

I BACKGROUND TO RESEARCH

Introduction

This report presents results of research into traditional Tahltan subsistence practices. It represents an attempt to apply a relatively new approach, ethnoarchaeology, to British Columbia archaeology in order to understand the nature of past cultural adaptation in a northern sub-arctic environment.

The goals of the present research are based on the premise that an understanding of the dynamics of prehistoric subsistence behavior and site formation processes is crucial for full interpretation of archaeological remains of an area. Thus, the major goal of this research was to establish a model of traditional subsistence patterns of the Tahltan Indians useful for interpretation of archaeological sites in the Upper Stikine River area of northern British Columbia.

A second goal has been to provide more general theoretic contributions to the study of hunter-gatherer societies. Using an ethnoarchaeological approach to the study of subsistence patterns, this research has gathered data which provide a basis for the formulation of testable hypotheses concerning processes of subsistence specific site formation and transformation.

The rapid increase in development of natural resources in the northern part of the province has stimulated an increased need for archaeological research in more remote areas of British Columbia. The B.C. Hydro and Power Authority are currently conducting feasibility studies for the damming of several major rivers in the province, including the Stikine and Liard rivers in the far north. The expansion of mining and logging operations and the development of hydroelectric power also require the extension of highways, railways, and transmission line corridors, as well as the sale of large tracts of land for private and commercial development.

Rapid increase in resource development is

accompanied by changes not only in the physical landscape but also in the social environment of groups living in these areas. This means that opportunities for ethnographic recording of traditional aspects of native culture are quickly being eroded away. This situation is not restricted to British Columbia and has been recognised by the National Museum of Man through the implementation of an Urgent Ethnology Program for research in many parts of Canada. Two research contracts have been granted for work in the Stikine area of British Columbia; one to Robert Adlam, of the University of Toronto, for a study of Tahltan kinship systems, the second to Howard Higgins, of the University of New Mexico, who is concerned with symbolic aspects of Tahltan use of space.

Most of the Stikine River area is still relatively isolated in comparison with other parts of British Columbia. However, a number of development projects have been proposed for the area. Plans for leasing a large tract of Crown Land along the Stikine River on either side of Telegraph Creek instigated an archaeological site survey and inventory project by the B.C. Heritage Conservation Branch during the summer of 1978. This survey project recorded 132 new sites along the Stikine and lower Tahltan Rivers (French 1980).

Previous interest in the prehistory of the Stikine River area was first stimulated by the discovery of archaeological remains in the vicinity of Telegraph Creek by W. Workman during a brief visit in 1967. Bryan C. Gordan carried out preliminary survey of the road between Telegraph Creek and the Tahltan River in 1968, recording several sites. J. Smith, of the University of Calgary, returned to the area in 1969 and 1970 at which time he conducted test excavations of several sites in the vicinity of the confluence of the Tahltan River with the Stikine. On the basis of obsidian

hydration values, Smith defined five phases in a somewhat questionable chronological sequence of occupation extending from the historic period back more than 10,000 years. The latest "Tahltan" phase has been directly related to occupation of the area by Athabaskan speaking Tahltans for at least the last 500 years (Smith 1970, 1971).

More recently, Fladmark and Nelson (1977) conducted a brief reconnaissance in the southwestern portion of Mt. Edziza Provincial Park to assess the archaeological potential of this previously unknown area. A large number of quarry sites as well as associated workshops and camp sites were found in several localities adjacent to extensive obsidian sources in the Raspberry Pass area. Subsequent investigation of these sites (Fladmark 1982) indicates occupation and use of the area during the past 5,000 years.

X-ray fluorescence analysis of obsidian artifacts (Nelson *et al.* 1975) suggests that extensive trade networks were established throughout northern British Columbia by aboriginal peoples in early prehistoric times. Artifacts made of obsidian from Mt. Edziza sources have been identified in archaeological sites as far away as the Yukon, northern Alberta, central B.C., and southeast Alaska, and from components as old as 9,000 to 10,000 years (Fladmark 1982).

Archaeological investigations have also been conducted in the middle Stikine River area in response to B.C. Hydro's proposed generation dams on the Stikine (Apland

1980, Friesen 1982, Magne 1982).

Many native people in British Columbia still maintain strong ties to their aboriginal land through continued involvement in traditional subsistence activities. In some areas traditional economic pursuits are still carried out even in the face of rapidly encroaching industrial development, as poignantly described by Brody (1981) in his recent study with the Beaver Indians. Many older native people have a wealth of knowledge concerning traditional activities which they are often willing to share with the archaeologist who has a genuine interest and who is willing to spend time actively participating in them.

