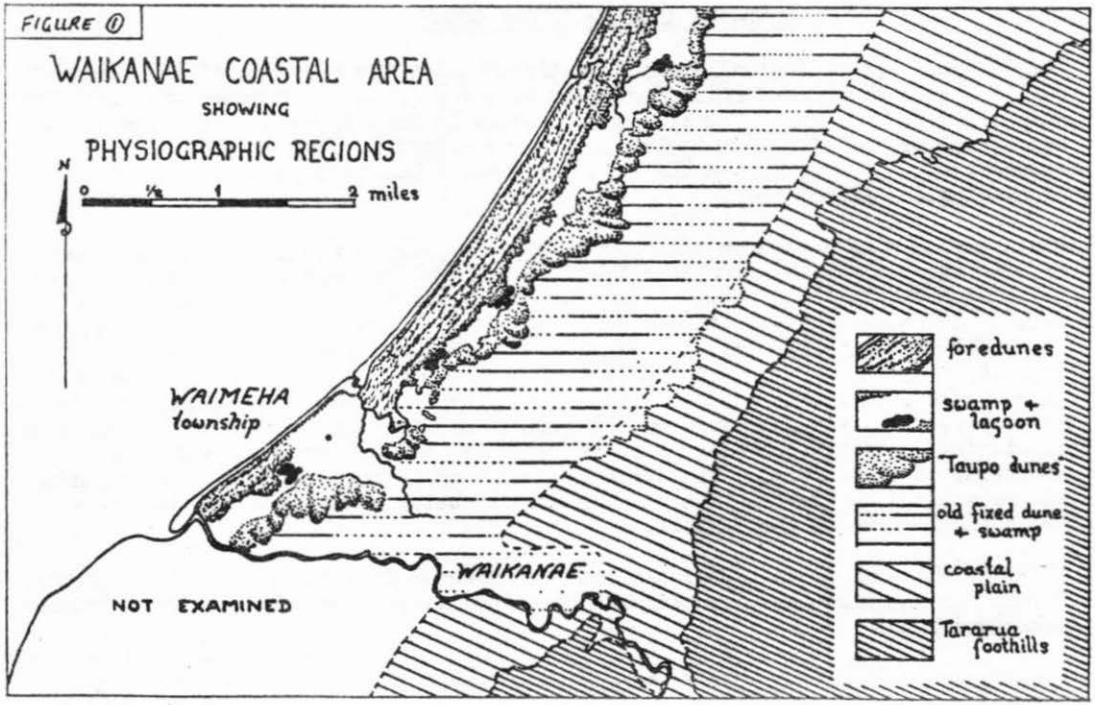
NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER

MIDDEN RECORDING AND SAMPLING in the WAIKANAE REGION

by Colin D. Smart

The information presented here is the result of work carried out by a number of people. The location and recording of sites in the Waikanae region was begun by John Daniels and Win Mumford in 1959 and continued by John Daniels and Colin Smart in 1961 with the help of others in the Wellington Archaeological group. From the 13th. to the 16th. November, 1961, Colin Smart and a group of sixteen students (Misses S. Astridge, B. Dennison, F. Gatchell, Y. Helson, J. Heron, H. Holme, L. Hood, R. Jolly, P. Jude, R. Levy, M. McLean, R. Phillips, C. Scott, H. Taylor and Messrs. R. Chambers, G. Moss) from the Wellington Teachers' College, undertook an intensive survey and sampling coverage of selected areas. The same group subsequently analysed the samples and gathered together supplementary information on the Waikanae region. I am grateful for the assistance given by Dr. C.A. Fleming, Geological Survey, who provifed considerable information on the geological interpretation of the Waikanae physiographic regions.

Two objectives were kept in mind when undertaking this study. The first was to devise a method for carrying out midden sampling. For this a rather experimental approach was required to see just how the procedures and techniques applied in similar programmes overseas could be applied in New Zealand situations and, more specifically, in the Waikanae region. No attempt was made to explore all categories of quantitative research. Rather an emphasis was placed on procedures and techniques which could be applied by the New Zealand archaeologist who is still predominantly a non-professional and "spare-time" worker.



The second objective, intended to give the "experiment" some definite purpose, was to investigate the occurence of change in dietary preference, or dietary change due to other factors, (known to occur in Horowhenua and elsewhere) in the Waikanae region. If such could be detected they might eventually be contained within a relative chronology by way of associated cultural material. If dietary changes could be well substantiated, it might even be possible to construct a sequence by using geological or radio-carbon dating, into which other cultural material could be placed.

