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Prehistoric culture change in the intermontane plateau of western north America

Introduction

There are two fundamental approaches to the explanation of prehistoric culture change. The most widely applied is ethnographic analogy, the explanation of prehistoric events through the use of ethnographically identified patterns and processes which have no direct historic link with the changes they are used to explain. Though this is the only method available in the analysis of remote prehistoric periods, it is also possible to deal with prehistoric culture change as an historical problem wherever ethnographic data is sufficiently detailed. The foundations of this approach were laid decades ago (e.g. Sapir 1916) and numerous archaeologists have implicitly utilized it in dealing with the recent prehistoric remains which they have encountered.

This paper explores the possibility of operating more directly from the ethnographic record by identifying those aspects of economic organization which leave tangible archaeological remains, tracing the origins of these in the prehistoric record, and using the information so acquired to generate an explanatory hypothesis. The case study presented is drawn from a portion of the Intermontane Plateau of western North America (Freeman, Forester, and Luphur 1945) which corresponds roughly to Kroeber's (1939: Map 6, Table 18) Columbia-Fraser culture area (Fig. 1). This area has been occupied throughout prehistory by hunters and gatherers and at contact contained societies with band and simple tribal social organizations. Since similar degrees of social and economic integration characterize much of the world's prehistory, this study is also an example of the detail in which events can be reconstructed from palaeolithic remains given a sufficient amount of information.

Physiographic and climatic patterning of culture in the Intermontane Plateau

Topography, climate, and drainage have always profoundly effected the demography and economy of human populations in the Intermontane Plateau. The heart of this physiographic province is composed of a broad ramp of Miocene basalt which slopes gently westward from the foothills of the Rocky mountains to the deeply incised valley of the Columbia River. Much of this area, usually referred to as the Columbia Plateau, receives less than 10 in. of rain per year and in consequence has a seasonally and geographically restricted supply of surface water. The Columbia Plateau is ringed with hills and mountains which are bordered by and contain numerous permanently flowing streams and rivers. Temperatures decline and precipitation increases markedly with altitude. This produces marked zonation of the plant communities and in some areas it is possible to travel from a semiarid biotic community subsisting on less than 10 in. of precipitation a year to forests of pine and fir subsisting on more than 30 in. of rain per year over a distance of 10 miles or less (Fig. 1). It is this area of transitional biotic communities, which commonly ranges from 10 to 50 miles in breadth, which supports the densest populations of game animals such as deer, elk, mountain sheep, and pronghorn antelope.

Low temperatures and snow severely limit the distribution of human population during the winter months from October to March. Though the bulk of the Columbia Plateau lies only between 1000 and 1500 feet above the sea level, winters are nonetheless severe. Temperatures frequently drop between 10 and 40° F. below freezing in all but the most sheltered areas. As a result, the human population is concentrated in the narrow, sheltered valleys of the major rivers at the fringes of the Columbia Plateau. Many of the ungulates are driven into the same areas as snow buries their forage at higher elevations. Palynological evidence (Hansen 1944; 1947; 1955; Heusser 1960) suggests winter temperatures severe enough to effect human populations in this fashion throughout the prehistoric record.

The distribution of important edible plants, such as the tubers of kouse and camas, is also effected by climate and topography. Maturation of these plants is linked with altitude and temperature. Although they mature enough to be eaten early in the spring in the warmest, most sheltered portions of the Columbia Plateau, they can still be gathered late in the fall in the surrounding mountains. Archaeological evidence suggests that successive, geographically patterned root harvests must have been an important aspect of the yearly economic round for the last 6,000 years of prehistory.

The most stable source of protein for Plateau peoples comes in the form of salmon whose spawning migrations follow a highly predic-

