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A HISTORY NOT TO BE FORGOTTEN: MASS BURIALS IN MONGOLIA

by Bruno Frohlich and David Hunt



In the summer of 2003, while Smithsonian physical anthropologist Bruno Frohlich was surveying burial mounds in the Hovsgol aimag (province), he was informed by Naran Bazarsad of the Mongolian Academy of Sciences that mass burials had been discovered earlier that year at Hambiin Ovoo outside Ulaanbaatar. The mass burials had been excavated by monks, but there were many concerns that the mass graves had not been documented adequately for historic and forensic purposes.

A few miles outside the capital city of Ulaanbaatar, construction workers removing fill for housing construction had found the remains of many individuals with Buddhist monks' clothing and religious objects. They notified the lamas at Ulaanbaatar's Gandan Monastery, whose leader Lama Purevbat decided to have the monastery lamas retrieve as many bodies as possible and render Buddhist ceremonies and burial practices for the dead. The number of crania and femora (thigh bones) uncovered in their work suggested that the grave site contained more than 600 individuals. Following the removal of the bodies with large construction equipment, the lamas performed rituals for the dead and cremated the remains at the mass grave site.

Subsequent negotiations between the Mongolian Academy of Sciences and Lama Purevbat and his associates from the Gandan Monastery resulted in a plan for continued excavation of the burial site at a later time through the application of modern forensic techniques and evidence collection. As part of this negotiation, Bruno Frohlich visited the Gandan Monastery where Lama Purevbat gave him a fascinating introduction to Buddhist mortuary practices, Buddhist anatomical learning, and the traditional treatment of human remains. The Mongolian Academy of Sciences agreed to coordinate with the

Gandan Monastery and notify the Smithsonian Institution when the scientists could proceed with further study.

A few months later, the Mongolian Academy of Sciences approved the continued documentation and investigation. Frohlich and Naran were to organize survey and excavation at the Hambiin Ovoo site with the assistance of Smithsonian physical anthropologist David Hunt and Erdene Batshatar, Tsend Amgalantugs, Enkhtur Altangerel, Batsukh Dunburee, and Jamsranjav Bayarsaikhan from the Institute of Archeology and the National Museum of Mongolian History.

During the initial visit to the Gandan Monastery, Frohlich had been allowed to view about 80 skulls and some postcranial remains kept by Lama Purevbat in a small building within the monastery. As proof of the killings, these remains had been preserved rather than cremated. About 70 out of the 80 crania had two holes in the cranial vault, one in back and one in front, typical features of projectile entry and exit trauma made by firearms in the execution of victims. In most cases, the position of the holes suggested that the individual was executed by a gun fired directly at the lower left part of the head (occipital) and with its projectile exiting at the front of the head (upper frontal bone). Extensive fracturing of cranial bones was present, especially around the exit hole. Associated clothing from the bodies in the mass grave strongly suggested that the executed individuals were all Buddhist monks. The artifacts and objects present with the bodies were commonly used in the 1930s and 1940s. From this evidence, it was inferred that the bodies were from mass executions carried out by the Mongolian Stalinist regime between 1937 and 1939.





The three vertical depressions in the foreground (two to the left of the center and one to the right) identify the original location of the remains removed by Lama Purevbat. The small area between the depressions includes our excavations during a two week period in September 2003.

Historical Context

After the fall of Communism and other totalitarian regimes, and their replacement with more open and democratic forms of government, the world has become aware of the enormous number of state-sanctioned killings justified in the names of development and state security. In a November 2003 article in the *Atlantic Monthly*, it was estimated that during the 20th century 170 million people were victims of government approved, intentional killings by “induced famines, forced labor, assassinations, extra-judicial executions, massacres and full-scale genocides.” This compared to ‘only’ 34 million recorded battle deaths resulting from civil and international wars fought during the same period. The Hitler, Stalin and Mao regimes were responsible for more than 100 million of these 170 million murders. Even with the highly efficient killing process that these regimes developed over time, they never succeeded in annihilating more than five to ten percent of the total populations in their respective countries. Few, if any compare in percentages to Pol Pot’s genocides of the Cambodian population from 1975 to 1979 that annihilated more than 30 percent of that population.

Unfortunately, government sponsored killing is not a ‘past’ event. Such killings are taking place while this is being written and will undoubtedly continue in the future.

Most recently, mass burials found in Iraq suggest that between 1979 and 2003 the Saddam Hussein regime was responsible for the arbitrary murder of about 300,000 people because of their political, ethnic, or religious associations.

The identification, documentation, and exposure of mass burials provide important information for the writing of contemporary history. As a result of the involvement of Smithsonian anthropologists in the documentation of the mass graves in Mongolia, future generations may become more aware of the onset and extent of such atrocities, and may be able to keep history from repeating itself.

Background for Present Research

From about 1922 to the fall of Communism in the early 1990s, the Mongolian government was controlled by its northern neighbor, the Soviet Union. Mass burials now being discovered and identified in Mongolia parallel events that took place in the Soviet Union and Eastern European countries in the 1930s and possibly into the 1960s. Collectivization, ethnic purges, communization and the killing of citizens with higher education, different religious beliefs, and undesirable ethnic affiliations resulted in an untold number of state sponsored killings. It is with this background that we view the finds of contemporary mass burials in Mongolia.



The excavations at Hamiin Ovoo included personnel from Mongolia and U.S.A. Tsend Amgalantugs, Erdene Batshatar, Enkhtur Altangerel, David Hunt, and Batsukh Dunburee are seen after the completion of the work.

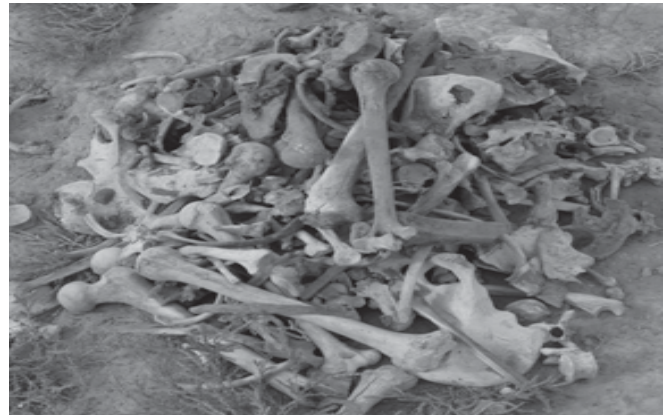


Research at Hambiin Owoo

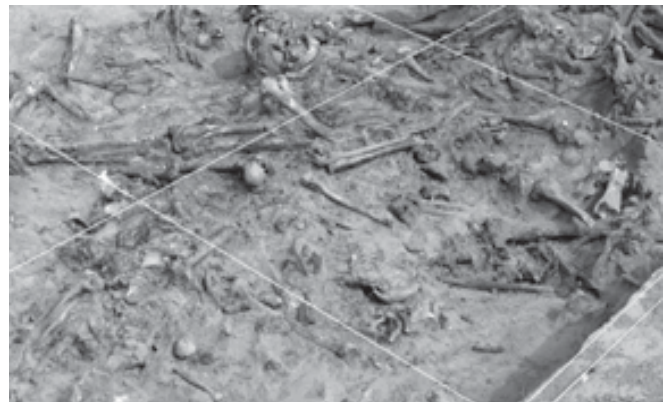
Our initial visit to the mass burial at Hambiin Owoo was on the afternoon of September 18, 2003. After identifying the initial extent of the burial site, we began to document the site by surveying, extensive photography, and detailed descriptions. Because of limited time, we relied heavily on Geographic Positioning System (GPS) surveying and photography, in this case digital photography. We continued with the removal of surface vegetation and the careful collection of human remains found on the ground. David Hunt was in charge of surface collections. Despite

strenuous effort, it was impossible to collect everything. The previous use of heavy construction equipment had only removed part of the upper layers of possibly more than one mass burial, leaving thousands of human bones scattered over a large area. Therefore, the removal of one

