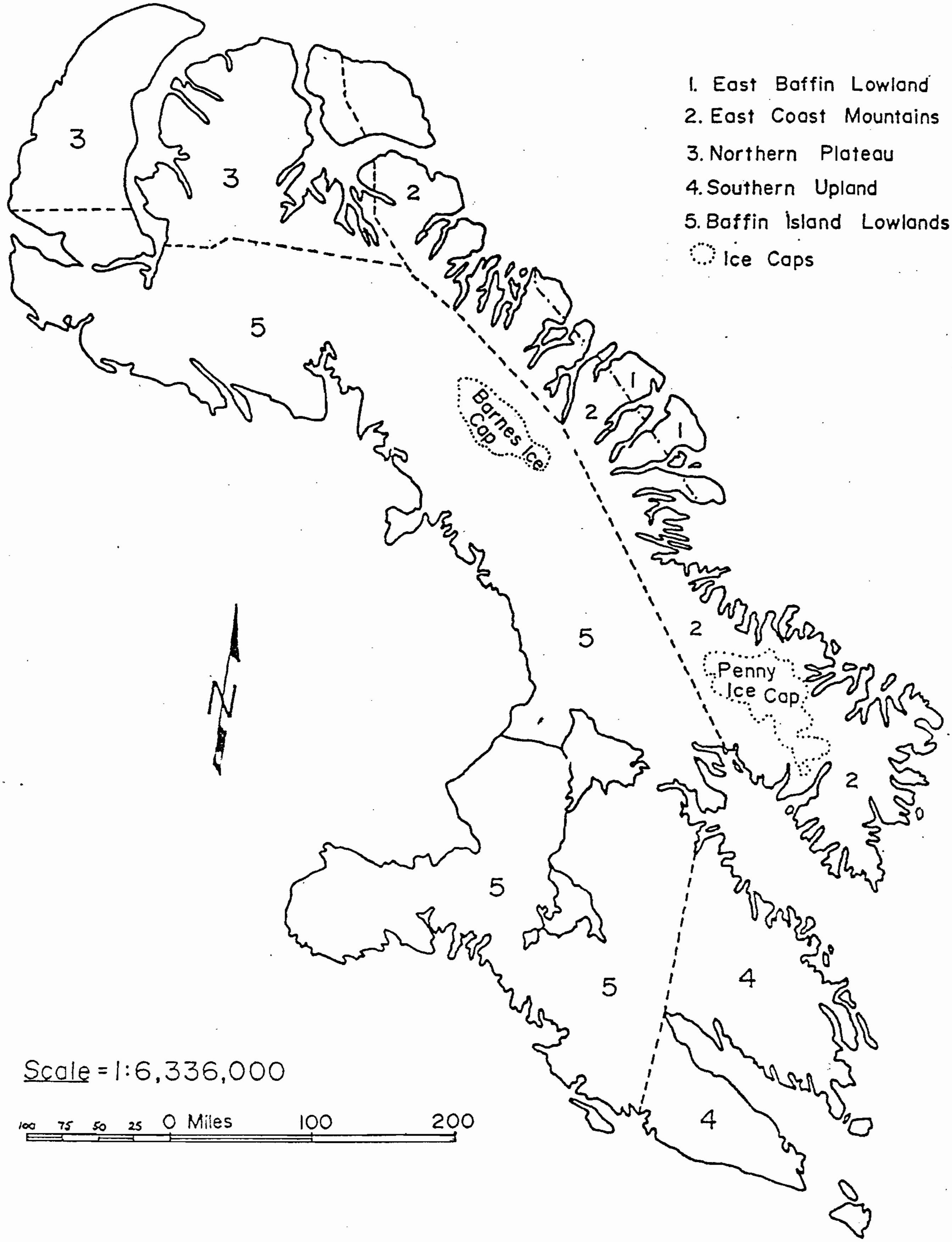
The main feature of the land, north of the Kogalu, is its ruggedness. North-south travel must generally be effected by snowmobile or dogteam on the sea ice in winter or boat in summer. Although relatively narrow fingers of land separate Eglinton and Sam Ford Fiords and the latter from Scott Inlet, mountains upward of 1000 m or more fairly well isolate one from the other. While a few land passages, such as Revoir Pass and Stewart Valley, provide difficult access between fiords by snow machine or dog traction, the great majority of these mountains can be traversed only on foot (Piungnituq, 1971, personal communication). Little hunting takes place in the areas between the fiords and bays, but the river valleys west of most of these coastal features are avenues to inland caribou ranges.

Such a general description, while of minimal value in concrete terms of the various subsystem relationships in the region, does provide a measure of orientation. It is now necessary to proceed to a more precise look at specific attributes which comprise the selective environment from which the Inuit draw.

Physiography

Dunbar and Greenaway (1956:98) have divided the land portion of the Clyde region into three distinct zones and one sub-zone; while basically adhering to their classification, I have simplified their scheme somewhat. The results (See Fig. III-II) differ only by including the Barnes Ice Cap as a component of the interior zone, rather than as sub-zone. Thus, the major features of the area important to the local Inuit are the coastal lowlands (Zone 1), the east coast mountains (Zone 2), and the interior lowlands or, more properly, plateau (Zone 5). The east coast mountains divide the coastal lowlands from the interior, as has already been described in the general introduction to the region, and are a continuation of the mountains which rise along the north side of

FIG. III-11: Physiographic Zones of Baffin Island



Cumberland Peninsula. These mountains average well over 1000 m for much of the Clyde area and in the vicinity of Gibbs Fiord a number of peaks exceed 1500 m. Many of these mountains are table-topped and extensive, but discontinuous, glacial remnants are present throughout the region.

East of these mountains, beginning at Henry Kater Peninsula and continuing to just above Scott Inlet, are the Clyde lowlands. The shoreline configuration along this coast is fairly regular with only a few islands on the outer coast. The fiords and inlets, which cut into Baffin Island, are generally quite long with rough shores and, in Alexander and Isabella Bays and the mouth of Clyde Inlet, a fair number of islands.

The coast, itself, stretching from Isabella Bay to the Kogalu River, is generally composed of steep bluffs formed of loosely consolidated sands and gravels with large boulders scattered through the material. These bluffs are most apparent between Capes Raper and Hewitt, south of Clyde Inlet, and from Cape Christian to the Kogalu River. The Pilot of Arctic Canada (1968:229) reports these more northern cliffs to rise as much as 150 m. and the bluffs below Clyde Inlet appear, from the sea, to be roughly the same in elevation. On the lowlands above Clyde Inlet are several significant features recognized by all the Clyde Inuit. These are Black Bluff, at the northeast corner of the entrance to Clyde Inlet, the Sledge Pointers, which lie on the lowlands approximately 15 km south of the Kogalu River, and Agnes Monument, a flat-topped island off shore from Cape Christian.

All three are of importance to the Inuit because they serve as significant navigation markers for Inuit travelling the outer coast.

Black Bluff, which appears to be of granitic material, is roughly 500 m high and the most imposing natural feature on the outer coast between Cape Henry Kater and Eglinton Fiord. It and Agnes Monument (12 m) (National Hydrographic Service, 1968:229) are used by Inuit travelling by boat or on the winter sea ice as locational markers in inclement weather. The Sledge Pointers, located inland, are somewhat over 600 m (Ibid.) and serve the same purpose for inland travellers.

The last major zone is the interior uplands. This area varies between 600 and 1000 m in elevation and contains two important geographic elements. The first are the Dewar Lakes and the other the Barnes Ice Cap. Both areas are most often visited by Inuit in the course of winter caribou hunting.

The main geological component of interest is a gneiss bedrock formation (Kranck, 1955:229), much of which is exposed across the region. Quartzites, mica-schists, and crystalline limestone are found throughout the area and, of significance to pre-contact inhabitants, nodules of dark grey chert are found along the shores of Eglinton and Sam Ford Fiords, while, on the headland between Sam Ford Fiord and Scott Inlet, soapstone, in the form of massive boulders, may be found.

In regard to the recent geological history of the Clyde region, the last Pleistocene advance and subsequent deglaciation of the area are of the most importance. Besides the Barnes Ice Cap and scattered mountain glaciers, other Pleistocene evidence is revealed by the outwash gravels, marine clays, and moraine features which are present. In addition, the lowlands are dotted by massive glacial erratics. Evidence of post-Pleistocene effects is attested to by the fact that a number of prehistoric human features along the coast are gradually undergoing marine erosion (the site in question was reported to the staff of the Thule Archaeology Conservation Project and designated under the Borden Classification as OcDn-6 [Gardner, 1979:252]).

Climate and Meteorology

Climate has generally come to be regarded as a critical element in boreal regions because of its widespread effects on fauna and flora through low temperatures and high winds. Climatic factors have often been perceived as one of the chief limiting agents hindering modern occupation in the North (Erskine, n.d.:11) and is generally seen as being of serious consequence for hunter-gatherers (Lee, 1969) living outside the arctic. It, therefore, must be regarded when considering cultural adaptation to an environment in which all ecological processes are subject to such climatological extremes.

The climatic regime, which effects Clyde, may be characterized as marine in type and is part of the larger system which influences Canada's High Arctic (Bliss et al., 1973:362-3). Winters are long and cold with little snow accumulation, while summers are short in duration, cool, receive low amounts of precipitation, and experience highly variable winds. A summary of several relevant climatic factors is presented in the following series of tables (III-I, III-II, III-III) for the 36 months spanning from January, 1971, to December, 1973. These data were collected by personnel of the Department (now Ministry) of Transport stationed at Clyde River.

The most striking aspect of the area's climatic subsystem is that of temperature (Sarvas, 1970: 79), which, especially in winter, has

Table III-I: Temperature Data, 1971-1973, Clyde River, N.W.T.[1]

Month/Year	Max. Temp.(°C)	Min. Temp. (°C)	Mean Temp. (°C)	Days ≤ 0°C
January 1971	-8.3	-41.1	-26.1	31
February	-12.7	-42.7	-28.8	28
March	-12.7	-33.3	-23.8	31
April	0.0	-31.1	-16.6	30
May	3.8	-19.4	-7.2	31
June	9.4	-5.5	0.5	28
July	15.6	-1.6	3.8	16
August	19.4	-2.2	3.8	18
September	5.5	-8.3	-0.5	27
October	2.2	-17.2	-6.1	31
November	-7.2	-31.6	-20.0	30
December	-17.8	-40.5	-29.4	31
January 1972	-18.8	-42.7	-31.6	31
February	-15.0	-42.2	-29.4	29
March	-15.0	-41.6	-28.8	31
April	-1.1	-32.2	-19.4	30
May	2.2	-21.1	-10.0	31
June	N.D.	N.D.	N.D.	N.D.
July	12.7	-4.4	2.2	24
August	14.4	-3.3	2.2	25
September	6.1	-13.3	-1.6	30
October	0.0	-23.8	-8.8	31
November	-5.0	-31.6	-18.9	30
December	-18.3	-38.8	-27.7	31
January 1973	-13.8	-36.6	-26.9	31
February	-18.8	-41.6	-32.7	28
March	-13.3	-40.0	-27.7	31
April	-8.3	-31.3	-19.4	30
May	-1.1	-23.2	-10.0	31
June	13.8	-7.2	0.0	26
July	14.4	-2.7	3.3	14
August	17.7	-2.3	6.1	5
September	13.3	-5.5	0.8	22
October	3.8	-14.4	-2.7	30
November	-3.3	-21.6	-11.2	30
December	N.D.	N.D.	N.D.	N.D.

[1]Data supplied by Ministry of Transport personnel, Clyde River.

Table III-II: Snowfall and Accumulation, 1971-1973, Clyde River, N.W.T.[1]

Month/Year	Snow Days	Snowfall (cm.)	Snow Accumulation (cm.)
January 1971	6	10.6	35.5
February	4	8.4	35.5
March	2	3.0	38.1
April	1	1.2	38.1
May	16	40.6	Trace
June	1	2.5	Trace
July	2	0.0	Trace
August	3	0.0	Trace
September	11	66.8	5.0
October	17	129.2	27.9
November	10	36.5	40.6
December	2	1.5	40.6
January 1972	2	3.3	40.6
February	2	1.5	38.1
March	2	1.5	38.1
April	2	1.2	40.6
May	9	16.2	38.1
June	N.D.	N.D.	N.D.
July	2	1.5	Trace
August	9	2.2	Trace
September	17	72.6	2.5
October	19	54.5	17.8
November	12	21.8	17.8
December	2	4.0	10.1
January 1973	7	5.0	12.7
February	9	3.5	15.2
March	5	2.7	17.8
April	8	4.0	20.3
May	12	11.4	40.6
June	6	4.3	20.3
July	0	Trace	0.0
August	0	0.0	0.0
September	10	12.9	2.5
October	15	24.1	15.2
November	19	22.3	20.3
December	N.D.	N.D.	N.D.

[1]Data supplied by Ministry of Transport personnel, Clyde River.

Table III-III: Mean Monthly Wind Conditions, 1951-1960, Clyde River, N.W.T.*

Month	Prevalent Direction	Percentage Frequency	Average Speed (KPH)	Days of Blowing Snow
January	NW	29	7.3	5
February	NW	43	11.8	5
March	NW	35	7.8	2
April	NW	36	7.5	2
May	NW	43	10.2	3
June	NW	59	12.8	2
July	NW	59	13.6	0
August	NW	36	10.2	0
September	NW	48	12.9	1
October	NW	32	16.5	4
November	NW	46	11.2	4
December	NW	38	6.0	3

*Data Source - Department of Transport (1968:18).

a severe effect on local biological activity. It should be noted, however, that, as Dunbar (1968:95) maintains, these temperatures have their greatest impact on the land component of the ecosystem. In the marine subsystem (Ibid.), the difference between summer and winter temperatures is significant only in areas where there is a mixing of arctic and subarctic waters. Along the Clyde coast, as is true for most of western Baffin Bay, the marine subsystem is subjected to a flow of cold water moving south from the Arctic Ocean Basin (Ibid.:44).

While temperature appears to be of immediate importance, experience with Inuit engaged in winter hunting clearly hinted that wind speed and its accompanying chill factor may be at least as important for all organisms exposed to their effects on the surface of the land and sea. Winds of 32kmh or more occur in every month of the year and are particularly disturbing in winter when (1) the chill factor combined with already low temperatures makes outdoor activity extremely uncomfortable, (2) once winds reach a certain velocity (roughly 16 kmh), they begin to produce white-out (piksuktuk) conditions in which falling or already deposited snow is whipped along in a horizontal plane reducing, if not totally obscurring, visibility.

For biological organisms exposed on the surface of the sea ice or land, a number of effects are associated with wind. Plants which are above the snow surface undergo severe dessication and scouring, animals (including man) are limited as to mobility, and, without special adaptations, unable to endure any but short periods of exposure. Among the Inuit, this point is borne out by the fact that, although men would often go out on winter hunts at temperatures of -40°C when conditions were still, wind speeds above 12 to 15 kph at relatively milder temperatures (-25° C) would generally bring most outdoor activity to a halt. In addition, the effects of wind are not limited to the biological component of the ecosystem. Stable sea ice, necessary for successful seal hunting, may be retarded in forming or break-up prematurely because of adverse winds. By the same token, the summer, open water season may be severely curtailed because of wind-whipped seas and drifting ice.

The Marine Environment

It would be grossly incorrect to limit this discussion to the land environment in the Clyde area, since, for the Inuit population, the sea is utilized in virtually every month of the year. The maritime regime along the Clyde coast is influenced by the cold waters which flow down from the Arctic Ocean Basin, via Lancaster Sound and the North Water area (Dunbar, 1968). This current has been termed by Anders (1967:18) the Canadian Current, who estimated that the volume of water discharged along the Clyde coast into Davis Strait is roughly 2×10^6 m3 sec^{-1} with a summer surface speed of $20cm^{-1}$.

Depths along the Clyde coast vary markedly with numerous rocks, shoals, and reefs (National Hydrographic Service, 1968) having been recorded, especially in Home Bay and Alexandra Bay. Further north, there appear to be far fewer navigational obstructions, although these are of little consequence to the Inuit who travel solely by freighter canoe. Also, unlike some areas on southern Baffin Island, the normal tides in the region offer little difficulty for the Inuit. In southern Home Bay at Cape Hooper and Ekalugad Fiord, the mean tides are 1.4 and

1.1 m, respectively (Ibid.:218-20). In Patricia Bay, where the village of Clyde River is located, tides range from 1.2 to 1.5 m and are about the same near Aqviqtiuk (Ibid.:227). The only open water hazard for Inuit travelling the coast is fog which is relatively frequent between mid-July and the end of August.

The most important feature of the marine environment for the Inuit is the extended presence of sea ice along the coast for much of the year (Table III-IV). Sea ice conditions along this coast are complex and highly variable and of paramount importance to the Clyde Inuit, who, for much of the year, use the sea ice both as a hunting ground and an avenue of travel. In this regard, Table III-IV should be examined a bit more closely. Although there are definite gaps in the data on dates of freeze-up, break-up, and duration of ice cover, what is readily apparent is that complete freezing of, at least, the protected fiords and bays in the area usually occurs between mid-October and early November and that a safe ice platform lasts approximately nine months.

What the table cannot show, however, is that, for a people with limited technological facilities to compensate for unpredictable events in the selective environment, there are critical periods when conditions deter Inuit subsistence activities. This is exemplified by the table's freeze-up data which in a number of years indicates that an extended period of time elapsed between the appearance of first ice and complete freezing. The formation of new ice (sikkuak) generally means a time when the ice is too weak for a man to walk on, but too close to permit the passage of a boat. If freezing is delayed by windy, choppy conditions, hunting of sea mammals can be sharply curtailed. A year like

Table III-IV: Freeze-up, Break-up Data, Clyde River, N.W.T.*

Ice Year	1st Ice	Complete Freeze	Ice Unsafe	Water Clear	Duration
1942	Aug. 31	Sept. 15(?)	June 20	July 2	10 months
1943			June 12	July 29	
1944	Oct. 16		July 01	July 19	9 months
1945	Oct. 09				
1946					
1947	Sep. 30		July 04	July 17	9 months
1948					
1949					
1950					
1951					
1952					
1953					
1954	Nov. 08	Nov. 20	June 06	July 28	8½ months
1955	Nov. 10	Nov. 20	June 09	July 24	@8¼ months
1956	Oct. 18	Oct. 30	June 19	July 27	8½ months
1957					
1958	Oct. 12	Oct. 25	June 19	Aug. 2-7	10 months
1959					
1960					
1961			July 07	July 31	
1962	Oct. 17	Nov. 11	@July 25		8¼ months
1963	Nov. 01	Nov. 16	July 20	July 25	9 months
1964	Oct. 10	Oct. 27		Aug. 04	@10 months
1965	Oct. 10	Oct. 17		Aug. 14	10 months
1966	Oct. 30	Nov. 14	July 25(?)	Aug. 03	@9 months
1967	Oct. 04	Oct. 22	June 20	Oct. 02	12 months
1968	Nov. 14	Nov. 24	May 31	Aug. 09	@8½ months
1969	Oct. 23	Nov. 05	June 05		@8 months (?)
1970	Nov. 13	Nov. 14	June 04	Aug. 13	9 months
1971	Nov. 07	Nov. 08	June 03	Sep. 11	11¼ months[1]
1972	Oct. 20	Oct. 26	June 12		
1973	Oct. 29	Nov. 12	June 01	July 11	8 months
1974	Sep. 19	Nov. 26	May 15	July 20	10 months
1975					
1976					
1977			Aug. 15[2]		

*Source: Allen, 1977:35-6.

[1]No true break-up was recorded (Wenzel, Field Notes, 1972).

[2]Wenzel, Field Notes, 1978.

1974, when some five weeks elapsed between the first appearance of ice and complete coverage could very well be a time when literally no hunting can effectively take place, especially if little or no snow has fallen on the land to facilitate inland hunting. The same is true at the end of the ice season; in the spring of 1968, high, onshore winds prevented Inuit then living on the north side of Sam Ford Fiord from exploiting spring basking seals or shifting camp to the head of the fiord to hunt caribou (Piungnituq, 1971, personal communication). This camp of some 25 Inuit was obliged, therefore, to abandon the area and walk to Clyde River for assistance (Ibid.).

Sea ice on the Clyde coast is present as two types during a typical ice year (Jacobs et al., 1975:522). "Land fast ice" forms in the fiords and bays initially and, on the outer coast, first around islands and protected points of land. Pack ice, on the other hand, is ice at least one year old and generally drifts down into the Clyde coastal zone from the north, where it is incorporated into the fast ice formation. This land fast ice platform extends the entire length of the Clyde coast and may reach out as far as 70 km into Baffin Bay (Ibid.:523). The flow edge or interface between the land fast ice and the outer pack has been roughly correlated by Jacobs (Ibid.) with the 180 m. depth line in Baffin Bay-Davis Strait.

Fast ice differs from pack ice in that it is continuous and relatively smooth, except where strong current and wind action causes piling. Pack ice is frequently unconsolidated, rough, and in constant motion, although Jacobs (Ibid.) terms the Baffin Bay pack as "close pack" with minimum discontinuity in its surface. Travels with Inuit from Clyde

River and Aqviqtiuk out onto the pack, however, made it clear that in that ice area it was considerably rougher than over much of the intervening fast ice. Another feature of the sea ice around the Clyde area is the presence of large numbers of icebergs, particularly along the stretch of coast from Sam Ford Fiord to Isabella Bay. Many of these lie quite close to shore.

An extensive offshore ice platform is usually complete by late December and it is possible, not only to travel north and south, but also well out into Baffin Bay (in March 1972, one hunting party travelled approximately 100 km. out into the pack ice in pursuit of polar bears; no open water channels or associated ice fog was seen at that distance [Wenzel, Field Notes, 1972]). Deterioration of the ice begins to appear usually around early to mid-April with some melt-water puddles forming on the ice surface and a few cracks and holes appearing. The former may be from current and tidal stresses, while the latter are caused by the collapse of the ice domes over seal breathing holes (aglu). As daytime temperatures rise, drainage channels form on the ice, puddles enlarge, and large numbers of basking ringed seals appear on the ice. The onset and rate of true break-up differ from year-to-year, but, by early to mid-June, travel on the sea ice is a wet and sometimes dangerous affair (See Figs. III-III, III-IV, III-V, III-VI). Generally, by the end of July, the ice that remains along the coast and in the fiords has become a loosely consolidated mass of fractured pans. These may, however, remain along the coast well into August and even September, depending on wind direction in those months.

FIG. III-III: Ice Conditions for JUNE 1970-74 (After Weaver 1974)

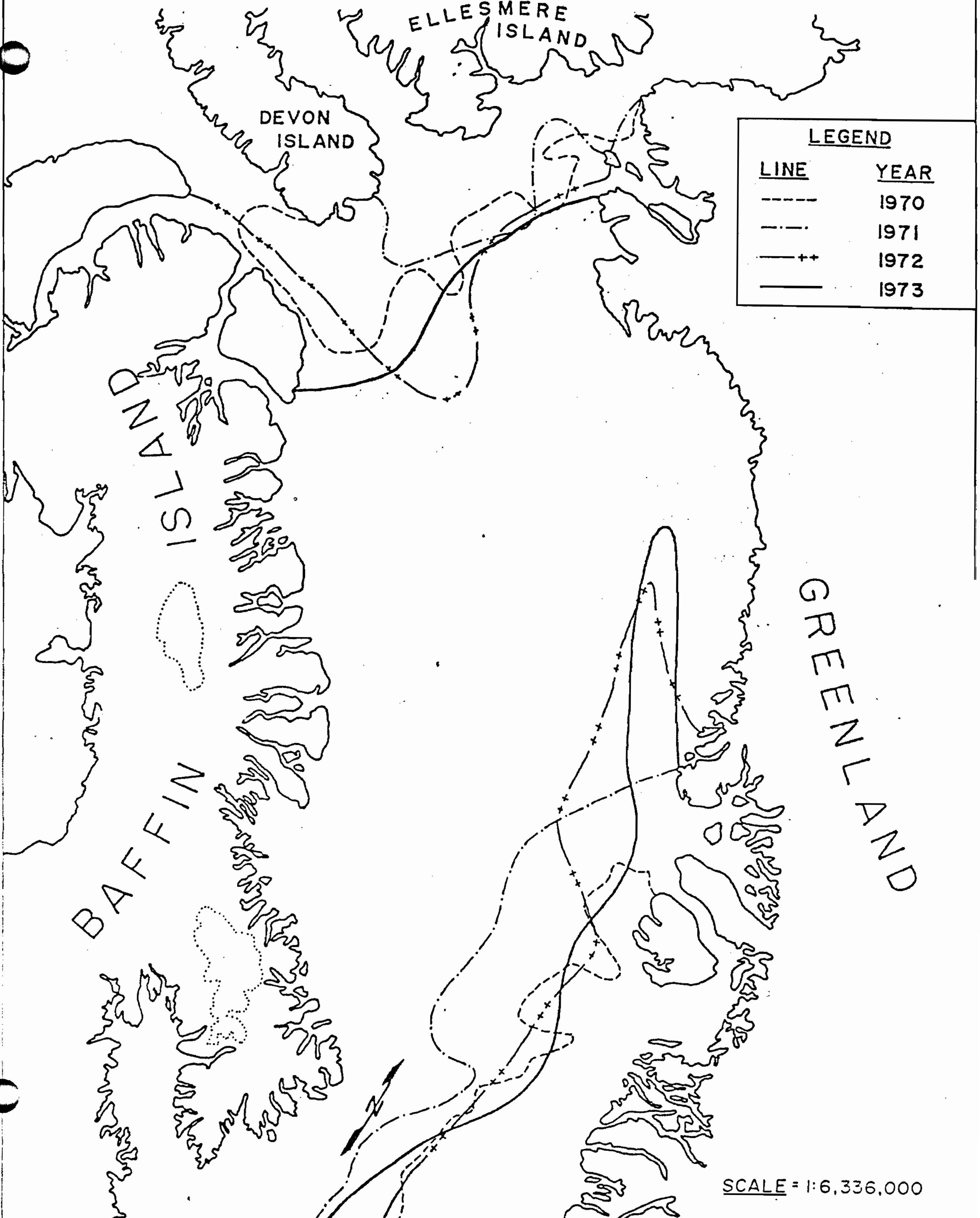


FIG. III-IV : Ice Conditions for JULY 1970-74 (After Weaver 1974)

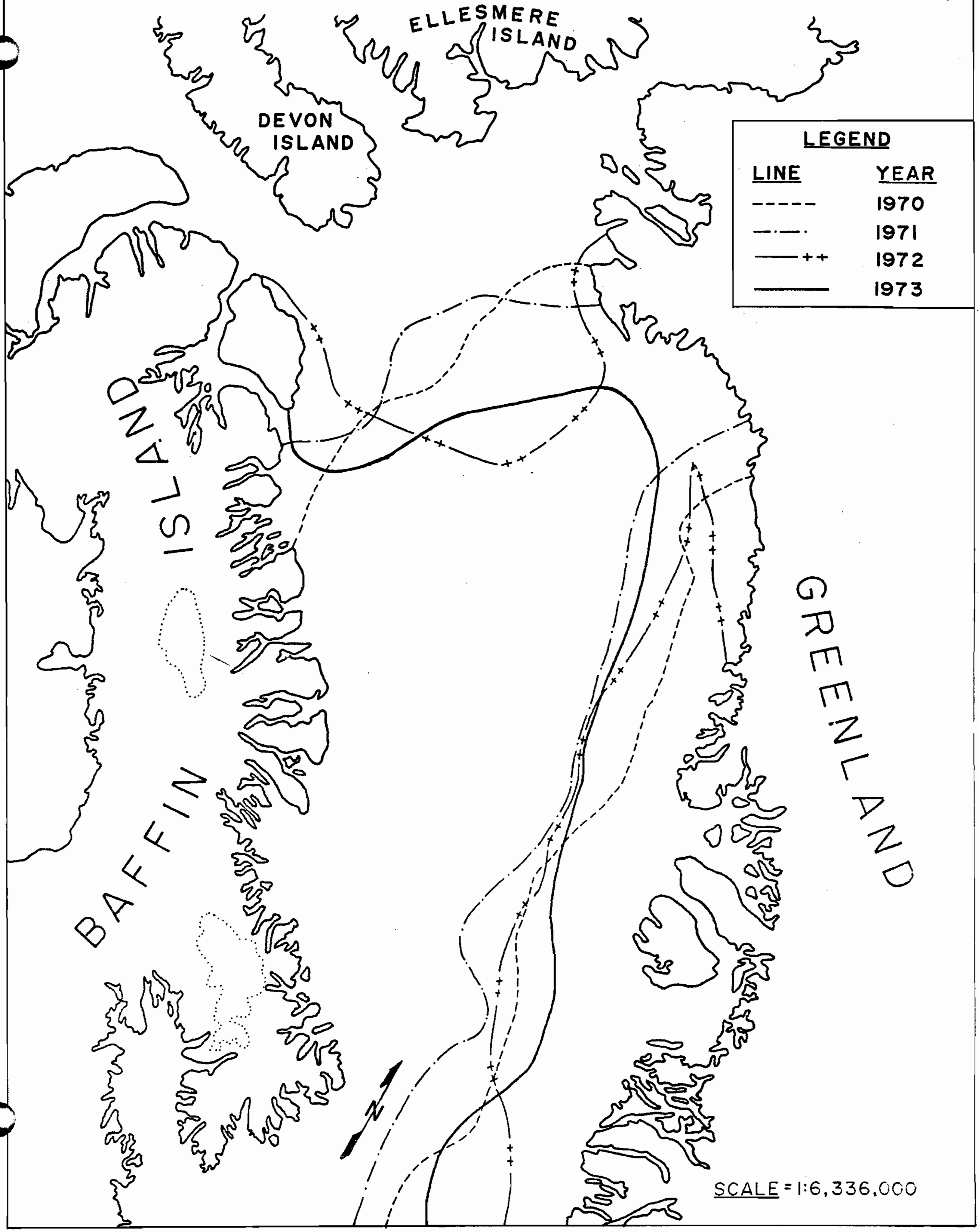


FIG. III-V: Ice Conditions for AUGUST 1970-74 (After Weaver 1974)

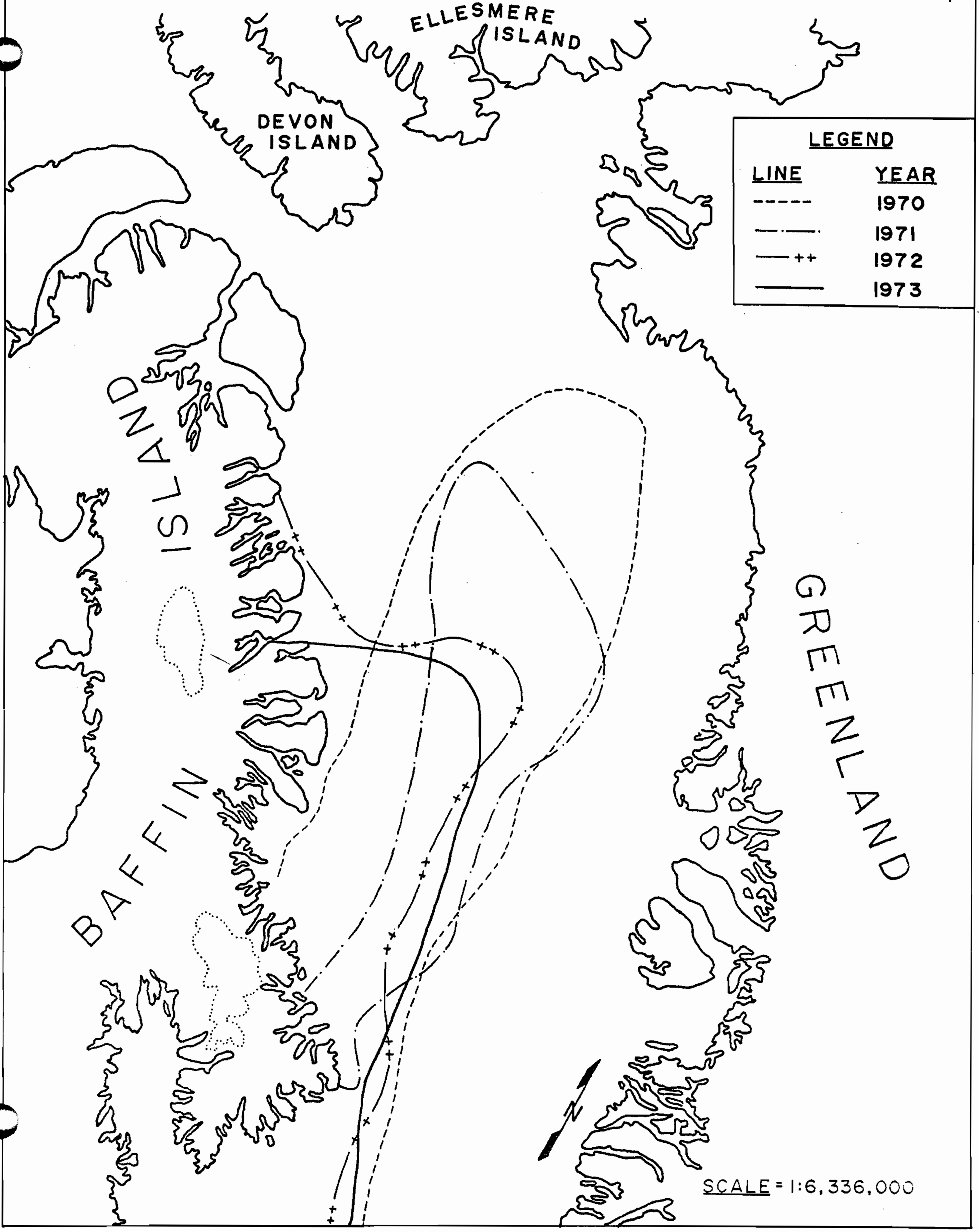
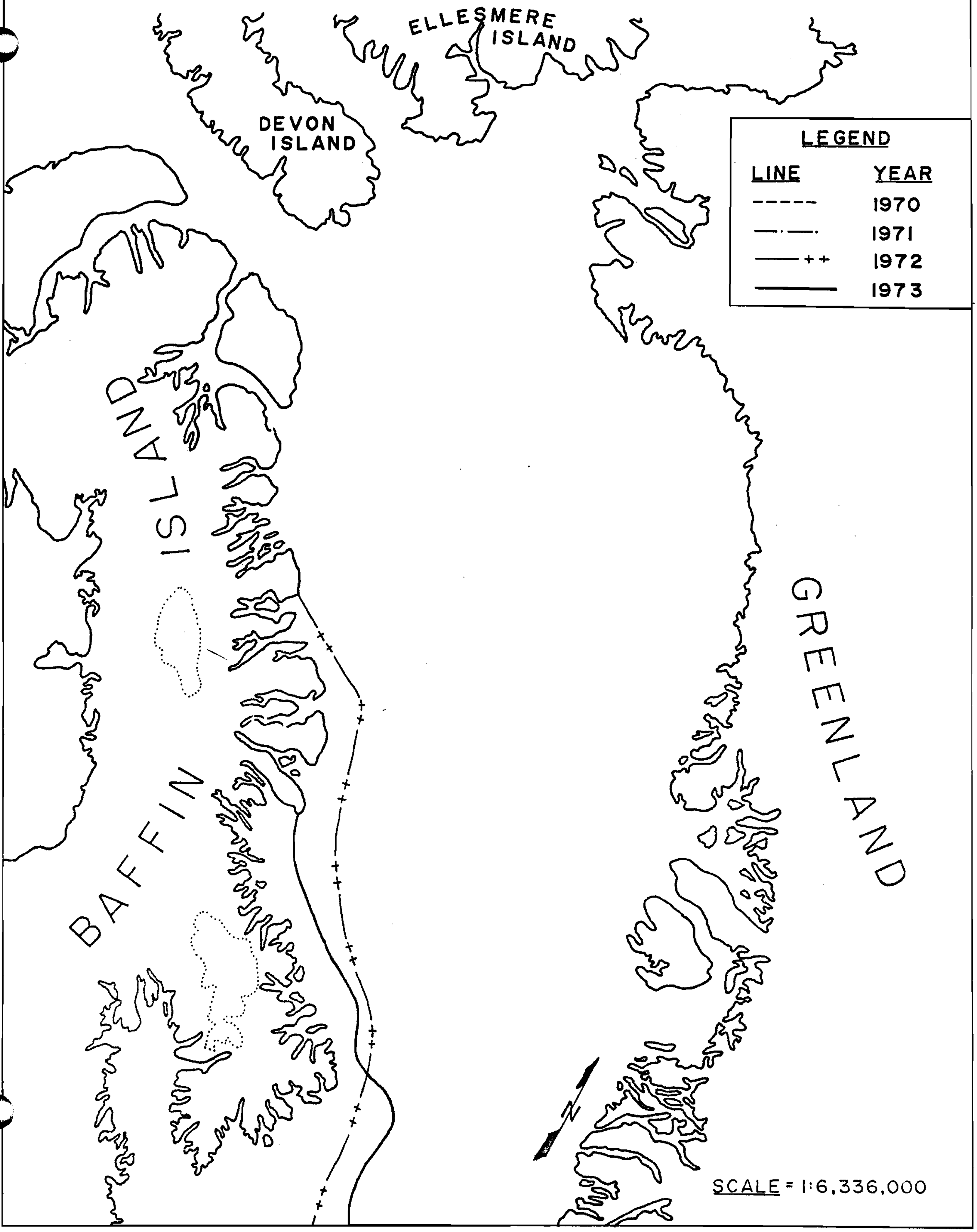


FIG. III-VI : Ice Conditions for SEPTEMBER 1970-74



Seasonal Variation in Daylight

Seasonal change in the Clyde area is marked by significant shifts in the amount of light usable in hunting. In essence, there are two seasons, one in which there is roughly 24 hours of daylight and a much longer dark season when there is a pronounced absence of true daylight. The first lasts from approximately mid-May to late August; the latter from October into April (See Table III-V).

The amount of solar radiation which reaches the earth's surface in arctic regions has definite consequences on the productivity of the ecosystem (Bliss et al., 1973). Clyde, like most areas in the High Arctic, has a markedly low heat budget which effects both the fauna and flora of the region. The growing season is quite short, roughly 2½ to 3½ months for plants, while the area is open to a large number of mammals and birds for a correspondingly short period. Dunbar (1968:53) has estimated the biological productivity of the ecosystem (excluding man) to be roughly the same in the terrestrial and marine subsystems, approximately $0.6g\ m^{-3}\ dy^{-1}$.

For Inuit engaged in hunting, the pattern of exploitative activities is generally compatible with the limitations that may be imposed by the presence or absence of daylight; for example, during the period when little light is available, hunting is usually concentrated on breathing hole sealing (maulukpuq) However, there are times when, despite disadvantageous light conditions, long distance hunting must be done. Such a time often occurs in October or early November, when light is fading, but, because no ice has formed, open water sealing from boats must be practiced. Foote (1967) and Bradley (1970) have outlined the

Table III-V: Average of Real and Theoretical Daylight at Clyde River, N.W.T.

Month	Daylight	Twilight	Hunting Light
January	02h 57'	00h 55'	03h 12'
February	08h 21'	01h 02'	09h 23'
March	11h 45'	01h 02'	12h 47'
April	16h 05'	01h 11'	17h 17'
May	21h 18'	02h 42'	24h 00'
June	23h 19'	01h 41'	24h 00'
July	22h 02'	01h 58'	24h 00'
August	17h 25'	00h 54'	18h 19'
September	13h 29'	01h 17'	14h 46'
October	09h 16'	01h 02'	10h 18'
November	14h 19'	00h 43'	05h 02'
December	01h 00'	00h 30'	01h 30'

Data hypothetical; based on an average drawn from Foote, 1967:17.

effective distance such hunting can be conducted at. During October 1971, at Aqviqtiuk, I estimated that hunters had no better than a 50-50 chance of success at ranges much over 35 to 40 m. This conclusion was reached on the basis of some 40 observations under conditions considered normal at that month - dull light, low clouds, high winds, and choppy seas.

Phytogeography

The flora of the Clyde region can be classified as typical of the plant communities found on the High Arctic tundra. The region is devoid of arboreal species, with permafrost, intense cold, and desiccating winds acting as the chief retardants of plant growth. Permafrost, because it inhibits the absorption of surface water and causes soil movement and discontinuities through solifluction severely disturbs the surface habitat and saturates much of the ground surface (Porsild, 1964:5). Generally, the tundra in summer is boggy with numerous ponds and small streams. In addition, wind and cold remove moisture from exposed plants, slow organic breakdown, and scour vegetation with wind driven grit and snow. The plants found in the area, therefore, are understandably hard and low.

