PALEO-ESKIMO OCCUPATIONS AT DIANA-1, UNGAVA BAY (NOUVEAU-QUEBEC)

by

© Pierre Desrosiers

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Abstract

Paleo-Eskimo occupations at the Diana-1 site, Nouveau-Québec have been examined in terms of lithic analysis. This analysis involved the study not only of diagnostic implements but also of all the artifacts, including debitage. The examination of single, short term occupations provided the framework for studying variations in two specific aspects of lithic materials: their provenience and techniques of exploitation in an area where prehistoric peoples were frequently dependent upon raw materials collected over a wide area. The differential exploitation of raw materials suggests that technological developments in respect of these two factors account to a considerable degree for the transition between Pre-Dorset and Dorset cultures in the Eastern Arctic. Along with these interpretations, it is also possible to relate on typological grounds the Pre-Dorset implements to similar ones in Greenland.

Résumé

Les occupations paléo-esquimaudes du site Diana-1, Nouveau-Québec, ont été étudiées grâce à une analyse lithique. Cette analyse ne s'est pas limitée aux seuls objets diagnostiques, mais a aussi examiné plus particulièrement aux objets moins façonnés et les autres vestiges de culture matérielle. L'étude d'occupations uniques et de courte durée a permis de dégager certains aspects des matériaux lithiques, plus spécifiquement leur provenance et leur exploitation. L'interprétation de l'exploitation de ces matières premières lithiques est d'autant plus importante que les matériaux n'étaient pas disponible localement et, de plus; étaient essentiels à la survie du groupe. L'exploitation différentielle des matières premières nous suggère que des développements technologiques ont provoqué la période de transition des cultures pré-dorsétiennes et dorsétiennes dans l'Arctique de l'Est. Conjugué à ces interprétations, il nous est possible de suggérer la nature de ces occupations dans la région de la Baie d'Ungava de même que l'origine des premières d'entre elles dans la région qui d'après une comparaison typologique, proviendrait du Groenland.

Preface

This thesis has been made possible as the result of a collaboration between the Laboratoire d'Archéologie de l'Université du Québec à Montréal and the Department of Anthropology of McGill University. The archaeological data studied in this thesis have been generously put at my disposal by the coordinator of the Tuvaaluk Program and director of the Laboratoire d'Archéologie: Patrick Plumet. I, myself, have worked closely with the Tuvaaluk program since the spring of 1979 and participated in the last season of field work in the Arctic in the summer of 1979. Unfortunately, at that time I did not know that I would be using archaeological data that came from the Diana-1 site, which was excavated during the same period. Nevertheless, the methods and principles behind the excavations at all the sites during that field season were identical. Ian Badgley supervised the crew sent to Diana-1 and helped to initiate my thesis project once I enrolled at McGill University in September 1979.

The archaeological data recovered at Diana-1 were completely analyzed by me, but within the framework of the Tuvaaluk Program funded by S.S.H.R.C. and l'Université du Québec à Montréal. One of the reasons for this common framework was to develop a unified analytical method for all studies which were part of the Tuvaaluk Program and to provide a comparative basis for all the research involving lithic material in the Arctic. Within this framework, the Laboratoire d'Archéologie offered several computer programs which had been prepared by André Cosselin especially for the treatment of archaeological data. My personal apprenticeship was dependent on Jean-François Moreau, who spent many hours ensuring that I was able to deal with my data as well as instructing me how to write my thesis into the

computer and edit it.

I had total freedom to interpret my archaeological data. The approach I have adopted originated from various discussions at the Laboratoire d'Archéologie and also from a series of seminars in which I participated during my M.A. coursework at McGill University which were conducted by Professors Bruce Trigger, Eumiko Ikawa-Smith and Michael Bisson.

The final version of this thesis is a product of several revisons. Professor Ikawa-Smith, as thesis supervisor, has graciously given of her time to see me through several versions, always aiming to clarify my thoughts and to ensure that I presented clear and precise work. In Professor Ikawa-Smith's absence, Professor Trigger helped me to edit the final version of this work. Professor Bisson offered various helful comments and suggestions. Professor David Yesner also provided excellent comments and suggestions used in the final version of the thesis.

From the Laboratoire d'Archéologie, I have also received considerable feedback from several people. I am considerably in debt for the excellent facilities that were put at my disposal (these included laboratory equipment, computer time and terminals, and stationary). Patrick Plumet has assisted in different stages of my thesis. J.F. Moreau provided practically constant assistance and contributed to the completion of this thesis. Several colleagues who are also pursuing a masters thesis provided excellent comments to my penultimate draft: Jean-Guy Brossard, Pierre Bibeau, Yves Labrèche (whom I also thank for the excellent photographs). I would also wish to thank Lyn Pinel for the faunal analysis, Françoise Lebrun for help in the presentation of the site plans and Marguerite Lanteigne for

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I: Introduction

The present work is based upon the study of Paleo-Eskimo surface structures on the high beaches of the Diana-1 site in the northwest portion of Ungava Bay (Nouveau-Québec). This research is a part of the Tuvaaluk Archaeological Program of the Laboratoire d'Archéologie de l'Université du Québec à Montréal and relies mostly on an analysis which will examine lithic technology, the choice of raw materials, and their relations in the production of tools. This analysis, together with the study of tool typologies, will attempt to understand the dynamics behind lithic use in Paleo-Eskimo short-term occupation settlements. The second part of this study will examine the chronological setting of these occupations within an Eastern Arctic perspective.

Artifact typologies are current practice in Arctic archaeological studies but very few of them (Maxwell 1980; Arundale 1980) have examined the role of these implements in the subsistence patterns of Paleo-Eskimo cultures. This work will therefore attempt to establish the importance of lithic assemblages in terms of implements in surface structures at Diana-1 and to demonstrate their full validity for understanding prehistoric cultures in the Eastern Arctic. In order to fulfill this aim, lithic assemblages ideally should represent one occupation. Lithic components will be discussed in terms of cultures, namely the Pre-Dorset and Dorset components of Diana-1.

The Diana-1 site is composed of many units of occupation. The various excavated units are distinct from each other and each contains a single habitation structure (except for one excavated area). Most units therefore

correspond to single occupations. Through the cultural remains left behind, the archaeologist can thus try to trace what occurred during individual occupations. Unfortunately, few bones were recovered, or other cultural remains apart from lithics. Even habitation structures and features (hearths, pits or mid-passages) were severely disturbed. The study of seasonality is therefore very difficult to establish in these occupations. As for cultural identifications, 60 diagnostic implements and two C-14 dates situate the site within the Paleo-Eskimo period. Although this evidence is limited when one examines individual structures, raw materials and technological processes are used as a complementary method for relating these occupations to a regional cultural sequence. Fitzhugh sustains this approach when he states that: "using the evidence of raw materials and technology it is frequently possible to identify cultures solely from the waste debris at a site" (Fitzhugh 1972:106).

The lithic analysis relies on a specific concept based on descriptive attributes in the lithic collection. This descriptive analysis should provide the basis for interpreting the cultural data without relying initially on function, technology or style. This kind of analysis follows the methodology presently utilized by the Tuvaaluk Program and enables similar studies to be compared under the same guidelines. Other approaches are also integral parts of this study; they not only supply the context but also control the interpretative procedures. These involve an analysis of the chronological and cultural indications that characterize the site: the study of diagnostic implements, habitation structures and features (which trace the cultural affiliations), and C-14 dates which together delimit the chronological periods within the site. Isostatic rebound rates can also be used for this same purpose (Andrews et al 1971).

The aim of this work is to test and develop new methods of research (such as a descriptive analysis) as well as to present new avenues of interpretations which go beyond the habitual integration of artifact typologies within a chronological scheme. This work can be considered as pursuing what Dekin calls: "the real revolution in archaeology: the shift from the study of artifacts to the study of the relations among artifacts" (Dekin 1975:170).

At present, only superficial typological studies have been employed in an Arctic context (Linnamae 1975:17). For the last 50 years, practically since the beginning of Arctic research, archaeologists have devoted their energy to accumulating lithic collections in order to examine the diagnostic implements and on that basis to establish the characteristics of Arctic cultures. These diagnostic implements, however, are only part of a larger phenomenon: "all types of material culture undergo fluctuations through time" (McGhee 1980a:39). Unfortunately, Arctic archaeologists have not studied the associations between lithic implements and the other lithic remains (additional implements may also be fashioned in organic materials such as bone, antler and ivory but none were recovered at Diana-1). Moreover, as will be demonstrated, the mechanics behind the fabrication of these implements were not necessarily perfected or stylized as in other cultures. McGhee makes such an argument in his study on Pre-Dorset components at Point Refuge:

> "In each of these classes all artifacts are roughly the same size, weight, have similar edge angles and similar hafting arrangements. Within these functional constraints, however, there appears to have been a great deal of leeway for individual stylistic preference"(1979:110)... "In fact, given the views on variability in artifact styles... very little of use can be said regarding the stylistic resemblances or differences between assemblages. This could then support the notion of Paleo-Eskimo peoples manufacturing implements under functional attributes rather than stylistic attributes, therefore the basis on which archaeologists have been working their artifact typology sequences have been erroneous and this would explain why artifact typologies have been unsuccessful in this context"(McGhee 1979:115).

Although the present work deals with a traditional mode of analysis (a lithic analysis) and has a traditional problem orientation (the origin and transition of Pre-Dorset to Dorset), it seeks, within the limits of a site study, to understand the importance of lithic artifacts (including debitage) in both of these cultures and to contribute to an understanding of contrasts in the utilization of these resources in different cultural periods.

II: Archaeology of the Eastern Arctic

Early archaeological work in the Eastern Arctic was the incidental by-product of exploring, whaling and ethnographic research (Dekin 1978:8). Subsequently, increasing interest developed in ethnic origins and the prehistory of the region. These initial studies set the pace for archaeological expeditions and excavations. One such endeavour was the Vth Thule Expedition of 1921-24, in the course of which Mathiassen identified the Thule culture. This culture, Mathiassen (1925) determined, was a widely disseminated prehistoric one based on whale hunting. Subsequently, Jenness (1925) distinguished the Dorset culture from Thule in several collections on the basis of a darker patination on implements and the presence of incised rather than drilled holes (Dekin 1978:13; Maxwell 1976:1). Following this initial period which favoured the accumulation of archaeological data, the main concern of archaeologists was to develop a general chronology. This research was enhanced in the 1950s, by the appearance of C-14 dating, which provided a solid basis for establishing the chronology of Arctic cultures. Since about 1960, the prehistory of the Eastern Arctic has been defined within the following cultural chronology of Paleo-Eskimo cultures: Independence I, Pre-Dorset (including Sarqaq), Independence II and Dorset; and Neo-Eskimo culture: Thule. Unfortunately, little is known about these cultures, which are based mainly on artifact typologies.

Traditional archaeological work has examined lithic and organic (bone, antler, ivory) diagnostic implements. Moreover, before 1973, Arctic archaeology was done in relative isolation by archaeologists conducting their studies in specific regions. Occasionally, they would publish their

results but, mainly as a preliminary study of the region under investigation. The overall discussions relating to Arctic archaeology concepts were conducted mainly in the form of inter-personal communications between archaeologists, which led to the paraphrase: "Arctic small paper tradition" instead of "Arctic small tool tradition". Arctic research was also handicaped by unfavourable climatic conditions, difficulties in site accessability, short working seasons for excavation and surveys, and high money costs. These factors provided archaeologists with an arduous task: to cover the Eastern Arctic in order to establish the constituents of prehistoric Arctic cultures. These constituents (or archaeological data) were far too numerous to understand all their complexity at first hand; therefore the study of diagnostic implements was favoured in order to summarize and characterize the finds. The undiagnostic data were occasionally conserved and filled the stacks of museums, but most of the time they were not recorded and left behind because of transportation difficulties.

The origin of Eastern Arctic prehistory seems to have issued from the Arctic Small tool tradition which has its roots in Alaska. The link betwen these two Arctic regions has been discussed by Irving (1957). It seems to have its oldest connection in the Eastern Arctic in Greenland lithic assemblages. On the basis of the small-tool flint material and the presence of microblades, Knuth positively linked his Independence I components with Alaska and the Denbigh Flint Complex (Bandi 1969:136, 158; Knuth 1967:62). Knuth's study on Independence I (ca 4,000 B.P.) corresponds to a climatic period with less ice in the Polar Basin: "the same slightly milder climate could have cause the driftwood, the musk-oxen and the older hunters to invade Peary Island" (Greenland) (Knuth 1967:17). Following the

Independence I culture, Pre-Dorset and Dorset cultures expanded throughout the Eastern Arctic. Meldgaard's studies (1954,1960) initiated the debate on the distinction between Pre-Dorset and Dorset cultures when he observed that the occupations on the higher elevations were distinct from lower Dorset and Thule occupations; they also indicated clearly, however, that the "Sarqaq" (or pre-Dorset) culture was oriented towards a coastal life similar to that of the Dorset people (Bandi 1969:139) and that this culture lasted approximately from 4,000 to 2,800 B.P. Larsen and Meldgaard (1958) had originally distinguished these two cultures as migrations of two separate peoples and Meldgaard further suggested that Dorset probably "smelled of the forest" (Meldgaard 1960:593). Collins, however, argued that these distinctions were less clear cut. They were probably part of a continuity that he referred to as "pre-Dorset". Taylor then rallied to these opposite views by stating that Dorset had developed within the Eastern Arctic from a Pre-Dorset base and with little or no influence from outside (reported by Maxwell 1973:297 in a personal communication with Taylor). Subsequently, slightly before A.D. 1,000, Thule people migrated rapidly across the Eastern Arctic and within a few generations supplanted (at least economically) the Dorset people and caused their extinction in many regions. Since 1973, the year in which Arctic archaeologists met in Santa Fe to reassess their work (Maxwell 1976), they have started to compare and publish their data more systematically. Although most of the contributions concentrated upon traditional artifact typologies for their discussion, some new analytical models were proposed: Dekin focusing on human migrations, Nash on cultural systems and Fitzhugh on environmental archaeology. Other important work, though largely limited to the study of lithic implements was done in the 1960-1970 period and has contributed greatly to our present knowledge of the Eastern Arctic. Taylor (1968) examined the transition

period between Pre-Dorset and Dorset cultures. Maxwell (1973) developed a lithic tool typology. Others have studied Paleo-Eskimo regional occupations: in the Central and High Arctic (McGhee 1973, 1979, 1981); in Labrador (Fitzhugh 1972, 1976, 1980; Tuck 1975, 1976); in Newfoundland (Harp 1964; Linnamae 1975); in Greenland (Knuth 1967; Meldgaard 1960, 1976). Only recently have archaeologists expanded their work to habitation structures and features (McCartney 1977; Plumet 1976, 1978, 1979a). Anthropological theory in Arctic research was virtually non-existent before the 1970s. Problems were narrowly Arctic oriented and few influences were seen entering the region from outside. Although the primary focus was set on problems related to Pre-Dorset and Dorset research, the reunion of Arctic archaeologists in 1973 served to unify and disseminate important personal views on Arctic archaeology (Maxwell 1976:5).

In recent years, outside influences have encouraged the development of the anthropological aspect of archaeological research in the Arctic, specifically concerning cultural ecological studies. However, many Arctic archaeologists are slow to approach the analysis of social change and culture process involving prehistoric Arctic cultures (Dekin 1978:5). Since 1976, however, there has been a resurgence of archaeological work in the Arctic based on more open discussions among archaeologists and also reflecting influences from outside the Arctic. These stimuli have originated from a new generation of archaeologists concerned with the dynamics and complexities of prehistoric settlements in the Arctic: for example, Arundale's functional analysis of lithic assemblages (1980) and Badgley's distinctions of multiple occupations in a stratified Dorset site (1980). Lithic and bone studies have widened their approaches considerably to include the examination of lithic technology (Arundale 1980); bone

technology (Blaylock 1980); descriptive analysis of lithic artifacts (Plumet 1979b,1980); lithic source areas and nature of raw materials (Gramley 1978; Lazenby 1980; Archambault 1981; De Boutray 1981; and Plumet 1981); lithic studies correlated with seasonality (Maxwell 1980); and individual techniques for the production of lithic implements (McGhee 1979,1981). In close relation to lithic studies, additional ones were involved with stratigraphy (Badgley 1980) and faunal analyses (Julien 1980; Spiess and Cox 1980).

Surprisingly, very few archaeologists have attempted to propose a major synthesis for the Eastern Arctic: Bandi (1969) working from west to east defined the cultural content of individual regional units; Dekin (1978) approached the synthesis within a historical perspective; and finally, McGhee (1978) has produced a general summary of Canadian Arctic prehistory for the general public.

Furthermore, beyond the immediate site or excavation report very little is attempted. Arctic archaeologists are still mainly concerned with cultural history and their interpretations do not go beyond a site or occasionally, a regional perspective. Nevertheless, some avenues of research have begun to produce excellent regional syntheses. Although these syntheses generally concern the Neo-Eskimo (Thule) period, they provide significant approaches to deal with earlier prehistoric hunter-gatherer societies of the Arctic. Sabo and Jacobs (1980) have examined notions about Thule subsistence patterns by comparing them with other studies of hunter-gatherer societies (Yellen and Harpending 1972; Yellen 1976, 1977); Kaplan (1980) studied the changing economic and social interactions of Thule people from both archaeological and historical records; McCartney (1980)

and Freeman (1979) applied the results of the ethnoarchaeological studies by Binford (1976, 1978) and Chang (1967) and hunter-gatherer subsistence patterns by Jochim (1976) to demonstrate Thule Eskimo whale use in the Arctic.

Although exterior influences are limited in Arctic archaeology, as well as the applications of current theories and models, the increasing diffusion of works concerning the Arctic and outside, have successfully developed new ideas for the interpretation of cultural data which will contribute to the development of a broader anthropological perspective.

III: Analytical framework

Descriptive analysis

A descriptive analysis, like any other kind of archaeological analysis, relies on the observation of qualitative and quantitative characters which depict technological, functional or stylistic traits. Once these characters have been described, it is possible to understand the variations in collections according to the problems to be solved.

Historical background

The starting point of this study comes from French European archaeologists such as A. Laming-Emperaire, J. Lesage, N. Guidon, D. Lavallée and P. Plumet who were working in South and North America, in regions where prehistoric sequences were still relatively unknown in the late sixties. At that time, Laming-Emperaire (1969) made a French version of her previous guide (written in portuguese):"guide 1969" or "guide pour l'étude des industries lithiques d'Amérique du Sud". This guide reflected the experiences of members of a working team who all confronted similar problems: collections that traditional typologies, for these particular regions, could not describe or explain. This guide sought to unify the ideas coming out of individual research in an effort to establish a basic descriptive system that would promote the construction of types (technological, morphological, functional, etc...): "en dehors de tout type préalablement défini et de toute liste antérieurement établie (Laming-Emperaire 1979:12). For several years following the "guide 1969", Laming-Emperaire, pursuing her initial goal, was elaborating the

methodological approach behind the descriptive analysis, when her accidental death in 1977 put a premature end to her work. Nevertheless, she had time to write several drafts that P. Plumet has put together in Paléo-Québec no. 9 (1979).

Laming-Emperaire's ideas concerning a descriptive analysis

The basic task behind this kind of analysis was to characterize the lithic objects that occurred in prehistoric cultures in the New World. Specifically with regard to tools, types can be defined by their form, manufacturing technique, inferred function, or by a combination of these criteria. Instead of dealing with these criteria on a first hand basis, Laming-Emperaire suggested developing a descriptive analysis that would deal with a series of descriptive traits and definitions and only subsequently undertaking specific studies concerning function, form, or even technology. Because basic analysis was the same for each study, it could evolve in any direction in which the archaeologist wished to pursue it. Thus, research in different areas could be brought together and compared using the same classification (Laming-Emperaire 1979:14).

In order to achieve this unification, a descriptive analysis must provide for: (1) the study of traits of manufacture linked to cultural techniques as well as constraints of the raw materials, (2) a study of the utilization of lithic objects linked to their subsistence patterns and environment, and (3) the study of stylistic traits (individual or cultural). The synthesis of these traits will permit the definition of types.

The underlying notion that must be kept in mind in this task is that an archaeological study in a fairly unknown region should be as systematic and complete as possible in order to be able to characterize the cultural elements within the widest perspective. Moreover, archaeological research must be defined within a geographical and chronological framework. A descriptive analysis, because it deals with qualitative and quantitative attributes of cultural remains, can provide the basic approach towards the spatial and temporal setting of lithic industries and cultural patterns. For this purpose, a descriptive analysis can choose to concentrate on the study of cultures and the environment in which they are found. This includes the analysis of every single trait related to prehistoric human activities. In relation to lithic artifacts (including debitage) these characteristics can be divided into several categories: localisation of the object (vertically and horizontally); its completeness or incompleteness; nature of the raw material; form and dimensions; evidence of manufacture or utilization; typology (this category is a reminder of the taxonomy used by other archaeologists working in the same area). Each of these categories (as will be demonstrated in chapter V) has close ties with human activities and can therefore be used in an attempt to reconstruct them. The quantification of attributes corresponds to strict metrical determinants rather than a terminology such as: long, short, thin, thick. Furthermore, the notion of "tendency" underlines the characterization of the object (flat, triangular, bifacially retouched). This notion is linked to a threshold where it is often difficult to establish a boundary between two qualitative traits. (N.B. the details of the analysis, although applied to the Eastern Arctic, are presented in Plumet's contribution). Concerning the qualitative attributes, each category is set within a hierarchy of traits.

The research methodology of P. Plumet and objectives of the Tuvaaluk Program.

Plumet's approach is an adaptation of Laming-Emperaire's "guide 1969" reflecting his and her experiences in their respective field work. The first step was to organize categories in hierarchies of traits which would facilitate the study of a lithic collection. In turn, the development of this approach applied to demands of computer processing would serve as the basis for field and laboratory studies.

The archaeologist attempting to reconstruct past cultural systems has at his disposal material remains. Among these remains, habitation structures (including features) and artifacts testify directly to human activities and indirectly to their socio-cultural systems and subsistence patterns (Plumet 1979:93).

The main objective of the Tuvaaluk Program (funded by SSHRC and FCAC) was the study of the introduction and development of prehistoric cultures in Ungava. The prehistoric cultures (particularly, Paleo-Eskimo) of the Eastern Arctic offer an excellent basis for the study of a cultural system which seems to have had only limited contact with exterior peoples during 3,000 years until the arrival of the Thule people around A.D. 1,000. This research program relied on extensive archaeological excavations in order to understand the synchronic variations within spatial dimensions rather than seeking to build up a chronological sequence:

> "Il fallait au contraire un mode de classement descriptif et non-normatif, reposant sur une structure logique et hiérarchisée permettant à la fois rigueur et souplesse dans l'enregistrement des éléments les plus simples des systèmes techniques étudiés" (Plumet 1979:94).

In order to undertake such analyses, both surveys and excavations had to be organized in terms of well-established procedures. First of all, the context in which the cultural remains were found had to be understood in relation to an ecological setting.

The excavations of the Tuvaaluk Program were undertaken in such a way as to record both horizontally and vertically the position of each artifact (including debitage) and to determine its relationships to other objects, to structures, and to the immediate locale. To facilitate the gathering of field data, one could treat a group of similar artifacts as clusters (for example, of lithic debitage). These clusters, although generally applied to chips (flakes smaller than 1 cm^2) are localized within a restricted radius and this radius is then transmitted to the computer which places the objects within the radius and position in which it was found.

TUVAALUK 79 - ENREGISTREMENT DE . TEMOINS SUR LE TERRAIN

Site Mètre N° prov

Couche loc Couche globale N° catal

Pt de référence _ Cote de référ

Jour Mois _ Année _ _ Fouilleur _ _ _ _ .

LOCALISATION(S) DANS L'UNITE DE FOUILLE

(Emplacement sur l'objet du point localisé Blanc:au centre,* à une extrémité, A--Z références à un croquis du carnet)

N° loc	Pos mes	Coord.métriques N-S	E-O	Hv.rel	Cote	Loc approximatives
1	_	_ _	_ _	_ _	_ _ _	Secteur _
2	_	_ _	_ _	_ _ _	_ _ _	Hv sup _ Cote s
3		_ _	_ _	_ _ _	_ _ _	Hv.inf _ _ _ Cote i. _
4	_	_ _	_ _	_ _ _	_ _ _	Rayon _ _ _ _ _ _ _ _ _ _ _

DIVERS

Collectif nb _ _ _ _ Mat prem. _ _ _ _ Intégrité _ _ _ _

Description sommaire. _

LIAISON(S)	N°	Type	Identification de l'autre élément
CODE PX,PC			
DES AC,AP	1	_ _	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
TYPES LO,IN			
SR,SS	2	_ _	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
PR,AY			
	3	_ _	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

ILLUSTRATIONS DE TERRAIN		COMMENTAIRES	
Type	Identification, ref.	Type	Références
	_ _ _ _ _ _ _ _ _ _ _ _	_ _	_ _ _ _ _ _ _ _ _ _
	_ _ _ _ _ _ _ _ _ _ _ _	_ _	_ _ _ _ _ _ _ _ _ _
	_ _ _ _ _ _ _ _ _ _ _ _	_ _	_ _ _ _ _ _ _ _ _ _

Code des illustrations PL(plan), NB(noir et blanc), DI(diapositive), CR(croquis).

Fig 3.1: Individual data sheet.

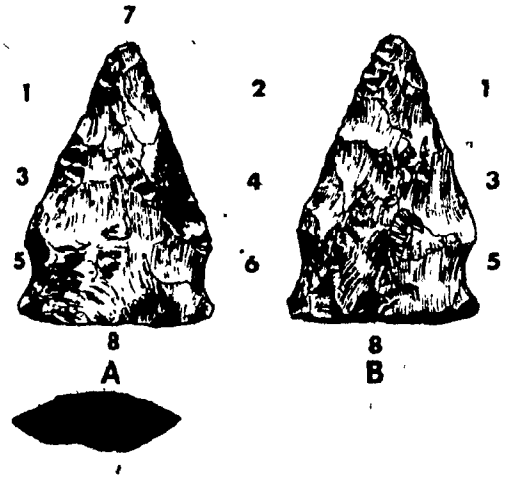


Fig. 3.2: General reference system for the study of lithic objects.

The individual object (or cluster) is entered on separate sheets (fig. 3.1) and these sheets are used to record all cultural remains. These archaeological data are subsequently inserted into computer programs prepared by A. Cosselin and J. F. Moreau. Cosselin (1978) has also established a program to reproduce graphically the excavation in plan, side-view, or in three dimensions. Furthermore, these reproductions can be oriented to offer several different views of the excavations. In this framework, the site is considered as a three dimensional entity rather than as a surface: "c'est le parallélipède ayant le maximum de chance de contenir la totalité des vestiges correspondant à un regroupement spatial unique et bien distinct d'autres regroupements voisins" (Plumet 1979:98).

Once the field data are gathered, one controls the "extrinsic" information about the cultural remains relating the data to a spatial and temporal context. The second step therefore involves the "intrinsic" information related to particular aspects of the individual object (Gardin 1980:65-68). The archaeology laboratory at the Université du Québec à Montréal was utilized to deal mainly with lithic studies aimed at extracting the "intrinsic" information concerning the techniques involved in the manufacture and use of artifacts, nature of the raw material, and the condition ("état") (completeness, alterations) in which artifacts were found. Linked to this study is "control" information which supplies additional data, such as illustrations, remarks, and verifications of analytical procedures. Traditional artifact typologies provide comparison materials as a complement to this study. The "intrinsic" and "control" information consequently form the basis for the descriptive analysis.

