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Compiled by

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Objectives

These Occasional Papers are designed to permit the rapid dissemination of information resulting from Historical Resources' programmes. They are intended primarily for interested specialists, rather than as popular publications for general readers. In the interests of making information available quickly to these specialists, normal publication procedures have been abbreviated.

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AN INTRODUCTION TO ARCHAEOLOGY IN ALBERTA IN 1983

Paul F. Donahue
Archaeological Survey of Alberta

The format of this annual review is similar to that of the past two years in that emphasis is placed upon abstracts of 1983 projects and those 1982 permits not previously published, as well as papers of special interest. In an effort to make the annual review more informative, however, abstracts are now organized in a consistent fashion and specifically address key items.

In common with the lessening of development activity in the province, archaeological investigations were down appreciably from previous years. In 1983, 114 permits were issued through the Archaeological Survey (Table 1). This represents 26 percent fewer than in 1982 and 44 percent less than in 1981. The frequencies and types of archaeological investigations represented by these 114 permits consisted of 88 (77 percent) H.R.I.A.s, 10 (9 percent) mitigative excavations, and 16 (14 percent) research oriented projects. As to type of development activity, 24 (21 percent) permits were for subdivision investigations, 54 (47 percent) for linear developments, and 20 (18 percent) for area developments. Within the research category, nine permits were for non-development oriented research projects, and of these, five were undertaken by staff archaeologists and four by other archaeologists. Compared to 1982, there was an increase in subdivision and area projects, a decrease in linear developments and an increase in the percentage of research projects. The ratio of development oriented to research oriented projects in 1983 was 7:1, an increase over last year's 9:1. As a result of the above investigations, 645 new sites were recorded, bringing the provincial inventory to about 15,000 sites.

Some reorganization has occurred within the Archaeological Survey of Alberta (Figure 1). This reflects changes in focus, manpower and financial resources. There is, for example, increased in-house and Divisional emphasis on site developments for interpretive purposes. To

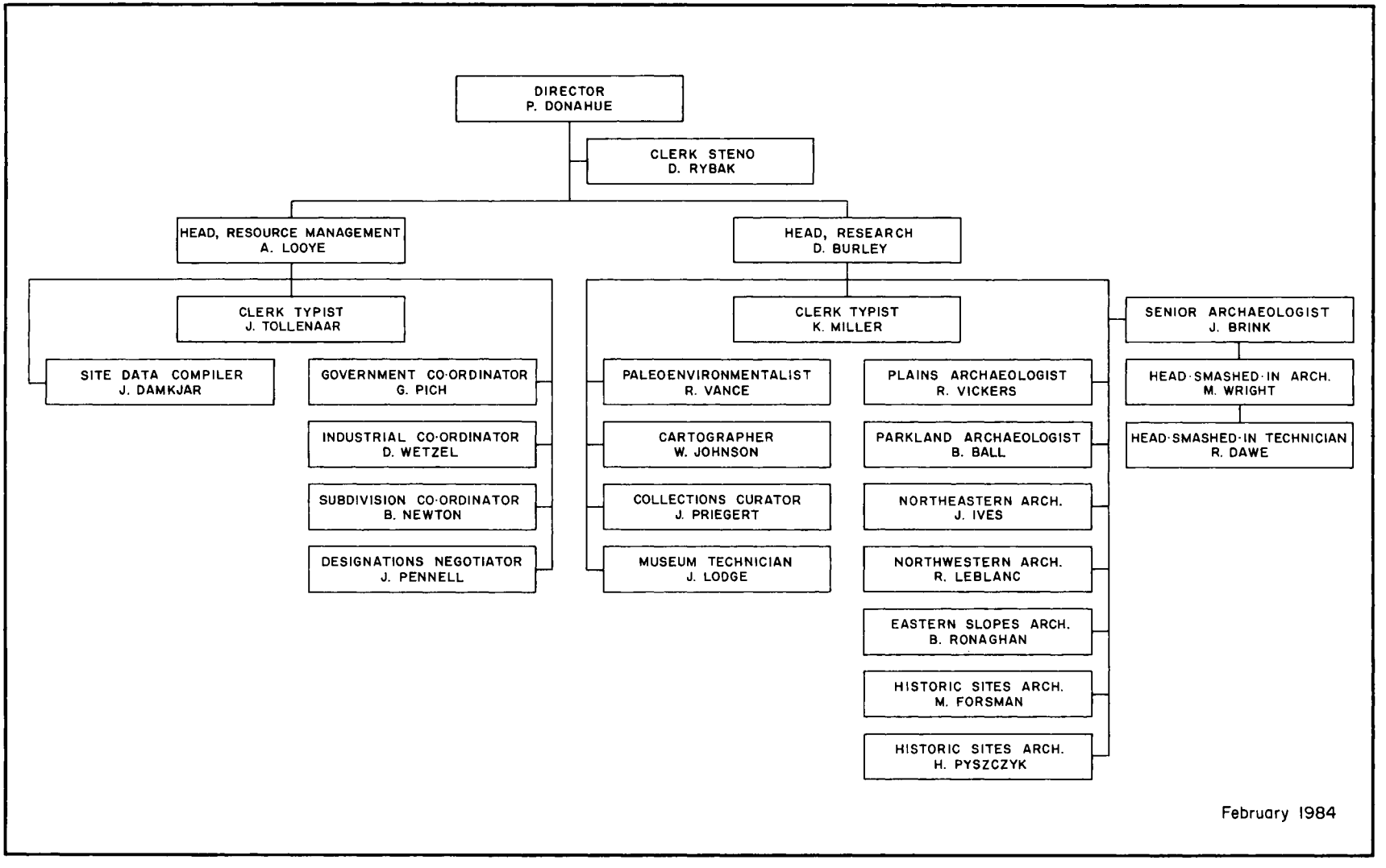

Figure 1. Archaeological Survey of Alberta organizational chart.

this end, John Brink, Senior Archaeologist, was assigned full-time to the Head-Smashed-In project and was allocated two support man-years. Heinz Pyszczyk and Michael Forsman were also assigned to aid in the archaeological research and development of historical resources for interpretive purposes. Pyszczyk undertook surveys and excavations at Dunvegan in addition to investigations at two early Ukrainian homesteads; Forsman focused on Leitch Collieries and the Lille townsite in the Crowsnest Pass. This allocation of staff to site development related research and planning is expected to continue for a number of years.

Public education efforts have continued and will be further increased over the next few years. Three new thematic pamphlets devoted to Rock Art, Medicine Wheels, and the Fur Trade are now available to the public. As well, a course entitled Alberta Archaeology is being team taught at the University of Alberta by "Survey" staff as a public service. Given that no prerequisites are required, the lectures attempt to introduce the history and method of archaeology, depict the paleoenvironmental context, provide regional prehistories and a broad overview of historic archaeology, and lastly, discuss the whys and wherefores of resource management. The course has proven popular, and in the two times it has been taught, enrollment averaged 45 students, mostly non-majors. Staff view the course as an opportunity to sensitize students to archaeology in Alberta. Similarly, an eight-part lecture series on Alberta archaeology was presented in Medicine Hat and Lethbridge in 1983, co-hosted by the Archaeological Society of Alberta. Attendance at each centre averaged 50 and 35, respectively. Research staff also presented individual talks to the Archaeological Society, grade schools, universities and special interest groups.

As to publications, research staff are credited with 12 published professional papers and 14 conference papers. Area syntheses have also been set as an objective for publication in the Occasional Paper Series. Presently scheduled are syntheses on the Plains, Boreal Forest, Parklands, and Eastern Slopes regions. The latter three syntheses will form chapters in edited volumes on these areas. An edited volume on historic archaeology in Alberta, as well as a collected volume of physical anthropology papers, are also in preparation.

Research and archaeological resource management projects undertaken

by staff covered a broad gamut. Rod Vickers, Plains Archaeologist, undertook assessment excavations at the Saamis Site in Medicine Hat, in order to determine site extent for designation purposes. Rod also excavated a human burial eroding out of a coulee wall near Lethbridge, assisted by Dr. T.A. Moore of the University of Lethbridge and T. Schowalter of the A.S.A. Jack Brink, Senior Archaeologist, initiated research and mitigative activities at Head-Smashed-In Buffalo Jump west of Fort Macleod in southwestern Alberta. Efforts this past year focused on an impact assessment of the building site, parking lots and access roads. Exploratory excavations were also undertaken in the extensive campsite area. R. McDonnell and E. Verbicky-Todd were also awarded contracts for ethnographic and ethnohistoric studies. Bruce Ball, Parkland Archaeologist, primarily focused his research efforts on writing up previously collected data. However, he did take part in a testing programme at Head-Smashed-In, recovered a column sample at a site on Brule Lake near Hinton to obtain charcoal for a radiocarbon assay, and was involved with a mapping project of the Rumsey Cairn organized by Sharon Thorpe on behalf of the Archaeological Society of Alberta, Calgary Chapter. Ray LeBlanc, Northwestern Archaeologist, undertook further excavations at the Bezya Site near Fort MacKay in an effort to recover additional cultural material and a charcoal sample suitable for radiocarbon assay. LeBlanc also worked towards completion of his report on prior research at Lesser Slave Lake. The efforts of John Ives, Northeastern Archaeologist, focused on a survey of Beaver River Sandstone outcrops near Fort MacKay in conjunction with Mark Fenton of the Alberta Research Council. Michael Forsman, Historic Archaeologist, in addition to his previously noted efforts at Leitch Collieries and Lille in the Crowsnest Pass, also undertook assessments of Fort Whoop-Up and Fort Saskatchewan North West Mounted Police post. Both of these sites are being considered for designation. Heinz Pyszczyk, Historic Archaeologist, undertook directed research at the Lakusta Homestead, near Redwater, and the Pawliuk Ukrainian Dugout, an early Ukrainian homestead near Vegreville, as part of the development programme for the Ukrainian Cultural Heritage Village east of Edmonton. He also pursued a second season of excavations at Dunvegan, as a precursor to possible site development. Brian Ronaghan, the new Eastern Slopes Archaeologist, has

initiated a site mapping and analysis project to consolidate resource locational data for the purpose of settlement pattern analysis.

Tim Schowalter, Faunal Curator, has completed the task of assembling a faunal reference collection for comparative purposes, and has subsequently returned to university. During 1983, the comparative faunal collection was utilized on 45 different occasions for identification purposes by students, archaeological consultants, staff, non-Alberta universities, the Department of Fish and Wildlife and the Attorney General's Department. Robert Vance, Paleoenvironmental Research Officer, continued his analysis of cores to determine a preliminary outline of forest development in the Birch Mountains of northeastern Alberta. He also initiated field work in southern Alberta in conjunction with archaeological studies at Head-Smashed-In. Efforts were directed at beginning to outline prehistoric environmental conditions in southern Alberta.

The Archaeological Survey of Alberta also supported research projects undertaken by consultants. John Brumley, Ethos Consultants Ltd., was contracted to undertake a comprehensive synthesis and study of medicine wheel sites within Alberta. The results of this study will be incorporated within two volumes: a synthesis suitable for publication, and a data volume. The results will aid in the development of designation and resource management guidelines. John Pollock, Settlement Surveys Ltd., completed a project focusing on the collection of subsurface architectural data from the Grekul Homestead near Smoky Lake. These data will be used for Ukrainian Cultural Heritage Village site development purposes. Dr. Brian Reeves is in the process of mapping and marking drive lane cairns and cairn complexes at Head-Smashed-In Buffalo Jump. The entire gathering basin is to be examined in this study, and results will form an integral part of the interpretive development of Head-Smashed-In. Eleanor Verbicky-Todd was given a contract to research and compile information on the material culture of northwest Plains Indians with particular emphasis on the Blackfoot and Piegan, in order to amass all data necessary to relate interpretive themes to actual displays at Head-Smashed-In. Dr. James Helmer again directed excavations at the Strathcona Site, a prehistoric site on the edge of Edmonton that is interpreted to the public. These excavations are contracted to the

University of Calgary who operate their archaeological field school at the site.

Independent research projects occurring in Alberta in 1983 included John Brumley's work with the Archaeological Society of Alberta at a medicine wheel site near Schuler. Brumley's efforts were directed at testing the hypothesis that this type of medicine wheel reflects memorials to prominent warriors or chiefs whose lodges were pitched in that location at time of death. J. Michael Quigg undertook the partial excavation of a site containing ceramics near Cowley, in an effort to obtain dateable and culturally diagnostic material. John Brumley, in association with the Archaeological Society of Alberta, conducted preliminary test excavations at the Laidlaw site near Bow Island. Discovered by John during an aerial reconnaissance of the region, it has since been determined that the site is an antelope trap. Research at the site is reported by Brumley in this volume.

The Resource Management Section of the Archaeological Survey has experienced a slowdown in some types of development projects. Concomitantly, they have also expanded the referral process such that the overall workload has not decreased. George Pich, Government Coordinator, maintains liaison with the Departments of Transportation, Energy and Natural Resources, Recreation and Parks, Environment, and Public Works, Supply and Services, in order to have their development projects received and reviewed by the Historical Resources Division. Some 750 projects were received in 1983. Barry Newton, Subdivision Coordinator, is responsible for receiving, forwarding for review, and responding to all subdivision applications, General Municipal Plans and Area Structure Plans. Approximately 2300 such referrals are received and reviewed each year. The Subdivision Coordinator is now also responsible for the referral of integrated Resource Management Plans and irrigation projects. Dean Wetzel, Industrial Coordinator, maintains close liaison with the Coal Explorations Review Committee, Development and Reclamation Review Committee and the Crown Minerals Dispositions Review Committee. In the past year, he has become increasingly involved with the Exploration Approvals and Incentives Branch of Alberta Energy and Natural Resources in the review of Geophysical Survey Programmes. During the past year, he has received in excess of 250 separate referrals related to

approximately 1000 development projects. James Pennell, Designations Negotiator, is responsible for facilitating and coordinating the designations of historical resources as defined under the Act. On average, he receives 400 inquiries per year. These normally result in approximately 120 applications for designation and 21 actual designations. Joan Damjkar, Site Data Compiler, received and processed 114 Excavation Permit applications, 120 reports, 650 site forms, and entered 300 sites into the National Inventory.

The Archaeological Survey of Alberta continues to fulfill its role as a key regulatory, research and educational agency in this province and, as such, actively works to conserve the past for future generations. The Annual Review is designed to keep the public informed of activities of the "Survey" and the progress of archaeological research in Alberta. Any comments you may have for making the review more interesting and informative would be welcome.

Table 1: 1983 Project Permits issued by the Archaeological Survey of Alberta

Permit	Archaeologist	Project
83-1	John Pollock	Quint Holdings Ltd.; subdivision; Athabasca Landing Settlement
83-2	Bea Loveseth	Lombard North Group; gravel extraction; mitigation of EfPm-143; Carburn Park, Calgary
83-3	John Pollock	County of Strathcona; sewage lagoon; North Cooking Lake
83-4	Stanley Van Dyke	Canterra Energy Ltd.; gas gathering line; Blackstone to Brazeau
83-5	Rod Heitzmann	Tritek Engineering Ltd.; Athabasca University building site/access road; Athabasca
83-6	Donald N. Steer	Gulf Canada Resources; gas pipeline; Trochu
83-7	John Pollock	Alberta Housing Corp.; housing subdivision; Wabasca
83-8	J. Rod Vickers	Alberta Culture; Saamis site (EaOq-7) research; Medicine Hat
83-9	Bruce Wright	Hat Development Ltd; monitoring of Ross Glen subdivision (Ross Glen Site - DlOp-2); Medicine Hat
83-10	Stanley Van Dyke	Cochrane West Lands; residential development; Cochrane
83-11	John Pollock	Amoco Canada Ltd.; Pembalta gas pipeline loop; Drayton Valley
83-12	Stanley Van Dyke	Fording Coal Ltd; mine and related facilities; Genesee Power Project
83-13	Mike Quigg	Research at the Todd Creek site (DjPm-51); Cowley
83-14	Rod Heitzmann	Westcoast Petroleum Ltd.; McGregor Lake pipeline; Vulcan
83-15	Rod Heitzmann	Dome Petroleum Ltd.; Haight gas pipeline; Mundare

Permit	Archaeologist	Project
83-16	Jennifer Hunt	Nova, An Alberta Corporation; Schuler gas pipeline; mitigation of EcOo-12, 13, 18, 20, 28; Medicine Hat
83-17	John Pollock	Dome Petroleum Ltd; wellsite and access roads; Lindbergh
83-18	Rod Heitzmann	Rachynski Land Surveys Ltd.; housing subdivision; Ashmont
83-19	Brian Reeves	Sleeping Giant Properties Ltd.; subdivision; Crowsnest Pass
83-20	Margaret Kennedy	Alberta Transportation; Highway 3 realignment; mitigation of DjPo-63; Crowsnest Pass
83-21	Mike Quigg	Western Oilfield Environmental Services; Drowning Ford wellsite and pipeline; Medicine Hat
83-22	John Pollock	Mr. N. Kohlman; residential subdivision; Ponoka
83-23	Stanley Van Dyke	Edmonton Power; borrow sources; Genesee Power Project
83-24	Jack Brink	Alberta Culture; mitigation/research at Head-Smashed-In Buffalo Jump (DkPj-1); Fort Macleod
83-25	Margaret Kennedy	Lethbridge Urban Parks; historical synthesis; Lethbridge
83-26	James Helmer	Alberta Culture; research at Strathcona site; Edmonton
83-27	John Pollock	Alberta Transportation; gravel pit and SR 657; Milk River and Bonnyville
83-28	Rod Heitzmann	Esso Resources; water pipeline/access road; Cold Lake
83-29	John Brumley	Archaeological Society of Alberta; research at Laidlaw Site (DlOu-9); Bow Island
83-30	Rod Heitzmann	Husky Oil; Cold Lake pipeline; Lloydminster
83-31	James Calder	TransAlta Utilities; transmission line; Calgary to Crowsnest

Permit	Archaeologist	Project
83-32	John Pollock	Cameron Acres Ltd; subdivision; Pigeon Lake
83-33	Rebecca Balcom	Shorty Heringer; Paradise Valley golf course; Medicine Hat
83-34	J. Rod Vickers	Alberta Culture; salvage excavation of Magrath burial (DiPf-6); Lethbridge
83-35	CANCELLED	
83-36	Rebecca Balcom	Alberta Transportation; airport/ highway/gravel pit; Calling Lake/ Isle Lake/Monarch
83-37	Bruce Ball	Alberta Culture; research at Brule Lake site (FhQl-4); Hinton
83-38	Rod Heitzmann	Alberta Transportation; SR 940; Grande Prairie
83-39	Stanley Van Dyke	Citadel Resources Ltd.; Westward Ho gas gathering system; Sundre
83-40	Bruce Wright	Canadian Superior Oil Ltd.; Majorville - Scandia pipeline; Milo
83-41	Michael Forsman	Alberta Culture; research at Leitch Collieries (DjPn-21), and Lille (DjPo-112); Crowsnest Pass
83-42	CANCELLED	
83-43	Margaret Kennedy	Alberta Recreation and Parks; Fish Creek Provincial Park Interpretive Centre; Calgary
83-44	John Pollock	Alberta Transportation; highway mitigation excavations at FiPs-7, EdPq-15, 16; Cremona/Turner Valley
83-45	Rebecca Balcom	Alberta Environment; Crawling Valley reservoir and dam; Bassano
83-46	Mike Quigg	City of Medicine Hat; Trans-Canada highway twinning; Medicine Hat
83-47	Rod Heitzmann	Alberta Recreation and Parks; fish hatchery/recreation area; Cold Lake/Chip Lake

Permit	Archaeologist	Project
83-48	Stanley Van Dyke	Alberta Power Ltd.; Louise Creek-Mitsue East transmission line; Swan Hills
83-49	Heinz Pyszczyk	Alberta Culture; mitigation/research historic Dunvegan missions; Fairview
83-50	Rebecca Balcom	Shell Canada Ltd.; Sarcee pipeline replacement; Bragg Creek
83-51	Mike Quigg	Western Oilfield Environmental Services; gas pipeline; Big Valley
83-52	Rod Heitzmann	Northwestern Utilities Ltd.; pipeline; Josephburg
83-53	Raymond LeBlanc	Alberta Culture; research at the Bezya Site (HhOv-73); Fort MacKay
83-54	John W. Ives	Alberta Culture; research: Beaver River Sandstone geological survey; Fort MacKay
83-55	Rod Heitzmann	Alberta Transportation; SR 884 mitigation at EgOt-4; Youngstown
83-56	Bea Loveseth	Manalta Coal; mitigation at EiOw-10; Sheerness
83-57	Rod Heitzmann	Nova, An Alberta Corporation; Hackett gas pipeline; Stettler
83-58	Brian Reeves	Geoff Peters; residential subdivision; Coleman
83-59	Mike Quigg	Western Oilfield Environmental Services; gas wellsites; Medicine Hat
83-60	Bea Loveseth	Alberta Transportation; Highways 855 and 813; Big Valley/Calling Lake
83-61	Stanley Saylor	North Canadian Oils Ltd.; gas pipeline; Cavendish
83-62	Margaret Kennedy	Town of Stettler; water treatment plant and access road; Stettler
83-63	Heinz Pyszczyk	Alberta Culture; research Pawliuk Site (FjPb-2); Vegreville
83-64	Peter Bobrowsky	W. Truxler; residential subdivision; Hinton

Permit	Archaeologist	Project
83-65	John Pollock	TransAlta Utilities; transmission line; Lodgepole
83-66	John Pollock	Husky Oil; gas gathering system; Lloydminster
83-67	Eugene Gryba	Alberta Transportation/Recreation and Parks; highway and recreation developments; southern Alberta
83-68	Peter Bobrowsky	Alberta Forest Service; Chain Lakes water access; Athabasca
83-69	Bruce Wright	Alberta Fish and Wildlife; McKinnon's Flats fishing access site; Dalemead
83-70	Brian Reeves	Alberta Transportation; SR 509; Standoff
83-71	Rod Heitzmann	Grande Prairie Urban Parks; Grande Prairie
83-72	E.J. McCullough	TransAlta Utilities/Alberta Power/ Alberta Government; Slave River dam; Fort Smith
83-73	Michael Forsman	Alberta Culture; research at Fort Whoop-Up (DjPf-2) and Fort Saskatchewan (FkPh-15); Lethbridge/ Fort Saskatchewan
83-74	Shawn Haley	DePlaedt Holdings Ltd.; residential subdivision; Calgary
83-75	John Pollock	Galaxy Promotions Ltd; residential subdivision; Lac Ste. Anne
83-76	John Brumley	Research; test excavations at EbOm-1; Schuler
83-77	Gloria Fedirchuk	Northwestern Utilities Ltd.; Lloydminster-Buffalo Coulee pipeline; Vermilion
83-78	John Pollock	Nova, An Alberta Corporation; gas pipeline/meter station; Camrose
83-79	Shawn Haley	Pockar Management Ltd.; industrial subdivision; Airdrie
83-80	Gloria Fedirchuk	Petro-Canada; Brazeau River gas pipeline; Lodgepole

Permit	Archaeologist	Project
83-81	Gloria Fedirchuk	Petro-Canada; Benjamin Creek gas pipeline; Water Valley
83-82	Gloria Fedirchuk	Northwest Resource Consultants Ltd.; underground test facilities and associated developments; Fort MacKay
83-83	W.J. Wood	Luscar Ltd.; open pit coal mine; Sheerness
83-84	Rebecca Balcom	Alberta Oil Sands Pipeline Ltd.; Scotford lateral pipeline; Fort Saskatchewan
83-85	Heinz Pyszczyk	Alberta Culture; research at the Lakusta site (FlPg-67); Redwater
83-86	Mike Quigg	Western Oilfield Environmental Services; gas pipeline; Big Valley
83-87	Eugene Gryba	Alberta Transportation; SR 940; Grande Cache
83-88	Brian Reeves	Alberta Transportation; mitigation at Conrad's Post (DkPf-2); Lethbridge
83-89	E.J. McCullough	PanCanadian Petroleum Ltd.; Hussar-Crowfoot gas pipeline; Bassano
83-90	Rod Heitzmann	Petro-Canada; Arrowwood gas pipeline; Gleichen
83-91	John Brumley	Alberta Environment; Forty Mile Coulee irrigation canal; Bow Island
83-92	Mike Quigg	Alberta Transportation; Highway 1 twinning; Gleichen
83-93	John Pollock	Texaco Canada Ltd.; Bonnie Glen pipeline; Pigeon Lake
83-94	John Pollock	Dr. S.R. Souch; recreational subdivision; North Buck Lake
83-95	John Pollock	Wimpey Western Ltd.; residential subdivision; Edmonton
83-96	John Pollock	Alberta Culture; research at the Grekul House (GaPc-12); Smoky Lake
83-97	Stanley Van Dyke	C&T Resources Ltd.; Medicine River gas pipeline; Red Deer

Permit	Archaeologist	Project
83-98	Stanley Van Dyke	Gulf Canada Resources; gas pipeline; Rimbey
83-99	W.J. Wood	B. Ogertschnig; residential subdivision, and testing at DjPo-85; Bellevue
83-100	John Pollock	Alberta Environment; stabilization weir at Iosegun Lake and testing at Outlet Creek Village site (GdQf-1); Fox Creek
83-101	Rebecca Balcom	Makale & Kyllo Planning Assoc. Ltd.; Somadka industrial subdivision; Fort Saskatchewan
83-102	Stanley Van Dyke	Gulf Canada Products Co.; pipeline; Bashaw
83-103	John Pollock	TransAlta Utilities; gravel pit operation; Rocky Mountain House
83-104	John Pollock	Pinecrest Construction; residential subdivision; Rocky Mountain House
83-105	Jennifer Hunt	D. Bigcharles; subdivision; Blairmore
83-106	John Brumley	SoQuip Oil & Gas Ltd.; gas wellsites; Medicine Hat
83-107	Donald Steer	Avala Engineering Ltd.; Tower gas gathering system; House River
83-108	Rebecca Balcom	Alberta Forest Service; Hidden Creek Forestry Trunk Road; Blairmore
83-109	Rebecca Balcom	Canadian Occidental Petroleum Ltd.; Mazeppa gas plant; High River
83-110	John Pollock	Dome Petroleum Ltd.; oil well and associated facilities; Provost
83-111	Rod Heitzmann	Alberta Transportation; Highway 2 improvements; Cardston
83-112	Rebecca Balcom	Western Irrigation District; subdivision; Strathmore
83-113	Stanley Van Dyke	Bumper Development Corp.; Twining gas pipeline; Linden
83-114	John Pollock	Town of Drayton Valley; subdivision; Drayton Valley

Permit	Archaeologist	Project
83-115	John Brumley	Alberta Recreation and Parks; campground; Lower Kananaskis Lake
83-116	John Brumley	Ocelot Industries; gas wellsite; Grassy Lake

PRELIMINARY REPORT ON THE 1983 FIELD SEASON AT HEAD-SMASHED-IN BUFFALO JUMP, ALBERTA

Jack Brink, Milt Wright
Bob Dawe, Guy Trott
Archaeological Survey of Alberta

INTRODUCTION

The 1983 field season marked the beginning of archaeological investigations by staff of the Archaeological Survey of Alberta at the Head-Smashed-In Buffalo Jump site (DkPj-1) in southwestern Alberta. These investigations are part of the overall project by Alberta Culture to develop a public interpretation program at the site by 1986. The program will include a 2400 square metre interpretive building, full time staff, guided tours of the site, on-going archaeological investigations, and year round operation. Prior to the opening of the building, several seasons of archaeological studies are planned. These studies have two purposes: (1) to investigate and mitigate any impacts to archaeological resources at the site as might be occasioned by construction of the interpretive building facilities; (2) to promote research oriented studies of poorly understood aspects of the site and plains prehistory in order to present a more comprehensive interpretation of the site to future visitors. The 1983 season necessarily focused on the first of these objectives, but also initiated limited research oriented studies. A final report is in preparation and should be completed in the spring of 1984.

The Setting and History of Head-Smashed-In

The Head-Smashed-In Buffalo Jump site is located in southwestern Alberta on the southeast edge of the Porcupine Hills, some 16 km west of Fort Macleod (Figure 2). A roughly north-to-south trending exposure of Paskapoo Sandstone formed the jump off for the kill; this exposure now attains a maximum height of 11 m, but was presumably higher in the past

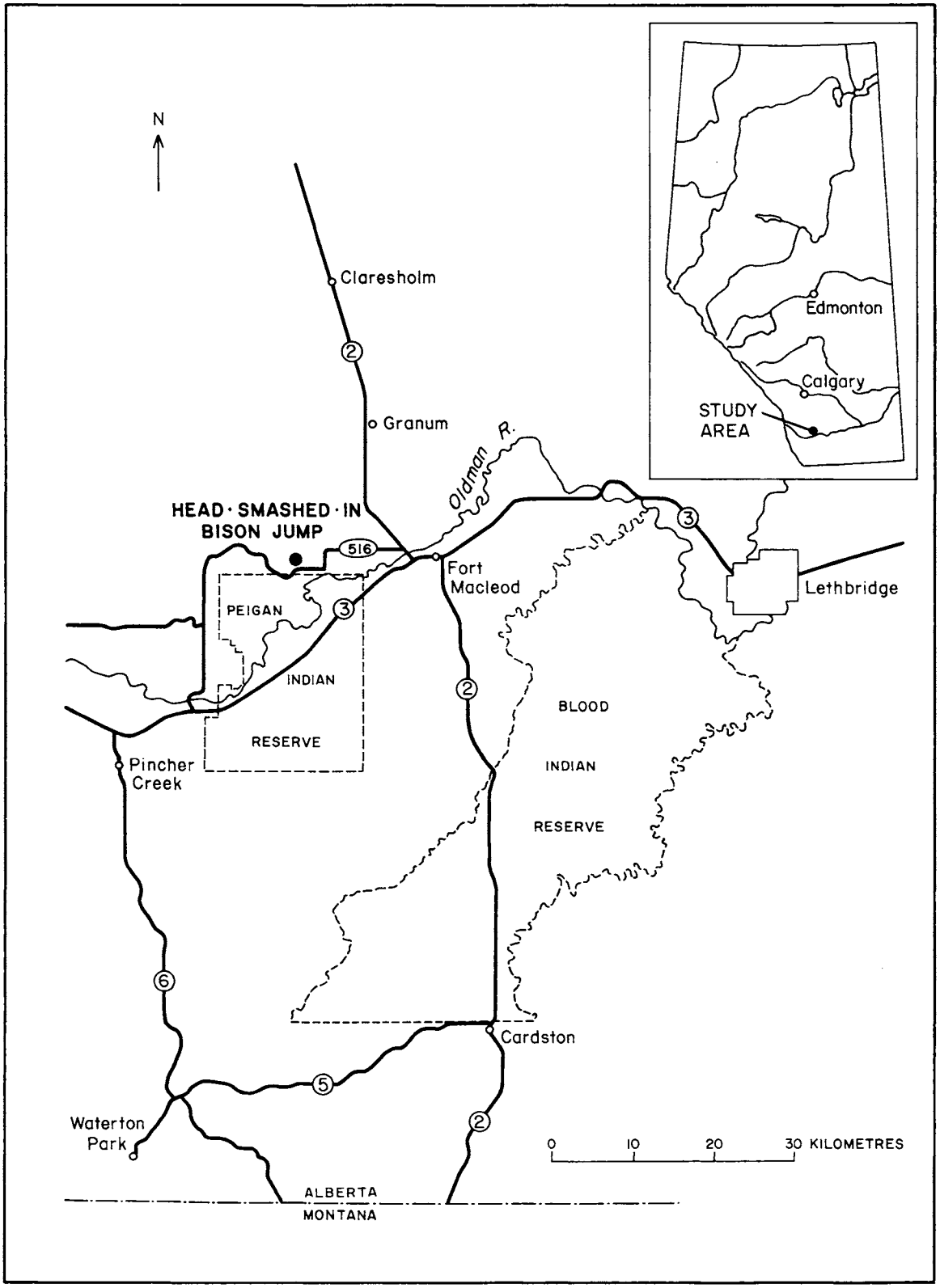

Figure 2. Study area and location of DkPj-1.

before slump activity and deposition built up the block "terraces" at the base of the cliff (Figure 3). Bison were driven to the cliff from a large (40 square kilometre) collecting area to the west, where a natural basin is formed within the Porcupine Hills by the valley of Olsen Creek and its tributaries. Some of the complex stone cairn drive lane system which assisted in guiding the bison through the basin and towards the cliff may still be seen today. The animals were partially butchered at the kill site, and complete butchering and processing was accomplished on the gently rolling prairie level to the east of the jump (Figure 4).

The operation of manipulating, coercing, stampeding, killing, butchering and processing bison began at Head-Smashed-In at least 5700 years ago and continued until the historic period (ca. 1840). The spectacular stratified bone bed at the kill site extends at least 11 m below ground surface, while the camp/processing materials on the prairie cover a known area of about one square kilometre. These facts, coupled with the overall integrity of the archaeological deposits, led to the designation of Head-Smashed-In as a U.N.E.S.C.O. World Heritage Site in 1981. The site had already been designated both a Provincial Historic Site and a National Historic Site.

The history of archaeological studies at Head-Smashed-In is itself significant in that it was the first site excavated by a professional archaeologist in Alberta. This occurred in 1938 when Junius Bird of the American Museum of Natural History visited and briefly tested the site during his summer reconnaissance of Alberta and Saskatchewan. Some field notes and photographs of Bird's work are still available. Eleven years later, one of western Canada's pioneer archaeologists, Boyd Wettlaufer, spent the better part of the 1949 field season conducting excavations in both the kill site bone bed and the prairie level butchering site. Field notes and artifacts of Wettlaufer's work have been located and obtained.

Aside from persistent looting by arrowhead collectors, the site lay dormant for 16 years, until Richard Forbis of the Glenbow Institute assembled a project to excavate at Head-Smashed-In. Brian Reeves was appointed to direct the excavations in 1965 and he subsequently returned to continue this work in 1966 and briefly in 1972 (Reeves 1978, 1983b). No research was conducted at the site for another decade until Rod Vickers of the Archaeological Survey of Alberta returned in 1982 to

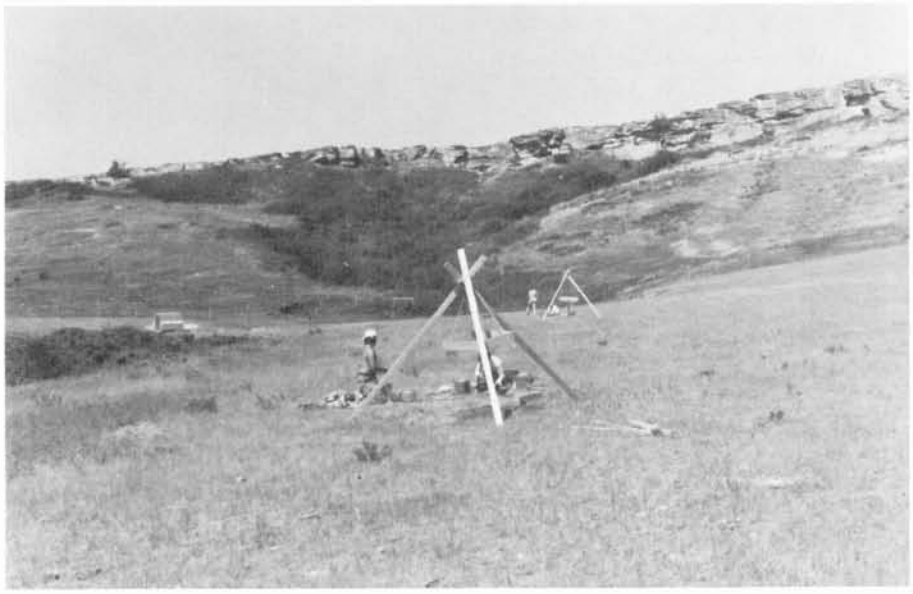

Figure 3. View from camp/processing area on prairie level to cliff edge and slump block formation. Note gulley in centre and left; kill site is located below cliff in upper right.

Figure 4. View from slump block below kill site to prairie level camp/processing area.

conduct a brief test of a small area of the camp/processing site which was to be disturbed by placement of temporary interpretive trailers and a parking lot (Vickers 1983).

The 1983 Season at Head-Smashed-In

As mentioned above, the primary focus of the 1983 field season was to explore the archaeological deposits contained within areas which are (or were) scheduled to be disturbed by construction of the interpretive facilities. All development plans for the site have been designed with the protection of significant archaeological resources as the foremost concern. Thus, prior to the formulation of specific plans for the various interpretive facilities, field studies early in the 1983 season were designed to identify those areas of greatest and lowest archaeological sensitivity. This was done within zones designated Areas 1, 11 and 12 (Figure 5) which lie southwest of the main kill and processing sites. These areas were selected for development, after consideration of numerous factors, including proximity to the main site area, minimal visual impact on the general site setting, and because of anticipated (and subsequently demonstrated) low impact on archaeological deposits.

Once a general location for the development facilities was established, the architect and associated consultants prepared rough plans for the building, parking lots, access road, and some of the building support services. All plans were reviewed by the project archaeologist and the necessary field tests were conducted. In several cases, the proposed development plans were modified as a result of our field studies. The currently proposed parking lots in Areas 11 and 12, for example, differ dramatically from the architect's first drafts which would have caused a substantial impact to a large area of significant cultural materials. Similarly, the access road into the facilities from the existing SR 516 was originally to have come in from the east (Figure 6). The entire proposed right-of-way was found to be rich in cultural materials, and the road was re-directed to the southwest where few archaeological remains were found.

Exploratory testing of the primary building site was conducted for two weeks in May 1983, followed by three full months of field work from

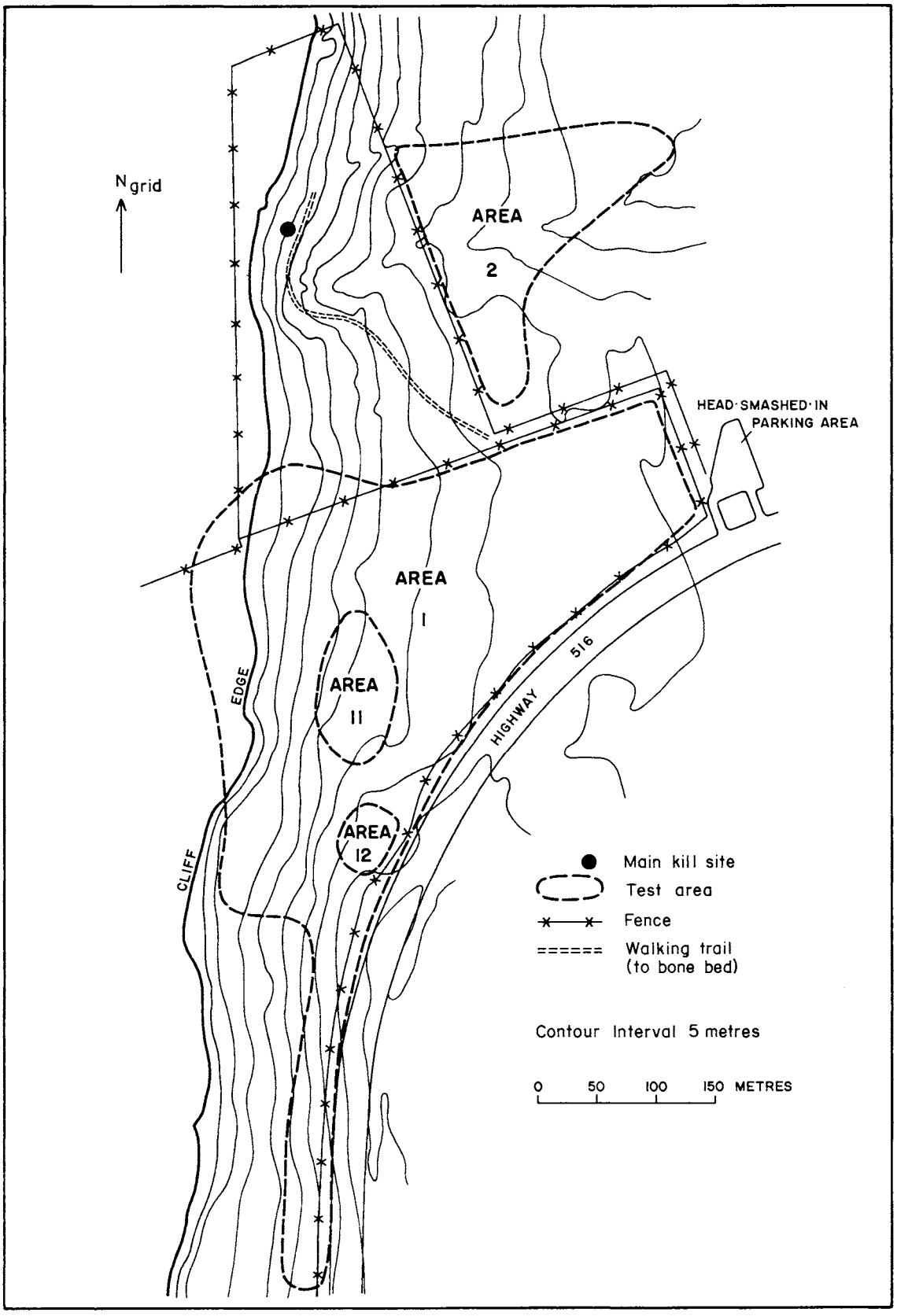

Figure 5. Site map showing mitigation area (Area 1) and research area (Area 2).

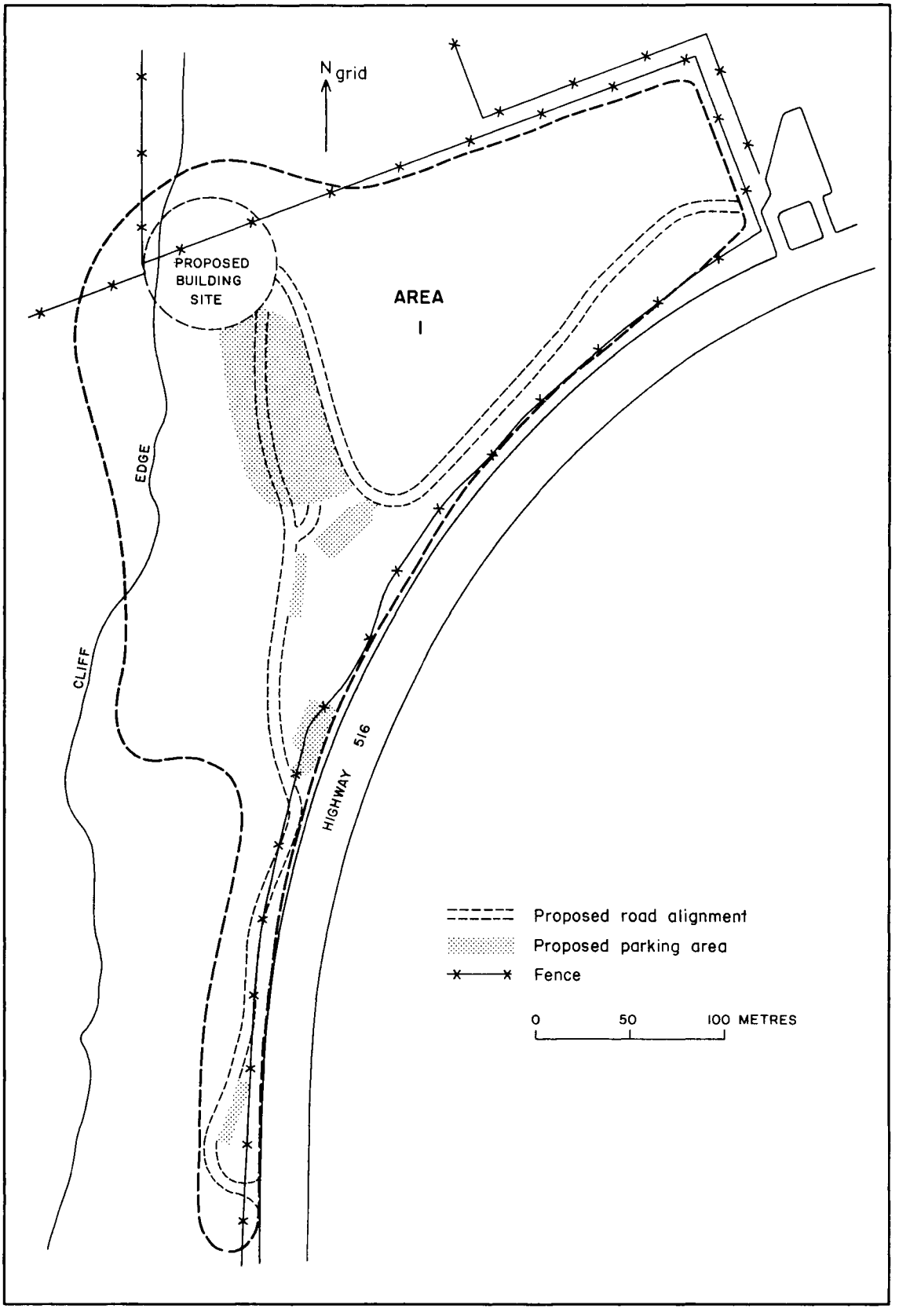

Figure 6. Details of proposed developments in Area 1.

late June to mid-September. Crew size fluctuated between 10 and 15 full time workers, plus several volunteers. In total, Area 1 was tested and excavated with eighteen 2 x 2 m units, one 1 x 2 m unit, five 1 x 1 m units and 147 .5 x .5 m shovel tests, equalling a total of 116 square metres of excavated area.

Time and resources were sufficient to permit some brief exploratory tests of other non-development areas at Head-Smashed-In. The deep, complex bone bed at the kill site was avoided, as it has already been the focus of major studies (Reeves 1978, 1983b), and because our more immediate research interests are largely associated with the camp/processing areas of the site. Although both Reeves and Wettlaufer conducted excavations on the prairie below the jump, little about the archaeology of this area has been reported; rather, their published reports focused on the data from the kill site. Indeed, this seems to be true at many bison kill sites where the impressive faunal assemblages of the kill areas lure the archaeologists away from the more mundane, and often problematic, butchering and processing areas. One component of our research design for the 1983 season was to initiate exploratory excavations in the main camp and processing areas of the site with an eye towards a major excavation of this area in future seasons. To accomplish this exploration, seven excavation units consisting of one 1 x 1 m unit, three 1 x 2 m units, and three 2 x 2 m units were placed over a considerable distance on the prairie level on both the north and south sides of the spring channel which bisects the camp/processing site. In addition, two .5 x .5 m shovel tests were excavated in Area 2, and two partial 1 x 1 m units were placed over the cutbank on the south side of the spring channel. These latter two units were designed to produce a clear profile of the stratified channel deposits, and to recover a small sample of the faunal and lithic materials.

Rounding out the field season were several off-site projects, including viewing and recording of petroglyphs southwest of the jump; visiting and recording a bison quest structure with associated surface rock features on a high hill north of the jump; examining some of the drive lane cairns west of the site; and conducting an extensive foot traverse of the flats below the sandstone cliff, observing and recording the distribution of cultural material and rock features.

METHODOLOGY

Only general information on site excavation methodology will be presented here; full details will be provided in the final report. The exploratory and mitigative nature of the excavations in Area 1 necessitated adoption of a strategy which effected a compromise between the need to quickly investigate large and topographically diverse areas of the site, and the desirability of recording detailed provenience information. The technique selected consisted of recording artifact provenience to a 50 cm square x 10 cm deep area, rather than plotting items individually. Exceptions to this procedure were made when features were encountered or when articulated faunal elements were recovered.

In Area 2, where research oriented studies were not constrained by the same time requirement, the excavation methodology was altered. Here, all floor plans for 10 cm levels were drawn, showing the distribution of bone, fire broken rock, and any stains. Flaked stone items were not included on these plans but rather were bagged by their .5 x .5 m provenience. Soil from excavations in all areas was screened through 6.3 mm (1/4 inch) mesh hand screens. In addition, at all units larger than 1 x 1 m, a control sample measuring .5 x.5 m was removed in 10 cm levels and bagged for flotation. The flotation system brought organics off the top of a 45 gallon drum, and retained all items larger than 1.5 mm (1/16 inch) in a bottom screen.

All units were primarily excavated by trowel, although some variations occurred across the site in response to the type and amount of cultural material being recovered. For example, in some of the exceedingly rich units at the main processing site, the sheer density of material necessitated use of delicate excavation techniques, whereas shovels were used routinely in certain parts of Area 1 when little or nothing was being found.

Horizontal provenience was established according to one of the several baselines set up in Areas 1 and 2. All units were numbered sequentially within a specific area, and were systematically divided into lettered quadrants (1 x 1 m) and numbered sub-quadrants (.5 x .5 m). Depth was recorded as a measurement below surface. Arbitrary 10 cm levels were maintained for the entire season, even in areas displaying

natural stratigraphy, because of the exploratory nature of this season's excavations. Fire broken rock was counted, weighed and discarded. All other recognized cultural material was retained, including the fill matrix of several hearths and other features. The retained matrix was subsequently floated. Profiles of one wall in each completed unit (or a group of units) were sketched and photographed. In order to determine the maximum depth of cultural remains, all units (except one unfinished pit) were excavated by shovel and pick well beyond the depth of the last recorded cultural material. Backhoe trenchs were employed at several locations in Area 1 to assist in testing for any deeply buried cultural deposits. Artifacts recovered from these trenches (consisting entirely of bison bone), were recorded according to approximate depth below surface and the number of the backhoe unit.

RESULTS

Through continued liaison with the architect and the Head-Smashed-In planning team, the 1983 field season succeeded in identifying those areas most suitable for construction adjacent to the main site, and completed most of the archaeological studies necessary to permit the commencement of site development without further excavation. Proposed developments within Area 1 were shifted repeatedly to attain the least impact to buried cultural materials, while still achieving the purpose of the development facility. To a large extent, those areas found to contain minimal prehistoric materials, and where development facilities are now proposed, correspond with areas of greater topographic relief. Even within a limited field of study, it soon became apparent that an area with a slope of about 10^{o} or more was likely to be nearly sterile, while only a few metres away, an area of nearly level ground would be rich with artifacts and features. This knowledge, confirmed many times over, guided the siting of the development facilities.

In general, the archaeological record of Area 1 was one of scattered, low density clusters of cultural materials consisting mainly of bison bone, fire broken rock, flaked stone and features. These materials were buried in a brown chernozemic soil; depth of burial ranged from less than 10 cm on the level areas away from the steep sloping soils against the

cliff face, to over 1 m in areas of repeated colluvial activity near the steep slope. Soils away from the slope have been subject to erosion and deflation, resulting in very thin Ah and Bm soil horizons and a compressed cultural record (Figure 7). Nearer the slope of the cliff, sheetwash and slumping have produced very thick Ah horizons with numerous paleosols evident (Figure 8). These paleosols suggest the possibility of discovering primary archaeological deposits in a well stratified context - a situation lacking on the deflated prairie away from the slope. Unfortunately, these stratified areas of the site near the cliff are also those areas with the least evidence of cultural activity. Again, this is believed to be due to the sloping nature of the ground surface. A radiocarbon date of 310±80 B.P. (Beta 7793) was obtained on bison bone collected from a depth of 50-60 cm in a unit at the top of the slope, indicating that deposits accumulate rapidly in that area.

Typically, excavations on the prairie below the cliff slope (in the areas of proposed development) yielded low quantities of processed bison bone, flaked stone debris and the rare tool, fire broken rock, and a few features. This indicates sporadic use of this area for both general camping activities and bison processing.

Excavations on the slope at the proposed location of the interpretive building yielded low quantities of bison bone. No stone or other artifacts were recovered, and most of the bone contrasted with that from the prairie level by lacking evidence of heavy butchering or processing. The exact boundaries of the kill site along the cliff had not previously been determined, and it was our purpose in testing the building location to ascertain whether primary kill deposits continued this far south along the cliff. We concluded that such is not the case, and that the isolated elements found in our excavations are the result of discarding and scavenging from the main kill. Excavations on the slope were taken to a depth of 4 m below surface, and auger tests extended to 5.5 m, without revealing any evidence of human utilization of this area. Most of the bone recovered from the units on the slope was found in the upper 1.75 m of soil, with very little below that depth. No radiocarbon dates are yet available from these excavations.

In Area 2, where the research oriented study was conducted, the archaeological record differed dramatically. Excavations on the prairie

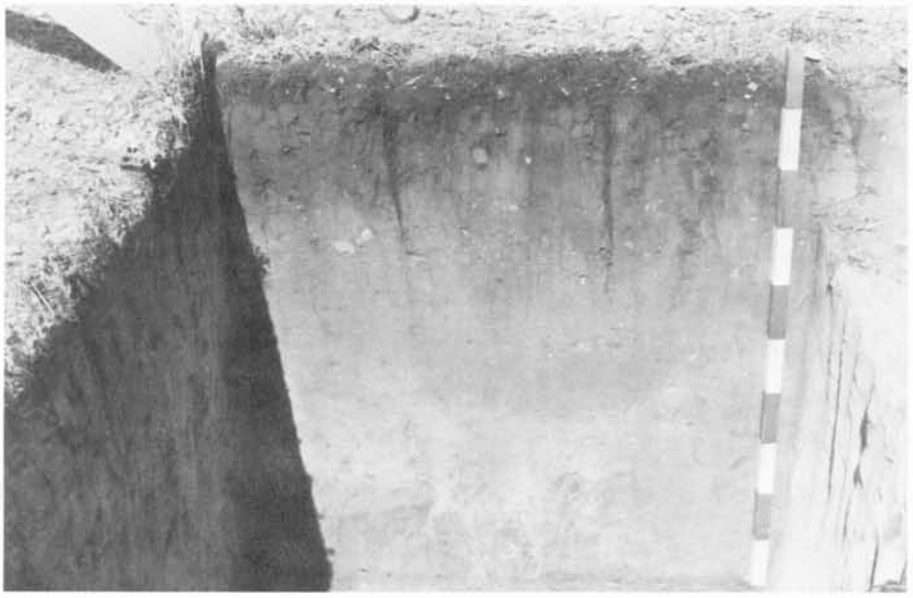

Figure 7. Typical soil profile in prairie level camp/processing area some distance from slope deposits. Note the thin Ah horizon and indefinite B horizon.

