



NEW ZEALAND  
ARCHAEOLOGICAL  
ASSOCIATION

**NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER**



This document is made available by The New Zealand Archaeological Association under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

To view a copy of this license, visit  
<http://creativecommons.org/licenses/by-nc-sa/4.0/>.

1973/74 ABSTRACTS FROM THESES AND RESEARCH ESSAYS AT  
THE UNIVERSITY OF AUCKLAND

R. C. Green  
Professor of Prehistory

Abstracts from seven theses and seven research essays completed at the Department of Anthropology, University of Auckland in the 1973/74 academic years are given below. This is in line with NZAA policy to encourage their publication in the *Newsletter*. The essays are held in the Department of Anthropology of the University of Auckland, where they may be consulted. Microfilm and xerox copies may be made available at cost on an individual basis, subject to the usual restrictions applying to theses, on the understanding that their use is for private research and not publication.

THESES ABSTRACTS

A discriminant analysis of Maori and non-Maori innominate bones  
by Roger Baker.

Anthropology Department, University of Auckland. Two-page abstract, 16 tables, 25 figures, 5 appendices. 1975.

A discriminant analysis was carried out on 47 Maori and 34 Indian innominate bones. Ten functional innominate components (landmarks) were defined and measured as co-ordinates in three dimensional space. Using these, 38 discriminators were derived: 14 lineal measures, eight angles and 18 indices. Acetabular width was also derived.

Eliminating size by setting all innominates to a constant innominate height facilitated comprehension of changes in shape and form by the plotting of the relative positions of the landmarks. The observed changes included: an increase in the substance of the chord joining a point on the iliac crest with one on the ischio-public ramus (thus reflecting a lateral bulging of the acetabular region); the inferior movement of the two superior iliac spines; a marked sigmoid curve of the iliac blade; and a twist of the inferior ramus - mainly from the ischium.

Although some of the changes can be related to the unique features of the Maori femur, others suggest changes in response to factors similar to those producing bowing of the long bones. These may be for accommodation of increased muscle bulk and to produce changes in the position of origin and insertion points of muscles which may increase or maintain efficiency.

By the application of a simple multivariate discriminant analysis (coined "the Fool's Statistic") discrimination of Maori and non-Maori innominates was achieved with greater than 90% accuracy. The significant racial factors highlighted by the Fool's Statistic are presumed to be those associated with large relative muscle bulk. Insignificant numbers of European, Negro and Bushman innominates were intruded into the study and supported the above contentions.

Conservation of artifacts in New Zealand by Dorothy C. Brown.

Anthropology Department, University of Auckland. Three-page abstract, 15 plates, 3 figures, 4 appendices. 1973.

The conservation of antiquities includes the processes of routine examination, diagnosis, treatment, and specialist consultation which must be carried out to ensure the safe keeping of artifacts for research and study in prehistory. The attitudes towards artifact conservation which these processes imply are not to be found in New Zealand situation. Rather, positive attitudes towards the conservation of artifacts in New Zealand are little developed and the practices of conservation largely an illusion.

The reasons for this situation are many, ranging from the lack of interest or negligible practical knowledge and experience on the part of the archaeologist, to inadequate working conditions and poor financial allocations to museums and universities.

This is in marked contrast to attitudes abroad, where various countries, namely those of Scandinavia and Britain, require students in archaeology to have some practical experience in the subject of conservation, generally through a course of study lasting up to a year, incorporated into the degree or diploma structure. This ensures a basic background in the subject, and even if the interest of the student falters, it can be assumed that the knowledge is still there to be recalled at need.

Inadequate financial allocations and poor working conditions are a worldwide problem, but in many areas, particularly those countries classified as 'developing', UNESCO grants and practical assistance have established museums and laboratories for the conservation and protection of cultural property. Laboratories in museums and universities in Britain, Europe and the United States of America, for example, have been privately funded, or given government aid to encourage research in conservation - the British Museum Laboratories being a major case in point. Even in such institutions there is a constant effort to increase funding so as to expand conservation research facilities and programmes, and to broaden knowledge and interest in its diverse aspects and problems.

The divergence in attitudes towards conservation in New Zealand and abroad led to this study. The first step was to examine the local New Zealand situation in the conservation of artifacts and then to compare the findings with the state of conservation abroad. Included in this step were laboratory conditions, training of staff, and general methods of treatment with concentration on specific types of material, i.e., wood, bone and pottery. From this it was hoped that the shortcomings of New Zealand conservation would be highlighted. Using overseas experience, possible solutions for the future are then put forward.

