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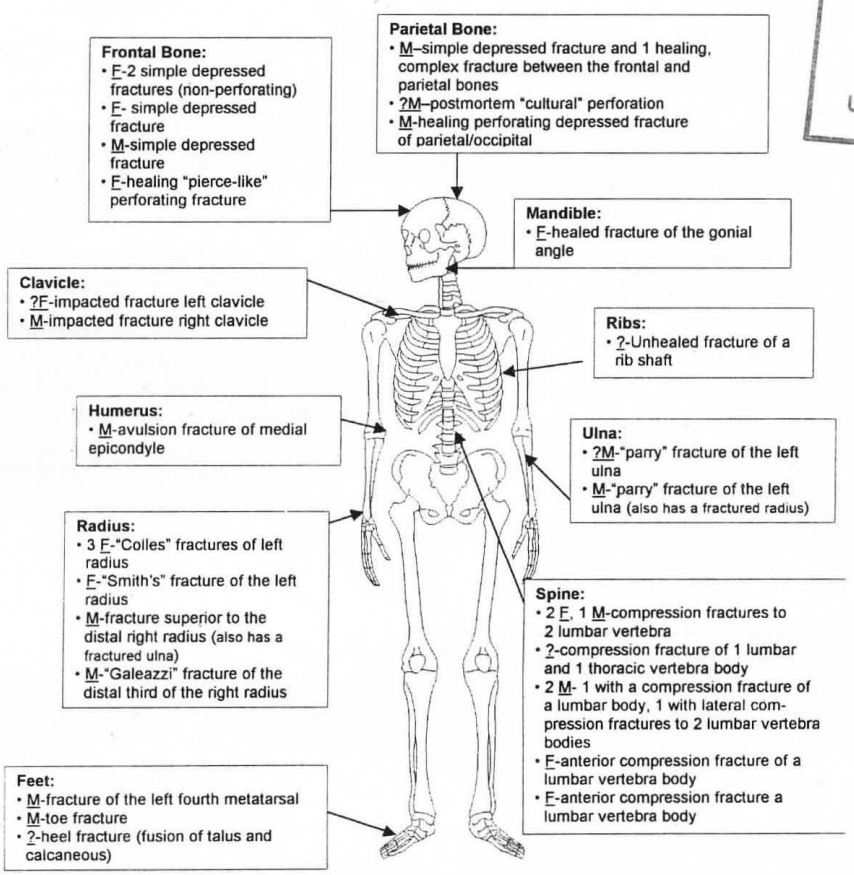

Diagram 1 Fractures from DeRt 2

Pender Island Trauma; Manufacturing Ground Stone Tools; Permits 2000

THE MIDDEN

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Editorial Committee

Editor: Heather Myles (274-4294)
heathermyles@home.com
Assistant Editor: Helmi Braches (462-8942)
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Contributors this issue

Joan Banahan, Robyn Banerjee, Joyce Johnson, Erin Strutt, Ronald Wright

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Dedicated to the protection of archaeological resources and the spread of archaeological knowledge.

President

Andrew Mason (874-9221)
andrew_mason@golder.com

Membership

Leah Pageot (687-7754)
lpageot@aol.com

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ARCHAEOLOGICAL SOCIETY OF BRITISH COLUMBIA meetings in Vancouver featuring illustrated lectures are usually held on the second Wednesday of each month from September to June at 8:00 P.M. in the Auditorium of the Vancouver Museum at 1100 Chestnut Street. New members and visitors are welcome. Admission is free.

Next lecture: 10 January, Hector Williams, UBC, speaks about new excavations at Stymphalos, Turkey. Joint ASBC/AIA meeting.

THE MIDDEN

Volume 32 No. 3, 2000

In this issue

HAPPY 2001

All of us of the editorial committee of *The Midden* wish ASBC members, readers, and faithful contributors to our quarterly a happy, healthy, and succesful New Year.

Heather, Monica, Richard, Helmi, and Fred.

Cover Page

DeRt 2 is an archaeological site at Pender Canal, excavated in the summer field seasons 1984–1986 under the management of Dr. Roy Carlson. As part of her MA-thesis research, Erin Strutt studied skeletal fractures of human remains from the site and found that individuals were well cared for and that the population must have had an excellent knowledge of the medical properties of the local flora and fauna. See page 9.

GROUND STONE TOOL TECHNOLOGY

AN EXPERIMENT IN MANUFACTURING PROCESSES

by Joan Banahan

Introduction

This report concerns the manufacture of ground stone tools. An experiment was conducted in an effort to better understand the manufacturing processes involved in ground stone tool technology. The objective of the experiment was not to make a finished, formed tool. Rather, the emphasis was on reduction processes using slate as a raw material for the manufacture of ground stone tools. However, an attempt was made to produce thinned, ground sharp edges suitable for cutting.

Ground stone tool technology was widely used in many regions of the world during pre-contact times, including North America, the Arctic, Australia, Europe, the Near East, and New Guinea. A variety of ground stone artifacts were manufactured in these regions that included hunting and fishing tools, processing tools, manufacturing tools, and ceremonial items. Despite the ubiquitous nature of ground stone tools, the emphasis in lithic analyses has been on chipped stone technologies employed by hunter-gatherers (Bamforth 1986; Grimes and Grimes 1985; Nance 1971; Odell 1981, 1994; Parry and Kelly 1986; Patterson 1985; Shott 1986, 1989). However, hunting and gathering groups on the Northwest Coast, such as the pre-contact Haida, Tlingit and Tsimshian, manufactured and utilized ground stone, bone, and shell tools. Despite this, ground stone tools are an underused source of information about technological organization, subsistence, and social relations among Northwest Coast groups (for exceptions, see Darwent 1998; Mackie 1995).

In pre-contact northwestern and northeastern North America, and in the western Arctic, slate was a common raw material used in the production of ground stone tools. The natural properties of slate and its relative abundance in these regions made it an appropriate raw material for ground stone tools. Rather than breaking conchoidally, slate tends to fracture along bedding planes, due to the parallel minerals aligned during foliation processes. However, there is much qualitative variability between and within outcrops of slate, which affect the manufacturing processes employed. Other types of lithic raw materials used in the manufacture of ground stone tools on the Northwest Coast include schist, phyllite, sandstone, basalt, nephrite, rhyolite, and andesite (Banahan 2000; Darwent 1998; Davis 1989).

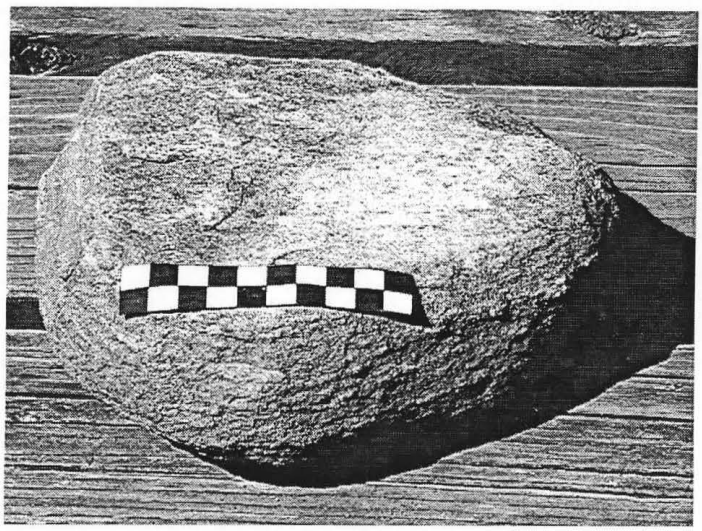

Figure 1: Coarse-grained soft abrader (sandstone).

Previous Research on Ground Stone Tool Technology

Although only a limited amount of research on the manufacture and use of ground stone tools has been published, several studies have been interesting and informative. These studies have focused on sandstone, slate, basalt, nephrite, and flint as raw materials for the production of various ground stone tools (Adams 1989; Arthurs 1974; Darwent 1998; Davis 1989; Dickson 1980; Harding 1987; Kapches 1979; Lowrey 1999; Roberts n.d.; Ross and D'Annibale 2000; Stewart 1996; Wright 1992). These sorts of analyses emphasize technological aspects such as tool form, raw material type, manufacturing techniques, and manufacturing and use wear patterns.

For example, Roberts' (n.d.) experiment on the production of a ground slate axe head focused on variation in raw material and manufacturing techniques. Using pecking as a method of primary reduction, Roberts (n.d.:1) found that a fine-grained, hard slate was the best type for the production of a sharp edge. Employing hard hammer percussion as a method of primary reduction in his attempt to make a ground slate ulu, Arthurs (1974) noted the tendency of edges to nick and chip during grinding. I encountered a similar problem during my experimental research. Arthurs (1974:10) suggests that there is a functional relationship between thickness of the edge and the angle of bevel that determines the strength and sharpness of the edge produced. Roberts

(n.d.:3) best avoided weak edges by keeping a bevel angle of 20° on a 4 mm thick edge.

Manufacturing wear and use-wear analyses on ground stone tools are not common in the literature, and what little has been done has produced equivocal results. Often it is difficult to distinguish wear patterns of manufacturing processes from those of tool use on ground stone tools. Manufacturing wear patterns on raw materials due to grinding processes may include striations and polishes. Use-wear patterns may also include striations and polishes. Adams (1989) conducted a basic use-wear analysis on replicated manufacturing and processing sandstone tools. *Manos, metates,* and abraders were manufactured and then used on stone, bone, wood, and shell. However, Adams' results were inconclusive because it was impossible to distinguish specific wear patterns created by any particular material (Adams 1989:270). Similarly, Harding (1987), in his manufacture of a ground flint axe, reached no definite conclusions concerning manufacturing wear patterns on flint. Nevertheless, in a comparison with a sample of Neolithic flint axes, he was able to suggest that a glassy polished surface may indicate that a grinding medium was left out during final stages of manufacture or during re-sharpening (Harding 1987:40). However, this polish could also be associated with the durability of the grinding stone.

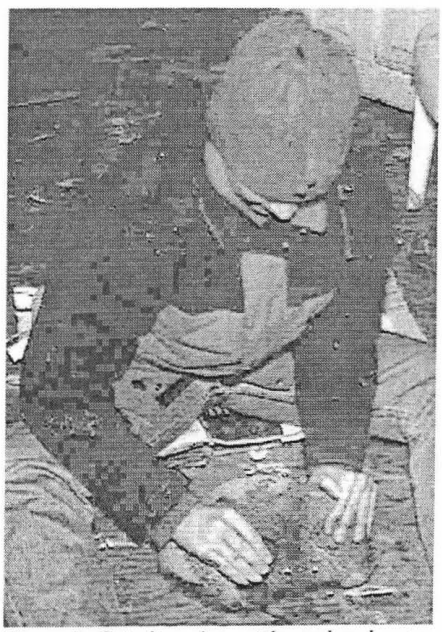

Figure 3: Grinding slate with sand and water.

Figure 4: Finished tools.

Beyond the manufacture and use of ground stone tools, some studies have attempted to place ground stone tool technology in a broader cultural context (e.g., Burton 1987; Darwent 1998; Pétrequin and Pétrequin 1993). Darwent's (1998) regional spatial analysis of pre-contact nephrite artifacts on the British Columbia Plateau indicated that nephrite had both utilitarian and symbolic functions such that the further away from the raw material source it occurred, the more salient its prestige role became. Quentin Mackie's research (1995) on Coast Salish celts from the Central Coast examined the factors that might effect the manufacture, morphology, and discard of ground nephrite celts. The failure to locate distinct celt types through cluster analysis led Mackie to suggest that non-stylistic, non-functional influences, such as the intentional prolonging of the life of a celt through reuse and re-sharpening, are important factors in celt form. Similarly, studies in Irian Jaya and central America further emphasize the complex social and economic importance of ground stone tools (Burton 1987; Horsfall 1987; Pétrequin and Pétrequin 1993).

In light of these kinds of studies, the following experiment emphasizes manufacturing processes of ground stone tools, such as reduction sequences and grinding techniques, and the effects of variation in methods and raw materials on tool manufacture.

Experiment in the Manufacture of Ground Slate Tools

Objectives

The experiment had four main goals: (1) to examine methods of slate preparation prior to grinding; (2) to investigate the effects of raw material variability on reduction and grinding processes, and thus on the resulting products; (3) to examine the role of production media in grinding methods; and (4) to compare manufacturing patterns of replicated pieces with archaeological specimens.

