Chapter 3

Functional Analysis of Stone Tools in the Western Sector of Housepit 7

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The following study deals with the use-wear analysis of lithic material taken from about 25 square meters of the western part of the floor of HP 7, which has a total surface area of about 113 square meters. Because only 20% of the living floor has been studied, the results to be presented cannot be used to interpret the overall organization of activities either within HP 7 or to ascertain the place of HP 7 within the entire community. However, a number of interesting issues and questions about socioeconomic differences within and between houses are raised that are pertinent to the issue of socioeconomic organization at Keatley Creek. Use-wear analysis is particularly suited to the identification of activities as represented by stone tools and the detection of activity patterns on living floors.

The nearly 120 structures at Keatley Creek vary both in size (from 5–20 m in diameter) and in locational characteristics. Most structures are tightly clustered in the core of the site, however, a certain number are located on the peripheries. Both the size and position of these structures is the product of a specific social organization. In order to interpret this organization in terms of activities and behavior, a much broader investigation would be required, including the study of all the lithic material from the floors of several houses as well as material from outside these structures (Petrequin and Petrequin 1988, Beugnier 1997). In my opinion, the present study should be considered as a feasibility study for a more comprehensive functional study of the lithic material at the site. The corpus of ethnography that is related to the Keatley Creek site (Vol. II, Chaps. 1, 2, 17; Teit 1900, 1906; Hayden 1992) helps considerably in understanding the general nature of social organization within the site, and especially within the houses.

The western floor sector of HP 7 (Squares MM, BB, RR, Z, SS, H, G) contained 139 retouched lithic tools, mostly of small size (< 4 cm). Most of this material (66%) was clustered in Squares MM, RR, and SS, near the wall of the structure. The distribution of these tools in the center of the western sector is very variable (Fig. 1, Table 1):

Table 1: Distribution of Tools in the Western Sector:

Square	Number of Tools	Tools with Use Wear
MM	20	0
RR	38	11
SS	34	10
BB	5	2
Z	11	0
H	17	9
G	14	1
Total	139	33

The entire study assemblage was derived from small nonstandardized primary flakes of trachydacite. Previous studies have shown that this material is relatively soft and easily develops smoothed surfaces from use. On the other hand, this material exhibits poor development of the other kinds of wear traces,

especially the polishes characteristic of different contact materials (Rousseau 1992). Although all pieces in the study assemblage were retouched, only 33 tools displayed interpretable use wear traces, probably due either to the relatively short periods of use of most pieces (many "expedient tools"—Vol. I, Chap. 12) or to resharpening before discard.

Four activities were identified from the tools in this sample: processing mineral substances, working plant materials, skin working, and lastly, hunting.

Working Mineral Substances

Thirteen tools display contact traces from minerals. This is the most common activity represented in the sample. Two types of activities can be identified: those involving mineral pigments and those involving other types of stone.

Actions Involving Pigment Minerals

Five tools carry traces of red mineral pigment. No scanning electron microscope backscatter analysis or elemental mapping were undertaken; however, it seems very likely that the red pigment is ochre. There are ochre quarries relatively close to Keatley Creek (Alexander 1992).

Teit (1900:241, 371; 1906:224) and Tepper (1994) observe that among the Lillooet and the Nlaka'pamux (located close to the Lillooet region) pigments were abundantly used. Pigments could be of different types. On one hand, mineral pigments were crushed and were especially used for coloring faces, the body, hunting weapons, or painting pictographs on rock surfaces. On the other hand, vegetal pigments were made from roots, branches, stalks, bark, or fruits and underwent more specific kinds of processing. These pigments were more specifically used for coloring hair, skin clothes, and wood objects (Vol. II, Chap. 2, Appendix II).