From the evidence assembled, a case is established for inadequate conservation practices in New Zealand. It is also shown that until recently there has been little real interest in the conservation of archaeological artifacts in New Zealand, except as an emergency measure to save fragile articles from final destruction. Next it is shown that local conservation methods, when used, are similar to those overseas, but with adaptation to the local conditions. Finally, it is predicted that the future of conservation of archaeological artifacts in New Zealand is more assured now than at any previous time, because archaeologists, museum and laboratory workers are becoming more aware of the importance of the conservation of artifacts, not only for present work but also for long-term studies in the future. Thus they are putting forward constructive ideas to improve the situation as it stands at present.

Prehistoric coprolites: A study of dog and human coprolites from prehistoric archaeological sites in the North Island of New Zealand

by Denis R. Byrne.

Anthropology Department, University of Auckland. One-page abstract, 15 tables, 3 figures, 8 plates. 1973.

Faecal material from dogs was obtained from Mt Camel, the Sunde site on Motutapu Island, Hot Water Beach and Foxton. All are coastal North Island sites. Human faecal material came from the inland cave site, Whakamoenga.

Food remains in dog coprolites are found to consist exclusively of bone material from fish and bird with a preponderance of the former. The bone material is extremely fragmentary. Most fish bone is tentatively identified as snapper.

The analysis demonstrates the primary importance of fish in the diet of the Maori dog at coastal locations. Quantification of the fish bone suggests a surprisingly large proportion of the human food net is consumed by dogs.

Human coprolites were found to contain mainly plant material. Bracken fern rhizome (*Pteridium esculentum*) was identified in coprolites from the early levels of Whakamoenga Cave.

The method of analysis and presentation is hoped to facilitate comparison between the coprolites studied and those from other sites.

Human ecology and prehistoric settlement on some offshore islands (East Cape to Cape Reinga), New Zealand by Stephen C. Edson.

Anthropology Department, University of Auckland. Three-page abstract, 11 tables, 10 figures, 6 appendices. 1973.

Of some 200 islands situated off the east coast of the North Island, virtually all preserve substantial evidence for their intermittent occupation by the Maori since remote prehistoric times. With few exceptions, they remain poorly documented. However, it is suggested that their significance for New Zealand prehistory can be determined by other than conventional archaeological techniques.

This study, confined to a sample of nine true offshore islands or island groups, between East Cape and Cape Reinga, explores some aspects of prehistoric behaviour which have proved difficult to recover on the mainland.

The unique conditions obtaining on these islands are ideally suited to a human ecological approach. Characterised by their physiographic heterogeneity and micro-environmental diversity, they may be seen to represent loci in a graduated spectrum of possibilities for prehistoric settlement. Each island offers a unique combination of those resources known to comprise the subsistence basis of the prehistoric Maori economy. Depending on the availability and abundance of specific resources, and the size of each island's population, potential for an occupation of at least one year's duration, ranges from low to high throughout the sample studied.

A range of culturally-determined responses are preserved in the changing configuration of site type, distribution and density on these islands. Such changes are demonstrable and predictable. Like configurations are consistently found to recur between islands with a similar potential for human ecology, and unlike configurations between those with a different potential.

In exploring those thresholds for human carrying-capacity, below and above which significant changes in such configurations repeatedly occur, an attempt is made to delineate the minimum prerequisite conditions for viable settlement on the offshore islands.

Utilising data from field archaeology, ethnography, ethnology and the natural sciences, each island or group is treated as a small ecosystem, but from an autecological point of view. A consistent procedure is followed. Each island's prehistoric environment is inferred, and major resources of ethnographically-documented value are located and evaluated. Each island's potential for human ecology - the major criterion for which is settlement of some duration - is estimated on a relative scale, and predictions are made as to the anticipated settlement pattern. Such broad predictions are tested against the actual field evidence at hand, and tentative conclusions are drawn from the resulting convergence or divergence. Finally, analogues are sought in the protohistoric and historic periods of occupation.