The methods of raw material reduction and the debitage or waste produced during manufacturing of slate tools are not well understood. For instance, it may be possible to produce a blank of sufficient size simply by smashing a nodule on the ground. Harder quality slates may require flaking for further reduction compared to softer material. As such, different types of slate may influence the methods of reduction and grinding, and the quality of the finished product. For example, highly metamorphosed or hard grades of slate may hold a sharp edge for longer; however, they may be more difficult to reduce due to their resistant nature. Softer, or low-grade metamorphic slates may be easier to grind but may break more frequently during manufacture.

As mentioned above, a major problem in the analysis of ground stone tools is distinguishing manufacturing wear from use wear on the tool. It is likely that grinding stones with various grain sizes and different grinding media were used at dif-

Figure 2: Fine-grained hard abrader (dolomite).

ferent stages in the reduction and manufacture of ground slate tools. For instance, course-grained, platform abraders would be more useful for primary shaping of a preform, whereas finer-grained, hand-held abraders would be better suited to the finishing stages of fine grinding and polishing. Discerning wear patterns from manufacturing processes on slate will help us recognize stages of manufacture in a given archaeological assemblage.

Raw Material

Slate is a good example of a foliated metamorphic rock with parallel cleavage. A parallel arrangement of platy minerals, similar to stratification layers found in sedimentary rocks, characterize foliated metamorphic rocks (Andrefsky 1998:54). As a consequence of heat and pressure during foliation processes, slate tends to fracture along these parallel lines to form parallel cleavage. The presence of cleavage in slate makes it relatively easy to split. During intense metamorphic processes, the cleavage can be destroyed and the slate often becomes "spotted," producing hornfels (Whittow 1984). There are different grades of slates due to variation in lithic properties of the parent material (generally shale or mudstone), and in metamorphic and depositional processes. As a result, variability in quality can occur between and within slate outcrops. Slate generally ranges in colour from black to dark grey, depending on the amounts of trapped carbonaceous matter and graphite. However, it does occur in green, red, brown or yellow, as a result of the variation in the amounts of iron oxides (Chesterman and Lowe 1998).

Three kinds of slate material were used in this experiment: (1) a fine-grained, hard slate, dark grey in colour, from southern Ontario; (2) a coarse-grained, soft, dark grey slate from a glacial till deposit in the Nass River valley in northern British Columbia; and (3) a medium-grained, relatively hard slate, light grey in colour that was retrieved from a beach deposit in the Prince Rupert Harbour area in northern British Columbia.

Six large platform abraders of locally available sandstones and metamorphic rocks were employed. These large rocks were obtained from the Moonstone area in south central Ontario. They were not modified in any manner prior to their use as abrading stones. Abrader types chosen were: (1) two coarse-grained, soft abraders; (2) two coarse-grained, hard abraders; and (3) two fine-grained, hard abraders. The abraders ranged in size from 25–35 cm in length, 15–25 cm in width, and 10–15 cm thickness, and fit comfortably between the knees (Figure 3). All of the abraders possessed a flat, tabular surface.

Methodological procedures

The experiment was conducted over two sessions that resulted in the production of six ground edge tools (Figure 4). Both primary and secondary reduction methods were employed prior to grinding (Table 1). The first session involved two people for two hours, resulting in the production of two single edged tools. The second session involved four people for two hours, and produced four single edged tools. Debitage in the form of flakes was collected from primary and secondary reduction stages, sorted according to size, and counted (Table 2). It is understood here that this is a very small comparative sample, therefore any interpretations are merely suggestive.

The sand employed as a grinding medium was a relatively coarse sand of medium grain size. The addition of sand aids in the grinding process by adding extra abrasive material, and water helps to prevent clogging of grains and to cool the friction heat. In one case, no grinding media

Table 1 Data for Cores and Reduction Methods Prior to Grinding

	Slate Type	Length (cm)	Width (cm)	Thickness (cm)	Primary Reduction	Secondary Reduction
		Prior to reduction				
1	soft (NR)	22	7	6	Direct smashing	soft hammer
2	soft (NR)	20.5	8.6	6.5	Direct smashing	hard hammer
3	soft (NR)	12.3	9.6	1.4	Bipolar percussion (hard hammer, billet)	none
4	hard (PR)	15	10	2.3	Bipolar percussion (billet)	none
5	hard (ON)	12.8	10	2	Direct smashing	soft hammer
6	hard (ON)	18.6	9	3.8	Direct smashing	hard hammer

NR = Nass River, PR = Prince Rupert, ON = Ontario

were used. In another case, water on its own was used as a grinding medium, whereas a mix of sand and water was used in the other four cases (Table 3).

Each session was divided into two stages: one hour was allotted for reduction prior to grinding, and one hour was spent on the grinding process. Methods of primary reduction included: (1) direct smashing, and (2) bipolar percussion. Secondary reduction methods employed were: (1) hard hammer percussion, and (2) soft hammer percussion. Observations on the effectiveness of reduction methods and breakage patterns of raw material type were recorded. During the grinding stage, edge change over time was recorded every ten minutes, along with additional observations concerning grain size, media type, and raw material type. Macroscopic analysis was conducted on the resulting single edged tools. What follows is predominantly a descriptive analysis, which is best suited to such a small sample size.

Table 2. Data for Debitage from Primary and Secondary Reduction

	Primary Reduction					Secondary Reduction				
	Flake Size	Direct Smashing. No. of Flakes	Bipolar. No. of Flakes	Mean Thickness (cm)	St. Dev.	Flake Size	Hard Hammer No. of Flakes	Soft Hammer No. of Flakes	Mean Thickness (cm)	St. Dev
1	0-5 cm	12				0-2 cm	5			
	5-10 cm	8				2-4 cm	6			
	> 10cm	1				4-6 cm	3			
				15.8	6.3	> 6 cm	1			
									10.7	3.8
2	0-5 cm	8				0-2 cm	4			
	5-10 cm	22				2-4 cm	16			
	> 10cm	3				4-6 cm	6			
				10.1	5.7	> 6 cm	4			
									8.7	2.8
3	0-5 cm		27			0-2 cm		3		
	5-10 cm		5			2-4 cm		4		
	> 10cm					4-6 cm		8		
				5.2	2.5	> 6 cm				
									6.3	1.9
4	0-5 cm		17			0-2 cm		5		
	5-10 cm		3			2-4 cm		2		
	> 10cm		2			4-6 cm		3		
				5.2	3.3	> 6 cm			5.8	1.5

Primary Reduction Sequence

Four participants primarily reduced their raw material by simply smashing it to the ground. This was an attempt to recognize basic breakage patterns of slate. In addition, I wanted to see if it was possible to produce a workable blank by this method, which in this experiment, it was not. Primary reduction was more successful using bipolar percussion. In two cases, bipolar percussion using a hammerstone and a billet was employed. Regardless of raw material type, flakes produced by direct smashing tended to be thicker and more irregular than those produced by bipolar techniques, which were thinner, flatter, and more tabular in shape (Table 2). This suggests that slate does not necessarily break naturally nor easily along its bedding planes, producing suitable blanks. Also important to note here is that in the two cases where bipolar percussion was employed, it was not necessary to reduce the selected flakes further before grinding. Raw material did not appear to be a factor, as bipolar percussion was useful for the reduction of both hard and soft material types. This suggests that bipolar technological methods may be an effective way for reducing slate to produce a suitable blank or preform. Flake debitage was collected from primary reduction processes and measured (Table 2). Selected flakes were reduced further employing hard and soft hammer percussion.

Secondary Reduction Sequence

Hard hammer percussion was used in two cases of secondary reduction, and soft hammer percussion was employed in two cases. In general, it was difficult to force all types of raw material to split completely through their bedding planes. However, it was found that in the two cases using low grade metamorphic slate, employing soft hammer percussion provided more control in the thinning process, allowing more successful splitting along bedding planes. In these two situations, hard hammer percussion was considered too hard and heavy a method for thinning due to the consistent hinge fracturing during flake removal, making the thinning process rather difficult.

On the other hand, in the two cases using high grade metamorphic slate where secondary reduction was necessary, hard hammer percussion was found to be more effective in the reduction of a blank. In these cases, soft hammer techniques appeared to thicken the edge rather than have the desired effect of thinning it. Striking a large piece of hard slate on a crack or visible bedding plane with a billet often caused flakes to break too wide and not long enough, perhaps not providing enough weight to complete a split. Such differences in these responses of material to secondary methods may be due to the variation in raw material type, although variation in knapping experience among the participants may also be a factor. Debitage from this stage of reduction was collected and measured (Table 2). The resulting preforms were also measured prior to grinding (Table 3).

Grinding Processes

As mentioned above, platform abrader types employed in grinding varied in hardness and grain size. The addition of grinding media also varied. During this stage of manufacturing, changes in the appearance of all six preforms were observed every 10 minutes for one hour.

As expected, the low grade metamor-

Table 3. Data for Preforms and Grinding Processes

	Material Type	Length (cm)	Width (cm)	Thickness (cm)	Abrader Type	Grain size	Grinding Media
		Prior to grinding					
1	soft (NR)	7.5	4	1	soft	coarse	water
2	soft (NR)	9.4	7	1.3	hard	coarse	water, sand
3	soft (NR)	8	6	1.2	hard	fine	water,sand
4	hard (PR)	8	3.2	0.6	hard	fine	water, sand
5	hard (ON)	7.8	4	1.5	soft	coarse	water,sand
6	hard (ON)	8.2	4.5	1.3	soft	fine	none

NR = Nass River, PR = Prince Rupert, ON = Ontario

phic slates were found to reduce fairly quickly such that wear patterns in the form of striations were visible within 10 minutes. This may seem advantageous, but as a result of the soft nature of the material it was difficult to hold and control an edge shape for long due to rapid modification. Edges began to nick and chip within 15 minutes, resulting in splitting of some edges. Consequently, it was found to be necessary to strengthen the edge before proceeding to grind, by blunting the edge with soft blows from a small hammerstone. This method would also be helpful in re-sharpening slate tools. However, blunting was difficult to accomplish when the preform was relatively thin, as it would break easily.

Hard material types were slower to respond to the grinding process, whereby striations from grinding were apparent after 15–20 minutes of grinding. Although there were fewer problems with weak, brittle edges on harder slates, some splitting did occur after 20–25 minutes, which was mended by blunting the edge before proceeding to grind.

Manufacturing Wear Patterns

Manufacturing wear patterns were visible on all pieces, allowing some general observations to be made. For example, a coarse, soft abrader with water produced medium striations on low grade material, resulting in a relatively smooth surface. The abrader showed evidence of wear in the forms of concavity and smoothness rather quickly (Figure 1), and the soft nature of both the abrader and raw material resulted in the production of a slurry after 10 minutes. Furthermore, a coarse, hard abrader with the addition of sand and water modified all raw material types rather rapidly, within 10 minutes. Very fine striations were noted on the ground surfaces, and the overall appearance of the surfaces was very smooth.

Similar to Harding's (1987) observations, in the case where only water was employed during grinding, a slight, translucent polish was noted on the worked edge of the tool. This was not noted on edges where sand was added. Although Harding was working with flint, as he suggests, this may be one way of recognizing the use of a grinding medium in a given assemblage. A fine-grained, hard abrader with no media produced very fine striations on the ground surface. In this case, the grinding process was very slow, between 20 and 30 minutes.

Manufacturing striations from the use of coarse grinders, sand, and water on high-grade metamorphic material tended to be of large size, which is somewhat different to what was observed on the softer material using a similar type of abrader. This may be due to the fact that softer slate is more rapidly and easily ground down. The use of a fine-grained abrader (Figure 2) with sand and water resulted in smaller, finer striations and a smoother finish.

Finished Single edged Tools

Data for the experimental edged tools are provided in Table 4. All pieces showed extensive modification, and manufacturing wear patterns indicated the direction of grinding (Figure 4). The majority of the grinding was done up and down the edge, producing longitudinal striations. Generally, chipped edges were absent on high-grade metamorphic materials, whereas they were present on low-grade materials. Worked edges were both straight and convex, and all were relatively sharp. Generally, ground surfaces of all the tools were quite smooth. However, the addition of sand in the grinding process resulted in more visible striations on the surfaces, whereas a slight polish was apparent in the case where only water was employed.

Comparison with Archaeological Tools

Six ground slate tools from the McNichol Creek site (GcTo 6) in the Prince Rupert Harbour region in northern British Columbia were chosen for a basic comparison (Tables 4 and 5). McNichol Creek is a coastal winter village dating between 2200 and 1400 BP (Coupland 1999:45). The tools chosen from this site all had extensively modified edges through manufacture, and all six exhibited possible use wear in the form of damaged edges and edge polishes. Only general observations can be made due to the small sample sizes.