Information received from Mongolian sources suggests that more than 30,000 Mongolian citizens were murdered, probably between 1925 and 1940. Of these, a large number were Buddhist monks from all over Mongolia. As one example, the historical record describes how the Soviet regime, in 1937, executed more than 350 monks from the 200-year-old Buddhist monastery at Manzhir Mandzusheer, located 25 km outside Ulaanbaatar. After the executions the monastery was destroyed, leaving little except for stone foundations and mud-brick walls.



The area surrounding the Lama's excavations and our test excavations were surveyed using high precision GPS equipment. Erdene Batshatar, Tsend Amgalantugs, and Enkhtur Altangerel are using the Ashtec/Magellan Rover unit to record longitude, latitude and elevation of selected positions. Data is later downloaded to a small computer and the results can be observed and used shortly afterwards.



Top photo shows extensive surface finds. Below, test excavations displayed high degree of disarticulation in upper levels indicating this site as place of execution and burial for a prolonged period of time. Lower levels showed less disturbance and greater articulation of bodies.

bone most often resulted in the appearance of two new ones. In terms of volume, the remains collected from the surface added up to between one and two cubic meters of bones.

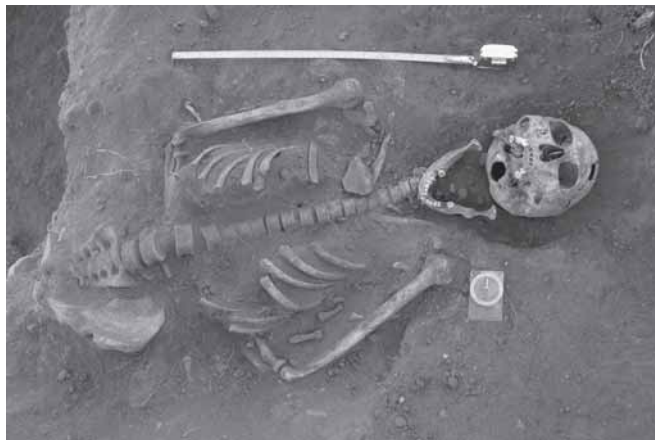
Based on the results of a series of 1 by 1-meter test pit excavations, we began excavating a 4 x 5.5 meter square. In forensic phraseology, we used a 'modified archaeological technique,' a compromise between the accuracy of archaeological methodology and the speed necessary in forensic investigations, resulting in good and reliable evidence handling.

Our finds yielded several layers of human bodies. All skulls, except for one, suggested an execution style trauma similar to the crania observed by Froehlich at the Gandan Monastery. We reconstructed how the executions and internments took place: the person was brought to the site of burial (the pit had already been excavated or was excavated by the victim before execution), forced to kneel down at the end of the burial pit, and shot in the back of the head, resulting in an entry opening in the lower left occipital bone and an exit opening in the frontal bone.

A single burial about 550 meters northwest of the mass burial yielded an approximately 30-year-old male who had been shot in the back of the head and placed in a shallow grave. The burial pit was not deep enough to hold the body so the killers had to turn the body around, resulting in a supine position with the hands still tied behind his back. After removing his body, we found the heavily damaged projectile at the base of the burial pit. A reconstruction showed that this would be the place where we would expect to find the projectile after it had passed through the victim's head while he was being executed kneeling at the end of the burial pit. This type of secure and accurate reconstruction was only possible in this case of a single burial.

At our 4 x 5.5 meters square, we found several layers of human bodies, mostly articulated but all mixed, suggesting that the bodies had been placed within the burial pit without any specific order in mind. Little soil was found between the individual bodies and layers of bones, suggesting that the total number of identified bodies represented one killing session, most likely carried out in a relatively short time.

Most of the upper layers were significantly disturbed, making it difficult to establish complete articulation between the bones. As soon as we reached layers less



The body of one male about 30 years old was found in a shallow grave about 500 meters northwest of the mass burial. The body was placed on its back in a supine position with the arms tied up behind the back. An entry hole was identified in the lower left occipital bone and an exit hole in the frontal bone indicating that the individual had been executed. The find of a severely damaged iron projectile below the individual's back strongly suggests that the person had been executed while kneeling in front of the grave.

exposed to destructive forces, such as later excavations for burials and heavy vehicle traffic, we started to find the degree of articulation we expected. Because of the extensive post-mortem destruction of the remains and likely post-mortem disarticulation, we were unable to verify if the victims had been exposed to severe maltreatment and torture before the executions. We identified several cases of well-healed fractures of upper and lower extremities both in the Gandan monastery collection and some from our own excavations. Although the healing took place without proper setting and alignment of the fractured bones, it strongly suggested that the victims at an earlier time in their lives had received reasonably good care in helping them recover from fractured bones. Such healed fractures are unrelated to the executions and burials of the victims.

Preservation of the remains found in the lower layers was significantly poorer than the bodies found and removed by Lama Purevbat. We would have expected the opposite if the bodies had been placed in the burial pit at the same time. For this reason we argue that this specific location includes more than one mass burial and most likely represents different time periods. At this time we have no basis for exact dating; however, with the analysis of the associated gun shell casings and other objects, we may be

able to establish an approximate date for the killings and subsequent burials.

Recovered Objects

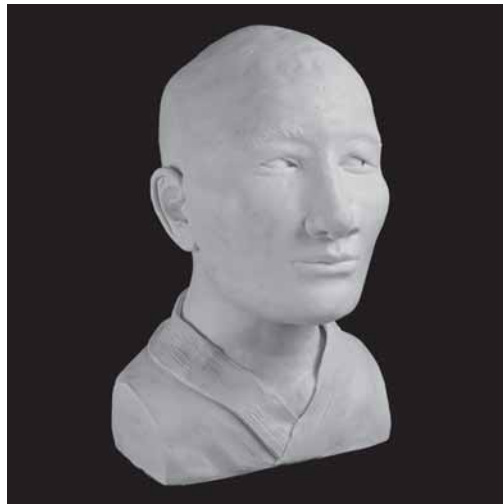
Our tentative conclusion is based on the initial analysis and description of the human remains and on finds of associated clothes (mostly similar to items used by Buddhist monks), Russian artifacts including metal cups, and other objects.

