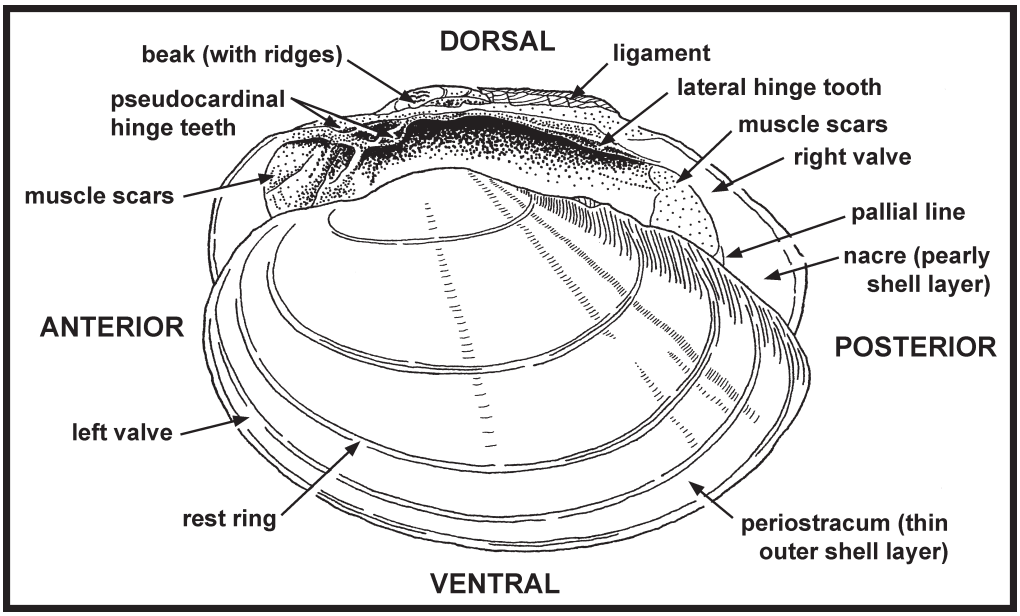
THE WYOMING ARCHAEOLOGIST



VOLUME 49(1)
SPRING 2005
ISSN: 0043-9665

[THIS ISSUE PUBLISHED FEBRUARY 2007]

THE WYOMING ARCHAEOLOGIST
VOLUME 49(1), SPRING 2005

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IN MEMORIUM

ANNE MARTHA SAXON SLATER

Professor Emeritus and former UW Anthropology Department chair Anne Martha Saxon Slater, 68, died peacefully on Tuesday, Nov. 21, 2006, at Ivinson Memorial Hospital after a tenacious battle with cancer. Her husband, John Frederick Slater, precedes her in death. Survivors include her daughter and son-in-law Marlis and Karl Taboga, and grandsons Benjamin and Luke Taboga, of Laramie; her daughter and son-in-law Martha Slater and William Waskowitz, and granddaughters Clarke, Hannah and Emily Waskowitz, of Cleveland, Ohio; a brother and sister-in-law, Joseph and Jan Saxon, of Salt Lake City; and numerous nieces and nephews.

Anne was born in Evanston, Il., on March 13, 1938. Her mother, Frances Anne Renner, served as a leading member of the Kansas State Board of Health until her marriage to Worth Montgomery Saxon, a manager for the Pure Oil Company. Mr. Saxon's work led the family to move frequently, and as a child Anne lived in Oklahoma, Ohio, Michigan and Montana. Though Anne found the moves difficult due to her shyness, she also recalled them as fundamental to her interests later in life. She was particularly fond of her time in Michigan, identifying her friendship with several WWII refugee children from Lithuania as the beginning of her profound interest in language structure and cultural studies.

These interests took hold at the University of

The editors of the Wyoming Archaeologist encourage members and other readers of the journal to submit obituary information about WAS members to the editorial staff in Laramie when such notices appear in local papers. We will then recognize the accomplishments of these members in the journal. Thank you.

Michigan, where she became the first female recipient of the Woodrow Wilson Fellowship in 1959, and earned an AB in English with distinction and highest honors in 1961. She pursued graduate studies at the University of California, Berkeley, completing her MA in English in 1961 followed by a Ph.D. in 1964 at the age of 26. Her dissertation was recognized as a major contribution to the field of Old Norse studies, and captured the attention of Rutgers University in New Brunswick, N.J. In 1964, she was named the Assistant Director of the graduate English program at Rutgers, the first woman to hold that post. While at Rutgers Anne met Fred Slater, then a Ph.D. candidate; the two married in 1965 and remained at Rutgers until both joined the University of Wyoming English department faculty in 1969.

During her 25 years of service to the College of Arts and Sciences, Anne was a devoted and outspoken faculty member best known for her remarkable and rigorous teaching and her unwavering commitment to students, as well as her eccentric sense of humor and long braided hair. She transferred to the UW Anthropology faculty in 1970 to begin the department's program in Linguistics, teaching courses that drew a diverse student audience ranging from Speech Pathology/Audiology majors to Computer Science students interested in the creation of artificial languages. Her classes in the History of Anthropological Thought became requirements for both the undergraduate and graduate Anthropology programs, and virtually every student to receive a degree from the department passed through her classroom until her retirement in 1995. Anne also served as Associate Dean of the College of Arts and Sciences from 1972-1974, established the Seibold Award for research support in the Humanities and Social Sciences, and had completed her sixth year as chair of the Anthropology Department at the time of her retirement.

Outside of the classroom, Anne was a devoted proponent of language preservation. In the early 1970's she completed structural analyses of several South Pacific and Inuit dialects, followed in the 1980's by her development of writing systems for previously unwritten dialects native to the Tukan and Bongwa tribes in Cameroon. From the mid-80's through her retirement Anne worked extensively with residents of the Wind River Reservation to create recorded libraries of the Shoshone and Arapaho languages, an innovative use of technology for the time, and helped to generate a dictionary and workbook system for use in Arapaho grade schools.

Students remember Anne for both her encouragement to pursue the highest levels of academic achievement, and her humanist commitment to disadvantaged and minority students. In 1970 she served as an advisor to the African-American football players known as "The Black Fourteen," and later served as faculty advisor to the Black Student Alliance. She was instrumental in establishing UW's Religious Studies and American Indian Studies Programs, and served as faculty advisor to student organizations including Keepers of the Fire, UW's Native American student group; the Anthropology Club and the Folklore Group. Off campus, Anne's home served as an enclave for many international, Native American and inner city students suffering from extreme culture shock. Colleague Dr. George Frison recalls that "these students always found a warm meal and a sympathetic ear, and on more than one occasion I knew her to write a check from her personal funds to help pay a deserving student's registration expenses with no thought or expectation of reimbursement."

Anne's daughters wish to express their deepest gratitude to the many friends, family and medical staff who have provided family support during the past year, and look forward to their presence at a memorial service for Anne on Saturday, Dec. 2, at 3 p.m., at St. Matthew's Cathedral, 3rd and Ivinson. A reception will follow. In lieu of flowers, Anne's family requests friends consider donating to a UW student support scholarship fund in Anne's name. Contributions may be sent to the Anne Slater Scholarship Fund, UW Foundation, 1200 East Ivinson Avenue, Laramie, WY 82070.

Laramie Daily Boomerang, November 25, 2006

NEWS AND ANNOUNCEMENTS

WYOMING STATE HISTORIC PRESERVATION OFFICE (SHPO)

The State Historic Preservation Office modified staff responsibilities to better serve the public and federal agencies in 2006. SHPO also successfully negotiated and signed a statewide protocol with the BLM that will dramatically streamline the Section 106 review process, the main workload of the SHPO office. Training sessions provided by SHPO and BLM were attended by Federal staff, SHPO staff, and cultural resource contractors. A draft Programmatic Agreement with the U.S. Forest Services has also been completed on streamlining their Section 106 consultation process. We are in negotiations with other Federal agencies to develop agreements to streamline the Section 106 process. SHPO received 3,730 requests for comment on federal projects under Section 106 this past year and averaged 7 days to review and comment. This also included consultations with the State Land Board on proposed state land leases and potential affects to known cultural resources. SHPO is working closely with Federal agencies and local governments to develop planning documents for future projects, but remain unable to provide up-to-date information on cultural resource sites due to a backlog of data waiting to be entered into our database. We are seeking additional funding sources to facilitate bringing our databases current.

CULTURAL RECORDS OFFICE (CRO)

During 2005, the Cultural Records Office completed a major project sponsored by the US Department of Energy entitled "Adaptive Management and Planning Models for Cultural Resources in Oil and Gas Fields in Wyoming and New Mexico." This project helped bring the CRO GIS system to approximately 55% of being complete. This is 20% below the original goal for the year, but in 2005, the number of new recorded sites and new inventories almost doubled from what had been recorded and submitted to the SHPO in 2004. Other projects completed during this time period include Atlantic Rim, with funding provided by the Bureau of Land Management (BLM), and the Moxa Arch Oil and Gas Field, with funding provided by EOG, Inc. The EOG, Inc. funding was unique because the industry felt this was a critical piece of information for the oil and gas development to go forward smoothly.

During 2005, 56,826 site and project queries were submitted to our on-line system, an 80% increase from 2004. Electronic submission of Section 106 project information has also been a priority for the office with progress being made on a final version of the software. The backlog of Section 106 reports to be processed continues to be a priority, and, with the dramatic increases in energy development, is causing unprecedented demands to SHPO staff.

Cooperative agreements recently renewed include the BLM data sharing task order, the Bureau of Reclamation data sharing MOU, and a continuation of support from the Wyoming Department of Transportation. Consideration was given to several different federal grant programs during this time; however, many of these have undergone reduction in funding. Future cooperative grant projects are being considered.

EDUCATION AND OUTREACH

SHPO managed to make some headway in building an education and outreach program despite having to focus attention on Section 106 related work. Staff offered training sessions on Section 106, Preservation Tax Incentive Programs and Certified Local Governments and the National Register to the public, members of the Wyoming Association of Municipalities, Certified Local Governments, state and federal agencies. SHPO arranged for a nationally recognized speaker to discuss design guidelines for communities at the annual Wyoming Association of Municipalities meeting

SHPO recently established a new program called the "Wyoming Centennial Farm and Ranch." The program is designed to honor farms and ranches in Wyoming owned and operated for 100 years or more by the same family. The first awards will be

presented by Governor Freudenthal at the 2006 State Fair. We are seeking funding from private sources to purchase signs for each award recipient's fence or barn.

PLANNING, NATIONAL REGISTER, GRANTING, AND TAX INCENTIVES SERVICES

The Governor appointed Historic Context Steering Committee met five times in this fiscal year and drafted a plan for developing Historic Contexts, including a cost analysis for developing a priority list of contexts. The SHPO staff completed a draft context for stone circle sites and progress was made on a draft context for historic military sites. These context studies are used to examine a specific historic theme by synthesizing existing data and analyzing what we already know, what is likely to be found, and what is worthy of preservation. Contexts are a valuable planning tool that will ultimately expedite project permitting while enhancing the State's ability to protect important resources.

The National Register review board and National Park Service approved 13 National Register Nominations this year including ten Cheyenne schools that were part of a National Register District nomination. Seven more National Register nominations were submitted for review and 12 additional nominations are in progress.

As defined within the National Historic Preservation Act (NHPA) each SHPO is responsible for certifying local governments as CLGs and functions as a pass-through for at least 10% of our federal grant award for development of local historic preservation programs. SHPO provided $54,608 in grants to local communities and approved 15 different projects throughout the state, representing nine counties. SHPO staff provided training and technical assistance to Certified Local Governments.

WYOMING STATE ARCHAEOLOGIST'S OFFICE

The Wyoming State Archaeologist's Office, Survey Section completed 50 new projects in this fiscal year, including a partial inventory of the National Guard collection (in cooperation with the Wyoming Militia Historical Society) and survey projects for private engineering companies. Survey section highlights for this fiscal year included new survey and evaluative test excavations for the Wyoming National Guard at the Guernsey training areas. This resulted in over 100 new prehistoric/historic cultural resource sites being identified and recorded. Fieldwork was completed on an archaeological data recovery project for Yellowstone National Park.

The State Archaeologist's Office staff conducted 99 public outreach programs this fiscal year and reached over 3,500 people.

During the past fiscal year the University of Wyoming Archaeological Repository completed quality control checks on 97 inventory boxes. The curator and contract or intern assistants continue to conduct an inventory of the repository collections, handle research and outreach loans to various facilities, accession incoming collections from Section 106 projects, resolve old collection problems, assist with outreach, and a variety of other tasks. The demand for these services is increasing dramatically because Wyoming is the most active state in the nation with regard to Section 106 projects for federal undertakings.

OSWA, SHPO, and UW personnel helped Casper College's Tate Museum excavate a mammoth north of Glenrock. John Laughlin, Steve Sutter, and Mary Prasciunas assisted the Tate's J.P. Cavigelli and Kent Sundell on this Pleistocene mammoth site.

Dale Wedel was elected Vice President of WAPA (Wyoming Association of Professional Archaeologists), Marty Rogers was elected Secretary and John Laughlin was elected Treasurer. John Laughlin, now at SHPO, assisted a CSU grad student with geoarchaeological work in the Washakie Wilderness

The Yellowstone Center for Cultural Resources at Mammoth is currently working with Grand Teton National Park, Bridger Teton National Forest, the Shoshone National Forest and 26 surrounding tribal governments to design a management plan for pole lodges or "wickiups." In October, Dan Eakin and Richard Adams, assisted Rosemary Sucec, Cultural Anthropologist, Yellowstone National Park, in her efforts to locate and document such features on the Shoshone National Forest.

While visiting the Clover Mist Sheep Trap in Sunlight Basin, Dan and Julie Eakin and Chris Finley (Bighorn Canyon National Recreation Area)

discovered a previously undocumented feature believed to be a sheep trap. The feature is unique in that rather than having a catch pen, the animals were evidently run into a barricaded cleft in the bedrock.

Investigations continued in the vicinity of Boulder Ridge, off the South Fork of the Shoshone River in June and July. An Indiana University field school run by Laura Scheiber and Jud Finley conducted high-resolution mapping in areas originally recorded by Dan Eakin, Chris Finley, and Forrest Green of Cody. Eakin's report on the Boulder Ridge sites has been submitted to the University of Wyoming--National Park Service Research Center for review and publication.

An article titled "The Greater Yellowstone Ecosystem, Soapstone Bowls, and the Mountain Shoshone" was published in *World Archaeology* (38(3): 528-546) by OWSA's Richard Adams. A version of his paper was presented at the Spring WAS meeting in Cheyenne last spring. This past summer, Adams and his crew discovered a village of 20 burned lodges at an altitude of 10,700 feet in the Wind River Mountains. More work is planned for next summer.

THE ANTIQUITIES ACT AFTER ONE-HUNDRED YEARS OF PRESERVATION

The American Antiquities Act, the first and perhaps least well known of the legislation protecting the archaeological resources of the United States, is celebrating its centennial. The Antiquities Act gave the United States president unilateral power to create national monuments from federally owned property. The Antiquities Act provided punishment for persons caught looting or damaging property within these areas, as well as defining who could be allowed to excavate and conduct research on properties. There are currently 125 monuments, most of them in the Western United States and Alaska. The first national monument was a rocky geologic feature called Devils Tower in Wyoming created by President Theodore Roosevelt 100 years ago. Roosevelt established 18 national monuments covering more than 1 million acres in total. The biggest by far was the Grand Canyon, a monument covering more than 800,000 acres.

In 1906, Congress enacted the Antiquities Act giving presidents the power to establish national monuments to preserve significant geologic, cultural, and historic features. The Act grew out of concerns that developed over the course of the last quarter of the 19th century for the preservation of America's archeological sites and the artifacts and information that they contained. National and regional educators and scientists, including those involved in the developing profession of archeology, joined together in a movement to safeguard sites on public lands being endangered by haphazard digging and purposeful, commercial artifact looting. The Antiquities Act is the first law to establish that archeological sites on public lands are important public resources. It obligates federal agencies that manage the public lands to preserve for present and future generations the historic, scientific, commemorative, and cultural values of the archaeological and historic sites and structures on these lands. The Antiquities Act also made it a crime to steal Native American artifacts or deface ancient and historical sites on federal lands. It also authorizes the President to protect landmarks, structures, and objects of historic or scientific interest by designating them as National Monuments. The law is a model of both brevity and visionary purpose. The Antiquities Act is a statute with only four paragraphs and fewer than 500 words.