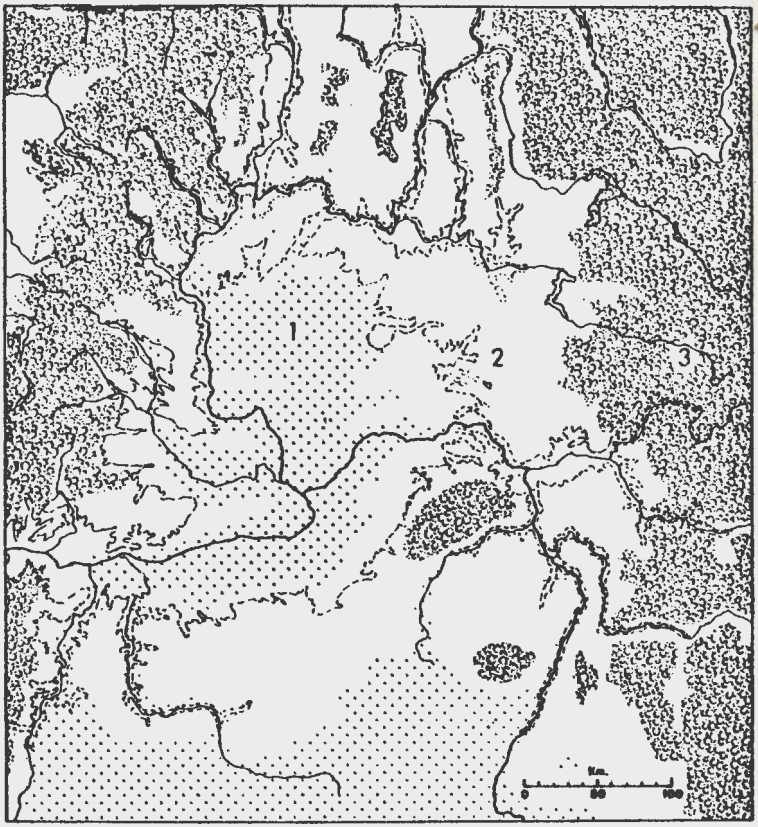

Figure 1 Biotic zones and exploitation areas in the Columbia Plateau (modified from Piper 1906, St. John 1937 and the U.S. National Atlas 1971).
1, semi-arid desert. 2, semi-arid to well-watered grasslands and open forests of yellow pine. 3, dense forest of fire and white pine, and alpine vegetation at higher altitudes. Zone 2 contained the greatest biomass usable by hunters and gatherers.

table four year cycle. Migratory salmon are typically in the trunk streams and their stable tributaries from late in the spring to the end of autumn. Due to the absence of streams in the central portion of the Columbia Plateau, nearly all the salmon are funnelled into the surrounding hills and mountains, a pattern which is apt to have been stable since the end of the Anathermal some 8,000 years ago.

Ethnographic economic patterns

Ethnographic economic patterns in the Columbia-Fraser culture area

are reasonably well known through the work of Ray (1932; 1936; 1939; 1942), Anastasio (1955), Schwede (1966; 1969), Spinden (1908), Teit (1900; 1906; 1909; 1928; 1930), and others. The following description, drawn primarily from these authors, is a generalized summary of features commonly held by groups whose territories adjoin the arid heartland of the Columbia Plateau.

Two kinds of data are apt to be useful when attempting to reconstruct the archaeological parameters of an ethnographically reported economic pattern: the functional associations of durable tools and the economic associations of demographic patterns reflected in the remains of archaeological sites. Much is known of numerous tool categories common throughout the Plateau (e.g. Ray 1942). The majority are perishable or possess a broad spectrum of potential uses so that they are of little use in reconstructing economic activities. Implements useful in such a task are limited to hopper mortars, pestles, and hammerstones used in the preparation of kouse and camas, stone and bone handles for digging sticks, composite harpoon valves, leister prongs, and the barbs of salmon spears used in fishing, gages and shuttles used in the manufacture of nets, and flaked stone and ground bone points used in hunting large game animals. These tools enter the archaeological record and undergo stylistic modifications in a piece-meal fashion, giving the prehistory of the area an apparent stability. This has been interpreted by many in terms of gradual change through the accretion of new artifact types and processes (Daugherty 1962; Butler 1966). A greater reliance on demographic data can be used to generate a more detailed and dynamic view of prehistoric culture change, as will be shown hereafter.

Defining the archaeological parameters of an economic organization through the use of demographic data is more complex, however, for it requires a careful consideration of the effects which the economic organization imposes on archaeologically identifiable settlements and their contents. For this purpose, the yearly economic round can be divided into two major segments: (1) the winter concentration of families into villages, and (2) the dispersal of the village band to a succession of temporary camps during the spring, summer, and fall. These camps were maintained while obtaining the surpluses of fish and edible roots necessary to support villages during the winter months. These activities were organized as follows throughout most of the Columbia Plateau.

Winter villages were occupied for about five months and abandoned as early in the spring as weather permitted. The cramped, unhygenic conditions in winter houses are frequently cited as the reason for this exodus to nearby camps, but the stress which most ethnographers place on winter hardships and hunger also makes it clear that the consumption of available food supplies was often as important a factor. The first spring camps were located near the

winter villages in areas where the earliest edible plants appeared and where pocket gophers, ground squirrels, rabbits, birds, and other small animals were plentiful. These camps were left after a few weeks. With the exception of the infirm and a few able individuals left behind to care for them, village bands split into families and moved to the spring root gathering areas in the arid heartland of the Columbia Plateau or in the warmer areas flanking the Blue Mountains. During this period women gathered and prepared roots while men hunted antelope, rabbits, and other small animals. Though the products of the hunt were consumed on the spot, the bulk of the roots were dried, pulverized and ground into a coarse flour, and moulded into cakes so they could be carried with ease.

