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# NON-DESTRUCTIVE ARCHEOLOGY AND REMOTE SENSING

# A CONCEPTUAL AND METHODOLOGICAL STANCE

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## Introduction

Under the aegis of the National Park Service's internal Cultural Management Program, we are in our ninth year of a systematic and progressively more sophisticated project concerned with applications of remote sensing methods and techniques to the exploration, discovery, recording, evaluation, investigation, monitoring and management of cultural resources. We are now at the point at which we have put forth some results of our collective labors (Lyons, 1976; Lyons and Hitchcock, 1977) and have developed a methodology of "Non-destructive Archeology."

The objectives of this discussion are threefold:

First, to define and describe our concept of non-destructive archeology.
Second, to discuss the methods, procedures, and techniques upon which it is based.
Third, to identify the impacts of the concept on the conduct of research and on the management of cultural resources.

Our thesis, in brief, rests on the following position. Archeology is a science of the human past. The history of its practice demonstrates a continuous effort in the development, application, and refinement of the scientific tools of observing, measuring, recording, classifying, analyzing, testing, defining, theorizing, and explaining. The existing limits in the capabilities of each of these scientific tools constrains our capacity and our effectiveness in research into the human post. One set of tools that currently limits us is the traditional methods and techniques of observing, measuring, recording, analyzing, and testing the physical attributes of the archeological record and the natural milieu within which that record exists.

The basis of modern archeology has rested on a weak foundation for decades, that of its concepts, methods, and techniques of observing, collecting and recording its basic data. Consider the following (admittedly jingoistic) description of how we currently go about these tasks:

Frequently, archeologists, still in training and with varying degrees of professional accomplishment and observational prowess, walk the ground on site surveys. They visually search for, discover, and concurrently assist, sift, and select a highly limited number of physical attributes deemed to be adequately descriptive and representative of rather obvious classes of archeological and natural phenomena. They record mentally massaged observations of these physical phenomena in summary fashion in logs, diaries, and on printed forms, using imprecise terminology and syntax in an often indecipherable scrawl. They plot site locations with Brunton compass accuracy, a technique that often precludes rediscovery and positive identification of those sites at a future date. From this process comes a highly personalized statement about the archeology of an area and the natural environment; a statement that invariably concludes that more surveying, more collecting, and more excavating of the resources are required.

Moreover, it is our assumption that the process of tromping over hill and dale using the limited observation capacity of the human senses, progressively dulled by growing fatigue as the days and weeks wear on, results in the following:

1. A mixing of the raw data and interpretation of that data to the extent that one becomes substituted for and indistinguishable from the other.

2. The inability of subsequent investigators to replicate the observations of the original investigators with any level of confidence.

3. An imprecise, low quantity, low quality, often frustratingly incomplete record of limited use to future investigators.

4. Because of the physical limits of human observational capabilities, the failure to discover, and thus, to record entire classes of archeologically relevant data and data relationships, and the failure to accurately and adequately record synoptic observations of the site(s) or of the territory covered.

We believe that there is an alternative to the traditional approach to archeological exploration, discovery, and investigation--an alternative that does not rely primarily on the use of field survey parties and field excavation as tools for determining the content and data potential of sites or areas of study. And, we hold that there are substantially better ways to document observations and to record data accurately. The alternative is non-destructive archeology, and its major method is remote sensing.

Non-Destructive Archeology

The non-destructive approach to the exploration, discovery, and investigation of cultural resources uses a wide variety of pre-fieldwork research techniques. These techniques include collection, evaluation, and analysis of data, and the planning of the overall research project. Then on-destructive approach emphasizes the acquisition and sophisticated analysis of a variety of remotely sensed imagery and data as the primary tools of exploration, discovery, and recording. It uses fieldwork (survey, collecting, and excavation)primarily as a method of verifying, validating, and testing the results of the pre-fieldwork research. And finally, it demands sound logistical planning, based on the pre field work research, as a condition precedent to the initiation of field studies.