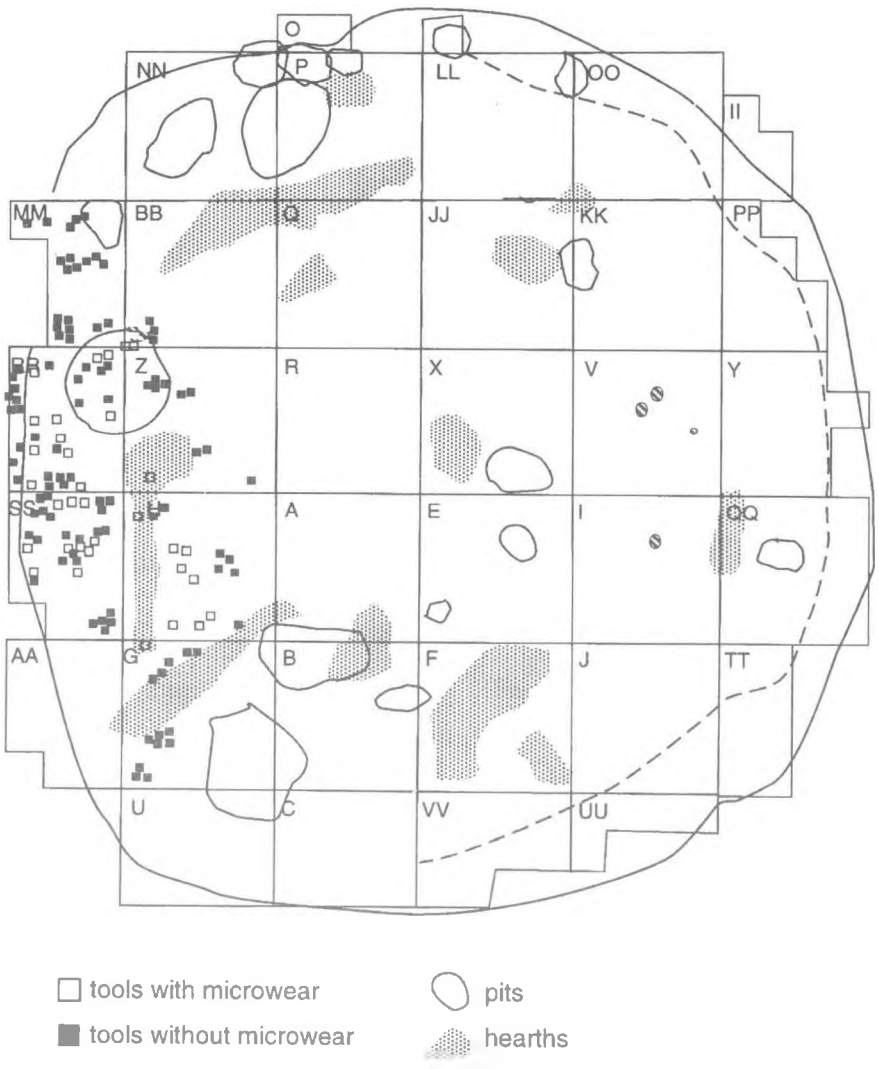

Figure 1. Floor plan map of HP 7 showing the distribution of tools with use wear traces. Note: only tools from the west sector of the house floor were examined in this analysis.

On three tools, the traces of pigment did not involve the working edge of the tools. These traces may have been due to accidental contacts. The remaining two are small tools with convex working edges and very abrupt edge retouch. The line of the working edge is very rounded and displays short, very deep striations perpendicular to the working edge. These could have been tools that served to scrape pieces of pigment in order to obtain powder (Beyries and Walter 1996).

Frequently, the hardness of mineral pigments, and especially those that are very crystallized, prevents the direct use of these natural pigments. Even if such pigments are pointed in order to form a "crayon," their use in forming lines will act to scratch the contact material rather than coloring it. Reducing pigments into fine powders before using them is therefore often indispensable. Besides this, for certain pigments, the reduction into powder enhances the brightness of the color as well as the adhesive properties of the pigment. Perhaps it is in this fashion that the use wear traces

observed on the tools at Keatley Creek should be interpreted (Beyries and Walker 1996).

Actions Involving Other Minerals

Eight tools with straight cutting edges and direct retouch display very clear use traces of contact on mineral substances. The edges are strongly rounded with a mat luster, striations are pronounced and oriented either parallel or transversely to the cutting edge (Fig. 2). These traces appear to be the result of grooving a soft mineral such as soapstone or shale. These materials were used to make certain kinds of containers such as figurine bowls, or for specially crafted items such as beads, pendants, bracelets, and pipes (Moeller 1984; Desmond Peters, personal communication). Craft items described by Hayden as lithic prestige objects have been described for the site (Vol. II, Chap. 13), including pipe fragments, small serpentine sculptures, pendants, copper sheets and beads, and sculptured mauls. The flake tools under discussion could therefore result from the production of these objects. These flake tools were therefore probably used either for detaching small blocks destined to be sculpted later into desired forms (tools with striations parallel to the cutting edge), or for the following stage involving the creation of a specific form or the removal of material for the polishing of the object (transverse striations).