Where adequate appropriate soil conditions exist, the most common rooted plants found include grasses and sedges, low shrubs, and ferns. Dwarf willows (*Salix herbacea* and *S. arctica*) are the primary shrub species and an important food item for a number of birds and small mammals. Other common tundra shrubs, like dwarf birch (*Koenigia islandica*), found in low arctic regions, appear to be absent from the Clyde region.

Grasses and sedges are represented by some 25 species of *Carex*, *Poa*, and cotton grass (*Eriophorum augustifolium*) (*Ibid*.). Dry areas, such as beach ridges and sandy blowouts, are predominated by heaths, including crowberry (*Empetrum hermaphroditum*) and Labrador tea (*Ledum palustre*). Like the sedges and shrubs, many of these plants are a food source for birds and mammals.

Other than rooted plants, a large portion of the plant population in the region is made up of lichens and mosses. Roughly 30 families of lichens are found in the High Arctic (N. McCartney, 1969, personal communication), with many present in the Clyde area. They, particularly *Cladonia alpestris*, *C. rangiferina*, *Cetraria nivalia*, and *C. islandica*, provide food for the major herbivore species in the area, the caribou (Porsild, 1964; Kelsall, 1968).

The area's flora is not of much consequence presently for the Inuit. Formerly, grasses and sedges were used extensively as insulating materials between the walls of the post-contact *qanqmaq*-type dwelling and chunks of sod were cut in low areas for wall construction in summer-fall tents. Today, however, very little use is made of the local plant life. Occasionally, an older man or woman may collect tufts of cotton grass to use as wicks in soapstone lamps, although only a very few such apparatus still exist today in Clyde. Inuit of all ages often take advantage of ripening crowberries and willow catkins for food. However, this is generally more a recreational than a subsistence activity. Beyond these, very little use is made of local plants. A species of seaweed is sometimes gathered in shallow waters and eaten, but this was observed on only three occasions over three summers at Aqviqtiuk and Clyde River.

Mammals, Birds, and Fishes

Excluding insect life (notably mosquitos, spiders, and bees; all of which have a disconcerting effect on Inuit), the Clyde Inuit are chiefly concerned with the local fauna which is economically exploitable. Therefore, while a wide range of mammals, birds, and fishes are present in the region for part or all of the year, those that are truly important to the subsistence effort reduces the overall catalogue of species substantially (See Appendix I for a full listing of resident and migratory avifauna, fish, and mammals). This primary list includes six sea mammal species, four terrestrial mammals, six birds, and one fish species.

In terms of Inuit-environmental exchanges, it is this component of the ecosystem that the Inuit emphasize. Presently, this resource group, collectively, provides approximately 35-45% of the money available to Inuit through sales to the Hudson Bay Company or, less importantly, private auctions and buyers and over 70% of the protein consumed by the Inuit. In 1971, when research was begun, this proportion of cash/meat obtained from the land was substantially higher, perhaps as much as 60% of the cash income and 80-90% of the protein ingested; at Aqviqtiuk, it was probably 90% of all monies and food (Wenzel, Field Notes, 1971, 1978). Traditionally, of course, these resources also provided clothing, shelter, fuel, and raw materials for tools, but, by 1971, most of these other uses were limited to the 18 Inuit living at Aqviqtiuk.

Abundance and seasonality are two of the major factors which effect the interactions which occur between the Clyde Inuit and this biological subsystem. Inuit decision-making, subsistence strategy, and ecological pattern reflect these two elements. Correspondingly, the physical aspects of the ecosystem affect the Inuit both directly and through their influence on this resource base. In order to understand the Clyde Inuit ecological adaptation, it is, therefore, necessary to understand the interactions which take place between the two main components of the non-human system. This, of course, is the cornerstone of the cultural ecological method and remains an important element of the present approach.

The dynamics of this system may, in some cases, be straightforward, as in the migration of arctic char to and from the sea, or more complex, like the relationship between ringed seal, polar bears, and arctic fox on the sea ice. All are of importance to the Inuit and their ability to explain such relationships reflects the depth of local knowledge about the environment. For example, children of five or six can correctly name all the important resource species in the region and, in some cases, relate more obscure processes to the appearance of an animal at a certain time. On the other hand, hunters in their twenties and older have on several occasions been unable to identify pictures of small birds or less frequent visitors to the area.

The birds, which are included as a component of the Inuit subsistence regime, are mainly migratory species present in the area only for part or all of the summer and fall. The only important exception is the rock ptarmigan (*Lagopus mutus* or *aqqiqik*), which is actively pursued from March until November or December. It is generally found in higher country (Godfrey, 1979:111) where drier conditions prevail. Ptarmigan are often found around the rocky sides of most of the fiords in the area and it is not uncommon for birds to be taken within a kilometer of Clyde village. While this species is active all year, the camoflage provided by its white winter plumage makes it difficult to hunt.

When birds are taken, they are usually eaten in their entirety, either boiled or raw. Twice I observed men from Aqviqtiuk consume the flesh, heart, and most of the bones of ptarmigan, leaving only the entrails, beak, and feet. Not uncommonly, the skin (birds are skinned, not plucked by the Clyde Inuit) was kept either as a children's plaything or as a rag. In addition, ptarmigan eggs are much sought after, although large numbers are rarely gathered at one time.

The most important avian species utilized by the Clyde Inuit belong to the family Anatidae, especially the snow goose, qanuq, (Chen caerulescens), common eider, mittil, (Somateria mollissima), and the king eider (Somateria spectabilis). While the former nest to some extent, relatively few are taken by the Inuit. Generally, snow geese are hunted from boats when they are observed close to the shoreline; on one occasion, however, I observed two Inuit pursue a flock of greyish immatures on foot, dispatching the birds by strangling them.

Spring arrival of the geese seems to take place in late May, but may be earlier. Informants were unclear on this point; most hunting in the region takes place in July and August. Godfrey (Ibid.:52) notes that nesting takes place near lakes and wet, low areas. What observations I have of geese in the area and data from Inuit suggests that the many ponds and bogs on the Clyde lowlands are important habitat areas, as are vegetated areas near the shore and rivers.

The snow goose ranks high with the Clyde Inuit, but, over three summers of hunting records (1972, 1973, 1978), the harvests of this species that I recorded were surprisingly low. While, without doubt, my data for birds of all species harvested at Clyde is low, since there were long periods when I was separated from the main body of Inuit in the region, an averaging of the harvest places it somewhere between 200-300 snow geese annually. It is also likely that some brants and Canada geese may be included in the harvest total for any single year. It appears, therefore, that while the Clyde Inuit see geese as a desirable summer food resource, the reality is that very few are actually taken. This is most likely due to two factors. First, no great number of snow geese nest in the region (this is asserted by the local Inuit). Second, many of the geese that do nest around Clyde are on the coastal lowlands which are an area not heavily used by the Inuit, who are, for much of the summer, either near the heads of the fiords and on high ground pursuing caribou or practicing open water sealing and whaling.

Both the common and king eider ducks are common throughout the summer in the Clyde region. While the common eider favors a marine habitat, the king eider often nests on the tundra (Godfrey, 1979:75, 78). As a consequence, the former is more often taken by Inuit in conjunction with open water and lead or floe edge hunting. It is difficult to estimate the number of eiders harvested each summer, since they are shot incidental to other kinds of hunting and consumed very rapidly. Certainly, many more common eiders are taken than kings. Other marine ducks, like the oldsquaw (Clangula hyemalis), in the area are rarely shot and never eaten, except as emergency food. Clyde Inuit say that the flesh of the oldsquaw simply does not taste good.

There are two additional species of marine birds, members of the family Alcidae (Ibid.:195), which are taken in association with sea mammal hunting and which are rather important to the Clyde Inuit as a food source when poor conditions around freeze-up restrict other forms of hunting. These birds are the thick-billed murre (Uria lomvia) or akpa and the black guillemot (Cepphus grylle) or pitsiaulak; together, somewhere between 1,500 to 2,000 are taken annually. Both species occupy similar habitats, feeding on the sea and nesting on rocky slopes and cliffs. Murres appear to remain longer into the fall than guillemots, but there is no hard evidence to support this observation. In 1971, however, murres were still present on Eglinton Fiord in the second week of November, while the last guillemot was seen in mid-October.

No special effort is made to harvest either species by the Inuit. The usual hunting circumstance is when sealing has been poor and a boat of hunters will shoot whatever birds they encounter on their way to shore. Like ptarmigan and eiders, murres and guillemots are skinned and then either boiled or eaten raw. The skin and legs are often given to children as toys. Presently, no particular effort is made to search for or gather the eggs of either bird, although Inuit informants noted several cliffs which they said held small colonies.

As in the case of avifauna, the economically exploitable number of fish species available to the Clyde Inuit is quite small. Indeed, while such ocean fish like members of the Cottidae (sculpins) may be sought as an emergency resource, the Inuit regularly exploit only one species, the arctic char or iqaluk (Salvelinus alpinus).

Char are present in many of the lakes and rivers in the region. They are typically trout-like in appearance and similar to the brook trout, although char lack the worm-like dorsal markings of the trout. Char are an anadromous species (McPhail and Lindsey, 1970:145), migrating to the sea immediately after access rivers have cleared of ice and returning in the late summer-early fall (Ibid.). In the Clyde area, this generally means that char run to the sea sometime in June and return between mid-August and mid-September. In addition, there are a number of lakes around the region which hold land-locked populations of arctic char (Iqalukjuak, 1972, personal communication). According to McPhail and Lindsey (Ibid.), the sea run fish do not move far from the mouths of rivers and, in Patricia Bay, nets set throughout the summer produce char.

The Clyde Inuit harvest char by means of gill nets, fish leisters, and rod and reel. The leister (kukivak) was the traditional item for fishing among Inuit until fairly recently and is still used around Clyde for winter lake fishing. In summer and during the migratory runs, rods and nets are the most popular tools today. It must be noted that, because of the use of the gill net, a number of rivers in the area have, essentially, been fished out. This has come about through the employment of nets with exceedingly small mesh sizes, often less than ten cm. As a result, breeding stock in certain lakes has been seriously reduced. While there is no published data to support this statement, personal observation of activities on certain lakes between 1972 and 1978 confirms the fact that many lakes close to Clyde village have been fished out.

Measurements were carried out on char harvested at four sites during 1971-72. Two of these were summer river sites at the Kakiana, a small river between Cape Christian and the Kogalu River, and at Clyde River, where it meets Clyde Inlet. The other sites were a winter fishing area on Bieler Lake and a land-locked lake, called the M.O.T. Lake, about six km. from Clyde village. One hundred fish were weighed at each of the former sites; the results were an average fall migration weight of 2.1 kg. All fish weighed at these sites had been captured with gill nets. Fourteen fish were measured at the M.O.T.lake with an average weight of 0.7 kg. The winter fish site on the southeast margin of Bieler Lake produced 28 char from one hole on November 30, 1971. The average weight for these fish was roughly 2.5 kg. Informants state that, in their opinion, the average char harvested has decreased in size from those that were taken in the 1950's and 1960's; however, their is no way of confirming this opinion. The average annual harvest runs to 1,500 to 2,000 fish.

Char are a primary food source at several points during the year. In the Clyde region, most men make one winter fishing expedition inland, usually in March, and, if the harvest is substantial, several weeks may be spent subsisting principally on char. The weeks immediately after the fall run are also a time when fish forms the main component of the local diet. In the area, char are not air dried (pisik) as they are in other northern Baffin regions; rather, they are consumed either frozen and raw or in the form of a soup. The absence of air drying seems to be relatively recent, since photographs, taken at the Hudson Bay post at Patricia Bay in 1937 (National Museum of Canada Photo Archives, Ottawa), clearly show split char drying on a rock alongside an Inuit tent.

In contrast to the low number of viably exploitable bird and fish species in the region, the local mammalian resources, particularly those of the sea, are quite rich. As a whole, mammalian species account for over 90% of the harvested biomass in the region, with marine mammals the most important component. Of the six marine mammal species exploited by the Clyde Inuit, three families are represented, Cetacea (narwhal or qillilungaq - Monodon monoceros), Pinnipedia (ringed seal or nitsiq - Phoca hispida; bearded seal or ujjuk - Eringnatus barbatus; harp seal or kaiaulik - Pagophilus groenlandicus; walrus or ivviq - Odobenus rosmarus), and Ursidae (polar bear or nanuk - Ursus maritimus); the latter is included among marine mammals because a major portion of its activities are carried out on the sea ice. In addition, several other marine species occasion the Clyde waters. These are Greenland whales, aqviq, (Balaena mysticetus), beluga, qillilungaq (Delphinapterus leucas), killer whales (Orcinus orca), and hooded seals, aapa, (Cystophora cristata); all of this latter group have been reported only by Inuit and, with the exception of killer whales (Qaqasik, 1973, personal communication), not in the last ten years.

There are also four terrestrial mammals of importance for Inuit in the area. These are caribou or tuktu (Rangifer tarandus, g.), arctic hare or ukkurik (Lepus arcticus), arctic fox or tivviganiq (Alopex lagopus), and arctic wolf or amaruq (Canis lupus). Blue and crossed foxes have been reported from entries in the Clyde H.B.C. post diary, but none have been traded since the early 1960's. In the fall of 1978, an inuk from Aqviqtiuk captured what appeared to be a red fox near Sam Ford Fiord, but this was revealed to be a fox which had been dyed by N.W.T. Fish and Wildlife personnel near Hall Beach (Wooley, 1978, personal communication) the preceding summer.

Marine Mammals

I. Cetacea

Narwhal (qillilungaq; tugaluk - Pond Inlet) are the only whale species of major importance to the Clyde Inuit. Narwhal are present along the Clyde coast only for short periods at the start and end of the summer, as they migrate to and from waters off northern Baffin Island and Barrow Strait. Narwhal usually first pass along the coast in late May or early June, when, because of ice conditions, they can only be hunted several kilometers off shore. Because ice along the Clyde coast is often still closely packed at this time, it is not uncommon for Inuit to be unable to reach the northward migrating animals at this time. This situation occurred in 1972 and 1978 (Wenzel, Field Notes) and was reported by informants (Iqalukjuak, 1972, personal communication) to have also happened at least twice in the preceding two decades. The state of knowledge about this type of event, as well as much related to the general history and behavior of narwhals in the Clyde area, is scant; most work which has taken place on narwhal censusing, behavior, and natural history has been recorded from the north Baffin-Lancaster Sound-Barrow Strait area. Therefore, as in the above cited case, much of what can be stated in reference to narwhal in the area must be gleaned from the Inuit.

Inuit were not able to say whether narwhal moving north in the early summer feed while passing the coast. Large numbers of polar cod may be seen along the ice edge and in cracks at this time and most Inuit questioned said that it was likely that feeding did take place. In order to hunt spring narwhal, Inuit from Clyde are required to either venture out to a floe edge location, where narwhal may pass close to the margin, or to locate a crack, where the animals surface to breathe. The only spring narwhal hunts I accompanied in 1972-73 were the latter type. Very few narwhal are obtained during the spring migration, apparently because ice conditions keep them well off shore and make Inuit travel uncomfortable at the least. In 1972, no narwhal were obtained at this time, while in 1973, only two were harvested. The only other year I have personal data for, 1978, was again a bad ice year with no whales being taken.

The late summer return of the narwhal tends to be much more productive for the Inuit. In 1971 and 1973, both years when the coast was clear of ice by late July, hunters from Aqviqtiuk and Clyde River had excellent success. Hunting at this time is done by open freighter canoe with three to four men per boat. Heavy caliber rifles (.303, .30-30, .308) are used to wound the animals and, once the whales can no longer dive, a metal hand thrust harpoon dart is used to secure the carcass to a float. While seal skins are still sometimes used in float (avvituk) manufacture, five and ten gallon gasoline drums are now commonly employed in this role.

As mentioned, the late season whaling is generally good, if the ice has been blown clear along the coast and, particularly, in the fiords and bays. The most productive hunting carried out at this time is by trapping pods of whales in narrow embayments. The Inuit keep the narwhal trapped by criss-crossing in front of the whales and by shooting in front of them. The Clyde Inuit say that narwhal forage for arctic cod in these inshore areas, but no observations were made of stomach contents from kills.

Table III-VI records the narwhal catch tabulated by Mansfield *et al.* (1975:1044) for the Clyde area. In all likelihood, the bulk of the catch in any one year comes from late summer hunting and, it should be noted, that the catch total from earlier years includes the harvest from camps at Scott Inlet, Sam Ford Fiord, and northern Home Bay, as well as Clyde River and Eglinton Fiord. After 1969, the total reflects harvesting by Inuit from the latter two communities.

Table III-VI: Clyde Narwhal Harvest, 1956-1971

Year	Number Harvested	Year	Number Harvested
1956	40	1964	25
1957	40	1965	18
1958	12	1966	15
1959	25	1967	24
1960	54	1968	8
1961		1969	13
1962	42	1970	9
1963	50	1971[1]	20

Source: Mansfield *et al.*, 1975.
[1]My own harvest figure for 1971 is 22 narwhal (Wenzel, Field Notes, 1971).

It is striking that the overall annual catch appears to have declined fairly steadily since the early 1960's and that there is marked fluctuation from year to year.

Three factors may account for this. First, poor or incomplete data recording by the R.C.M.P., who, until recently, were the official collators of hunting statistics in the Clyde area. It is not unlikely that, from year to year, the local officer simply did not visit one or more camps or did not see certain Inuit when they visited Clyde village. Second, poor ice years may have curtailed hunting. Although Fig. III-IV indicates that it was hypothetically possible to carry out at least late season narwhal hunting in many of the years when a low harvest is recorded, drifting ice, while not keeping the whales away from the Clyde area, may have made it impossible to boat hunt. Last, by the late 1960's, as camps declined (Scott Inlet 1962, Sam Ford Fiord 1968, Inugsuin Fiord and Cape Henry Kater 1969), many of the Inuit, who then moved to Clyde River, became engaged in casual wage-labour, such as stevedoring at sealift, which sometimes coincided with the appearance of narwhal.

During the field research carried out in the area, I was present for part or all of four narwhal hunting seasons (1971-72, 1973, 1978). On the basis of experience from five hunts, some more detailed comments may be made concerning techniques, yields, and prey selection. It should be noted that two of these years entailed poor ice conditions (1972, 1978), which led the Inuit to deviate from what they stated was normal procedure.

In 1971, narwhal hunting followed the general description for early and late exploitation described earlier. Two animals were harvested in late May by Inuit, who travelled some 15 km out onto the sea ice off Cap Christian. A total of four animals were actually reported killed by Inuit, but one sank before it could be retrieved and a second submerged its float and drifted under the ice edge. Since I was not present on this hunt, I was unable to obtain data on the age or sex of the animals taken.

Participants stated, however, that all the <u>muktuk</u> (skin with a thin layer of blubber) had been taken from both whales (sufficient for each household in Clyde village, 42, to have some) and that the carcasses had then been sunk. Informants were clear on the fact that neither retrieved whale had a tusk.

The late season hunt in the area took place from mid-September to the first week of October and was confined almost exclusively to Eglinton Fiord. The formation of new ice on Patricia Bay prevented Clyde village hunters from pursuing whales extensively and, as a result, only three animals of unknown sex or size were harvested (Qillaq, 1971, personal communication). At Eglinton Fiord, however, sea ice formation was retarded by strong winds and, in one hunt, five hunters, using two outboard powered freighter canoes and rifles, killed 18 whales and retrieved 17 (Wenzel, Field Notes, 1971). Of these 17 animals, seven were juvenile or immature narwhal, three adult males, and seven females. The immature whales averaged approximately 1.8 m. each, while the adults were 3.1 m. on the average. All the <u>muktuk</u> from these animals was transported to Aqviqtiuk over two days and one hunter, on leaving for Clyde River, took with him over 100 kg. of <u>muktuk</u>.

The following year saw no narwhal taken by Inuit anywhere in the Clyde area because of heavily packed ice all along the coast. However, 1973 was considerably more productive. While no early season hunting took place on the ice, several Inuit from Clyde village traveled to Scott Inlet, where 11 narwhal had been trapped over the winter in a polynia or <u>sapuk</u>. These men were able to kill three and retrieve two of the animals, despite the lack of a boat and blowing snow conditions. They returned to Clyde with over 100 kg of muktuk and a broken tusk.

August found narwhal hunting productive along the entire coast, with successful hunts conducted in Inugsuin Fiord, Clyde Inlet, Eglinton Fiord, and Sam Ford Fiord. Respectively, these hunts yielded two animals at Inugsuin, five in Clyde Inlet, eight at Eglinton Fiord, and three at Sam Ford Fiord. The latter hunt was highly typical of such hunts.

Two Inuit encountered 14 narwhal and were able to herd them into a small bay on the north side of the fiord. By remaining between the whales and the mouth of the bay, the hunters were able to hold the pod in and to select particular animals. The animals were further harassed by rifle shots fired ahead of them whenever they began to outdistance the canoe. In two hours of hunting, four whales, one adult and three juveniles, were killed and two retrieved immediately. These two were both small males, roughly 2.5 m in length, and yielded some 75 kg of muktuk. Of the other two, the following day the third young animal was located by its float. It was also a male and 19 kg of muktuk were retrieved from it. The adult animal, with tusk, was not harpooned, but was recovered seven days later after it had floated to shore with the tide. No measurements are available for this animal.

The last year for which information is avilable is 1978. Again, as in 1972, ice prevented May-June hunting and was still heavily packed along the coast in August; however, nine Inuit chose to transport three canoes to the floe edge, 9 km from shore, to search for narwhal. The hunters traveled from Clyde River to northern Home Bay, two days travel, before encountering any whales. Because extensive ice still remained in

Home Bay, hunting was conducted from the floe edge, rather than from boats. The Inuit spread out over 2 km. of ice, with two men remaining with each boat. The hunters concealed themselves behind piles of ice as the narwhal passed within a few meters of the floe edge and shot from point blank range and then immediately harpooned. Four whales, all adult males, were killed and retrieved; indeed, of the 16 or 17 animals observed, all were adult males. Each provided between 45 and 55 kg. of muktuk and four tusks, although two were damaged. Continued bad ice prevented further hunting and, ultimately, prevented any further hunting for the remainder of the migration.

The Clyde Inuit seem to be willing to take narwhal of any age or sex, although several hunters stated that males were preferrable because of their tusks, which are sold (Mansfield et al., 1975:1046). For most of the Clyde and Aqviqtiuk Inuit, however, it appears that securing muktuk is paramount and if the animal has a tusk, so much the better. The 1973 Sam Ford Fiord hunt is a case in point. The two Inuit participants acknowledged that they selected juvenile animals because of the difficulty they anticipated in retrieving killed whales under the circumstances of limited manpower (Kautuq and Ilkuk, 1973, personal communication). They killed an adult male, however, because they hoped to get a tusk, as well, and felt they were fortunate to find the carcass a week later. When it is feasible to isolate and dispatch an entire pod, as in 1971 at Eglinton Fiord, however, Inuit feel no compunction to select particular animals (Piungnituq, 1971, personal communication).

Muktuk at Clyde is highly valued and is preferred to most other food resources when available. At Aqviqtiuk, following the large 1971 kill, muktuk was eaten raw or boiled everyday for nearly three weeks. When muktuk is obtained by hunters, it is widely distributed. This generalized sharing behavior was observed time and again after narwhal kills and is consistent with Damas' (1969b:48, 1972a:231-4) observations of generalized sharing.

Local physical conditions are obviously highly important in narwhal exploitation. Very often, hunters in one part of the region are severely restricted in their ability to participate in this activity. However, data also bear out that if successful hunting is carried out somewhere in the area, then it is highly probable that all the residents of the area will benefit to some degree. As noted, muktuk secured by Clyde River hunters was widely distributed through the settlement as a whole. More conclusively, in 1971, muktuk from Aqviqtiuk was sent through the agency of one inuk back to the larger settlement. Although I was unable to definitely establish how widely this shipment of muktuk was shared, I was told (Ilkuk, 1971, personal communication) that many people had received some either directly or through second persons.

Regarding other Cetaceans that may occur in Clyde waters, I have no data of actual kills. I have already noted the sighting of two killer whales in 1973, but Greenland and beluga whales are said to be occasionally observed. The only record I have of hunting for either species do not relate directly to Clyde activities. In 1974, a Broughton Island Inuit told me that he had shot two beluga whales "above Cape Hooper" (Lucassie, 1974, personal communication). An elderly inuk in Clyde (Iqalukjuak, 1972, personal communication) also noted that he had seen a bowhead whale killed, but, when pressed, stated that this occurred in

Cumberland Sound in the 1930's.

II. Pinnipedia

While four species of Pinnipeds are hunted in the Clyde area, one, the ringed seal or nitsiq, is of central importance. The others, the harp and bearded seals and the walrus, are present only during the open water season and, while utilized, are far less significant than the ringed seal.

The ringed seal is present in the Clyde area, both on the outer coast and in fiords and bays, year round. And, as has been copiously documented (Boas, 1888; McLaren, 1958a; Damas, 1969b; Nelson, 1969; Beaubier, 1970), is the principal resource enabling Inuit to survive in much of the Arctic (See Appendices II, III). The Clyde Inuit hunt ringed seals throughout the year, as a source of food and as a saleable commodity, and use the species in most of its life stages.

The size of the ringed seal population for the Clyde area can only be estimated. McLaren (1958a, 1958b) has pointed out that, in terms of reproductive ecology and population distribution, physical factors, such as amount of fast ice, ice stability, and snow cover (McLaren, 1958b: 60-1), are critical to ringed seals. He notes (Ibid.) that coastlines, which are complex in form, with many islands, bays, and points where a stable ice platform may be established, contain the heaviest densities of seals. Such coastal areas provide the best pupping and feeding areas for ringed seals.

In the Clyde region, both simple and complex coastal configurations are found. Much of the outer coast, along the Clyde lowlands from Cape Henry Kater to above Scott Inlet, is generally regular with few islands or large bays. According to McLaren (1958a:27), such areas have a relatively lower ringed seal density than complex shore areas because there is less water available and less stable ice suitable for pupping. However, inner coastal areas around Clyde, especially areas like Eglinton Fiord, Scott Inlet, and Isabella Bay, provide conditions particularly suitable for ringed seal habitat.

McLaren (Ibid.:28-9) has estimated the number of seals for the northern portion of the Clyde coast (Cape Adair to Cape Henry Kater) as 38,900 animals, while down through the Home Bay area (Cape Henry Kater to Cape Dyer) his estimate rises to 74,900 seals (as a whole, this southern section is far more complex in outline than that along the Clyde lowlands). McLaren's distinction between inshore, complex coasts and regular, outer coastal areas is intuitively reinforced from observations on the pattern of Clyde Inuit seal hunting. Generally, the Inuit concentrate their sealing activities for this species, in both summer and winter, within fiords and bays; only under particular conditions are areas of the outer coast hunted. These are usually areas around islands and points where tidal action and currents keep cracks open in the ice through the winter.

More recent than McLaren's work is that of Smith (1973a), who researched the population dynamics of ringed seals in the Home Bay and Cumberland Sound areas. Of particular interest is Smith's (1973a:30, 1973b:10) estimates of mean density of seals per square kilometer of ice during early July in Home Bay. Roughly, he estimated that fiord ice supports 8.83 per km^2, while ice around islands and the mouths of fiords had a mean density of 6.53. In addition, stable sea ice on the outer coast held only 5.02 seals, while the density dropped to 1.02 for areas far from shore.

No systematic counts were made while in the Clyde area, but some rough comparisons are possible between fiord and offshore ice areas. During May and June, 1972, I was able to make some estimates of seals within a 5 km area of campsites on Eglinton Fiord and Walker Arm. At Eglinton Fiord, over five days (10:00h-13:00h), this was approximately 7.6 seals on what I estimated to be a square kilometer; during three days of observation, totalling about five hours, on Walker Arm roughly, 5.8 seals were observed. Very little opportunity was available to estimate seal densities on ice along the outer coast. However, during four trips travelling between Eglinton and Sam Ford Fiords and Scott Inlet, it was apparent that clusterings of basking seals were confined exclusively to open crack areas. Along one crack, 6 km east of Erik Point, 17 basking seals (uuttuq) were seen along 400 m of crack.

During the winter, the time when Inuit ringed seal exploitation is most concentrated, the Clyde Inuit practice intensive breathing hole hunting. Once sea ice forms, ringed seals, which are resident through the year, maintain conical shaped holes (aglu) in the ice in order to breathe. This is done by scratching through the ice with their fore-flippers (Smith, 1979, personal communication) or by butting through newly formed thin ice with their heads (Nelson, 1969:231-2). Several Inuit from Clyde River mentioned the latter means (Inutik, 1972, personal communication), although one Aqviqtiuk resident stated that seals scratched the ice. As the winter progresses, these cones increase in height as the seal's breathing condenses around the rim of the cone. By February, these aglu cones may be 0.3 m high.

Inuit maulukpuq or breathing hole sealing is presently concentrated in areas close to the two villages in the area. At Eglinton Fiord, breathing hole hunting is practiced along both the north and south margins of the fiord along its entire length. Clyde village hunted both fiord and outer coast areas. The former was centered primarily on the northeast side of Inugsuin Fiord, while coastal hunting stretched from Agnes Monument to the mouth of Clyde Inlet. This latter area offered the advantage of a number of long cracks which remained through the winter, running both east and south, and, from 1971 through 1974, a cluster of icebergs, 3 to 5 km off Black Bluff. This area of grounded icebergs was, in fact, named pikaluit, because of this feature.

With spring, as the amount of daylight increased, ringed seals began to haul out on the ice at open crack areas and where aglu cones collapsed over breathing holes. At this time, the Inuit shift from maulukpuq to uuttuq sealing, utilizing the same areas as in winter and also traveling to Sam Ford Fiord and Isabella Bay. Occurring conjointly with basking sealing is the birthing of seal pups. This begins in April and May with pregnant females constructing birth lairs and pups born shortly thereafter. Such birthing areas are generally located in areas of stable ice, which has undergone some piling so that deep accumulations of snow have built up on the leeward side (Smith and Stirling, 1975, 1978; Smith et al., 1978). These lairs (nunariak), in the Clyde area, cluster near the mouth of Sam Ford Fiord, Isabella Bay, and Inugsuin Fiord and Inuit hunting of newborn seals (nitsiavinik) generally occurs in these areas. While lairs are sometimes found on the outer coastal ice, along cracks, the Clyde hunters expend very little effort for pups away from the fiords.

Seals continue to haul out on the ice right up until actual break-up along the Clyde coast, although Smith notes (1973a) that there appears to be a peak two to three weeks before break-up (Smith's data comes from Ekalugad Fiord). After break-up, ringed seals generally free swim all along the coast. Hunting remains concentrated, however, in bays and fiords, although there is a slight decline in effort from early June to August, since the seals are in full molt, virtually cancelling any cash value for skins, and the amount of insulating fat is reduced causing rapid sinking of animals in open water.

Field measurements (Table III-VII) show that seal sizes differ radically with the season. While no truly systematic record was kept of all seals coming into the two main regional villages or many summer camps, more than 200 observations were made between 1971 and 1974. These were either length/girth measurements with weight conversions made following Usher and Church's (1969) reference tables or by outright weighing of carcasses using a spring scale, calibrated to 500 pounds, suspended from a tripod. All measurements and/or weights were done before the carcasses were skinned, but they had been bleed.

The only other pinnipedia of significance for the Clyde Inuit are the bearded seal (ujjuk) and the harp seal (kaiaulik). Both are basically summer residents of the waters off Clyde, although ujjuk are present from June or July into late October, while harp seals are rarely seen before August and never before the outer coast has undergone extensive clearing of ice. Bearded seals, when present, freely range through the

Table III-VII: Ringed Seal Weight Data, Clyde Region, 1971-72

Month/Year	Length(cm)	Girth(cm)	Weight(kg)	Sex	Location
Sept.	86.3	78.7	22.6	M	Clyde Inlet
Sept.	114.3	101.6	48.5	M	Clyde Inlet
Sept.	78.7	81.2	21.7	F	Clyde Inlet
Sept.	139.7	121.9	83.4	F	Clyde Inlet
Sept.	121.9	111.7	61.6	F	Eglinton Fiord
Sept.	96.5	93.9	35.3	M	Eglinton Fiord
Sept.	109.2	106.6	50.8	M	Eglinton Fiord
Oct.	99.0	86.3	30.8	F	Eglinton Fiord
Oct	83.8	76.2	20.8	M	Eglinton Fiord
Oct.	88.9	86.3	27.6	F	Eglinton Fiord
Oct.	88.9	83.8	26.3	F	Eglinton Fiord
Oct.	121.9	116.8	67.1		Eglinton Fiord
Oct.	99.0	88.9	32.6		Eglinton Fiord
Nov.	63.5	60.9	10.8		Eglinton Fiord
Nov.	139.7	121.8	83.0		Eglinton Fiord
Nov.	127.0	114.3	67.1		Eglinton Fiord
Nov.	124.4	104.1	55.3		Eglinton Fiord
Nov.	124.4	109.2	60.3		Eglinton Fiord
Nov.	101.6	91.4	35.3	F	Eglinton Fiord
Nov.	121.9	109.2	59.4		Eglinton Fiord
March 1972	104.1	101.6	43.9		Eglinton Fiord
March	93.9	86.3	29.4	M	Eglinton Fiord
March	88.9	86.3	27.6		Eglinton Fiord
April			45.3		Eglinton Fiord
April			54.4		Eglinton Fiord
April			54.4	F	Eglinton Fiord
April			29.4		Eglinton Fiord
April			34.0		Eglinton Fiord
April			38.1	M	Eglinton Fiord
April			38.5	M	Eglinton Fiord
April			54.4	F	Eglinton Fiord
April			28.5		Eglinton Fiord
May	149.8	127.0	96.6	M	Eglinton Fiord
May	127.0	101.6	53.9		Eglinton Fiord
May	101.6	93.9	35.3	M	Sam Ford Fiord
May	109.2	99.0	43.9	F	Sam Ford Fiord
May	119.3	111.7	60.3		Sam Ford Fiord
May	127.0	111.7	64.4	M	Sam Ford Fiord
May			16.3		Walker Arm
May			66.6	F	Sam Ford Fiord
May			13.6	M	Walker Arm
June			15.4		Walker Arm
June			15.8		Walker Arm
June	101.6	93.9	37.1	F	Walker Arm
June	104.1	86.3	32.6	M	Sam Ford Fiord

Table III-VII: Continued

Month/Year	Length(cm)	Girth(cm)	Weight(kg)	Sex	Location
June 1972	104.1	99.0	42.1	M	Sam Ford Fiord
June	86.3	76.2	21.3		Sam Ford Fiord
June	91.4	81.2	25.4		Sam Ford Fiord
June	106.6	93.9	39.0		Elginton Fiord
June	124.4	101.6	53.0		Eglinton Fiord
June	91.4	78.7	24.0		Eglinton Fiord
July	86.3	78.7	25.4		Kogalu River
July	88.9	78.5	22.9		Kogalu River
August	132.0	93.0	48.5	F	Inugsuin Fiord
August	121.9	106.6	56.7	F	Inugsuin Fiord
August	124.4	104.1	55.3		Clyde Inlet
August	116.8	101.6	49.4		Inugsuin Fiord
August	111.7	91.4	39.0		Inugsuin Fiord
August	114.3	88.9	37.6		Clyde Inlet
August	129.5	101.6	54.8	M	Inugsuin Fiord
August	116.8	91.4	40.8		Clyde Inlet
August	119.3	93.9	43.9		Clyde Inlet
August	124.4	104.1	55.3		Inugsuin Fiord
August	134.6	111.7	68.4		Inugsuin Fiord
August	119.3	96.5	46.2	F	Inugsuin Fiord
August	124.4	96.5	48.0	M	Inugsuin Fiord
August	124.4	99.0	50.3	M	Inugsuin Fiord
August	114.3	88.9	37.6	M	Inugsuin Fiord

same waters as ringed seals; that is, they are found and hunted both in fiords and along the outer coast. By contrast, harp seals never enter the Clyde inshore waters and can only be hunted well off shore. On the hunting trips I accompanied for harp seal, these animals were never encountered less than 8 to 10 km away from the coast. Thus, in poor ice years when there is little or no break-up, harp sealing is severely hindered.

Bearded seals are usually individually encountered, although, occasionally a presumably adult female is seen with a pup. Like ringed seals, <u>ujjuk</u> are hunted with rifles from open boats. But, because of their considerably larger size than that of the ringed seal, the Clyde Inuit try to select animals which have hauled out onto floating pans of ice. Only two sets of measurements were made on <u>ujjuk</u>. These were both adult males and, using the approximate formula provided by Usher and Church (1969:3): $(\text{weight}) = [3(\text{length})\,(\text{maximum girth})^2] / 2000$, the weights of the animals measured converted to approximately 154.2 and 163.2 kg. Both animals were August kills, although one was taken in 1973 and the other in 1978.

The combined Clyde River-Aqviqtiuk harvest of <u>ujjuk</u> probably does not exceed 20 animals annually, although this is hard to confirm since bearded seal hides are rarely sold to the Hudson's Bay Co. The majority of the kill are adults, but each year that I was in Clyde 2 - 4 immature <u>ujjuk</u> were taken. The skin of the immature bearded seal is covered with brown, wooly fur, which is quite distinctive from that of either the ringed seal or harp seal. Inuit in Clyde say that bearded seal meat is virtually unpalatable, although on one occasion I saw several hunters eat a few pieces off a freshly killed <u>ujjuk</u>. On all other occasions, however, Inuit took only the skin for rope (aklunak) and abandoned the meat, or, in the case at Aqviqtiuk, used it for dog food.

Harp seal hunting in Clyde waters requires that break-up be well advanced in order that the Inuit may launch their boats. The only area in which Inuit sought harp seals during my stays in the region was the waters northeast of Cape Christian. Very few harp seals are taken in any given year and those that are harvested are killed for their skin alone.

During the early 1970's, most summers saw five or six of this species taken. However, a H.B.C. employee (Anonymous, personal communication) informed me that in 1977, following a precipitous decline in ringed seal prices (Wenzel, 1978), more effort was extended in harp seal hunting, but only 30 to 40 skins were sold through The Bay. While I was at Clyde village, only one family actively engaged in harp seal hunting; most other hunters took harps only on their travels along the coast and the hunting was incidental to the traveling None of the Inuit resident at Aqviqtiuk participated in this hunting at all.

The only other pinniped of any importance to the region's Inuit is the walrus. These are by far the largest marine mammal, other than narwhal, pursued by the local Inuit. Presently, the Clyde Inuit hunting for this species is concentrated on the Isabella Bay-Home Bay areas, although the occasional individual is seen hauled out on the moving ice between Capes Hewitt and Raper. A prime hunting area, according to the Inuit (Jamesee, 1978, personal communication), is the waters around two small islands directly west of Niagurnak Point on the south side of Henry Kater Peninsula. Inuit state that these islands are haul out areas for two colonies of walrus.

Presently (as of August 1978), Clyde Inuit were restricted in their walrus hunting because of a lack of large boats. However, such was not the case in the recent past.

Inuit recall significant numbers of walrus at Eglinton Fiord, Scott Inlet, Inugsuin Fiord and Clyde Inlet, and Isabella Bay. In 1943, The H.B.C. post factor at Clyde River reported (Unpublished Clyde H.B.C. Diary 1939-43) that 59 walrus were harvested during September of that year from Inugsuin Fiord, Isabella Bay, and northern Home Bay; indeed, 13 were obtained from Igloo Bay, near the mouth of Inugsuin Fiord. According to the post manager's account, this hunting was facilitated by the H.B.C. Peterhead boat based at Clyde. As late as the mid-1950's, five to ten walrus were harvested annually at Scott Inlet by the Inuit living there (Iqalukjuak, 1974, personal communication). The disappearance of walrus from most of the Clyde coast can only be explained through overhunting (See Loughrey, 1959:72).

During the early 1970's, Clyde Inuit did not seriously attempt to exploit Home Bay and Isabella Bay herds because of their basic lack of equipment. Broughton Island Inuit did, however, travel as far north as Ilutalik Island and even to Henry Kater Peninsula for walrus. It has only been since 1977 that Clyde men have started walrus hunting again. The reason for this is again the decline in ringed seal fur prices (Kautuq, 1978, personal communication). A single walrus was taken in 1977 and 1978; such a low level of hunting appears to be due primarily to the lack of large boats, although in 1978 ice was definitely a factor. This boat problem has recently been alleviated, however, with the arrival of a long liner craft for the local Fish and Wildlife station (Wooley, 1979, personal communication). Shortly after its arrival on the fall 1978 sealift, a crew of Inuit travelled to Home Bay and killed eight to ten walrus (Ibid.).