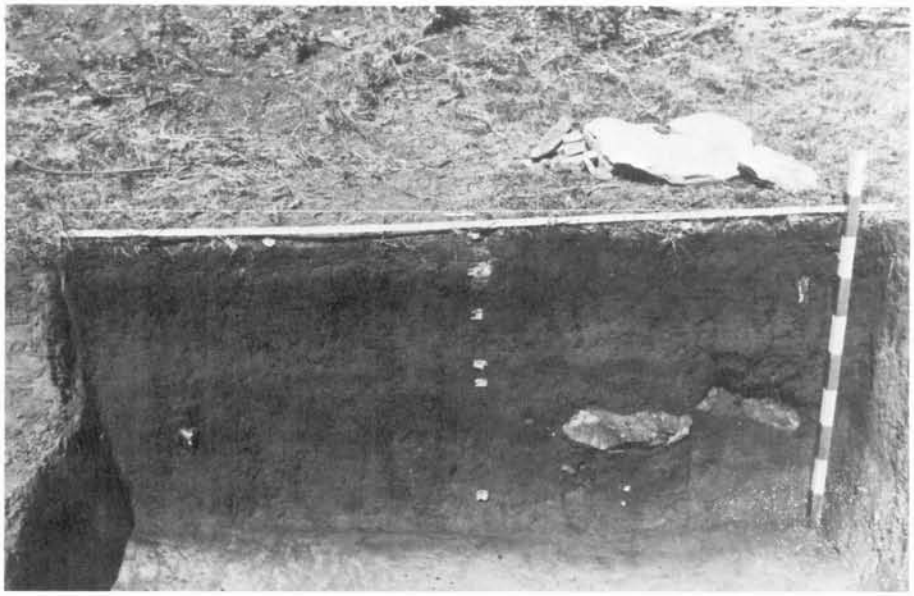

Figure 8. Typical soil profile in vicinity of slope deposits below escarpment. Note the thick Ah horizon, multiple paleosols, and colluviated sandstone fragments.

level to the east of the jump and kill deposits revealed an exceedingly rich record of prehistoric occupation. Butchered and processed bison bone, fire broken rock, stone tools and debitage, as well as ceramics, bone tools, shell, historic items, tipi rings, hearths and bone boiling pits were all recorded. All units on the prairie were characterized by an awesome array of cultural residue, except for one unit located several hundred metres east of the kill site and one situated on moderately sloping ground at the top of the kill site. Erosion and/or deflation has prevented significant buildup of the chernozemic soil and has thereby compressed thousands of years of repeated occupations into a short 20 to 30 cm soil profile. Vertical separation of cultural or temporal components does not appear to be possible. Units were literally paved with processed bison bone and fire broken rock (Figure 9). Features which were probably once present in the hundreds or thousands, are now largely unrecognizable due to the repeated use of the area. Exceptions were noted in outlying areas where individual features survived intact.

A summary of the major data recovered is presented below.

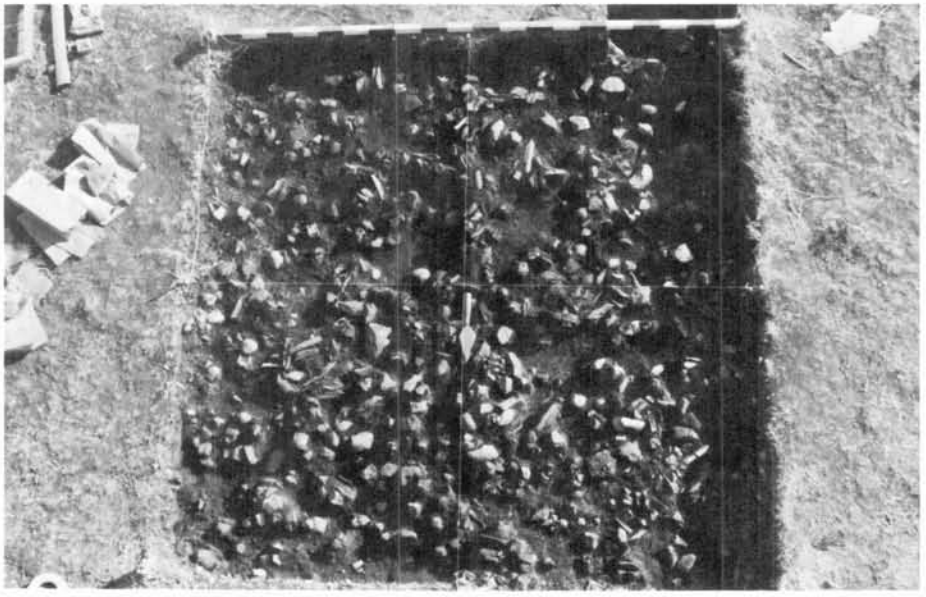

Figure 9. Two metre square test excavation on prairie level camp/processing area. Note undifferentiated deposits of bone and F.B.R. characteristic of deflation surface.

Faunal Remains

The 1983 Head-Smashed-In faunal assemblage consists of well over 100,000 items. The faunal remains were identified while in the field and later in the laboratory with the aid of a reference skeleton and an identification manual for recording butchered ungulate remains (Brumley 1980). Most of the 1983 assemblage was not identifiable to species, consisting of fragmented mammalian long bone and rib bone portions. These are generally large ungulate size, most likely bison.

The poor preservation of the assemblage is due to both cultural modification and taphonomic processes. The camp/processing area can be expected to contain many more fragmentary remains than would occur in the main kill deposit, arising from the secondary processing of the bone for marrow and grease extraction. Fragmentation of the bone is further compounded by a variety of environmental agents. As noted earlier, the camp deposits are stratigraphically compressed, and it is likely that bone deposited in these areas would have remained on the site surface for an extended period of time prior to burial by aeolian sediments. Prolonged exposure to wide ranging extremes of temperature and humidity, along with compaction through trampling by grazing ungulates and man, have reduced all but the most robust bone elements to small unidentifiable fragments. Most of the remarks concerning the faunal assemblage are restricted to qualitative statements at this time; quantitative results are anticipated in the final report to be completed later this year.

As anticipated, the majority of the identifiable fauna at Head-Smashed-In is Plains Bison (*Bison bison*). The most common elements recovered were astragali, phalanges, tarsals and carpals, and the articular ends of metapodials. A few complete mandibles were recovered, and several badly shattered skulls were found in Area 2. A total of 22 pieces of foetal bone were identified, but seasonality estimates have not been attempted. Next to bison, remains of Canidae were the most numerous, with 20 specimens represented. Several mandibles and well preserved skull portions have facilitated the identification of domestic dog (*Canis familiaris*), and possibly wolf (*Canis lupus*). Other animals identified include deer (*Odocoileus sp.*), fox (*Vulpes sp.*), beaver

(Castor canadensis), ground squirrel (Spermophilus sp.), pronghorn antelope (Antilocapra americana), pocket gopher (Geomyidae) and various small indigenous rodents. One bird bone and a single fish vertebra were recovered from a feature in Area 2.

The best preserved faunal remains were recovered from a gulley deposit in Area 2. An analysis of these remains has been reported elsewhere (Brink and Morlan 1983) and will be appended to the final report detailing the 1983 results.

Few bone tools were recognized and while some may have been expedient butchering implements (Frison 1974), the majority consisted of one or more ground and polished surfaces on fragmentary portions of unidentified bone elements. Further analysis of the faunal assemblage will be directed toward examination of differential element reduction and distribution within the campsite area which may assist in delineating activity patterning and butchering practices at Head-Smashed-In.

Lithics

The lithic assemblage recovered during the 1983 season at Head-Smashed-In consists of approximately 18,000 items. Although the artifact analysis is in its preliminary stages and the collection as a whole has not been carefully scrutinized, it is evident that there are several hundred formed and expedient tools present. More than 120 of these are projectile points or fragments thereof. The inventory of other tools includes a wide variety of end scrapers, several hundred retouched and utilized flakes with various edge morphologies and a few bifaces, pièces esquillées, flake butt drills, small notched unifaces, bipolar pebble cores, and multiple and single platform cores (Figure 10). There is a conspicuous lack of large stone butchering tools, suggesting that these were either curated or that expedient bone tools were used for this task. The flaked stone debitage is characterized by very small, thin retouch and resharpening flakes of fine grained rocks with occasional large flakes of coarser grained materials. Often, these larger flakes exhibit evidence of use.

The raw materials used for the flaked stone assemblage appear to be predominantly from non-local sources. Lithic materials represented include numerous multicoloured fine grained cherts, chalcedonies,

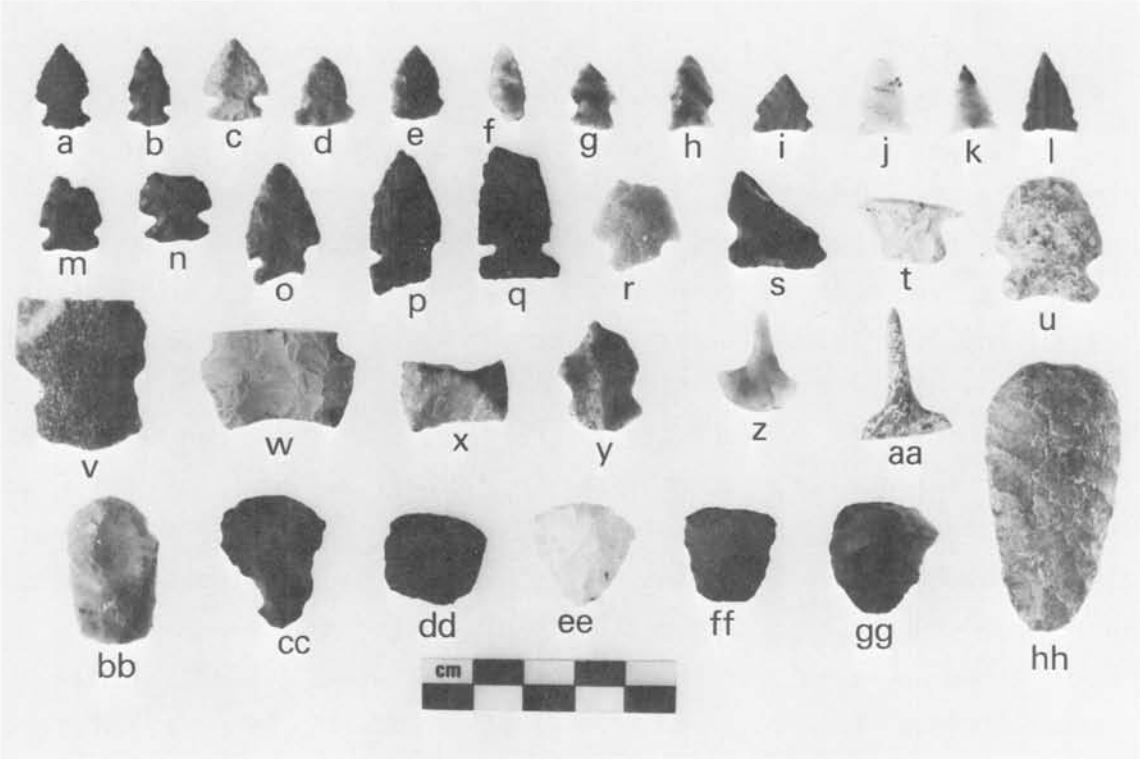

Figure 10: Projectile points and formed tools from the 1983 test excavations and controlled surface collections.

quartzites, siliceous mudstones and siltstones, obsidian, basalt, petrified wood, quartz crystal and porcellanite. Macroscopic examinations of these materials suggest that many of the cherts are derived from sources in Montana and the foothills of Alberta. The obsidian is obviously exotic, presumably from the Yellowstone area. Many items of brown chalcedony occur, but whether these are Knife River Flint or similar materials from closer quarries has yet to be determined.

In addition to the flaked stone assemblage, several hammerstones, anvils, a grooved maul, a few fragments of possible ground stone pestles, and an enormous quantity of fire broken rock (FBR) were recovered. The fire broken rocks are largely coarse grained metamorphics which tend to have crenulated or curvilinear spall fractures and often have crazed surfaces; these conditions are attributable to use as either hearth or boiling stones. The occurrence of numerous pieces of thermally reddened local sandstone presumably indicates a similar use. The density of fire broken rock was greatest on the prairie level in Area 2 below the jump. In one 2 x 2 m excavation unit, for example, the uppermost 10 cm level

yielded 2,089 pieces of fire broken rock with a total weight of 26.6 kg, representing a density of 66.5 kg of fire broken rock per cubic metre.

The emphasis of the preliminary lithic analysis was focused on the projectile points, which are widely regarded by plains archaeologists as temporally and culturally diagnostic. With few exceptions, the projectile point types recovered from the excavations in the camp/processing area are representative of the Old Women's and Avonlea Phases, and to a lesser extent, the Besant Phase (Figure 10). Those tentatively assigned to the Old Women's Phase fall within the range of variation of the types documented by Forbis (1962, 1977) and Kehoe (1966, 1973). The Avonlea points recovered in 1983 are all of the Timber Ridge variety as defined by Reeves (1983a), with one possible exception: a petrified wood projectile point with sharply barbed shoulders, rounded ears and a concave base (Figure 10). This latter may be a Head-Smashed-In variant of the Avonlea Phase (Reeves 1983a), but the overall workmanship seems more typical of the Prairie Side-notched type, possibly the Swift Current Fish-tail variety (Kehoe 1973:57). Besant Phase material is represented by several fragments, mostly the small Samantha variety (Reeves 1983a, Kehoe 1974), with at least two specimens representative of the larger Besant (Reeves 1983a) or "Large Samantha" (Kehoe 1974) varieties (Figure 10, s,w).

The poor representation of Pelican Lake material recovered this year is surprising; only a few fragments appear attributable to this type (Figure 10,r). This is not consistent with the results obtained by Reeves in excavations in the bone bed of the kill site (1978, 1983b). As our excavations were restricted to the camp and processing areas, this apparent discrepancy may be indicative of differential intra-site utilization by various cultural groups. However, based on our small sample, this inference can only be regarded as speculation at this time.

Other Middle Prehistoric types are represented by a few fragments. One point base (Figure 10,t) compares favourably with the Hanna types recovered by Reeves at Head-Smashed-In (1983a:333). An unusual point base found on the surface is quite unlike any previously recovered at this site (Figure 10,w). This artifact bears some resemblance to a few of the large side-notched Middle Prehistoric points recovered from Danger

Cave (Jennings 1957), Sudden Shelter (Jennings et al. 1980), and Pictograph Cave (Mulloy 1958).

A concave-based lanceolate point fragment (Figure 10,x) was found *in situ* in a hearth which unfortunately yielded an enigmatic modern date on bone collagen (Beta 7791). This artifact has a morphology similar to early Prehistoric types such as Plainview or Meserve. Two Scottsbluff points recovered on the surface at Head-Smashed-In by Boyd Wettlaufer in 1949 indicate occupation of this area during Paleo-Indian times. However, there is no good evidence yet to demonstrate use of the buffalo jump at this early date.

Other projectile points recovered in 1983 include a variety of small, unnotched, triangular points as well as a few small, corner-notched, side-notched and stemmed varieties which appear to be relatively recent types. Overall, the range of projectile points found in the 1983 season reflects the heavy utilization of this site in Late Middle Prehistoric and Late Prehistoric times, in accordance with the results of Wettlaufer and Reeves.

Ceramics

Previous archaeological investigations at Head-Smashed-In indicated that ceramics were present in the campsite area. Subsequent analysis of the material recovered revealed that the assemblage contained representative decorative techniques and motifs for the three ceramic complexes currently identified for Alberta (Byrne 1973).

The majority of the 110 ceramic fragments recovered during the 1983 field season were derived from the upper 10 cm of the site deposit. Only seven analysable rim sherds from three vessels were recognized; the remaining assemblage consists of small fragments averaging less than 2 gm in weight. Taphonomic factors at the Head-Smashed-In site have reduced much of the ceramic assemblage to unanalysable fragments (Grove and Buge 1978), many of which were probably missed during the excavation and passed through the 6.3 mm (1/4 inch) screen. While these fragments were useful for noting paste characteristics and vessel construction techniques, they were of little assistance in defining the decorative techniques and motifs present at the site.

The seven rim sherds are representative of the decorative motifs and techniques recognized in the Saskatchewan Basin Complex (A.D. 1150-1700) and the Cluny Complex (A.D. 1700-1870). Vessel form could not be ascertained, but the paste consisted of coarse to moderate sized temper particles derived from weathered granites. The firing was usually incomplete and no evidence of coil construction was noted. In many instances, rim sherds possessed encrusted carbonaceous deposits which would have ringed the interior of the vessel, indicating prolonged exposure to high heat. The available evidence suggests that ceramics were not manufactured at the site, but at a more permanent habitation site and transported to Head-Smashed-In for use as personal cooking vessels. While use of ceramic vessels in the process of bone boiling for grease extraction is conceivable (Vehik 1977:171), it is unlikely to have been commmonly practised at Head-Smashed-In. Given the volume of bone to be processed, such activities were probably conducted using large subsoil pit features.

Features

The features recorded at Head-Smashed-In, while perhaps typical of those recorded at other Plains sites (Byrne 1973, Brumley 1978, Quigg 1975), are especially significant at this site. Feature classes identified in 1983 include concentrations of fire broken rock and bone, hearth stains, cooking pits and possibly a bone rendering facility (Table 2). The absence of stratified deposits over much of the site area gives the features added importance as the primary source of data from the campsite area that possesses contextual integrity. The contents of the features are well preserved, presumably a result of their rapid and relatively deep burial.

The 1983 features at Head-Smashed-In are comparable to those discovered from previous excavations of the campsite area. Most features were recognized following removal of the Ah horizon (Figures 11 and 12). The plan and profile shapes were recorded and the dimensions of the features measured. The feature matrix was either completely retained or sampled for water screening and flotation. This portion of the analysis is not yet complete, and only summary tabulations are presented at this time.

Table 2: Feature Data At Head-Smashed-In (1983)

CATEGORY	DIMENSIONS (cm)				MODAL SHAPE		CONTENTS	FBR NO/WGT (kg)
	MAX	MIN	DEPTH (B.S.)	VOLUME ESTIMATE (litres)	PLAN	PROFILE		
Rock Conc.	40	40	20	--	Circle	Shallow Basin	FBR	52/10.5
Rock Conc.	30	20	15	--	Oval	Shallow Basin	FBR, bone, lithics	208/6.6
Hearth	40	40	30	--	Circle	Deep Basin	FBR, bone, ash, charcoal, oxidized sediment	90/3.8
Hearth	35	30	20	--	Oval	Shallow Basin	Oxidized sediment	---
Hearth	24	24	14	--	Circle	Shallow Basin	Oxidized sediment	---
Pit	100	80	50	400	Oval	Deep Basin	FBR, bone, charcoal, ceramic, wk bone	1643/17.4
Roasting Pit	68	38	35	90	Oval	Asymmetric Deep basin	FBR, bone, charcoal, oxidized sediment	26/0.5
Roasting Pit	80	45	30	100	Oval	Shallow Basin	FBR, bone, charcoal, ash, ceramic	288/13.6

Figure 11. Large pit feature partially exposed in camp/processing area. Note distinct pit outline in lower right compared with undifferentiated upper 10 cm of Ah horizon in upper left.

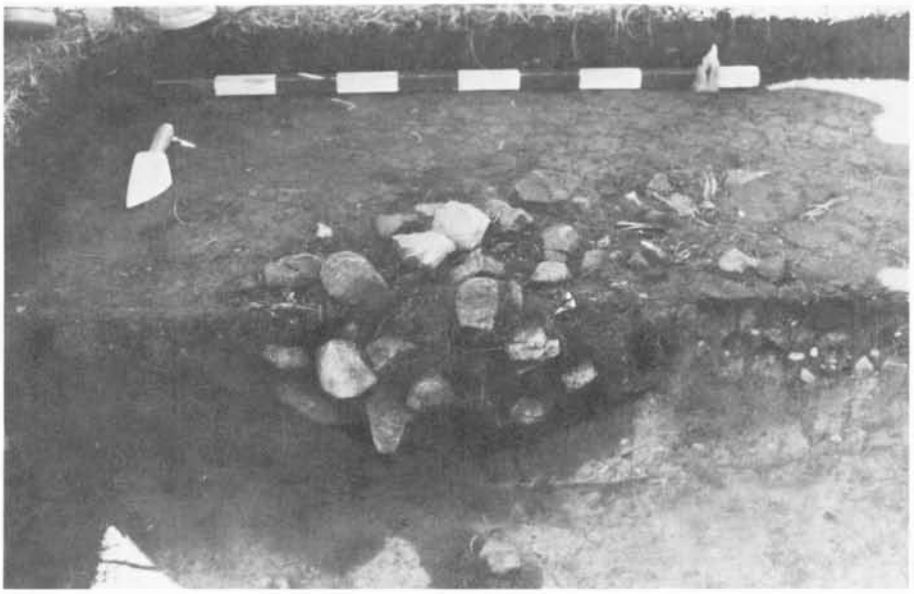

Figure 12. Profile of shallow basin shaped feature containing bone, fire broken rock and charcoal.

The most conspicuous feature at Head-Smashed-In was the dense pavement of fire broken rock and bone fragments which occurred in the upper 20 cm of the soil in Area 2 (Figure 9). This pavement is interpreted to be the consequence of the construction and use of numerous discrete features through time. Individual activity patterns cannot be extracted from these dense concentrations; however, the evidence suggests that food preparation, bone boiling, marrow extraction and other activities associated with bison processing were being conducted.

Previous studies (Quigg 1975, Brumley 1978) have identified two classes of hearth feature: prepared and unprepared. The hearth features from Head-Smashed-In conform to the unprepared hearth variety and, in most instances, are only defined on the basis of an oxidized sedimentary horizon (Figure 13). Presumably, this horizon was the result of heat transfer from an overlying hearth structure which was dispersed by erosional agencies.

Peripheral to the areas of dense bone and FBR deposits, a few intact, well preserved, discrete pit features were recorded (Figure 14). These

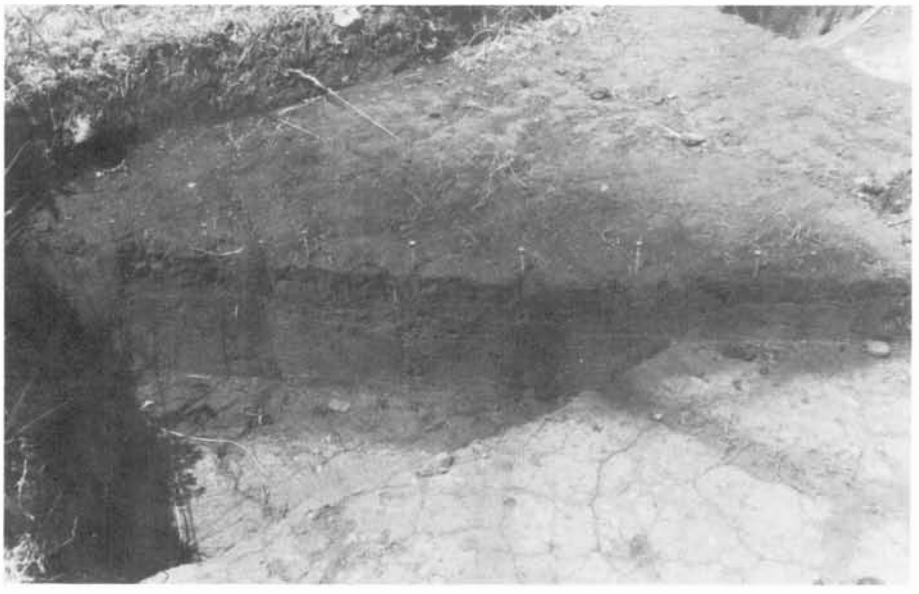

Figure 13. Profile of two hearth stains in camp/processing area exhibiting shallow basin profiles and ovate plan shapes.

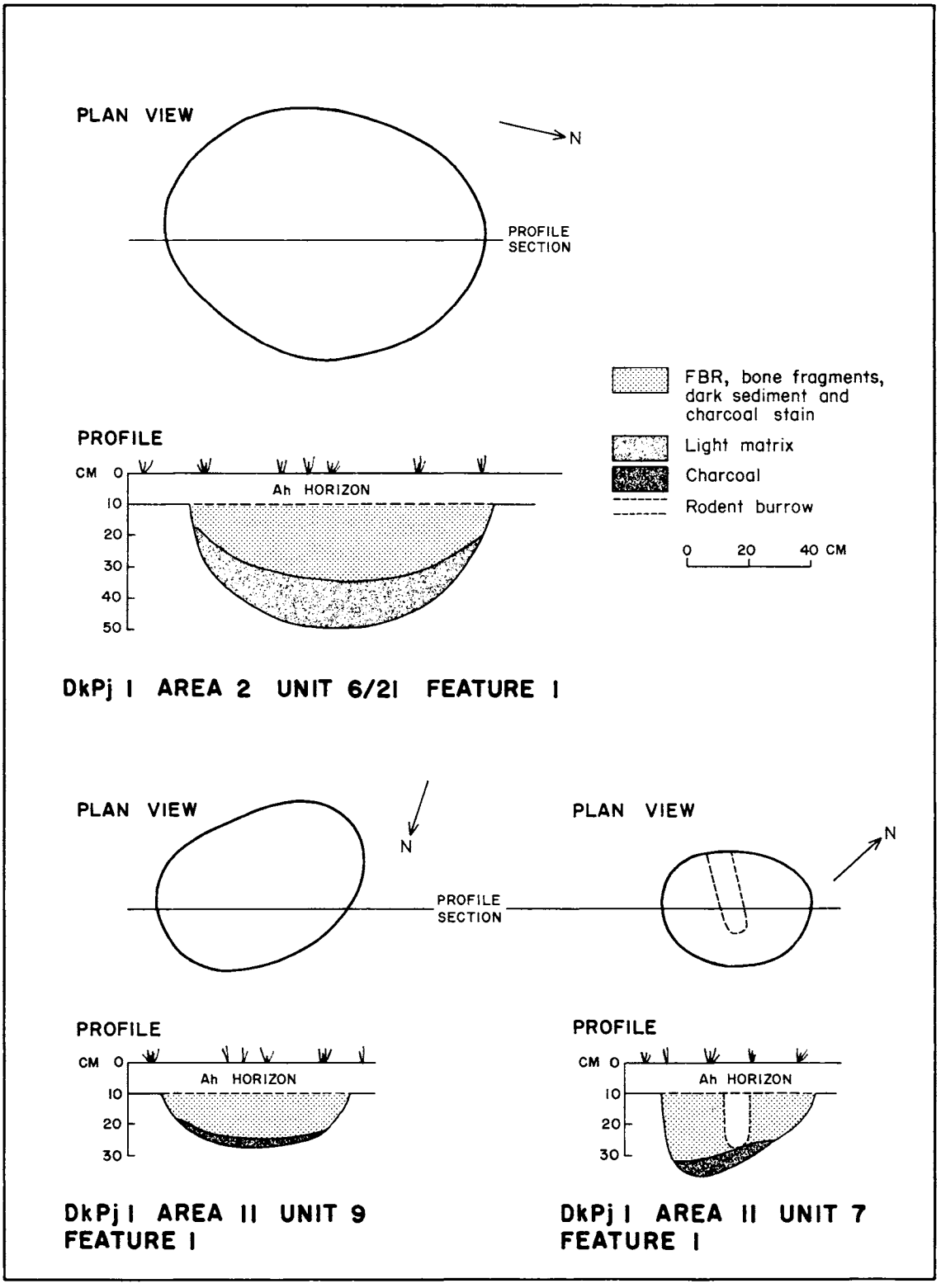

Figure 14. Model representations of three varieties of pit features recorded during the 1983 field season. (See Figures 11, 12 and 15 for photographs of these features)

are also assumed to have been used as food preparation or bone rendering pits. Those features exhibiting a charcoal lense in the basal zone of the feature matrix (Figure 15) may conform to the roasting pits described by Wissler (1910:25) and Lowie (1954:26) as typically used by the Plains groups. In Area 2, a large feature with layered deposits may represent a boiling pit facility which was employed at least twice before being abandoned. It is difficult to determine the specific function of the Head-Smashed-In features with complete confidence, but the detailed matrix analysis should be of some aid in delimiting the range of functions represented (cf. Syms 1974).

Figure 15. Profile of deep basin shaped pit feature distinctive basal charcoal lense.

SUMMARY AND CONCLUSIONS

The archaeological research at the Head-Smashed-In Buffalo Jump in 1983 satisfied two primary objectives. First, an intensive testing program demarcated areas of lowest archaeological sensitivity suitable for the future development of interpretive facilities. Mitigation of the proposed building site was completed and no significant cultural deposits were located. Investigations of the initially proposed access route and parking lot locations, however, indicated a shallow but relatively dense cultural deposit. These latter developments were redirected to areas of lower archaeological impact.

A second goal of the field work was to examine the processing site area at the prairie level below the jump. Previous excavations in this area suggest that it was an important aspect of the site. Exploratory excavations here revealed an extremely dense deposit of bone debris and artifactual materials associated with butchering and processing activities.

Analyses of both faunal and lithic materials recovered in 1983 have been undertaken. Preliminary results indicate that the faunal assemblage is comprised almost exclusively of bison, although a few other species are represented, most notably canid. The lithic assemblage is dominated by a high proportion of debitage and several hundred formed tools made of fine grained materials. The projectile point types are predominantly diagnostic of the Late Middle Prehistoric and Late Prehistoric periods.

The 1983 research design employed at Head-Smashed-In contained both a reactive component and a problem oriented component. This flexibility was necessitated by the unsettled state of specific mitigation programs involving the location of the interpretive centre and access road alignments. As a consequence, the research objectives of the 1983 field program were restricted in scope and largely limited to the test evaluations of the campsite and processing areas.

The results of the 1983 excavation and testing program are still being compiled, but it is clear from the preliminary analyses that the testing program has considerably improved our understanding of the camp/processing area. While the surficial scatters of bone, lithics and discrete features extend for several thousand metres along the base of

the Porcupine Hills escarpment, there are discrete areas in immediate proximity to the kill site which contain the more compact and extensive deposits of artifactual remains and features. With a few notable exceptions, the camp/processing areas are deflation surfaces and reveal a collapsed stratigraphic record. Analysis is currently being completed to determine the interpretive limitations of these collapsed deposits and the results will guide future excavation strategies.

Despite the complex stratigraphic record, there is some indication of chronological separation of deposits in the horizontal dimension. In Area 2, there was an over representation of Late Prehistoric material relative to Middle Prehistoric remains, suggesting that occupations were not always coterminous. Correlations between the chronology identified in the kill deposits (Reeves 1978) with that of the camp/processing area have yet to be attempted. Such correlations are both necessary and crucial, and may document adaptational shifts through time. Unfortunately, the small sample of data currently available from the camp/processing area preclude such analyses.

Resolution of these sequential occupations may be obtained through the identification and excavation of discrete feature assemblages within separate occupation areas. The identification of feature clusters, as well as the demarcation of those areas of the processing site that may contain stratified deposits (i.e., the spring channel), were initiated in the 1983 season. Completion of these tasks will assist in the integration of the camp/processing and kill site deposits. These preliminary gleanings from the test evaluations of the camp/processing areas are essential precursors to the expanded and intensified research program that is anticipated as part of the 1984 research.

Future Research

During upcoming field seasons, we will continue to provide a variety of archaeological services during the construction and development of on-site facilities. Primarily, this will include monitoring of mechanized stripping and excavation operations to ensure salvage of any significant archaeological features or deposits that may be encountered. It is anticipated that during the 1984 field season, considerable time will be devoted to these monitor duties, and to the resultant excavation

of features, especially in the proposed parking lot areas where intact, discrete activity features were discovered in 1983. These well defined, peripherally situated features are of considerable significance, since such features are not well preserved in the areas of intense occupation such as the main camp/processing site. Thus, research goals which are expected to dovetail with compulsory mitigative duties at Head-Smashed-In will include an examination and exploration of the structure and function of the diverse features recorded at the site. This will likely include experimental studies of bone grease and marrow extraction, and experiments with feature construction and abandonment. Studies initiated in 1983 investigating the use of different lithologies for stone boiling will be continued and expanded to provide a body of quantifiable data.

The whole system of bison processing at buffalo jump sites is a curious one which has received scant attention in both ethnohistoric and archaeological literature. Sweeping and undemonstrated assumptions are made regarding smashed bone and fire broken rock as evidence of specific, historically documented processing activities. We question, for example, whether all the fragmentary bone recorded at Head-Smashed-In was exclusively the result of bone breakage and rendering to recover marrow and grease by-products. Quartzite cobbles, assumed to be superior to the local sandstone for heating and boiling water, are not readily available at the site, and must be transported a distance of at least 1 km. Similarly, bison dung fires would likely be a poor way to try to heat these large cobbles, and sufficient wood fuel would have likewise necessitated extensive travel from the immediate site area. Since the faunal sample is dominated by the small, broken pieces of bone typically attributed to grease extraction processing, research will be directed toward resolving the apparently contradictory forms of data gathered from the site in 1983.

A second avenue of future investigations will be to extract and study a control sample from one of Reeves' large excavation units in the bone bed of the kill site. The unit, portions of which were excavated to a depth of about 11 m, was shored and capped, and then covered with over a metre of dirt (B. Reeves, personal communication). Tentative plans for the 1984 season include opening up the excavation and removing a continuous 1 or 2 square metre sample from one wall. This sample would

hopefully serve as a research collection for faunal material, lithics, radiocarbon specimens, and would provide base data for interdisciplinary studies.

An additional target of research for 1984 will be a continuation of our test excavations in the spring channel at the camp/processing site. Richard Morlan will again be joining us to continue our mutual study of archaeological and taphonomic processes as evidenced in the stratified deposits of the channel. One major goal of the channel excavations will be to continue to pursue the very important problem of the compression of natural and cultural stratigraphy in the camp/processing area. Long range research gains at Head-Smashed-In are likely to emanate from innovative studies of the complex archaeological record on the prairie level below the kill site. If Frison is correct (1978:220) in asserting that buffalo jumps likely resulted in the killing of a minimum of 100 to 200 animals at a time, successful processing and preservation of the food is essential if the whole effort is not to have been a pointless waste. Here, in the camp/processing area, lies the evidence of the great diversity of human activities and the webs of human relationships which accounted for the ultimate success of a communal hunting episode.

ACKNOWLEDGEMENTS

Space does not permit naming of all the individuals who have contributed to this project. The final report will make amends. The senior author would like to acknowledge the efforts of an outstanding field crew consisting of Bob Dawe, Karie Hardie, Chris Hughes, Rita Morning Bull, Heather Nelson, John Priegert, Maureen Rollans, Loretta Rose, Tim Schowalter, Craig Shupe, Guy Trott and Milt Wright. The Head-Smashed-In guides Shauna Cunningham, Darron Massey, Susan Marshall, Lyn Tuk and Brian Yellowhorn became our friends and invaluable aids; we thank them and their supervisors David McIntyre and Grant Tolley. Coaldale residents Armin and Gerry Dyck gave us the pleasure of their hospitality, as well as volunteering their services on many occasions, for which we are all very grateful. Numerous residents of Fort Macleod helped make our stay an enjoyable and productive one. Richard Morlan

spent several weeks working with us, contributing greatly to our intellectual stimulation and our beer consumption.

The report has benefited from the fine work of Wendy Johnson (draftsperson), Gabriella Prager (editorial assistant), and Lucille Fedorychka and Kathy Miller (typists). The authors wish to acknowledge the advice and support offered by Drs. Paul Donahue and David Burley of the Archaeological Survey. Finally, we extend our thanks to William Byrne, Ronald Getty, Brian Reeves and Boyd Wettlaufer, all of whom returned to Head-Smashed-In in 1983 to share their experiences and memories.

CONSERVATION STUDIES, HIGHWAY 3 REALIGNMENT BLAIRMORE TO FRANK SUMMARY OF 1982-83 WORK

Margaret Kennedy
Lifeways of Canada Ltd.

This paper summarizes some of the most recent of a decade of archaeological investigations conducted in the Crowsnest Pass during Highway 3 realignment studies. The full report for the 1982 project is on file with the Archaeological Survey of Alberta (Kennedy and Smith 1983). A report for the final conservation studies in 1983 at DjPo-63 is in progress.

The 1982 assessment involved archaeological testing at five sites (DjPo-6, 30, 40, 63 and 155), and historical evaluation of the Greenhill Mine's rotary dump, coal bins, truck ramp and assay office/rail car. All sites were within the proposed direct impact zone of the highway realignment, and would have received complete and irreversible impact without conservation assessment.

Subsequent to assessment stage activities, specific conservation measures were recommended for four of the sites (Figure 16). These included an inventory, recording and informant interview program at the Greenhill Mine, and conservation excavations at the prehistoric sites DjPo-40 and 155, and the historic red light area at DjPo-30. No further work was recommended for DjPo-6. As well, testing was not conducted at DjPo-63 until October 1982, so those conservation studies have formed a separate project.

The archaeological conservation program was undertaken in October, shortly after clearing and grading of portions of DjPo-30, 40 and 155 by Alberta Transportation. No further assessment of the Greenhill Mine's rotary dump was conducted by Lifeways at this time; the mine car/ assay office was eventually moved to Heritage Park in Calgary by

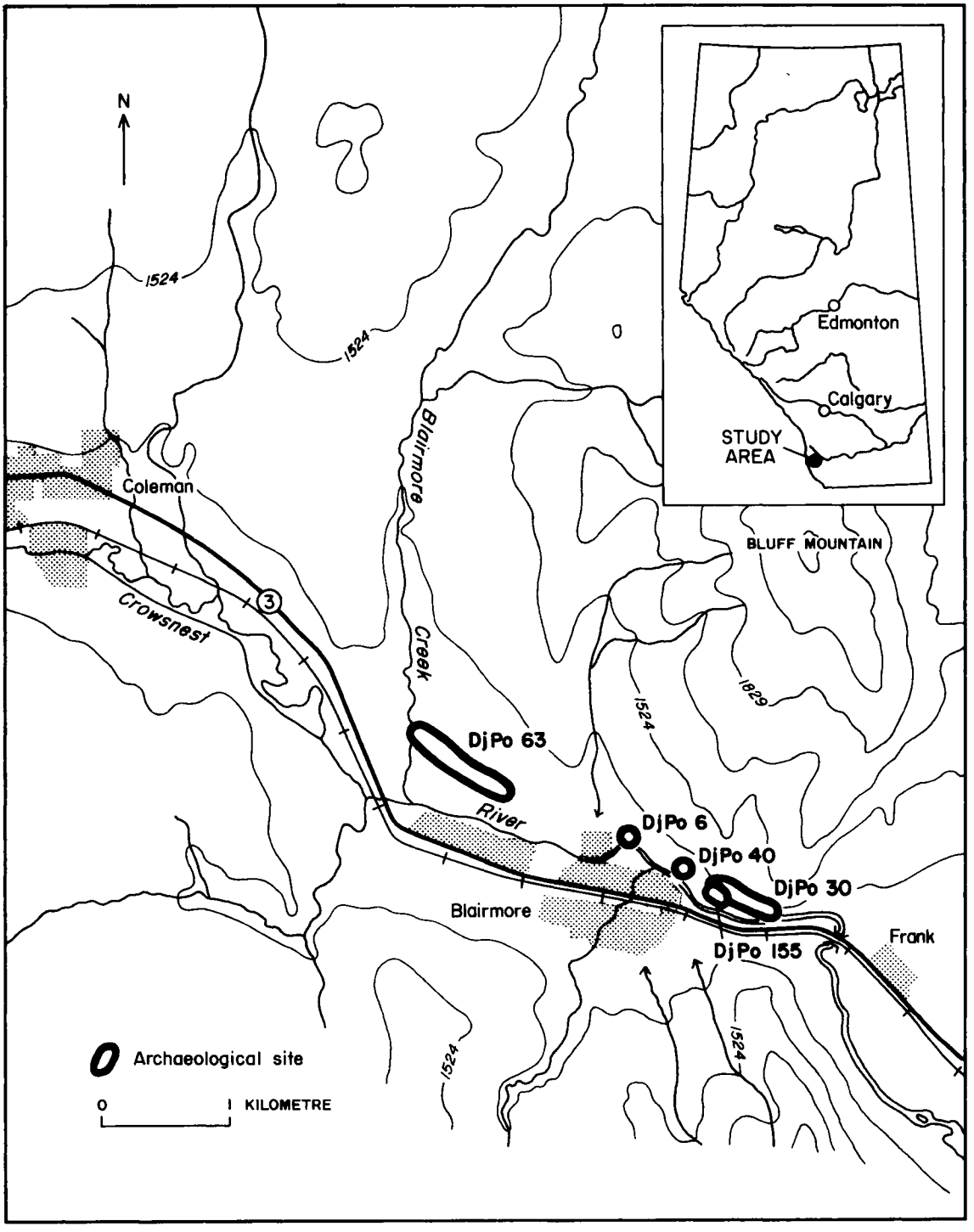

Figure 16. Archaeological site location map, Crowsnest Pass Highway 3 realignment Frank - Blairmore.

a private society, the coal bins and truck ramps were cleared for dismantlement, and the rotary dump shed still stands.

DjPo-155

Located on an alluvial fan terrace just east of the Blairmore Gap (Figures 16 and 17), DjPo-155 was a Late Middle to Late Prehistoric Period campsite, characterized by two cultural occupations representing the Burmis and Crowsnest Lake Subphases. The site appeared to represent a temporary campsite where food processing (interpreted through reduced faunal elements and fire broken rock), hide and bone processing activities (indicated by presence of specific tool types), and tool production and maintenance activities were conducted.

Occupation 1 was associated with a thin dark brown organic soil containing unsorted gravels, at a depth of 15 to 20 cm below surface. Cultural material was dispersed throughout in no apparent concentration. However, activity was likely linked to a unique pit feature, which formed the centre of our archaeological investigations after it was found during initial assessment excavations near the terrace edge.

Figure 17. View along terrace at Blairmore Gap. Test excavations in progress at DjPo-155 in mid foreground. DjPo-30 (Red Light District) located on same terrace.

This feature was an oval shaped pit filled with fire broken rock and extended from 15 to 40 cm below surface. It measured approximately 1 x 1.5 m at its surface, and contained over 181 kg of fire broken rock, almost all quartzite foreign to the predominantly limestone and dolomite fan matrix, and probably gathered from the river deposits below. Bone fragments, largely unburnt, were located within it. A variety of lithic artifacts were observed both within and around the pit: numerous retouched and unmodified secondary flakes, retouch/resharpening flakes, cores and core fragments, core tools, bifaces, end scrapers and two projectile points (a Samantha Side-notched, and a broken, reworked corner-notched point). A charcoal sample from 40 cm below surface was radiocarbon dated at 1870±110 BP. (Beta-5447).

Immediately east of the pit, an extensive patch of ashy silt with over 12 kg of fire broken rock was observed. This may reflect emptying and disturbance of the pit feature.

Although rock lined hearths occur elsewhere in the southwestern Rocky Mountains (e.g., DgPl-42 in Waterton, DjPq-2 near Crowsnest Park in B.C., and DjPp-3 on Crowsnest Lake), this depth and volume of fire broken rock has not been observed before. Pit hearths have been recognized in historic Kutenai culture, although water boiling in rawhide lined pits was apparently preferred (Johnson 1969; Schaeffer 1934:60).

Occupation 2 at DjPo-155 was associated with the thin modern Ah horizon, and was encountered in every excavation unit on the western edge of the terrace. Three projectile points were found: Plains Side-notched, Head-Smashed-In Corner-notched, and Pelican Lake Corner-notched, and there was good representation of other tool and debitage types. The faunal remains do not suggest concentrated bone processing, and seasonality could not be inferred.

The Late Prehistoric Period, as represented by Occupation 2, is relatively poorly understood in the Crowsnest Pass. DjPo-155 and DjPo-63 contained the only known occupations attributable to this date in the Middle Crowsnest Valley, although the terrace locale is one of the most common landforms preferred for Late Prehistoric settlement (Driver 1978).

DjPo-40

DjPo-40 consisted of a knoll campsite and a swale kill/processing

area (Figures 16 and 18).

Excavations which removed nearly all of the swale sediments were highly productive, and provided an invaluable opportunity to study a prehistoric site in almost its entirety. The information resulting from these conservation excavations has enlarged our understanding of prehistoric land and resource use in the Middle Crowsnest Valley (particularly since so little was previously known), and has contributed to the development of a clearer picture of overall site patterning in the Crowsnest.

The lower occupation was also the best represented within the site, with excellent preservation of articulated bone units (Figure 19). It is interpreted as a primary kill and meat processing site. Modification by carnivores has also been a factor in taphonomy of the bison bone from DjPo-40; thus, consideration of such carnivore activity necessarily tempered interpretations about which parts of the animal may have been selected or preferred. (See Appendix II in Kennedy and Smith 1983).

Two radiocarbon calibrations were returned on bone: 1370±80 B.P. and 990±70 B.P. (Beta 6308, 6309, respectively). These dates prompted some consideration of the contemporaneity of the faunal remains, as well as the association of projectile point styles which dated much earlier on a typological basis. Analysis of bone distribution, stratigraphic profile and basin morphology, suggested that Occupation 1 represented a number of discrete kills, thus, the non-aligned dates. The variance in projectile point types could be explained in behavioural terms; there was apparently a large degree of curation and maintenance of the tool kit within Occupation 1. At least four points displayed reworked tips, and two of these showed asymmetric cross-sections due to reworked lateral edges (two Pelican Lake, one Salmon River Side-notched, one likely reworked Oxbow Side-notched). The Besant points which occur in DjPo-40 did not display any signs of reworking for alternate functions; their temporal range (ca. 1750-900 B.P. in the mountains) fits agreeably with the radiocarbon dates. Pelican Lake and Hanna points have been found elsewhere in association with Besant. A lanceolate point base fragment was an anomaly, having a straight and thinned base marked by a small concave area at the left basal-lateral juncture. The specimen displays greater affinity with known assemblages dating to the Early Prehistoric Period.

Figure 18. DjPo-40, view south. Test excavations in progress at knoll campsite. Swale kill area to left of knoll.

Figure 19. DjPo-40, Occupation 1 bone feature. Articulating vertebrae, lower limb bones (bison), and fire broken rock.

It, too, may have been adapted for later re-use.

A minimum of eight bison individuals was identified within Occupation 1, on the basis of aging mandibular teeth. The elements showed evidence of meat stripping activities, and skeletal segmentation, with an emphasis on selection of hind limb elements (i.e., these bones were absent, suggesting further reduction elsewhere). A possible late foetal distal metapodial may suggest an early spring occupation.

Numerous features were associated with Occupation 1, and are listed briefly here: (1) two articulating bison vertebral sections, and a lower limb section with adjacent clusters of fire broken rock (Figure 19); (2) a rock hearth, a small basin shaped pit and a concentration of butchered bone; of particular interest here was the discovery of eight hafted "netsinkers", the function of which at this site is not clear; and (3) a large pile of fire broken rock situated on bare bedrock at the northern end of the swale, with a thin, carbon-like sediment coating the adjacent bedrock.

Occupation 2 was characterized by much less intensive dismemberment and primary processing. Smith suggests that the faunal remains likely represented secondary processing, including both skeletal separation and meat consumption. This information, in addition to characteristics of the lithic assemblage, provides support for the contemporaneous use of the knoll campsite and the swale. Point styles also indicate a close temporal association with Occupation 1. Again, the points were reworked: a corner-and basally-notched specimen, a stemmed point identified as Hanna, a broken corner-notched point fragment, and a large reworked Pelican Lake point.

DjPo-40 represents intense utilization of the terrace landform common to the Middle and Lower Crowsnest Valley; in this case, it was extensively used as a kill locale by prehistoric man. Only three other kills dating to the Frank-Crowsnest Lake Subphases are known in the Pass. The general funnel shape of the swale would have been useful in the trapping and killing of bison, particularly in winter, when the swale could be drifted in with deep snow. Analysis of the overall settlement pattern within the Pass has indicated that winter occupation was concentrated in the eastern part of the Pass, where the ungulate herds gathered. Assuming that DjPo-40 represents a winter/spring occupation,

interesting hypotheses as to the conservative nature of the lithic assemblage at this site can be pursued. For example, curation may have been due to curtailed trade in lithic raw materials because of the limited movement of people during winter conditions.

DjPo-63

DjPo-63 was originally identified in 1973 as a long linear scatter of cultural material along the crest of the first terrace north of the Crowsnest River. Terraforming activities for the existing golf course, and erosion had eliminated much of the original site area, and consequently, the 1982 investigations concentrated on the eastern portions of the golf course, where there appeared to be some preserved archaeological site integrity. The site displayed potential for examining several different aspects of prehistoric land use and subsistence strategies in the Crowsnest Pass; on the basis of the initial assessment results, additional work was recommended.

Conservation excavations at DjPo-63 were conducted in April 1983. A block excavation area was opened up in the vicinity of two adjacent test units which had displayed deep, preserved sediments and a good representative sample of the workshop floor. The upper silt sediments were still frozen in certain parts of the site area, due to ponding of run-off water, and waterscreening became necessary.

Three cultural components were identified in this central block area. The uppermost level, dating to the Late Prehistoric Period, was characterized by a rock hearth feature associated with numerous lithic tools and debitage. Faunal elements were extremely comminuted and calcined. A Prairie Side-notched point was associated with the component.

The second cultural component was identified as an Etherington chert workshop, and was located in yellow-brown sandy silts extending from approximately 30 to 50 cm below surface (most dense at 40-50 cm in main excavation block area). Thousands of lithic artifacts composed this component, including secondary flakes, flake fragments, biface performs, core fragments, rejuvenation flakes, decortication flakes and shatter, as well as a small number of hammerstones. No diagnostic projectile points were located, but because of its stratigraphic position relative to other portions of the site, and the known period of use of Etherington chert,

it can likely be dated to the Pelican Lake Phase of the Middle Prehistoric Period.

The third component in the main excavation block area was characterized solely by distinctive quartzite cores and retouched spalls, identified in the tan silts intermixed in basal gravels about 52-60 cm below surface. This material was not encountered in the overlying sediments; conversely, Etherington chert did not appear in this component. Stratigraphic analysis of the site suggests that this component likely dates earlier than the deposition of Mazama ash, which occurs in the eastern site area, but not in the main block area. No radiocarbon date could be obtained for this component.

The site is situated at the base of steeply sloping hills leading to the second terrace, where a large basin once existed in which sediments gathered and remained well preserved. Three of our exploratory excavation units approximately 30 m east of the main block area encountered well preserved sediments and paleosols, including Mazama ash at about 60-70 cm below surface. A paleosol with an associated cultural component occurred immediately below this, at a depth of about 73-82 cm below surface. Lithic material, including biface fragments, and faunal specimens were recovered. A radiocarbon date was not available at the time of writing. The presence of this apparently early cultural occupation at DjPo-63 substantiates results from other sites in the Middle Crowsnest Valley, and indicates that the terrace landforms provided bases for intensive occupation and utilization throughout the Middle and Late Prehistoric Periods.

DjPo-30: THE EAST BLAIRMORE TOWNSITE

DjPo-30, a historic archaeological site, represents the remains of one of Crowsnest's more notorious, albeit significant industries. Also known as the East Blairmore Townsite, it was a red light district, occupied from the early 1920s until 1954, when the most well known structure, the "Red Brick House", was closed down (Figure 20). Our archaeological investigations centered on the Red Brick House dumps as well as several dumps and house foundations on the higher terrace to the west (affectionately known as "Hill 60" by World War I veterans recuperating at the former Frank Sanatorium). A complete site inventory,

site mapping project and informant interview program composed important parts of our investigations of this area.

Background

The early years of Crowsnest's development into one of Alberta's major coal mining regions was characterized by the proliferation of independent company towns, populated almost entirely by single males, usually immigrants. This overwhelmingly male citizenry resulted in the spread of leisure oriented pastimes and establishments, typically bars, hotels, bootlegging outfits, pool halls, gambling and prostitution houses. As the Pass towns matured, and as women and families became more prevalent in the community, the "red light district" became increasingly circumscribed, more obviously relegated to the outskirts of central town life. The area studied during our assessment was similarly located, and was truly a community in itself.

Figure 20. DjPo-30, Red Brick House foundation from south side of Crowsnest River. Prior to 1924 river diversion, there were five frame cottages to left of house.

The Red Brick House was likely built in 1908 by William Amasa Beebe, a miner. Bricks used in its construction were manufactured at the Blairmore Brickyards. During the initial years of its occupation, the building was run as a residential store, and served a small Italian neighbourhood that had sprung up on adjacent lots. The adjacent cottages were removed in 1924 prior to one of a series of river diversions (Figure 21). After the mid 1920s, the house was utilized solely as a brothel and gambling den until its closure in 1954. In 1967, the citizens of Blairmore demolished the house as a Centennial project, thus removing a rather famous landmark from the Pass scenery.

"Hill 60" was subdivided into residential lots in approximately 1903, and had gained a reputation as a red light district by at least 1915. Several of the better known inhabitants were of Japanese background, a historical fact which was substantiated by the archaeological record.

By 1939, all houses on Hill 60 had been removed or demolished. Many informants suggested that the girls had vacated Hill 60 after the river diversion work in 1934, which had initially isolated them. During our work, we identified three house cellar depressions and wall remains of a fourth house.

Archaeological Assemblage

The prominent feature of the artifact collection is the overwhelming presence of glass artifacts, which are almost all bottles. Unfortunately, the high quantity of broken unidentifable glass fragments disallowed firm identification of specific bottle types and use. However, through comparative metric analysis, many of these were interpreted as liquor or beer bottles, supported by the additional association of crimped beer bottle caps and foil liquor lids which gave a minimum number count. In short, drinking formed an important activity in the red light district, particularly in the Red Brick House, and the south houses on Hill 60.

