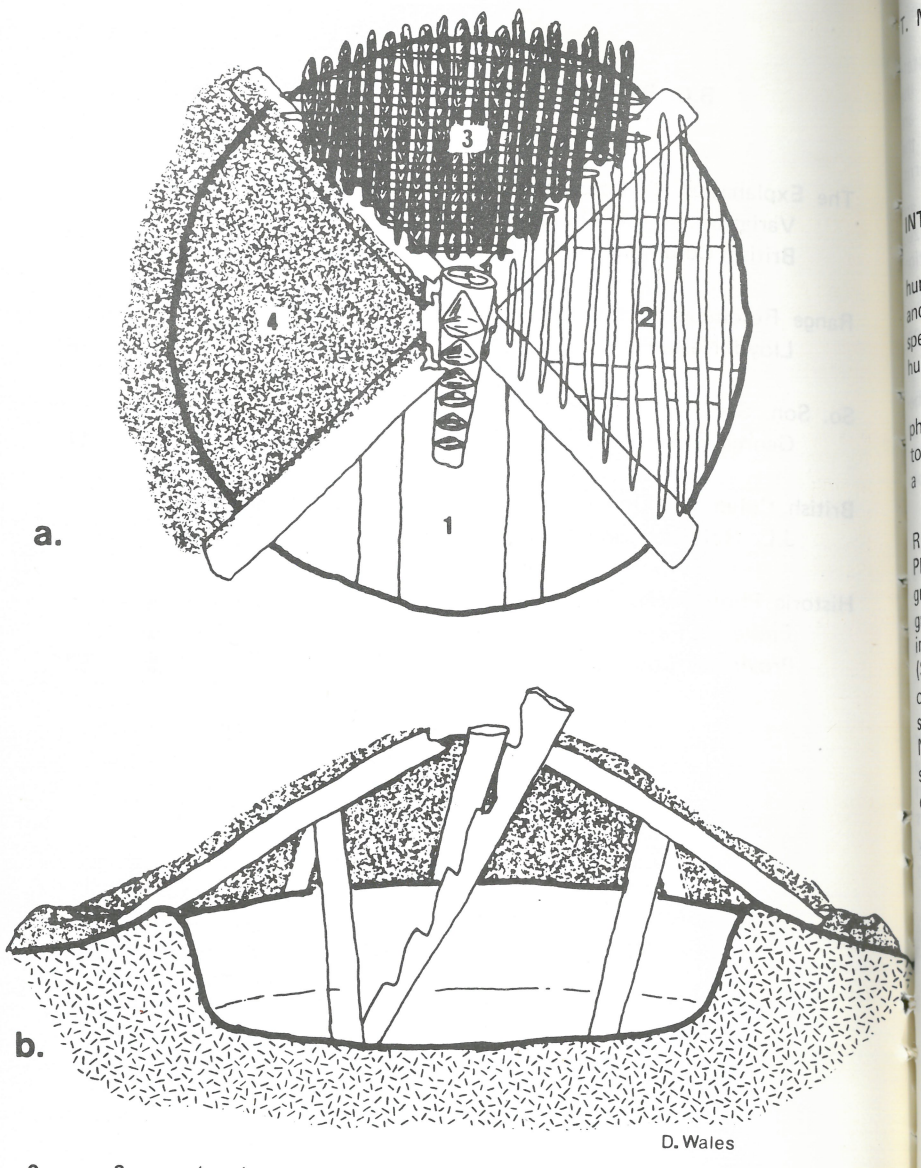

Figure 1. a) Top view of pithouse. 1. cut away view showing interior of house and two support posts. 2. second stage of construction showing cross poles. 3. vertical poles and branches overlay cross poles. 4. sod covering.
b) Cross sectional view, showing notched log ladder. (after Teit, 1900)

T. MICHAEL BLAKE

THE EXPLANATION OF LATE PREHISTORIC SETTLEMENT PATTERN VARIATION IN THE THOMPSON AND FRASER RIVER VALLEYS, BRITISH COLUMBIA

INTRODUCTION

Settlement patterns can be defined as the areal distributions of human habitations, and are determined by an aggregate of ecological and cultural factors. It is the interaction of these factors which produces specific behavioral responses as manifested in the configurations of human occupations upon the landscape (Trigger, 1968, pp. 53-4).

Through the use of an intergrated model incorporating both physical and social environmental determinants, this paper will attempt to explain certain variations in prehistoric settlement patterns within a single though differentiated physiographic region.