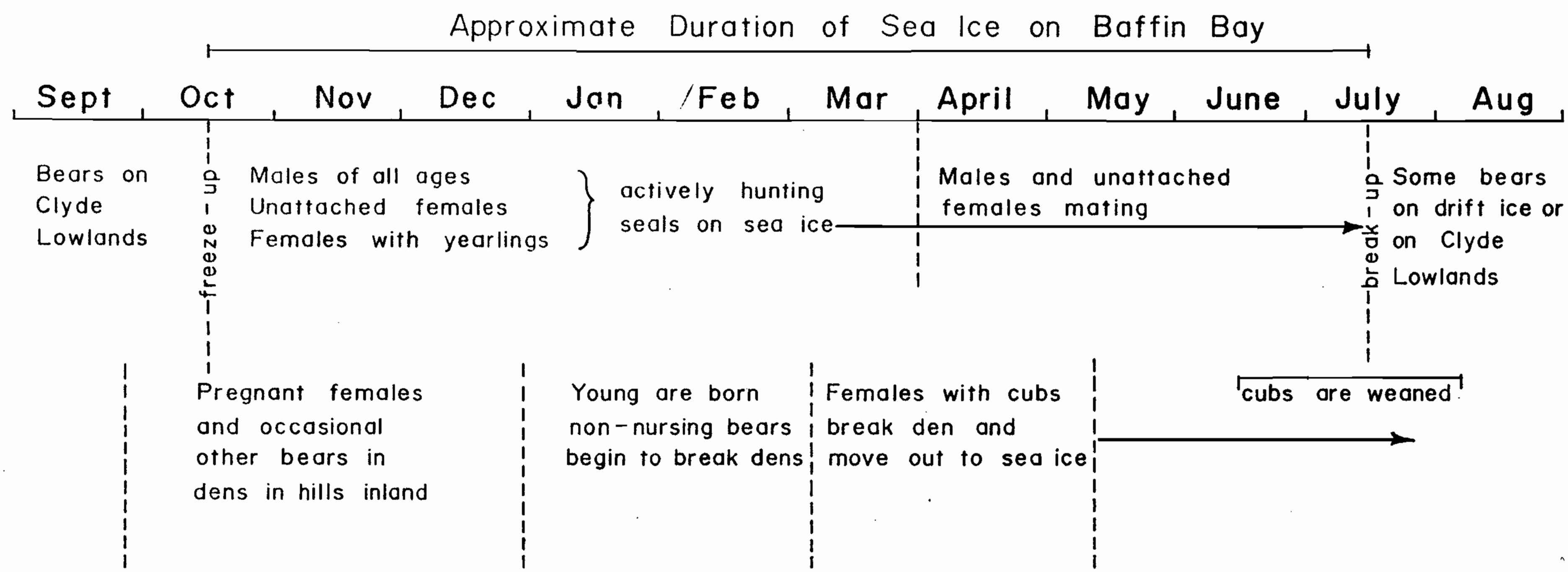
III. Ursidae

The polar bear or nanuk is the only other predator of any major significance with whom the Inuit share the Clyde sea ice environment. While polar bears are found along the entirety of the eastern Baffin Island coast (Manning, 1971) with the area from Buchan Gulf to Home Bay having an especially heavy density of animals (Harington, 1968:7), the Clyde area, particularly that portion from Clyde Inlet north to Cape Hunter, contains a large number of bears present on both the sea ice and denning inland during the winter. Some idea of the size of the Clyde bear population can be received when the region's allowable harvest of bears is compared to that of other eastern and northern Baffin communities (Arctic Bay - 12, Pond Inlet - 13, Clyde River - 42, Broughton Island - 16, Pangnirtung - 8). In fact, Clyde's regulated quota is exceeded only by one region in the Canadian Arctic, Southampton Island, which has a quota of 65 polar bears.

For most of the year, polar bears are found on the sea ice, either along the floe edge or in areas where there are concentrations of seal aglu. However, a variety of local conditions affect where and in what numbers bears may be found in any particular year or part of the year. The general pattern of polar bear movement in the region is presented in Fig. III-VI.

While most male adult animals, as well as some sub-adults and non-pregnant females spend the bulk of the year on the ice or along the shore between break-up and freeze-up, pregnant animals and the occasional

FIG. III-VII : Seasonal Activities of Polar Bears in the Clyde Region



male animal move inland across the Clyde lowlands or along the fiords to establish winter dens. This movement begins around the end of September and continues as late as November. Harington (Ibid.:17) records the commencement of denning along the eastern Baffin coast as occurring between October 1 to 7 on the basis of 20 observations. Dens are usually excavated in deep drifts of snow along hillsides, the margins of fiords, and even in ice fields (Qillaq, 1972, personal communication).

While large numbers of denning and non-denning animals are found on the Clyde lowlands and clustered near promontories and at points (in 1973, six different individuals were seen at Cape Eglinton in 7 hours of observation), the onset of freeze-up sees the large majority of bears begin to move out onto the ice. Once land fast ice forms, polar bears disperse along the entire coast. Concentrations of animals, however, are found where ever ringed seals are readily accessible (Vibe, 1967:57, emphasizes the close interrelationship between bears and ringed seals).

While Inuit range all the coast from Cape Hooper to Dexterity Inlet for bears, several areas are of particular importance year after year. For the Clyde villagers, the cracks and icebergs between Cape Christian and Black Bluff consistently yield a large percentage of the bears taken from that community. A second important area is the narrow strip of land which separates the outer coast from Inugsuin Fiord. The Aqviqtiuk Inuit do much of their early season hunting within the confines of Eglinton Fiord. In late winter, however, when most bears have dispersed out away from the land, the rough ice between Capes Hunter and Adair are heavily hunted. Table III-VIII provides information of sightings in the region.

Table III-VIII: Observations on Polar Bears, Clyde River, N.W.T., 1971-72

Year/Month	Location	No. of Animals	Type of Observation
1971 September 26	Cape Hewitt	single adult	visual-Inuit
October 15	S. Side Eglinton Fiord	adult female/1 cub	both killed
October 25	Hills N. of Kogalu R.	adult female in den	killed
October 27	S. Side Eglinton Fiord	adult female	killed
November 23	Revoir Pass	single bear-adult?	tracks inland
November 24	Swiss Bay	two bears	tracks headed out onto Sam Ford Fiord
December 11	Ayr Lake	two adult females	killed
1972 March 1	Cape Hooper	single male	killed
March 2	Alexander Bay, Entrance to Bay	one adult male; one sub-adult male	both killed
March 6-20	Pikaluit between Black Bluff and Cape Christian	four bears	tracks; no sightings
April 11	Ice above Cape Christ-ian	two adult males	killed
April 14	@ 10km. from Sam Ford Fiord Entrance	two adult bears	tracks leading out into Baffin Bay
April 15	@ 35km. East of Scott Inlet	single adult	tracks and visual sighting; pursue east for 4 hours

Polar bears which have denned on the uplands of the interior usually begin to emerge from the dens between January and March. Once these animals break from the dens, they move eastward out onto the sea ice. By late April, it is quite common to see females with young cubs or their tracks in the vicinity of ringed seal birthing areas. Clyde Inuit report that the areas of heaviest den concentration are the cliffs surrounding Ayr Lake, the mountains behind Clyde Inlet, Inugsuin Fiord, Eglinton Fiord, and the highlands around to Dexterity Fiord. One denning area which is often hunted actively is the hills which range east-west between the Kogalu River and Eglinton Fiord.

By May, the entire bear population which has wintered in the region is present on the offshore ice. The number of excavated nunariak and seal remains testifies to their activities and their relationship to ringed seals. In turn, the importance of the bear to the Inuit is evidenced by the fact that it supplies both meat and a source of cash to the Inuit. While the former is important, the latter, particularly in view of the high prices which polar bear hides fetch (See Smith and Jonkel, 1975a, 1975b; Smith and Stirling, 1976; Stirling et al., 1978), has become a major component of cash derived from the land by the Clyde Inuit. An examination of the numbers of ringed seal and polar bear skins sold to the Clyde H.B.C. store bears out the importance of polar bear hunting from a strictly monetary viewpoint; this comparison is shown in Table III-IX below. The difference between the two components became even more pronounced from 1974-76, when the average price paid for a polar bear hide rose to over $1,000, while ringed seal prices remained relatively stable. In 1977, the price of ringed seal skins fell below $1.50 (Wenzel, 1978), thus making polar bear hunting even more important in cash terms.

Table III-IX: Economic Value of Polar Bear Hides, Clyde River, 1972-73*

	Polar Bears	Ringed Seals
No. of Hunters	18	46
No. of Animals	24	1,497
Total Cash Value	$16,600.	$20,705
Ave. Price/Hide	$691.66	$13.83
Ave. Income/Hunter	$922.22	$450.10

*These data only account for bears sold to the H.B.C.; in addition, 18 hides were sold to private individuals or auctions. By contrast, fewer than 100 ringed seal skins were sold outside the H.B.C.

Terrestrial Mammals

I. Herbivores

Two herbivores inhabit the land portion of the Clyde ecosystem which are of at least some importance to the Inuit population. By far the most important of any land mammal exploited presently is the caribou or tuktu. It fulfills a land role in relation to the Inuit comparable only to the ringed seal in importance. The other herbivore is the arctic hare which is of marginal import to the Inuit and hunted in much a similar vein as the ptarmigan. The hare is seen by the Inuit strictly as a supplemental or emergency food resource.

Caribou are widely distributed on Baffin Island (Brody, 1976: 207) and their overall importance to Inuit throughout the arctic has been widely discussed (See Burch, 1972 for an in-depth discussion of Rangifer exploitation). In the Clyde Region, caribou have both a winter and summer importance, despite the fact that they are usually perceived as a migratory species (See Fig. III-VII).

In winter, the distribution of caribou in central Baffin is comprised of three major herds (Brody, 1976:303). These are centered on Nettiling Lake, west of Cumberland Sound, Dewar Lakes, and the land around Conn and Bieler Lakes. Formerly, a fourth herd, located between the Rowley and Ravn Rivers, was exploited in winter by Inuit in the Buchan Gulf area, but this grouping, along with the Nettiling herd to a lesser extent, has ceased to be of importance to Clyde Inuit since the 1950's when most of the northern camps closed (it should be noted that these herds were also exploited by Inuit living to the north and south of the Clyde area). In summer, these large winter aggregations break down into smaller herds which move out to various areas on the east coast.

The caribou which comprise the Dewar Lakes and north Ice Cap herds are the ones primary to the Clyde Inuit. While both winter herds are exploited to some degree between November and May, before they disperse into summer range, it is their summer movement and distribution which is critical to the Inuit. The Dewar Lakes herd is found in summer scattered through the river valleys which empty into the fiords of northern Home Bay, as well as McBeth and Inugsuin Fiords and Clyde Inlet. These animals begin to move eastward in April, initially following the McBeth River Valley, but soon begin to disperse into more discrete herds. As with arctic mainland herds, the groupings during this movement include both male and female animals (Kelsall, 1968:138-9). By May, the majority

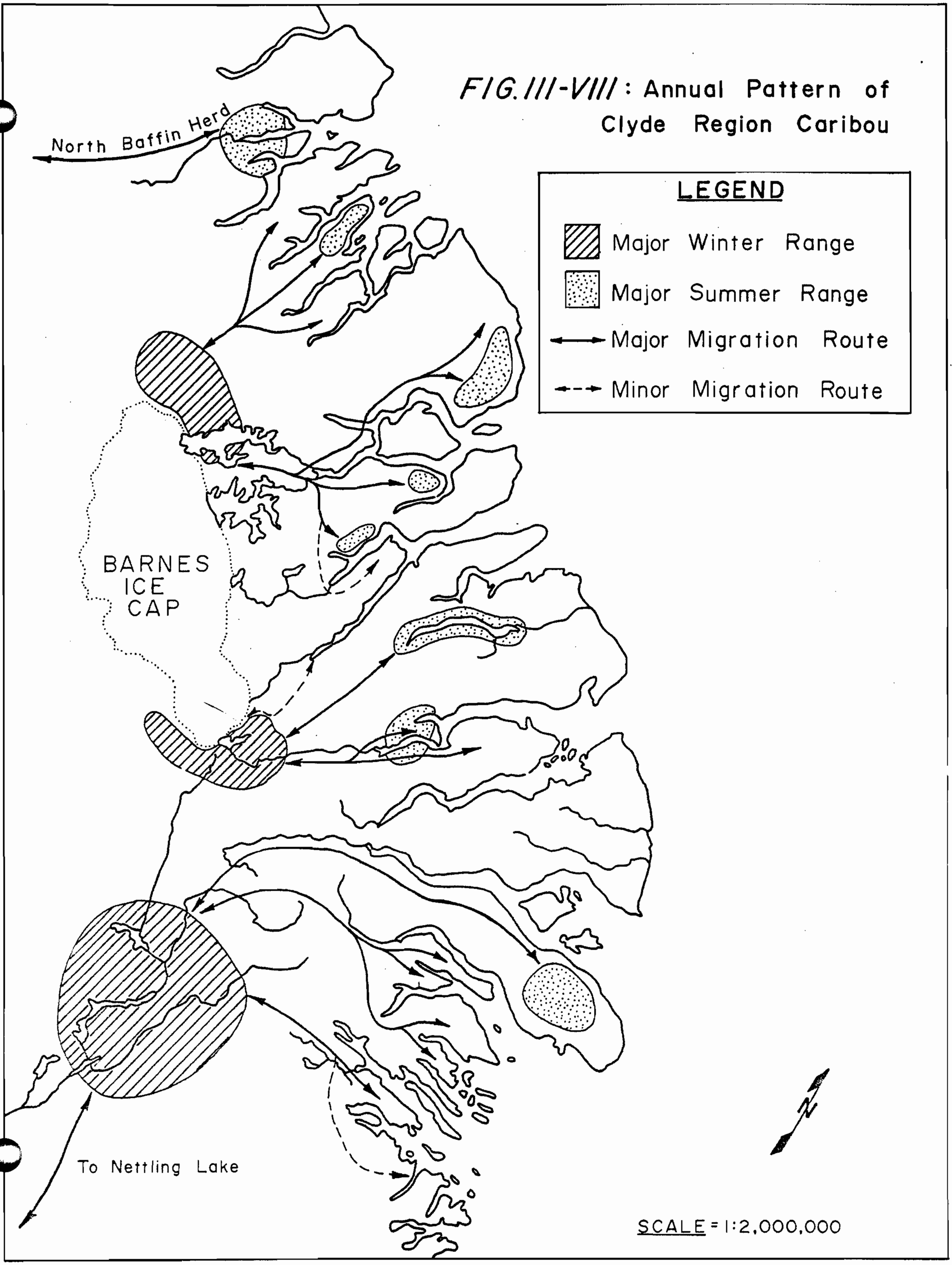


FIG. III-VIII: Annual Pattern of Clyde Region Caribou
LEGEND
Major Winter Range
Major Summer Range
Major Migration Route
Minor Migration Route
North Baffin Herd
BARNES ICE CAP
To Nettling Lake
N
SCALE = 1:2,000,000

of these animals have reached lower coastal areas where an important event is the annual calving. Interviews with the Clyde people indicate that the exact location of these calving areas is unknown, but that calving occurs before the animals come out to the coast.

As summer advances and insects in the lower valleys begin to harass the animals, groups of caribou break away and move to high ground above the rivers seeking relief. Travels with Inuit for caribou in August have led to summer range areas above 600 m. By the time summer is well advanced, caribou are present in all the valley areas from Clyde Inlet to Ekalugad Fiord.

The return migration inland appears to begin slowly in mid-September, although groups of animals can be found well east in the Clyde and McBeth River valleys into October. Apparently, fusioning into the main winter herd is not complete until sometime near the end of November, although, in all likelihood, major formations have occurred by the time of the fall rut. According to the Inuit (Appa, 1973, personal communication), the majority of animals reaches the Dewar Lakes in December-January.

The other major herd of present day importance follows much the same pattern of annual movement. These animals disperse, however, into the coast areas between Eglinton Fiord and Dexterity Inlet. Again only the vaguest information was forthcoming from the Inuit interviewed concerning the locations of rutting and calving areas.

While Clyde region Inuit formerly used to follow the caribou herds extensively during the late summer and fall (one inuk, Jonatanni, described a walking hunt in the early 1950's which took the Inuit of Eglinton Fiord inland as far as the upper reaches of the Clyde River and then back along Clyde Inlet; this trip began in June and ended back at Eglinton Fiord in October), today summer hunting focuses on the herds found near Inugsuin and Sam Ford Fiords, Clyde Inlet, and Scott Inlet. By the same token, no fall-winter hunting trips have been made to the Dewar Lakes since the 1950's. Presently, winter hunting centers on smaller winter groupings associated with these main winter herds. The Clyde River people generally travel to Generator Lake, at the southern foot of the Barnes Ice Cap, while Aqviqtiuk hunters follow the river behind Walker Arm to the southeast part of Bieler Lake. These trips in winter are quite rigorous and, even with snowmobiles, rarely take less than one week. Records kept by 26 Clyde village Inuit during 1971-2 show to some degree the pattern and intensity of caribou hunting (Table III-X).

Arctic hare, with ptarmigan, form the small game component of the Inuit subsistence system. They are present throughout the year, but their actual hunting usually takes place from May to September. This is an activity generally engaged in by young boys and women and takes place within a few kilometers of village or camp. While men may use hare as an emergency food while hunting caribou, it is not unusual to see hare ignored or discarded as food, if a more preferable resource is available.

II. Carnivores

Two carnivores, the wolf and the arctic fox, are hunted by the Clyde Inuit. The sole basis for this hunting is the sale of furs. Neither species figures to any importance in the Clyde economy. Wolves are taken opportunistically, although if wolves are reported close to camp men will attempt to take them. Most often, however, wolves are killed in conjunction with caribou hunting. The Inuit perceive the wolf

Table III-X: Inuit Caribou Harvest, Clyde River, N.W.T., 1971-72*

Month/Year	Adult Caribou	Immature Animals	Location
September 1971	2F		Inugsuin Fiord
October	4M/3F	6	Sam Ford Fiord
November	4M/7F	3	Clyde River; Ayr Lake
December	22M/4F	10	Bieler Lake; Clyde River; McBeth River
January 1972	7M/6F	7	Clyde River
February	6M/9F	19	Generator Lake; Ayr Lake
March	10M/14F	7	Ayr Lake; Clyde River; Bruce Mts.
April	29M/11F	1	Clyde River; Clark Fiord; Ayr Lake; Walker Arm
May	35M/16F	13	Clyde Inlet; Clark Fiord; Walker Arm; Sam Ford Fiord
June	20M/1F	40	Generator Lake; Clark Fiord; Clyde Inlet; Stewart Valley

*Data base 26 informants.

as a threat both to the caribou and to man and it is in the latter context that they will deliberately set out for a wolf. In most years, however, only five or six wolves are killed and all are sold either to the H.B.C. or to private auctions.

Arctic fox were the staple commodity upon which the Hudson's Bay Company focused in its early years on Baffin Island. It appears, however, that fox were never of any great importance to the Clyde Inuit. Indeed, the Clyde Inuit were so reticent to take up fox trapping that the H.B.C. imported trappers from the Lake Harbour and Cape Dorset areas in the 1930's (Arnakak, 1972, personal communication). Two of these men still reside at Clyde River. Table III-XI shows that, while in the early years arctic fox may have been intensively trapped, in general, little effort has been concentrated on this species recently.

Table III-XI: Number of Arctic Fox Traded, Clyde River, N.W.T., 1935-67*

Year	Number	Year	Number	Year	Number
1935	741	1946	N.D.	1957	50
1936	204	1947	474	1958	228
1937	332	1948	181	1959	478
1938	631	1949	244	1960	N.D.
1939	748	1950	320	1961	600
1940	296	1951	445	1962	N.D.
1941	569	1952	350	1963	14
1942	969	1953	114	1964	295
1943	767	1954	296	1965	685
1944	362	1955	182	1966	N.D.
1945	192	1956	173	1967	50

*Source: H.B.C. Clyde Post Customer Account Records (unpublished).

In the early 1970's, almost no serious trapping was done by Inuit from either Clyde River or Aqviqtiuk. The four adult hunters at Aqviqtiuk set a total of 14 traps during the winter of 1971-72. In the last two years, the N.W.T. Fish and Wildlife Service has tried to restimulate fox trapping in the Clyde area (Wooley, 1978, personal communication). However, in 1977-78, only five men attempted any serious trapping and only one harvested more than 100 fox (Ibid.).

Trapping at Clyde is usually done on the sea ice; often 8 to 10 km. from shore. Traps are set near recent seal kill sites, covered with snow, and secured with snow blocks. Occasionally, an inuk may urinate around the trap to attract fox. Bait is usually rotted seal or narwhal meat. Having had the opportunity to watch Sachs Harbour trappers in December, 1975, it must be noted that Clyde men appear generally disinterested in trapping as a resource alternative.

Patterns in the Selective Environment

Adaptation is a process by which organisms are able to respond successfully to environmental pressures. The selective environment of the Clyde region is composed of biological populations which are adapted to specific physical conditions. The adaptive processes, which involve the biological component of the ecosystem, produce spatial and temporal patterns of activity considered to be non-random arrangements by which populations of organisms respond to specific environmental pressures. For such information to be useful, however, an observer must recognize the structure which exists in the biological subsystem relative to the physical milieu.

Under "normal" conditions in the Clyde region, such as those shown in Figure III-IX, the relationships between various species in the system, including the Inuit, remain strong as the interacting species are usually in close proximity until specific needs are fulfilled. Bird nesting sites, caribou migration routes, walrus haul-out areas are straightforward examples of this non-random environment, which the Inuit generally perceive as forming definite patterns. In reality, however, even expected relationships, like that of polar bear, ringed seals, and arctic fox on the sea ice, must under certain conditions change.

Inuit material adaptation is designed for coping with this non-random selective aspect of the ecosystem. However, events which disrupt the expected and which cannot be materially controlled, require additional flexibility within the cultural subsystem. It can be argued that there are no such occurrences as unexpected or "abnormal" events in nature (Smith, 1979, personal communication). While this question inevitably leads to discussions on evolutionary biology and would be beyond my specific interests, the point is raised solely in reference to the cultural, and in this case the Inuit, subsystem because such social-material formations structure their activity sets to a composite of events which they perceive as real, although this reality may not conform completely to the situation outside the cultural subsystem. It is only when events become long-term and/or critical (Waddell, 1975; Amsden, 1977) enough to prompt extraordinary responses that these mechanisms are recognized.

Vibe (1967) has provided an extensive examination on the effects of climatic change on arctic biological relations; likewise, Pruitt (1970: 90) has dealt with the effects of short-term changes in the physical

Fig. III-IX: Correlation of Physical and Biological Conditions in the Clyde Environment

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
temperture	-23.3° C or less			-17.8°C or above		0.0°C or above			-17.8°C		-23.3°C or less	
daylight	no light	daylight increasing				total daylight			decreasing daylight			no light
snow	present						absent		present			
sea ice	uniform				melting		break-up	open water		freeze-up		uniform
lake ice	present						unsafe or absent				present	
caribou	winter range			spring migration			summer range		fall migration			inland
ringed seal	breathing holes			ice surface and dens				open water			breathing holes	
bearded seal							open water and ice surface					
polar bear	dens and sea ice			all bears on ice			coast and open water				dens and sea ice	
narwhal					north migration-leads			south migration-inshore				
fox	inland and sea ice							coast and inland			inland and sea ice	
arctic char	lakes and rivers					spring run		sea	fall run		lakes and rivers	
small game	ptarmigan and arctic hare											
migratory birds						geese, ducks, and sea birds						

environment as relevant to equilibrium of the local ecosystem. While disruptions of limited duration are often rapidly adjusted to in the non-human environment (Mech, 1970, on physical disturbance effects on wolf-prey interactions), hunter-gatherers are generally less well equipped to handle such disruptions through technological means as Slobodin emphasized in his characterization of band societies.

The Clyde Inuit cultural subsystem is faced with such material limitations when confronted with contingencies in the ecosystem. Therefore, it is not unreasonable to expect that societies, with limited material control over external interactions, may employ non-material mechanisms to alleviate the pressures of such perturbations. Cultural ecology has recognized some aspects of possible responses in this area, such as band fissioning (Balikci, 1968; Damas, 1969b, 1969c; Lee, 1969) or outright migration (Waddell, 1975) in critical or crisis periods. These development are not arbitrary, however, but are facilitated through specific known relationships which include within their boundaries particular results, just as certain physical conditions in the environment lead hunters to expect certain patterns of behavior from selected prey species.

CHAPTER IV

THE CLYDE INUIT CULTURAL ENVIRONMENT

The Material Component

The material culture inventory employed by the Clyde region Inuit has changed substantially over the past thirty or so years; indeed, it may be said that such change began with Parry's visit to the area in 1819 (Parry, 1840), when he obtained a whalebone sled, stone seal oil lamp, a kayak, and a number of dogs from a family camped at the entrance to Patricia Bay in exchange for some pieces of metal and a broken file. Presumably, this process of introducing exotic goods and materials continued through contacts with European and American whalers fishing in Baffin Bay and Davis Strait, although this cannot be presently documented (W.G. Ross, 1976, personal communication). It is likely, however, that even if whalers did not have direct contact with Clyde Inuit, such goods and raw materials found their way into the area from Cumberland Sound and Pond Inlet where Inuit and Europeans had frequent contact.

In 1923, two trading posts were opened in the Clyde region. On the east side of Patricia Bay, the Hudson's Bay Company established a two-man post, which has operated continuously since and parts of which still stand. The other post was opened by the Sabellum Company in the same year at Kivitoo with Hector Pitchforth as manager, but was shifted north in 1924 to Henry Kater Peninsula. The Sabellum Company's effort was short lived.

ending with Pitchforth's death in 1926 (Harper, 1973:32-9). It is clear from R.C.M.P. reports from the Pond Inlet detachment that by the mid-1920's guns and ammunition, as well as some foodstuffs (flour, tea, sugar, molasses, biscuits, and baking powder) were obtainable locally from the Patricia Bay post. Such items, along with canvas, clothing, and kerosene, seem to have been the main items received from The Bay. Photographs (National Museum Photo Archive) from the 1930's show, however, that traditional forms of dress and dwelling construction were still important and widely used before the Second World War.

The war and the immediate post-war years probably saw an increase in Inuit utilization of imported goods and materials, since the United States Army established a meteorological station at Clyde River in 1943. Much of the materials used were probably items discarded by the military. Inuit informants (Piungnituq, 1971, personal communication) state that around this time, Inuit began to obtain larger caliber rifles; previously, .22's seem to have been the caliber in most common use (R.C.M.P. Patrol Reports Vol. I). From this period forward, change accelerated with southern cloth becoming the principal material for clothing and tents, metal began to completely replace native materials for tools, and manufactured boats and canoes substituting for skin boats.

The final stage in this process was the establishment of Clyde River as a centralized settlement by the Canadian government in 1961. It is in this last period that wide-spread demographic change also came to the Clyde area. By 1971, some 300 of the 320 Inuit in the area lived in Clyde village in one type or another of prefabricated housing, every hunter in the region possessed at least one rifle, only six dogteams versus

43 functioning snowmobiles remained, and no skin watercraft were left.

However, while the traditional material components of Inuit life and subsistence may have appeared to have totally disappeared (much to my naive disappointment), it soon became obvious that in many activity areas a mixed technology was often used or, in cases where totally introduced items were employed, they were utilized in line with traditional techniques. A winter hunting trip often saw men breathing hole hunting with harpoons, albeit harpoons with aluminum toggling heads and iron shafts, lashing kamatik loads with rope made from ujjuk hide, and attaching their sleds to snowmobiles with ivory toggles; in hunting camps, stone lamps burning seal oil were used to heat and light snowhouses, while hunters slept between caribou skins. Within a few months, I began to realize that, while a large degree of replacement had occurred within the Clyde Inuit material culture universe, these new items were employed according to traditional patterns and, in addition, rifles, snowmobiles, and canoes still did not permit the Inuit to exert any greater degree of physical control over the ecosystem, except in rare circumstances. In fact, in some cases, these new technologies were a hinderance at times in adequately meeting the selective environment.

On the other hand, it became gradually apparent that specific social and interpersonal associations played a large role in terms of Clyde Inuit ecological relations. First at Aqviqtiuk and, later, in Clyde village, a pattern of decision-making and task organization began to emerge which suggested that the organization of subsistence and economic activities were non-random, not only in relation to the selective environment, but also in terms of the local population's internal structure. As such, this was analogous to Spencer's (1959:124) observation that,

> Because the social relationships in the cultures of Eskimo groupings of the Alaskan Arctic slope are so intimately affected by economic considerations, it becomes virtually impossible to offer separate treatment of the two institutions. There are interrelationships between them which are eclipsed if economy is viewed out of context from social forms or if social life is described without reference to the economic round.

It was this similarity to the North Alaska situation, that suggested the ecological activities of the Clyde Inuit be examined from a socio-cultural, as well as a material exchange, perspective.

Therefore, while a treatment of the material contextual aspects of Clyde Inuit subsistence might have some ethnographic and/or heuristic value, the general elements of this subsystem are well known and will be examined in a following chapter in relation to the implementation of these features within the framework of Clyde ecological relations. Rather, in order to accurately place social structural features within this ecological framework, the Clyde Inuit social system will be described, first in terms of interpersonal organization and regulation and, second, how such non-material features, based on kinship and its concomitants, effectively integrate the physical and societal components of Clyde society.

Clyde Inuit Kinship - Terminology

Interest in Inuit kinship originated with Morgan (1871) who was primarily concerned with the classification and description of the terminological aspects of the systems. Questions concerning various features of Inuit social structure, particularly the classification of cousins first raised by Morgan, continued to be addressed sporadically by others (See Heinrich, 1963: Chapter I) into the 1940's. The primary cause for this line of investigation, however, remained centered on the structural complexities of what may be called Eskimo-type kinship, rather than including the behavioral patterns subsumed within the nature of the system. It has only been in the last two decades that serious attempts have been undertaken to correlate the functional importance of structural features in areas beyond descent reckoning. In a large measure, it has been the efforts of this group of researchers, which includes Spencer (1959), Damas (1963), Heinrich (1963), Burch (1975), and Correll (1976), that have led to the basic hypothesis presented in this dissertation, that the organizational framework imposed by the social structural component of Inuit culture is an integral element contributing to the basic pattern of Inuit ecological relations.

The non-material associational complex which operates among the Clyde Inuit encompasses a variety of attributes, among which are naming, joking, and adoptive relationships. The central feature, however, upon which most relationships relevant to ecological activities are based, is kinship, either consanguinal or affinal. And principal to understanding the meaning of kinship as a behavioral referent, either within or beyond the main unit, is the relationship between terminological placement and status/role in the society as a whole.

The terminology applied by Clyde River Inuit to describe the various relational positions within the maximum kinship universe is virtually identical with that identified by Damas (1963:34-42) for the Iglulingmiut of Melville Peninsula and western Foxe Basin. In fact, the similarities between the East Baffin Clyde people and the Iglulingmiut extend beyond terminological description, alone, to include real kinship ties between the two areas. Because of this exact correspondance in terminology, the accompanying figures (Figs. IV-I, II, III) and table (Table IV-I) have been drawn from Damas' (1963) examination of the Iglulingmiut system. As will be noted, the emphasis in the following discussion is centered on Clyde male relevant ties, although Table IV-I includes parallel kinship classification for female Ego.

The first figure shows the classification of consanguines using the terminology derived from male kinship reckoning. Encompassed within this scheme are five generational levels. In general, this five-level representation is adequate for the inclusion of all relevant collateral kin. Beginning at the level of Ego's generation, the first primary terminological distinction is made within Ego's sibling group. Older siblings are distinguished from younger siblings, although such differentiation appeared to be optional at Clyde in respect to opposite-sex siblings. While the oldest male sibling was termed angayuk, all other brothers were classed as nuka. On the other hand, as Damas (1963:34) points out, all of male Ego's female siblings were lumped as naiyak. Damas (Ibid.: 35, 37) does note that the affix -kuluk was apparently optionally applied to younger opposite-sex siblings at Iglulik (naiyak[kuluk]); however, no such distinction was observed at Clyde.

At the same time, cousin terminology at Clyde corresponds to the complex system observed by Damas among the Iglulingmiut. The basics of this system sharply separate male and female cousins. All females are classed as naiyak, the term applied to male Ego's sisters. While Damas

Fig. IV-I: Clyde River Consanguinal System - Male Ego

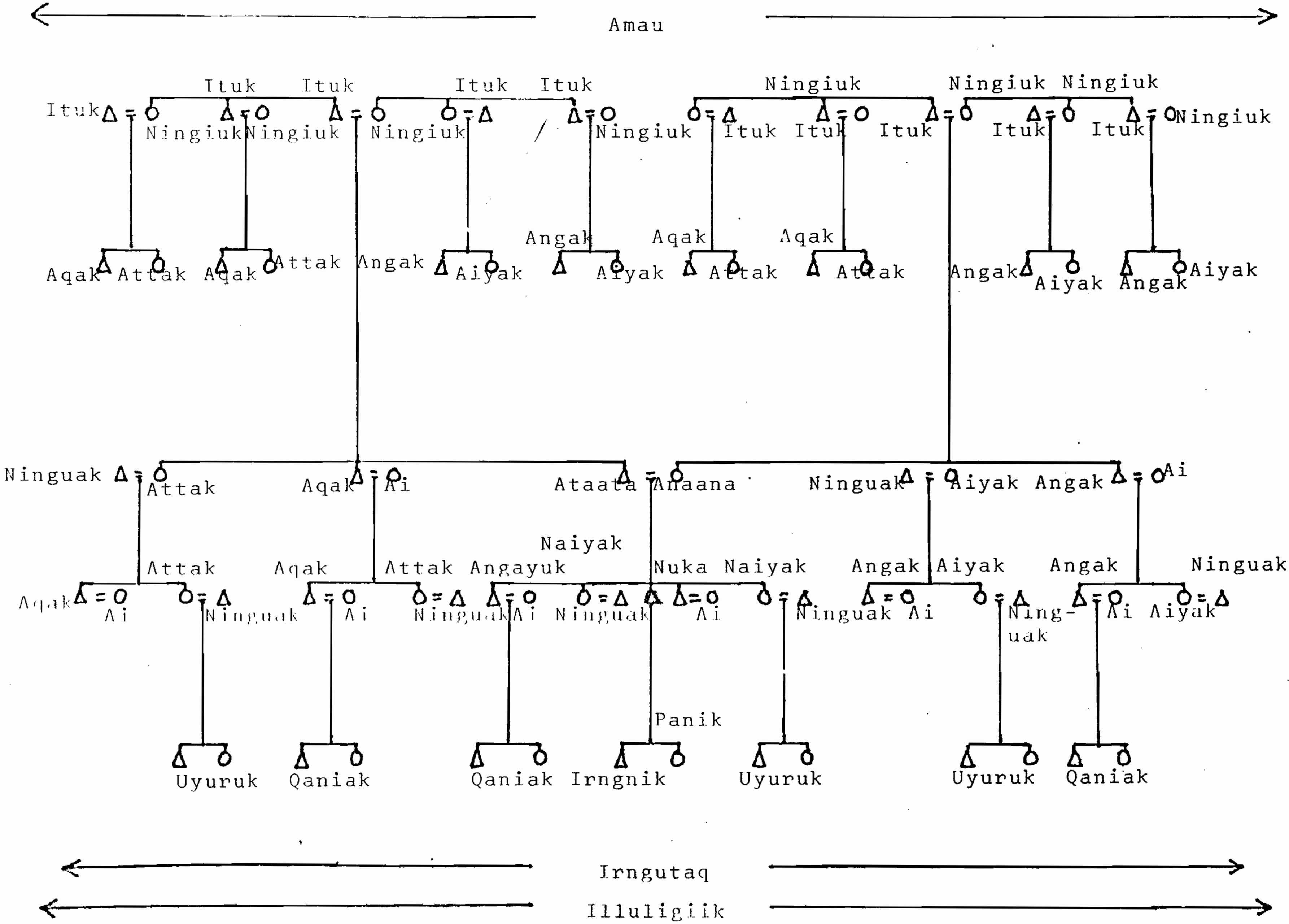


Fig. IV-II: Clyde River Affinal Subsystem - Male Ego

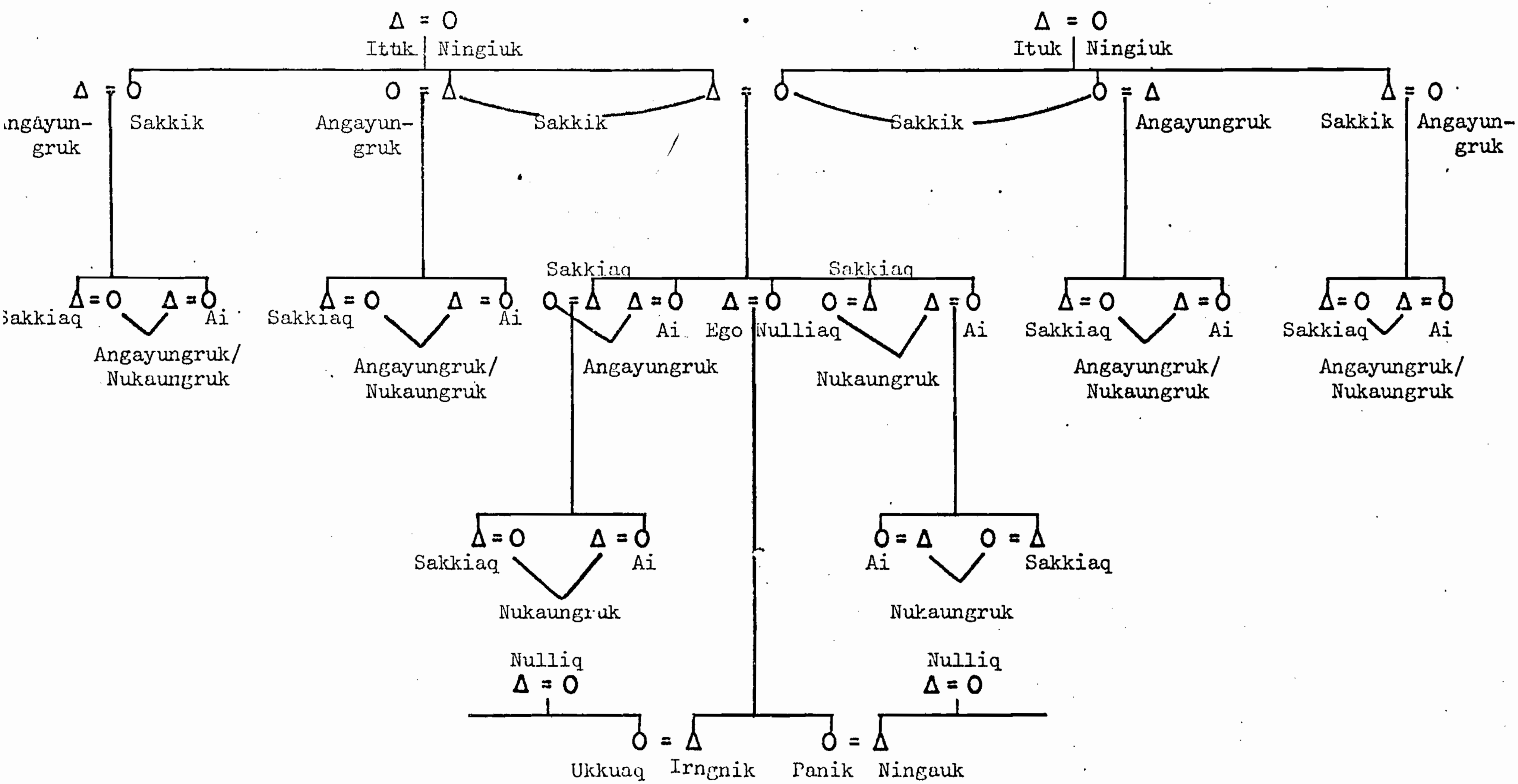


Fig. IV-III: Clyde River Consanguinal System - Female Ego

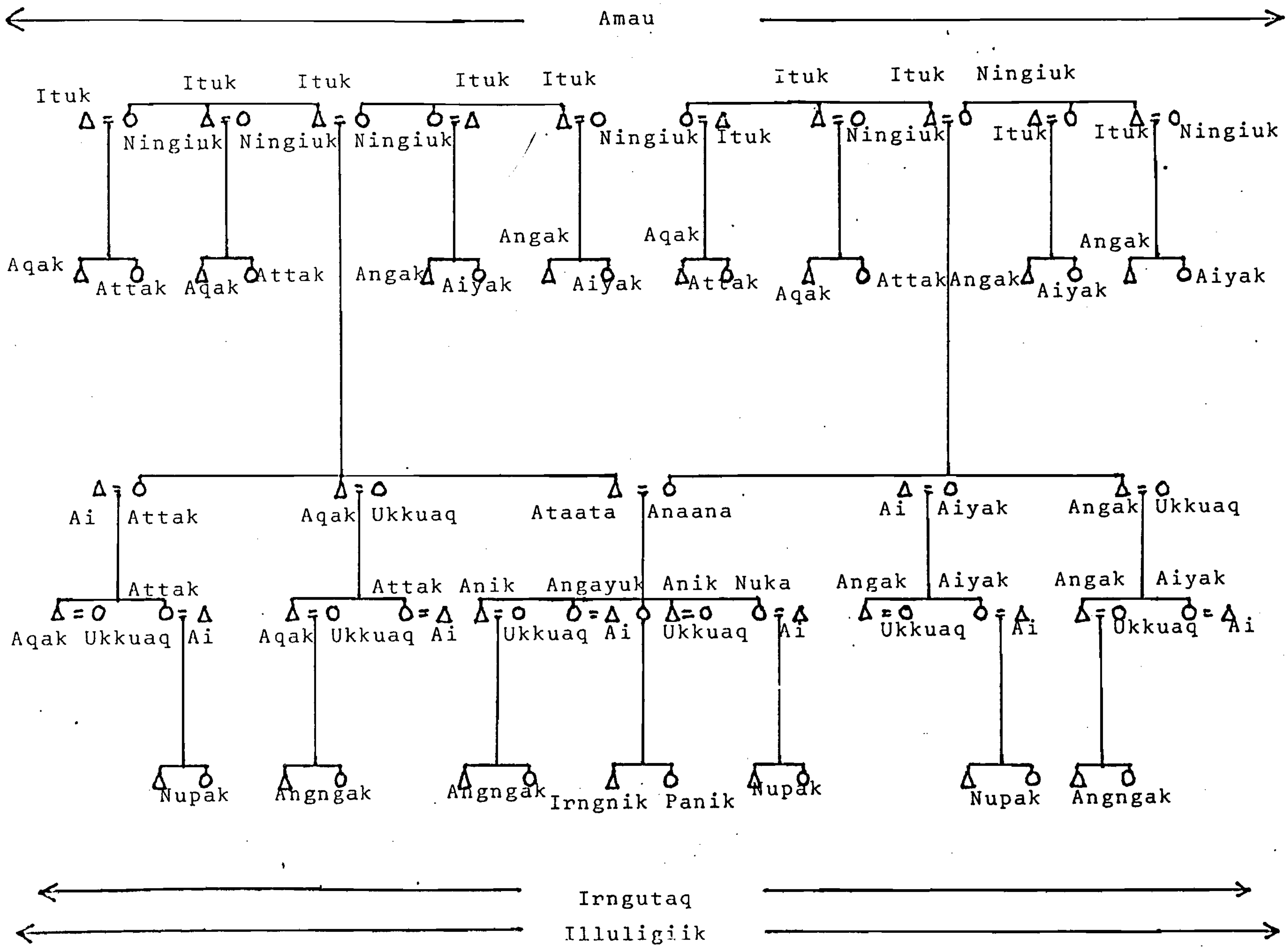


Table IV-I: Clyde River Kinship Terms*

1) nulliaq:	Wife
2) uii:	Husband
3) ataata:	Father
4) anaana:	Mother
5) aqak:	Father's brother or male cousins
6) angak:	Mother's brother or male cousins
7) attak:	Father's sister or female cousins
8) aiyak:	Mother's sister or female cousins
9) ituk:	Grandfather and all males of generation[1]
10) ningiuk:	Grandmother and all females of generation[1]
11) amauq:	All persons of fourth ascending generation (at Clyde sometimes used to refer to grandparental generation)
12) paniq:	Daugher
13) irngnik:	Son
14) irngutaq:	Second descending generation[2]
15) illuligik:	Third descending generation[2]
16) naiyak:	Sister or female cousin, Male Ego
17) angayuk:	Elder Brother, Male Ego; Elder Sister, Female Ego
18) nuka:	Younger Brother, Male Ego; Younger Sister, Female Ego
19) aniq:	Brother or male cousin, Female Ego
20) qaniak:	Brother's or male cousin's child, Male Ego
21) uyuruk:	Sister's or female cousin's child, Male Ego
22) angnak:	Brother's or male cousin's child, Female Ego
23) nubaq:	Sister's or female cousin's child, Female Ego
24) ningauk:	All in-marrying males, same or descending generation from Ego[3]
25) ukkuaq:	All in-marrying females, same or descending generation from Ego; also, female affines first ascending generation. Female Ego
26) ai:	All in-marrying females, first ascending generation, Male Ego; also, spouse's same or descending generation collaterals
27) angutikattik:	Father's brother's son, Male Ego; Father's brother's daughter, Female Ego
28) arngnakattik:	Mother's sister's son, Male Ego; Mother's sister's daughter, Female Ego
29) illu	Father's sister's and mother's brother's sons, Male Ego; Father's sister's and mother's brother's daughters, Female Ego
30) sakkik:	Spouse's parents and their same generation consanguines

Table IV-I: continued

31) sakkiaq:	Spouse's same and first descending generation opposite sex consanguines
32 and 33)[4]	

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*The terms listed are as recorded at Clyde River in 1971-72; Damas (1975: 18-19) presents a similar listing, but with some variation in spelling.