Supplementing the social activities suggested by the high frequency of liquor related items is an assemblage of artifacts associated with residential habitation. These are the Kitchen Group artifacts such as dishes, tin cans, utensils, foodstuff bottles, and architectural items relating strictly to house construction and maintenance. These artifacts should be expected in any residential situation, no matter what primary

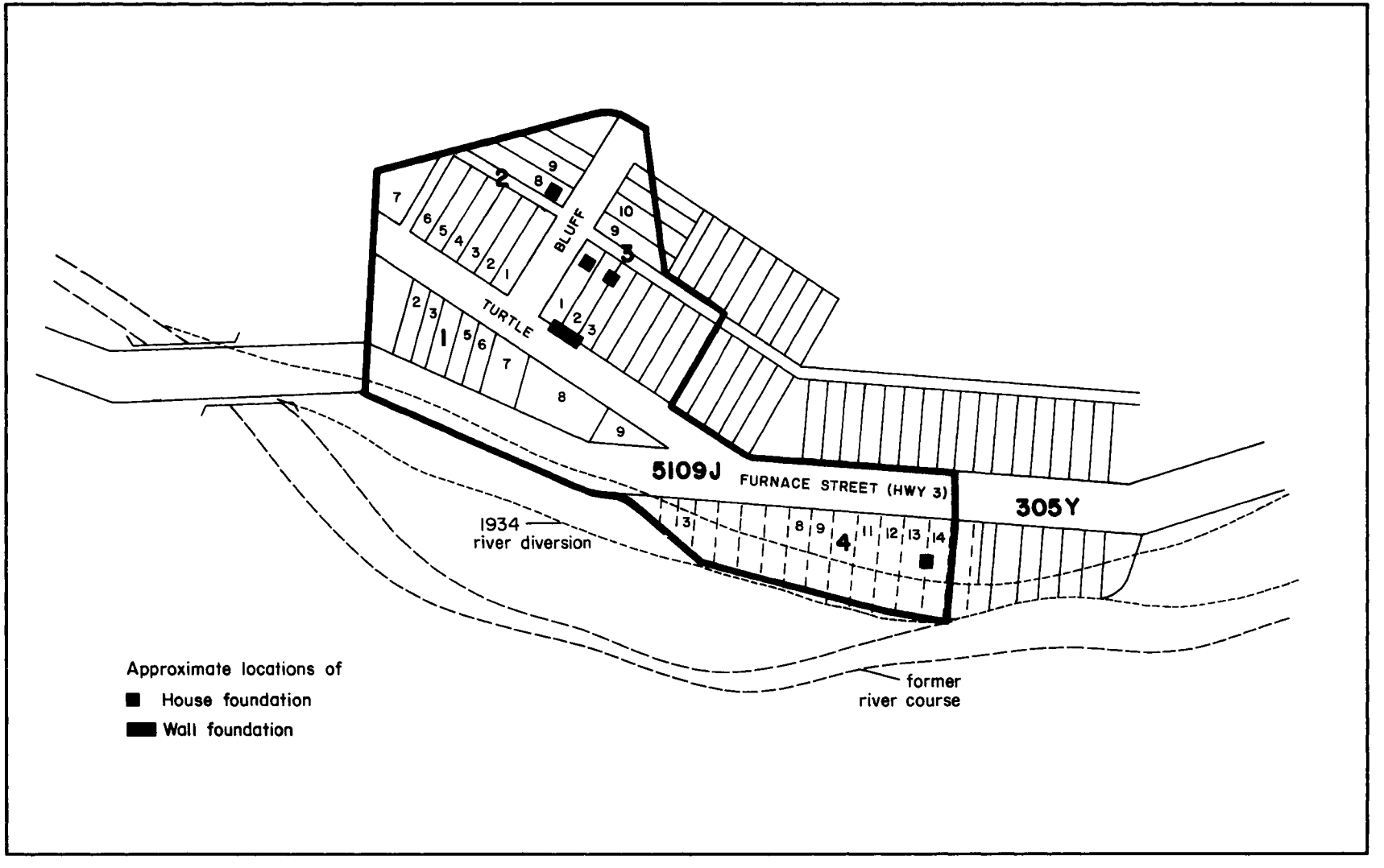

Figure 21. Legal plan 5109J (ca. 1934) East Blairmore townsite.

activity (in this case, red light activities) characterizes the site. However, some characteristics of the DjPo-30 assemblage are particularly noteworthy. Compared to assemblages excavated in other historic archaeological contexts in the Pass, e.g., Passburg, Frank, Lille (Forsman 1980; Kennedy 1982), representations of artifact classes such as ceramics or utility/storage are markedly lower, and the variety is minimal. Several explanations for this assemblage difference could be forwarded, for example, (1) these classes of artifacts were not important possessions to the district's inhabitants and therefore are less commonly found in the dumps; or (2) the better ceramics were curated, and moved with the frequently changing "staff" in the district.

Another noticeable characteristic of the collection is the presence of feminine items in all excavated areas (Figure 22). Toiletry items such as cosmetic containers, perfumes, preparations, and distinctive clothing items such as gaudy buttons and buckles, outnumber any item that may be male associated. Indeed, the only typically male related artifacts found were a pipe stem, tobacco cans (use by females cannot be ruled out), certain toiletry items that could be used by both sexes, and contraceptive items which, in the context of this study, have greater meaning in terms of the female occupants. The implications of drinking as one of the prime activities in the district certainly has male overtones, particularly in a mining community such as the Crowsnest. That portion of the artifact assemblage that represents habitation rather than visitation, however, remains distinctly female.

Some indications as to ethnic identity of the red light district on Hill 60 were given by the presence of Japanese ceramics, a bottle marked by Japanese characters, and the indirect association of English earthenwares bearing an oriental pattern. This correlates with informant accounts that Japanese ladies lived in the houses on Hill 60. The cobble walls may also be of ethnic significance, as in the early Kootenay mining towns such as Sandon, where Japanese residents often built walls near their houses, for gardening and terracing. The faunal record illustrates a greater diversity in animal products for the Japanese associated dumps, than for the Red Brick House. This forms an important characteristic useful for future site comparison.

Figure 22. Artifacts recovered from DjPo-30.
BACK ROW, left to right: Violet glass medicinal bottle (Dump C), Pond's cold cream jar (Dump C), "Waterman's ink" bottle (Dump C), Lysol bottle (Red Brick House Dump), small 10cc medicinal bottle (Red Brick House Dump), Perfume bottle (Dump A).
FRONT, left to right: "LePage's Mucillage" bottle (Dump C), Cosmetic jar and lid (Dump C), "Musterole" jar and cap (Dump C), "Iodine" bottle (Red Brick House Dump), "Harriet Hubbard Ayer Famous Toilet Preparations U.S.A."
IMMEDIATE FRONT, left to right: Two "Sheik" condom cases (Red Brick House Dump), Syringe bag pipette (Red Brick House Dump), Ladies shoe buckle (Red Brick House Dump), Button (Red Brick House Dump), Two blue medicinal vials (Red Brick House Dump), Two metal shoe buckles (Red Brick House Dump), Lipstick case (Red Brick House Dump), Bone tooth brush (Dump C), Two large ladies buttons.

The artifact sample from DjPo-30 represents a later occupation than other assemblages excavated from early mining communities in the Crowsnest (e.g., Lille, Passburg, Frank). The associated lifestyle of DjPo-30 was also characteristically different, although the other excavations (particularly of privies at Lille) indicate drinking was a very important part of the mining town lifestyle (Kennedy 1982). In the extremely diversified artifact assemblage from Lille, the architectural and industrial/construction classes are far better represented than at DjPo-30. Male related items, and associated activities are also more visible. One similarity between all excavated samples is the continued dependence on English ceramics, although other types are also present, particularly at Lille.

In the detailed report, our analysis of DjPo-30 and its red light activities was accompanied by discussion of a recently developed model which placed "frontier" societies in the perspective of Victorian behaviours. The model is called the "American Victorian Cultural Tradition" (Baker 1983), and shows much potential for use in western Canadian contexts.

SITE OCCUPATION LENGTH AS A FACTOR IN ARTIFACT ASSEMBLAGE VARIABILITY AND FREQUENCY

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Archaeological Survey of Alberta

INTRODUCTION

The increasing use of quantitative analysis in historical archaeology to demonstrate pattern in material remains of past cultures is based primarily on the assumption that the relative frequency of archaeological remains is a direct measure of their relative importance of use in past societies. That is, differences in artifact frequencies measure differences in cultural trends in past cultural systems (South 1977). However, some researchers (Schiffer 1972, 1976, 1977) do not entirely agree. Although they agree that archaeological remains do represent the activities of past cultures, they insist that these remains have been distorted by both cultural and natural processes, making direct equivalence transformations between material remains and the cultural system questionable. But how much do the various cultural formation processes really distort the archaeological record? Are major cultural trends entirely masked? Unfortunately, such questions have not been fully investigated, thus, the accuracy of the use of fragmentary archaeological remains to measure cultural trends remains problematic.

The list of factors that could potentially distort material culture entering the archaeological record is enormous, but can often be narrowed down considerably since the importance of each factor varies depending on the level of spatial or temporal trends being investigated. The purpose of this study is to focus on the effects of occupation length in order to begin to examine the validity of comparing fragmentary archaeological assemblages recovered from different sites. Specifically, the study will investigate whether factors such as variability in artifact diversity, variability in artifact fragmentation rates, or changes in the relative importance of certain artifacts, are a function of site occupation length.

An intrinsic aspect of this investigation is the fact that cultural formation processes and archaeological site formation processes will differ in sites occupied for varying lengths of time, affecting either qualitative or quantitatve attributes of the artifact assemblages recovered. Such changes must be identified and methods devised to provide a more realistic interpretation of the cultural system. Historic archaeological assemblages provide a good data set with which to begin to examine just how much distortion actually occurs, since many of the variables essential in understanding the relationship are known and can be controlled. The results from such controlled archaeological comparisons have some important implications for prehistoric inter-site assemblage comparison.

In the remainder of this study, I will examine the potential relationships between varying site occupation length and three major factors: (1) the degree of artifact diversity; (2) the degree of artifact fragmentation; and (3) the degree of relative importance of valuable artifacts. These factors are tested with historic archaeological assemblages chosen for their suitability for testing the specific problem.

EXPLORING VARIATION IN ARTIFACT DIVERSITY AND FREQUENCY

Over a decade ago, Schiffer (1972) wrote that one of the most underdeveloped areas of archaeological theory was that which attempts to explain how behaviour in the cultural system forms the archaeological record. To a large degree, most archaeologists felt that major cultural trends are reflected directly in variations in the diversity and quantities of certain archaeological remains. It was only implicitly acknowledged by archaeologists then that secondary cultural formation processes to some degree modified these general trends in material culture before it entered the archaeological record. However, behavioural processes such as the maintenance, modification or re-use of certain artifacts, as well as refuse disposal patterns, all contribute greatly to the final "appearance" of the archaeological record. Since then, several of these behavioural processes have received considerable attention in the archaeological literature, leading to increasing

controversy about how much they distort the more general cultural trends and how their effects can be recognized and "corrected".

The manner in which site occupation length potentially affects variety, frequency, and distribution of material remains becomes more clear if we concentrate on the effects on the discard rates of elements and what happens to those elements once they are discarded. Theoretically, increasing occupation length should intensify those processes that regulate deposition of material remains and the degree of deterioration of those remains. For example, a long occupation period leads to a decreasing correspondence between use and discard locations for all elements (Schiffer 1972:162). As well, longer exposure of elements may result in increased damage to them from trampling and other site activities (cf. McPherron 1967; Justice 1983; Tringham 1974). Consequently, it must first be shown how both the spatial distribution and the relative frequencies and varieties of particular artifacts change with occupation period and then how these factors can be controlled (if necessary), before comparison of assemblages from sites occupied different lengths of time is valid. Several more specific examples of the relationship between occupation length and variability in material culture are discussed next.

Differential Artifact Diversity and Occupation Length

Indices of artifact type variability (i.e., diversity) are often used to measure cultural complexity either spatially or temporally. These indices are generally expressed by noting changes in the variety of types or stylistic changes within a particular type. It is important to understand how a diversity index is related to site occupation length in situations where variety remains constant, or when variety is known to increase or decrease temporally and/or spatially. In either situation, it would be ideal to determine whether such an index is a true measurement of artifact variety in the cultural systemic context or whether it is being affected by other variables.

Site occupation length and sample size are two factors which could affect diversity in a similar manner. Past studies of diversity in archaeological assemblages clearly show that, in many cases, diversity figures are primarily a function of the amount sampled especially where

the sample is small; that is, as sample size increases, artifact diversity increases. However, because occupation length produces a cumulative effect in artifact deposition, this factor will likely overshadow the effects of sample size. That is, at long term occupied sites, a small sample will show a relatively higher degree of diversity than may be expected. This will be examined later in this study.

Differential Artifact Frequencies and Site Occupation Length

The second predictable consequence of varying lengths of site occupation is the potential effect on the artifact fragmentation rates, especially of the more fragile elements (i.e., ceramics, glass or pipes). If these rates vary considerably in different areas of a site or at different sites, they should have a considerable effect on quantitative frequencies. The degree to which any artifact breaks is due to its physical characteristics as well as the relative amount of exposure of the artifact to site activities (and to a lesser degree, natural processes) once it is discarded. If artifact composition (hardness, thickness, etc.) is uniform or can be shown to have no effect on the degree of fragmentation, it can be argued that varying degrees of fragmentation are the function of exposure to site activities. While such activities may vary in their frequency of occurrence spatially at any site, and may in fact result in different breakage rates, a sample from the entire site should reflect the range and the average degree of fragmentation that occurs in these assemblages. It is argued that, to some degree, longer site occupation periods expose fragile artifacts to consistently greater intensities of these site activities and conceivably could result in increased artifact frequencies. However, a recent study (Justice 1983) on experimental fragmentation rates of clay pipes suggests that pipes break only to a particular degree when they are trampled; any additional fragmentation would be due to extreme and limited factors at the site. Therefore, the important question is at what period of site occupation length do these fragments no longer become smaller? A thorough examination of this question is necessary before comparison of artifact fragments from different assemblages would become more valid.

Differential Artifact Deposition Rates and Site Occupation Length

Differences in the rates of deposition of various artifacts and consequent differences in their frequencies in archaeological assemblages, may be related to the length of time the site is occupied. Conceivably, because different artifacts have various values or levels of importance, they will to some extent, be deposited at different rates in the archaeological record. In other words, highly curated items will not be deposited at the same rate as more common goods. This would suggest that the relative proportions of curated artifacts may be under-represented at sites that are occupied for short periods of time because the deposition rate is so slow. If this is the case, then the comparison of assemblages resulting from different occupation lengths becomes somewhat more tenuous. This question will be examined further.

METHOD OF INQUIRY

The extent to which many of the inferences postulated here can be tested archaeologically is dependent on the available data base, which presently is relatively small. Ideally, such tests should include as many forts as possible, spanning a range of short to long periods of occupation. Furthermore, the results of the analysis would be more objective if other potential factors affecting variability in artifact diversity or frequency could be tested or controlled; these include variables such as fort population, fort size, and economic factors of the time period. Unfortunately, the relationships of these factors to site occupation length, or their effects on artifact diversity or quantity will require much more research in the future, as the necessary data are not yet available. A consideration of the effects of site occupation length on the full range of artifact types would also make this analysis more complete and more useful. However, because of the lack of available data, and the need to begin at a controlled level, only a few artifact types have been chosen here as examples for analysis and comparison.

A number of behavioural assumptions are used in this study. They are as follows:

1. All artifact types are entering the archaeological record at a steady rate, regardless of the length of occupation of the site (this assumption is important in the comparison of ceramic variety and is actually tested in the third part of this analysis);
2. All artifact types are entering the archaeological record at a similar rate, regardless of the hierarchical position of the forts;
3. Artifacts are exposed to relatively similar types of fragmentation processes (i.e., dropping, trampling), regardless of the length of occupation of the site; it is the degree of intensity to which they are exposed to these factors that is critical.

Presently, each of the above factors must be held constant even though they are still poorly understood and require more research.

Analytical Techniques and Measurements

Each of the comparisons required some form of objective measurement in order to examine the relationship to site occupation length. The samples, assemblages, and the methods of measurement that were used for each are briefly discussed.

1. Artifact Diversity and Occupation Length

In order to examine the relationship between site occupation length and artifact diversity, a sample was chosen that covered many fur trade sites, and that was consistently examined by one qualified person. One of the best samples presently available consists of Spode-Copeland transfer printed ceramic patterns documented from 20 Hudson's Bay Company forts in western Canada and the United States (Sussman 1979:12-19). This sample is comprised of forts occupied from very short terms (3 years) to very long periods (81 years). Each Spode-Copeland pattern was considered to represent one type; thus, the total number of patterns found at any fort measured ceramic diversity or variety. The sample sizes of these forts were not presented, so this factor was ignored initially, in order to see if a significant relationship can be identified regardless of sample sizes.

A product-moment correlation coefficient for small and medium samples (Sokal and Rohlf 1981:575-578) was used to determine the relationship between ceramic diversity and site occupation length. In order to maintain as much consistency as possible, only 17 of the 20

archaeological assemblages were used, consisting of only inland forts with accurately documented occupation lengths. Tests of significance for the coefficient value and confidence limits for the regression equation were also computed. Finally, an independent sample, not used to formulate the linear regression equation, from more recent Fort Victoria excavations (Forsman 1983), was used to test the accuracy of the regression equation in predicting ceramic diversity from occupation length.

2. Artifact Frequency and Site Occupation Length

In order to determine how occupation length affected the degree of artifact fragmentation, and thus fragment frequencies, clay pipe fragments were used in the analysis since they are the most uniform artifact types in terms of form and material composition, and thus, such attributes as thickness can be controlled. The relationship between pipe stem thickness and length was first determined to ensure that the degree of thickness was not responsible for the degree of fragmentation. Once this was accomplished, the mean pipe stem length and mean pipe bowl size were compared from sites occupied for long periods of time to those occupied for short periods. The sites used in this comparison are Fort George (Kidd 1970; Losey et al. 1978, 1979, 1980), Lac La Biche (Davis and Smith 1979), Fort Dunvegan (Pyszczyk 1983) and Fort McLaughlin (Hobler 1983). Occupation lengths range from 8 - 10 years (Fort George, 1792-1800; Fort McLaughlin, 1833-43) to 60 - 80 years (Lac La Biche Post, 1853-1917; Fort Dunvegan, 1805-78).

A Student's T-test of significance (Sokal and Rohlf 1981:145-48) was used to determine whether the means and variances of pipe stem and bowl sizes were different in fort assemblages recovered from different occupation periods. Different sample sizes are taken into account in this statistic. All tests of significance were carried out at the 95 percent confidence level.

3. Artifact Deposition Rates and Occupation Length

In order to examine whether relatively more curated artifacts are associated with longer occupied sites, two artifact groups were chosen as examples. These are: (1) tools, such as axes, files, saws, etc., which are relatively rare and always highly curated historically (Prager 1980); and, (2) ceramics, which are divided into porcelains (highly valued) and

common wares (relatively less valuable). Although such a division is somewhat gross, it is presently the best way to compare assemblages over a long range of time period since changes in prices and value cause problems with finer division of these groups. Currently, only six fur trade site assemblages, consisting of three short term occupied forts, Fort George, Fort Wedderburn (Karklins 1981), Nottingham House (Karklins 1979) and three long occupation period sites, Fort Chipewyan (Heitzmann 1978, 1979), Rocky Mountain House (Noble 1973), Fort Dunvegan, were used to examine relative proportions of tools versus occupation length. For the ceramic comparisons, a total of nine fur trade assemblages were used and consist of five short term occupied sites (Fort George, Buckingham House (Nicks 1969), Fort White Earth, Fort Wedderburn, Nottingham House) and four long occupation period sites (Fort Chipewyan, Fort Dunvegan, Fort Victoria, Rocky Mountain House).

A G-Test for goodness of fit (Sokal and Rohlf 1981:696) was used to determine whether significantly larger relative quantities of valuable artifacts were associated with longer occupation sites than with shorter occupation sites. All tests were carried out at a 95 percent confidence level.

RESULTS

The results are only briefly described here, while their implications are discussed at greater length later in the paper.

Variability in Ceramic Diversity

Comparison of Spode-Copeland pattern diversity to occupation length is summarized in Figure 23. The resulting correlation coefficient (.7990) indicates a relatively high correlation considering the great amount of variability of sample size that must exist between the assemblages. The linear regression equation is also presented in Figure 23.

An independent ceramic sample from Fort Victoria was used to determine the accuracy of the equation in predicting ceramic diversity. The actual number of different Spode-Copeland patterns recovered from the later excavations at Fort Victoria was 24. Using the linear regression

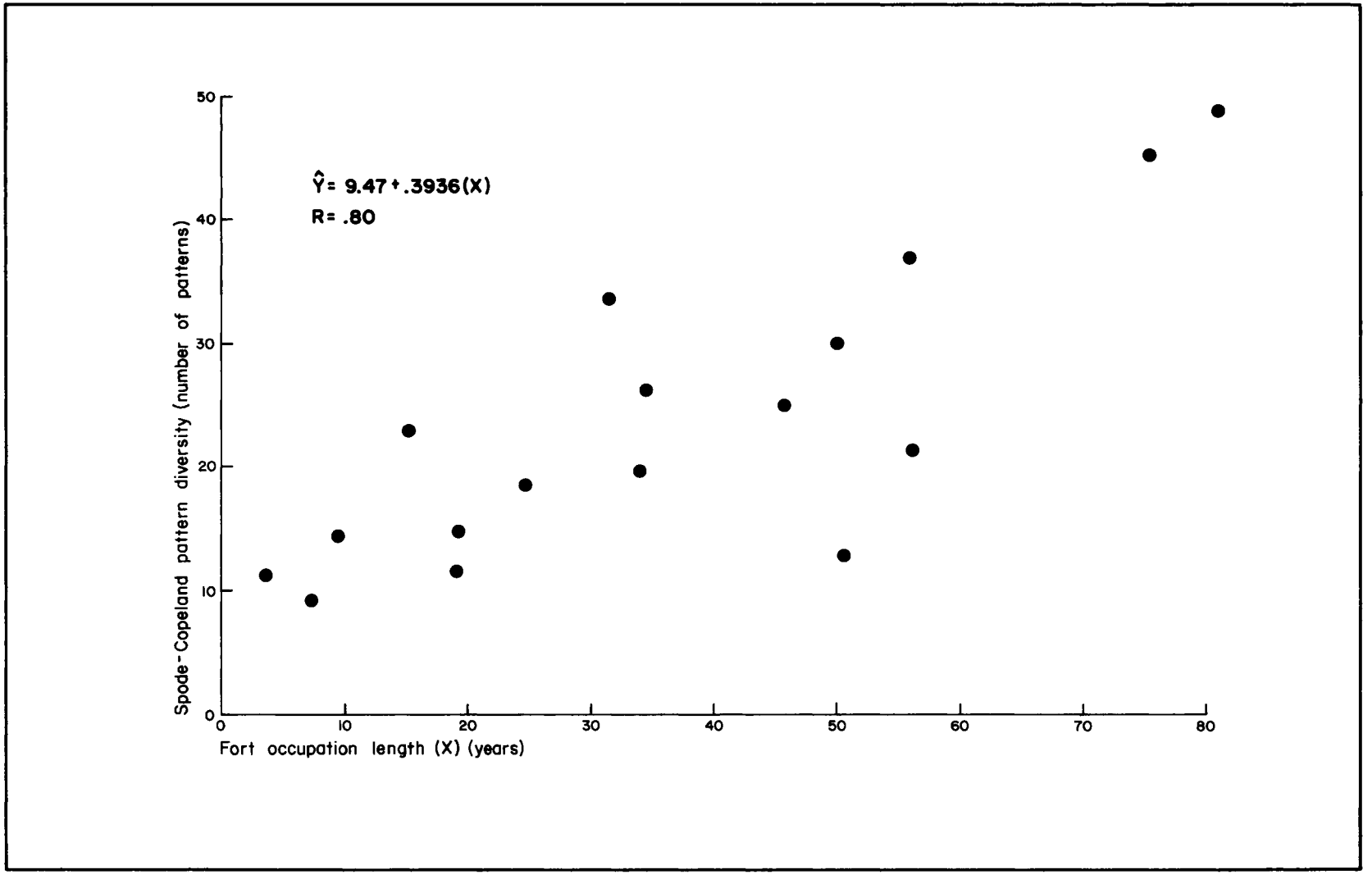

Figure 23. Relationship between ceramic diversity and site occupation length.

formula, 23 Spode-Copeland patterns were predicted to occur at Fort Victoria, representing a deviation of only one between the actual patterns found and those predicted.

Variability in Artifact Fragmentation and Frequency

Before it could be examined whether occupation length affected fragmentation rates, it was necessary to first determine whether differences in pipe stem lengths were a function of differences in pipe stem thickness. This comparison was already undertaken in another study (Pyszczyk 1983) which indicated that there was no significant relationship between pipe stem length and thickness; thus, this factor is not responsible for variability in length of pipe stem fragments and, consequently, for variable frequencies.

The results of the comparison of mean pipe stem length to site occupation length showed that mean stem length generally decreased with an increase in site occupation period (Table 3). However, statistical tests of significance revealed that differences in mean pipe stem lengths recovered from Fort George, Fort McLaughlin and Lac La Biche were insignificant and that these samples were all significantly different from Fort Dunvegan (Table 3). But when the mean pipe stem lengths of the two short term occupation forts (Fort George and Fort McLaughlin) were combined and compared to the mean length of the longer occupied forts (Lac La Biche and Fort Dunvegan) they were significantly different (Table 3). However, the mean length difference in only 5 mm.

The results from the comparison of mean pipe bowl size to fort occupation length showed a great deal of variability with no clear pattern (Table 3). Bowl sizes did not consistently decrease as sites were occupied longer. Instead, the two short occupation sites had similar mean bowl sizes, which were larger and significantly different from the Dunvegan sample. The Lac La Biche sample had the largest mean bowl size, but it was not significantly different from the two short occupation samples. As with the mean pipe lengths, combining the means of the short term occupation forts and comparing them to the combined means of the longer occupied forts, showed that the bowl sizes of the former forts were significantly larger than the latter (Table 3).

Perhaps the most interesting aspect of the results of this comparison

Table 3: Clay Pipe Fragmentation And Site Occupation Length

	FORTS	SAMPLE SIZE n	MEAN $\bar{x}$	VARIANCE s^2	S.D. S	OCCUPATION LENGTH (YEARS)
Ft. Geo.	Stems	622	32	253.6	15.9	8
	Bowls	214	363	113,217.9	336.5	
Ft. McL.	Stems	37	29	345.06	18.6	10
	Bowls	11	377	23,012.9	151.7	
L.L.B.	Stems	257	29	165.22	12.9	64
	Bowls	63	414	68,978.3	262.6	
Ft. Dun.	Stems	126	22	66.4	8.2	73
	Bowls	106	194	22,801	151.0	

Summary of Results of Significance Tests*

	STEMS $\bar{X}$	STEMS S^2	BOWLS $\bar{X}$	BOWLS S^2
Ft. George - Dunvegan	Yes	Yes	Yes	Yes
Ft. George - Lac La Biche	Yes	Yes	No	Yes
Ft. George - McLaughlin	No	No	No	Yes
McLaughlin - Lac La Biche	No	Yes	No	Yes
McLaughlin - Dunvegan	Yes	Yes	Yes	No
Lac La Biche - Dunvegan	Yes	Yes	Yes	Yes

*Results of student's T -test for significant differences between means and variance.

was the progressive increase of the variance in pipe stem size and, to some extent, pipe bowl size, as the length of fort occupation increased (Table 3). Since variance is a value which suggests homogeneity or the degree to which measurements cluster around the mean, the results indicate that as sites are occupied longer, the variation in stem length measurements continually decreases or becomes smoother. The results of tests for significant differences between these variances are presented in Table 3, and generally show that difference in variability in stem and bowl sizes is greater between the short term and long term occupation samples than it is within each of these two groups. The implications of these results are discussed later.

Occupation Length and Variability in Curated Artifact Frequencies

The G-statistic was used to test whether more valuable items occur less often in short term occupied sites; the different sample sizes are taken into account in this statistic. The results of these tests are negative (Table 4). When the common ceramic quantities were compared to porcelain fragments, no significant difference in relative quantities at short term versus long occupation sites was apparent. Similar negative results were found when comparing tool fragments between the two groups (Table 4). In fact, closer examination of both artifact type quantities revealed that their varying frequencies may be more a function of total assemblage size (Table 4).

DISCUSSION AND CONCLUSIONS

This study has only touched on some very difficult problems involved in using measurements of artifact diversity or relative frequencies to compare a number of archaeological assemblages. However, the specific task of the paper was to begin to examine how one factor, site occupation length, was related to various cultural formation processes which affect variability in artifact diversity and artifact frequency. The reasons for such a study, and why additional research on archaeological site formation must be conducted, become all too clear when observing the increasing use of fragment frequencies and diversity measurements by historic and prehistoric archaeologists alike. Although only a few

Table 4: Comparisons of Tool and Ceramic Frequencies to Occupation Length

FORTS	TOOLS		CERAMICS	
	TOOLS	OTHER	COMMON	PORCELAIN
Short Occupation (0-20 years)	84	21166	299	17
Long Occupation (21-100 years)	33	6414	1299	66
Total	117	27580	1598	83

Sites Used:

Tool Assemblages - Fort George, Fort Wedderburn, Nottingham House, Rocky Mountain House, Fort Chipewyan, Fort Dunvegan.

Ceramic Assemblages - Fort George, Buckingham House, Fort White Earth, Fort Wedderburn, Nottingham House, Fort Chipewyan, Fort Dunvegan, Fort Victoria, Rocky Mountain House.

Results of G-Statistics

1) Tools - There is no significant relationship between tool frequencies and occupation length.

2) Ceramics - There is no significant relationship between ceramic quality and occupation length.

artifact types were examined in this study, several major conclusions and implications of the research for the use of diversity indices in archaeology can be discussed.

The relationship between artifact diversity and site occupation length is a very interesting one in terms of its strength of relation even when sample size is unknown. Intuitively, it might be expected that because discard of different ceramic patterns over a number of years is a cumulative process, this should result in higher diversities in sites that were occupied the longest period of time. Since diversity appears to be affected by occupation length, what are the implications of the use of such an index in inter-site assemblage comparison to measure various cultural trends or cultural changes. For example, if we hypothesize that availability of material culture, as expressed by variety/artifact diversity, is a function of a site's relative importance and/or proximity to the source, then clearly, we must be careful to control the effects of occupation length when choosing sites to measure this proposition.

The implications of diversity indices in measuring cultural complexity in prehistoric artifact assemblages temporally or spatially are also interesting. If the apparent relationship between diversity and occupation length holds, then sites revisited many times through seasonal rounds may show high diversity indices compared to sites frequented less often, similar to those occupied for long continuous periods. The measurement would therefore not denote varying degrees of cultural complexity, but instead denotes a progressive accumulation of material culture.

More research regarding this relationship may provide a means of predicting the relative length of occupation of an area within a site, or an entire site, through first establishing a diversity index of material culture. This index could be composed of only one or a number of artifact types and would imply that as sites are occupied longer, there is an increase in diversity as material culture accumulates. Such a relationship is useful to rank or organize sites temporally or spatially for a range of objective comparisons.

A number of interesting trends were noted regarding the relationship between the degree of artifact fragmentation and occupation length, which

could potentially lead to differences in artifact frequencies. Examination of variability in artifact fragment size, is perhaps one of the most fundamental tasks that must be dealt with by archaeologists if they are to use artifact fragment frequencies in either intra- or inter-site comparisons. For example, is McPherron (1967) correct in implying that trampling results in a progressive reduction of artifact size? Studies conducted on clay pipe fragmentation rates suggest this is only true to a certain point (Justice 1983).

The results of the clay pipe example seem to indicate that, although there generally is a relationship between site occupation length and pipe fragment size, it is strongest in the case of pipe stems at the opposite ends of the occupation length range, and shows no clear pattern for pipe bowl size. However, at a more general level, when the sites are grouped into short versus long occupation periods, the differences in both pipe stem and bowl size are significant.

These results imply that when dealing with pipe fragment assemblages recovered from sites that differ considerably in occupation length, the frequencies must be corrected only slightly before they are directly comparable. The next step is to examine more assemblages in order to develop a standard correction factor which would allow us to directly compare the fragment frequencies. For the time being, we can begin to formulate such an equation, although it must presently be conservative to ensure that relatively minimal frequency differences between assemblages are not a function of fragment size. Since the differences between the mean pipe stem length of assemblages from long term versus short term occupation sites is 5 mm, it is suggested that comparison of these two groups would mean that five fragments recovered from short term sites would be equivalent to six fragments from long occupation sites, or:

Estimated Pipe Stem Freq. = Total Pipe Stem Frags. x 1.20

For pipe bowl fragments, the correction would be:

Estimated Pipe Bowl Freq. = Total Pipe Bowl Frags. x 5.61

The general observed pattern of a decrease of variance in pipe stem lengths and bowl sizes as sites are occupied longer, regardless of sample size, has some important implications for understanding variability in artifact size (of fragile objects) and its use in identifying occupation length. If this trend can be repeated with other samples and with other fragmentary objects, it could be used to relatively rank sites of unknown occupation lengths, according to the degree of variability in artifact size. Unfortunately, such a relative measurement of occupation length has few prehistoric artifact equivalents, with the possible exceptions of pottery, fragile stone flakes, or shells in coastal sites. The studies by McPherron (1967) and Tringham et al. (1974) have shown increased damage to sherds and flakes with longer occupation. These items might potentially show the same degree of variance in size or breakage related to different site occupation lengths. Finally, although it was not examined here, variance in artifact size might also be related to different parts of the site, allowing archaeologists to predict degrees of activity within the site. Although such measurements have not been thoroughly investigated, they could define activity areas as well as relative artifact frequencies within the site.

The results of the examination of curation and occupation period suggest that variation in the relative importance of valuable items in archaeological assemblages is not a function of site occupation length. Such variation is either a direct function of sample size, or when sample size is controlled, reflects degree of use or initial quantities of such items in the cultural systemic context. These results have important implications for the use of this measurement in inter-site assemblage comparisons of sites with various occupation lengths.

To conclude, this study has begun to examine how several site formation processes affect variability in artifact diversity and artifact frequency in historical archaeological assemblages. The study primarily examined how length of site occupation might be related to archaeological site formation processes, and subsequently, to differences in artifact diversity and frequency through degree of fragmentation. Although it is premature to generalize from these results to other artifact types, there is some indication that changes in diversity and fragmentation rates are related to occupation length; the former results from an increasing

accumulation of quantities of cultural remains and types, and the latter results from a greater degree of fragmentation due to trampling and other site activities. If these relationships hold, they may help to predict occupation length when it is unknown. It is urged that more research be conducted on factors that potentially affect variability in artifact types and frequencies. It is only through control of this variability that the use of comparative quantitative analysis for archaeological remains can be developed to address higher order questions about cultural systems.

ARCHAEOLOGICAL INVESTIGATIONS IN BANFF NATIONAL PARK - 1983

Daryl Fedje
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INTRODUCTION

The Archaeological Research Unit of Parks Canada, Western Region, conducted archaeological investigations of several prehistoric sites in the Vermilion Lakes area of Banff Park during the summer and fall of 1983. These activities were undertaken in response to the proposed twinning of the Trans-Canada Highway in this area. Due to a much accelerated development schedule, a compressed archaeological program incorporating both assessment and mitigation was necessitated. Investigations were initially handicapped in that development plans did not reach the intermediate design stage until well into and beyond the 1983 field season, but federal funding allocations required rapid scheduling, with construction of this section planned for mid 1984. As a result, the bounds of the study area and the mitigative approaches were altered substantially throughout the program in response to continuing production of these development plans.

Four prehistoric sites were examined during the 1983-84 fiscal year. These included the Norquay Site (EhPv-15), the Timberline Site (EhPv-43), the Five Mile Creek Site (EhPv-7) and the Vermilion Lakes Site (EhPv-8). While all of these are significant heritage resources, the present report will concentrate on the Vermilion Lakes site due to its unique interpretive potential. Analysis of data recovered in 1983 is not complete and, thus, only preliminary results and interpretations can be presented at this time.

Environmental Setting

The four archaeological sites examined during 1983 are within the Montane ecoregion and overlook the wetlands of the Vermilion Lakes on the

north side of the Bow River valley (Figure 24). While all of these sites are in relatively close proximity to one another, each occupies a unique physiographic location with a different depositional history. These will be briefly described for each site. For a more comprehensive description of the environmental setting of each locale, refer to the "Ecological (Biophysical) Land Classification of Banff and Jasper National Parks" (Holland and Coen 1983).

METHODOLOGY

Through the use of systematic and/or stratified random sampling, each site was initially tested for delineation of bounds and for location of areas with high interpretive potential. During this program, test units were normally excavated by 10 cm arbitrary levels, and the recovered matrix was screened through 3.2 mm (1/8 inch) or 4.8 mm (3/16 inch) mesh screens. At one site (EhPv-43), the excavated matrix was hand sorted by trowel only.

Block excavations were conducted using a combination of natural layers and arbitrary levels. All excavated sediment from the block excavation unit levels/layers was dry screened through 3.2 mm (1/8 inch) mesh with the exception of the colluvial rock/gravel layers at the Vermilion Lakes site. Precise horizontal and vertical control records were maintained for these excavation units. The blocks were located with reference to a U.T.M. grid, offset from Trans-Canada Highway survey monuments, and elevations in metres above mean sea level were obtained from established datums.

THE NORQUAY SITE (EhPv-15)

This prehistoric campsite/quarry is situated on an aeolian and alluvial capped bedrock outcrop at the northeast periphery of the Vermilion Lake wetlands. The campsite portion was heavily impacted by the 1958 Trans-Canada Highway construction which appears to have removed in excess of 50 percent of the site area. Expansion of the Norquay interchange in 1983, now complete, had disturbed and/or buried an additional seven to eight metre swath near the southern edge of the main

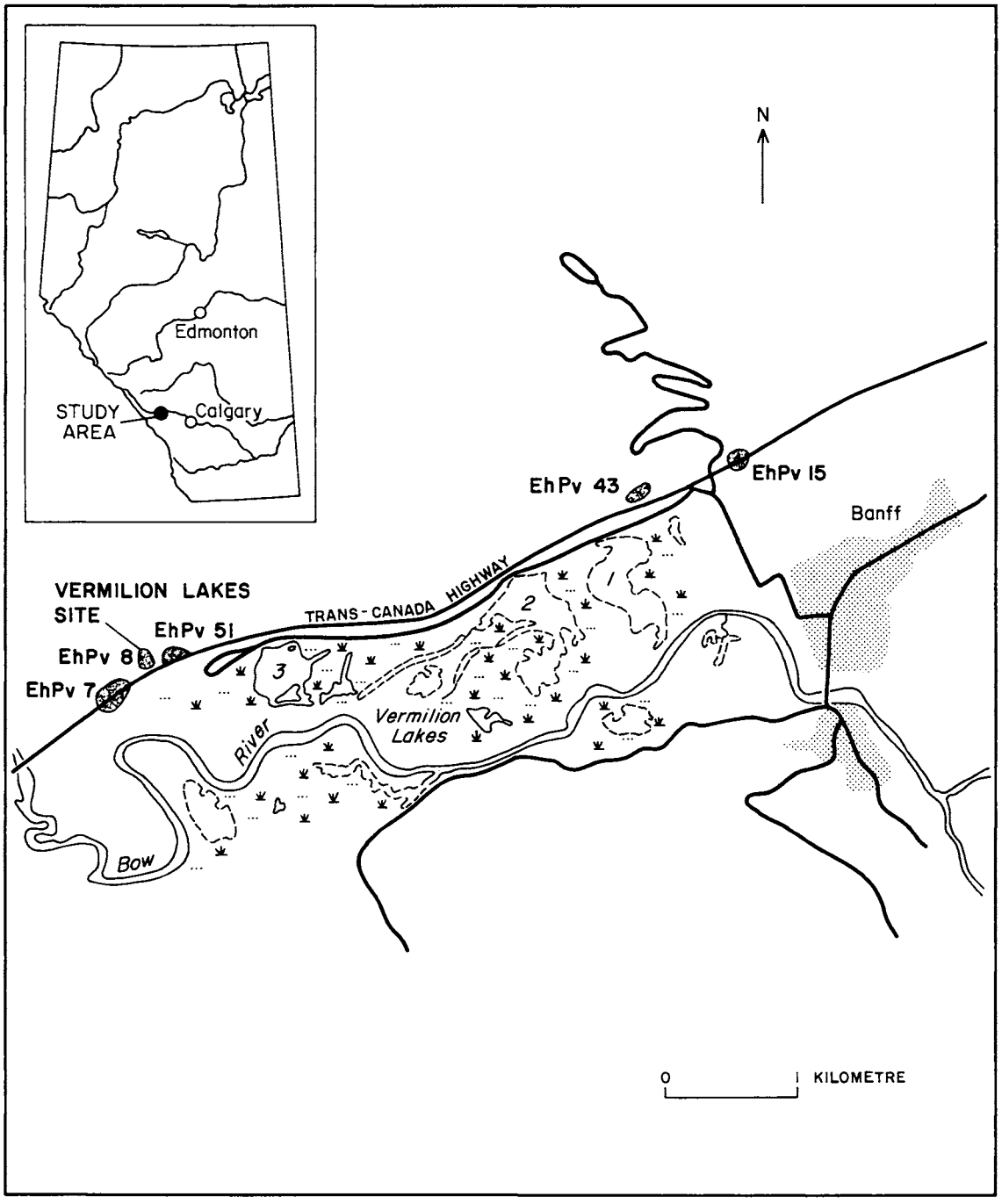

Figure 24. Vermilion Lakes study area.

site area. During 1983, a systematic testing program and limited block excavations were carried out. While material culture data recovery was minimal, there is evidence for at least 9,000 years of prehistoric occupation at this locale.

Excavation results indicate that this is a well stratified multicomponent site including a minimum of three prehistoric components. The first (upper) component produced a limited lithic assemblage which included two Late Prehistoric projectile points (Figure 25, e,f). The second component included a minimal lithic assemblage associated with a previous land surface represented by a thick layer of volcanic ash. While results of a compositional analysis of the tephra have not yet been received, it appears most similar to Mazama ash. Several hearth-like features and a number of lithic items comprised the third component which is associated with a strongly developed paleosol underlying the tephra layer. A reworked Alberta-type projectile point (Figure 25, g) was recovered as an isolated find in association with a second, weakly developed paleosol well below the ash. However, this item was recovered in an area that has been subjected to some cryoturbation, and association with the paleosol containing the third component cannot be ruled out.

In general, stratigraphy was quite clear and consistent on the north side of the Trans-Canada Highway (no impact per final design) but very convoluted on the south side (impact zone) with considerable cryoturbation and tree-throw disturbance evident in the excavation units. Faunal remains recovered were limited to a few calcined bone fragments and a small amount of highly dessicated bone.

THE TIMBERLINE SITE (EhPv-43)

This prehistoric site is situated on a high, aeolian-capped ice-contact landform overlooking the Vermilion Lakes. At the present time, it appears that this site will not be affected by the proposed development, though slope stablization measures will likely affect the southern edge of the site area in the long term. Reconnaissance in 1983 included systematic sampling of the southerly portion of the landform, and limited block excavation.

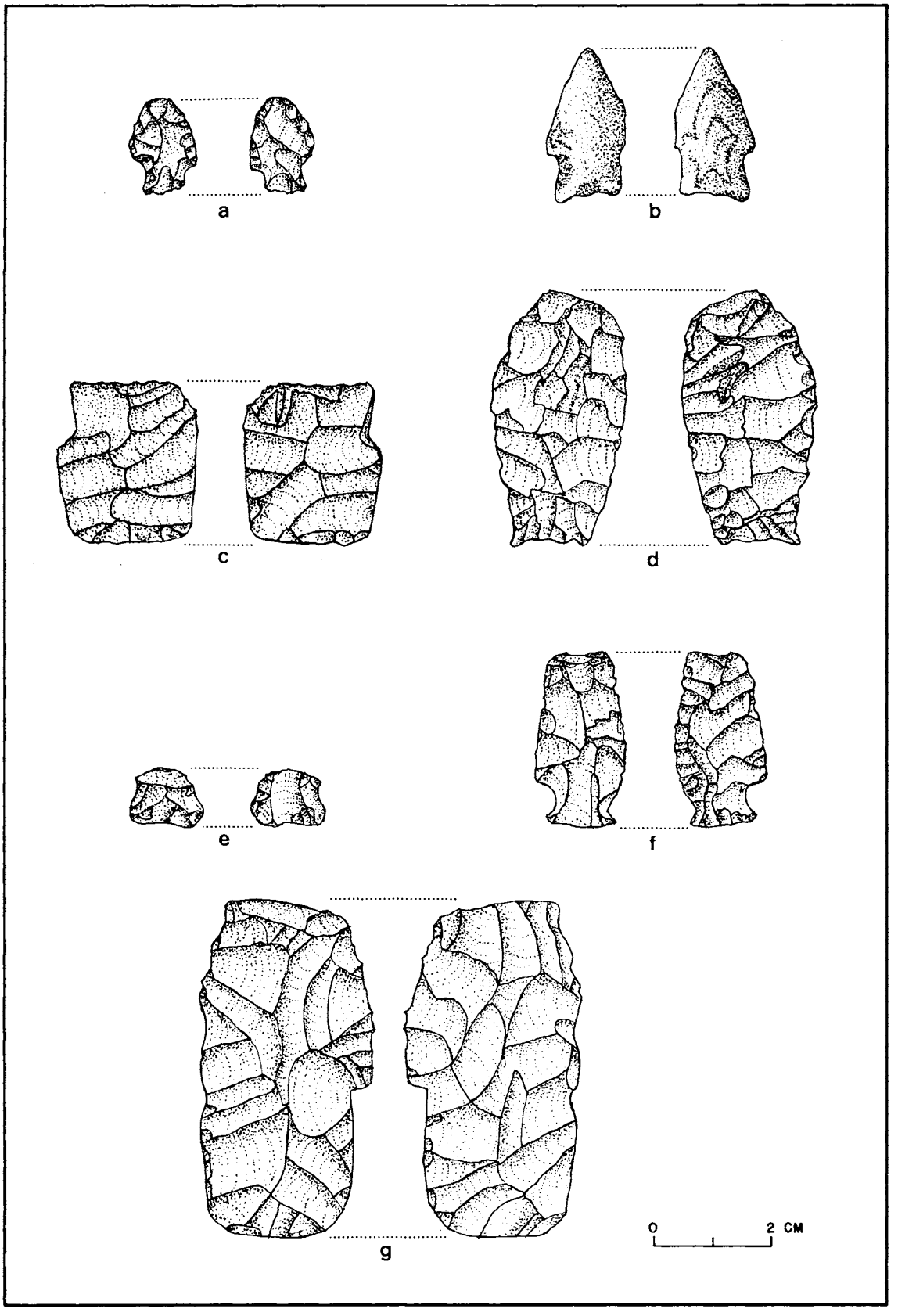

Figure 25. Artifacts from EhPv-43 (a-d) and EhPv-15 (e-g).

The postglacial stratigraphy at this site is compressed, with generally only 15 to 20 cm of aeolian veneer on the moraine, but there is some evidence for horizontally distinct components. In one small block excavation, a Lusk-type projectile point was recovered in association with the base of a second large lanceolate point (Figure 25, c, d) and a number of formed tools. A possible Hanna Phase point and a Late Plains Side-notched point were recovered from two other well separated excavation units (Figure 25, a, b). No intact hearths or identifiable faunal remains were recovered.

THE FIVE-MILE CREEK SITE (EhPv-7)

This large prehistoric site, situated on an aeolian-capped lateral moraine at the western end of the Vermilion Lakes, will be severely impacted by proposed highway twinning in 1984-85. Extensive testing and block excavation indicate that some 8,000 to 10,000 years of the material culture record are represented at this locale. This site was very productive with respect to the lithic portion of this record. Cataloguing is currently in progress, and it is estimated that the assemblage includes some 20,000 lithic items. The diagnostic projectile points recovered indicate occupation from the late Early Prehistoric period through to the Late Prehistoric period, and include Plains Mountain lanceolate, Bitterroot Side-notched, an Oxbow variant, Hanna, Pelican Lake and Plains Side-notched points. A major impediment to the interpretation of the site is the very compressed cultural stratigraphy (generally limited to 20 to 30 cm) and at least some natural turbation of these sediments. Sediment analysis and lithic conjoinability determinations should indicate the potential for secure stratigraphic separation of cultural events. No intact hearths were encountered, and faunal remains were limited to small scatterings of dessicated bone fragments.

THE VERMILION LAKES SITE (EhPv-8)

Location and Assessment

EhPv-8 is situated at the foot of a small colluvial fan fronting to

the infilled north shore of the third Vermilion Lake. This is a deeply stratified multicomponent site, and preliminary results indicate that some 11,000 years of culture history are preserved within some two metres of sediments. The site was quite productive and appears to hold significant potential for the interpretation of both local and regional prehistory.

The site was initially located during transect testing (at 20 m intervals) of the colluvial landform along the proposed highway right-of-way. Subsequently, a systematic testing program was undertaken to determine site bounds and to locate areas of high potential within this development zone. In the testing program, 50 cm square units were excavated to a depth of 50 to 60 cm on a 10 m cardinal grid expanding out from the initial findspot. The bounds, as represented in the upper 50 cm of sediment, were determined to comprise an area of approximately 10 m north-south by 50 m east-west. Recovered cultural items included limited numbers of siltstone flakes and some fire broken rock; ten of 40 test units were productive but only one produced more than a half dozen lithic items. These results first suggested a small transitory camp.

A 2 by 2 m unit was then placed over the most productive test pit and excavated to a depth of approximately 2 m below the modern landsurface. During this excavation, several buried components were revealed, indicating the need for additional deep testing. This was carried out by excavation of 1 by 2 m units at 10 m intervals along the right-of-way. Due to time and manpower constraints, testing was extended only slightly beyond the bounds determined during shallow testing, but it was clear that the lower components may have encompassed quite different bounds than the upper levels. During the deep testing program a trench was excavated by backhoe through the landform (Figure 26) in order to aid in interpretation of the complex stratigraphy encountered in the test units.

The final stage of 1983 field work at EhPv-8 involved the excavation of three larger blocks in areas where the test results indicated the greatest potential for recovery of cultural data. These blocks were identified as Operation 2, a 3 by 6 m unit in the southwest portion of the site; Operation 4, a 2 by 3 m unit 20 m to the east; and Operation 12, a 3 by 3 m unit 10 m to the north (Figure 26).

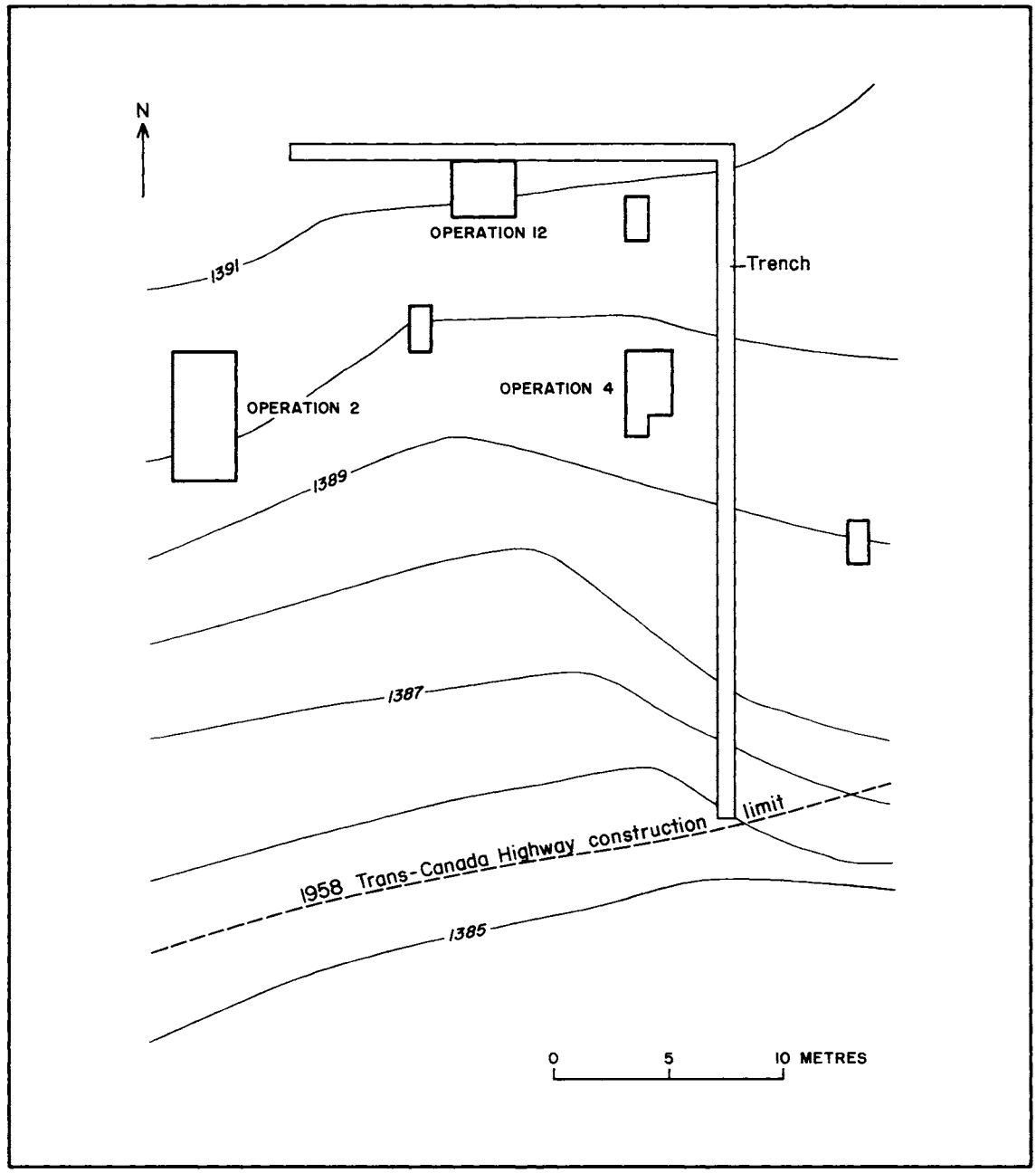

Figure 26. Vermilion Lake site (EhPv-8) plan.

Stratigraphy

Although the site stratigraphy is complex in terms of the numbers of depositional events and correlation between discrete excavation units, it does, for the most part, provide excellent vertical separation of cultural components. Substantial debris flow deposits are the salient stratigraphic markers within the lower deposits, as are tephra charged deposits in the upper strata. A minimum of 16 discrete depositional units have been identified within the major block excavations, each of which includes a former landsurface (although most of short duration). Within this context, eight separate cultural layers have been identified.

Three processes have been identified as responsible for producing this landform: (1) colluvial or debris-flow events; (2) alluvial action, (i.e., downslope transport of fine gravel to clay sized particles by stream flow and/or sheetwash); and (3) aeolian deposition of tephras, fine sands, silts and clays.

Within the excavations, four major colluvial units and four major silt units were identified. The major silt units each comprised several separate layers, including cultural levels, sheetwash deposits and developed soils. In the west wall profile of Operation 12 (Figure 27),

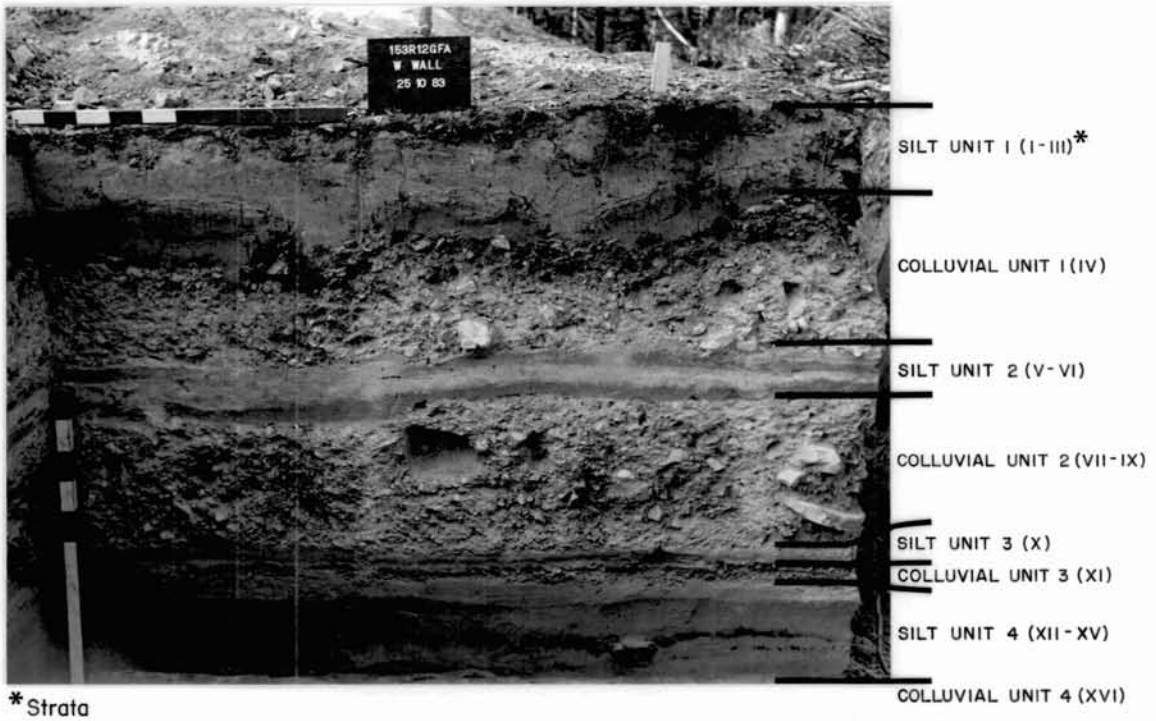

Figure 27. EhPv-8: photograph of west wall of Operation 12.

this depositional framework is shown quite clearly. The three upper colluvial units can be seen in profile, and the fourth occurs at the base of excavation. In a more southerly unit (Operation 2), the upper colluvial deposits have already petered out, but these events can be correlated with a series of thin alluvial layers (Figure 28) represented by thin gravel and/or silt lenses underlain by calcium carbonate concentrations.