The objectives of the pre-fieldwork research are to develop a synoptic understanding of the biosphere, geosphere, and archeosphere of the site(s) or area(s) under investigation as a basis for designing research and logistical plans. In developing the synoptic view, the traditional approach of literature and site records search and evaluation, analysis and evaluation of available biosphere and geosphere data is buttressed by a search, evaluation and analysis of available remote sensor data. From this process the gaps in available data necessary to obtain the synoptic understanding of natural and cultural resources of the area of interest are identified, data and a systematic plan to acquire the data is formulated and executed. An assumption borne

out by our experience of nine years is that when data gaps exist, the most rapid and cost effective way to fill them in will be through the use of remote sensing methods and techniques.

A complete and thorough analysis of all pre-fieldwork data should be made, including the identification from imagery and other remote sensor data of cultural features as well as of all anomalies that might be cultural features. The analysis should be thorough enough to allow the articulation of the fieldwork research design, including accurate logistical planning, scheduling and coordinating of field parties. Field procedures should be specified, terminology and field records standardized, and project staff trained to execute the work as planned. The field research design at this point emphasizes the confirmation, modification or rejection of the pre-fieldwork analysis, but without the use of test excavations or the collection of artifacts. The use of collecting or excavating techniques should be considered when and only when the non-destructive procedures for data collection and analysis have been exhausted and then only if testable problems have been formulated and identified.

We hold that collecting and excavating are tools of testing and verification, not tools of discovery, identification, or site or area exploration. The non-destructive approach makes the maximum use of predictive and confirmative sampling strategies and techniques. It sets stringent, defined limits in field research designs on the collection of artifacts, on the conditions under which excavation will occur, and on the extent of the excavation. In nondestructive archeology, the use of field survey, with its direct observing and recording of on-the ground cultural and natural phenomena by the human senses, is recognized as an essential ingredient of data collection, but not as a primary means of collection. The field survey is judged as an unreliable, ineffective and inefficient tool of data collection if it is not preceded by and systematically integrated with the pre-fieldwork research and logistical planning approach described above. The function of fieldwork is to verify and validate the findings of the pre-fieldwork studies--not to explore, discover, and record the cultural and the natural resources of the study area. It uses the traditional techniques of artifact collection and excavation to resolve the real issues based on testable problems rather than as an assumed sine qua non of "standard" field method.

In summary, then, we see five significant differences between the nondestructive approach to data acquisition and research in archeology and the traditional approach:

1. Sophisticated use of remote sensing imagery and techniques as the primary tool for acquiring, recording, and analyzing data.

2. Rejection of collecting surveys and excavating as sine qua non tools of exploration, discovery, and investigation of cultural resources.

3. Emphasis on fieldwork as being primarily the verifying, validating, and testing phases of the project.

4. Acquisition of a synoptic data base as an essential ingredient to the development of specific research designs to resolve testable problems and as the basis for completion of the logistical planning, scheduling, and coordinating of fieldwork.

5. Use of processed remote sensor imagery as the basic archival record of the cultural and natural phenomena, the "human" sensed data being only a supplementary record.

## Methodology of Non-Destructive Archeology

Instrumentation. From the standpoint of instrumentation (that is, data recording devices), advances in remote sensing are comparable to developments in optical physics. They provide anew perspective, the synoptic as contrasted with the atomic view, the synergistic as well as the particularistic view of site-

specific investigations. The potential of remote sensing for discovery and analysis is now as great as that of the new eyes on the universe provided by the optics of the telescope and the microscope.

Multidisciplinary Applications. Remote sensing has broad multidisciplinary applications to geology, geomorphology, biology, pedology, hydrology, and climatology, as well as to anthropology. Coupled with the concept of nondestructive archeology, it provides a perspective that is indispensable in today's study of mankind, our past, our spread through time and space, and human cultural behavior and development. It has the capability for quantification of the human cultural activities and historic manifestations so intimately related to the geosphere and biosphere. The remote sensing perspective provides not only the synoptic overview otherwise unobtainable, but more importantly, a synergistic grasp of observed physical and cultural phenomena (Lyons and Avery, 1977:53). This perspective is becoming more and more essential in the formulation of evaluation and monitoring schemes for the research into and administration of cultural as well as natural resources.