In contrast, the substantial productions of objects in nephrite found at Keatley Creek should not be associated with the flake tools described above. In effect, these rocks are much harder and would not have been able to be shaped with tools made of the much softer trachydacite materials used for chipped stone. These results tend to indicate that there was a certain degree of specialization among craftsmen; specialists who worked soft mineral substances were not the same as those who concentrated on the production of harder crystalline rocks.

For the production of the softer mineral objects, both stages of the "chaîne opératoire" are represented: the preparation of the initial block and the creation of the desired shape. It therefore seems probable that an activity area for the production of sculpted objects in stone is present in Squares SS and H since all the tools related to this function are found in this part of the housepit.

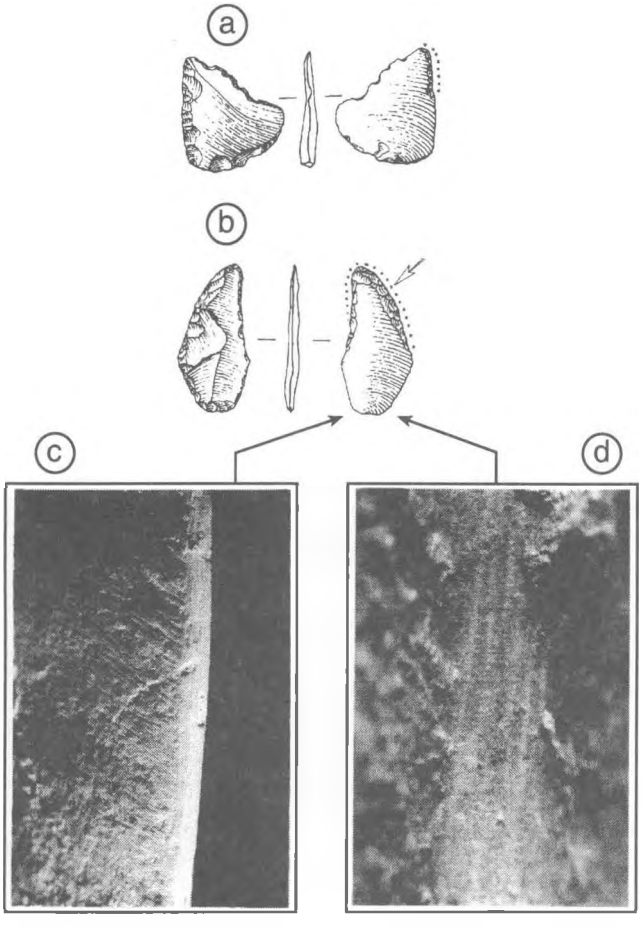

Figure 2. (A) and (B) tools with wear indicating mineral contact; (C) striations (×100) showing the different use modes of tool b with longitudinal striations indicating a sawing action and the relatively perpendicular striations indicating a scraping action; (D) detail of the working edge (×200).

Working Plant Materials

Use wear indicating contact with plant materials is present on nine tools. Four tools with straight working edges display signs of having been used for cutting woody plants; these pieces have alternating retouch and a very reflective vegetal polish (Figs. 3–4). Although the pieces involved are among the largest tools (maximum length 4.5 cm), the size of these tools which are small in absolute terms, indicates that they were intended to be used for the procurement or working of moderate sized plants such as those that might be used for wicker baskets.

Seven small endscrapers display transversal striations and a very pronounced reflective polish. These pieces should be related to a scraping action on plant material, therefore involving the processing or working of these materials.

It is extremely difficult to interpret these results in more specific terms. On the one hand, working plant materials is complex; on the other hand, their composition and their condition at the time of