The area covered by the survey and analysis of midden material to be dealt with here, extends north from the mouth of the Waikane River for some 5 miles and inland from the present beach for 2 to 2½ miles. It is a coastal area aligned in a N.E. to S.W. direction, composed largely of sand dunes and swamp much of which has been converted to stable farming land. Several physiographic regions are easily recognised (see map, fig.1, and cross-section, fig.2)

(a) A belt of foredunes - coastal dunes only partly stabilised by plant cover, rising irregularly to heights less than 50', extending a distance of ¼ to 3/8 miles behind the beach. The irregular inner edge of this belt is often marked by an abrupt drop to the flats of the next region.

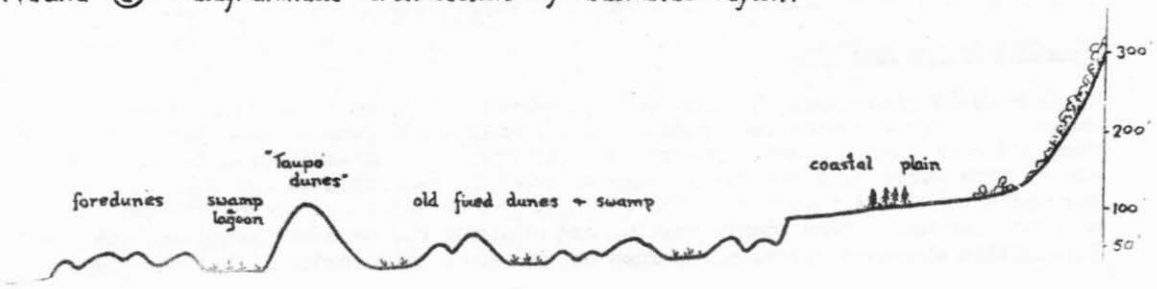
(b) A strip of swamp and sandy flats, with occasional lagoons, only a little above high tide level. This must have originally been an almost continuous waterway but is now partially drained and grassed. A layer of "Taupo" pumice known to underlie this area in places, probably represents the rapidly built and extensive beach related to the "Taupo eruption" (about 1800 years before 1950).

(c) A dune ridge, sometimes over 100' in height, running in a fairly regular way along the inner margin of the lagoons and swampy flats. These dunes are mostly fixed by grass or lupin cover, but several areas are actively moving again. This was the foredune of the "Taupo pumice shoreline" under the swampy flats.

(d) An extensive area of low irregular dunes with pockets of swamp or flat. This area has been successfully converted to farmland and most of the swampy areas have been drained. Old sand dunes rise only occasionally to 70 to 90 feet with considerable areas below this height.

(e) The alluvial and sandstone coastal plain at the foot of the Tararua ranges slopes down to below 100' where it terminates rather abruptly in a line of sea-cut cliff (an old coastline, well beyond the period of human occupation in New Zealand.) In places the older dunes of area (d) have built up against and moved over the cliff to obscure it.

FIGURE ② - *diagrammatic cross-section of Waikanae region.*



RECORDING AND SAMPLING IN THE FIELD.

The first recording of middens in the Waikanae district (by W. Mumford and J. Daniels) was aimed at locating and describing middens only. Subsequent work included more itemised description and the collecting of samples. The procedure adopted in the field, once a midden was located, was as follows:

(1) The position of the midden was marked on a base map (Aerial Mosaic sheet no. N.157/4, scale 4" to 1 mile) and the standard Site Reference form (N.Z.A.A. Site Recording Scheme) completed. A more detailed description of the site, on a separate form, was then made under the following headings:

SETTING - in terms of the general physiographic position and also in regard to immediate surroundings.

CONDITION - undisturbed/disturbed by ... (agent of disturbance); and the degree of disturbance.

POSITION WHEN DEPOSITED - whether on the top, slope or foot of the dune, etc. (where this could be determined)

DETAILED DESCRIPTION - by way of a sketch plan (to scale), diagram, measurements, or in verbal form; to record the area, extent of disturbance, nature of deposition, stratigraphy, position of samples collected, and so on.