Late in April or early in May the root gathering camps were abandoned and families moved to summer fishing sites. Throughout much of the Columbia Plateau this meant moving outward from the semiarid interior to the surrounding hills and mountains. During this move, the dried rootmeal was stored at or near the winter village.

The summer fishing camps were occupied for nearly four months. During this period weirs or traps were built or repaired and as many as six successive salmon runs exploited along the small rivers and streams which spread in a wide arc along the margin of the Columbia Basin. The size of these camps depended on the importance of the local runs, the convenience of the location and the amount of labour required to maintain the weirs and process the salmon. When caught, fish were filleted, dried on racks and frequently ground into meal.

Summer fishing camps were abandoned at the end of August. Some families returned to the major trunk streams where they put the prepared fish in storage and continued to fish with seins, dip nets, and spears. Though these methods are not as effective as the use of weirs, spawning salmon deteriorate too rapidly after the beginning of September to be of much use if left to enter the smaller rivers and streams in which they will soon die. Moreover, salmon which spawn in the spring after wintering in the Snake and Columbia rivers become available in September.

When the summer fishing camps dispersed, other families moved higher in the surrounding mountains in order to collect late maturing roots, gather berries, and hunt, sometimes from a succession of small camps. These people returned to the winter villages in October as the autumn weather failed. Houses were cleaned and repaired, food stores secured, and the deepening of winter awaited.

Winter villages were explicitly located and, with the exception of a few natural fisheries, controlled all rights to local resources. Precise figures for the number of families or individuals commonly sheltered by a single village are not available, but ethnographic reports and archaeological evidence both suggest they commonly contained three to ten houses each of which might have contained one to three families, or a grand total of 20 to 100 individuals. The traditional

dwelling was a semi-subterranean pit house between five and ten meters in diameter. It was usually excavated to a depth of one or two meters and in some areas might be lined with wooden planks or stone slabs. House roofs were covered with earth and therefore required substantial structural members. In the semiarid areas of the western and southern Columbia Plateau beams and uprights had to be salvaged from abandoned houses or transported from the nearest stand of suitable timber, often over a considerable distance.

The labour required to erect and maintain pit houses, the recognized control of local resources, and the need for specially prepared storage facilities all tended to stabilize the location of winter villages. In its turn this stability produced a host of subsidiary phenomena which are easily identified during archaeological surveying.

1. Storage facilities are frequently in the form of pits within the village or in nearby rock shelters.
2. With the exception of some individuals who die under ritually unfavourable circumstances, all people are interred in formally identified burial areas adjacent to village sites. The hardships of life during the closing months of winter and the custom of leaving the infirm in the vicinity of the winter village throughout the year insure the growth and maintenance of burial yards in the vicinity of any stable village.
3. A complex cycle of religious rituals had its focal point in the winter village and often produces tangible remains such as pictographs, petroglyphs, rock alignments, and sweat houses.
4. The winter village often acquires a series of satellite camp sites by virtue of the fact that these had to be located near early spring root gathering locations, fall fishing stations, and winter hunting camps.
5. Stored supplies of salmon, kouse, and camas were never accumulated in sufficient quantities to maintain a winter village against the threat of an unduly severe winter. As a result deer, elk, mountain sheep and antelope were hunted most extensively during the winter months. Carcasses were returned to the village virtually intact and in this way large quantities of bone were introduced into household refuse. Though dogs were kept only a very small proportion of the discarded bone shows any signs of gnawing.
6. Fresh water mussels were commonly gathered to supplement winter food supplies. Their shells frequently occur in localized middens within the winter village site.
7. The manufacture and repair of a wide variety of implements normally was undertaken in the winter during forced periods of inactivity. Coupled with the activities of the winter village, this custom tended to concentrate the widest possible variety of material objects in the site complex utilized by the village.

8. By virtue of the crucial geographic position and economic functions of the winter village, it will be substantially larger than the camps which its members exploited in root gathering and fishing. Such camps tend in the main to be small, lack structural remains, and contain faunal remains and artifacts appropriate to their economic functions.

These features characterize at least a part of the archaeological record throughout the Columbia Plateau. Their history in that record should document the emergence of ethnographic patterns since any alteration affecting the accumulation and storage of quantities of salmon, kouse, and camas, or the efficiency of winter hunting will be reflected in the settlement pattern.