[1]Damas (Ibid.) notes that these terms apply to in-marrying affines of the grandparental generation.

[2]Damas (Ibid.) notes that these terms do not apply to affines.

[3]Damas (Ibid.) has recorded that ninguak includes sister's or female cousin's husband, Female Ego; also, all in-marrying males in the first ascending generation.

[4]Damas (Ibid.) includes two more terms not elicited from Clyde informants: angayuunnuk - spouses of spouse's uncles and aunts, elder siblings and elder cousins; nukaunnguk - spouses of spouse's younger siblings and younger cousins and spouses of nephews and nieces.

(Ibid.:35) cites two observed exceptions to this "rule", only one of these, the addition of the affix -saq (naiyak[saq]), was used to identify adopted cousins. Male cousins, however, are set off from Ego's same sex siblings and from each other by being placed in one of three groups. The male offspring of Father's Sister and Mother's Brother are termed illu. By contrast, male cousins by Father's Brother and Mother's Sister (parallel same-sex cousins) are designated angutikattik and arngnakattik, respectively. In each case, the root words anguti- and arngna- connote male and female affiliations.

Among consanguines in the first ascending generation, four uncle-aunt terms are used (Damas, Ibid.:36, also notes that the same uncle-aunt classifications apply to parent's cousins). Father's Brother and Sister are termed aqak and attak, while Mother's Sister and Brother are aiyak and angak. As Damas (Ibid.) points out, a similar distinction between collateral and lineal relations is maintained in the first descending generation as well.

Beyond the first ascending and descending generations, the classing of relations narrows. The second ascending generational terms are ituk (grandfather) and ningiuk (grandmother), although, as Damas (Ibid.: 39) mentions, ataatasiaq and anaanasiaq were sometimes applied in place of the more formal male and female terms. It should be noted that the latter pair of terms were heard in what might be described as affectional usage; no individual proposed either as the general term for members of this generation. Members of the third ascending generation, regardless of sex, are termed amau. In the second and third descending generations, single terms apply to each. At the second level below Ego, irngutaq designates grandchildren, while in the next generation down illuligiik is used. At both levels, no sexual distinction is associated with the catagories. In addition, in-marrying males and females are ningauk and ukkuaq.

Affinal relations in respect to a male Ego are shown in Figure IV-II. Naturally, Ego, as the in-marrying individual, would be termed ninguak by his wife's consanguinal kin affiliate. To most males in this group, Ego applies the term sakkiaq for same generation and descending generation affines, while first and second ascending generation males are sakkik and sakkikpa, respectively. This latter term was not mentioned by any Clyde informant, but no specific question was phrased to elicit the appropriate term. Same generation and descending generation females are ai, the terminological designations for those in the ascending generations are the same as those for affinal male kin. In addition, Ego's second set of affinal kin are his co-affines, who marry Ego's spouse's consanguines. Those who marry the spouse's older siblings or cousins are angayungruk. As Damas (Ibid.:42) points out, neither relative ages of in-marrying individuals nor sex distinctions affect this system of affinal classification. Rather, only the relative ages of spouses are important.

Clyde Kinship - Behavioral Relations

As Damas (1963:34) has pointed out, kinship terminology provides a valuable tool for interpreting many of the social behaviors which are observed in Inuit and other band level societies. It is in this area of interpersonal relations that the study of terminological systems has been deemed most useful. A second area where such analysis is of importance, however, is concerned with human ecological relations. Damas (1969b, 1975b), Waddell (1975), and Watson (1970) have all touched on the ecological applications of social structural kinship analysis. Before delving into the latter area of consideration, however, it is first necessary to understand the strong correlation between the terminological and social behavioral systems.

As has been mentioned, the Clyde terminological system closely resembles, if not exactly mirrors, that found among the Iglulingmiut of northern Baffin Island (Pond Inlet and Arctic Bay) and Melville Peninsula (Igloolik, Hall Beach, and Repulse Bay). Perhaps the most striking feature of the system is the elaborate catagorization of relations of the same sex in Ego's own generation. Although Figures IV-I and IV-II depict only those aspects of the system in terms of male Ego, Table IV-I shows a similar elaboration for females.

Clear distinction is made between older (angayuk) and younger (nuka) siblings of the same sex as Ego, while three terms are used to describe the Ego's same sex cousin relationships. These are angutikattik and arngnakattik for same sex parallel-cousins on Ego's father's and mother's sides, respectively, and illu for cross-cousins; that is, for male Ego father's sister's and mother's brother's sons. In contrast, opposite sex cousins and siblings are lumped as a single catagory, for a male Ego as naiyak or aniq for female Ego. As Damas (1975b:19) has observed, an "Iroquoian" arrangement is applied to same sex cousins, while a "Hawaiian" system is imposed on cross sex cousins.

A second important feature here is the separation of consanguinal and affinal terms in the first ascending generation and the distinction made between father's siblings and cousins (aqak-male, attak-female) and those in a similar realtion to Ego's mother (angak-male, aiyak-female). A similar distinction is found in the first descending generation. Thus four sets of consanguinal dyads or pairings are established between generations (Ibid.): attak-angnak, aqak-qaniak, angak-uyuruk, aiyak-nutak. At the same time only two affinal sets are established: ukkuaq-ai and ukkuaq-sakkiaq.

As may be noted in the preceding three figures and the table, beyond the first ascending and descending generations far less distinction is drawn in the catagorizing of consanguinal and affinal kin. In the grandparent (second ascending) generation, ideally two terms, ituk (male) and ningiuk (female), are used by both male and female Ego; however, among younger informants at Clyde the term amau, normally used for the third ascending generation both sexes, has come to apply to ituk and ningiuk kin. In the second descending generations, the terms irngutaq and illùligiik cover all mambers of those generations regardless of sex.

In respect to interpersonal and social integration, Inuit kinship terminology is revealing along several lines. The most important of these are the two behavioral dyads associated with respect-obedience (nalartuk) and emotional closeness (ungayuk). Damas (1963, 1975b), Heinrich (1963), Guemple (1965), and Burch (1970, 1975) all note a number of other relationships arising through joking, name avoidance, and name-sharing, but, for the purposes of the present discussion, only the nalartuk and ungayuk aspects of the social behavioral system will be included. The reason for this limitation is directly related, as will be shown, to the relevance of these particular behavioral dyads to Inuit ecological relations.

In the nalartuk subsystem, that of respect-obedience, the chief determinents of sub-superordinance are: (1) age; (2) sex. As Damas (1963: 50, 1975b:16) has pointed out, the term nalartuk refers to the behavior appropriate to the subordinate member of the pairing and has been defined by him (1975b:16) as meaning "to listen to" or "obey". Thus, pairings are referred to by the kin term appropriate to the subordinate member. Therefore, the relationship between father-son (ataata-irngniik) becomes irngniriik, father's brother-brother's son (aqak-qaniak) becomes qaniriik, with similar combinations existing for brother-sister, mother-daughter, father-in-law-son-in-law, and so forth. In all such pairings, superior generation is dominent in same sex relationships except in consanguinal-affinal situations where the in-marrying individual is inferior; in cases involving males and females of the same generation, the female position is subordinate.

In the Clyde area, nalartuk behavioral relations are quite apparent in the household, at the level of the extended family, and even at the settlement level. While nalartuk dominence-subordinance might operate between such pairings as parents and children, uncles and nephews, and younger and older siblings as a potentially coersive association, it, in fact, does not by virtue of two factors. First, as Damas (1963:50) has noted in cases such as those cited above, the "harsh edge" of the sub-superordinence aspects of nalartuk are smoothed by the existence of the complementary effects of the ungayuk affectional system. A fuller exposition of this will follow. The second factor encompasses such elements as maturity and economic role. Elder members of same-sex relationships, as those involving members of asceding generations, are seen as having greater experience and, therefore, are to be obeyed. By the same token, males, as hunters, serve an important economic role which clearly dominates male-female nalartuk associations. On numerous occasions at Clyde and Aqviqtiuk, young men, who were considered superior hunters, were seen to demure in the presence or in the face of advice from older kinsmen, many of whom were no longer active hunters or who were said to have been only mediocre hunters.

Although age and sex are important in nalartuk associations, with older individuals superior to younger and males dominant to females, exceptions were noted. Most obvious were cases where young males attempted to dominate their older female siblings and cousins. In these cases, maturity took precedence over sex. Also, in household relations associated with women's occupations, men often followed the directions of their spouses in apparent contradiction to nalartuk precepts (See Briggs, 1970).

Perhaps the areas where, as Damas (1963:51) has put it, "the quintessence of nalatuk" was observed was in the case of affinally related people. In-marrying males (ninguak) and females (ukkuaq) are dominated by their spouses' consanguinal group regardless of age and generational differences. Such relationships as sakkik-ninguak (ninguagiik) between father-in-law-son-in-law, demonstrate the extreme aspects of the nalartuk axis. Many Clyde men recall spending time early in their marriages in residence at their spouses' father's camp as clearly unpleasant. Another such area involves the relationship between two mature brothers in which the older (angayuk) clearly dominates the younger (nuka). In at least one case at Clyde some thirty years ago, such a situation contributed to the break up of a major extended family.

The second axis, ungayuk, in which affectional closeness is dominant, is as important as nalartuk in understanding Inuit social and ecological relations and, as mentioned, these two behavioral subsystems are mutually influencing (Ibid.:50). Ungayuk relations are most important in the area of same generation solidarity, but also have important cross-generational meaning. As Damas (1975b:20) has observed, the major precept of this behavioral norm is emotional closeness within a generation and of solidarity of the sexes across generations. For individuals, the primary consideration in ungayuk subsystems are sex and generation.

Within male Ego's own generation, primacy exists first with Ego's younger and older male siblings to be followed by same-sex parallel cousins - first, angutigattik (father's brother's son), then, illu (mother's brother's sons) - and, last, by male cross-cousins (arngnakattik). Rounding off this intragenerational solidarity are all naiyak which includes all female siblings and cousins. As is apparent, the application of ungayuk principles to the Clyde/Iglulik cousin system therefore means that cousins the same sex as Ego are ranked by affectional closeness as has been done by Damas (1963:50). Similarly, the same affectional ranking applies for female Ego.

In terms of alternate or cross-generational relations, the same principle of sexual solidarity is operative. Principal intergenerational connections are as described by Damas (Ibid.). As would be expected, these are: (1) father-son; (2) father's brother-nephew; (3) mother's brother-nephew. These are then followed by corresponding male-female ties, the most important of which is mother-son. A similar hierarchical relationship exists for females, i.e. mother-daughter, etc. An important element of

<u>ungayuk</u>, as well, is the affectional closeness which extends between non-contiguous generations which is free of the solidarity of the sexes aspect of the subsystem. The strongest such bond exemplifying the above is that of grandparent-grandchild.

Observation among the Clyde Inuit revealed several important aspects of <u>ungayuk</u> which emphasized not only its strength, but also the part it plays on the <u>nalartuk</u> subsystem. The first of these was the importance of the <u>qaniariik</u> (father's brother-brother's son) dyad. In hunting, it was generally observed that individuals in this relationship hunted together in high frequency; in fact, second only to siblings and parallel cousins. This observation receives support as to its strength and importance from Damas (<u>Ibid</u>.:49), who notes that the avuncular-nepotic relationship was one in which collaterals of the first ascending generation often appear to be in the position of surrogate parents.

A second area where <u>ungayuk</u> precepts appear to be of importance relates to leadership and decision-making within the kin group. Specifically, <u>ungayuk</u> functions in some situations, particularly in <u>angayuk</u>-<u>nuka</u> relations, to ameliorate certain aspects of the <u>nalartuk</u> respect-obedience axis. This is of importance in situations in which the leadership/decision-making role (<u>isumataq</u>), which is usually held by a male kinsmen in a superior generation (father, father's brother), is assumed by an older sibling. Several examples of this occurring were found at Clyde River, including Aqviqtiuk, during the period of this research. In such a circumstance, <u>ungayuk</u> eases the strain between siblings during the transition into this new role. While this role change is generally successful, there are cases, such as that noted earlier, in which the strain between brothers leads to a fragmenting of the kin group.

Social Organization and Ecological Regulation

The importance of kinship directives in Inuit interpersonal behavior is obvious; however, these same features have an effect which extends beyond "the controlled relations of individuals within the social unity" (Eggan, 1955:82). Damas (1969b:51-55, 1975b:26-27) has attempted to integrate these internal social features with the external adaptation of Inuit groups. In so doing, he has focussed on the pattern of fission and fusion in Inuit bands during the annual cycle, their tendancy toward viri-residence, bilateral kinship, and the economic advantage of such features as spouse exchange and adoption. While Damas has drawn a limited number of associations relating these aspects of Inuit society to local environment, he has not paid particular attention to the specific role these features play in the organization of Inuit ecological relations.

The principal social features outlined above for the Clyde Inuit are all elements which strengthen the internal cohesion of the extended family or restricted ilagiit. As such, they do not function independent of each other, but, in fact, form an integrated information set. An example of this is the mutually influencing effects of the nalartuk and ungayuk axis, which, when examined as separate elements, appear to transmit contradictory information to the cultural system's participants. As has been shown, however, by Damas (1963, 1971, 1972b), the behavioral directives associated with these two axes serve to enhance the solidarity of the ilagiit, while providing a means for effective direction. It should not be surprising, therefore, that these same features play a similar role in the patterning of ecological activities, since, following Steward's (1955:44-45) observations, no higher mechanism above the extended family organization is present in hunter-gatherer society.

The nalartuk axis is of principal importance because of its association with leadership and decision-making within the extended family/local group. The respect-obedience bond which accompanies the sub-superordinant condition between kin of adjacent generations is, in addition, applicable to age differences within the same generation. As stated earlier, male collaterals dominate the nalartuk axis at the interpersonal level of behavior; the most relevant examples of this are irngniriik (father-son) and qangiqriik (father's brother-brother's son) dyads.

The dynamics of Inuit local groups may be thought of in the same terms, since the behavioral directives which operate at this level are the same. The primary difference is in conceptualizing the ilagiit not only as a social unit, but also as an economic one. In its former aspect, the ilagiit acts as the mechanism of socialization in which the nalartuk subsystem establishes primacy of generation and age. In the latter aspect, that of an economic unit, the respect-obedience subsystem is focused upon a single individual within the local group/extended family aggregate. As would be expected in this latter case, the domi-nence pole of the nalartuk axis, in the person of the isumataq, is centered on subsistence decision-making.

The coincidence between the role of nalartuk relations in the composition of ilagiit "social" formations and ilagiit "economic" formations becomes more complete when the residential aspect of Inuit bands is examined. Damas (1963:105) points out, the concept of viri-locality, at Iglulik, especially father-son ties, becomes central when the bonding of nuclear families into larger aggregates is probed. As Damas (Ibid.) states, "the father-son relationship is the keystone of these latter aggregations (above the nuclear family*) which have been identified as extended families." In the Clyde area, interviews with 24 men over the age of 25 showed that each had resided in camps led by their fathers or father's brothers prior to their moving to Clyde River.

A second component of the nalartuk subsystem is its age aspect. In the above discussion, the generational component, such as father-son bonding has been stressed. But an important element of this axis is that it also allows for transition in leadership. Damas (Ibid.) has noted that besides organizing available labor within the restricted ilagiit, there is also provision for the diffusion of leadership downward to sons and sons-in-law (expanded ilagiit). The extended family group at Aqviqtiuk offers an example of the transfer of leadership across generational lines. The present isumataq, who is the oldest of four brothers who presently maintain atleast part-time residence in the camp, assumed the responsibilities of decision-making in 1964. Prior to that time, leadership among the members of the ilagiit rested with the father of these four co-residential siblings. The change, from father to oldest son as leader, resulted from the father's death and was accomplished according to the camp residents with little or no disruption. In this case, no suitable replacement was available from the generation immediately above the remaining residents; the age component which accompanies the nalartuk directive, however, provided a collateral replacement on the basis of chronological, rather than generational, position.

The importance of the nalartuk axis, however, must not be overemphasized in respect to its contribution in structuring Inuit ecological relations. Taken alone, nalartuk directives, with their emphasis on respect and obedience, may be overly rigid and, therefore, unable to comply with the flexibility required of Inuit adaptation (Heinrich, 1963: 68). Thus, as Damas (1963:105) and Heinrich (1963:68-69) have pointed out, the importance of voluntary cooperative behavior is an important element in Inuit adaptation. This flexibility, at a behavioral level, is provided by the complementary ungayuk subsystem. The distance-closeness aspects associated with this axis funciton in much the same manner as was outlined in respect to interpersonal behavior. Ungayuk, as essentially a means of affectional solidarity, modifies the more rigid elements of the respect-obedience dyad, particularly in regard to same-generational relations.

Once again, Aqviqtiuk provides an example of the ungayuk modifier. At the time of the leadership change from father to oldest son, all the brothers co-resident at Aqviqtiuk were mature hunters, ranging in age from 35 to 25. The projection of the oldest into the position of isumataq could conceivably have led to conflict between siblings. Earlier, just such an occurance was cited in relation to the fragmenting of another Clyde extended family. The affectional closeness, which applies between brothers through the ungayuk directive, served to stabilize social relations at a difficult time at Aqviqtiuk.

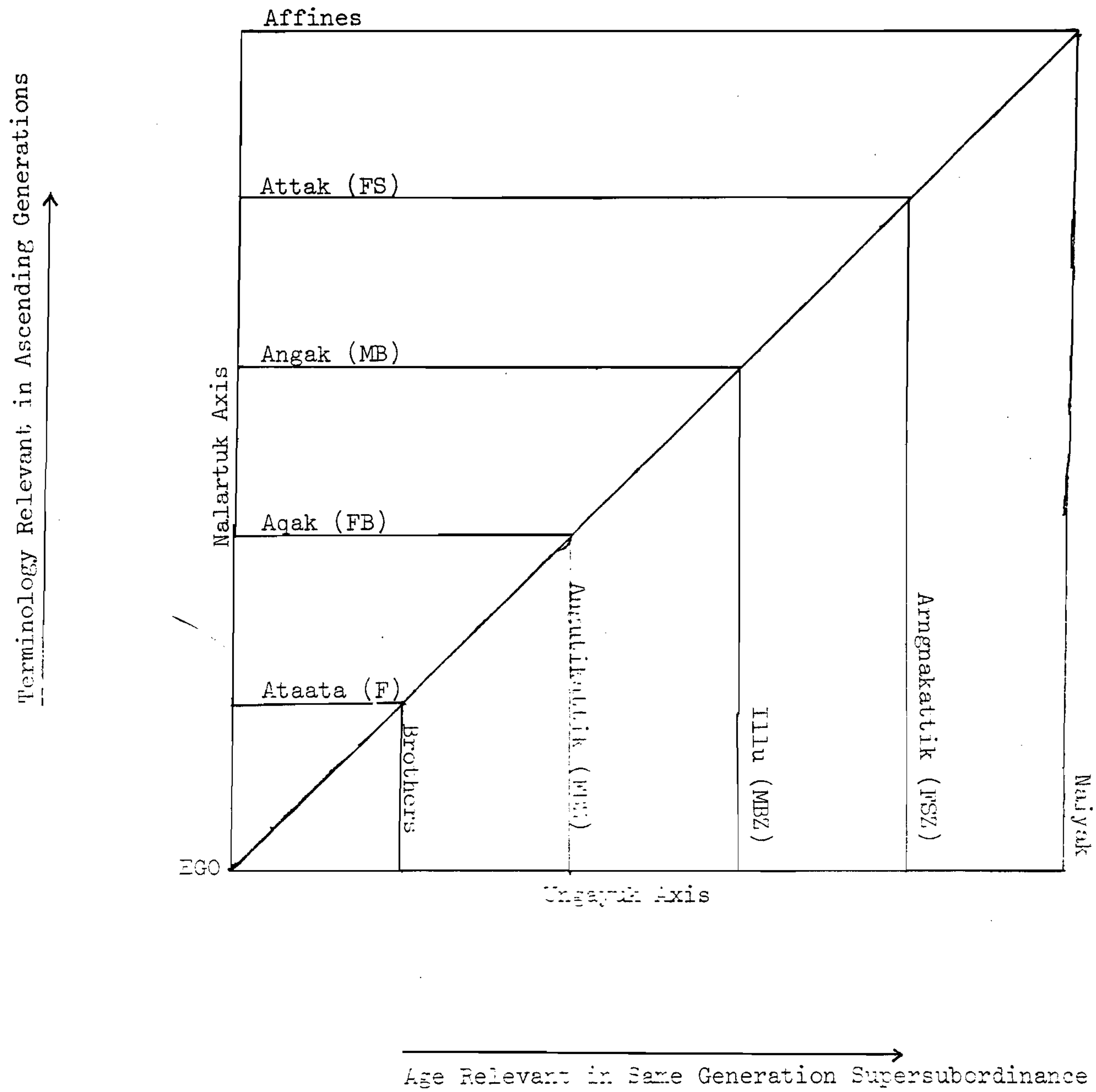
The cooperative aspects of the ungayuk axis are also of importance in ecological relations. To a large degree, Inuit subsistence activities and economic relations are dependent on voluntary support to the ilagiit. Briggs (1970) has amply documented the problems which accompany too close an adherence to nalartuk directives, alone. Before continuing, however, it is apparent that a specific pattern, based on the integration of these two sociocultural subsystems, is recognizable in relation to Clyde local group organization (Fig. IV-III).

This model is presented in order to show the categories in which kinship-derived behavioral directives associated with each axis are most strongly mutually influencing. Since Clyde groupings normally shows a propensity for viriorientation, the model is concerned with only the male relevant aspects of Clyde bands.

The strongest associations along both axes which emerge are those linking close male collaterals, namely father-son/brother-brother and father's brother-brother's son. The strength implicit in these associations is congruent with Damas' (1963:48-51) data on ungayuk and nalartuk interpersonal bonding. It appears from information gathered in the Clyde area that these behavioral subsystems function in the organization of the local band/ilagiit in much the same way as they do in individual social relations. It is important to note that there is a strong correlation of a double bond, that is of respect-obedience and emotional closeness, operating in those relationships closest to Ego.

As terminological distance increases beyond the irngniriik and qaniagiriik relational categories, there is a diminishing of strength in

Fig. IV-IV: Axial Integration in Eastern Inuit Social Organization

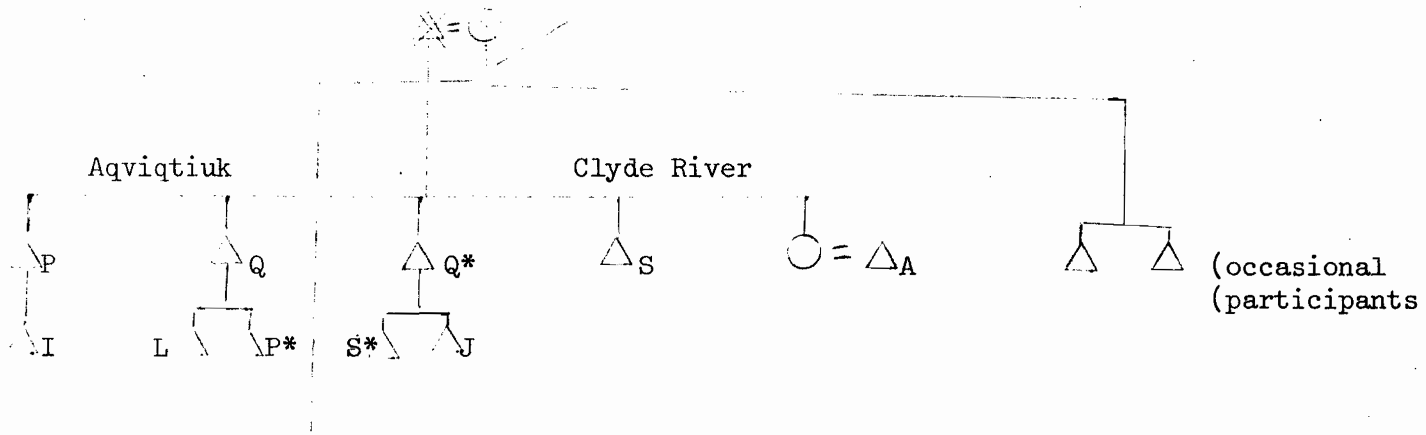


bonding. This correlates with the low incidence found among Clyde informants for establishing long term residence with maternal collaterals and affines and is consistent with the observed preference (See Damas, 1963; Heinrich, 1963) for viri-patrilocal residence. The lowest expressed preference by Clyde males was for residence with their spouses' collaterals for periods other than bride-service. This is explainable by the rigid nalartuk element inherent in the ningaugiik (father-in-law-son-in-law) relationship. Similarly, only extreme circumstances would prompt a male to reside with a married sister or female cousin's affines.

In terms, then, of leadership, decision-making, and solidarity within both types of ilagiit, similar behavioral directives apply to the extended family as a socio-economic entity as to it as a kinship formation. Role and status within this economic unit appears to be flavored by the same socio-behavioral directives which effect interpersonal relations. In relation to band ecological activities, the focus of these directives is the position of the isumataq. The isumataq, therefore, is represented by an individual who, ideally, is dominant in terms of nalartuk directives by virtue of terminological and geneological position and, at the same time, is in a position of affectional closeness with the other principals within the ilagiit. Damas (1963:105) notes that the Iglulik father-son/father's brother-brother's son/brother-brother dyads form the main kinship reference points in respect to nalartuk-ungayuk behavioral directives.

At Aqviqtiuk, the primary hunting unit during the 1971-73 research period was made up of the four adult males. The relational bonds within this core are shown below (Fig. IV-IV). The central figure in the

Fig. IV-V: Structure of the Aqviqtiuk Subsistence Unit, 1971-72



In addition to this core group of hunters, several non-resident kinsmen participated as part of the Aqviqtiuk unit for between two to six months each year. As is shown in the figure, this grouping included P and Q's two youngest brothers, one brother's sons, and a brother-in-law. Although Q* and S did reside within the ilagiit until the late 1960's, there movement to Clyde River was motivated by two factors. In Q*'s case, a serious medical problem restricted his hunting and, although he was well-known for his hunting ability, he chose to remain in Clyde River because of his need for fairly frequent medical attention. Nevertheless, Q* spent from two to three months at Aqviqtiuk each year from 1971-74.

Q*'s two oldest sons spent considerably more time at Aqviqtiuk than their father. During 1971-72, S* resided at the camp for nearly half the year, but was married in 1973 and took up residence with his father-in-law at Clyde River and hunted with him. It is notable that although all the Clyde area ilagiit, with the exception of Aqviqtiukmiut, reside in a central location, bride service, such as that described by Damas (1963:51) persists with the usual case being that the husband will spend his first year of marriage in his spouse's father's house and will hunt almost exclusively with his spouse's collaterals.

Q*'s second son, J, was at Aqviqtiuk only briefly in 1971-72 because of attendence at the Clyde River school, but in the following years spent an increasing amount of time at the camp. In 1973, J left school $1\frac{1}{2}$ months early and stayed at Aqviqtiuk for nearly five months, while in the following year, having completed school, he was at Aqviqtiuk approximately six months. J was considered an exceptional young hunter and was encouraged by P to spend time at Aqviqtiuk.

The youngest brother of the Aqviqtiuk nukariit (sibling group), S, spent most of the first year of fieldwork living in Clyde River. He had moved to Clyde in 1968 when a serious food shortage due to weather had forced the relocation of the group. At that time, S's wife had insisted on taking up residence in Clyde River to be near her aging father. In 1973, however, S spent some six months at Aqviqtiuk and was still residing there with his family through the first three months of 1974.

The most interesting of the part-time residents at Aqviqtiuk was A, who was married to one of the Aqviqtiuk sibling group females. Although originally from the Cumberland Sound area, A moved to the Clyde area in 1949 with members of his own extended family and took up residence at Scott Inlet, some 75 km north of Aqviqtiuk. He moved to Clyde River in 1963, when his father and two brothers died. A, although he has no very close affinity with the Aqviqtiuk group, spends from two to three months each year hunting and travelling with P and his brothers. Although A's relations with his wife's ilagiit appear to contradict the probability of such association in Fig. IV-III, the explanation appear to lie with A's isolation from any closer kindred in the Clyde area.

The dominant role P plays as isumataq in the Aqviqtiuk residential group extends to the less permanent members of the unit. P's status is a result of his chronological position in the ilagiit and his present position is the result of the intersection of the nalartuk and ungayuk axes. As oldest male sibling and isumataq, he is at the apex of the sub-super-ordinance dyad. At the same time, potential conflict and over-rigidity is avoided because of strong emotional closeness of the nukariit. Less tangible, but of great importance, are the facts that P is considered an excellent hunter and artisan and is supported by his son, I, who is also a fine hunter. P, in respect to the other members of the unit, occupies the dominant position in regard to the dyadic network within Aqviqtiuk: in relation to Q, Q*, and S, he is nukariik (older brother-younger brother); to I, he is in a irngniriik relationship; L, P*, S*, and J are qaniariik; and A in ninguariik.

As noted earlier, all major decisions related to the ecological activities of the camp group, such as the relocation of the camp, resources to be pursued, even, at times, travel routes, were the domain of P as isumataq. An area of equal importance, closely related to the more direct ecological considerations of the local band/ilagiit, was the division and distribution of resources. Discussions with P and several former camp isumataq in Clyde River led to the development of the following list of responsibilities. The "duties" of the isumataq were noted as include: (1) keeping the people out of danger; (2) showing people how to do things; (3) thinking (decision-making); (4) settling or preventing internal disputes; (5) taking care of food. This last is highly significant, since it is one area in which the isumataq's role is highly visible.

As noted earlier, very often decisions concerning hunted areas or divisions of labor occurred in such a manner as to be virtually unnoticeable; sometimes only a few words were exchanged, since all the principal participants were mature and experienced hunters. In fact, to a large degree, the isumataq coordinated, rather than directed, subsistence efforts. Likewise, the lead provided by the isumataq in the other areas mentioned were relatively invisible, particularly to an observer not well-skilled in the language. However, in regard to the distribution of resources once the active segment of hunting was complete, the dominance of the isumataq was highly visible.

Although the nuclear family/household formed the primary consumption unit at both Aqviqtiuk and Clyde River, the restricted ilagiit remained the unit of storage. As such, the isumataq, commensurate with his responsibility to "take care of food" was in sole charge of allocating resources among the households. The most obvious form of ningiq (sharing) occurred immediately after all hunters had returned to the settlement.

At Aqviqtiuk, or one of the mobile seasonal camps, the results of the day's hunting were unloaded on the beach in from of the camp. Here, P would directly apportion a part of the kill to each household. The amount received differed in proportion to the total catch and not according to a hunter's success or failure. Two examples of this process while in residence at Aqviqtiuk are given below; both took place in mid-October, 1971 and involved only the truly resident members of Aqviqtiuk:

On the first occasion, all four hunters accounted for a total of eleven ringed seals. Q and his son, L, returned with six animals, while P and I each returned with four. P distributed one seal to each household immediately, two carcasses were fed to the considerable number of camp dogs, and six were placed in two stone caches for future use. It was notable that Q and L, who resided together, received one seal, while P and I each took one. Although P and I lived in separate households, I and his wife and infant ate sixty percent of their meals at P's house. The only direct recognition of an individual's effort was that before the surplus seals were cached and fed to the dogs, they were each skinned with Q and L receiving six of the skins.

The second example occurred six days later. At that time, although all four hunters had travelled out, only P returned with two seals. The division between households was done much more carefully. Three quarters of the meat and fat was given to Q and L, while P took the meat of an entire seal and I received the small remaining portion. The remaining fat was divided equally between P and I. The skins from the two carcasses were divided between P and I. Since so few seals were procured, seals from earlier caches were fed to the dogs.

The direct ningiq form of distribution operates on much the same manner at Clyde River. Since ilagiit members are often spread throughout the settlement, a hunter, upon returning to the village, will take his skidoo and sled directly to his father's or older brother's house and leave most, if not all, of his meat there. In summer, when most travel is by boat, meat and skins are unloaded on the beach fronting Patricia Bay. From there, loads are hand carried to the appropriate central location. The main difference between the systems of distribution at Aqviqtiuk and Cyde River was that Clyde the hunter often selected a portion of the return immediately for himself. At Aqviqtiuk, the dispersal of meat and fat was done by the isumataq, with the hunter retaining only the skins from the seals he had shot.

The ningiq system, just described, is highly generalized, but does serve to point out several elements relevant to the role of the cultural system in the overall Clyde Inuit adaptation. The most important of these is the multi-layered character of the ecological adaptation. The distance-closeness dyad which strongly influences interpersonal behavior is paralleled within the structure of the local band/expanded ilagiit. The nuclear family or household, in such an analogy, although the primary domestic unit for the individual, is subordinate within the local band aggregate. In a real sense, the immediate demands of single households are moderated as a result of the mutually advantageous nature of the ilagiit to meet contingencies. Like the Inuit system of kinship, an important component of this economic approach is the flexibility it provides each of its elements.

It is interesting to note that the form ningiq sharing took in the Clyde area, that is the community-wide sharing of both small and large species of game, differs somewhat from Damas' (1972a:232) observations of large animals, such as narwhal, beluga, bearded seal, polar bear, and walrus. The practice was not extended to include ringed seal, caribou, and fish, while these lesser species are definitely included in the Clyde area (Damas further notes that among the Netsilingmiut, ningiq practices were restricted to hunt participants). The most probable explanation is in part ecological and also a product of non-Inuit intervention. The Clyde area generally lacks large species of marine fauna. Narwhal, as noted, are common in Clyde waters for only a few weeks in late summer, while walrus, a highly important species in the Iglulik area (Damas, 1971, personal communication), are virtually non-existent north of Isabella Bay. Caribou, ringed seal, and arctic char, on the other hand are more-or-less available year-round and the ringed seal, in particular, is the most dependable resource to be found from October to April.

Ningiq, however, is only one example of the economic interdependence found within the *ilagiit* and the importance of the *isumataq* in local band solidarity. At Aqviqtiuk and, to a lesser extent, Clyde River, a variety of commensal practices, which center around the *isumataq* supplement direct *ningiq* sharing. While meals among the Clyde area people, like those of other Inuit, tend to be highly unstructured and random with each member of a household eating when he/she wishes, several types of group meals occur which are directly associated with the *ilagiit*/local band arrangement. All of these are subsumed under a general category of commensal practices called *nirriyaqtuqtuq*.