The first thing to notice is the relatively standard thickness of the archaeological artifacts; maximum thickness is between 0.4 and 0.5 cm, whereas the experimental tools are generally thicker, between 0.5 and 0.8 cm. This supports the observation made by Arthurs (1974) that 4 mm is the

Table 4. Data for Experimental Tools

	Length (cm)	Width (cm)	Thickness (cm)	Edge shape	Edge angle
1	6	2.9	0.7	convex	122
2	7.9	6.5	0.7	straight	94
3	6.8	5	0.8	convex	115
4	7.3	2.6	0.5	straight	96
5	4.9	3.9	0.6	convex	106
6	5.1	4.6	0.5	convex	117

Table 5. Data for Archaeological Tools

	Length (cm)	Width (cm)	Thickness (cm)	Edge shape	Edge angle
1	6.7	0.8	0.5	straight	101
2	10.1	2.4	0.5	convex	124
3	6.5	1.9	0.5	convex	119
4	6.7	1.1	0.4	straight	128
5	5.6	0.8	0.5	straight	95
6	6	0.9	0.4	straight	96

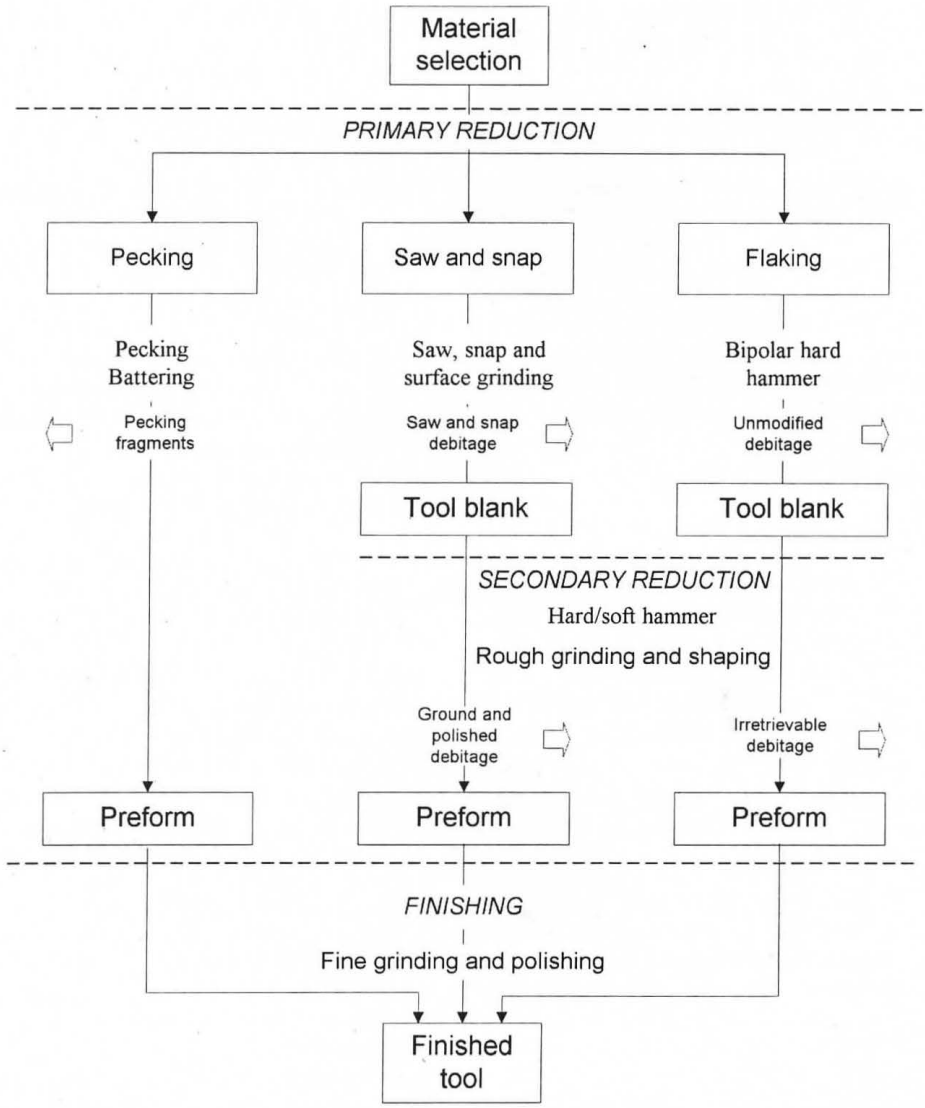

Figure 5: Manufacturing sequence for ground stone tools

most effective thickness for a strong edge. Edge angles of both sets of tools are relatively similar. Generally, differences in manufacturing and use-wear patterns among the archaeological and experimental tools were difficult to discern. However, some observations can be made.

All the tools from McNichol Creek exhibited manufacturing striations in a diagonal direction, as opposed to longitudinal striations noted on the experimental tools. This indicates that the direction of grinding for the most part was perpendicular to the edge rather than parallel to it. Generally, the striations were relatively coarse and deep on the archaeological tools, suggesting that grinding media were used. Furthermore, polishing was not carried out to any large extent on the artifacts. In fact, four out of five of the archaeological tools did not have worked body surfaces, only ground edges.

Polish was not readily apparent on the archaeological assemblage, which makes it difficult to discern any differences between polishes from use and from manufacture. However, one projectile point and one drill exhibited a slight, dark polish around the distal breaks that resulted in the loss of their tips. When compared to manufacturing polish on the experimental tools, this polish appeared to be different in that it was dark and shiny (perhaps from residue), rather than translucent. Moreover, aside from use and post-depositional processes, nicked and chipped edges on a slate tool may be caused during manufacturing, particularly if the raw material is of a soft nature.

Conclusions

Based on both experimental data and examination of archaeological assemblages (Banahan 2000), a flow chart was constructed to display the steps and processes involved in ground stone tool manufacture (Figure 5). Some conclusions drawn from the experiment include:

(1) The effectiveness of bipolar percussion as a method of primary reduction of slate was evident. The use of hard and soft hammer techniques may be more dependent on the quality of raw material.

(2) Variability in grades of slate effect both manufacturing procedures and the resulting product. Although softer slates are easier to reduce and grind, breakage during manufacturing is a likely occurrence. On the other hand, although more time-consuming to reduce, harder quality slates are more conducive to the production of a strong sharp edge, and probably hold this edge longer during use.

(3) The addition of media such as water and sand during grinding processes greatly speeds up this stage of reduction, and tends to produce highly visible manufacturing wear patterns in the form of visible striations and relative smoothness. The observation made with the most immediate archaeological application is a linking of manufacturing polish to time investment. The amount of time involved in the production of a ground stone tool is greatly increased when the tool is highly polished. This factor may have implications for ground stone tool design. One question to be asked here might be: is there a difference in the effectiveness of a tool that is intensely finished and polished versus one that is not?

In some cases, this may be a consideration. For example, nephrite takes an inordinate amount of time to reduce by grinding (Darwent 1998:39). Nonetheless nephrite implements tend to be highly ground and polished in Northwest Coast assemblages. One functional reason for this may be that nephrite celt bits that are highly polished have a greater resistance to abrasion than rough nephrite (Leaming 1978:7). Thus tool durability is enhanced through the extra effort of polishing (Mackie 1995:45).

The emphasis on worked edges among the McNichol Creek slate tools suggests a strategy in which suitable edges for use were the primary focus, whereas surface

finish was not a major concern. Ground slate knives that were used intensively in fish processing on the Northwest Coast could be manufactured rather quickly by producing ground cutting edges on large slate flakes. This experiment demonstrated that sharp ground slate tool edges can be produced in a relatively short period of time with a minimum of effort. In addition, resharpening of single-edge slate tools is fairly quick and easy. It has previously been suggested that ground slate knives were more efficient for intensive fish processing in terms of the amount of raw material used for the task, as compared to chipped stone cutting tools (Hayden 1989:15).

The manufacture and use of ground stone technology by pre-contact complex hunter-gatherers on the Northwest Coast has obvious cultural implications for such factors as mobility patterns, resource production and control, craft specialization, and group interaction. Thus, ground stone tool technology and its place in the broader context of Northwest Coast society is an important area for archaeological research. The above interpretations are merely suggestive; 12 tools in total is a very small sample. Nonetheless, much was learnt regarding the reduction of slate using methods primarily associated with chipped stone tool technologies. Other methods of slate reduction and grinding that were not replicated here due to time constraints include pecking, sawing, grooving, and snapping, and the use of hand-held abraders for fine finishing.

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Joan Banahan completed her BA and MSc at the Department of Anthropology, University of Toronto. She is currently conducting PhD research at the Department of Anthropology at McMaster University. Joan has been involved in Northwest Coast archaeology for several years. Her current research concerns the organization of production by pre-contact complex hunter-gatherers on the Northwest Coast, specifically in Prince Rupert Harbour on the northern coast of British Columbia, where she has participated in extensive fieldwork.

TRAUMA

BONE FRACTURES IN THE PREHISTORIC ADULT POPULATION FROM THE PENDER ISLAND CANAL SITE

by Erin Strutt

OSTEOLOGISTS are specialized biological anthropologists (or archaeologists) who study human skeletal remains to gain a greater understanding of humans and human culture. The inferences that can be made about a culture by studying human skeletal remains are limited to the processes that affect bone. In 1997, the skeletal remains of the adult inhabitants of the Pender Island Canal site (DeRt 2) were examined for evidence of fractures. Human bone fractures may reflect many factors about the lifestyle of individuals, for example, their material culture, economy, living environment, occupation, and interpersonal violence. In addition, the state of fracture healing may indicate dietary status, the availability of treatment, and the occurrence of complications (Roberts and Manchester 1995).

Pender Island Canal Site

The archaeological sites at Pender Canal (DeRt 1 and DeRt 2) were pre-contact shell middens that were excavated in the summer field seasons of 1984 to 1986, a project that was jointly funded by Simon Fraser University and the Heritage Conservation Branch. Dr. Roy Carlson, the project director, recommended excavation of these sites because they were located on a rapidly eroding shoreline of North Pender Island.

Radiocarbon dating yielded dates from 5170 ± 220 years BP to 840 ± 55 years BP. The shell midden at Pender Canal was used for a burial ground for over 4000 years. There were two mound features, which contained hearth and rock features; human burials; mammal, fish, and bird bones; and artifacts such as wooden spoons, microblades, and "whatsits".

Due to the compression and disturbance of the middens (by burials), it was not possible to create a stratigraphic chronology. Dr. Roy Carlson and Dr. Philip Hobler defined three depositional units using the radiocarbon dates and provenience data:

Early Midden (~5000 TO 4000 BP) – This component contained four discrete burials. Carlson and Hobler found sufficient evidence to determine that there was marine subsistence and some status differentiation indicated by the presence of simple labrets.

Main Midden (4500 to 3000 BP) – This component contained 105 discrete burials. The artifacts correspond to the Mayne cultural phase and Carlson and Hobler found that this component has evidence of craft specialization, masks and ceremonialism, social ranking, and a continuity of marine subsistence.

Late Midden (3000 to 800 BP) – The number of discrete burials was not recorded due to disturbance of the sediment. The burials were episodic. This component spans the Locarno Beach, Marpole, and San Juan phases, but Locarno Beach is the best represented. The stone technologies change from those typically seen in the Mayne phase to those seen in the Locarno Beach phase. Labret use continues and artificial cranial deformation is first seen in this component. By 2200 BP the Locarno Beach phase ended, and based upon faunal evidence and culture-specific artifacts Carlson and Hobler hypothesized that site usage changed from a winter village to a seasonal resource camp (Carlson 1985, 1986, 1993; Carlson and Hobler 1993).

Presently, First Nations people do not inhabit Pender Island. Carlson and Hobler determined that the human remains are ancestors of the Central Coast Salish who occupied this region during the historic period. Their hypothesis that site usage changed from a winter village to a seasonal resource camp is consistent with the ethnographic history of the Salish people.