The present author's introduction to the Stikine River area was during the summer of 1978 as part of the crew carrying out archaeological survey and inventory under K. Fladmark. It was during this time that I had the opportunity to observe and participate in summer salmon fishing activities with several Tahltan people. Although it was suggested that a more narrowly focused study would have been suitable for research, it was the encouragement of Tahltan people to learn more about their traditional subsistence activities that led to the research on which this report is based. This study is therefore a reflection of my extended involvement with the Tahltan people in the Stikine area. It is written as much for them, and others who live in or are interested in the Stikine area, as for students of aboriginal peoples and cultures.

Theoretical Framework

The conceptual framework underlying the focus of this study of subsistence patterns is founded in the approach of cultural ecology. The tendency to adopt an ecological perspective in anthropological analysis began to gather momentum in the late 1950's and early 1960's (Netting 1977:6). Steward (1955:30), who first defined the concept of cultural ecology, felt that a new approach was needed to

supplement the usual historic approach in anthropology in order to explore the creative processes involved in the adaptation of culture to environment. Using a holistic view of culture in which all aspects of culture are functionally interdependent on one another, Steward (1955:37) also developed the concept of culture core--the constellation of cultural features which are most closely related to subsistence activities

and economic arrangements.

In presenting a method for cultural ecological research Steward accords three research priorities: 1) the analysis of interrelationships of the exploitative or productive technology and the environment; 2) the analysis of behavior patterns in the exploitation of a particular area by means of a particular technology; and 3) to ascertain the extent to which behavior patterns entailed in exploiting the environment affect other aspects of culture (Steward 1955:40-41).

Following in the footsteps of cultural anthropology, archaeology slowly adopted ecological approaches in the study of prehistoric societies, accompanied by changing concepts of culture, and expanding goals for archaeological research. A theoretical debate which developed in the mid 1960's in American archaeology resulted in a split between the 'normative' approach of cultural historians and approaches used by members of the process school. A basic assumption of the process school, derived from the ecological approach in anthropology, is that culture is adaptive and systemic (Binford 1962, 1964, 1965, Flannery 1967). Process archaeologists have adopted White's definition of culture as man's extrasomatic means of adaptation which serves to fulfill his needs (White 1959:8).

Influenced by a developing body of general systems theory and ecological approaches in the biological sciences, White viewed cultures or sociocultural systems as living, open systems involved in harnessing free energy for maintenance and self extension. White was concerned with following the flow of energy through the cultural system as a process of energy transformation which conforms to the first and second principles of thermodynamics (White 1959:38, Odum 1975:60). Energy flow models are useful for analyzing how various forms of energy in terms of resources available within the physical environment are procured, transformed and finally discarded by the cultural system to form part of the archaeological record (Schiffer 1972, 1976).

A system is defined as "a set of objects

together with the relationships between the objects and between their attributes" (Hall and Fagan 1956:18). A system can be biological, physical, or cultural and can be divided into subsystems. General systems theory is useful at the theoretical level of model building in order to study all possible relationships between component parts of a system which are abstracted from a concrete situation or body of empirical knowledge (Boulding 1956:11). A model is a theoretical construct which represents our understanding of the system under investigation. It is not static as long as research on the problem is in progress. As new data are acquired and our understanding of the system changes so do the models we use. Model building is thus important for the formulation and testing of hypotheses concerning relationships between component parts of the system.

Within an ecological framework, subsistence behavior is viewed as a subsystem of the larger cultural system which most closely links human groups to their environment. Each environmental zone consists of a set of potentially exploitable resources which presents particular problems for human utilization. Subsistence behavior reflects the nature of the cultural adaptation of a group to environmental variation in order to fulfill its basic needs of food, shelter, and clothing. Being complex adaptive systems, sociocultural groups are involved in processing, storing, and retrieving environmental information in order to make decisions concerning the scheduling of activities (Buckley 1968:490-91).

According to cultural materialists, the study of subsistence activities is of primary importance in understanding the way cultures function and for the reconstruction of other aspects of culture (Harris 1968, 1971, 1974, 1977, 1979, White 1959). Subsistence activities have a direct and demonstrable influence on other cultural subsystems and variables such as settlement patterns, level of technology, social and political organization, degree of sedentism, as well as on archaeological factors such as intensity of refuse discarded at sites of occupation.

Since subsistence activities can be more readily reconstructed and interpreted from remains which are visible and identifiable in the archaeological record, subsistence studies have predominated the field of ecological archaeology over the past few years. A growing body of recent studies on hunter-gatherers has focused on the need to develop general models of economic behavior which have predictive value in interpreting adaptive responses to specific situations.