Nirriyaqtuqtuq communal meals occur in a variety of circumstances. The most common observed at both Aqviqtiuk and Clyde River would take place when several hunters were preparing to depart on a joint hunt or trip. At Aqviqtiuk, all the men would attend to their preparations and equipment; once all was prepared, all the participants would gather at P's house before departing. In such a case, generally a pot of boiled seal or fish was shared by the men and a last kettle of tea drunk before leaving the village. The same practice occurred in Clyde River, but not necessarily in the home of an *ilagiit* head. Clyde men, if the party was composed of two or more brothers or cousins, would go to their father's or father's brother's house before departing. However, if the party was made up of hunters from several different families, it often happened that the men would gather at the home of the oldest, who was also the individual who acted as the leader on such mixed hunts.

Several other types of *nirriyaqtuqtuq* meals were also seen at Aqviqtiuk. Each included all the people resident in the camp and were always held at the qangmaq or tent of the isumataq. The circumstances surrounding these organized meals were: (1) the presence of a "new" or relatively scarce food item in camp; (2) a large surplus; (3) a general shortage of food. The latter circumstance corresponds to Damas' (1972a: 232) observations on village-wide commensalism among the Iglulingmiut.

The appearance of a new or different food item at Aqviqtiuk was often the occasion for a communal gathering in P's dwelling. Such gatherings were particularly frequent during the winter when ringed seal was the staple food item at Aqviqtiuk. On three occasions during the winter of 1971-72, commensal meals were held at P's when murres, caribou, and arctic char, food items only occasionally procured in winter, were available in camp. The commensal meal which centered around the murres was the most intriguing because of the small number of birds which comprised it.

While seal hunting by canoe in mid-October, P managed to shoot four murres with a .22 caliber rifle. The total live weight of the four birds was approximately four and one-half kilograms. The only food which had been available in camp to this time (from roughly mid-September) had been seal meat. Upon returning to Aqviqtiuk, P sent two of his young daughters to summon the other two households to P's qangmaq. Once all 18 residents were gathered, the murres were divided so that each person present was able to have a small portion of the birds. Seal was also eaten, but it was the murres which were obviously most relished. An important aspect of this form of commensalism appears to be sharing action, itself, regardless of the quantity and is consistent with the concept of solidarity and leadership associated with the isumataq role.

Nirriyaqtuqtuq commensalism associated with large surplus food stocks appear to occur most frequently during the late summer-early fall caribou hunt and the fall fish run. On several occasions, while at summer camp at Eglinton and Sam Ford Fiords, large quantities of caribou were present in camp and there was the risk of loss through spoilage. On three occasions in the summer of 1972 and, at least, once in August 1973, a camp-wide caribou feast was held by P at his tent. At the largest of these, two caribou totalling approximately 60 kg of edible meat were nearly completely consumed by 14 adults, 7 adolescents (from 12 to 16 years old), and 7 children (under 12).

Participants were summoned to the meal by two small children going throughout the camp calling at each tent. The communal caribou meal in which 28 people participated lasted nearly two hours with over 40 kg of meat being consumed. No such formalized meals were observed in Clyde River, but it was not uncommon for a father to have his sons and their families in his house at mealtime. Although similar such meals were reported as taking place formerly when large numbers of sea run arctic char were procured in the fall, the present use of nets, instead of stone weir, has resulted in many fewer people gathering at fishing spots, since two or three men using nets can capture large quantities of fish.

The final type of nirriyaqtuqtuq, in times of food emergencies, corresponds exactly to that observed by Damas (1972a:232). Earlier, while explaining the form ningiq distribution followed, the case was noted where only two seals were captured with one of the two being kept by P at Aqviqtiuk. On that occasion, P summoned the members of the other two households to his qangmaq where the seal he had taken was laid out on the floor of the dwelling by his wife. All were invited to eat from the carcass and parts of the seal were, in addition, boiled and consumed over the course of the evening. This apparently most common form of commensalism, while relatively rare in the Clyde area, was explained by P as part of the isumataq's role within the ilagiit.

Two other forms of sharing, noted by Damas (Ibid.:231-233) among Foxe Basin Iglulingmiut, namely payuktuq (literally carrying food to another household) and akpallugit or the invitation of specific people to a meal, were acknowledged as occurring by both Clyde and Aqviqtiuk informants, but were never knowingly observed. In response to questions about payuktuq, several informants mentioned that this practice was primarily confined to food sharing with affines. Inviting or akpallugit, on the other hand, was remarked as a form of sharing more frequent among Pond Inlet people than those at Clyde.

While Aqviqtiuk offers an isolated site for testing questions related to the role of social organizational directives in ecological regulation, it is, in fact, the exception to the general centralization of the region. The reality for better than 80% of the Inuit at Clyde is that for at least ten years and longer, in some cases, hunters have lived under conditions of acculturation or modernity. These factors are represented not solely by the presence of various material culture items, but also by a powerful, albeit small, Euro-Canadian population (See Briggs, 1970), which has been in place since the mid-1960's. Also, such a description of relationships is academic unless it can be placed within the broader context of the ecosystem.

CHAPTER V

SUBSYSTEM INTEGRATION AND CLYDE INUIT ECOLOGY

Clyde Inuit Adaptation as a Systems Problem

The express object of utilizing the "systemic approach" to the study of Inuit adaptation at Clyde River is to demonstrate the organization of multivariable component subsystems as part of a structured and dynamic whole. This is in marked contrast to the dualistic, causal linkages which are often drawn between objects under investigation and which form the basic approach of empirical science (Battista, 1977:65). In cultural ecology, as has been pointed out, it has been this dualistic paradigm, first interpreted as space-time divisions and, more recently, matter-energy relationships, which has been the core methodology. It has become apparent, however, that it is no longer adequate to base our understanding on the observed interdependence of cultural and environmental components, if only because such interdependencies are difficult to establish in human behavioral systems. As Rapoport (1968:xx) noted, in open living systems, structure, function, and change are all aspects of systemic organization.

The preceding two chapters, although limited in detail, illustrate the amount and variety of information present in two major subsystems affecting Inuit ecological adaptation. It should also be noted that a third subsystem, the technological, which is intermediate between the selective and structural components, also exists as part of this adaptation. This aspect of Inuit culture has, however, been extensively documented by many observers (See Boas, 1888; Mathiassen, 1928; Damas, 1969b; Nelson, 1969; Balikci, 1970; Wenzel, 1975). Attributes pertinent to the analysis, therefore, will be presented as appropriate in the ensuing discussion.

Two points need clarification before continuing with this examination of Clyde Inuit ecological relations, as they pertain to the information aspects of the system. Both refer to the descriptions of the selective and structural subsystems and are essential to the understanding of the Clyde human adaptation as an integrated set of cultural, as well as physical, relationships.

The first is that the Clyde selective environment, as the physical and biological ensemble in which the Inuit function, is not reducible to a set of well-ordered, non-random occurrences which are predictable, and around which the Inuit are able confidently to pattern their subsistence regime. As was pointed out in Chapter Three, although long range patterns are discernable in the Clyde ecosystem, a degree of variability exists within man-land interactions in regard to short-term physical and biological fluctuations. In cultural ecology, the realization of this has contributed to an approach in which technology has come to be seen as the primary means of reducing, if not controlling, such uncertainty. However, because of the limited information value of technology, in either the traditional or modern Inuit context, the extent to which it serves to stabilize this situation is slight.

The other point is that certain behavioral directives, which, in the framework of functional analyses, have been perceived as defining a range of interpersonal relationships based on kinship and dyadic parameters (Damas, 1963), operate to add a further dimension to Inuit adaptation. In this context, such behavioral mechanisms provide flexibility at the level of unit organization and, therefore, act as ecological, as well as social, regulators. In this latter role, structural concomitants provide a baseline for the organization of data received by the cultural system from its external environment (See Fig. V-I). Bertalanffy (1968: 16) has stated,

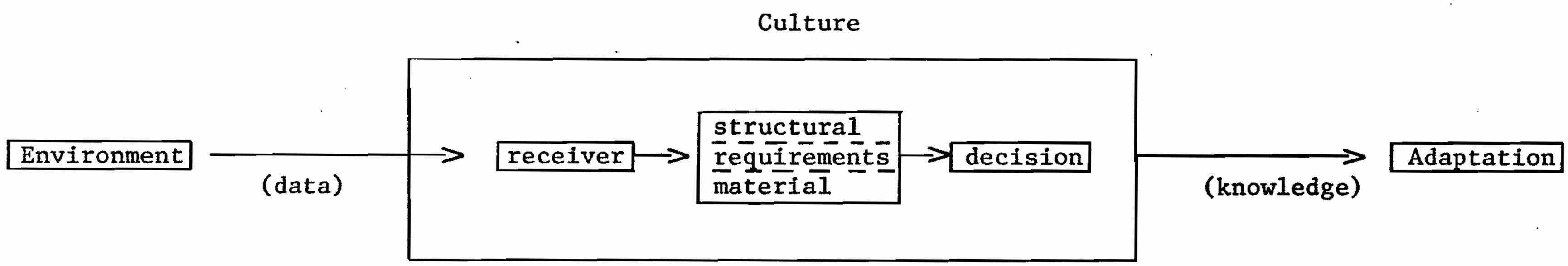
> Compared to the information content (organization) of a living system, the imported matter (nutrition, etc.) carries not information but "noise".

Simply, in terms of the inefficiency inherently potential from conflicting messages being received from the selective environment, it becomes clear that highly organized internal features figure in organizing the form and content of ecological relations and, as Heinrich (1963:68) notes, kinship is an important (although not only) means for bonding individuals in Inuit society.

This latter point is a function of the relative complexity present in the cultural subsystem in terms of information, as opposed to its material, organization. The data contained in environmental messages is not organized in relation to the needs of the Inuit in its raw form. It cannot be assumed, therefore, that the randomness present in the selective subsystem can be resolved solely through material culture means.

The core of Inuit adaptation in the Clyde region is composed not only of well-delineated selective components, but also of less tangible

Figure V-I: Selective Information and Human Ecological Organization



processual elements within the social organizational component of the culture. It is necessary, therefore, to recognize that patterns of material relationships (such as settlement and subsistence patterns) include a non-material cultural component which reduces conflict between selective data and the internal organization of the cultural unit. In the case of material relationships, superficial direct causal links can be made between the external environment and the human component. The non-material aspects of Inuit ecological adaptation, however, are not so evident in their manifestation. Rather, they are primarily relationships whose role in pattern formation is expressed through specific social organizational bonds which can then be linked to Inuit-environment activities. In order to adequately establish the integrative nature of Inuit adaptation, then, it is necessary to analyze the pattern of Clyde ecological activities not only from the perspective of selective and material features, but also in terms of the behavioral directives which regulate and organize these activities as an element of societal, rather than individual, action.

As a picture of Inuit activities, however, data, such as Figure III-IX, are incomplete. Seasonality of species, local conditions, and individual behavior have to be accounted for before a truly clear picture of Inuit material relations is framed. And, finally, the structural features which affect these material interrelationships must be synthesized within this framework in order to discern the coherence and flexibility with which these activities are carried out.

Clyde Inuit Ecological Activities

Cultural ecology, while focusing on adaptation as its central organizing concept, has, since the work of Sauer (1931), Forde (1934), and Steward (1955), emphasized those aspects of man-environment relations which are the most tangible. The scope encompassed by this man-environment perspective has come to include a wide variety of relationships, ranging from the most direct kinds, such as hunting technology and techniques (Nelson, 1969), to human settlement patterning (Chang, 1962; Helm, 1968a) and resource scheduling (Flannery, 1968).

In contrast, the argument stressed throughout this thesis has been that human ecology's concentration on the nuts-and-bolts elements of cultural adaptation have resulted in a fairly precise awareness on our part of the form adaptation takes, but very little idea about how it works. While the spatial relations between man and resources are important, how hunters make out on "scarce" resources entails more than scanning, stalking, and capture behaviors (See Appendix IV). To approach the study of a group's adaptation as a system of mutually-influencing material relationships or even as an information set based on biological need, therefore, is not sufficient for understanding the reality of the adaptive process.

The Clyde region Inuit are, and historically have been, hunters. During the year, September 1971-72, Inuit hunters from Aqviqtiuk and Clyde River harvested nearly 60,000 kg of edible animal products from the five most commonly exploited species in the local environment (See Table V-I). This activity was carried out by 46 hunters and their labor supplied 224 individuals. In this context, however, it should be noted that not all the harvest participants recorded in the survey were necessarily full-time hunters--some were women and children--nor does each of the above 46 hunters represent a separate household. In 1971, these five prey species, with wildfowl and the occasional bearded seal, provided approximately 80 to 85% of the total protein intake of the Clyde region's Inuit population.

Table V-I: Clyde Region Harvest Results, September 1971-72*

Species	Ave. Live Weight (kg)	Total Number	Total Live Weight (kg)	Edible Weight (kg)	Total Edible Weight (kg)
Caribou					
a. adult	68.2	241	16,436	10,676	}12,322
b. immature	27.7	112	2,542	1,646	
Ringed Seal	45.0	1,996	89,820	39,934	39,934
Narwhal					
a. adult	365.0	12	4,380	1,440	}1,800
b. immature	182.0	12	2,184	360	
Polar Bear	365.0	42	15,330	1,680	1,680
Arctic Char	2.0	@1,000	2,000	1,600	1,600

*Weight Data from Foote, 1967.

In order to analyze the Clyde adaptation in any depth, however, it is necessary to place such data within the interaction sphere of the selective and structural environments. Despite assertions that hunting societies are representitives of the "original affluent society" (Sahlins, 1972) and the general perception by the Clyde Inuit that the region is well-endowed with biological resources, the patterning of subsistence activities in the area entails behavioral and knowledge sets which closely intertwine the socio-cultural and biophysical components of Clyde Inuit society.

The Winter Seasonal Complex

As is shown in the following diagram (Fig. V-II), the most obvious contrast between the two seasonal complexes is the presence of a uniform sea ice cover from approximately mid-October to mid-June accompanied by consistently low temperatures. These temperatures are normally in the -20 to -30° C range and often drop to -40°C or below for long intervals. Snow, during the winter period, rarely exceeds 45 cm, but is subject to frequent horizontal movement and drifting throughout the season. Wind is an important physical factor because the snow movement it causes and accompanying wind chill limit hunting. Last, much of the winter season, from late November to early March, is either totally or partially dark. Freeze-up begins in October and is accompanied by daylight conditions reduced to eight hours or less of usable hunting light.

The winter subsistence system is heavily marine-oriented, although several minor procurement subsystems involve inland activities. Four species, two dominant and two less important, comprise the winter subsistence complex. This is in sharp contrast to the summer complex when subsistence activities broaden, not only in relation to the availability of a wider variety of resources, but also in terms of increased land species exploitation (See Table V-II).

Two marine species, the ringed seal and polar bear, comprise the major winter procurement subsystem of the Clyde Inuit. McLaren (1958b:29, 1961:167) has estimated that inshore ice along convoluted coastlines, such as that in the Clyde region, are capable of supporting

FIG. V-11: Seasonal Complexes and Conditions

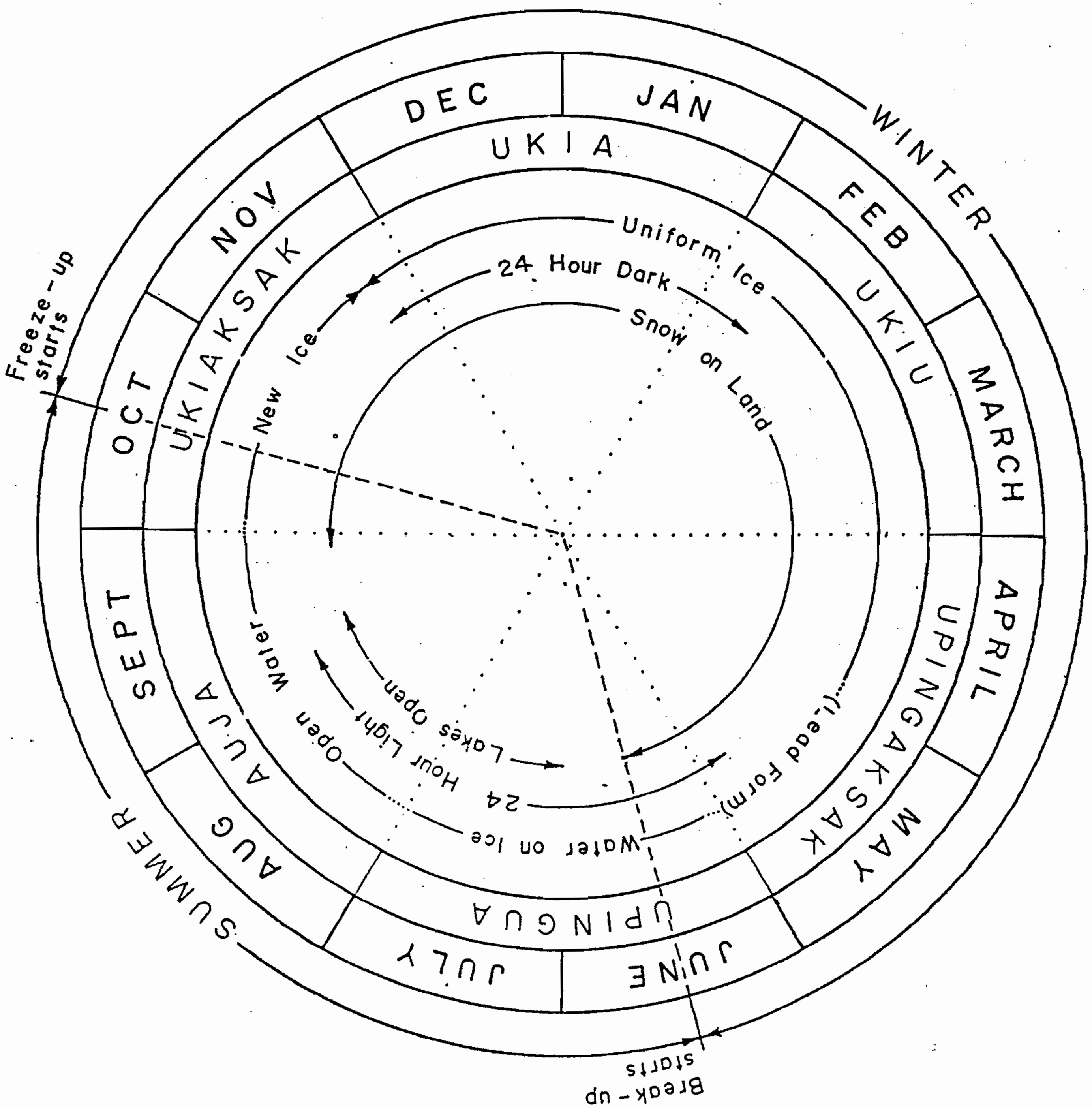


Table V-II: Clyde Inuit Procurement Subsystems

I. Winter Subsistence System:

A. Major Procurement Subsystem: Marine
- ringed seal - outer ice/fiords/bays
- polar bear - outer ice/fiords/bays

B. Minor Procurement Subsystem: Terrestrial
- caribou - inland valleys
- arctic char - inland lakes

C. Opportunistic Procurement Subsystem: Mixed
- wolf - associated with inland activities
- ptarmigan - associated with inland activities
- murre/guillemot - early winter - marine
- fox - land/sea ice

II. Summer Subsistence System:

A. Major Procurement Subsystem: Mixed
- caribou - coastal valleys/sea ice fringe
- ringed seal - ice leads/surface; later, open water
- narwhal - late season, ice edge and/or open water bays and fiords

B. Minor Procurement Subsystem: Mixed
- geese-ducks - lowlying wetlands; occasional duck in open water
- arctic char - river mouths and small bays

C. Opportunistic Procurement Subsystems: Mixed
- harp seal - open water
- walrus - open water/broken ice
- ptarmigan - inland valleys
- arctic hare - inland valleys

approximately 35 ringed seals per square kilometer throughout the winter. With the exception of the outer coast from Cape Eglinton to Cape Christian and from Halliday Point to Isabella Bay, virtually all the fiords and bays in the Clyde area are considered by the Inuit as being good winter sealing areas. At the same time, the entire Clyde area is thought to be outstanding for polar bear hunting. The presence of good inland denning conditions, a large ringed seal population, and easy land-sea access all contribute to Clyde's sizable bear population. Although pregnant females and immature animals den for part of the winter, Inuit frequently encounter bears hunting the winter ice for ringed seal.

I. The Ringed Seal-Polar Bear Subsystem

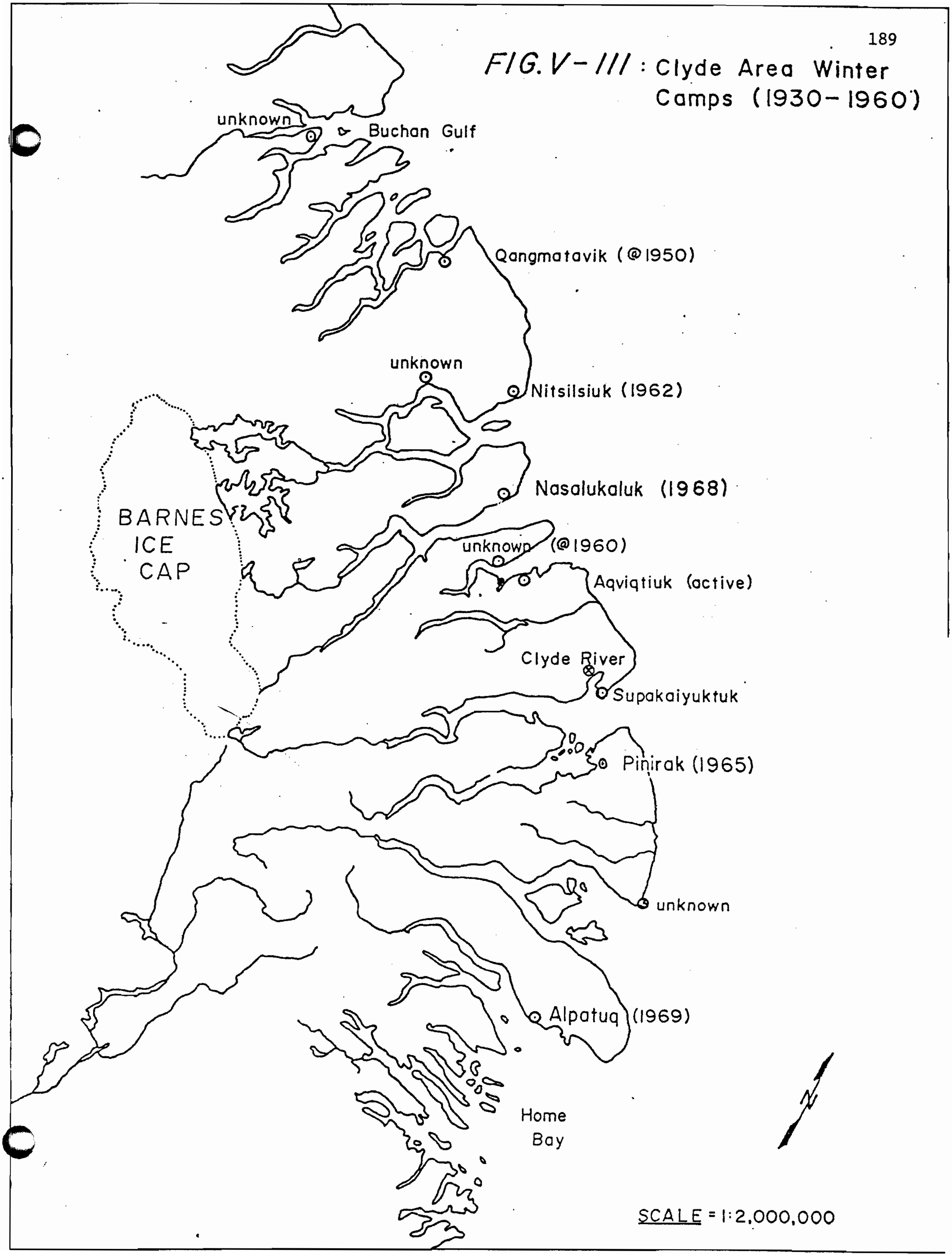
Winter sealing by the Clyde area Inuit is dominated by breathing hole hunting. This practice commences immediately after freeze-up and may extend, depending upon conditions into late June. For much of this time--mid-October to mid-May (the legal hunting season)--it is not uncommon for the Inuit to carry out a dual hunt, since hunting bears often are present in areas of dense seal breathing hole concentrations.

Ringed seals form breathing holes (aglu) as soon as a flexible skin of ice appears on the sea, usually sometime in October. At this time, the ice is too thin to support the weight of hunters and one to two weeks may elapse, depending on wind conditions, before the ice is sufficiently thick for hunters to travel upon it. Although the aglu is initially a small opening in the flat ice surface, as the ice depth increases, a dome is formed by repeated returns of seals to the hole and the subsequent freezing of their exhalations around the hole. Autumn forays by the Inuit onto the new ice generally amount to a reconnaisance and marking of aglu; little hunting is usually done at this time because the hunters cast shadows through the thin ice, frightening the seals. When new ice loses its translucent greenish hue, breathing hole--or maulukpuq--hunting begins. In 1971, a late freeze-up accompanied by heavy winds delayed the start of sea ice hunting until early November. In contrast, ice conditions in 1978 advanced the start of breathing hole sealing to the last week of September.

Clyde settlement patterning for winter maulukpuq sealing appears to have resembled, the following for at least the past thirty years. Winter villages were placed on land near fiord mouths (See Fig. V-III) to allow access to both inshore and outer ice sealing areas. Such settlements were usually snowhouse complexes (as late as the 1960's at Sam Ford Fiord) or canvas-grass-wood frame qangmaq. At present, there are two established winter settlements in the region: Aqviqtiuk, at Eglinton Fiord; and Clyde River, on Patricia Bay. Only Aqviqtiuk, however, conforms to the spatial pattern described above, since Clyde River was located to provide access to deep-water anchorage for supply vessals.

Although Aqviqtiuk is the only remaining "traditional-type" settlement, five settlements occupied between 1930 and 1960 were examined and found to show the same locational bias in relation to ice access. Inuit informants stated that each of the former settlements had been occupied by a single extended family (closed ilagiit). Exceptions were noted, however, for Alpatuq and Nitsilsiuk. At the former two ilagiit were co-resident and joined through affinal bonds, while at Nitsilsiuk two fragmented extended families from the Cumberland Sound area were resident.

FIG. V-III : Clyde Area Winter Camps (1930-1960)



This winter shore-based settlement pattern in the Clyde area differs with data gathered by Damas (1969b:45, 47) for the Iglulik and Copper peoples and with the observations of Balikci (1968:7) and Damas (1969b:45) for the Netsilik Eskimo at winter sea ice camps for pre-1925 populations in those areas. The most plausable explanation for this rests in a comparison of the coastal configurations of eastern Baffin Island with those areas. In general, the coasts occupied by the more westerly Inuit groups tend to be far more regular than the Baffin coast.

The effect of this on seal numbers and density is evident when McLaren's estimates for the lower east Melville Peninsula, just below the Iglulik area proper, are compared to those for the Clyde coast. For the waters off southeast Melville, he estimates (1958a:33) a ringed seal population of 8,700 animals compared to the total figure for Clyde of about 38,900 animals. While the Foxe Basin coastal segment drawn from McLaren does not conform precisely to the northeast Melville coastline, the contrast in population numbers and, as a result, local density are marked. Sealing from winter shore settlements in the Clyde region appears related to Inuit attempts to maximize access to the most productive sea ice zones.

Polar bear are presently found along the entire Clyde coast and virtually anywhere on sea or land. While bears are encountered at almost anytime in the areas hunted by the Inuit, sightings and kills most often occur in the period from October into December and March to May. The reasons for this are several. Probably the most important is that at these times greater numbers of bears are in the inshore ice area. During the fall-early winter, this is due to the fact that bears are denning and are, therefore, congregated along the shore, particularly on seaward points. Non-denning animals are also found near shore where they hunt seals, either at the new aglu or along cracks where seals may still surface. Late winter is also a time for increased contact between bears and Inuit, for then the seals construct pupping lairs in inshore areas of the rough ice zone. Such rough ice areas often form at the mouths of fiords or near points and islands where winds and currents tumble the ice and, since both Inuit and bears hunt newborn seals at this time, contact between them increases.

Fewer random encounters between bears and Inuit occur during the middle of the winter. This is because cold and darkness influence the Inuit to minimize the distances they travel for seals. Also, observations of polar bear spoor while accompanying hunters in 1971-72 and 1974 at this time of the season indicated that very few bears were present on the near ice areas hunted by the Inuit. This was particularly noticeable at Eglinton Fiord, where little December to March hunting was done outside the fiord. However, one of the principal sealing areas used by Inuit from Clyde River, the 15 km stretch of coast between Cape Christian and the mouth of Clyde Inlet, was frequented by bears all winter long from 1971 to 1974 (Qillaq, personal communication). This was due to the presence of a number of open leads around a small island off Cape Christian which were the result of currents and tides. And also because three large icebergs were grounded a short distance from shore. The Inuit felt that these were used by bears as lookouts and on two occasions, while climbing these icebergs, I found claw marks some 10 to 15 m above the sea ice.

Extended hunts for seal of more than one day's duration were rare among the Inuit for much of the winter. On only one occasion did an inuk from Clyde River deliberately overnight on the sea ice while seal hunting and this was done because he had not made a kill his first day out. Hunts of two to four days duration are more common in the latter part of the winter/spring when the sun has returned and seals haul out onto the ice to bask.

Generally, the only deliberate extended hunts made during the winter are inland for caribou, arctic char, or polar bear. While at Aqviqtiuk in 1971-72, I twice accompanied hunters on three-day bear hunting trips. On both occasions the stated object of the hunt was bear. For the Eglinton Fiord hunters, such trips meant traveling to the off-shore ice between Dexterity Inlet and Scott Inlet. Although seals were hunted when active breathing holes were located, little time--often less than seven man-hours over six days by five hunters--was expended in this activity. Such trips were generally conducted 30-40 km from shore, with each hunter traveling apart in search of bear signs. When a recent spoor were found, all attention was focused on scanning for and following the animal's trail.

Longer trips for polar bear were more common among the younger hunters based at Clyde River. Two brothers-in-law were especially well known bear hunters. In February, 1972, these two, accompanied by three other young men, spent one month traversing Home Bay as far south as Cape Hooper DEW Line station. Estimating from the amount of gasoline expended by their four snowmobiles (an average rate of 16 km/3.7 l), these men covered approximately 600 to 700 km. On this trip, four of the five men killed a bear.

From 1971 through 1974, the major difference between winter hunting conducted from Aqviqtiuk and that from Clyde River was that 30 of the 40 hunters in Clyde had motorized transportation, while two maintained dog teams. At Aqviqtiuk all four adult hunters used dog traction exclusively. The differences relating to the mobility afforded by both modes of travel are not, however, as great as might by expected. Hunters, using dog traction, were unable to travel more than 3 to 4 km per hour, while snowmobile hunters were able to cover as much as 45 km under good winter conditions, in the same time. An example may be made by comparing the time taken by each type of hunter from Clyde River to the sealing area near Cape Christian. Under ideal snow and wind conditions, such a trip, traveling over some 20 km of snowcovered lowland took roughly 30 to 45 minutes by snowmobile and one and one half to two hours by dogteam.

While, ideally, snowmobile travel was the faster means of travel, a number of factors substantially reduced its advantages. Conditions were rarely ideal; in rough ice or in soft snow and areas of thin snowcover, it was not uncommon for the rate of travel to be reduced below that of the dogs. Second, snow machines were frequently broken down and often, as pointed out by Müller-Wille (1978:105), have a short lifespan. Finally, snowmobiles are costly to operate (Ibid.:111), costing, using Müller-Wille's seal skin units as a basis for comparison, more than two dogs per year. And, as numerous observers have noted, a man trapped on the trail cannot eat his snowmobile.

Beyond this major difference, the equipment used by hunters from both settlements were virtually identical. By the same token, the tactics used in breathing hole hunting were generally the same, as they were for polar bear hunting. However, hunting, employing dogs, had the added advantage while seeking an active aglu of the dogs scenting a hole. The machine hunter was forced to rely on visual sighting. The same held true to a lesser degree in bear hunting; often the dogs would scent a bear before any recognizable spoor was sighted. Breathing hole hunting generally required a kamatik or sled for transporting gear and kills, a rifle, cooking gear, a skinning knife, an implement for chopping ice, and either a dogteam or snowmobile. Virtually the same equipment was used for polar bear.

The organization of a winter sea ice hunt differed somewhat, however, between the two communities. The four Aqviqtiuk hunters, who were all close consanguinal kin, were directed in hunting activities by the oldest male, who was recognized as the isumataq. He chose the location within the fiord to be hunted each day or, in the case of hunts held outside the fiord, who would go and roughly survey the area they would be covered. He also crafted specialized tools, such as harpoon heads, fishing leisters, and ivory fish lures. And, while the hunt was in progress, he would direct individuals to certain areas, decide when to close activities, and divide the harvest upon return to Aqviqtiuk.

By contrast, Inuit undertaking sealing from Clyde River appeared to operate much more autonomously. While a hunter might travel over to the Cape Christian area with several other men, there was no overall leadership. It was not uncommon for a man to travel out alone, if weather conditions were good, since, on almost any day, ten to twenty hunters would be on the ice from Cape Christian to Clyde Inlet. During the course of a day's hunt, men often met together for tea and traveled to and from Clyde in groups. Once back in the settlement, a successful hunter almost invariably distributed part of his take, either directly or though his wife or children, to a variety of kinsmen.

Clyde-based polar bear hunts, unlike the sealing, were organized similarly to those at Eglinton Fiord. Men never hunted alone and, generally, two men, often close kinsmen, traveling together. The organization of a trip, such as ensuring that there was sufficient fuel and food, was done by the older hunter and the overall leadership during the hunt came from this man.

While the principal component of the winter subsistence complex is associated with ringed seal breathing hole activity, the late season, extending from April to mid-June sees a shift from maulukpuq hunting to stalking basking seals or uuttuq. This change is prompted by longer periods of intense sunlight in which seals haul out onto the ice from collapsed aglu or along open leads. Hunting, at this time, no longer is a matter of waiting behavior, as described in much of the literature on Inuit (See Boas, 1888) but, rather, of stalking seals dozing on the surface of the ice.

The difference between the techniques used by the two settlements' hunters was precipitated by the use of snowmobiles by one group. Aqviqtiuk Inuit, using dogteams, were forced to stalk seal on foot, usually crossing up to a kilometer of open snow. In so doing, the hunter would usually leave his dogs either behind rough ice or at a distance where they could not scent the seal and then proceed to cross the intervening ice concealed behind a telawa or white cloth shield. Although Clyde hunters remember using exposed creeping toward basking seals as late as the 1950's, by the 1970's every hunter employed a telawa to approach uttuq, sometimes within 50 m, before firing at it.

The organization of spring hunts was less apparent than that of mid-winter sealing. Generally, each man would be directed to a specific area. Since each inuk hunted alone, the area covered was much less well-defined than that of maulukpuq winter sealing. An individual often would wander over the ice following an open lead or trying to approach a distant seal which he had previously spotted. Hunters would terminate the hunting when they wished with some men staying out only a few hours, while others might spend a full twenty-four hours on the ice. The amount of time expended was often a product of hunting success and fair weather. The dispersal of the kill, however, was as formalized as that of winter hunting. Shares were generally not apportioned to each household until all hunters had returned and then only by the isumataq. As noted earlier in Chapter Four, the isumataq would, if a large number of seals had been taken, divide these between the various households and meat caches for the dogs; if only one seal was harvested, rather than divide it between the three households, he might hold a communal meal in his qangmaq or tent.

Spring sealing at Clyde River followed the same type of organization described for the winter hunt. The chief difference between the two communities was the technique employed. By 1972, few Clyde River hunters used the hand-held telawa; instead, most stretched white cloth across snowmobile hoods and windscreens and drove to within 40 to 50 m of the seal. Although the seal was alerted to the presence of the machine, as long as the hunter stayed downwind from the animal, he could almost always get sufficiently close for a shot. Approximate calculations from notes made during the winter of 1971-72 at Aqviqtiuk and Clyde River and the months of February and March, 1974, at Clyde River and Broughton Island indicate that the shot to kill ratio for aglu hunting was roughly 1.0/0.9, while uuttuq sealing was 2.3/1. The latter catagory, when broken down into stalking on foot and hunting by machine, shows a ratio of 1.6/1 and 3.0/1, respectively for technique. In 1978, when I returned to Clyde River, the snowmobile technique had been further refined through the device of painting the front of the machine white and by cutting a small shooting aperture in the windscreen. The kill ratio may have risen by 1978 due to the much wider use being made of rifles equipped with telescopic sights; in 1972 only 25 per cent of the region's hunters were so equipped.

II. The Caribou-Arctic Char Subsystem

The minor procurement subsystem within the Clyde winter subsistence complex is distinguished from that season's major subsystem by the fact that the resources sought are, generally, spatially removed from winter settlement sites and are only occasionally exploited. While maulukpuq sealing and polar bear hunting form the basis of daily subsistence, winter inland hunting and fishing take place only infrequently, and in some years not at all. This form of winter hunting requires special preparation, and constitutes a high risk in terms of harvest to effort.

For the Inuit of both communities in the region, such trips represent journeys of between 300 to 400 or more kilometers under mid-season conditions and may last from one to three weeks depending on the mode of transportation. As shown in the following map (Fig. V-IV), the principal foci for such activity are along the eastern and southern borders of the Barnes Ice Cap although one area, above Scott Inlet, was heavily used in 1972, 1975, and 1977-78. The geographic extent of inland hunting/fishing was once larger and included areas west of Buchan Gulf and Home Bay, but, since the disappearance of winter settlements in these areas, they have been, at best, only sporadically visited.

The general areas utilized by Clyde River Inuit are the Ayr Lake-Clyde River-Generator Lake drainage south and east of the ice cap and the valley system north of Scott Inlet, which extends from Scott Inlet through the Bruce Mountains to Dexterity Fiord. The former area is the most heavily frequented with as many as five or six hunting groups visiting it during the winter. The valleys above Scott Inlet are much less frequently used, and only be former occupants of the Scott Inlet community, which was abandoned in 1962, or by Inuit who used to live in the area between Dexterity Inlet and Buchan Gulf. Aqviqtiuk Inuit confine winter inland excursions to the valleys and lakes between Sam Ford Fiord and the Barnes Ice Cap. According to Aqviqtiuk informants, the period of utilization of this area, particularly Conn and Bieler Lakes, goes back to when their families occupied camps at Dexterity Fiord and Nasalukaluk at the mouth of Sam Ford Fiord. In the 1940's and 50's, winter caribou hunting extended around the northern end of the ice cap (See Kemp, 1976: 148; Inuit Land Use and Occupancy Study Vol. III:126).