The descriptive analysis under the Tuvaaluk Program

In order to maximize the efficiency of a descriptive analysis, the study of artifacts must be conducted in a uniform manner and the same criteria applied to all objects. Shape is the aspect which can fit these demands most closely. Consequently, a general reference system (fig. 3.2), based on shape, may be applied to the lithic objects:

> "... nous avons donc choisi d'orienter l'objet morphologiquement selon les conventions suivantes: la face d'éclatement pour un éclat ou la face la moins travaillée ou la plus plate pour un biface est disposée contre le papier de façon à ce que le plan principal de l'objet s'inscrive dans le plus petit rectangle possible, la partie la plus large de l'objet étant en bas du rectangle, c'est-à-dire vers l'utilisateur de la fiche, et la plus étroite vers le haut (Plumet 1979:107).

The analysis sheet (fig. 3.3) contains basic data from the field sheet (site, square metre, etc.), the subdivisions of a cluster, raw material of the object, its state, dimensions, lithic category (fabrication: debitage-façonnage), verifications, typology and remarks (other variables named on the sheet have not been included in the general analysis and pertain to more specialized research). For more complete details on the utilization of this analysis sheet one should consult Plumet (1979).

TUVAALUK 79 - FICHE D'ANALYSE PRELIMINAIRE N°

ANALYSTE: *Date anal:* _____ COLL.D'ORIG.:

RAPPEL: Site _____ *Mètre²* _____ | Vent il.: _____ à _____
Fouilleur _____ *N° prov.* _____ | _____ à _____
Année _____ | _____ à _____
| _____ à _____

COLLECTIF: Nb.exact _____ N°racine _____ Pds.total: ⌊⌋⌊⌋⌊⌋⌊⌋

MATIERE PREMIERE: Code ⌊⌋⌊⌋⌊⌋

ETAT: Intégr. ⌊⌋⌊⌋⌊⌋ ⌊⌋ Etat ph.-ch. 1 ⌊⌋ 2 ⌊⌋ Obs.comp. ⌊⌋
3 ⌊⌋ 4 ⌊⌋

DIMENSIONS: poids ⌊⌋⌊⌋⌊⌋ g ⌊⌋⌊⌋ cg

QL. ⌊⌋ Ql. ⌊⌋ Qép. ⌊⌋

Long. ⌊⌋⌊⌋⌊⌋ Larg. ⌊⌋⌊⌋⌊⌋ Ep ⌊⌋⌊⌋⌊⌋ mm

MORPHOLOGIE: forme générale C ⌊⌋⌊⌋⌊⌋ I ⌊⌋⌊⌋⌊⌋ R ⌊⌋⌊⌋⌊⌋

Symétrie	Int.	Qual.		Int.	Qual.		Int.	Qual.
N°1(A78)	⌊⌋	⌊⌋	3(S.lgt.78)	⌊⌋	⌊⌋	5(S.tr.AB)	⌊⌋	⌊⌋
N°2(A34)	⌊⌋	⌊⌋	4(S.lgt.AB)	⌊⌋	⌊⌋	6(S.tr.34)	⌊⌋	⌊⌋

FABRICATION: Débitage-façonnage ⌊⌋⌊⌋⌊⌋ OBS.DEB.et AME.: ⌊⌋⌊⌋

AME.PART. PREH.: local. ⌊⌋ amén. ⌊⌋⌊⌋⌊⌋ OBS.COMPL.: N°1 ⌊⌋⌊⌋⌊⌋ N°2 ⌊⌋⌊⌋⌊⌋ N°3 ⌊⌋⌊⌋⌊⌋ N°4 ⌊⌋⌊⌋⌊⌋

VERIFICATIONS* ⌊⌋⌊⌋⌊⌋⌊⌋ ⌊⌋⌊⌋⌊⌋⌊⌋ ⌊⌋⌊⌋⌊⌋⌊⌋

TYPOLOGIE(30) _____

REMARQUES*(60) _____

_____

_____

ILLUSTRATIONS*	TYPE	IDENTIFICATION, RÉFERENCES
PL:plan	____	_____
NB:photo NB	____	_____
DI:diapo	____	_____
CR: croquis	____	_____
	____	_____

UTILISATION: Code _____ OBS.COMP.: loc.: _____ obs. _____

*Variables à occurence multiple

Fig. 3.3: Analysis sheet of individual and collective lithic objects.

Description of variables and codes

This review of the content and definitions of variables will only apply to those variables previously mentioned (raw material, condition, lithic category and typology). The condition (état) of the lithic object denotes its present aspect: complete or broken. In this general analysis, broken objects are first described in relationship to the missing part (incomplete) or to the remainder (fragment) and secondly, to the position of the missing part or fragment (distal, proximal, lateral, or combinations). The position is established according to its orientation during debitage or during utilization (for tools).

Each object is assigned to a lithic manufacturing category (catégorie de fabrication ou de débitage-façonnage). The underlying notion behind the different categories is that they largely reflect technological traditions, types of activities, environmental constraints, and individual techniques of manufacture or use of lithic artifacts that occurred during the occupation of the site. Three basic categories are distinguished: (1) non-worked lithic objects (neither polished nor knapped); (2) polished or battered; (3) knapped lithic objects. The third and last category constitutes the largest part of Paleo-Eskimo lithic collections. This category can be divided in two: core objects and core debitage. Within the debitage category several subdivisions are made: debris, flakes, blades, and microblades. Debris are essentially unclassifiable specimens or simply chunks. Flakes are divided in two: chips (smaller than 1 cm^2) and flakes (bigger than 1 cm^2). Blades and microblades are examined within the same category (statistical compilations of their dimensions nevertheless enable one to distinguish between the two based on Taylor's (1962) previous

research). Following these preliminary distinctions, flakes and blades are subdivided into modification categories. The modifications are based on the extent of reworking. Blades may be unretouched, locally (less than 50% of retouch on the edges) or generally (more than 50%) retouched. Flakes, on the other hand, have more subdivisions: unmodified, flakes with micro-scars (as a result of utilization or manufacture), locally retouched (less than 50% on the edges) or generally retouched. The "generally retouched" category is further subdivided into 4 sub-categories. In order to deal with these sub-categories, Plumet introduced the notion of "index of retouch" (indice de façonnage) for an objective evaluation of the collection under study. The index of retouch is based on retouch which is deeper than 1 mm. Moreover, the measurement of the retouch on the edges of the dorsal (a) and ventral (b) faces is made by a curvimetre in relation to the perimeter of the object. The index of retouch is then calculated as follows:

$$\text{index of retouch} = \frac{(\text{length of retouch on A + B}) \times 100}{\text{Perimeter}}$$

The subcategories are described as: (1) unifacial A (generally retouched on the dorsal face); (2) unifacial B (on the ventral face); (3) tending to be bifacial; or (4) completely bifacial.

No typological study is made within this framework but a reminder of what the tool is considered to be within the traditional taxonomic system in the Arctic is stated.

Conclusion

The idea behind this work is to develop a systematic approach to lithic studies in the Arctic as well as in other regions of the New World. Although the use of computers is essential to the processing of these data, and though it is expensive and time consuming, it enables researchers to exploit the data to a maximum degree and provides coherent and rigorous descriptive (non-interpretative) data. Although, at present, this kind of research may be considered eccentric because of time and money investments, it promises to open up future avenues of archaeological research and to help unify methods in the interpretation of archaeological data.

Analytical framework of the present study

This research involves the study of individual units of occupation (both Pre-Dorset and Dorset). These units of occupation are defined as structures or excavated areas and represent one single occupation that occurred over a relatively short time span (one exception to this can be found in "Structure R" where there could be three occupations). The objective of this research is to characterize certain elements within these individual units of occupation which will in turn provide clues as to the nature of their occupation. The basic tool used in this research will be a lithic analysis of diagnostic artifacts as well as non-diagnostic ones (including debitage).

The first part of the analysis seeks to define the lithic collection. This preliminary study will identify the constituents of the site and define its significance within an Eastern Arctic context. The lithic analysis will note distinctions in raw materials, lithic categories, flake completeness patterns, artifact typologies, and the combinations of these variables. The results can subsequently be compared to other sites in the region. This task has been the major concern of Arctic archaeologists but it is suggested, in the present study, that this kind of research must be followed by more in-depth analyses that will broaden our knowledge of the nature of the occupations and help to reconstruct the prehistoric lifeways of Paleo-Eskimo peoples.

The ideal situation for the study of archaeological sites, in the Arctic especially, is to be able to study individually defined units of occupation. If one may study several clearly-defined individual units of

occupations that are delimited spatially, one may attempt to understand the nature of these units. Correspondingly, the study of brief individual occupation units, as presented in this site, enables one to understand the utilization of their lithic resources, the inferred nature of their tool kit, the variety of habitation structures, and the features included within a chronological and cultural setting. In this way, it will also be possible to define characteristics common to Pre-Dorset and Dorset occupations as well as their distinctive features. Furthermore, it is hoped that these characteristics will reveal information about the Pre-Dorset/Dorset transition period. In this sense, it will be possible to tentatively examine the technological developments, population distribution and the organization of these two cultures in relation to each other and finally present some interpretations on the evolution of these Paleo-Eskimo cultures.

Because the study of individual occupations relies almost exclusively on lithic remains, two additional guidelines were considered in this study: the provenience (local and regional) and exploitation (curation and expediency) of the lithic resources. This particular site, unlike many other sites in the Eastern Arctic, contains several raw materials that are not of a local origin. Thus, a particular study was undertaken to evaluate the importance of specific raw materials within individual lithic assemblages. As a corollary, it was important to understand how individual raw materials were knapped; modified into flakes, retouched flakes, or diagnostic implements; and how they were broken and re-used. For this purpose, Binford's (1972, 1977, 1979) ideas on "curation" were applied to these assemblages. We sought to understand the relations between curated implements, expedient tools, and debitage in individual assemblages and

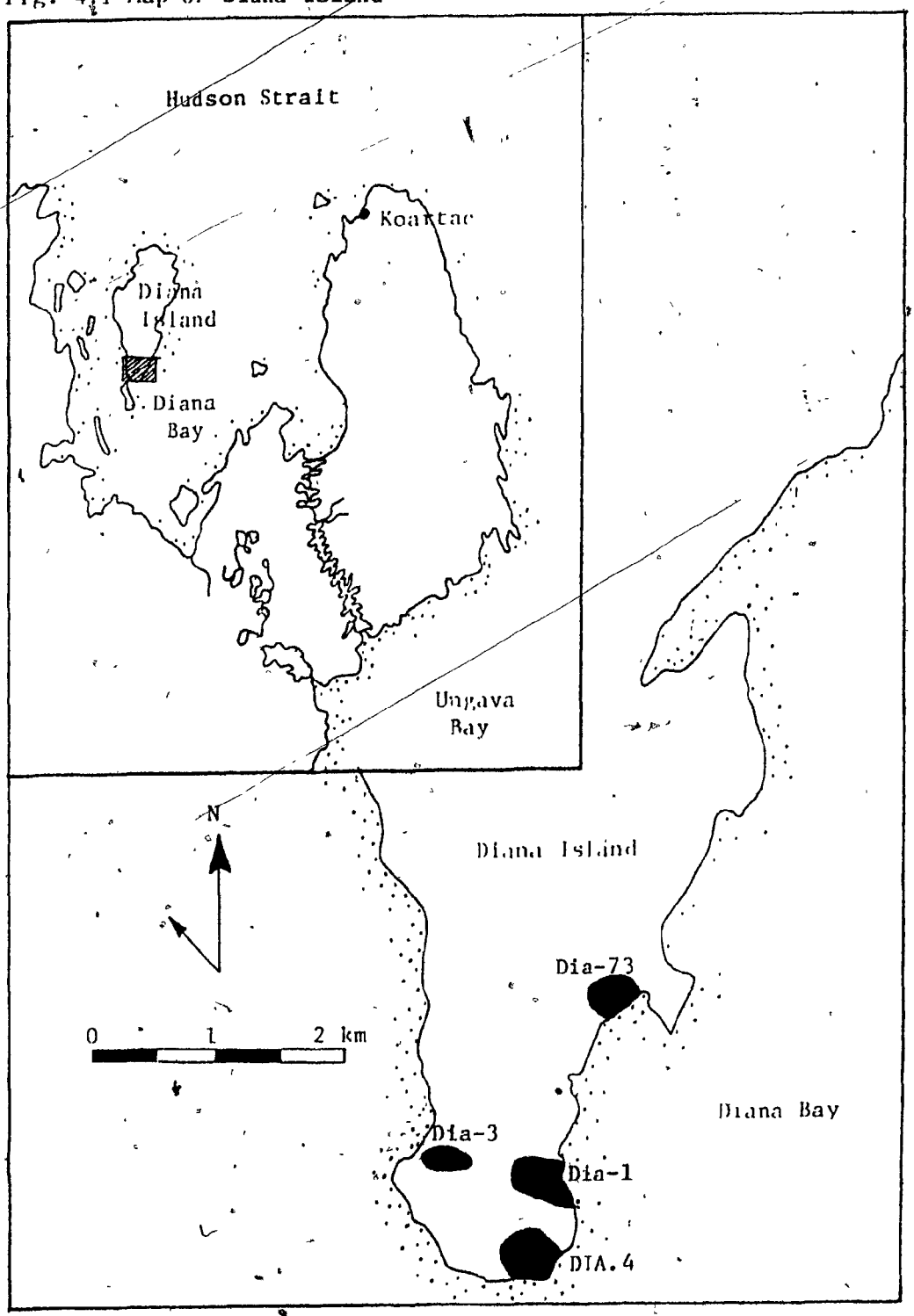
attempted to identify indications as to why they were left behind.

Fortunately, one can also rely on the distribution of cultural remains within the excavated area and the structural elements uncovered within it. From this it is possible to determine how these prehistoric people utilized the space in which they lived.

The combination of these elements of analysis can establish the character of individual units of occupation, as well as suggest their chronological positions and cultural affiliations.

In addition, diagnostic traits of Diana-1 assemblages are employed in the comparative study undertaken in chapter VI. Here, relationships will be examined by means of comparisons with other regions in the Arctic (Labrador, Greenland, High Arctic, Hudson Strait, Poste-de-la-Baleine and Baffin Island) in an attempt to situate the earliest Paleo-Eskimo occupations of Diana-1 within the context of Eastern Arctic prehistory.

Fig. 4.1 Map of Diana Island



IV: Site description

Geographical background

Diana Island is situated in the northwestern portion of Ungava Bay, approximately 12 km southwest of the Inuit village of Koartak. The Diana Island and bay area are frequently visited by the Inuit, especially for hunting marine fauna.

Diana Island was formed during the Precambrian Age. The island's structure is geologically stable but comprises certain fracture zones which occurred in Precambrian times. These fracture zones have directed the erosion processes on the island, but the rock is highly resistant to erosion which hence occurs very slowly. There is no relief degradation. One fracture zone corresponds to the Diana-1 site location (fig. 4.1). This fracture area was exploited by erosion processes which increased the extent of the fracture zone. During deglaciations this area was filled with moraine deposits. These deposits, which are probably not very deep, because of the presence of local outcrops of rocks, were subsequently remodeled to form successive marine beaches as a result of isostatic movements. The archaeological site under study is situated on these paleo-beaches. A few residual lakes occur on the site and could be the result of ice remnants which were isolated during deglaciations.

The climate in the Diana Bay area is characterized by harsh winters and brief summers. The mean annual temperature is of -6.7°C. In January the temperature reaches highs of -18 to -26°C, while in July these are between 4.4 and 10°C (Fletcher and Young 1975). The bay is generally frozen until

the end of June and the freeze-up occurs around the end of November or in early December.

Periods of climatic change have been proposed for the northeastern part of Canada as follows (fig. 4.2):

Period	*BP*	*Climate*
	8000	
I		Cool Warming Tundra to shrub transition
	6000	Cool episode about 6000
	5500	
II		Climatic Optimum with several cool episodes such as at 5000 otherwise relatively warm and dry Forest moves north of present boundary by 4500
	3500	
III		Fluctuations Generally cooler eventually wetter Forest retreats south
	3000	
IV		Early stable period Warm but cooling
	2 500	
V		Cool period Wetter
	2000	
VI		Warmer and drier Forest again moves north Cooling episode about 1500
	1500	
VII		Gradual warming resulting in Little Climatic Optimum around 1000 AD thereafter slight cooling
	800	
VIII		Climatic fluctuations Warm to cool Gradually cooling more after 500 Little Ice Age about 100 400
	300	

Fig. 4.2: Climatic periods in northeastern Canada
(from Fitzhugh 1972, p. 37)

The vegetation cover on the island is typical of a tundra environment: sphagnum and caribou moss and lichens are the main constituents of this arid environment. Complementary plant species provide additional variations: ericaceae and graminaceae plants grow where moss is thicker and where water

accumulates during the summer (Richard 1974).

Present day fauna on the island is limited to lemmings and lagopeds, and includes occasional arctic foxes and hares and rare caribou and polar bears. Indeed the richness of this area lies in the surrounding waters. Marine mammals are numerous and a reliable food resource. On a year round basis many species of seal can be hunted: Pusa hispida, Erignatus barbatus, Phoca vitulina. Seasonally, other marine mammals visit these waters: walrus (Odobenus odobenus) and whales. Migratory avifauna (several varieties of geese and ducks) still cross over and stop in this region during the summer months and occasionally add to the diet of present-day Inuit. Archaeological sites contain many of the marine and land mammals previously described and a few birds. An analysis of faunal remains was conducted on the low beaches of Diana-1 by Piérard (1975).

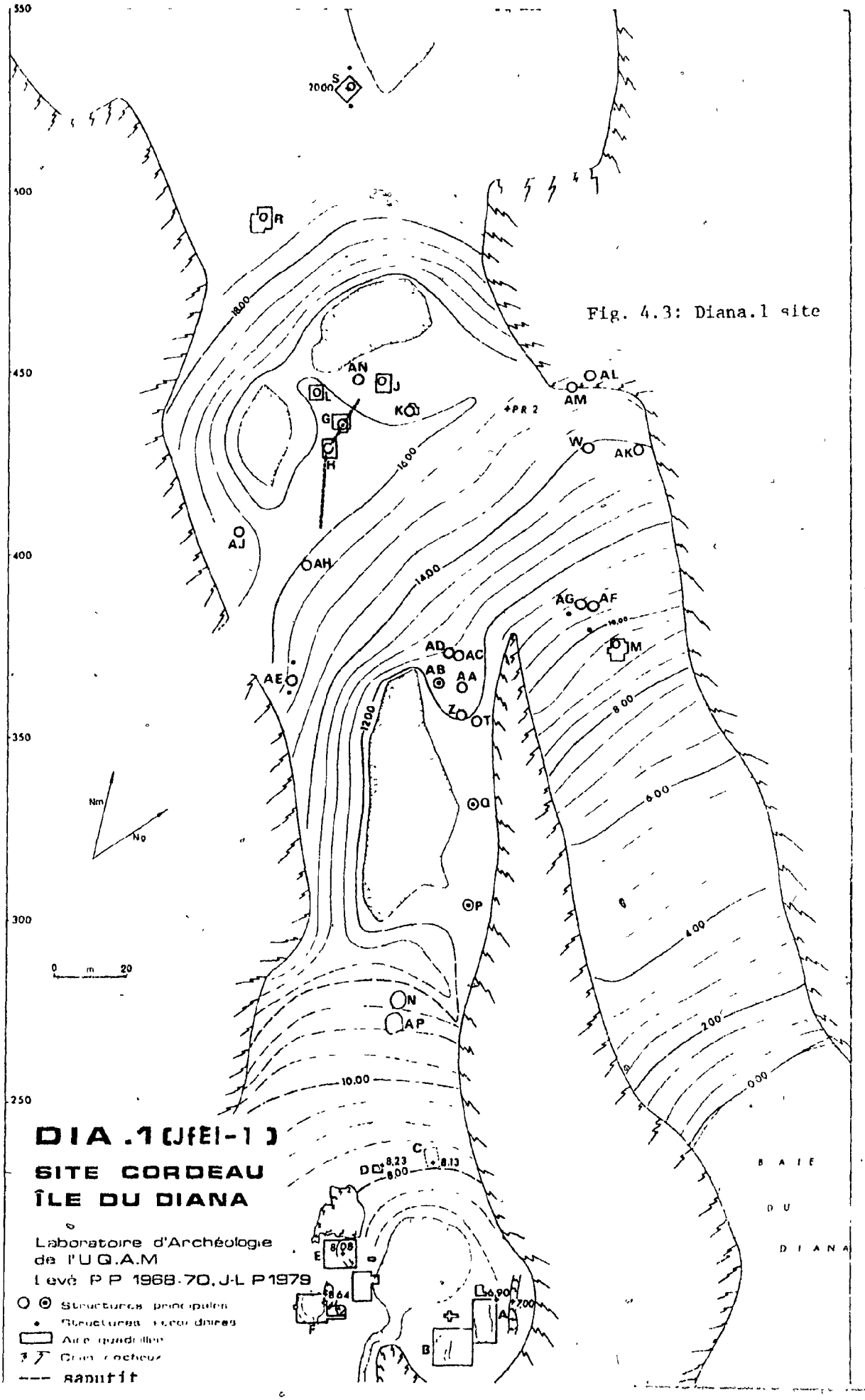


Fig. 4.3: Diana.1 site

Site location

Geographical coordinates: W 69°, 58′, 35″; N 60°, 56′, 14″

Military coordinates: 19VDT475600

Borden Code: JfEl-1

Diana Island, although at the tip of Northern Québec, is part of the Northwest Territories. The island is 12 km north to south and 6 km east to west. The Diana-1 site is situated on the southeastern slope of the island and the habitation structures are dispersed on paleo-beaches at different altitudes. It covers 350 by 150 metres on an east-west axis (fig. 4.3). The northwest portion of the site is interrupted by a lake (30 metres in diameter) which lies below a tombolo (creating the link between the fracture zone and the island's internal rock structure). The lowest altitude of the Diana-1 site corresponds to 5.50 m (a.s.l.). At this altitude, the tide seldom reaches the site (although tides are several metres high). Corresponding to the 7 m level, there is a terrace approximately 100 m long which is surmounted by a smooth succession of beach ridges and a terrace at the 22 m level.

A new grid was installed in 1979 to link the structures of the low beaches to the ones on the high beaches. The previous reference point (p.r.1) was at the 7 m terrace and a second reference point was installed 240 m farther north (p.r.2). This grid system fully integrates Gosselin's (1978) model for computerized data recovery.

Diana-1

In 1979, during the last season of the Tuvaaluk Program (directed by Ian Badgley), 50,000 artifacts (including debitage) and numerous habitation structures were uncovered at the Diana-4 site. During this same season, it was suggested that another field group spend two weeks excavating several surface structures on the high beaches of Diana-1 (less than 1 kilometre from Diana-4). These structures were excavated for their admittedly simpler and clearer occupation patterns. The surface structures could be tentatively identified by a circular or oval pattern of rocks, or even by hearth remains. These habitation structures and others in the vicinity (Bibeau 1980: Diana-73; Labrèche 1981: Diana-4t; Pinard 1980: Diana-3) are expected to provide additional data concerning domestic areas, which will be relevant for understanding the more complex situation at Diana-4.

The Diana-1 site is divided in two parts: the low and the high beaches. The habitation structures of the high beaches will be examined here while the study of structures found in the lower beaches is to be undertaken soon by P. Plumet. These two sections are studied separately for practical reasons. The reason for separating them is mainly that the settlement patterns differ. What caught the eye of archaeologists while first treading upon this site was that the lower beaches contained principally semi-subterranean dwellings, while the higher beaches had only superficial surface structures, which were nevertheless quite numerous.

At the beginning of the excavations on the higher beaches of Diana-1 in 1979, it was believed that all of these surface structures were Paleo-Eskimo occupations. However, it was uncertain whether or not there was a

chronological separation between the surface structures ranging from the 10 metre level (a.s.l.) up to the 22 metre level (a.s.l.). Considering this, it was decided that a sample of structures would be excavated at different altitudes from thirty or more structures visible on the surface. One structure was excavated on the 10 metre terrace, but the majority were excavated between the 16 and 20 metre levels. "Structure S", excavated by Plumet in 1976 on the 22 metre level, completed the site study of the higher beaches. The eight surface structures excavated, based on surface indications, were assumed to represent individual occupations.

The stratigraphy

The stratigraphy of the site is simple: it is composed at the surface of a variable coat of moss and lichens. The moss is generally between 2 and 10 cm thick. Under the vegetation cover was a thin humus level, sometimes thread-like, but usually present in lenses not more than 8 cm thick except in local depressions where the humus could be more than 10 cm in thickness. The humus level also varied naturally from thick to thin in relation to its position between beach ridges, the thickest layers being in the centre. Immediately below the humus level, and occasionally directly underneath the vegetation cover, lay the beach gravel.

The recovery

The basic procedures applied in the recovery of the archaeological data come from papers published in Paleo-Québec 9 (Gosselin 1979; Laming-Emperaire 1979; Plumet 1979). Three categories of cultural remains were uncovered and subsequently analyzed: lithic remains, bones and

decomposed organic material (wood, charcoal, burnt grease and red ochre). Their occurrences were recorded on individual slips along with the horizontal location, description and connections with other cultural remains. The vertical localization was not necessary in this context because the overall majority of the cultural remains were found between the surface vegetation and beach gravel and inside a thin humus level.

151 square metres and 7 surface structures were excavated in 1979 (and 20 square metres in "Structure S" in 1976). The ends pursued here were similar to the general goals of the Tuvaaluk Program, which consists of understanding the domestic life of the Paleo-Eskimo peoples. Each structure was excavated according to surface indications relating to the periphery of a structure, as witnessed by stone alignments or by features such as hearth remains. Once the structure was provisionally delimited, it was sectioned in 2 square metres and each section was excavated down to the beach gravel layer.

Limitations of time led excavators to work in metre squares where surface indications revealed a stone alignment, a hearth feature, or a land depression. The quantity of excavated metres was restricted by time constraints. This accounts for the fact that some structures are incompletely excavated.

Description and interpretation of excavated areas

Some "structures" revealed one distinct occupation and clear structural limits (L, G and M) even though the latter were partially interrupted, but others had features without a habitation configuration (R) or no structural elements at all (H, S). Because of a total lack of cultural remains, two other excavated areas (K,J) could equally well be cultural or natural depressions.

"Structure S" (22m level) (fig. 4.4)

"Structure S" was excavated in 1976 but it had not been examined in detail before the present study. It was reported that no habitation configuration was discerned during excavation even though surface indications revealed a possible oval stone alignment. 20 square metres were excavated. Because of its high altitude, it was hoped that this would represent the earliest occupation on the Diana-1 site but since no structural remains or diagnostic implements were recovered for positive cultural identification it was abandoned until other excavations in 1979 contributed to put this structure within a general framework.