(2) Two types of sample were collected while recording was carried out:

SURFACE COLLECTION (usually in one bag) made by selecting a single example of every different item which could be found in the deposit. Where there appeared to be differences in size or shape of a particular item, several examples illustrating the differences were kept. Every effort was made to ensure that all possible variations in midden content were represented in the surface collection.

QUANTITATIVE COLLECTION - a small block of undisturbed midden deposit was removed with a trowel and placed in a strong plastic bag. The sample weight was about 2000gms. (almost 4½lbs.), sufficient to fill the plastic bag used for this collecting. Several quantitative samples were taken for each midden whenever possible.

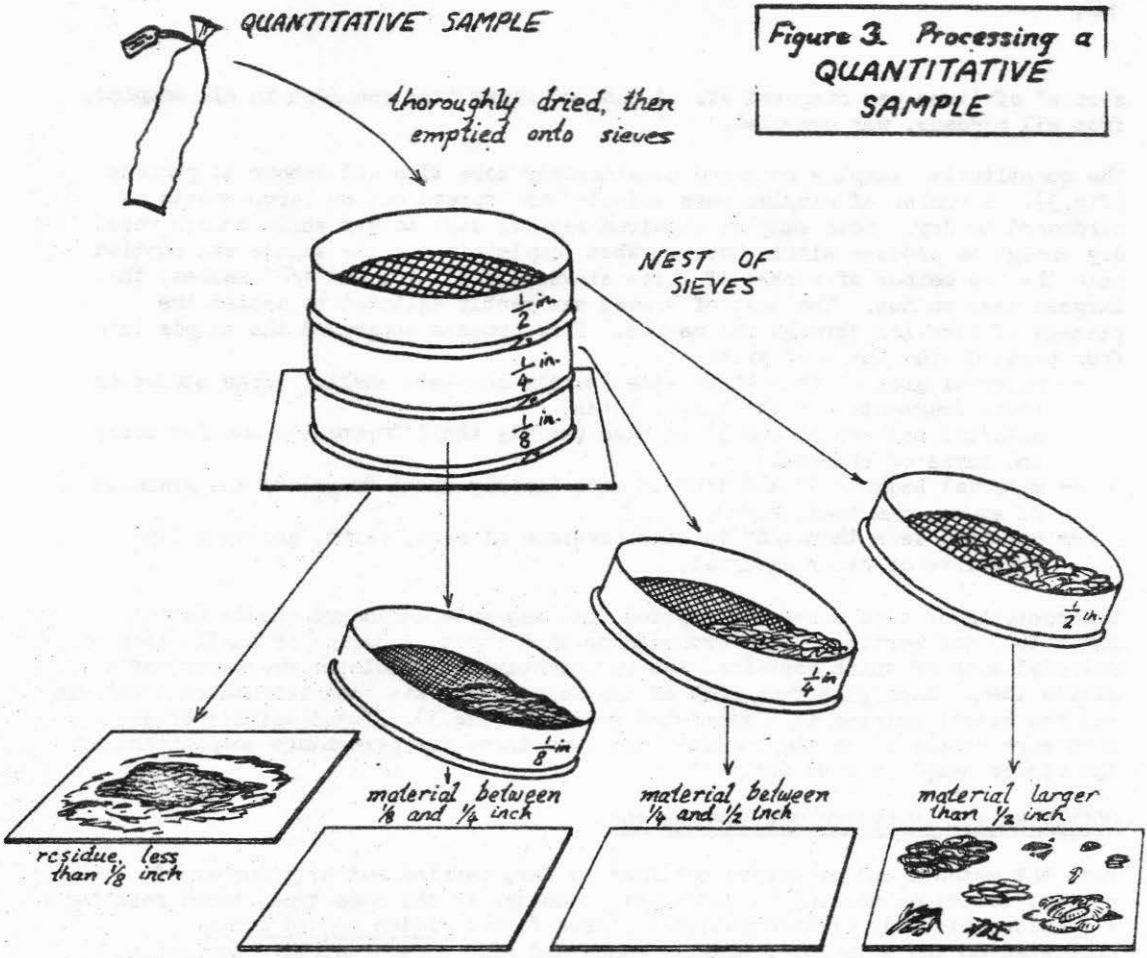
All samples were labelled to show their nature (surface coll. or quantitative), the midden number and the sample number for that particular midden (a,b,c,d, etc.), and the location of the position from which the sample was collected was marked on the sketch plan of the midden.