A minimum of seven German-made ammunition casings were found with the bodies. Detailed analysis shows that this 7.63 mm ammunition was generally used in the Tokarev pistol developed in the mid 1920s and used by Soviet and eastern European armed forces.

We have only found adolescent and adult males, perhaps consistent with a mass burial of Buddhist monks, although our sample size is too small for a definitive conclusion. One cranium and one mandible were brought to the Smithsonian for x-ray analysis, CT scanning and facial reconstruction. Facial reconstruction was done at the National Center for Missing and Exploited Children in Alexandria, Virginia. Multivariate statistical comparison of 30 Hambiin Ovoo cases with Buriats from the Lake Baikal area, Mongols from Ulaanbaatar/Urga (collected by Ales Hrdlicka) (Mongols), and northern Chinese showed excellent statistical separation between Buriats, Mongols, and Chinese groups. Variation in the Hambiin Ovoo mass burial cases encompassed the variation of the other three groups, thus supporting the assumption that the Gandan Monastery was an important center where Buddhist monks from isolated groups all over Mongolia and the surrounding countries assembled for religious and academic purposes.



Side view of casing found with the bodies excavated from the 4 x 5.5 meter square site. Ammunition most likely manufactured by the Deutsche Waffen- und Munitionsfabriken AG in Karlsruhe, Germany.



Facial reconstruction of the skull of the 30 year-old male recovered, completed by Joe Mullins at the National Center for Missing and Exploited Children in Alexandria, Virginia.

Additional Mass Burials in Mongolia

Hambiin Ovoo area is only one of several mass burials reported in Mongolia. We are told that similar burials have been found in Dornod (northeastern Mongolia), mostly including murdered Buriats, in Ulaango (northwestern Mongolia), Khovsol (northern Mongolia), Bayankhongor (central-southern Mongolia), Tsetserleg (central Mongolia), and at other locations in the eastern part of Ulaanbaatar province. It is believed that investigations of all these places and others unknown to us will show that the 30,000 number of individuals thought to have been murdered is a very conservative number.

Reference

Mass Burials at Hambiin Ovoo, Ulaanbaatar, Mongolia. 2004. Bruno Frohlich, Naran Bazarsad, David Hunt, and Enkhtur Altangerel. In: William Fitzhugh, ed., *The Hovsgol Deer Stone Project 2003 Field Report*, pp. 92-104. The Arctic Studies Center, Smithsonian Institution.

Acknowledgements

Our research would not have been possible without the excellent support we received from our Mongolian colleagues. Thanks to Professor D. Steveendorj, Director of the Institute of Archaeology; Naran Bazarsad at the Institute of Archaeology; Professor T. Galbaatar, Vice President of the Mongolian Academy of Sciences; and Lama Purevbat of the Gandan monastery. Also thanks to Nancy Tokola of the American Embassy in Mongolia.

Bruno Frohlich and David Hunt are physical anthropologists in the Smithsonian's Department of Anthropology.

FORENSIC ANTHROPOLOGY AT THE SMITHSONIAN INSTITUTION

by David Hunt



Bones, CSI and similar TV programs have introduced a broad general public to forensics—the application of science or technology to the investigation and establishment of facts or evidence in a court of law. Forensic anthropology is a specialty within the larger field of forensics.

For decades physical anthropologists in the Smithsonian's Department of Anthropology have assisted law enforcement agencies and medical examiners in the retrieval, evaluation, and analysis of human remains in order to identify the victims. These remains usually are decomposed to the point that a normal autopsy cannot be performed. Forensic anthropologists use their knowledge of skeletal biology to give investigators information about a victim's age, sex, ancestry or "race," and height. A victim's medical history may be reflected in pathological conditions and trauma to the bones. Muscle markings on the bone can also indicate the kinds of activities the victim was engaged in during her lifetime (such as dance, horseback riding, playing a musical instrument), to aid further in the identification. The National Museum of Natural History, where the Department of Anthropology is located, is down the street from the Federal Bureau of Investigation (FBI) and the Department of Justice, enabling a close working relationship between these agencies and the physical anthropologists in the Department.

In addition to forensic expertise, the Anthropology Department holds one of the world's premier human comparative skeletal collections. For almost a century the Department has been a world center for research in skeletal biology and human variation. The information from these studies enables forensic anthropologists to assess unknown skeletal materials.

Assisting physical anthropologists in the study, interpretation, and preservation of human skeletal remains are new chemical, electronic and laboratory technologies (CT scanning, DNA analysis, isotopic studies, pathological research, stereo-lithographic reproduction). Smithsonian forensic and archaeological investigations include human skeletal remains in mid-nineteenth century iron coffins and

in historic cemeteries (Ubelaker and Jones 2003), mummified remains from Mongolia (Frohlich et al. 2005), and the well publicized 9,100 year-old "Kennewick Man" found in Washington State (Owsley et al. 2006).

The Collections

The skeletal collections of the Department's Division of Physical Anthropology, founded in 1904, come from archeological excavations through the Smithsonian's Bureau of American Ethnology (which became part of the Department in 1965) and from skeletal remains collected through the Army Medical Museum. Ales Hrdlicka, the Division of Physical Anthropology's first curator, significantly augmented the human skeletal collections in his travels around the world during the first half of the twentieth century. Excavations in the mid- to the end of the century, under the funding and auspices of the Works Projects Administration, Civilian Conservation Corps, River Basin Survey, National Geographic Society and various federal agencies, also greatly contributed to the strength of the Department's collections.

The over 30,000 cataloged remains currently housed in the Department's collections have provided the foundation for assessing morphological (shape) and metrical (mea-



Dave Hunt measuring a skull.

surable) features of the skeleton. The international standards used today in forensic cases (including mass disasters) for estimating sex, age, ancestry, disease history and trauma are largely derived from the Smithsonian's physical anthropology collections.

Beginnings of Smithsonian Forensic Anthropology

Ales Hrdlicka (Hurd-LITCH-ka) and the FBI

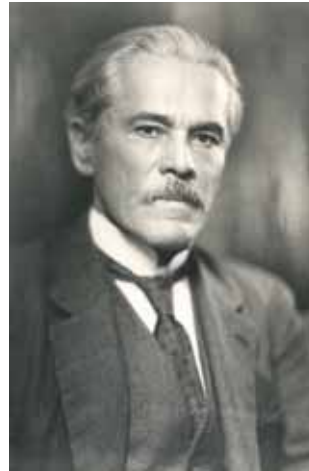
Ales Hrdlicka, a driving force in the development of physical anthropology, was hired as the Smithsonian's first physical anthropologist in 1903. Even before arriving at the Smithsonian, Hrdlicka was providing testimony at trials on questions concerning the insane and behavior abnormalities. In 1897 he published on the medico-legal aspects of a case concerning the mental state of Maria Barbella, an epileptic accused of murder (Hrdlicka 1897; Ubelaker 1999). Hrdlicka's papers in the National Anthropological Archives indicate he was involved in personal identification of a rancher in Argentina and the examination of the purported skeleton of the explorer Pizarro (Ubelaker 1999:727).