In a survey of some of the recently proposed general models of hunter-gatherer behavior, many of which draw upon theories or principals used in other disciplines, Bettinger (1981) groups these into four types according to their specific focus and predictive value. Among the models of environment, subsistence, settlement location, and population, models of subsistence are seen as having the greatest potential for developing general explanatory approaches to problems of adaptive responses among hunter-gatherers. While subsistence studies must include a consideration of environmental variables, prior knowledge of subsistence adaptation is required in formulating models of settlement location and population.

Several recently developed models of hunter-gatherer subsistence examine the extent to which adaptive subsistence strategies depend on maximization of energy acquisition and minimization of risk. These models use mathematical techniques for weighing relative costs and benefits of different economic choices in an attempt to predict optimal strategies for a given environment.

Among these recent models, Jochim (1976) uses a decision making approach in order to develop a predictive model of proportional resource use. Assuming that different resources are exploited according to their ability to satisfy basic subsistence goals, this model evaluates seasonal variation in animal characteristics, including weight, non-food yield, aggregation size, density, and mobility.

Optimal foraging theory, developed in the field of evolutionary ecology, has recently been applied to the study of hunter-gatherers and the development of a

variety of predictive models of subsistence behavior, focusing on such problems as optimal diet, optimal group size, and optimal levels of information exchange. Optimal diet models (Hawkes *et al.* 1982, Perlman 1980, Winterhalder 1981) attempt to predict the range of items exploited based on relative abundance and net caloric yield of different resources in relation to costs of procuring and processing them.

Earle (1980) combines a decision making approach with optimal foraging concepts to develop a model in which the costs of individual procurement strategies are weighted against their potential yields in order to predict an optimal foraging strategy mix.

The recent application of linear programming techniques to optimal foraging models (Keene 1979, Reidhead 1979, 1980) allows for a more complex analysis of a wider range variables and resource attributes in order to predict the most efficient solution to a given economic problem.

Bettinger (1981: 231-241) has reviewed some of the critical assumptions and conditions that must be dealt with if the predictions of recently proposed models are to be valid: 1) The models require that all potential resources be listed and their costs and payoffs specified. It must also be assumed that aboriginal groups had full knowledge of these resources so that the subsistence system is the result of economic decision; 2) It must be assumed that the environment and its resources are stable so that the yield of individual resources can be described by a mean or range of values, and that exploitation of a resource does not affect these values; 3) Holding technology constant, it must be assumed that decisions regarding the range and intensity of resources to be exploited are made with reference to the local group (minimum band), and that no larger regional system is being involved; 4) It is usually assumed that for a given environment, and a given technology, there is only one optimal adaptive solution and that the adaptive process is sufficiently constraining that local groups will closely approximate this optimal solution.

Application and testing of these

predictive models in specific ethnographic and archaeological situations have met with limited success to date, largely due to rigid data requirements and some unrealistic theoretical assumptions on which the models are based (Bettinger 1981, Durham 1981). These studies suggest that reliability rather than efficiency may be a major factor influencing economic decisions made by hunter-gatherers. For these reasons I have not attempted to use one of these recent mathematical models in the present study to describe Tahltan subsistence behavior. However, this research gathers a data base which could be used in formulating mathematical models for testing with archaeological data at a more detailed level of analysis in the future.

Taking a general systems approach to reconstructing subsistence patterns, the present research investigates the relationships between environmental variables, resource attributes, technology of exploitation, and details of subsistence activities derived from ethnographic data. This study examines the extent to which seasonal and long term fluctuations in resource abundance and availability influence the subsistence strategies employed by Tahltan people in adapting to a northern environment. A seasonal model of subsistence patterns is reconstructed as a basis for predicting the types of archaeological sites, their location, and kinds of remains which might be found in the Stikine River area.

Methodology

In order to reconstruct traditional subsistence patterns in the form of a model useful for the interpretation of archaeological sites in the Tahltan area, the present research has gathered data from a wide range of sources, using a variety of methods. Theoretical considerations, based on a review of other studies of hunter-gatherer groups and their adaptation, have been used to direct investigations and postulate hypotheses concerning subsistence behavior and site formation processes.

With a cultural ecological approach to the study of subsistence patterns, environmental factors such as geomorphology, topography, climate, vegetation, and fauna are essential variables in the model. Much of the data on these aspects is obtained from Federal and Provincial Government agencies including Departments of Agriculture, Environment, Fish and Wildlife, Forestry, and the Geological Survey of Canada.

Library study of historic accounts of early exploration and culture contact in the Stikine area has been carried out in order to establish historical continuity of the Tahltan people in the study area and to determine the degree of influence of culture contact on traditional subsistence practices.

Early ethnographic literature on the Tahltan was consulted for information recorded on technology and subsistence activities as practiced during the early historic and protohistoric period. Extensive use has been made of Teit's unpublished notes which provide a wealth of information concerning traditional aspects of Tahltan culture. While the ethnographic data available covers a wide range of topics, this study only summarizes those aspects which are related to subsistence behavior.