The areas of study are the middle Fraser and upper Thompson River valleys, both located in the British Columbia portion of Interior Plateau region of north-west North America (Holland, 1964). Ethnographically this region was occupied by Interior Salish speaking Indian groups (Teit, 1900, 1906) who had a band level of socio-cultural integration adapted to the nomadic life of hunters, fishers and gathers (Service, 1962). They were not wholly nomadic however, being one of the few examples of peoples on the band level who had semi-sedentary habitation sites. During the winter months from approximately November to March permanent village sites consisting of individual semi-subterrainean pithouses were occupied; (Fig. 1) while the remainder of the year was spent in a more nomadic existence. (Teit, 1900).

SETTLEMENT VARIATION

During the course of archaeological surveys along the Thompson and Fraser Rivers, the author has noticed significant inter - and intra - village settlement pattern differences between the remains of prehistoric winter village sites in the two areas. These differences represent the specific adaptation of two similar cultures to slight variances in the physical and social environments. However, in order to understand how cultures adapt to the over-all environmental system, it is necessary to understand how the integral portions of the total system or subsystems interact. The environmental subsystems which together form the physical ecological environment are:

1. Geomorphological system (including edaphic)
2. Climatic system
3. Biotic system

The cultural-ecological environment can be described as:

1. Other societies with which a culture is in direct or indirect spatial contact.

2. Other societies from which a culture has sprung or who have influenced its present state.

Not only does each of these subsystems influence the present state of the others and therefore the total system; they also influence the state of the cultural system under observation. In particular, we are concerned with the differential effect of each subsystem upon the observable output of the cultural system, ie. settlement patterns.

The differences between the winter housepit sites as they are found in the Thompson and Fraser River valleys can be summarized in terms of: site complexes – general distribution of sites in relation to each other within a definate area; individual sites – the distribution of habitations within a particular site; and individual habitations – variations in the structure and layout of each house (Trigger, 1968, pp. 55).

1. **Site Complexes:** In the Thompson Valley the boundaries between individual sites seem to be less clearly defined. Sites often merge with one another for up to 5 km (3 mi.) while in the Fraser Valley between Lytton and Williams Lake sites are distinctly separated from each other.

2. **Individual Sites:** The location of housepit sites in the Thompson Valley in relation to the river is vastly different from the relationship in the Fraser Valley. Sites are altitudinally higher above and horizontally farther away from the Fraser River than they are the Thompson River. In addition, the housepits within most Fraser River sites are clustered into larger groups and almost always situated near creeks. (Fig. 2)

3. **Individual Habitations:** The housepits on the Fraser River are usually larger than the ones from the Thompson River. The average diameter of approximately 12 meters is 4 meters larger than the average diameter of Thompson Valley housepits. There also seems to be more storage locations inside of large housepits on the Fraser River, while on the Thompson River storage pits are located outside of the dwelling.

Even though the overall pattern of settlement is remarkably homogeneous, these three differences will certainly help to give a better understanding of the factors which influence the structure of settlements as well as their locations.

ENVIRONMENTAL PERCEPTION

Davidson has noted in his terrain adjustment studies that it is important to ascertain not only the environmental subsystems which influence settlement, but also the levels of environmental perception (1972, pp. 17-19). The environment will be taken here to mean both the physical environment and the cultural environment. Not all portions of the environment are actually noticed by a particular culture occupying any given area, but those which are can be classified as part of the per-