"Structure R" (20m level) (fig. 4.5)

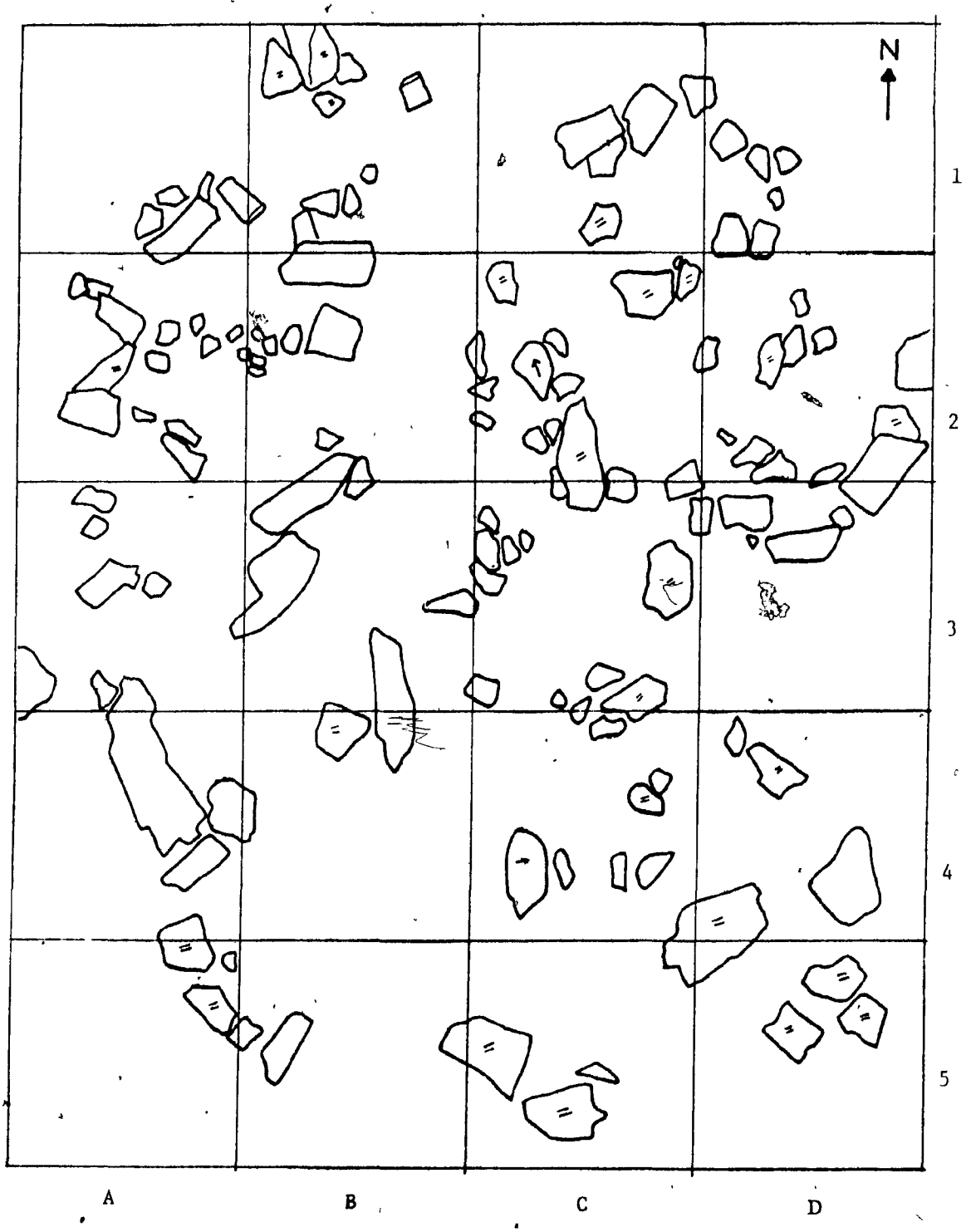
36 square metres were unearthed. Initially the surface rocks seemed to form, together with the rocks covered by vegetation, an oval stone alignment which might represent the periphery of a habitation structure. However, once the vegetation cover was removed, the continuous stone alignment became

DlA.I-S-76 (fig. 4.4)

Laboratoire d'Archéologie de l'Université du Québec à Montréal

- Contour extérieur des pierres visibles en surface
- Contour extérieur des pierres enfouies
- Contour intérieur des pierres
- = Dalle
- → Inclinaison de la pierre
- Pierre verticale
- Pierre partiellement enfouie

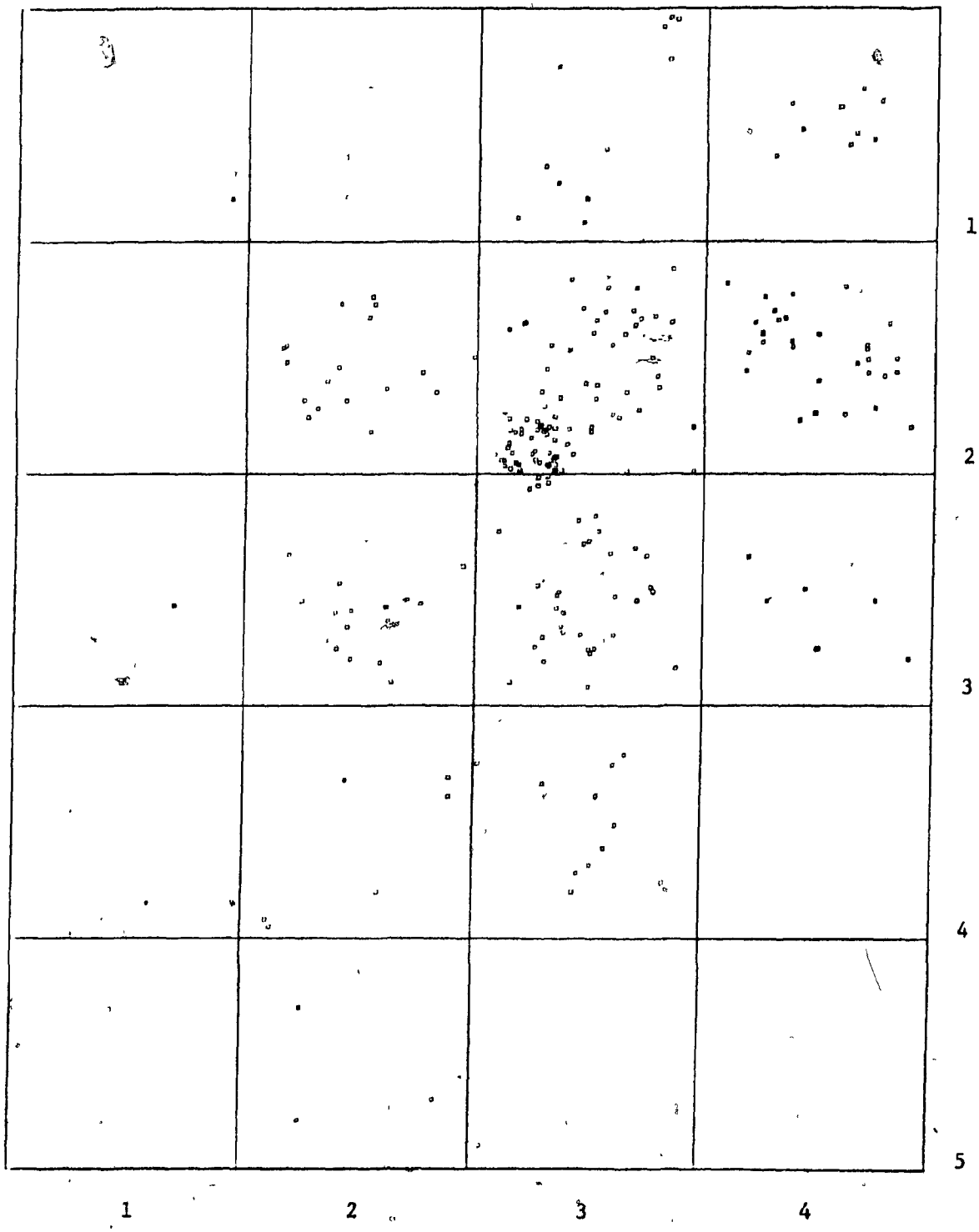
0 — 1 mètre



STRUCTURE "S"

DISTRIBUTION OF CULTURAL REMAINS

. lithic
B bone
O decomposed organic material



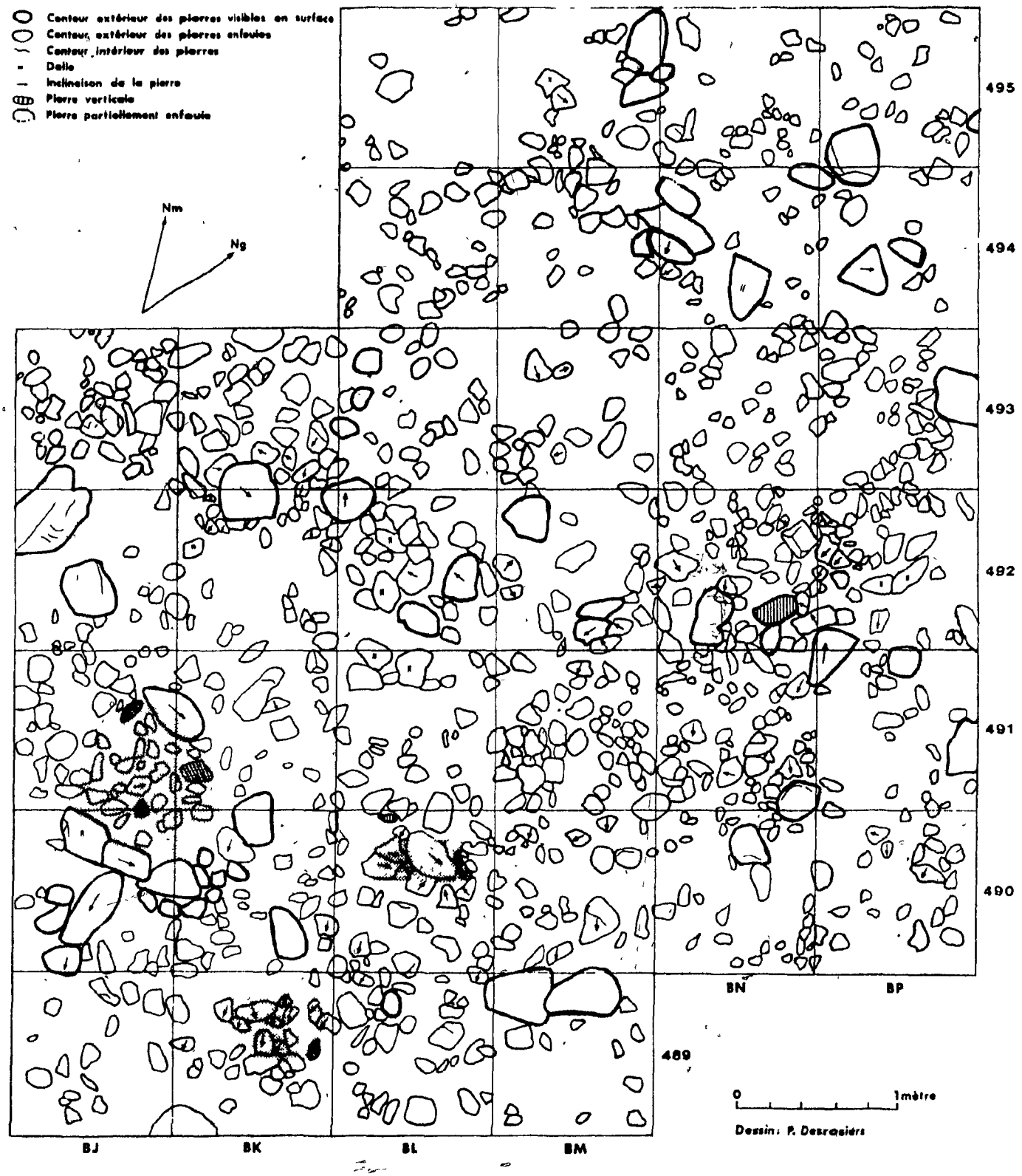
Site DIA-1 (UfEl-1)

Aire de fouille: R (fig. 4.5)

LABORATOIRE D'ARCHEOLOGIE DE L'UNIVERSITE DU QUEBEC

A MONTREAL.

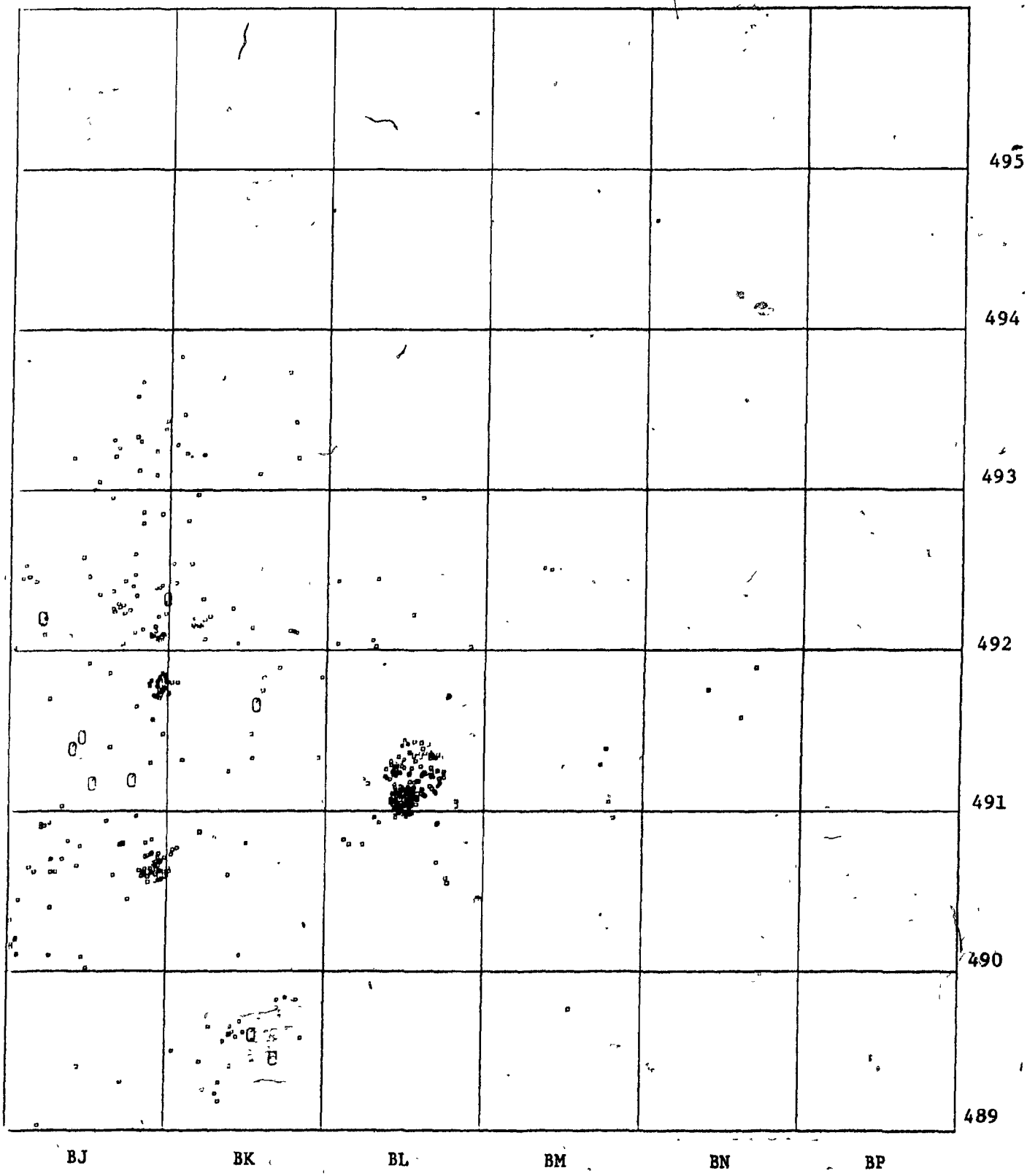
(with estimated hearth areas shown by shading)



STRUCTURE "R"

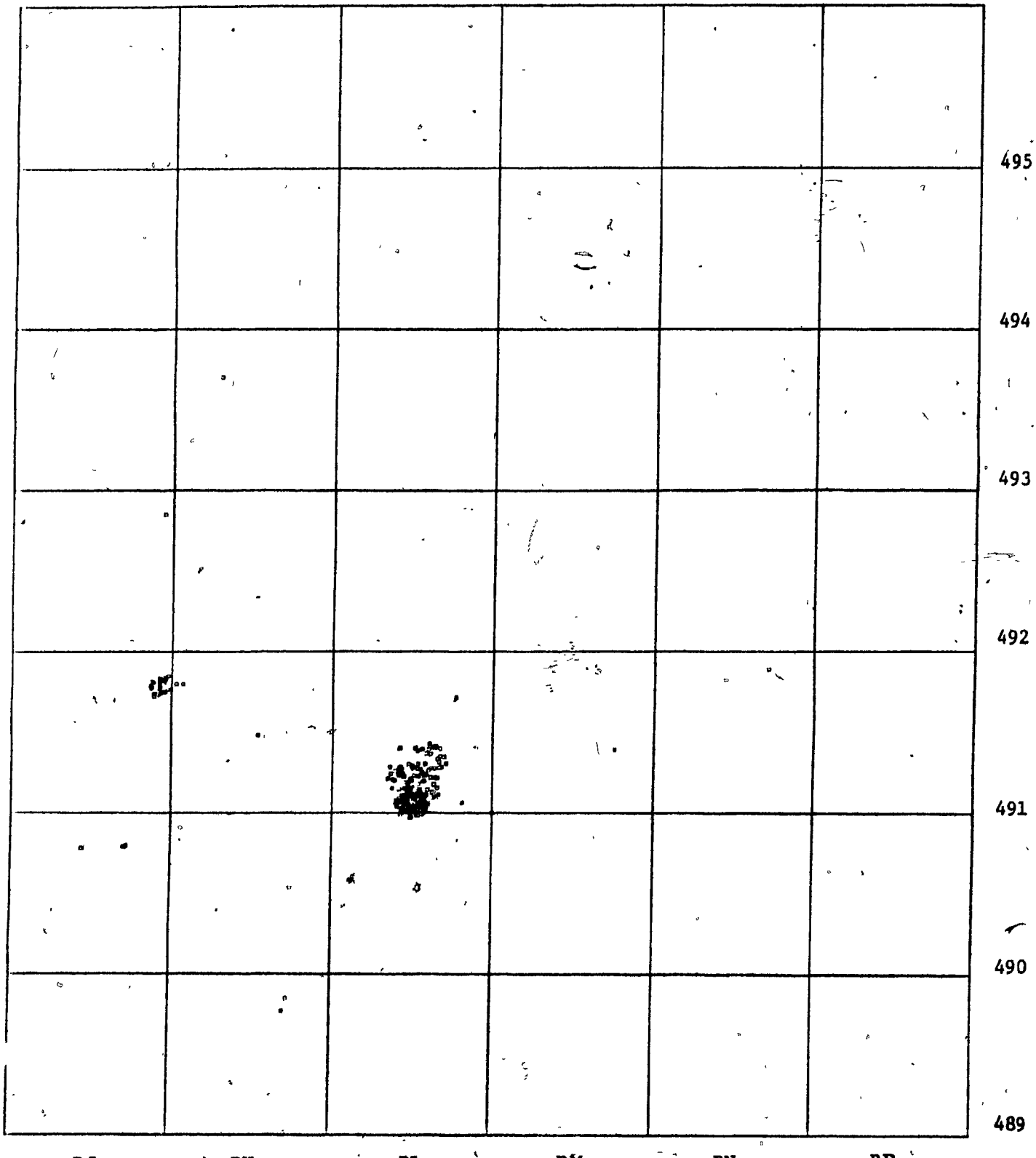
DISTRIBUTION OF CULTURAL REMAINS

. lithic
B bone
O decomposed organic material



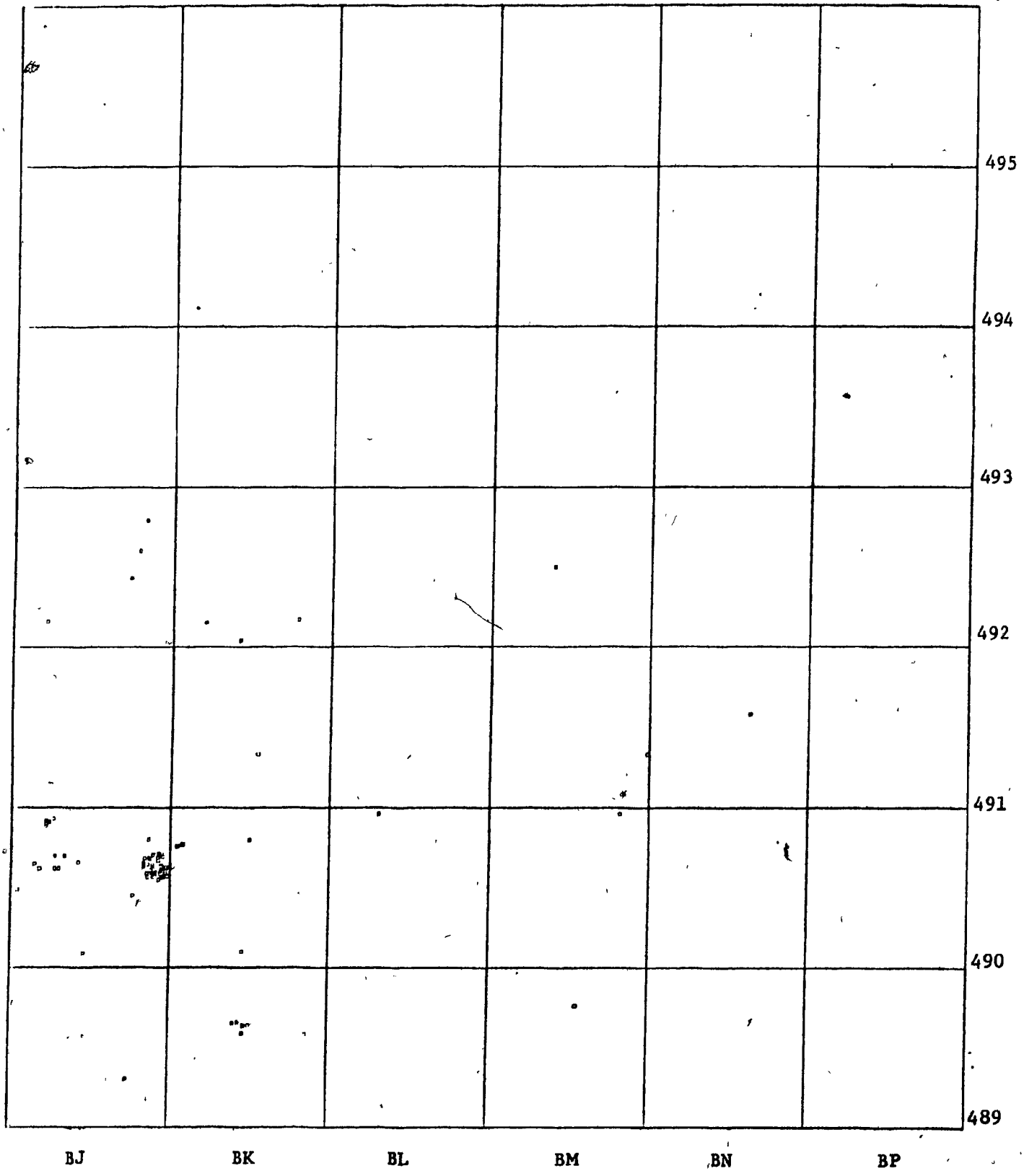
STRUCTURE "R"

DISTRIBUTION OF CLAY SCHIST



STRUCTURE "R"

DISTRIBUTION OF COARSE QUARTZ



disarticulated. Nevertheless, cultural remains were found and three features were uncovered in the southwest portion of the excavated area.

The very thin vegetation cover (1-3 cm) was exclusively composed of caribou moss and graminaceae. The humus layer was even thinner and often imperceptible. The humus was composed of organic material, sand, gravel and rootlets and was found mostly in small interrupted lenses between the surface vegetation and beach gravel layers. Only occasionally, where features were discovered, did the humus become thicker.

No distinct occupational unit was distinguished in the excavated area. This lack seems to reflect not only the possibility of multiple occupations but also natural and cultural disturbances, as witnessed by the jumble of disorderly rock concentrations and the thin vegetation cover.

The first depression (in BK-489), corresponding to feature 1, was surrounded by small flagstones and rocks (20-30 cm long) and was 10 cm deep. This depression had been severely disturbed but measured approximately 60 X 40 cm and was more or less round. Lithic artifacts (including debitage) and decomposed organic materials were associated with the feature. Furthermore, several of the rocks surrounding the feature contained grease encrustations; others were quite fractured probably due to heat. These many factors contribute to identifying this feature and the surrounding rocks as the remains of a hearth.

Feature 2 (in BL-490) was composed of thin rock slabs lining a rectangular depression measuring approximately 20 X 40 cm and 15cm deep. Slabs with sloped sides formed a box-like feature inside the depression.

This depression consisted entirely of pure humus and overlying fine sands (aeolian). The humus inside the feature contained a large quantity of lithic debitage. This box-like feature could be a hearth, even though there was no charcoal or burnt grease on the rocks to clearly demonstrate its utilization. This feature, because of its good preservation, can be considered as corresponding to the latest occupation in the excavated area.

Feature 3 had also been severely disturbed (in BJ-491) and was composed of oblique stones with a small concentration of wood charcoal in the centre. Practically no humus was present in this feature and no depression could be seen. Because of the oblique stones and wood charcoal, it can be suggested that this feature was a hearth. The difficulty of positive identification could result from the fact that this was the earliest of the features in this structure.

"Structure L" (16m level) (fig. 4.6)

This structure was first spotted by the presence of a depression which seemed circular and was 3 metres in diameter. In addition, some rocks in the northwest portion of the depression, still not covered entirely, seemed to indicate remains of a surface structure. An area 16 metres square was excavated.

Site DIA-1 (JfEl-1)

Aire de fouille: L (fig. 4.6)

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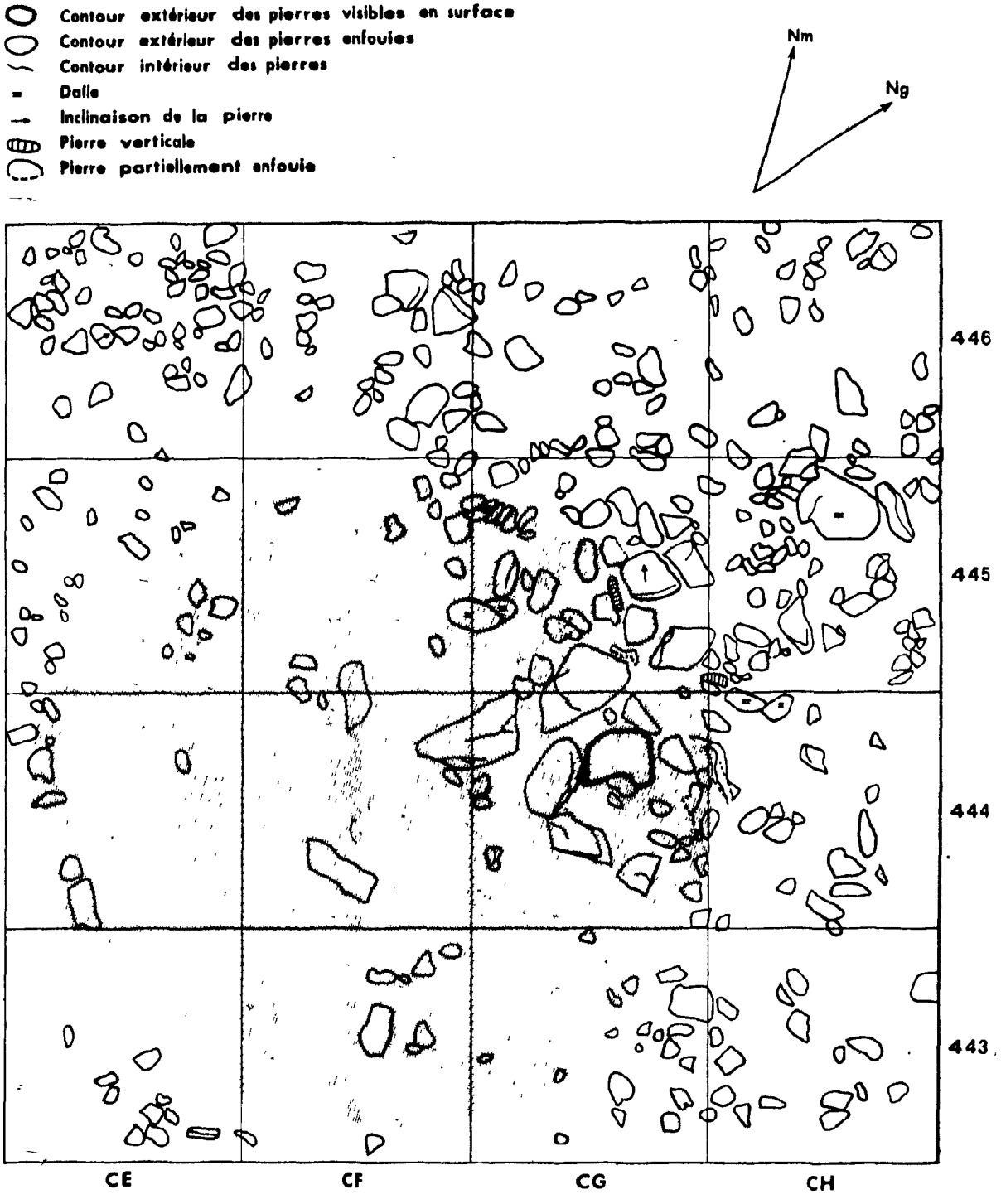
(with estimated occupation area shown by shading)



Dessin: P. Desrosiers

The vegetation cover consisted entirely of sphagnum moss. Under the moss, the humus layer was generally very thin (1-3 cm) and heterogeneous, except in the depression where it was generally pure. Outside this depression small amounts of gravel were mixed in the humus and farther away the humus was practically non-existent. Under the depression, the beach gravel varied significantly in size: while gravel was small in the depression, its size increased outside of it.