Inland caribou-arctic char hunting trips occur throughout the winter season, beginning in late November or early December, as soon as the river and lake ice is safe for travel. Important factors at both the

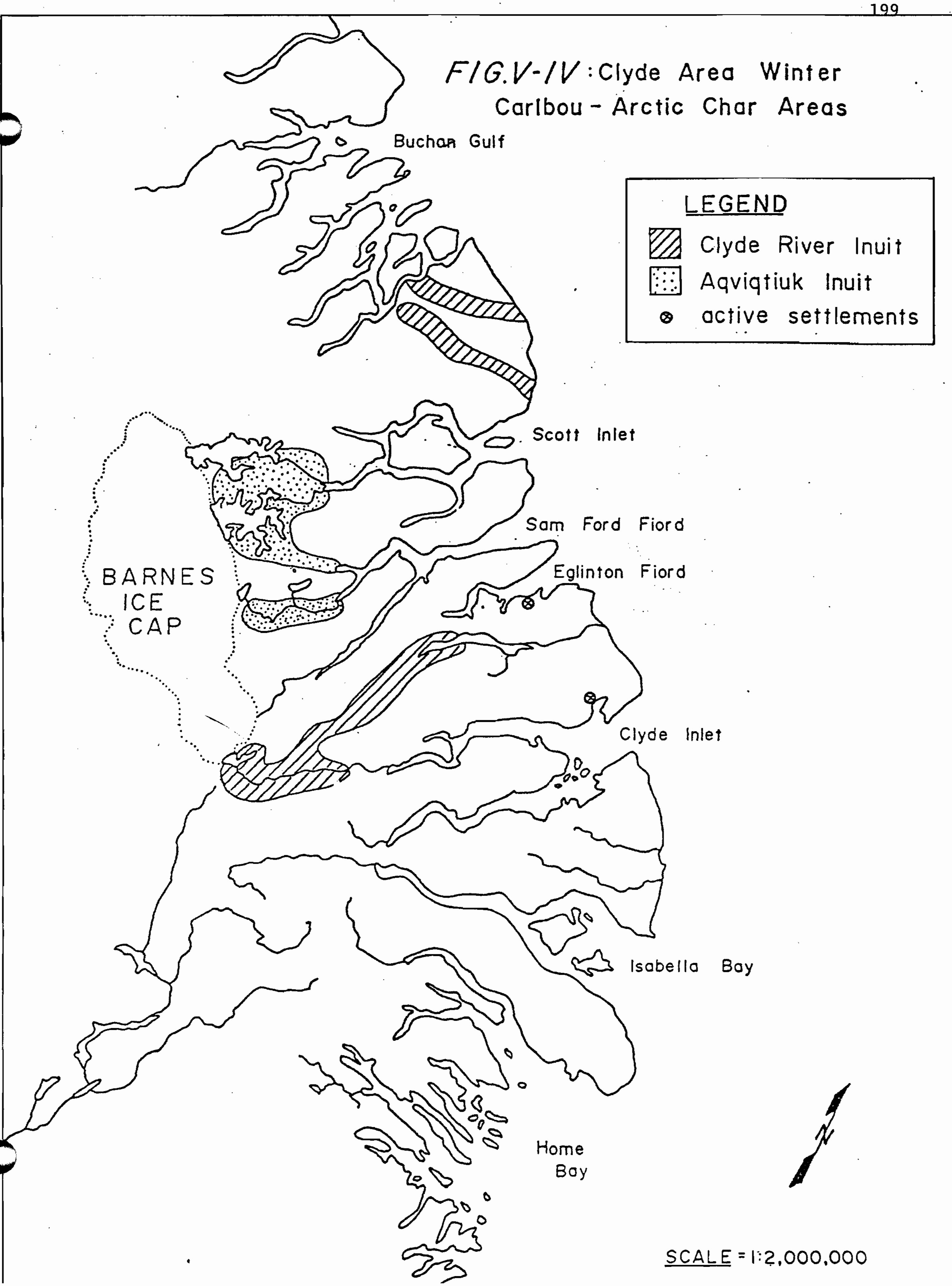


FIG.V-IV: Clyde Area Winter Caribou - Arctic Char Areas
LEGEND
Clyde River Inuit
Aqviqtiuk Inuit
active settlements
Buchan Gulf
Scott Inlet
Sam Ford Fiord
Eglinton Fiord
BARNES ICE CAP
Clyde Inlet
Isabella Bay
Home Bay
SCALE = 1:2,000,000

start and end of the season are whether safe ice and sufficient snow for overland travel are available (See Fig. V-V). Hunts undertaken in the latter part of the winter, when longer periods of daylight are prevalent, tend to be exclusively for the purpose of hunting caribou; trips made earlier, however, have a dual focus, since poor light and weather make little difference in fishing.

One such inland trip was made while I was living at Eglinton Fiord. This occurred in the early winter of 1971, from November 21 to December 3, to the southeast edge of Bieler Lake. Preparations for the trip began several weeks in advance with complete overhauls being made on the three kamatiks which were to make the trip and specialized gear, such as fish leisters and lures, being manufactured. The route followed was one detailed in Figure V-V, following Eglinton Fiord to Revoir Pass, over the pass to Sam Ford Fiord, and then along the northern arm of the fiord to a river which led to the Bieler Lake system. The total travel time from Aqviqtiuk to the lake was three days.

My experience on a number of such winter hunts was revealing in terms of the human organization and leadership involved. At both Eglinton Fiord and Clyde River, it was common for the head of an ilagiit to organize family members and equipment, although he might not actually participate in the hunt itself. In the Bieler Lake trip previously described, the Aqviqtiuk isumataq prepared needed gear, as mentioned, and carefully described the route and areas to be visited. This was done, despite the fact that his oldest brother, who was familiar with the area, was actually leading the party. Afterwards, this was explained to me by the isumataq as part of his responsibility as leader of the extended family,

FIG. V-V : Winter Travel Routes in the Clyde Area and his reputed ability to locate caribou at a distance.

The groups which I accompanied up the Clyde River were often composed of younger hunters, although on at least one occasion an older man led a group. In this latter instance he did not actively participate in caribou hunting, but, rather, remained in camp fishing. He did direct the younger members of the group to specific areas, however. The two other winter caribou/char trips I was on had three and four Inuit of roughly the same age group. While both parties were composed of related individuals, the leadership role fell in both instances to a hunter who, while not the oldest in either case, was considered the most knowledgeable hunter. On both occasions, this particular individual's father was the organizer of the hunts.

The equipment used for inland subsistence activities differs little in terms of the basic outfit from that of sea ice hunting, except for the inclusion of a large canvas tent, which is used either as a temporary shelter or hung inside a snowhouse for extra insulation (See Boas, 1888:542). The only specialized equipment used on the hunt is that for inland char fishing.

Three major items are needed for such activity. The most important is generally a fish leister or <u>kukivak</u> or three pronged spear. For inland fishing, Clyde Inuit generally use a leister from 3.5 to 4.5 meters in length. The length is important because much of the fishing done at this time is through one to one and one-half meters of ice and at several meters below the ice. A few men were observed fishing at this time with store-bought attractor lures, but with generally less success than the other technique. My own attempts with a lure over two days (ten man-hours) of fishing produced less than one-third the number of fish caught by any inuk in the same time using a leister.

The other two pieces of gear needed are a lure and an ice chopper. Since fishing holes must be nearly a meter on a side to afford the fisherman an adequate field of vision, a substantial amount of chopping must be done. Also, men often use two and three holes in a day with each hole requiring as much as two hours of labor. Most of the lures used in ice fishing are of caribou antler or, occasionally, ivory, often weighted with a rifle shell. In addition, a few men sometimes attached feathers or wool fluff to lures. Store-bought lures were also occasionally used. Several Inuit stated that char do not feed during the winter, but are attracted by the jigging motion of a lure. Therefore, it is necessary to use a kukivak.

Caribou hunting requires no more equipment than a rifle and transportation. Telescopic sights and binoculars are useful after daylight returns, but are of limited value from November into March. Hunting at this time has an opportunistic quality in that, while hunters expressly search for caribou and have detailed knowledge of potential areas, environmental conditions, particularly in mid-winter, make such endeavors risky. The Generator Lake area is viewed this way by the Inuit, as it is constantly windswept and referred to as the place where the snow is always smokey. Also, on one trip up the Clyde River, the Inuit stated that poor success was realized because too many wolves were present in the area and the caribou had moved into places less accessible to wolves.

III. Opportunistic Procurement Subsystems

Unlike either of the procurement subsystems already described, winter season exploitation of wolf, ptarmigan, or sea birds is highly unreliable, for other than an emergency or short-term subsistence source. Indeed, wolf is viewed by the Inuit as having no food value, but is included as the fur is prized for certain articles of clothing. It should also be noted that wolf, like the skins of certain other Clyde species, particularly fox, ringed seal and polar bear, has a potentially high value on the southern fur market. In addition, narwhal and walrus represent cash potential through the sale of their ivory. While it is not a primary aspect of this study, the monetary value of various animals has come to be as important as their food value for Clyde hunters (See Nowak, 1977; Müller-Wille, 1978; Wenzel, 1978); however, of the species comprising the subsystems outlined in Table V-II, only harp seal, fox, and wolf are considered by the Clyde Inuit of no nutritional significance.

Wolves, when hunted by Clyde area Inuit, are taken only during winter inland caribou hunting forays. At this time, it is common for wolves and caribou to be in close proximity, while the Inuit have the additional advantage of the high mobility afforded by snowmobiles or dog-teams. Nevertheless, the alertness shown by wolves makes them a difficult quarry and it is only on rare occasions that one is killed. During the Clyde River trip, wolves were attributed with causing the poor caribou hunting encountered. While camped near Generator Lake, numerous signs of wolf were found near our camp before each day's hunting and the howling of wolves was heard virtually outside our snowhouse, although no wolves were seen, let alone shot.

Ptarmigan may be encountered throughout the winter along almost any rock-willow valley bottom. Their white plumage, as well as the fact that they rarely flock during this season, makes them very difficult to hunt, however. Because very little meat is represented in one ptarmigan (0.9 kg according to Foote [1967:150]), little effort is generally expended on their acquisition.

There were several instances at Aqviqtiuk, however, which contradict this statement. In early November, 1971, and mid-March, 1972, hunters returned to the settlement with single ptarmigan. On both occasions, the community's diet consisted almost exclusively of ringed seal. Both times, all the inhabitants present in the settlement gathered at the <u>isumataq</u>'s <u>qangmaq</u> where each person received a small bit of bird flesh. One of the hunters told me that he had shot at the bird 11 times with a .22 caliber rifle before hitting it. This persistence for a single bird differs markedly from the behavior exhibited by Inuit during summer bird hunting; also, the gathering of camp members at the <u>isumataq</u> closely resembled the behavior associated with larger communal meals.

While the wolf and ptarmigan are exclusively terrestrial species in the Clyde region, W.O. Pruitt (personal communication) informed me of occasionally encountering wolves on the sea ice in the Jones Sound area. Murres and guillemots are occasionally taken before new ice has consolidated in the fall, and leads and channels have closed. At this time, Inuit sometimes carry a shotgun or small caliber rifle expressly for bird shooting. When a bird is shot in the open water, retrieval consists of allowing the body to float to the ice edge, although frequently birds are lost through sinking or because weak ice has formed between the hunter and the bird. These sea birds, like the ptarmigan, contribute very few calories to the winter diet and are never actively pursued unless encountered in the course of other activities.

Arctic fox in the Clyde area, in contrast to other parts of the Canadian North, are only haphazardly sought and few are harvested. The chief method used in their capture is the steel trap (See Usher, 1971), and the fact that no inuk in the Clyde district owns more than 15 to 20 traps is indicative of the low priority presently placed on trapping. Field observation in 1971-72 and 1974, as well as informant responses for intervening years, indicate that as many as half the able hunters set no traps during a trapping season.

The low emphasis currently found among Clyde Inuit toward trapping can be traced to the establishing of the Clyde Hudson's Bay post in 1923. As early as the late 1920's and early 1930's, the company found it necessary to transport Inuit from the Frobisher Bay-Lake Harbour region to trap the Clyde area. Several men, still resident in the area, were brought to Clyde at that time. Despite the importation of skilled trappers, however, post records at Clyde show what must be regarded as a low annual yield when compared to other arctic trapping areas. From 1935 to 1967, the yearly trade in arctic fox at the post (Clyde HBC Customer Account Records) averaged fewer than 400 skins. The last decade has seen a further decline in this trade with the average annual harvest amounting to less than 100 animals per annum. Inuit from both Clyde River and Aqviqtiuk state that the Clyde area has simply never supported sufficient numbers of fox to make trapping practical.

When Inuit do trap, lines are generally set in two distinct zones. The first is along the shore from Cape Christian north to the Kugaluk River, where stream valleys have cut down through the coastal bluffs and provide easy avenues of access for fox to the sea ice. The second area is on the ice itself, usually where there are concentrations of winter breathing holes. Traps are set in these areas in order to exploit fox attracted to the remains of seals killed by bears and Inuit.

Summary

The overall picture of the winter subsistence complex in the Clyde regions shows a strong marine orientation which extends from the time of freeze-up until break-up. Ringed seal and polar bear form the focus of subsistence activities at this time. In addition, caribou and arctic char obtained in areas away from the coast form an important secondary resource component. However, these inland activities are occasional events, with a hunter making at most two or three such trips. Although this caribou-arctic char subsystem involves a brief time component in relation to the primary subsystem, large amounts of energy and equipment are invested in this activity by the Inuit.

The Summer Seasonal Complex

The physical characteristics of the Clyde regional environment from mid-June to October drastically affect both the variety and type of Inuit activities. As shown in Figure V-II, the coast is usually ice-free, at least enough to permit travel by boat. On the other hand, the absence of snow from the land places some restrictions on the mobility of the hunters. Both conditions are generally present in the summer, but twice during the course of this study--in 1972 and again in 1978--the sea remained locked with ice, while the disappearance of snow was much later than usual. While informants recall such conditions in earlier decades, such an occurrence in a five year period is regarded as an anomoly.

The major difference between the two seasonal complexes is the number and variety of resource types present around Clyde. While only one primary subsistence set is available in winter, the summer season provides, at present, three major subsystems. These include caribou, ringed seal, and narwhal. Until recently, roughly the early 1960's, arctic char could be counted as a fourth important subsystem. The introduction of gill nets appears to have caused the overexploitation of easily accessible char fisheries. Likewise, until the late 1940's and early 1905's, walrus were an important late season Clyde resource (Unpublished HBC Diary, 1939-1942; Iqalukjuak, personal communication). By the time Foote (1967) undertook his socio-economic analysis of the Clyde area, however, walrus were virtually unknown and, according to informants, only two walrus has been harvested in the Clyde area since 1970.

Another significant difference between summer and winter is the occurance of more frequent extended hunting trips and the relocation by much of the Clyde population to temporary camps outside the winter settlements. Figure V-VI shows the principal summer camp locations used by the Clyde River and Aqviqtiuk Inuit.

Movement into summer encampments may begin as early as mid-May at Aqviqtiuk, if warm weather (less than 10° C of frost) are prevalent. This warming is important, since, as the winter settlement area begins to melt, the grass-insulated qangmaq become almost uninhabitable. A

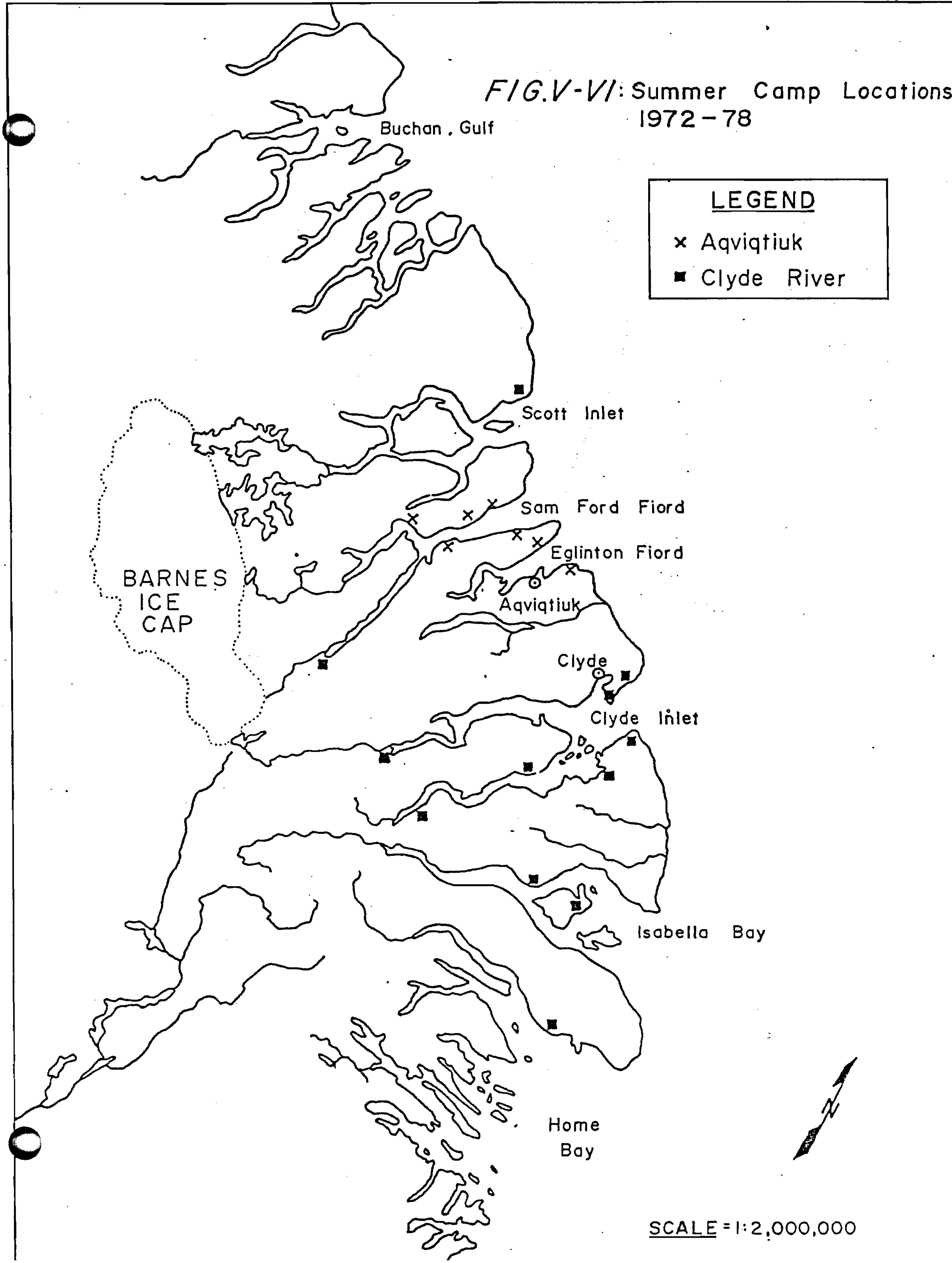


FIG.V-VI: Summer Camp Locations
1972-78
LEGEND
× Aqviqtiuk
■ Clyde River
Buchan. Gulf
Scott Inlet
Sam Ford Fiord
Eglinton Fiord
Aqviqtiuk
BARNES
ICE
CAP
Clyde
Clyde Inlet
Isabella Bay
Home
Bay
SCALE = 1:2,000,000

second important consideration toward an early removal to summer camp is that deteriorating ice conditions on the fiords or along the outer coast may hinder such movement if delayed too long. In 1972, the Inuit from Eglinton Fiord moved into summer camp on May 16th, the earliest date recorded for the seven years from 1971 to 1978.

The initial stage of the summer camp move at Eglinton Fiord is across the ice to a gravel beach area near the northern edge of the fiord mouth. The decision-making in this move was entirely that of the camp leader, who decided upon the time for the move and the new camp location. In 1973, camp was established on a site some 70 m east of the 1972 site at which boulders for securing tents had to be moved from the old location. The explanation for this choice, rather than the previous year's location, was simply that the new site afforded better access to the fiord, even though both areas were on the same stretch of beach.

For the Aqviqtiukmiut, at least one other major camp relocation is undertaken before break-up. In 1971 to 1973, this was north to Sam Ford Fiord, where these Inuit had lived until 1968. The reason given for this was that Eglinton Fiord did not provide adequate routes inland and that the Sam Ford area was much better known to them than the land around Ayr Lake.

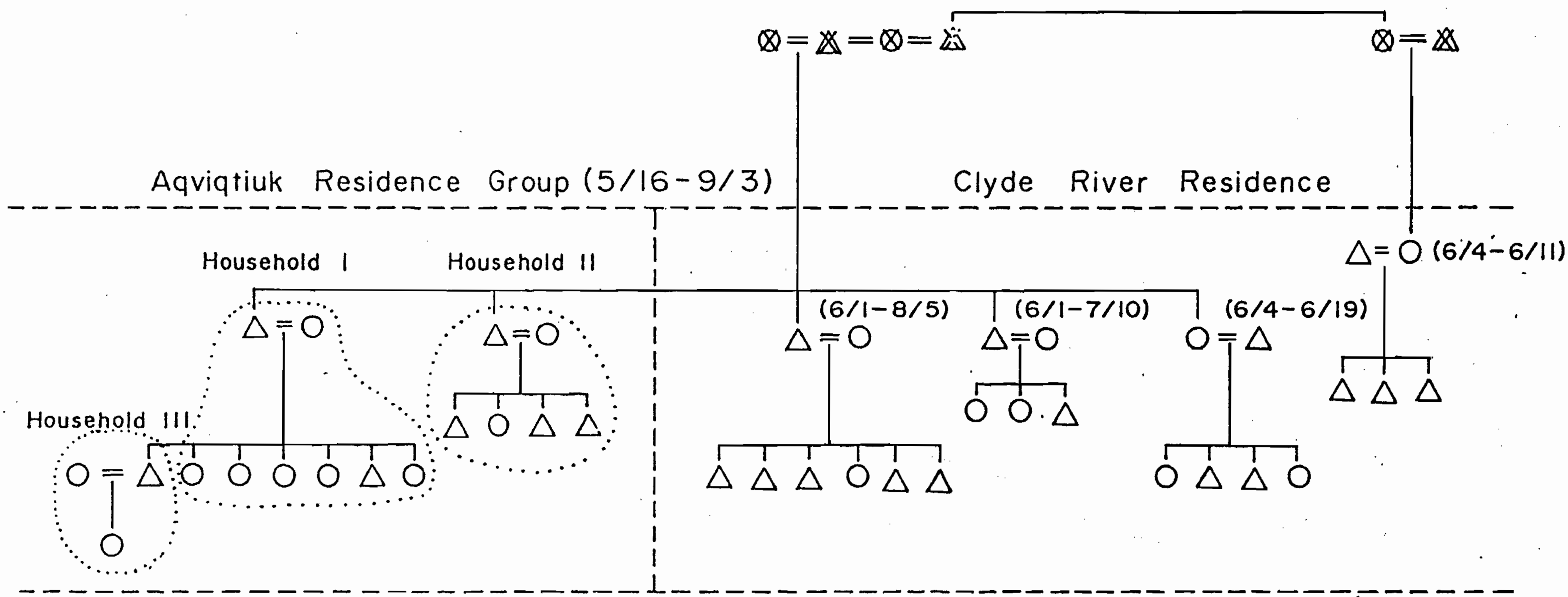
As is shown in Figure V-VI, movement into summer camps is not limited to those Inuit already on the land. Beginning late May-early June, a substantial portion of the Clyde village Inuit establish residence in camps spread as far north as Scott Inlet and south to Isabella Bay and Henry Kater Peninsula. Most movement of family units is limited, however, to July and August when the government school in Clyde closes for the summer and the available wage labor market is slack.

The majority of Clyde summer camps are in locations which were formerly occupied before the settlement of the region's Inuit into Clyde River in the late 1950's and early 1960's. Only three sites, camps 1, 2, and 3 (See Fig. V-VI), are generally used by a number of extended family groups each summer. The remaining camps are associated by the Inuit with specific ilagiit in much the same manner as the Eglinton-Sam Ford Fiords area is referred to as Piungnituq nuna after the camp leader at Aqviqtiuk.

Scott Inlet, Inugsuin Fiord, Isabella Bay, and the camp at the head of Sam Ford Fiord are each used and referred to by an extended family from Clyde River. In fact, several camps in an area may be used over the course of a summer. In 1973, the Eglinton Fiord population established an early summer camp on the north side of the fiord, moved in stages down Sam Ford Fiord to Walker Arm before break-up, and returned to Aqviqtiuk in early September after abandoning a late season camp near the mouth of Sam Ford. The same is true at Inugsuin Fiord, where May-June camp is established before break-up on the west side of the fiord, followed by an open water camp at the foot of the fiord for caribou hunting, and then a late season camp on the east side near the fiord's exit.

Although summer camps are associated with single extended family occupation, it is common for nuclear families with either affinal or distant consanguinal links to share residence in a camp for short periods of time, especially if brothers or fathers and sons are not able to move out of Clyde River at the same time. In 1972 (Fig. V-VII), such a situation existed at Eglinton Fiord. Inuit from Clyde River resided in

FIG. V-VII: Eglinton Fiord Summer Camp Grouping, May to September, 1972



summer camp with Aqviqtiuk Inuit at Eglinton and Sam Ford Fiords for varying lengths of time, ranging from one brother who remained for two full months to a family, with loose affinal relations, who resided with the group for one week in early June.

Leadership and decision-making in the summer camp situation coincides with that outlined for winter settlements with the oldest male usually assuming these responsibilities. Decisions as to the appropriate time to relocate, where and what to hunt, and the division of food are all taken by the camp isumataq. Once hunters disperse, however, from camp into smaller hunting groups, the leadership role may be subsumed by an individual not directly linked to the main camp extended family. An example of this was observed in June, 1972, while hunting with members of the Aqviqtiuk summer camp group. Although Piungnituq, as the oldest male of the Eglinton Fiord residence groups, was recognized as the composite group leader, his brother (the head of household II in Fig. V-VII), a brother-in-law from Clyde River, and their families were dispatched down Walker Arm to hunt caribou. The leader of this sub-group, to my surprise, was not Piungnituaq's brother, but rather his brother-in-law, who was the oldest adult male in the party. This came as a surprise, since when Piungnituq was absent from the main camp, his brother assumed the leader's role; however, it emphasizes the importance of age in relation to certain behavioral categories.

I. Major Summer Procurement Subsystems

Ringed seal hunting remains a major subsistence component in the summer, as well as winter, in the Clyde area. However, the intensity with which it is practiced differs in relation to changes in the physical environment. In the early summer, from mid-June to as late as August, it is generally possible to hunt seals basking on the surface of the ice. This is so because, although break-up may begin along the coast in June, the broken ice remains jammed along the shoreline for much of the summer. The rapidity with which the Clyde coast clears of ice is, to a large degree, a function of wind direction, with southern and onshore winds causing the ice to pack against the shore.

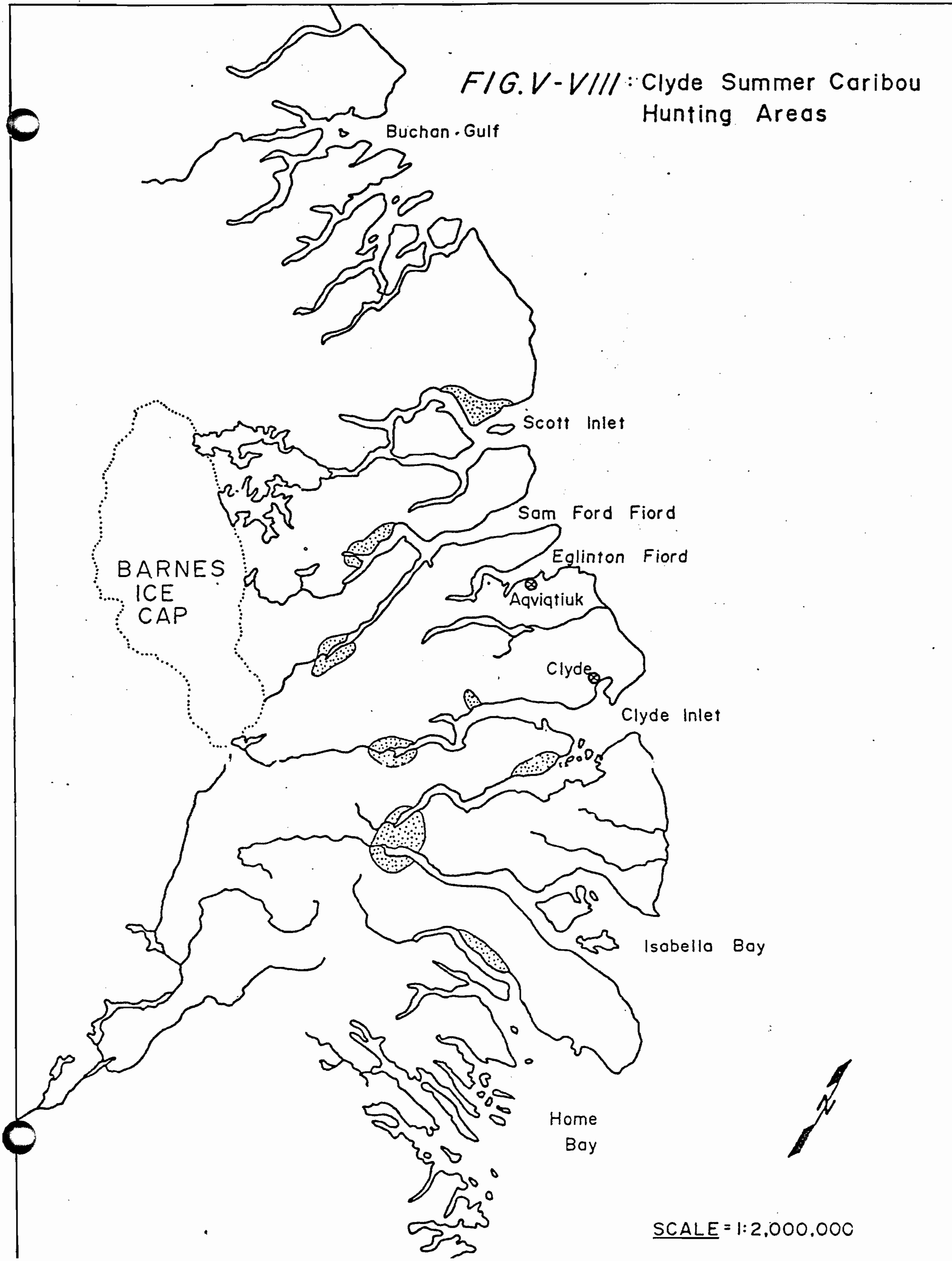
Until wide leads and deep pools form on the ice, hunters are able to continue seal hunting in much the same manner as in late winter. Hunters will travel by snowmobile or dogteam on the ice and hunt basking seals in the manner already described. Once ice conditions deteriorate to the point when easy travel over the ice is no longer possible, but not open enough to allow boats to move freely along the coast, hunters are faced with several options. One is to relocate in camps with access to caribou or species which comprise one or more of the minor subsystems or to continue to hunt seals by stalking seals from the land.

At Aqviqtiuk and Clyde River, it is common for three to five camps, ranging in size from approximately 10 to 25 or 30 Inuit, to have been established in the vicinities of Sam Ford Fiord, Isabella Bay, and Clyde Inlet before rotten ice hinders or eliminates travel. Although once the ice is clear, camps are easily established by canoe, it is difficult to predict when this will happen. In the summer of 1978, there was every indication of an early break-up, with the outer Clyde coast relatively free of ice by mid-July. However, the onset of calm conditions stabilized the broken ice and it was not until early September that easy boat travel was possible. Because of this unexpected turn in ice conditions, only three large summer camps were established, since the majority of hunters from Clyde expected an early boating season.

Stalking seals from the land places severe restrictions on the overall harvesting capabilities of the Inuit. This is caused by the fact that hunters are on foot and only a small area can be hunted in a day. Also, only one or, at most, two seals can be taken because of the difficulties inherent in returning to the land with any large quantity of meat. One last factor, which affects open water seal hunting, as well as stalking from the land, is that, as the summer progresses, ringed seals undergo a loss of fat and melting ice lowers the salinity of the sea, so that if a seal is shot in the water or is wounded while on the ice and gets into the water, it sinks almost immediately. A hunter might shoot three or four seals from a range of only 25 m and be unable to retrieve his kills because they sink so quickly.

For all but those remaining in Clyde River, seal hunting by late July, while continuing to provide food on a day-to-day basis, is secondary to caribou hunting. By this time, the Inuit expect caribou to have arrived in their summer range in the valleys near the coast and small groups of hunters may make extended trips inland for caribou. Important summer hunting areas, depending on whether a camp is in the area, are Scott Inlet, Sam Ford Fiord, and Inugsuin Fiord (See Fig. V-VIII). The area at the foot of Clyde Inlet, where the Clyde River enters the sea, is also a major hunting area. However, unlike the aforementioned areas, it is in use by virtually all the Inuit from Clyde River and 10 or more hunters may be present in the area at one time.

FIG. V-VIII: Clyde Summer Caribou Hunting Areas



Unless hunters are uncommonly lucky, hunting for summer caribou involves long hours and even days of searching on foot, usually by parties of two and three men. The equipment carried at these times is limited to rifles with telescopic sights or, in the case that no rifle is so equipped, binoculars or a telescope, ammunition, knives, rope, and a tea kettle. Parkas are generally carried in case of bad weather or for sleeping in lieu of a sleeping bag when overnighting and rubber footgear is worn, since the land is often quite wet at this time. If fires are built, heather-like vegetation is used for fuel in order to save the weight represented by stove and fuel.

Hunters walk along ridges or upland areas in order to maximize the area which can be scanned while traveling. Careful watch is kept for the recent spoor of caribou and, if found, small parties may further divide if there is uncertainty about the route the animals may have taken. Long distances are covered in this type of hunting with men making a circuit of 50 to 60 km. over several days. As would be expected when large areas and few hunters are involved, only a fractional amount of time is spent in the actual shooting of caribou. In late June, 1972, while I was living in summer camp at Sam Ford Fiord, there was one such hunt which lasted 30 hours. However, the actual time spent by three Inuit in the harvesting of 12 caribou was less than 20 minutes; the remainder of the trip was spent as follows: travel - 19 hours; stalking after initial sighting - approximately 3½ hours; butchering and transport of carcasses to the shore - roughly 7½ hours. That this is a high intensity activity is attested to by the fact that the hunters on the trip made just one stop for tea, lasting some 30 minutes, after all the meat harvested was cached on the shore of the fiord.

As has been pointed out, once a group of hunters leaves the main camp, leadership of the group is assumed, with very few observed exceptions, by the oldest male. On one trip, however, a younger man acted as the party's leader as the oldest member participating was from outside the Clyde region and unfamiliar with the area. Once a group returns, the camp isumataq directs the allocation of meat among the households in camp. This is generally done immediately upon the return of a successful party to camp.

The allocation process, particularly if a large supply of meat is in camp, is sometimes the occasion for a communal meal (nirriyaktuqtuq). Such meals are most often called to ensure that all those present in camp obtain a share of the harvest. This was explained in relation to the fact that when non-residents are in camp who are not within the normal circle of sharing, communal eating serves as an important means of sharing animals, such as caribou, arctic char, or seals, around which, unlike large species (narwhal, walrus, polar bear), there is no specific obligation to share outside the extended family (See Damas, 1972a:231-2). In such cases, the group is informed of such a meal by children announcing it to each household and all those present in camp were expected to participate.

Summer caribou hunting continues as long as the season allows, although, in late August there is a tendency to relocate camps closer to the mouths of fiords and bays. This is generally done in expectation of the arrival of narwhal on their southward migration. Hunters may continue caribou hunting closer to camp, although it is rare for animals to wander into these areas.

Narwhal comprise the third major procurement subsystem available to the Clyde Inuit in summer. Whether narwhal are in fact hunted in any year is dependent on conditions along the coast. If the outer coast and fiords are relatively free of ice, narwhal will often come well into the inshore areas. If heavy ice persists through the summer, as it did in 1972 and 1978, it is possible that no whales will be accessible to the hunters. While the situation is neither entirely black nor white (as for instance, when ice is packed along the coast but large leads provide areas for whales to surface and routes to the shallower fiords and bays), it is generally the case that in years of persistent sea ice few whales will be harvested.

The Inuit state that the best conditions for narwhal hunting occur when canoes can be used to herd pods of whales into shallow water. The high rate of success by this method over ice edge and lead hunting has been confirmed by Silverman (personal communication) during two summers of biological fieldwork on narwhal at Pond Inlet. Data from good and bad ice years at Clyde show that in 1972 and 1978, summers of heavy ice, zero and four narwhal were harvested, respectively. However, when open water allows the entry of whales into shallower waters and boats can be used, as in 1971, 1973, 1977, not fewer than 28 narwhal were killed by hunters from Aqviqtiuk and Clyde River in each season.

Although the period in which narwhal can be hunted is short--rarely more than three weeks, if conditions are promising--virtually every Clyde hunter participates. With open water, canoes with three or four Inuit will travel up the Clyde coast to Sam Ford Fiord or Scott Inlet to intercept the animals. The main hunting technique is for one or two boats to drive a pod of whales into a shallow bay and, while one boat keeps the animals from escaping, the other tracks and shoots individual narwhal. Heavy caliber rifles are used in such hunts and, when an animal is sufficiently weakened by gunfire so that it cannot sound, a long toggle head harpoon with a sealskin or oil can float is attached to the carcass.

Once the carcasses have been butchered for muktuk, they are abandoned and the hunters return either to camp or the main settlement. The dispersal of muktuk, unlike that of seal or caribou, is much more generalized and follows the pattern described by Damas (1972a:232) among the Iglulingmiut for sharing of walrus and other large game. While at Clyde River and Aqviqtiuk, I was unable to distinguish any recognizable pattern in this distribution, whether along kinship or other lines.

In Clyde, hunters would begin to distribute muktuk as soon as they had beached their boat. At that time, anyone present received a share, usually a slab weighing between 15 and 20 kg. In addition, it was a common occurrence for people to begin eating muktuk as soon as the boat was secured. In the case that an individual or household had not been present at the landing, a share was acquired by simply asking one of the hunters involved. It was only after this initial distribution was completed that a hunter would leave the muktuk in his possession at his father's or older brother's house, in the same manner as seal or caribou.

II. Secondary Summer Procurement Subsystem

Like the principal subsistence subsystems found in summer in the Clyde area, the minor procurement sets reflect the dualistic marine-land opportunities open to the Inuit. Among these less important species are geese and ducks, bearded seals, and arctic char. The importance of any one of these minor resources is closely related to their availability in the course of the season.

Geese and ducks are probably the least reliable component of the summer hunting period. The chief reason for this is that, even in the best of times, these migratory waterfowl species are usually late season arrivals in the Clyde region. Clyde is not a major nesting area for these birds and, so, the geese and ducks that are found in the region arrive toward middle to late August with few remaining in the area after mid-September.

Snow geese are generally found on the low wetland areas between Clyde River and the Kogalu River. As very little summer hunting is done by the Clyde Inuit on this foreland, and since caribou rarely are found in the area, exploitation of these southward-migrating flocks is confined to periods when coastal ice conditions prevent movement to areas normally hunted for caribou and when ringed seal hunting is infeasible. At such times, groups of two to five men may walk north from Clyde River to the lake and marsh area where the largest flocks congregate in the interior of the foreland. These trips necessarily require that the hunters travel light, with each man carrying 10 to 15 kg of gear, and may last from three to five days.

Deliberate trips for inland geese are rare and are undertaken only when deteriorating ice conditions along the shore prevent seal hunting from the land. It is much more common for hunters to take geese while hunting caribou in the river valleys that run into Clyde Inlet and Sam Ford Fiord or in the valleys between Scott Inlet and Dexterity Fiord.

At these times, smaller flocks, which are sometimes in a molting phase, are encountered and are then actively hunted.

Most of the ducks taken by Clyde hunters are generally taken while men are either seal hunting by canoe or traveling by boat. While quite large flocks of eider ducks, in particular, are somtimes happened upon on the water, their shy nature means that invariably they must be taken in flight. However, it is indicative of Inuit awareness that most boats are equipped with at least one shotgun for just such an eventuality.

Overall, very few migratory birds are harvested by Clyde Inuit. At a maximum, approximately 200 geese are taken during a summer, although accurate data is lacking, since such kills are often consumed almost immediately with very few returned to the settlement. By the same token, no accurate harvest of ducks is possible, although somewhat fewer than the number of geese appear to be taken each summer. The importance of waterfowl cannot be slighted, despite the relatively low numbers killed, since in particular years, such as 1972, when little other subsistence activity is possible, their importance is markedly increased. An increase in waterfowl harvest may, in fact, be expected in the Clyde area with the introduction of all-terrain vehicles, such as trail bikes, in the last few years. Such machines, put much of the lowlands between Clyde Inlet and the Kogalu River less than two hours travel from Clyde River. During 1978, it was noted that numbers of young hunters from Clyde River used the enhanced mobility afforded by these machines to make individual trips onto the Clyde Forelands for geese. Whereas in 1972, such hunts took up to five days, bike equipped hunters were able to accomplish the same trip in 10-12 hours.

The composition of groups engaged in geese and duck hunting varies little from that of caribou or seal hunting. Generally, such groups were made up of several close consanguinal kin and, possibly, one or two affines or non-kinsmen. Leadership on such hunts closely follows the pattern already described for major hunts. An exception, however, was observed in relation to motorized goose hunts seen in 1978. In almost all cases, these were made up of hunters from within a single generation with kinship bonds of little or no consequence.

Bearded seal hunting occurs in conjunction with open water ringed sealing. While bearded seal are presently perceived as having little economic value outside of the Aqviqtiuk settlement, where they are cached as dog food, Clyde hunters harvest this larger pinniped whenever possible. While generally seen as a poor food resource, ujjuk hide is still used for making sealskin line and younger animals are eaten when other foods are not readily available.