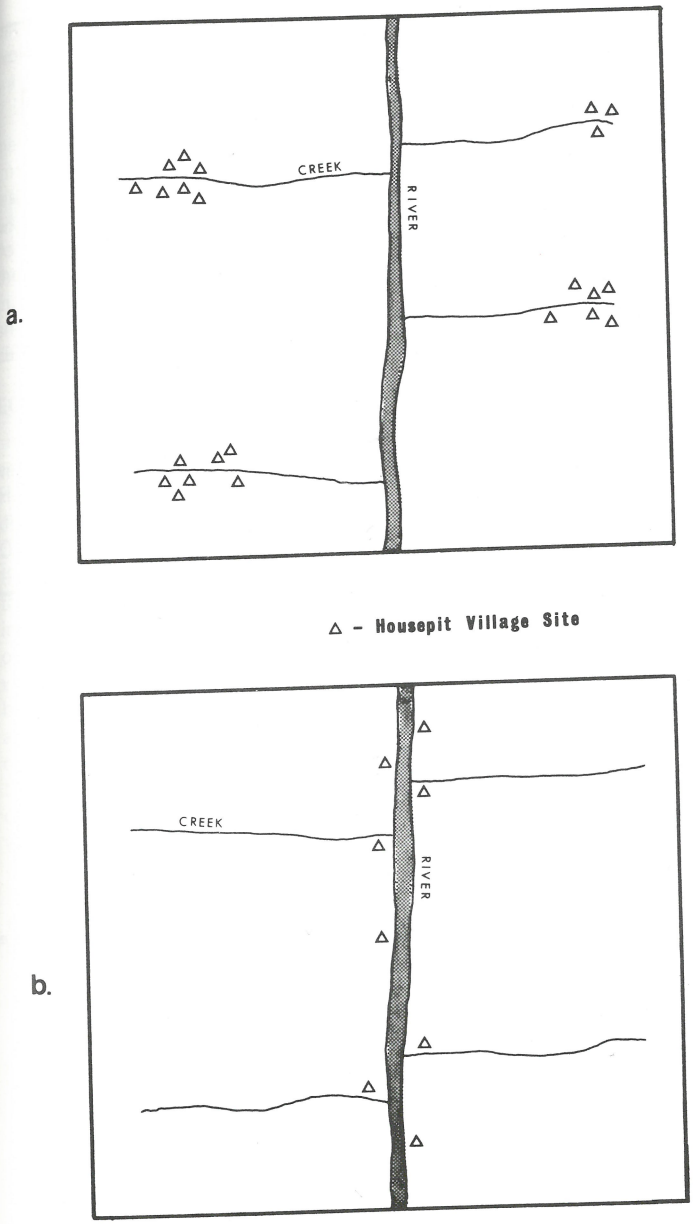

Figure 2. Schematized representation of settlement patterns in; a) Fraser River b) Thompson River Valley.

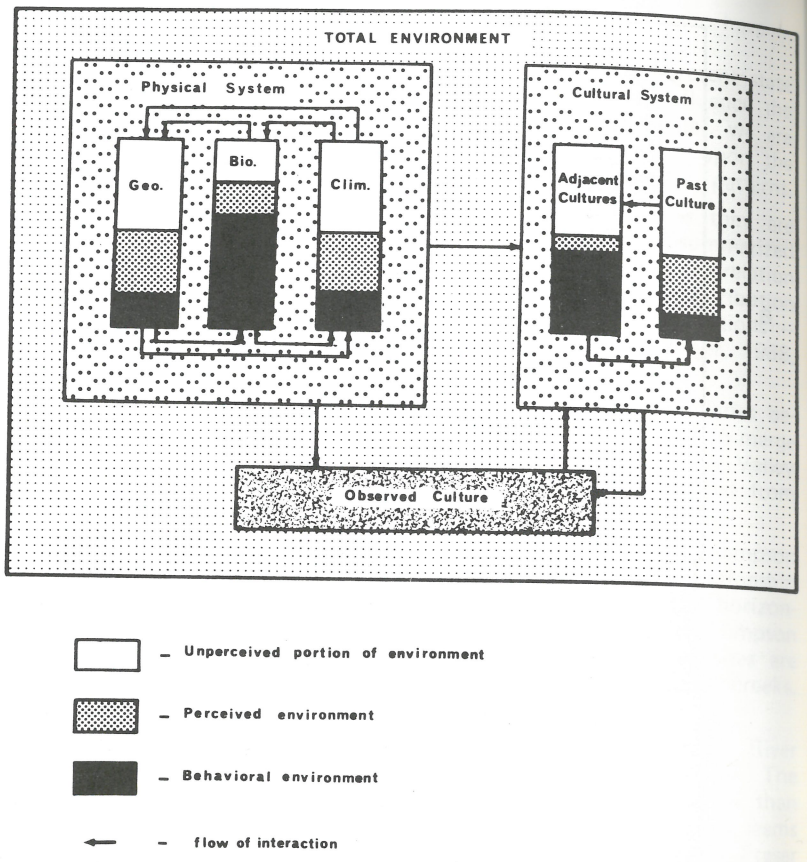

Figure 3. Model of ecological interrelationships as they affect particular cultures on various levels of environmental perception.

eived environment. When any subset of the perceptual environment voke a behavioral response from the cultural group, then those elements re part of the groups behavioral environment (Davidson. 1972. pp. 17).

Figure 3 graphically illustrates the interaction of all of the environmental subsystems which influence the observed culture and how only small portions of these environmental factors actually ellicit behavioral responses. At this point it is necessary to reiterate that the behavioral responses in which we are interested are the patterns of settlements. As the environment changes the perception of it will also change; as the perception changes so will the effective environment. Variations in perception will in turn effect the responses of a culture to the environment and evidences of this will pervade most aspects of the cultural system.