The northeast part of the excavated area probably corresponds to the entrance (in CC-445) of the structure because of the larger beach gravel in this part which contrasts with the smaller gravel in the rest of the depression. The entry did not cut the structure in two but stopped at the centre of the structure where the hearth area was located. The habitation structure could have been roughly circular and was 3 metres in diameter. The rocks first noticed on the surface corresponded to the centre of the structure. Even though no clear arrangement could be discerned, this area can be considered as a hearth area because a second depression (1.25 metre in diameter) under the stones indicated the general hearth area and contained wood charcoal at the bottom. The gravel mixed in the humus inside this depression may have resulted from digging the depression during the occupation.

The three wood charcoal samples found in the depression and in other parts of the structure were combined to provide a quantity large enough for radiocarbon dating. The uncorrected date for this structure is: 3470 $\pm$160 years B.P. (U.Q. 86).

"Structure C" (16m level). (fig. 4.7)

The excavated area comprised 22 square metres and was characterized by a surface depression thought to correspond to an occupation area. The vegetation cover was principally composed of sphagnum moss in the interior of the depression, while the exterior contained mostly caribou moss.

The humus layer situated immediately underneath the moss, varied from 4 to 8 cm thick. This layer also contained a large quantity of sand, gravel and rootlets. The humus layer was often difficult to distinguish in the eastern and northern parts of the excavated area where it was the thinnest. Following the removal of the humus layer, a small earth ridge was unearthed in the northeast section of the excavation although no stone alignments were associated with it. The southwest section seemed to mark the centre of the occupation. Here, the humus was thicker and together with the stone alignments appeared to suggest an occupation surface. These alignments might constitute the extremities of two lobes separated by a mid-passage. The axis of the structure was oriented in a northeast-southwest direction and the two lobes are estimated each to be approximately 1.5 metres long and 1 metre wide (on the same axis as the structure). Thus the structure would cover a total of 3 m by 2.5 m including the mid-passage. Inside the mid-passage, the remains of a central hearth is suggested by: (1) a concentration of predominantly small flat rocks which form a circle approximately 75 cm in diameter, (2) the remains of burnt grease encrustations on the reverse surface of the majority of constituent rocks,

Site DIA-1 (JfEl-1)

Aire de fouille : G (fig. 4.7)

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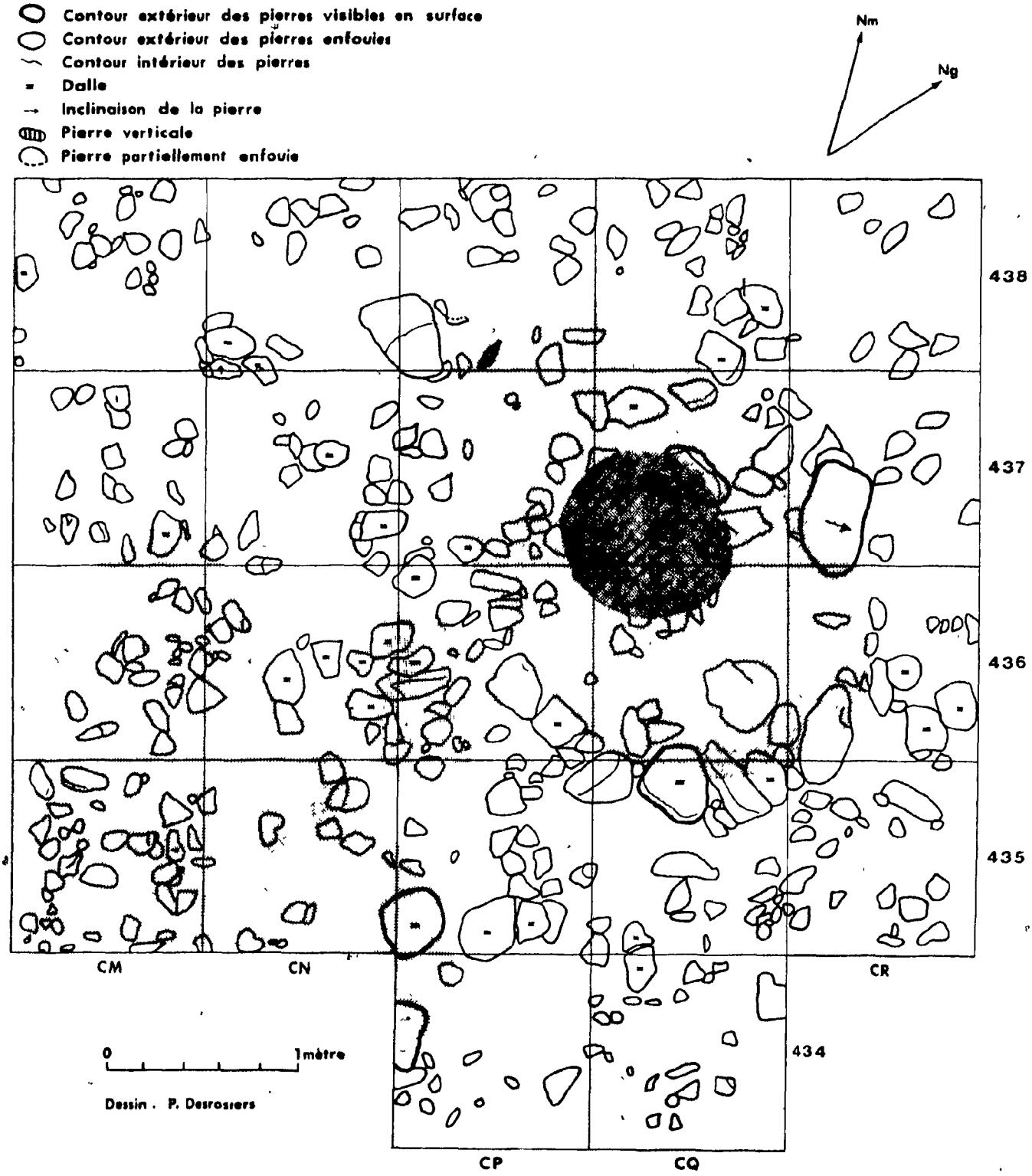
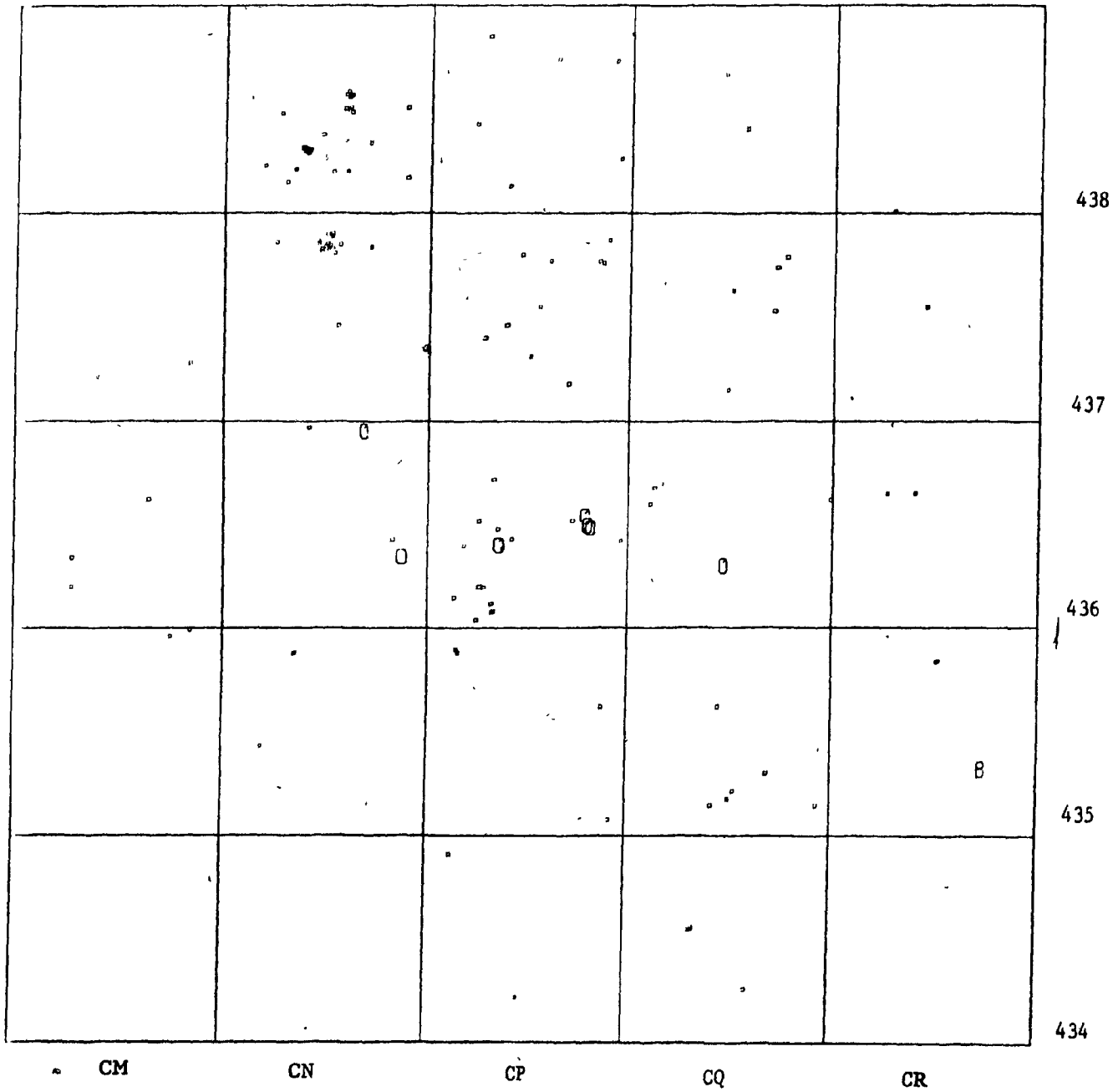
(with estimated hearth and occupation areas shown by shading)



STRUCTURE "G"

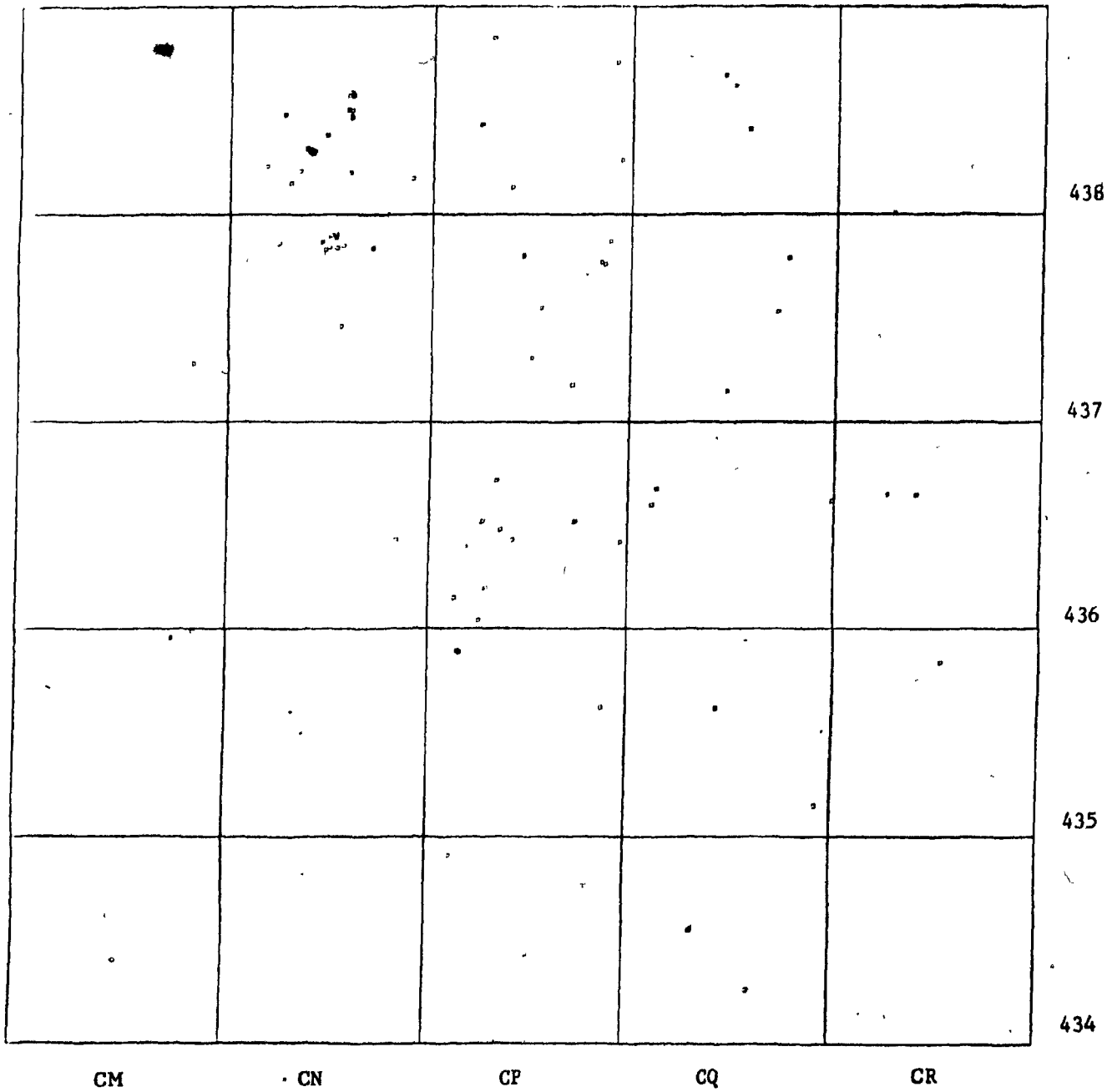
DISTRIBUTION OF CULTURAL REMAINS

. lithic
B bones
O decomposed organic material



STRUCTURE "G"

DISTRIBUTION OF BLACK QUARTZITE



(3) its roughly circular contour, (4) its layout composing an entrance and perimeter and, (5) several nearby wood charcoal fragments. Another feature (80 cm in diameter) lies in a shallow depression and contains several inclined stones. This second feature is located at the centre of the eastern lobe, one metre across from the central hearth. No other cultural elements contribute to the identification of this feature, which was probably a pit contemporaneous with the habitation structure.

"Structure H" (16m level) (fig. 4.8)

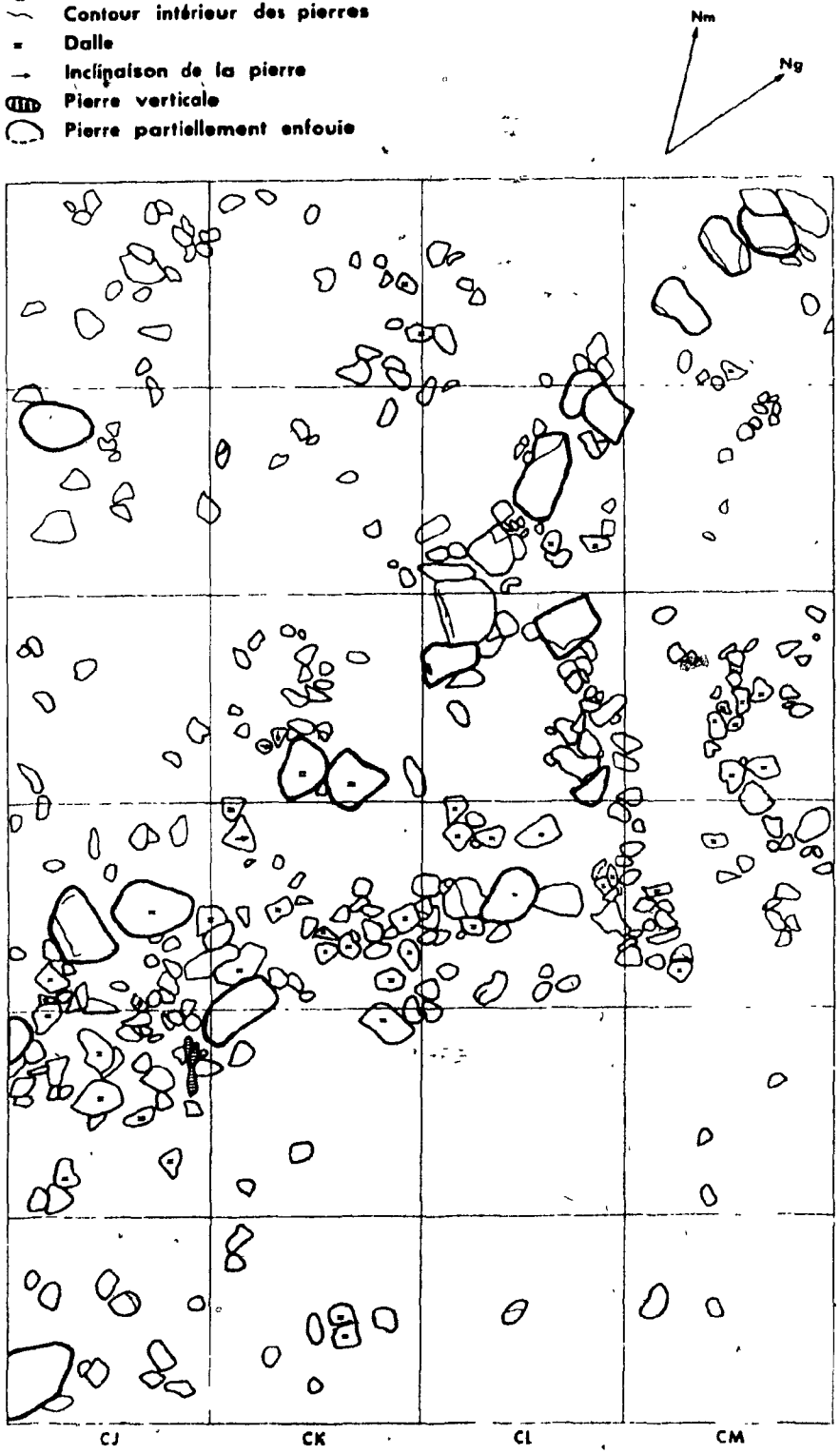
This structure appeared as a shallow surface depression and its diameter covered approximately 3.5 m. Some half-metre sized blocks marked the northeastern and southwestern limits of the occupation area. An area of 24 square metres was excavated.

The vegetation cover was generally of caribou moss and lichens but occasionally traces of sphagnum moss and graminaceae were present. Under this vegetation, the humus layer, 2 to 4 cm thick, was infiltrated by roots and sand. The depression, however, was approximately 10 to 12 cm deep and was partly delimited by large slabs and concentrations of small flat rocks and cobbles in the interior. Another concentration of rocks situated in the depression corresponded to a deepening of the depression and a thickening (up to 15 cm) of the humus layer; some rocks in this concentration were found in an inclined position. This, it is inferred, constituted the hearth area. On top of this hearth area, in the vegetation cover, a rock bearing a natural notch had been noticed previously.

Site DIA-1 (JfEl-1)

Aire de fouille: H (fig. 4.8)

Contour extérieur des pierres visibles en surface
Contour extérieur des pierres enfouies
Contour intérieur des pierres
Dalle
Inclinaison de la pierre
Pierre verticale
Pierre partiellement enfouie



Dessin. P. Desrosiers

Unfortunately, apart from this hearth area, no habitation structures were identified in the excavated area. Nevertheless, a stone alignment crossed over the excavated area and can be seen in a diagonal line on the structure plan. This alignment can be tentatively interpreted as a "saputit" (see fig. 4.3, 4.8) used in hunting caribou to direct the herd towards a kill site.

"Structure J" (16m level)

The excavated area corresponded to a slight surface depression. The likelihood that it was a unit of cultural occupation was suggested by the fact that the depression was oblique to the orientation of the beach; which indicated that it would not be natural. An area of 15 square metres was unearthed.

The vegetation cover consisted principally of caribou moss. Under the moss a very thin layer of mixed humus, sand, rootlets, and gravel was present. This humus layer (1-3 cm) often was intermittent and overlaid the beach gravel layer. Under the depression the beach gravel was smaller in size in proportion to the gravel outside the depression.

The depression was oval-shaped and approximately 3 m long and 2.5 m wide with a north-south orientation. A continuous concentration of flat rocks was located on the eastern and southern peripheries of the depression. No other feature or any lithic artifact was found in this excavated area. This depression cannot therefore be associated with a human activity.

"Structure K" (16m level)

This excavated area was dominated by an oval depression which was delimited by 2 large flagstones and smaller cobbles along the southeastern periphery. 10 square metres were excavated.

The vegetation cover was composed of caribou moss, lichens and graminaceae. The humus layer, under the vegetation cover, was fairly thin (5-6 cm) in the depression. The beach gravel underlying the humus layer contained humus infiltrations for an additional 6 cm. Outside this depression the beach lay directly under the vegetation cover. No artifact or any feature was found in the excavated area. It cannot be positively stated, therefore, that this depression was the result of human activity.

"Structure M" (10m level) (fig. 4.9)

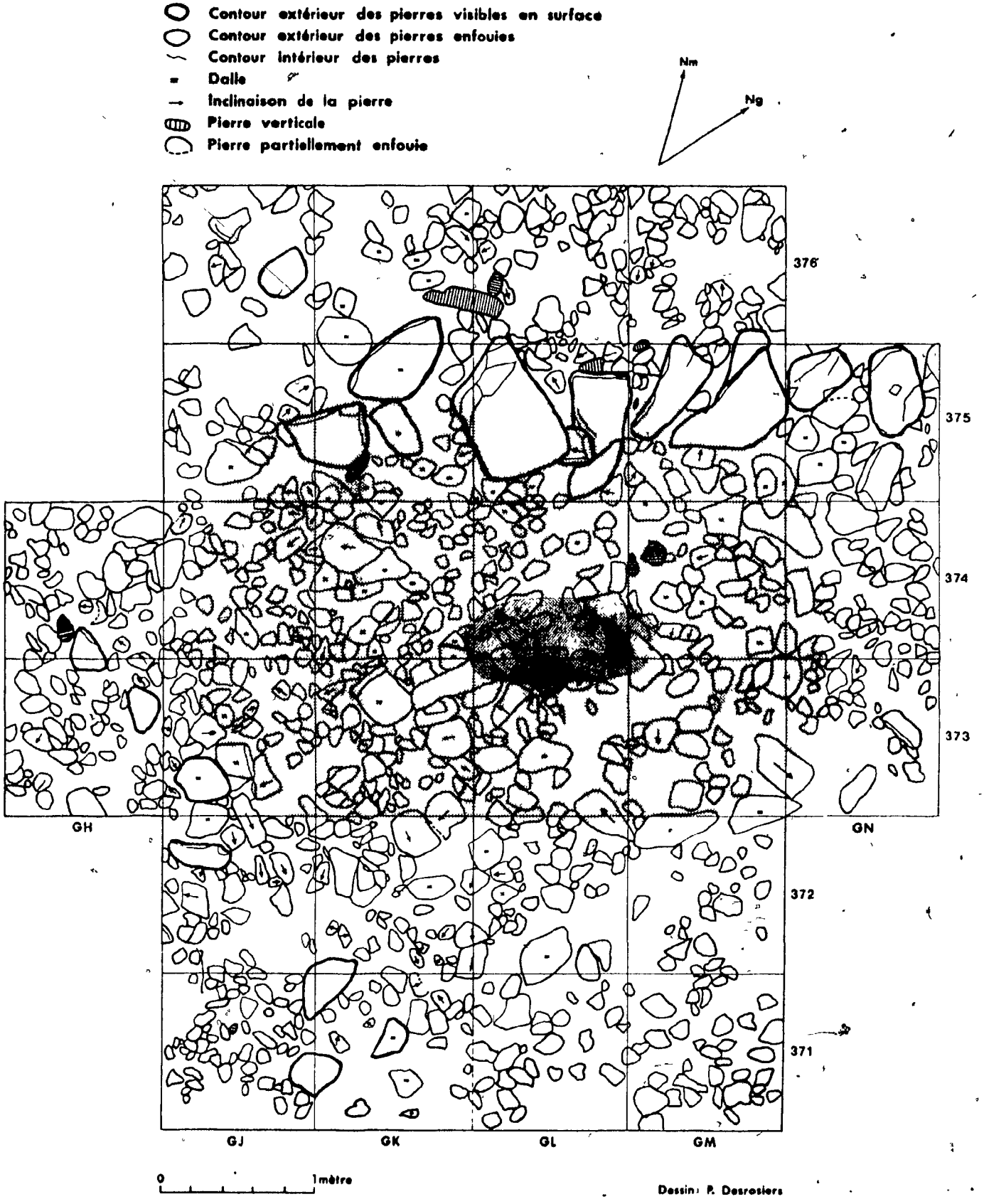
This structure caught the attention of archaeologists because of a notched flagstone sticking out of the thin vegetation cover. This flagstone measured 25 cm wide, 18 cm high and 6 cm thick and was in a vertical position. Adjacent to the flagstone, was a rock alignment which was made out of large (70-120 cm long) and medium (30-70 cm) sized rocks bordering a beach ridge in an east-west direction. 29 square metres were unearthed in this structure.