It is found that actual settlement patterns do not entirely coincide with the anticipated patterns. The minimal prerequisite conditions for viable settlement have been underestimated, and some of the student's assumptions regarding the prehistoric Maori as a cultivator found to be prejudicial. According to their potential, all the islands studied have been consistently and extensively exploited; however, the major operative factor in determining choice of location for settlement, and duration or intensity of occupation, is

each island's potential for horticulture. Above all else, it is this potential - greatly enhanced by a longer growing season with fewer attendant risks - which has enabled the success or, conversely, determined the failure of sustained prehistoric settlement on the offshore islands.

A preliminary report on the prehistory of the North Kaipara Head, New Zealand, by Ian K. Harnett

Anthropology Department, University of Auckland. Two-page abstract, 3 tables, 20 figures, 3 appendices. 1972.

This is basically a study of the location and distribution of archaeological sites on the North Head of the Kaipara Harbour. An attempt is made to interpret this distribution by reconstructing the prehistoric environment and availability of resources in some detail. However, only limited conclusions could be drawn from this distribution study, for a number of reasons: (a) it was impossible to date the majority of sites; (b) the narrowness of the area meant that virtually any site location was as good as any other for exploiting ocean, land and harbour resources; (c) the field survey (partly by Harnett himself and partly by Mr Peters' separate project) was biased towards the recording of pa sites, so that other sites, in particular middens, were under-represented.

The study of the resources available is extensive and provides a most useful source of information for archaeologists; in particular, the section on sea-mammals is very full. Another major contribution is the discussion of the role of prehistoric man in upsetting the stability of the sand dunes. Finally, the numerous maps of site distributions will be of permanent value.

A number of other issues are considered; the field data were considered to be consistent with the hypothesis that terraced pa are earlier than ring-ditch pa; it is suggested that a distinction between ditch-and-bank and ring-ditch pa is difficult to maintain; a number of 'citadel' pa are identified, being central points of clusters of smaller pa; lastly, the possible importance of canoe transport is stressed, particularly in interpreting the accessibility of resources for inhabitants of pa above present-day swamps which may have had navigable channels in the past.

This thesis demonstrates the difficulties of attempting to extract "prehistory" from site distribution alone. Nevertheless, a very wide range of current issues, problems and possible approaches are discussed, and this range of curiosity balances the demonstrated impossibility of achieving any neat synthesis or clear-cut conclusion on the basis of the data available.

The prehistoric polity in New Zealand by John M. J. Mihaljevic

Anthropology Department, University of Auckland. Three-page abstract, 1 table, 13 figures, 2 appendices. 1973.

The basic object of this thesis is to determine the nature of the sociopolitical situation in prehistoric New Zealand. This involves defining the unit of sociopolitical behaviour - the polity. The polity is defined as "a group of people whose members interact more with each other than with outsiders". Such a polity is spatially distinct - territorial - and so produces a distinctive settlement pattern, depending on its precise nature. In the case of the prehistoric polity, the discovery of this settlement pattern by the archaeologist enables the nature of the causative polity to be deduced. In the New Zealand situation, there is as yet insufficient suitable archaeological data to enable this procedure to be followed. Instead, this thesis is a study not so much of what there is as of what there should be: it suggests first what the prehistoric polity may have been like, then what sort of settlement pattern it would have produced. This settlement pattern, and other material consequences of prehistoric sociopolitical behaviour, are then offered as means of testing the Model by archaeology.

The Model of the prehistoric polity in New Zealand developed here is based on the assumption that the sociopolitical behaviour of Man in general and of the Maori in particular is determined by factors internal to Man. Therefore, any form of explanation involving environmental determinism or diffusion is rejected in favour of a concept of Demographic Determinism. This sees culture in general and sociopolitical behaviour in particular as the consequence of the number of individuals involved.

The form of the polity is seen as a combination of the consequences of the hexagonal packing of territories and of communication overload, which determine the shape and size, respectively, of the polity-settlement pattern. This leads to regularities in the sizes of polities, while a refinement of the concept of the communication overload leads to the concept of a hierarchy of polities.

The quantitative structure of this polity hierarchy is postulated from a combination of the geometry of the hexagon and of relevant ethnological data. Two versions of this Socio-territorial Hierarchy Model are possible, based on the contrasting views as to the size of the Australian Aboriginal tribe offered by Birdsell and Hamilton. A number of behavioural predictions is also made from the Model.

This Model is then tested against known ethnographic data, first excluding, then concentrating on, New Zealand. As far as the data allows, the Model is valid, especially in New Zealand. The Hamilton version of the Model seems more appropriate than the Birdsell version.