Preliminary sediment analyses indicate the presence of three developed soils in the upper silt unit (Figure 28; Stratum I to III). These include the modern soil and two paleosols. The uppermost soil (Stratum I) has been identified as a tephra charged Luvisol with the Ae and Bm horizons containing a large proportion of volcanic ash. Similarly, the underlying soil (Stratum II) was identified as a Luvisol with the Ae2 and Bt2 horizons containing significant quantities of tephra. This horizon sequence is very similar to a (bisequa) Brunisolic Grey Luvisol. Separation into two luvisols is partially based on tephra and cultural evidence, which appear to support two (and possibly three) depositional units. A tentative inference to be derived from these data is that the two ash charged soils may reflect the Bridge River and Mazama Ash falls, the two main tephras documented within the Vermilion Lakes region. Additional support for this interpretation is to be found in the material culture associations which will be discussed in the following section. Ancillary samples from these horizons have been submitted for identification. The lowest soil in the upper silt unit has been tentatively identified as an immature Chernozem; because of the very preliminary nature of analysis, potential implications of this soil will not be considered here.

Within the lower silt units, all soils are regosolic with weak and often discontinuous Ah horizons and/or very weakly developed B horizons. The Ah horizons are often highlighted by charcoal concentrations, most of which appear to be derived from cultural activity. The B horizons often display cultural modifications and are evidenced by minor colour shifts and higher concentrations of fines derived from limited illuviation of the paleosurface sediments.

Most of the following data are derived from Operations 2 and 12, and correlations of natural and cultural strata between these two units must

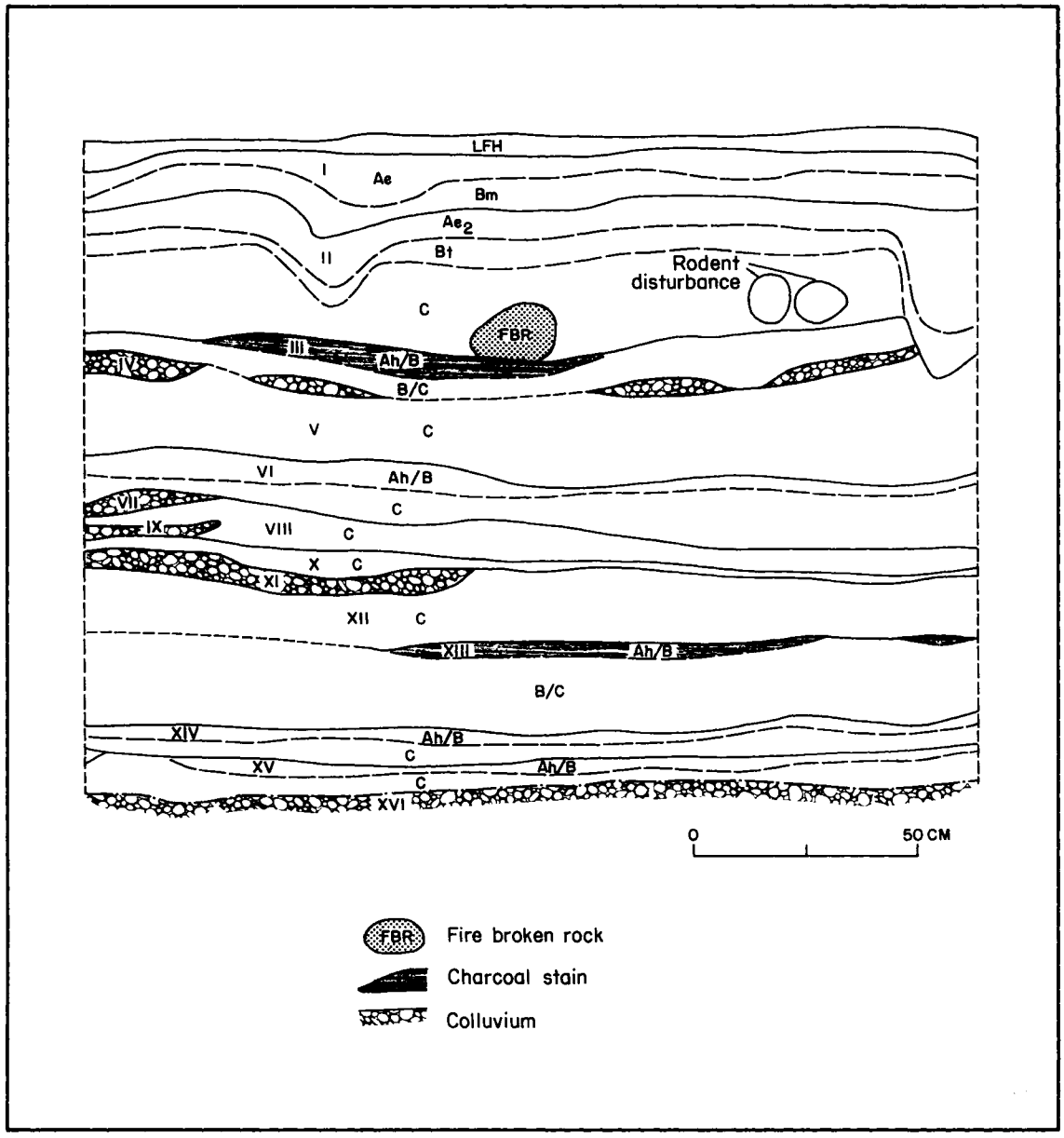

Figure 28. EhPv-8: profile of south wall of Operation 12.

be considered tentative at this time. This is especially true in the case of events represented within the complex depositional framework evident in those layers below Stratum II. Testing clearly indicates that the debris flow events are extremely variable in number and extent, with several terminating in or near the site area. Present correlations were obtained from radiocarbon dating and comparisons of landmarks (e.g., developed soils, major colluvial events, etc.) between the recorded profiles. More secure correlations between events represented in the excavation blocks, may be obtainable through attempts to conjoin component elements of the lithic and faunal assemblages and from additional sediment analysis and radiocarbon dating.

Before proceeding to document the cultural record, it should be noted that evidence for a significantly higher water (lake?) level during the early postglacial period was observed in the trench profile. Weather sorted sands and fine gravels were present at the southern end of the north-south trench profile near a point of break in slope. These possible beach deposits finger into the third major silt unit and reach a maximum elevation of 1387 m above sea level, some 7 m above the present elevation of the third Vermilion Lake. Mottling is present below these sands/gravels and continues north at approximately the same elevation, suggesting a significantly higher water table.

Culture History Record

Eight cultural layers have been identified to date at the Vermilion Lakes Site. Each of these appears to represent a single cultural component, with the exception of the most recent which includes both a historic and a prehistoric component. Each component will be described in brief, but only limited interpretation can be presented since lithic, faunal and sediment analyses are incomplete. In this section, only Operation 2 and Operation 12 (the two most productive units) will be considered, due to present data analysis limitations. Artifact categories and counts are tentative. The time periods given for each component indicate the total time frame within which the individual component is suggested to have been deposited.

Component 1 (ca. 200 - 100 B.P.)

This component was associated with the upper portion of the Ae horizon in Stratum I (Figure 28). It is evinced by a single .57 calibre lead musket ball.

Component 2 (ca. 2,000 - 200 B.P.)

This component was associated with the upper portion of the Ae horizon in Stratum I. Recovered cultural material included over 450 lithic items, less than two percent of which were formed tools. Predominant material types were local siliceous siltstone (more than 80 percent) and obsidian (approximately 10 percent), but limited quantities of quartzite, quartz crystal, chert and chalcedony items were recovered as well. No time diagnostic artifacts or dateable features were encountered in this component. Lithic activity area distributions were supportive of a vertically discrete component. Faunal remains were limited to a few dessicated fragments. Temporal limits for deposition of this component are from Avonlea period to Euro-Canadian contact.

Component 3 (ca. 2,000 - 900 B.P.)

This component was associated with the Bm horizon in Stratum I. There was poor definition of the boundary between the Bm and Ae2 horizons and only discontinuous separation from the next lower component. As a result, there was likely some inclusion of earlier material from the Component 3/Component 4 interface. The lithic assemblage included over 1,400 items, of which approximately 90 percent were unmodified flakes and shatter. The lithic suite is dominated by local siltstone but also includes a few items of quartzite, quartz crystal and chert. Two projectile points were recovered, consisting of an Avonlea Phase point and a large flake point (Figure 29 a, f). The former was produced from a small black siltstone blade-like flake and exhibits relatively fine workmanship. The latter was manufactured on a tan-coloured siltstone flake and is bifacially asymmetrical, with quite abrupt retouch on the ventral face. It is comparable in size and outline to Bitterroot atlatl points, but is technologically very inferior.

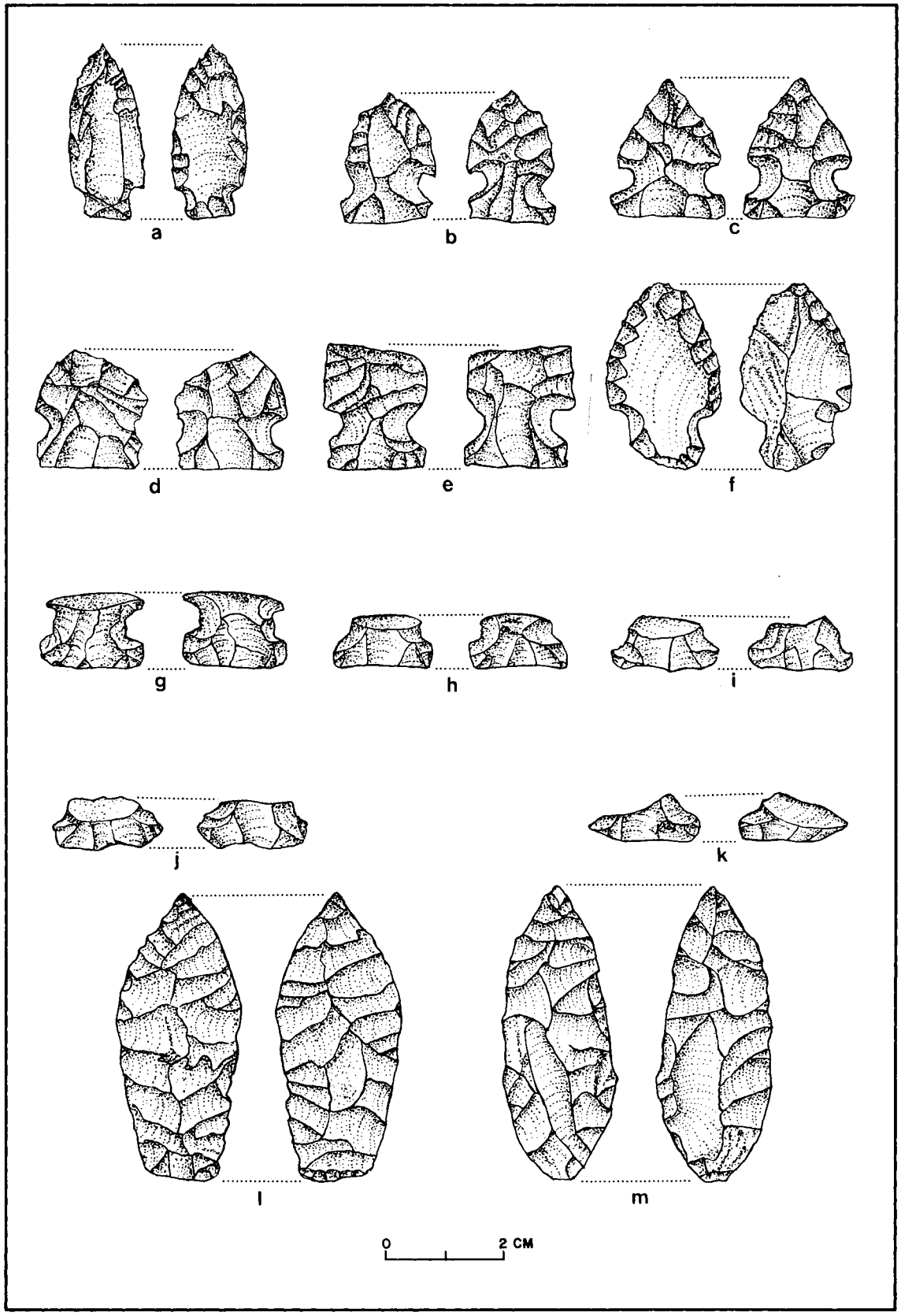

Figure 29. Artifacts from EhPv-8.

No identifiable faunal remains or intact hearth features were found in association with this component. The tentative time frame within which this component is subsumed includes the estimated temporal limit of the Avonlea Phase (Reeves 1983a:16), consistent with aforementioned tentative correlation of Stratum I matrix with the Bridge River ashfall of about 2,400 B.P.

Component 4 (ca. 6,850 - 5,000 B.P.)

This component was associated with the Ae horizon in Stratum II. The lithic assemblage included more than 7,600 items, of which approximately 98 percent were unmodified flakes and shatter. The lithic materials are dominated by siltstones, but include some quartzite, quartz crystal, and a few items of chert and chalcedony. Eight large side-notched projectile points (complete and fragmentary) were recovered (Figure 29, b-e, g-k). These are technologically similar to Bitterroot atlatl points of the Early Mummy Cave Complex (Reeves 1973:1245).

No identifiable faunal material was recovered, and no intact hearth features were observed. The temporal range within which Component 4 was deposited includes the time from the Mazama event through to the approximate terminal date for Bitterroot-type projectile points. Assignation of this component to the Early Mummy Cave Complex (ca. 7,500 - 5,000 B.P.) is consistent with the tentative correlation of Stratum II matrix with the Mazama ashfall of about 6,850 B.P.

Component 5 (ca. 9,000 - 6,850 B.P.)

This component was associated with the Ah/B horizon of Stratum III. The artifact assemblage included over 150 items, of which approximately 50 percent were unmodified flakes and shatter. The lithic collection was dominated by quartzite and siltstone, and included a single chert item.

No diagnostic artifacts or identifiable faunal materials were recovered. A cobble encircled hearth feature in association with this cultural layer was excavated, but there was insufficient charcoal for radiocarbon dating. Temporal limits for deposition of this component are the tentatively identified Mazama event of Stratum II, and the radiocarbon estimate of 8,950±600 B.P. from the upper strata of the lowest major silt unit (Stratum XII - XV).

Component 6 (ca. 9,000 - 8,000 B.P.)

This component was associated with a weak Ah/B horizon within Stratum VI. The lithic assemblage included more than 150 items, of which approximately 95 percent were unmodified flakes and shatter. The lithic suite was comprised largely of siltstones, but included a few quartzite, chert and chalcedony flakes. Two lanceolate projectile points were found, one of which (Figure 29, l) is a banded siltstone and exhibits evidence of reworking. It is technologically similar to Agate Basin (ca. 10,500 - 9,500 B.P.), but would also fall into the range of the "Agate Basin-like" Lusk projectile points of the Plains Mountain Complex, dated at ca. 9,500 - 8,000 B.P. (Kennedy et al. 1982:44; Husted and Edgar 1968:56). The second point (Figure 29, m) is comparable to Cascade type points found in association with Plains Mountain Complex material in the Crowsnest Pass area of the Southern Canadian Rockies (Kennedy et al. 1982:44). The Cascade-like projectile point was recovered immediately above the "Agate Basin-like" specimen and probably occupies a similar time frame.

No identifiable bone was recovered from Component 6. A radiocarbon sample from a hearth feature associated with Component 6 artifacts has been submitted but no results have yet been obtained. Temporal limits for this component range from a minimum of 8,000 B.P., reflecting the replacement of Agate Basin-like points in the northern Plains/Mountains area by large side-notched atlatl points at about 7,700-8,000 B.P. (Wedel et al. 1969:184-5; Frison 1983:120), and a maximum of about 9,000 B.P., based on radiocarbon dates of 8,950±600 B.P. (SFU 347) and 9,400±400 B.P. (SFU 317) from the upper portion of the next lower major silt unit (Stratum XII-XV).

Component 7 (ca. 9,400 B.P.)

This component was associated with a discontinuous and poorly defined Ah/B horizon in the upper portion of Stratum XIII. The lithic assemblage included over 300 items, of which approximately 95 percent have been catalogued as unmodified flakes and shatter. The lithic materials include local silicified siltstones and weakly silicified sandstone. The latter appears very prone to hydration weathering and, in most cases,

some surface exfoliation has occurred. No diagnostic items were recovered.

The faunal assemblage includes sheep (Ovis canadensis), and beaver (Castor canadensis), as well as elements attributable to other large and small ungulates, unidentifiable as to species. Charcoal from a probable hearth feature within an activity area containing the majority of the artifact assemblage was radiocarbon dated to 9,400±400 B.P. (SFU 317).

Component 8 (ca. 11,000 B.P.)

This component was associated with a weak but relatively well defined and continuous Ah/B horizon in the upper portion of Stratum XIV. Material culture remains ascribed to Component 8 were recovered in Operation 12 only. The lithic assemblage included more than 150 items (exclusive of fire broken rock and large unmodified cobbles), of which more than 95 percent have been catalogued as unmodified flakes and shatter. The lithic materials were dominated by local silicified siltstone but included some items of weakly silicified sandstone and mudstone, and a single item (biface) of green tuff. No diagnostic projectile points were recovered.

The faunal assemblage included sheep (Ovis canadensis - very robust), bison (Bison sp.), hare (Lepus americanus), caribou (Rangifer tarandus - tentative identification) and deer (Odocoileus sp. - tentative). This assemblage was quite extensive and comprised in excess of 100 identifiable bones and bone fragments. A bone bead was also recovered from this component. The activity area is clearly an animal processing locale, substantiated by bone elements with butchering marks and impact scars, and their association with lithic cutting and chopping tools.

Large quantities of charcoal were recovered in direct association with the faunal and lithic material over an area encompassing about 50-60 percent of the 3 m by 3 m unit. Radiocarbon dates of 11,500±240 B.P. (SFU 316) and 11,700±350 B.P. (SFU 346) were obtained for charcoal from two separate areas within the feature, supportive of an age of about 11,500 B.P. At the present time, it is felt that these dates are a few hundred years earlier than the human activity with which they are associated, since the next lower component has two radiocarbon dates, 10,900±350 B.P. (SFU 314) and 11,000±480 B.P. (SFU 348), which are

strongly supportive of an occupation at around 11,000 B.P. Because the dates in each set correspond well and the components were clearly separated, and there was no evidence for possible contamination, it is felt that the dates are valid. The incongruity may indicate that the charcoal fragments from Component 8 represent heartwood, perhaps from an old deadfall or driftwood; that is, we may be dating part of a tree that died several hundred years prior to burning. In order to evaluate this interpretation, we shall attempt to obtain bone collagen dates. In addition, a third carbon sample containing large fragments of charcoal from the Component 8 feature has been submitted to the Geological Survey of Canada for dating and species identification.

Of note with regard to the faunal assemblage is the fact that analysis indicates that the sheep from this component were significantly larger (10 to 20 percent) than the modern populations (M. Wilson, personal communication). They are of similar size range to the sheep subspecies present in the Big Hill Creek gravels of the Bow Valley near Cochrane, dated at 11,370 to 10,760 B.P. (M. Wilson, personal communication). This subspecies, Ovis canadensis catclawensis (Harris and Mundale 1974), is thought to be the late pleistocene precursor of Ovis canadensis.

Component 9 (ca. 11,000 B.P.)

This component was associated with the Ah/B horizon of Stratum XV. The lithic assemblage included over 4,250 items, of which approximately 98 percent were catalogued as unmodified flakes and shatter. Lithic material types represented included black silicified siltstone (about 98 percent), grey weakly silicified sandstone (approximately two percent) and a few items manufactured from mudstone. The faunal assemblage included Ovis canadensis (very robust), Odocoileus sp. (tentative) and (a) large ungulate(s) (Bison sp. and/or Cervus). Radiocarbon dates of 10,900 $\pm$ 350 B.P. (SFU 314) and 11,000$\pm$ 480 B.P. (SFU 348) were obtained on charcoal from a probable hearth feature associated with the lithic concentration.

EhPv-8 Current Status

Following the presentation of concerns for the protection of the Vermilion Lakes Site, the developer (Public Works Canada) has responded with significant modifications to the highway design. These modifications ensure that none of the main site area, as identified during 1983, will be impacted by the twinning development. A very limited area peripheral to the known site area will be impacted, and since there is significant potential in all of this colluvial landform north of the present highway, detailed testing and requisite mitigative action will be conducted in early 1984. In conjunction with this program, paleoenvironmental studies are also being initiated to aid in a more complete interpretation of these heritage resources.

SUMMARY

The Vermilion Lakes area in general, and the Vermilion Lakes Site in particular, represent a unique repository of paleocultural and paleoenvironmental information. In 1983, reconnaissance by Parks Canada archaeologists provided evidence for approximately 11,000 years of human activity in this region. Excellent data preservation in context within some of these heritage sites promises to shed considerable light on these activities and their relationships to the biophysical environment.

THE LAIDLAW SITE: AN ABORIGINAL ANTELOPE TRAP FROM SOUTHEASTERN ALBERTA

John H. Brumley
Ethos Consultants Ltd.

INTRODUCTION

In the summer of 1982 while on an aerial photography flight along the South Saskatchewan River, the writer and Dan Lander observed an unusual surface stone structure and associated stone circles (subsequently designated the Laidlaw site, DlOu-9). As observed from the air, this unusual structure consisted of two lines of stone converging towards, and connected to, a rectangular stone enclosure.

Subsequently, the writer made several ground inspections of the site and locale, culminating in limited mapping and test excavation during May of 1983. This work was conducted by members of the Archaeological Society of Alberta, under the writer's direction. This report presents a detailed description of data gathered, and interpretations in terms of relevant archaeological, historic and ethnographic information for the region.

Physical Setting

The Laidlaw site is located on a terrace or terrace-like surface which is midway up the north face of the South Saskatchewan River valley, about 1.5 km north of the present river channel margin (Figure 30). This terrace-like surface is approximately 2.5 km long by 1 km wide, and is characterized by a moderately undulating to essentially level surface. Surficial deposits consist of coarse sands and gravel outcropping along the margins and high points, with finer colluvial and aeolian deposits in lower areas. The Laidlaw site is located along the northwest margin of this surface where it is bordered by a moderately sized coulee. Vegetation in the site vicinity consists of shortgrass prairie, except along low lying fringes of the river where small to extensive stands of poplar or brush are located. Numerous stone circles have been observed

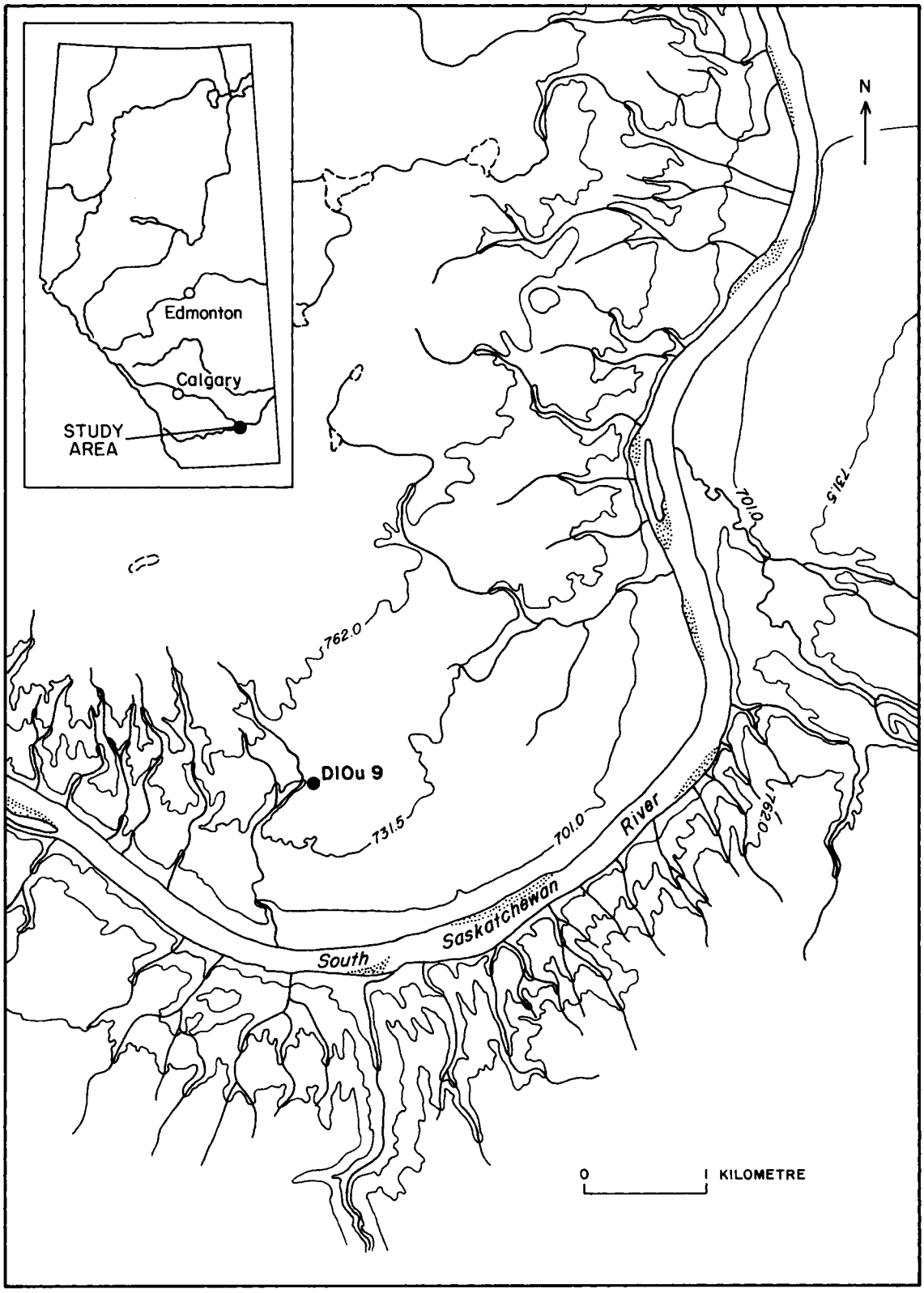

Figure 30. Location of the Laidlaw site (DlOu-9).

in various areas of this bench-like surface. As well, a pair of stone alignments terminating at the edge of a steep slope which forms part of this terrace-like surface were noted approximately 0.5 km southwest of the Laidlaw site. Although not thoroughly examined, the valley wall and prairie margins within a 2 km radius of the site are known to contain numerous surface stone features in the form of circles, cairns and alignments.

FEATURE DESCRIPTION

Feature 1

Four features, all surface stone structures, have been identified and defined at Laidlaw. Feature 1, the most prominent structure at the site, consists of two relatively straight stone lines (designated A and B), converging and terminating on adjacent corners of a roughly rectangular stone enclosure (Figures 31 - 34). Stone Line A is approximately 29 m long and oriented from SW to NE. Stone Line B is approximately 35 m long and oriented from SSW to NNE. Most portions of both lines are situated along the crest of a very stoney ridge. They are composed of variously sized boulders which are positioned to form closely spaced, single lines of rock. The southernmost portion of Line A is situated in a low swale where soil deposition is greater. There, as a result of stone placement and/or depositional burial, stones comprising the line are fewer in number and more widely spaced. Near the southernmost portion of Line B, it is impossible to precisely determine where the line terminates because of abundant natural stone comprising the crest of the ridge.

The rectangular stone enclosure forming the apex of the structure is composed of a well-defined band of stones, one to three stones in width and one or two stones in height. The enclosed area is wider at its westernmost end (inside width of 3.75 m), and the opposite end has an inside width of 2.5 m. The inside length of the structure is 7.1 m, and it has a total inside area of 22.2 square metres.

Figure 32 illustrates an arbitrarily drawn line positioned roughly along the center axis of Feature 1. Subdivisions 1 to 5 on the line have been designated at varying distances along the line as points of reference, based on topographic changes. From points 1 to 2, the ground

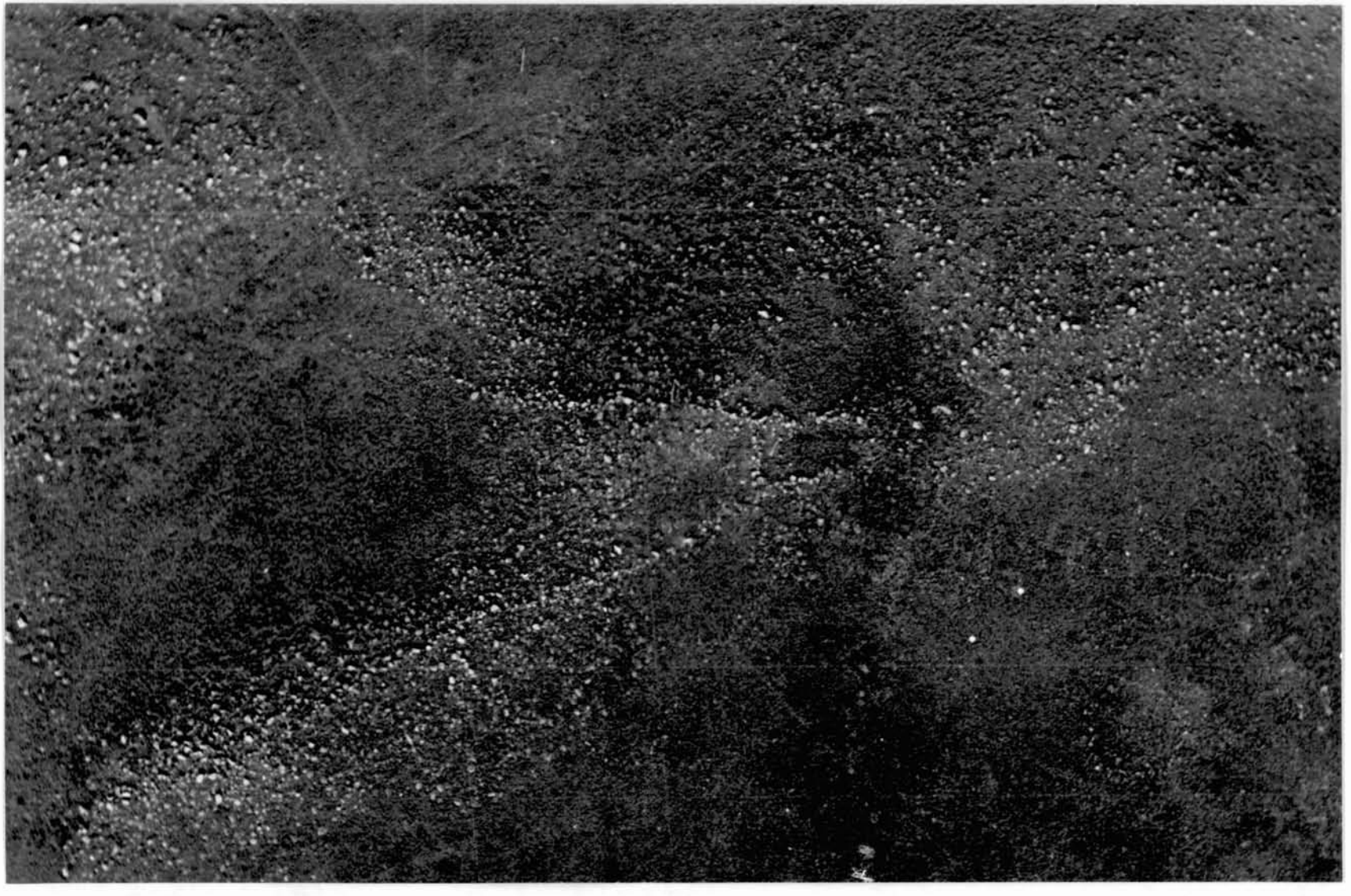

Figure 31. Vertical aerial view of Laidlaw Site.

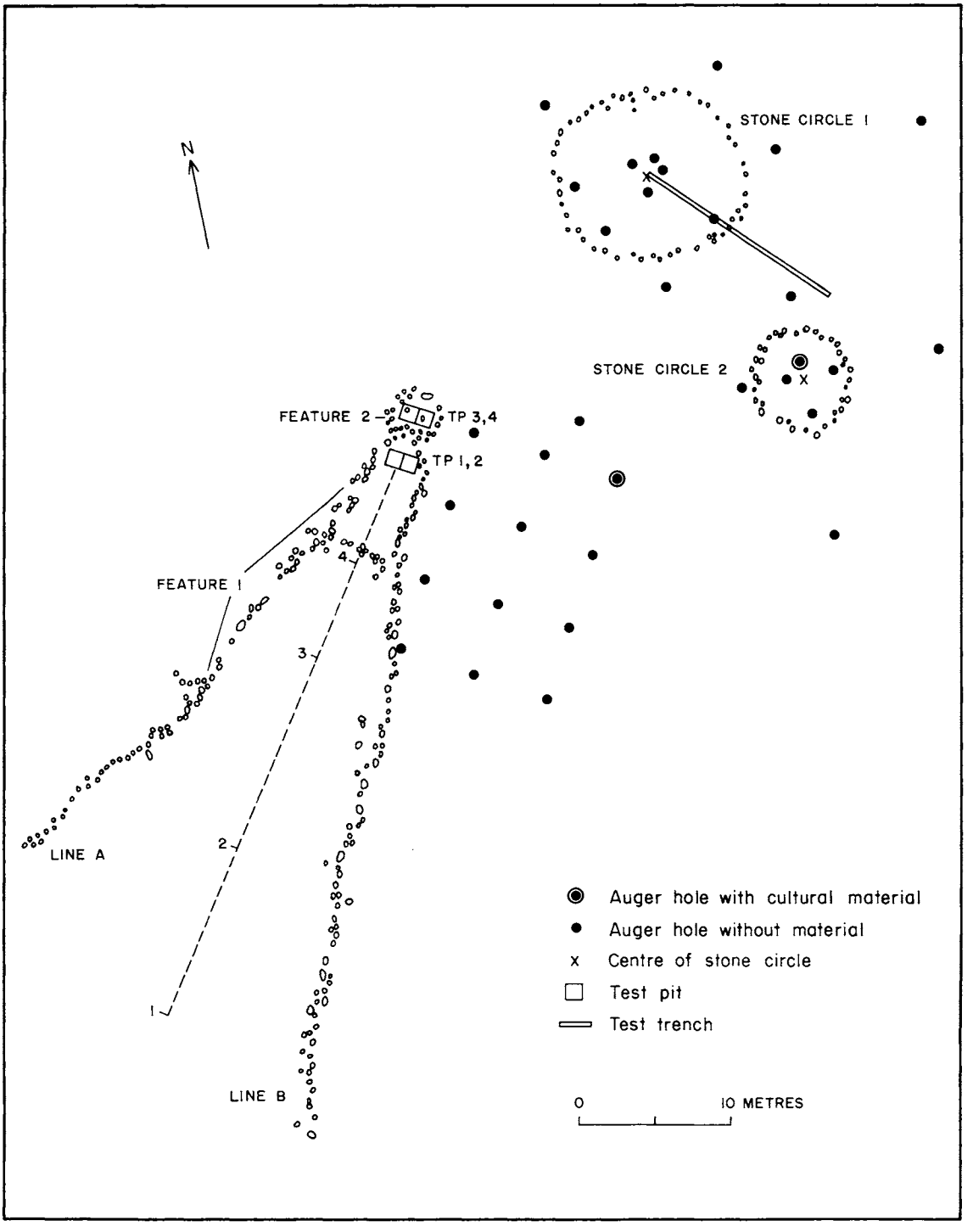

Figure 32. Sketch map of Laidlaw site cultural features.

Figure 33. Oblique aerial view of Laidlaw site, looking west.

Figure 34. Backfilled test pits 1 and 2 within Feature 1.

surface is relatively level with heavy grass cover. From points 2 to 3, the ground surface is extremely stoney and rises markedly, leveling between points 3 and 4, only to drop markedly again between points 4 and 5. The ground surface between the long sides of the rectangular enclosure is slightly U-shaped or dished out, with the center area being from 10 to 20 cm deeper than the margins.

Two contiguous one metre square test pits were excavated within the northeastern end of the enclosure (Test Pits 1 and 2; Figure 32). Excavation revealed the presence of an upper soil cap of fine aeolian and colluvial materials. This cap was as much as 20 cm thick near the central area of the enclosure, thinning out to an average thickness of 5 cm along the margins adjacent to the stones forming the long axis. Beneath this cap lay a solid band of large stones, several of which were estimated to weigh over 50 kg. Soil matrix between these stones consisted largely of fine aeolian and colluvial material which, in a few instances, was stained black by decomposed organics. The base of this band of stone was encountered at an average of 80 cm below surface and was underlain by a gritty subsoil. Within the area tested, the surface of this subsoil appears to slope markedly downward towards the northeast end, and to a lesser extent, from the southeast side to the northwest side. Recovered cultural material consisted exclusively of a small number of bone fragments found between and beneath individual rocks near the base of this stone mass.

It would appear that the stones outlining the rectangular portion of Feature 1 represent the base of a stone wall which surrounded a centrally excavated pit. The floor of this pit was apparently excavated to at least 80 cm below original ground surface and sloped downward towards its northeast end. It appears that stones comprising all but the base of this surrounding wall collapsed inward, largely filling the central pit. Considering the amount of stone removed from Test Pits 1 and 2 in excavation, it is estimated that this stone wall was originally some 80 to 100 cm in height. Thus, as originally constructed, the height from the base of the excavated pit to the top of the stone wall was probably from 160 to 180 cm.

Along a portion of the south side of Feature 1, a series of 16 auger holes 20.5 cm in diameter, spaced at 5 m intervals, was excavated to

depths of from 24 to 50 cm below surface. The matrix was passed though a 6 mm mesh screen and carefully examined. A marginally retouched stone tool from the southernmost auger hole was the only cultural item recovered.

Feature 2

Feature 2 consists of a roughly circular stone mass 2.5 m in diameter and is situated immediately adjacent to the rectangular enclosure. (Figures 31 and 32). Two contiguous one metre square units (Test Pits 3 and 4) were excavated in the central portion of Feature 2. Excavation revealed the presence of a dark, fine textured soil from ground surface to 20 cm below surface surrounding the individual stones comprising the features. At 20 cm below surface, a silty sand and gravel subsoil was encountered upon which the base of the stones rested. Recovered cultural material consisted solely of three bone fragments found beneath and between the stones.

The individual stones in Feature 2 are relatively large, with the biggest estimated at approximately 50 kg. Stones were generally piled no more than two or three deep, and their relative positions suggest that Feature 2 originated as a circular, stone-walled structure, probably some 30 to 50 cm in height. Through time, the walls collapsed inward until a simple circular mass of stones remained. No evidence of an excavated interior pit was found in this feature.

Stone Circles 1 and 2

Two stone circles located a short distance east of Features 1 and 2 are included within the defined area of the site. Additional stone circles are located further afield on the terrace-like surface but are not considered part of this site. Both stone circles were mapped (Figures 35, 36) utilizing the method described by Dau (1981), and a series of twenty-two 20.5 cm diameter auger holes were excavated within and adjacent to each stone circle. Cultural materials recovered in augering consisted of a single chert flake from within Stone Circle 2. Within Stone Circle 1, an additional test trench, 35 cm wide and 15 m long, was excavated from the center of the circle outwards in a

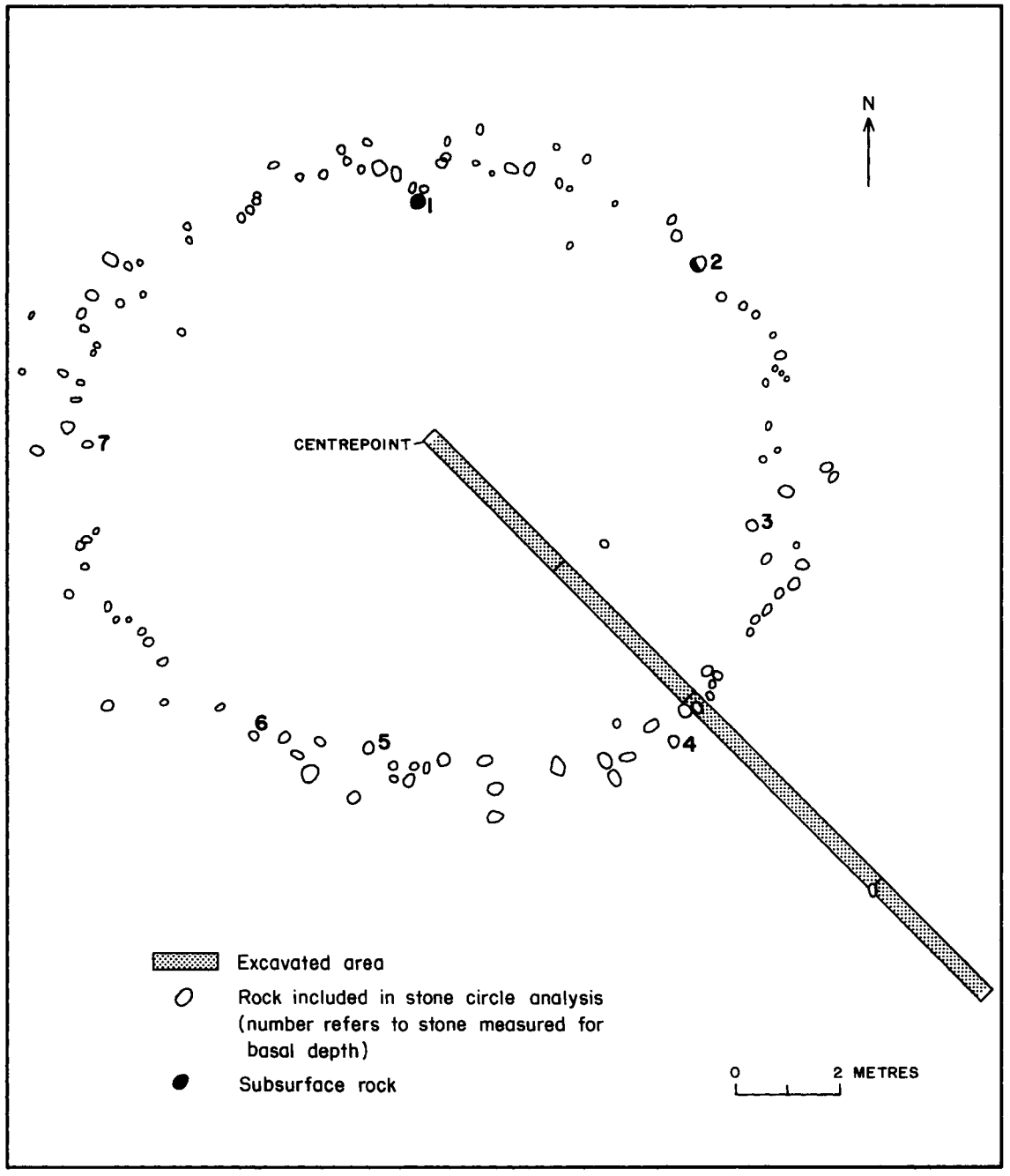

Figure 35. DlOu-9, Stone Circle 1.

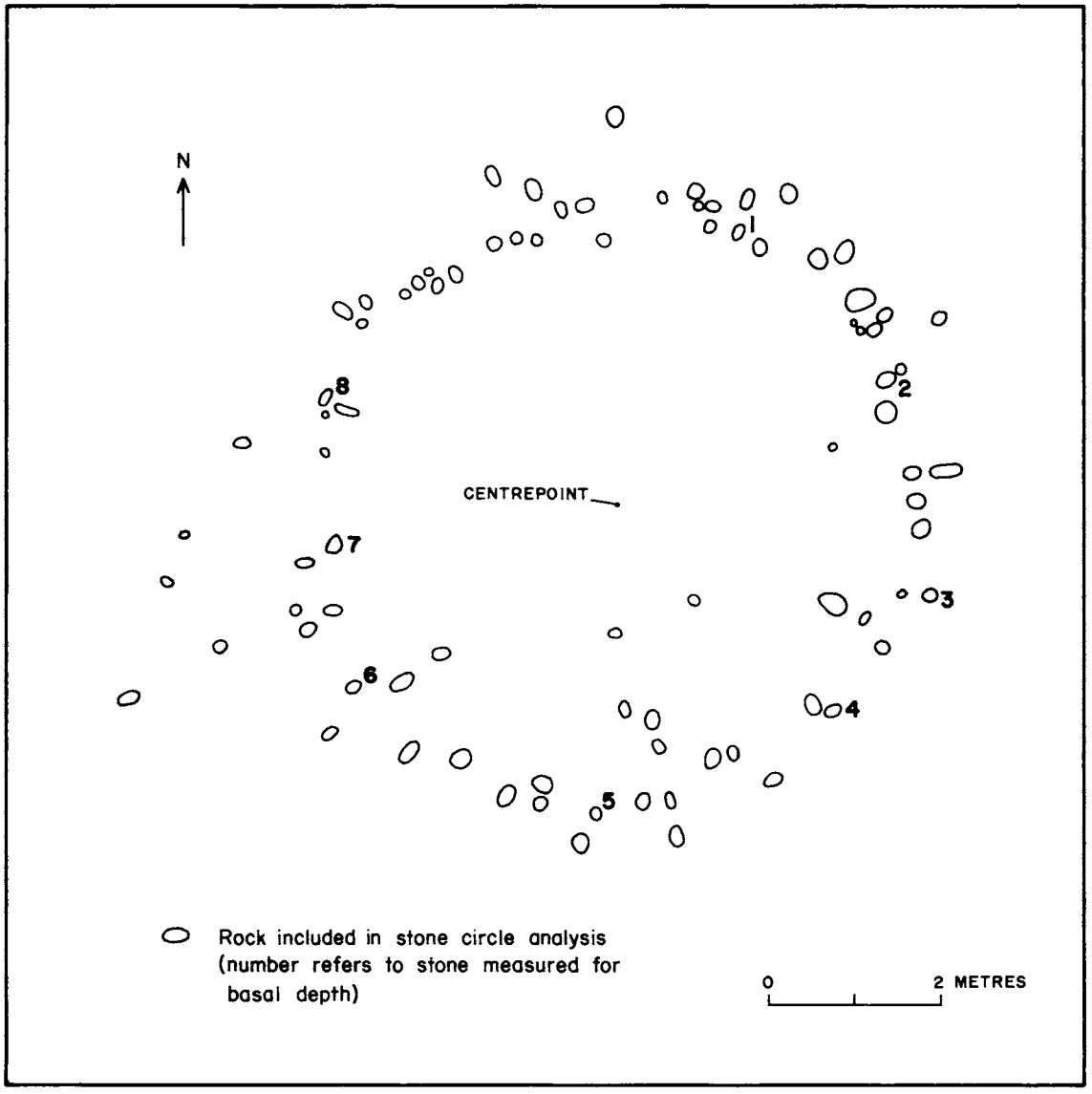

Figure 36. DlOu-9, Stone Circle 2.

southeasterly direction (Figure 35). The maximum excavated depth of this trench varied from 20 to 30 cm below surface. Material recovered from this test trench consisted of two pieces of coarse debitage in the section 0 to 5 m outside the wall of the stone circle.

Cultural Material

Table 5 summarizes the kinds, quantities and distribution of recovered cultural material. Of the 23 pieces of bone recovered, only five (all from near the base of Test Pits 1 and 2, Feature 1) are identifiable as to element and species. All five pieces are either definitely or probably Pronghorn antelope (Antilocapra americana) and consist of the following:

1. the anterior articular process and dens of an axis;
2. a complete left internal auditory meatus;
3. a metatarsal shaft fragment;
4. a fragment of the proximal end of a metacarpal (side indeterminate);
5. the basal portion of a spinous process from a thoracic vertebra.

All bone fragments were less than 4 cm in maximum length. An examination of the thickness of these fragments suggests that all but two definitely resulted from fragmentation of antelope or antelope sized ungulate elements. The remaining two fragments are of considerably thicker bone and may be referable to a larger ungulate such as bison.

As previously noted, faunal remains were only recovered beneath and between the stones comprising Features 1 and 2. This distribution in all likelihood reflects the protected depositional environments rather than cultural activity. Recent research at stone circle sites in the Forty Mile Coulee area contrasts bone preservation in exposed prairie surface sites to sites on coulee slopes or coulee bottoms, where soil deposition is rapid (Brumley 1983:33-34); the prairie sites contain less than ten percent of the bone material found in similar sites in the coulees, where faunal remains are abundant (often 80 to 96 percent of a site assemblage). With the exception of areas beneath and around the stones sampled by Test Pits 1 to 4, the Laidlaw site surface does not provide a good environment for preservation of faunal remains.

Table 5: Summary of Cultural Material Recovered from DlOu-9

PROVENIENCE	AREA (m^2)	BONE (n=)	COARSE DEBITAGE	FINE DEBITAGE	MRST
Feature 1, Test Pits 1 and 2	2	20			
Feature 1, Auger Holes	0.53	-			1
Feature 2, Test Pits 3 and 4	2	3			
Stone Circle 1, Inside Auger Holes and Test Trench	2.72	-			
Stone Circle 1, Outside Auger Holes and Test Trench	2.97	-	2		
Stone Circle 2, Inside Auger Holes	0.13	-		1	
Stone Circle 2, Outside Auger Holes	0.17	-			
TOTAL:	10.52	23	2	1	1

ABORIGINAL ANTELOPE PROCUREMENT AND UTILIZATION

Introduction

The form of Feature 1 strongly suggests a function as a trap or pound structure; recovered faunal remains indicate antelope were the animals hunted. It is thus appropriate here to review a number of archaeological, ethnographic and historic references to aboriginal antelope utilization and procurement as a basis for further discussion and interpretation of data from the Laidlaw site.

Antelope: A Brief Characterization

Pronghorn antelope (Antilocapra americana) are small, trim ungulates, standing about three feet high at the shoulder. Adult males average 50 kg (113 lbs) and females 41 kg (92 lbs). They are found in variously sized herds most of the year, with adult bucks separating from the does and younger males in spring and summer, rejoining them in the fall (Banfield 1974:401-404).

Pronghorns are noted for their keen eyesight and speed. An antelope can see objects 5 to 6 km away, but generally ignores them if they are stationary. Strange objects or movements easily arouse their curiosity and they will approach quietly to investigate. Pronghorn are the swiftest North American mammal, capable of brief speed sprints of 80 or 90 km an hour, and can run 55 to 60 km an hour for distances of up to 6 km before becoming exhausted.

In winter, antelope tend to bunch into larger herds, and drift into valleys for shelter. When weather permits, they return to wind blown hillsides where they paw through snow to feed. In their northern range, antelope historically migrated considerable distances to winter in areas of less snowfall. However, recent historic construction of roads, fences, and railways has extensively disrupted these movements. Although they can jump considerable distances, they refuse to do so over an object. Antelope will not jump even low fences, either crawling through or under them (Banfield 1974:401-404).

Pronghorn inhabit plains, steppes, deserts and foothills regions of western North America, extending from the Canadian Plains south to

northern Mexico. Historically, antelope roamed western North America in numbers comparable to bison (Banfield 1974:403).

> Few people today realize that in old times the antelope in their range were probably more abundant than the buffalo. They were found in vast numbers over all the plains, but because of their small size and inconspicuous coloring, they did not impress those who saw them as did the black herds of the larger animals. (Grinnell 1962 Vol. 1:277)

Aboriginal Significance and Use of Antelope

A review of historic and ethnographic sources for the northern Plains suggests that antelope were second, albeit distantly, only to bison in economic importance among most aboriginal groups. In common with other important secondary game animals such as deer, elk and mountain sheep, it is obvious that antelope were generally hunted for meat only when bison were absent or scarce.

> The antelope became more and more common in this part of the country, and we saw several today, but the wishes of our hunters were disappointed. The Indians use the skin of these animals for clothing, but they are not very eager in the chase of the antelope, except where the buffalo is scarce. (Maximilian in Thwaites 1966 Vol. XXII:298)

"The antelope was only a subsidiary food animal of the Plains, for the Flathead did not relish its musky meat. It was only hunted when hungry." (Turney-High 1937:119). DeSmet (in Thwaites 1966 Vol. XXVII:264) notes of antelope meat: "The flesh is wholesome and easily digested, but it is used only where deer and buffalo meat are wanting". The light hides of antelope were preferred by various tribes in the northern Plains for the manufacture of clothing items such as shirts, leggings and moccasins (cf. Ewers 1955:170; Burpee 1910:67; Masson 1889:279).

Individual and Small Group Hunting Techniques

A frequently recorded hunting technique for antelope relied on their:

> ...great curiosity apparently [they are] determined to look at everything they do not understand, so long as they do not scent it. Our hunter set off into the valley, to show me the manner of shooting them. .... The hunter stole forward and hid himself behind a small bush, so as to have the wind blowing from them, and gently waved a piece of rag tied to his ramrod; as soon as the cabrees [antelope]

> perceived this, they gradually came up to him, until within shot, when he knocked one over; this was of course all he could expect, as the rest were off in an instant. (Paul Kane in Harper 1971:80)

In such hunting, a disguise consisting of a wolf, antelope or other skin would commonly be utilized by the hunter (Denig 1930:535; Lowie 1909:185).