The stratigraphy of this structure is fairly simple. The vegetation cover was composed of sphagnum and caribou moss, lichens, and graminaceae. The humus layer, generally thin and mixed, was composed of sand, organic

Site DIA-1 (JfEl-1)

Aire de fouille: M (fig. 4.9)

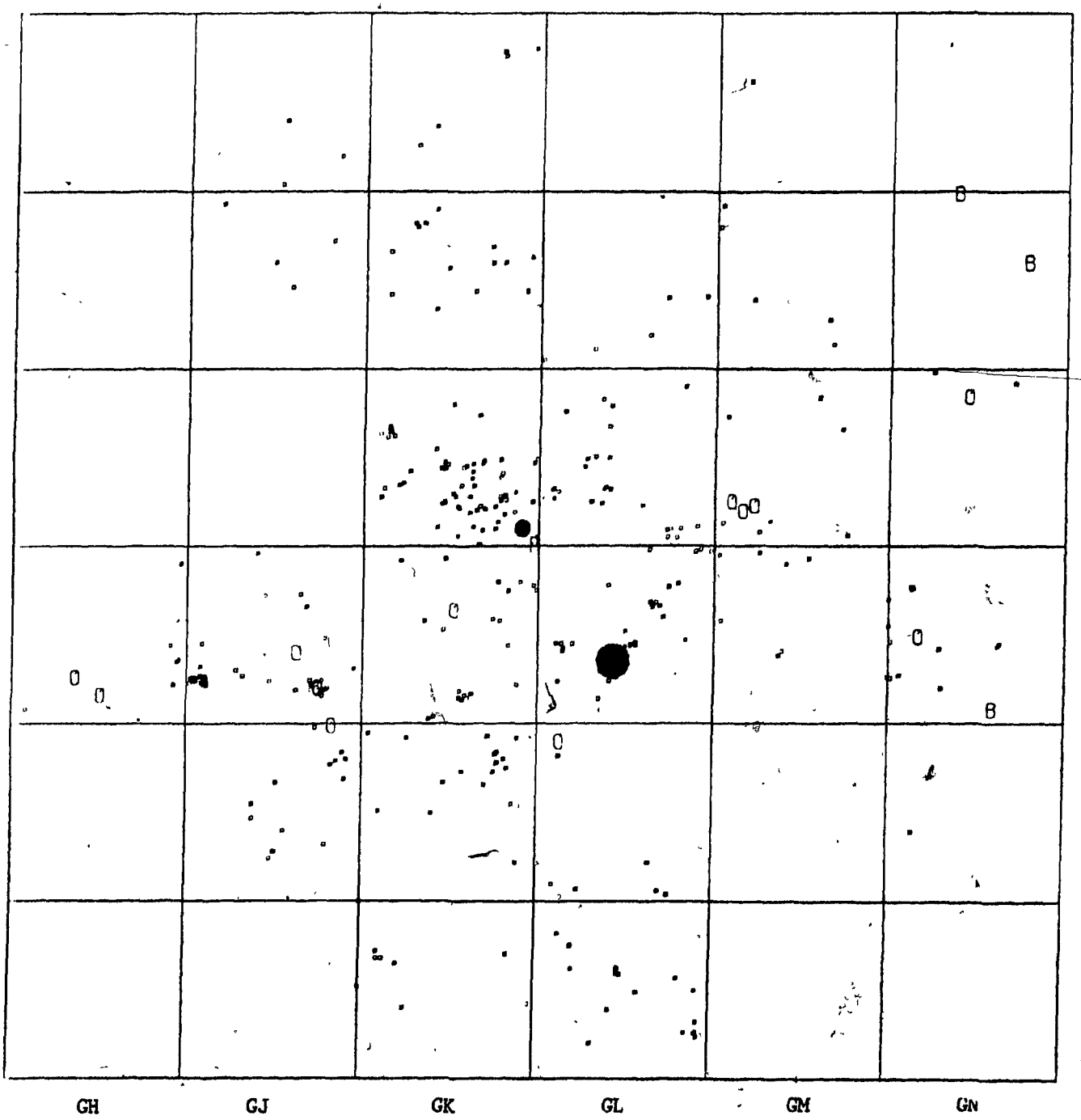
(with estimated hearth and occupation areas shown by shading)



STRUCTURE "M"

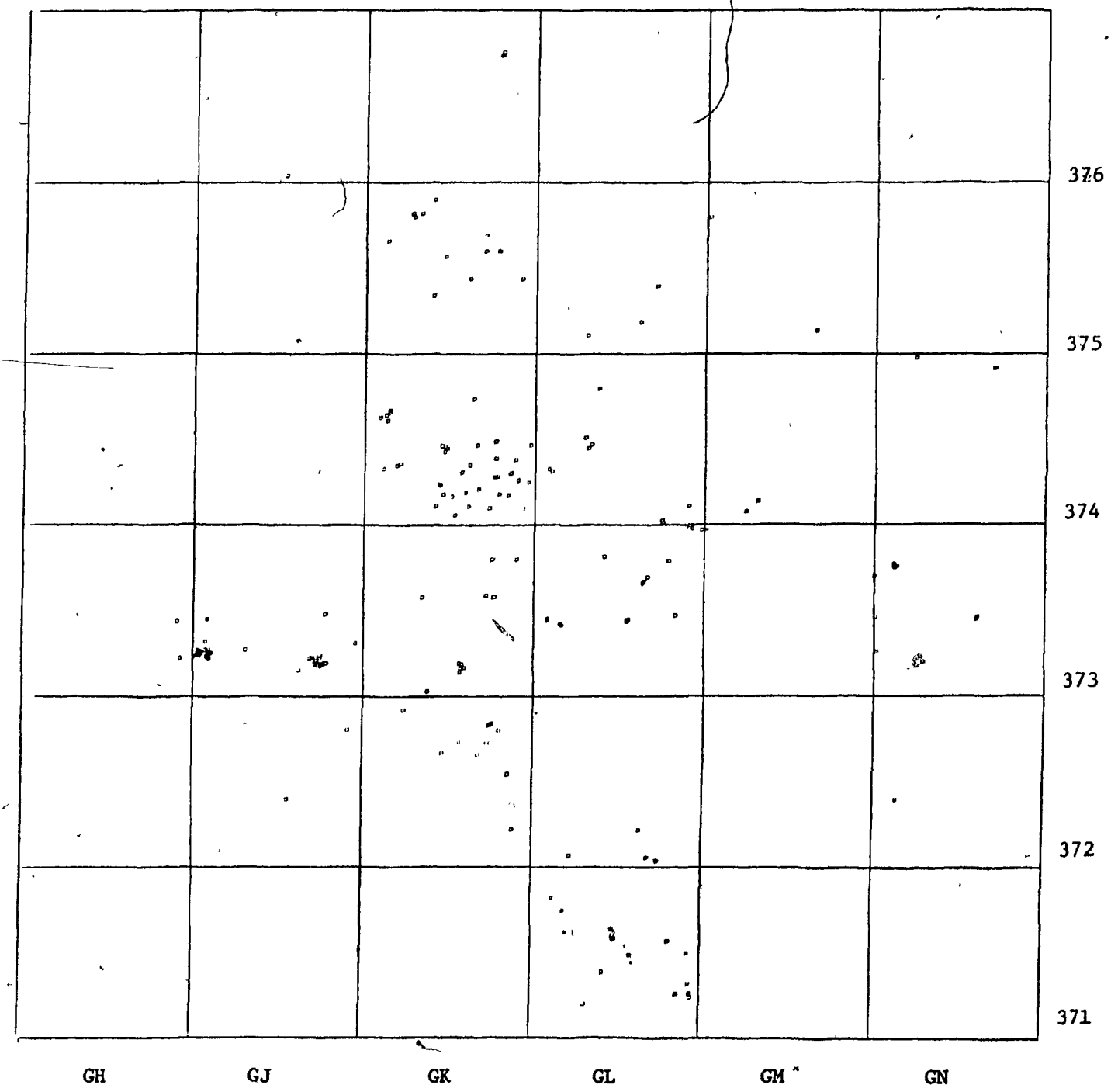
DISTRIBUTION OF CULTURAL REMAINS

. lithic
O decomposed organic material
B bone



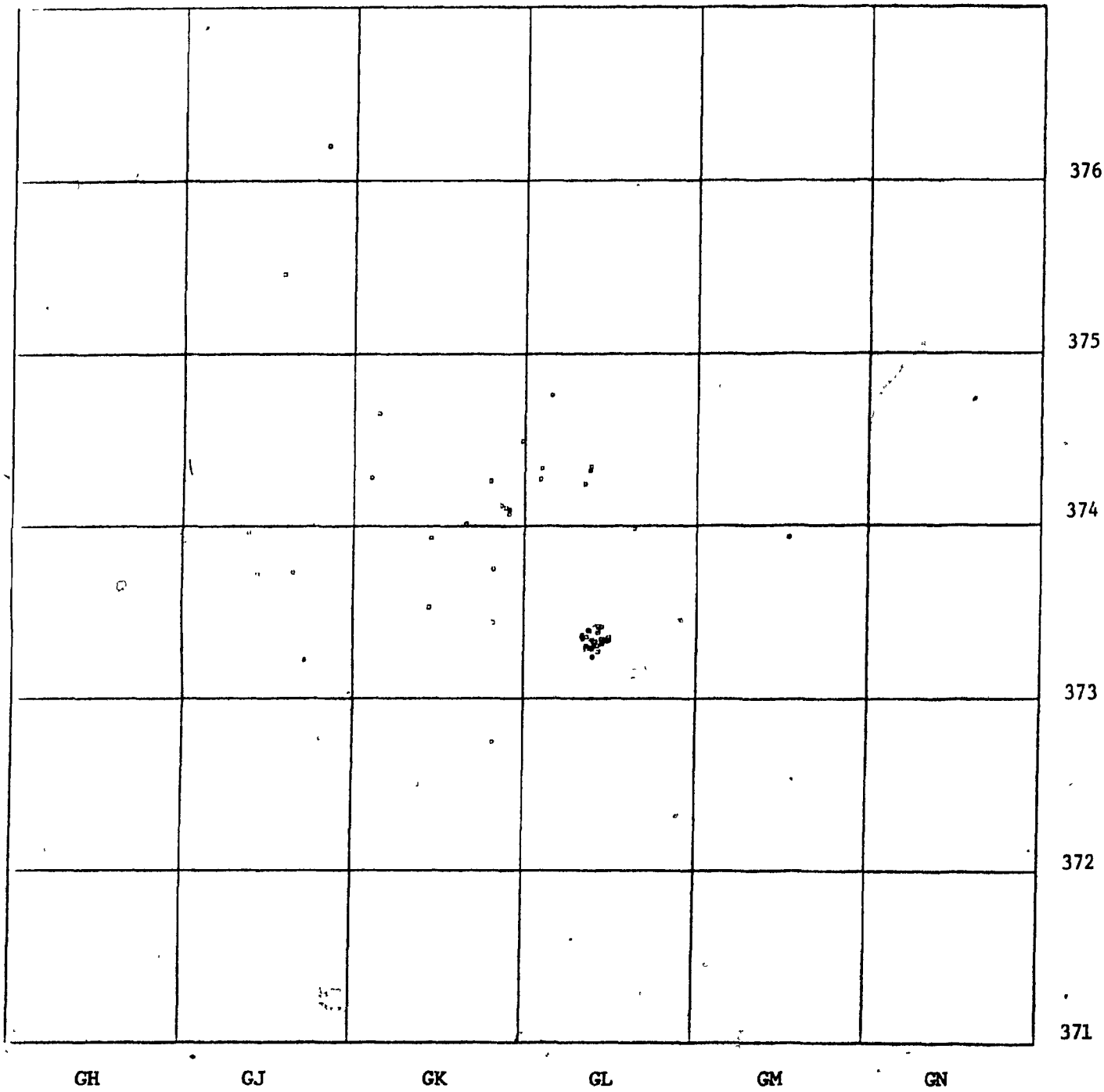
STRUCTURE "M"

DISTRIBUTION OF DIANA QUARTZITE



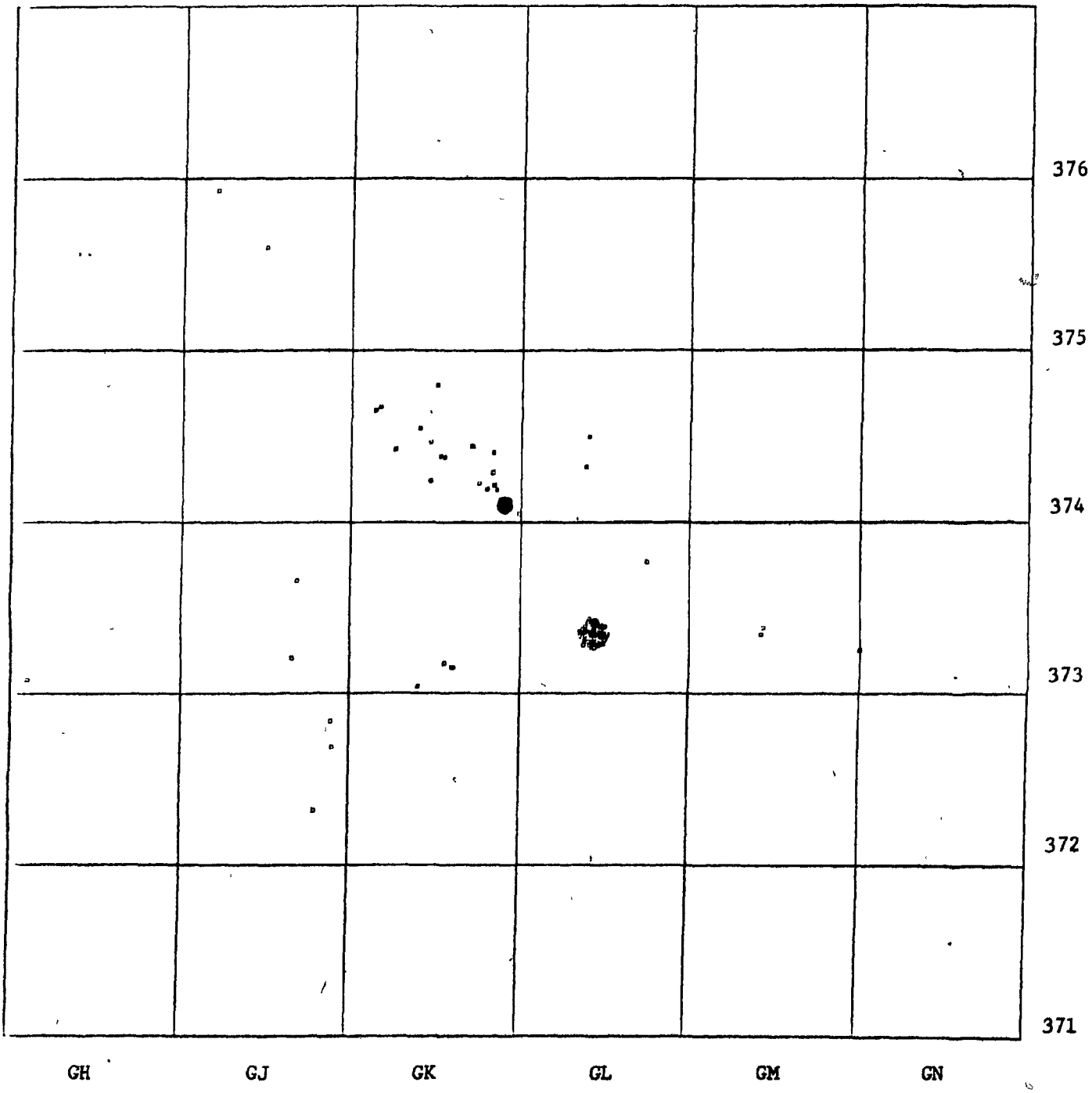
STRUCTURE "M"

DISTRIBUTION OF MILKY QUARTZ



STRUCTURE "M"

DISTRIBUTION OF HYALINE QUARTZ



material, rootlets and infrequently, decomposed rocks (these rocks crumbled easily). The humus layer was directly underlain by the beach gravel layer.

Many stone alignments were found in the excavated area of this structure. The largest of these were the metre and half-metre sized blocks found at the edge of a beach ridge. This alignment lay both on beach gravel and on the vegetation cover, which suggests that some stones were probably laying on top one another at the northern limit of the habitation structure. The surface under this alignment had been excavated into somewhat by the occupants.. A second alignment was composed of smaller rocks and completes the estimated form of this oval structure. This combination of alignments measures 3.5 X 3 m on an east-west axis. Fortunately, the flagstone fits adequately at the centre of the oval structure. This flagstone might have been incorporated into a feature involving a cantilever technique (fig. 4.10 shows one example of such a feature in Diana.25). The cantilever technique can be described as representing a suspended flagstone held by two vertical blocks at each extremity which are maintained by counter-weights. What remains of this feature is one extremity of the hearth consisting of the vertical block and counterweights. The flagstone or support was maintained by two counterweights. Its position indicates that it was oriented in a southwest-northeast axis and probably measured 1 m in length by 60 cm wide. A pavement of small rocks and other flagstones was included in this feature area and several of these stones bore grease encrustations. It is therefore suggested that this feature is the remains of a hearth. A wood charcoal sample was taken in the hearth area and was dated to 1435 ±70 B.P. (U.Q.-89 (non-corrected)).

Fig. 4.10: The constituents of a hearth using a cantilever technique -
the top flagstone has been removed. (Photograph no. TUV 73.5 - Diana.25, 1973).

V: Descriptive Analysis

The Diana-1 lithic collection

The objective of this chapter is to understand the lithic characteristics of these Paleo-Eskimo surface structures. The study of the high beaches of Diana-1 relies heavily on a lithic analysis, since other remains were scarce, as demonstrated in the following table:

Table 5.1: Distribution of cultural remains.

Quantity	Nature of cultural remains
2826	lithic artifacts
75	decomposed organic material (including wood, bone, etc.)
14	identified bones (including those of caribou, walrus and seal)

Unfortunately, the number of bones that have been recovered is insufficient to deal with seasonality. The combination of decomposed materials, bones and lithic artifacts (including debitage) will, however, supply indications concerning the nature of specific activities in occupational units for each structure under study.

Raw materials

The study of raw materials has not been undertaken at great length in Arctic studies and could be a useful approach, as Fitzhugh points out:

> "The two principal uses of raw material analysis are for determining trade patterns or cultural movements between source locations and final destinations, and secondly, for determining culturally distinctive patterns of usage relating to functional and technological attributes of the material, cultural choice, availability, and other factors." (Fitzhugh 1972:38)

Eleven different types of raw materials were recognized in the lithic collection from the high beaches of 'Diana-1. Their distinction refers primarily to the homogeneity of lithic properties (the different colours of chert were not distinguished). This aspect of the raw materials does not always correspond to separate quarry sources or even to different nodules of raw material. In fact, the same nodule may contain different raw material categories. For instance, hyaline quartz and milky quartz can be found on the same nodule.

Two aspects will be kept in mind throughout this study of raw materials: (1) the distinction between local and regional raw materials, and (2) the idea of curated raw materials. Local raw materials are those found on Diana Island or in its immediate vicinity, while regional raw materials are ones that are known to have been brought to the island. This distinction is currently proposed in other archaeological researches in the Arctic (Plumet 1981 and De Boutray 1981) and in Connecticut (Fedder 1980-81). Fedder further exploits the use of lithic resources with varying degrees of efficiency according to the "value" or the inherent qualities of raw materials, including their workability and edge characteristics.

The second concept, which concerns curation, is borrowed from Binford's studies (1972,1978,1979) which are mostly based on ethnoarchaeological data and utilize a distinction between "curated tools" and "expedient tools".

Our use of these terms differs significantly from Binford's since it is inferred that behind the idea of curated and expedient tools there is the choice of raw materials in this specific context. This choice occurs when local raw materials are lacking and therefore people have to depend on regional resources for their subsistence. The Diana Bay area, in contrast to most other regions in the Eastern Arctic, had to depend on regional raw materials. At Diana-1 the Paleo-Eskimo people seem to have preferred certain raw materials which they curated (i.e. which were carried around not only as tools but also as cores or bifaces). Binford argues that curated tools imply: "a basic, portable set of tools, regularly maintained and used frequently in a multifunctional context" (Binford 1972:189). In the Ungava region, this statement can also be applied to the raw material which produced these tools. The choice of raw material, specifically in this regional context, may well have been in accordance with predetermined norms. Subsequently, raw materials were chosen not only for the production of specific tools but also for expedient use as necessitated during individual occupations. Part of their tool kit consisted of diagnostic implements but cores or bifaces were integral parts of individual assemblages and these were flaked in order to produce "on the spur of the moment" tools.

Table 5.2: Raw material categories

Raw material	Amount	Percentage	Nature
Hyaline quartz	1510	53%	igneous or metamorphic
Milky quartz	291	10%	igneous or metamorphic
Crystal quartz	19	1%	igneous or metamorphic
Coarse quartz	131	5%	igneous or metamorphic
Diana quartzite	236	8%	metamorphic
Ramah quartzite	18	1%	metamorphic
Black quartzite	202	7%	metamorphic
Clay schist	294	10%	sedimentary
Chert	96	3%	sedimentary
Slate	19	1%	metamorphic
Metabasalt	11	1%	metamorphic
Total	2826	100%	

As indicated in table 5.2, there are four kinds of vein quartz in this collection. Even though hyaline, milky quartz and occasionally crystal quartz can be found on the same nodule, they have differential knapping properties and hence a different significance for the artisan. Crystal quartz is transparent, homogeneous and has a glassy aspect. Milky quartz is also fairly homogeneous and can be distinguished by its white glassy aspect. Hyaline quartz has a mixture of both milky and crystal quartz. Its structure has been altered somewhat and several cleavage planes may obstruct the debitage process. Both milky and hyaline quartz have been found at Robert's Lake and Wakeham Bay (Nouveau-Québec) but there are probably many other sources. Coarse quartz definitely corresponds to the last stage of the destructuration of quartz stone and is consequently very difficult to flake. Three varieties of "smoky" quartzite have been identified in this collection. Two of these quartzites can be found in the same environmental context: black and Ramah quartzite are found at Ramah Bay, in Labrador. The distinction of these smoky quartzites seems to be linked to cultural preferences (this will be demonstrated in the study of individual structures). The third smoky quartzite is called Diana quartzite and has no

correlates in other Arctic sites except in the nearby Ungava region (Diana quartzite could also be of a local origin, however, field surveys in the Diana Bay area did not discover the quarry). Chert, which is present in small quantities, has a variety of colours on different specimens ranging from black, grey, tan to white. Clay schist, metabasalt and coarse quartz are the only local raw materials. All the others are considered to be regional raw materials.

Lithic categories

The 2826 lithic artifacts were identified under 8 distinct categories of debitage and modifications. Modified flakes are flakes which have undergone a distinct transformation (scars or retouch). While modifications apply mostly to the edges of specimens they can vary in size and also in quantity. It must be kept in mind that the diagnostic implements are distributed within several of these lithic categories.

Although this descriptive analysis is inspired by the Tuvaaluk Program, many categories have been omitted or combined in this site study.

Table 5.3: Lithic categories

Categories(with corresponding French terms)	Quantity	%
Polished tools(outils polis)	3	0.11%
Cores(nucleus)	24	0.85%
Debris(debris)	163	5.77%
Flakes and chips(éclats et déchets)	2319	82.06%
Flakes with micro-scars(avec stigmates)	118	4.18%
Locally retouched flakes(retouches localisées)	101	3.57%
Generally retouched flakes(retouches généralisées)	72	2.55%
Micro-blades and blades(lames et microlames) (including modified blades)	26	0.92%
Total	2826	100%

This study combines flakes and chips as debitage. The polished tool and blade/micro-blade categories comprise only slightly more than 1% of the collection. Unmodified and modified blades and microblades were grouped together on the basis that they are tools although they may not always bear traces of utilization. Generally speaking, direct and indirect percussion and pressure flaking were apparently the main techniques employed to process raw materials. Evidence for other types of modifications (grinding, abrading, etc.) is infrequent. "Debris" is a major category in this collection. It refers to rocks disintegrated as a result of natural exposure or even waste material having few or no definitive characteristics.

Flake completeness ("état")

This variable applies to only 32% of the collection. The artifacts not included are the debris and incomplete chips.

Table 5.4: Categories of flake completeness

Categories	Quantity	Percentage
Complete or slightly chipped	235	26.23%
Distally incomplete	156	17.41%
Proximally incomplete	54	6.03%
Laterally incomplete	64	7.14%
Incomplete in more than one location	201	22.44%
Incomplete by use	42	4.69%
Indeterminate	144	16.07%
Total	896	100%

The "indeterminate" category refers to flakes which cannot be readily identified: they are fragments of flakes which do not reveal, if the faces are ventral or dorsal, any indications of the direction of the blow. Indeterminate flakes could also be included in the category "incomplete in more than one location", except that there is even less information in the indeterminate category. The category "incomplete by use" generally applies to broken tools.

The category "incomplete in more than one location" includes all the possible combinations of distally, proximally or laterally incomplete flakes. The main reason for this distinction is that two or more forces have been applied on the flake. These forces could be related to manufacture, trampling or other causes and could have been applied simultaneously or at different times. The subsequent application of forces could be the result of either manufacture or utilization. This distinction will, in turn, reveal useful interpretations concerning specific raw materials as well as the "curation" of lithic materials in general. The fact that only 26% of the flakes are complete argues in favour of this same notion of extensive use and re-use of flakes during individual occupations, and this until the flakes broke.

Raw materials and lithic categories

The selection of raw materials for stone toolmaking was not a random procedure. Cultural patterning is as evident here as in tool typology. By correlating these two variables, one can indicate their intricate interrelations:

Table 5.5: Distribution of raw materials within lithic categories

Raw material	Cor	Flk	Debr	Mic-scar	Loc.ret	Gen.ret	Bld	Tot	%
Ramah qzt	0	14	0	0	0	4	0	18	1%
Diana qzt	1	185	0	23	17	10	0	236	8%
Black qzt	0	138	2	33	11	17	0	201	7%
Hyaline qz	2	1451	20	12	20	5	0	1510	53%
Milky qz	9	202	15	21	21	19	4	291	10%
Crystal qz	2	2	1	1	3	0	10	19	1%
Coarse qz	1	7	121	0	2	0	0	131	5%
Chert	3	39	0	16	16	10	12	96	3%
Slate	0	6	0	2	2	6	0	19	1%
(including 3 polished tools)									
Clay schist	6	270	1	9	7	1	0	294	10%
Other	0	5	3	1	2	0	0	11	1%
(including metabasalt)									
Total	24	2319	163	118	101	72	26	2826	100%
Percentage	1%	82%	6%	4%	4%	3%	1%	100%	

Raw material codes: qzt=quartzite; qz=quartz

Lithic category codes: cor=core; flk=flake; debr=debris; mic-scar=flake with micro-scars; loc.ret=locally retouched flake; gen.ret=generally retouched flake; bld=blade or microblade; tot=total.

When a raw material has more than 30% of flakes distributed within modified categories it can be considered as a multi-purpose raw material. The highest frequencies of unretouched flakes occur in hyaline quartz and clay schist. Most of the debris is of coarse quartz and only a small amount of it is of regional raw materials. Polished artifacts are made exclusively of slate. Cores come mostly from hyaline and milky quartz but also from clay schist and chert core fragments.

These few brief statements suggest several hypotheses. The division between local and regional raw materials is well stressed in this perspective. For blade production regional materials are used exclusively. Knappers also preferred regional materials for generally retouched flakes; only one specimen of local material (clay schist) that was recovered belonged to this category. As for the other lithic categories, the general tendency is that the more modifications are made upon a specimen the greater is the chance that the specimen is made of a regional raw material (Fedder (1980-81) arrives at similar conclusions in his work).

Special mention must be made to a specific local raw material (clay schist) that does not behave in the same way as other local raw materials. Its distinction lies in the fact that it is different from other local materials, that are sporadic and were utilized infrequently and only for "on the moment" purposes. A large amount of clay schist debitage was found, but it seems that only limited use was made of this material, as witnessed by the small amount of modified flakes and implements produced.

The high percentage of generally retouched slate flakes becomes clearer upon the identification of the flakes as preforms (as defined by Crabtree 1972). Individual specimens had been generally retouched and had only begun to be polished. All of these preforms come from the same structure ("M").

Cherts seem to be the favoured raw material for all purposes. Only 40% of its artifacts have not been modified in contrast to hyaline quartz which has 90% of unmodified flakes. Even quartzite raw materials have not been modified as extensively as chert but they have been preferred over quartz.

Flake completeness and raw materials

Table 5.6: Distribution of raw materials within flake completeness patterns.

Raw material	Cmp	Ind	Inc-use	Dist.inc	Prox.inc	Lat.inc	Inc.2+loc	Tot
Ramah qzt	4	1	2	4	0	3	1	15
Diana qzt	38	14	3	27	9	11	22	124
Black qzt	36	9	12	30	16	9	60	172
Hyaline qz	45	32	3	26	6	10	47	172
Milky qz	43	40	6	32	8	22	43	194
Crystal qz	3	4	1	5	2	0	3	18
Coarse qz	4	1	0	2	0	1	2	10
Chert	26	13	7	11	11	3	13	84
Slate	4	0	7	3	0	3	1	18
Clay schist	29	27	1	15	2	2	8	84
Other	3	3	0	1	0	0	1	8
Total	235	144	42	156	54	64	201	896
Percentage	26%	16%	5%	17%	6%	7%	22%	100%

Flake completeness codes: cmp=complete or slightly chipped; ind=indeterminate; inc-use=incomplete by use; dist.inc=distally incomplete; prox.inc=proximally incomplete; lat.inc=laterally incomplete; inc.2+loc=incomplete in more than one location; tot=total.