This Model is "static" in that it ignores time. A "dynamic" model involving time is therefore developed. This expands the concept of Demographic Determinism to see population change as the cause of cultural change. To this end, the prehistoric population curve is reconstructed and used to derive a sequence of demographic periods.

These two models are then combined, to derive a prehistoric sequence leading up to the establishment of the full Socio-territorial Hierarchy Model. Also postulated are a population dispersion model, the settlement pattern, a functional definition of the pa (which sees it as a temple), the role of status, and the manner of covariance between polity and culture.

Finally, the likely archaeologically-testable material effects of these are suggested and, where possible, used to test the models. Lack of suitable data prevents this chapter from being fuller.

#### The identification of wood-charcoal from archaeological sites

by Paul R. Smith

Anthropology Department, University of Auckland. Three-page abstract, 23 figures, 2 tables, 4 appendices. 1973.

Considering the large quantities of charcoal, and less frequently preserved wood, excavated from archaeological sites, research towards the identification of this material was initiated. A Flora of the Waikato was constructed from contemporary species lists, with the additional sources of historical records and pollen analysis being consulted. Seventy-one genera of the Dicotyledons, and four genera of the Coniferae, were present.

While New Zealand Conifers have been well detailed anatomically, the principal problem was that data covering the wood anatomy of New Zealand woody Dicotyledons were extremely sparse, and information derived from the authorities consulted would not permit the accurate identification of species present in the Waikato at the period of Maori exploitation. It was therefore necessary to determine the anatomical characters of these genera, and to establish an artificial key of defined characteristics before any identification could be initiated. This involved the study of 58 genera, the diagnostic features necessary for this study being produced in the appendices (Appendix IV) to this thesis.

In order to develop a general methodology for examining charcoal and to apply the collected anatomical data to excavated materials, charcoal from a site at Aotea Harbour was examined. While the methods employed were found to be adequate in identification, specialized techniques for sectioning charcoal were investigated. This process will reveal anatomical features that may not be readily observed using

incident light equipment, but its value lies chiefly in the construction of a reference collection, and in permitting photomicrography of a high standard.

The examination of Aotea Harbour material is intended only as a preliminary investigation, and no conclusions regarding ecology or Maori exploitation of the Flora can be determined from this study. Only brief notes on the plants identified are included.

#### RESEARCH ESSAY ABSTRACTS

##### Adzes, rocks and men by Simon B. Best. 1975.

This work examines the relationship between a man and his adze in prehistoric New Zealand; what he made it from and why, and what he used it for and why. Early and late adzes from prehistoric sites in New Zealand are compared, and attempts made to explain the differences. In particular, adzes of Tahanga basalt from the early period and later adzes of Northland gabbro are examined in detail. It is concluded that early adzes were predominantly canoe-building tools, and that late adzes were associated with a change in economy, from maritime to agricultural.

##### Eels in New Zealand prehistory by Glennis D. Boyle. 1974

The aim of this research is to shed some light on the ecology, distribution, life history and productivity of New Zealand freshwater eels as they affect the archaeologist studying the prehistoric Maori man-land, man-fish relationships. The underlying hypothesis is that the two species of Anguillidae were an important food item in New Zealand prehistory.

There is an introductory section discussing the types of data on eels required by the archaeologist and the problems inherent in obtaining them. Chapter 1 attempts to synthesise available zoological information including descriptions of the two species, their distribution, distinguishing characteristics, ecology, seasonality, diseases, growth rates and nutritional values.

Up until the time of writing, the recovery in New Zealand of eel remains in an archaeological context has been restricted to two sites. The problems associated with recovery are discussed and practical

research on bone, scales and otoliths described and the results analysed. A short section on the identification of marine eels is included.

Because of the detailed and varied information in later ethnographies, the section on ethnographic records is limited to a discussion of ethnotaxonomy and its implications, capture methods, storage alive and preservation techniques said to have been employed in prehistory.

Chapter 4 contains a brief discussion of modern commercial eel fishing and the research associated with its recent boom. The severe lack of information on modern Maori subsistence eel fishing prompts a section outlining a possible ethnoarchaeological programme, the aims and desired results of such a project.

The concluding section discusses the availability of eels as a food source, their great variation in type, space and time and the explanations available to the archaeologist interpreting excavated eel remains.