Hrdlicka was involved in human personal identification for the FBI as early as 1932 with a skull sent to him from Phoenix, Arizona. He employed the method of photo super-imposition (overlying photos of the skull to antemortem photographs) in this investigation, one of the earliest reported utilizations of this technique (Ubelaker 1999:728). In his 1939 edition of *Practical Anthropometry*, he shows the use of skeletal morphology and the application of anthropometric measurements for the identification of individuals in legal and medical situations. He also described forensic methods of differentiating human and non-human remains.

Hrdlicka's service to the FBI was personally acknowledged by J. Edgar Hoover in a letter to Hrdlicka's widow dated September 8, 1943, stating; "He will always be remembered for his outstanding contributions to the science of crime detection and for his gracious and spirited willingness to help us at every turn" (cited in Ubelaker 1999:729).

T. Dale Stewart and U.S. Soldier

With Hrdlicka's retirement in 1942, T. Dale Stewart (who started his career at the Smithsonian in 1927) became the Physical Anthropology Division's consultant to the FBI. Stewart was not aware of Hrdlicka's involvement with the



Ales Hrdlicka

FBI until after Hrdlicka's retirement, most likely because Hrdlicka considered these cases too confidential to be discussed even with close colleagues. As sole consultant for the FBI and for approximately 85 other law enforcement agencies, Stewart reported on no fewer than 169 cases from 1943 to 1969 (Ubelaker 2000:248). He was distinctly aware of the responsibility that anthropologists undertake when they become involved in a legal investigation. In *Essentials of Forensic Anthropology* (1979), he states that the role of the physical anthropologist must be one of objectivity and accuracy. In his own reports, Stewart was always concise and non-speculative in his presentation of his findings.

In 1948, Stewart was asked by the Quartermaster's Corps to assist in the identification of remains of WWII soldiers. He realized that the standards for assessing personal identification used by the military were deficient. In an editorial in *Science* (1953), he identified a need for research in physical anthropology/skeletal biology to revise and improve accuracy in determining sex, age and ancestry from the skeleton for the identification of the war dead. The next year, the Army sponsored a study of 375 positively identified skeletons from American war dead, result-



T. Dale Stewart (left) receiving an FBI award.

ing in the landmark report *Skeletal Changes in Young American Maless* (McKern and Stewart 1957).

During the Viet Nam conflict, the military again requested Stewart's assistance to improve the Army's identification methods. In 1968, Stewart organized a second research study in the problems of skeletal identification. This study culminated in an edited volume, *Personal Identification in Mass Disasters* (1970), an essential handbook for forensic anthropologists.

J. Lawrence Angel or "Sherlock Bones"

When Stewart became director of the National Museum of Natural History in 1962, J. Lawrence Angel was hired as curator and took over Stewart's forensic anthropology responsibilities. Although Angel had not previously worked as a forensic anthropologist, he was intimately familiar with pathology and autopsy from his anatomical teaching at Jefferson Medical College and quickly adapted to the role. Angel excelled in the methods and analysis of forensic anthropological investigation and was called "Sherlock Bones" by the popular press (Ubelaker 1989:6). During his tenure at the Smithsonian, Angel was involved in no fewer than 565 cases (Ubelaker 1990:194). He was always excited to take on forensic cases and enjoyed involving others in the work, including the collections manager, Lucille St. Hoyme, who originally came to the department as an aide to Hrdlicka in 1939, and Donald J. Ortner, who was hired as Angel's assistant in 1962. Promoted to assistant curator in 1969, Ortner focuses on bone biology, histology and paleopathology, and produced a seminal work, the *Identification of Pathological Conditions in Human Skeletal Remains*.

Angel also felt the need to provide education in forensic anthropology. Beginning in the 1970s, he taught a course on the techniques and application of skeletal biology in forensic anthropology, primarily targeted to pathologists but also to anthropologists and law enforcement personnel. Angel estimated that over 50% of the medical examiners in the US had taken his course. He also taught an annual course on the anthropology of the skeleton at George Washington University.

Despite the notoriety, Angel described his forensic anthropology work as "consultant work," not as research or fieldwork. He clearly saw his role as a community public service to assist with crime investigation. But Angel was aware of the research potential of his work as well, a way to obtain an understanding of contemporary



Lucille St. Hoyme, J. Lawrence Angel, and T. Dale Stewart with the 171/2 ft. beard of Hans Langseth (b. 1846, Norway).

population variation (see Angel 1976; Kelley and Angel 1987). Angel died in 1986, leaving a void in the Division of Physical Anthropology and the anthropological community as a whole.

The Tradition Continues

Douglas Ubelaker assumed the role of primary consultant to the FBI in 1977, when Angel took a sabbatical year to focus on his scholarly research. Ubelaker has been involved in more than 750 FBI cases and consults on non-FBI cases as well. His publication, *Human Skeletal Remains*, is one of the most widely used references in human skeletal investigation. Like Angel, Ubelaker is dedicated to disseminating



Donald Ortner

knowledge to future physical anthropologists by teaching courses at George Washington University and also to members of the law enforcement agencies.

From his research on the FBI case load, Ubelaker notes a significant increase in FBI case activity in the 1970s. He attributes this increase to the inclusion of Physical Anthropology as a section in the American Academy of Forensic Sciences and the increased awareness of the science to law enforcement and medical examiners offices. A notable decrease in FBI cases in the 1980s was due, he thinks, to the growing number of forensic anthropologists in the U.S. who are consulted within their own region, rather than the cases being sent to the FBI and subsequently to the Smithsonian. In the early 1990s, the number of cases again increased, due partly to greater media attention to criminal investigations and identification of human remains, and partly to changes in financial resources and/or crime activities at the regional level, leading to the need for federal involvement (Grisbaum and Ubelaker 2001:12).

In 1985 Douglas Owsley joined the Department as curator. He was a university professor and practicing forensic anthropologist and relieved Ubelaker of the non-FBI caseloads. Owsley, became involved in notable cases such as identification of missing press reporters in Guatemala and the remains of Jeffrey Dahmer's victims. He also



Doug Owsley and his assistant Kari Bruwelheide

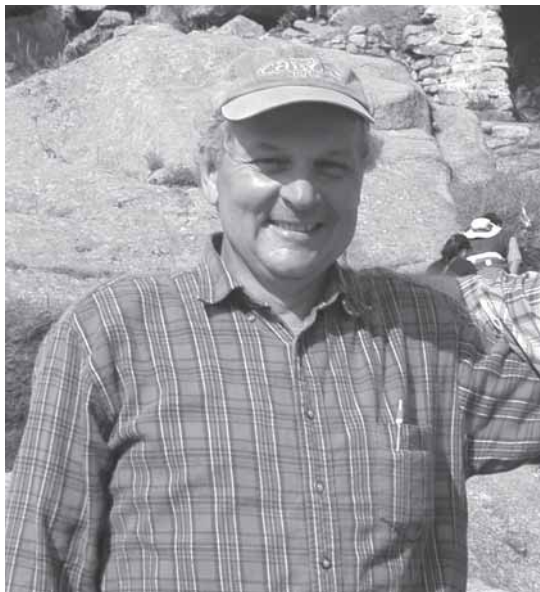
has been involved in working on mass graves in Croatia and historic identification cases such as the Civil War submarine, *The Hunley*, and Jamestown settlers.