ECOLOGICAL SUB-SYSTEMS

The subsystems which make up the physical environment are very important determinants of the settlement patterns of any culture. However some will have a greater effect than others and will more directly influence the morphological characteristics of the settlement. On the Interior Plateau some of the environmental factors which influence settlement patterns will tend to create pressures or input into the cultural system that will homogenize behavioral responses. For instance the climatic and biotic systems are essentially similar throughout most parts of the Plateau and especially the Thompson and Fraser valley. It is not necessary for all aspects of each system to be the same, but specifically the elements which elicit response. Ultimately since all parts of each system are interrelated, every unit of the system directly or indirectly requires some form of adaptation. An example of the problem in determining those parts of the behavioral environment can be found in the biotic system. Douglas fir (Pseudotsuga menziesii) was commonly used as building material for housepits throughout most of the Plateau (Blake, 1974, pp. 38). It therefore can be classified as part of the behavioral environment. But, if the Douglas fir population was endangered through an imbalance in the population of parasitic insects, a new strategy for obtaining that type of resource would have been required. The insects were directly responsible for the change in settlement activity yet they themselves were not the objects of a behaviorial response and in all probability they may not have even been part of the perceived environment. By looking at the portions of each ecological subsystem which forms part of the perceived and more specifically the behavioral environment, it should be possible to determine not only which of the subsystems was responsible for the observed settlement pattern differences, but which elements of the subsystem were responsible.

GEOMORPHOLOGICAL SYSTEM

Geological work in the Interior Plateau has indicated that by early Tertiary times, the relative position of present day stream channels was well established (Duffell and Mctaggart 1952, pp. 9). During the

Cretaceous, the Fraser River area of the Plateau underwent stages of uplift (Trettin, 1961, pp. 99) causing the streams in the western half of the Plateau to cut deeply into its geological formations of metamorphic and igneous rocks. This uplifting was probably experienced though the entire period of formation of the Coastal Mountains, but affected only the Fraser River area. Several major faults were caused by this tilting and uplifting; longitudinal faults running roughly north to south and cross-faults which dissect the larger ones (Trettin, 1961, pp. 96). Rejuvenation of the Fraser River has not only occurred as a result of early uplifting and faulting, but is also attributable to isostatic rebound in more recent times (Trettin, 1961, pp. 3; 101). The effect of this almost continuous rejuvenation has been to cut a narrow gorge deep into the bedrock of the Fraser River fault zone.

The Thompson River flows across a much flatter portion of the Plateau than does the mid-Fraser River. Deposition surpasses erosion for all but the lower Thompson River south of Ashcroft. This is evidenced by large sand bars and relatively broad flood plains. The uplifting of the Plateau has also caused rejuventation of the Thompson River and it has cut deeply into the geologic formations present. However, relative to the Fraser Valley, most of the Thompson Valley has not been excavated to nearly the same depth, nor are its sides as precipitous.

These differences in morphology have greatly affected the valleys' deglaciation patterns after the Fraser Glaciation which lasted from 20,000 – 10,000 B.P. (Fulton, 1968). On the Thompson Plateau and Shuswap Highland deglaciation occurred by downwasting. The ice remained stagnant in the valley regions while the higher elevations became free of ice (Fulton, 1971). Because ice dammed the original drainage routes, the water accumulated in the Thompson and Shuswap basins, forming enormous ice marginal lakes (Fulton, 1969). The damming of this melt water caused the deposition of a vast amount of sediment in the lakes. When the stagnant ice tongues melted, the water from these lakes drained out through the Fraser River system, cutting deeply into the soft lacaustrine deposits.

Ice marginal lakes had also formed in the Fraser Valley, but because drainage was not blocked to the same extent as in the Thompson valley, melt water never accumulated in such large proportions. As a result very few lacustrine deposits are present.

Alluvial fans formed at the mouths of streams which entered onto the melting glaciers occupying the Fraser Valley. As the ice melted, the river level dropped causing steep down-cutting of the alluvial deposits. Subsequently, this process left small terraces several hundred feet above the present river level. (Ryder, 1971, pp. 280). These terraces occur only where streams had entered onto the glacier and are now usually isolated from each other by steeply sloping embankments.

The lakes which occupied much of the Thompson River Valley as well as the Okanagan and Nicola Valleys in the central Plateau,

left silt over 100 meters thick in the valley bottoms. However, since the terrain is much less mountainous than the Fraser River area, few large alluvial fans formed in the Thompson Valley and the lacustrine deposits are relatively continuous for its entire length. When the ice barriers melted, the lakes in the central Plateau drained and rapid rejuvenation occurred, eroding away most of the lake bed sediments. Stabilization in the erosional process occurred when the Thompson River reached an elevation approximately 150 meters below the old lake levels.