Grand Teton National Park was established by Congress in 1929 and included just the east slope of the Teton mountain range. Today's park was created after a lengthy battle wherein John D. Rockefeller Jr. established the Snake River Land Company in 1927 and purchased 35,000 acres of private land in Jackson Hole (the name of the valley on the east side of the Teton mountains). He wanted to give it to the U.S. government to enlarge the national park. Opposition to the park from Wyoming Stock growers was intense, but in 1943 President Franklin D. Roosevelt took Rockefeller's land, combined it with scattered public lands in the valley and proclaimed Jackson Hole National Monument under the Antiquities Act of 1906 -- the same act President Clinton used in 1996 to proclaim the Escalante Canyons/Grand Staircase

National Monument in southern Utah. The reaction in both cases was similar. Just as the case now with Utah, Wyoming went to court to try and find the President's action declared invalid. Wyoming lost. Wyoming Representative Frank Barrett and Senator Frank Robertson, both stock-growers, introduced legislation to prohibit further presidential proclamations of national monuments. The bill was debated with heat in Congress. The bill passed the House and Senate, but the President pocket-vetoed it. Barrett continued his efforts as well as a much bigger attempt to give most of the public lands of the United States to the western states, and from there to the stockgrowers for a nominal fee. Finally a compromise was reached in 1950 when senators O'Mahoney and Hunt of Wyoming sponsored a bill that would create an enlarged Grand Teton National Park including most of the lands in the national monument.

In the late 1970s, Jimmy Carter used the Antiquities Act to buy time for the vast Alaska mountain ranges, valleys, rivers, and forests that later won protection under the bipartisan Alaska National Interest Lands Conservation Act – the most sweeping land protection package in United States history. The Statue of Liberty is a national monument. The most recent use of the Antiquities Act established African Burial Ground National Monument in the heart of New York City. Covering one-third of an acre, the new monument protects the final resting places of free and enslaved Africans who lived in New York during the 18th century. By establishing the monument, George W. Bush became the 15th president to use the Antiquities Act's authority. President Bush's use of the Antiquities Act to protect a hidden bit of America's story is a fitting way to commemorate the law's centennial. The Antiquities Act is an essential element of America's conservation vision. An appropriate and necessary part of celebrating the law's centennial this year is to renew the dedication and marshal the resources that conservation will require during the Antiquities Act's second hundred years.

Despite generally ineffective protection due to inadequate field law enforcement, the Antiquities Act established essential public policies. Antiquities Act archives in particular the rich permit information enables present day researchers an opportunity to rediscover the earliest federal excavations. These artifacts inform us about ruins stabilization techniques and materials of the past and aid us in rediscovering excavated collections. The impact of the passage of the Antiquities Act is still present today in the information, reports, and correspondence arising from excavations used to answer the lingering questions of the past and address problems of the present.

Submitted by Joe Daniele, Wyoming SHPO Office.

GRAND THEFT HISTORY

Wyoming is a state rich in archaeological material drawing great interest from the scientific community, as well as the general public. In general, the public attitude pertaining to archaeology, both historic and prehistoric, is positive and many Wyoming residents are interested in preserving their past.

However, some of the public interest in Wyoming's archaeology has not been positive. In recent years, looting of archaeological sites, in Wyoming and worldwide, has become a serious issue with Internet commerce intensifying the desire to make money illegally. Commercial demand for artifacts promotes looting and the illicit antiquities trade, which distributes artifacts to collectors all over the world. Many avocational archaeologists report their findings to professional archaeologists and sometimes have hands-on involvement with site investigation and subsequent preservation.

The same is not true about looters. Looting is synonymous with stealing. Looters destroy the integrity of an archaeological site, denying archaeologists and the public valuable information garnered from proper excavation, robbing Wyoming of its heritage.

Are there any laws that protect archaeological resources?

Yes, there are state and federal laws protecting archaeological sites and artifacts. The Archaeological Resource Protection Act (among others) makes it is illegal to collect artifacts or destroy sites from any federal or Native American lands, such as military bases, National Forests, or National Parks. Wyoming Statute (§36-1-114) prohibits excavation on any prehistoric ruins, pictographs, hieroglyphics or any other ancient markings, writing or archeological and paleontological deposits on any state or public land

in Wyoming without first obtaining a permit from the State Board of Land Commissioners. Wyoming Statutes (§36-1-114 through §36-1-116) prohibits removal from Wyoming of any part of prehistoric ruins or deposits from state lands except by consent of the State Board of Land Commissioners. While no law protects archaeological sites on private property, landowners have the right to protect archaeological resources on their property just as they would protect other resources under their management.

If looting has become such a problem why aren't there more stringent laws protecting archaeological sites?

For preservationists and archaeologists this question is a head scratcher. The problem is not the need for more laws. Unfortunately, our lawmakers are often unaware Wyoming's cultural resources are being destroyed. If the trend continues eventually there will be few preserved sites to study and visit. If you notice an archaeological site in your area being looted, contact federal, state, or local law enforcement.

Can someone be prosecuted for having a private collection or collecting on private land?

While surface collecting on private land is not illegal, artifacts in private collections often become nothing more than knick-knacks when traded or sold. When an artifact is removed from its original location, important contextual information is forever lost. Once an artifact is collected, it loses most of its scientific significance. Preservation of private collections cannot be guaranteed and the scientific importance of those specimens may never be realized.

Are items stored at repositories and museums put in a box never to be seen again, similar to the ending of "Raiders of the lost Ark?"

Museums can display only a minute percentage of their collections at any one time. Exhibits cost money and government cannot adequately fund most museums and repositories. The artifacts placed in a repository are cared for and available for research and reference, as well as possible display. Long-term curation and research availability is something that no collector can continually offer for artifacts in their possession.

Is it wrong to go to an archaeological site and dig areas where archaeologists did not excavate?

Archaeologists do not excavate an entire site for two reasons. First, archaeologists need to examine several different site localities to better understand a specific site locality and a specific research question. Second, archaeologists are seldom-allotted time or funds to fully excavate and investigate a site. Unlike artifacts excavated during an "official" archaeological excavation, looted artifacts yield no valuable information. If you want to see or participate in an archaeological excavation, contact your local university, state archaeologist, or other professional archaeologist.

Aren't there an abundance of archaeological sites? Does losing a few to looting make a difference?

Archaeological sites aren't everywhere and those worthy of study and preservation are even scarcer. Archaeological sites are a non-renewable resource, and without careful site stewardship, Wyoming will have little heritage left. Looted sites do make a difference in what we can learn about our history and prehistory.

Are all artifacts available online through sources looted?

Nobody knows. Once removed from its original provenience, an artifact becomes nearly impossible to authenticate. It is possible to duplicate stone tools found in antiquity and pawn them off as authentic to collectors online.

Persons with questions concerning archaeology in Wyoming are asked to contact the Wyoming State Historic Preservation Office at 307-777-7697 or the Office of the Wyoming State Archaeologist at 307-721-0882.

Submitted by Joe Daniele, Wyoming SHPO Office

GEORGE FRISON INSTITUTE NEWS

On May 24th the Wyoming Archaeological Foundation (WAF) presented a check of $50,000 to the University of Wyoming Foundation, for the establishment of the Frison Institute Endowment. This was two full years ahead of schedule! The check was presented to William B. Blalock III, VP for Institutional Advancement by Judy Wolf, President of the WAF. Numerous individuals contributed to the WAF for the establishment of this endowment.

The endowment will yield income for the Institute in perpetuity and will allow the Institute to carry on its programs and mission. We thank the WAF for raising the funds and achieving our goal.

A most significant aspect of the endowment is that state matching for additional endowment gifts is now available. This means that any donation to the WAF for the Institute Endowment will be matched immediately once the gifts are received by the UW Foundation as long as the state matching lasts. The WAF will make another pledge to insure that all gifts up to the pledge amount will be matched through September 2011.

BOARD OF THE FRIENDS OF THE FRISON INSTITUTE MEETING

The Board of the Friends of the Frison Institute met on September 21, 2006. The meeting followed a morning of research presentations. Drs. James Ahern, Todd Surovell, Julie Francis, and Marcel Kornfeld presented ongoing research by the Frison Institute and Department of Anthropology. The presentations included: hominid evolution-specifically Neandertals and their relation to modern humans as seen from the Croatian evidence; the results of 2006 field season at Barger Gulch Locality B and its implications for Folsom demographics; the state of Wyoming rock art research; and an overview of Rocky Mountain rockshelter research.

The meeting was one of the most vibrant ones yet with 19 Board members participating. Four new members joined the board, Bill Vasey of Rawlins, Wyoming, Mike Toft of Sterling, Colorado, Tom Young of Thermopolis, Wyoming, and Larry Amundson of Ocean Lake, Wyoming. The meeting opened with welcome statements by Dr. Audrey Shalinsky, Associate Dean of the College of Arts and Sciences (former anthropology chair) and Dr. Robert L. Kelly, anthropology chair. Both stressed the current growing state of the Department, Institute, and our facilities, specifically the construction of the new building. We will be in the new building by next year with the opening ceremonies sometime in the spring. Hope you can all be there.

The Board discussed a range of issues including: 1) continued fundraising for the growth of the newly established Frison Institute Endowment; 2) continued development of promotional material, namely Institute pins for donors, volunteers, and friends; and 3) acquisition of major equipment for the Institute, namely tractor/backhoe, vehicles, and trailers.

Reports by the director and associate director stressed the establishment of the $100,000 Frison Institute Endowment and the fiscal statement and status of the Institute funds. The director additionally noted that this was the 10th anniversary of the Board of Friends of the Frison Institute, with a name change from original Friends of the Frison Institute occurring several years ago. It is particularly appropriate and a happy situation that the Frison Institute endowment was inaugurated with our 10th anniversary! Other reports were given by Dale Walker, College of Arts and Sciences Director of Development and the vice-chairs (Rhoda O. Lewis and P. Jaye Rippley). Walker explained the ongoing state matching program for endowment, namely any additional amount of gifts raised for the Institute by the Wyoming Archaeological Foundation (WAF) will be matched as long as the state funding lasts. If a new pledge is made by the WAF the matching of that amount will be guaranteed if raised within five years of the pledge. Rhoda O. Lewis reported on the membership, while P. Jaye Ripley reported on the Board pins as well as the design and purchase of donor, volunteer, and Friends pins.

GAIL GOSSETT VOTED FOR HONORARY LIFETIME MEMBERSHIP

The Board unanimously voted to make Gail Gossett, who resigned for personal reasons, an honorary lifetime board member. Gail was one of the original members of the Friends of the Frison Institute (the original Board) and Ray Gossett's and her efforts towards the establishment of the Frison Institute Endowment were a significant contribution to its eventual establishment.

VOLUNTEER OF THE YEAR

Many volunteers have worked with the Institute over the years and our success is closely tied with such public dedication to prehistory. Mr. Robert Godsoe, now of Woodland Park, CO has volunteered on numerous projects since the late 1990s. Most recently he has set up the screening system at the Hell Gap Site and along with his family has contributed to the excavation at Barger Gulch, Locality B.

STUDENT OF THE YEAR

Student of the Year is Mr. Joe Gingerich. Joe is a second year MA student. He has worked with Institute projects at Barger Gulch and works on his own research material from the Shawnee-Minisink site in the Institute labs. He has been working with Don Klein, an avocational archaeologist from Maryland, on renewed investigations of the Shawnee-Minisink Clovis site. Joe's work with avocationals is an excellent example of Institute's mission and we are pleased to name him Student of the Year!

8TH ANNUAL FRISON INSTITUTE LECTURE

The 8th Annual Frison Institute Lecture was held on September 21, 2006. As in the past several years, it was also the Wyoming Archaeology Awareness Month Speaker. The latter is supported by all the WAAM sponsors. Dr. Gary Haynes of the University of Nevada at Reno delivered the lecture. Professor Haynes discussed the role of rapid human dispersals in the extinction of animal species. Haynes' argues that while humans did not kill the animals in most instances, they created conditions where slight environmental or other perturbations acted in conjunction with human predators to cause extinction.

CO-OPERATIVE AGREEMENT WITH THE CITY OF CHEYENNE

Last spring the Institute signed a cooperative agreement with the City of Cheyenne to conduct archaeological research on Belvoir and Bighole ranches. The ranches were acquired by Cheyenne as open spaces for development of outdoor recreation activities. Several visits to the area showed that buried prehistoric and historic features and artifacts are present (in alluvial terrace contexts), as are stone circles, rockshelters, historic trails, and abandoned missile silos. Chert outcrops were also located, possibly significant to the occupation of nearby Lindenmeier Folsom site in Colorado, where some tools were manufactured of material from unknown source locations. Research on the property will begin in the next several years as a part of a field class at the University of Wyoming.

INSTITUTE GRANTS AND VISITING FELLOWSHIPS

Mr. Matt E. Hill is the 2006 Frison Institute zooarchaeology grant recipient and a fellow. Matt, a Ph.D. candidate at the University of Arizona, is studying regional differences in Paleoindian procurement strategies with Plains bison assemblages. He analyzed several zooarchaeological collections during early October. Matt gave a talk entitled "Paleoindian Faunal Exploitation: The Myth and Reality of Big Game Hunters." The brown bag talk was presented in conjunction with the October meeting of the June Frison Chapter of the Wyoming Archaeological Society.

Chris Widga, the 2004 Frison Institute zooarchaeology grant recipient and a fellow, published an article in the Journal of Archaeological Science that includes his research while at the Institute. "Niche variability in late Holocene bison: a perspective from Big Bone Lick, KY" is in JAS 33:1237-1255.

INTERNATIONAL DEVELOPMENT

The Institute has been involved with international development since before its official establishment in 1998. In 1996, 1997, and 1998 the Institute hosted international scholars and enhanced UW student involvement in foreign archaeological field programs. Throughout the later 1990s and early 2000s, the Institute continued to host international Fulbright and Wenner-Gren scholars. Within the last several years new cooperative agreements were established and student and faculty exchanges intensified. For the second year in a row, the Institute enhanced a significant exchange of foreign students and faculty. Last year (2005) two Croatian, one Japanese, and one Russian student participated in field projects while one Japanese student also did his own research on Paleoindian assemblages. At the same time, four UW students participated in field and laboratory analysis of archaeological materials in Russia and Croatia. In 2006, two French students and one Japanese student participated in our field projects while three UW students and one faculty member worked on projects with Croatian colleagues and the director and associate director participated in a project in France.

INSTITUTE PROJECTS RESULTS

Bighorn Rockshelters *by Robert L. Kelly*

The Bighorn Rockshelter project continued this year with further excavations at Ditch Creek Shelter near Thermopolis, and new stratigraphic work at Little Canyon Creek, Rice, and Carter caves. With the help of geoarchaeologists Judson Finley and Gary Huckleberry, we also examined the stratigraphies at Alm Shelter, Paint Rock V and Tumbling Dice, all in Paint Rock Canyon, several shelters on Little Mountain near Lovell, Southsider Shelter and Cutt Shelter near Ten Sleep, as well as Ditch Creek. With the submission of new radiocarbon samples, we should be able to date the earliest occupation at Ditch Creek Shelter – a possible Clovis occupation, and at the other shelters as well. In addition, consultation with Finley and Huckleberry played an important role in understanding the formation of these shelters, and in determining which sites will merit further excavation next summer (pending funding).

Testing Bighorn Shelters *by Jack Fenner*

The Frison Institute continued its investigation of rockshelter occupation patterns in the foothills of the Bighorn Basin. Following up on survey work performed in previous years, graduate student Jack Fenner led a team that excavated test pits in a series of rockshelters within Paint Rock Canyon and along Shell Creek Canyon near Black Mountain. Several previously unknown subsurface prehistoric sites were located. These discoveries, along with the insight gained from rockshelters which did not produce evidence of occupation, will help in understanding the choices prehistoric people made when deciding where to live.

Bighorn Shelter Geoarchaeology *by Judson Finley*

Geoarchaeological analysis of Bighorn Mountain rockshelters continued this year with visits to Alm Shelter, Little Canyon Creek, and Southsider Shelter. Analysis of sediments from Eagle Shelter, BA Cave, and Alm Shelter is showing evidence of episodic, millennial-scale environmental change at many sites along the foothills of the Bighorn Mountains. Normally very gravelly, rockshelter deposits consistently show accumulation of discrete dust layers indicative of increasingly arid conditions in the Bighorn Basin. At Eagle Shelter and BA Cave, dust deposits occur approximately 9000, 8000, 4500-4000, 3000, and 2000 years ago. We are tentatively proposing these events reflect decreasing precipitation regimes and increased erosion on floodplains at the margin of the Bighorn Basin. Wind erosion carries floodplain sediments to rockshelters situated in the foothills. These events also appear to correlate with Holocene regional records of greater forest fire frequency in the Yellowstone Plateau. Future work will examine whether dust deposition in Bighorn Mountain rockshelters correlates with other records of Holocene global climate changes.