The Osteology

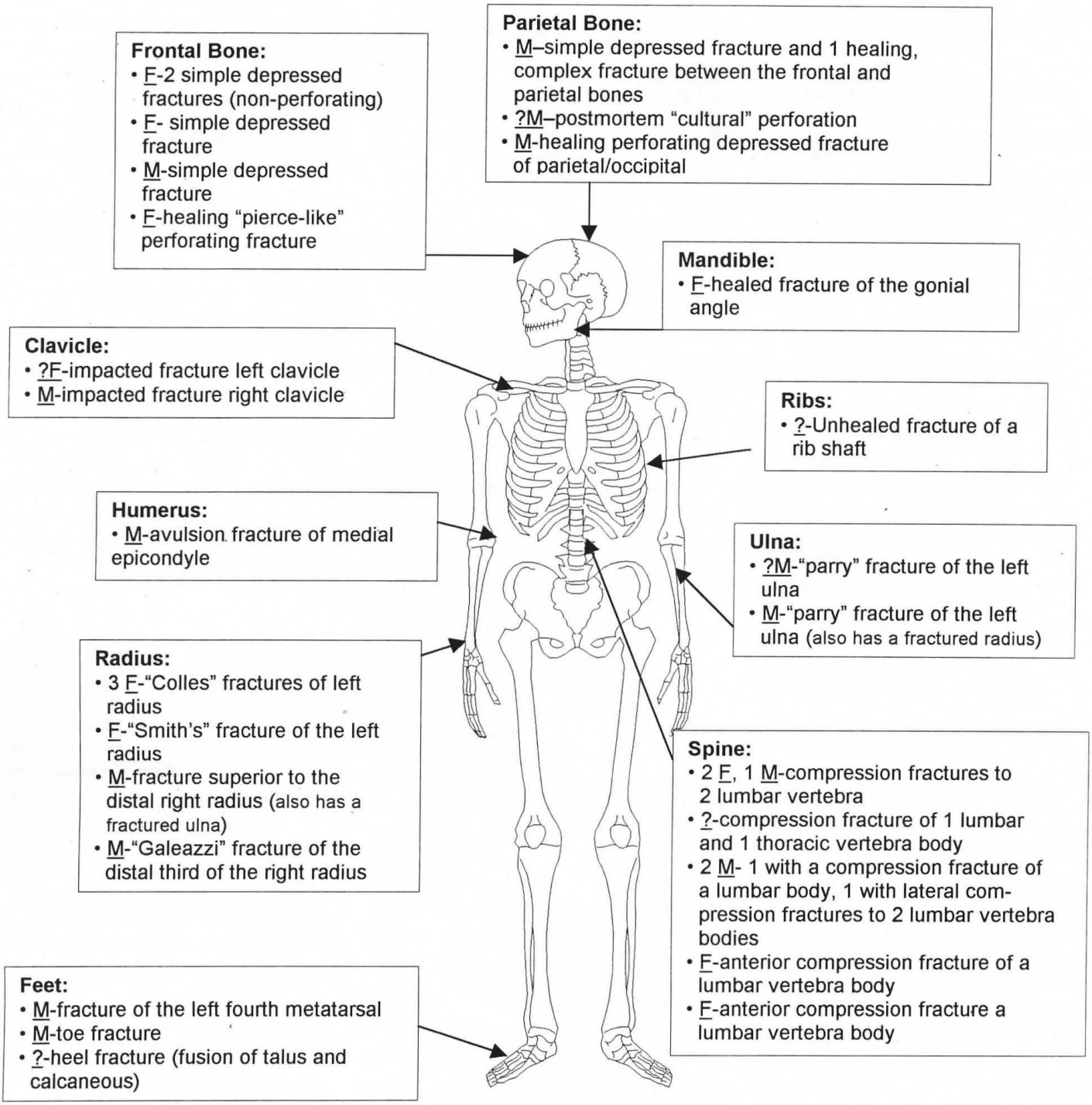
To date, there has not been a complete osteological analysis of the human remains.

During the examination of each discrete burial it was normal to find the remains of two or three individuals assigned to a single burial number. The burial catalogue lists 128 discrete adult burials. Extremely fragmentary or single-element burials were eliminated from this examination; therefore only 67 adult individuals were examined for evidence of fractures.

Table 1 – Fractures per age and sex.

Age/Sex	Female	?Female	Male	?Male	Indeterminate	Total
Young Adult (18 to25 years)	4	1	0	1	2	**8**
Early Middle Adult (26 to 35 years)	1	0	4	0	0	**5**
Late Middle Adult (36 to 45 years)	5	0	8	1	0	**14**
Old Adult (46 plus)	10	1	10	1	1	**23**
Adult (age unknown)	0	4	1	1	11	**17**
Total	**20**	**6**	**23**	**4**	**14**	**67**

Female mean stature (n=13): 154.17 cm, Male mean stature (n=8): 163.24 cm



KEY:

F – female
M – male
?F – possible female
?M – possible male
? – sex undetermined

Diagram 1 Fractures from DeRt 2

The sex of each individual was determined by metrical analysis (for example, femoral head diameter), or by examining morphological differences in the pelvis, skull, and long bones. When it was impossible to determine with certainty the sex of each individual they were assigned to a "possible female" or "possible male" category. Ambiguous individuals were assigned to an "indeterminate" category. Broad categories were used to ascribe an age at death to each individual. Methods used to determine the age at death included examination of degenerative age changes at the pelvis, dental attrition rates, and degenerative joint disease (especially in the vertebrae, knee, and shoulder). In addition, it was possible to calculate the stature of 21 individuals, 13 females, and 8 males (see Table 1) (Buikstra and Ubelaker 1994; Lovejoy 1985; Miles 1963; Trotter 1970).

Fractures

By studying skeletal trauma, osteologists can provide insights about the lifestyle and perhaps culture of individuals or populations. Fractures were studied because healing or healed fractures are readily discernable. In addition, by using modern clinical and forensic data it is possible to determine, or at least speculate about, the cause of each fracture.

Fractures cause considerable pain, and, even today, make life more difficult for the injured person. A set (reduced), healing, or healed fracture allows us to view the healing techniques and potentially the social complexity of an archaeological population. Infirm or immobilized persons required continuous care and could not contribute labour to their society, thus some level of social complexity would have been required to properly care for these individuals.

Bone is one of the hardest and most resilient structures in the human body but there are several factors which cause bone to fracture: pathological processes (e.g., osteoporosis), occupational or lifestyle stress (e.g., hairline stress fractures), and acute injury. Soft tissue injury always accompanies a fracture or dislocation both locally and generally. Depending upon the severity of the fracture, an individual may go into shock, suffer from a nerve injury, or die and/or sustain a brain injury (if the skull is fractured). Such damage may have a significant affect upon the individual, both socially and personally, during their lifetime.

Table 2 – Fractures (per sex and location)

Location/Sex	Female	?Female	Male	?Male	Sex Unknown	Total
Cranial	5	0	4	0	0	9
Postcranial	4	1	7	1	2	15
Vertebra	6	0	3	0	3	12
Total	15	1	14	1	5	36

Fractures that healed or were healing occurred well before the death of the individual and are called antemortem fractures. If death occurs before a fracture begins to heal, it may be very difficult to differentiate perimortem (at the time of death) from postmortem (after death) fractures, especially in fragmentary archaeological populations. If the skeletal elements are reconstructed it may be possible to determine if the fracture occurred prior to or at the time of death. For example, fractures to green (living-tissue) bone leave distinctive markers around the fracture site, while dry-bone (dead bone with no surrounding tissue) breaks look different.

Thirty-six antemortem fractures were discovered in 24 individuals. Twenty-eight of the fractures were healed and eight were in the process of healing when the individuals perished. (Table 2)

Discussion

Generally, osteologists have been more concerned with deliberate injury due to violence. Increased and more fatal violence can be considered an indicator of increased social complexity. Modern forensic studies document the soft-tissue and skeletal damage accompanying violence. By applying clinical and forensic knowledge to the fractures of an archaeological population it is possible to speculate about levels of social complexity, violence, and possibly weapon use within a given culture.

The Skull

The skull is a plastic medium that records the details of any object that strikes it. Depressed skull fractures are created when an object strikes the head; therefore, the cause of these fractures is interpersonal violence or self-mutilation. Further, depressed skull fractures may be simple (indentations of the outer table; brain damage rarely occurs) or complex (the skull is perforated; the depressed portion may become embedded in the brain; death or brain damage usually occur). Linear fractures are caused by accidents, the head hitting the ground, or secondary to depressed fractures.

The spatial patterning of depressed skull fractures also helps osteologists to make social and cultural interpretations. The brain and face are two of the most vulnerable areas of the body when damaged, which makes them targets for violence. The face and neck are favoured positions for violent injury both strategically (painful and disabling) and symbolically (the aggressor's social dominance are visible due to bleeding and bruising). Occipital (back of the skull) injuries are rare. Injuries to this part of the skull indicate that the individual was injured when struck from above or when fleeing from an assailant. Skull fractures at Pender Canal were consistent with these patterns, only one individual had a fractured occipital.

Five fractures were observed in four females. Of these five fractures, four are frontal bone fractures (see Diagram 1). The only female with a parietal (top of skull) fracture had the largest simple depressed fracture observed in this collection. Three of the five fractures were simple depressed fractures. The other two women had two of the more unusual fractures in the Pender Canal population. It appears that a small sharp object pierced the frontal bone of one woman and the injury was not fatal as it had almost completely healed when the woman died. Such an injury was probably caused by violent interaction, as it is unlikely that people would stab themselves in their own forehead.

The fractured mandible (jaw) of the other woman had completely healed before she had died. However, this injury is unusual in the fact that the tempomandibular joint was not affected, thus leading to the conclusion that the injury occurred during childhood. The cause of this unusual fracture is speculative at best. It is unlikely that such a fracture could be caused by an accidental fall as

the cranium would strike the ground prior to the mandible.

Four healed or healing fractures were observed in three males and a fourth male had an unhealed fracture. Male skull fractures were almost exclusively restricted to the parietals and half were complex depressed fractures. One male had a healed, simple depressed fracture on the right frontal bone. A second male had a simple depressed fracture and the largest, healing, perforating depressed fracture, both on the parietals. A third male had a complex depressed fracture in the posterior portion of the right parietal that extended to the occipital. This fracture was the only skull fracture with bone infection, which had obliterated the fracture site. This individual may have perished from the secondary infection. All other cranial fractures were not fatal.

A fourth male had a small, unhealed, perforation on the parietal. Jerome Cybulski (personal communication 1998) was consulted regarding the cause of this unusual fracture. He found the lesion to be very similar to perforations found in other Northwest Coast skulls, which were punctured after death to be suspended as a trophy. Therefore, the perforation was actually postmortem cultural manipulation.

The differences in spatial patterning of fractures between males and females may be due to a cultural patterning of violence. In archaeological populations, facial fractures and projectile-point wounds provide the best direct evidence for interpersonal violence. However, depressed cranial fractures are indicative of violence due to blunt-instrument trauma. As mentioned previously, in modern assault cases, there is a predilection for the face as a target. The female skull fractures from Pender Canal are consistent with modern data, especially domestic- or spousal-abuse data. Cranial trauma resulting from domestic abuse is usually concentrated in the facial area. Four of the five female skull fractures from Pender Canal are in the forehead or facial regions.

The pattern of cranial trauma observed in the male skulls from Pender Canal is not consistent with modern forensic data as there is not a predilection for the face. When engaging in interpersonal conflict, males from Pender Canal tended to target the parietal regions rather than the face and forehead.

Why did so many individuals with skull fractures survive? Non-fatal cranial injuries may represent various cultural practices such as ritualized violence (to settle disputes or via sports) or even self-inflicted injuries. Non-fatal cranial trauma could be representative of intragroup violence. Rather than kill each other, members of a small group, such as Pender Canal, may have practiced ritualized violence to solve disputes.

A majority of the vault injuries appear to have been caused by a weapon that created a saucer-shaped or ellipsoidal depression. The preferred weapon of Northwest Coast residents was a wooden or stone club. It is likely that such clubs would produce a saucer or ellipsoid depression on the skull.

Postcranial Trauma

Unlike cranial fractures, the causes of postcranial fractures are not always diagnostic. A majority of postcranial fractures were caused by accidents, but accidental injuries are also useful for making social and cultural interpretations. Modern clinical and forensic data has also been used to interpret the cause of postcranial fractures.

Traumatic fractures of the upper body exceed the number of lower-body fractures. Such a pattern of fractures was expected as the high incidence rates of lower-limb fractures in modern populations are attributed to automobile accidents and other forms of trauma to which the Pender Canal population was not subjected. Two individuals had impacted clavicle (collarbone) fractures that probably occurred during accidents involving a fall upon the shoulder. The only individual with a fractured humerus (upper arm) was a young male. Clinical data revealed that such fractures are common in adolescents. Habitual use, hyperflexion, or a fall upon the hand may have led to such a fracture.