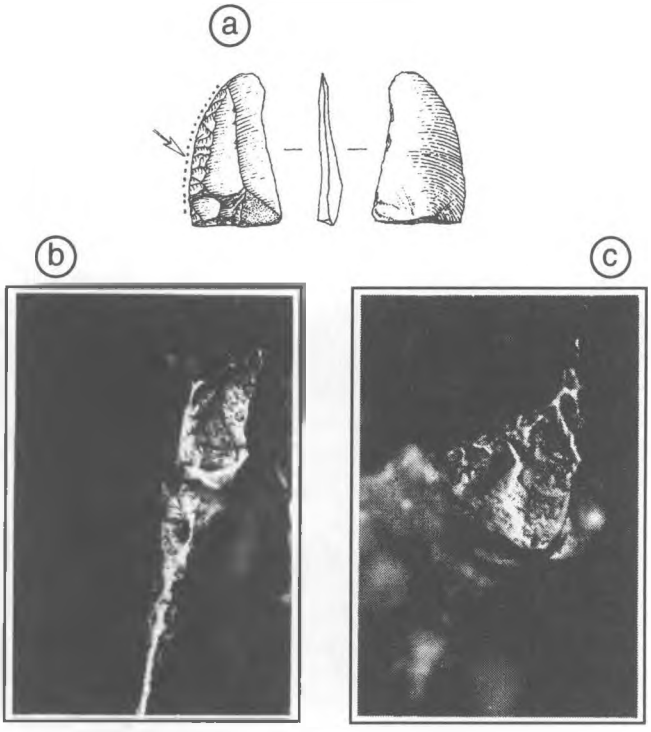

Figure 3. (A) An implement displaying a tranverse action on soft plant materials; (B) ×100 magnification; (C) ×200 magnification detail.

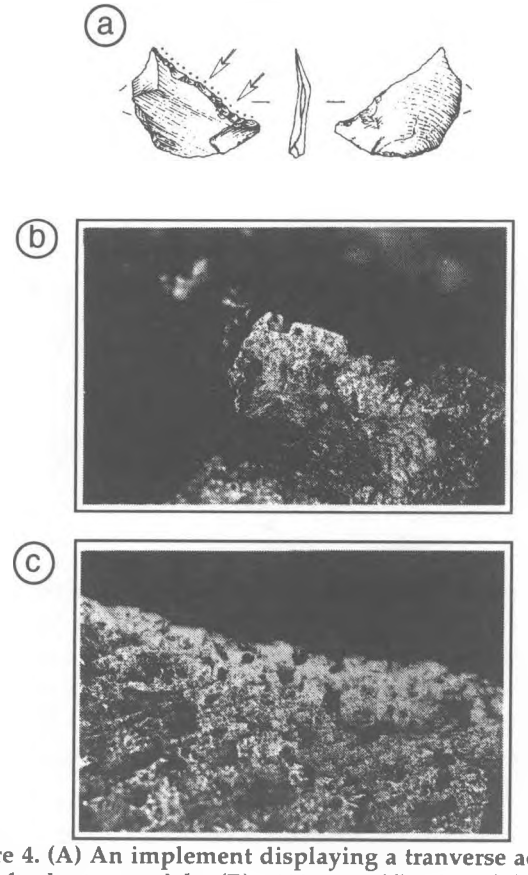

Figure 4. (A) An implement displaying a tranverse action on soft plant materials; (B) ×100 magnification; (C) ×200 magnification detail.

processing has a very important effect on the morpology of wear traces on tools (orientation of striations, extension of polish, patterns of micro-fracturing, and other attributes). A better interpretation of these plant working use wear traces would require a larger sample of archaeological tools in order to undertake comparisons (morphology of the cutting edge, distribution and extension of the various traces). As well, an extensive body of experimental tools and observations needs to be established, taking into account numerous parameters of importance (function of the tool, species worked, precise location of procurement for each species or raw material, ability of the artisan—Beyries 1993) as well as ethnographic sources.

Working Hides

Nine endscrapers show the very typical characteristics of hide working: very pronounced rounding skewed to one side along the working edge. The tools showing these wear traces are not very thick (less than 1.5 cm) and display a cutting edge that is not very wide (less than 3 cm). The size of these tools as well as their intended use seems to have required that they be hafted.

One re-fit was obtained between two tools (in Squares H and SS). This refit seems to indicate that the tool was broken in this area (Fig. 5 b–e).

Observations of artisans who still work hides using traditional techniques provide information which enable us to interpret these tools in a more precise fashion (Beyries, In press). In order for a tool in use to be effective, it is necessary for it to transmit a force (in the case of hide working, this force gives the tool the "bite" which enables the worker to remove material from the hide) and as well for this force to be given a direction (this is the movement of the tool). There are two possible scenarios.