Carrying capacities, settlement and subsistence strategies in prehistoric Makaha, Kohana, and Halaua Valleys, Hawaii

by Rodney E. Clough. 1974.

This essay is concerned with the prehistoric carrying capacities, settlement and subsistence strategies of three Hawaiian valleys, including a consideration of data from other areas. It relies heavily on soil maps for its basic environmental data, using archaeological and historical information as controls.

The study suggests that there is not the necessity for too fine a differentiation between soil types, because of the wide adaptive range of many native crops, and indicates the importance of stones, soils and water in the prehistoric environment. It aims to demonstrate the value of a zonal approach in outlining variables in settlement and subsistence strategies.

The effects of the introduction of firearms on Maori warfare in the nineteenth century by Bruce G. Deverell. 1973.

Firearms began arriving in New Zealand from 1790 onwards and were used by the Maori in increasing quantities. The immediate consequence of this was to bestow a distinct military advantage on the Ngapuhi tribe,

the first to use firearms in warfare. As a result of frequent Ngapuhi raids on areas further to the South, other tribes endeavoured to obtain their own muskets by engaging in trade with the Europeans.

There is considerable evidence which indicates not only that warfare increased in the early nineteenth century but also that casualties were probably greater than in pre-musket times. However, by the 1830s when most tribes in the North Island had acquired muskets, it is likely that the numbers of people killed in battles declined.

The introduction of firearms also resulted in the abandonment or modification of many prehistoric pa and in the construction of numerous new fortifications especially adapted to the contingencies of firearm warfare.

Certain new factors which partially determined the location of fortifications became operative after the advent of guns. It became desirable for pa sites to be relatively close to a source of supply for weapons and ammunition. It was apparent that pa needed to be situated so that they could not be overlooked by higher ground from where an enemy could fire down into the fortifications.

Some traditional defensive devices of pa were modified after the introduction of firearms. Ditches which generally became shallower and which were now used as rifle pits were frequently situated inside rather than outside palisade fences in proto-historic pa. Banks became lower to enable the defenders to fire over the top, and they no longer functioned as a platform on which to stand and fight. There is some evidence which indicates that palisades may have become more massive. Fighting stages and terrace defences generally did not appear adaptable to firearm warfare and were not commonly used in the early nineteenth century. On the other hand, some entirely new features were incorporated in fortifications as a result of the introduction of firearms. These were flanking angles, bastions, banquettes and loopholes.

The various modifications to pa during the first half of the nineteenth century may help the archaeologist to distinguish between prehistoric and protohistoric sites in New Zealand.

Raised storage structures in New Zealand prehistory

by M. Anieke (Ann) X. Geelen de Kabath. 1974.

This essay is concerned with raised storage structures in the prehistoric settlement pattern in New Zealand. For many years archaeologists have been interested in the storage structures of the prehistoric inhabitants of New Zealand, but they have concentrated on the semi-subterranean pit stores found on many hilltops throughout the country. I would like to make out a case for the antiquity of the raised storage structure.

In New Zealand, raised storage structures fall into three structural categories. Firstly, there are open platform stores built on the top of posts or in trees. Secondly, are the miniature raised storehouses, raised on one or two posts about six feet high, and, thirdly, the large raised storehouses supported by four posts, three or four feet off the ground.

As there is currently little definite evidence of prehistoric raised storage structures in New Zealand, one has to begin by assembling a case for their antiquity in New Zealand. This is done by looking at Polynesian raised storage structures in order to establish that their presence in New Zealand's prehistoric settlement pattern is likely. Throughout Polynesia, the terms fata or pafata refer to open and enclosed raised storage structures respectively. They have a variety of other functions including their use as food stores, storehouses for other items, and their use as graves. Raised storage structures are, therefore, a part of the Polynesian settlement pattern.

In the eighteenth and nineteenth century New Zealand, open and enclosed raised storage structures were also part of the Maori settlement pattern. They were referred to as whata or pataka. Their recorded uses exactly parallel those noted for the rest of Polynesia. This suggests a continuity in the use of raised storage structures by the Polynesian settlers in New Zealand from the time of their arrival here. One deduction from this line of argument is that evidence for such structures should be present in prehistoric sites in New Zealand. This necessitates another look at both the ethnohistoric and the archaeological record, firstly to predict the likely form of the archaeological evidence and secondly to identify such structures overlooked by previous investigators. At present only one piece of a raised storehouse carving has been found and two raised storage structures identified by excavators. Using the pictorial record of the nineteenth century, together with measurements from storehouses

held in museums, it is possible to suggest locations for raised storage structures in the prehistoric Maori settlement pattern and to use this information to interpret patterns of postholes in a number of other prehistoric sites as belonging to each of the categories of raised storage structures known from the ethnographic record.