Since most ethnographies generally lack the kinds of specific data useful to the archaeologist in reconstructing past lifeways, an ethnoarchaeological approach has also been used. Considerable time was spent in active participant observation and recording of subsistence activities which are still being carried out in a traditional manner. In cooperation with the band councils, a summer program was implemented which involved local Tahltan young people in interviewing knowledgeable elders in the communities about a variety of aspects of traditional lifestyle. Field work also involved survey and mapping of fishing camps and other sites in the area.

Recent emphasis in archaeology on explanation and reconstruction of cultural

institutions and cultural processes has brought with it a new realization of the need for data concerning the relationship between a group's adaptive behaviour, the tools that are used, their social organization, and other aspects of culture. According to Stanislawski (1974:18), to understand cultural processes and the structure and function of prehistoric societies, information is best derived from a study of living societies as well as the archaeological record. He defines ethnoarchaeology as the study from an archaeological point of view of the form, manufacture, distribution, meaning, and use of material culture in its institutional setting among non-industrial societies for the purpose of constructing better explanatory models to aid archaeological interpretation and inference.

Thus, ethnographic analogy refers to a general theoretical framework for comparing ethnographic and archaeological patterning. Archaeologists have made use of ethnographic analogy long before the ethnoarchaeological approach received formal recognition (Chang 1967). There are several levels at which ethnographic analogy can be useful in archaeological research. At the most general level, discontinuous models are based on general analogy between areas widely separated in time and space but in which the ecology, resources, and technology used are similar. Although this level of analogy has the widest application, it must be used with caution since it is the most susceptible to misuse and poor application. The most specific, and potentially the most reliable, level of analogy is the direct historic approach (Steward 1942, Baerreis 1961) which makes use of continuous models in situations where the ethnographic society is historically continuous with the prehistoric culture being excavated in the same region (Gould 1974:38-39).

One point of criticism of the use of ethnographic analogy by some archaeologists is that culture change does not allow for a one to one relation or analogy. However, it is probably more efficient to test archaeological data against ethnographic data for an analysis of the relationship between

material items in the archaeological record and the adaptive behaviour of which they are the result. It must be stressed that ethnographic data are not used for the purpose of finding the answer to a problem but rather to obtain suggestions for possible solutions to problems of archaeological interpretation in the form of testable hypotheses (Binford 1967, 1968:27). We have a greater probability of finding appropriate solutions to problems by beginning with possibilities suggested from ethnographic examples than we do by randomly applying just any imaginable solution to the problem (Hayden 1978:184).

One of the major problems confronting archaeologists in their attempts to reconstruct subsistence patterns from archaeological remains is that of archaeological visibility. Because the problem of archaeological visibility is greatest for the student of nomadic or semi-nomadic hunter-gatherer groups whose short term, transitory subsistence activities leave little in the way of visible archaeological remains, the use of ethnoarchaeological approaches is especially valuable.

Schiffer (1976: 11-12) has indicated that the archaeological record is an incomplete and often distorted reflection of a past cultural system due to the cultural and non-cultural processes which have transformed cultural materials spatially, qualitatively, formally, and relationally. Several studies (Gould 1968, Lee 1968, Yellen 1976, 1977) have indicated that open air camp sites of highly mobile groups with minimal structures are very susceptible to rapid erosion by wind and rain. Bones are altered or quickly carried off by dogs and other animals. Other natural processes such as vulcanism, stream action, rapid vegetation growth, and frost action can also destroy, alter, or conceal archaeological remains.

Since a large proportion of the material culture of hunter-gatherer peoples is manufactured from organic materials which leave little or no trace in the archaeological record, lithic using activities must be sufficiently focused in a restricted area for the accumulation of tools to be visible.

Yellen (1977) indicates that task specific activities carried out away from habitation camps have low archaeological visibility. The procurement of plant foods, small game, or the occasional larger game animal, leaves too few remains to be significantly visible in the archaeological record.

Archaeological visibility of sites also depends on a variety of factors related to organization of subsistence activities and the technology used to carry them out (Binford 1979), including caching of food and equipment, curation of personal tool kits and valuable items, length of occupation, group size, and range of activities taking place.

It seems evident that the formulation of a model of subsistence patterns through

ethnographic observation as well as oral reconstruction of activities, frequencies of visits, duration of occupation as well as the disposition of debris resulting from subsistence activities would enable us to predict the degree of visibility of various types of archaeological sites occupied as well as the nature of the remains. An ethnoarchaeological study of subsistence behavior would thus permit the reconstruction of a much more complete picture of the cultural system than would interpretation of archaeological remains alone. This kind of approach also allows for the generation of useful heuristic and predictive models for different types of subsistence strategies.