In contrast to the limited amounts of flat land in the Fraser Valley, the Thompson Valley has continuous flat areas of lake bed sediments above the river; and even more significantly it has extensive horizontal floodplains at river level. This variation in availability of flat land area between the two valleys is the major geomorphological difference which affected the adaptive strategies of the prehistoric Indian groups.

CLIMATIC SYSTEM

The climate of the Interior Plateau is classified as semi-arid and receives, on the average, less than 36 cm (15 in.) of precipitation annually. The temperatures range from 37 degrees C. or more during the summer to -18 degrees C. in the winter. The seasonality of precipitation is comparatively standard over most of the Plateau; relatively wet winters and dry summers. The climatic system is part of what has been called the Rocky Mountain ecological system by Daubenmire (1943) and is characterized by two storm tracks which move inland to the east from the low air pressure system over the Pacific Ocean. The more northerly of the storm tracks corresponds roughly to the U.S.-Canadian border and accounts for the extremely large amount of precipitation on the west facing slopes of the Coastal and Rocky Mountains in British Columbia. The Plateau region between these two high precipitation areas receives little precipitation itself due to the rain shadow effect. This small amount of precipitation has a profound effect upon the biotic community of the Plateau; such that small, seemingly insignificant variations in precipitation will greatly alter the ability of certain plants and animals to exist. The Thompson River Valley itself receives less than 25 cm. (10 in.) of precipitation annually, while the mid-Fraser River Valley receives on the average 13 cm. (5 in.) more per year. This was an important influence on biotic variation between the two valleys, even though it in itself did not produce significantly different behavioral responses. Probably of more direct importance in terms of behavioral adaptation was temperature rather than precipitation. The wide range of temperature present on the Plateau directly affected the biotic communities present and thus indirectly affected the cultural systems, but it also directly influenced the possible adaptive alternatives as far as individual dwelling structure is concerned.

The seasonal variations in climate throughout the Plateau are very drastic and the cold winters necessitated a habitation structure

which would permit the maximum amount of protection. However, if climate alone was the determining factor in the development and spread of housepits, we would expect to find that this type of dwelling was used everywhere within the cultural region. This is not the case at all: it was reported ethnographically that housepits did not occur in the central portion of the Plateau where there was no access to salmon spawning streams (Teit, 1900; 1909). It would seem then that climate necessitates a cultural response in the form of a durable protective shelter, but that other factors such as available food resources are more important in determining the shape and the location of the actual habitation. Indirectly, climate has influenced other factors of the ecological system which may have been responsible for the differences in settlement patterns between the Thompson and Fraser River Valleys.

BIOTIC SUBSYSTEM

Even though there are differences in the distributions of plant and animal communities throughout the Interior Plateau Region, there are few differences in the species to be found. Unlike the geomorphological and climatic subsystems, almost every element in the biotic community was not only part of the perceived environment, but was also the object of some form of behavioral response. This means that because the prehistoric Interior Salish-speaking cultures were so dependant upon the plant and animal resources, small variations in type or availability would disturb the homogeneity of the cultural patterns. It has already been mentioned that differences in the availability of anadromous salmon had influenced the settlement patterns so greatly that in areas where salmon was not accessable, the groups remained nomadic year round.

The two primary areas of study within the Plateau region; the Thompson and Fraser River Valleys, do not differ greatly in the biotic communities present. There is, however, a difference in biotic distribution between the two areas. For the purposes of this paper it will not be necessary to describe in detail the biotic subsystem of the Plateau, but rather to contrast differences which may be responsible for the settlement variation. There is evidence to support the underlying assumption here, that the climate at present is not significantly different from that which occured when the pithouses were occupied (Hansen, 1955).

The most notable difference between the areas, is the altitudinal stratification of ecozones. At Lillooet on the Fraser River it is approximately 32 km. (20 mi.) to the nearest ecozone which receives more than 150 cm. (60 in.) of precipitation annually; while from the Thompson River at Kamloops, one must travel over 130 km. (80 mi.) to reach the same ecozone. Since most of the Thompson Valley is in the central part of the Plateau where there are almost no highland ecozones close at hand, the aboriginal groups who occupied the area were forced to exploit solely dryland adapted plants and animals. They must also have had to spend more time travelling in order to reach their

food supplies (Fig. 4). The comparison between the two areas of the perceived biosystem can be more explicitly stated in the following way:

1. Both areas had salmon resources which permitted winter habitation in pithouses.
2. In the Thompson area greater distances had to be covered in order for groups to exploit land mammals which occupy forested areas.
3. These resources were closer at hand in the Fraser Valley so that a larger population density could be supported than in the Thompson Valley.