Four old females fractured their distal radii (wrists). Three of the four had a Colles' fracture, which is most commonly found in post-menopausal women and is caused by a fall on an outstretched hand. The fourth female had a Smith's fracture, which is similar to a Colles' fracture but the bone is broken at the opposite angle; it is also caused by a fall.

Four radius and ulna (forearm) fractures were observed in four males; it was not possible to determine the cause of one of these fractures as it did not fit a type from modern clinical descriptions. Another male had a Galeazzi fracture, which is the term for a fracture of the lower half of the radius. Such a fracture is caused by a fall upon the hand or from a direct blow to the radius.

A male and a possible male both had Parry fractures of the lower end of the left ulna. The usual cause of such a fracture is raising the left arm to defend oneself from an assailant's blow. Parry fractures are considered one of the few fractures, in the postcranial skeleton, diagnostic to interpersonal conflict.

Only one rib fracture was found, probably due to the poor preservation of the ribs. The rib fracture was found in an individual whose skeletal elements were diseased. The bones were "biscuity" and the individual was extremely short, perhaps an achondroplastic dwarf. The rib fracture was probably caused by the pathological weakness of the skeletal elements of this individual.

Eight individuals suffered from compression fractures of the vertebra. Compression fractures may be pathological or traumatic in origin. Cybulski (n. d.) states that in younger individuals the stress of hyperflexion may cause compression fractures; older individuals may suffer from the same stress and/or they are more susceptible to compression due to age-related osteoporosis. Due to the variety in the age and sex of the individuals with compression fractures, it is likely that both pathology and trauma were causal factors.

Three individuals had foot fractures. The left calcaneus and talus (ankle) of one individual were fused. The two bones probably became fused due to an impacted fracture; the probable cause would be landing upon the feet after a great fall. An old male had a fractured metatarsal (foot) bone. Metatarsal fractures are usually the result of direct violence or fatigue. Finally, one individual had a toe fracture. The toe bones were probably impacted due to accident and then remained fused. Toe fractures, while painful, do not disable the individual.

Similar to the skull fractures, spatial patterns of postcranial fractures differ between females and males. All female fractures were confined to the upper body and the distribution of certain fracture types was expected. For example, four of the six individuals with wrist fractures were old females whose wrists were fractured when they fell. The cause of all female postcranial fractures was accident or pathological stress. Male fractures were more randomly distributed throughout the postcranial skeleton and the causes were more variable. Only males had fractures that were diagnostic of violent interaction. The fracture patterns also suggest that females and males undertook different activities. For example, the males engaged in more activities which caused fractures to the lower body.

Treatment and Healing

The alignment of the healing or healed long bone fractures in the Pender Canal population suggests that splinting and immobilization were practiced as remedial techniques. However, a large number of arm fractures had healed with considerable shortening of the limb. Therefore, traction was not a healing technique that was used by this population.

The individuals who continued to live with fractures were relatively healthy. Only one individual had evidence of nerve damage of the musculo-skeletal nerves in the form of long-bone atrophy. It appears that injured individuals were well cared for by the residents of Pender Island. It is also likely that this population had an excellent knowledge of the medicinal properties of the local flora and fauna, especially for prevention of infection, since only two individuals had clinical signs of bone infection.

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Erin Strutt received her MSc from the University of Bradford, England, in 1998. Her interest in human biology remains strong and she is currently employed as a Clinical Trial Coordinator at the Canadian HIV Trials Network. She plans to return to university to work toward a PhD sometime in the near future.

DEBITAGE

DURING THE PAST YEAR AT UBC

A lone PhD student in archaeology, **Warren Hill**, completed his dissertation on "Ballcourts, Competitive Games and the Emergence of Complex Societies." Warren was wooed by media from all over the world for his findings in Mexico, and spoke on this topic to the ASBC in June 1999.

In addition, **Martin Bale** and **Li Min** were two of the last students to have the opportunity of working with Richard Pearson before he retired this July. Martin did his thesis on "Prehistoric Settlement and Production in the Nam River Valley, South Korea." Li Min, who talked to the ASBC last year about "The Excavation at Baligang: Village Life at the Dawn of Chinese Civilization," successfully completed his thesis, "Jinan in the First Millennium BC: Archaeology and Structural History."

Eric McLay also completed his MA thesis entitled "The Diversity of Northwest Coast Shell Middens: Late Pre-Contact Settlement-Subsistence Patterns on Valdes Island, British Columbia." His thesis describes his findings of a coastal resource survey of Valdes Island in the Gulf of Georgia. Looking at limited-activity sites vs. residential sites, he shows how different pre-contact populations structured their regional settlement patterns and socio-economic organization to procure critical resources.

Following his thesis, Eric, along with **Colin Grier** and **Neil Miller** (a Penelakut Salish archaeologist) have formed a research partnership to do collective research mainly with Gulf Islands First Nations. **Coast Research** has recently received a grant for survey work in the Gulf Islands.

Last summer UBC didn't have a field school because **David Pokotylo** was in Africa from January to March helping conduct a field school organized by Langara College, and involving Dalhousie, McGill, and UBC. The ASBC heard about David's African sojourn in a lecture in October. Many of the UBC students joined **Dana Lepofsky**'s SFU field school at Deep Cove.

BOOK REVIEWS

Paradise Lost to the Plow

The Other Side of Eden: Hunters, Farmers and the Shaping of the World

by HUGH BRODY

Douglas & McIntyre, 2000.
374 pp. Price: ISBN 1550548069
$35.00 (CDN).

Nearly everyone now lives in civilization, defined anthropologically as populous, stratified societies based on farming. We six billion are the consequence of two revolutions: the Neolithic invention of agriculture, beginning in the Middle East, Asia and the Americas soon after the last Ice Age; and the Industrial, which is merely an intensification of the Neolithic. The runaway success of this experiment often blinds us to the fact that it is recent and inherently unstable. If we date the emergence of man to a million years ago, we have farmed for only one hundredth of our career. Civilization is not the way of life by which and for which we evolved.

The job we trained for is hunting and gathering, living by the wild meat and veg the Earth provides. Civilized folk view such a life as primitive and short. (Every word should be qualified with quotes, so I'll omit them.) But civilization brought a restricted diet, overcrowding, poor sanitation, and the rule of many by few—conditions that several billion know all too well today. In ancient Rome, life expectancy may have averaged no more than 20 years. In England's early industrial centres, it dipped to 17 or 18. Evidence shows that hunter-gatherers have generally worked fewer hours and lived longer than peasants, slaves, and proletarians.

Hugh Brody is a British anthropologist, filmmaker, and writer who has done much of his work among hunter-gatherers in Canada. He is perhaps best known for his 1981 book, *Maps and Dreams: Indians and the British Columbia Frontier.* He has also studied Irish potato farmers. Shaped by these contrasting worlds, *The Other Side of Eden* is a euhemerist meditation on the biblical Fall, which he equates with the domestication of plants and animals. Familiar with the Hebrew texts, Brody believes that the primordial hunters' world is recalled in the myth of Eden, the good place where God provides as long as man doesn't meddle with the scenery. Drawing on his knowledge of Inuit and other northerners, he argues persuasively that these people do indeed regard their lands as Edens. They have no desire to modify their territories or leave them for new frontiers; they wish only to know them and respect them, to live in the best way in the best place on the Earth.

Brody's evocation of the modern hunter-gatherer's world is affectionate and well done. The reader feels welcomed into the tents and cabins of the people, into their subtleties of speech and thought. Their initial otherness dissolves in a common humanity that enlarges our understanding of who we are and can be. Wanting to learn Inuktitut thoroughly, Brody apprentices himself to Inuit elders, and this becomes less a language course than an ordeal by snow, initiating him into the culture. Later, the shrewd and engaging Anaviapik, who has never before left the North, visits London to help edit an ethnographic film. Far from being awed by the teeming metropolis, Anaviapik (like Gandhi) asks to see the East End poor; and after a drive down a motorway, he observes: "Now I understand why the Qallunat [whites] come to our land to get the oil."

The murder of Jimmy Field, an Athabaskan friend of Brody's, by racist louts in Fort St. John, is told not only as a source of outrage; it belongs "in any of a hundred centuries." Echoing many a Great Plains orator, Brody insists that farmers and "settlers," not hunters, are the true nomads. Hunter-gatherers keep their numbers at sustainable levels; their relationship with nature is, ideally, eternal. Farmers, on the other hand, "assume a right to enter the wild, tame it, reshape it, farm it. And there they ... create that surplus of sons and daughters who will move on." Sooner or later, the population multiplies and goes forth murderously. The only brakes on this chain reaction are plagues that breed in cities, especially where livestock and people live side by side. These too become weapons against hunter-gatherers. Crowding and poverty provoke mass invasions, culminating with the one that began in 1492 and continues in the Amazon and Arctic to this day.

There's much to be said for this argument, and when Brody is on his northern turf he is sure-footed. But pitfalls occur when he ventures south, especially into what he calls "South" America, which seems to include Central America and Mexico. Sources in his notes are sometimes patchy and unreliable, for instance Marvin Harris on the Aztecs. Even in North America, it is simply wrong to claim that the European invasion "was, for the most part, an encounter between agriculturalists and hunter-gatherers." From the Atlantic to the Mississippi, the whites encountered farming peoples, growers of dozens of crops, especially corn, beans, and squash. Moreover, many Plains hunters had in fact been farmers, refugees from the invaded east. Brody's divide between hunting and farming isn't the issue in the European takeover of this hemisphere; hunter-gatherers were already a tiny minority by 1492. The New World's catastrophic population loss—about 90 per cent—from Old World plagues was purely the result of long isolation, and it was worst where people were most numerous: in the great civilizations of Mesoamerica and Peru.

Brody's thesis is utopian, and he doesn't let inconvenient detail clutter a good dichotomy. He gives a nod to some complications—mixed types of subsistence, warfare between hunter-gatherers, etc.—but fails to confront the biggest problem. Any book on this subject should address growing evidence that ancient hunters drove prey to extinction. Around the end of the last Ice Age, megafauna vanished as foraging humanity spread across Eurasia, America, and Australia. There was, it seems, a big-game binge.

If these archaeological suspicions are confirmed, we shall have to conclude that man has often been fatally short-sighted, no matter how chastened hunter-gatherers have since become. The leap from bison-jump to capitalist "killing" may be shorter than we think. Adam and Eve expelled themselves from Eden—by eating the place bare.

Ronald Wright

Ronald Wright read archaeology at Cambridge University and later at the University of Calgary, which awarded him an honourary doctorate in 1996. His non-fiction books include the international bestsellers *Time among the Maya* (1989) and *Stolen Continents* (1992), a history of the European invasion of the Americas as seen by native chroniclers. His first novel, the dystopian satire *A Scientific Romance*, won Britain's David Higham Prize for Fiction and was chosen a New York Times Notable Book. His new novel, *Henderson's Spear*, will be published by Knopf next September.

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DEBITAGE

DURING THE PAST YEAR AT SIMON FRASER UNIVERSITY

The Archaeology Department of SFU had five MA students complete their theses. The topics focused on a wide range of subject areas from forensic anthropology, to archaeobotany, to high-elevation archaeology in BC. The recent MA graduates include:

Sara Jane Yoshida, "The Replication of Depressed, Localized Skull Fractures: An Experiment Using *Sus domesticus* as a Model for Human Forensic Trauma."

Lisa Seip, "Early Nuxalk Masks."

Ian Franck, "An Archaeological Investigation of the Galene Lakes Area in the Skagit Range of the North Cascade Mountains, Skagit Valley Park, BC."

Natasha Lynn Lyons, "Investigating Ancient Socioeconomy in Stó:lō Territory: A Palaeoethnobotanical Analysis of the Scowlitz Site, Southwestern BC."

Rudolf Reimer, "Extreme Archaeology: The Results of Investigations at High Elevation Regions in the Northwest."

One PhD student also graduated during 2000. Carol Elizabeth MacLeod's area of research is physical anthropology, and her thesis is entitled "The Cerebellum and Its Part in the Evolution of the Hominoid Brain."