The archaeological parameters of the winter village pattern

Sites which display the characteristics of winter villages are abundant in the Columbia Plateau. Though our knowledge of the distribution of ethnographically reported winter villages and archaeological sites is far from complete, there is enough information to produce obviously related patterns (Figs. 2 and 3). Winter villages, pit houses, and the archaeological site complexes which document the former location of winter villages cluster around the semiarid heartland of the Columbia Plateau and extend into the protected valleys and lake basins of the northern Columbia basin.

The exact relationships between specific site complexes and ethnographically reported villages is, however, more difficult to assess. In most areas we lack sufficiently detailed ethnographies and exhaustive archaeological surveys to do more than identify the most obvious specific relationships. The most detailed comparison available is provided by Nelson and Rice (1969) who, in co-operation with Schwede (1966), have documented the relationships between Nez Perce settlement patterns and the archaeological distribution of sites along a portion of the Snake River on the south-eastern periphery of the Columbia Plateau.

Schwede's analysis indicates that Nez Perce villages functioned at three territorial levels. The central concept is that of the village area, the geographic space in which the village controlled the utilization of all resources. The village locus, or site, theoretically might be located anywhere within the village area, but in practice there never seems to have been more than three separate sites which were occupied in a sporadic rotation. Finally, a zone of economic exploitation extended outward from the village area. This zone overlapped with the zones of other villages and the resources which it contained were held in common by all Nez Perce. Temporary use of a specific resource was

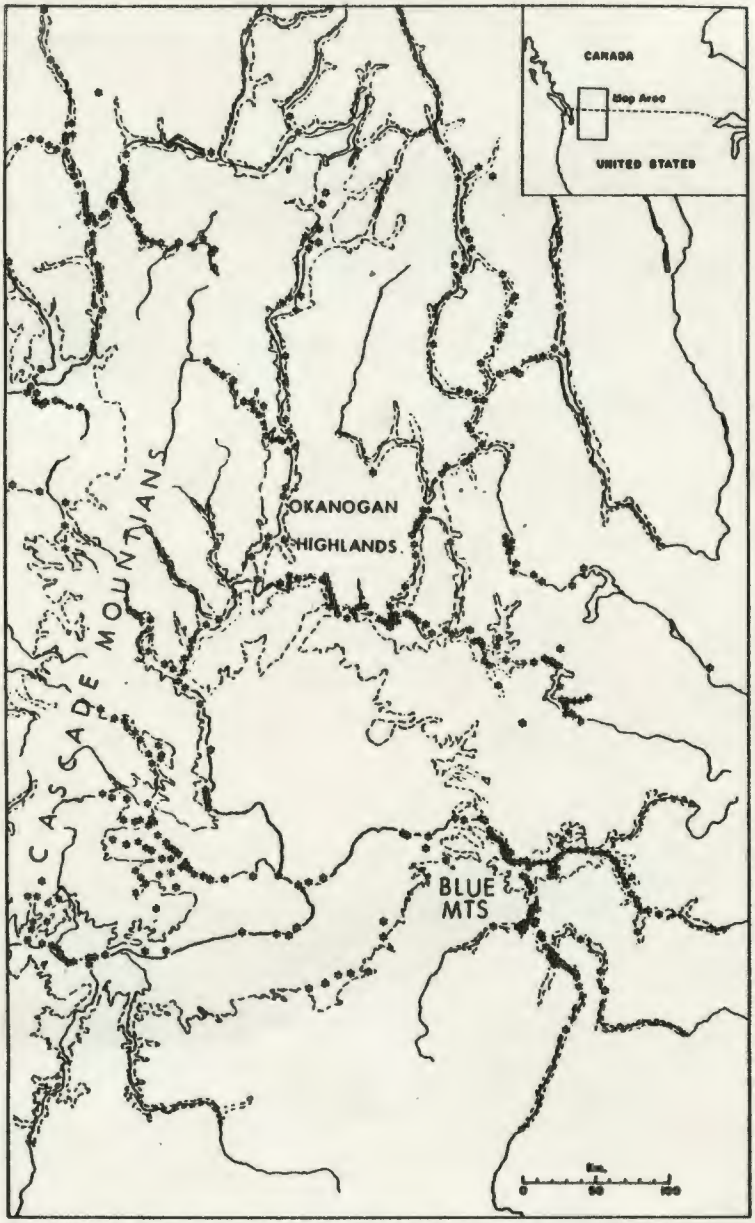

Figure 2 Ethnographically reported winter villages in and around the Columbia Plateau (summarized in Ray 1932, 1936; Schwede 1966; M. Smith 1950; Swanton 1952; and Teit 1900, 1906, 1909). Villages are represented by stars superimposed on the river system. The 2,000 foot contour is shown by a broken line.