Black Mountain Archaeological District (BMAD) *by Marcel Kornfeld*

Continuing field investigations at BMAD during 2006 included testing of several rock shelters (see Testing Bighorn Shelter by Fenner) and continuation of testing at BA Cave and Two Moon Shelter. At BA Cave, testing was limited because of the field crew size. Nevertheless, a few additional levels were excavated in both excavation units under investigation. Specifically, the surface of the roof fall was largely exposed by the end of the field season, leaving it ready for removal next season. We discovered the third Early Plains Archaic projectile point in the process. The side notched point has a deep basal notch reminiscent of Oxbow style, but probably represents a range of variation of Early Plains Archaic side notched varieties such as those found at the Lookingbill Site. Deeper levels, such as those producing fluted bifaces last year were not tested further.

A new field recording system was initiated at BMAD that significantly improved the efficiency of excavation, especially at Two Moon Shelter. The new system was introduced at Two Moon at the beginning of the season and despite early glitches, point provenienced nearly 2500 artifacts, about one third the total recorded in the past 15 years of testing! Although this efficiency is significant, the real success of Two Moon investigations was the clear demonstration of three cultural components: Folsom, Agate Basin, and Pryor Stemmed. Previous seasons excavations yielded radiocarbon ages and chronologically diagnostic artifacts, but the diagnostic artifacts recovered during the 2006 field

season demonstrated the cultural association of one component (Agate Basin) and confirmed another (Folsom). It is now clear three components are present at Two Moon (Folsom, Agate Basin, and Pryor Stemmed), while the previously postulated Clovis component is probably not Clovis, but a part of the Folsom layer.

White Creek Canyon Survey *by Marcel Kornfeld*

A significant expansion of our Bighorn rockshelter study occurred with the initiation of the White Creek Canyon survey. White Canyon is adjacent to BMAD and some portions of it were examined during previous field seasons. An opportunity to examine several tributaries of the canyon presented itself with a BLM call for proposals to survey areas considered for fire abatement. Given its proximity to our other research areas, this is a perfect opportunity to locate, record, and test additional rockshelters. The field studies were only initiated the past season, but already nearly 50 shelters have been located.

Barger Gulch *by Todd Surovell and Nicole Waguespack*

We had another productive field season at Barger Gulch, during which we excavated almost 50 sq. m and recovered almost 10,000 artifacts. Our excavations were designed to expose artifact concentrations associated with hearths. We expanded the northeastern portion Main Excavation Block to create a 5 x 5 m exposure surrounding a hearth discovered in 2004. We also expanded the perimeter of East Block to find the edge of a high density cluster of artifacts associated with another hearth. Finally, we initiated excavations in a new area, which we call the "South Block," sitting approximately 30 m to the south of our previous excavations. Here, we also recovered additional Folsom archaeology including one projectile point fragment, channel flakes, bifaces, various flake tools, and a sandstone abrader.

SAND DRAW: HOT TIMES AT THE COUNTY DUMP

by Eva Peden

In the spring of 2006 we were once again headed to Sand Draw to help Dr. Danny Walker finish the excavations at the prehistoric site which lies within the boundary of the Fremont County Landfill. This area was slated for landfill expansion several years ago but before the bulldozers and trash trucks moved in it was discovered that it contained a massive prehistoric component. We first dug there in 1997, then again in 2000. This 2006 project was a last chance to extract as much information as possible before releasing the area for expansion. At this time, the county has started to bale the trash and it now appears several years will pass before the landfill will cover the site area.

Previously, numerous depressions were located which had fire hearths within. These hearths typically were approximately 70cm across and up to one and one half meter deep. All were filled with a dark sooty soil which made workers appear like they had been in working in coal mines. I am not going to attempt to give the analysis of these pits or depressions as that is better done by the professionals but am giving an amateur's perspective of the project.

Our camp consisted of between 4-6 camper trailers, SUV's, and a couple of tents. Early on in the project starting time was 7 a.m. and coats or jackets were in order. Before long we decided that 6:30 a.m. was a more appropriate time to start and quitting time in the afternoon was moved earlier to head for the shade as the temperatures rose.

We had been to Sand Draw in the previous month and helped Danny work on areas of remote sensing which had not been covered in the past. Based on the information gleaned from that, he planned several blocks for investigation. The first one he wanted to check out was on the east end of the site where we started with 1x1 meter units scattered throughout the block under the direction of our crew chief, Adam Wiewal. Instead of troweling each level to a specific depth, the first level went through the loose, sandy surface which was 4-7 cm thick, and in most instances, another 5cm or less brought the unit down to a very hard, old surface. The contour of this surface determined the depth of the unit.

The first couple of days we managed to take several units down to that surface and in one unit a faint charcoal stain had appeared. With Danny's approval, we dismissed it as not terribly significant. That night however, we had a light rain and upon going out to the block the next morning, we could see a very definite dark circle in that unit. Danny immediately decided that it needed more investigation and it proved to be one of the fire hearths we were hoping to find. Once again, nearly 50cm across and about 1 meter deep, it was filled with the same dark, sooty soil and the walls of the hearth showed red oxidation. All of the soil from it was bagged to take back to the University for flotation, then the light fraction will be sent off for analysis. After this hearth was found we needed to excavate more units around it to be able to check out at least two meters beyond the edge of any features.

During the first week, a bus load of Native American high school students from the Arapaho Charter School were brought out to spend two days working at an archaeological site. Many were very interested as were most of their teachers. One of the teachers, after only a few minutes of using a trowel, let out a cry, "here's an arrowhead." She had uncovered a perfect Archaic point…in situ! In all of the units which had been excavated in previous years and all of those under current work, very few lithic items had been found which made it even more exciting for her to have found the point.

While the first block was still underway, Dr. Walker moved Don and me to another area of inter-

First fire pit located in 2006 (Photo courtesy of Dan Bach).

est to open another block. Clearing sage brush and cactus was always the first order of business when opening up an area and we soon found that my mother's old tree lopping pruners worked perfectly for cutting off sage brush so that task was quickly taken care of. The cactus however, was a different story. Regardless of how thoroughly the prickly pear was relocated, the first time you got on your hands and knees, it was possible to find another. Numerous hours were wasted in removing spines from knees, hands or gloves. In this new area Danny had a large anomaly showing on his magnetometer maps and wanted to check it out. The map of this area appeared to be very similar to the "signature" of many of the hearth areas. We worked several days on numerous units and finally took one down as deep as we could with no sign of a hearth. What we did find was layers of bedrock at about 40cm.

In the meantime, Danny and Dan Bach had begun to open an area north of the units Don and I were working in. It wasn't long before they started finding a depression and soon had stains of a hearth. This was followed out and a large hearth was excavated. Soon, several other hearths were excavated in this block and hundreds of bags of fill soil preserved. Danny brought out two 55 gallon barrels full of water to use for doing field floatation of this fill. Working under a semi-opaque umbrella with screens, mud, and water, we separated out the heavy and light fraction of numerous bags. It soon became apparent that we couldn't possibly haul enough water to take care of all of the preserved soil so the remainder was hauled back to Laramie at the close of the project.

As the days grew hotter, we welcomed the slightest breeze. However, Sand Draw is not noted for mild breezes. By most afternoons the wind would come up hard enough that it was impossible to hang on to your paperwork without taking shelter in one of the vehicles. When excavating, the wind whistled around your body and made mini whirlwinds which kept the sand billowing in our faces. By quitting time, we were all totally covered with sand and looking forward to cleaning up a bit before gathering in the shade of one of the trailers. There the unshelled peanuts were passed around to go along with each person's preferred libation. The shells were dropped on the ground (after all, this was the dump!). We lived to regret that decision.

I don't recall who the first to find our next surprise was, but one by one, nearly every vehicle was found to have a packrat nest being built under the

Soil floatation station (Photo courtesy of Dan Bach)
(Overseer recruited from the dump in after hours shopping trip)

Soil samples headed for UW (Photo courtesy of Dan

hood. (probably drawn in by all the peanut shells lying around). Imagine Adam's surprise when he banged around on his car, then cautiously opened the hood to see a rat sitting on the engine looking at him.

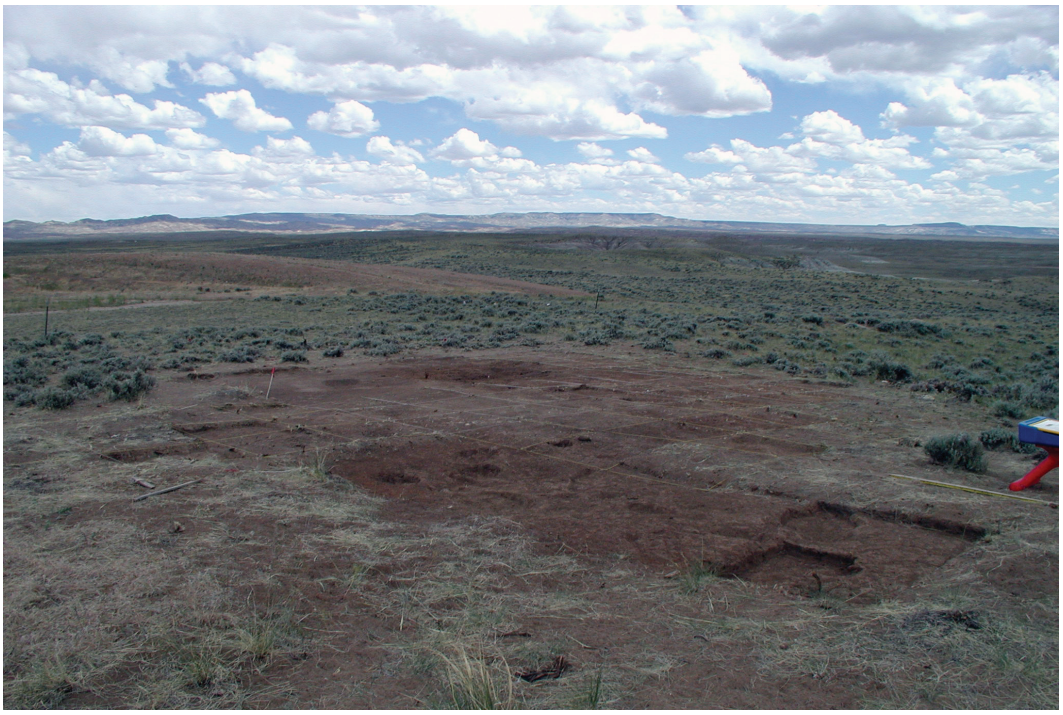
He was soon equipped with a proper weapon for taking care of rats but I don't believe he ever got close enough to use it. (Danny had found the rod and prongs from a barbeque spit which made a perfect spear).The rats even attempted to build nests in a couple of the trailers before grumpy homeowners evicted them. Needless to say, dropping peanut shells on the ground ceased.

Shortly after finishing work one afternoon, we looked up to see a brown cloud coming our way. This thing was at least 1000 feet high and coming on fast. Adam said it would only take about 5 minutes to get his tent down and out of danger but he didn't have that long. The wind/dust storm hit with a vengeance as we all raced for shelter. Adam flung himself on top of his tent and rode out the storm there. We made the mistake of leaving one window on the lee side of our camper open a bit for air but soon realized it was working like a funnel and siphoning the dust in. Midway through this storm we saw our nifty solar shower was losing a corner and in danger of blowing away. Don ran out into wind and grabbed one of our seven gallon cans of water and set it inside the shower to hold it down. The storm only lasted about 10-15 minutes but we later learned that the wind speed hit 86 mph at the Riverton airport. No doubt on that open ridge it was at least that much if not more. Sand had sifted into every nook and cranny of all the vehicles, campers and people. When we started coming back outside, we noticed that the two "big johns" were both tipped over even though they had a cable over them to hold them down. They had tilted far enough to hit the fence behind them and that had stopped them going clear down. Fortunately, they had been cleaned that day!

Work continued through mid July with more and more fire hearths uncovered but no further indication of what was being processed in these features. Obviously the location of these depressions and hearths indicate a large village with a planned space between the living areas and in most cases, there are two hearths in close proximity, then a space between them and the next set.

Some of the volunteers would look across the site and with a derogatory expression, ask, "Why in the world were they up here?" But, in my mind,

Adam, ready for rats (Photo courtesy of Dan Bach)



View of Beaver Rim from Sand Draw (Photo courtesy of Dan Bach)

ignoring the landfill to the northeast of the site, and looking down into Beaver Creek, the open area below the bench and a plya to the east, it appears it would have been a perfect choice for a camp.

Water, overlooks for game, and enough wind to keep the bugs down! What they were doing with the hearths, for how long, etc., I leave to the experts to figure out.

Over three different years Don and I have each put in close to 400 hours working at Sand Draw. It has been a very interesting experience. As with any archaeology project, there were days when the heat was nearly unbearable and days when the wind drove you crazy. But the learning, the time with old friends and the camaraderie made it all worthwhile.

The project was well supported by the Fremont County Archaeological Society but other volunteers came from all around the state (Buffalo, Casper, Laramie, Thermopolis, Cody) as well as Colorado and Montana.

Eva Peden
Fremont County Chapter
Wyoming Archaeological Society

CORE AND PERIPHERIES: CHINESE COMMUNITIES IN SOUTHWESTERN WYOMING, 1869-1922

by
A. Dudley Gardner Ph.D.

ABSTRACT

Chinese immigrants began to arrive in large numbers in Wyoming Territory in 1869. Archaeological excavations from 1990 to the present are beginning to shed some light on how these immigrants structured their households and communities. We now have a clearer picture as to how scattered nineteenth century Chinese communities in southwestern Wyoming were linked together. The community ties that evolved benefited the immigrants in several ways. Here we will suggest that the household structures that developed in Chinese communities and the linkage systems that emerged between cores and peripheries may have given the immigrants the ability to develop beneficial relationships within households and between communities.

INTRODUCTION

A *New York Daily Tribune* reporter traveling with the United States Army in 1857 filed a report from future Wyoming, then a part of Utah territory. The reporter wrote, "having gone out from the camp a few days ago, to pass a day and night . . . I trifled away a morning in visiting the lodges of some mountaineers. . . ." In one of the tents "a Chinese boy was darning his pantaloons, encircled by puppies. . . ." In another lodge "three or four" Shoshoni women sat cooking. The "Chinese boy" apparently worked for the Shoshoni women and their husbands (*New York Daily Tribune,* 18 January, 1858:1). Describing the military encampment and neighboring camps on the Black's Fork River near Fort Bridger, the unidentified writer noted that a Chinese "boy" had found his way into the trapping and trading industry in the Intermountain West. Not until the Union Pacific Railroad arrived a dozen years later, however, did noticeable numbers of Chinese appear in Wyoming (*Special Census of Wyoming Territory, 1869; United States Census 1870,* Wyoming Territory*)*.

The emergence of Chinatowns in Wyoming begins in the early 1870s. In the 1870 census, neither Rock Springs nor Evanston had a Chinatown. They would soon become the largest Chinese communities in nineteenth century Wyoming. By 1880 Evanston and Rock Springs had become the core of business activity. Chinese communities on the peripheries of these two towns varied in size and waxed and waned. Most were home to Chinese railroad workers or coal miners. At distances of up to seventy-five miles from Evanston or Rock Springs, in villages of less than 20 people, Chinese immigrants lived scattered along the Union Pacific Railroad. In the late nineteenth century, two Chinatowns would come to dominate the territory. These two towns were located in southwest Wyoming (Figure 1).