PERMITS

ISSUED BY THE ARCHAEOLOGY BRANCH
JULY - SEPTEMBER 2000

The assistance of Ray Kenny (Manager, Assessment and Planning Section) and Alan Riches (Branch Secretary) in providing this information is gratefully acknowledged. A number of recurrent abbreviations may not be familiar to many readers of *The Midden*. Most importantly, the following abbreviations refer to specific Permit types: ALT = Alteration; INS = Inspection; INV = Investigation. The most common of these are "AIA" = Archaeological Impact Assessment, "MoF" = Ministry of Forests, "SBFEP" = Small Business Forest Enterprise Program, "MoTH" = Ministry of Transportation and Highways, and "CMT" = Culturally Modified Tree. Several forest industry abbreviations occur, such as "CP," which means Cutting Permit, "FD" for Forest District, "FL" is Forest Licence, "TSL" refers to Timber Supply Licence, "TSA" is Timber Sales Area, "TFL" means Tree Farm Licence, and "TL" is Timber Licence. Less often, the following terms may appear in legal descriptions: "LD" is for Land District, "DL" refers to District Lot, "Sec" means Section, "Tp" is short for Township, "Rge" means Range, and "r/w" is short for right-of-way.

2000-201	Ian Burdikin	ALT	Alterations to DlQr 007, 010, 011, 012, 013, and 014 by forestry operations and road construction within Block 2, CP 309, located N of Westbridge in the Christian Valley, Boundary FD
2000-202	Amber Ridington	INS	AIA of Houston Forest Products and other licensees' forestry operations in the Morice FD
2000-203	Gordon Mohs	INS	AIA of forestry operations within TSL A58044, Blocks A & B, A51348, Blocks A-D, and A51349, Block A, Chilliwack FD
2000-204	Ian Wilson	INS	AIA for test trenching of placer gold deposits and associated clearing operations in claim areas RA 1, RA 2, RA 4, RA 10, and RA 11, all located near the confluence of McDame Creek and the Dease River in NW BC, in vicinity of historic site IhTh 001
2000-205	Robert Howie, Jr.	ALT	Alterations to CMTs within DgSi 014, 015, and 016 by forestry operations in Blocks 306 and 9910, FL A19234, near Toquart Bay, South Island FD
2000-206	Peter Merchant	INS	AIA for a proposed residential development near Harrison Mills, Harrison River, described as Lot 1, Sec 35, Tp 3, Rge 30, W6M, Plan 69456, except part of Plan 85959, NWD
2000-207	Chris Engisch	INS	AIA of MoF/SBFEP forestry operations in the Williams Lake, Horsefly, and Chilcotin FDs
2000-208	John Bennett	ALT	Alterations to GaUa 008 by construction of a footpath along the NE side of Masset Harbour, between Masset and Old Masset
2000-209	Joel Kinzie	INS	AIA for proposed MoF/SBFEP logging access road for TSL A60510, NTS map 94B/15, Fort St. John FD
2000-210	Hugh Middleton	INS	AIA for 2 kilometre-long access road proposed by Eiyorr Properties Ltd. for the W shore of Moyie Lake, SE BC
2000-211	Beth Hrychuk	INS	AIA of AEC Oil and Gas Ltd. and other proponents' oil/gas developments in those portions of NTS map sheet areas 94A/2 to A/7, 94A/11 to A/13, and 94B/8, A/9, A/10, A/15, A/16, within the asserted traditional territories of the Blueberry River and Halfway River First Nations, NE BC
2000-212	Beth Hrychuk	INS	AIA of Ranger Oil Ltd. and other proponents' oil/gas developments within the asserted traditional territory of the Fort Nelson First Nation, NE BC
2000-213	Beth Hrychuk	INS	AIA of Burlington Resources Canada Energy Ltd. and other proponents' oil/gas developments within the asserted traditional territory of the Fort Nelson First Nation, NE BC
2000-214	Jeff Bailey	INS	AIA for a City of Kamloops proposed water-collection well, to be located at one of several locations S of the Halston Bridge on the W side of the North Thompson River, or along the N side of the Thompson River in the vicinity of McArthur Island, North Kamloops
2000-215	Beth Hrychuk	INS	AIA of Roy Northern Land Service Ltd. and other proponents' oil/gas developments within NTS map sheets 94G/1-16, NE BC
2000-216	Beth Hrychuk	INS	AIA of Badger Pass Minerals Inc. and other proponents' oil/gas developments within NTS map sheets 94G/1-16, NE BC
2000-217	James Haggarty	INS	Site inventory and AIA for proposed water lines at Chrome Island Light Station property, Lot 126, Section 1, Nanaimo District, off the SE tip of Denman Island in vicinity of DiSe 009

2000-218	Rob Wondrasek	INS	AIA of Berkley Petroleum Corporation, Impact 2000 Inc., PetroCanada Oil and Gas, Union Pacific Resources, and other proponents' oil/gas developments within the non-overlapping portions of the Fort Nelson First Nation's asserted traditional territory, NE BC
2000-219	Beth Hrychuk	INS	AIA of Union Pacific Resources Inc. and other proponents' oil/gas developments within portions of the Fort Nelson and Prophet River First Nations' asserted traditional territories, NE BC
2000-220	Joel Kinzie	INS	AIA of J.S. Jones Timber Ltd.'s forestry operations within the Chilliwack FD
2000-221	Tanja Hoffmann	INS	Site inventory for BCAL of selected portions of Blaney Bog and surrounding areas, including Sturgeon Slough, Pitt Polder, and Katzie Marsh, bounded on the E by Pitt River and on the S by Alouette River and North Alouette River
2000-222	Geordie Howe	INS	AIA of Iisaak Forest Resources Ltd.'s forestry operations within TFL 57 at Hecate Bay, South Island FD
2000-223	Geordie Howe	INS	AIA of MoF and other licensees' forestry operations within the Fort St. James FD
2000-224	Jim McDowell	ALT	Alterations to CMTs #1 - 3 within FeTb 014, by Western Forest Products Ltd.'s forestry operations in vicinity of proposed log dump at James Bay on W side of Pooley Island, Mid-Coast FD
2000-225	Allan Bennett	ALT	Alterations to FhRt 031 by West Fraser Mills Ltd.'s forestry operations within CP 343, Block 10 (FL A20005), in the Blackwater River drainage NW of Quesnel, Quesnel FD
2000-226	Allan Bennett	ALT	Alterations FhRs 035 by West Fraser Mills Ltd.'s forestry operations in CP 33, Block 146 (FL A20005), in the Blackwater River drainage NW of Quesnel, Quesnel FD
2000-227	Beth Hrychuk	INS	AIA of Louisiana-Pacific Canada Ltd.'s forestry operations within the Dawson Creek FD
2000-228	Rico Jorimann	ALT	Alterations to CMTs within GcTg 006 by Bell Pole Company's forestry operations within Block C16013 in Chart No. 4 - Exstew Chart of FL A16836, Kalum FD
2000-229	Rico Jorimann	ALT	Alterations to CMTs within GdTd 023, GdTd 024, GdTd 025, GdTd 026, GdTd 027, and GdTd 028 by Bell Pole Company's forestry operations within Block 1, Units B, C, D, F, G, and H in Chart No. 2, Newtown Creek Chart of FL A16836, Kalum FD
2000-230	Ian Franck	INS	AIA of Bell Pole Company and other licensees' forestry operations within the Clearwater FD
2000-231	Matt Nealis	ALT	Alterations to FlSl 003 by forestry operations
2000-232	Joel Kinzie	INS	AIA of Canadian Forest Products Ltd.'s forestry operations within CBs 11038, 11039, 11040, 11041, 11042, 11043, 11044, 11045, and 11049, in the asserted traditional territory of the Halfway River First Nation, Fort St. John FD
2000-233	Brent Persello	ALT	Alterations to EaRd 015 and EaRd 016 by placement of fill for upgrading Hwy 5A, Courtenay Lake to Aspen Grove section
2000-234	Angela Buckingham	ALT	Alterations to EfQq 001 by realignment of Lybarger Road and relocation of Craigellachie Overhead, as part of construction improvements to the Trans-Canada Highway between Cambie and Revelstoke
2000-235	Rico Jorimann	ALT	Alterations to CMTs within GdTd 022 by Bell Pole Company's forestry operations in the Newtown Creek Chart of FL A16836, Kalum FD
2000-236	Gabriella Prager	INS	AIA for project revisions and additional developments proposed by Redfgern Resources Ltd. for the Tulsequah Chief Mine Project
2000-237	Doris Zibauer	INV	Systematic data recovery from EfRl 062, in the lower McKay Creek drainage, NW of the Fraser River, Lillooet FD
2000-238	Chris Engisch	INS	AIA of Western Forest Products and other licensees' forestry operations, solely within the asserted traditional territory of the Oweekeno Nation, Mid-Coast FD
2000-239	Morley Eldridge	INS	AIA of MoF/SBFEP forestry operations within the Chilcotin FD
2000-240	Mike Rousseau	INS	AIA of International Forest Products (Hope Operations) forestry operations in the vicinity of Hope and Harrison Lake, Chilliwack FD
2000-241	Karl Hutchings	INS	AIA of Alliance Pipeline Ltd.'s proposed Aitken Creek Lateral pipeline realignment between KP 19.8 and 18.8 (Fish Creek crossing) in the vicinity of Fort St. John
2000-242	Sandra Witt	INV	Systematic data recovery at EcRq 001, on the E bank of the Birkenhead River by the Pemberton Portage Road, between Mount Currie and D'arcy, 14 km NE of Pemberton
2000-243	Sheila Greer	INS	Site inventory of alpine ice patches in N BC, located within the asserted traditional territories of the Champagne and Aishihik First Nation and the Carcross-Tagish First Nation

2000-244	Sandra Witt	INS	AIA for the Miller Creek hydroelectric project in the vicinity of Pemberton
2000-245	Jeff Bailey	INS	AIA for proposed District of Saanich Parks Department developments on the N shore of the Gorge Waterway from Tillicum Bridge to, and including the Victoria Kayak and Canoe Club property, in the vicinity of DcRu 007
2000-246	Bjorn Simonsen	INS	Site inventory and AIA for proposed secondary school on a selected portion of a North Nanaimo property bounded by Oliver Road on the S, Rutherford Road on the E, and McIntosh Road on the N, Wellington District, Nanaimo
2000-247	John Maxwell	INS	Site inventory of remainder of Parcel A (DD13188N) of DLs 2 and 6; that part of DL 6 (DD232421); those parts of DL 2A and Parcel A (DD13188N) of DL 6 as shown in Plan 525R, the Remainder of DL 2A; that part of DL 2 (DD232421); DL 5 and DL 66, all located in Alberni District on Johnston Island, Shoemaker Bay and the SW shore of the Somass River near Port Alberni, in the vicinity of DhSe 002, DhSe 006, DhSf 023, and DhSf 025
2000-248	Jeff Bailey	INS	AIA of Lakeside Pacific Forest Products Ltd.'s forestry operations within Blocks 2175, 2180, 2420, 3014, and 3131, on the E and W sides of Harrison Lake, Chilliwack FD
2000-249	Hugh Middleton	INS	AIA of Crestbrook Forest Industries, JH Huscroft Ltd., Wyndell Box and Lumber Co., Creston Valley Forest Corp., MoF/SBFEP, and other licensees' forestry operations within the Kootenay Lake FD
2000-250	Andrew Mason	INS	AIA for redevelopment and construction of a gas bar and ancillary facilities on selected portions of Lots 1 and 2, Plan 16034, Section 1, Wellington District, at 2875 Departure Bay Road, Nanaimo, in the vicinity of DhRx 016
2000-251	Philip Hobler	INS	AIA for proposed developments in the Bella Coola area: (a) expansion of existing Nusatsum sand and gravel quarry N of Hwy 20 on E side of Nusatsum River 800 m from its confluence with Bella Coola River; (b) rock quarry within DL 444, and; (c) water bottling plant within the W end of DL 3, all Coast LD, Rge 3; (b) and (c) located behind and adjacent to Sutlej Point, on the S side of South Bentinct Arm immediately W of the mouth of Bella Coola River
2000-252	Carl Jones	ALT	Alterations to DgRw 004 by proposed house renovations at 1673 El Verano Drive, Lot 7, Plan 17835, Sec 28, Gabriola Island, Nanaimo District
2000-253	Ian Wilson	INS	AIA of MoF/SBFEP forestry operations within the Kalum FD
2000-254	Doris Zibauer	INS	AIA for various BCAL leased properties located on the shores of Tunkwa and Leighton lakes, 15 km S of the village of Savona on the Thompson Plateau
2000-255	Ian Wilson	INS	Post-construction AIA for selected areas of the Parkland 3D seismic programme, winter 1999-2000, within NTS map sheets 94A/1 and 2, and 93 P/15 and 16
2000-256	Keary Walde	INS	AIA of Murphy Oil Company oil/gas developments within delineated areas of NTS map sheets 94H/1 and 94H/8, NE BC
2000-257	Bonnie Campbell	INS	AIA of MoTH road construction projects in the vicinity of Canim Lake
2000-258	Eric Schroft	ALT	Alterations to CMTs within DhSl 129 and DhSl 130 by Iisaak Forest Resources' forestry operations within Block A on the W side of Hecate Bay and Block C on the W side of Cypress Bay, TFL 57, South Island FD
2000-259	Clinton Coates	INS	AIA of Skeena Cellulose (Terrace Operations) forestry operations within the Kalum FD
2000-260	Mike Rousseau	INS	AIA of International Forest Products (Hope Division) forestry operations E of Harrison Lake near Hope, Chilliwack FD
2000-261	Keary Walde	INS	AIAs of Encal Energy, Shell Canada, Anderson Exploration, and other petrochemical companies' oil/gas exploration within the non-overlapping asserted traditional territory of the Blueberry River First Nation, NE BC
2000-262	Gabriella Prager	INS	AIA of MoF/SBFEP forestry operations within the Penticton FD
2000-263	Keary Walde	INS	AIA for proposed MoTH Aurora gravel and exploration area, d'Easum Creek, NE BC
2000-264	Chris Engisch	INS	AIA of International Forest Products Ltd.'s forestry operations solely within the traditional territory of the Gwa'Sala-Nakwaxqa'xw, Port McNeill FD
2000-265	Beth Hrychuk	INS	AIA of MoF/SBFEP forestry operations within the Dawson Creek FD
2000-266	Rob Vincent	INS	AIA for a 3 x 9 m house addition at 10680 Blue Heron Road, North Saanich (Strata Lot 3, Strata Plan 923, Sec 17, Rge 3E, North Saanich District), vicinity of DeRu 001
2000-267	Ian Wilson	INS	AIA for a proposed housing subdivision for the S half of Sidney Island, located off the E shore of Saanich Peninsula, Cowichan LD
2000-268	Renée Carriere	INS	AIA of Plateau Forest Products and other licensees' forestry operations within the Vanderhoof FD