In 1989, I (Dave Hunt) joined the department as Collections Manager for the Division of Physical Anthropology. In the mid 1990s, Ubelaker turned over to me cases from the Washington D.C. Office of the Chief Medical Examiner, and I have since been involved in forensic identification cases for the local U.S. Park Police and the National Center for Missing and Exploited Children. I am also a member of the Disaster Mortuary Operational Response Team (DMORT), a forensic anthropology team that follows up on disasters such as 9/11. Like Angel and Ubelaker, I teach future physical anthropologists as an instructor in the annual Forensic Anthropology training course administered by the National Museum of Health and Medicine/Armed Forces Institute of Pathology, and as an adjunct professor at George Washington University

In 1992, Bruno Frohlich was hired into the Department. He is the on-call forensic anthropologist for the State of Vermont and an adjunct teacher at Hobart and William Smith Colleges and the Henry C. Lee Institute of Forensic Sciences. His multi-disciplinary approach to research includes archaeology, skeletal biology, statistics, and the use of computerized tomography. His research on mass graves in Mongolia is described elsewhere in this issue.



Douglas Ubelaker with T. Dale Stewart, whom Ubelaker considered a guiding force in his professional development.



Bruno Frohlich

Mass Disasters: A “New Age” in the U.S.

Although America has experienced loss of life from anarchists’ bombs in the past, disasters on a mass scale have become more frequent in the US as well as abroad since the early 1990s. Smithsonian forensic anthropologists have been asked to assist in several of these mass disasters. In 1993, an incident in Waco, Texas, involving the Branch Davidian cult led by David Koresh, ended with about 100 people dying when the cult’s compound was engulfed in fire. Ubelaker was asked by the FBI to assemble a team to assist federal and local authorities in the retrieval and identification of the remains from the compound. This mass disaster involved most of the Department’s physical anthropologists (including Ubelaker, Owsley and Bruwelheide), over several weeks of field retrieval and laboratory analysis. Resulting publications describe this difficult investigation and the essential role of the forensic anthropologists (Owsley et al. 1995; Ubelaker et al. 1995).

Natural disaster struck the Midwest in the fall of 1993 with extreme flooding of the Mississippi and Missouri rivers. The affected regions were identified as federal disaster areas and both the living and the dead required federal assistance. Significant water erosion unearthed a large cemetery outside Hardin, Missouri. The National Disaster Medical Services branch of Department of Health and Human Services established a multi-faceted organization called the Disaster Mortuary Operational Response Team

(DMORT) to deal with mortuary services. DMORT brought together specialists in mortuary care, personal effects documentation, family assistance, radiography, and experts in forensic pathology, forensic odontology (analysis of dental records), fingerprinting (FBI), and forensic anthropology. DMORT members and volunteers spent months retrieving skeletal remains and caskets located downstream from the cemetery. The results from sorting and examining the remains led to the identification of a significant number of caskets and remains from the post 1950 cemetery burials. Most of the remains coming from the earlier part of the century were not identifiable due to lack of information for personal identification from medical or family records (Sledzik and Hunt 1997).



Hardin, Missouri

One year later, flooding in Albany, Georgia, caused by a hurricane, resulted in dam overflow that flooded the main city cemetery, and over 769 caskets were disinterred from their sealed containers. DMORT was again activated. We were able to positively identify the majority of remains and re-interred them to their original resting place.



Albany, Georgia

In 1994 the Asociación Mutual Israelita Argentina, in Buenos Aires, was blown up by an ammonium nitrate bomb placed in a van. Three hundred people were injured and 85 people were killed in the blast, the largest single incident against Jewish people since WWII. The Argentinean government requested U.S. assistance in the mortuary needs of this tragedy, including body retrieval and forensic investigation. The Office of the Armed Forces Medical Examiner (OAFME) sent a group of pathologists and anthropologists (including myself) to Buenos Aires, where we re-assembled the body parts and identified individuals from the burned and fragmentary remains.

Nine months later in Oklahoma City, an ammonium nitrate bomb in a van extensively damaged the Murrah Federal Building. Over 800 people were injured and 168 people were killed in the bombing. The magnitude and the emotional devastation of this event prompted immediate action by federal agencies. All available specialists, including Smithsonian anthropologists, were asked to assist in the efforts to search for survivors, investigate the incident, retrieve the bodies of the victims, and re-assemble and identify the mostly fragmentary and partial remains.

The blackest day in recent American history was September 11, 2001, when all specialists and experts in mass fatality situations were called to assist in New York (World Trade Towers), Washington, DC (Pentagon) and Somerset, Pennsylvania (United Flight 93). All members of the Division of Physical Anthropology were involved at some level in this disaster, from consultation to field retrieval and laboratory analysis. Owsley and Ubelaker were sent to Dover, Delaware, to work with remains coming from the Pentagon. Several physical anthropologists working in the Department's Repatriation Office (Marilyn London and Erica Jones) were activated through DMORT and sent to Somerset to provide their expertise in field retrieval and forensic anthropology.

A Continuing Legacy

The activities in forensic anthropology by the Smithsonian's Division of Physical Anthropology reflect the historical progress of forensic anthropology in America in meeting the social, legal and federal needs for forensic investigations. The Physical Anthropology Division staff and the invaluable resource of the diverse skeletal collections curated by this division have been and will continue to be dominant for research contributions in skeletal biology and fo-

rensic anthropological methodology. These skeletal collections are continuously employed by the Physical Anthropology staff as well as over 60 visiting scientists each year. They form the basis for re-assessing morphometric and anthroposcopic techniques, as well as for rigorous evaluation of new techniques, methodologies, and equipment to improve the identification of sex, age, ancestry, and cause and manner of death from skeletal remains. The Division of Physical Anthropology and the Smithsonian Institution are dedicated to the advancement of skeletal biological research in the human skeleton and the applied utilization of these methods for assisting law enforcement agencies in the identification of missing persons and victims of crimes and mass disasters.

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Acknowledgements

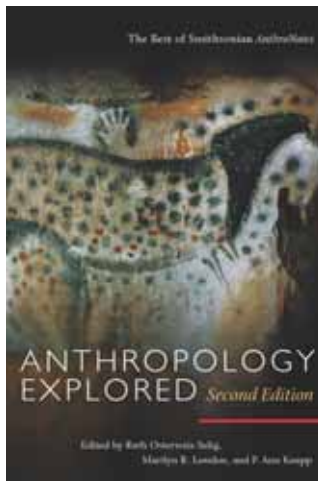
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This revised and expanded edition is edited by Ruth Osterweis Selig, Marilyn R.



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TEACHERS CORNER: FORENSIC ANTHROPOLOGY RESOURCES

by Marilyn R. London



Why are bones so fascinating? What can we learn from them? Research on bones—both human and non-human—has been popular for centuries. Both artists and scientists have long recognized that bones represent the remains of a living organism. For example, in Shakespeare's *Hamlet*, the Prince of Denmark holds the skull of a court jester in his hands and recalls the life of the man: "Alas, poor Yorick! I knew him, Horatio, a man of infinite jest, of most excellent fancy" (*Hamlet* Act V, Scene 1). Hamlet knew the jester during life, but the anthropologist who studies bones must reconstruct the life of the unknown individual based on scientific analysis of the remains.