These factors might in part explain the differences in structure of housepit sites between the two areas. If in the Fraser Valley a much larger concentration of people became possible, then new social mechanisms for integrating the population would also be necessary. Such innovations as large villages with massive house structures would not only permit the consolidation of group activity but would also stimulate and necessitate it. As the biotic community differs, so must the subsistance techniques and ultimately this will be reflected in settlement structure and location.

CULTURAL ENVIRONMENT

The physical environment is not the only factor influencing the patterns of settlement and possibly even causing the differences between the Thompson and Fraser River Indian Groups. The cultural environment must also be considered; including both the past inhabitants and adjacent cultures.

By 10,000 – 9,000 B.P., local deglaciation had occurred sufficiently to permit the immigration of plant and animal life (Hansen, 1955; Fulton, 1971, p. 19). The climate at this time was cooler and moister than at present, however the quantity and types of flora and fauna were not significantly different.

As the glaciers receeded, people from the unglaciated Columbia Plateau to the south, moved northward probably in search of game. The culture of these earliest inhabitants of the Interior Plateau is referred to as the Protowestern Tradition (Borden, 1969). These people had a generalized subsistance pattern in which land mammals, fish and wild plant foods all played an important role. From this generalized subsistance level it can be deduced that the people of the Protowestern Tradition followed a nomadic existence. They would have travelled and lived in small bands because their generalized level of adaptation would not have allowed them to remain sedentary for any length of time. Though as yet little is known of their habitation structures it is probable that they would have been easily portable in order to facilitate a nomadic life style. This cultural tradition seems to have been replaced in some parts of the Plateau by the Nesikep Tradition at approximately 7,000 B.P. (Sanger, 1969), and whether this represents an influx of

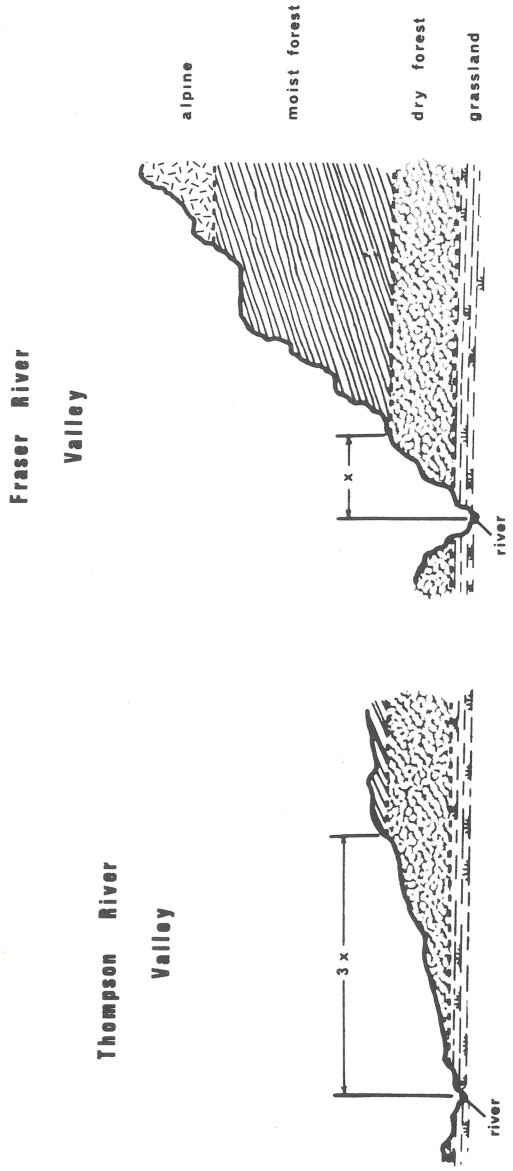

Figure 4. Idealized diagram of the differences in altitudinal stratification in ecozones (using vegetation cover).

culturally different people from outside the Plateau area or if it was the outcome of cultural evolution within the Plateau is still a disputed question.

Nelson (1973) suggests that the shift towards increased riverine exploitation accompanied the diffusion of cultures from the northern part of B.C. The peoples of the Nesikep Tradition continued to adapt to a riverine environment with increasing efficiency until the necessary technological preconditions for sedentary existence had been reached. This means that in correspondence with climatic changes, the cultures of the Plateau were able if not forced to rely more and more heavily on fishing.