By this method a total of 67 middens (site nos. N.157/3 to N.157/69) were recorded and described in some detail, and 111 samples collected although considerable difficulty was experienced in determining some aspects of the site description where the deposit was badly disturbed or where only a very small portion was visible without excavation or the removal of overburden.

ANALYSIS OF THE SAMPLES.

Surface collections were laid out and the identity of each item recorded on a small card, one card for each midden. Noticeable variations of any item were recorded here also. A small number of items required identification by specialists and a "type series" of the total range of material was retained for checking by specialists (we are indebted to the staff of the Dominion Museum who checked material for us). When identification and checking had been completed and the information obtained had been recorded on the cards concerned, all but the "Type

Figure 3. Processing a QUANTITATIVE SAMPLE



MATERIAL SORTED ON THE CARDBOARD TRAYS, then EVERY PILE WEIGHED AND RECORDED:

List of species:	SIZE IN CM. Min.	SIZE IN CM. Max.	WEIGHT IN GRAMS >½"	>¼"	>⅛"	<⅛"	TOTAL WEIGHT	% COMPOSIT.
			MIDDEN No. 157/28					
Hyridella sp								nil.
Bassinia yatei								nil.
Mactra discors								nil.
Amphidesma subtria.	3·2	7·3	225·8	45·8			271·6	38%
Dosinia anus	3·5	4·5	105·2	17·4	(95)		122·6	17%
Spisula aequilater.	3·2	5·5	48·9	4·4			53·3	8%

series" of items was disposed of. A list of every item recorded in all samples, from all middens, was compiled.

The quantitative samples required considerably more time and labour to process (fig.3). A number of samples were selected and spread out on large sheets of cardboard to dry. Some samples required several days to dry while others were dry enough to process within hours. When completely dry the sample was emptied onto the top member of a nest of three sieves, of ½", ¼", and 1/8" meshes, the largest mesh on top. The nest of sieves was gently agitated to assist the passage of material through the meshes. This process separated the sample into four parts on the basis of size:

-- material greater than ½" in size (mainly complete shells, large stones or stone fragments and the larger bones).
-- material between ½" and ¼" in size (mainly shell fragments, smaller bones and lumps of charcoal)
-- material between ¼" and 1/8" in size (mainly shell fragments and granules of stone, charcoal, earth, etc.)
-- material less than 1/8" in size (residue of sand, earth, and very fine fragments of other material.

The contents of each sieve was emptied onto separate cardboard sheets (about 24" x 36") for sorting. This produced on each sheet, a series of small piles of material each of which contained the representatives (whole or fragments) of a single item. Each pile from each of the four sheets was then weighed on a balance and the weight entered in a tabulated register (fig.3). Total weights of each item were completed in the register and from these the percentage composition of the midden sample worked out.

COLLATING AND ANALYSING THE INFORMATION.

From the methods and processes outlined so far, carried out by a number of people, sometimes working on different processes at the same time, there resulted a considerable body of information in three forms: midden record forms completed on the site and primarily concerned with morphological description, surface collection cards providing lists of identifications and other information on the range of contents of each midden, and the quantitative analysis register in which the results of the sorting and weighing of samples was recorded.

This material required collating in terms of what particular aspects of the middens we considered of value in a comparative way. A new form was devised for this (Midden Analysis Form, see pages 165 and 166) and the information transferred onto it. This information is of two different types-

(a) that largely concerning the morphology and situation of the midden deposit such as the degree and nature of disturbance, the physiographic position of the site (in terms of the physiographic regions outlined in fig.1 and 2), any evidence which might suggest the relative dating of the site, the position in which the material was originally deposited on the dune (or other natural situation), the size, area and thickness of the deposit and any other information recorded but not included under the above headings. With subsequent analysis in mind, the information under the above headings was graded or sorted into a coded scale (see p.166)

(b) that concerning the actual contents of the midden deposit, largely obtained from the analysis of surface collections and quantitative

MIDDEN ANALYSIS FORM:

Map number:

Map name:

Grid reference:

SITE NUMBER:

SITE TYPE:

1. DEGREE OF DISTURBANCE:

a	undisturbed
b	mainly undisturbed
c	half destroyed(about)
d	mainly destroyed
e	destroyed

NATURE OF DISTURBANCE:

a	wind(blowout)
b	stock
c	man
d	other

2. PHYSIOGRAPHIC POSITION:

a	coastal dunes
b	swamp/lagoon belt
c	"Taupo" dunes
d	pre-"Taupo" dunes
e	alluvial fans/hill country