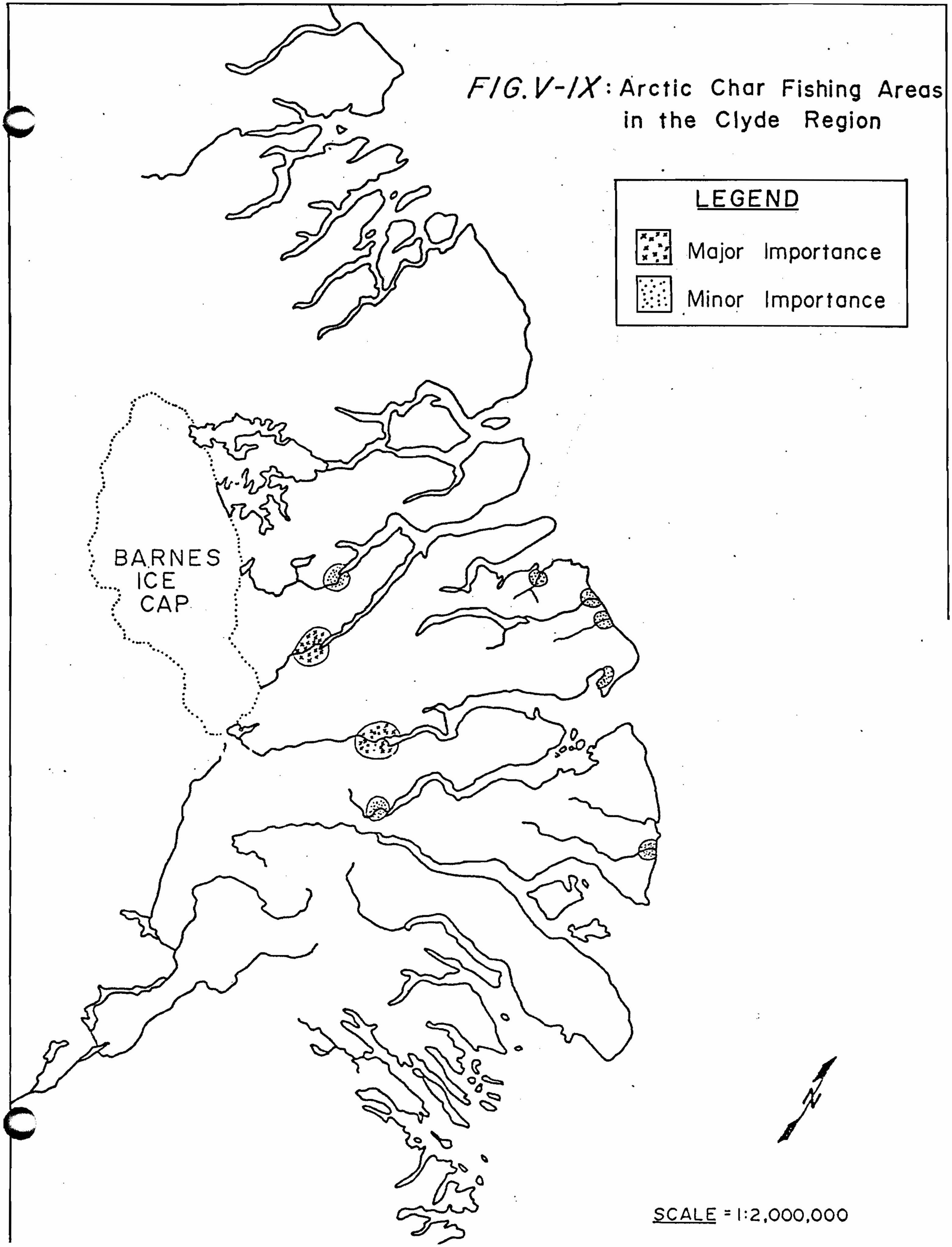
Bearded seal are relatively common to the Clyde coast from July onward and, since their appearance is distinctive from that of ringed seal, hunters obviously actively seek them. Two methods are used in bearded seal hunting. The first is to find an animal hauled out on an ice pan. In such cases, only a single boat is needed for the hunt. The other is when an ujjuk is found in open water. At these times, at least two boats are necessary as bearded seal are able to cover long distances underwater. The technique employed is to form a wide circle around the seal in order to prevent it from getting beyond the boats; then, each time the animal surfaces it is driven back under by rifle fire until it is exhausted and its dives become shorter. When the animals is tired and unable to dive, the boats move in to finish it. Once a bearded seal is killed, it is immediately towed to nearby ice or the shore, where, if it is a young animal, it is butchered and the meat taken, or, if too old, just skinned and the carcass abandoned.

Arctic char fishing in the Clyde region is, for the most part, a secondary activity carried out in conjunction with caribou hunting. Most major fishing areas around Clyde are well removed from either of the two principal settlements (See Fig. V-IX), with the two primary locations being Sam Ford Fiord and Clyde Inlet.

Char fishing is almost always done by setting gill nets either at the mouths of rivers or in salt water, where rivers join the sea. The use of nets has replaced the construction of stone weirs (seputi) and fishing with leisters, although such methods were used until the early 1960's on some of the smaller rivers in the region. The general pattern at Clyde Inlet and Sam Ford Fiord is for two men to set lengths of net 15 to 20 m long, using a canoe to emplace them beyond the low tide mark, with beach stones as weights and plastic oil containers as floats. These nets are checked usually two to three times each day, while, in the interim, hunters make forays inland for caribou.

Char fishing at sites located on the Clyde Forelands, unlike trips made down the fiords, are usually exclusively for fish, since very few caribou are found near the coast. Besides setting nets, men will sometimes fish with rods and reels, but only for very short periods of time, or take the opportunity to hunt seals by boat. According to informants, until recently, many of what are now considered minor fisheries were much

FIG. V-IX: Arctic Char Fishing Areas in the Clyde Region



productive and trips to areas such as Clyde Inlet were not necessary. For instance, a series of three small lakes, less than five kilometers from the Clyde River settlement had an extensive run of arctic char into Patricia Bay. This run, as well as those on a number of rivers draining the Forelands, appears to have been severely reduced by the late 1960's, both through increased usage by a concentrated population and the use of small gauge nets, which resulted in the harvesting of fish from all age groups.

The organization of fishing trips differs little from that of caribou and open water sealing parties, primarily because multiple harvesting activities are incorporated into most hunts. Since fishing requires very little expenditure of time beyond the initial setting of nets, most Inuit carry out seal or caribou hunting at the same time. The distribution of fish generally follows the kin-prescribed pattern found with seal or caribou. It is notable that a form of commensal meal, distinguished by a distinct invitational cry, is associated with large harvests of fish. As in the case of caribou, arctic char is another species with which camp-wide commensalism is associated. The primary purpose, once again, appears to have been to ensure that individuals and households not usually included within the sharing universe of the restricted ilagiit participated in the distribution of surplus. As with caribou, the announcement of the meal was made by children, usually those of the camp isumataq. Char, like caribou, had its own distinctive cry associated with it which informed participants of the kind of food to be eaten.

III. Opportunistic Summer Procurement Subsystem

In contrast to the rather constricted nature of the Clyde winter subsistence system, opportunistic hunting opportunities in the summer were, like the more important procurement subsystems of that season, carried out among several species in both the land and marine environments. In general, however, while the marine aspect of this hunting was potentially the most important, it was the land hunting which was the most evident.

The two species upon which opportunistic marine hunting may be said to have focused are walrus and harp seal. Although both species were relatively scarce in Clyde waters, the Inuit were particularly watchful for their presence in the course of open water sealing. One area, in particular, was considered an area where harp seals might be encountered. This was the open water some 15 km off Cape Christian. Men, when traveling through this stretch of water, were especially alert for the distinctive swimming style of harp seals.

The importance of harp seals to Clyde hunters comes from their potential contribution to the cash economy. Informants from both Clyde River and Eglinton Fiord all stated that harp seals were considered poor quality food with their only significant value coming from the sale of skins. Despite this attraction, the fact that harp seals are present in the region for only a brief portion of the summer and that poor ice conditions may prevent Inuit from locating them has limited the total annual harvest of harp seals to an average of five or six in most years.

Walrus, while recognized as an important food resource, is presently of virtually no consequence. Since at least 1970, the period for which accurate data is available on this species from Clyde informants, only two animal has been harvested by Clyde hunters. At present, walrus are only found in the waters of northern Home Bay, some 160 km south of Clyde River, and it is men who occasionally hunt in this area who are primarily concerned with walrus hunting.

Although walrus are currently of almost no importance, it would be inaccurate to state that this has always been so. Informant data, as well as unpublished writings by Hudson's Bay Company employees serving at Clyde in the 1930's and 1940's, indicate that, prior to 1960, local concentrations of walrus in the Clyde region formed an important summer-fall subsistence component. The primary concentrations of animals were at Dexterity Fiord, Scott Inlet, Inugsuin Fiord, and Isabella Bay. Discussions with Inuit, who were formerly resident in these locations, indicates that walrus were gradually eliminated all through the area with the Scott Inlet animals the last to disappear around 1960.

An indication of the numbers taken can be surmised from a diary entry for 1941 (HBC Clyde Post Diary 1941-44) which states that Inuit camped in September at Piniraq, near the mouth of Inugsuin Fiord, harvested 14 walrus, while a similar number were taken at Isabella Bay. The number of camp residents at the former site was 35, while Isabella Bay had about 30. Later entries show that Hudson's Bay Company employees began to organize late season walrus hunts, using a longliner supplied to the post, at Inugsuin Fiord and, later, Isabella Bay.

With the low opportunity for any active and regular inclusion of walrus as part of the Clyde summer subsistence regime, it is difficult to comment on the patterns of leadership and social relations which may have been associated with their hunting. However, Damas' work (1969b, 1969c) among the Inuit of the Iglulik area, where walrus form an important element of the annual cycle, suggests that in terms of resource distribution walrus were most likely treated in the same manner as other large animals, such as narwhal and polar bear; that is, sharing was not ordinarily restricted to members of the ilagiit. It is also highly probable that basic decision-making and strategy formulation among hunters in pursuit of walrus closely resembled that described for the hunting of other forms of large game. In the one walrus kill made by Clyde hunters in this decade, it was observed that while meat was distributed among the crews of both boats present at the time of the kill, only the two hunters who actually shot the animal shared the tusks.

The land component of this subsystem, while concentrated on relatively insignificant economic species, such as ptarmigan and arctic hare, proved to be of considerable limited importance during four summers of observation. In general, most hunters pursued these species only while hunting caribou from summer camps. At no time were hunts organized specifically to puruse hare or ptarmigan. The general practice was for hunters to only shoot at animals which were flushed in the course of more serious caribou hunting. It was a rare occasion when a hunter deliberately tracked or followed either a hare or ptarmigan for more than a few minutes.

Another set of circumstances in which such small game was sought was by young boys and teenagers, who would often leave camp in a group for this purpose. Although very few such excursions culminated with material results, an important consequence was the support given such attempts by adults. More than anything else, such small game hunting was useful as a training exercise for young hunters. To a degree, such training is analogous to that described by Laughlin (1968:305-7) for Aleut children.

Summary

The Clyde summer subsistence complex, with its greater diversity in major procurement alternatives and variety of resource species, provides a dimension of expanded mobility to Inuit utilizing the region. Residence at this time is highly temporary with camp relocations occurring as often as five and six times during the course of the summer. Such relocations, however, appear to correlate with the scheduling of resources and are carried out under the direction of the camp or _ilagiit_ leader. The _ilagiit_ appears to remain the principal travel and residential unit, as in winter, although periodic fissioning of the total unit occurs during this period.

Unlike the winter, no single resource subsystem is the sole focus of subsistence activities. The availability of both marine and terrestrial resources, indeed, appears to be a major factor in the splitting and consolidation of summer groups. To a degree, however, the diversity present in the mixed resource options open to the Inuit is conditioned by events in the physical component of the ecosystem. At these times, activities may be limited either to one or more of the species comprising the minor resource set or to more energy consuming and low return types of hunting.

The opportunistic aspect of the summer complex, while relatively diverse, is in fact closely tied, at least in regard to its marine elements, to conditions which allow the practice of open water sealing and are, therefore, less reliable than the ptarmigan-arctic hare land component. This latter aspect is also important because it offers future hunters the opportunity to sharpen their skills and to relate to adults in a context outside the restrictive precepts of the nalartuk respect-obedience dyad.

Social Organization and Clyde Ecological Relations

The preceding section attempts to integrate two important attributes of Inuit adaptation in the Clyde region. The first is to show the nature of the substantive relations which occur between the human population and the non-human components of the ecosystem. In this regard, the primary focus has necessarily been placed on the subsistence aspect of the man-environment relationship, with Inuit technology, spatial arrangement, and activity scheduling in relation to environmental conditions forming the substantive component of the adaptive system.

At this level of analysis, there is strong methodological conformity to the perception of cultural ecology expressed by Steward (1955) and Helm (1968b, 1969). In addition, however, there is the recognition, suggested by Rappaport (1969:184-8), that the population which interacts with the ecosystem is composed of several referent groups, whose differentiation is the product of cultural-historical factors. It is possible, in terms of this understanding, to dissect the general pattern of adaptation presented in Table V-III with respect to the material conditions which apply to the ecological activities observed at Aqviqtiuk and Clyde River. In general, these differences are limited to the means used

Table V-III: Principal Adaptive Relationships in the Clyde System

System Components	Seasonal Associations (Jun / Jul / Aug / Sep / Oct / Nov / Dec / Jan / Feb / Mar / Apr / May)
I. Environmental Set:	
a. physical forms-	
1) usable light	24 hrs. — decreasing — minimal — increasing
2) temperature	0° C. — -20° C. — below -30° C. — -20° C.
3) sea ice	weak or absent — constant
4) lake ice	weak — absent — constant
5) snow	little or none — total cover
6) wind chill	negligible — major
7) wind speed	major
b. biological forms-	
1) ringed seal	basking or swimming — breathing holes — basking
2) polar bear	sea ice/coast (some females inland Nov. - Jan./Feb.)
3) caribou	near coast — inland winter range — near coast
4) narwhal	migrations
5) bearded seal	open water
6) arctic char	bays and open sea — inland lakes
7) small game	scattered
8) migratory birds	some nesting
9) arctic fox	inland — scattered over land and sea ice
Material Culture Interface: 1) hunting technology; 2) transportation; 3) shelter; 4) fuel	
II. Inuit Action Set:	
a. marine hunting-	
1) ringed seal	uuttuq and boat hunting — mauluqpuq — uuttuq
2) narwhal	leads and boats
3) bearded seal	boats
4) polar bear	land and sea ice
b. land hunting-	
1) caribou	summer camps — inland journeys
2) small game	occasional
c. mixed hunting-	
1) migratory birds	occasional
2) arctic fox	sea ice
3) arctic char	netting — inland ice fishing

in these activities, for instance maulukpuq sealing at Aqviqtiuk with toggle harpoons and dogteams as opposed to rifles and snowmobiles at Clyde River, and not to the generalized adaptive pattern found in the region.

Such data, however, represent what is in essence the basic physical "shape" of the Clyde Inuit adaptation. By this is meant the material functional aspects of the system, but not the attributes which regulate the operations. The reasons for delving beyond this aspect of adaptation are derived directly from the systems approach as a tool for the study of cultural ecological adaptation. Having accepted Boulding's view, stated earlier, that cultures and societies are open systems and, as open systems, develop mechanisms for defending the integrity of their structures, there must, then, be some other set of attributes which function to amplify the efficiency of adaptation. That such amplification may be necessary beyond the material culture features is assumed, since it has already been shown in Chapter Three that a high degree of randomness exists in the non-human component of the Clyde ecosystem. The gap between technological controls and environmental uncertainty suggests that non-material cultural phenomena contribute importantly to increasing the effectiveness of these material relations by providing the means for organizing requisite activities through internal mechanisms.

Both Sahlins and Adams have made observations pertinent to this integrated approach in the analysis of human ecological adaptation. Sahlins (1960) has noted that increased thermodynamic acquisition has as its structural base increased organization. Likewise, Adams observed that,

> It is probably the case that our best approach to the interior-exterior connections will be had through a combination of energetic and structural analyses. (Adams, 1974:24)

What these statements stress is that any picture of substantive ecological relationships presented in a dualistic framework ignores the fact that in human societies there are non-material organizational structures which facilitate material relations.

It should be remembered, however, that the importance of non-material structures in cultural adaptation have not been ignored in the literature. Rappaport (1968, 1969:187) explicitly states the importance of ritual in Maring culture as a means of restoring equilibrium in the local system, while Levy (1966) and Boulding (1970) note the sophisticated institutional formations which order man-environment relations in Western society. In respect to Inuit culture, and hunter-gatherers in general, the mechanism which operates most like the institutions described for more complex societies, in terms of inter-component relations, is kinship.

Spencer (1959:124) observed, in this vein, that,

> Because the social relationships in the cultures of the Eskimo . . . are so intimately affected by economic considerations, it becomes virtually impossible to offer treatment of the separate institutions. . . . it was the family and kinship grouping which underlay the considerations of economy and environments. . . .

Spencer's comments on Inuit kinship and economic relations were substantially broadened by Heinrich (1963), who perceived that kinship was as important as technology in the formation of Inuit adaptation,

> Kinship, operating in a variety of ways, is the important other adjustive mechanism since there is little else in the way of integration at a higher level than kinship in Inupiaq society. (Ibid.:68)

While this latter view comes close to expressing the multi-variable interdependence inherent in cultural adaptation, it nonetheless maintains a dualistic causality between components in which kinship and technology are seen as co-adaptive mechanisms that function simultaneously, but independently, of each other, in culture-environment interactions. This may be expressed roughly as:

$$\text{CULTURE} \leftrightarrow \left| \frac{\text{technology}}{\text{kinship}} \right| \leftrightarrow \text{ENVIRONMENT}$$

The work of Heinrich (1963), Heinrich and Anderson (1968), and Damas (1969b, 1969c, 1975a, 1975b) are of particular importance <u>vis-à-vis</u> the discussion of the integrative role played by kinship in Inuit ecological adaptation because each has attempted to define social structure and organization in reference to ecological arrangements. In general, both determined that the behavioral directives, referent to terminological and dyadic associations based on kinship, relate primarily to internal ordering and only vaguely to substantive ecological activities.

The principal areas in which these investigators have interpreted correlations between the internal structural features and ecological activities of human societies have been in the spatial arrangements in relation to resources, and in the correspondence between kinship and economic networks, Spencer (1959:124) noted a similar relationship. In reference to internal features, Heinrich (1963:72) and Damas (1969b:47; 1975b:26-7) noted that the mobility of traditional Inuit social organization, especially exemplified by the fluidness of kin-correlated band aggregates, appears to be a clear ecological response. In summer, when the primary Inuit resource focus is caribou-fish, there is a tendency for extended family/band units to divide along nuclear family and generational lines to more effectively exploit spatially dispersed resources; in contrast, when breathing hole sealing became the principal means of production, aggregations composed of one or more extended families united in winter villages in proximity to dense concentrations of ringed seals.

The second area in which social structural features are seen to have had ecological relevance are those kinship elements which widened the geographic and economic universe. Such internal features as bilateral kinship, spouse exchange, and adoption, facilitate the recruitment of personnel, the arrangement of economic networks, and the hierarchical differentiation of roles through the behavioral precepts associated with kinship.

It is not in question whether the above mentioned relationships are ecologically adaptive. Clearly they are. However, the context which Heinrich, Damas, and Spencer have established is seen here as too restrictive. If technology is an inadequate mechanism for regulating interactions between the cultural subsystem and the external environment (Slobodin, 1969b), the view stated by Heinrich (1963:68) that kinship is the important other adjustive mechanism for ecological integration by Inuit is contradictory, since it is social structural parameters which provide the flexibility to meet ecological pressures.

In an earlier section describing the relations between human and non-human subsystems in the Clyde region, an attempt was made to show that the external operations of the Clyde Inuit are not limited to either spatial placement or material technology, but include particular organizational patterns which derive from the cultural system. Likewise, these organizational features do not function merely as adjuncts to the material attributes of the adaptation; to do so would imply that two simultaneous, yet independent subsystems exist. The limited examples described earlier in the chapter serve to show that an essential component in the Clyde adaptation, that of kinship-derived behavioral regulators, operates in a broader context than the ordering of interpersonal relations. Because no other mechanisms are available for reducing the costs of production, kinship information serves in an expanded form as the chief referent for regulating externally-directed, as well as intra-component, behaviors. The distinction drawn here is primarily oriented toward the limits of kinship-correlated behavioral directives as posited in the literature, rather than any difference over conclusions of ecological adaptiveness that have been drawn by Damas, Heinrich, Spencer, and others.

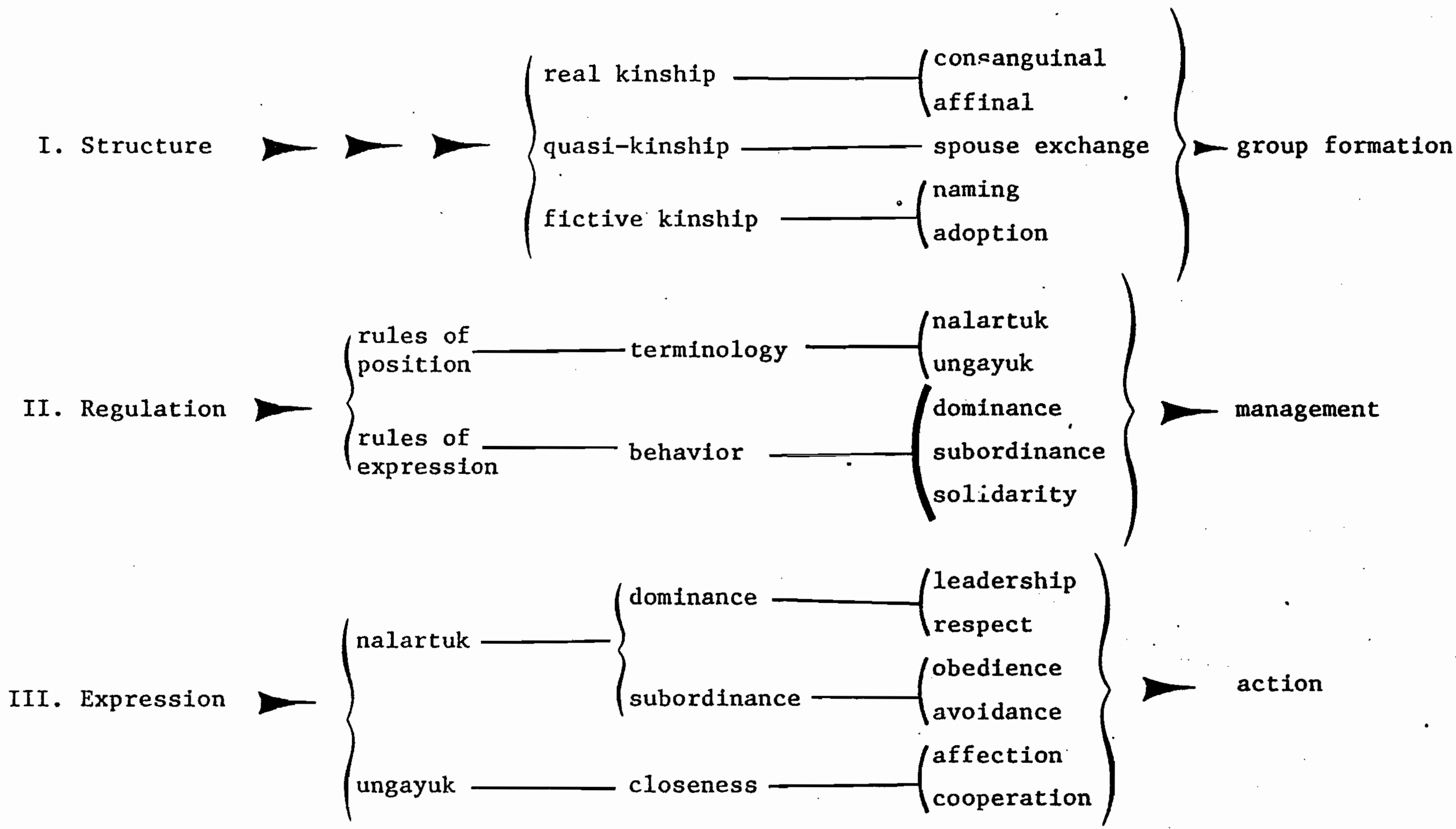
A frequent observation is the recognition of the extended family as the essential socio-economic formation among Iglulingmiut Eskimos (Damas, 1963, 1971, 1975a, 1975b). Damas (1971:65-6) made the point that during the period of fission, when elements of the extended family/band dispersed in pursuit of caribou and fish, ". . . the inland groups of young men and their nuclear families for the period formed decapitated extended families." Data on the organization of personnel and the formulation of strategy for hunting at Clyde indicates that, although many activities required the temporary separation of extended family members--either as whole nuclear families as described by Damas or of household heads as in Clyde today--these were regulated within the framework of directives derived from ilagiit dyadic organization.

In general, it appears that at the present time hunters function with a greater amount of autonomy, than previously, in regard to territory, technology, and allocation of effort and resources than they did formerly. Observations at Aqviqtiuk and Clyde River indicate, however, that the independence, which is frequently associated with Inuit hunting in the region, is in fact regulated by explicit behavioral directives. These directives, within the context of what was the local band in the Clyde region and is recognizable today as the extended family, are based on the kinship-correlated dyads of inter-generational subsuperordinance (nalartuk) and solidarity within the kindred (ungayuk). The importance of these directives to the stabilization of social relations within and without the kin group is shown as follows (See Fig. V-X).

The framework presented in the figure outlines the ideal arrangement of social relations within the boundaries of the Inuit kinship reticulate; that is, all those whom kin terms may be applied. It should be noted that in this framework the key elements connecting organizational structure and behavioral expression are the kinship-correlated dyadic axes which govern interactions within and between the generational levels that comprise kinship grouping. As Damas (1975b:20) suggested, it is the information associated with these dyadic pairings which provides the behavioral reference points needed for integration adaptation within the social subsystem.

The rules of position, as shown in Figure V-X, are generally perceived as operative within the context of the expanded ilagiit/kindred/local band situation, since, following earlier statements in Chapter II, it is only through kinship that the requisite web of social and economic relationships can be maintained. In this circumstance, these kinship mechanisms facilitate the types of ecological relations posited by Damas

Figure V-X: The Organization of Inuit Social and Ecological Relations



and Heinrich. In addition, it is possible to expand the influence of social organizational elements in ecological activities by recognizing the information derived from second level behavioral directives, the regulatory level, provide a convenient and, indeed, as is possible to interpret Heinrich's (1963) analysis, a necessary means of regulating interactions with external, as well as internal, adaptive meaning.

The data collected at Aqviqtiuk and presented in the preceding section are important in demonstrating this point. Aqviqtiuk represents the last example, in the Clyde region, of what may be described as the contract-traditional pattern of community organization. As it now exists, the community is composed of three consanguinally linked nuclear families (See Fig. V-VII) and, generally, functions along the lines of the _ilagiit_/ local band described in Chapter Three.

Within the Aqviqtiuk grouping, the ecological importance of the _nalartuk_ and _ungayuk_ behavioral axes is most obvious through the providing of a normative regulatory mechanism for subsistence activities. First, these dyads organize, in the manner referred to by Eggan, Damas, and Heinrich, the network of social relations which stabilize both the internal and inter-group arrangements of the central kinship formation, the _ilagiit_. This has been best delineated by Damas' (1963) work on Foxe Basin Iglulingmiut. Second, beyond the macro-ecological relations set out by Damas (1969b, 1975b) and others, this organizational information set forms the basis for those cooperative, externally-directed activities which are the core of Inuit ecological adaptation. This is accomplished through the organization of these activities as efficiently as is possible; that is, by limiting the cost of production within the unit. This maximization strategy, so to speak, is accomplished through the focusing of decision-making on resource use, activity patterns, and harvesting and follows from the dyadic precepts which order internal group relations.

The data presented for the Eglinton Fiord people illustrate the role these dyadic referents play in the material adaptation of the group. Leadership in subsistence activities, as well as internal relations, resides with the isumataq. All decisions concerning hunting, such as the relocation of camps, the composition of hunting parties, areas to be utilized, and the resource sought, are controlled by the isumataq. The respect-obedience expression embodied in the nalartuk dyad provides a continuum in the realm of ecological relations. As was shown, even when there is a temporary fragmentation of the central unit, as when several men travel inland to hunt caribou, they operate under the explicit directions of the isumataq.

At the same time, however, the leadership role, which arises from the nalartuk relationship, is not as inflexible as might first be supposed. Even in the separation of extended family elements, the principal of leadership based on generational-terminological position provides for the emergence of surrogate leadership within the fragmented group. At Aqviqtiuk, this surrogate role was most often filled by isumataq's brother, who, in the absence of his older brother, took over the responsibilities of decision-making, directing of activities, and social control. This temporary emergence occurred both in the context of the general settlement and the hunting party and clearly underlines the importance of nalartuk-derived central authority functions both in terms of insuring harmonious internal relations and the control function of the dyadic regulator in materially adaptive activities.

Similarly, the role the nalartuk structure plays in the allocation of harvested resources cannot be separated from the ecological nature of subsistence activities. The effort expended in organizing cooperative hunting activities would be valueless if the results were individualized. A second important adaptive consequence of these structural information regulators, ensures that resources are redistributed within the cooperative unit, either for immediate or future use. The concept of group resource appropriation and redistribution is central to Polayni's (1968) exploration of non-formalist economic modes. To view such economic activity as separate from the other aspects of Clyde Inuit subsistence is to see ecological interactions as a one-way process.

Allocation of harvest resources is, perhaps, the most apparent element in which the kinship-derived nalartuk rule operates in ecological relations. At Aqviqtiuk the division of these resources was determined solely by the isumataq. In winter, upon the return of all hunters to the settlement, the day's harvest was placed on the shore and the head of the ilagiit specified the portion of the harvest each nuclear family household was to receive. Surplus resources were assigned to storage by the isumataq and the disposal of this surplus was at the discretion of the leader. The importance of this responsibility was conveyed to me when, in questioning the Aqviqtiuk leader about the various aspects of the isumataq, he immediately informed me that he was obliged to see that there was always adequate food in the settlement.

While the informational importance of the nalartuk dyad is directly linked to the organization of ecological activities in a number of areas, the role of the solidarity principle embodied in the ungayuk dyad is less obvious. In terms of ecological relations ungayuk appears to be most important in the establishment of cooperative bonds between individuals of the same generation and sex. Essentially, nalartuk controls function, as mentioned previously, between generations and to establish vertical authority networks. On the other hand, individuals of the same status, who must cooperate in terms of social relations also form the basis for the cooperative subsistence unit. Solidarity, based on principles of gender and referent position, is important given the subordinant position of low terminological status individuals in relation to nalartuk authority. Disparities between same generation members is of little significance, since the primary patterns of dominance flow between generations.

At Aqviqtiuk, the adaptive significance of ungayuk closeness-solidarity bonds appeared to be in the expectation of cooperation in all activity spheres, both social and ecological. Distance between generations is embodied in the nalartuk obedience-respect dyad, although as Damas (1963:50) notes, ungayuk bonds do operate between adjacent generations. However, solidarity and cooperation are ensured because of the centralization built into ecological information content of the nalartuk directive. Under this authority precept, all subordinant individuals are obligated to share in the division of labor.

The ungayuk referent also functions in regard to the distribution of harvest products. While the isumataq clearly dominates the ningiq sharing system of the ilagiit, an essential component of the harvest processing phase is the equal allocation of all resources within the residential unit, regardless of the labor invested by individuals. While not all individuals or households receive equal shares, all are provided for proportional to their requirements and within the overall needs of the unit.

Although the Aqviqtiuk adaptive pattern serves as an excellent example of the interactive exchange that occurs between the material and non-material information components which form the local mode of adaptation, the Clyde River subsistence condition appears, superficially at least, far more confused. The reason for this less-than-clear picture of the Clyde village situation is the apparently independent and dispersed quality of Inuit subsistence carried out from the settlement. The considerably larger population and the proportionally greater number of hunters make data collection, such as that done at Eglinton Fiord, and activity observation a nightmare.

As was mentioned in the course of describing Clyde River subsistence activities, the hunting activities from this larger community are far less helter-skelter than they sometimes appear and are, in fact, organized through the same mechanisms which order the Aqviqtiuk adaptation. This picture of autonomy and individuality in hunting is fostered by the dispersal of extended family affiliates into several nuclear households across the settlement. In the early 1970's, when Clyde River was composed of only some 40 Inuit houses it was the exception, rather than the rule, to find brothers, parents and, married children residing next to each other. Now, the recent construction of 22 new detached housing units for the community has added an increased appearance of disjointedness within kinship units. This picture of highly individualistic hunting is further reinforced by the few studies which have been conducted on recent patterns of Inuit hunting (See Nelson, 1969; Beaubier, 1970; Bradley, 1970; Wenzel, 1975).

This appearance of residential and subsistence autonomy is highly erroneous. Hierarchical differentiation among extended family members closely parallels that noted for Aqviqtiuk. Decisions related to hunting flow, in general, from the head of the ilagiit to his sons or other male subordinants who may actually engage in hunting. While this is particularly true in regard to major undertakings, such as caribou or narwhal hunting, it also applies to more localized activities, such as breathing hole sealing, which usually is carried out within 25 or 30 km of the settlement. Breathing hole hunting in the Cape Christian area, while virtually a daily winter season activity, is never undertaken without consultation with the family head.

The distribution of harvest products, by the same token, follows the ningiq pattern (See Table V-IV) described for Eglinton Fiord. No hunter returning to the settlement goes directly to his own house. Generally, subordinant hunters go first to their father or elder brother's residence or, in the rare case that a man is without consanguines, to his father or brother-in-laws. The organization of subsistence operations and resource production shows the same internal nalartuk mechanism as described in Aqviqtiuk. Although the ilagiit tends to be highly dispersed within the village limits, coordination of externally directed activities is not dependent on voluntary alliances between hunters but, rather, follows from the same structural information set which unifies the single extended family organization of Aqviqtiuk. The most startling material example of

Table V-IV: Active Sharing Arrangements Observed at Clyde River

Type	Domain	Boundary	Control
I. Ningiq	1) expanded ilagiit 2) residential unit	1) kinship 2) none	isumataq
II. Nirriyaktuqtuq	generalized	open	isumataq
III. Akpaallugit	narrow	cognates	household head

Examples

Ningiq

1) Commodity: @40kg muktuk and 2 narwhal tusks from Aqviqtiuk to Clyde River; Primary Participants: Piungnituq (Aqviqtiuk) and Paneak (Clyde River), step-brothers; Secondary Participants: Paneak's parents and siblings.

2) Commodity: 10 arctic char and 5 kg caribou meat from Aqviqtiuk to Clyde River; Primary Participants: Qamminuq (Aqviqtiuk) and Ashivak (Clyde River), brothers-in-law (ningaugiik); Secondary Participants: Tassugat, Ashivak's father-in-law (ningaugiik).

3) Commodity: @160kg caribou meat; Primary Participants: 1) father-son (irniriik), (2) father-in-law - son-in-law (ningaugiik); one caribou; Secondary Participants: ningiq distribution to sibling households.

Nirriyaktuqtuq

1) Commodity: @25kg ringed seal; Primary Participants: all Aqviqtiuk residents and one non-kin visitor. Note: communal meal held in isumataq's dwelling.

2) Commodity: @65kg caribou; Primary Participants: all Aqviqtiuk residents and three cognate households. Organized by Aqviqtiuk isumataq.

Akpaallugit

1) Commodity: 10kg seal meat; Primary Participants: Qamminuq (Aqviqtiuk household head) and two brother-in-law (ningaugiik).

In addition to traditional foods and materials, store items were often included within the scope of such sharing. On several occasions, Piungnituq, upon completing a trading trip to Clyde River, supplied his parents-in-law with items, such as flour and sugar, as well as meat, fish, and salable fox and seal skins.

the subsuperordinant relationship in regard to the _ningiq_ network and the role of the _isumataq_ in the distribution and control of harvest products at Clyde River comes from the fact that five of the eleven extended family heads in the settlement possess deep freezes which were purchased in concert with subordinant members of the group. Two informants noted that this arrangement insured that meat for the group could be stored throughout the summer and that all personnel had equal access to stored foods.

The importance of _ungayuk_ cooperative networks based within the extended family formation is, if anything, more readily obvious in its functioning in Clyde River than at Eglinton Fiord. This is because at Aqviqtiuk money, as a resource, is tightly controlled by the _isumataq_ and its allocation for equipment and staples is done by the camp leader. When trading is done at the Clyde Hudson's Bay Company post, it is the _isumataq_ who deals with the store manager. It is only after trading is concluded by the camp _isumataq_ and staples for the camp purchased that individuals receive money for other purchases.

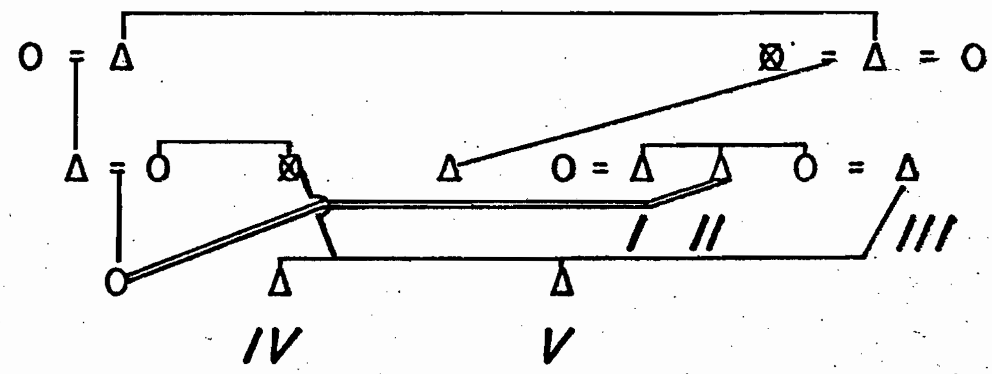
At Clyde River the cash aspect of the economy was far more individualized in terms of exchanges at the store and the purchasing of store goods. Each hunter purchased such equipment as he could afford or was allowed credit for. It was rare for cash to be loaned between hunters, whether they were kin or not. On the other hand, equipment held by any member of the _ilagiit_ was accessible to all other members of the formation. It was not unusual for a man to note that he was using his brother's canoe or father's guns in hunting.

More importantly, although a vast number of hunting associations were available within the settlement, the parties which were formed generally were composed of two or three close consanguines as the core and one or more affinally or otherwise distantly linked individuals. The extent and variety of these associations were at times only slightly less than staggering (See Fig. V-XI), yet the participants all were aware of the connections between them. It must be remembered that, while these associations were frequent, all individuals did not participate in every hunt nor necessarily spend time together in the settlement. In the first composite, hunters I, II, and III formed the nucleus of a hunting group which was often joined by hunter IV and less frequently by V. In the second example (Part B), hunters I and II nearly always traveled together while hunting and were frequently joined by hunters III and IV. Hunters V, VI and VII because of age distance from the core members and--in the case of VII--closer affiliation with his own collaterals, were only occasional participants in the group, however, V and VI when they did hunt, did so in concert with hunters I, II, and III.

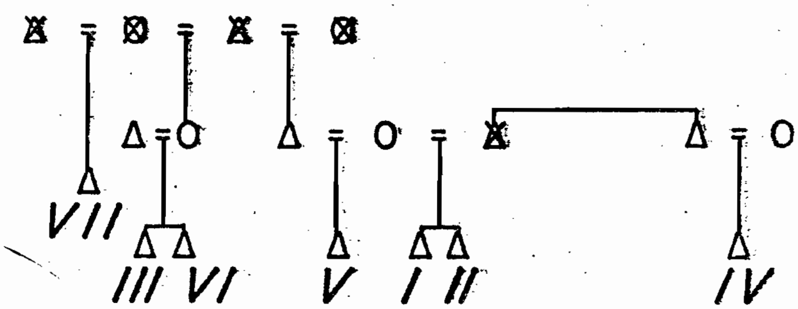
Interpersonal association forms only one aspect of ungayuk solidarity in the Clyde River situation. Of nearly equal importance is the access to equipment which these precepts provide affiliates, particularly the less skilled hunters. In example A, hunter IV, a very poor hunter with a marginally equipped hunting outfit, was able to freely depend on hunter III and through him hunters II and V, both of whom III addressed as angayuk or older brother, for gasoline and other equipment. In addition, both II and III told me that when they were bear or narwhal hunting with IV that they tried to ensure that he always got an animal.

FIG. V-XI: RELATIONAL NETWORK OF TWO CLYDE RIVER HUNTING COMPOSITES

A.