Anthropology in the United States is usually divided into four basic subfields. These are cultural or social anthropology, archaeology, linguistics, and physical anthropology. Anthropologists in the United States are trained in all four subfields in undergraduate school and then go on to specialize in graduate school. Almost all forensic anthropologists have archaeological field experience, which is very much like crime scene investigation. In both cases, the investigator must document everything with notes and illustrations and write a report. There is only one chance to do the investigation correctly; once the archaeological site or the crime scene has been disrupted, it will never look the same.

Physical anthropology includes human anatomy, population biology, genetics, growth and development, human evolution, non-human primate behavior, human variation, and human biology. Some physical anthropologists focus their studies on how all of these topics affect the human skeleton. One of the applications of skeletal biology is forensic anthropology. Many students have heard this term on television shows and in movies, and they want to consider this profession as a career.

Forensic anthropology is the application of anthropology to the processes of law. The forensic anthropologist creates a "biological profile"—age, sex, stature, ancestry, trauma, and pathological conditions—that can help verify the person's identity or lead to a positive identification through medical or other records. The bones record

events (disease, trauma) in an individual's life. The forensic anthropologist always works as part of a team that includes other forensic scientists such as forensic entomologists and forensic psychiatrists, and does not determine the cause of death; that role belongs to the medical examiner or coroner.

Activity

Activities that introduce the student to the scientific method of investigation can be developed using anthropology. Once the student has mastered this approach, it can be applied to any science.

Anthropologists need to be familiar with normal variation within a population in order to identify age, sex, and ancestry of an individual. To introduce the importance of using the correct sample size, recording accurate data, and taking variation into account, a few measurements can be taken on the students and analyzed with simple statistics. Stature and arm span (fingertip to fingertip) are two of the easiest measurements to take, but any standard measurements can be used. Each student should be measured, and the results recorded. Simple statistics (mean, mode, median, standard deviation) can be computed for the class as a whole, for males and females separately, and for randomly selected groups. Have the students compare the results when smaller groups are used for the analysis. In addition, pairs of measurements can be plotted against each other to see if there is positive, negative, or no correlation between them. Once again, smaller groups can be compared to the class as a whole. (An interactive website on statistical analysis can be found at home.clara.net/sisa/)

Web Resources

www.eskeletons.org/ (The e-Skeletons Project, which compares human bones to non-human primates)

www.nabt.org/sup/resources/ (National Association of Biology Teachers)

www.galeschools.com/sci_try/bones.htm
(Thomson Gale Publishers educational site)



Falcon.jmu.edu/~ramseyil/vertebrates.htm (Internet School Library Media Center information on vertebrates in general)

www.csuchico.edu/anth/Module/skull.html (An interactive guide to the human skull developed by California State University, Chico)

www.earthlife.net/mammals/skeleton.html (Earthlife Web Productions site on mammal skeletons and biomechanics)

www.uic.edu/classes/orla/orla312/correlated_images_skulls.htm (University of Illinois at Chicago site with illustrations on dental development)

<http://www.bartleby.com/107/> (Gray's Anatomy online)

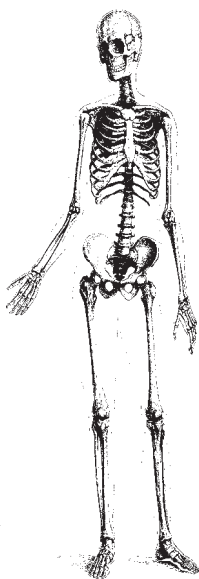
www.kidzone.ws/science/egg.htm. (KidsZone Fun Facts for Kids)

Cast Resources

Anatomical Chart Company
4711 Golf
Suite 650
Skokie, IL 60076
Phone: (847) 679-4700
Fax: (847) 674-0211
<http://anatomical.com/>
Anatomical charts and casts

University of Pennsylvania
Casting Program
University of PA University Museum
University of Pennsylvania
33rd & Spruce Sts.
Philadelphia, PA 19104-6398
www.sas.upenn.edu/~jmonge
email: jmonge@sas.upenn.edu
Catalogues of fossil reproductions are searchable online

France Casting
Diane L. France, Ph.D.
1713 Willox Ct. Unit A
Fort Collins, CO 80524
(970) 221-4044
Fax: (970) 482-4766
info@francecasts.com
www.francecasts.com



Casts of human cranial and postcranial bones, with features demonstrating age, sex, trauma, and pathological conditions. Also a primate series including gibbon and siamang crania, not commonly available. Some stone tool reproductions and animal bone casts are available.

Career Information

www.aafs.org/ (American Academy of Forensic Sciences)

www.physanth.org/ (American Association of Physical Anthropologists)

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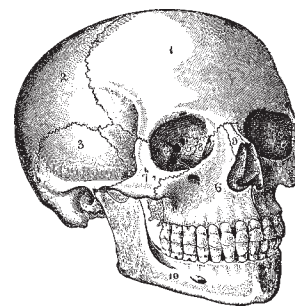
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A comprehensive glossary on skeletal biology with terms used by osteologists in their analysis and reporting can be obtained by emailing the Smithsonian's Anthropology Outreach Office at anthroureach@si.edu

Marilyn R. London is a physical anthropologist and contractor in the Department of Anthropology's Repatriation Office, National Museum of Natural History.



LEWIS AND CLARK: Perspectives for Students and Teachers

by Herman J. Viola



[Editor's Note: *Lewis and Clark: The National Bicentennial Exhibition* opened May 12 at the Smithsonian's National Museum of Natural History and will close mid-September. More than 450 artifacts illustrate cultural encounters along the journey of Lewis and Clark, including the many American Indian tribes they encountered. In the exhibit, visitors follow the steps of Lewis and Clark across America. In schools today, students learn about the Lewis and Clark expedition at different grade levels. It is a drama of adventure and discovery covered in many textbooks focusing on the American Experience. In connection with this exhibit, Curator Emeritus Herman Viola has lectured widely and shares with *AnthroNotes*® readers his insights into using the "Corps of Discovery" as a model for integrating social studies strands such as history, culture, civics, economics, and geography. The article includes teaching activities, many of them using the journals of Lewis and Clark. For a taste of the expedition in the explorers' own words, a readily available paperback abridgement with modernized spelling is *The Journals of Lewis and Clark*, edited by Anthony Brant, with an afterward by Herman J. Viola, National Geographic Society, 2002.]

Nearly 200 years ago President Thomas Jefferson commissioned his young friend Meriwether Lewis captain of the "Corps of Discovery," a daring effort to unlock the mysteries of the vast interior of the North American continent. Lewis, in turn, convinced his former comrade-in-arms William Clark to share with him the hardships and glory of this unique commission, which today is remembered as the Lewis and Clark Expedition. By any standard, it was as successful as it was monumental. The expedition was a triumph for the young republic, for Jefferson, and for the members of the Corps of Discovery, who are deservedly honored as American heroes today. Indeed, our country might now be entirely different had it not been for their courage, their determination, and their faithfulness to each other and to their president.