3. EVIDENCE SUGGESTING AGE:

a	Archaic Phase
b	Classic Maori Phase
c	"contact" period
d	post-European

4. ORIGINAL POSITION ON DUNE:

a	summit
b	side
c	foot
d	small dune at foot

a	north
b	south
c	east
d	west

a	windward
b	leeward/sheltered

5. SIZE:

6. REMARKS:

7. RECORDED BY:

DATE:

Surface collections:

Quantitative collections:

FAUNAL MATERIAL: (SHELL/ECHINODERM)		SURFACE COLLECT.	QUANTITATIVE COLLECT.
SANDY SHORE			
Dosinia anus	1		
Amphidesma subtriangulatum	2		
Spisula aequilateralis	3		
Mactra discors	4		
Bassinia yatei	5		
	6		
Austrofusus glans	7		
Alcithoe arabica	8		
Maurea cunninghamii	9		
Struthiolaria papulosa	10		
Struthiolaria vermis	11		
Xenophallium pyrum	12		
Baryspira australis	13		
	14		
Arachnoides zelandiae	15		
	16		
	17		
ROCKY SHORE			
Haliotis iris	18		
Penion adusta	19		
Cookia sulcata	20		
	21		
Evechinus chloroticus	22		
	23		
	24		
MUDFLATS:			
Chione stutchburyi	25		
Amphibola crenata	26		
	27		
	28		
FRESHWATER:			
Hyridella menziesi	29		
	30		
BONE MATERIAL:			
whale	31		
seal	32		
bird	33		
fish	34		
human	35		
rabbit, lamb, etc.	36		
	37		
STONE, ETC.:			
greywacke	38		
argillite	39		
obsidian	40		
sandstone	41		
pumice	42		
charcoal	43		
	44		
	45		

samples. This information is recorded in tabulated form with regard to subsequent analysis (see p.166)

Once the information had been sorted and collatedin this way it was a fairly simple task to transfer it onto a small punch card, one card for each midden, (see fig.4) and analyse the midden series as required.

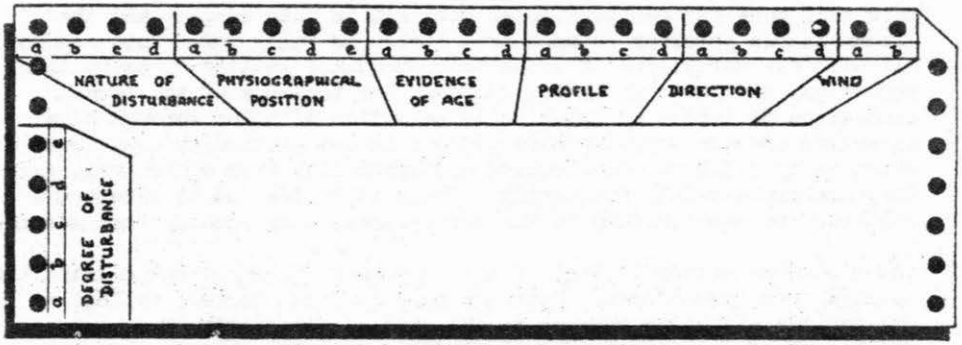


FIGURE ④

SUPPLEMENTARY INFORMATION.

A proper analysis of this form requires a considerable amount of supplementary information to enable results to be correctly considered in terms of the environment offered by the area. A considerable body of material concerning the pre-European and recent environment of the Waikanae region was obtained with the assistance of a number of people: geology and physiography (Dr. C.A. Fleming, Geological Survey), climate (the Meteorological Service), pre-European vegetation (Mr. B. Hamlin, Dominion Museum), animals and birds (Dr. J.C. Yaldwyn, Dominion Museum) and shellfish (Dr. R. Bell, Dominion Museum). Stone adzes in the Dominion Museum collections, registered as coming from the Waikanae region, were recorded and drawn. Published information referring to artifact finds, sites and traditional information, was assembled and summarised where necessary. (Especially does this apply to the work of Mr. G.I. Adkin in the Horowhenua area, since the Waikanae region dealt with in this report is a southern extension of the same prograding coastline.)

ASSESSMENT.