Aerial Imagery and Data. Many of the techniques of remote sensing are now operative, some are in the process of development, and others are still on the drawing board. Photography and other types of imagery recorded from aircraft and spacecraft platforms are among the best understood and most useful products of remote sensing. Multispectral scanning systems ultimately hold the greatest promise for quantitative data handling and widespread use in anthropology as well as in other disciplines. Another technique to be studied further and made fully operational is automated data processing of digitized multiband photography and multispectral scanner signal output.

With the aid of data derived from spacecraft, aircraft balloon, and bipod platforms, regional and site specific analyses can be made. Obviously, regional overviews and studies of cultural resource areas can be undertaken with small scale imagery (Ebert, et. al., 1977; Schalk and Lyons, 1976). This would include mapping and analysis of the environmental setting, that is, the differentiation of vegetative zones, physiographic regions, gross soil changes, etc. Using this base and armed with an understanding of the type and distribution of sites within a target area, the investigator can formulate predictive models for site and site cluster locations.

A most important remote sensing technique is the interpretation of multispectral scanner and photographic data and imagery. One of the most widespread applications of interpretation lies in reconnaissance. With minimal training, field crews can employ stereo pairs or models to determine the location of sites during ground survey(Loose and Lyons, 1976). Even the locations of sites that are not themselves visible on the imagery can be identified as long as the crew is capable of reading topography, identifying its own location on the photos and marking its relationship to the discovered site. This identification of sites is not the only value of image interpretation, however. (For further discussion, see Lyons and Avery, 1977:62-65.) Another type of aerial photo useful in field surveys is the orthophoto, an aerial image derived from stereo models in which all elements in the physical environment are in correct horizontal relationship to one another (Lyons and Avery, 1977). Such orthophotographs can be of considerable use in both small and large areas, within sites and between sites and site clusters. Such imagery is also of great value in transferring site locational data and environmental information to base maps (Morris and Manire, 1976). Standard base maps of the U.S.G.S. topographic quadrangle type contain a minimal amount of vegetative and drainage data compared to what is observable in an aerial photograph. Much of this kind of information is readily observed on imagery and easily transferred to the standard quadrangle or other base maps.

Aerial photography and space imagery are excellent tools in the preparation of sampling and stratifying procedures. The identification of the region of interest and the determination of its general physiographic, vegetative cover and site type characteristics provide a base map for the development of a sampling technique and for stratifying procedures. For many years, workers in other disciplines have mapped vegetative cover with the aid of aerial photography. Recently, vegetative cover maps of portions of the Alaskan North Slope and the arid Southwest have provided the environmental information necessary in

cultural resource identification and location, evaluation and monitoring (Schalk and Lyons, 1976; Brown and Ebert, 1978). Vegetative communities are often identifiable on color or color infrared aerial photographs of proper scale. Gross vegetative cover can be identified and mapped from high altitude or space imagery. It is also possible, of course, to monitor vegetative change both seasonally and annually with the proper type of aircraft or spacecraft imagery (Drager, 1977; Ebert, 1977). Some regions lend themselves particularly well to soil mapping. The Southwest is one of these. Different soils frequently manifest themselves in the types of vegetation they support, in the color they present, and in the manner in which they erode. Consequently, soil studies can be made when the objectives are identified and specifications for the data gathering determined. Both low altitude photographs, and spacecraft and higher altitude aircraft imagery can be employed to this end. It should be remembered, however, that the objectives of the mapping effort are the determining factors in the selection of instruments, scale, format, and film emulsion type. When vegetative cover studies have been completed soil maps derived, and archeological survey information compiled, a foundation is provided for paleoenvironmental reconstruction. In addition, evidence of geomorphological features, such as dry lake beds, lake terraces, ocean strandlines, extant and fossil stream patterns, living and fossil springs, and glacial features can be acquired. For this purpose, various types of aerial imagery provide some of the best investigative tools.