(Data for Fig. 3 in part from Borden 1956; Butler 1966; Caldwell 1954; Caldwell and Mallory 1967; Chance 1968; Coale 1956; Collier, Hudson and Ford 1942; Cressman 1960; Daugherty 1952; Daugherty, Purdy and Fryxell 1967; Drucker 1948; Grabert 1966, 1968; Gunkel 1961; Kenaston 1966;

Figure 3 Prehistoric site complexes marking the locations of winter villages in and around the Columbia Plateau. Asterisks indicate site complexes composed of open sites with structural remains and cemeteries. Additional special function sites, such as storage shelters, are frequently present. Open circles indicate additional sites containing structural remains. These sites indicate probable winter villages.

Kidd 1964; Lee 1955; C.G. Nelson 1963; C.M. Nelson 1965; 1966, 1969; Nelson and Rice 1969; Osborne 1957, 1959; Osborne, Crabtree and Bryan 1952; Pavesic, Lynch and Warren 1964; Rice 1968a; Smith 1900, 1910, 1913; Warren 1959, Warren, Sims and Pavesic 1968; Weeks 1962).

obtained simply by occupying the camp site with which it was associated.

The archaeological confirmation of winter villages reported by Schwede was found to be excellent. All ethnographically reported areas contain large stratified sites and burial yards. The vast majority contain clear surface indications of structural remains and geographically differentiated site complexes. Most also contain storage shelters or other special features, such as petroglyphs. In some cases, however, well differentiated site complexes are divided between two adjoining villages. This may reflect informant error, overlapping village areas, or possibly even the budding of villages in protohistoric times.

Archaeological history of the winter village pattern

Identifying the relationships between ethnographic economic patterns and the archaeological phenomena to which they are related historically is only the first step in explaining their origin. In this case it should be possible to document the origins of the ethnographic economic pattern by considering the prehistory of the winter village pattern. This pattern emerges throughout the Columbia Plateau in the 500 years preceding 2000 B.P. In any given area the appearance of winter villages is sudden but there is a time vector operating from the northern portion of the Columbia River basin southward along the western flank of the Columbia Plateau and thence eastward along its southern margin (Nelson 1969: 47-8). The appearance of winter villages on the floodplains of rivers at this time was first noted by Swanson (1956: 1962) who thought it represented a shift in village or settlement location. In fact, it recorded the first appearance of semipermanent villages.

The introduction of winter villages is coupled with an increase in the average density and size of sites (Nelson 1969: 42-5). In as much as winter populations were always restricted to the areas in which winter villages came to be established, a significant increase in population must have occured during or shortly after the introduction of site complexes. This, in turn, suggests that the emergence of the winter village pattern must have brought with it substantial changes in the economic organization of Plateau peoples.

The economic basis for change

The economic changes which made the maintenance of winter villages possible can only be inferred by analysing the major economic components of the ethnographic pattern. There are three

majour resources essential to the maintenance of winter villages: (1) stored surpluses of kouse and camas, (2) stored surpluses of salmon, and (3) the successful winter hunting of ungulates. Although the efficient combination of all these resources is indirectly indicated by the presence of site complexes, the most direct evidence for each taken individually lies in functionally associated implements and the frequency of faunal remains in wintering sites.

Winter hunting is reflected by the presence of projectile points and the faunal remains of deer, elk, mountain sheep, and antelope. These, together with edge-worn skin working tools, are abundant at wintering sites throughout Plateau prehistory. Though quantative figures are not available, no observable qualitative change occurs in the ratio between debris from the manufacture of stone tools and the remains of large game animals when site complexes are introduced. It is therefore unlikely that changes in hunting techniques were responsible for the emergence of winter villages.

The preparation of kouse and camas for eating and storage is closely linked to the hopper mortar, shaped pestle, and unshaped hammerstone with the appropriate type of pecked platforms. The hopper mortar and pestle were widely adopted in the Plateau sometime prior to 4000 B.P., some two millennia prior to the introduction of the winter village pattern. Root gathering stations are also known from an early date (Daugherty 1952:45GR27, Feature 1; Nelson 1969:55). Thus, there is no concrete evidence to suggest that major innovations were made in the exploitation of camas and kouse at the time the winter village pattern emerged in the Plateau.