The most difficult raw material to interpret is clay schist, because it has undergone post-depositional alterations, namely, heating as a result its proximity to a hearth. The heat fractured this raw material into several fragments which now are often impossible to reconstruct into their former shape. This, added to a small proportion of other indeterminate debitage flakes, contributes to the high percentage of this category.

Generally, regional raw materials have been broken more than local materials and more often on the same specimen.

Artifact typology

As stated earlier, artifact typology is not included as such in this analysis. Brief descriptions, however, will be made for comparative purposes with other Arctic regions. These comparisons will therefore provide the chronological index to assign the Diana-1 assemblages into specific cultural units.

Very few artifacts are present in this collection that can be used as diagnostic implements for cultural and temporal identifications. Only 60 implements, of which several are fragments, reveal indications of a formal typology, and still fewer identify the lithic collection as being part of a Paleo-Eskimo culture. More specifically, at least one assemblage indicates a Dorset origin ("Structure M"), while structures R, G, H and L show affiliations with Pre-Dorset. ("Structure S"'s cultural affiliation is uncertain).

Table 5.7: Artifact typology categories

Raw material	End-bl	Knife	Scrap	Burin	Bifac	Prefo	Perfo	Total	%
Ramah qzt	1	2	1	0	0	0	0	4	7%
Diana qzt	1	5	1	0	0	0	0	7	10%
Black qzt	0	11	1	0	3	0	0	15	25%
Hyaline qz	0	1	0	0	2	0	0	3	5%
Milky qz	1	6	6	0	2	0	0	15	25%
Crystal qz	0	0	1	0	0	0	0	1	2%
Chert	0	1	0	5	0	0	1	7	10%
Slate	1	1	0	0	0	6	0	8	13%
Clay schist	0	1	0	0	0	0	0	1	2%
Total	4	27	10	5	3	10	1	60	100%

Artifact typology codes: end-bl=end-blade; scrap=scraper; bifac=biface; prefo=preform; perfo=perforator.

One important distinction must be noted concerning the two major categories: end-blades and knives. An end-blade, in this context, is symmetrical both in outline and in cross-section, and also must have a sharp edge and a pointed distal end (unless it shows signs that it has been dulled). Thus a knife may be both asymmetrical or symmetrical, its main ridge centred or off-centre and its distal end may be pointed or rounded.

Individual types and tool morphology will be described by individual structures.

Summary of the lithic collection of the high beaches of Diana-1.

This preliminary study has isolated two kinds of raw material provenience: regional and local. It has been demonstrated that these two sources of procurement vary significantly in use in this collection. Furthermore, diagnostic implements form only one quarter of the possible tools used during the occupations at Diana-1. Although the site can be inserted chronologically into an Eastern Arctic perspective, this does not contribute much to an understanding of the nature of the occupation and the exploitation of the region's raw material resources. These two last themes will be the primary concern of the following study.

Individual analysis of the structures on the high beaches of Diana-1.

The objective of this analysis is to understand the factors conditioning the provenience of raw materials as well as the manufacture and use of tools in each of the Paleo-Eskimo surface structures. The individual structures do not overlap and will facilitate the search for occupation characteristics.

"Structure S" (table 5.10, 5.11, 5.12, 5.13) (pp. 88-91)

Unfortunately, in addition to the fact that there were no structural remains in this unit, no diagnostic implements were found. The importance of this structure must be stressed here, for it lies on the 22 metre terrace, the highest excavated area. Its association to other structures could determine the chronological sequence of the site.

The raw materials recovered in this structure are mostly made of quartz (hyaline and milky). The range of raw materials in "Structure S" reveals that there was probably no contact with Labrador Ramah quarries at the time of its occupation.

In the lithic assemblage from "Structure S", 30% of the flakes are complete. This is the highest percentage associated with any structure at Diana-1. That can be explained by the nature of quartz, which behaves quite differently from quartzite or chert when knapped. Quartz flakes, when detached from cores, often manifest cleavage planes that would be considered inappropriate for further modifications because they break too easily during use. This would account for the high percentage of complete flakes in

relation to other assemblages.

On the basis of the lithic categories made of hyaline quartz one may observe that its use (shown in the modified categories) is limited to only three specimens and that these have been retouched only locally. Milky quartz specimens, on the other hand, were extensively modified and even blades were made of this resource. In this assemblage, milky quartz probably played a major role in subsistence activities because, although only 15% of the specimens were modified they are present in all the lithic categories. No other raw materials had been utilized as much.

Additional evidence concerning the lithic assemblage comes from three exhausted chert cores which were evidently discarded because they could no longer be flaked. Additional chert specimens do not correspond to the cores and can be considered as "resharpening flakes". Resharpening flakes can be recognized by the presence on them of retouch which had been done prior to the detachment of the flake.

Artifact typology (plate 1)

The implements recovered in this structure are mainly fragments. Five implements can be described: no. 36, made of Diana quartzite, is a bifacially retouched stem; no. 145 (hyaline quartz) is a knife 10 mm thick which has a crescent shape; the following specimens are bifacially retouched and made of milky quartz: no. 269 is a notched implement broken at both extremities; no. 34 could be the distal end of an asymmetric knife; no. 8 is delicately retouched on a thin flake (2 mm) but broken distally and laterally.

Distribution of cultural remains

Only lithic remains were recovered in this excavated area. The plans of the excavated area and of lithic distribution do not help in clarifying the possible occupation or occupations. There seems, however, to be little evidence for multiple occupations.

Cultural identification

Although the lithic elements of this structure are essentially Paleo-Eskimo, it cannot be determined whether this structure belongs to the Pre-Dorset or Dorset culture.

"Structure R" (table 5.10, 5.11, 5.12, 5.13, 5.14)

The basic problem related to this unit is the presence of multiple occupations, as evidenced by three hearth features. No habitation structure elements were distinguished amongst the array of stone alignments. Some of the aims here will be to verify the cultural homogeneity, separate the cultural remains that can be associated with individual features and establish the chronology of the occupations from features and associated cultural remains.

Local raw materials predominate in this assemblage: 68% of artifacts are made of coarse quartz and clay schist. The important regional raw materials are black quartzite (15%) and chert (10%). The debris in this excavated area amounts to 15% of the lithic assemblage. Even so, all the categories have increased significantly from the lithic assemblage of

"Structure S". Cores reveal that debitage was practiced during one or more occupations. Unfortunately, the results on the flake completeness patterns are biased because of the importance of the "indeterminate" category, which includes post-deposition fractured clay schist.

What in this assemblage has been called "clay schist" may bear physical characteristics with what is called "angmaq" in Western Greenland. Angmaq was the major raw material used by the "Sarqaq" (or Pre-Dorset) people. Although no specimens of angmaq were available for comparisons, it is possible that the clay schist specimens contain similar properties to angmaq. While clay schist is a local raw material, it has been worked to produce implements rather than "on the spur of the moment" flake tools. This is evidenced by the quantity of chips that have been recovered, as well as the low percentage of modifications (8%) on these specimens. This raw material was therefore exploited in a different fashion from other raw materials (regional or local) in this assemblage.

The coarse quartz in this assemblage is also unusual because of its quantity. Coarse quartz specimens are mostly debris and consist of fractured fragments which occasionally can be reassembled. Although they have not been manufactured or modified, they could have been used as part of a feature, as heating stones or even as hammerstones.

Through particular observations of implements and flakes made of the less numerous raw materials, it can be clearly established that some implements were brought to the site and their edges occasionally resharpened.

Black quartzite specimens have been significantly modified and extensively broken (85%). This is also the case with "Structure G" where it was probably used in the same fashion (see also "Structure C"). Chert may have been utilized in a similar way as black quartzite although more complete flakes of this raw material were recovered (28%). Not only does the variety of lithic categories for this raw material suggest that it was present as implements and resharpening flakes, but also blades and other modified flakes indicate that it had been brought there as cores and perhaps bifaces.

Artifact typology (plates 2, 3, 4)

The lithic implements consist of six broken non-identifiable implements, four chert burins and three knives. Of the bifaces three are black quartzite specimens and three are made of milky quartz. No. 725-726 has been partially reconstructed and can be described as an asymmetric knife; no. 414 is only a proximal end with a straight base; no. 449 is a partially broken blank; no. 651 is probably a milky quartz side-scraper broken at both extremities (with a retouch angle of 85°); no. 563 is a unifacial milky quartz flake broken distally and laterally; no. 737 is a bifacially retouched fragment.

The four burins (between 22 and 26 mm long) bear traces of several burin blows but they also have been modified, probably for additional purposes. No. 648 is made of beige chert, was bifacially retouched and has been slightly polished on both faces of the burin tip. The distal end bears traces of at least one burin blow and the extremity of the tip witnesses several step fractures assumed to be related to the utilization of the tip.

Furthermore, retouch has been produced on the edge of the burin's active edge. This retouch probably indicates a complementary function of the burin. Below the active edge of the burin, both sides were tapered. The proximal end is surprisingly sharp and thin and could also have served an additional purpose, perhaps cutting. The second burin (no. 623), of grey chert, is bifacially retouched and its base bears several long parallel flakes. Several burin spalls have been removed at the tip of the implement and at its base. The tip shows that it was ground on both faces. The proximal end of the implement has been tapered on the sides and its base is relatively flat. The third burin (no. 616), of white chert, has been generally retouched and bears definite similarities to no. 648, because of the tip modifications and partial polish on both faces, but is somewhat smaller. The fourth (no. 744) is made of black chert and is unifacially (dorsally) retouched. Its platform and bulb of percussion can still be distinguished although the artisan has partially levelled them down. The retouch is limited to the edges and is fairly abrupt in comparison to other burins. Several burin spalls have been taken off its tip and grinding is clearly seen on both faces of the implement. The mesial part of the burin is tapered and the base is more oblique than flat.

The three knives have been bifacially retouched. No. 739, a black quartzite knife, has a characteristic box-shaped base and elongated retracting body ended by a rounded tip. The two other knives are asymmetric: no. 558-587 is made of black quartzite and no. 717 of clay schist and has been notched.

In summary, of the four burins three seem to have been subject to additional modifications besides burin blows. These modifications can be

related to an additional use. The other burin is characteristically different from the rest because it is unifacially and abruptly retouched. Unfortunately, it is difficult to identify whether the striations corresponding to the tip of these burins are evidence of grinding before utilization or simply the result of polish from use-wear. While all the burins are made of chert, the majority of the other implements are made of black quartzite. Most of the implements are bifacially retouched and have been broken.

Cultural remains distributions

No occupation peripheries can be distinguished through the distribution of cultural remains. The southwestern sector of the excavated area contains most of the remains while the other sectors are practically empty. The cultural remains are concentrated more or less around the three features.

If one tries to establish a chronological order of the occupations in this excavated area, the results remain somewhat subjective. The earliest occupation, as stated earlier, corresponds to feature "3". Unfortunately, no raw materials can definitely be associated with this feature because of the close proximity of the other features. Feature "1", on the other hand, corresponds to the intermediate occupation and seems to contain most of the coarse quartz specimens. Feature "2", the last occupation, seems to include in its vicinity most of the clay schist artifacts, even though they slightly overlap into feature "3".

Cultural identification

Although the lithic assemblage represents more than one occupation, there is evidence that these occupations were most probably Pre-Dorset. This can be demonstrated mainly by artifact typologies and will be discussed together with regional artifact typologies in chapter VI.

"Structure L"

Few lithic specimens have been recovered from this unit (38 artifacts). Together with the structural evidence, one can estimate that the excavated area most probably represents only one occupation and a fairly brief one. Because of the small quantity of artifacts, no comparisons were made with tables of other structures. Table 5.8 presents, however, a brief description of these objects.

Table 5.8: Artifact description of Diana.1-L

Number	Raw material	Flake complet.	Lithic catego.	Amount	W/cg
000282	coarse qz		debris	1	508
000283	coarse qz		debris	1	140
000284	milky qz	incomplete	w.micro-scars	1	41
000285	milky qz		flakes	2	21
000286	crystal qz	incomplete	core	1	182
000287	hyaline qz	incomplete	gen.retouched	1	154
000288	hyaline qz	inc. by use	gen.retouched	1	172
000289	milky qz	inc.later.	flake	1	12
000290	hyaline qz		flakes	2	12
000291	milky qz	incomplete	gen.retouched	1	85
000292	hyaline qz	complete	flake	1	17
000293	milky qz	inc.later.	flake	1	88
000294	milky qz	incomplete	loc.retouched	1	23
000295	coarse qz		debris	1	21
000296	coarse qz	incomplete	loc.retouched	1	17
000297	coarse qz		debris	1	41
000298	milky qz	incomplete	flake	1	25
000299	milky qz	inc.later.	loc.retouched	1	455
000300	crystal qz	inc.dist.	flake	1	51
000301	milky qz	incomplete	w.micro-scars	1	26
000302	clay schist	inc.dist.	w.micro-scars	1	149
000403	Diana qzt	complete	gen.retouched	1	253
000404	milky qz	inc.later.	w.micro-scars	1	70
000405	Diana qzt	incomplete	flake	1	42
000406	milky qz	inc.2+loc	loc.retouched	1	98
000922	milky qz	inc.dist.	flake	1	70
000923	milky qz	inc.dist.	flake	1	37
000924	coarse qz		debris	1	28
001011	milky qz	incomplete	loc.retouched	1	31
001012	milky qz	incomplete	gen.retouched	1	15
001013	milky qz	incomplete	flake	1	11
001014	coarse qz		debris	1	24
001015	coarse qz		debris	1	30
001016	coarse qz		debris	1	70
001017	coarse qz		debris	1	77
001215	milky qz	inc.prox.	w.micro-scars	1	21

Milky quartz is the predominant material in this assemblage but coarse quartz is also significant. The coarse quartz debris reveals once more that it is an inherent part of the assemblage as it was with structures "G", "R" and "S". The role played by this raw material is still ambiguous, because it was not manufactured into flakes. Milky quartz could have been the multi-purpose raw material in this assemblage for it is present in all the modified flake categories. The presence of Diana quartzite along with milky

and hyaline quartz denotes a strong similarity to the raw materials and proportions of modified flakes for expedient use of "Structure S".

Artifact typology (plate 5)

Only three implements have been recovered. No. 403 has an oval shape but its tip has been broken off. The base of the specimen is flat but reduced to keep the oval shape. A single notch has been made on the specimen. The second knife (no. 287) is of hyaline quartz and has been severely broken. One additional implement has been distinguished: a perforator (no. 301). This unretouched specimen was probably used on its extremities because several scars have been removed at both ends.

Distribution of cultural remains

The distribution of cultural remains is sporadic and situated almost exclusively within the occupation zone delimited by smaller beach gravels.

Cultural identification

Once again, diagnostic implements are rare but on the basis of similarities between Pre-Dorset assemblages and the concentration of trait similarities in nearby structures, it can be estimated that this structure was a Pre-Dorset occupation.

"Structure C" (table 5.10, 5.11, 5.12, 5.13, 5.14)

Black quartzite constitutes the dominant raw material of this structure, representing slightly less than 80% of the assemblage. The main characteristic of this raw material is that it was manufactured during the occupation. No cores were found, but a broken biface seems to have served for the production of flakes. The biface (plates 6,7), was intentionally thinned by several flakes (four of which can be refitted) and because it is broken it is not clear whether it was to be utilized itself or was flaked only to produce expedient flakes (probably both). Three of the flakes that came from this biface have been modified: one generally retouched flake seems to have been used as a cutting implement; two others bear traces of micro-scars. The other raw materials generally represent broken tools and flakes detached for refreshing the tool edges.

In terms of flake completeness patterns: one-third of the flakes have been broken in more than one location (excluding the indeterminate and incomplete by use categories). This pattern, which corresponds to simultaneous or subsequent breakage, is even higher when examining exclusively the black quartzite specimens which form the dominant raw material in this assemblage. This further encourages the idea that subsequent breakage did in fact occur. The probability that the knappers could not control the flaking of this raw material is excluded here since it was a regional raw material which they had purposefully acquired and depended on for their survival. It is doubtful, in this present context, that they would purposefully break their raw material or that they did not know how to exploit it. The multiple breakage patterns on individual flakes, combined with the modified flakes suggest that they were utilized

quite extensively until the specimen was broken and reduced to a size that was no longer functional. Other agents could have produced breakage; however, they would have been minimal because of the short time span of the occupation.

The nature of the lithic remains in this structure reflects a general homogeneity: one regional raw material was processed there and yielded a quantity of flakes which were probably used for "on the spur of the moment" purposes. This raw material probably arrived in the form of a blank or biface which was carried from one occupation to another and was used to detach expedient flakes. This kind of object could have been an intrinsic element of the Pre-Dorset toolkit. Moreover, the other raw materials generally represent broken or dulled implements and debitage from resharpening which occasionally can be correlated with implements on the basis of similar colours in the raw materials. The importance of local raw materials in this assemblage is minimal.

Artifact typology (plates 8, 9, 10, 11)

Two burins, one side-blade, a preform, a scraper, two knives and four bifacial fragments were recovered. The two burins are between 15 and 20 mm long and consequently much smaller than the burins in "Structure R". They also differ by the absence of grinding on the burin tips. The first burin (no. 530) is a unifacially retouched flake which has been broken on its proximal edge. The lateral sides have been tapered and are retouched in alternation; dulling the edge in order to tie it to a support. Several oblique burin spalls were detached from the implement. Incidental polish is found on the working edge. The ridges on the dorsal face suggest that the

burin was made from a blade. The tip of an engraving tool is suggested from the presence of several micro-scars occurring on the tip of the burin.

The second burin in this assemblage (no 802) has virtually the same characteristics as the first one but does not carry micro-scars on the tip. This implement was modified, probably once the burin spalls were removed and perhaps after it could no longer be used as a burin. Although it conserves the appearance of a burin, where the burin blows have been removed the artisan made abrupt retouches without destroying its original oblique form. This part can be interpreted as a side-scraper. Moreover, the proximal edge has also been modified, seemingly into a scraper. The artifact nevertheless retains the presence of use-wear polish on the active edge of the initial burin. This implement would have been used by a left-handed individual according to Gidding's (1964:218) classification.

Of the other implements, one is an oval side-blade of black quartzite (no. 521) that was unifacially retouched (dorsally). Its ventral face has been retouched only to eliminate the bulb of percussion. No. 526 is a slate preform that is bifacially retouched. No. 692 is a unifacially (dorsally) retouched rounded scraper made on a black quartzite flake. The retouch angle is 80° and its proximal edge has been partially broken off. The distal end corresponds to the platform area and bulb of percussion which have been slightly retouched to level the surface of the specimen. Both knives are made of black quartzite and although they are bifacially retouched, the ventral face has been considerably less retouched than the dorsal face. No. 679 is asymmetric; its proximal end has tapered sides and its base is thinned down bifacially by the removal of long parallel flakes. No. 782 is notched with a rounded, partly broken, tip.

In general, most of the implements were made of black quartzite and have been manufactured on flakes retouched significantly more on the dorsal face than on the ventral one. Some of these implements carry parallel flake removals. The burins have several modifications on them which suggest more than one function.

Distribution of cultural remains

The general distribution of cultural remains (including bones and decomposed organic materials) associated with the habitation structure and features reveals that a concentration of organic material lies in the range of the hearth at the centre of the mid-passage. Along with these decomposed materials, some lithic artifacts are gathered in small quantities. The most important lithic concentrations are found in the northeast portion of the eastern lobe but the small quantity of lithic artifacts in the western lobe probably results from a disturbance. The distribution of the dominant raw material (black quartzite), does not reveal much. Most of the black quartzite is situated in the northern sector of the lobes. The biface and refitted flakes belong to this portion also.

Cultural identification

This structure provides the best evidence of a Pre-Dorset occupation, both in its tool typology and in the nature of its habitation structure.

"Structure H"

"Structure H" contains only 8 lithic artifacts. From structural and lithic evidence it is estimated that only one brief occupation occurred in the excavated area.

Table 5.9: Artifact description of Diana.1-H

Number	Raw material	Flake complet.	Lithic catego.	Amount	W/cg
000281	chert	inc.2+ loc	microblade	1	28
000531	chert	inc.dist.	microblade	1	28
000532	black qzt	inc.dist.	flake	1	50
000709	chert	inc.dist.	microblade	1	16
000807	black qzt	inc.2+ loc	flake	1	4
000810	Ramah qzt	incomplete	flake	1	6
000811	Ramah qzt	complete	gen.retouched	1	474
000812	Ramah qzt	inc.2+ loc	flake	1	11

One typological element (plate 12) has been uncovered in the shape of a Ramah quartzite knife (no. 811). This specimen is asymmetric and has a shape similar to nos. 679 and 558-587. Furthermore, the tip is rounded and the proximal end has notches and a straight base. Two debitage chips can be connected to this implement and are the result of edge refreshing. The other lithic remains are three broken chert microblades.

Two seal bones were recovered inside this excavated area.

Cultural identification

Even though the remains are few, this structure can be linked to structures R, S, C, and perhaps L because of the presence of a knife typologically representative of the Pre-Dorset culture.

"Structure M" (tables 5.10, 5.11, 5.12, 5.13, 5.14)

"Structure M" contains the largest amount of lithic materials on the higher beaches and at first it was suggested that more than one occupation occurred within this excavated area.

The dominant raw materials are hyaline quartz (80%), Diana quartzite (12%) and milky quartz (3%). Even though "Structure M" carries a wide variety of raw materials (10) only three make up the bulk of the assemblage. Less than 1% of the raw materials is of local origin.

92% of the assemblage is debitage. This excessive amount of debitage squeezes the other categories into insignificant percentages. The overwhelming presence of debitage consists mainly of chips (flakes smaller than 1 cm^2). The evidence, however, suggests that the occupants were working hyaline quartz diligently. Yet in the evidence left at the site it does not seem that they were producing expedient tools similar to those found in Structures C and R lithic assemblages. They were probably using hyaline quartz to manufacture implements, suggesting a differential use of raw materials. Furthermore, along with this differential use of raw materials, there is a visible preference for less homogeneous raw materials such as quartz instead of chert and quartzite (present in the assemblages of structures R and C). The large number of hyaline chips and flakes in this structure suggests that this material was brought to the site as unprepared chunks or as cores, and not as bifaces.

Only 25% of the assemblage has been studied under the flake completeness variable. Generally, the pattern seems to be that complete

artifacts are higher in percentage than in other assemblages and that this is directly related to the fact that materials were manufactured in this structure. Nevertheless, the flakes larger than 1 cm^2 have been substantially broken which suggests that these specimens could have been utilized following initial manufacture.

When reviewing the relationships between raw materials and lithic categories several ideas come to light. Ramah and black quartzite were most probably brought to the site as implements. Only a few unmodified flakes were found with these quartzites. This would further suggest that the occupants of this structure were resharpening the edges of their implements during the occupation; which is further witnessed by three black quartzite distal flutes. Diana quartzite behaves quite differently and can be considered in this assemblage as a multi-purpose raw material. Hyaline quartz accounts for only 2% of modified flakes, which suggests that little could be accomplished because of the nature of this raw material. Milky quartz was probably a multi-purpose material very similar to Diana quartzite. Chert was rare in this structure and no implements made of it were discovered. It can be estimated that it arrived on the site in the shape of implements as did the Ramah and black quartzite. Chert debitage was further modified, which would mean that this raw material was curated in this assemblage. Slate follows a pattern similar to chert: several polished implements and preforms were brought to the site and slate debitage was further modified there.

In general, the study of raw materials and lithic categories clearly argues for a different pattern of occupation here than in the other structures. This perhaps reflects a longer period of occupation or even a

different season of occupation. There are numerous raw materials which indicate that they were brought to the site not as implements only, but also as chunks and cores (and bifaces). The debitage of several regional raw materials served as expedient tools while others were left unmodified.

Artifact typology (plates 13, 14, 15, 16)

The emphasis of "Structure M" is clearly different from other structures. End-blades are distinctly favoured over knives, no burins were found and, instead, scrapers were recovered.

Six slate preforms were bifacially retouched but only slightly polished. The other slate implements although partially incomplete have been generally and bifacially polished. No. 858 is a mesial fragment which has parallel sides that are slightly retouched, but its initial shape or function is unknown. The end-blade (no. 342), although proximally broken, was probably symmetric and has a central ridge and a pointed tip. The ventral face has only been polished on the edges. The third slate implement (no. 838) was most probably an asymmetric, bifacially polished knife even though its distal end has been broken off. The proximal end of the implement has two notches on both sides but the second one is not as well defined as the initial one and the base of the implement has not been polished or retouched.

Five triangular scrapers have been recovered. Four of them are made of milky quartz and one of Diana quartzite. Although they are all triangular in shape, they have specific distinctions. The active edge had different shapes and probably a different function. Nos. 343 and 348 are the

smallest specimens: they are unifacial and have an expanded corner. The third scraper (no. 351) is unifacially retouched and broken distally and laterally. Its proximal edge (or in this case the active edge) is still intact. The fourth scraper (no. 827) has been broken laterally and has been retouched only to create an active edge and a notch on the distal end. The Diana quartzite scraper has an expanded corner (no. 397) and probably comes from a resharpening flake detached from an implement. Large interrupted flakes are present on one side of this implement and have no relation to the scraper.

Four implements bear traces of tip fluting on their ventral face. Two tip flutes have been taken off each of these implements. Two small (21 mm long) Ramah quartzite end-blades (nos. 824 and 370) are complete, except for small chips broken off. Fine bifacial retouch and symmetry neatly characterize these triangular end-blades. The bases of these implements are flat. The third implement (no. 851) is made of Diana quartzite and though it has been broken in half, still measures 46 mm. This bifacially retouched specimen was probably a knife because of its apparent asymmetry and rounded tip. The retouch on this specimen is generally coarse and uneven. The last tip fluted object (no. 842) is a milky quartz specimen which has been broken at the proximal end. This end-blade is bifacially retouched with a central ridge and a pointed tip.

One side-blade (no. 339) was made of Diana quartzite and has been broken distally. Four additional implement fragments have been recovered but their initial shape is unknown.

Distribution of cultural remains

The bulk of the cultural remains surround the hearth area which corresponds to the centre of the excavated area. The rest of the remains lie within the southwest portion of the excavated area. The distribution of Diana quartzite lies within the hearth area but also in the western sector. This portion, unfortunately, is disturbed and it is not possible to determine if it was in or outside the habitation structure. Hyaline quartz is restricted to the hearth area, which indicates that it was worked in proximity to it and that it probably came from at least one or two cores, because there are two large concentrations in the area. The distribution of milky quartz does not vary from that of hyaline quartz and both were probably part of the same core.

A variety of bones were recovered in this excavated area. Faunal analysis revealed a fragment of a walrus mandible, a caribou humerus and seven other non-identified bones, which include seal.

The argument for more than one occupation in this excavated area goes against the stone alignment pattern and feature evidence that have been identified. Furthermore, the lithic remains do not indicate specific differences. It is therefore suggested that the lithic and structural remains probably form only one occupation.

Cultural identification

"Structure M" contains several elements linking it to a Dorset occupation: its habitation structure, hearth and nature of implements.

Furthermore new techniques of working stone tools have appeared in this assemblage which confirm its cultural origin: tip fluting and polishing.