Lewis and Clark, while ascending the Missouri River in what is now South Dakota, observed large numbers of antelope being hunted by the Arikara while crossing the river:

> As we proceeded there were great numbers of goats [antelope] on the banks of the river, and we soon after saw large flocks of them in the water. They had been gradually driven into the river by the Indians who now lined the shore so as to prevent their escape, and were firing on them, while sometimes boys went into the river and killed them with sticks: they seemed to be very successful, for we counted fifty-eight which they had killed ... The goats, of which we see large flock coming to the north bank of the river, spend the summer ... in the plains east of the Missouri, and at the present season are returning to the Black Mountains, where they subsist on leaves and shrubbery during the winter, and resume their migrations in the spring. (in Biddle 1904 Vol. 1:162-163)

Lewis and Clark present several other references to the hunting of antelope while they crossed the Missouri River in the course of their seasonal migrations, by Arikara, Mandan, Hidatsa, and Assiniboine (cf. Biddle 1904 Vol. 1:179-180, 213, 254). Such references suggest a regularized, seasonal pattern of antelope procurement along this portion of the Missouri. No similar indications of seasonal or regional patterning in antelope procurement were noted in references from elsewhere in the Northern Plains. Denig notes:

> ... another method by which great numbers of both buffalo and antelope are slain is, when the snow has drifted in the gullies, forming banks 10 to 15 feet deep. The animals are pursued on foot with raquettes and snowshoes. The hunter goes over the snow, but the animals become embedded and are killed with ease. (1930:535)

Denig does not specify, but presumably the above technique could be conducted by individuals or groups. John Audubon notes a variation of this technique:

> In 1840, during the winter, and when the snow was deep on the prairies and in the ravines by having drifted there, Mr. Laidlaw, then at Fort Union, caught four Antelopes by following them on horseback and forcing them into these drifts, which were in places ten or twelve feet deep. (M. Audubon 1972:132)

Ewers (1955:170) notes that the Blackfoot normally hunted antelope on foot and that only an exceptional horse was able to catch up with these animals. Turney-High records a Flathead technique of chasing antelope on horseback taking advantage of the animal's habit of running in a large circle:

> Antelope hunting was an individual enterprise, lacking in organization and public interest. It was moreover hard work. Only the fleetest charger could hope to overtake one in any reasonable length of time. Furthermore the animal's speed made it possible to take only one at a time from a herd.
>
> The herd was approached as quietly as possible by the mounted men. When it became alarmed the hunter galloped after the one he had chosen. Now an antelope can easily outdistance a horse but does not have that animal's endurance. Furthermore it can be relied upon to run in a circle, even though one of several miles circumference. Actually a determined man afoot can run an antelope down by taking advantage of this fact. So keeping on the inside of the antelope's wide circle the hunter followed it until it began tiring sufficiently to press the horse up closer. An arrow was then dispatched, catching the prey behind the shoulder. (Turney-High 1937:119).

Communal Antelope Hunting Techniques

Communal antelope hunting on horseback has been recorded historically for several groups. While with a group of Shoshoni in southwestern Montana, Lewis noted:

> ...game which they principally hunt is the Antelope which they pursue on horseback and shoot with their arrows. this animal is so extremely fleet and dureable that a single horse has no possible chance to overtake them or run them down. the Indians are therefore obliged to have recorce to strategem when they discover a herd of the Antelope they seperate and scatter themselves to the distance of five or six miles in different directions around them generally selecting some commanding eminence for a stand; some one or two now pursue the herd at full speed over the hills vallies gullies and the sides of precipices that are tremendious to view. thus after runing them from five to six or seven miles the fresh horses that were in waiting head them and drive them back persuing them as far or perhaps further quite to the other extreem of the hunters who now in turn pursue on their fresh horses thus worrying the poor animal down and finally killing them with their arrows. forty or fifty hunters will be engaged for half a day in this manner and perhaps not kill more than two or three Antelopes. they have but few Elk or black tailed deer, and the common red deer they cannot take as they secrete themselves in the brush when pursued, and they have only the bow and arrow which is a very slender dependence for killing any game except such as they can run down with their horses. I was very much entertained with a view of this indian chase; it was after a herd of about 10 Antelope and about 20 hunters. it lasted about 2 hours and considerable part

> of the chase in view from my tent. about 1.A.M. the hunters returned had not killed a single Antelope, and their horses foaming with sweat. my hunters returned soon after and had been equally unsuccessfull. (Thwaites 1959 Vol. 2:345-46).

Ewers (1955:170) notes there is no evidence for group hunting of antelope on horseback by the Blackfoot, but he does reference accounts of such activity by a number of other Indian groups, including the Cour d'Alene, Osage, Comanche, and Kiowa.

Grinnell (1962) presents a detailed account of an antelope surround performed by the Cheyenne in 1858 while they were travelling with William Bent's wagon train:

> ... White Faced Bull ... mounted his horse and rode off in the direction in which the antelope were thought to be, and the whole camp - men, women, children - followed him. After a time White Faced Bull stopped and dismounted. All the different bands of soldiers formed in one broad-fronted line, abreast ... two young men riding fast and long-winded horses...started [forward] ... the soldiers moved forward in two long lines on either side, following these two young men, and all the young men followed the soldiers. White Faced Bull sat there. No one knew where the Antelope were or even if there were any antelope.
>
> After the young men had gone, the old men, the women, and the children stepped up into the places where the young men had been, and stood on either side of White Faced Bull, making a long line, reaching forward at the ends - a crescent so as to make the beginning of a circle. At the ends of the line were many young women who were riding good horses. They held in their hand the forked poles that women used to support their drying scaffolds.
>
> The leading [two] young men ... rode fast out on the prairie, getting farther and farther apart, until at length the distance between them must have been two miles; and now it was seen that between them there were many antelope, which, instead of running away began to run toward White Faced Bull. When the young men in either line - those who were following the men [riding fast and long winded horses]... saw that there were many antelope between them, and that they were running thick together, then the two men with the [long winded horses]... rode toward each other, and those who followed them began to close in. The leaders continued to ride toward each other, and then passed each other, and each rode back on the outside of the lines to where White Faced Bull was standing. The other mounted men did not follow them, but met and closed in on the antelope, riding not behind the antelope but rather at the sides of the herds. The young men were whooping and calling, to drive the antelope toward White Faced Bull.
>
> The leading young man who reached White Faced Bull first handed him his antelope arrow. Then the other came up and gave him the other arrow. Now White Faced Bull stood holding one antelope arrow in each hand.

Porcupine Bull was back near his father, and he had seen, a long way off, the soldiers tossing their robes as a signal that something was coming. The women and children now dismounted and formed a circle about White Faced Bull, and the old men began to call out to him to get into the center of the circle. The people in the circle all held their blankets or robes spread out behind them, and got close together so as to make a barrier that the antelope could not get through.

White Faced Bull called his son to come with him into the middle of the circle. Now the antelope were coming fast, and soon they entered the circle, which by this time was almost complete. It was still large, but was growing smaller all the time. White Faced Bull held the antelope arrows in his hands and made motions with them, and whenever he did so the antelope turned in the direction toward which he motioned. There were many antelope, and when one band suddenly turned and ran into another, the antelope piled up in a struggling heap, so that many were knocked down and broke their legs, or were hurt in other ways.

When the antelope began to run around inside the circle, they made the old man dizzy, and he said to his son, "Let us get out of here!" As he started to move, the antelope stopped and looked at him, and the old men on the outside cried "Do not move!" he stopped and made a motion with his arrows, and the antelope moved in the direction in which he motioned. He caused them to run first one way and then another. He did this to confuse them, so that they would run first in one direction and then in another, and against and over one another. They soon became entirely exhausted.

When this took place all the people broke out of the circle and ran toward the antelope. It had been ordered that morning that neither guns nor bows and arrows should be used. The women were armed with forked sticks, poles, and axes with short, straight handles, even root-diggers, which they used to knock down the antelope. Men used ropes and boys did the same, catching the antelope and dragging them away. Women who knocked down antelope claimed those that they had killed. Some stranger Indians were present in the village, but they were not allowed to enter the circle for fear they might shoot and hurt someone.

The very few antelope which got out of the circle were followed by the mounted men and all killed. With the antelope were wolves, coyotes, kit foxes, and rabbits.

The antelope killed in the circle were all dragged to its center where White Faced Bull had stood, and were placed in rows - all the oldest bucks in a row together, then a row of younger ones, and then others still younger in rows, till they reached the kids. The females were all placed in similar rows by age. White Faced Bull selected his antelope, choosing only two for himself, but all the tongues came to him. The two girls and the two young men who carried the antelope arrows were called up and told to choose each an antelope. Then the men cut out the tongues, and two women carried them in a big blanket to White Faced Bull, telling him that there was his food. They made heavy loads for the two women.

There were six hundred lodges of Cheyennes, and every woman had an antelope. The antelope were so many that the leanest ones were not saved - only their hides were taken off. Bent's wagon train had all the antelope it could use. (Grinnell 1962:283-288)

No other accounts of antelope surrounds were noted in the literature examined, although this technique was most probably employed by groups other than the Cheyenne.

Use of pound structures to procure antelope is the most frequent communal kill technique noted in the literature, with direct references to its use by the Mandan, Hidatsa, Assiniboine, Brule Sioux, Blackfoot and Cheyenne (Lewis and Clark in Biddle 1904 Vol. 1:179, 213, 254, 383; Maximilian in Thwaites 1966 Vol. XXIII:232; Will and Spinden 1906:121; Denig 1961:18; Wissler 1910:51; Grinnell 1962 Vol. 1:278).

> Monday [November/ 5 /18]. - The Indians are all out on their hunting parties: a camp of Mandans caught within two days one hundred goats /antelope/ a short distance below us: their mode of hunting them is to form a large strong pen or fold, from which a fence made of brushes gradually widens on each side: the animals are surrounded by the hunters and gently driven towards this pen, in which they imperceptably find themselves inclosed and are then at the mercy of the hunters. (Lewis and Clark in Biddle 1904 Vol. 1:179-180)

> [The Brule Sioux] ... throw antelope over precipices into pens made for the purpose, thus enclosing and killing several hundred at a time. A part of their country on White River, being broken somewhat in the same way as that described as the Bad Lands, is favorable for this purpose. The animals being surrounded by several hundred people are driven through some gap in the hills beyond which is a perpendicular descent of many feet enclosed at and around the base with logs and brush built up to sufficient height to prevent their jumping over. The goats [antelope] once through the gap cannot recede and the pressure of those from behind forces those in the front over, the rear being hastily followed by the people engaged in the pursual. (Denig 1961:18)

> ... little is to be said of the hunting ... of the Manitaries [Hidatsa] which has not been already related of the Mandans. They are reported as being very skilful in making the cabri [antelope] parks, which, in the month of April, they can do in half a day .... (Maximilian in Thwaites 1966 Vol. XXIII:383)

> The Antelope hunt is a favorite sport with the Indians. They choose a spot of ground from fifty to eighty feet square, and enclose it with posts and boughs, leaving a small opening or entrance, two or three feet wide. From this entrance they construct two wings or hedges, which they extend for several miles. - After this they form a large semicircle, and drive the Antelopes before them till they enter between the hedges, where they press so hard upon them that they force them into the square enclosure, in which they kill them with clubs. I have been told that the number of Antelopes thus driven into the enclosure, often amounts to more than two hundred. (DeSmet in Thwaites 1966 Vol. XXIII:264)

> I saw the remains of several camps of the Assinniboins; near one of which in a small ravene, there was a park which they had formed of timber and brush, for the purpose of taking the cabrie or Antelope. it was constructed in the following manner. a strong pound was first made of timbers, on one side of which there was a small apparture, sufficiently large to admit an Antelope; from each side of this apparture, a curtain was extended to a considerable distance, widening as they receded from the pound. (Lewis and Clark in Thwaites 1959 Vol. 1:313)

> Probably [to the Mandan] the antelope were next in importance to the buffalo. These were caught in large bands by means of what were called parks. At the head of a coulee an enclosure of branches was made with a narrow opening from which two fences of branches led away in the shape of a funnel, extending for a mile or often more. The Indians, on horseback, by surrounding a band of antelopes could gradually work them towards this enclosure, through the gate of which they were at last forced to go. The entrance was then guarded and the hunters knocked the animals on the head with the stone war clubs; a hundred or more at a time were often killed in this fashion. (Will and Spinden 1906:121)

What might be considered a variation of the above described pound structures involved construction of a pit into which the antelope were driven. Wissler describes one such structure built by the Blackfoot:

> Antelope were taken in a pound somewhat after the method for taking buffalo. There is an old site on Birch Creek in the Blackfoot Reservation, Montana. A pit was dug about two meters wide by six meters long to a depth of from three to four meters. The earth from the excavation was ridged up at the sides of the hole and decked with fresh branches. Two converging lines led up to this pit as in the buffalo pound. There was one important difference, however. As the lines came near together, a turn like an elbow was made to conceal the obstruction at the pit, thus lessening the tendency of the running antelope to jump the line. The lines were marked by small heaps of stones, about a meter apart. Two or more slender willows were bowed over each rock pile, thus forming a kind of fence. When antelope were seen grazing within the lines, the young men stole up to the rear and flanks, while old men, women and even children manned the length of the lines. They lay down behind the rock piles. When the antelope were started and approached a line, the concealed watchers waved something in the air to turn them. Thus, the poor animals ran down between the ever narrowing fences to the brush-covered ridge in front of the pit. Leaping this, they fell into the hole and were caught. (Wissler 1910:38)

Grinnell gives a detailed account of the construction and use of such an antelope kill by the Cheyenne. Although lengthy, the account warrants reiteration in total as it not only illustrates the mechanical technology

of such an endeavor but also the ceremonial and religious aspects involved.

> The older people have always said that when the Cheyennes first came west of the Missouri River and had worked out toward the Black Hills, they found many antelope pits already existing along the different streams. What tribe had dug and used these pits is not known. The pits or ditches were usually found near where two branches of a stream came together. The wings - often bushes piled up close together - which guided the antelope toward the pit were built along the borders of these small streams. Behind the fences and the brush wings the men, women, children, and dogs lay hidden. Resting on the piles of brush at frequent intervals were poles with one end on the ground whose weight should hold down the brush. The Cheyennes repaired any of these old pits, and used them. In those days it was very easy to pit antelope, since they were enormously abundant and overran the whole country. It may be that it was from their neighbours the Kiowas that the Cheyennes learned how to catch antelope in pits.
>
> I shall let White Bull tell how Red Lodge did this. He said:
>
> When I was a young man, more than fifty years ago [say 1885], my people had only a few guns. Not many white men had come into the country, and we still took the food animals in the ways that our people had always used.
>
> When they were going to catch antelope there was always some one medicine man who told the people what they must do, and who watched to see that they did it. The man whom I saw do this was named Red Lodge. His lodge was always painted red, and from this fact he had that name. When the people needed antelope to eat, or their skins for war shirts, and when the spirits were favorable, then Red Lodge determined that antelope might be taken, and told the people what they should do.
>
> In a broad flat they began to build the straight, tight, brush fences, eight or ten feet high, as if for the opposite sides of a square pen. From the ends of these fences on one side two lines of brush heaps about five steps apart stretched away onto the flat for 400 or 500 yards, the ends of the two lines constantly becoming farther and farther apart. This made two wings, which ran out from the ends of the tight fences, to direct the antelope to the pit. Between the ends of the tight fences opposite the side from which the wings extended, the people dug a big hole in the ground, reaching from the end of one fence to the end of the other. The side of this hole toward the opening between the wings was straight across, stretching from the end of one fence to the end of the other; the other side of the pit was rounding - a part of a circle. They dug this pit about five feet deep and with sides straight up and down. On the rounding side of the pit they drove stakes in the ground and tied low bushes to them, but on the straight side they stuck in the ground bunches of grass, some of it standing up straight and some hanging over the edge of the pit so as to hide it. Outside of both the straight, high, tight fences and outside the wings they dug trenches, deep enough for people to get into and to be hidden when they were lying down. After all this had been done, they made many clubs, which were put on the ground at each end of the pit close to the ends of the high fences.

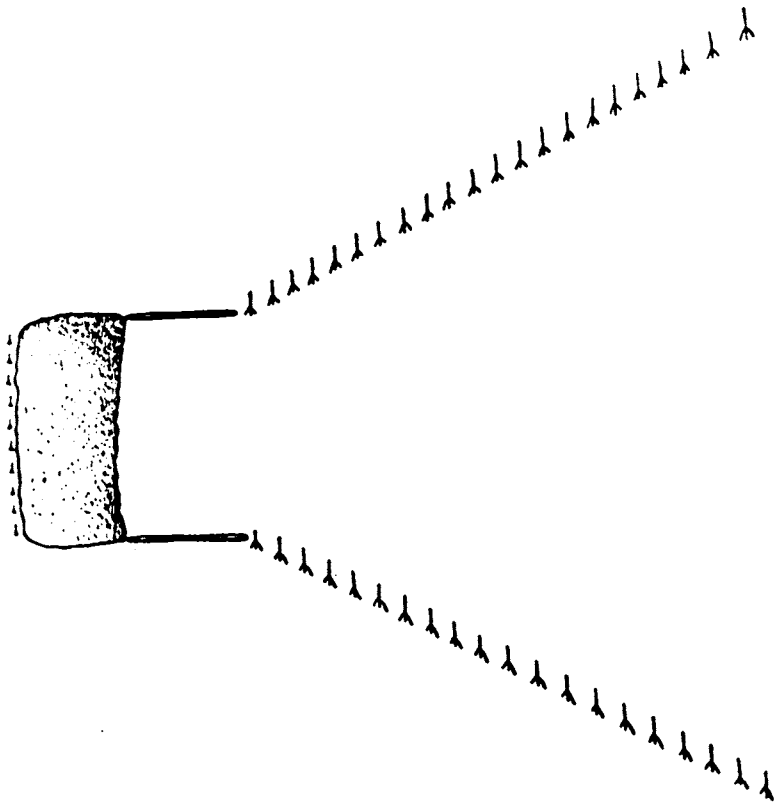

Figure 37. Cheyenne "antelope pit with wings" from Grinnell (1962 Vol. 1:279).

When all this was nearly finished, Red Lodge had his lodge cleaned up and prepared for the ceremony. The beds were taken out; all the family moved out and slept elsewhere. Only Red Lodge remained in his lodge. If the camp was new, and the ground not yet worn bare, the roots of grass and of weeds were still left on the floor of the lodge, the women cleared these away, so as to leave the ground bare and smooth. Then they gathered white sage, and covered the floor of the lodge next to the walls with these stems, the tops of the stems pointing toward the fire. From one of his sacred bundles Red Lodge took many antelope feet, which had been cut off at the pastern joint, and had been bent and dried so that they would stand upright on the ground. One of these feet was the right fore foot of a buck, the foot with which he paws the ground. This pawing foot Red Lodge put down on the floor of the lodge, about three feet from the wall and to the left of the door, and so to the right of the lodge man's bed. The other feet were placed on the ground, standing on their soles in circles all about the fire; but in front of the door these circles did not meet. Here, opposite the door, was left

an opening about three feet wide. There were four circles of these antelope feet about the fire, one inside the other.

After the lodge had been prepared, Red Lodge went into it alone and made his medicine [i.e., exercised his spiritual power]. No one knows what he did while he was there. For one day and one night he ate nothing, and all night long he sat in the lodge and sang. After he had made his medicine and was ready to call the antelope, he painted himself like an antelope - his mouth black, his back red, his belly, arms, legs, rump, and face white, and painted red streaks across his upper chest. On each temple, and running down on his cheeks, he painted an antelope horn, black. Then he was ready, and he came out of his lodge, naked except for his breechclout and moccasins. In his hand he held his own medicine pipe, which was painted red over bowl and stem. Now he walked to the opening in the pen where the wings met the fences; there he stopped and filled and lighted his pipe, then walked between the wings out onto the prairie, sang his sacred songs and held his pipe up to the Great Power [Heammawihio], and then out toward the prairie where the antelope live. Then he walked back, still singing, between the wings and the fences until he reached the edge of the pit, where he rested the bowl of the pipe upon the ground, and prayed. Four times he went backward and forward, and sang his antelope songs. The fourth time, after he had touched the ground with the pipe bowl, he went around to the back of the pit, and placed his pipe on the ground there. The bowl was toward the pit, and the stem was leaning against a support, so that it pointed diagonally upward.

When he had placed the pipe on the ground, two young men, who had already been told what to do, started out toward the prairie, one on the right and one on the left, following out the wings so as to come in behind the antelope, and all the people hid themselves in the trenches that were dug outside the high fences and the wings.

Now, after this, Red Lodge walked about within and without the fences, holding in his hand a feather which he waved in the air, and as he walked and waved the feather, he was singing his sacred songs.

After a little time, the young men who had been sent out and were running on the prairie far beyond the ends of the wings, discovered antelope coming, and when they saw them they gave a loud, high-pitched call, which could be heard a long way. This was a signal to the people that the antelope were coming, and when they heard it everyone was glad. When the antelope had passed these young men, they turned in and ran along behind the animals, keeping up this calling until the antelope had come between the wings and were close to the pen. After the young men themselves got within the wings they began to call differently, and to imitate the hooting of an owl.

As soon as the antelope had come to the opening between the fences, all the people who had been hidden in the trenches rose and rushed toward the opening and crossed it by crowding into it. They ran toward the antelope, which now were frightened and were going so fast that they could not stop, and rushed on and fell into the pit. Then men and women seized each a club, and jumping into the pit, knocked the antelope on their heads. After all were dead, the people climbed out of the pit.

> Now Red Lodge went around behind the pit, took his pipe and filled it, and then sprinkled on top of the tobacco a little powdered buffalo-dung. Then he went back thirty or forty steps from the rounding side of the pit, struck fire, and lighted his pipe. He looked about on the ground until he found a small flat stone, which he picked up. He went around the fence, and entering the opening, went close to the edge of the pit, placed his little flat stone on the ground, sat down, and resting the bowl of his pipe on the stone, he smoked there alone.
>
> As Red Lodge smoked, he pointed the stem of his pipe at the antelope, trying to point at each one, and to offer a smoke to each. Next he smoked to the little flat stone and then gave four smokes to the direction from which the antelope came. After he had done all this, he smoked his pipe out. When he was about to begin to clean his pipe, he first pointed it in the direction whence the antelope came; then he knocked out some of the ashes on the flat stone, and pointed the pipe in the same direction. He knocked out more ashes and pointed again, and so until he had pointed four times and knocked out all the ashes on the stone. Now he took the stone, holding the ashes on it, went down through and across the pit to the other side, where he climbed out, holding the stone carefully, and going slowly, so that he should not spill the ashes, and walking away a few steps, poured the ashes off the stone to the ground in four places, finally putting down the stone and leaving it there.
>
> After this had been done, the people went into the pit and began to cut up the antelope. First they picked out a young fat antelope - one about two years old - fat and tender. That was taken out to some high hill where everything could see it, and without being skinned it was cut up into small pieces, and left there to be eaten by the birds and by the wolves. It was a sacrifice.
>
> After these ceremonies had been performed, the meat was divided. The medicine man let his lodge remain as it was over the next night. That night he cooked, and called in his friends, and they sat around the lodge behind the circles of antelope feet and ate. When the medicine man put away these antelope feet, he did it alone. No one knew what he did.
>
> If after the antelope had come between the fences and before they reached the pit, they should by any chance turn back and get away without falling into the pit, it was certain that some one of the medicine man's family or relations would die. (Grinnell 1962: Vol. 1:278-282)

Grinnell also provides considerable detail regarding the type of shamanistic and ceremonial activities associated with antelope procurement:

> In ancient times, long before they [the Cheyenne] had horses, certain men are said to have possessed especial skill in calling the antelope and to have devoted much of their time to this work. It is said that these men often remained in certain favorable situations to perform this function while the tribe moved off and left them. These men gave all their time to leading the antelope into pits, killing them, and drying the meat and skins, which the tribe found on its return.

> The number of men and women still alive who have witnessed this method of securing antelope justifies the belief that it was in use up to the year 1870 or even later. (Grinnell 1962 Vol. 1:290)

No similar record of shamanism or ceremonialism was noted in relation to antelope hunting accounts of other tribal groups. However, the lack of such accounts probably reflects the inadequacy of the record rather than a real lack of such features.

The Archaeological Record

The foregoing discussion clearly indicates that antelope procurement based on a broad spectrum of hunting techniques, was a standard component of aboriginal subsistence strategies in the northern Plains during the historic period. However, examination of the archaeological literature indicates this pattern is only minimally documented prehistorically.

Within southern Alberta, a limited sample of antelope remains was recovered at Cactus Flower, a campsite containing seven McKean Complex occupations dating between 4200 and 3600 radiocarbon years before present (Brumley 1975:15). This faunal sample was interpreted as indicating that antelope was a secondary but minor food resource in relation to bison. The occurrence of differences in element frequency per minimum number of individuals for antelope in comparison to bison was used to suggest that the two animals were being hunted in different manners and in differing locales. It was inferred that only single or small groups of antelope were being killed at some distance from the site by means of individual or small group hunting techniques (Brumley 1975:93).

Most archaeological evidence of antelope versus bison procurement and utilization is similar to that encountered at Cactus Flower - a small number of antelope faunal elements found in relation to large quantities of bison material. Such evidence may generally reflect the same pattern of cultural utilization inferred for Cactus Flower. The writer is aware of only two well documented archaeological examples of communal antelope procurement in the northern Plains.

Davis (1976) documents the Lost Terrace Site (24CH68), an antelope processing site located along the shoreline of the Missouri River in Central Montana. The site consists of a dense midden deposit exposed along the river bank for a distance of 25 m and at a depth of 1.8 m below

the terrace surface. The midden fluctuates from 15 cm to a fraction of a centimetre in thickness. The small area tested produced quantities of butchered antelope elements, an excavated U-shaped pit, fire cracked rock, numerous resharpening flakes and artifacts. Artifacts included Avonlea projectile points, a fully grooved maul, a chert chopper, bifaces and a shaft straightener fragment. Heavily butchered faunal remains represented a minimum of 20 individual antelope, with an additional seven foetal individuals represented. Analysis of foetal and mandibular elements is stated as indicating a December to January period of site seasonality. Davis refers the site to the Avonlea Phase and accepts a radiocarbon date of A.D. 970 for the occupation. He also notes that considering the large area of the site in relation to the limited area tested, a large number of antelope must have been killed and processed. However, he further states that, "The antelope procurement strategy cannot be inferred from present data" (Davis 1976:51). It does seem reasonable, however, to infer that a communal kill technique was employed.

In discussing the Lost Terrace site in relation to several essentially contemporaneous Avonlea occupations elsewhere in the northern Plains, Davis states:

> Since bison were clearly the focal prey sought by Avonlea Phase hunters at all of the sites mentioned above, except for Lost Terrace, and since the above manifestations are essentially contemporaneous, it seems clear that Avonlea Phase hunters had developed alternate subsistence orientations to the procurement of resident big game species. It is tempting to suggest that Avonlea hunters, late in their history, were influenced by populations for whom antelope hunting was commonplace. Cultures that were perhaps more closely adapted to the northern periphery of the northern Big Horn basin area would be likely candidates. Until more sites of this kind are found and investigated fully, disciplined speculation will run its creative course. (Davis 1976:52)

This statement appears to reflect the assumption that communal antelope procurement, as Lost Terrace presumably reflects, is not typical or commonplace to aboriginal groups in the northern Plains and reflects outside influences. As the preceeding ethnographic documentation indicates, this is not the case historically. One could argue that Davis is still correct and that Lost Terrace reflects the earliest evidence of an alternate subsistence strategy - communal antelope procurement -

introduced from outside the region which then persists into the historic period.

Frison (1971) presents a detailed description of excavations conducted at the Eden-Farson site located in the Green River Basin of western Wyoming, where antelope processing was a primary activity. The site is located in an area of presently stabilized sand dunes and consists of the remains of at least 12 and possibly as many as 14 individual lodges. Considerable quantities of cultural material, including the remains of at least 212 antelope, were recovered in excavation. Based on several lines of evidence, including a radiocarbon date of A.D. 1720±100 years, historic and ethnographic data regarding aboriginal groups inhabiting the area, and the presence of quantities of Intermountain tradition pottery, Frison convincingly argues that the site represents an occupation by a Shoshonean group in late prehistoric - early historic times. Based on a population study of antelope remains, the period of occupation is inferred to have been late October and early November. In addition to antelope, there is clear evidence that the site's inhabitants were utilizing a variety of plants and insects for food as well.

Although the remains of an antelope kill site were not found within or near the site, Frison infers the original presence of some type of communal trap in order to account for the large quantities of antelope remains present. He goes on to present possibly analogous examples of known but not investigated antelope pound structures elsewhere in Wyoming (Frison 1971). In concluding, Frison states:

> The hypothesis presented here is that the Eden-Farson Site represents a Shoshonean group oriented toward a Great Basin rather than a Plains cultural pattern.... There seems little possibility that the Eden-Farson Site has any connection with the Plains-oriented, horse period, buffalo hunting Shoshone. (Frison 1971:282)

Obvious in this statement is the assumption that communal antelope procurement was more reminiscent of the Great Basin and atypical of Plains-oriented, horse period, buffalo hunting groups. As has been ethnographically demonstrated, such is not the case.

THE LAIDLAW SITE: DISCUSSION AND INTERPRETATION

Feature 1

Based on its overall form and associated antelope faunal remains, Feature 1 at the Laidlaw site is interpreted to be analogous to the antelope pit traps described by Wissler (1910:38) for the Blackfoot and Grinnell (1962 Vol. 1:278-282) for the Cheyenne. Although specific constructional and dimensional details of the structures described by Wissler and Grinnell differ from those of Feature 1 at Laidlaw, the similarities are striking and irrefutable. In fact, the number of differences exhibited between the pit trap structures described by Grinnell in comparison to those described by Wissler indicates that a strong range of variation may be expected. Feature 1 fits comfortably into this range of variation, but the most striking difference is the use of stone rather than wood in construction of the wall around the excavated pit. This difference is understandable, however, considering that presently, and probably prehistorically, the nearest source area for wood to construct such a wall would be along the margins of the South Saskatchewan River, at least 1.5 km away. Natural stone on the other hand, is abundantly available in the immediate vicinity of the feature.

The previously cited ethnographic accounts of historic communal antelope drives provide the best data available from which to infer how Feature 1 was employed. Feature 1 is situated - apparently deliberately - at the downwind end of a natural trough-like feature formed by two, essentially parallel, stoney ridges (Figures 31 and 33). Antelope would be hazed by Indian hunters into the south end of this trough-like feature and then stampeded toward Feature 1, at the opposite end.

Toward their south ends, the two stoney crests of these ridges probably served as natural unmodified drive lines, with hunters stationed at intervals in order to keep the antelope moving toward the enclosure at a high speed. Near the north end, aboriginal hunters constructed stone drive lines to hide behind in order to deflect the stampeded antelope from a north to a northeastward line of flight, out of the low bottom area and up the slope of the southernmost ridge. Feature 1 is situated just beyond and below the crest of this ridge in a small natural swale

where most of the structure would be concealed from the stampeding animals until they were virtually at the threshold of the pit. By this time, hunters presumably stationed along the drive lines, had the antelope running at high speed, so that by the time the antelope observed the trap they would have no time to try to avoid it. The trap structure is quite small and it is impossible to imagine more than 20 or 30 antelope in it at any one time. Presumably, most of these animals were stunned or injured to a varying extent as a result of their pell-mell entry into the trap and were thus easily dispatched with clubs.

The small amount of faunal remains recovered from test excavation within Feature 1 suggests minimal butchering took place within the structure itself. The minimal amount of faunal material recovered in augering in the area adjacent to the south side of Feature 1 may reflect poor bone preservation factors and/or that butchering and processing activities were conducted elsewhere. Because of the small size of antelope, entire carcasses could quite easily be dragged some distance from the kill prior to butchering and processing.

> An ordinary Indian can not lift more than 125 to 150 pounds at most yet most of them will carry a large deer on their backs, travelling at a swift pace for miles without stopping and this is equal to 170 to 185 pounds weight .... The greatest burden we have known an Indian to carry any distance, say 3 or 4 miles, was two entire antelope, about 225 pounds. (Denig 1961:529)

No culturally or temporally diagnostic materials were recovered from Feature 1, or elsewhere at the site, from which to determine age and cultural association of the structure. However, bone material recovered from Test Pits 1 and 2 has been submitted for radiocarbon dating.

Feature 2

The positions of individual stones comprising Feature 2, as well as stratigraphic data collected in test excavation, suggest that the feature originally represented a circular, stone walled enclosure approximately 30 to 50 cm high. After abandonment, the stone walls collapsed inward to form the feature's present shape. Although it cannot be firmly demonstrated, the close spatial positioning of Features 1 and 2 suggest they are contemporaneous and associated. The writer found no direct ethnographic or historic analogues to explain the function of a structure

such as that represented by Feature 2. However, the writer would suggest the possibility that Feature 2 may represent a structure used in conducting shamanistic rituals during the course of the hunt, which were intended to insure success. Grinnell (1962) discusses a variety of such shamanistic rituals practiced by the Cheyenne during an antelope hunt. The writer has already suggested that such shamanistic practices were probably an integral part of communal antelope procurement techniques for all aboriginal groups.

Stone Circles 1 and 2

Stone Circles 1 and 2, east of Features 1 and 2, both appear to be tipi rings used to weigh down lodge covers and indicate the previous location of such structures. It is not clear whether these are contemporaneous with each other or with Features 1 and 2.

Based on a comparison of the mean inside diameters of Stone Circles 1 and 2 to the size distribution of a large sample of stone circles from southeastern Alberta (Brumley 1983:128), it is evident that Stone Circle 1 is an exceptionally large structure while the size of Stone Circle 2 coincides to the mode for the sample. The largest stone circles for which temporal and cultural control is currently available within southeastern Alberta, relate to the Bullpound Subphase of Besant which dates from about 2200 to 1200 years B.P. (Brumley 1983:22). The large size of Stone Circle 1 may thus indicate a Besant Phase association. Alternatively, historic and ethnographic references to "average" lodge size among various Plains Indian groups vary considerably; Denig (1930:578) and Ewers (1955:131) provide insights into the primary factors governing lodge size variability:

> Families of from 2 to 10 persons, large and small, occupy tents of different dimensions, say, one of 6 skins for the former and one of 16 skins for the latter number. Lodges of 36 skins are sometimes found among the Sioux, owned by chiefs or soldiers. ... A tent of this size will accommodate 50 to 80 people on an occasion of feast or council, as they can sit in rows three or four deep; about 30 persons, however, could sleep therein with ease, independant of the space required for baggage, provisions, and utensils. (Denig 1930:578)

> ... for the larger the lodge of the greater were the number of skins required for construction of its cover and the number, length, and basal thickness of the lodge poles necessary for its foundations. Consequently the larger the number of horses required to transport it. (Ewers 1955:131)

The writer (Brumley 1983) has suggested that the generally large size of Besant Phase stone circles reflects significantly larger family group size than in other time periods.

Following these various lines of evidence, it is suggested that the large size of Stone Circle 1 reflects:

1. Temporal and cultural association with the Besant Phase when large lodges were apparently commonplace; or,
2. A non-Besant Phase association, with the large size reflecting a lodge owned by a prominent individual or by a tribal society.

Examination of these and other possibilities cannot be made without further excavation data from Stone Circle 1, which will hopefully enable determination of its age, and a determination of whether it is associated with the antelope trap. It is intriguing, and not unreasonable to speculate that Stone Circle 1 reflects a lodge erected by a shaman or a soldier society while constructing and utilizing the trap.

CONCLUDING REMARKS

The Laidlaw site reflects one of a variety of antelope procurement techniques documented historically for aboriginal groups in the northern Plains. Although of minor importance in comparision to bison, antelope were utilized extensively for their hides (these being preferred for their lightness in making certain clothing items), as well as for their meat when bison were scarce or not available. Antelope were apparently as numerous as bison historically and were also gregarious, which made communal kill techniques economically feasible so that large numbers of animals, and thus meat and hides, could be obtained. The range of hunting techniques documented here for antelope all have analogues in bison hunting techniques, including the pit trap technique. At the Ramillies site, also located in southern Alberta, the writer (Brumley 1976) documented a bison trap where aboriginal hunters deepened and modified a natural depression to form a pit trap into which bison were driven during both the Avonlea and Old Women's phases. Davis (1976) and Frison (1971) both infer that communal antelope procurement is not typical of aboriginal subsistence strategies on the Plains. Based on the evidence presented here, the writer would argue that it is.

Ethnographic and historic references have been utilized extensively in this paper to interpret data from the Laidlaw site. Hopefully, this use has provided a good example of the need for, and the benefits of, examination of such records in interpreting archaeological data.

THE STRATIGRAPHIC POSITION OF BEAVER RIVER SANDSTONE

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The study of geological sources for Beaver River Sandstone was initiated in March of 1981 to help define the natural and cultural factors responsible for the distribution of this material at prehistoric archaeological sites in the Athabasca oil sands region. The initial phase of the project involves delineation of natural sources for this raw material which so dominates stone tool assemblages in the region. Subsequent research, now in progress, will continue to deal with the geographical distribution of Beaver River Sandstone for prehistoric sites at various distances from known sources. The purpose of this aspect of the research is to document how a common lithic material circulated within the technological systems of prehistoric natives inhabiting the lower Athabasca River and surrounding uplands. The following contribution describes recent field work and makes a revision of the stratigraphic position of the Beaver River Sandstone unit within the McMurray Formation.

Brief field activities undertaken by Fenton and Ives in August of 1983 have permitted a refinement in our understanding of the stratigraphic position of the Beaver River Sandstone unit. Both Fenton and Ives (1982) and McCullough and Wilson (1982) originally attributed Beaver River Sandstone to Carrigy's (1966) "Pre-McMurray?" unit noted for the Fort MacKay area. Subsequent research led Fenton and Ives to examine a Beaver River Sandstone outcrop at HhOv-55 (Figure 38). This outcrop appeared to be well within the McMurray Formation, perhaps as high as its middle member (Ives and Fenton, 1983). The 1983 field investigations were conducted with the assistance of Peter D. Flach, Alberta Geological

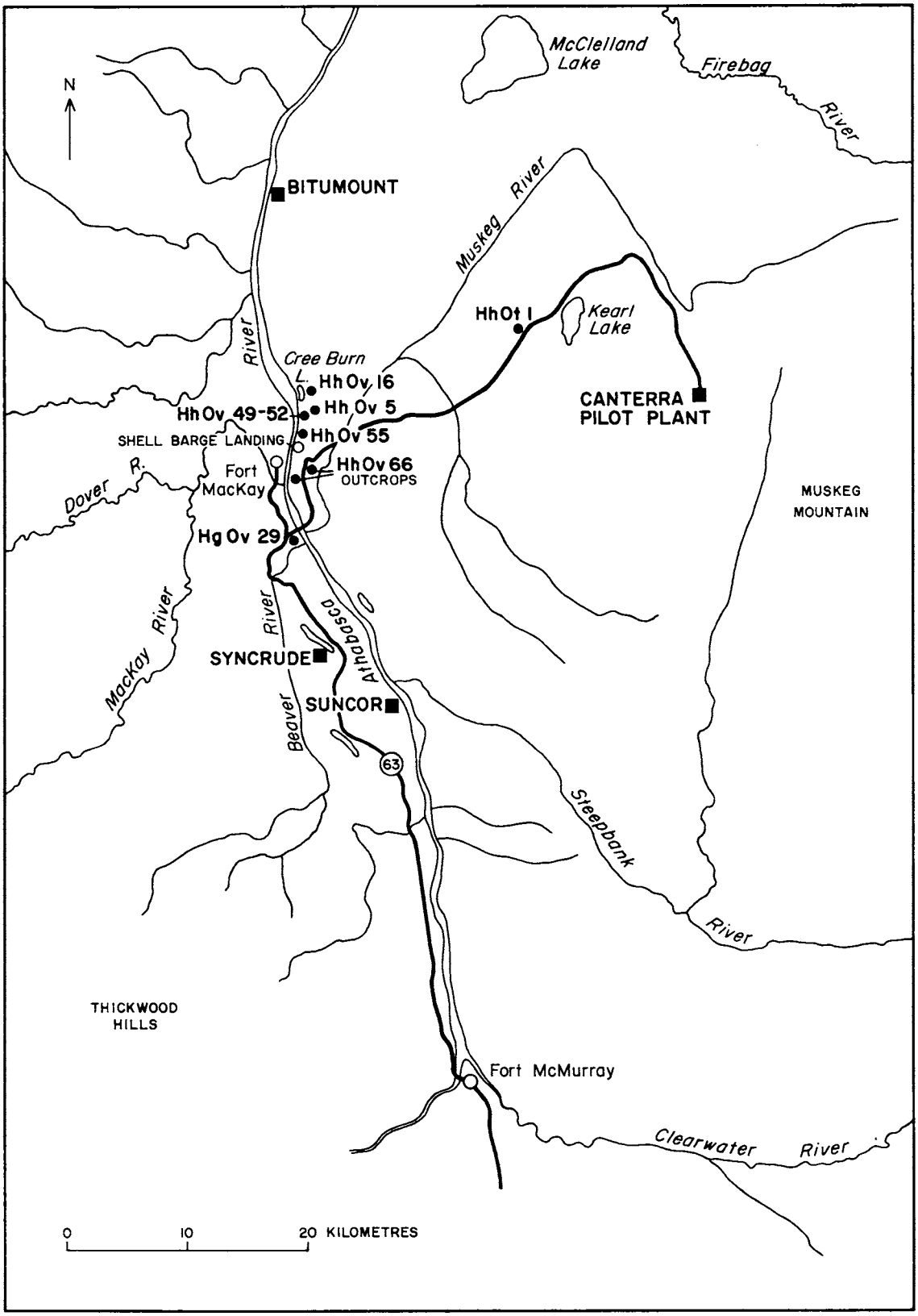

Figure 38. Location of prehistoric sites and outcrops discussed in text.

Survey, a geologist familiar with the local stratigraphy of the McMurray Formation. Present evidence indicates that Beaver River Sandstone forms an unconformity near the top of the lower member of the McMurray Formation.

THE BEAVER RIVER SANDSTONE UNIT RELATIVE TO THE McMURRAY FORMATION

Flach (in prep.) and Flach and Mossop (in prep.) provide the most recent description of the sedimentology, paleoenvironment and paleohydrology of the McMurray Formation. The McMurray Formation is of Lower Cretaceous age and rests unconformably on the karstic surface of the Devonian Age Waterways Formation. It is divided into three informal members: the upper, middle, and lower. The last two members are important to the stratigraphic position of the Beaver River Sandstone.

The lower member of the McMurray Formation is characterized by a variable petrology and texture. The petrology consists of generally unlithified quartzose sandstone with local layers and lenses of kaolin indurated sandstone, siderite cemented sandstone, coal, and siderite pebble conglomerates. The sandstone texture varies from fine grained to conglomeritic sandstone. Root molds are common but burrows are rare. This member is of fluvial origin, with individual upward-fining channel sequences 5 to 10 m thick. These are commonly superimposed upon one another. The lower member is of relatively limited lateral extent, occupying lows on the Devonian erosion surface, and is present only where the formation is greater than about 60 m thick.

The middle member is characterized by channel sands up to 30 m thick containing well sorted, fine grained sand. Laterally adjacent off-channel deposits are mud-dominated. The channel deposits, exposed in many cliffs, are cross-bedded and contain shale clast breccias and shale breaks representing clay drapes formed on the point bars. The off-channel deposits are recessive and generally not exposed. They consist of sequences of shale and interbedded sandstone and shale. The sediment is generally burrowed but coal and root molds are absent.

Fenton, Ives, and Flach visited sites HgOv-29 and HhOv-55 (Figure 38). At Beaver River Quarry (HgOv-29), Flach made the following

observations: the exposure in the borrow pit is near the Devonian surface and is low in the section; the sandstone contained root molds, some filled with carbonized wood and others with bitumen; coal laminae are common; and there is great variability in lithology. Flach also examined the HhOv-55 outcrop, which is at a similar elevation to Beaver River Quarry. Here the Beaver River Sandstone is overlain by bituminous sands containing abundant burrows. This combination of observations led Flach (personal communication) to conclude that the Beaver River Sandstone unit is situated near the top of the lower member of the McMurray Formation. Because of the silica cementation, he suggests that the sandstone may actually mark the unconformity between the middle and lower members at many locations.

A clarification of the evolution of terminology is useful at this point (see Figure 39). Carrigy (1966) described the stratigraphy, from the base, as the Waterways Formation (equivalent to the Beaverhill Lake Formation in the subsurface), the "Pre-McMurray" unit, and the McMurray Formation with lower, middle and upper members. Fenton and Ives (1982) placed the Beaver River Sandstone within the "Pre-McMurray" unit. However, Flach and Mossop (in prep., and Flach, personal communication) do not include a "Pre-McMurray" Formation in their scheme. Instead, they note the complex depositional history of their lower member which largely subsumes Carrigy's "Pre-McMurray?" Formation. The Beaver River Sandstone is now placed at or near the top of the lower member of the McMurray Formation.

ADDITIONAL OBSERVATIONS

An increasingly precise appreciation of the stratigraphic position of Beaver River Sandstone has greatly facilitated the search for its natural sources. In the area just north of Fort MacKay, it is clear that Beaver River Sandstone outcrops about three quarters of the way up sections exposed at the river. South of Fort MacKay, near the Highway 63 bridge over the Athabasca River, Beaver River Sandstone, when present, tends to form the land surface, as is the case at Beaver River Quarry. In the 1983 field season, we were able to examine sections exposed along the

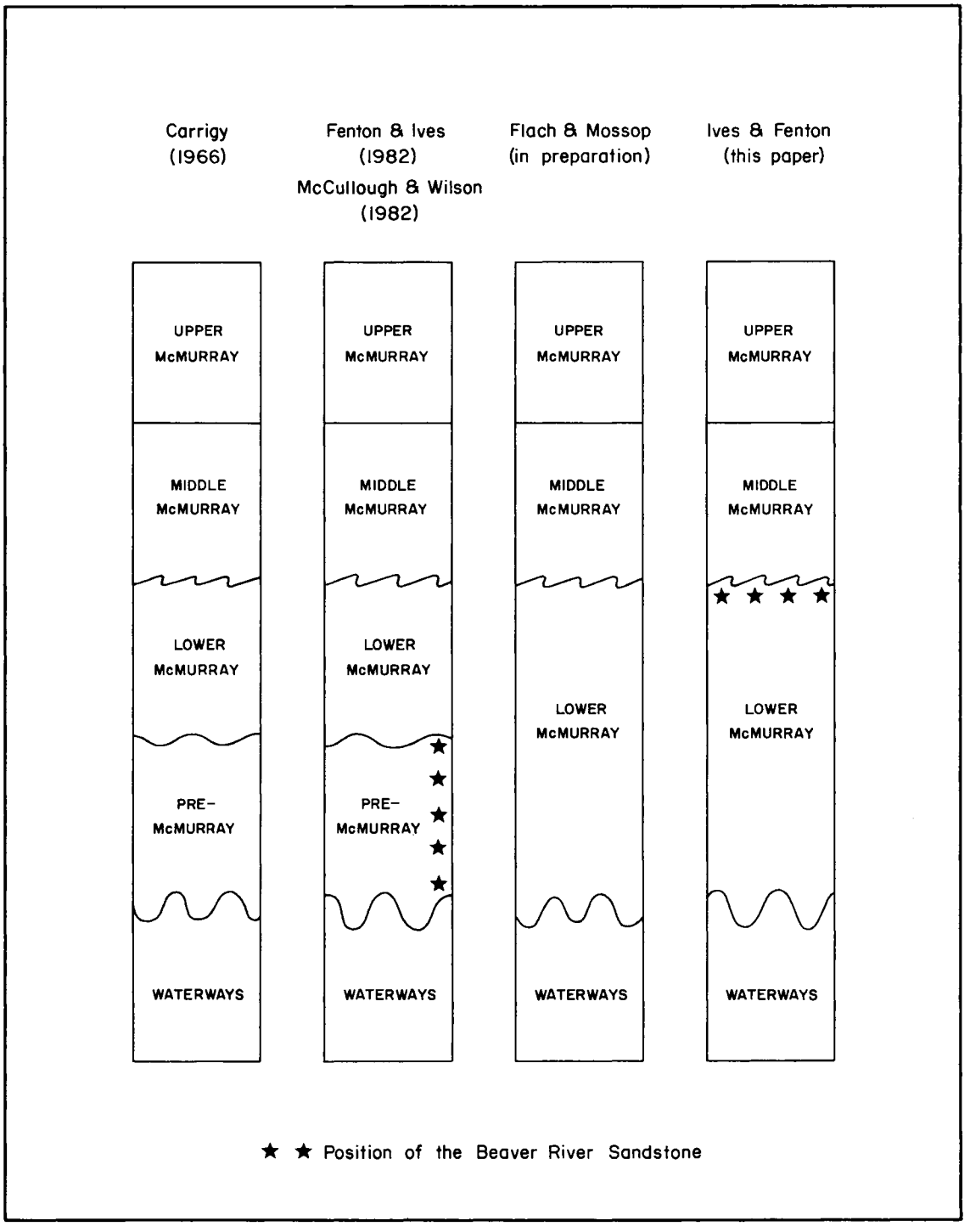

Figure 39. Different schemata for the stratigraphy of the Athabasca oil sands areas, showing previous and current interpretations of the position of Beaver River Sandstone.

Athabasca between the Shell barge landing (roughly 3 km north of Fort MacKay) and Bitumont (Figure 38). Immediately downstream of HhOv-55, we inspected a series of sections below sites HhOv-49, 50, 51 and 52 (Figure 38). Somewhat better quality Beaver River Sandstone was observed in float at the base of these sections. One highly restricted outcrop (less than 5 m in length) of Beaver River Sandstone was detected (below HhOv-49) in a similar stratigraphic position to HhOv-55. This raw material is thinly laminated and exhibits a coarse matrix texture. Downstream of Cree Burn Lake and HhOv-16, we did not observe any Beaver River Sandstone in outcrops or float. The McMurray Formation is generally barren and poorly consolidated with bedding and other features well exposed. Sections off the river and on the east side of Cree Burn Lake (at HhOv-16) were also traversed (Figure 40). Despite extensive subsurface exposures and the presence of abundant Beaver River Sandstone debitage, not a trace of Beaver River Sandstone could be detected in place or in float at the base of the slump faces. Ronaghan (1982 Appendix 1:11) reported similar results. We also examined a section above a very small oxbow lake immediately to the south of Cree Burn Lake. In this HhOv-5 area, Beaver River Sandstone artifacts were again abundant, but outcrops were completely absent.

A more careful examination of the northern terminus of Highway 63 and the general area around the Alsands lease turn-off (prior to the forks in the road for Alsands and Canterra) revealed extensive bedrock outcrops of Beaver River Sandstone (Figure 41). Outcrops along Highway 63 are quite close to the original location given for HhOv-66, and are likely coincident. HhOv-66 was described as a prehistoric site on the basis of the outcropping raw material. Intensive testing has never revealed artifacts (Ronaghan 1982:80-81). Along the road running east towards the Alsands and Canterra junction, we found slight knolls with nearly continuous exposures of Beaver River Sandstone at ground surface. In these patches, terrain quite resembled that of the shield. In spite of the presence of moderately good quality material, no artifacts were discovered in extensive exposures. Tentatively, it would appear that these outcrops were not quarried to any appreciable degree. Outcrops occur in a zone roughly 2 km across in a west to east direction; north to south extent is not known.

Figure 40. A view to the north of sections exposed above Cree Burn Lake at HhOv-16.

Figure 41. A small knoll at which Beaver River Sandstone outcrops at the surface, near the Alsands turn-off from Highway 63.

In the final episode of field activity, we followed the Canadian Development Corporation road inland from the Athabasca River for some 30 km east of the Alsands lease, to the Canterra pilot plant (east of Kearl Lake, Figure 38). We found a single, small piece of culturally unmodified Beaver River Sandstone in a borrow pit 11 km east along this road. No other Beaver River Sandstone was observed in till or outcrop in ditches or several other borrow sources along the road. We did discover HhOt-1, a prehistoric site, at the Shelley Creek crossing. It consisted of spatially concentrated Beaver River Sandstone knapping debris.

REMARKS

Further archaeological, laboratory and field research is planned or in progress for the Beaver River Sandstone project. The most pressing enigma in this research is the difficulty in discovering a fine quality natural source for the raw material. The great majority of archaeological sites, including the massive one of Cree Burn Lake (HhOv-16), have assemblages dominated by fine quality raw material. At present, we simply do not know if high quality sources have been eroded away at some locations, if they have been obscured by processes of mass movement at others, or if they simply have not been found.

Two critical points emerge from the 1983 field work. First, there continues to be a dearth of evidence to the effect that significant quantities of Beaver River Sandstone were dispersed to glacial and fluvial deposits. Thus, we may suspect that prehistoric natives exploited sources which may be predicted from outcrop distributions. Second, the target zone for the search may be redefined for a smaller area than that given in 1983 (Ives and Fenton 1983:87). Because the lower member of the McMurray Formation occurs only where there are thick oil sands deposits (it tends to fill depressions on the Devonian Waterways karst surface), outcrop occurrences are expected over an area only slightly larger than the target zone based upon 1981 field work (Fenton and Ives 1982:183). For the time being, readers are referred to this latter map because a structure contour map of the top of the lower member is not available.

ACKNOWLEDGEMENTS

We gratefully acknowledge the assistance of Peter D. Flach, Alberta Geological Survey, in establishing the stratigraphic position of the Beaver River Sandstone unit within the McMurray Formation. Our presentation relies heavily upon Flach and Mossop (in prep.). Wendy Johnson ably completed the drafting and Caroline Jones assisted during field work.

AN EXPERIMENT IN THE THERMAL PRETREATMENT OF QUARTZITE

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INTRODUCTION

In Alberta, most prehistoric lithic assemblages are characterized by a relatively high proportion of quartzite tools and debitage. Although Bonnichsen may be slightly overstating fact when he suggests that in Alberta "most artifact assemblages are constituted of more than 90 percent quartzite cobble and pebble tools" (Bonnichsen 1977:xii), it is evident that quartzite is a dominant raw material present in the lithic assemblages. For example, archaeological investigations at the proposed site of the Genesee power plant on the North Saskatchewan River recovered over 60,000 lithic items of which 86 percent are quartzite (Ronaghan, et al. 1983). The nearby Stone Plain Quarry site featured an "almost exclusive use of quartzite" (Losey 1971:141). At the Strathcona site, a multi-component lithic workshop in Edmonton, quartzite represented more than 70 percent of the approximately 26,000 lithic items in the assemblage. McCullough reports an 89 percent incidence of quartzite in lithic assemblages from a total of over 200 prehistoric sites surveyed in the Lac La Biche region (McCullough 1982). Of more than 10,000 pieces of lithic debitage recovered from four sites at Calling Lake, 84 percent were quartzite (Gruhn 1981).