Southwest Wyoming is distinct in many ways. It has mountains, basins, uplifts, and rivers that cut through deserts that receive less than eight inches of moisture a year. Most of the region is part of the Wyoming Basin. The basin is actually part of the Rocky Mountains and lies between the middle and southern Rockies. As the mountains uplifted, the region did not buckle; it rose as a large basin with current elevations ranging form 6,000 ft (1828.8m) to about 10,000 ft (3048m) above sea level. Bound by mountains on every side, the Wyoming Basin sits in a rain shadow. Lying directly under the jet stream, snow and rain evaporates before it reaches the sub soil. The net effect is the Wyoming Basin is a winter desert where Rock Springs receives less than eight inches of moisture per year and Evanston, which sat

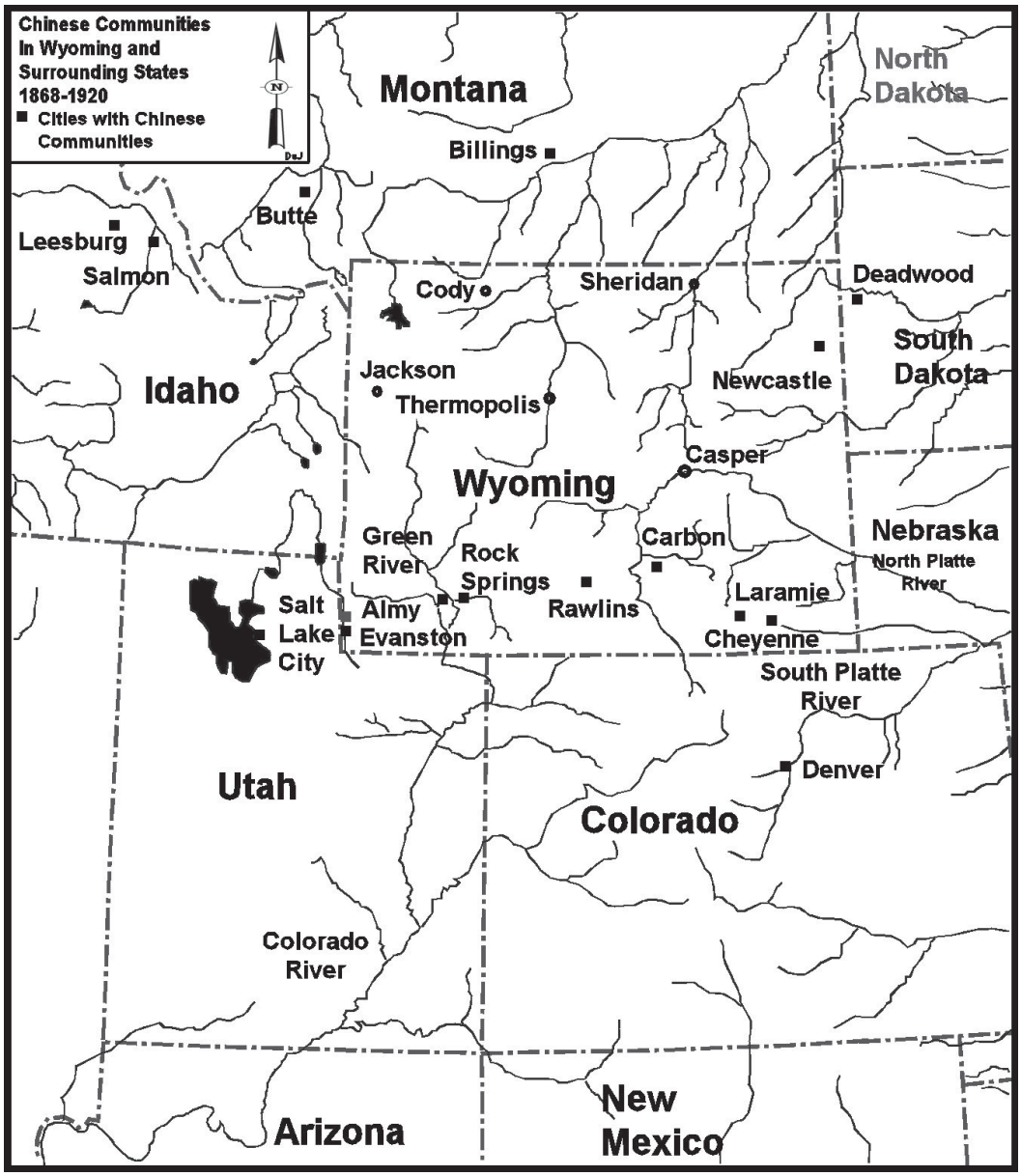


Figure 1: Location of various Chinese communities in the Intermountain West.

along the banks of the Bear River, gets about ten to eleven inches. Evanston at an elevation of 6,750 ft (2057 m) has an average growing season of 90 days. Rock Springs at 6,242 ft (1902.56 m) above sea level has a growing season of 101 days. The climate limited agriculture in terms of what could be grown and where. So when Chinese farmers chose to raise crops along the Bear River, they selected plants that could grow during a short growing season.

Why did Chinese immigrants settle in this winter desert? How did they structure their households? Were the scattered Chinese communities in southwestern Wyoming linked together? What foods did they choose to eat? Were the foods grown locally or did Chinese residents made choices that linked their food consumption to a wider network of goods and services? Here we would like to briefly address these questions.

HISTORIC CONTEXT

Before the golden spike sank into the last tie at Promontory, Utah, the Union Pacific Railroad Company knew it would have to make repairs to its tracks. In early May 1869, the *Daily Alta California*

noted the Union Pacific Railroad already had track and roadbed failures (*Daily Alta California,* 3 May, 1869: 1). The line had been built too quickly (*Helena Weekly Herald,* 16 July, 1868:1; 3 September, 1868:10; *Daily Alta California,* 3 May, 1869:1). In places the grade needed filling, and washed-out sections had to be repaired. Yet with little financial resources to draw from, the railroad company needed cheap labor to fix these problems. In Wyoming, the repairmen who could make the railroad operational at the lowest price were the Chinese. That summer Chinese women and men began moving to Wyoming (*Special Census of Wyoming Territory, 1869; United States Census 1870,* Wyoming*)*.

Although the Chinese of what is present-day Wyoming worked primarily in service industries in 1869, by the end of the year the majority labored for the Union Pacific Railroad Company (*Special Census of Wyoming Territory, 1869*; *United States Census 1870,* Wyoming). In 1869 the *Daily Alta California* reported that "the Union Pacific people are so satisfied of the superiority of the Chinese for railroad building that they are anxious to secure a large number of them to be employed as repairers and general workmen along their line this summer" (*Daily Alta California,* 8 May, 1869:1). To accommodate the railroad repairmen, more permanent housing appeared in the winter desert of southwest Wyoming. A series of small towns, called section camps, emerged along the Union Pacific mainline from Cheyenne to Evanston, and in these towns Chinese immigrants soon found employment as "maintenance-of-the-way" workers (*Daily Alta California,* 1 May, 1869:1; 4 May, 1869: 1).

Sometime early in 1870, the Union Pacific reached a decision to employ Chinese almost exclusively between Laramie, Wyoming, and Ogden, Utah. Of the 139 Chinese immigrants living in Wyoming in 1870, 118 worked as railroad laborers, two in restaurants, four "kept House," and 15 washed clothes (*United States Census 1870,* Wyoming Territory). In the section camps, the average household contained nine Chinese men and no females. The ratio of males to females was 135 to 4. Chinese women resided only in Cheyenne. These women lived and worked with their husbands who were "washermen." The average age of these workers from Guangdong Province was 23 years (*United States Census 1870,* Wyoming Territory).

Although repair crews were needed along the entire length of the railroad in Wyoming, no affordable housing was available to them. As a result, many newly arriving laborers cut homes into banks of creeks (Bell 1869: 572-573). Others, detesting these dugouts, hurriedly made homes from stones or lived in tents. Meanwhile, Union Pacific's solution to the housing dilemma was to construct wooden houses at section camps located at about six-mile intervals along its mainline throughout Wyoming. These houses were critical in an area that one 1869 observer called the most "forsaken and desolate region I ever saw" (Bell 1869: 570). Isolated communities strung out at even distances through the prairies, basins, deserts, and mountains, these tiny towns and wooden houses served as homes to many of the state's first Chinese immigrants.

THE EVANSTON CHINATOWN

The Evanston Chinatown grew from the need to maintain the railroad. Gradually, it expanded as a service center that provided food and merchandise for Chinese residents in the area. At Evanston, the Bear River, which was fed by the runoff from the Uinta Mountains to the south, literally flowed around Chinatown. Situated on a bench that jutted out into the river, the north, south, and east sides of town had boundaries marked by water. Chinese boys fished and swam in the river; women and girls used its waters to wash their clothes. Using bamboo poles with wire nooses, the children in Chinatown added to the food supply by catching fish. Meanwhile, men hauled water to their wash tubs in the commercial laundries that they owned and operated in Chinatown (Gardner 2000: 215). Clearly, for the Chinese, Bear River provided several basics of life. To the west lay the railroad and the town of Evanston. With the Chinese community literally lying on "the other side of the tracks," segregation proved to be the norm.

Day laborers working for the Union Pacific Railroad built the Evanston Chinatown that emerged from 1869 to 1873. By 1873, six "Chinamen" lived and worked at Evanston (Uinta County 1873 Assessment Roll). Few men made a fortune working as laborers on the railroad. Yet if one worked hard and managed well, a person could earn a living and save a little money for the future. By 1879, twenty-two men in the Evanston Chinatown had accrued $4,750

in personal property. The wealthiest man, "Mr. Wah Chin," had $750 in personal property, while the poorest man, Ah Yuk, had $50. Yet even Ah Yuk had assets. In fact, he had fourteen hogs valued at $100 (Uinta County 1879 Assessment Roll). Owning a swine herd in a Chinese community was one path to success, as pork was one of the principal foods in a Chinese immigrant's diet (Gardner and Clarke 2002:25-26; Gardner and Zehr 2000:1-14; Gardner, Zehr, and Gardner 1999:1-10).

It is enlightening to look at the way the vast majority of the Chinese earned their livings. In 1880, the Evanston Chinatown numbered 105 individuals. In Evanston, 80 men, worked as laborers for the railroad. Among the other occupations men in town held were druggists, clerks, and "superintendents of Chinese laborers." In addition to stores, the Evanston Chinatown also had houses of "ill repute," including gaming houses and "houses of prostitution." Evanston may have boasted the only Chinese brothels in Wyoming. The census of 1880 identified two such houses in Evanston (*United States Census 1880,* Wyoming ; See Gardner 2000, Appendix A for problems with census figures). Fifteen of the territory's 18 Chinese women lived in Evanston. Women made up 14% of Evanston's Chinese population, the highest percentage in the territory. Here 4% of the women worked as prostitutes and 3% as housekeepers. Meanwhile, another worked as a servant, whereas other females were children (*United States Census 1880,* Wyoming).

A notable development in Evanston lay with the formation of traditional families, complete with children and relatives. On the average, in 1880 a Chinese household in this Chinatown held 5.2 individuals. Evanston, where 15 females lived, reflects one of the more demographically diverse communities of the 1880s. In most Chinese communities of Wyoming, British Columbia, and Montana, women made up about 1 to 3% of the population (Gardner 2000:101-199). Because Evanston had a higher ratio of females to males, complex gender relations and family formation evolved. However, male only households do dominate the social structure in the Evanston Chinatown. Of the 23 homes in town, 17 only have male occupants. One of these "houses" held 33 males (*United States Census 1880,* Wyoming). The complexity of Chinese household formation in the Intermountain West merits further analysis.

MALE ONLY HOUSEHOLDS IN NINETEENTH CENTURY WYOMING

Although sojourners living in the Intermountain West often had wives in China, many of these married men never returned home (*United States Census 1870, 1880,* Wyoming). Others spent decades away from their families. That meant in Wyoming, as on the west coast and in Montana, married men and single men often shared a common plight: loneliness. Although the creation of households and Chinese communities helped fill part of the void, the need for companionship still existed. Of course, marriage proved to be the solution for a few single men. Some single men found wives and established families. Evanston, in 1880, had the highest ratio of females to males. Here the first Chinese children born in the Wyoming Territory lived. In Evanston 9% of the population were 18 years or younger; 5% were preteens, and 14% were females (*United States Census 1880,* Wyoming). The children and women who lived at Evanston would leave a distinctive archeological signature. For example, we have recovered toys, earrings, jewelry, women's shoes and clothing (Gardner 1996: 1-5: Gardner et. al. 2004). In the interior West, traditional Chinese families lived in Evanston, but there are other examples of household formations in Wyoming where males dominate.

Nationwide, in 1860, Chinese men outnumbered Chinese women 1,858 to 100. By 1880, the ratio of Chinese men to Chinese women in the United States improved to 2,106 to 800 but not necessarily in the Intermountain West (Xia 1993). The three principal Chinese communities in Wyoming reflected lopsided male to female ratios. In 1880, in the coal mining town of Almy, its Chinatown contained 192 men but no women (*United States Census 1880,* Wyoming). In the coal town of Rock Springs lived 348 men and one woman. Evanston, with its 105 Chinese residents, 90 were male. The odds against a Chinese man marrying and raising a family in Wyoming helped encourage men to live with other men to share the costs and divide the responsibilities of maintaining a home.

The historical records from the 1860s indicate Chinese men working on the railroad divided responsibilities. One man cooked while the others

worked. As the Central Pacific Railroad moved eastward, this arrangement benefited everyone. As one observer noted, "Chinese laborers work on a thorough system and everything moves on in perfect order," (*Daily Alta California,* November 16, 1868:2). The Chinese laborers also formed "gangs" consisting of thirty workers. Each gang elected a headman who "bought all provisions for the gang, [paid] for all, and at the end of the month [received] the entire pay--$30 in gold to each man--[deducted] the charges and then [paid] each man his balance." The men worked from sunrise to sunset. At noon they took an hour lunch. Their camps, according to one account, were like those of an army; the tents were "arranged in rows." Chinese storekeepers accompanied the camps as "they move[d] along and an American sutler [furnished] the main articles of food." Here in the camp, "all the cooking, washing and mending" took place, (*Daily Alta California,* November 16, 1868: 2). The homes of these laborers moved eastward with the railroad.

Living, working, and eating together, the Chinese improved their lives. In this regard, historian Jack Chen describes how Chinese men performed on the railroad in 1865: "They marched up in self-formed gangs of twelve to twenty men with their own supplies and cooks for each mess. They ate a meal of rice and dried cuttlefish . . ."(Chen 1981: 67-68). Overall, the diet of the Chinese laborer in the Sierra was balanced and relatively cost effective (Spier 1958: 130). Fial duty also drove the Chinese to save their money so that they could return as soon as possible to their homes and families in China. Although the Asian laborers dressed poorly and lived in simple dwellings to save money, they usually ate well. For example, they ate rice and noodles, "garnished with meats and vegetables, fish, dried oysters, cuttlefish, bacon and pork, and chicken on holidays, abalone, meat, five kinds of dried vegetables, bamboo shoots, seaweed, salted cabbage, and mushrooms, four kinds of dried fruit, and peanut oil and tea." For historian Chen, this diet reflects a considerable degree of sophistication (Chen 1981: 68). In buying food shipped by train these immigrants working on the railroad were participating in a consumer culture tied to two worlds, one based in southern China, the other the growing consumer culture of nineteenth century America.

The diversity of food, combined with the type of merchandise the Chinese merchants sold, showed that an elaborate supply system followed Chinese laborers. A Chinese merchant contractor followed the workers in a railway car as the line moved forward; (*Daily Alta California,* November 16, 1868:2) from this merchant, Chinese laborers could buy pipes, bowls, chopsticks, tobacco, Chinese style shoes, and ready-made clothing from China (Chen 1981: 68). As Chinese workers moved into the interior West, they carried their culture and cultural preferences with them, from the food they ate to the clothing they wore. They lived as Chinese men bound to cultural norms of food preparation and consumption.

Paul Mullin (2006:4) has asked: did Chinese material culture persist, as Chinese railroad laborers were "followed by railroad trains stocked with traditional material culture?" Was "this cultural persistence, or [was] it instead the railroad's own clever recognition that such materialism was a concession that created a compliant laboring class?" He adds "Chinese immigrants may have felt they were reproducing tradition while the railroad felt it was ensuring its expansion, and they may have both been correct" (Mullin 2006:4). As the rails moved into the interior the question became could the Chinese afford to maintain cultural preferences like eating sea bass? If they could no longer find Chinese lettuce in the market what would they eat? The distance goods had to be shipped would benefit the railroad but not the consumer and as a consumer what choices would Chinese immigrants make and why? The Chinese as a consumer would have to make choices that empowered them to continue their culture to some degree (Mullin 1999). To what degree could the consumer that had to pay the cost of shipping sea food and plants like bamboo into a winter desert continue their culture in Wyoming?