Since during the initial period of development of the Nesikep Tradition (7,000 – 5,000 B.P.), there is evidence to indicate that the Interior Plateau experienced xerothermic climatic conditions (Hansen, 1955), one could expect two things to have taken place. The first is that an altitudinal shift in ecozones occurred, causing population dispersal into the upland regions. The second is that a tremendous impetus for the development of a fishing technology, including storing processes, would have been initiated (Sneed, 1971).

The dispersal to upland areas may have been only seasonal but it would have necessitated a corresponding shift to increasing hunting efficiency. The development of the fishing technology as well as increase in technological perfection for hunting is strongly evidenced in the tools recovered from archaeological sites in the Interior Plateau (Sanger 1970; Stryd, 1973; Swanson, 1966).

Starting at approximately 4,000 - 3,000 B.P., is a tendency towards cooler-moister climatic conditions more closely resembling those of the present day (Antevs, 1948; Hansen, 1955). If this trend corresponds to increased technological specialization in subsistence economy then those groups who had the ability to remain sedentary for at least the winter portion of the year, would be at a definate advantage over those who could not. It is at this time period during these climatic conditions that the pithouse was introduced, and diffused throughout the Plateau region. The pithouse structure would have been the most efficient form of permanent winter dwelling for the technological level to which this culture had advanced; and the development of these permanent village sites permitted the amount of social cohesion necessary to maximize efficient riverine exploitation.

ISOLATION OF DETERMINANTS

A brief analysis of all of the environmental subsystems which influence settlement structures and locations indicates that some factors are more directly responsible for the observed differences between the Thompson and Fraser River than are others. Two chief variations seem to arise:

1. the behavioral environment of the prehistoric cultures has changed through time.

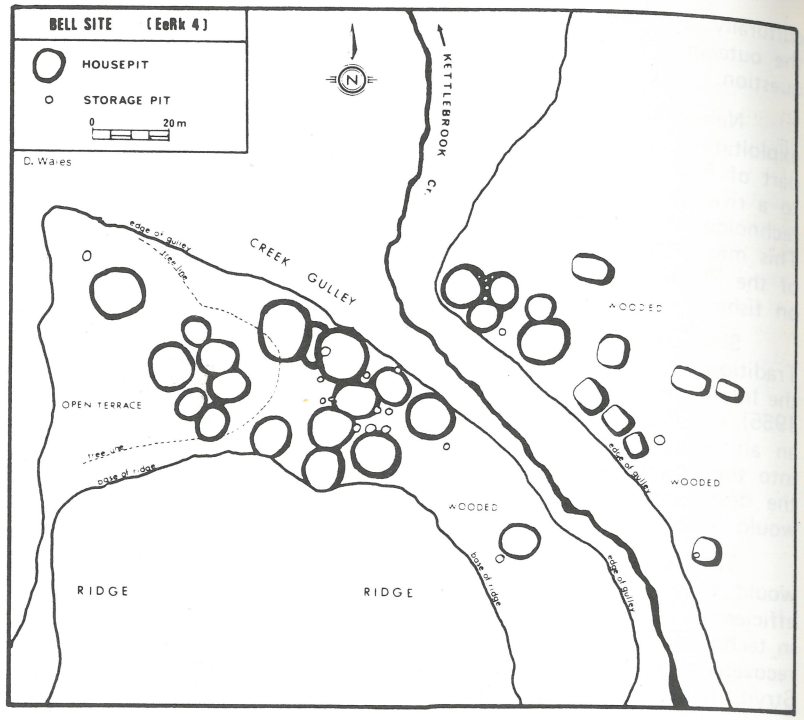

Figure 5. Bell Site on Kettlebrook Creek, 16 km. (10 mi.) north of Lillooet, B.C. (after A. H. Stryd, 1973).

2. the behavioral environment is different between the Thompson and Fraser Rivers.

The geomorphological subsystem provides us with a clear example of how these differences are manifested. Prior to the developed use of pithouses on the Plateau, settlement patterns between the two River Valleys were essentially the same. Even though there has not been a great deal of work on early prehistoric settlements and subsistence, no significant differences have been noticed. This strongly indicates that the portions of the physiography which influenced the culture were not different between the two areas. Apart from the fact that the total perception of that environment was no doubt different, exactly the same type of settlement distributions and structures could be employed. As subsistance became more centered around the seasonal cycles of salmon fishing and an overall riverine orientation grew, different aspects of the physical landscape became increasingly important. Whereas flat land near a continual source of drinking water was not as important in the past, it must have been at a premium during the occupation of housepit sites. Sites near the source of food, that is salmon, would for transportational reasons have been preferable to sites at a great distance from the source.