The Lewis and Clark Story can be told from many different perspectives, including history, culture, civics, economics, and geography. In this article, I focus on some of

the lesser known aspects of the Lewis and Clark Story to illustrate how this familiar topic can be naturally integrated into various social studies classes and perspectives. Throughout, there are some brief activity ideas for the classroom.

Teaching About the Expedition

History

Two hundred years ago, Captains Meriwether Lewis and William Clark of the U.S. Army led their Corps of Discovery across the North American continent to the Pacific Ocean. The guiding hand behind the Corps of Discovery was President Thomas Jefferson. In January 1803, he requested \$2500 from Congress to defray its costs, citing the need to encourage trade with the western Indians. Jefferson outlined a modest effort to reach the Pacific Ocean by sending a few soldiers up the Missouri River until they reached some westward flowing river, presumably the Columbia, and then continuing on to the Pacific coast. Congress accepted his claim that the trek across the continent would have commercial value and authorized the use of federal funds for salaries and supplies. In so doing, the Congress blessed scientific exploration under military auspices, thereby setting a precedent for the scores of other government explorers who followed.

Promoting American commerce may have been the official purpose of the expedition, but Jefferson's instructions to Lewis and Clark provide compelling evidence that the acquisition of knowledge about the Far West was paramount. In addition to finding a possible Northwest Passage that could link the west and east coasts of North America, the explorers were to observe the vegetation; record weather conditions; seek and identify wildlife, especially animals believed to be rare or extinct; and to befriend the western Indian tribes, learning as much as possible about their strength, militancy, and life ways.

Jefferson admonished the captains to take "great pains" with their notes, ensuring their accuracy and legibility. To guard against loss, he also advised them to make multiple copies, placing these "into the care of the most trustworthy of your attendants."

History Teaching Activity

Lewis, Clark, or both wrote a journal entry for nearly every day of their journey, but they did not attempt to detail all their activities. Instead, they wrote highlights of the day as they considered them to be important. Assign different entries from the journals for students to read, then ask them to explain the passages and tell why they think Lewis or Clark chose to record the information the way they did in these entries.

Culture

The Corps of Discovery demonstrated teamwork at its best—people from very different cultural, educational, social, and ethnic backgrounds working successfully for a common goal. With the party was a Shoshone woman, Sacagawea; her infant son, Jean Baptiste nicknamed Pomp; an African American man named York, a slave at the time who worked with Clark; several French boatmen; and two dozen soldiers of mixed ethnic and national heritage, including one who had recently immigrated to America from Germany. Meriwether Lewis was a patrician; his comrade William Clark was a product of the frontier. Yet all of them were totally dependent upon one another for their well-being and the success of their mission.

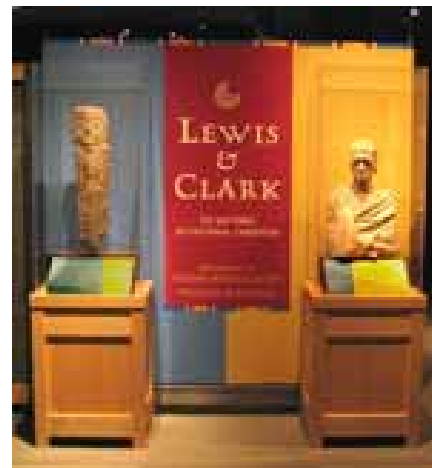
The members of the expedition were dependent upon each other, but they were also dependent upon the Indian peoples they met along the way. In truth, the Lewis and Clark expedition would be a footnote of history had the Indians met them with hostility instead of friendship. The Corps of Discovery and the Indians they encountered formed a partnership of sorts that enabled the explorers to complete their mission with a minimum of conflict and disruption. The Indian tribes along their route of travel formed a chain of friendship that stretched from the Mandan villages on the Upper Missouri across the Bitterroot Mountains and then along the Columbia River to the Pacific Coast. Each link in that chain was an Indian community that fed and sheltered the soldiers, providing them with a lifeline that enabled them to pass safely through that uncharted landscape. The Flathead, the Mandan, the Shoshone, and the Nez Perce, to name but a few of the forty or more tribes and bands they encountered, supplied them with food, gave them an opportunity to rest,

and often provided advice about the route that lay immediately ahead. Without this assistance, Lewis and Clark could not have succeeded. .

After toiling to the headwaters of the Missouri, the corps had to abandon the boats and obtain horses from the Shoshone and Flathead Indians in order to cross the formidable and snow covered Bitterroot Mountains, a challenge for which they were totally unprepared encumbered as they were by some 3000 pounds of lead, gun powder, paper, camp gear, weapons, and assorted gifts for the Indians. The route they used was the Lolo Trail, a rugged, twisting, tree-strewn pathway established by the Nez Perce Indians, a Pacific Northwest tribe who began venturing onto the northern plains to hunt buffalo after acquiring horses. Even with horses to carry their gear, however, the explorers had a difficult time crossing the Bitterroots, which seemed to have no end.

After surviving the hazardous crossing, getting food and help from the Nez Perce, and then building another fleet of dugouts, the explorers finally descended the Columbia River to the Pacific where, in a dramatic gesture, Clark carved the following words on a massive spruce: “Capt. William Clark December 3rd 1805. By land from U. States in 1804 and 1805.”

The Indian woman, Sacagawea, joined the corps at Fort Mandan. Only a teenager at the time, she was the wife of the French trader Toussaint Charbonneau, who had purchased her and another Shoshone woman from the Indian raiders who had captured them. Contrary to



Lewis & Clark: The National Bicentennial Exhibition was organized by the Missouri Historical Society.

popular belief, Sacagawea was not a guide, but her mere presence proved invaluable because it suggested to wary Indians met along the way that the Corps of Discovery had peaceful and not warlike intentions. Shortly after joining the enterprise, Sacagawea gave birth to a son they named Jean Baptiste but who the explorers dubbed Pompey or “Pomp.” Clark later educated Pomp in St. Louis at his expense. Another valued member of the expedition proved to be Private Pierre Cruzatte, part French and part Omaha Indian. An interpreter and musician, he carried a violin that did much to boost morale along the way. Each of the team contributed his or her various skills and experience to make the whole enterprise a tremendous success in the early exploration of America’s west.

Culture Teaching Activity

Divide your class into five groups of students and assign each group one of the American Indian tribes that Lewis and Clark encountered on their journey (the Blackfeet, Flathead, Mandan, Shoshone, and Nez Perce tribes). Ask each group to research its assigned Indian Tribe, and report back to the whole group what they found out about the tribe’s culture and history. How was each group different from the others; how did each group make its living and interact with other tribal groups; how did each face the challenge of the explorers, and later the settlers?