In the first case, both the force applied and the direction of movement combine and work together. In this case, the tool works in the direction of its axis. For hideworking, this is what happens when a person works very thick hides such as those of moose. These tools are heavy, about 400 g, the hides are stretched in such a manner that the worker can sit on the hide while holding her tool in both hands together which permits the worker to place all her force in the movement of the tool. In this case, the wear patterns of the tools are always symmetrical about the center of the tool. The distribution of the wear on the cutting edges of the archaeological tools examined and the size of these tools excludes the possibility of having been used on thick hides stretched in this fashion or being used in this fashion.

In the second case, the direction of force and the direction of movement do not work in tandem. This is the case when a person works moderately thick hides such as deer or elk. These hides are prepared when dry on frames that are placed more or less perpendicular to the ground. The artisan works standing and faces the hide. In this case, the tools can be hafted in elbow (or straight) handles. This type of haft is held with one hand on the bend (or shaft end) to provide the requisite force while the other hand is placed on the main part of the shaft to direct the tool's movement. In this case, during the contact of the cutting edge with the hide, the hand providing most of the force is always at risk of slipping away from the axis of movement. Moreover, the wear on the tool's edge will always be skewed either to the right or to the left depending on the hand placed on the bend (or the end) of the haft (Beyries, in press). At Keatley Creek, the size of the tools and the distribution of the use wear clearly indicate that the second scenario was being followed.

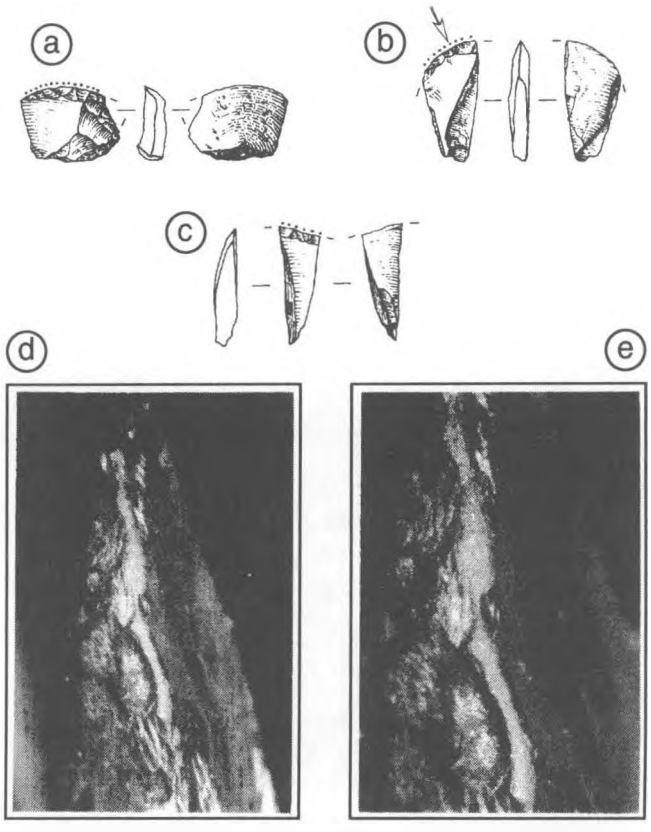

Figure 5. (A) A hidescraper; (B) and (C) fragments from a single tool; (D) pronounced edge smoothing from hide scraping (×100); (E) a detailed view of the edge (×200).

Hunting: Projectiles

Two implements display long fractures on their distal ends. One implement is a triangular piece with a wide base (Fig. 6), and one is a bifacial projectile. Both of these pieces should be interpreted as projectile points.

Summary

Although these results cannot be used to establish a view of the overall organization of the household group, they merit a certain number of comments. The activities are all craft activities: working of minerals, plants, and skin. There is no indication of activities involving the acquisition or the processing of animal flesh for consumption (butchering or preparation of fish). In terms of the preparation of fish, and salmon in particular, it has been shown that this type of work leaves few if any interpretable traces of wear on tools in general and on basalt or trachydacite in particular (Flenniken 1981; Beyries 1995). In addition, it is probable that this activity took place near fish procurement locations. As for butchering, if some of the tools examined had been used for deflesh-ing or the preparation of meat, they should have been identifiable. In fact, these activities leave very distinctive wear traces on lithic tools, especially very specific types of micro-fractures. It is curious that there is no indication of cutting skins for making clothes, since this is an activity that is recorded ethnographically (Vol. II, Chap. 2).