2000-269	Monty Mitchell	INS	AIA of MoF/SBFEP forestry operations in portions of TSLs A64723 (Robert Arm), A64727 (Naysash Inlet), A64721 and A64722 (Moses Inlet), A64719 and A64720 (Boswell Inlet), within Mid-Coast FD
2000-270	Rob Lackowicz	INS	AIA for West Kootenay Power's proposed 230 kV transmission line from Kootenay Canal at South Slocan to the Brilliant Dam N of Castlegar, S along the E side of the Kootenay River, across the Columbia River, then S along the W side of the Columbia to Waneta on the Canada/USA border
2000-271	Chris Engisch	INS	AIA of Hecate Logging, TimberWest Forest and other licensees' forestry operations within the Campell River FD
2000-272	Beth Hrychuk	INS	AIA of Canadian Forest Products Ltd.'s forestry operations within TFL 48 and FL A18151, Dawson Creek FD
2000-273	Brian Pegg	INS	AIA of BC Parks lands surrounding Strawberry Lake, located in the Marble Range 20 km NW of Clinton
2000-274	Robert Muir	INS	Archaeological inventory of a portion of the Osoyoos Indian Band's aboriginal interest area situated to the NE of Osoyoos within the vicinity of three traditional highland trails leading to Mt. Baldy, Penticton FD
2000-275	Beth Hrychuk	INS	AIA of Chetwynd Forest Industries and West Fraser Mills Ltd.'s forestry operations within the Dawson Creek FD
2000-276	Mike Rousseau	INS	AIA of Riverside Forest Products (Soda Creek Division) forestry operations within the asserted traditional territories of the Alexis Creek, Stone, Anaham and Xeni Gwet'in First Nations in the Chilcotin FD
2000-277	Gloria Fedirchuk	INS	AIA of Wascana Energy Inc.'s existing oil/gas developments located N of the Little Hay River, NTS map sheet 94 I/9E, Blocks A, B, G-J, NE BC
2000-278	David Schaepe	INS	AIA of MoF/SBFEP forestry operations within TSL areas A39512, A56193, A56509, A58019, A58020, A58021, A58022, A58033, A58035, A61062, and A61737, Chilliwack FD
2000-279	Philip Hobler	INS	AIA of JCH Forestry Ltd.'s forestry operations within DL 7, Rge 3, Coast Land District, on South Bentinct Arm adjacent to Taleomy Reserve 3
2000-280	Renée Carriere	INS	AIA of Chilcotin Forest Products, One Eye Outfit, and other licensees' forestry operations within the Western Supply Blocks, Chilcotin FD
2000-281	Ian Franck	INS	Archaeological inventory of selected areas of the highlands above Okanagan Lake between Bouleau and Ewer creeks, W of Vernon
2000-282	Geordie Howe	INS	AIA for Department of Fisheries and Oceans proposed access road to Babine River Fish Weir camp, on E bank of Babine River NE of Smithers
2000-283	Harry Grimm	ALT	Alterations to DhRq 031 by development of a multiple housing complex at 5766 - 148th Street: Lots 1 and 2 and Portion Dedicated Road, Sec 10, Tp 2, NWD, Plan LMP43323, and Parcel "A" (reference plan with charge deposited 40852C) of the W ½ of the W ½ of the SW ¼ of the SE ¼ Sec 10, Tp 2, except firstly, Parcel "One" and secondly, W 33 feet, NWD, City of Surrey
2000-284	Dave Schaepe	INS	AIA for proposed BC Parks' walking trail and footbridge at the W end of Chilliwack Lake, in Chilliwack Lake Provincial Park
2000-285	Dieter Thiess	ALT	Alterations to EiRb 017 and EiRb 019 by construction of CNR Chu Chua Siding extension, N of Kamloops
2000-286	Ian Wilson	INS	AIA for Department of Fisheries and Oceans Langara Island lighthouse and associated facilities located on DL 2077, Queen Charlotte LD
2000-287	Beth Hrychuk	INS	Post-impact AIA of completed Canadian Forest Products Ltd.'s forestry operations within TFL 48 and FL A18151, Dawson Creek FD
2000-288	Chris Engisch	INS	AIA of International Forest Products and other licensees' forestry operations within the Sunshine Coast FD
2000-289	Andrew Mackay	ALT	Alterations to CMTs within FgTf 011 by International Forest Products Ltd.'s forestry operations in the Surf Inlet operating area of the Outer Coast TSA of FL A16841, North Coast FD
2000-290	Susan Woods	INS	AIA of MoF/SBFEP, Canadian Forest Products, and other licensees' forestry operations within the Prince George FD
2000-291	Ian Franck	INS	AIA of Ainsworth Lumber Company's forestry operations within CP 999, Lillooet FD
2000-292	Carlos Rodriques	ALT	Removal by International Forest Products Ltd. of three lumber drying kiln structures, foundations, and underlying till, and replacement with a new drying kiln and a cooling

			shed, at the Hammond Cedar Division property in Port Hammond, in the area of DhRp 017, on the N bank of the Fraser River
2000-293	Ian Wilson	INS	AIA of International Forest Products (Campbell River Operations) forestry operations within the Port McNeill FD
2000-294	Ian Franck	INS	AIA of Ainsworth Lumber Company's forestry operations within CP 178, Lillooet FD
2000-295	Allan Bennett	ALT	Alterations to FhRu 019 by West Fraser Mills Ltd.'s forestry operations within CP 343, Block 8 (FL A20005), in the Blackwater River drainage NW of Quesnèl, Quesnel FD
2000-296	Keary Walde	INS	AIA of oil/gas developments within the non-overlapping portions of Doig River First Nation asserted traditional territory, as delineated in the permit application on NTS map sheets 94 A/1, 7-10, 15-16, and 94 H/1-2, 7-10, 15-16, in NE BC
2000-297	Robert Ziegler	ALT	Alterations to CMTs #1, 2, 9, 10, 11, 14, 21, and 26 within GdTc 060 by Skeena Cellulose (Terrace Woodland Operations) forestry operations associated with CB Q73506, in the Zymoetz River valley, Kalum FD
2000-298	Paul Anderson	ALT	Post-construction investigations at GlRb 002, GlRb 003, GlRb 004, HaRc 011, HaRc 035, HaRc 036, HaRd 025, HaRd 037, and HaRd 039, associated with construction of the Alliance Pipeline, Fort St. John Lateral
2000-299	Ian Wilson	INS	AIA for proposed widening of an existing 20 km-long BC Hydro transmission line corridor from Fort Babine at the N end of Babine Lake, NE to a point approximately 4 km N of Friday Lake
2000-300	Richard Gilbert	INS	AIA of forestry operations within TSL A55573, A55827, A56040, and A56041 in the Quesnel FD, TSL A63788 and A63789 in the Horsefly FD, and TSL A53685 (Blocks 6-9) in the Williams Lake FD
2000-301	Ian Franck	INS	Site inventory of selected portions of the Shuttle and Olalla Creek highlands between Nickle Plate Lake and the Shuttle Creek/Keremeos Creek confluence, Penticton FD
2000-302	Normand Canuel	INS	Site inventory within selected areas of the Bulkley/Cassiar FD on behalf of the MoF
2000-303	Marianne Berkey	INS	AIA for International Wayside Gold Mine Ltd.'s Cariboo Gold Project, located in the Quesnel Highlands, near Wells S of Jack of Clubs Lake
2000-304	Susan Rogers	ALT	Alterations to DhRr 008 by construction of a protective berm in Cates Park by the District of North Vancouver
2000-305	Marianne Berkey	INV	Systematic data recovery at FfRo 23, at the intersection of Gook and Hydraulic roads (Dragon Lake IR#3), near Quesnel
2000-306	Michael Mitchell	ALT	Alterations to EjSx 006 by proposed replacement of an existing wharf and upgrading of an access road by the Canadian Coast Guard at Addenbroke Island Light Station property, DL 1127, Rge 2, Coast District, on the W side of Addenbroke Island, Fitz Hugh Sound
2000-307	Walt Kowal	INS	Inventory and AIA for 31 small residential lots throughout the central interior of BC and managed by the Kamloops BCALC office
2000-308	Monty Mitchell	INS	AIA of International Forest Products Ltd.'s forestry operations within FL A16850 520C, 521E, 523B, 527, 529, 544A, 546, and 605B, in the vicinity of Kwatna Inlet, Mid-Coast FD
2000-309	Monty Mitchell	INS	AIA of International Forest Products Ltd.'s forestry operations within the asserted traditional territories of the Heiltsuk and Nuxalk First Nations, Mid-Coast FD
2000-310	Ian Franck	INS	AIA of Ainsworth Lumber Company's forestry operations within CP 114 and CP 115, Lillooet FD
2000-311	Brent Smith	ALT	Alterations to CMTs within GdTs 030 by Skeena Cellulose Inc.'s forestry operations in CB H43614, E of the Kitsumkalum River and N of Deep Creek, Kalum FD
2000-312	Gary Skelton	ALT	Alterations to DhRx 016 by redevelopment/construction of a gas bar and ancillary facilities at 2875 Departure Bay Road, Lots 1 & 2, Plan 16034, Sec 1, Wellington District, Nanaimo
2000-313	Morley Eldridge	INS	AIA of MoF/SBFEP and other licensees' forestry operations within the South Island FD
2000-314	Mike Rousseau	INS	AIA of International Forest Products (Hope Operations) forestry operations within harvesting blocks at Squeah, Lower Emory, and Gordon Creek, E of Harrison Lake near Hope, Chilliwack FD
2000-315	Ian Franck	INS	Site inventory study of selected portions of the Scotch Creek watershed and the Hunakwa Lake - Anstey River area, Salmon Arm FD