On this basis, it is concluded that raised storage structures of all three types were a part of the Maori settlement pattern in New Zealand, most likely from the beginning and certainly from the later end of the prehistoric sequence. This conclusion may be contrasted with views which assign the development of the pataka raised storehouse, for example, to the protohistoric period.

Human aggression and warfare by Jennifer McLelland. 1973.

Man's aggressive behaviour has been a source of great concern to him. Recent popular works have closely linked man's behaviour with that of animals, in fact reducing it to the level of instinctual drives. This viewpoint (the 'unconditional') is contrasted with a 'conditional' view of behaviour, which says behaviour is a response to certain social and environmental stimuli.

It is difficult to define such a loose term as 'aggression' for it encompasses a number of interpersonal behaviours, and not just individual acts. Aggression is intraspecific, and must involve intent to injure.

Studies in the past on animals in captivity have portrayed a spurious picture of intraspecific behaviour. Recent studies of monkeys and apes in the wild have changed this and revealed that there is little physical aggression amongst these animals.

Human-animal analogy is of limited and doubtful value in studies of human behaviour for it can only suggest hypotheses to test. Theories based on analogy are often illogical as well as inadequate.

Physiological studies show that certain areas of the brains are stimulated (externally and/or internally) to produce aggressive behaviour.

History reveals the extent and severity of man's aggression, and shows that certain conditions (famine and poverty for example) are more conducive to aggressive behaviour than others.

Psychological thought centres round two schools. Freud saw aggression as part of a necessary release of innate destructive energy. The Frustration-Aggression Hypothesis was also found to be inadequate; there is no one-to-one relationship between frustration and aggression. Also it is not a very useful or valid model to use.

Social learning theory is of greater value in explaining aggressive behaviour, for learning occurs at all ages and at all levels. Culture is an important transmitter and determiner of social norms.

Studies of four different cultures revealed how aggressive behaviour, at both the individual and group levels, was affected by different cultural norms and attitudes.

Intergroup conflict (involving warfare) was considered separately, as behaviour models from interpersonal studies are largely incompatible with group level studies.

War has been seen as due to the action of individual leaders, and to mass reactions. A more realistic view encompasses both of these aspects. Some consider that war fulfils a basic human need; others, including myself, see it as only one of several possible responses to a given problem. Killing is usually a means to an end. This end may be territory, prestige, economic gain, etc.

There is some evidence that war has adaptive value in terms of cultural-ecology. In terms of genetic selection, war would seem generally to have little effect.

A solution to war is seen in birth control; however, there is evidence that cultural and biological checks act in times of stress to limit population growth.

If we accept the unconditional view of human aggressive behaviour, then we do need substitutes for war if we wish to rid ourselves of it. Otherwise the answer seems to lie in the transmission (through culture and learning) of more positive aspects of human behaviour, such as co-operation and altruism.

Experiments with obsidian: functional and typological implications  
by Michael J. Morwood. 1974.

The topic of this essay arises from a concern with the logic of archaeological theory. A relative, rather than an absolute assessment of the scientific value of a theory is argued for, as this is consistent

with both contemporary scientific processes, and the mechanics of scientific change. If theoretical status is a relative concept, then there is a need in archaeology, which has traditionally stressed a monocausal approach to explanation, for alternative approaches to particular problems.

In New Zealand, formal typologies of flaked tools have not been successful, because of the morphologically undifferentiated nature of most flaked tool assemblages. Concentration on the functional attributes of such assemblages overcomes this difficulty, and has been undertaken, both as an alternative to technological studies, and because studies of stylistic or technological features assume functional control.

For this analysis of obsidian tools, experiments were conducted to establish parameters of functional significance, and then functional ranges for different tasks were defined in terms of these parameters. The results were then applied to four assemblages from the Auckland area. The functional distribution of obsidian at each site was then related to environmental resources and other archaeological evidence of site activities, and site and inter-site implications discussed.