Table 5.10: Raw material distributions within assemblages

	"S"		"R"		"G"		"M"		Total
Ramah qzt							15	(1%)	15
Diana qzt	10	(3%)	3	(1%)			221	(12%)	234
Black qzt			82	(15%)	99	(80%)	19	(1%)	200
Hyaline qz	51	(17%)	17	(3%)	4	(3%)	1433	(80%)	1505
Milky qz	173	(65%)	15	(3%)	3	(2%)	62	(3%)	253
Crystal qz	3	(1%)	3	(1%)			11	(1%)	17
Coarse qz	16	(5%)	88	(16%)	3	(2%)	14	(1%)	121
Chert	19	(6%)	58	(10%)	8	(6%)	8	(1%)	93
Slate	1	(1%)	1	(1%)	1	(1%)	16	(1%)	19
Clay schist			290	(52%)	1	(1%)	2	(1%)	293
Other (metabasalt)	3	(1%)	3	(1%)	5	(4%)			11
Total	296		560		124		1801		2781

Table 5.11: Lithic category distributions within assemblages

	"S"		"R"		"G"		"M"		Total
Polish.tools							3	(1%)	3
Core	10	(3%)	7	(1%)			6	(1%)	23
Debris	40	(14%)	88	(16%)	6	(5%)	20	(1%)	154
Unmod.flakes	202	(68%)	359	(64%)	84	(68%)	1657	(92%)	2302
W.micro-scar	13	(4%)	41	(7%)	14	(11%)	45	(3%)	113
Loc.retouch	15	(5%)	37	(7%)	4	(3%)	40	(2%)	96
Gen.retouch	9	(3%)	18	(3%)	16	(13%)	23	(1%)	66
Blade+micro.	7	(2%)	9	(2%)			7	(1%)	23
Total	296		559		124		1801		2781

Table 5.12: Flake completeness pattern within assemblages

	"S"		"R"		"G"		"M"		Total
Complete	46	(31%)	63	(26%)	25	(24%)	98	(27%)	232
Inc dist	26	(17%)	37	(15%)	19	(18%)	67	(18%)	149
Inc prox	4	(3%)	20	(8%)	10	(9%)	19	(5%)	53
Inc lat	14	(9%)	14	(6%)	5	(5%)	27	(7%)	60
Inc 2+ loc.	22	(15%)	55	(22%)	35	(33%)	85	(23%)	197
Inc by use	3	(2%)	14	(6%)	8	(8%)	16	(4%)	41
Indeterm.	34	(23%)	42	(17%)	4	(4%)	52	(14%)	132
Total	149		24		106		364		643

Table 5.13: Distribution of raw materials and lithic categories within assemblages

Dia.1-S

Raw material	Cor	Flk	Debr	Mic-scar	Loc.ret	Gen.ret	Bld	Tot	%
Diana qzt	0	7	0	0	1	2	0	10	3%
Hyaline qz	0	32	16	0	3	0	0	51	17%
Milky qz	6	150	7	13	7	6	4	193	65%
Crystal qz	1	0	1	0	1	0	0	3	1%
Coarse qz	0	1	15	0	0	0	0	16	5%
Chert	3	10	0	0	2	1	3	19	6%
Slate	0	1	0	0	0	0	0	1	1%
Other	0	1	1	0	1	0	0	3	1%
Total	10	202	40	13	15	9	7	296	100%
Percentage	3%	68%	14%	4%	5%	3%	2%	100%	

Dia.1-R

Diana qzt	0	1	0	0	2	0	0	3	1%
Black qzt	0	44	1	20	8	8	0	81	14%
Hyaline qz	1	13	1	1	1	0	0	17	3%
Milky qz	0	6	2	0	4	3	0	15	3%
Crystal qz	0	0	0	0	0	0	3	3	1%
Coarse qz	0	6	82	0	0	0	0	88	16%
Chert	0	22	0	11	13	6	6	58	10%
Slate	0	0	0	0	1	0	0	1	1%
Clay schist	6	267	1	8	7	1	0	290	52%
Other	0	0	1	1	1	0	0	3	1%
Total	7	359	88	41	37	18	9	559	100%
Percentage	1%	64%	16%	7%	7%	3%	2%	100%	

Dia.1-G

Black qzt	0	75	1	12	3	8	0	99	79%
Hyaline qz	0	1	1	0	1	1	0	4	3%
Milky qz	0	0	0	0	0	3	0	3	2%
Coarse qz	0	0	3	0	0	0	0	3	2%
Chert	0	3	0	2	0	3	0	8	6%
Slate	0	0	0	0	0	1	0	1	1%
Clay schist	0	1	0	0	0	0	0	1	1%
Other	0	4	1	0	0	0	0	5	4%
Total	0	84	6	14	4	16	0	124	100%
Percentage	-	68%	5%	11%	3%	13%	-	100%	

Dia.1-M

Ramah qzt	0	12	0	0	0	3	0	15	1%
Diana qzt	1	176	0	23	14	7	0	221	12%
Black qzt	0	17	0	1	0	1	0	19	1%
Hyaline qz	1	1402	2	11	15	2	0	1433	80%
Milky qz	3	38	6	4	6	5	0	62	3%
Crystal qz	0	1	0	1	2	0	7	11	1%
Chert	0	4	0	3	1	0	0	8	1%
Slate	0	5	0	2	1	5	0	16	1%
(including 3 polished tools)									
Total	6	1657	20	45	40	23	7	1801	100%
Percentage	1%	92%	1%	2%	2%	1%	1%	100%	

Table 5.14: Distribution of raw materials and flake completeness patterns within assemblages.

Dia.1-R

Raw material	Cmp	Ind	Inc-use	Dist.inc	Prox.inc	Lat.inc	Inc.2+loc	Tot
Diana qzt	1	1	0	0	0	1	0	3
Black qzt	11	6	8	11	6	4	26	72
Hyaline qz	3	1	0	2	0	1	4	11
Milky qz	1	0	1	4	1	2	3	12
Crystal qz	0	0	0	2	0	0	1	3
Coarse qz	2	0	0	1	0	1	2	6
Chert	15	7	4	3	11	3	11	54
Slate	0	0	0	1	0	0	0	1
Clay schist	28	27	1	13	2	2	8	81
Other	2	0	0	0	0	0	0	2
Total	63	42	14	37	20	14	55	245
Percentage	26%	17%	6%	15%	8%	6%	22%	100%

Diana.1-C

Black qzt	20	2	4	15	10	5	32	88
Hyaline qz	1	0	0	0	0	0	1	2
Milky qz	1	0	2	0	0	0	0	3
Chert	2	0	2	2	0	0	1	7
Slate	1	0	0	0	0	0	0	1
Clay schist	0	0	0	1	0	0	0	1
Other	0	2	0	1	0	0	0	4
Total	25	4	8	19	10	5	35	106
Percentage	24%	4%	8%	18%	9%	5%	33%	100%

Diana.1-M

Ramah qzt	3	1		2	4		0	3	0	13
Diana qzt	34	10		3	27		9	9	21	113
Black qzt	5	1		0	3		0	0	1	10
Hyaline qz	35	28		2	21		6	7	42	141
Milky qz	9	10		1	8		2	5	18	53
Crystal qz	3	1		1	2		2	0	2	11
Coarse qz	2	0		0	0		0	0	0	2
Chert	3	1		0	1		0	0	0	5
Slate	3	0		7	1		0	3	1	15
Clay schist	1	0		0	0		0	0	0	1
Total	98	52		16	67		19	27	85	364
Percentage	4%	14%		4%	18%		5%	7%	23%	100%

Characteristics of the Pre-Dorset component and comparisons with the Dorset assemblage

This particular study will determine the similarities and differences between the Pre-Dorset and Dorset brief occupation units.

Unfortunately, "Structure S" cannot be compared to any cultural component in the present analysis because the previous study did not reveal any certain affinities with other assemblages or any cultural denominators. The Pre-Dorset component therefore consists of structures "R, L, C, and H". The Dorset component consists only of "Structure M". While this is admittedly insufficient, it can nevertheless be viewed as one representative element of the Dorset pattern. Concern may arise for the following interpretations regarding the distinctions between cultural components because of the limited number of structures being compared. While keeping this warning in mind, however, it may be possible to draw a number of conclusions concerning the nature of these cultural components. It must also be kept in mind that cultural differences may effectively relate to a different season of occupation.

Furthermore, by comparing the contents of individual structures, it is estimated that the nature of the occupations can be correlated and differentiated according to the chronological and cultural contexts, and that subsequently, these results can be applied to other lithic collections in order to formulate more general concepts concerning Eastern Arctic prehistory.

Summary of structures and features

Generally speaking, the excavated areas have been disturbed and only provide partial evidence concerning the nature of the occupation. Only three structures ("G","L" and "M") which seem to have been occupied only once reveal good structural evidence. "Structure G" is a bi-lobate habitation structure measuring 2.5 by 3 m. This bi-lobate structure is separated by a mid-passage and at the centre of the mid-passage there is a hearth area. The second feature of this bi-lobate structure is found at the centre of the eastern lobe; it could well be a pit. "Structure L" is distinct from "G" in that it is more or less round and 3 m in diameter. Its northwest portion corresponds to the entry which leads to the centre of the structure and to the hearth area. "Structure M" can tentatively be considered an oval structure measuring approximately 4 by 3 m and oriented northeast by southwest. At the centre of this structure a disturbed hearth area is evidenced by the remains of a hearth using a cantilever technique.

The other excavated areas do not provide evidence of a habitation structure. The occupation area of "Structure H" corresponds to a soil depression but no structural elements were recovered. Structures "J" and "K" did not reveal one cultural item in the excavated areas and could probably be considered as natural depressions. "Structure R" has at least yielded features and lithic remains corresponding to as many as three occupations. Of the three features the clearest and probably the latest is feature "2", which consisted of thin slabs of rock formed into a box-like hearth. The two other features were heavily disturbed.

In general, the Pre-Dorset habitation structures are somewhat smaller than the Dorset "Structure M" but the features vary in the same pattern.

Lithic components

The individual assemblages vary significantly within the Pre-Dorset component. Yet, if one compares both components (Pre-Dorset and Dorset), they are quite similar in the kinds of raw materials but differ somewhat in the amounts of individual raw materials, distribution of lithic categories, flake completeness patterns and artifact typologies (for tables relating to the Dorset component refer to "Structure M").

Table 5.15: Distribution of raw materials and lithic categories in the Pre-Dorset component

Raw material	Cor	Flk	Debr	Mic-scar	Loc.ret	Gen.ret	Bld	Tot	%
Ramah qzt	0	2	0	0	0	1	0	3	1%
Diana qzt	0	2	0	0	2	1	0	5	1%
Black qzt	0	121	2	32	11	16	0	182	25%
Hyaline qz	1	17	2	1	2	2	0	26	4%
Milky qz	0	14	2	4	8	8	0	36	5%
Crystal qz	1	1	0	0	0	0	3	5	1%
Coarse qz	0	6	94	0	1	0	0	101	14%
Chert	0	25	0	13	13	9	9	69	10%
Slate	0	0	0	0	1	1	0	2	1%
Clay schist	6	268	1	9	7	1	0	292	40%
Other	0	4	2	1	0	0	0	8	1%
Total	8	103	460	60	46	40	12	729	100%
Percentage	1%	14%	63%	8%	6%	5%	2%	100%	

Table 5.16: Distribution of raw materials and flake completeness patterns in the Pre-Dorset component.

Raw material	Cmp	Ind	Inc-use	Dist.inc	Prox.inc	Lat.inc	Inc.2+loc	Tot
Ramah qzt	1	0	0	0	0	0	1	2
Diana qzt	2	2	0	0	1	0	0	5
Black qzt	31	8	12	27	16	9	59	162
Hyaline qz	5	2	1	2	0	1	5	16
Milky qz	2	8	3	6	2	6	4	31
Crystal qz	0	1	0	3	0	1	0	5
Coarse qz	2	1	0	1	0	1	2	7
Chert	17	7	6	7	11	3	13	64
Slate	1	0	0	1	0	0	0	2
Clay schist	24	32	1	14	2	2	8	83
Other	2	2	0	1	0	0	1	6
Total	87	62	23	62	31	22	94	383
Percentage	22%	16%	6%	16%	8%	6%	25%	100%

The major distinction between cultural components lies in the quantity of lithic objects. While "Structure M" covers a larger occupation area, it also includes more than 1800 lithic objects, of which 92% are debitage. The Pre-Dorset component, on the other hand, contains only 729 lithic objects, of which only 63% are debitage. This amount of debitage is quite representative of individual Pre-Dorset assemblages at this site. The only lithic category that varies in Pre-Dorset assemblages is the "core" one and the main reason for this is that bifaces are included not in this category but rather in the "generally retouched" category. In Pre-Dorset assemblages cores are present in two aspects: bifaces and cores. Blades and micro-blades were detached from cores while flakes were probably detached from bifaces in order to provide "on the spur of the moment" tools. These bifaces, also used as tools, were probably preferred to large cores because they were easier to carry and at the same time, because of maximum efficiency in using the raw material. One may observe that cores played a greater role than bifaces during the Dorset occupation. In "Structure M" the overwhelming amount of debitage suggests that cores were extensively worked. This clearly differentiates the two components and suggests that

they had probably brought these cores to the site in the shape of chunks. The fact that hyaline and milky quartz raw materials were extensively knapped, together with the heterogeneity of these raw materials, supports the contention that their initial form was probably as chunks rather than bifaces. The presence of bifacial cores in the Dorset assemblage seems uncertain; the only raw material that could have been flaked from a biface would have been Diana quartzite. The fact that Dorset people were utilizing chunks of quartz further indicates a preference for more readily accessible resources and a significant transformation of the exploitation of raw materials.

Local and regional raw materials

Although each assemblage contains virtually the same kinds of raw materials, local raw materials were more numerous in Pre-Dorset assemblages (55%) than in the Dorset assemblage (1%). Local raw materials, specifically in Pre-Dorset assemblages, played an ambiguous role. Several clues, however, indicate the following possibilities: they could have been used as expedient tools, as cores for the production of at least one implement (clay schist) or perhaps in the construction of features (hearths or pits) during particular occupations. By contrast, the Dorset assemblage most probably contains only local raw materials that served as expedient tools or else these materials are incidental and intrusive.

As for similar regional raw materials, their use and exploitation varies somewhat from component to component. From evidence recovered in individual Pre-Dorset assemblages, black quartzite was the all purpose raw material present not only in the form of implements but also as bifaces from

which several flakes were detached for subsequent use. In the Dorset assemblage, however, this raw material has been recovered only in the form of resharpening flakes (distal flutes, etc.). As stated earlier, hyaline and milky quartz were brought to the site as chunks and the limited presence of modified flakes suggests that their purpose was to produce implements rather than expedient tools. In the Pre-Dorset assemblages quartz was recovered not only as implements but also as expedient tools and seems to have been a multi-purpose raw material, especially when black quartzite was absent. Slate was also found in the Pre-Dorset component but was not polished as it was in the Dorset assemblage. Other raw materials, nevertheless, retained a relatively similar importance in both components: Ramah quartzite and crystal quartz. Diana quartzite and chert are poorly represented in one of the two components and therefore are difficult to compare. They suggest, however, that Diana quartzite was probably brought to the site as bifaces and cherts in the form of microblade cores.

In general, the shape in which regional raw materials were brought to the site varied in the two cultural components. Pre-Dorset assemblages relied heavily on black quartzite and chert in order to produce, respectively, expedient tools and microblades. Correspondingly, milky quartz and crystal quartz filled similar functions and specifically, milky quartz substituted for black quartzite. The Dorset assemblage relied heavily on quartz cores and various implements during the occupation. The reliance on quartz indicates a considerable change in the quality of the raw material and may even suggest that this change was correlated with new stone tool technologies, namely polishing. This new technique may have provided a significant number of implements which gradually replaced debitage. Correspondingly, one could estimate that additional technologies expanded

during the Dorset period. Bone, antler and ivory, although used during Pre-Dorset, were probably used more systematically during Dorset and entailed a decreasing interest in stone debitage.

Curation of raw materials

Curation was an important factor particularly in Pre-Dorset assemblages, mainly because only a few raw materials could be found on Diana Island. Regional raw materials were therefore curated. This can be demonstrated by the quantity made of modified specimens of the same raw material and by the flake completeness patterns.

The most obviously curated raw material was black quartzite. In Pre-Dorset assemblages black quartzite had been modified extensively during the occupations. Flakes detached from the biface or from implements in the course of tool resharpening were significantly modified for expedient use. Furthermore, there is good evidence that these modified flakes were often used until they were broken and, even so, were reworked and used again. Milky quartz follows a similar pattern in assemblages where black quartzite is absent or present only as implements. Chert and crystal quartz were heavily curated in both components, primarily for the production of blades and microblades. In Pre-Dorset assemblages all the burins are made of chert and at least one was made from a blade. The debitage recovered from these raw materials had generally been modified or, if not, was practically unusable (i.e. it consisted of core remnants, broken debitage and chips). Ramah and Diana quartzite, although less frequent in both components, were curated raw materials. These raw materials were recovered as implements and resharpening flakes. Furthermore, in the Dorset assemblage, Diana quartzite

was also used as a multi-purpose raw material during the occupation. A Diana quartzite biface could perhaps have served to detach flakes for expedient use. Hyaline quartz in both components is found in the form of implements but mainly as chips and flakes resulting from cores. This raw material does not seem to have been curated in the Dorset assemblage. On the contrary, the purpose of debitage may have been to produce specific implements rather than expedient tools. Slate was a highly curated raw material in both components but, while the Pre-Dorset people were knapping slate, the Dorset people extensively polished it.

These differences between the two cultural components, in regards to the curation of raw materials seem to follow successive cultural stages. The Pre-Dorset people depended strongly on regional raw materials like chert, crystal quartz and black quartzite and these materials are generally found in the assemblages as implements, resharpening flakes, cores (including bifaces) and expedient tools. The Dorset assemblage contains the same raw materials but relied more specifically on milky quartz and hyaline quartz which were brought to the site in the form of chunks and for the special purpose of producing implements. The overwhelming presence of quartz in the Dorset assemblage suggests a de-emphasizing of raw materials used in Pre-Dorset assemblages, as well as of the curation of raw materials. This can perhaps be explained by the utilization of other technologies in the Dorset culture which were known in the Pre-Dorset culture but were not as systematically used as during the Dorset period.

Artifact typology

In general, the Pre-Dorset component contains knive and burins, but only a few preforms and bifaces, while the Dorset assemblage contained a majority of end-blades, scrapers and preforms, fewer knives and no burins. No chert implements were discovered in the Dorset assemblage, suggesting a preference for quartz, Diana quartzite and slate for the production of implements.

Most of the knives in the Pre-Dorset component manifest similar traits: they are asymmetric, tanged, straight based and have a rounded tip. Burins are generally bifacially retouched and seem to have been used not only as burins but also for scraping and cutting. Most burins are tapered and bear several burin blows. The burins occur in only two assemblages ("R" and "C") and exhibit significant differences. In "R", the burins are practically all or partially ground on both faces of the burin tip and two also reveal multi-functions; in "C", however, polish on the tip is virtually absent and the active edges are significantly modified by retouch. Between structures R and C, the burins decreased significantly in length. It can be believed that additional factors produced these differences: time, season, group or even function of the implement.

One additional distinction can be noted in different Pre-Dorset assemblages: the earliest occupations (especially in "R") generally produce bifacially retouched implements while in "C" implements are mostly unifacially retouched with some local retouch on the other face.

The Dorset assemblage, on the other hand, contains triangular scrapers and end-blades that have been tip fluted as well as several polished implements and preforms.

Conclusion

What must to be stressed here are technological distinctions between Dorset and Pre-Dorset components and an attempt made to estimate their significance for the study of these two successive cultures. From what has been discussed, at least as viewed in terms of lithic analysis, there does not seem to have been a clear-cut break between these two cultural periods. What can be suggested is that Dorset people by acquiring a more efficient technology became better adapted to the environment than Pre-Dorset groups, which were more sparsely distributed and more careful with their exploitation of raw materials. They seem to have curated their resources in this specific region. Dorset people, in contrast, seem to have possessed a more efficient organization which did not require them to curate their raw materials as extensively as had Pre-Dorset people. Furthermore the introduction of a more systematic use of polishing, together with additional bone, antler and ivory technology contributed to the gradual de-emphasis of lithic debitage. In this sense, the Dorset culture reflects a technology fully adapted to the needs of the people, while the Pre-Dorset people, because of several constraints closely linked to lack of resources and to the fact that they were probably newly dispersed across a wide area, appear to have been dependent on limited sources of raw material for their survival.

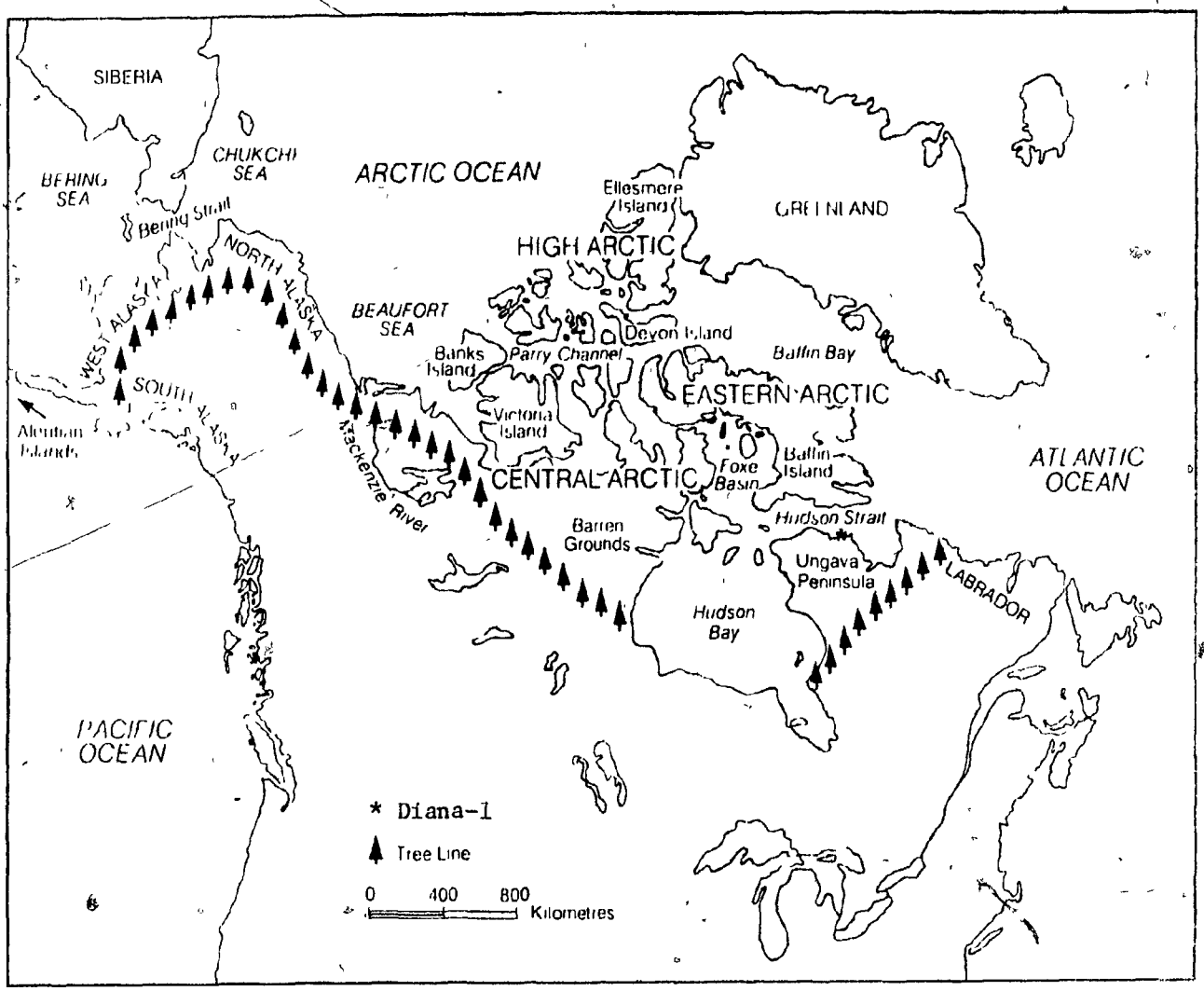


FIG. 6.1: Arctic North America (from McGhee 1978, p.6)

VI: Inter-regional comparisons of Early Paleo-Eskimo components

Introduction

Correlations between diagnostic traits found at Diana-1 and in other regions (fig. 6.1) in the Arctic are somewhat limited. This is not only because there are few typological data from Diana-1, but also because, in other regions, the data themselves and the context in which they have been found have often gone unrecorded or only been briefly summarized; without establishing beforehand the season of occupation, the time of occupation and, even occasionally, the distinct cultural background. Generally, in the Eastern Arctic, archaeological data are published on the basis of observations made during the excavations or surface collecting, which in turn reflect the archaeologist's personal experience.

Nevertheless, the major emphasis of this section lies in establishing these first correlations, in order to do as much as possible to fit Diana-1 within the broader context of Eastern Arctic prehistory. It is important not only to define the Pre-Dorset occupations at Diana-1 but also to establish their significance within the context of specific regions and chronological sequences. These cultural affiliations will eventually provide a setting for understanding the origin and extension of the Pre-Dorset culture.

Baffin Island

Maxwell's contribution to Eastern Arctic prehistory is not only voluminous but fundamental. Maxwell, among other things, developed a lithic artifact typology based mostly on formal, but also on functional attributes. Moreover, through his typological studies, he has reconstructed for Baffin Island a 2,500 year sequence of prehistory covering Pre-Dorset and Dorset cultures: "at least for the biogeographical vicinity being discussed in this report, there is a 2,500 year continuum of culture in which technology at least, if not non-material aspects of culture, has changed so little as to provide an unusual record of cultural conservatism" (Maxwell 1973:286). Three problems come immediately to mind: (1) this statement is based solely on artifact typologies which have been found in various contexts where the objective was to recover diagnostic implements. This was also done without any stratigraphical discriminations; (2) he assumes that artifact typologies are sufficient to reconstruct cultural history; and (3) his "conservative" characterization of technology cannot be fully credited because more is involved in technology than can be observed in the morphology of implements. Maxwell, however, has noted that most of the raw materials found in his collections are composed of light tan chert (75%), which is found today in the form of small pebbles on the sea bottom at low tide, and quartz (24%) (Maxwell 1973:300). This suggests that because chert was local, it was more easily available than in the Diana area, where the assemblages contained regional raw materials. A second observation was that: "the artifacts have a high degree of specificity" (Maxwell 1973:344). This last statement does not agree with Diana-1 implements because, for instance, burins appear to be multi-functional.

Typological comparisons between Diana-1 and Maxwell's collections at Lake Harbour revealed only few similarities. The only object which can be compared morphologically is Maxwell's notched asymmetric knife (Maxwell 1973:245a,fig. 63h). Unfortunately, no structural remains were clearly defined in Maxwell's research (1973).

Labrador

Fitzhugh and Cox have approached Eastern Arctic prehistory in the form of a cultural history of Labrador. These works have greatly contributed to the assessment that this region was not a fringe area, as previously thought, but an eastern "core area" (Cox 1978:115) where cultural continuity and homogeneity can be demonstrated within the Arctic cultures. This core area can be compared to a similar core area in the Baffin Island-Hudson Strait region.

Fitzhugh's research (1972, 1976, 1980) has emphasized only partially the archaeological site as a study unit: he publishes a brief description of the site, the diagnostic implement content and the cultural designation.

Only limited comparative data can be established between Fitzhugh's data and Diana-1. The transition period between Pre-Dorset and Dorset in the Labrador collections reveals the presence of a regional variant: Groswater Dorset. This variant is absent in other regions of the Eastern Arctic and is defined mainly in terms of diagnostic lithic implements by Fitzhugh (1972, 1976, 1980) and Cox (1978). While no diagnostic implements can be compared with Fitzhugh's and Cox researches, the structural remains they describe may have some relations with Diana-1. The mid-passage

suggested in "Structure C" is viewed by Cox as a Pre-Dorset trait in Labrador, as well as the box feature of "Structure R" (Cox 1978:103).

In Northern Labrador (Saglek Bay), Tuck (1975,1976) has also studied Early Paleo-Eskimo occupations but his conclusions are slightly different from Fitzhugh's views. Tuck has not encountered any implements related to Groswater Dorset. He explains his cultural sequence as probably the result of a few bands that had considerable freedom of movement which permitted periodic abandonment of particular regions, or of local extinctions (Tuck 1975:191).