Examination of these and other assemblages indicates many quartzite artifacts have a reddish discolouration which can be attributed to heating. This colour change could be the result of a chance exposure to heat, whether in a natural fire or by being in close proximity to a hearth. However, the growing awareness of the use of thermal pretreatment to produce favourable changes in the flaking quality of other raw materials, has led archaeologists in Alberta to speculate that the observed colour changes in quartzite may be the result of a

purposeful thermal pretreatment. Losey, for example, implies that heat treatment may have been responsible for an observed colour alteration of quartzites at the Stony Plain Quarry (Losey 1971). At Calling Lake, Gruhn has recorded a reddish discolouration of 32 percent of the quartzite debitage (Gruhn 1981). At the Strathcona site, one investigator observed that the quartzite debitage seemed to be of superior quality to that found locally, and therefore suggested the possibility that "many cobbles were heat treated prior to reduction" (Pyszczyk 1981:33).

Archaeologists have been cautious about concluding that thermal pretreatment of quartzite was a practice employed aboriginally. Ethnographic references to thermal pretreatment never specify quartzite as one of the materials used. Experimental attempts at thermally pretreating quartzite are poorly documented and the results have been inconclusive. In order to shed some light on this problem, the following experiment was undertaken to determine the effects of thermally pretreating quartzite.

BACKGROUND

Acceptance of the idea that thermal pretreatment of stone was used prehistorically is a relatively recent development in archaeology, despite the widespread historic documentation of this technique. In the last part of the 19th century and the early part of the 20th century, ethnographic accounts of aboriginal flintknapping practices often included references to the use of heat, many of which described variations of the "heat-and-drip" method of removing flakes by dripping water on preheated rocks (Mandeville 1973). Several early attempts to duplicate this technique were unsuccessful (Purdy 1974), and therefore, it was believed that the use of heat treatment was not a widespread occurrence.

In 1964, Butler and Crabtree published observations on the benefits of heat treating silica materials (Crabtree and Butler 1964). This article sparked a number of subsequent reviews of ethnographic accounts (e.g., Hester 1972; Mandeville 1973; Sollberger and Hester 1973; Collins and Fenwick 1974; Gregg and Grybush 1976), and several experimental

studies designed to quantify the effects of thermal pretreatment of various types of siliceous materials (e.g., Purdy and Brooks 1971; Mandeville 1973; Behm and Faulkner 1974; Mandeville and Flenniken 1974; Purdy 1974; Weymouth and Mandeville 1975; Gregg and Grybush 1976; Patterson 1979; Bleed and Meier 1980; Schindler et al. 1982; Ahler 1983). Chert was used in most of these experiments for a number of reasons: (1) chert is a favorite medium of contemporary flintknappers; (2) it was most frequently referred to in the historic accounts; and (3) it is a predominant raw material found at sites in the research area. Experiments in the thermal pretreatment of quartzite are not similarly well represented.

Quartzite is generally described as a variety of sedimentary and metamorphic rock which is composed primarily of quartz. There is confusion surrounding this term which is not limited to the realm of archaeologists: "The use of the general term quartzite for all sandstone consisting of quartz is becoming common practice among sedimentary petrographers and is causing a considerable amount of needless confusion" (Wahlstrom 1955:383). Cox describes quartzite as "a tough and massive rock consisting almost wholly of quartz, and it is the usual product of contact or regional metamorphism of an ortho-quartzite" (1973:274); the latter is a sedimentary sandstone characterized by a very high quartz content, normally with a silica cement, although calcium carbonate or iron oxides may also be the cementing material. Orthoquartzites are usually well sorted and the grains are highly rounded, but in some cases, they are formed by the breakdown of existing mature sedimentary rocks, introducing angular clastic particles and particles of different sizes. The fabric of quartzite can be variable, with some appearing as grains bound in a silica cement, or as fused particles, and in some instances, where "intense heat and great pressure may deform and compress the sand grains into a consolidated mass", grain boundaries can become indistinct (Dake et al. 1938:120).

Colour variations in quartzite are due to impurities which were present in the initial sandstone, usually mica, iron, and feldspars, which can impart various shades of yellow, brown, red and gray (Dake et al. 1938:120). Colour change from heating is probably attributable to the oxidation of iron impurities occurring in the rock (Purdy 1974; Behm

and Faulkner 1974). The colour changes most frequently observed among heated quartzites found in Alberta are to varying shades of red, although other discolourations could occur. Behm and Faulkner, for example, observed of heated Hixton quartzites that "certain off-white specimens became honey-colored" and that the minimum temperature required to cause this colour change was 245 ^{o}C (1974:273). Therefore, the absence of reddish colouration of quartzites should not preclude the use of heat treatment, nor should discolouration always indicate that pretreatment occurred.

Quartzite should be viewed as a fundamentally different material from chert for considerations of thermal pretreatment. Chert is composed of microcrystalline quartz and chalcedony and is usually contaminated with clay, carbonates, and/or iron oxides. Chert is commonly found as concretions, replacement patches, and veins (Cox 1973). Of quartzite, Toll notes that: "The basic mineralogical definition of quartzite is that it is a metamorphosed sandstone which will fracture through the constituent grains rather than around them" (Toll 1978:47). By this definition, quartzite has already been "heat treated" by natural geological processes, and has the transgranular fracture that is the characteristic of heat treated chert (Mandeville 1973; Purdy 1974). The problem which this situation presents is that if quartzite was thermally pretreated, would a desirable change occur?

Previous Studies

There are at least four instances of experimentation with the thermal pretreatment of quartzite. The earliest is reported by Shippee (1963) on the efforts of flintknapper Marvin McCormick:

> McCormick related on several occasions that he found it necessary to "temper" much of the material he used by burying it and building a hot fire above the deposit, then letting it cool slowly. Some flints needed more than one heating. Among these are those from the Alibates quarries, the quartzites and the agates. Obsidian could be worked without "tempering". (Shippee 1963:271)

Unfortunately, the methodology utilized is not explained and the precise result obtained on the quartzites is somewhat equivocal.

Crabtree (1967) found that his metamorphosed quartzite "has little or no response to thermal treatment". He did mention, however, that his

silicified sandstone responded to heat treatment "if the matrix, or cementing medium is chalcedony or a similar type of cryptocrystalline silica" (1967:11).

Mandeville (1973) cites two experiments by Phagan. Phagan placed several stone specimens over hot coals in a layer of dirt two inches thick. Over this he placed more coals which were also covered with dirt. After waiting a day, he reported "almost no changes in five samples of quartzite", although there was a change in the flaking character of the flints and a chalcedony. Using "high heat" tests, a similar result was obtained.

The only controlled experiment to date on the heat treatment of quartzite was that conducted by Behm and Faulkner (1974) on Hixton quartzite. Using pieces of quartzite that were lens-shaped in cross section, samples were placed in a sand bath and slowly heated to various temperatures up to a maximum of 750^{o}C. The specimens remained in the oven for several hours and then cooled slowly. The researchers recorded a colour change but found no weight change. Flintknappers then worked the material. Behm and Faulkner report that due to a lack of skill in working Hixton quartzite and because of its variable quality, a significant improvement could not be demonstrated.

> There was subjective agreement, however, that the material did behave "differently" than some of the unaltered samples. A few samples proved to be very fragile ... A pressure flaking test ... did not reveal any improvement in flaking control or reduction of effort required to produce controlled fracture. (Behm and Faulkner 1974:275)

It is apparent from the results of Behm and Faulkner that there was some kind of a change in quartzite due to heat pretreatment but if the material behaved "differently" this could either be favourable or undesirable.

METHODOLOGY

An experiment was devised with the goal of establishing whether or not thermal pretreatment of quartzite produces favourable changes.

The quartzite used in this experiment was from the Cypress Hills Formation, "a fluvial deposit of Oligocene age which caps the Cypress Hills in southeastern Alberta" (Bonnichsen 1977:87). Cobbles were chosen

on the basis of their size and the character of their cortical surface. Seven cobbles with no evidence of marked disconformities or inclusions were selected, and 70 of the samples used in this experiment were derived from these cobbles. The reminder of the 96 samples were obtained from material remaining from previous research (Bonnichsen 1977). Following Crabtree and Butler (1964), who note that thin, small sized pieces are preferable to "thick chunks or nodules", the selected cobbles were cut into 1 cm thick by 5 cm square samples, and all cortex was removed.

Microscopic examination of petrographic thin sections taken from some of the samples revealed that the fabric of the quartzites was variable. In some cases, a cement consisting of clay minerals and silica was readily distinguishable between tightly interlocking rounded quartz grains (a mosaic texture), in other cases, the grain boundaries were less distinct, probably due to crystal growth. Although a perfectly isotropic material was considered to be desirable, it was apparent that such is not the nature of quartzite. Indeed, it appeared that even if all samples were cut from a single cobble, it would be unlikely that the variables of intra-cobble bedding orientation and sorting could be controlled. Samples which appeared to vary significantly on the surface were not used for the experiment, nor were those with marked internal flaws.

Eighty-one quartzite samples were thermally pretreated (15 were control samples not heated). Two electric, thermostatically controlled ovens were used, and samples were placed on end in the oven. The lowest temperature possible in the ovens used was 200^{o}C. This temperature was maintained for twenty minutes before increasing to the desired heat. In raising the temperature, the thermostat was increased 50 degrees every five minutes. The samples were heated to temperatures of either 300, 450, 600 or 750^{o}C, and these temperatures were maintained over periods of 1, 2, 4, 24 or 48 hours before cooling. Cooling rates were varied in three ways. The slowest cooling rate was achieved by turning the oven off and allowing the samples to cool overnight. For faster cooling, samples were removed from the oven with metal tongs (which were warmed in the oven before touching the stones), and then either placed on a ceramic plate to cool in the air, or submerged in tepid water. The combinations of the heating and cooling variables which were used are shown in Table 6.

After the heat treatment, the samples were flaked and then compared

Table 6: Mean Metric Output Values (mm)

Hours in Oven	Cooling Mode	300°C			450°C			600°C			750°C		
		Length	Width	Platform Length	Length	Width	Platform Length	Length	Width	Platform Length	Length	Width	Platform Length
	Oven	13.7	21.3	17.8	14.2	23.6	19.2						
1	Air	12.2	18.9	16.8	11.3	16.7	14.7						
	Water	17.8	26.4	23.3	15.7	28.8	25.8						
2	Oven							13.3	19.0	17.2	14.7	26.1	21.5
4	Oven	13.8	26.3	18.8	12.8	22.1	20.3	13.3	19.8	18.9	12.7	19.5	17.1
	Oven	12.8	23.1	21.6	14.4	21.2	16.8	12.9	18.9	16.7	16.1	28.1	23.1
24	Air	15.6	25.6	20.4	11.1	23.3	20.8	15.3	22.3	20.9	16.3	34.3	29.4
	Water	13.8	24.8	23.5	12.7	16.7	17.2	12.4	19.2	17.1	13.6	26.9	24.8
	Oven										16.3	25.6	19.6
48	Air										15.4	27.9	23.5
	Water										14.9	32.5	29.8

Control Group: N = 25; Length: M = 13.0 S.D. = 2.6; Width: M = 23.2, S.D. = 7.5; Plat. Length: M = 15.2, S.D. = 4.5

with a control sample that was not heat treated. The percussion flaking was kept constant with the use of a "dynamic loading machine" (Bonnichsen 1977). The samples were held in a modified vice with a torque device to maintain pressure.

Stone and antler impactors had a tendency to break or crush after repeated use and, as it was considered essential to maintain the impactor characteristics and platform thickness as constants, a fairly broad, rounded steel impactor was used. Two flakes were derived from each sample when possible, one from each face of the sample from opposing platforms. In a few of the samples, structural weaknesses which resulted from the rapid cooling of the heated stone caused transverse fractures to occur during flaking. This fracture occurred along or adjacent to the zone of compression through the sample between the jaws of the vice, and the cause of failure is thought to relate to the change in the relationships of tensile or compressive forces in the material induced by a wave of force passing through this area at the moment of impaction.

As this study was primarily concerned with the changes in flaking characteristics of quartzite due to heating and cooling of the samples, analysis focused on recording two attribute categories: quantitative and qualitative. The quantitative attributes were measured to the nearest half millimetre. Three measurements were made on each flake scar. Flakes themselves were not measured because they shattered in several cases. Maximum length of the scar was measured perpendicular to the platform between the distal extreme of the flake scar and the platform. Maximum width was measured as the distance between two imaginary parallel lines perpendicular to the platform which intersect the lateral extremes of the flake scar at one point. The maximum platform width was measured between the two lateral extremes of the flake scar at the junctures of the platform and ventral faces. The sums, means, and standard deviations for all of the metric attributes are provided in Table 6.

The qualitative variables observed include: flake scar termination types; whether the lateral edges expanded or contracted from the platform; obvious changes in the lustre or texture were noted, such as the presence of a sugary texture; and the condition of the derived flake, whether it was one complete flake or shattered. These results are presented in Table 7.

Table 7: Frequencies of Non-Metric Attributes

Hours in Oven	Cooling Mode	300°C						450°C						600°C						750°C					
		N	VF	S	CB	H	CZ	N	VF	S	CB	H	CZ	N	VF	S	CB	H	CZ	N	VF	S	CB	H	CZ
	Oven	6	-	-	2	-	-	6	-	-	2	-	-												
1	Air	6	-	-	2	-	-	6	-	-	3	2	-												
	Water	4	-	-	4	1	4	6	-	2	5	-	6												
2	Oven													5	-	-	-	-	-	6	-	-	2	2	-
4	Oven	6	-	-	2	-	-	6	-	-	1	-	-	6	-	-	1	-	-	6	-	-	-	-	-
	Oven	6	-	-	1	-	-	6	-	-	-	-	-	6	-	-	1	2	-	6	-	2	4	-	-
24	Air	4	-	-	-	3	-	6	-	-	-	4	-	6	-	-	1	4	-	4	2	1	4	2	1
	Water	6	-	-	6	-	6	6	1	-	6	-	6	5	2	-	5	4	5	4	1	3	4	-	-
	Oven																			6	-	1	-	-	-
48	Air																			5	1	4	2	-	2
	Water																			5	2	3	5	-	-

Control Group (N = 25), Frequency For All Traits = 0, Except CB = 3

N = Number of Sample Tests; VF = Vice Failure; S = Sugary Texture; CB = Crumbly By-Product; H = Hairline Cracks; CZ = Crazing

RESULTS

Summaries of the mean metric values obtained on groups of samples subjected to the same thermal pretreatment variables are presented in Table 6. A Mann-Whitney U test (Siegel 1956) was undertaken to compare the unaltered control group with the thermally treated samples, under the hypothesis that the two samples are similar. The results of this analysis are presented in Table 8. At the .05 significance level, statistically significant values were observed in 28 of a possible 81 cases. Sixteen of the instances where a significant difference occurred, were in the platform width variable. This feature was accompanied by a qualitative change in the platforms. In the unheated controls, the negative flake scar at the focus of impaction forms a marked concavity. From this point, the platform ventral edge curves convexly to both lateral edges. On the derived flakes that are intact, the lateral extremes of the platform form very thin "wings", but the platform is quite thick at the locus of percussion. Speth suggests why this concavity is so pronounced:

> Since brittle materials generally are weaker in tension than compression ... fracture first occurs when the tensile stress exceeds the tensile strength of the material at the edge of the contact circle ... When this happens, a shallow, nearly vertical ring crack (the "lip" observed on many prehistoric flakes) develops around the contact area. (Speth 1972:37-38)

On the heated samples, however, the concavity of the negative flake scar tends to be more diffuse; the lateral platform edges taper uniformly to the lateral extremes without recurving to form "wings". The platform on the flake therefore, is broader towards the lateral edges than on the unheated specimens. This feature is illustrated in Figure 42. The increased platform width does not correlate with an increase or decrease in the other attributes. This outcome suggests that one of the first changes that occurs in the material is a physical change probably relating to the loss of compressive or tensile strength.

In chert, thermal pretreatment enables the production of longer flakes. In this experiment, however, there is an interesting bimodal distribution of longer flake production. The only cases where length was significantly greater than for the control samples were those at opposing

Table 8: Mann-Whitney U Test Results*

Hours in Oven	Cooling Mode	300°C			450°C			600°C			750°C		
		Length	Width	Platform Length	Length	Width	Platform Length	Length	Width	Platform Length	Length	Width	Platform Length
	Oven	0.73	0.5	0.78	0.93	0.48	2.1						
1	Air	0.53	1.15	1.18	1.18	2.15	0.28						
	Water	2.03	1.14	2.56	1.88	1.33	2.78						
2	Oven							0.31	1.11	1.06	0.68	1.38	2.58
4	Oven	1.3	1.18	1.43	0.3	0.03	2.18	0.03	0.9	1.28	0.25	1.28	0.75
	Oven	0.1	0.08	2.43	0.98	0.5	0.93	0.28	1.43	1.03	2.25	1.0	1.83
24	Air	1.65	0.6	1.87	1.45	0.38	1.93	1.58	0.58	2.1	1.9	1.84	3.04
	Water	0.3	0.6	2.13	0.13	1.75	1.13	0.75	1.2	0.7	0.6	0.92	2.63
	Oven										2.0	0.53	1.85
48	Air										1.64	1.67	3.01
	Water										1.31	1.98	3.09

*Values are comparisons with unaltered control samples; Values greater than Z = $\pm$ 1.64 are significant at the .05 level.

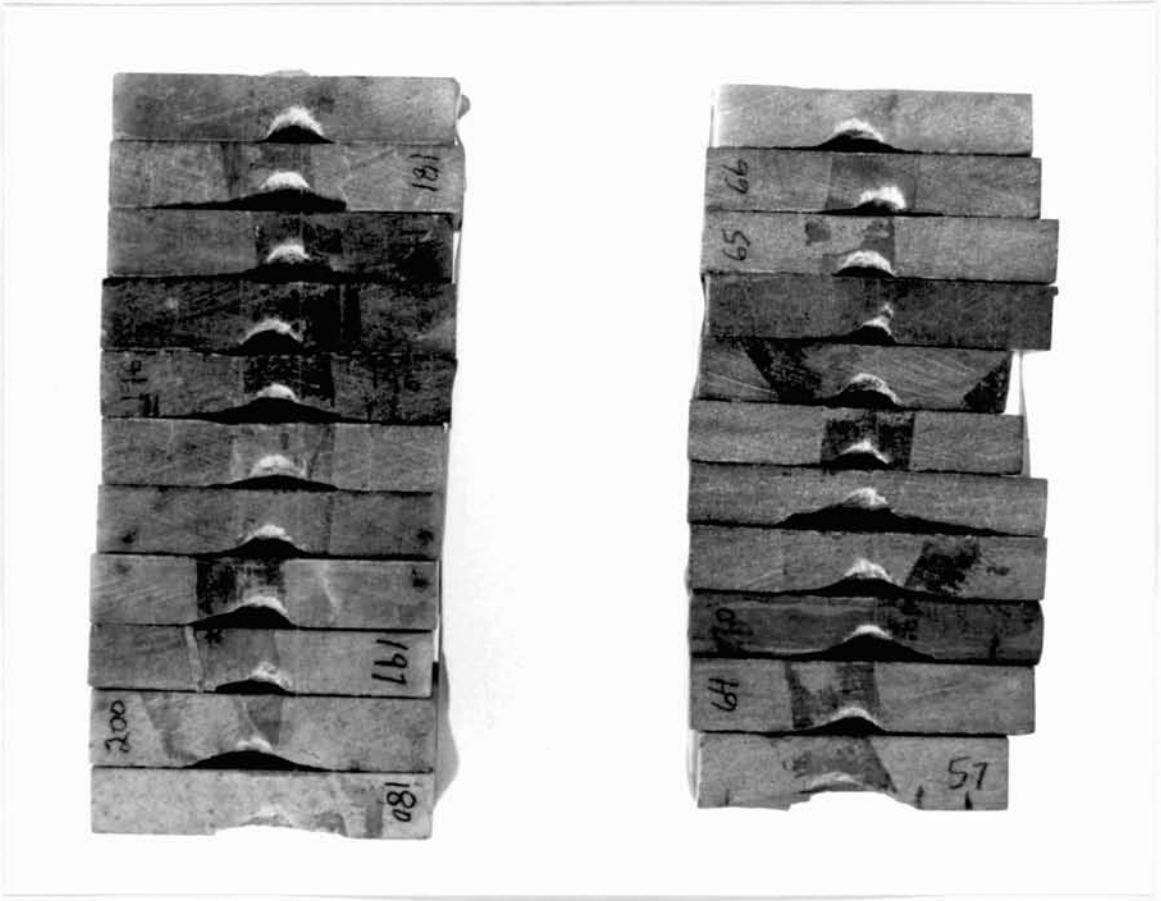

Figure 42. Platform characteristics of samples from two cobbles. The top sample of each column is not heated; the heated samples are arranged in order of increasing temperature from the top of each column.

extremes of the experiment matrix. The highest overall lengths were obtained from samples heated only for one hour at 300° C, and then quenched; high length values were also observed for the samples heated for one hour at 450°C and quenched. These results are a response to relatively low heat over a short period of time followed by rapid cooling. The effect on the quartzite was to create a thermally damaged surficial condition which apparently did not penetrate into the interior of the specimens. The flake propagation occurred along the interface formed between the crazed, thermally damaged exterior, and the unaltered interior of the specimens, effectively peeling off this "rind". This may have had a useful application. The following account provides an interesting example of this occurrence from the archaeological record:

> Heat treatment appears to have been carefully controlled and involved heating of only the outer layers at a time, or perhaps, in smaller pieces, only the section being worked. The latter would explain numerous pieces where one end or segment is pocked and crazed while the remainder of the object is not. (Sharrock 1966:39)

It is especially interesting to note in the above passage that the artifacts were only partly crazed. As noted above, this is an attribute associated with rapid cooling. The rapid cooling technique is described by Paul Schumacher as a practice used by the Yurok of California: "The rock is first exposed to fire, and after a thorough heating, rapidly cooled off, when it flakes readily into sherds of different sizes under well directed blows at its cleavage" (Schumacher 1962:304-307). The technique of thermally pretreating and reducing cores one layer at a time has been described as well by Schindler et al. (1982) for jasper used prehistorically in Pennsylvania.

A different interpretation is necessary for the cause of long flake production in samples at the high end of the experimental range, i.e., those heated to 750°C for either 24 or 48 hours and then oven cooled. Obviously, the whole specimen has been thoroughly heated in these cases. The interpretation of this result can be aided by a scrutiny of the data illustrated in Table 8. These oven cooled specimens did not experience vice failures as did the samples heated to 750°C and cooled at faster rates. Additionally, the occurrence of a sugary or friable texture on the flake scars was only observed on those samples heated to 750°C for 24 or more hours. The sugary texture may be a symptom of severe thermal

damage at a microscopic level. Although the quartzite used in this experiment showed remarkable integrity even when exposed to radical changes in temperature, it seems probable that the whole matrix, when subjected to such extremes, was altered internally to the extent that the constituent grains tended to separate at the grain boundaries. A fracture running through this weakened infrastructure may result in the detachment of longer flakes but the derived by-product is so severely damaged that it is of little use. The fractures appear to be intergranular rather than the transgranular fracture characteristic of the unheated specimens. This intergranular fracture produces fracture surfaces with a sugary texture. The coarse texture of quartzite itself may be partly responsible for the integrity apparent in quartzites which have been rapidly cooled. The thousands of minute interlocking grain interfaces may serve to bind together even a microcracked substructure.

Cooling the samples in water resulted in an immediate surface crazing (i.e., tiny irregular cracks) except on those rocks heated to a maximum temperature of 750^{o}C (Table 8). The crazing cracks extended between the individual grains rather than through them. Decrepitation (crackling) was clearly audible when specimens heated to 450^{o}C or higher were air cooled. In no instance did a quartzite sample spall or explode upon heating. That crazing was not observed in specimens heated to 750^{o} C suggests that microcracks so thoroughly permeated the samples that the macrocracks either did not form or were obscured. Crazing was normally associated with the production of "crumbly flakes" - flakes which fell apart upon impaction.

A different type of crack, referred to here as a hairline crack (Table 7), was most prevalent in thermally treated air cooled samples. These are long, irregular, often approximately parallel cracks which extend perpendicularly from the edges. Hairline cracks as observed here may be contraction or tensile cracks on a larger scale than crazing.

The qualitative attributes discussed above, namely crazing, hairline cracks, "crumbly" by-products, and sugary texture all seem symptomatic of thermal damage and are regarded as being undesirable results. Although such thermally damaged specimens are undesirable for flaking, the roughened surface or edges may be useful for some other functional application, such as abrading wood or bone, or perhaps for use in tanning

hides. For example, in reference to tanning practices of the Plains Indians, Clark Wissler noted that "rubbing with a rough stone is the usual treatment accorded deer skins" (Wissler 1910:70). Apparently, pumice was the favoured stone for this function, but when it was not available, substitutes were used.

In all cases of heat treatment in this experiment, a colour change was noted. Unaltered samples were various shades of either brown or grey. Upon heating, these changed to varying shades of red. Microscopic examination of thin sections revealed that this colour change was restricted to impurities imbedded in the intersticies. The depth of penetration of this discolouration was observed to be a function of time. The shades of red obtained were normally darkest at the lower temperatures and graduated to shades of pinkish white with high temperatures, hence the shade obtained was a function of temperature. This colour gradation is only of use when comparing heated samples from the same cobbles. In some instances, internal flaws turned red before the surrounding matrix did, but usually these flaws could be detected beforehand.

Flake terminations were recorded to determine if a reduction in the frequency of hinge or step type termination could be induced by heating. No significant change was recorded for the heated specimens.

DISCUSSION AND CONCLUSIONS

The prominence in Alberta of quartzite as a prehistoric raw material imparts some importance to studies dealing with quartzite. The frequent occurrence of red discolouration of quartzite tools and debitage could suggest thermal pretreatment. It is well known that the flaking qualities of stone such as chert can be improved by thermal pretreatment. Although there are no ethnographic accounts dealing specifically with heat treatment of quartzite, this does not preclude the possibility that such treatment was observed. In many ethnographic accounts, the term "flint" was used to refer to any stone material which was flaked into tools.

This experiment was undertaken to determine if beneficial changes in quartzite flake morphology would occur as a result of thermal

pretreatment. Although significant changes occurred in the dimensional aspects of flakes, the qualitative characteristics of the by-products indicate that these changes are undesirable. In no instance was an improvement in flake quality observed, but in certain cases, the ease of flaking was improved. In summary, the following changes were observed:

1. With thermal pretreatment, the fracture results in a more diffuse platform edge. This would affect the flaking process as well as the resultant tool edge morphology.
2. By heating and cooling the stone rapidly, a zone of weakness seems to be produced along the interface between the unaltered core of the material and the altered "cortex". Although a longer flake can be detached, the flake itself is too damaged for use. The notion that this characteristic could have a useful application in core reduction is supported ethnographically and archaeologically.
3. Heating the quartzites used in this experiment invariably caused a reddish colour change. This discolouration was observed to be the result of the oxidation of interstitial iron impurities.
4. The pieces of quartzite used in this experiment did not spall or explode when heated or cooled rapidly.
5. Quenching of hot quartzite caused surficial crazing.
6. By-products derived from cores heated and cooled rapidly have a tendency to break or crumble readily, and are regarded as undesirable.
7. Fracture surfaces on quartzites heated to very high temperatures tended to have a sugary texture. This is suggested to be the result of the fracture propagation following interstitial microcracks.

Although the experiment demonstrates that changes in the physical properties of quartzite can be induced with thermal pretreatment, these changes are not beneficial for improving flaking qualities. However, the thermal pretreatment does produce predictable results which may be useful in two respects. First, by creating a thermally damaged exterior rind, "decortication" flakes can be more easily propagated. Second, high temperatures induce a physical change to a friable, sugary texture which would improve the use of quartzite as an abrasive. Given these results, thermal pretreatment should be a consideration in the analysis of quartzite assemblages.

INTERIM REPORT OF THE 1983 HERITAGE RESOURCE INVENTORY AND ASSESSMENT PROJECT IN JASPER NATIONAL PARK

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INTRODUCTION

From June 1 to September 30 1983, the Archaeological Research Unit of Parks Canada, Western Region conducted heritage resource inventory and assessment studies in Jasper National Park. Parks Canada initiated the project in order to report on the status of significant historic period sites and to build on the archaeological inventory of the park. This interim report outlines the objectives, research design, methods, and preliminary results of this project.

Concurrent with the 1983 inventory program in Jasper National Park, a number of small Heritage Resource Impact Assessments (H.R.I.A.) were conducted by the Archaeological Research Unit during the months of June and July (Head 1983). Heritage resource site surveys were completed for a host of proposed construction projects, including: seven road alignments, three campgrounds, eight borrow areas, one sanitary landfill, the CNR railway twinning, an industrial development, a water pipeline and the Park's administrative/operations complex. Thirteen prehistoric and eight historic sites were discovered in connection with six of the projects examined. Apart from discussing the excavation of one of the sites discovered by Head (1983) but excavated by the inventory team, the results of the HRIA studies will not be discussed in further detail. Instead, the following report will concentrate on the results of the inventory.

Background

Previous inventory studies of selected portions of Jasper National Park were carried out in 1970 and 1971 by the Department of Archaeology,

University of Calgary under the field direction of Jack Elliott (Elliott 1971). Elliott's findings (48 prehistoric sites, 16 historic sites, and two sites with both prehistoric and historic occupations) provided the data for the Jasper National Park Archaeological Inventory (Anderson and Reeves 1975). Investigations in 1981 by Bruce Ball of the Archaeological Survey of Alberta resulted in the discovery of eight additional prehistoric sites and one historic site (Ball 1984).

Environmental Setting

Jasper National Park is a 10,870 square kilometre mountain park situated within the front and main ranges of the Rocky Mountains of west central Alberta. The 1983 inventory program focused on three distinct areas. The first was a 40 km long section of the Athabasca River (Figure 43). The 1050 - 1100 m contour line, the main elevation of kame terrace development, delineated the upper limit of the study area on either side of the river. Generally speaking, the area encompasses the Athabasca River, Jasper Lake and a number of tributary creeks which are flanked by terraced landforms of glaciofluvial parent material. A number of prominent alluvial fans are located at the junctions of tributary creeks and the Athabasca River. Deposits of aeolian sand and silts provide a cap of variable thickness on most terraces and low-lying landforms. According to the ecological land classification for the park (Holland and Coen 1983), this study area is largely located within the montane ecoregion. Forest vegetation consists predominantly of white spruce (Picea glauca) and to a lesser extent, lodgepole pine (Pinus contorta) and Douglas fir (Pseudotsuga menziesii). Small areas of grassland occur on dry basal slopes and in the valley bottom at elevations between 989 m and 1044 m above mean sea level.

The second area to be examined was the Pyramid and Patricia Lakes area (Figure 43). This area is located on the bench above the townsite of Jasper. The study boundaries encompass the two lakes and surrounding lakeshores and glacial environs.

The final area studied in 1983 was a large section of the southeast portion of the park. A brief overview was carried out in this area. The route taken on the reconnaissance trip started at Camp Parker on the Icefields Parkway near the Banff-Jasper park boundary, over Nigel Pass,

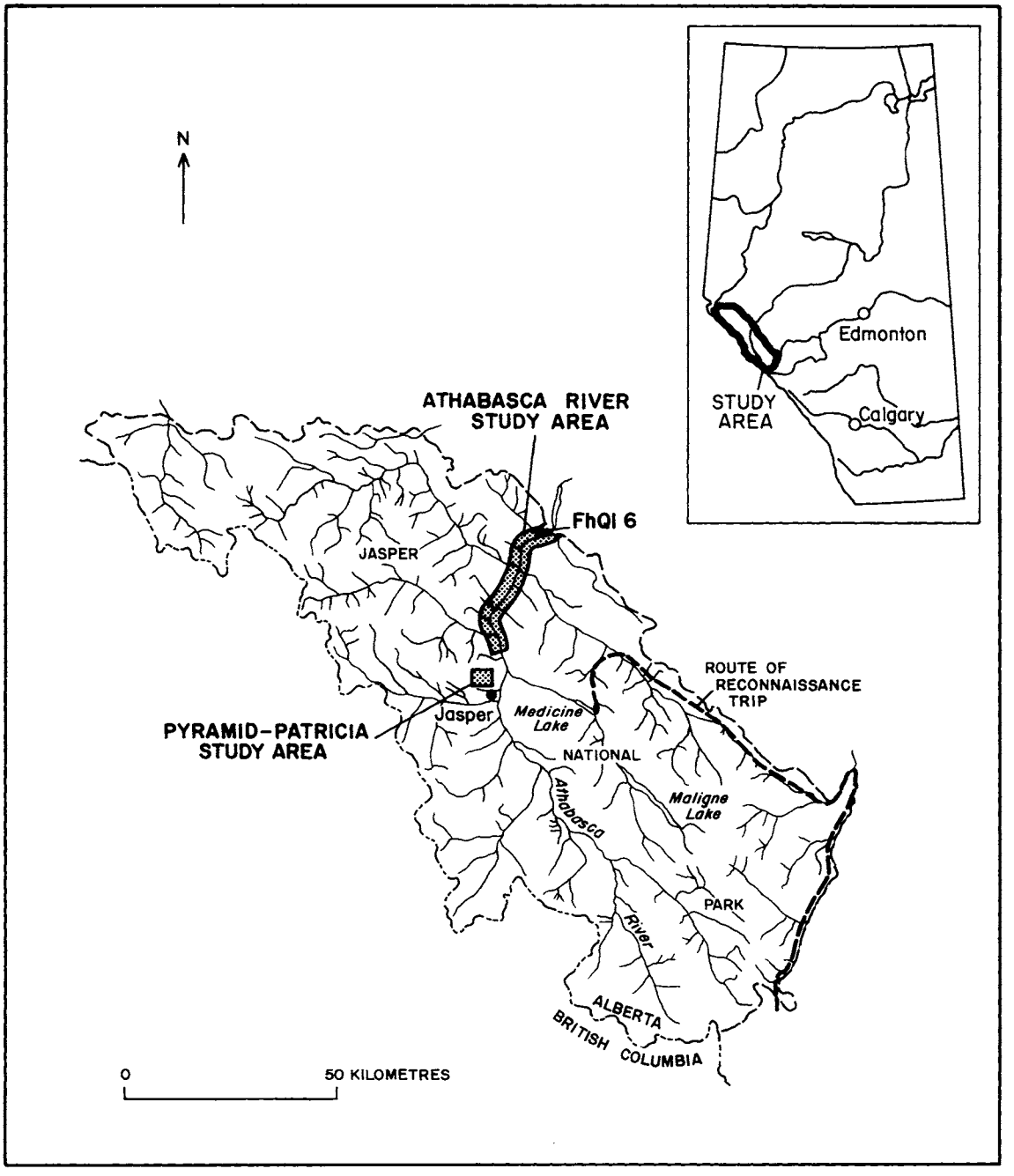

Figure 43. Map of Jasper National Park showing the study areas.

down the Brazeau River to the Brazeau-Southesk River confluence, up the Cairn River, over Cairn Pass, down the Medicine Tent and Rocky rivers and across to Medicine Lake via Jacques Lake (Figure 43). The reconnaissance route covered a distance of approximately 160 km through a variety of alpine, subalpine and montane ecoregions. Of particular note was the presence of valley grasslands along the Brazeau River and the rich alpine environment of the Cairn Pass area.

PROJECT OBJECTIVES AND RESEARCH DESIGN

From a heritage resource management perspective, Parks Canada was primarily concerned with the completeness of the inventory, the status of historic period sites (the recording of historic sites was incidental to the project objectives of the early surveys) and the lack of attention given to the interpretive potential of heritage resources in the park. Using these concerns as major reference points, six specific project objectives were proposed for 1983:

1. To increase archaeological awareness both in the warden, interpretive and management staff of Jasper National Park, as well as in the general public;
2. To undertake a systematic and judgemental survey of the Athabasca River and Pyramid-Patricia Lakes study areas;
3. To complete a heritage resource overview of the southeastern portion of the Park;
4. To report on the status of significant historical period sites;
5. To report on a limited number of heritage resources previously recorded within the defined study areas;
6. To provide recommendations for future archaeological investigations within Jasper National Park.

A detailed research design was prepared prior to the initiation of the project. Research questions were put forth in the form of hypotheses. Although the hypotheses were based on current archaeological thought, most were directed at answering some rather basic questions typical of the early stages of data acquisition. More specifically, questions directed at elucidating culture history through the collection of particularistic information on site location, cultural features,

artifact styles and other baseline information. In this same vein, clarification of the time-space cultural-historical units of the Park (Anderson and Reeves 1975) and the relationship of these units to the broader and better known plains-mountain sequences of Alberta formed a major focus of the research design.

Beyond the general culture history problems, research centered on a series of explicit hypotheses. Inherent in the generation of these hypotheses was the possibility that the survey would not produce adequate data to test a particular hypothesis. Recognizing this problem at an early stage, it was used to condition expectations between available data and testable hypotheses. At the same time, every reasonable attempt was made to test hypothetical ideas and relationships within the context of an archaeological survey. Some of the major hypotheses generated in the research design were as follows:

1. The project area was occupied for a considerable length of time, from at least Early Prehistoric times; however, due to a combination of glacial, fluvial, alluvial and aeolian processes within the mountain ecosystem, archaeological sites from the early part of the record will be poorly represented.
2. Prehistoric utilization of Jasper National Park is manifested in the archaeological record by temporary campsites and base activity areas where general maintenance and specialized activities were conducted.
3. The configuration of prehistoric site types consists primarily of strategically located base camps characterized by a variety of similar artifact types. Ancillary temporary sites are situated in proximity to ecosystems which supplied the base with resources.
4. Lithic raw material use varied through time and space.
5. Patterns of cultural adaptation within the park remained relatively static throughout the prehistoric record.
6. Socio-economic patterning is present in archaeological and extant remains of historic period sites (e.g., Metis settlement loci, industrial sites).
7. Cultural formation processes (c-transforms, Schiffer 1976) played a key role in determining the nature of present archaeological remains of historic period sites.

METHODS

The inventory of the Athabasca River study area (from the park boundary to the Jasper Airport) was approached by utilizing a systematic transect survey method. The entire area was systematically examined by the transect method, with the exception of steep slopes (greater than 15 percent), marshy areas along rivers and creeks (the VL1- VL5 category on the Ecological Land Classification Maps), and water bodies (rivers, streams, and lakes), which in total accounted for approximately 40 percent of the survey universe. Transects were completed at intervals of 100 m by a crew ranging in size from three to five people. Shovel tests (40 by 40 cm and approximately 50 cm deep) were excavated at 50 m intervals along the transects. In areas of extreme terrain variability or dense forest cover, transect spacing varied slightly; however, as a rule, the 100 m spacing interval was well maintained.

Detailed notes of the survey universe were recorded along with relevant stratigraphic observations. During the month of June, the 50 m shovel testing interval remained unchanged, since the purpose of the program was to ascertain the location of buried remains and to decipher the sedimentological parameters of the Athabasca River valley. In the second and third months, the transect method remained unchanged in terms of spacing and coverage, but shovel testing evolved to the point of eliminating rocky alluvial fans and ridges with weakly developed soil horizons.

In the cases where prehistoric sites were located on the basis of surficial presence of artifacts, small collections of representative lithic material types, artifacts at various stages of manufacture, and diagnostic items were made. All artifacts recovered from shovel tests were collected. Diagnostic items were collected from historic period sites to aid in determining cultural and/or temporal association.

In the Pyramid-Patricia Lakes study area, a combination of judgemental and systematic survey techniques were employed. Experimentation with systematic transect survey of quadrat sample units based on UTM blocks was carried out. Three UTM blocks were surveyed by conducting ten transects at 100 m intervals across the block and excavating shovel tests at 50 m intervals along the transects. Portions

of the actual lakeshores of Pyramid and Patricia lakes were judgementally surveyed by restricting shovel tests to suitable landforms in a 200 m periphery around the lake.

The assessment of one of the HRIA projects, the Canadian National Railway twinning project, resulted in the discovery of a prehistoric site characterized by small amounts of faunal material in association with buried soils (FhQl-6; Figure 43). The initial find was made on the proposed railway right-of-way. Following the recommendations of Head (1983) and examination by the author, a mitigative excavation utilizing the inventory crew was carried out over twenty working days. Initially, a 4 m wide by 2 m deep section was excavated to delineate stratigraphic units (Figure 44). Subsequently, the site was tested to maximize artifact recovery with five 1 x 1 m test units; a small block excavation consisting of three 2 x 2 m units was completed to mitigate the loss of heritage resource information. The site was also monitored during the construction stage.

In the month of September, the reconnaissance through the southeastern portion of the park was completed over a twelve day period. A total of approximately 160 km was covered by horseback and foot. Prominent prehistoric and historic sites were recovered, and general observations were made on the environmental suitability of the area for prehistoric and historic occupations in order to recommend approaches for further study.

During the course of the entire 1983 field program, the staff of the Archaeological Research Unit worked closely with the wardens and interpretive staff of Parks Canada. Efforts were made to keep parks staff informed as to new archaeological findings during the summer.

RESULTS

Analysis and data compilation of the 1983 inventory findings is continuing. Preliminary tabulations indicate that a total of 109 heritage resource sites (52 prehistoric and 57 historic) were located during the course of the inventory; this does not include the 121 heritage sites located during the 1983 Heritage Resource Impact Assessment studies in the Park (Head 1983). Of these 109 sites, nine

were located along the Brazeau River and in Cairn Pass during the overview trip. The remaining 100 were located in the Athabasca and Pyramid-Patricia study areas. Thirty previously recorded sites were visited and reassessed.

Some general observations will be presented based on initial evaluations of survey findings. In terms of the historic period, a number of sites attributable to the fur-trade era (Jasper House and other unidentified sites), railway era, industrial era and pre-park settlement period appear to be well represented in the archaeological record of the Athabasca River area. Available data indicates that historic period sites are dispersed thoroughout the study area according to complex combinations of socio-economic and environmental factors. Cultural features characteristic of the historic period range widely - from small depressions associated with the faint remains of a fur trade site, to the large rectangular concrete foundation remains of mine structures (Pickard 1984).

The majority of prehistoric sites tended to be located on river terraces, at confluences of rivers and creeks, around lake margins and other "high priority areas". However, a small but significant number of prehistoric sites were located in areas normally deemed to be of lower heritage resource potential. Apart from a number of strategically located base camps characterized by relatively large lithic assemblages, most prehistoric sites tended to be characterized by small lithic concentrations. The most difficult problem in locating prehistoric sites in the Jasper National Park study area was the extreme aeolian deposition which at times impaired the usefulness of shovel tests.

The excavation of site FhQl-6 (198R) in the Canadian National Railway twinning area resulted in the discovery of a multicomponent prehistoric site characterized by limited (small artifact yields) yet well separated cultural layers. The stratigraphy of the site is extremely interesting, offering excellent potential for archaeological and paleoenvironmental interpretation (Figure 44). A distinctive volcanic ash was noted in the stratigraphic profile during excavation of the site. An Oxbow-like projectile point was located in a stratigraphic position below the ash (Figure 45). Analyses of samples of the volcanic ash, soil horizon and buried soils are underway at the Department of Geography, University of

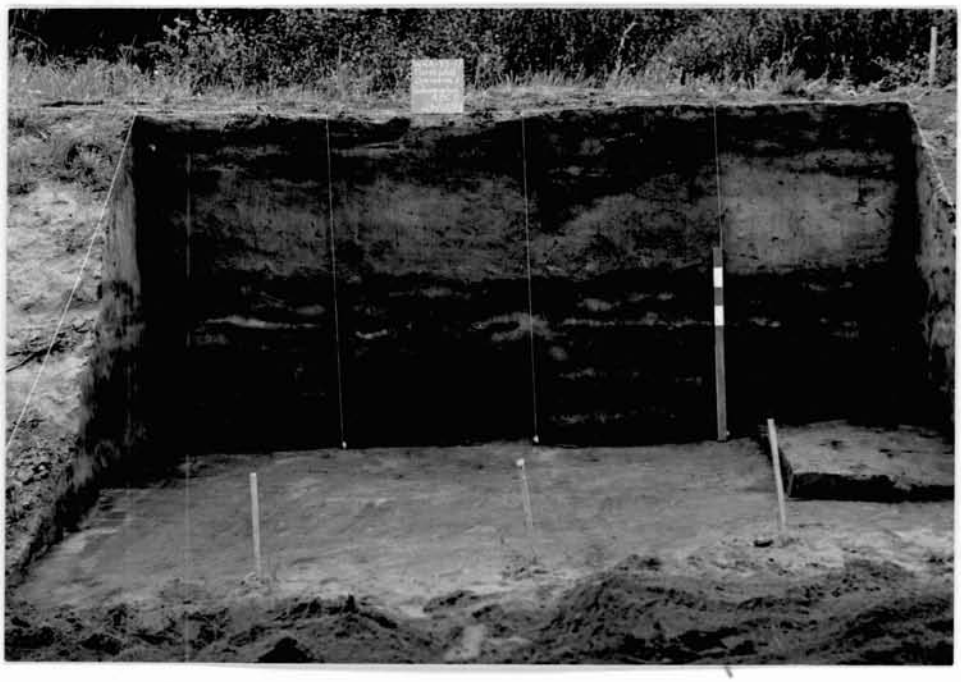

Figure 44. Stratigraphic profile of FhQl-6, Jasper National Park.

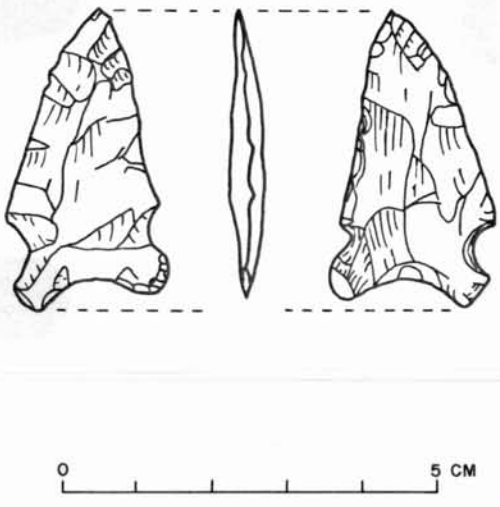

Figure 45. Projectile point from FhQl-6.

Western Ontario. Radiocarbon dating of faunal material is pending completion of the faunal analysis.

The results of the reconnaissance in the southeastern portion of the park indicate that the Brazeau and Southesk River valleys and the Cairn Pass area offer definite potential for prehistoric site location. Archaeological studies in the Cairn Pass area suggest that the Pass was possibly utilized as a transportation corridor between the Brazeau and Athabasca River valleys, and as a source area for lithic raw materials. Prehistoric utilization of Cairn Pass would appear to be similar to that noted by Elliott (1971) for Glacier Pass in the north end of the park. Additional studies are required to substantiate these postulates.

CONCLUDING REMARKS

This report has outlined and summarized the goals, project objectives, methods and results of Parks Canada's 1983 archaeological program in Jasper National Park. Interim and final reports pertaining to the 1983 season will provide more complete documentation of the project.

Preliminary results indicate that the strategy employed yielded positive results toward building upon the park inventory. More specifically, it is believed that the methods and results of this project will aid in the design of future large scale inventory projects, both within and outside the context of a national park. Archaeological data collected in 1983 from Jasper National Park is significant and relevant to eastern slopes archaeology and the historical development of the Upper Athabasca River valley.

BIBLIOGRAPHY OF PALEOENVIRONMENTAL STUDIES IN ALBERTA

Robert Vance
Archaeological Survey of Alberta

This contribution is intended as a source of references for archaeologists interested in late glacial and Holocene environmental conditions in Alberta. It contains references to both published and unpublished reports and includes all work up to 1983. The studies cited are concerned mainly with paleolimnological analyses (particularly pollen analysis) and, with one exception (i.e., Ritchie 1976), all provide primary paleoenvironmental data. Figure 46 shows the location of all study sites included in this bibliography. The numbers on the map correspond to the bracketed numbers below the dates in the bibliographic listing.

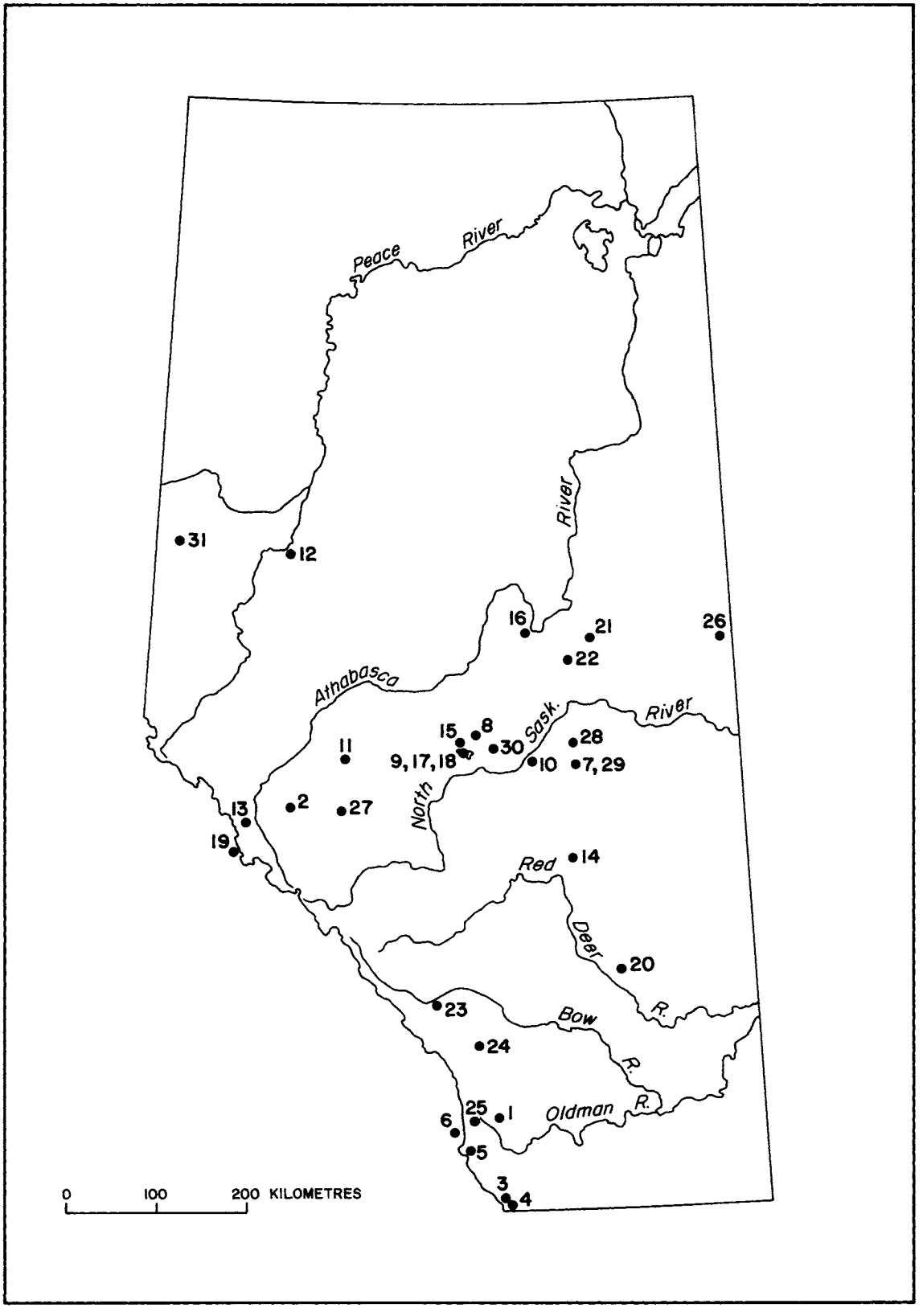

Figure 46. Paleoenvironmental study sites in Alberta up to 1983.

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ABSTRACTS FOR
1982 and 1983 PERMITS

Compiled By
Gabriella Prager

INTRODUCTION

The presentation format of the abstract information has been revised for this annual review volume. This has been done in order to standardize the data and to make specific aspects more readily retrievable and useable. The following categories of information were requested (where applicable):

Archaeological Project Type
Location/Setting
Methodology
Results
Site Types
Cultural Affiliation
Dates
Report
Additional Information

In each of the following abstracts, only those categories that are directly relevant to the specific project are included. It was requested that as much useful detail as could be briefly presented be included. Provision was made in the final two categories for additional comments on any aspect of the project or report which might be of particular interest to other researchers.

The following abstracts represent those unpublished in the 1982 annual review and those for 1983 permits available at the time of publication.

82-2

Stan Saylor
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

City of Medicine Hat
Crescent Heights
residential subdivision

PROJECT TYPE: HRIA, test excavations

LOCATION/SETTING: Within the City of Medicine Hat; generally disturbed by cultivation and borrowing.

METHODOLOGY: Surface reconnaissance, followed by site assessment and detailed shovel testing.

RESULTS: Three new sites were found (EaOq-30, 31, 32); no subsurface remains were found.

SITE TYPES: Isolated find, small surface lithic scatters

REPORT: Complete, entitled "Northeast Crescent heights housing subdivision and Northeast buffer park: an historical resources impact assessment - final report", by Stanley G. Saylor; report includes a summary of site distribution in and around Medicine Hat.

82-10, 82-22
82-62

Brian Ronaghan
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Edmonton Power/Fording
Coal Ltd.
Genesee Power Project

PROJECT TYPE: HRIA and mitigation of potential impact to historical resources, as well as answering research questions regarding culture history and site distribution.

LOCATION/SETTING: In the Parklands of central Alberta, 50 km west of Edmonton, on the south side of the North Saskatchewan River. The central area of the project is depressed rolling knob and kettle topography. The majority of the area has been cultivated, but some cleared pasture and undisturbed woodlots exist.

METHODOLOGY: The total study area was 71.7 square km, but investigations were limited to areas slated for immediate development (approximately 15.4 square km). Inventory consisted of visual and subsurface assessment of treed and pasture areas, and tilling of ploughed fields prior to visual examination. Site assessment involved systematic shovel testing, 1 x 1 m excavations of undisturbed sites, and controlled collection of ploughed sites. Mitigation consisted of surface collection, tilling and second collection, small block excavations, and large block excavations

at selected sites. Areas to be disturbed were examined in total. The project required approximately 10 to 12 people and took 7 months to complete.

RESULTS: 242 new prehistoric sites were found (Borden blocks FhPn, FiPn, FhPo, FiPo), bringing the total number of known sites in the project area to 533. 77 controlled collections were undertaken, 13 sites were retilled and collected, 9 small and 3 major block excavations were completed. Over 62,000 lithic artifacts were recovered from 318 sites, including about 200 projectile points and fragments.

SITE TYPES: Small lithic scatters, small and large campsites, isolated finds

CULTURAL AFFILIATION: Virtually all known projectile point types in the Parklands are represented, including a fluted point, Agate Basin, Scottsbluff, Eden, Bitterroot, Oxbow, McKean, Hanna, Pelican Lake, Late Northern, Plains side-notched.

DATES: Based on projectile point typology, the entire span of prehistoric occupation of the Parklands is represented. A date of 7830±100 years B.P. was obtained on a collagen sample from an undisturbed site.

REPORT: The report entitled "Final report Genesee Power Project historical resources impact assessment and conservation studies" consists of 4 volumes and an appendix, but is not yet complete. Authors are Brian Ronaghan, Don Hanna, Sharon Thorpe, and Stanley Van Dyke. Report includes a factor analysis to define activity types within the "campsite" category.