The utilization of salmon is the most difficult of the three resources to assess. Ethnographic records document the systematic ritual destruction of salmon bones by many groups (e.g. Ray 1932; 1942). Most salmon were taken on tributary streams with weirs and traps. Butchery practices normally involved removing the head and filleting the meat from the backbone and ribs. The gut sack and enclosing boney structure were discarded, usually on the beach as salmon fishing took place at low water. Butchered fish were hung on racks to dry and afterwards might be ground into meal together with any bones they might still contain. The remains were then transported back to the winter village. Thus in the winter village the frequency of salmon remains will not directly reflect the dietary importance of salmon, while at fishing camps the abundant preservation of fish remains will only occur under the most favourable of circumstances (e.g. Cressman 1960).

The interpretive difficulties which this presents are compounded by a lack of firm archaeological data on the frequency of various types of faunal remains. Nevertheless, some trends do appear to be emerging (Nelson 1969: 56-7). Prior to the introduction of the winter village pattern fish bones of all types are generally rare, constituting from 0-3% of all bones by number. Of these approxi-

mately half come from cyprinids which may be obtained throughout the year or which spawn in the rivers early in the spring. The remainder are also salmonid. After the introduction of the winter village pattern, the remains of fish increase to an average of *c.*8-10% by number, while the ratio of salmonid to cyprinid remains seems to increase at least fractionally. These conclusions must be regarded tentatively until a good deal more quantative data is available, but they do provide a *prima facie* case for a change in fishing practices at the time winter villages were introduced.

Fishing implements, portions of which might survive in the archaeological record, include leisters, composite harpoons, the three-pronged salmon spear, and notched stone weights. Net weights and leister barbs are occasionally found in contexts which may antedate the emergence of winter villages, but composite harpoon heads and the barbs from three-prong salmon spears are strictly associated with the winter village pattern. These implements are closely associated with the use of weirs. Their appearance seems to herald the introduction of a new and more efficient fishing technology capable of producing significant surpluses of high protein food (Nelson 1969:56-57).

If this interpretation is correct, the emergence of the winter village pattern and the ethnographically associated economic organization was linked directly with the introduction of more sophisticated fishing techniques which included the construction of weirs designed to pool large numbers of spawning fish. Ethnographic reports suggest that this was the most efficient way of taking salmon in large quantities. Without the use of weirs it is quite possible that winter villages could not be supported in many areas of the Plateau. The introduction of weirs and related paraphernalia may be viewed as the impetus which led to the emergence of the winter village pattern. The question is how.

The origin of economic change

If it is assumed that the crucial economic factor in the emergence of the winter village pattern was the introduction of new and superior fishing techniques, then it becomes necessary to identify the source of that introduction. A wide variety of fishing spears and harpoons were in use along the coast of Washington and British Columbia and in the western Canadian Plateau well before the emergence of the winter village pattern in the adjoining Columbia Plateau. It is also likely that weirs were being employed, though only the most indirect archaeological evidence has yet been found (Nordquist 1961).

C-14 dates on the appearance of winter villages in the Columbia Plateau (Nelson 1969:47-8), the spread of a specific house type known earliest in the Thompson River basin of British Columbia, the

apparent realignment of trading patterns (Nelson 1969:45-6), and linguistic evidence all support the hypothesis that the new fishing techniques were introduced from the western Cascades of southern British Columbia.

C-14 dates indicate that winter villages were first introduced along the northwestern periphery of the Columbia Plateau in the vicinity of the Okanogan Highlands between 600 and 900 B.C. By 50 or 100 B.C. the construction of winter villages had spread southward along the Columbia River past Walulah Gap and eastward along the Snake River and into the adjoining portions of western Idaho. During this process, the western and southern margins of the Columbia Plateau were host to the circumperipheral diffusion of stylistic elements, particularly the shape of projectile points. Point types developed along the eastern foothills of the Cascade Mountains were diffused southward along the Columbia River, types prevalent along the Columbia River were in turn diffused up the Snake River, and point types along the lower Snake River spread into western Idaho (Nelson 1969:61). Introduced varieties never completely replaced indigenous types. The balance of new and traditional forms is highly variable from area to area and traditional forms frequently undergo stylistic changes inspired by newly introduced forms. The widespread introduction of certain decorative motifs applied to bone tools and ornaments, the stylistic shift in petroglyph motifs in the southeastern Columbia Plateau, and changes in site demography in the western foothills of the Cascade Mountains may also date from this period (Nelson 1969; Rice in Swanson *et al.* 1970:123).