One intriguing choice Chinese immigrants made was to form smaller communal systems that served in place of the families. The household is a good example of a smaller communal system. For example, the 1870 and 1880 censuses for Montana reveal that Chinese laborers established well-ordered households where six to ten men lived. These households, according to the census records, often included one cook who labored at home while the rest of the men worked outside the household in the mines or on the railroads. In Wyoming this "familia" type of household structure surfaced in the mining

town of Rock Springs and, to a lesser degree, in the coal town of Almy. In Montana this kind of household structure appeared in many mining communities (United States Census 1870, Montana Territory, Jefferson County). The cook, apparently not employed outside a household, must have received economic compensation from the other residents inside the home. The Montana census clearly shows the number of months the cooks worked. In many cases these cooks were employed all year (United States Census 1880, Montana).

Often, the cook was either the oldest or youngest member of the household. Possibly, an older household member might have been physically unable to work; the younger members might not have been strong enough or too inexperienced to labor outside the home. Since few Chinese women resided in these frontier communities, men served as the domestic laborers. In many cases it was around these male cooks that new households formed (United States Census 1870, 1880, Montana Territory; United States Census 1870, 1880, Wyoming Territory).

Whenever possible, Chinese immigrants ordered themselves into households resembling families. Census takers referred to these households as "companies," "gangs," or "households." In many cases Chinese miners lived together and selected a responsible individual to perform the important task of running the home. A revealing example of this division of labor was apparent in Virginia City, Montana, in 1881. There Wing Lim served as cook for the "Lam Wah Company" that mined placer deposits near Virginia City (Territory of Montana v Ah Wah and Ah Yen 1881:2). This individual was responsible for purchasing and preparing food and for ensuring good order within the "Lam Wah House." One delivery man noted that his primary contact with the household came through contact with Wing Lim (Territory of Montana v Ah Wah and Ah Yen 1881:2). Since food had to be fresh, and the immigrants were without refrigeration, preparing fresh food daily proved imperative. The cook ensured that the quality and an adequate quantity of food were available. Undoubtedly, if a person was successful in filling these roles, he likely served as cook for a long time.

Usually members of a Chinese mining company took an early breakfast. That being the schedule, a cook had to get up early to prepare food for his fellow countrymen. One miner Ah Get, recalled his day: "I belong to the Lam Wah Company. I took breakfast at the Lam Wah Cabin . . . and went to work about seven o'clock in the morning." He added, "all the partners of the Lam Wah Company, except the cook Wing Lim, went to work on the ditch and mining claim of the Lam Wah Company." As Ah Sam, another member of the Lam Wah Company noted, only the cook remained at the Lam Wah Cabin when the partners or residents of the house went to work (Territory of Montana v Ah Wah and Ah Yen 1881:5).

A pattern emerges at Almy and in Rock Springs, Wyoming where, like in Montana, men served as the cooks for the household (Table 1). Almy, located 7 miles north of Evanston, and Rock Springs, located 110 miles to the east owed their existence to coal mining. As the Chinatown along the Bear River developed at Evanston, less than seven miles north, another Chinese community emerged shortly after 1874. This community grew up around the coal mining town of Almy. Here in 1880, 192 Chinese men lived. One hundred sixty-seven worked in the mines, 15 cooked, 5 labored above ground, and the remainder were storekeepers (1), gardeners (1), clerks (1), barbers (1), or doctors (1) (United States Census 1880, Wyoming). Men at Almy primarily either mined or cooked. But the cook, as in Montana, seemed to serve as the head of the household.

As early as 1874 when striking miners were first replaced with Chinese workers, Jay Gould, president of the Union Pacific Railroad, had instructed S. H. H. Clark, the railroad's coal company superintendent, to employ only Chinese laborers in a new mine at Almy. "With Chinese at Almy and native miners at the other point," Gould pointedly observed, "you can play one against the other and thus keep master of the situation." Union Pacific continued to bring in Chinese miners until Chinese outnumbered "whites" in the Wyoming coal mines (Klein 1987: 331-332; Larson 1978: 115). Almy and Rock Springs shared a dependence on coal mining. This led to some shared experiences. In 1880 the average Chinese home in Almy housed 5.18 people. In that same year Rock Springs averaged 11.25 Chinese per home. Fifty cooks lived in Wyoming, 44 of these served households (See Table 1; *United States Census 1870, 1880*, Wyoming). It would be at Rock Springs, however, that the largest Chinatown

Table 1: Household makeup s in Rock Springs, Wyoming in 1880, showing an example of Chinese households in late nineteenth century Wyoming. Spellings of miner's names directly from United States Census.

HOUSE NUMBER	ROCK SPRINGS 1880 NAME	AGE	SEX	(M) (S)	OCCUPATION	PLACE OF BIRTH
House 133						
	Ah Pugh Gang No17	29	m	s	Coal Miner	China
	Ah Guce	41	m	s	Coal Miner	China
	Ah Toy	41	m	s	Coal Miner	China
	Ah Ghong	42	m	s	Coal Miner	China
	Ah Tom	28	m	s	Coal Miner	China
	Ah Toy	36	m	s	Cook	China
House 135						
	Ah Kng Gang No 20	20	m	s	Coal Miner	China
	Ah Yonkee	25	m	s	Coal Miner	China
	Ah Dok	34	m	s	Coal Miner	China
	Ah Toy	26	m	s	Coal Miner	China
	Ah Tong	21	m	s	Coal Miner	China
	Ah Hock	31	m	s	Coal Miner	China
	Ah....	28	m	s	Coal Miner	China
	Ah....	29	m	s	Cook	China
	Ah Ching	52	m	s	Cook	China
House 139						
	Ah Oynee Gang No 22	26	m	s	Coal Miner	China
	Ah Oh Say	59	m	s	Coal Miner	China
	Ah ...boy	30	m	s	Coal Miner	China
	Ah....	28	m	s	Coal Miner	China
	Ah Yang	28	m	s	Cook	China

in Wyoming emerged (*United States Census 1880,* Wyoming).

The Rock Springs Chinese community had its genesis in the mid-1870s, but by 1880 the Chinatown eclipsed all others in the territory. Three times as large as the Evanston Chinatown, Rock Springs's Chinese community contained 40 % of the territory's 914 Chinese immigrants in 1880. Two decades later, Rock Springs held 60 % of the state's 461 Chinese residents (*United States Census 1880, 1900,* Wyoming). Throughout the territory, most individuals in 1880 worked below the ground in coal mines. In fact, 52 % of the Chinese immigrants (448) worked in mines, 20 % as railroad laborers (172), and 14 % worked as laborers (123). Coal mining brought these men to the town along Bitter Creek. And here evidence of stable support systems centered around the household became clear (*United States Census 1880, 1900,* Wyoming).

In 1880 in Rock Springs, both miners and cooks worked nearly year around with few breaks in their routine (*United States Census 1880,* Wyoming). The census for Rock Springs indicated all but one cook worked year around, and most coal miners rarely were unemployed. In fact, just 27% lost a month of work. Only one cook lost a month of work in 1880. Coal miners went underground and returned to meals prepared by cooks who remained at home. Those houses, although relatively small in size, contained an average of eleven men (*United States Census 1880,* Wyoming). The houses that the Union Pacific Coal Company built for these men measured 12 ft. by 16 ft (Gardner and Brinkerhoff 1993: 184). Eight percent of the population worked as cooks in the households of miners, whereas 78% of Rock Springs's Chinese population mined coal. In one way, the men lived lonely lives without families, yet households functioned as places where cooks provided meals and structure to the immigrants' home lives. Chinese men could profit from working in the service industry. Author Rose Hum Lee, in her classic study of the Butte Chinatown, contends men from China succeeded at working in domestic or service industries because there were few women to clean, sew, or cook. That is, in the late nineteenth century, "Chinamen" performed so-called "women's work" (Lee 1947:145). As cooks and laundrymen, they could earn a living.

THE EMERGENCE OF CORES AND PERIPHERIES

While coal mining dominated Rock Springs in the 1880's, the town slowly evolved into a regional service center. Likewise the Chinatown in Rock Springs became the center of Chinese commercial activity for the surrounding area. Both Rock Springs, and Evanston 110 miles to the west, became centers for Chinese immigrants in the area. They became the core for not only shopping, but for Chinese ceremonies as well.

Cores and peripheries in nineteenth century Wyoming can be classified by several characteristics. Cores are communities that occupy positions of "centrality." "Intuitively, certain individuals or communities may be more central than others and therefore more prominent, influential, or powerful" (Hage and Harary 1983:30). This intuitive concept can be described in several ways. The core would, for example have more: services, material wealth, and access to political and economic resources. On the periphery would be smaller communities with fewer services and a dependence on a single industry for their livelihood. In late nineteenth and early twentieth century Wyoming, the communities on the periphery owed their living to either the railroad or coal mining. In general terms, the peripheral areas in southwest Wyoming shared similar characteristics. They were located in marginal locations (due to climate or terrain). Their standard of living was lower than in the core. They provided fewer job opportunities. Communities on the periphery were reliant on the core for a variety of services.

By the late nineteenth century Wyoming Chinese communities had evolved into Chinatowns (cores) and villages (peripheries). In southwest Wyoming, the cores contained temples ("*Josh* Houses"), *tong* houses, and Chinese Masonic Temples. In China, the *tong* was a community center. As historical geographer David Chuenyan Lai, states: "The Chinese character '*tong*' means a hall or a place to meet and talk" (Lai 1991: 50-51). Lai notes too that a variety of Chinese organizations "such as clan associations, county associations, business organizations, charitable organizations, and secret societies, are commonly designated as *tongs* and subsumed on this term (Lai 1991:51)." This variety sometimes confused outside observers about the purpose of a *tong*. The same scholar explains that the *tong* proved important to "Chinese immigrants, because they recreate[d] the institutions with which they were familiar in China" (Lai 1991:51) Another source of misunderstanding came about because *tong* houses often had a link to "Free Masonry." Furthermore, *tongs* also took on familiar labels, such as Masonic Temples, and this led to additional confusion (Lai 1972: 53-67; 1989: 1-50; 1990: 1-54; 1988: 1-38).

Large ceremonies took place in the core. The best examples of this were the annual Chinese New Year Parades. (Gardner 2000: 251-259). One characteristic of core areas lies in decision-making (political/financial). It appears that from Evanston and Rock Springs Chinese leaders made decisions about labor contracts and possibly who worked where. Much more research needs to be done to determine the extent labor contracts dictated the lives of Chinese laborers in Wyoming, but it is clear Chinese elders did play a role in selecting where their country men worked. In 1880 Census, Ah Say was called the "Supt of Chinese Laborers;" he was the only Chinese resident with this title. In 1880 he lived in Evanston, and would eventually be transferred to Rock Springs (*United States Census 1880*, Wyoming; *Rock Springs Miner*, February 2, 1899:3). Elaborate funeral ceremonies for immigrants who died in the area were also held in the cores. They also had Chinese grave yards. Communities on the periphery did not have permanent temples or halls built solely for meetings. While they probably celebrated festivals, the large celebrations occurred in the core.

In terms of the archeological record, the core communities exhibit the greatest amount of variability in the assemblage, exhibiting the entire range of artifacts found at Chinatowns throughout the west (cf. Costello and Maniery 1988; Gardner 1995a:1-9; 1995b:1-5; 1997a:1-6; 1997b:1-11; 1998:1-13; 1999:1-9; Homer 1996; Voss 2004; Wegars 1993) (Figure 2). In the archaeological record the artifact assemblage in peripheral communities might exhibit diversity, but not the full range of artifacts found at Evanston or Rock Springs (Gardner and Clarke 2002:23-28; Gardner and Johnson 1991:1-59; Gardner and Ralston 1999:1-22; Juell 2000:6-8).

Spaced six miles apart, the railroad section camps in Wyoming were on the periphery. In nineteenth century Wyoming two to twenty Chinese men

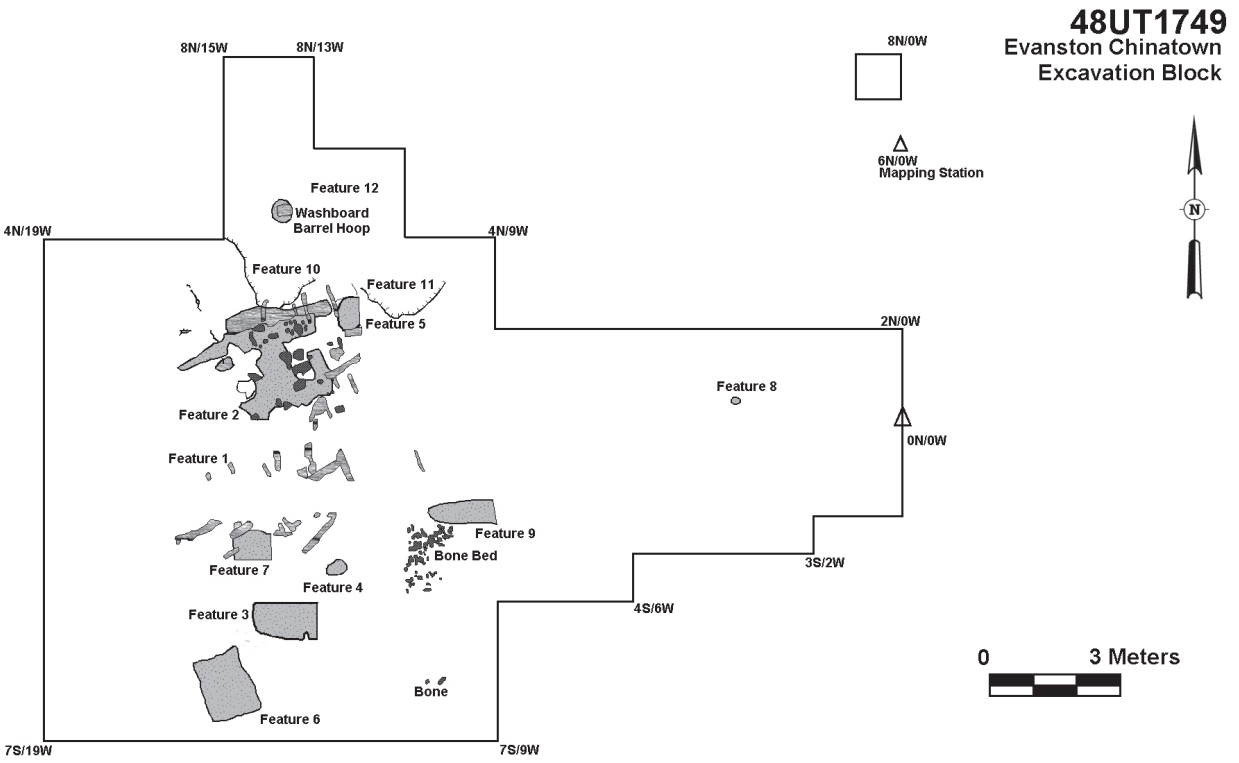


Figure 2: Excavation units and features at the Evanston Chinatown.

lived in these villages (*United States Census 1870 and 1880*, Wyoming). The marginal nature of their location lent itself to the villages vanishing in the twentieth century. The principle employment was the railroad. Food came from town, in most cases Evanston or Rock Springs. Political power radiated outward from the towns to the section camps in more than one way. The Union Pacific Railroad controlled the laborers' movements. The power center for this company lay outside the territories boundaries, but there were local offices in places like Evanston and Rock Springs (Figure 3). Political control of the area also originated from the towns. The Chinatowns were located in towns that had some political control over government services. Added to this was the fact trains were loaded and unloaded in Evanston and Rock Springs. Supplies came from or through Evanston and Rock Springs and the merchants could control the prices the Chinese men paid in the periphery.

In the Chinatowns of Evanston and Rock Springs different social dynamics were at play. Rock Springs Chinese most commonly were employed in the coal mines. Towns like Almy had more Chinese residents than did the section camps, but like the section camps fewer job opportunities presented themselves. Most residents in Almy worked in the coal mines (*United States Census 1870, 1880*, Wyoming). The Chinese population in Almy was relatively high in 1880 (192). Its proximity to Evanston, where goods and services originated, and its reliance on a single industry prevented it from evolving into a core Chinese community. By 1900 the Chinese in Almy had moved away.