2000-316	Clinton Coates	INS	AIA of MoF/SBFEP forestry operations within TSL A59351, A62516, A61402, and other possible blocks, Kispiox FD
2000-317	Geordie Howe	INS	Site inventory and AIA for proposed Garibaldi at Squamish Ski Resort project, located NE of Squamish on the SW slopes of Garibaldi Mtn., adjacent to and within Garibaldi Provincial Park
2000-318	Sheila Minni	INS	AIA for proposed 2 km-long expansion of Hwy 97 immediately W of Okanagan Lake floating bridge, 3 associated graving-dock sites at Bear Creek Park, and a rest area on Hwy 97 approximately 3.5 km N of Penticton
2000-319	Ian Wilson	INS	AIA of J.S. Jones Timber Ltd.'s forestry operations on the W side of Harrison Lake within Stó:lō and Chehalis asserted traditional territories, Chilliwack FD
2000-320	David Nicholson	ALT	Alterations to CMTs #1-8 within GdTd 029 by MoF/Terrace Woodlands Operations forestry operations in Block 1, TSL A64761 at Deep Creek, Kalum FD
2000-321	Morley Eldridge	INS	Site inventory in selected areas of Ditidaht asserted traditional territory W of the Esquimault & Nanaimo Land Grant boundary, W coast of Vancouver Island, South Island FD
2000-322	Les Huffman	ALT	Alterations to Nyan Whetl Heritage Trail (Fraser Lake-Stuart Lake Carrier Pack Trail – GcSc 017) by construction of a road crossing in Woodlot 1211, Fort St. James FD
2000-323	Monty Mitchell	INS	AIA of MoF/SBFEP forestry operations within portions of TSL A64786, A64787, and A64788 in the Spiller Inlet/Snass Lake area, and TSL A45330, Block P8 on Pierce Bay off Darby Channel, Mid-Coast FD
2000-324	Walt Kowal	INS	Site inventory and AIA of proposed Woodlot 504 expansion, DP Z, on the N side of Lowry Lake, Horsefly FD
2000-325	Dave Dobi	ALT	Alterations to EfRl 062 by forestry operations within Block 13, CP 100, FL A18700, on the lower McKay Creek drainage NW of the Fraser River, Lillooet FD

LOOK FOR

Ethnographic Eyes, In Honour of Douglas Cole, a special double issue of *BC Studies* (No. 125/126) edited by Wendy Wickwire. The issue will appeal to anyone interested in anthropology, history, art history, museum studies, and First Nations studies on the Northwest Coast. Contributors to the issue include Regna Darnell, Ira Jacknis, Judith Berman, Gloria Frank, and Nusqimata (Jacinda Mack). The issue also contains a complete bibliography of Douglas Cole's publications. The issue can be purchased for $20 (Cdn) plus postage (or as part of a subscription) from *BC Studies*, University of British Columbia, 161-1855 West Mall, Vancouver, BC, V6T 1Z2.

NEWS ITEMS

BC 2000 Book Awards

To mark the millennium, the British Columbia 2000 Book Awards honoured some of the best titles published in the province. The program's aim is to help support BC publishers, profile BC books and authors, and help put more BC books in school libraries. Several of the 64 books honoured focused on First Nations. They include *Mythic Beings: Spirit Art of the Northwest Coast* by Gary Wyatt, *Out of the Mist: Treasures of the Nuu-chah-nulth Chiefs* by Martha Black, *The Terror of the Coast: Land Alienation and Colonial War on Vancouver Island and the Gulf Islands* by Chris Arnet, and *Those Who Fell From the Sky: A History of the Cowichan People* by Daniel P. Marshall.

CRM Courses at UVic

The following professional development courses are being offered on campus at the University of Victoria in the Cultural Resource Management Program during 2001.

- Museum Information Management, instructor James Blackaby, February 19-24.
- Public Programming, instructor Kathleen Kuba, March 26-31.
- Managing Heritage Conservation Projects, instructor Harold Kalman, April 2-7.
- Cultural Tourism: Planning and Partnership, instructor Brian White, April 30-May 5.

For more information contact Joy Davis, Program Director, Cultural Resource Management Program, Continuing Studies, University of Victoria, PO Box 3030 STN CSC, Victoria, BC, V8W 3N6; tel. (250) 721-8462; fax (250) 721-8774; e-mail: joydavis@uvcs.uvic.ca; Web site: http://www.uvcs.uvic.ca/crmp.

Graduate Program in Curatorial Studies

A new master's Program in Critical Curatorial Studies will launched in September 2001 by the Museum of Anthropology, together with the UBC Department of Fine Arts and Department of Anthropology and Sociology, and the Belkin Art Gallery. The two-year program will offer a specialization in either anthropology or art history. For more information and to receive application forms contact Dr. Kersti Krug, Director of Studies, (604) 822-9859 or krug@interchange.ubc.ca.

Kwaday Dän Sinchì

Photographs of the investigation of Kwaday Dän Sinchì (BC's "Ice Man"), conducted in a glacial field in Tatshenshini-Alsek Wilderness Park last August, are available on the Ministry of Small Business, Tourism and Culture's Web site at http://www.sbtc.gov.bc.ca/news/99sep/fg_map.htm. Several pictures of the artifacts recovered from the archaeological site are also included, which have been radiocarbon dated to approximately 550 years old.

A public information session was held November 30th at the University of Victoria to discuss the research and the initial findings. An April news release from the ministry outlined some of the proposed research currently being undertaken on Kwaday Dän Sinchì, which includes reconstructing the man's DNA profile, studying the associated botanical remains, and conserving the animal skin robe found with the human remains. The news release is available on-line at http://www.sbtc.gov.bc.ca/news/2000april/kwaday_dan_sinchi.html. The human remains will be transferred from the Royal British Columbia Museum back to the Champagne and Aishihik First Nations by December 31, 2000.

British Columbia Heritage Trust Scholarships and Student Prizes

The British Columbia Heritage Trust annually awards student scholarships as part of its mandate to gain further knowledge and increase public awareness, understanding, and appreciation of BC's heritage. The Trust awards up to 10 student prizes of $500 for post-secondary education to grade twelve students graduating from high schools in British Columbia. They also award a scholarship of up to $5000 to assist a meritorious student in an undergraduate degree program at a university in British Columbia, and up to three scholarships of up to $5000 to students in a graduate or professional degree program at a Canadian university.

The purpose of this investment is to encourage research and scholarship that will have a practical application at the provincial or community level in the field of heritage conservation, or will contribute to telling the complete story of British Columbia's history. Heritage Trust scholarships may be applied to an appropriate program of study in any heritage-related discipline such as ethnology, archaeology, heritage preservation, and museology.

The application deadline for Student Prizes is February 28th, 2001. The application deadline for University Scholarships is February 16th, 2001. For further information and to obtain application forms contact the British Columbia Heritage Trust, PO Box 9818, Stn Prov Govt, Victoria, BC, V8W 9W3; tel. (250) 356-1433; fax (250) 356-7796; e-mail: heritage@tbc.gov.bc.ca; Web site: http://www.heritage.gov.bc.ca/trust/

DEBITAGE

Looking for archaeological field work? Check out www.egroups.com/group/shovelbums, a cultural resource management (CRM) job posting service that was started in 1999 by an archaeology student. The site is dedicated to helping CRM specialists from field technicians to project managers find paying CRM field, office, and lab jobs. Most of the listings are for jobs throughout the United States, however the occasional CRM job in BC and Canada has appeared.

The BC Association of Professional Consulting Archaeologists (BCAPCA) has a mailing list that is open to the public. To subscribe send the message "subscribe BCAPCA-list your full name" to List@BCAPCA.BC.CA.

In BC and across the rest of Canada, the third week of each February is set aside to celebrate heritage. Heritage Week 2001 will be held February 19th to 25th. This year's theme is "Transportation". The objective of Heritage Week is to encourage communities and individuals across Canada to celebrate and explore their heritage. The theme of Heritage Week 2002, which will be held February 18th to 24th is "Industrial Heritage".

The Society for American Archaeology's (SAA) quarterly newsletter *Archaeology and Public Education* is now being posted on-line. The print version is no longer available. Check out the fall issue on their Web site at www.saa.org/PubEdu/a&pe/index.html. Their entire collection of back issues will soon be available on-line.

The Museum of Anthropology's archives are available by appointment on Monday, Tuesday, and Wednesday. Contact MOA at (604) 822-1946 to inquire.

LECTURES

UNDERWATER ARCHAEOLOGICAL SOCIETY OF BRITISH COLUMBIA (UASBC)

UASBC's Oceans of History Speaker Series 2001

The UASBC is a non-profit society for people interested in BC's underwater heritage. The society meets on the last Wednesday of every month at 7:00 p.m. at the Vancouver Maritime Museum, 1905 Ogden Avenue. Admission is free and non-members are welcome.

January 31 - TBA

February 28 - "The Red Bay Chalupa: A 430 Year-Old Whaleboat Returns to Labrador" (Charles Moore, Parks Canada)
Parks Canada archaeologists excavated a 16th-century Basque whaling ship and an amazingly well-preserved whaleboat, or "chalupa", from the cold waters of Red Bay. Charles Moore tells the fascinating story of the Basques, their shipbuilding prowess and their whaling techniques, focusing on the whaleboat, its excavation, conservation, reassembly, and proud return for display at the National Historic Site at Red Bay, Labrador.

March 28 - "The Capture of the Schooner Vancouver by the Haida in 1834" (Steve Acheson, Archaeology Branch)
An account of the events surrounding the loss of the HBC schooner Vancouver to the Haida in 1834 serves to illustrate the complex, often volatile nature of the coastal trade and of Native-Anglo-American relations on the Northwest Coast.

April 25 – "UASBC Explorations: The Year in Review" (Jacques Marc, UASBC Explorations Director)

CONFERENCES

2001

January 3-6 **Archaeological Institute of America (AIA)**, 102nd Annual Meeting
San Diego, California, USA

The AIA meeting brings together professional and avocational archaeologists from around the world to learn about the latest developments from the field. The meeting agenda and preliminary programme are available on the society's Web site. On-line registration forms are also available. Advanced registrations must be received by December 20, 2000.

Contact: *AIA Conference Manager, Jennifer Moen, AIA headquarters, Boston University, 656 Beacon Street, Boston, MA, 02215-2006; tel. (617) 353-9361; fax (617) 353-6550; e-mail: aiamtg@bu.edu; Web site: www.archaeological.org*

January 10-13 **Society for Historical Archaeology (SHA)**, 2001 Conference on Historical and Underwater Archaeology
Long Beach, California, USA

This year's conference theme is education, and how archaeologists have used education to promote and advance the field of archaeology. The conference program, including information about pre-conference tours and workshops, can be downloaded from the society's Web site.

Contact: *SHA Conference 2001, PO Box 2667 Long Beach, CA, 90801, tel. (562) 424-0201; fax (562) 290-0064; Web site: www.sha.org/sha_mtg.htm*

April 18-22 **Society for American Archaeology (SAA)**, 66th Annual Meeting
New Orleans, Louisiana, USA

New to the SAA Annual Meeting is an "electronic symposium" consisting of up to 16 papers that will be made available on the SAA web site one month prior to the meeting. Participants and attendees may read papers before the meeting allowing the entire session to be devoted to discussing issues raised by the papers.

Contact: *SAA Headquarters, 900 Second St. NE #12, Washington DC, 20002-3557, USA; tel. (202) 789-8200; fax (202) 789-0284; e-mail: meetings@saa.org; Web site: www.saa.org*

May 9-13 **Canadian Archaeological Association (CAA)**, 34th Annual Meeting
Banff, Alberta

Contact: *Lesley Nicholls, Conference Coordinator, CAA 2001, Department of Archaeology, University of Calgary, Calgary, Alberta, T2N 1N4; tel. (403) 220-7131; fax (403) 282-9567; e-mail: nicholls@ucalgary.ca; Web site: www.canadianarchaeology.com*

November 14-18 **34th Annual Chacmool Conference** "An Odyssey of Space"
Calgary, Alberta

The deadline for early submissions of session topics is January 15, 2001. The deadline for early submissions of paper abstracts is February 15, 2001. Potential sessions include: How Space is Defined; How Space is Used; Public Space; Landscapes; Archaeoastronomy; The Cosmos; Mapping Space; Sacred Space; Ancient Maritime Utilization of Space; The Temporalization of Space; Geoarchaeology; Spatial Analysis; Ethnographic Studies of Space; and Spatial Data Management within CRM. More session proposals are welcomed, and late submissions will be accepted. Abstracts can be submitted via electronic submission forms.

Contact: *2001 Conference Committee, Department of Archaeology, University of Calgary, 2500 University Drive NW, Calgary, AB, T2N 1N4; tel. (403) 220-7120; fax (403) 282-9567; e-mail abstracts to Christine Cluney cjcluney@ucalgary.ca, Janet Blakey jsblakey@ucalgary.ca, or Kathryn Reese-Taylor kreeseta@ucalgary.ca; Web site: www.ucalgary.ca/UofC/faculties/SS/ARKY/Dept_Files/conference.html*

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P.O. Box 520
Bentall Station
Vancouver, B.C.
V6C 2N3

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