The direction of diffusion along the periphery of the Columbia Plateau together with the temporally vectored introduction of winter villages strongly suggests a source area somewhere in southern British Columbia. This interpretation is further supported by the introduction of a complex type of semi-subterranean house along the northwestern periphery of the plateau at the time the winter village pattern was introduced. This pit house type was excavated to as much as two meters below ground level and contained an unbroken internal bench, possibly for sleeping or storage. This variety of house was subsequently diffused as far southward as the Klamath Basin in Oregon (Cressman 1956), but occurs as early as the middle of the second millennium B.C. in the Thompson River basin of British Columbia (Sanger 1963:1966). Thus the diffusion of this house type has accompanied the spread of the winter village pattern itself.

The spread of the winter village pattern also seems to have affected the traditional patterns of trade between the Columbia Plateau and adjacent regions. Prior to the introduction of winter villages, identifiable trade goods are limited primarily to *Olivella* shells from the coast of Washington or Oregon and obsidian from the northern periphery of the Great Basin. These goods were heavily concentrated in the southern portion of the Columbia Plateau and

must have been traded in from the south, west, and east. With the advent of the winter village pattern *Dentalium* shells, jade adzes, and mussel shell adzes are introduced from the Canadian Plateau and the coast of northern Washington and British Columbia. The addition of this northerly trading pattern does not noticeably alter trading relations in the southern part of the Plateau (Nelson 1969:45-6).

The final piece of corroborative evidence is linguistic. The type case for Swadesh's application of glottochronology to a non-literate language family was Salish which is spoken on the coast of Washington and British Columbia, through much of the Thompson-Fraser river basin, and throughout the northern two-thirds of the Columbia River basin. A variety of linguistic analyses (Swadesh 1950; 1952; Suttles and Elmendorf 1962; Elmendorf 1965) show that Salishan communities were first established on the western side of the Cascade Mountains and that they subsequently spread across the divide somewhere in southern British Columbia or northernmost Washington, spreading south and east along the western and northern margins of the Columbia Plateau. Elmendorf (1965) estimates that the initial spread into the Okanogan Highlands may have been complete by *c.* 1000 B.C., with subsequent spread to the south and east continuing as late as A.D. 1000. The archaeological evidence as interpreted here would suggest a more limited time span for the final spread of Salishan, beginning around 600 B.C. and terminating not later than *c.* A.D. 100. All in all this is an extraordinarily good fit considering the statistical limitation of glottochronology.

The dynamics of change

It has been suggested that the winter village pattern, hallmark of ethnographic economic organization, was introduced into the Columbia Plateau together with an improved fishing technology and the Salish language from an adjacent portion of British Columbia. What model of change can be used to explain this phenomenon most adequately? A simple migration model is ruled out by the remarkable stability of tool types and techniques of tool manufacture during a time of profound economic and linguistic change, the limited local diffusion of projectile point styles, the failure of diffused styles to supplant local counterparts, and the failure of the material culture of the region of origin to move *en masse* into and throughout the Columbia Plateau. Classically defined diffusion, on the other hand, is hard pressed to explain the spread of Salishan or so complete an adoption of a foreign economic organization which must also have entailed at least some re-orientation of band structure and religious practices. The following hypothesis combines some aspects of each of these classic devices and so might be called 'migrafusion' or 'progressive local immigration' for those whose passion it is to classify explanations.

By approximately 1000 B.C. the Thompson-Fraser river basin contained a highly differentiated series of societies heavily adapted to a highly restricted set of riverine resources of which salmon was the most important. To date archaeological work in this area has produced an astounding variety of well differentiated industries which are short-lived and confined to small geographic areas. If material culture were being used to differentiate groups which were competing for the resources, this archaeological diversity could be interpreted as an indirect reflection of population pressure. If this pressure were severe enough in downstream sections of the basin, chronic shortages of fish might occur upstream, especially every fourth year when the salmon runs are minimal in size. Whatever the cause might have been, Salishan communities occupying the eastern margin of the Thompson-Fraser basin must have expanded over the divide into the Columbia basin at a point where the headwaters of local streams provided a source of spawning salmon. Bands speaking Athabaskan or Sahaptin may have traditionally utilized these areas, but if they did not possess weirs their use of the salmon would be inefficient. Salishan communities could easily set up their weirs in unused sections of streams with little initial impact on their neighbours ability to obtain their usual quota of fish and with little or no interference with their traditional economic prerogatives.

The act of establishing permanent fishing stations in border areas with non-Salishan bands would soon lead to contact and potential acculturation. In order for the Salishan community to continue its expansion into the adjacent territory of another band, however, a situation would have to exist in which the rights to economic resources diffused more rapidly into the Salishan community than the ability to construct and man fishing sites diffused outward into the surrounding territory. Such factors might have included a reluctance to accept economic innovations, a reluctance on the part of the Salish to impart details of the construction of weirs, traps, and harpoons, the inability of the non-Salishan bands to muster the man power necessary to construct and maintain weirs, or a social system ill-adapted to the co-operative accumulation, storage, and redistribution of large food surpluses.