At the Evanston and Rock Springs Chinatowns, political, social, and commercial structures evolved to serve the needs of the Chinese in the surrounding areas. At the towns, Chinese New Year was celebrated and in the temples the ancestors were venerated. At both core communities lodges, like the Chinese "Free Masons," provided social organizations to aid the immigrants. Local head men like "Ah Say," living first at Evanston and then at Rock Springs, served as a "go between" for the Chinese and the powerful Union Pacific Coal and Railroad Company (*Rock Springs Miner*, 2 February, 1899:3). Ah Say negotiated on behalf of the community and held the powerful role of being able to get Chinese

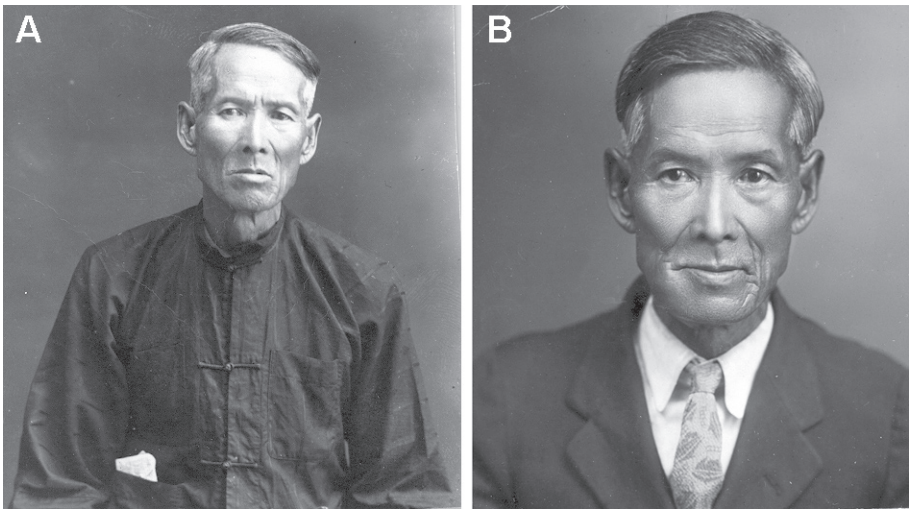


Figure 3: Two photographs of Ah Bow a Chinese coal miner in Rock Springs. The first shows him in traditional dress, the second in a western suit. (Courtesy of Union Pacific Coal Company Collection, Western Wyoming Community College).

immigrant jobs with the "Company." In terms of services the Chinatowns had Chinese markets, laundries, restaurants, doctors, "opium dens," salons, and houses of prostitution. Laundries and restaurants could be found in other Wyoming communities but, between 1870 and 1900, the Chinatowns of Rocks Spring and Evanston were the centers of Chinese commercial, religious, and social activities. There are subtle distinctions between the core and the periphery. In some instances coal towns like Almy might have more Chinese residents (192 in 1880) than Evanston (105 in 1880), but the census records are clear. Evanston had the more diverse population and offered a variety of services (Figures 4 and 5) (United States Census, Wyoming: 1880; Gardner 2000:205-252). Rock Springs, on the other hand, dominated in both population and diversity. More importantly, since both Evanston and Rock Springs sat along the Union Pacific Railroad mainline, they had a logistic advantage in having first access to goods shipped into the area.

Goods flowed from Chinatown to section towns. Section town's populations fluctuated. After several winter snow storms, Chinese men shoveled tracks and lived in trains or section camps while working to clear the tracks. Clearing snow required large numbers of men but only for a short time. In the summer, repairs to the railroad also led to some section camps swelling in size. When the job was finished the men moved on. A permanent crew of between 2 to 12 Chinese men remained in the section camp year round. These men clearly lived on the periphery. While they ate Chinese food (Gardner and Clarke 2002:23-28), initial excavations at section camps indicate the variety and amount may have been less than that consumed by counterparts

Figure 4: General overview of area excavated at the Evanston Chinatown. Photograph taken facing east.

Figure 5: Overview of excavations at the Evanston Chinatown facing southwest.

in places like Evanston. Items like opium tins, woks, celledon wares, four season ceramics, and Chinese coins are present in section camps like Aspen and Hampton. Chicken eggs, possibly from local farms or from Evanston, were consumed at Aspen (Gardner and Clarke 2002:22-28). The difference in terms of material culture remains proved striking. The sections camps of Aspen, Hampton, Monell, and Separation all had Chinese ceramics (Table 2; Figure 6). The census records for 1880 indicate that Aspen had four Chinese residents, Hampton eight, Monell/Table Rock three to four, and Separation eight. Only Aspen has been excavated, but from the surface Monell produced 17 Chinese ceramic fragments, Separation 7, and Hampton 8 (Fawcett 1979:1-19; Gardner and Ralston 1999:1-20; Gardner and Johnson 1991:1-59; Juell 2000: 6-8; Gardner and Clarke 2002:22-28). In excavations at Aspen we recovered 62 ceramic fragments (Gardner and Clarke 2002:24-25, Appendix A). To date we have cataloged 1,152 ceramics from the Evanston excavations, representing an estimated 300 vessels. The comparison is not a one to one comparison. The census statistics list the 1880 Evanston population at 105 (United States Census Wyoming, 1880). The section camp residents were all listed in the census as "railroad laborers."

Making generalizations about cores and peripheries requires comparisons between occupation horizons and artifact assemblages. Occupations dating to 1880 should be compared to horizons at other sites dating to 1880. Thus, the best generalizations would be derived from excavations. As with a lot of comparisons across sites this is easier to say than to do. In terms of cores, both the Evanston and Rock Springs Chinatowns have had excavations conducted at households. Aspen, on the periphery of Evanston, has also had limited excavation in a household. We can look at household to household comparisons at around 1880 between Evanston and Aspen. Any generalization we might draw has to be tempered with the fact Aspen always had a small Chinese population and a Chinese occupation that spanned the period from 1870 to 1906. The Evanston Chinatown dated from 1869 to 1922 and had continuous occupation. Ideally, however, by comparing household to household assemblages dating to the same period, some generalizations can emerge.

Table 2: Minimum number of Chinese vessels and ceramics recovered at Chinese sites along the Union Pacific railroad in southwest Wyoming, including Rock Springs, Evanston, and Aspen. Additional sites are surface assemblage collections. Excavations would increase these totals as will final catalog count from Evanston and Rock Springs. Excavations at Evanston are on-going annually. The Rock Springs count seems to come from one household. Totals are for known Chinese ceramics and vessels.

LOCATION	NUMBER OF CHINESE 1880 CENSUS[1] REPORTED	NUMBER OF CHINESE CERAMIC FRAGMENTS	MINIMUM NUMBER OF VESSELS[2]
Evanston	105	1,152	300
Rock Springs	349	62[3]	39
Aspen	4	62	14 (?)
Hampton	8	8	3 (?)
Monell/Table Rock	3 to 4	17	4
Separation Station	7	8	2 (?)

[1] It is hard to correlate the excavated strata's or surface components to the 1880 census. Any comparison is tenuous but it is strongly felt the number of vessels indicates whether a community occupied a core or peripheral position in the Wyoming Chinese Communities.

[2] This is based on rim sherds, glace, and decoration. It is a very conservative estimate number of vessels.

[3] The total ceramic count is 1,090. We know 62 are Chinese vessel fragments and represent a minimum of 29 vessels. More work needs to be done on the Rock Springs ceramic collection.

The diet of the Chinese in the core community of Evanston and Aspen had similarities. At both, chicken (G*allus*), pig (S*us*), cow (B*os*), sea bass (Serranidae), oysters, and cuttlefish were processed. We know that in Evanston, trout (Salmonidea) was also part of the diet (Scott and Puseman 2005:1-15). While we do not have the data from Aspen that we do from Evanston, there are indications that canned peaches and either canned peas or corn made up part of the Chinese diet (Gardner and Clarke 2002:1-28). What we do have is a clearer picture of diet at Evanston (Scott et. al., 1998:1-15; Scott and Puseman 2005:1-15). From the outhouse adjacent to one residence in Evanston, we gain some insight into the diversity of the resident's diet. Specifically, the macro and micro botanical remains provided general data about consumer choices in Evanston.

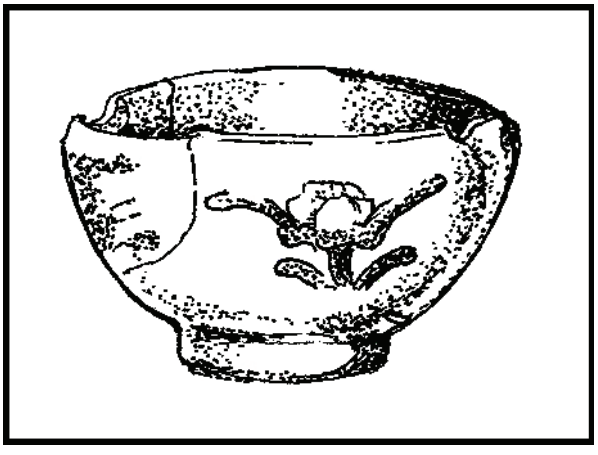


Figure 6: Four seasons teacup found at both Evanston and Aspen Section Camp.

MICRO AND MACRO BOTANICAL REMAINS

Tables 3, 4 and 5 list the macro and micro botanical remains recovered in Evanston. In analyzing the material our principal question became, where did the resources come from? We know there were Chinese gardeners/farmers living along the Bear River near the Evanston Chinatown (Boggart 1996:1-10, 2001; Choong 1911:1) (Figure 7). These farmers would not only have provided things like lettuce and carrots to the residents of Chinatown but to Chinese residents in peripheral towns like Aspen where gardens might not have been practical or possible. A network of producers and consum-

Table 3: Pollen Types observed in the samples from 48UT1749, the Evanston Chinatown (Scott and Puseman 2005: 14-15).

SCIENTIFIC NAME	COMMON NAME
ARBOREAL POLLEN	
Acer negundo	Boxelder
Alnus	Alder
Betula-type	Birch
Juniperus	Juniper
Pinaceae:	Pine family
Abies	Fir
Pinus	Pine
Pseudotsuga	Douglas-fir
cf. Populus	Aspen, Poplar, Cottonwood
NON-ARBOREAL POLLEN	
Asteraceae:	Sunflower family
Artemisia	Sagebrush
Cirsium	Thistle
High-spine	Includes aster, rabbitbrush, snakeweed, sunflower, etc.
Liguliflorae	Includes dandelion and chicory
Brassicaceae	Mustard family
Cheno-am	Includes amaranth and pigweed family
Ephedra nevadensis-type	Mormon tea
Eriogonum	Wild buckwheat
Erysimum-type	Wallflower
Euphorbia	Spurge
Liliaceae	Lily family
Lonicera-type	Honeysuckle
Phlox-type	Phlox
Poaceae	Grass family
Polygonum	Knotweed, Smartweed
Polygonum aviculare-type	Knotweed, Smartweed
cf. Ranunculaceae	Buttercup family
Rhus-type	Sumac, Skunkbush, Squawberry
Rosaceae	Rose family
FOODS	
Cerealia	Economic members of the grass family (cereal grains), including Triticum (wheat), Avena sativa (oat), Hordeum vulgare (barley), and Secale cereale (rye)
Daucus-type	Carrot
Lamiaceae	Mint family
Ribes	Currant, gooseberry
Fragaria-type	Strawberry
Prunus-type	Cherry, Plum
Vitis	Grape
STARCHES	
Sub-round, medium, with eccentric hilum and X	
Sub-round, medium, with hollow hilum and no X	
SPORES	
Trilete	Fern
Sporormiella	Dung fungus

Table 4: Index of macrofloral remains recovered from the Evanston Chinatown (Scott and Puseman 2005:20).

SCIENTIFIC NAME	COMMON NAME
FOODS	
Crataegus	Hawthorn
Cucurbita	Squash, Pumpkin
Ficus	Fig
Fragaria	Strawberry
Olea europaea	Olive
Rubus	Raspberry group (includes raspberry, blackberry, cloud berry, dewberry, salmonberry, thimbleberry, wineberry and yellowberry)
Solanaceae	Nightshade family
Capsicum	Pepper
Lycopersicon esculentum	Tomato
cf. *Solanum melongena*	Eggplant
Vitis	Grape
WEEDS	
Amaranthus	Pigweed, amaranth
Asteraceae	Sunflower family
Tragopogon	Salsify
Poaceae	Grass family
CHARCOAL/WOOD	
Conifer	Cone-bearing, gymnospermous trees and shrubs, mostly evergreens, including the pine, spruce, fir, juniper, cedar, yew, and cypress
Pinus	Pine

ers evolved that provided capital for the farmers at Evanston and vegetables for railroad workers. We do have historic analogies for this core to section camp model (Okano 1986:1-7). Further research could provide concrete macro or micro botanical data to illuminate the flow of produce from the core to periphery. What we have learned is that many of the plant resources consumed in Chinatown were grown locally. We know that currants, strawberries, raspberries, squash, pumpkin, pigweed, carrots, and rose hips can be grown locally. Peppers, tomatoes, eggplant, cherries, and plums could have been imported from the Salt Lake Valley in Utah (76 miles west of Evanston by rail). Grapes, olives, and figs would have to have come from the west coast (or from overseas). Both the items from Utah and the Pacific Coast would have been shipped by railroad. The growers in California, the railroad, middlemen and Chinatown merchants would have profited from the appetite for things like grapes and tomatoes in Evanston.

Table 5: Macrofloral remains recovered from 48UT1749, the Evanston Chinatown (Scott and Puseman 2005: 18-19).

Sample No.	Identification	Part	Charred W	Charred F	Uncharred W	Uncharred F	Weights/ Comments
283	Liters Floated						0.4 L
Feature	Light Fraction Weight						14.90 g
6	FLORAL REMAINS:						
	Crataegus	Seed			1		
Privy	*Cucurbita*	Seed				1	
	Ficus	Seed			176*	48*	
	Fragaria	Seed			908*	108*	
	Olea europaea	Seed			1		
	Rubus	Seed			3196*	112*	
	Solanaceae	Seed				28*	
	Capsicum	Seed			14*		
	Lycopersicon esculentum	Seed			792*	322*	
	cf. *Solanum melongena*	Seed			1		
	Vitis	Seed			70*	104*	
	Amaranthus	Seed			1		
	Asteraceae	Seed			1		
	Tragopogon	Seed			1		
	Poaceae	Floret			1		
	CHARCOAL/WOOD:						
	Conifer	Wood				17	0.21 g
	Pinus	Charcoal		2			<0.01 g
	Pinus	Wood				3	0.03 g
	Unidentifiable (vitrified)	Charcoal		X			Moderate
	NON-FLORAL REMAINS:						
	Bone					14	
	Fish vertebrae				29	3	
	Coal					X	Few
	Eggshell					54*	
	Insect	Chitin			1	390*	
	Metal pieces					X	Moderate
399	Liters Floated						
Bone	Light Fraction Weight						
Concen-	FLORAL REMAINS:						
tration	Poaceae	Floret				4	
	CHARCOAL/WOOD:						
	Conifer	Charcoal		1			0.03 g
	Salicaceae	Charcoal		3			0.01 g
	Unidentified cf. charcoal - vitrified and degraded				X		Abundant
	Conifer	Wood				X	Few
	NON-FLORAL REMAINS:						
	Bone ≥ 2 mm					5	
	Bone < 2 mm					X	Few
	Coal and cf. charcoal ≥ 2 mm					X	45.58 g
	Coal and cf. charcoal < 2 mm					X	Moderate
	Glass - green					1	
	Metal - oxidized					X	Few
	Porcelain - white glaze					1	
	Rock/Gravel					X	Few

Based on the micro and macro botanical remains at Evanston, it is clear that a variety of plant resources were consumed. These plant resources, along with the material cultural assemblage, show how the commercial ties the Chinese community had to areas outside Wyoming. While consuming foods that suited their taste, they included in their diet items like currants and rose hips that are native to Wyoming. As consumer of goods from a distance, they were part of a consumer process that involved producers, middlemen, shippers, and merchants that profited from serving the needs of the Evan-

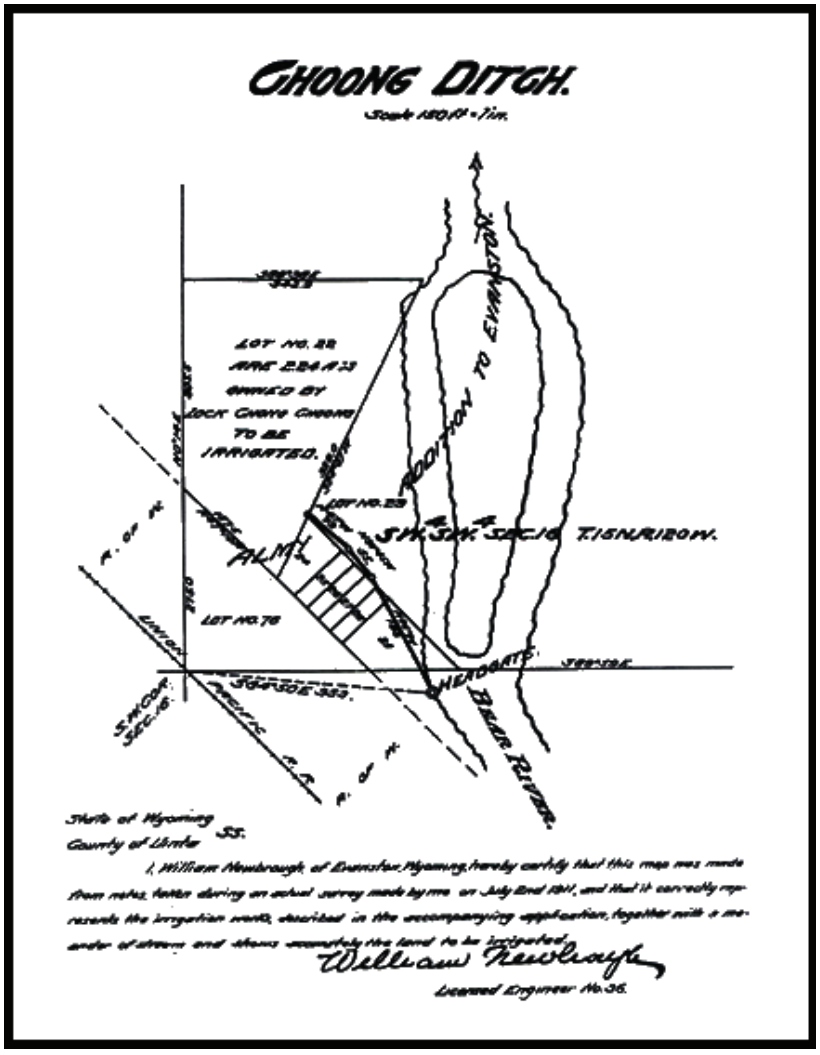


Figure 7: Map of irrigation ditch built by "Choong" in the early 1900's to water his fields along the Bear River. Original on file Uinta County Courthouse, copy provided courtesy of the Uinta County Museum Evanston.

ston Chinatown.The Evanston merchants, in turn, profited from selling their wares to men working in the periphery. This system, where men were cooks and food resources pooled from a wider area, had a materially beneficial side affect. It gave many residents of core and peripheral Chinese communities access to a relatively balanced diet.