In the Fraser River Valley, relatively flat land which is required for village sites is only to be found on the fan terraces high above the river. Some of the sites are several acres in area and may consist of 20 - 100 individual housepits (Stryd, 1973). These terraces are often undulating and difficult to traverse because of steep cliffs and gullies. As a result, the housepits are often found closely packed in dense concentrations (Fig. 5). Because flat land is so restricted and scarce, the same pithouses may have been occupied intermittently for more than 500 years (Stryd, 1974, pers. comm.). In the large villages not all of the housepits were occupied at the same time. Younger housepits overlap older and are themselves overlapped by still younger housepits.

The structure of the village sites in the Thompson River Valley is substantially different. They are located on the flood plains, close to the river (Fig. 6). The number of housepits found in any one site is often much smaller than the number in the Fraser Valley. In the Thompson Valley it was not necessary to rebuild for hundreds of years in the same location nor was it necessary for the same density of house-pits (per acre) at village sites. Villages were located close to the river for several reasons: it was the major source of drinking water, it was a ready means of transportation, and, in addition to salmon, provided a base for migratory waterfowl. These facilities which the river provided are not concentrated at certain locations but were easily accessible all along the Thompson River.

The Fraser River in contrast does not invite the same type of utilization. Only those locations on the river that have very fast rapids and steep rock promontories are suitable for fishing (Sneed, 1971). In most spots the river is fairly wide and the fish are not forced to swim

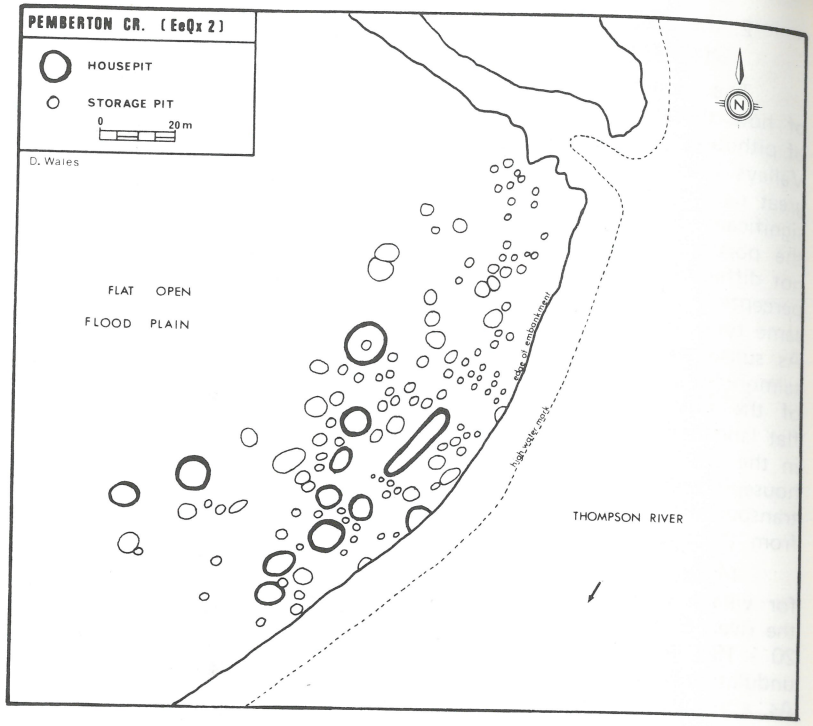

Figure 6. Pemberton Creek Site on the South Thompson River 38 km. (24 mi.) east of Kamloops, B.C. (after Eldridge, M. and T. M. Blake, 1971).

in large concentrations near the shore where they can be easily netted. If it was preferrable for a band or group of bands to have control over good fishing locations, then it would be expected that their village sites would be as close as possible to them. In addition all of the fish caught had to be transported by hand several hundred feet in elevation to the village sites and much time and energy could have been saved by locating the village as near as possible to the fishing spot.

Even if the perception of the physiographic environment was similar between the cultures occupying the two valleys, it was not possible for the behavioral responses to be the same. The response to the climatic and biotic subsystems was no doubt similar, but there was not a great deal of variation between the areas. It is clear that the presence of a similar environmental element in two locations will not in itself cause a similar cultural response, but that in order for a like response to occur the behavioral environment must at least be the same.

CONCLUSION

The overriding ecological influence in determining the differential manifestations of cultural behavior upon the landscape, does in this case appear to be the landscape itself. All other factors; antecedant cultures, adjacent cultures, biotic resources, and climate appear to be relatively constant within the two areas under consideration. The model presented here should only be considered tentative and exploratory; obviously much more detailed data is necessary in order that the variables may be quantified and more objectively compared.

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