Whatever the specific combination of factors, the non-Salishan bands failed to adopt the more efficient fishing techniques of their neighbours with sufficient dispatch. The diffusion of economic rights through intermarriage overtook them all too soon. This intermarriage may have come about when the more efficient utilization of salmon produced situations in which Salishan villages were substantially better off than the neighbouring bands during periods of winter hardship. On the other hand, marriage into adjacent villages may have come about in an effort to clarify territorial relationships or simply because individuals sought to extend their kin base as far as possible as insurance against economic hardships. Whatever reasons

non-Salishan families had for marrying into nearby villages, the Salish would logically welcome intermarriage as a way of cementing their rights to the newly acquired economic resources and as a means of extending their fishing stations into new areas.

Extensive intermarriage would lead to the establishment of winter villages in non-Salishan territory. If such villages were dominated by Salishan speakers, the primary language might well be Salish. Thus, as intermarriage proceeded, as rights diffused and winter villages budded into the territory of adjoining bands, Salish would slowly advance behind a frontier of bilingual communities. This process would be halted by any of three sets of factors: (1) the distribution of salmon, (2) social or economic factors which favour the diffusion of fishing technology more rapidly than the diffusion of rights in fishing resources, and (3) social or linguistic factors which inhibited the spread of the Salish language.

In the Columbia River basin north of the semi-arid heartland of the Columbia Plateau, east of the Cascade Mountains, and west of the Rocky Mountains, the distribution of salmon effectively controlled the spread of Salishan communities. On the western margin of the Columbia Plateau, however, Salish failed to spread southward though the winter village pattern continued to spread around the southern margin of the Plateau along the Snake River into Idaho. The reasons for this are unknown and might easily involve factors which cannot be assessed archaeologically. Nonetheless, the modern boundary of Salish along the western edge of the Columbia Plateau coincides well with two other phenomena. First it occurs in an area where fishing streams are limited to a narrow corridor, a geographic factor which may have inhibited the budding of Salishan villages. Second, it corresponds to the boundary between two archaeologically defined areas which split the Columbia Plateau in two. The southern portion of this area is characterized by the use of flaked cobble implements. This tradition is well defined by 8000 B.P. and usually accounts for between 40 and 80% of all stone tools in any archaeological occurrence. Tool forms and patterns of edge damage are remarkably stable and survive numerous changes in projectile point styles and even the introduction of the winter village pattern itself. By 4000 B.P., and possibly much earlier, the northern half of the Columbia Plateau is characterized by assemblages which contain only a very few cobble implements of narrowly restricted form. These are stylistically different from their counterparts in the south and form less than 3% of most assemblages. Instead, a wide variety of flake implements take the place of the cobble tools so abundant in the south, a substitution which is both functional and stylistic.

If these very conservative tool kits somehow reflect long established differences in the distribution of languages or social structures, they may help to explain the failure of Salish to spread into the southern Columbia Plateau.

Protohistoric changes in the winter village pattern

The horse was introduced into the Columbia Plateau in approximately A.D. 1750 and instantly revolutionized the transportation system. This in turn rapidly affected the religious, social, and economic aspects of Plateau cultures. Ray (1939) has extensively discussed some of the social and religious effects which the horse made possible. The impact of the horse is also clearly evident in three aspects of the archaeological record.

1. Travel by horse greatly increased the frequency of contact among groups and encouraged the exchange of goods and ideas. Thus the plateau became an exchange point along a vastly extended and very active trading network which drew goods from as far away as the Great Plains, the Pueblo areas of the southwest, the coast of California, and Alaska. This is evident in the sudden appearance of large quantities of grave goods almost all of which are trade items. It is also reflected in the diffusion of projectile point types, stylistic motifs, and the like. Prior to the introduction of the horse there were a number of regions within the Columbia Plateau, each characterized by a distinctive assemblage of projectile point types, gambling bones, bone points, and the like. With the introduction of the horse the extensive diffusion of these local types produces a convergence towards a pan-Plateau material culture.
2. Settlement patterns are drastically effected. The horse can be used to transport food surpluses over much greater distances. As a result, villages become fewer and much larger, being located only in the most favourable wintering areas including some in the central part of the Columbia Plateau which could not be occupied with ease before.
3. The nature of the settlements, themselves, changes. The transportation of structural members and fuel is of little consequence. Pit houses therefore become larger, reaching diameters greater than 20 metres, and are finally altogether replaced by portable mat lodges which can be moved and reassembled with comparative ease.

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