Photogrammetry. Aerial and terrestrial photogrammetry are excellent measurement tools for documenting all types of historic and prehistoric sites with great detail and accuracy. Using aerial stereo models of sites (produced with preset horizontal and vertical controls), planimetric and topographic maps of a wide variety of scales and contour intervals can be constructed (Pouls, Lyons, and Ebert, 1976). As a practical example, a scale of 1 inch to 30 feet, and a 6-inch contour interval were specified for Hidatsa village sites along the Knife River in North Dakota. A great deal of archeological information was derived, not only from examination of the villages, but also from interpretation of the topographic configuration of the photogrammetric contour map. Such maps are useful in pre-excavation of sites, in recording excavated features and in post-evaluation analysis (Obenauf, 1978).

Another capability of aerial photogrammetry used in studies of Anasazi ruins in the Southwest is the digitization of site features. Digitization consists of obtaining the x, y, and z coordinates, that is, the horizontal and vertical relationships of the junctions and vertical breaks along walls in ruins, and punching the data onto computer cards for printouts and evaluation. With the aid of existing computer software, this quantitative base can then be employed in developing floor plans, three-dimensional perspectives, reproductions, and cross-sect ions or profiles ( Pouls, Lyons, and Ebert, 1976).

Currently, there is an experiment underway in which we are attempting to combine such data with field-derived data from the excavation of Pueblo Alto in Chaco Canyon National Monument, New Mexico. The field information consists of the calculations of the volume of fall rock from the excavation of this masonry structure. With this quantified data base (that is, the measured volume of fallen construction material and the digitized information on standing walls) ,together with complementary information acquired on site by the excavators, it is possible to make a perspective drawing of the structure. The use of computer graphic techniques permits greater accuracy and a higher level of confidence in the interpretation and restoration of sites than has been possible in the past using the "artist's conception" approach. In al I these cases, it must be remembered that ground coordinate control is essential (Lyons and Avery, 1977).

The principles and theory of terrestrial or ground-based photogrammetry and aerial photogrammetry are for practical purposes identical (Wolf, 1974; Lyons and Avery, 1977). Planimetry and horizontal or vertical plane typography of target can be mapped using controlled ground-based photography. For instance, floor plans and architectural elevations of Anasazi ruins hidden within rock overhangs and caves have been successfully mapped (Borchers, 1977).

Structure type and details, e.g. masonry, doors, windows, vigas, are easily identified and recorded. More detailed information, such as elaborate artistic design, can also be recorded.

It is apparent, then, that an individual trained in both archeology and in the theory and applications of aerial and terrestrial photogrammetry can gather relevant field data and furnish to the photogrammetrist (who operates the plotting instrument) the properly controlled photography for the development of elevations and maps specifically oriented to archeological and architectural interpretations.

Subsurface Probes. A set of instruments used in non-destructive remote sensing investigations, but not always recognized as remote sensors, are those involved in subsurface probing and exploration. These include groundpenetrating radar, resistivity measuring devices, seismographs, and magnetometers. By and large, these instruments are not capable of great depth penetration.

Ground Truth. An essential and never-to-be-omitted element of remote sensing procedures is known as ground truth. Ground truth is often used as a generic term including: 1) the prearrangement of the on-the-ground data gathering devices or procedures that operate during instrumental over flights; 2) ground level horizontal and vertical engineering control; and 3) ground checking of interpretations of acquired imagery. As used in anthropology, the term refers primarily to the latter two activities. Another way of expressing this in terms of archeological and cultural resource interests is that ground truthing is a procedure for establishing target references and measurements and/or for verification of image interpretation.

Standard Non-Destructive Techniques. In the minds of many, archeologists and nonarcheologists alike, excavation is virtually synonymous with archeology. Some few standard methods and procedures of archeology are essentially non-destructive: in non-collection surveys, computer analysis, cartographic work, some dating techniques, and archival or literature research. Obviously, much of what has been established in archeological methodology to date can be used in conjunction with the non-destructive methodology of remote sensing to provide a scientific approach to archeological problems. Combined procedures currently being employed to some degree in nondestructive analysis of historic and prehistoric cultural resources include non-collecting blanket and spot surveys, site location mapping with the aid of aerial photography in the field, sampling designs created with the help of imagery of the target area, and the analysis and mapping from imagery of the environmental setting (vegetative cover, drainage patterns, soils, slope, etc.).