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FRESHWATER MUSSEL IDENTIFICATION AND ANALYSIS FROM THE RIVER BEND SITE, 48NA202

by
KERRY LIPPINCOTT

INTRODUCTION

The subject of freshwater mussels in Wyoming archaeology is of more importance than might first appear and seems not to have been recognized by students of Wyoming archaeology. A significant body of data exists concerning mussels' biological description, ecology, and relationships as well as the archaeological identification and prehistoric cultural connections of mussels. The following draws on those data and applies it to an example of Wyoming's archaeologically recovered mussels from the River Bend site (48NA202). Many different aspects of freshwater mussel valves are potentially available for archaeological identification. Just as with other kinds of faunal elements, it is possible to identify species, side, portion, sex, age, and time of death if the appropriate parts of the animal are preserved. Based on those identifications, it might then be possible to reconstruct a part of the local environment, to evaluate the importance of mussels in the site inhabitants' diet, and to develop hypotheses about the human or social nature of resource utilization. Some, but not all, of these factors are actually realizable with the River Bend site specimens. This effort is one in a continuing series of identifications and analyses detailing the occurrences of freshwater mussels at Great Plains archaeological sites (Lippincott 2000).

EXTANT FRESHWATER MUSSELS IN WYOMING

Freshwater mussels have a venerable paleontological past, having been recognized in deposits from the Triassic Period, at least 200 million years ago (Cvancara 2000). Mussels are easily recognized as bivalves by the presence of a matching pair of valves which make up their exterior shell. Overall shape is distinctive from one mussel species to another with that shape being related to their habitat. Different species have preferences for specific water depths, flow rates, mud, sand, gravel composition of the stream or pond bottom, water chemistry, and other possibly unrecognized factors.

A mussel's shell is composed of three alternating oriented layers of a hard, calcium carbonate material: an inner layer of "pearly" nacre, an intermediate lamellar layer, and a dark-colored outer layer named the periostracum, which is almost like a skin. The shell itself has several important, identifying landmarks (Figure 1). These include dorsal (top), ventral (bottom), anterior (forward), and posterior (rearward) margins, an umbo or beak (with beak "sculpture" specific to individual species), and various kinds of exterior grooves, nodules, colored rays, and other features. On the shell's interior, there are pairs of interlocking pseudocardinal and lateral teeth, scars left from attachment of anteriorally- and posteriorly-located muscles, and a pallial line left from the attachment of the mussel's mantle. The interior and exterior are variously colored, sometimes in subtle degrees, which may aid in their identification. The internal organism that lives in and is protected by the shell is more complex than its exterior structure, although the valves are what archaeologists are left to analyze.

The animal that fills the inside of these valves is an invertebrate, enclosed within a fleshy mantle. It lives by extracting nutrients from the water through an inhalant siphon, filters food by means of gills and a mouth, and expelling through an exhalant siphon. It has a heart and circulatory system, a primitive nervous system, a respiratory system made up of gills to extract oxygen dissolved in water, and a reproductive system. Fertilized eggs are briefly incubated on specialized gills and then expelled as parasitic larval glochidia. These glochidia attach

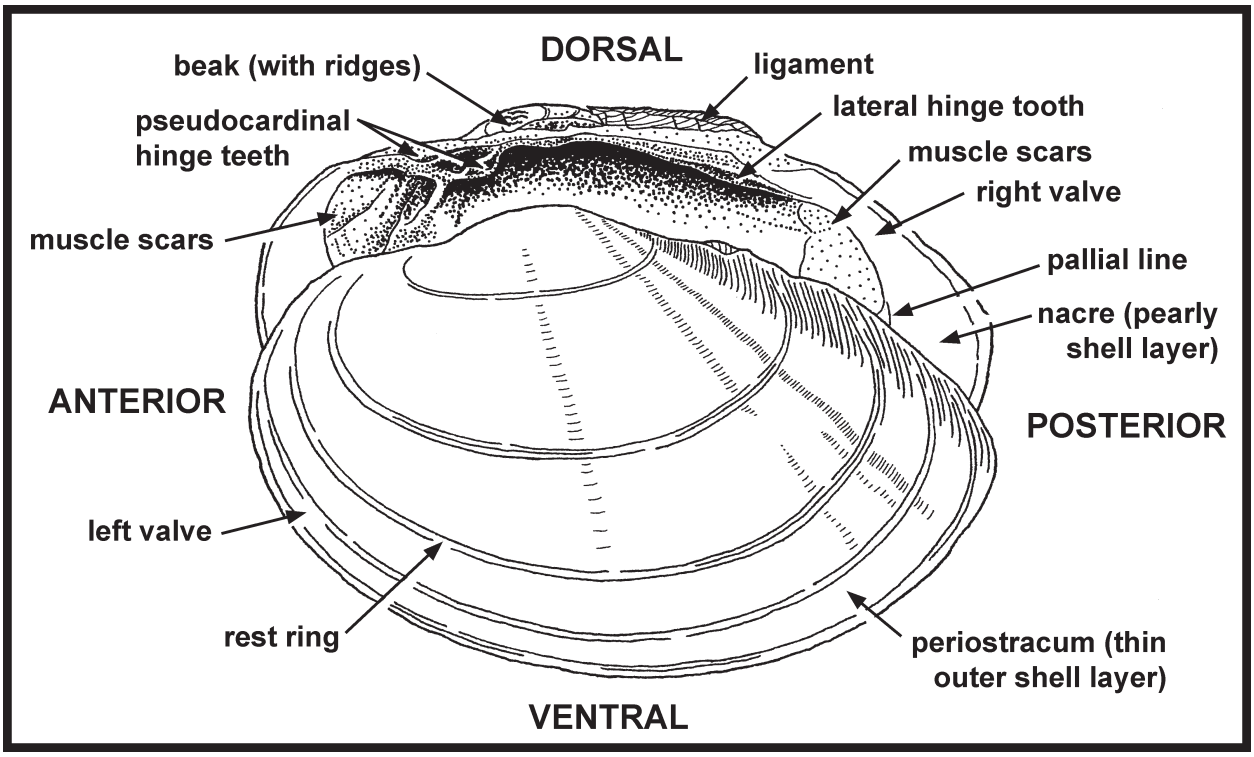

FIGURE 1: Freshwater mussel shell descriptive landmarks based on an example of *Lampsilis cardium*, plain pocketbook (adapted from Crancara 1983).

themselves to a host fish species (with specific mussel species often using a specific fish species as its host) where they grow for a few weeks and then undergo a metamorphosis into miniature mussels. These sprats then drop off the host fish and take on an independent existence of growth and reproduction. Most mussel species are heterosexual, with distinctive male and female individuals, although some species are hermaphroditic.

Compared to more mature river systems, Wyoming's rivers are relatively young and swift flowing with gravel and/or sand bottoms, and having few oxbows or backwater residuals. Therefore, stream courses have relatively few distinctive habitats to support a wide variety of mussel species. Such limited environments result in relatively few species of freshwater mussels. Presumably the Wyoming mussels are at their uppermost environmental limit.

There are two modern, biological listings of Wyoming's freshwater molluscan fauna (Beetle 1989; Whaley et al. 2004). Beetle (1989) reported results of collecting expeditions throughout the state from 1948 to 1988. She identified her collecting localities generally only to counties, but by township, range, and section in some cases. For the most part, a combination of Wyoming's political divisions and watershed geography is simple and integrated enough that each county has only one major drainage within it. Beetle listed four species of freshwater mussels in the state; one in the Pacific Ocean drainage of the Snake, Salt, and Green Rivers, one species in the Bear River, and two species in the North Platte River drainage.

In the west, Beetle reported the western pearlshell, *Margaritifera falcata*, from the Snake and Green Rivers and their tributaries, and the California floater, *Anodonta californiensis*, from the Bear River in Uinta County. Two species were identified in the upper Missouri River-related drainages of the North Platte. Beetle reported no mussels from other Missouri River tributaries, such as the Cheyenne, Belle Fourche, Powder, and Wind/Bighorn River drainages. One eastern Wyoming species was the cylindrical papershell, *Anodontoides ferussacianus*, recovered from the North Platte River and its tributaries in Goshen, Platte, and Laramie counties. The other species was *Lampsilis siliquoidea*, fatmucket, also in the North Platte and Sweetwater Rivers in

Platte, Converse, Natrona, and Fremont counties. Beetle appears to have considered another species, plain pocketbook, *Lampsilis ventricosa*, now identified as *Lampsilis cardium*, as a synonym of *Lampsilis siliquoidea*, because she listed the two currently recognized separate species together as if they were one species.

Whaley et al. (2004) identified seven species of mussels in the state: the four Beetle listed, western pearlshell, California floater, cylindrical papershell, and fatmucket. The plain pocketbook, *Lampsilis cardium*, was considered a subspecies by Beetle but now given full species status. In addition, the giant floater, *Pyganodon grandis*, has been recovered in the Belle Fourche River drainage and is reported to be in the Little Missouri drainage, while an immature white heelsplitter, *Lasmigona complanata*, was collected from the Belle Fourche River. This more recent research also identified fatmucket from the Wind/Bighorn, Tongue, and Powder Rivers.

In sum, two species are found in the Pacific Coast drainages and at least five species in the Missouri River watershed. One species in the west and one in the east are "toothless" while the others possess pseudocardinal and lateral "teeth." Interestingly, one of the predominately Pacific drainage species also occurs in the very headwaters of Atlantic bound streams.

PREHISTORIC FRESHWATER MUSSELS IN WYOMING

Freshwater mussels have been recovered, and in some cases identified to the species level, from Wyoming archaeological excavations beginning in the 1950s. Mussels are a relatively common inclusion in sites close to water courses. They are even found with surprising regularity in sites along small drainages and intermittent streams and in sites miles from a water source that could sustain a viable mussel population. Freshwater mussels have been recovered from sites as diverse as caves, rockshelters, tipi rings, camp or village sites, and buffalo kills. Mussels have come from Early, Middle, and Late Plains Archaic, Plains Woodland, Late Prehistoric, and Protohistoric components. A literature review has been compiled for sites with only a few freshwater mussels (Lippincott n.d.). In addition, there are three sites in the state from which more than a hundred to several thousand mussel fragments have been recovered: the McKean site (Mulloy 1954; Kornfeld et al. 1995), the Butler-Rissler site (Miller and Waitkus 1989), and the River Bend site (Buff 1983; McKee 1988b).

McKean site (48CK7) investigations by the Smithsonian Institution River Basin Survey but excavated under a cooperative agreement by the University of Wyoming, produced a wealth of mussel remains. Mulloy's report (1954) for the 1951 and 1952 excavations at the McKean site was one of the first to identify prehistoric use of mussels in the state. Mulloy considered there were an upper and lower components at the McKean site. Features and artifacts from the lower component provided data for Mulloy's definition of the "Early Middle Prehistoric Period," now identified as Middle Plains Archaic, while he called the upper one "Late Middle Prehistoric Period" but which is now be considered Late Plains Archaic (Mulloy 1954:433). There were no mussels from Mulloy's lower component but about 1100 shell fragments were recovered from the upper component. These mussels were apparently quite eroded and decomposed so the only identification provided was to taxonomic level of Order *Unio*, but not to genus or species. Mulloy (1954:453) was quite explicit the shells were an important part of the prehistoric diet. Mulloy had a single radiocarbon assay for the upper component of 3287±600 RCYBP (Mulloy 1954).

The University of Wyoming (funded by the Bureau of Reclamation), reinvestigated sites at Keyhole Reservoir and the McKean site from 1985 to 1987 (Kornfeld et al 1995). The new interpretations did not always agree with Mulloy's work from 35 years earlier. Specifically, identification of two distinct cultural strata at the site was judged to be incorrect. Instead, continuous occupations of varying intensity or duration were observed in the archaeological deposits (Kornfeld 1995:306-308). Excavations near Mulloy's Locality I did produce additional freshwater mussels, which, like Mulloy's, were confined to the uppermost levels (Stratum I), in association with an untyped projectile point. Other investigations in Locality I (Area S1015-1017/E914-925) produced mussels and a Late Plains Archaic style point. Thus, it appears in those areas of the site where freshwater mussels and chronologically diagnostic projectile points were recovered, the 1985-87 study corroborates Mulloy's interpretations. One hundred

and ninety-one mussels, all from Locality I, were identified as *Lampsilis radialis*, an identification at odds with nomenclature for mussels in Wyoming.

Another site with recovered mussels was the Butler-Rissler site (48NA1000), a Plains Woodland site along the North Platte River near Casper (Miller and Waitkus 1989). Butler-Rissler is a single component site with a hearth feature, cord-marked pottery, Besant projectile points and other chipped stone tools and debitage, manos and metates, and a suite of floral and faunal remains. Two Accelerator Mass Spectrometer (AMS) radiocarbon dates were obtained, one of 1660±90 and the other of 1800±100 RCYBP (Miller and Waitkus 1989). Among the faunal remains were almost 5,000 freshwater mussel fragments. Five nearly complete valves were identified by Dr. Robert E. Warren, Illinois State Museum as plain pocketbook, *Lampsilis* cf. *ovata ventricosa* (now *Lampsilis cardium*). Warren also provided an analysis of the specimens as left or right valve and male or female form. He, like Mulloy at the McKean site, was explicit in asserting the mussels were part of the food regimen at the site, although there was one decoratively incised shell fragment.

Another site with a large number of mussels was the River Bend site (48NA202) (Buff 1983; McKee 1988b). The location was on a low terrace at a bend in the North Platte River near Casper. It was identified as a Protohistoric Shoshoni camp or village based on recognition of intact living floors and a wide range of artifacts and ecofacts. Along with metal trade tools and steatite bowl fragments, there were chipped stone tools including small side-notched and tri-notched arrow points, end scrapers, drills, metates and shaft abraders, bone and antler tools, and bone and shell ornaments. In addition, there were faunal materials, which included mature and fetal bison bones, a horse skull (McKee 1988a, 1988b) and thousands of mussel shells and shell fragments. The species is identified here as *Lampsilis siliquoidea.*

RIVER BEND SITE MUSSELS

The River Bend site mussels have been in storage in cataloged plastic bags at the University of Wyoming. There are indications on the catalog bags someone identified at least some of these specimens when curated. Several bags are marked with some variation of "*Lampsilis radiata siliquoidea,*" "Mollusca, right valve," or "4 left hinges." Such identifications were noted but not always followed in the present study. In several instances, species identification were given to specimens which, in this author's opinion, did not retain diagnostic portions of the valve. In other instances, identifications of valves as left or right were incorrect. McKee's thesis (1988b) provided a species identification, a geographic distribution, and a general discussion of the species, as well as a calculation for Minimum Number of Individuals (MNI) and a calculation for pounds of edible meat. All identifications given here are based on personal examination of the specimens.