ADDITIONAL INFORMATION: The 1982 studies on the Genesee Power Project constituted the largest plough zone archaeological study conducted in Canada to date. Information was collected in the field in a systematic fashion, and materials were classified under a consistent system such that the data base is suitable for a wide range of analytical techniques.

82-11

Rod Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

City of Medicine Hat River Valley Park

PROJECT TYPE: HRIA

LOCATION/SETTING: Two areas on the south terrace of the South Saskatchewan River, within and just west of Medicine Hat; terrain is level to gently rolling, covered by a mixture of poplar, cottonwood and grassland.

METHODOLOGY: Strathcona Island study area is approximately 4.5 ha, the Regional Park study area is about 12 ha; areas were examined by systematic foot traverse and shovel testing every 100 m.

RESULTS: Two sites were found in the Regional Park (EaOq-27 and Ajax Coal Mine); EaOq-27 could be avoided, and the Ajax Coal Mine site was recommended for restoration to provide an interpretive feature in the park.

SITE TYPES: Stone circle; historic coal mine

REPORT: Complete, entitled "Historical resources impact assessment Medicine Hat River Valley Park Strathcona Island and Regional Park", by R. J. Heitzmann.

82-14

James Helmer
Department of Archaeology
University of Calgary
Calgary, Alberta

Alberta Culture
Strathcona Site

PROJECT TYPE: Research: continuing excavations at FjPi-29, and survey of surrounding area.

LOCATION/SETTING: On the east side (highest terrace) of the North Saskatchewan River, in the County of Strathcona, near the eastern limits of the City of Edmonton; some portions of the site have been disturbed.

METHODOLOGY: Following a stratified cluster sampling design, 19 1x1 m units were excavated; also carried out a stratified random sampling programme of a nearby township by foot traverse; a sample of the sites was closely examined and surficial artifact frequencies recorded; work was conducted from May to September.

RESULTS: Excavations yielded 1618 artifacts representing a complete range of tools and debitage; survey yielded 5 new sites (FiPj-73 to 76, FiPk-45).

SITE TYPES: Lithic scatters; workshop/habitation

CULTURAL AFFILIATION: Oxbow, Duncan, McKean, Pelican Lake, Besant, Avonlea, Old Women's Phase

DATES: Early Middle Prehistoric period (about 5000 years ago) to Late Prehistoric period, based on projectile point typology.

REPORT: Complete, entitled "Report of the 1982 University of Calgary archaeology field school excavations at the Strathcona Site (FjPi-29)", by James W. Helmer; report includes an analysis of land use patterns in the Parkland zone.

82-17

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Hilltown Developments Ltd.
Easthaven subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Northeast edge of Hinton, near the Athabasca River; surface cleared and bulldozed.

METHODOLOGY: Systematic foot traverse of area about 64 ha in size, with regularly spaced shovel tests; more detailed shovel testing in areas of cultural material.

RESULTS: Three sites were found (FiQj-8, 9, 10); artifacts recovered were flakes and one biface; not judged significant.

SITE TYPES: Surface scatters, small workshop

REPORT: Complete, entitled "Historical resources impact assessment East Haven subdivision", by J. Pollock and K. Walde.

82-23

Jennifer Hunt
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Shell Canada Ltd.
Scotford to Edmonton pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: From several kilometres north of Fort Saskatchewan to Edmonton; generally flat terrain and about 90 percent cultivated.

METHODOLOGY: A corridor approximately 36 km long and 12 m wide was surveyed by a zigzag foot transect, with shovel tests restricted to wooded areas and creek crossings; where cultural materials were located, the area was shovel tested more intensively.

RESULTS: Nine prehistoric sites were found (FjPh-76 to 80, FkPh-21, FkPg-60 to 62); two sites were judged worthy of further investigation, because of reasonable quantities of cultural material and undisturbed context.

SITE TYPES: Isolated finds, surface scatters, campsites

REPORT: Complete, entitled "Historical resource impact assessment Scotford to Edmonton Pipeline", by Jennifer Hunt.

82-27

Maurice Doll
Provincial Museum of Alberta
Edmonton, Alberta

Alberta Culture
Buffalo Lake Metis site

PROJECT TYPE: Salvage excavation and research

LOCATION/SETTING: On the northeast shore of Buffalo Lake, north of Stettler; rolling terrain covered by Aspen Parkland.

METHODOLOGY: One cabin was excavated to save remaining information from agricultural activities, and another cabin was partially excavated for research purposes; methods consisted of trowel excavations with screening.

RESULTS: Excavations uncovered borrow pits, storage pits, hearths and refuse deposits associated with the cabins. Artifact and faunal samples were also recovered.

SITE TYPE: Log cabins representing a wintering village

CULTURAL AFFILIATION: Metis

DATES: Occupied between 1872 and 1878

REPORT: In preparation

82-29

Jennifer Hunt
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Power Ltd.
Sheerness railspur realignment

PROJECT TYPE: HRIA

LOCATION/SETTING: South of Hanna, Alberta; on generally flat terrain covered predominantly by mixed grasses, currently used for grazing.

METHODOLOGY: Rail line right-of-way was surveyed by foot transects with regularly spaced shovel tests.

RESULTS: No new sites were found.

REPORT: Complete, entitled "Historical resource impact asssessment Sheerness power project railspur realignment final report", by Jennifer Hunt.

82-31

Rebecca J. Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Power Ltd.
Sheerness Power Project
borrow pit

PROJECT TYPE: HRIA

LOCATION/SETTING: South of Hanna, Alberta; on generally flat terrain covered by grasses.

METHODOLOGY: A study area of approximately 6.25 ha was surveyed by parallel transects and systematically placed shovel tests.

RESULTS: No sites were found.

REPORT: Complete, entitled "Historical resource impact assessment Sheerness power project borrow pit final report", by Rebecca J. Balcom.

82-32

Jennifer Hunt
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Power Ltd.
Sheerness Power Project

PROJECT TYPE: Test excavations at EhPa-2 and EhPa-10.

LOCATION/SETTING: On the north upper terrace of the Red Deer River near Finnegan, Alberta; relatively flat to rolling terrain covered by short grass prairie, currently used for grazing.

METHODOLOGY: Tipi rings in danger of damage/destruction were mapped then test excavated; one trench was dug at EhPa-10, while at EhPa-2, the entire ring was excavated and the surrounding area tested; systematic surface collection was also carried out at EhPa-2.

RESULTS: At EhPa-10, no cultural materials were found and the site was not judged significant; EhPa-2 excavations yielded 781 artifacts, mostly flakes, but a Plains side-notched projectile point was also recovered.

SITE TYPES: Tipi rings, campsite

CULTURAL AFFILIATION: Plains side-notched

DATES: Late Prehistoric period (approximately A.D. 1200)

REPORT: Complete, entitled "Historical resource impact mitigation EhPa-2 and EhPa-10 final report", by Jennifer Hunt.

82-33

Bruce Ball
Archaeological Survey of Alberta

Alberta Culture
Belly River burial

PROJECT TYPE: Salvage excavation

LOCATION/SETTING: Northwest of Cardston, Alberta, in the south bank of the Belly River; surrounding area is grassland, but the burial location was disturbed.

METHODOLOGY: Bones found eroding from exposed paleontological shell section were removed by excavation.

RESULTS: Bones were found to be of a mature female amerindian. Seven artifacts were found in the vicinity, including a projectile point.

SITE TYPE: Burial

CULTURAL AFFILIATION: Point is Northern Side-notched.

DATES: Based on projectile point typology, could be as old as 6000 years; samples have been submitted for radiocarbon dating.

REPORT: Complete, entitled "Recovery of human remains from the Belly River Cardston Area, Alberta", by Bruce Ball; includes an appendix containing a descriptive analysis of the remains by Laraine Hess.

82-37

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Canadian Western Natural Gas
Okotoks-Cayley pipeline realignment

PROJECT TYPE: HRIA

LOCATION/SETTING: Approximately 3 km north of the town of High River, running east from the High River Fairgrounds and Airfield; route crosses High River; terrain is fairly flat and uniform; 80 percent disturbed by ploughing.

METHODOLOGY: An area of 4 km by 18 m was examined by a one day zigzag foot traverse; all exposures were examined, and 8 shovel tests were dug on the west bank of High River.

RESULTS: No sites were found.

REPORT: Complete, entitled "Historical resource impact assessment Okotoks - Cayley replacement pipeline final report", by Rebecca J. Balcom.

82-38

Barry Newton
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Merland Explorations Ltd.
Canard Sales pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: South of St. Paul, Alberta; gently undulating topography covered by a mixture of aspen stands and grasslands; much of the route is cultivated or used as pasture.

METHODOLOGY: The right-of-way is 20 km long and 15 m wide and was surveyed by foot over a period of three days; in non-cultivated fields, systematic shovel tests were dug, and where a site was found, intensive subsurface shovel testing occurred.

RESULTS: Six prehistoric sites (FlOt-2 to 7) and one historic site were found. No subsurface cultural remains were found.

SITE TYPES: Surface scatters, log cabin

REPORT: Complete, entitled "Historical resource investigations Merland Explorations Limited Canard Sales Line", by B. M. Newton and G. J. Fedirchuk.

82-39

E. J. McCullough
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Jager Holdings (Calgary) Ltd.
Residential subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: In the City of Calgary, overlooking the Elbow River; on level terrain covered by grassland which was previously ploughed.

METHODOLOGY: The study area is 64.7 ha and was systematically surveyed by foot transects and shovel tests; numerous rodent burrows also provided good exposure.

RESULTS: One previously recorded prehistoric site (EgPn-182) was re-examined and nothing was found. Two historic sites were identified (EgPn-127, CEP/J1); the historic water line was mostly destroyed but the homestead is still standing and was judged worthy of consideration for preservation.

SITE TYPES: Kill site, historic water line and homestead

DATES: Historic sites - 1910, 1911

REPORT: Complete, entitled "Historical resources impact assessment Jager Holdings (Calgary) Ltd. proposed subdivision", by E. J. McCullough and C. M. Fowler.

82-43

Rod Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Merland Explorations Ltd.
Garden Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: About 16 km northeast of Hanna, on flat grassland; about 80 percent of the right-of-way is ploughed.

METHODOLOGY: Intensive foot survey along 13.25 km x 15 m right-of-way, with periodic shovel tests; .5 x .5 m tests units dug at all creek crossings.

RESULTS: No sites were found.

REPORT: Complete, entitled "Historical resources impact assessment Merland Explorations Ltd. Garden Pipeline", by R. J. Heitzmann.

82-46

Rebecca J. Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Union Carbide Canada Ltd.
Prentiss-Blackfalds
Ethylene Glycol pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: Between Prentiss and Blackfalds, Alberta; terrain is flat to gently rolling and most of the study route is ploughed.

METHODOLOGY: Over a period of three days, the 16 km x 20 m right-of-way was surveyed by zigzag foot traverse with systematic shovel testing; the terminal location (250 x 400 m in size) just north of Blackfalds was also systematically surveyed by foot traverse and shovel tests.

RESULTS: One prehistoric site was located on the right-of-way (FcPk-28); no subsurface cultural remains were found.

SITE TYPE: Surface scatter

REPORT: Complete, entitled "Historical resource impact assessment Ethylene Glycol pipeline between the Union Carbide plant at Prentiss and Blackfalds, Alberta final report", by Rebecca J. Balcom.

82-47

Rebecca J. Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

B.C. Forest Products
Whitecourt Mill site

PROJECT TYPE: HRIA

LOCATION/SETTING: Northwest of Whitecourt, Alberta, on the north bank of the Athabasca River; on flat terrain covered by mixed aspen-spruce forest.

METHODOLOGY: Over a period of two days, an area of about 324 ha was examined by systematic foot traverses, with shovel testing on the river terrace and at river crossings by the rail access routes.

RESULTS: No cultural materials were found.

REPORT: Complete, entitled "Historical resources impact assessment Whitecourt millsite final report", by Rebecca J. Balcom.

82-49

J. Michael Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

TransAlta Utilities Corporation
Jenner-Dome Empress transmission line

PROJECT TYPE: HRIA

LOCATION/SETTING: From south of Jenner, along the northern border of the Suffield Military Reserve to the Dome plant site south of Empress; terrain varies from rolling to hummocky and broken, covered by shortgrass prairie; only a small portion is cultivated.

METHODOLOGY: The right-of-way (78 km x 24 m) was surveyed by zigzag foot traverse; shovel testing was limited to potential tower locations; all cultural features were staked and flagged.

RESULTS: 37 sites were found (EeOm-21 to 24, EeOn-4, EeOo-17, EeOp-36 to 46, EeOq-40 to 44, EeOr-72 to 79, EeOs-21 to 27), two of which are historic; shovel tests did not reveal any buried cultural materials; several of the sites are considered significant, but these can be avoided.

SITE TYPES: Stone circles, cairns, lithic scatters, campsites, historic foundation/depressions, drive lanes, isolated find.

REPORT: Complete, entitled "TransAlta Utilities 240 kV transmission line from Jenner to Dome Empress: an historical resource inventory and impact assessment", by J. Michael Quigg.

82-51

Jim Calder
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Patrician Land Corporation
Residential Development,
Canmore

PROJECT TYPE: HRIA

LOCATION/SETTING: In the town of Canmore, Alberta, on the west bank of the Bow River; on a heavily forested floodplain, about 50 percent disturbed.

METHODOLOGY: One day foot traverse of undisturbed portion of 30 ha area; shovel testing on ridges and trenches and examination of all exposures.

RESULTS: No sites were found, but the area has been noted as the former location of facilities and/or structures related to Canmore Mines Ltd.

REPORT: Complete, entitled "Final report historical resources impact assessment 'Project 75' Canmore, Alberta", by J. M. Calder.

82-52

J. Michael Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

St. Mary River Irrigation District
Verdigris Coulee water project

PROJECT TYPE: HRIA

LOCATION/SETTING: About 10 km northeast of the town of Milk River, in the Verdigris Valley; the valley floor is relatively flat, and is covered by shortgrass prairie.

METHODOLOGY: A 10 km x 30 m right-of-way was surveyed by foot traverse; all sites found were sketch mapped, and features which could not be avoided were plan mapped, then test excavated by several 1 x 1 m test units.

RESULTS: Seven sites were found (DhOx-5 to 11); 149 artifacts were recovered, primarily fire broken rock, flakes and debitage; no buried features were discovered.

SITE TYPES: Stone circles, cairns, lithic scatter, isolated find

REPORT: Complete, entitled "Verdigris Coulee water project an historical inventory and assessment program", by J. Michael Quigg. Report includes a variety of detailed measurements taken on all stone circles investigated.

82-54

Bea Loveseth
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Dekalb Petroleum Corporation
Nevis gas gathering system

PROJECT TYPE: Mitigative investigations

LOCATION/SETTING: Area immediately west of Buffalo Lake, northeast of Red Deer, Alberta; terrain is rolling and natural vegetation is Aspen Parkland, although much of the study area is cultivated.

METHODOLOGY: Three sites were systematically surface collected and test excavated in 2 x 2 m units; one site (FcPg-16) was tested by backhoe, due to possible age of deposits.

RESULTS: FdPh-4 has buried cultural material, including fire broken rock and bone debris; lithics recovered included scrapers, bifaces, flakes and debitage; two Besant points and one copper point were recovered from the ploughed surface. At FdPg-13, 72 lithic artifacts were recovered, including side-notched points, scrapers, bifaces, flakes and debitage; no buried remains. FdPg-16 appears to have two occupations mixed by ploughing; cultural materials included a Pelican Lake point, bifaces, scrapers, flakes, debitage and ceramics. At FcPg-16, nothing was found.

SITE TYPES: Campsites (one buried), isolated find

CULTURAL AFFILIATION: FdPh-4 Besant; FdPg-13 Late Prehistoric; FdPg-16 Pelican Lake.

DATES: On the basis of projectile point typology, FdPh-4 has one occupation between A.D. 1 to A.D. 700, another

dating to about A.D. 1750; FdPg-13 has one occupation between 1350 and 350 years B.P.; FdPg-16 has one occupation between 3000 and 1500 years B.P., another at approximately 1000 B.P.

REPORT: Complete, entitled "Final report archaeological conservation studies Dekalb Petroleum Corporation Nevis secondary gas gathering system", by Bea Loveseth.

82-58

Stan Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Manalta Coal Ltd.
Montgomery Mine expansion

PROJECT TYPE: HRIA

LOCATION/SETTING: At Sheerness, southeast of Hanna; terrain is characterized by rolling hills, covered by grasslands; majority of the land has been previously disturbed.

METHODOLOGY: Over a two week period, an area of about 1655 ha was examined by a series of parallel foot traverses; where artifacts were observed, shovel tests were dug.

RESULTS: 278 new sites were found (EiOw-37 to 298, EjOw-21 to 36).

SITE TYPES: Isolated finds, surface scatters, campsites, cairns, stone circles, possible historic hearth

REPORT: Complete, entitled "Final report, historical resources impact assessment Sheerness expansion Montgomery Mine Montgomery archaeological studies", by Stan Van Dyke.

82-61

John Brumley
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Alberta Environment
Forty Mile Coulee reservoir

PROJECT TYPE: HRIA

LOCATION/SETTING: In southeastern Alberta, about 25 km directly south of Bow Island; terrain is level to gently undulating, except the coulee walls, which are very steep; vegetation is grassland.

METHODOLOGY: Detailed examination of a study area 5.67 square km in size by foot traverses, as well as some survey in west damsite zone; areas being mechanically stripped were monitored; nine sites and 15 features were test excavated, and stone circles were randomly sampled by

auger testing. Aerial mapping of sites and detailed recording of stone features were also conducted.

RESULTS: 116 sites were found and a number of known sites were re-examined (DjOu-12 to 82, DkOu-1 to 50). Excavations recovered a range of lithic artifacts, F.B.R. and bone, representing habitation sites. Projectile points and ceramics were the most noteable finds.

SITE TYPES: Primarily stone circles and cairns

CULTURAL AFFILIATION: Pelican Lake, Old Women's Phase

DATES: Several radiocarbon samples gave a "modern" result; others ranged from 2850±135 years B.P. (on possibly unmodified bone) to 210±50 years B.P. (on possibly butchered bone).

REPORT: Complete, entitled "Historical resource investigations within the Forty Mile Coulee Reservoir Project: summary and evaluation of 1982 field work" (2 vols.), by John Brumley, Stanley Saylor and Carol Rushworth. Report contains numerous detailed measurements taken on stone circles.

82-66

Kathleen Conner Learn
Department of Anthropology
University of Alberta
Edmonton, Alberta

Alberta Culture
Black Fox Island

PROJECT TYPE: Research: test excavations of GfPa-32, and survey of Black Fox Island to increase pottery sample and known sites in this area.

LOCATION/SETTING: Island in Lac La Biche, near the town of Lac La Biche; diverse topography, mostly forested by poplar and heavy bush.

METHODOLOGY: .5 x .5 m test pits, plus 2 x .5 m trenches resulted in excavation of 12.15 square metres over two months; survey involved foot transects across the island, as well as around the perimeter, plus shovel testing.

RESULTS: Excavations yielded 5567 artifacts, consisting of assorted lithics, projectile points, pottery and bone; survey yielded 15 new sites (GfPa-41 to 56).

SITE TYPES: Campsites, isolated buried find, prehistoric workshop, historic camp, historic depression

CULTURAL AFFILIATION: GfPa-32 Oxbow; possibly McKean; possible Late Prehistoric corner-notched point.

DATES: Radiocarbon - 1220±130 B.P.
Thermoluminescence - 430 B.P.

REPORT: Complete, entitled "The Black Fox Island Archaeological Project", by Kathleen Conner Learn; includes a detailed pottery analysis.

82-71

Sheila Minni
9604 - 151 Street
Edmonton, Alberta

Alberta Housing Corp.
Lac La Biche
residential subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Within the settlement limits of Lac La Biche, about 1.5 km south of the lake; rolling terrain, some low lying swampy areas; mostly cultivated, with some areas of bush.

METHODOLOGY: Study area of 26 ha was investigated by a one day foot survey with judgementally placed shovel tests.

RESULTS: No sites were found.

REPORT: Complete, entitled "Final report, historical resources impact assessment, residential subdivision", by Sheila J. Minni.

82-72

Eugene M. Gryba
3, 346 - 4th Avenue, N.E.
Calgary, Alberta

Alberta Transportation/
Recreation and Parks
Southern Highways and
Recreation Area
Developments

PROJECT TYPE: HRIA

LOCATION/SETTING: Mainly in the southern half of Alberta; plains, foothills and mountains; grasslands, aspen and mixed forest.

METHODOLOGY: Foot traverse and shovel tests of 190 km of highway alignment, six gravel pits, 20 recreation area developments, one airport.

RESULTS: 60 prehistoric sites were recorded and/or re-examined: DhPj-3, DkPe-42 and 43, DlPo-57 to 59, EaOr-3, EdPo-38, EdPq-6, EdPq-15 to 17, EePp-2 to 5, EfPr-2 and 3, EgPn-301, EhPr-20, EiPs-1, EiPs-6 to 11, FcQa-13, 16 to 18, FdPu-1 to 5, FePu-1, FfPx-1, FfQa-1, FhQa-3, FiQa-1 to 5, FiQe-2 and 3, FiQj-1, FiQj-15 and 16, FjOm-4 to 6, FjOn-18, FlOr-2, GaOp-1 to 3, and GgQq-2; one historic site (EfOm-38).

SITE TYPES: Prehistoric campsites, tipi ring site, lithic workshops, isolated finds, butchering station, homestead site

CULTURAL AFFILIATION: Cody complex at DlPo-59 and FdPu-2; Pelican Lake at EiPs-7; Late Prehistoric side-notched at GaOp-2; aboriginal ceramics and Historic Period beads at EePp-3.

REPORT: Complete, entitled "Final report of the 1982 Archaeological Survey of Alberta Highways and Recreation Area Developments", by Eugene M. Gryba.

82-74

Barry M. Newton
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Interprovincial Pipe Line (N.W.) Ltd.
Norman Wells Pipeline borrow pit

PROJECT TYPE: HRIA

LOCATION/SETTING: Northwestern corner of Alberta, northwest of Bistcho Lake; on a well drained esker covered by pine forest, surrounded by muskeg.

METHODOLOGY: An area 50 m x 30 m was examined by systematic transects and shovel testing as well as visual examination of all exposures.

RESULTS: No sites were found.

REPORT: Complete, entitled "Historical resources impact assessment Norman Wells Pipeline potential borrow pit location", by Barry M. Newton.

82-75

E. J. McCullough
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Canstar Oil Sands Ltd.
Bituminous Sands Leases

PROJECT TYPE: Post-construction audit

LOCATION/SETTING: Approximately 30 km north of Fort MacKay, between the Athabasca River and the Birch Mountains; gently rolling topography covered by mixed wood boreal forest interspersed with wetlands.

METHODOLOGY: The study area encompassed 24 wellsites (30 x 30 m) and 14 km of new access right-of-way (12 m wide); following aerial reconnaissance, well-drained areas were traversed on foot during a one day survey.

RESULTS: One site was found (HiOw-25).

SITE TYPE: Isolated find

REPORT: Complete, entitled "Canstar Oil Sands Ltd. post-constuction audit Bituminous sands leases 38 and 39", by E. J. McCullough and G. J. Fedirchuk.

82-77

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Murphy Oil Company
Grand Forks Wellsite

PROJECT TYPE: A cultural resource inventory and site assessment within an access road.

LOCATION: The development is located on the north side of the South Saskatchewan River downstream from the Grand Forks, north of the town of Grassy Lake; on the prairie level adjacent to the valley edge in a natural prairie environment.

METHODOLOGY: An area of approximately 1.4 ha with a 15 to 20 m wide access road, was foot traversed; some parts of development were relocated to avoid major portion of large stone circle site. A total of 25 auger holes and 24 square metres were excavated during subsurface evaluations, varying in depth between 8-12 cm below surface. Three stone circles plus a segment of a drive lane were mapped, with stone weights and depths being recorded.

RESULTS: A single prehistoric site was identified (DlOw-6) which included 31 stone circles, one well defined drive lane, one moderately preserved medicine wheel, and four small cairns. The stone depth for the features examined indicated at least two and probably three events were represented. Only 15 pieces of cultural material were recorded, with no time diagnostic artifacts.

SITE TYPE: Stone circle, cairn, drive lane and medicine wheel

REPORT: Complete, entitled: "Murphy's Grand Forks Wellsite: evaluation of DlOw-6", by J. Michael Quigg.

82-79

Bea Loveseth
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Pembina Pipe Line Ltd.
West Pembina Field
pipeline system

PROJECT TYPE: HRIA

LOCATION/SETTING: West of Lodgepole, Alberta, crossing the Pembina River; terrain rolling to flat, heavily forested with some wetlands; partially disturbed by clearing.

METHODOLOGY: Right-of-way was 22 km long and 15 m wide; all dry areas were traversed on foot, and some shovel tests were judgementally placed.

RESULTS: No sites were found.

REPORT: Complete, entitled "Final report historical resources impact assessment segregated condensate pipeline system West Pembina field", by Bea Loveseth and J. M. Calder.

82-82

Shawn Haley
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Alberta Utilities & Telephones
Swan River natural gas pipeline

PROJECT TYPE: Post-construction monitoring

LOCATION/SETTING: Along south shore of Lesser Slave Lake, in mostly undisturbed boreal forest; undulating topography.

METHODOLOGY: Record review of general area; foot traverse of 10 km of completed pipeline right-of-way; some shovel testing.

RESULTS: No sites were found.

REPORT: Complete, entitled "Historical resources impact assessment Alberta Utilities and Telephones Swan River natural gas pipeline post-construction audit section a-b" by S. D. Haley.

82-87

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Alberta Transportation
S.R. 657 highway construction

PROJECT TYPE: Mitigative excavation

LOCATION/SETTING: On an un-named creek flowing into Muriel Lake (south of Bonnyville); strongly rolling terrain covered by Aspen Parkland.

METHODOLOGY: 1 x 1 m test excavations of GaOp-1, 2, 3, followed by more intensive trowel excavations at GaOp-2, consisting of 30 1 x 1 m units.

RESULTS: Testing at GaOp-1 and 3 revealed no buried cultural materials within the right-of-way; excavations at GaOp-2 revealed 1194 artifacts, mostly lithic tool production materials, including two corner-notched projectile points, bifaces, scrapers, miscellaneous cores, flakes and debitage; judged to be a significant site for this area.

SITE TYPES: Campsite/workshop; small campsite, surface findspot

DATES: GaOp-2: ca. A.D. 1350 - 1500; a sample for radiocarbon dating was taken.

REPORT: Complete, entitled "Historical resources mitigation assessment at sites GaOp-1 and GaOp-2 secondary road 657 Bonnyville, Alberta", by John Pollock.

82-88

Margaret Kennedy
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Alberta Transportation
Highway 3 Frank to
Blairmore realignment

PROJECT TYPE: Mitigative assessment and conservation excavations involving six sites.

LOCATION/SETTING: In the Crowsnest Pass, between Frank and Blairmore; on the various terraces of the Crowsnest River, which are vegetated by extensive grasslands and subalpine forests.

METHODOLOGY: Test excavations were conducted at five sites (DjPo-6, 30, 40, 63, 155), involving 1 x 1 m and 2 x 2 m units. Between 7 and 52 square metres were excavated at each site. The historic site of Greenhill Mine was surface surveyed and all features recorded.

RESULTS: Several buried components were discovered, as well as a hearth feature and a rock filled pit. A complete range of numerous lithic tools and debitage, and faunal remains, were recovered from the prehistoric sites. DjPo-30 represents a historic "red light" district, and numerous historic artifacts demonstrating a predominantly feminine assemblage, were recovered.

SITE TYPES: Surface scatter, campsites (buried), historic Greenhill Mine, Blairmore "red light" district

CULTURAL AFFILIATION: Hanna, Pelican Lake, Besant, Avonlea, miscellaneous Late Prehistoric corner-notched and side-notched points.

DATES: DjPo-155 - radiocarbon date of 1870±110 years B.P.; DjPo-40 - radiocarbon dates of 1370±80 years B.P. and 990±70 years B.P.

REPORT: Complete, entitled "Final report historical resources impact assessment and conservation studies Highway 3 realignment Frank to Blairmore", by Margaret Kennedy.

82-89

Bruce Wright
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

TransAlta Utilities
Outer Rainy Hill radio tower site

PROJECT TYPE: HRIA

LOCATION/SETTING: Southeast of Brooks near C.F.B. Suffield; on gently undulating topography covered with short grass prairie.

METHODOLOGY: Two areas 20 x 20 m square, plus a 5 x 20 m access road, were visually inspected by transect survey, with spot shovel testing; cultural features not endangered.

RESULTS: One site was found (EcOt-12).

SITE TYPE: Cairn with possible buried ring

REPORT: Complete, entitled "Outer Rainy Hill radio site historical resource impact assessment permit 82-89 final report," by Bruce Wright.

82-92

Stanley G. Saylor
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

City of Lethbridge
Urban Parks Project

PROJECT TYPE: HRIA

LOCATION/SETTING: Within an area adjacent to the City of Lethbridge and the Oldman River; terrain is variable, from relatively flat prairie to steep and highly dissected valley sides; a wide range of types of disturbance is represented, and there are some undisturbed areas.

METHODOLOGY: The study area was surveyed by evenly spaced zigzag foot transects and all exposures were examined; some shovel tests were judgementally placed. When sites were located, the surface was surveyed and sketch mapped, and shovel tests were dug.

RESULTS: 39 sites were examined (DjPe-4 to 9, DjPf-85 to 87, DkPf-5, 13 to 15, 26 to 50).

SITE TYPES: Isolated finds, stone circles, cairns, Indian Battle Coulee, lithic scatters, surface campsites, paleontological find, historic mine remains, farmstead, townsite, historic cemetery, historic foundation.

DATES: Historic habitation and cemetery features - 1880s; Indian Battle Coulee - 1870; historic mining remains beginning in 1870s.

REPORT: Complete, entitled "An inventory and preliminary historical resource assessment of the Lethbridge urban parks system final report", by Stanley G. Saylor.

82-95

Barry Newton
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Lexco Testing Ltd.
Pembina Forks coal exploration

PROJECT TYPE: HRIA

LOCATION/SETTING: South of Robb, Alberta, along the Lovett River near its confluence with the Pembina River; rolling terrain covered by coniferous forests with areas of muskeg.

METHODOLOGY: Systematic shovel testing along baselines, on drill sites and along proposed access routes.

RESULTS: Three prehistoric sites were located (FfQd-2, 3, 4); all were previously disturbed and none were judged significant.

SITE TYPES: Surface scatter

REPORT: Complete, entitled "Pembina Forks proposed coal exploration program historical resources impact assessment final report", by Barry Newton.

82-112

J. Michael Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Niblock and Company
Residential acreage development

PROJECT TYPE: Mitigation - surface collection, testing and mapping of two sites.

LOCATION/SETTING: About 15 km southeast of Medicine Hat, on a small tributary of Bullshead Creek; short grass prairie on gently rolling terrain; some disturbance.

METHODOLOGY: DlOp-14 was mapped and four 1 x 1 m test units were dug; surface mapping at DlOp-15.

RESULTS: Work at DlOp-14 revealed some prehistoric material but no historic remains; mapping of DlOp-15 showed a variety of lithic debitage, some tools and a projectile point.

SITE TYPES: Prehistoric campsite: stone foundation

CULTURAL AFFILIATION: DlOp-15 - Avonlea

DATES: DlOp-14 - early 1900s
DlOp-15 - approximately 1500 years old, based on projectile point typology

REPORT: Complete, entitled "Mitigation Results at DlOp-14 and DlOp-15", by J. Michael Quigg.

82-117

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Nova, An Alberta Corporation
Akuinu River Pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: North of Barrhead, proceeding west from the Athabasca River, crossing the Akuinu River; flat terrain with dune ridges and swampy area with spruce and tamarack; some disturbance.

METHODOLOGY: Right-of-way 16 m x 13 km, only spot checked in likely locations, and about 40 test pits were dug.

RESULTS: Three sites were found (GePo-1, 2, 3), one with possible hearth feature surrounded by flakes, another is semi-subterranean log structure; not judged significant.

SITE TYPES: Prehistoric campsite, small campsite, log cabin/shelter

REPORT: Complete, entitled "Historical resources impact assessment proposed Akuinu River Pipeline", by John Pollock.

82-122

Bea Loveseth
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Alberta Transportation
Highway 24 mitigation

PROJECT TYPE: Mitigation mapping and excavation of stone circles at EePi-3

LOCATION/SETTING: Southeast of Carseland, near the south bank of the Bow River; generally flat terrain covered with short grass prairie; undisturbed.

METHODOLOGY: Over a period of 11 days, seven stone circles were mapped and approximately 30 square metres were excavated, within and between the rings; one ring was completely excavated.

RESULTS: 846 artifacts were recovered, mostly debitage, but also 66 tools; most rings were thought to contain a central hearth.

CULTURAL AFFILIATION: Pelican Lake

DATE: On the basis of typology, 2000 to 3000 years old

REPORT: Complete, entitled "Final report historical resources impact mitigation EePi-3, Highway 24, Carseland", by Bea Loveseth.

82-125

R. J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Alberta Transportation
SR 884 mitigation

PROJECT TYPE: Evaluative excavations and mapping

LOCATION/SETTING: About 55 km south of Youngstown, on a terrace overlooking a tributary of Blood Indian Creek; gently rolling terrain covered by grassland.

METHODOLOGY: A stone circle and surrounding area was tested by 13 1 x 1 m test units.

RESULTS: Thirteen artifacts were recovered, mostly debitage; one bone peg was found, thought to have helped hold down tipi, representing first find of this type in Alberta; although artifact recovery was low, the site was assessed as highly significant.

REPORT: Complete, entitled "Evaluation excavations Site EgOt-4 Blood Indian Creek Stone circles", by R. J. Heitzmann.

82-128

E. McCullough
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Alberta Transportation
SR 546 and 553, Kananaskis

PROJECT TYPE: Mitigative excavations at four sites

LOCATION/SETTING: In the southern Alberta foothills, southwest of Calgary near Bragg Creek and Turner Valley; in the Elbow and Sheep River valleys, which are generally in the Boreal Forest/Cordilleran Transition zone.

METHODOLOGY: Sites EdPp-21, 22, and EfPq-5, 6 were excavated by a combination of transect trenches, one square metre units, and block excavations. Between 30 and 70 square metres were excavated at each site.

RESULTS: Two sites (EdPp-21, EfPq-5) were interpreted as multicomponent, based on projectile point typology, although there was no stratigraphic separation. Numerous artifacts, representing a complete range of tools and debitage, were recovered, indicative of a wide range of activities. Some pottery fragments and some historic artifacts were also found. Cultural features located were a stone slab circle and a hearth.

SITE TYPES: Habitation, campsites

CULTURAL AFFILIATION: Bitterroot, Oxbow, Pelican Lake, Avonlea, Besant, Old Women's Phase, Protohistoric

DATES: On the basis of point typology, these sites exhibit an age range from 5500 B.C. to A.D. 1750.
EfPq-5 - radiocarbon date of 1600 ±140 B.P.
EdPp-22 - radiometric dating in progress.

REPORT: Complete, entitled "Final report archaeological investigations Eastern Slopes region Sites EdPp-21, EdPp-22, EfPq-5, EfPq-6", by E. J. McCullough and G. J. Fedirchuk.

82-131

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Wispering Spruce Ranch Ltd.
Residential subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: West shore of Cold Lake, near the town of Cold Lake; terrain gently sloping towards lake and covered by heavy bush and trees; most of lakeshore is already developed.

METHODOLOGY: Area about 68 ha was inspected by transect survey with systematic subsurface testing (every 25 m near the lakeshore).

RESULTS: Three sites were found (GdOn-11, 12, 13); flakes only were found, no buried cultural materials; not considered significant.

SITE TYPES: Isolated finds; small surface scatter

REPORT: Complete, entitled "Historical resources impact assessment of a proposed subdivision, Cold Lake, Alberta", by John Pollock.

82-132

Stan Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

City of Calgary,
Top Hill Reservoir site

PROJECT TYPE: HRIA

LOCATION/SETTING: Northwest edge of Calgary, on a prominent kame; mixed tree/grassland vegetation on undulating terrain; little previous disturbance.

METHODOLOGY: Study area 5.78 ha, with 21.3 m wide feeder main and access road was examined by foot traverse, and approximately 14 shovel tests and 10 backhoe tests were dug.

RESULTS: No new sites were found; one previously identified rock concentration was tested and no cultural materials were found; therefore, it was not considered a site of any significance.

REPORT: Complete, entitled "Historical resources impact assessment, City of Calgary Top Hill reservoir site", by Stan Van Dyke.

82-134

E. J. McCullough
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road N.W.
Calgary, Alberta

Alberta Transportation
S.R. 813 extension

PROJECT TYPE: HRIA

LOCATION/SETTING: About 170 km north of Edmonton, between Calling Lake and Sandy Lake; terrain is generally level to gently rolling and covered with spruce forest; the majority of the route follows existing lines of disturbance.

METHODOLOGY: The proposed road is about 65 km long and 50 m wide, and was traversed by foot; judgementally placed shovel tests were excavated.

RESULTS: Three prehistoric sites were found (GkPi-2, GhPh-12, GiPi-1); one historic site was found (GiPi-1); buried cultural material (mostly debitage) was discovered; campsites fairly extensive.

SITE TYPES: Isolated find, campsites, homestead

REPORT: Complete, entitled "Historical resources impact assessment Alberta Transportation Secondary Road 813 extension", by E. J. McCullough.

82-136

Barry Newton
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Fort Industry Management Corp.
Industrial subdivision, Fort Saskatchewan

PROJECT TYPE: Evaluative testing and additional survey

LOCATION/SETTING: On a terrace on the southeast side of the North Saskatchewan River, just north of the limits of Fort Saskatchewan; on level to slightly undulating land which has been cultivated.

METHODOLOGY: Each of four sites was surface surveyed and systematically shovel tested; an adjacent cultivated area on the upper terrace was also surveyed and tested.

RESULTS: No subsurface cultural remains were discovered; two small sites (FkPg-70, 71) were found.

SITE TYPES: New sites are isolated findspots.

REPORT: Complete, entitled "FkPg-10, 11, 12, and 13 shovel testing near Fort Saskatchewan, Alberta Permit 82-136 final report", by Barry Newton.

82-137

J. Michael Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Dome Petroleum Ltd.
Arrowwood gas gathering system

PROJECT TYPE: HRIA

LOCATION/SETTING: About 32 km east of High River, running NW-SE, crossing Highway 23 and West Arrowwood Creek; shortgrass prairie on relatively flat terrain, almost entirely cultivated.

METHODOLOGY: 13 km x 15 m wide pipeline right-of-way was surveyed in a zigzag pattern by foot and vehicle traverses; where cultural material was encountered, subsurface shovel tests were conducted.

RESULTS: Six prehistoric sites were located (EdPi-1 to 6); no buried cultural material was found; artifacts consisted of debitage; sites not considered significant.

SITE TYPES: small camp, surface scatters

REPORT: Complete, entitled "Arrowwood Gas Gathering System: an historical resource evaluation", by J. Michael Quigg.

82-140

R. J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Bruyer Consulting Group Ltd.
Amex - The Meadows housing subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: In southeast Edmonton; generally flat, covered with Aspen Parkland; entire study area ploughed.

METHODOLOGY: Study area of about 64 ha was surveyed by systematic foot traverses, with regularly spaced shovel tests.

RESULTS: No sites were found.

REPORT: Complete, entitled "Historical resources impact assessment Bruyer Consulting Group Ltd. Amex - The Meadows housing subdivision", by R. J. Heitzmann.

82-143

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Nova, An Alberta Corporation
Linaria/Jarvie/Neerlandia pipeline system

PROJECT TYPE: HRIA

LOCATION/SETTING: West of Jarvie, between the Athabasca River and Highway 44, crossing the Pembina River; topography is flat to gently rolling; areas of peat, muskeg, and aspen covered sand dunes.

METHODOLOGY: Right-of-way 47 km long x 18 m wide was surveyed by zigzag foot traverse with judgementally placed shovel tests; where cultural material was located, five more shovel tests were dug.

RESULTS: Three sites were found (GcPm-1, GcPl-1, GcPn-1); recovered small amounts of artifactual material, consisting of flakes, biface, cobbles and a projectile point; no buried cultural materials were found; sites not judged significant.

SITE TYPES: Isolated findspot, surface scatter, campsite

REPORT: Complete, entitled "Historical resources impact assessment Linaria/Jarvie/Neerlandia Pipeline system", by John Pollock.

82-149

J. Michael Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Nova, an Alberta Corporation
Aeco "F" Lateral

PROJECT TYPE: Preliminary HRIA

LOCATION/SETTING: North of Medicine Hat, southeast of the South Saskatchewan River; terrain is gently rolling or hummocky, covered by short grass prairie; about one quarter of the study area has been cultivated.

METHODOLOGY: The pipeline right-of-way (21.5 km long and 23 m wide) was inspected to assess the potential for avoiding previously recorded sites. These sites were visited and assessed, and a cursory right-of-way inspection was undertaken.

RESULTS: One new site (EcOo-28) was found; recommendations were made for mapping and testing at all known sites in the right-of-way.

SITE TYPES: Stone circles, cairns, campsites

REPORT: Complete, entitled "Inspection and recommmendations for the Aeco 'F' Lateral", by J. Michael Quigg.

82-154

J. Michael Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Canadian Landmasters Resource Services
Roxy Petroleum wellsite

PROJECT TYPE: HRIA

LOCATION/SETTING: South of the Red Deer River, near the town of Cavendish; on high ground, covered by grassland.

METHODOLOGY: Study area is 90 m square, with an access road 448 m long and 15 m wide; complete foot traverse was done, and three shovel tests were dug.

RESULTS: An extensive stone circle site (EeOo-18) was found with 30 to 40 circles, one of which was inside the study area; some flakes were noted; shovel tests yielded nothing; wellsite was moved and impacts avoided.

SITE TYPES: Stone circles and cairns

REPORT: Complete, entitled "Avoidance of EeOo-18 at Roxy Petroleum Wellsite", by J. Michael Quigg.

82-159 **Brian O.K. Reeves**
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Novalta Resources
North Princess gas gathering system

PROJECT TYPE: HRIA

LOCATION/SETTING: Crossing the Red Deer River near the community of Iddesleigh in southeastern Alberta; terrain is gently undulating except the river valley, which is deeply dissected; vegetation is short grass prairie and much of the area has been cultivated.

METHODOLOGY: Right-of-way approximately 5 km in length and 15 m wide (30 m at river) was traversed on foot, with particular attention paid to the river valley.

RESULTS: One prehistoric site and one partial dinosaur were found; although both were judged significant, they could be avoided by development.

SITE TYPES: Tipi rings and cairns; paleontological

REPORT: Complete, entitled "Final report historical resources impact assessment North Princess gas gathering system", by Brian O. K. Reeves.

83-2

Bea Loveseth
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Lombard North Group
Carburn Park
Gravel excavation mitigation

PROJECT TYPE: Conservation excavations at EfPm-143

LOCATION/SETTING: South end of the City of Calgary, on alluvial terraces on the east side of the Bow River.

METHODOLOGY: First Phase: assessment excavation of 12 square metres
Second Phase: conservation excavation of 12 square metres

RESULTS: Identification of four buried cultural components discontinuously preserved across the site; these produced limited samples of faunal and lithic material.

SITE TYPE: The small sample size and the dispersed nature of cultural material hinder interpretation, but are suggestive of campsite activities, including lithic reduction and tool maintenance, and some bone processing.

DATES: Radiocarbon assay on bone from Component 4 produced a date of 3510±60 years B.P. (Beta-6695).

REPORT: In final preparation stages, to be entitled "Conservation Excavations, Proposed Gravel Extraction Operations, Carburn Park", by Bea Loveseth.

83-4

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Canterra Energy Ltd.
Blackstone-Brazeau gathering line

PROJECT TYPE: HRIA

LOCATION/SETTING: North and west of Rocky Mountain House; for part of its length, the line will share a common right-of-way.

METHODOLOGY: The proposed line is 27 km long; however, because the ground was snow covered and frozen, the study was restricted to backhoe excavations of the Brazeau and Elk river crossings. Sediment was removed in approximate 10 cm levels, and was closely examined.

RESULTS: Two sites were found (FfQa-2, FfQb-2).

SITE TYPE: Isolated finds

REPORT: Complete, entitled "Final report historical resources impact assessment Blackstone-Brazeau gathering system", by Stanley Van Dyke.

83-5

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Tritek Engineering Ltd. & Athabasca University
Building site

PROJECT TYPE: HRIA

LOCATION/SETTING: This project examined the Athabasca University site in the Town of Athabasca, Alberta; on the plains level near the top of the bank of the Athabasca Valley; previously ploughed and used for agriculture.

METHODOLOGY: Visual surface examination was done during foot traverses, with some shovel testing. Part of the access road was examined in the early spring with the aid of a bulldozer.

RESULTS: Four historical resources sites (GePh-9 to 11) were located. None were judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated finds, artifact scatter, historic garbage dump

REPORT: Complete, entitled "Historical Resources Impact Assessment Athabasca University Project I. Final Report", by R. J. Heitzmann, and G. J. Fedirchuk.

83-6

Donald N. Steer
DS Consulting
723 Woodpark Blvd. S.W.
Calgary, Alberta

Gulf Canada Resources Inc.
Trochu gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: Trochu - Three Hills area of south-central Alberta, near the Red Deer River; native vegetation has been displaced by cultivated crops over most of study area.

METHODOLOGY: Systematic foot traverse of a 22 km x 15 m right-of-way, with judgementally located shovel testing; extensive subsurface testing at identified site locations.

RESULTS: Three sites (EkPg-7, 8, 9) were recorded; recovered artifacts included lithics and bone (some burnt). Fire broken rock was noted at all sites. No buried cultural remains were found.

SITE TYPES: Prehistoric campsites (limited activity loci)

REPORT: Complete, entitled "Heritage Resource Impact Assessment Gulf Canada Resources Inc. Trochu Gas Pipeline Right-of-Way", by D. N. Steer.

83-8

J. Rod Vickers
Archaeological Survey of Alberta

Alberta Culture
Saamis Site

PROJECT TYPE: Research; location of south boundary of Saamis Site (EaOq-7) for designation

LOCATION/SETTING: In Medicine Hat; the site is located within the valley of Seven Persons Creek, on two low terraces.

METHODOLOGY: Two terraces south of the creek were examined. Some 37 auger holes and a 1 x 1 m test unit were dug on the lower terrace. A single 1 x 1 m test unit was dug on a knoll (terrace remnant) further south.

RESULTS: The lower terrace test yielded bison bone and a side-notched point (66-75 cm BS) and appears similar to the bison processing area noted north of the creek by Milne Brumley. The knoll yielded ceramics and other campsite materials similar to those found by Milne Brumley; these were present at 0-11 cm BS. Augering was a poor technique due to the depth of burial.

CULTURAL AFFILIATION: Old Women's Phase - Protohistoric

DATES: 210±80 BP (S827), 435±125 BP (S824), 85±70 BP (S825); see Milne Brumley 1978:147.

REPORT: Main site report: The Saamis Site, ASC Paper No. 79 (Mercury Series), by L. Milne Brumley (1978); designation report by J.R. Vickers on file at the Archaeological Survey of Alberta.

83-9

Bruce Wright
ARESCO Ltd.
2912 - 18th Street, N.E.
Calgary, Alberta

Hat Development Ltd.
Ross Glen subdivision

PROJECT TYPE: Site monitoring (DlOp-2 - Ross Glen site)

LOCATION/SETTING: Within the city of Medicine Hat, on prairie level adjacent to Bulls Head Coulee.

METHODOLOGY: An earth-mover was utilized to remove the topsoil from the site in two to three passes while the consultant watched, identified, recorded and mapped features as they became exposed.

RESULTS: An additional six buried features were located and several hundred pieces of cultural material were observed.

SITE TYPE: tipi ring site

CULTURAL AFFILIATION: Besant

REPORT: Complete, entitled "Ross Glen site topsoil stripping-historical resource monitoring", by Bruce Wright; includes a general discussion of pre-construction monitoring.

83-10

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Cochrane West Lands
Residential development

PROJECT TYPE: HRIA and mitigation

LOCATION/SETTING: Immediately west of Cochrane, Alberta; terrain is largely flat and grass covered.

METHODOLOGY: The study area of approximately 85 ha was surficially examined. Grass cover was fired to expose the surface. 23 stone circles were mapped, and 94 square metres were excavated from the interior of five circles.

RESULTS: 117 stone circles were identified; 21 artifacts (non-diagnostic) and three bone fragments were recovered during excavations.

REPORT: In preparation; will include an analysis of ring configuration and distribution.

83-12

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Fording Coal Ltd.
Genesse Power Project, mine developments

PROJECT TYPE: HRIA

LOCATION/SETTING: 50 km southwest of Edmonton, in the Aspen Parkland region; terrain is undulating, and the majority of the study area has been cultivated.

METHODOLOGY: An area of 243 ha was assessed by traverses at 50 m intervals. Where artifacts were visible, shovel tests were dug. In addition to the new sites, 21 previously located sites were also assessed.

RESULTS: 44 prehistoric sites were found (FiPn-266 to 306, FiPo-280 to 282), all in plough-zone context. Excluding isolated finds, sites ranged in size from about .003 ha to 2.0 ha, and artifact content ranged between 2 and 103 artifacts. Two sites yielded projectile points.

SITE TYPES: 7 isolated finds, 15 small finds (between 2 and 5 artifacts), lithic scatters (6 or more artifacts).

CULTURAL AFFILIATION: Bitterroot, Mummy Cave

DATES: Middle Prehistoric period

REPORT: In preparation; to be titled "Genesse Power Project 1983, Historical resources impact assessment, Fording Coal developments", by Stanley Van Dyke.

83-13

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Research
Todd Creek Site

PROJECT TYPE: Research and assessment of DjPm-51

LOCATION/SETTING: North of Cowley on Todd Creek

METHODOLOGY: Excavation of 4 square metres, plus shovel tests; three days in the field by a party of two.

RESULTS: Site excavation revealed two occupations (20 cm and 40 cm B.S.); extensive bone remains and a few bone tools; foetal remains imply spring occupations; little ceramic material was recovered.

SITE TYPE: Bone processing area

CULTURAL AFFILIATION: Old Women's Phase, based on points from cutbank

REPORT: In preparation; report will concentrate on ceramic material.

ADDITIONAL INFORMATION: Site contains small kill area as well; significant amounts of ceramics from cutbank.

83-14 **Roderick J. Heitzmann**
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Westcoast Petroleum Ltd.
McGregor Lake pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: In the County of Vulcan; in a grasslands area east of McGregor Lake.

METHODOLOGY: The pipeline right-of-way 1.6 km long was examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: No historical resource sites were located. This may be attributable to the short length of right-of-way examined and the low lying route of the pipeline.

REPORT: Complete, entitled "Historical Resources Impact Assessment Westcoast Petroleum Ltd. Pipeline County of Vulcan. Final Report", by R. J. Heitzmann.

83-15 **Roderick J. Heitzmann**
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Dome Petroleum Limited
Haight gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: Near Vegreville, Alberta; across rolling upland terrain in the parkland zone; most of the area was ploughed.

METHODOLOGY: The 28 km pipeline right-of-way was examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: One historical resource site (FjPc-6) was located. It was not judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated find

REPORT: Complete, entitled "Historical Resources Impact Assessment Dome Petroleum Limited. Haight Gas Gathering System. Final Report", by R. J. Heitzmann.

83-16

Jennifer Hunt
DS Consulting
723 Woodpark Blvd., S.W.
Calgary, Alberta

Nova, An Alberta Corporation
Schuler gas pipeline

PROJECT TYPE: HRIA/mitigation excavations at EcOo-12, 13, 18, 20 and 28.

LOCATION/SETTING: Approximately 40 km north of Medicine Hat and east of South Saskatchewan River; gently rolling natural short grass-covered terrain with coulees; some site disturbance caused by pipeline construction projects.

METHODOLOGY: Controlled excavation of five prehistoric sites and detailed remapping of all site-related stone features. All cairns found within the proposed right-of-way were totally excavated. Stone circles which fell within the alignment were tested by means of eight 1 x 1 m units placed both inside and outside the feature. The units were excavated in 10 cm levels to a depth of at least 15 cm below surface; one site was tested by two 2 x 2 m units excavated to a maximum depth of 130 cm; cultural materal was recovered to a depth of 20 cm with some bone recovered at greater depths.

RESULTS: 24 lithic specimens and 237 bone fragments were recovered from the buried campsite; several tool types, including a Pelican Lake point, were found at the 10 cm to 20 cm level. A Besant point and other lithics were recovered as surface finds during a previous survey (1978). Three of the four rock feature sites were virtually sterile; the largest ring site (EcOo-18) produced quartzite flake debitage.

SITE TYPES: Buried campsite, cairn/stone circle sites

CULTURAL AFFILIATION: Site EcOo-20: Pelican Lake, Besant

DATES: Middle Prehistoric period

REPORT: Complete; entitled "Archaeological Investigations at Five Sites on the Aeco F Lateral, Southeast Alberta", by Jennifer Hunt.

83-18

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Rachynski Land Surveys Ltd.
Ashmont housing subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Near Ashmont, Alberta, in the boreal forest-parkland transition zone; previously ploughed and used for agriculture.

METHODOLOGY: The study area of about 40 ha was examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: One historical resource site (GaOv-2) was located. It is not judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated find

REPORT: Complete, entitled "Historical Resources Impact Assessment Proposed Subdivision. Final Report" by R.J. Heitzmann.

83-20

Margaret Kennedy
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Alberta Transportation
Crowsnest Pass
Highway 3 realignment
mitigation

PROJECT TYPE: Conservation excavations of DjPo-63

LOCATION/SETTING: West edge of town of Blairmore, Crowsnest Pass; on east edge of Crowsnest Pass Golf Course; on an alluvial fan terrace north of Crowsnest River.

METHODOLOGY: Block conservation excavations

RESULTS: Three buried components were identified, and a large sample of artifacts were recovered, representing a wide range of tools and debitage.

SITE TYPES: Upper component characterized by campsite activities; middle component identified as Etherington Chert workshop and associated campsite; lowest component poorly represented except by reduction of large quartzite core.

DATES: Tentatively assigned to Middle Prehistoric Period, and Late Prehistoric Period

REPORT: In preparation

83-21

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Western Oilfield
Environmental Services
Drowning Ford
wellsite and pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: North of Medicine Hat along east side of South Saskatchewan River.

METHODOLOGY: Assessment of four wellsites and associated pipelines (7 km) by foot traversing and shovel testing.

RESULTS: One site was found (EbOp-161).

SITE TYPE: Stone circle site (3 stone circles)

REPORT: Completed, entitled "Soquip Petroleum Developments: An historical resource impact assessment" by J. Michael Quigg.