B.



A similar situation existed in the second case. Again hunter IV, although a good hunter was poorly equipped because, being only 17 years of age, he was unable to obtain credit at the settlement store. Therefore, hunters I, II, and particularly III, freely shared their outfits with him and often asked him to join their hunting trips.

The role of kinship in cementing Inuit economic and social relations has been well noted by Moyer (N.D.) in his analysis of communal solidarity at Salliq, Southampton Island. However, as the cited examples illustrate, kinship, even when tenuously stretched, as between hunters I and II and IV in the first example and hunters III and IV in the second case, is an important mechanism for facilitating subsistence activities. Further, the behavioral information which Damas and others have established as central to internal social ordering also plays an equally essential function in ordering the authoritative and cooperative behaviors critical to Inuit ecological success.

An important conclusion to be drawn is that even if no more direct kin ties are present, the system of affiliates still retains flexibility (See Heinrich, 1963:72) to meet ecological as well as interpersonal, contingencies through the extension of the normative kinship scheme. This conforms to Heinrich's (1963:69) statement that Inuit kinship is permissive and that its emphasis is on establishing mutually advantageous relationships between individuals. At Aqviqtiuk, these interconnections are real and within the established boundaries of the ilagiit; however, in the two examples cited from Clyde River, the links between individuals were outside the recognized limits of the kindred group, but, in both cases, kinship ties were involved as the basis for the relationship.

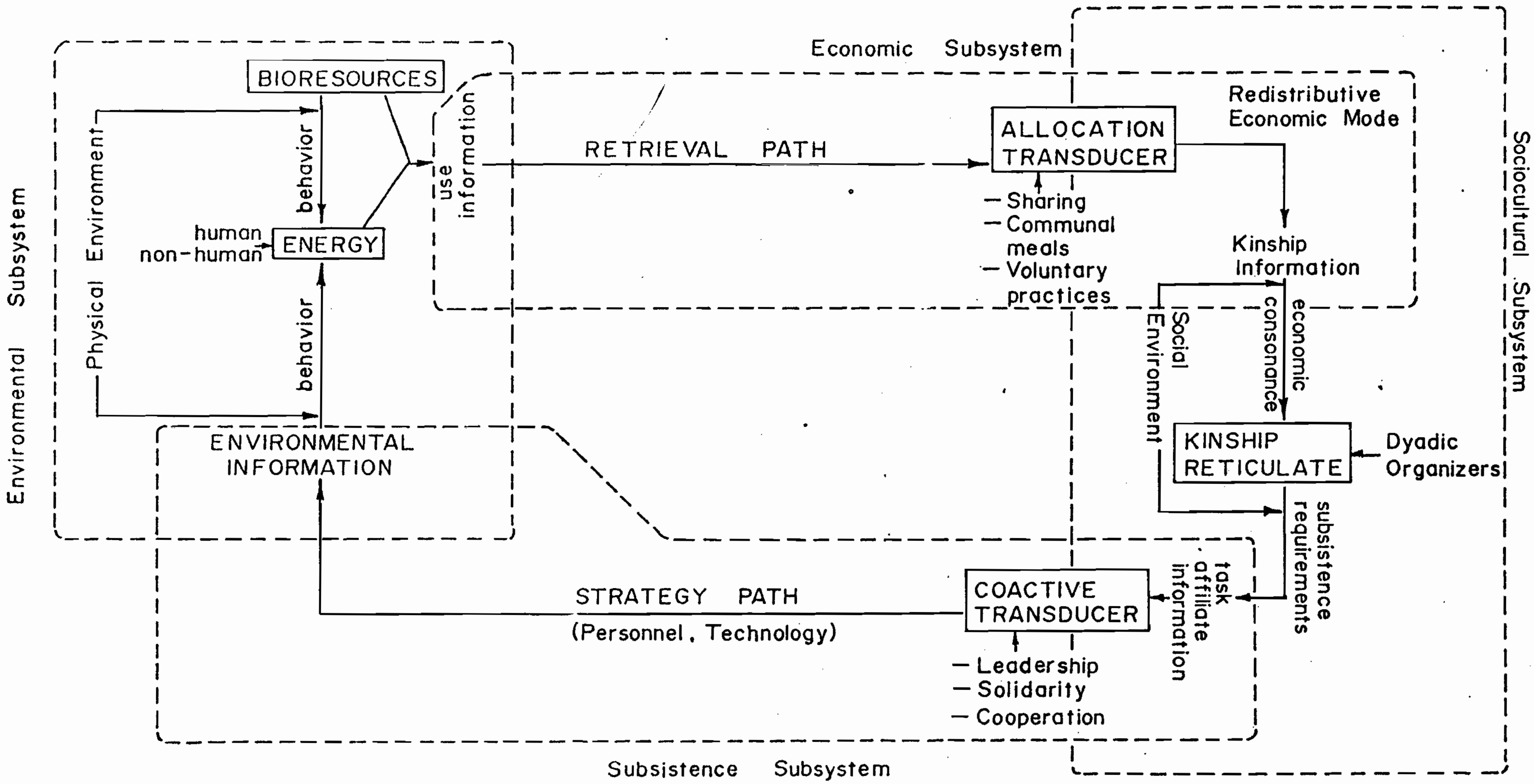
This expanded view of Inuit kinship as an ecological, as well as social and economic, mechanism of adaptation is seen here as providing a fuller view of Inuit ecological adaptation than the more circumscribed perspectives of other investigations. In general, it can be said that no Inuit hunter's actions are physically or socially isolated from those of other hunters. Indeed, Spencer (1959), Heinrich (1963), and Damas (1963, 1969b, 1975b) have all been cited in respect to their noting the importance of collective behavior in Inuit cultural ecology. However, all can be said to have drawn some distinction between social-cultural and ecological activities.

The foregoing material has attempted to show this separation of social organizational and ecological information is incompatible with the reality of observed behavior among Inuit hunters in the Clyde area. The integration of hunters in cooperative subsistence and ecological endeavors, which, as has been often repeated in the literature, is a necessity, can be best organized in most circumstances via the machinery of kinship, since there is literally no other strong institution or framework for ensuring the cooperation among Eastern Arctic Inuit. The analysis presented here is based on this fact. Bio-behavioral models, such as that postulated by Laughlin (1968:310), see hunting as an integration of individual capabilities and environmental knowledge and fail to take into account the essence of ecological adaptation; that all aspects of an organism's behavior contribute to this adaptiveness. Likewise, Helm's (1968b:119, 1969:151-2) view of hunter-gatherer cultural ecology, which focuses on the spatial and temporal placement of hunters and the application of technology, encounters the same difficulty, namely, how do hunters organize cooperative exploitative activities given that adequate environmental information is in hand. Lastly, Heinrich's (1963) view that kinship is the other important ecological adjustive mechanism, along with technology, leaves open the question whether social structure and technology are integrated into Inuit ecological pattern or whether one is of secondary importance to the other, as in the case of Watson (1970) in which kinship serves a contingency function between Highland New Guinean groups.

The direction taken in the present analysis has been to look at Inuit adaptation in terms of its information, as well as its material, components. The organization of Clyde hunters into cooperative units, as is necessary, is carried out via the directives which form the behavioral content of Inuit kinship. The following figure diagrams (Fig. V-XII) the manner in which the structural information component of Clyde Inuit society integrates into the overall adaptive mode exhibited in the region as a regulator of the system's processes.

As is shown, four primary subsystems form the total system. It should be noted that no accommodation has been made in the figure for inter-cultural exchanges, since, with limited experience, introduced items of technology had little impact on the local Inuit adaptation in the early 1970's. The two focal subsystems are the environmental and sociocultural sets with the former composed of a variety of physical and biological interactions and the latter human relations predicated on the normative ordering of behavior through kinship. The two polar sets are joined through what I have termed the exploitative and economic subsystems which represent the input-output exchanges between the first two subsystems.

FIG. V-XII : Clyde Inuit Mode of Adaptation



In the model, the central focus is placed on the sociocultural subsystem, since, following the work of Damas (1963) and Heinrich (1963), it is in this set that the internal integration of behavioral norms and expression occur. While kinship serves as the principal organizing mechanism in this process, these same regulators, as had been here suggested, perform a similar integrating function in relation to Inuit ecological maintenance and adaptation. In this regard, the central attribute in the analysis is the kinship reticulate which is the primary relational universe for the individual. As was shown earlier, it is through kinship that the individual's position and relations with all others are established.

While kinship is of the highest importance in regulating interpersonal behavior, it also affects ecological behavior, since, as Damas (1971) has noted, in regard to Eastern Arctic Inuit, it is with kindred that the densest and strongest bonds are established. Given the principle of kin solidarity (ungayuk), which comprises one of the two main aspects of the dyadic structure, it is consistent that task affiliates are generally formed from among kinsmen. Data from both Clyde River and Aqviqtiuk confirm that this is the case, although the distance between even regular hunting partners shows the wide degree of permissiveness within the system. It also appears, therefore, that kinship is extremely flexible when contingencies require recruitment beyond the formal limits of the extended family.

The part played by the nalartuk dyad is obvious. The principle of isumataq or leadership by the oldest male of the extended family is directly paralleled in hunting activities by group leadership being naturally assumed by the most experienced participant. While exceptions were noted during the study, the reasons for deviance from this general rule were most apparent.

The organization of personnel for hunting then feeds into the exploitative subsystem. The requisite personnel and technology having been assembled (see the coactive transducer), a specific strategy for action can be undertaken in which one or more resources in the environmental subsystem can be collected. It is in this component that the non-human aspects of the system are of the greatest consequence.

The output which results from these man-environment exchanges forms the material substance of the Clyde economic subsystem. However, before absorption into the sociocultural assemblage, this output is redistributed according to definite structural relations which are organized on the basis of kinship information. This redistributive pattern, shown in the figure as the allocation transducer, is seen in its most common form as sharing or ningiq. As has been discussed, sharing involves a set of specific determinations which are derived through the dyadic precepts which order all other Inuit normative associations. This economic mode functions to ensure that consonance within the cooperative formation remains stable. Kinship information necessarily is of importance if only because the recruitment of the task affiliate is so organized. Likewise, the dyadic mechanisms of nalartuk and ungayuk operate to directly dampen deviation from the normative pattern. The authority relation centralizes this allocation process, while cooperative solidarity reinforces associative bonding.

This model incorporates the general elements recognized by Heinrich (1963) and Damas (1969b, 1969c, 1971, 1975b) in regard to internal organizational relationships which occur in the sociocultural subsystem. It also borrows heavily from the bio-behavioral conceptualizations of Laughlin (1968) as they pertain to material subsistence processes. However, the identification of non-material mechanisms as regulators of material relationships for the integration of various components in the system serves to unify what otherwise appear as two closed and non-influencing behavioral frameworks, one structural and the other material, in which interpersonal behavior is regulated by dyadic mechanisms and ecological actions by material human and environmental attributes. The model shows how the mode of Inuit adaptation in the Clyde area reflects the integration of these two primary subsystems based upon the information organizing capacity of non-material cultural structures in relation to known technological and environmental requirements needed for maintenance of the human system.

CHAPTER VI

CONCLUSIONS AND COMMENTS ON THE ANALYSIS

To those within a system, the outside reality tends to pale and disappear.
John Gall in Systematics: How Systems Work and Especially How They Fail

The Clyde Study and Inuit Cultural Ecology

Gall's (1975:67) statement, although outwardly frivolous, does, in several ways, have meaning relative to the Clyde study. First, Gall provides a simplified restatement of Boulding's concept of "image". In essence Gall, like Boulding (1961), has concluded that societal systems have, as an essential attribute of their wholeness, an internal organizational structure which is based, to use Boulding's term (Ibid.: 11), on value, as well as fact. The second meaning has applicability with reference to the framework imposed on the question at hand. This is basically one of emics and etics; the attributes of a relational set, which the observer identifies, are not necessarily all those considered by the actor. Steward (1955) went a long way toward overcoming this dichotomy, but the problem remains.

In Chapter Two of this study, it was postulated that much of the stuff of cultural ecology has been composed of the substantive aspects of human adaptation, whether as analyses of matter-energy transformations, subsistence patterning, or technology and task behavior.

Indeed, in the literature on Inuit ecology, all of these foci, plus some variations, can be found. It is the view here that, while important, this material focus, whether on contextual studies or locational patterning, represents an emphasizing of fact(s), while less attention has been directed toward value(s) within the cultural system. In broad terms, two aspects of a single process, the form of the adaptation and the goal-directiveness of the adaptation, are split when the material attributes of Inuit ecology are analyzed apart from the socio-cultural component of the system.

Such an approach seems to be, at least in part, a legacy of Steward's original methodology. In Theory of Culture Change, he (Steward, 1955:40-1) emphasized three key analytical procedures: (1) establishing the relationship between technology and environment; (2) linking behavior patterns used in exploitative activities with particular areas and technologies; (3) then evaluating the extent to which exploitative patterns of behavior effected other aspects of culture. The overall direction of this method is one of moving from material relationships to socio-cultural features. That this orientation may not be entirely satisfactory is suggested by Moran (1979:301) in his closing statement on the status of arctic human ecological investigations:

> . . . the social and cultural aspects of human adaptability have not been adequately researched, and more work following up on the baseline studies of . . . is sorely required.

This is a telling remark which goes beyond the northern context alluded to by Moran, especially when the primary concern of cultural ecology, its "constant and chief" concern (Heider, 1972:207), is culture, albeit from the perspective of the relationship between environment, subsistence, and society (Ibid.).

In fact, although cultural ecology has often sought to extend the breadth of its analytical powers to encompass the socio-cultural part of this relationship, it has generally done so in reductionistic terms, whereby environment was situated as an independent variable influencing the non-material elements of culture. Examples of this are Watson (1970) and Waddell's (1975) work on migration in Highland New Guinea and Wiessner's (1977) analysis of kinship-based reciprocity among the !Kung San of the Kalahari Desert. In the above examples, each has incorporated social structural features of the respective cultures into the analysis as response mechanisms to environmental stress, and not as institutionalized components of the adaptive system which are not extraordinary, but operate on a daily basis.

Returning to Boulding's concept of value, it is clear that Boulding has integrated within his view of the environment, subsistence, society relationship, the idea that the societal component of the equation is organized not solely according to external influences, but also according to its own internalized perception of the world (Boulding, 1970: 6). Given the systems framework in which Boulding's analysis is conducted, it is apparent that the societal component also influences the material shape and content of adaptation through the way it regulates interpersonal relations, authority patterns, and labour time. Therefore, while an understanding of how the material aspects of subsistence, as the point of articulation between environment and culture, function cannot be dispensed with, to exclude the social organizational aspect of culture as a variable in ecological analysis is to eliminate one set of ecological regulators from the culture-environment relationship.

The analysis which has been presented for Inuit ecological relations in the Clyde River region is based on the hypothesis that social structure forms an information network which effects the material form of the adaptation through a set of "value" regulators. In essence, therefore, the inuk stalking a seal on the spring sea ice is involved in a set of actions effected by cultural, as well as, environmental constraints. While his physical activities may be evaluated in terms of caloric expenditure, technology, and task behavior, they can also be analyzed with reference to kinship and authority patterns, social relations, and institutionalized economic patterns. As was stated in an earlier chapter, taken in isolation, the first set of behaviors form the substantive means of adaptation; when placed within the context of a regulated open system, which includes both the pressures of the environment and of socio-cultural parameters, a mode of adaptation comes into focus, one which is capable of change from within, as well as without.

The interactive nature of Inuit ecological activities has been at least partially established by Spencer (1959), Heinrich (1963), and Damas (1969b, 1972a, 1972b). This view of Inuit adaptation as a cooperative endeavor has, at its foundation, the strong functional analyses of Damas (1963) and Heinrich (1963) on kinship as the basis for band formation and control. Further, their work indicates that it is kinship which provides the principal mechanism for the internal regulation of adaptive relations in Inuit society. In the present study, it is this kinship based organizational framework that binds individuals into a coherent ecological and social unit.

Major Points in the Analysis

An important element in the study is that it examines the problem of Inuit ecological adaptation in the Clyde River area from a bi-directional, rather than unidirectional, perspective. Ecological analyses of Inuit and, more broadly, most hunter-gatherer groups have been somewhat singleminded in their concentration on the interactions which take place between the human unit and the environment. Material relationships have become the key to interpreting the adaptive "stance", whether it is "stable or unstable", of particular societies. This approach has examined the technological and subsistence arrangements of groups, their adaptability in terms of matter-energy exchange, and locational placement in relation to ecological conditions. Common to all variations in this substantive approach, however, is the effect of environmental parameters on human activity. Viewing cultural ecological relations systemically, this approach necessarily requires that such activities therefore be seen as externally regulated.

At Clyde River, I have tried to take the perspective that while, as Slobodin (1969b) has noted, hunter-gatherer societies in general possess only marginal physical control over their external environments, some mechanism (or mechanisms) within such groupings functions to dampen this condition. Since hunter-gatherers do not possess material cultural means to accomplish this, it must be accomplished through the non-material component of the culture. Assuming that the Clyde Inuit may be considered as modern representatives of Inuit hunters, the chief institutionalized element in the society which could fulfill such a ròle function is kinship (See Heinrich, 1963:68; Guemple, 1972).

In order to integrate such a non-material referent into the Clyde Inuit adaptational construct, it was necessary to first view the core of this adaptation in terms of informational, rather than material, relationships. The material activity set of the Clyde Inuit was divided into two environments or subsystems. The first was the selective environment, the information composite outside the cultural system. The second was the structural environment, which encompassed the normative structures regulating Inuit society.

Experience with Clyde hunters made it apparent that not all data assimilated from the selective environment was necessarily organized into the knowledge set pertaining to a particular activity. Rather, such data were filtered, either by the hunter actually engaged or, as was more often the case, it was already a part of the activity's structure (See Laughlin, 1968:310); when unusual conditions or behaviors were encountered, they were closely examined on the spot. This transmission of selective information was, itself, an attribute of the Clyde structural subsystem. Of greater importance, however, was that normative behavioral directives within this subsystem, referent to interpersonal relations (Radcliffe-Brown, 1952) and which defined leadership, authority, and decision-making status within the Inuit extended family, had application to subsistence and economic, as well as social, relations.

A behavioral correlation was apparent between dominant and subordinate individuals in terms of social relations and the organization of subsistence and economic activities within closed _ilagiit_ in the Clyde region. While this organizational structure encompassed the entire range of consanguines, it also extended to several categories of affinal kin, notably those in superior (parents-in-law) and, occasionally, reciprocal (brothers-in-law) positions. This normative system of organizing personnel and resources also had applicability in the more general framework of composite subsistence affiliates. By and large, these latter units were organized along age-experience lines bearing close resemblance to the pattern within the restricted _ilagiit_.

This interactive perception of Inuit adaptation in the region also has methodological value because it attempts to come more closely to grips with a major difficulty in cultural ecology. This is, how to adequately examine the variety of relationships which comprise human adaptation within a particular environmental setting and not lose sight of the main focus of the approach, namely culture. By focusing on substantive-material-technology-bioenergetic arrangements, a static and, at best, narrow picture of human adaptation is drawn which runs contrary to the holism implied in the disciplines of ecology and anthropology/human geography. While, perhaps, not as satisfying, as approaches which are amenable to measurement or quantification, the approach applied here has tried to bring the systemic nature of the Clyde mode, as opposed to just the means, of adaptation into perspective.

Finally, the study presented has value at an ethnographic level specific to the region. It examines the subsistence, economic, and social patterns in two different types of northern community situations and identifies elements which allow in-depth comparison of adaptive operations active today.

The detail of this descriptive aspect of the study, while not as far-ranging as might be found within a classical ethnographic investigation, provides particular information on the conditions and resources of the region, the functional technology of the Inuit population, and structure which orders Clyde Inuit social relations. The limits which have been placed on the inclusion of such data are related to the methodological approach employed, but nevertheless provide a concrete framework for the nomothetic concerns of the analysis.

An area of weakness within the study (relative to the specific mechanisms under investigation) is that data on the voluntary forms of affiliation and alliance have not been adequately explored. What role these may play in the organization and regulation of Clyde Inuit ecological activities remains problematical. While certain features were indeed identified, such as name-sharing and joking relationship, I was unable to determine through observation of Inuit activities in the area any specific relevance of these elements to the question under investigation. Similarly, interviews with Inuit at Clyde River and Aqviqtiuk did little but establish that such features existed.

The importance of such voluntary mechanisms in ecological and social relations has been well-documented for Inuit living to the west on the arctic mainland (See Damas, 1972a, 1975b). Among the Copper Eskimo, as Damas has shown (1972a:233-6), and the Netsilingmiut (Damas, 1972a: 227-31; Van de Velde, 1956:3-7), voluntary seal sharing partnerships, termed <u>piqatigiit</u> and <u>niqaiturvigiit</u>, respectively, are of paramount importance. Questioning among the Clyde Inuit, however, established that such voluntarism did not occur in the area.

Information as an Attribute of Cultural Ecology

In assessing the analysis which has been presented in relation to preceding cultural ecological studies on Inuit, two major divergences from the methodology usually employed are obvious. The first is the present study's reliance on a systems approach to delineate the nature of the Inuit adaptation in the Clyde region. The second is the emphasis stressed throughout the study on the components of this adaptation as informational, as well as action, sets. The underlying rationale for this was presented in Chapter Two, but the basic premise is derived from the assumption that cultures are information systems.

The most important components of this perception concerned the establishing of two distinct, but interactive, subsystems, namely the selective environment and social structural components, which form the core knowledge referents bearing on Inuit ecological activities. While one is derived from the internal organization of the cultural unit and the second from patterns which exist in the external environment, an integration of types is accomplished through the value-based structure of the cultural component. The role of selective information in the formation of adaptive strategies is seen here as being more circumscribed than that of structural information because the former is restricted to material arrangements alone. The structural information component is more encompassing and complex since it functions not only to structure social relations, but is also the framework through which environmental data is filtered and arranged to facilitate continuing coherence in the goal-orientation of the cultural subsystem.

The presentation of the data dealing with the specific methodological approach entails the reconciling of this gestalt view of cultural systems operations through the examination, first, of the differing perspectives presented by Steward and Radcliffe-Brown concerning the relationship between economic arrangements and other aspects of culture, particularly as they effect our perception of band ecology. The primary vehicle for this synthesis was Slobodin's (1969a, 1969b) discussion of band society characteristics upon which a "model" of Clyde unit organization and typology was generated. This methodological section concludes with the operationalization of this band construct to the reality of Clyde River in the early 1970's.

The second body of data, presented in Chapters Three and Four, relate directly and exclusively to the concepts of selective and structural information proposed in the preceding chapter. Chapter Three, which is a review of the non-human component of the Clyde ecosystem, details extensively these physical and biological characteristics of the Clyde environment which most effect human utilization of the area. As such, looking at the general ecosystem as an information system such as was presented in Table II-I, these elements represent the attributes contained in levels IIa and IIb that contribute needed selective information to the cultural system.

By contrast, Chapter Four is concerned solely with the information organizing capacity of the principal structural feature of the Clyde Inuit cultural subsystem, kinship. The purpose of the data presented here is to demonstrate the integrative ability of such an organizational component to cope with both the primary requirements of interpersonal social relations and the broader requisite of ecological regulations. This latter function is examined chiefly in the context of economic relations in the band setting.

This may, at first glance, appear as a contradiction in light of criticisms made of Steward's overemphasis on material adaptive phenomena. The difference, however, between the argument presented in Chapter Four and Steward's approach is that the relationship between structural features of Inuit culture and substantive aspects of the adaptation is one of functional interdependence, as opposed to a one-way causality. The overall intent of introducing kinship as an integral component of the Clyde Inuit adaptation is to demonstrate how such structures carry an information processing role which has applicability to external environmental relations, as opposed to the narrow sense generally circumscribed in structural-functional analyses.

Following these two chapters, which describe the poles of the Inuit information universe in the Clyde region, is the core segment of the analysis. This final chapter is presented as a synthesis of the various material configurations which are formed when these data are integrated by the Inuit. It is in this chapter that the contribution of these subsystems is placed in the context of the local material adaptation.

The central focus of this synthesis is the subsistence activities and economic patterns of the human population. This extensive subsistence system is organized in terms of its component procurement subsystems which are analyzed according to their seasonality, activity intensity, and environmental position within the regional configuration. These activities are, in turn, then looked at from the perspective of technology, task behavior requirements, personnel recruitment, and decision-making.

It is these last two components of the Clyde subsistence regime that most clearly show the connectivity between the material and non-material aspects of local adaptation. As is discussed in the chapter, randomness in the environmental component cannot be completely reconciled through material culture alone. This is demonstrated in detail through comparisons made between the Inuit located at Aqviqtiuk, who function at a relatively low technological level, particularly in the period 1971-73, when compared with the material resources of the people based in Clyde village.

Concluding Statements

The appropriateness of any conclusions derived from such a case study must be judged with reference to the context in which the analysis was conducted. In this circumstance, it is apparent that any primary conclusions will be limited by the methodological constraints imposed by the approach employed. The decision to analyze the adaptive system of the Clyde Inuit population in terms of information content may appear a passive approach to questions dealing with adaptation. The focus, however, was not to describe the action phase of the adaptation, but, rather, how the social and environmental components of the system can only be considered in relation to how they effect such active behaviors.

A number of final statements will be put forward as derived from this work. I say statements rather than conclusions because the narrow geographical focus of the study inhibits drawing firm conclusions of too broad a nature. As such, therefore, the direct conclusions, which will be set forth, are those statements which are specific to ecological relations in the Clyde area. It has been eight years, however, since I first began the fieldwork which led to this dissertation. In this time, some 37 months have been spent in active field research, of which only 20 or 21 were devoted directly to the Clyde Inuit. While the remainder of those months was spent in communities as diverse as Resolute Bay, Sachs Harbour, and Kuvinaluk, the work done at Aqviqtiuk and Clyde River provided a baseline reference set for examining the nature of Inuit adaptation in these other locales. I feel it is justifiable, therefore, to cautiously extend these conclusions somewhat beyond the boundaries of Clyde.

It should be clear from the comparative analysis of the two permanent communities in the Clyde region that the technological aspect of the Inuit subsistence regime need not form the central facet of study on ecological adaptation. Indeed, technology and material culture together constitute the component which has received the least attention in this thesis. This approach has been deliberate, since, in the analysis of the functioning adaptations of Aqviqtiuk and Clyde village, it was clearly shown that these material features are basically the instruments by which the local adaptation is implemented, but they do not form its core.

Rather, what this analysis has shown is that it is the knowledge structure within the cultural subsystem, a structure which is not confined to environmental information, but which interprets selectively from the environment on the basis of its internal social structural values, that is the crux of the Clyde adaptation. Basically, the adaptation is not merely a matter of knowing that activities to engage in, but also in knowing how to organize these activities with regard to socio-cultural, as well as physical, requirements. This question of organization requires the analysis of Inuit society in terms of institutions, rather than individuals, since, as numerous other observers (Heinrich, 1963; Damas, 1969b, 1969c; Wiessner, 1977) have noted, Inuit hunting is a cooperative endeavor which suggests some orderly structuring beyond the general pattern imposed by the environment.

The preoccupation of this study with kinship is an outgrowth of the fact that kinship is an important institutional structure in Inuit culture. Observation and interview at Clyde confirmed this fact. Damas (1963) and Heinrich (1963), as well as Guemple and Balikci, have shown that this institutional formation is the principal organizer of interpersonal behavior among Inuit. This analysis, taking the systemic perspective that social relations are an interactive, rather than a dependent component of the system, demonstrates is that these social behavioral directives, based on the dyads of <u>ungayuk</u> and <u>nalartuk</u>, are extendable beyond the framework of individual social relations and have a parallel function in the organization of economic and, more broadly, ecological interactions. Structures. such as authority and cooperation, which are intrinsic features of Inuit hunting, are directly related to the organization of social relations through the kinship system.

A second conclusion, based on the particularness of the Clyde situation, concerns the organization and maintenance of Inuit groupings in the region. While this may have wider applications in terms of hunter-gatherer studies, the data base upon which it is derived is too narrow to extend it beyond the borders of the Clyde area. The format of Clyde Inuit structure developed in Chapter Four is an outgrowth of what local formations appear to have been in the area between Pond Inlet and Home Bay prior to increased non-Inuit interest in the Clyde area in the recent past.

What these composites show is the existence of a systemic relationship between the various sub-units and the minimum and maximum extensions of viable unit formation in the northern Baffin environment. The basis for linkage between these different units is once again kinship, which suggests that the band was an informational, as well as demographic, biological, or economic, aggregation. While bands do not exist in any ideal sense today in the Clyde region, the general pattern of organization and behavior of the modern _ilagiit_ in the region appears to at least partially reflect operational design of the Inuit band.

Venturing forth to possible wider statements which may be made from the Clyde analysis, experience in a number of communities and areas, ranging from Aqviqtiuk camp-like situations to highly impacted administrative centers, suggest that consideration of the social organizational component is highly useful in understanding the nature of local ecological adaptation as it pertains to subsistence. In communities similar to those in the Clyde area, where traditional social structure features remain, the economic yardsticks generally recognized as signifying quality of adaptation (See Kemp, 1971; Usher, 1976; Müller-Wille, 1978) are strong.

Research, done with others in the Resolute Bay area (Kemp _et al._, 1978), pointedly shows the disparity which results from determining strength of adaptation on the basis of material technology and number of trips made for hunting. Of the two communities which formed the focus of that study, it was patently clear that the community that contained the hunters who were best equipped exhibited the most marginal subsistence regime. Further, those hunters who were most successful within that community were those who were members of traditionally-organized ilagiit. The fact that historical factors promulgated and exacerbated this socially fragmented condition in the community only sets off the importance of social structural features as integral components in Inuit ecological adaptation.

It would appear that consistent and long-term success, as measured in terms of being a "hunter" in Inuit society, is highly correlated with the organizational framework in which the hunter operates. To approach the case of Inuit adaptation in terms of analyzing the material attributes of that adaptation is to eliminate the informational framework which defines the hunters relationship to the ecological system. The contribution of environment or material culture cannot be adequately evaluated until the social framework, as an organizer of ecological and socio-cultural relations, is integrated as an analytical variable which contributes to the mode, as a holistic system, of Inuit adaptation. To paraphrase Marshall Sahlins (1965:139), the connection between material exchange and social relations is reciprocal. This dissertation, while admitting that social relations occur in space and may be elucidated through the understanding of functional material transfers, strongly presents a view in which social organizational components of culture have an interactive role, as internal regulators of the adaptive system, in the maintenance of specific human ecological transactions.

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APPENDIX I

A Listing of Faunal Species Observed in the Clyde Region

Common Name	Scientific Name	Location	Comment
Birds			
Snow Goose	Chen hyperborea	Clyde Lowlands	Food Resource
Canada Goose	Branta canadensis	Clyde Lowlands	Infrequent
Brant	Branta bernicula	Walker Arm	One Observation
Common Eider	Somateria mollissima	Open Water	Food Resource
King Eider	Somateria spectabilis	Open Water	Food Resource
Common Raven	Corvus corax	Village Areas	Year-round
Lapland Longspur	Calcarius lapponicus	Open Tundra	Summer
Snow Bunting	Plectrophenax nivalis	Open Tundra	Summer
Oldsquaw	Clangula hyemalis	Open Water	Occasional
Rock Ptarmigan	Lagopus mutus	Tundra	Year-round
Peregrine Falcon	Falco peregrinus	Eglinton Fiord	One Observation
Snowy Owl	Nyctea scandiaca	Clyde Lowlands	Summer
Parasitic Jaeger	Stercovarius parasiticus	Clyde Lowlands	Summer
Long-Tailed Jaeger	Stercovarius longicaudus	Scott Inlet	One Observation
Northern Fulmar	Fulmarus glacialis	Scott Inlet	Cliff Nests

APPENDIX I (con't)

Glaucous Gull	Larus hyperboreus	Entire Coast	Eggs Eaten
Herring Gull	Larus argentatus	Entire Coast	Eggs Eaten
Golden Plover	Pluvialis dominica	Dry Ridges	Summer
Black-Bellied Plover	Squatarola squatarola	Wet Tundra	Summer
Baird's Sandpiper	Erolia bairdii	Open Tundra	Summer
Purple Sandpiper	Erolia maritima	Open Tundra	Two Observations
Common Loon	Gavia immer	Tundra Ponds	Food Resource
Red-Throated Loon	Gavia stellata	Tundra Ponds	Food Resource
Hoary Redpoll	Acanthis hornemanni	Tundra	Summer
Common Redpoll	Acanthis flammea	Tundra	Summer
Fish			
Deepwater Sculpin	Myoxocephalus quadricornis	Saltwater	Emergency Resource
Greenland Cod	Gadus ogac	Saltwater	
Arctic Char	Salvelinus alpinus	Freshwater	Food Resource
Greenland Shark	Somniosus microcephalus	Saltwater	One Observation
Polar Cod	Boreogadus saida	Saltwater	

APPENDIX I (con't)

Mammals

Marine:

Greenland Right Whale	Balaena mysticetus	Henry Kater	One Observation
Killer Whale	Orcinus orca	Clyde Inlet	One Observation
Narwhal	Monodon monoceros	Entire Coast	Food Resource
Ringed Seal	Phoca hispida	Ubiquitus	Food Resource
Bearded Seal	Erignatus barbatus	Entire Coast	Summer
Harp Seal	Pagophilus groenlandicus	Cape Christian	Summer
Walrus	Odobenus rosmarus	Home Bay	Food Resource
Polar Bear	Ursus maritimus	Entire Region	Food Resource

Terrestrial:

Caribou	Rangifer tarandus	Entire Region	Food Resource
Arctic Hare	Lepus arcticus	Entire Region	Food Resource
Collared Lemming	Dicrostonyx groenlandicus	Entire Region	One Observation
Brown Lemming	Lemmus trimucronatus	Entire Region	Common
Ermine	Mustela erminea	Entire Region	Three Observations
Arctic Fox	Alopex lagopus	Coastal Area	Trapped on Sea Ice
Arctic Wolf	Canis lupis	Entire Region	Associated with Caribou

APPENDIX II

Clyde River Hudson's Bay Company Fur Purchases, 1935-67

Year	Bear	White Fox	Seal	Ermine	Other
1935		741		62	21
1936		204		21	7
1937		332	420	19	9
1938		631		45	16
1939		748		93	38
1940		296	237	7	6
1941		569	491	22	16
1942		969	193	49	42
1943	36	767	212	120	38
1944	18	362	351	21	10
1945	6	192	319	6	5
1946					
1947	15	474	190	90	28
1948	13	181	285	2	6
1949	17	244	396		7
1950	17	320	28	6	7
1951	10	445		58	20
1952		350			
1953	21	114	172		2
1954		296		33	8
1955		182	173	7	
1956		173	169		

APPENDIX II (con't)

1957		50	292		
1958		228	229	12	1
1959		478		16	2
1960					
1961		600	245	39	
1962					
1963		14	1,697		
1964		295	2,128		2
1965	54	685	1,992		8
1966					
1967	55	50	2,402	4	

APPENDIX III

Clyde River Fur Sale and Per Capita Income Survey, 1972-75[1]

Year	# of Hunters	Polar Bear	Arctic Fox	Ringed Seal	Other
1972-73	46	25/$16,600.00	3/$38.00	1497/$20.705.00	1/$15.00
1973-74	77[2]	24/$25,450.00[3]	14/$265.00	1930/$30,695.00	1/$20.00
1974-75	85[2]	38/$28,120.00	245/$4,489.00	3934/$68,886.00	6/$124.00

Year	Price/Polar Bear	Price/Ringed Seal	Price/Fox and Other
1972-73	$664.00	$13.83	$13.25
1973-74	$1060.00	$15.90	$19.00
1974-75	$740.00	$17.51	$18.37

Year	Ave. Income/Bear	Ave. Income/Seal	Per Capita Income
1972-73	18 - 922.22	46 - 450.10	810.97
1973-74	17 - 1,497.05	68 - 451.39[4]	825.66[4]
1974-75	34 - 827.05	75 - 918.48[4]	970.06[4]

[1]Data Source Hudson's Bay Company Receipts

[2]Totals include non-licensed hunters: 1973-74 - 9; 1974-75 - 10.

[3]In addition, 12 polar bear hides sold privately earned an additional $15,700.00.

[4]Average incomes based on the total number of licensed hunters: 1973-74 - 68; 1974-75 - 75.

APPENDIX IV

Observational Data on Aqviqtiuk Inuit Hunting, 1971-1972

Year/Month	No. of Hunters	Hunt Type	Location	Total Time/Hunt Time	Harvest
1971/September	5	Canoe (2)	Eglinton Fiord	14:00/09:30	17 narwhal
"	5	Canoe (2)	Eglinton Fiord	08:00/04:00	2 ringed seal 2 polar bear
October	4	Canoe (2)	Eglinton Fiord	06:50/00:50	2 ringed seal 4 murres 1 herring gull
"	2	Dogteam (2)	Esquimaux River	04:15/03:25	14 arctic char
"	3	Dogteam (3)	Esquimaux River	03:45/02:45	2 arctic char
"	3	Canoe (2)	Eglinton Fiord	05:35/00:45	1 eider 1 murre
"	1	Dogteam	Hills N. Kogalu R.	13:30/04:00	1 polar bear
November	3	Canoe (2)	Eglinton Fiord	07:30/03:35	7 ringed seal
"	3	Canoe (2)	Eglinton Fiord	06:30/02:10	5 ringed seal 5 ptarmigan
"	2	Canoe	Eglinton Fiord	07:20/01:50	1 ringed seal 2 eider
"	4	Dogteam (4)	Eglinton Fiord	05:00/02:00	
"	4	Dogteam (4)	Eglinton Fiord	05:40/01:45	
"	4	Dogteam (4)	Eglinton Fiord	07:05/04:00	1 ringed seal
"	2	Dogteam	Eglinton Fiord	06:00/03:50	1 ringed seal
"	2	Dogteam	Eglinton Fiord	07:20/04:45	3 ringed seal
"	2	Dogteam	Eglinton Fiord	06:30/03:10	1 ringed seal

APPENDIX IV (con't)

November (11 days)	3	Dogteam (3)	Bieler Lake	240:00/35:00	8 caribou 87 arctic char
1972/April (2 days)	2	Dogteam (2)	Sam Ford Fiord	65:00/07:30	1 ringed seal
"	1	Foot	Eglinton Fiord	01:00/00:10	1 ptarmigan
"	2	Dogteam (2)	Eglinton Fiord	07:50/00:40	1 ringed seal
" (3 days)	2	Dogteam (2)	Baffin Bay	40:00/17:00	1 ringed seal
May	3	Dogteam (3)	Eglinton Fiord	09:05/05:45	1 ringed seal
"	2	Dogteam	Eglinton Fiord	08:00/03:30	
" (7 days)	2	Dogteam (2)	Scott Inlet	166:00/18:00	6 ringed seal 13 caribou
June	1	Dogteam	Eglinton Fiord	04:00/01:25	3 ringed seal
"	3	Dogteam (3)	Eglinton Fiord	07:00/01:00	1 ringed seal
"	1	Dogteam	Eglinton Fiord	05:15/01:05	4 ringed seal
"	2	Dogteam (2)	Eglinton Fiord	25:10/07:20	16 ringed seal
"	2	Dogteam (2)	Eglinton Fiord	05:20/00:55	1 ringed seal
"(5 days)	2	Dogteam	Sam Ford Fiord	104:00/25:00	4 caribou 2 ringed seal 2 hare
"	1	Dogteam	Sam Ford Fiord	03:20/00:50	2 ringed seal
"	2	Dogteam	Walker Arm	05:20/00:35	1 ringed seal
"	1	Dogteam	Sam Ford Fiord	08:40/01:15	3 ringed seal
"	1	Snowmobile	Sam Ford Fiord	02:15/00:25	2 ringed seal

APPENDIX IV (con't)

1972/June	5	Dogteam (3)	Sam Ford Fiord	09:15/02:00	3 caribou 1 ringed seal 2 hare
"	6	Dogteam (3)	Walker Arm	19:00/11:15	12 caribou 1 ringed seal
"	2	Foot	Walker Arm	00:40/00:40	1 caribou
"	2	Snowmobile	Walker Arm	12:00/03:20	2 caribou 6 ringed seal
"	9	Dogteam (5) Snowmobile	Sam Ford Fiord	07:30/01:00	2 ringed seal
"	9	Dogteam (5) Snowmobile	Eglinton Fiord	07:30/03:00	7 ringed seal