SPECIES

Based on the valve hinge shape, elevation of beak, and to some extent, curvature of the ventral margin, those specimens considered classifiable are here identified as fatmucket (*Lampsilis siliquoidea*). Fatmucket shells are smooth, elongate or elliptical in overall shape, moderately thick, and inflated. Dorsal and ventral margins are straight, the anterior end is rounded, and the posterior is pointed for males, or truncated for females (Figure 2). There are two divergent pseudocardinal and two straight lateral teeth in the left valve and one of each in the right valve. The interior nacre is white while the exterior periostracum ranges from yellow to tan, or brown, with greenish rays extending from the beak to the posterior ventral margin (Cummings and Mayer 1992:150). Fatmuckets are complacent, generalized mussels with a wide distribution within the Mississippi drainage basin, including the Missouri River and its tributaries where they are characterized as widespread and common. Their preferred habitat is small to medium-sized rivers and creeks with depths of 10 to 120 cm and various combinations of gravel, sand, or mud bottoms (Warren 1991:33). Fatmuckets are not in danger of extinction although they are no longer present in this stretch of the North Platte River. Twenty specimens are felt to have retained a large enough fraction of the total valve's outline to be realistically identified at the species level. A larger number of specimens (192) retained a smaller portion of the pseudocardinal tooth area and might be identified as most likely members of that species. Since the standards of mussel identification require enough of the pseudocardinal teeth and adjacent portions be present for a reliable identification, those

Figure 2: Examples of a female (top) and male (bottom) fatmucket, *Lampsilis siliquoidea*.

standards are followed here.

VALVE

If enough valve landmarks are present, left and right valves are readily identified. Such identification is considered of value in calculation of MNI and as a possible indication of randomness or intentional selection on the part of the site's original inhabitants (or possibly on the part of the archaeologist's) for left or right valves. Table 1 presents counts of lefts and rights valve portions from River Bend.

Simple left or right totals are not particularly informative since, presumably, a single valve could be fractured into two fragments that would be identified as left anterior one-quarter and as a left posterior one-quarter. To have a single valve counted as two lefts would artificially inflate the MNI. The actual probability of having one valve counted as two is not considered as very great but still possible. Nevertheless valve lefts and rights with an identifiable landmark are presented as if there could have been some cross contamination of numbers. Pseudocardinal teeth are the thickest, most robust part of the shell. They easily outnumber all other identifiable portions of the shell. A combination of identifiable pseudocardinal teeth with either portions of the left and right dorsal (192) or the left and right anterior (16) fragments of the valve account for 208 total valves. Of those, 89 are lefts and 119 are rights. Thus, a minimum of seven relatively complete right valves plus 119 dorsal and anterior right fragments

Table 1: River Bend site, 48NA202, identification of freshwater mussel species, left and right valves, and portions of valve fragments.

	LEFT	RIGHT	SUBTOTAL	TOTAL
ID as *Lampsilis siliquoidea*	13	7	20	*20*
Pseudocardinal teeth, dorsal 3/4	3	1	4	
" ", dorsal 1/2	1	8	9	
" ", dorsal 1/4	35	38	73	
" ", dorsal 1/8	39	57	96	
" ", dorsal <1/8	4	6	10	
" ", all dorsal, subtotal	*82*	*110*	*192*	*192*
" ", anterior 1/2	2	1		
" ", anterior 1/4	5	8		
" ", anterior, subtotal	*7*	*9*	*16*	*16*
Lateral teeth, dorsal 3/4		1	1	
" ", dorsal 1/2	2	1	3	
" ", dorsal 1/4	79	79	158	
" ", dorsal 1/8	6	9	15	
" ", all dorsal, subtotal	*87*	*90*	*177*	*177*
Anterior muscle scar, anterior 1/2	3	3	6	
" " ", anterior 1/4	38	59	97	
" " ", anterior 1/8	8	7	15	
" " ", all anterior, subtotal	*49*	*69*	*118*	*118*
Posterior muscle scar, posterior 1/4	12	9	21	
" " ", posterior 1/8	3	4	7	
" " ", all posterior, subtotal	*15*	*13*	*28*	*28*
Ventral margin, 1/4			155	
" ", 1/8			41	
" ", all marginal, subtotal			*196*	*196*
Interior fragment			1875	
TOTAL				**2627**

provide a total of 126 right valves and an MNI of 126 mussel shells from the collections at the site.

PORTION

Figure 3 illustrates portion and proportion of valves as used in this study. Identification of individual discrete landmarks is a first necessity, followed by estimation of the attached portion of the valve. Pseudocardinal and lateral teeth identifications are easy and straight forward. Differentiating anterior and posterior muscle scars, or their fragments, does take greater effort but is aided by the valve's relative thickness and sometimes by growth line curvature on the valve's external surface. One hundred and eighteen anterior muscle scar fragments and twenty-eight posterior muscle scar fragments were identified. The posterior portion is thinner than the anterior and more subject to breakage, deterioration, and erosion. Identification of ventral margin fragments consisted of fragments with a portion of the pallial line intact but identification as either left or right was not attempted for this kind of fragment. A total of 196 specimens were identified as some portion of the ventral margin. Finally, a large number of otherwise unidentifiable interior fragments (1875) were, for the most part, merely counted. The overall number of mussel specimens identified (NISP) here is the combination of those identified to species (20), those identified as pseudocardinal teeth (208), lateral teeth (177), anterior (118) and posterior (28) muscle scars, ventral margins (196), and interior fragments (1875) for a total of 2627.

FRAGMENT OR PROPORTION

For comparative purposes, an estimation was made of the proportion of the valve adjacent to the interior's surface landmark. These consisted mostly of an attached 1/2, 1/4, 1/8, or even <1/8 of that portion of the valve (Figure 3). These estimations are subjective and may have varied slightly from one

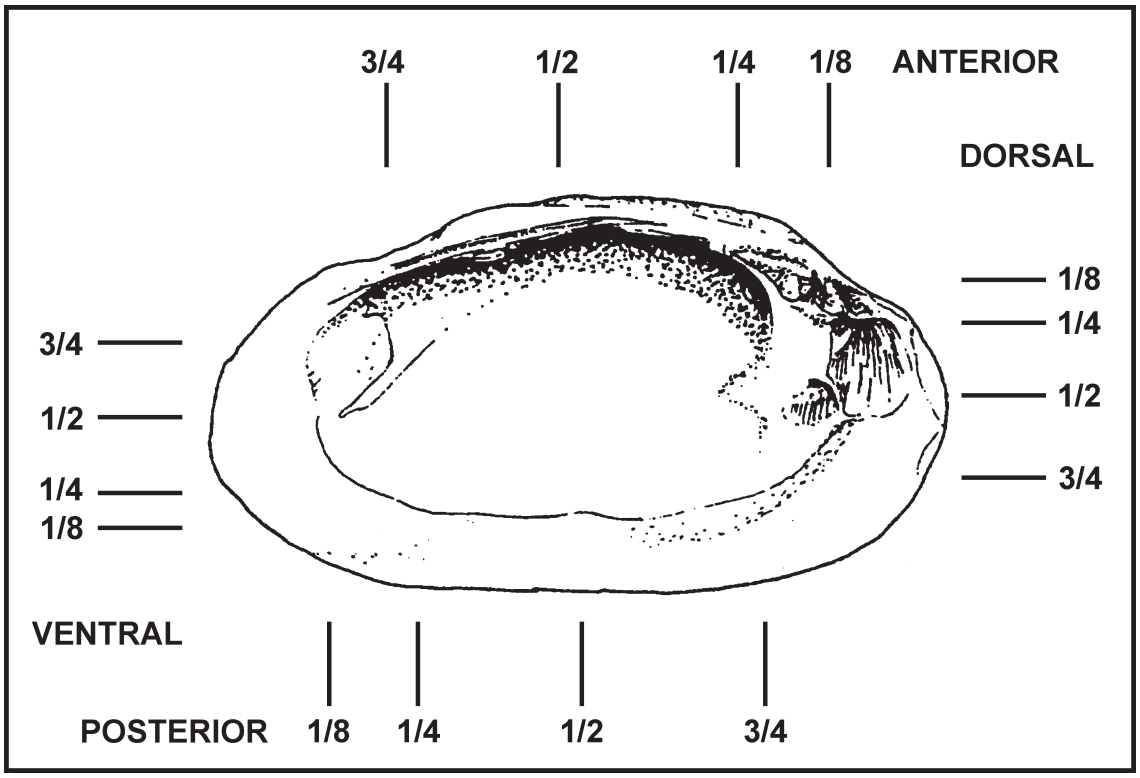

FIGURE 3: Divisions of a valve into anterior:posterior and dorsal:ventral 1/8, 1/4, 1/2, and 3/4 portions. Illustration is *Lampsilis siliquoidea*, fatmucket, male, lfet valve.

day of identification to the next.

SEX

Under adequate conditions of preservation, fatmucket shells are identifiable as either male or female individuals based on the posterior margin's shape - females are squared and truncated whereas males are tapered or pointed. (Cummings and Mayer 1992:150; Lippincott 1995). However, no posterior margins were complete enough to determine their overall shape. Thus, no sex determination was possible for the River Bend site's sample of mussels.

AGE

As with determination of sexual dimorphism, determination of age at death for mussels is greatly facilitated by specimens as complete as possible (Lippincott 1996). Since no complete specimens were available, age determination would probably require some form of cross-sectioning (Dorsey 2000). No cross-sectioning and no age estimation or determinations were attempted.

SEASONALITY

It is possible to measure the degree of completeness of the last annual cycle of growth and rest rings and thereby estimate the season of collection. Mostly broad, seasonal categories, such as late spring/summer or fall/early winter, are possible since mussels live in a fairly stable environment and have only a general, seasonal reproductive period (Dorsey 2000). Once again, the technique for these kinds of measurements or estimations requires cutting a cross-section through the valve and this was not performed on the River Bend site specimens.

MUSSELS AS A PREHISTORIC FOOD RESOURCE

The archaeological remains of mussels at sites in Wyoming with a large number of mussels are identified as the remains of prehistoric meals. Those sites span a wide range of time from the Middle Plains Archaic McKean site (Mulloy 1954; Kornfeld et al. 1995), the Plains Woodland Butler-Rissler site (Miller and Waitkus 1989), and the Protohistoric River Bend site (Buff 1983; Lippincott, this report). The use of freshwater mussels as a food resource is not particularly common on the Northwestern Plains but neither is it totally unheard of nor unreported in

the literature (Aaberg 1991; Lippincott 1995; Lippincott and Davis 2000; Warren 1996). There seems to be a prejudice against recognition of mussels as a food resource on the part of Northwestern Plains archaeologists. But that is not the case for archaeologists in other parts of the country. Mussels are edible and they have been eaten in the prehistoric past. A wealth of data are available in the Southeast (Morrison 1942), the Midwest (Parmalee and Klippel 1974), and even the Middle Missouri subarea of the Great Plains (Warren 2000) as evidence for mussel's as food.

Although they may have been a food resource, mussels are not particularly nutritious (Parmalee and Klippel 1974: Table 4). Mussel meat has a relatively high moisture content, moisture which adds little to its nutritional value. Mussels contain 50% or less, often much less, of the calories per hundred grams of meat compared to various species of mammals, birds, or even fish. They also have small amounts of protein and fat compared to other flesh. But mussels do possess amazingly high levels of calcium, phosphorus, potassium, sodium, and iron, as measured in milligrams per 100 grams of edible meat. Perhaps their attraction to the diet was as a source of trace minerals. They may have been eaten merely because they were there.

Collecting mussels can be a relaxed or leisurely effort; all it involves is wading in knee deep water, being able to recognize the difference between mussel shells and similarly-sized river rocks, picking them up, and putting them in a container. Visually searching for mussels takes only rudimentary clues of "prey recognition." In their normal orientation, the dorsal surface is facing upwards and, if the valves are open so the foot can provide attachment to the stream bottom, there is an opening or seam visible between the two valves. There are few rocks in the river with a seam through their middle. Although mussels can reach a density of dozens, or even a hundred individuals per square meter in a long established mussel "bed," their usual occurrence in favored habitat would be only one or several to the meter. Once recognized, there is no possibility they can escape collection. They would certainly qualify as the slowest of the "slow game." Therefore, collecting mussels could be a task performed by otherwise under occupied members of a hunting and gathering band.

Once collected, cooking mussels is also pretty rudimentary. Mussels probably could be shucked, like oysters, with a thin but stout blade inserted between the valves to sever the anterior and posterior abductor muscles that hold the valves together. Another scooping motion would separate the animal from the shell and deposit it into a cooking vessel. However, it is relatively easy to simply roast or steam any number of mussels in their own shells, whereby they are cooked and open themselves at the same time. The necessary components for the technique would include a fire, rocks for retaining heat, mussels in their shells, and a covering of vegetative material to hold in the heat and possibly to provide more moisture for the cooking process. All of these elements were recovered from the River Bend site or could be reasonably postulated to have been there. Therefore, the mussel shells from the River Bend site are considered residue from meals eaten at the site.

Recipes that include freshwater mussels are another matter altogether. Freshwater mussels are not the same kind of thing as the blue or green mussel species of marine origin found in the frozen food section of modern grocery stores. The freshwater mussels I have tasted (admittedly very few) have a combination of a decidedly muddy and fishy flavor. Supposedly the best way to clean mussels is to place them in a wash tub with changes of fresh water and feed them cornmeal for several days. Even then a controversy exists as to whether a Tabasco sauce condiment should be applied by the drop or by the spoonful.

CONCLUSIONS

Wyoming's freshwater mussels are small, unprepossessing, aquatic invertebrates in a region with large, impressive, terrestrial mammals. They don't get the respect or attention they deserve from the general public, biologists, or archaeologists. The general public will probably continue to ignore mussels and biologists have their own publication outlets to inform one another. This article is intended to be an introduction to mussels for Wyoming archaeologists.

Freshwater mussel remains recovered from archaeological sites in Wyoming are a persistent, although minor, attribute of excavated sites and have even been recorded from a few surface sites.

Mussels have been noted from sites as early as the Middle Plains Archaic and all subsequent time periods. They have been characteristically recovered from sites in proximity to a permanent or at least stable water source but isolated valves have been recovered from surprisingly far away from such sources. Utilitarian tools could have taken advantage of a mussel shell's inherent hardness or the natural shape of its paired valves. Mussel shells have been identified as prehistoric paint containers, spoons, scrapers, or tinder boxes, and most often as the raw material source for ornaments including beads, discs, pendants, and other forms. Ornaments made from mussel shell, particularly if the mother of pearl or nacre were exposed, exhibit a smooth, white, and iridescent surface that can seem unusually attractive. In addition, mussels were also a prehistoric food source and have been identified as such at three sites, i.e., McKean, Butler-Rissler, and River Bend, with several hundred to several thousand identified specimens.

Those specimens from the River Bend site which retained adequate and specific hallmarks were identified to the species *Lampsilis siliquoidea*, fatmucket, and as either a left or a right valve. These amounted to 20 specimens, including 13 left and seven right valves. Additional specimens with remains of pseudocardinal teeth and a portion of the dorsal or anterior margin were identified as "cf.", or most like, the same species but did not retain enough specific or diagnostic characters for unqualified identification. However, there were no other species of freshwater mussels identified from the site. These amounted to 192 pseudocardinal teeth/dorsal fragments, 82 left and 110 right valves, and 16 pseudocardinal teeth/anterior fragments, seven left and nine right valves. Adding all of the right valves together gives a total of 126, which is the Minimum Number of Individuals for the species from the River Bend site. Other identifiable portions of the valve but ones with little species identification value are those that include the lateral teeth (n = 177), anterior muscle scar (n = 118), posterior muscle scar (n = 28), and ventral margin (n = 196). In addition, there are 1,875 otherwise unidentifiable interior fragments. The cumulative addition of all of these fragments yields a total number of identified specimens of 2,627.

Other kinds of data may also be gleaned from freshwater mussel remains from archaeological sites. These data include sex and age of the individual mussels and the season of their death. Such pieces of information could be very useful in reconstructing human predation patterns on mussels or even developing hypotheses of the human social system.

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