83-23

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Edmonton Power
Genesee Project
Borrow sources,
soil storage areas

PROJECT TYPE: HRIA

LOCATION/SETTING: In the Parkland region, about 50 km southwest of Edmonton; primarily cultivated fields.

METHODOLOGY: The study area of about 75.5 ha was examined by pre-survey disking/tilling and/or firing of developable areas.

RESULTS: 56 new sites were found (FiPn-223 to 265; FiPo 267, 269 to 279). Eight previously recorded sites were re-examined. Bifaces and other large tools occurred frequently in the collections, and several projectile points were recovered.

SITE TYPES: Isolated finds (5), small finds/lithic scatters (39), lithic activity areas (7), campsite activity areas(5).

CULTURAL AFFILIATION: Milnesand, Cascade, Pelican Lake, Thalteilei

REPORT: In preparation

83-24

Jack Brink
Archaeological Survey
of Alberta

Alberta Culture
Head-Smashed-In
Buffalo Jump

PROJECT TYPE: HRIA, mitigation, research

LOCATION/SETTING: The project was conducted at the Head-Smashed-In Buffalo Jump (DkPj-1), 16 km west of Fort Macleod, Alberta, on the eastern flanks of the Porcupine Hills.

METHODOLOGY: Areas to be disturbed by construction of visitor centre, parking lots and roads were examined with shovel and auger tests, backhoe tests, and 2 x 2 m excavation units. Research excavations utilized 1 x 1 m, 1 x 2 m and 2 x 2 m excavation units.

RESULTS: The building site was determined to lie outside of the kill site deposits which are situated some 200 m north of the proposed building. The parking and road facilities intersected minor archaeological deposits related but peripheral to the main butcher/processing site on the prairie below the cliff. Excavation of a 118 square metre area was considered sufficient to retrieve a representative sample of the camping and butchering activities in this area. Analysis is continuing of the results of research excavations in the main camp/processing site and in the spring gulley which bisects the site.

SITE TYPE: Buffalo jump and associated camp/processing areas

REPORT: Preliminary report in this volume; final report in preparation.

ADDITIONAL INFORMATION: Part of the 1983 research studies included a preliminary test of the stratified deposits in the spring gulley. A report on these studies is being prepared by Richard Morlan of the Archaeological Survey of Canada.

83-25

Margaret Kennedy
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Lethbridge Urban Parks
Proposed Park development

PROJECT TYPE: Historical synthesis and HRIA

LOCATION/SETTING: Indian Battle Park and Nature Reserve within City of Lethbridge; study area consists largely of river bottoms and coulee slopes; historic resources in bottoms have been affected by river flooding and development of existing park.

METHODOLOGY: Archival, documentary and photographic search, followed by surface reconnaissance of the study area.

RESULTS: A synthesis of changing land use in Indian Battle Park over past 12,000 years, and development of four historic themes for park interpretation. Thirty-nine historic and archaeological sites were examined, including the early settlement/coal mining complex of

Coalbanks, numerous independent drift mines, and the post-Coalbanks occupation of the river bottoms (ca. 1893-1965). (For previously recorded Borden numbers, refer to Saylor 1982, permit 82-92).

SITE TYPES: Coal mines and associated features, historic garbage dumps, structural foundations, cemetery and a railway bed.

REPORT: Complete, entitled "Final Report Historical Synthesis and Assessment, Lethbridge Urban Parks Project, Indian Battle Park and Nature Reserve", by Margaret Kennedy and Brian Reeves.

83-26

Dr. James Helmer
Department of Archaeology
University of Calgary
Calgary, Alberta

Alberta Culture
Strathcona Site

PROJECT TYPE: Research/archaeology field school: continuing excavations at FjPi-29

LOCATION/SETTING: On the east side of the North Saskatchewan River, in the County of Strathcona, near the eastern limits of the City of Edmonton; in the Parkland zone; partly disturbed.

METHODOLOGY: Following a stratified cluster sampling design, 24 1 x 1 m units were excavated; the proposed stratified random sampling survey of Tp 251 Rg 25 was cancelled due to land access problems.

RESULTS: Approximately 3700 lithic artifacts and bone fragments were recovered, representing a complete range of tool and debitage types.

SITE TYPE: Lithic workshop/habitation

CULTURAL AFFILIATION: Middle Prehistoric to Late Prehistoric (Oxbow, Duncan, McKean, Pelican Lake, Avonlea and Old Women's)

DATES: ca. 5000 BP to contact, based on projectile point typology.

REPORT: In preparation

83-28

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Esso Resources Canada Ltd.
Cold Lake water pipeline

PROJECT TYPE: HRIA and test excavations

LOCATION/SETTING: Adjacent to the town of Cold Lake, Alberta, across rolling forested terrain west of the lake.

METHODOLOGY: The study area (including 10.5 km of pipeline and access road right-of-way and a water intake site), was examined during foot traverses, with visual surface examination and shovel testing. Subsequently, 51 1 x 1 m test units were dug at GdOn-14.

RESULTS: Two historical resources sites were located, consisting of one prehistoric site, (GdOn-14), and one historic site, two cabin ruins constructed by Mr. Charles A. Labatt early in this century. GdOn-14 had no cultural stratigraphy, however, three time diagnostic artifacts were recovered, as well as a range of lithic tools and debitage. Raw material included local quartzite, Beaver River sandstone and Knife River Flint.

SITE TYPES: Campsite (GdOn-14), historic cabin ruins (Charles A. Labatt Homestead)

CULTURAL AFFILIATION: McKean

DATES: About 4500 - 3500 B.P., based on point typology.

REPORT: Complete, entitled "Historical Resources Impact Assessment Esso Resources Canada Limited Cold Lake Water Pipeline, Water Intake and Water Filtration plant site. Final Report", by R.J. Heitzmann, G.J. Fedirchuk, and E.J. McCullough.

83-30

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Husky Oil Operations Ltd.
Cold Lake pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: From south of Muriel Lake to west of Lloydminster, Alberta; the area is in the Parkland region and is largely ploughed for agriculture.

METHODOLOGY: The 147 km right-of-way was examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: Six historical resources sites were located (FiOo-1, FjOp-2, FkOo-2, FkOp-5, FlOp-11, 12). None were

judged to be of sufficient value to warrant additional research.

REPORT: Complete, entitled "Historical Resources Impact Assessment Husky Oil Operations Ltd. Cold Lake Pipeline. Final Report", by R.J. Heitzmann and E.J. McCullough.

83-33

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Medicine Hat
Paradise Valley Golf Course

PROJECT TYPE: HRIA, Test excavation

LOCATION/SETTING: Within the city of Medicine Hat; in the valley bottom of Seven Persons Creek; immediately south of the Saamis Site.

METHODOLOGY: Surface reconnaissance, shovel testing and excavation of three 1 x 1 m units.

RESULTS: A total of 86 artifacts (non-diagnostic) were collected from EaOq-33 which had been previously tested by Vickers; site appeared to be fairly dense at the northern extremity but sparse elsewhere; site was later monitored during construction by Vickers.

SITE TYPE: campsite; possibly an extension of the Saamis site

REPORT: Complete, entitled "Historical resources impact assessment, Paradise Valley Par 3 golf course", by Rebecca Balcom.

83-34

J. Rod Vickers
Archaeological Survey of Alberta

Alberta Culture/ R.C.M.P.
Magrath Burial

PROJECT TYPE: Salvage excavation of burial (DiPf-6)

LOCATION: Prairie level on the north-facing bank of St. Mary River, 10 km northwest of Magrath.

METHODOLOGY: Trowel excavation of slump containing upper skeleton; collection of eroded material.

RESULTS: The skeleton of a 15 year old Native female had been placed in a prairie level crevice at the valley edge. Erosion resulted in crevice fill and skeleton moving downslope. No grave goods were noted. A surface camp and blowouts are present on prairie level adjacent to the burial; no diagnostics were observed.

REPORT: Complete, entitled "Final Report 1983 Salvage excavation of the DiPf-6 Burial near Magrath, Alberta", by J. Rod Vickers.

83-36

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Transportation
Assorted developments

PROJECT TYPE: HRIA

LOCATION/SETTING: In the community of Calling Lake, where an airport is planned on low-lying, fairly wet land; near Isle Lake, where a road is to be upgraded on mostly disturbed land; south of Monarch, in a lower terrace of the Oldman River, where a gravel pit is to be extended.

METHODOLOGY: Visual surface examination of rights-of-way 1 km and 20 km long, and an area of approximately 20 ha; shovel testing was done in areas of moderate to high potential, with intensive shovel testing where cultural materials were observed.

RESULTS: Six sites were recorded in the Isle Lake vicinity (FjPq-21 to 25, FkPp-15); nothing was found in the other two areas. Artifacts recovered were primarily flakes, although one projectile point was found.

SITE TYPES: 3 lookouts, 1 lithic scatter and 2 isolated finds

CULTURAL AFFILIATION: A Late Prehistoric side-notched projectile point was located at FjPq-22.

REPORT: Complete, entitled "Historical resource impact assessments at Calling Lake, Isle Lake, and Monarch", by Rebecca Balcom.

83-37

Bruce F. Ball
Archaeological Survey of Alberta

Alberta Culture
Brule Site

PROJECT TYPE: Research - to recover charcoal samples from FhQl-4 to date site.

LOCATION/SETTING: Brule Lake, west of Hinton; site area is cleared and used for grazing.

METHODOLOGY: A column sample was taken from FhQl-4 (site appears to have 3 components). Column was 50 cm x 50 cm and 3.7 m deep. Samples were recovered at 10 cm intervals.

RESULTS: Analysis is not complete.

SITE TYPE: Stratified

CULTURAL AFFILIATION: Early Middle Prehistoric period

DATES: 8675±270 years B.P. and 7010±1560 years B.P.

REPORT: In preparation; preliminary information in "Archaeology of the Athabasca River Valley between Jasper and Hinton, 1981", by Bruce F. Ball.

83-38

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Alberta Transportation
SR940

PROJECT TYPE: HRIA

LOCATION/SETTING: South of Grande Prairie, Alberta; area is in the Boreal - Cordilleran Transition Zone and is heavily forested.

METHODOLOGY: The proposed right-of-way (about 50 km long) was examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: Three previously recorded historical resources sites (GdQq-1 to 3) were examined. None were judged to be of sufficient value to warrant additional research.

SITE TYPES: Chipping station, surface scatters

REPORT: Complete, entitled "Historical Resources Impact Assessment Alberta Transportation Secondary Road 940:38 & 40 Final Report", by R.J. Heitzmann and G.J. Fedirchuk.

83-39

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Citadel Resources Ltd.
Westward Ho gas gathering system

PROJECT TYPE: HRIA

LOCATION/SETTING: 7.5 km northwest of Sundre, Alberta; area is hummocky terrain covered by mixed aspen-spruce forest interspersed with wetlands.

METHODOLOGY: A 20 km right-of-way was examined by four people for a one day period.

RESULTS: No sites were found.

REPORT: Complete, entitled "Historical resources impact assessment Citadel Resources Ltd. Westward Ho Project", by Stanley Van Dyke.

83-40

Bruce Wright
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Canadian Superior Oil Ltd.
Majorville-Scandia pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: Majorville area southeast of Calgary; area is native prairie with knob and kettle terrain.

METHODOLOGY: A pipeline route about 1 km in length was examined by a two-way foot traverse with shovel testing of the knolls.

RESULTS: No sites or features were recorded.

REPORT: Complete, entitled "Historical resources impact assessment Majorville - Scandia pipeline well site tie-in", by Bruce Wright.

83-41

Michael R.A. Forsman
Archaeological Survey of Alberta

Alberta Culture
Crowsnest Pass history

PROJECT TYPE: Research: survey and assessment of historical resources.

LOCATION/SETTING: In the Crowsnest Pass; Leich is on the lower terrace of the Crowsnest River, while Lille is in Gold Creek valley, at subalpine elevation.

METHODOLOGY: Over 500 ha were examined by surface traverses. Sites were recorded by written documentation, mapping and photography. Excavations were carried out at Leitch Collieries (DjPn-21) to expose part of the coking oven complex. Surface collection and test excavations were completed at Lille (DjPo-112), to examine intra-site distribution and to collect a representative sample of material culture.

RESULTS: Major new site areas were located at Lille and Leitch resulting in redefinition of site boundaries.

SITE TYPES: Mine sites, industrial remains and residential locations

DATES: ca. 1902-1914

REPORT: In preparation

83-43

Margaret Kennedy
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Fish Creek Provincial Park Interpretive Centre and Utility Corridor

PROJECT TYPE: HRIA

LOCATION/SETTING: Within Fish Creek Provincial Park, City of Calgary; valley floodplain immediately south of Fish Creek.

METHODOLOGY: A backhoe was used to test for the presence of site EfPm-50, known to exist on the valley floodplain and prairie level terrace, in the area of proposed development.

RESULTS: EfPm-50 was not found to extend to the area of the proposed interpretive centre. No further work was recommended.

REPORT: Complete, entitled "Historical Resources Impact Assessment, Proposed Interpretive Centre and Utility Corridor, Shaw's Meadow, Fish Creek Provincial Park", by Margaret Kennedy.

83-45

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Environment Crawling Valley reservoir

PROJECT TYPE: Mitigation excavation and some research oriented survey.

LOCATION/SETTING: Crawling Valley, near Bassano, and the areas of its confluence with the Bow and Red Deer River valleys; primarily undisturbed prairie lands.

METHODOLOGY: A total of 72 tipi rings from a number of sites were excavated; 14 rings were completely excavated and 60 ring peripheries were excavated (30 in Crawling Valley and 30 outside of the valley); survey at the Bow and Red Deer rivers was done by foot traverses; field work was conducted from July to September.

RESULTS: 23 new sites were found in the Bow River valley (EdPc-29 to 46), containing in excess of 310 tipi rings, and 12 sites were found in the Red Deer River valley (EhPb-12 to 23), with in excess of 440 tipi rings. Analysis of excavation results is currently in progress.

SITE TYPE: Tipi rings

REPORT: In preparation

83-46

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

City of Medicine Hat
Highway 1 Twinning

PROJECT TYPE: HRIA and test excavation

LOCATION/SETTING: East of Kin Coulee on Trans-Canada Highway in Medicine Hat.

METHODOLOGY: Foot reconnaissance, shovel testing, followed by site excavation.

RESULTS: One prehistoric cairn (EaOq-24) was found. Excavation revealed tiny bone fragments, a point fragment and nine pieces of debitage.

SITE TYPE: Cairn

REPORT: In preparation, to be entitled: "Historical Resource Assessment: Trans-Canada upgrading from Kin Coulee to East City Limits", by Mike Quigg. Includes brief review of cairn uses in southeastern Alberta.

83-47

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Alberta Recreation and Parks
Cold Lake Fish Hatchery & Chip Lake Recreation Area

PROJECT TYPE: HRIA

LOCATION/SETTING: The Cold Lake Fish Hatchery building site is approximately 400 m west of the west shore of Cold Lake, in a densely forested area. The Chip Lake Recreation Area is located on the east shore of Chip Lake, and has been partly cleared while the remainder is covered with poplar forest.

METHODOLOGY: The areas were examined by foot traverses, with visual surface examination and shovel testing.

RESULTS: Cold Lake - five new sites were located (GdOn-15 to 19), two of which are historic.
Chip Lake - one new prehistoric site was located (FkPu-1).

SITE TYPES: Campsites, isolated finds, historic

REPORT: In preparation

83-48

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Alberta Power Ltd.
Louise Creek-Mitsue East
transmission line

PROJECT TYPE: HRIA

LOCATION/SETTING: The right-of-way traverses the eastern flanks of the Swan Hills, between Slave Lake and the town of Swan Hills; much of the route consists of wetlands. A centre line had already been cut along the length of the route by bulldozer.

METHODOLOGY: The proposed transmission line was 103 km long; however, due to the extensive wetlands, only 36 km were examined, i.e., all areas accessible by vehicle, and segments with archaeological potential accessible by helicopter.

RESULTS: One site (GePt-1) was found.

SITE TYPE: Isolated find

REPORT: Complete, entitled "Historical resources impact assessment Louise Creek-Mitsue East 9L40, 240 kV proposed route", by Stanley Van Dyke.

83-49

Heinz Pyszczyk
Archaeological Survey
of Alberta

Alberta Culture
Historic Dunvegan
Missions

PROJECT TYPE: HRIA, test excavations at historic missions

LOCATION/SETTING: At Historic Dunvegan, about 24 km south of Fairview, Alberta; on the river flats on the north side of the Peace River; St. Charles Mission site is landscaped, while the St. Saviour's Mission site is treed and partly disturbed by road.

SITE TYPES: St. Charles Rectory, constructed in 1889;
St. Saviour's Mission (1879-1895).

METHODOLOGY: Surface reconnaissance and systematic shovel testing at the St. Saviour's Mission site; test excavations involved .5 x 2 or 3 m trenches at St. Charles Rectory.

RESULTS: St. Charles Rectory; test excavations around the rectory revealed:
1. no additional significant structural remains;
2. a large accumulation of refuse (historic artifacts) north of the building;

3. later period (early 1900s) bunkhouse was found east of the Rectory;
4. a scatter of lithic flakes indicates the presence of an aboriginal component.
St. Saviour's Mission: Surface reconnaissance revealed cellar depression and stone foundations belonging to mission buildings; test excavations near the area exposed structural remains. Additional systematic shovel tests in Mission grounds recovered surprisingly few faunal or artifactual remains. Surface examination of field north of Mission grounds and subsequent test excavations, revealed a thin surface scatter of historic and aboriginal artifacts, and a possible deeper, undisturbed prehistoric component.

REPORT: In preparation; will include a comprehensive description of all structural features exposed, and the types and quantities of artifacts and faunal remains recovered at each site.

83-50

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Shell Canada
Sarcee Line replacement

PROJECT TYPE: HRIA

LOCATION/SETTING: Area is southwest of Bragg Creek; route crosses Jumping Pound Creek and follows the upper terrace for nearly half of the length; the southern portion of the route crosses the Elbow River; almost the entire route is cultivated.

METHODOLOGY: The 16 km long right-of-way was subjected to visual examination and regularly spaced shovel tests.

RESULTS: No sites were recorded.

REPORT: Complete, entitled "Historical resources impact assessment, Jumping Pound Creek Complex", by Rebecca Balcom.

83-51

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Western Oilfield
Environmental Services
Big Valley pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: 6.5 km east of Big Valley in central Alberta.

METHODOLOGY: Pipeline right-of-way 16 m wide and 4 km long was surveyed by vehicle and foot traverse, with some judgementally placed shovel tests.

RESULTS: Two sites were located in right-of-way (FaPd-2 and 3).

SITE TYPES: Stone circle sites

REPORT: Completed, entitled, "Western Oilfield Environmental Services: An historical resource impact assessment near Big Valley", by J. Michael Quigg.

83-52

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Northwestern Utilities Limited
Salt Cavern pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: In the Parklands area east of Fort Saskatchewan; crosses ploughed fields for the entire route. Two small drainages are crossed.

METHODOLOGY: The 10 km long pipeline right-of-way was examined during foot traverses with visual surface examination and shovel testing.

RESULTS: No historical resource sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Northwestern Utilities Limited Salt Cavern Transmission Project. Final Report", by R. J. Heitzmann and G. J. Fedirchuk.

83-53

Raymond LeBlanc
Archaeological Survey of Alberta

Alberta Culture
The Bezya Site

PROJECT TYPE: Research: a continuation of test excavations at HhOv-73.

LOCATION/SETTING: East of Athabasca River, and northeast of Fort MacKay, Alberta; on a sandy, pine covered knoll in a muskeg area.

METHODOLOGY: The 1982 test trench which produced microcores and microblades was expanded to the north, east, and west during a nine day field programme in early August. An additional six and one half 1 x 1 m units were excavated using trowels and 3.2 mm (1/8 inch) mesh

screens. Ten shovel test pits were also excavated in other areas of the site in an attempt to locate further concentrations of microblade material.

RESULTS: The excavations in the microblade trench produced 172 artifacts including 11 complete and fragmentary microblades, various flakes, a burin spall, a side scraper, and a small amount of debitage. The shovel testing revealed no additional concentrations of microblade material but did isolate another area of cultural material approximately 3 m north of the microblade trench.

DATES: A composite charcoal sample was collected from the deepest natural level (Level 3) and has been submitted for dating purposes.

REPORT: A final report of 1982-83 test excavations is in preparation.

83-54 | **John W. Ives** | **Archaeological Survey of Alberta** | **Alberta Culture** | **Beaver River Sandstone source study**

PROJECT TYPE: Research: exploration to identify geological sources of Beaver River Sandstone raw material.

LOCATION/SETTING: Mainly the east bank of the Athabasca River, as far north as Bitumount and as far east as the Canterra plant, roughly 40 m east of the Athabasca River.

METHODOLOGY: Sections on both banks of the Athabasca River from Fort MacKay to Bitumount were assessed. Sections at and near the Cree Burn Lake site were examined, as were road cuts and borrow sources on the C.D.C. road to the Canterra Plant.

RESULTS: A new Beaver River Sandstone outcrop was discovered immediately south of HhOv-16. Sections at HhOv-16 yielded no trace of Beaver River Sandstone. No Beaver River Sandstone sources were noted on the road to the Canterra Plant, although site HhOt-1 was discovered. Extensive outcrops of low quality Beaver River Sandstone were encountered around the Alsands turn-off (the HhOv-66 area) on Highway 963.

SITE TYPE: Small surface scatter

REPORT: In preparation

83-55

Roderick J. Heitzmann
Fedirchuk McCullough
& Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Alberta Transportation
SR 884 mitigation

PROJECT TYPE: Mitigation excavations at EgOt-3

LOCATION/SETTING: Near Blood Indian Creek, south of Youngstown, Alberta; the site is situated on a hill overlooking Blood Indian Creek in the short prairie grasslands region.

METHODOLOGY: The site consists of two large stone circles, one of which will be impacted, and 55 square metres were excavated; 28 1 x 1 m units straddled the ring rocks, 26 1 x 1 m units were excavated within the stone circle and one 1 x 1 m unit was excavated outside the circle. Particular attention was directed towards locating bone pegs along the margin of the circle, as had been previously reported.

RESULTS: A total of 189 pieces of cultural material was recorded, including stone scrapers, flakes and fire broken rock. No additional bone pegs, nor any diagnostic materials were recorded.

REPORT: In preparation

83-57

Roderick J. Heitzmann
Fedirchuk McCullough &
Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

NOVA, An Alberta
Corporation
Hackett gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: Southeast of Stettler, Alberta, crossing sharply rolling knob and kettle terrain; vegetation is long grass prairie interspersed with small clumps of poplar.

METHODOLOGY: The 6.6 km long pipeline right-of-way was examined during foot traverses with visual surface examination and shovel testing.

RESULTS: Two sites were located, one prehistoric (FaPd-4) and one historic. None were judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated find, wind powered pump

REPORT: Complete, entitled "Historical Resources Impact Assessment NOVA, An Alberta Corporation Hackett Lateral Natural Gas Pipeline Final Report", by R.J. Heitzmann.

83-59

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Western Oilfield
Environmental Services
Wellsite development

PROJECT TYPE: HRIA

LOCATION/SETTING: On the east side of the South Saskatchewan River, 32 km north of Medicine Hat; two proposed wellsites are on the prairie level immediately overlooking the valley while the third is in natural prairie 0.5 km east of the valley rim.

METHODOLOGY: Foot traversing was undertaken at all three wellsites. Where surface stone features were found, wellsite relocation was attempted to reduce the potential impact. Shovel testing was completed, as well as examination of previous access roads and a fireguard. Monitoring of the well pad preparations was also carried out.

RESULTS: Three sites were discovered (EcOp-137, 138, 139); one could be avoided, the other two were test excavated. One site yielded considerable quantities of artifacts, mostly debitage, while the other yielded few pieces of cultural material.

REPORT: Complete, entitled: "Merland Explorations Ltd. Wellsites: An historical resource impact assessment north of Medicine Hat", by Mike Quigg.

83-62

Margaret Kennedy
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Town of Stettler
Water treatment plant
and related facilities

PROJECT TYPE: HRIA, test excavations

LOCATION/SETTING: On a broad terrace east of Red Deer River, 24 km southwest of Stettler. Transmission line links plant with Town of Stettler.

METHODOLOGY: Surface reconnaissance, judgemental shovel testing, limited backhoe testing on terrace, and limited excavations on upper terrace road access.

RESULTS: Eight historical resource sites were found (FbPg-7 to 13,) one with a buried component (FbPg-7).

SITE TYPES: One historic children's cemetery, three isolated finds, four lithic scatters

REPORT: Complete, entitled "Historical Resources Impact Assessment, Town of Stettler Water Treatment Plant, Road Access and Transmission Line", by Margaret Kennedy.

83-63 **Heinz Pyszczyk** **Alberta Culture**
Archaeological Survey of **Pawliuk Site**
of Alberta

PROJECT TYPE: Research: to investigate construction techniques of Ukrainian semi-subterranean dwellings at FjPb-2.

LOCATION/SETTING: About 11 km west of Vegreville, Alberta; on gently rolling terrain covered with aspen bush.

SITE TYPE: Dugout (Ukrainian semi-subterranean dwelling)

METHODOLOGY: Extensive excavations in "dugout" depression with additional systematic and random testing in the surrounding area.

RESULTS: Investigations provided relatively little evidence regarding construction of the Pawliuk Dugout due to later disturbance of this feature. Very few faunal remains and virtually no artifactual remains were recovered.

REPORT: Complete, entitled "Archaeological Investigations at the Pawliuk Dugout Site (FjPb-2), by Heinz W. Pyszczyk.

83-64 **Peter T. Bobrowsky** **Truxler**
4604 - 119 Avenue **residential subdivision**
Edmonton, Alberta

PROJECT TYPE: HRIA

LOCATION/SETTING: Southwest of Hinton, along Maskuta Creek; undisturbed.

METHODOLOGY: Surface reconnaissance in the form of systematic foot traverse of an area enclosing 4 ha, and 50 judgementally placed shovel tests measuring 50 x 50 cm in size; 6.4 mm (1/4 inch) screen was used.

RESULTS: No historical, archaeological or paleontological sites were found.

REPORT: In preparation, to be entitled "Historical Resources Impact Assessment: Maskuta Creek Subdivision - Final Report", by Peter T. Bobrowsky.

83-67	**Eugene M. Gryba** **3, 346 - 4th Avenue, N.E.** **Calgary, Alberta**	**Alberta Transportation/ Recreation and Parks** **Highway and recreational developments**

PROJECT TYPE: HRIA

LOCATION/SETTING: Throughout southern Alberta, in the vicinities of Stony Plain, Bentley, Taber, Hussar, Medicine Hat, Kananaskis Foothills.

METHODOLOGY: Foot traverse and shovel tests of proposed highway alignments, borrow sources, gravel pits, and recreation area developments.

RESULTS: Six prehistoric sites were found (DlOo-10, 11, 12, 14, DlPb-4 and FcPm-22), as well as homestead cellars (DlOo-13), abandoned farmstead; none of the sites is exceptional.

SITE TYPES: Five tipi ring sites, isolated find, homestead cellars and historic buildings

REPORT: Complete, entitled "A Final Report on a 1983 Historical Impact Assessment of Planned Highway Developments, Borrow Sources, Gravel Pits and Recreation Areas", by Eugene M. Gryba.

83-68	**Peter T. Bobrowsky** **4604 - 119 Avenue** **Edmonton, Alberta**	**Alberta Forest Service** **Chain Lakes** **Recreational development**

PROJECT TYPE: HRIA

LOCATION/SETTING: On the southeast shore of the southernmost of the Chain Lakes, northwest of the community of Athabasca.

METHODOLOGY: Foot traverse of an area enclosing 16 ha, with 45 systematic shovel tests and 33 judgementally located shovel tests, all measuring 50 x 50 cm; 6.4 mm (1/4 inch) mesh screens were employed.

RESULTS: No historical, archaeological or paleontological sites were found in the study area.

REPORT: In preparation, to be entitled "Historical Resources Impact Assessment: Chain Lakes Water Access Road Alberta Forestry Service - Final Report", by Peter T. Bobrowsky.

83-69

Bruce Wright
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Fish and Wildlife
McKinnon's Flats
development

PROJECT TYPE: Historical resources reconnaissance

LOCATION/SETTING: On McKinnon's Flats, south of Langdon on the north bank of the Bow River; primarily in the valley bottom.

METHODOLOGY: Study area of 134 ha was subjected to surface examination and shovel testing in areas of poor visibility and in cultural material concentrations.

RESULTS: A number of previously recorded sites were revisited (EePk-211 to 216, 218 to 224 and 253); two historic sites were recorded, EePk-273 (a tree burial) and the LK Ranch; both historic sites have interpretive potential.

SITE TYPES: Extensive campsite, tipi rings, tree burial, homestead

DATES: The LK Ranch (Lachlin McKinnon Homestead) dates to 1898.

REPORT: Complete, entitled "McKinnon's Flats site development study", by Bruce Wright.

83-71

Roderick J. Heitzmann
Fedirchuk McCullough
& Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

City of Grande Prairie
Urban park

PROJECT TYPE: HRIA

LOCATION/SETTING: This project examined an area proposed for parks development along Bear Creek valley within the City of Grande Prairie. The study area is partly agricultural, partly urban and partly forested.

METHODOLOGY: The area was examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: Four historical resources sites were located. One of these (GhQq-3) is prehistoric in age, while the other three are historic. (GhQq-1, 2, Sirley Homestead). One site (GhQq-1) , the remains of an early Grande Prairie building, has been recommended for protection and preservation. The remaining sites were not judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated find, historic sites

REPORT: Complete, entitled "Historical Resources Impact Assessment Grande Prairie Urban Parks. Final report", by R.J. Heitzmann.

83-73

Michael R.A. Forsman
Archaeological Survey of Alberta

Alberta Culture
Fort Whoop-Up and Fort Saskatchewan

PROJECT TYPE: Research: surveys to locate and assess the sites of an early whiskey post, Fort Whoop-Up (DjPf-2), and the Fort Saskatchewan North West Mounted Police post (FkPh-15).

LOCATION/SETTING: Fort Whoop-Up is located near the junction of the Oldman and St. Mary's rivers, southeast of Lethbridge. The Fort Saskatchewan N.W.M.P. post is located on the grounds of the Fort Saskatchewan Correctional centre.

METHODOLOGY: Surface traverses, test excavations.

RESULTS: River erosion destroyed the site of the first Fort Whoop-Up (1896-1870) around 1902. The second Fort Whoop-Up (1870-1874) is largely intact, although slightly damaged by pot-hunting and construction of a commemorative cairn. Continuing erosion by the Oldman River will probably destroy the second site. Fort Saskatchewan (1875-1911) has been partially impacted by roadways, building construction and the installation of subsurface utilities. Nevertheless, the extent of intact palisade remains together with portions of an undisturbed occupation horizon was considered a significant discovery.

SITE TYPES: Whiskey trading post, N.W.M.P. post

REPORT: In preparation

83-74

Shawn Haley
Haley-Charles Consulting
5111 Rundleview Road, N.E.
Calgary, Alberta

Deplaedt Holdings Ltd.
DeWinton residential subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Coulee on the south side of the Bow River, 8 km south of Calgary; natural prairie and tree stands, currently used as pasture.

METHODOLOGY: Systematic foot traverse of a 29 ha area with regularly spaced shovel tests; more detailed shovel testing in areas of cultural material.

RESULTS: One site was found (EfPl-137); artifact recovered was a single edge modified flake.

SITE TYPE: Isolated find

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Deplaedt Holdings Ltd. Subdivision", by Shawn D. Haley.

83-77

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Northwestern Utilities Limited
Lloydminster Buffalo Coulee pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: South of Vermilion, Alberta; the area is in the Parkland region and is largely ploughed.

METHODOLOGY: The 19.2 km long proposed pipeline right-of-way was examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: Five historical resources sites were located (FhOq-1 to 4, FhOr-1). None were judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated finds, artifact scatters

REPORT: Complete, entitled "Historical Resources Impact Assessment Northwestern Utilities Limited Lloydminster - Buffalo Coulee Interconnection. Final Report", by Gloria J. Fedirchuk.

83-79

Shawn Haley
Haley-Charles Consulting
5111 Rundleview Road, N.E.
Calgary, Alberta

Pockar Management Ltd.
Airdrie commercial subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: In cultivated field at west edge of Airdrie; straddles Nose Creek.

METHODOLOGY: Systematic foot traverse of a 23 ha area with regularly spaced shovel tests.

RESULTS: No historical resources sites were found.

REPORT: Complete, entitled "Final Report Historical Resources Impact Assessment Pockar Management Proposed Industrial Park Subdivision Airdrie", by Shawn D. Haley.

83-80

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Petro-Canada
Brazeau River gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: In the Boreal-Cordilleran Transition Zone west of Lodgepole, Alberta; major drainages affected include Dismal Creek and Pembina River.

METHODOLOGY: Portions of the 18 km pipeline right-of-way were selected for assessment by the Archaeological Survey of Alberta. These were examined by foot traverses, with visual surface examination and shovel testing.

RESULTS: No historical resources sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Brazeau River Gas Pipeline Project. Final Report", by G. J. Fedirchuk.

83-81

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Petro-Canada
Benjamin Creek gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: In the Foothills region west of Water Valley, Alberta, northwest of Calgary; the entire area is forested.

METHODOLOGY: Portions of the 17 km pipeline right-of-way were selected for assessment by the Archaeological Survey of Alberta. These were examined by foot traverses, with visual surface examination and shovel testing.

RESULTS: No historical resources sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Benjamin Creek Gathering System. Final Report", by G. J. Fedirchuk.

83-82

Gloria J. Fedirchuk
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Norwest Resource Consultants Limited
AOSTRA plant facilities

PROJECT TYPE: HRIA

LOCATION/SETTING: In the boreal forest region southwest of Fort MacKay, Alberta. Principal drainages crossed include the MacKay and Beaver rivers.

METHODOLOGY: The project examined a proposed facilities site, and associated roadway (17 km) and borrow sources. A helicopter overflight was undertaken to identify areas of medium and high potential. These were then examined during foot traverses accompanied by a shovel testing program.

RESULTS: No historical resources sites were located.

REPORT: Complete, entitled "Historical Resources Impact Assessment Norwest Resource Consultants Ltd. AOSTRA Underground Test Facilities. Final Report", by G. J. Fedirchuk.

83-83

W. J. Wood
W. J. Wood Consulting
801 - Norcen Tower
Calgary, Alberta

Luscar Ltd.
Sheerness open pit coal mine

PROJECT TYPE: HRIA designed to bring a previous study (1975) to current standards.

LOCATION/SETTING: Within the Sheerness coal fields southeast of Hanna. Eighty percent of the area was native prairie with most of the remaining 20 percent as stubble fields.

METHODOLOGY: Within the more than 4000 ha study area, systematic aligned walking transects were carried out on cultivated lands; complete, but unaligned traverses on native prairie.

RESULTS: Several of the 26 previously recorded sites were re-examined. During the course of this study, 30 new sites were found (EiOw-299 to 328). Of particular interest was a bison pound site consisting of two rock walls, over 75 rock cairns, bone deposits and hearths.

SITE TYPES: Tipi rings, cairns, isolated finds, surface scatters

REPORT: Complete, entitled "Sheerness Project Area Historical Resource Impact Assessment", by W. J. Wood.

83-84

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Oil Sands
Pipelines Ltd.
Scotford lateral pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: North of Fort Saskatchewan on both sides of the North Saskatchewan River; the entire route is cultivated.

METHODOLOGY: The 8.5 km right-of-way was subjected to surface examination and a limited amount of shovel testing.

RESULTS: No sites were found.

REPORT: Complete, entited "Historical resources impact assessment Scotford Lateral Pipeline", by Rebecca Balcom.

83-85

Heinz Pyszczyk
Archaeological Survey
of Alberta

Alberta Culture
Lakusta Site

PROJECT TYPE: Research at FlPg-67: to recover structural information regarding the granary, the barn, and the layout of the farmyard; also to recover a sample of artifacts relating to the time period.

LOCATION/SETTING: About 13 km southeast of Redwater, Alberta; flat terrain, in pasture.

SITE TYPE: Early Ukrainian homestead (ca. 1900-1949)

METHODOLOGY: Surface survey and mapping of surface features; test excavations at the location of the granary, an area southeast of the second house, and the area east of the fourth barn.

RESULTS: Investigations revealed that the granary and barn rested on a prepared mound and were supported along the walls and corners by a combination of rocks and logs. Two fences were located and another possible structure was found southeast of the second house. The site also contains a late prehistoric component.

REPORT: Complete, entitled "Archaeological Investigations at the Lakusta Site (FlPg-67)", by Heinz Pyszczyk and Brenda Belokrinicev.

83-86

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Western Oilfield
Environmental Services
Big Valley
gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: About 6.5 km east of Big Valley in central Alberta.

METHODOLOGY: Surface reconnaissance and shovel testing of pipeline right-of-way 1.2 km long and 15 m wide.

RESULTS: No new sites were found.

REPORT: Complete, entitled: "Gas pipeline near Big Valley: an historical resource impact assessment for Western Oilfield Environmental Services Ltd.", by J. Michael Quigg.

83-87

Eugene M. Gryba
3, 346 - 4 Avenue, N.E.
Calgary, Alberta

Alberta Transportation
SR 940

PROJECT TYPE: HRIA

LOCATION/SETTING: Smoky River valley, high Foothills 10 km north of Grande Cache; aspen and mixed forest.

METHODOLOGY: 18 km of 200 m wide proposed alignment were examined by foot traverse and shovel tests.

RESULTS: Four new sites were found (GaQs-2, 3, 4 and GaQr-1), and a previously located site (GaQs-1) was re-examined.

SITE TYPES: All are buried prehistoric campsites located on terraces or along valley edge.

CULTURAL AFFILIATION: Previous excavations at GaQs-1 yielded a Clovis point and notched points.

REPORTS: Complete, entitled "Historical Resources Impact Assessment of Highway 940 in the Smoky River Valley near Grande Cache", by Eugene M. Gryba.

83-89

E. J. McCullough
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

PanCanadian Petroleum Limited
Hussar-Crowfoot gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: In the Hussar-Crowfoot area, near Bassano, Alberta; gently rolling plains area of which approximately 90 percent had been ploughed and used for agriculture; the routes crossed several small creeks.

METHODOLOGY: The 157 km of proposed pipeline right-of-way were examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: Nine prehistoric sites were located (EfPe-19, 20; EfPf-9 to 11, EgPe-7, EgPf-17 to 19), plus a paleontological site. Most of these were not judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated finds, cairn, artifact scatters, campsites, paleontological

REPORT: Complete, entitled "Historical Resources Impact Assessment PanCanadian Petroleum Limited Hussar-Crowfoot Phase II Gas Facilities. Final Report", by E. J. McCullough and R. J. Heitzmann.

83-90

R.J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Petro-Canada Exploration
Arrowwood gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: South of Gleichen, Alberta, in gently rolling plains area of which approximately 90 percent had been ploughed and used for agriculture; the route crosses West Arrowwood Creek.

METHODOLOGY: The 18 km of proposed pipeline right-of-way were examined during foot traverses, with visual surface examination and shovel testing. One site (EePh-10) was tested for deeply buried deposits with backhoe trenches.

RESULTS: Six historical resources sites were located (EePh-8 to 13). Most of these were not judged to be of sufficient value to warrant additional research.

SITE TYPES: Isolated finds, artifact scatters, campsites, butchering station

REPORT: Complete, entitled "Historical resources impact assessment Petro-Canada Inc. Arrowwood Gas Project", by R.J. Heitzmann and E.J. McCullough.

83-92

Mike Quigg
Ethos Consultants Ltd.
Group Box 20, Veinerville
Medicine Hat, Alberta

Alberta Transportation
Highway 1 Twinning

PROJECT TYPE: Cultural resource inventory and assessment

LOCATION/SETTING: The project lies 60 km east of Calgary paralleling the Trans-Canada Highway near the Gleichen junction.

METHODOLOGY: The R.O.W., 40 m wide and 30 km long, was foot traversed; shovel tests were utilized to investigate areas of site potential which had little or no surface exposure. The area opposite the Gleichen Jump was evaluated by the excavation of ten 1 m units. The adjacent coulees were tested with four backhoe trenches. A historic structure, an eight sided barn, was recorded through measurements and photographs. Its history was gathered through interviews with the present and original land owners.

RESULTS: Three historical resources were encountered, two historic (EgPg-2, and one structure) and one prehistoric (EfPg-8). The latter yielded evidence of camping activities with lithic debitage and bone fragments dominating the limited assemblage of 150 artifacts. Four projectile points and six marginally retouched stone tools were the only tools recovered. No features or unusual artifacts were encountered. Only scattered bones were recovered from the backhoe trenches. Historic artifacts including glass, ceramics, crockery and metal were recovered from a corner of a ploughed field; no structural remains were found. The estimated age (less than 70 years) plus the lack of structural features implies a site of low significance. The eight sided barn was built in 1915 by Bennett and White of Calgary, as a horse barn and contained a round central loft. It has been a landmark in the area because of its unique shape; however, it is in a very poor state of preservation.

SITE TYPES: Prehistoric campsite, barn, historic scatter

CULTURAL AFFILIATION: Old Women's Phase

DATES: Late Prehistoric period, based on projectile point typology; the two historic sites are less than 70 years old.

REPORT: In preparation

83-93

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Texaco Canada Ltd.
A.E.G.S. to Bonnie Glen pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: East of Pigeon Lake, Central Alberta, through predominantly cleared agricultural lands.

METHODOLOGY: Complete foot traverse of pipeline right-of-way (17.5 km x 15 m), with judgemental subsurface testing.

RESULTS: Two sites were located (FgPk-1 and 2).

SITE TYPES: Isolated surface finds

REPORT: Complete, entitled "Historical resources impact assessment proposed liquid ethane supply pipeline A.E.G.S. to Bonnie Glen", by John Pollock.

83-94

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Dr. S. R. Souch
Recreational subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: East of Athabasca, Alberta, on North Buck Lake shoreline and backshore sand dunes.

METHODOLOGY: Study area of 20 ha was subjected to judgemental surface and subsurface inspection and testing.

RESULTS: Two prehistoric sites (GdPd-2 and 3) were found.

SITE TYPES: Isolated surface find, small buried campsite on lakeshore

REPORT: Complete, entitled "Historical resources impact assessment North Buck Lake, Alberta" by John Pollock.

83-95

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Wimpey Western Ltd.
Residential subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: City of Edmonton (Castledowns area)

METHODOLOGY: Study area of 64 ha was examined by foot traverse with subsurface tests.

RESULTS: One prehistoric findspot was located (FjPj-36).

SITE TYPES: Isolated find on surface

REPORT: Complete, entitled "Historical resources impact assessment Castledowns extension, Edmonton", by John Pollock.

ADDITIONAL INFORMATION: Several sites found on adjacent lands during previous survey. See project 81-151 by John Pollock, Settlement Surveys Ltd.

83-96

John W. Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Alberta Culture
Grekul House Foundation

PROJECT TYPE: To gather archaeological data on the foundation of the Grekul House (GaPc-12) to aid in restoration.

LOCATION/SETTING: Near Smoky Lake, Alberta

METHODOLOGY: 1 x 1 m test units and test trenches to locate and define foundation.

RESULTS: The foundation was found to consist of an original clay pad floor, followed by a sand capping at a later date, probably at the same time a wood floor was installed. Some stones were used for levelling at the corners.

SITE TYPES: Historic farmstead constructed in 1909 by Nykolai and Ieryna Grekul.

REPORT: Complete, entitled "Initial archaeological excavations Grekul House foundation (GaPc-12) Smoky Lake, Alberta", by John Pollock.

83-97

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

C & T Energy Resources Ltd.
Medicine River gathering pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: North and west of Sylvan Lake, near Red Deer, Alberta. Substantial areas of cultivation on flat to undulating hills adjacent to Sylvan Lake.

METHODOLOGY: Pipeline rights-of-way totalling 12 km with a width of 15 m, were traversed on foot, with all disturbed lands visually examined; shovel testing was conducted in woodlots and on pastures.

RESULTS: Two prehistoric sites were identified (FcPn-8 and FcPm-23). FcPn-8 consists of two secondary flakes,

while FcPm-23 consists of a projectile point mid-section modified to scraping tool, a small quartzite flake and a fragment of bone.

SITE TYPES: Both are small finds.

CULTURAL AFFILIATION: FcPm-23 is possibly Middle to Late Prehistoric in age.

REPORT: Complete, entitled "Historical Resources Impact Assessment Medicine River Prospect Gathering Facilities", by Stanley Van Dyke.

83-98

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Gulf Canada Resources
Gilby/Rimbey pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: South of Rimbey, across the watershed between the Blindman and Medicine rivers referred to as the Medicine Lodge hills.

METHODOLOGY: Pipeline right-of-way 10.9 km x 15 m was traversed on foot with all disturbed lands examined. Shovel testing was done in woodlots and on pastures.

RESULTS: One prehistoric site was identified (FcPn-9), which consists of a biface and a slice flake of quartzite in a tilled field. It is located on a prominent knoll with west facing aspect north of the watershed.

SITE TYPE: Small find

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment, Gilby/Rimbey Pipeline project", by Stanley Van Dyke.

83-99

W. J. Wood
W. J. Wood Consultig
801 Norcen Tower
Calgary, Alberta

B. Ogertschnig
Bellevue residential subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Within the community of Bellevue in the Crowsnest Pass region of Alberta.

METHODOLOGY: Within this 70 ha area, all lands were visually examined; all undisturbed as well as some disturbed areas were shovel tested. Previously recorded site DjPo-85 was also tested.

RESULTS: No new sites were found. DjPo-85 was identified as being a small, well defined campsite with a high subsurface artifact density.

SITE TYPE: Buried campsite

REPORT: Complete, entitled "Historical Resource Impact Assessment Bill Ogertschnig Property, Bellevue, Alberta", by W. J. Wood.

83-100

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Alberta Environment
Stabilization weir on Outlet Creek

PROJECT TYPE: HRIA

LOCATION/SETTING: Outlet Creek Prehistoric and Historic Village site (GdQf-1) on Iosegun Lake, north of Fox Creek, Alberta.

METHODOLOGY: Research included surface inspection and subsurface tests, plus informant interviews.

RESULTS: Three prehistoric site zones bordenized under one site (GdQf-1), a second prehistoric site (GdQf-2) a previously unknown historic cemetery, a recent trapper's cabin and the original weir are all contained within a former native peoples historic village area.

SITE TYPES: Buried prehistoric campsites, buried cabin foundations, log and plank weir, standing log cabin

REPORT: In preparation

83-101

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Makale & Kyllo Planning Associates Ltd.
Somadka industrial subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: North of Fort Saskatchewan on the upper east terrace of the North Saskatchewan River; almost completely ploughed.

METHODOLOGY: The 53 ha study area was examined by surface reconnaissance with shovel testing in areas of poor visibility and within areas where cultural material was observed.

RESULTS: Two previously recorded sites (FkPg-64 and 75) were re-evaluated and three new sites (FkPg-79, 80 and 81) were located.

SITE TYPES: Isolated finds, small lithic scatters,campsite

REPORT: Complete, entitled "Historical resource impact assessment Somadka Industrial Subdivision", by Rebecca Balcom.

83-102

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Gulf Canada Products Co.
pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: In Bashaw area north and east of Red Deer; crosses areas of undulating hills and tributary valley of the Battle River. Higher areas are marked by mixed woodlots and cultivated fields while lower areas are primarily cultivated.

METHODOLOGY: The pipeline right-of-way of approximately 23 km x 15 m was traversed on foot and all disturbed lands were examined. Shovel tests were placed in woodlots, on pastures and on the edges of prominent coulee features. An additional 10 km segment of the right-of-way which parallels the existing Malmo to Bashaw pipeline was examined where the right-of-way intersected areas containing known prehistoric sites.

RESULTS: Eight new prehistoric sites were identified (FdPh-5 to 8, FePh-2 to 5). These occurred in ploughed fields, primarily on the north facing slopes of the valley and in the hills to the south.

SITE TYPES: Small lithic scatters

DATES: Late Prehistoric, based on a projectile point from FePh-3.

REPORT: Complete, entitled "Final Report, Historical Resources Impact Assessment Bashaw Area", by Stanley Van Dyke.

83-103

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

TransAlta Utilities
Gravel pit operation

PROJECT TYPE: HRIA

LOCATION/SETTING: Rocky Mountain House

METHODOLOGY: Foot transects and systematic subsurface testing of a 13.57 ha area.

RESULTS: No sites were located.

REPORT: In preparation

83-104

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Pinecrest Construction
residential subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Rocky Mountain House

METHODOLOGY: An area of approximately 40 ha was examined by foot traverse and subsurface testing.

RESULTS: Two prehistoric sites were located (FcPr-13 and 14).

SITE TYPES: Isolated finds

REPORT: In preparation

83-105

Jennifer Hunt
Hunt Archaeology
68 Rundlelawn Place N.E.
Calgary, Alberta

D. Bigcharles
Blairmore subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Crowsnest Pass, south Blairmore; the study area was located near the Lost Lemon Campgrounds. The majority of the land in this particular area is moderate to steep slope, with swamp making up 14 percent of the area. Soil deposition was minimal. There had been some logging activities in the study area.

METHODOLOGY: The 31 ha study area was visually examined, with shovel testing of all level areas.

RESULTS: No archaeological sites were located.

REPORT: Complete, entitled "Historical Resource Impact Assessment of a Proposed Subdivision, Blairmore, Alberta", by Jennifer Hunt.

83-107

Donald N. Steer
DS Consulting
723 Woodpark Blvd., S.W.
Calgary, Alberta

Avala Engineering Ltd.
House River gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: May Hills-Lower House River area of northeastern Alberta; dense boreal forest.

METHODOLOGY: Systematic foot traverse of a 7.2 km x 15 m pipeline right-of-way, with judgementally placed shovel tests; extensive subsurface testing at identified site location.

RESULTS: One site (GjPb-1) was recorded; recovered artifacts included two quartzite lithics (non-diagnostic); no buried cultural remains were found.

SITE TYPE: Isolated prehistoric lithic scatter

REPORT: Complete, entitled "Historical Resources Impact Assessment Bralorne Resources Ltd. Tower Gathering System (North Section) Gas Pipeline Right-of-Way, House River", by D.N. Steer and J.M. White.

83-108

Rebecca J. Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Alberta Forest Service
Hidden Creek Forestry Trunk Road

PROJECT TYPE: HRIA

LOCATION/SETTING: Approximately 80 km northwest of Blairmore in the Hidden Creek area; runs mostly on side slope through dense pine and spruce forest, crossing a number of creeks; part of the route follows an existing seismic line.

METHODOLOGY: The southern 3.2 km of the 18 km route was foot traversed and the remainder assessed by helicopter overflight, with subsurface testing in moderate to high potential areas.

RESULTS: No archaeological sites were located; this was expected since historical resource potential of this route was very low.

REPORT: In preparation

83-109

Rebecca Balcom
ARESCO Ltd.
2912 - 17th Street, N.E.
Calgary, Alberta

Canadian Occidental Petroleum Ltd.
Mazeppa Gas Plant

PROJECT TYPE: HRIA

LOCATION/SETTING: Study area is 9 km northeast of High River on relatively flat ploughed lands; dry creek present.

METHODOLOGY: The 130 ha study area was examined by surface reconnaissance with shovel testing along portions of the dry creek where visibility was poor; shovel testing was done in areas of cultural material.

RESULTS: Three prehistoric sites (EdPk-22, 23 and 24) were recorded; sites were judged to be of little significance.

SITE TYPES: Two isolated finds, a small lithic scatter

REPORT: Complete, entitled "Historical resources impact assessment, Mazeppa gas plant", by Rebecca Balcom.

83-110

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Dome Petroleum Ltd.
Lloydminster Heavy Oil Experimental Project

PROJECT TYPE: HRIA

LOCATION/SETTING: North of Provost, Alberta

METHODOLOGY: Foot traverse with surface examination and subsurface testing of a 194 ha area.

RESULTS: Three prehistoric sites (FdOn-1, 3, and FcOo-1) as well as one historic foundation (FdOn-2) were found.

SITE TYPES: Isolated finds, buried historic farmstead foundation

REPORT: Complete, entitled "Historical resources impact assessment Dome David Lloydminster'A' caustic project", by John Pollock.

83-111

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.
6607 Bowness Road, N.W.
Calgary, Alberta

Alberta Transportation
Highway 2 improvements

PROJECT TYPE: HRIA

LOCATION/SETTING: In southern Alberta, along Highway 2 from north of Cardston, to Secondary Road 505. The entire route passed through level plains and has been extensively ploughed.

METHODOLOGY: Approximately 19 km of road right-of-way were examined during foot traverses, with visual surface examination and shovel testing.

RESULTS: No historical resources sites were located.

REPORT: In preparation

83-112

Rebecca Balcom
ARESCO Ltd.
2912 - 18 Street, N.E.
Calgary, Alberta

Western Irrigation District
Strathmore subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Within the town of Strathmore, east of Calgary; disturbed by cultivation, grazing, and buildings.

METHODOLOGY: A survey of the 64 ha area was done by surface inspection with judgemental shovel testing in areas of poor surface visibility.

RESULTS: No prehistoric features were found, but several historic buildings were encountered and recorded; these buildings were judged to be of minor significance.

SITE TYPES: A small historic period house, barn and associated outbuildings

REPORT: In preparation

83-113

Stanley Van Dyke
Lifeways of Canada Ltd.
317 - 37 Avenue, N.E.
Calgary, Alberta

Bumper Development Corp.
Twining gas pipeline

PROJECT TYPE: HRIA

LOCATION/SETTING: North of Linden in the Twining area, northwest of Drumheller. The proposed system covers relatively flat ground, but also intersects the lower slopes of the south end of the Kneehills.

METHODOLOGY: The right-of-way (about 15 km by 18 m) was traversed on foot with all disturbed lands visually examined. Shovel testing was carried out on the perimeters of sloughs intersected by the right-of-way.

RESULTS: Four prehistoric sites were identified (EjPj-6 to 9). All of the sites consisted of quartzite flakes and a single quartzite spall.

SITE TYPES: All are isolated finds.

REPORT: Complete, entitled "Historical resources impact assessment, gas pipeline right-of-way, Twining Area, Alberta", by Stanley Van Dyke.

83-114

John Pollock
Settlement Surveys Ltd.
19 Addison Crescent
St. Albert, Alberta

Town of Drayton Valley Subdivision

PROJECT TYPE: HRIA

LOCATION/SETTING: Near the town of Drayton Valley, on relatively flat, bush covered land near the North Saskatchewan River.

METHODOLOGY: Foot traverse with intensive subsurface testing following a systematic grid pattern.

RESULTS: No sites were found in the proposed development area, but one log cabin foundation/ruin was located outside the impact area.

SITE TYPES: Historic cabin foundation

REPORT: Complete, entitled "Historical resources impact assessment, town of Drayton Valley", by John Pollock.

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