The concentration of ochre working, rock sculpting, and hide working in the western sector of HP 7 is also interesting since this has been identified as a high status domestic area within the house (Vol. II, Chap. 1), and since all three of these activities are ethnographically

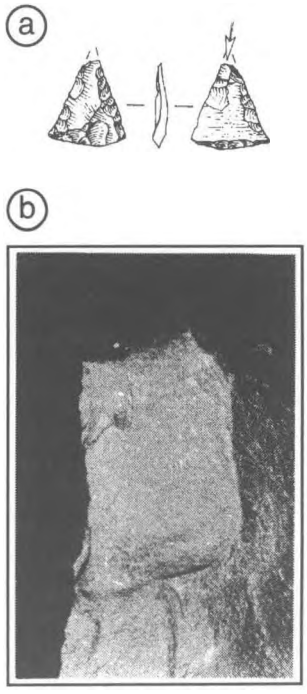

Figure 6. A projectile point.

or logically related to high status individuals and families (Hayden and Schulting 1997). Therefore it would be very interesting to compare these results with a use wear analysis of tools associated with lower status domestic groups within the same house (e.g., those on the eastern half of the floor), as well as with tools from other smaller houses which appear to have been poorer and of a relatively low socioeconomic rank (for example, HP 12 or HP 90). However, this work must await the future.

It is also interesting that almost half of the tools with endscraper morphology do not appear to have been used for hide working, but rather were used on woody plants. This means that the simple equation of endscraper frequency as a measure of the relative importance of hideworking in a household is not reliable.

Although the results of this analysis may seem disappointing in terms of the small percentage of tools that bear interpretable use wear traces, the activities of certain craftsmen has, nevertheless, been able to be documented. It is certain that these results will increase in their relevance with a more comprehensive study of the material both from within this structure and in relation to other structures in the community.

References

Alexander, Diana
1992 A Reconstruction of Prehistoric Land Use in the Mid-Fraser River Area Based on Ethnographic Data. In B. Hayden (Ed.), *A Complex Culture of the British Columbia Plateau.* University of British Columbia Press: Vancouver. pp. 47–98.

Beyries, S.
1995 Preparation et stockage des saumons sur la Fraser River (Colombie Britannique): evidence archaeologiques. *Anthropologica* 21:123–130.

Beyries, S.
In press Ethnoarchaeology: A Way of Experimentation. In L. Owen and M. Poor (Eds). *Ethno-analogy and the Reconstruction of Prehistoric Artefact Use and Production.*

Beyries, S., and Ph. Walter
1996 Racloirs et colorants a Combe Grenal. In A. Bietti, (Ed.), Reduction processes ("chaînes opératoires"). *European Mousterian Quaternaria* 6:167-185.

Beugnier, V.
1997 L'usage de silex dans l'acquisition et le traitement des matieres animales dans le neolithique de Chalain et Clairvaux. Thesis, Paris X-Nanterre.

Flenniken, J.
1981 *Replicative Systems Analysis: A Model Applied to Vein Quartz Artifacts from the Hoko River Site.* Laboratory of Anthropology, Reports of Investigations No. 59. Washington State University: Pullman.

Hayden, B. (Ed.)
1992 *A Complex Culture of the British Columbia Plateau.* University of British Columbia Press: Vancouver.

Hayden, B., and Rick Schulting
1997 The Plateau Interaction Sphere and Late Prehistoric Cultural Complexity. *American Antiquity* 62:51–85.

Moeller, R.W.
1984 Guide to Indian Artifacts of the Northeast. Hancock House: Surrey.

Petrequin, A.M., and P. Petrequin
1988 Le neolithique des lacs de Chalain et Clairvaux. Errance: Paris.

Rousseau, Michael
1992 Integrated Lithic Analysis: The Significance and Function of Key-Shaped Formed Unifaces on the Interior Plateau of Northwestern North America. Department of Archaeology Press, Vol. 20. Simon Fraser University: Burnaby.

Teit, James
1900 The Thompson Indians of British Columbia. *American Museum of Natural History Memoirs* 2(4).

Teit, James A.
1906 The Lillooet Indian. *American Museum of Natural History Memoirs* 2(5):193–300.

Tepper, L.
1994 Earth Line and Morning Star: Nlaka'pamux Clothing Traditions. Canadian Museum of Civilization: Hull, Quebec.