It is not the intention of this paper to present the results obtained by the midden sampling programme in the Waikane region. The first objective of the work was to devise procedures and techniques suitable to New Zealand circumstances and, more specifically to the Waikanae region. This is one of the few ways in which the field archaeologist can obtain good comparative information from an extremely common and widespread New Zealand field evidence, the midden.

The following aspects of the work require special attention and were shown to be of special importance in the Waikanae midden sampling project:
OBJECTIVES - it is essential that these should be fully defined and understood before work begins. Only in this way can the project be directed and purposeful.

They should not, of course, be so inflexible that unexpected avenues of enquiry which inevitably appear, must be ignored.

SELECTION OF SAMPLES - is undoubtedly the most important aspect of this type of work. It is essential to select only a small part of the total range of material while taking care to select a small part which is truly representative of the total range. The selection of samples takes place at two levels:

(1) the first selection is that of a representative range of middens for description and analysis. Every area selected for sampling and recording work will pose its own particular problems in this respect and the circumstances peculiar to each area should be fully taken into account. All possible variations of situation, immediate setting, preservation, and so on, should occur in the sample. Any tendency of the local conditions to impose an undesirable selection of sites through more extensive erosion exposing more middens in one particular area, must be overcome by deliberate collection of information from other area, where they are exposed less frequently. Where it is desired to record and collect from every midden in the survey area, this problem does not arise.

(2) the second selection is that of the surface collections and quantitative samples from each midden. Even the most thorough surface collection may not include all items present in the midden, especially where only a small part of the midden is exposed for collecting, but it must be made as representative of the full range of midden contents as possible. It is not sufficient just to collect one of each object in the midden. Any visible variations of a particular item should be collected in the sample and any peculiarities of appearance, texture, variation of content within the midden itself, and so on, should be noted in the records. Quantitative samples must be collected from an undisturbed section of the midden deposit. A minimum of 5 samples should be taken for each midden but wherever possible a greater number, up to 10, provides better and more reliable results in analysis. Each sample should contain about 2000gms (4-5 pounds) of material when collected. A strong plastic bag of constant size (a size of 16" by 5" was used in the Waikanae survey) facilitates the collection of the required weight of material.

PROCESSING THE SAMPLES - the techniques described above proved quite satisfactory in the Waikanae survey. There are, however, several points of special importance:

(1) considerable time can be saved by identifying surface collection material in the field, retaining only a very few items for checking or identification by specialists. Most field workers are capable of identifying shells and some bone, stone and more common objects. This does, of course, place a far greater responsiblity upon the recorder - it leaves no room for doubt or guesswork !

(2) surface collections should be processed first and a list of the entire range of items encountered can be compiled as well as a "type series", to assist in the identification of items in the quantitative samples.

(3) quantitative samples must be adequately dried before sieving or the weights will be affected by loss of moisture during sorting and weighing.

(4) the possibility of sorting the contents of each sieve depends largely upon the size range of the material retained. Objects retained by the $\frac{1}{2}$" mesh can be sorted and identified without much difficulty, the contents of the $\frac{1}{4}$" sieve can be sorted but with more difficulty while the

recorder will have to decide whether the information obtained from the partial sorting of the finely fragmented material in the 1/8" sieve is worth the time and effort which must be spent in the process. (In fact, the value of the 1/8" sieve is doubtful.)

(5) it is worthwhile weighing every individual pile of sorted material separately and recording every weight. This can provide added information apart from percentage composition.

(6) the analysis of much of the information can be made a great deal easier and quicker with the aid of a simple punch-card system.

RESULTS - some significant differences in midden composition may be comparatively small - others may be quite obvious. Only by the careful application of sampling methods, the collection of a sufficiently large number of samples and the careful processing of them, can any differences be regarded as potentially significant.

It is the midden which provides information in all categories of description and analysis which proves the most useful. Thes "ideal" midden is not as common as one would expect. The persistent occurence of a pattern or assemblage of factors (of situation, texture, proportions of shellfish species, etc.) is the most simple and immediate result to emerge in this type of analysis but the incomplete description or analysis does provide a certain amount of information.

The final analysis of all information may indicate cultural preferences for particular items of food from a known available range, preferences for certain situations for occupation (temporary or permanent), methods of food preparation and waste disposal, seasonal activities of food collection, and so on. In suitable areas it may be possible to construct cultural sequences with the help og geological or other evidence. Specially intensive studies can, of course, explore aspects of the relationship between man and his environment considerbaly beyond the more simple examples listed above.