Greenland

Archaeological research in Greenland has been conducted by Danish archaeologists (Bandi, Birket-Smith, Knuth, Larsen and Meldgaard). Although their archaeological methods and investigations are defined within an Eastern Arctic perspective, these archaeologists have discerned some variants in the cultural chronology of Greenland (for example: the Sarqaq culture).

Knuth's research (1967) in Peary Island, as stated earlier, has led him to discover the earliest presence of Paleo-Eskimo peoples (Independence I). He has recovered a variety of cultural remains which represent this culture: well defined habitation structures, lithic and bone implements, C-14 dates and even made a preliminary faunal analysis. Few typological comparisons or chronological links can be drawn between these Independence I sites from the northern part of Greenland and the Pre-Dorset cultures. Nevertheless, one trait could have been borrowed from Independence I: bi-lobate habitation

structures with a mid-passage.

Other researchers, especially Meldgaard and Larsen have developed original hypotheses that diverge from those proposed by other researchers in the Eastern Arctic. While it is often argued that there is a discontinuity between Sarqaq (Pre-Dorset) and Dorset cultures:

> "What we find is apparently a culture which along the Arctic coast of Canada grew more and more Eskimo-like, an adaptation where environment was the main factor, although the evolution to some extent may have been directed by influences from the Western Arctic represented by the Sarqaq culture" (Meldgaard 1960:594).

The Pre-Dorset assemblages at Diana-1 exhibit a number of affinities to the Sarqaq culture of Western Greenland. Typologically, comparisons can be made with respect to asymmetric knives and asymmetric tanged blades, rounded scrapers and most importantly, the burins which have been ground on the tip (Larsen and Meldgaard 1958:plates of Sarqaq culture; Meldgaard 1976:47). The raw material used in the Sarqaq assemblages is almost entirely angmaq or silicified slate. Unfortunately, the poor state of the habitation structures in both locations does not enable typological comparisons.

It seems, therefore, although evidence is somewhat thin, that diagnostic elements reflect cultural links between Sarqaq and the Pre-Dorset culture at Diana-1.

High Arctic (Port Refuge, Devon Island)

Recently, McGhee has made a number of proposals concerning Paleo-Eskimo occupations (McGhee 1979, 1981). Studying Independence I, Pre-Dorset and Dorset components, he has proposed relationships between his finds in the

High Arctic and finds in other regions in the Arctic. He has also attempted to explain the nature of the earliest occupations in his research area. One of his most interesting ideas is based on his assumption that Independence I occupations were brief and represent single family units. This in turn enables him to propose that variability of artifact form in assemblages can be explained simply in terms of individual stylistic preferences (McGhee 1979:110). Unfortunately, the fact that these artifacts (or tools) were not necessarily manufactured during the occupation of each site leaves open the possibility that these tools could have been exchanged and hence made by other people before the occupation. One cannot assume that everything that has been found in an occupation has been processed by the occupants. Only the expedient materials can be directly assigned to the occupants. Moreover, his study is based mainly on surface finds and only a few excavations and the lithic objects have been artificially grouped to form cultural components.

In general, the Diana-1 Pre-Dorset assemblages do not correlate with any of McGhee's tool typologies, except for a stemmed biface (McGhee 1979:155, plate 10f). Very little information about the nature of the habitation structures was gathered from his research at Port Refuge.

Concerning the cultural succession at Port Refuge, McGhee has stated that Independence I and Pre-Dorset people belonged to a separate cultural tradition and that:

> "It seems likely that affiliations of the Cull Cliff component (Pre-Dorset) were toward the south, and that the component represents an occupation by a group of people who originated from more southerly Arctic islands, who moved northward for some unknown reason and hunted seasonally at Port Refuge for at least a few years" (McGhee 1979:124).

This orientation towards the south is perhaps the only link to the Pre-Dorset people at Diana-1.

Hudson Strait

Taylor's research (1968) is one of the pioneering works in the Eastern Arctic that deals with the transition period between Pre-Dorset and Dorset cultures. His work is based mainly on two sites which contain exclusively Pre-Dorset (Arnapik) and Dorset (Tyara) components. The data have been gathered from find spots (or dwellings) and have been combined in order to study the nature of the cultural presence in the individual sites.

Comparable data between Arnapik and Diana-1 implements are practically non-existent except perhaps for a similar double concave side-scraper (Taylor 1968:115, fig. 18c).

Taylor also established that Arnapik is probably older than the Sarqaq components: "there is reason to assume an increasing frequency of grinding facets on burins throughout the Pre-Dorset continuum. If this be the case, then the Arnapik site is older than Sarqaq culture, perhaps considerably older" (Taylor 1968:41).

Poste-de-la-Baleine

At Great Whale River, Plumet (1976) has undertaken the study of Paleo-Eskimo cultures in cobble fields (champs de blocs). Most of the habitation structures studied are of Pre-dorset origin and have confirmed the presence of central hearths and mid-passages in this region for the

Pre-Dorset culture.

Plumet (1980) pursued his studies in this region and analyzed the lithic collections gathered by himself in 1969 and Harp in 1970. His work concentrated especially on the study of technology and the burin blow technique involved in the manufacture of burins and several other tools. While no morphologically diagnostic implements can be correlated with the Diana-1 Pre-Dorset assemblages, there is evidence that bifaces (or blanks) were most probably utilized as expedient tools in at least one of his assemblages (Bal.1-C). Visual comparison between the specimen no. 578-82 from Bal.1-C and specimen no. 779 from "Structure C" reveals that both specimens bear a similar morphology. These specimens can therefore be compared on the basis of the presence of wide flake scars, irregular edges which form platform edges and a lack of fine retouch which gives an unfinished aspect to the specimens.

Summary

Cultural evidence at Diana-1 suggests direct affinities with Western Greenland material. Lithic artifact typologies have revealed several links in form as well as in possible function with respect to certain implements common in both Pre-Dorset components. Meldgaard's and Larsen's (1958) studies have dealt with asymmetric and tanged knives, rounded scrapers and burins that are morphologically similar to Diana-1 Pre-Dorset assemblages. Furthermore, the burins have the same grind on the active edges in "Structure R" as in Sarqaq assemblages. Comparative analysis of lithic assemblages in other regions was considerably limited. Only one additional relationship can be proposed based on a blank or biface used for detaching

expedient tools in Plumet's (1980) Bal.1-C collection.

Structural remains at Diana-1, as well as in other sites in the Eastern Arctic, are quite disturbed and difficult to interpret. One notable exception is in Northern Greenland, where Knuth (1967) has observed well preserved house patterns, belonging to Independence I peoples. Inter-regional comparisons of features and habitation structures are therefore limited to generalities concerning settlements. For instance, one may observe that, as is found in Labrador Pre-Dorset settlements, "Structure C" is a bi-lobate habitation structure with a mid-passage and central hearth. The cultural link of this habitation structure would therefore be in accordance with Cox but against McGhee's views which state that bi-lobate structures are linked to Independence I rather than with Pre-Dorset (McGhee 1979:124). "Structure L" contains a central hearth; and feature "2" of "Structure R" was a box hearth similar to what can be found at Okak, in Labrador (Cox 1978).

The C-14 date from "Structure L" is not in agreement with other dates from the Eastern Arctic and needs at this time to be evaluated. This date of 3420 years B.P. (or 1920 years B.C., if one uses the corrected date established by Ralph et al 1973), although fitting easily within an Early Paleo-Eskimo context, seems excessively early when one observes the succession established by means of typological comparisons (i.e. between Arnapik: 1,500-1000 B.C. and Sarqaq: 900-700 B.C.). Considering that this measurement was made on a sample composed of three small fragments of wood charcoal, one wishes to have more solid evidence before accepting a date that is in contradiction to several C-14 dates from Arnapik and Sarqaq. It is therefore suggested that, at present, the early date of "Structure L"

is not acceptable, in terms of current knowledge of the cultural sequence of Pre-Dorset peoples throughout the Eastern Arctic.

VII: Conclusion

This work has been undertaken to propose some additional avenues of research in an Arctic context where archaeologists examine brief occupation settlements. Although this research employed traditional working concepts such as typology, it has widened its perspective by examining the role played by lithic materials in the subsistence pattern of Paleo-Eskimo people.

This research was conducted within the context of a specific site study (Diana-1) and has utilized concepts of lithic variability in cultural components as well as in individual assemblages of the same component. The lithic analysis constituted the working basis of this study and focused especially on the nature and exploitation of lithic materials. The occupants at Diana-1 had to rely on regional raw materials rather than local raw materials. This dependence accentuated the exploitation of their raw materials, as is demonstrated by the heavy curation of regional raw materials, which is seen in the curation not only of implements but also of debitage for use as expedient tools. These particular elements were examined within specific assemblages, which were generally equivalent to individual structures, in order to characterize each assemblage and to estimate the differences and similarities among them as well as among different cultural components. It has been demonstrated that Pre-Dorset units of occupation were quite similar in the presence of the variety of raw materials, the exploitation of raw materials on the site, and the variety of diagnostic implements.

One of the contributions of this work was to demonstrate that, although implements play a major role in lithic assemblages, they were supported by other lithic tools during the occupation and that the latter tools have a variable significance from one culture to another. Pre-Dorset assemblages contained not only implements and resharpened flakes but most probably bifaces, from which flakes were detached that could be used for multiple purposes during the occupation. It can also be proposed that the flakes detached from these bifaces were subsequently used, resharpened and even reworked, if broken, in order to maximize their exploitation. The clearest example was found in "Structure C". The Dorset assemblage however, reflects a different pattern. There again, implements were part of the lithic assemblage together with resharpening flakes but the debitage is significantly different from Pre-Dorset assemblages. Dorset debitage comes most probably from chunks, as was demonstrated by the nature of the cores. Expedient tools appear less frequently in this assemblage, suggesting that the occupants tended to manufacture implements for specific purposes. The fact that quartz was worked in such a fashion also indicates a reliance on more accessible raw material, which is found in the immediate region (though not locally), rather than on stone from the Ramah quarries or chert quarries in more distant regions. The presence of several polished implements and preforms in the Dorset assemblage further demonstrates a distinct difference in lithic technology. This suggests that, in contrast to Pre-Dorset peoples, the Dorset may have systematically developed other technologies, such as stone polishing, or using bone, antler and ivory.

The inter-regional comparisons have revealed that the Pre-Dorset occupations exhibit several affinities with the Sarqaq culture of Western Greenland. These similarities are based on morphological and, perhaps,

functional traits of diagnostic implements. If one considers that Sarqaq has been well dated by several C-14 dates at approximately 900-700 B.C. and that 98% of its burin tips are ground (Taylor 1968), it could be estimated that the Pre-Dorset presence at Diana-1 is probably somewhat earlier, since the burin tips are not exclusively ground at Diana-1. Secondly, because the Diana-1 Pre-Dorset implements do not easily compare with those from other regions, it can be estimated that the Pre-Dorset component at Diana-1 closely precedes the Sarqaq occupations. The single C-14 date taken from three small charcoal samples is therefore probably in error.

Although this study was somewhat limited because of the small quantity of cultural remains, it is hoped that future research will be oriented towards small, well-defined occupation units such as these brief occupation dwellings at Diana-1. Such studies would enable archaeologists to understand the dynamics behind Paleo-Eskimo settlements, which cannot be examined easily when dealing with large collections. It is also important to acknowledge the important distinction between implements and expedient tools within assemblages. These elements can effectively contribute to the understanding of subsistence patterns in the Eastern Arctic as well as in other regions. In fact, through these observations, as suggested by the present research, one can successfully draw several conclusions about the nature of the Pre-Dorset/Dorset transition specifically in regards to technological developments, social organization and population distributions of these Paleo-Eskimo cultures. Within a more general anthropological perspective, this study has demonstrated the importance of curated and expedient tools in relation to lithic assemblages. This, in turn, has provided a better understanding of the nature of prehistoric occupations.

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Plates

N.B.: These plates include all the implements described previously.
Only the name and number are given in these plates.

Plate 1: Diana.1-S (JfEl-1). no.36: a bifacially retouched stem; no.145: knife; no.269: notched biface (broken); no.34: distal end of an asymmetric knife; no.8: broken biface.

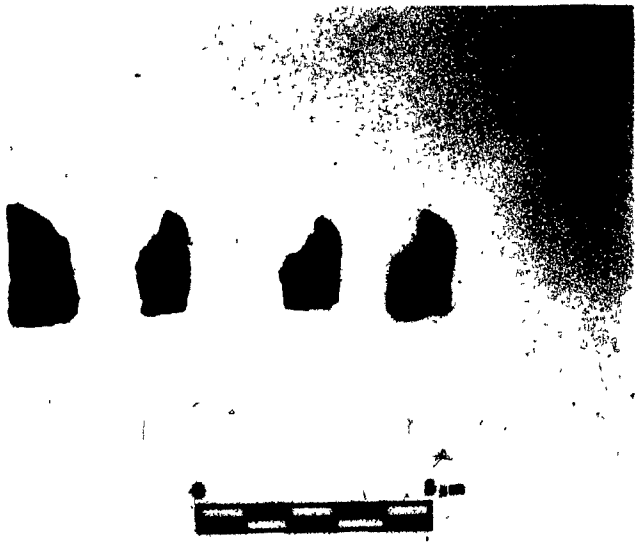

Plate 2: Diana.1-R (JfEl-1) 4 burins (nos: 648,623, 616,744).

Plate 3: Diana.1-R (JfEl-1) 3 knives (nos: 739,558-587,717).

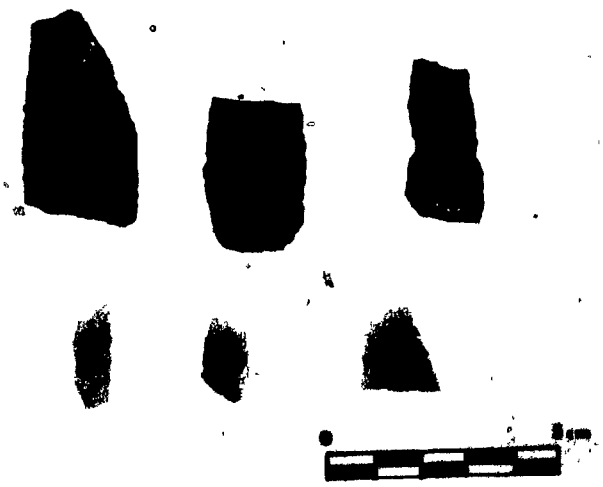

Plate 4: Diana.1-R (JfEl-1). 6 broken bifaces. no. 725-726: asymmetric knife; no. 414 broken base; no. 449: blank; no. 651: side-scraper; no. 563: unifacially retouched fragment; no. 737: bifacially retouched fragment.

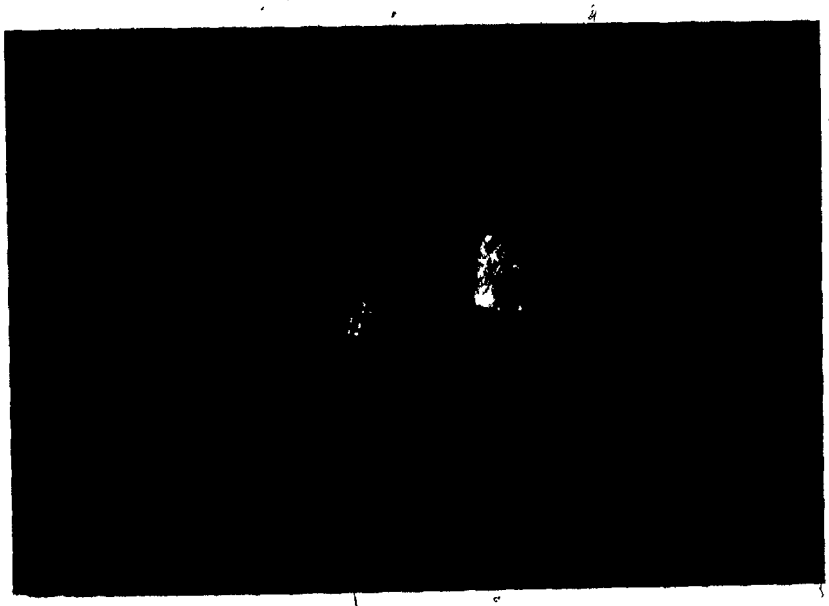

Plate 5: Diana.1-L (JfEl-1). 2 broken knives (nos. 403, 287).

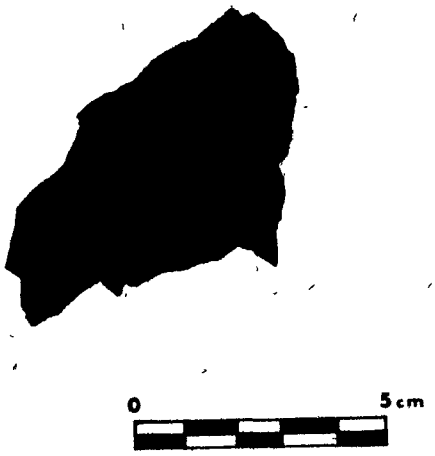

Plate 6: Diana.1-G (JfEl-1). Bifacial core with refitted flakes.

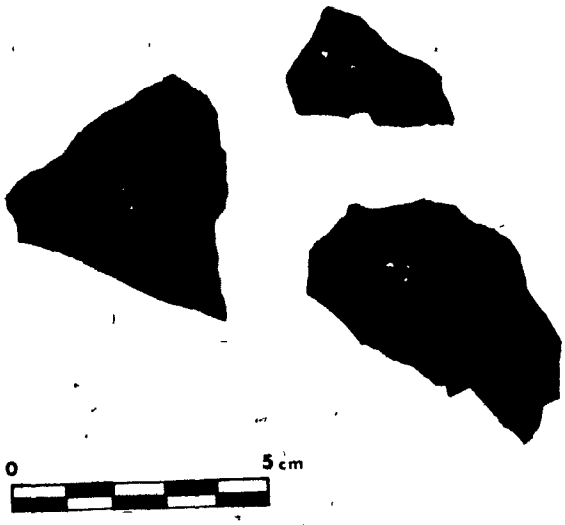

Plate 7: Diana.1-G (JfEl-1). Bifacial core (no. 779) and corresponding two flakes (nos. 687,578).

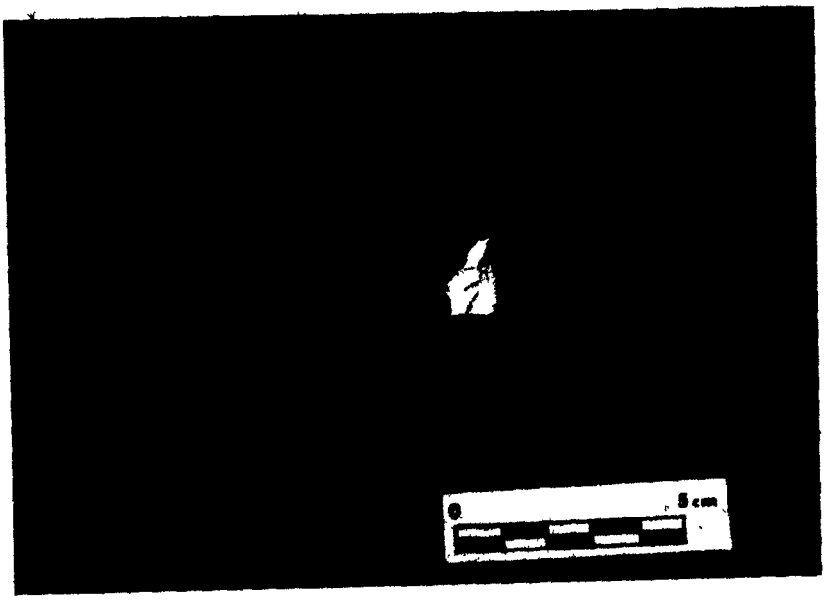

Plate 8: Diana.1-G (JfEl-1). 2 burins (from left to right, nos. 530,802).

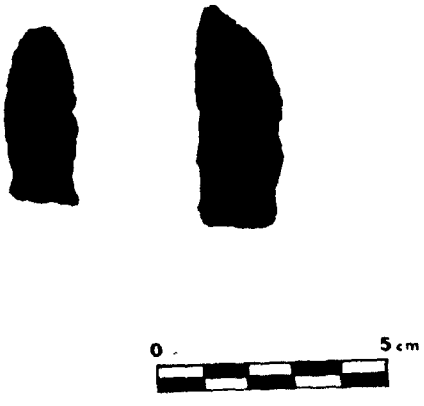

Plate 9: Diana.1-G (JfEl-1). 2 knives (from left to right, nos. 679,782).

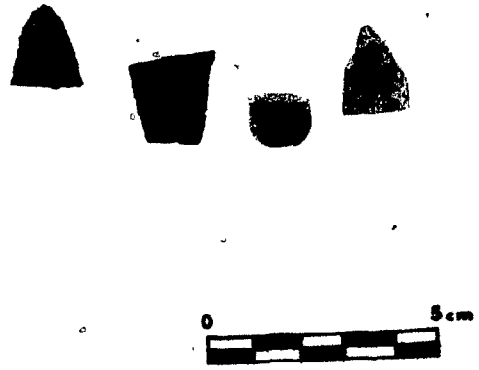

Plate 10: Diana.1-G (JfEl-1). 4 broken bifaces. no. 794: broken tip; no. 503: mesial fragment; no. 686: broken base; no. 706: mesial fragment.

Plate 11: Diana.1-G (JfEl-1). (from left to right) no. 521: side-blade; no. 526: preform; no. 692: rounded scraper.

Plate 12: Diana.1-H (JfEl-1). no. 811: asymmetric knife.

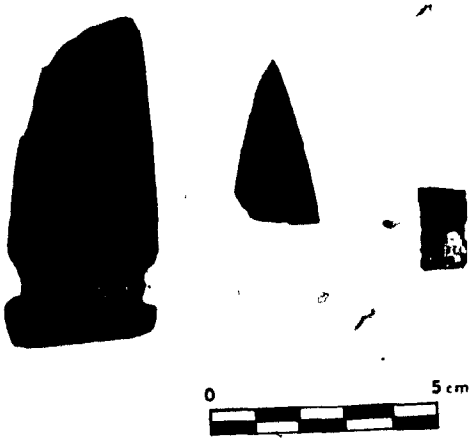

Plate 13: Diana.1-M (JfE1-1). Polished implements. No. 838: asymmetric knife, no. 342: end-blade; no. 858: mesial fragment.

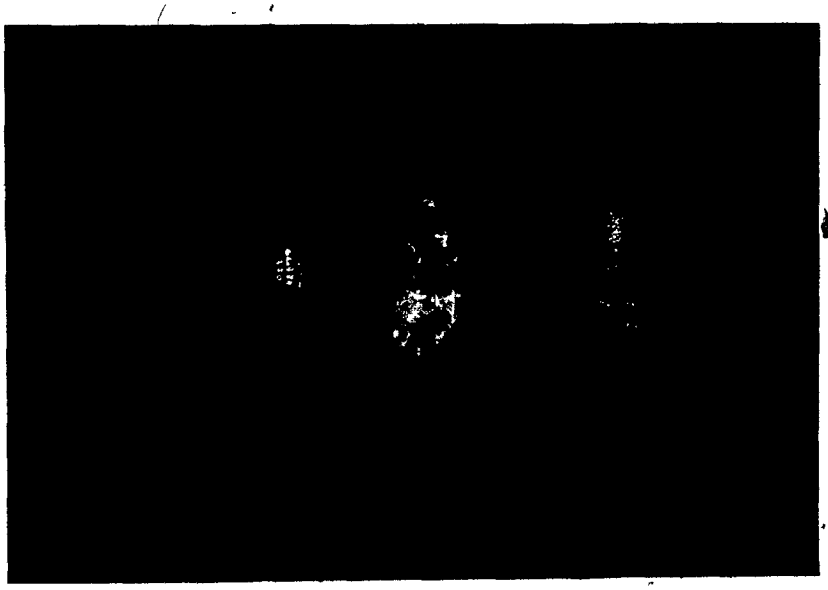

Plate 14: Diana.1-M (JfE1-1). 4 tip fluted implements. No. 824: end-blade; no. 730: end-blade; no. 851: broken knife; no. 842: end-blade.

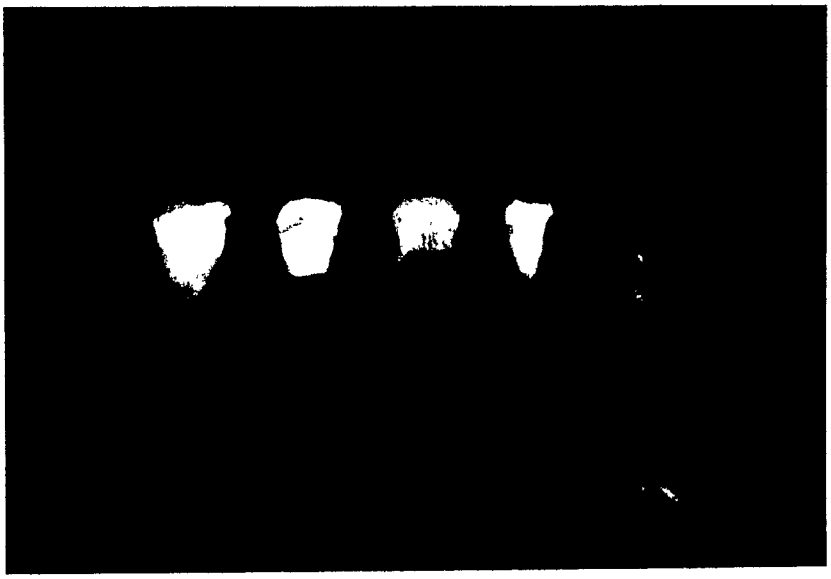

Plate 15: Diana.1-M (JfEl-1). 5 scrapers (from left to right) nos. 827, 348,351,343,397.

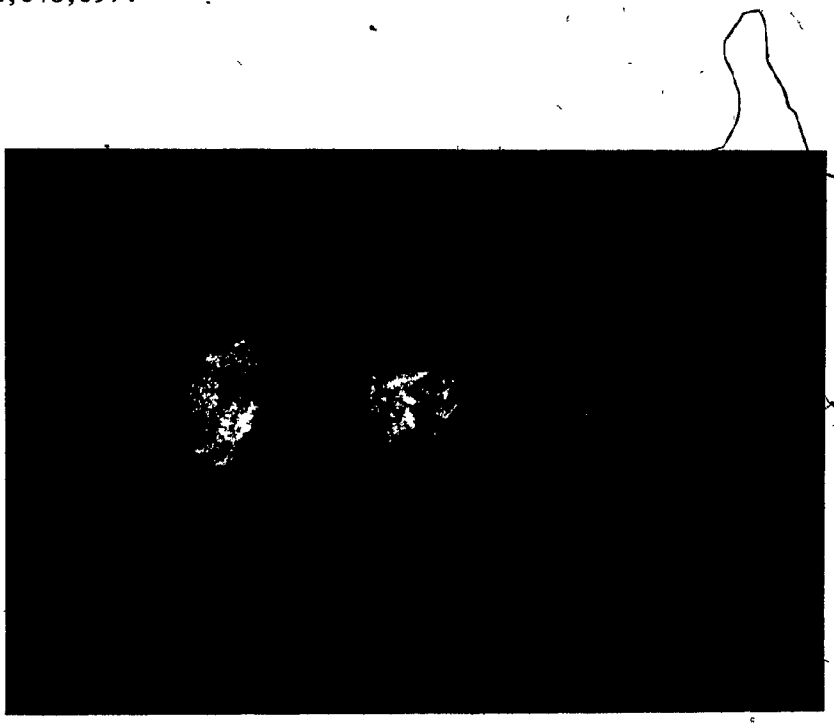

Plate 16: Diana.1-M (JfEl-1). 3 broken bifaces. no. 339: side-blade; no. 852: notched base; no. 470: fragment.