Government/Civics

Both Lewis and Clark expected to hold the rank of captain, but because of bureaucratic interference in the Department of War, Clark received only the commission and pay of a second lieutenant. During the expedition no one was the wiser. Lewis always referred to his co-commander as “Capt. C.” in his journals, and there is no evidence of any disharmony between them because of their unequal status, but the situation irritated Clark, to say the least, since he had earlier been both a captain and Lewis’s superior officer. Upon his return, Clark returned the commission to the Secretary of War with a testy note and no one except his closest friends ever knew that he had been “captain” in name only during the expedition.

The Corps was a military operation and as such was organized in typical military hierarchy. Yet, on November 24, 1805, while huddled together on a sandy beach in sight of the Pacific Ocean, the Corps of Discovery did something unusual for a military unit of any kind. They

voted on a crucial issue: Where would be the best place to set up camp for the winter? Not only did the soldiers vote, but so did everyone else in the party, including York and Sacagawea. Each of their votes was recorded in the diary entry for that day. This was certainly an unusual and special moment in American history because neither African Americans nor women had yet won the right to vote in the United States. In this, as in other ways, the Corps of Discovery foreshadowed the future of multicultural inclusiveness of American democracy.

Government/Civics Teaching Activity

Being a military expedition, the Corps of Discovery soldiers were organized in a military chain of command: officially Lewis was the captain and Clark was a lieutenant although they functioned as co-captains; there were four sergeants, and 24 privates. The other members of the group—three French boatmen, York, Sacagawea, and Pomp—were not employed by the Army and held no official status. Direct students to draw a graphic chart (or graphic organizer) to show the “official” organizational structure of the group. Then have them draw a second chart (or graphic organizer) to illustrate the equality in voting among the expedition members after they reached the Pacific and had to decide where to wait out the winter. Discuss why the expedition itself might have fostered two different ways of “doing business”: the military approach and the more egalitarian approach to decision making.

Economics

The economic aspects of the Lewis and Clark expedition actually began when President Jefferson came to believe that the land and rivers of the Louisiana Territory were valuable for trade. His beliefs were based on a journal written in 1801 by Alexander Mackenzie, a Scotsman and explorer for the British Empire. The journal described Mackenzie’s journey through parts of the Louisiana Territory. Jefferson became alarmed that Great Britain would succeed in finding a path to the Pacific and expand its trade with Asia. Knowing that international trade was vital to the success of the new nation, Jefferson was eager to learn more about the territory before the British and other European rivals could take action.

The journals kept by Lewis and Clark are filled with examples of economic choices that both producers and consumers have to make. For example, with the \$2500

Congress appropriated for the expedition, Lewis purchased about 200 different items for the expedition, including 3500 doses of sweat inducers, 1100 doses of emetic, 50 dozen of Dr. Rush's pills known as "thunder clappers," 30 gallons of liquor, 130 rolls of pigtail tobacco, 193 pounds of portable soup, 500 gun flints, 6 papers of ink powder, 176 pounds of gunpowder packed in 52 lead canisters, plus 420 pounds of sheet lead for bullets that the soldiers would need. For the Indians they would meet, Lewis obtained, among other things he thought would make nice presents and trade items, 33 pounds of beads of assorted colors, 4600 sewing needles, 144 small scissors, 10 pounds of sewing thread, 12 dozen pocket mirrors, and 288 knives. The total weight of all these purchases was about 3500 pounds.

For the most part, Lewis selected well, but there were glaring shortages. Although Lewis and Clark had enough paper and ammunition to make the trip again, the liquor—that was part of the daily ration to the U.S. military at that time—was consumed by the time the explorers reached the Great Falls (Montana) in June 1805; the tobacco ran out while they waited for that winter to end. A serious deficiency was blue beads, which the Indians coveted. "This article," Lewis wrote, "among all the nations of this country may be justly compared to gold or silver among civilized nations."

Lewis and Clark quickly discovered that the Indians were shrewd traders who knew the value of the food, horses, and other goods the explorers needed. Late in the expedition, on the return journey while traveling along the Columbia River, Clark tried without success to buy a horse from an Indian despite offering "a blue robe, a calico shirt, a silk handkerchief, five parcels of paint, a knife, a wampum moon, eight yards of ribbon, several pieces of brass, a moccasin awl, and six braces of yellow beads." This, Clark grumbled, was twice the value of goods he had paid the previous year when purchasing horses from the Shoshone and Flathead.

Economics Teaching Activity

When Captain Clark complained that he was unable to buy a horse despite offering an Indian man twice the value of goods with which he had purchased horses the preceding year, he was exemplifying a basic economic principle—supply and demand. Ask students to explain why the Indian he approached might not want to sell him any horse for any price, and suggest strategies Clark might have used

to "strike a deal" with the reluctant trader. What gifts might a modern day explorer bring to an isolated group of people? What might they want in return?

Geography

The social studies discipline, other than history, that is most obvious in the Lewis and Clark story is geography. Just about every aspect of geography can be found in the diaries Lewis and Clark wrote during their expedition. Jefferson had charged his captains of discovery with measuring the western landscape and this they did with fidelity and accuracy. Indeed, their expedition marked the first effort of the young United States to attempt a scientific survey of the continent, setting the standard that was followed so successfully by later Army exploring expeditions.

The keystone of that scientific survey was mapping the landscape, and Jefferson instructed his captains of discovery accordingly. "The work we are now doing," he advised them, "is, I trust, for posterity . . . We should delineate with correctness the great arteries of this great country; those who come after us will extend the ramifications as they become acquainted with them, and fill up the canvas we begin." Lewis and Clark heeded well Jefferson's admonition. Later explorers filled in the details, but Lewis and Clark compiled the first accurate map of the Far West. In fact, we know today that the Lewis and Clark maps are accurate to within 50 miles of the route they traveled.

Geography Teaching Activity

Select some key locations mentioned in the Lewis and Clark journals. These might include: St. Louis; Bismarck, North Dakota; Great Falls, Montana; Powell Ranger Station or Weippe, Idaho; Ft. Clatsop, Oregon. After students have read the Lewis and Clark entries describing these locations, have them locate pictures (perhaps on the Internet) of the areas today. Ask students to hypothesize about why the locations have or have not developed into populated areas. Students can also map the journey, using the various place names given in the journals.

Historian Herman J. Viola, former director of the National Anthropological Archives, is author of several books dealing with American History, Native Americans, and the Lewis and Clark Expedition.

AnthroNotes[®] offers in-depth articles on current anthropological research, teaching activities, and reviews of new resources. *AnthroNotes* was originally part of the George Washington University/Smithsonian Institution Anthropology for Teachers Program funded by the National Science Foundation. It is published free-of-charge twice a year. A compendium of *AnthroNotes* articles is available as *Anthropology Explored: The Best of Smithsonian AnthroNotes* (http://www.nmnh.si.edu/anthro//outreach/anthropology_explored.htm).

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1. To more widely disseminate original, recent research in anthropology in order to help readers stay current in the field;
2. To help those teaching anthropology utilize new materials, approaches, and community resources, as well as integrate anthropology into a wide variety of subjects; and
3. To create a national network of anthropologists, archaeologists, teachers, museum and other professionals interested in the wider dissemination of anthropology, particularly in schools.

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