Cultural Resource Management and Non-Destructive Archeology. The remote sensing procedures and techniques briefly described above have many applications, both to continuing research in anthropology and to the needs of cultural resource management.

Applications research in remote sensing is continuing in the Division of Remote Sensing of the National Park Service's Southwest Cultural Resources Center and in a number of university anthropology departments across the nation. The ongoing work consists of investigations into the applications of different film emulsions in different physiographic settings containing different cultural manifestations, multispectral scanning studies, and photogrammetric documentation and reconstructions. From these efforts, technical, interpretative, and applied publications have been and are continuing to be prepared for distribution to the profession. However, much remains to be done in formulating guidelines for the future directions of remote sensing research and for its application in non-destructive archeology.

A most practical application of the concepts of remote sensing in non-destructive archeology is in the administration and management of our cultural resources. The data and information derived from the techniques described provide managers with substantial input to their working data base for use in planning, developing, and administering cultural resources, particularly for those agencies civic, federal, and private--in control of large landholdings.

A vital extension of remote sensing and standard methods of non-destructive archeology *i6* in the planning and setting up of monitoring programs for assessing impact on our cultural and related natural resources. As we are all aware, there is currently a tremendous impact on our historical heritage arising out of the needs and activities of an expanding population. In addition, natural forces, such as wind, water, chemical reaction and fire, have had destructive effects on these resources.

We must come to grips with the human factor. Not only is the visitor in a national or state park an agent affecting deterioration of the natural and cultural resources, but the administrator himself in his planning of walkways, roads, access trails, housing sites, and work areas is also often a major element in damaging or destroying resources. The industrial impact of the extractive industries (mining and petroleum companies) on natural or cultural resources is often profound.

It must also be acknowledged that one of the most destructive of all agents is the archeologist. When a site is pothunted, archeologists understandably raise their voices in protest. At the same time, there is a considerable variability in the skills of the professionals. It is painfully apparent that there are those who excavate a site, take only sparse field notes and do not fully record or adequately report the results of their efforts. Further, there are many available techniques of data recording that could be, but are not, employed. Two such techniques are the mapping of sites from vertical photographs taken from a bipod platform, and mapping from vertical aerial photographs. A very important consideration here is the historic value of these records. A wealth of data is captured in most site photography; if controls are set, measurements can be derived by other archeologists who may wish to reevaluate a site when the site itself no longer exists.

Another important aspect of nondestructive archeology through remote sensing is that of economics. The applications of the procedures for remote sensing and non-destructive archeology are not usually dollar-generating activities, but rather, are dollar-saving and dollar-extending procedures. For both the archeologist and the manager, this is an important factor in budgeting for the investigation, preservation, and stabilization of resources.

Impact On Research and Management

There are few standard archeological techniques that are non-destructive in execution, and until now, no explicit statement on the nature and implementation of a non-destructive methodology in archeological research has been set forth. Remote sensing techniques as applied to archeology provide a major component of such a methodology, and constitute a viable scientific approach fitted to today's conservation and preservation requirements. In addition, remote sensing in non-destructive archeology is equally applicable to American archeology with its emphasis on human behavior, to classical prehistory, and to ecclesiastical archeology. It is a source of vast amounts of data for studies in whatever theoretical or philosophical persuasion an investigator labors.

The non-destructive archeological approach, as defined and outlined here, is presented as an operational model or formula. It is a methodological stance formulated out of standard established techniques, resource management requirements, and advances in remote sensing and other technologies. Its application to archeological research is truly interdisciplinary, requiring of its practitioners some functional knowledge of a number of complementary disciplines.

The remote sensing procedures of nondestructive archeology briefly listed above (and more fully explained in the cited literature) are techniques that obviate many of the problems encountered in recording ephemeral archeological data, whether data are environmental, excavational, or artifactual. The value of these methods of recording regional and site-specific data lies in the facts that: I) the subjective bias of the human observer and recorder is reduced 2) quantifiable and digital data in greater quantities than previous techniques produced are permanently registered; 3)archives of retrievable archeological data are produced; and 4) the opportunities for re-studying, re-evaluating, and re-testing are provided future generations of scholars.

In our view, given the products and advantages of the non-destructive approach, collecting surveys and excavation take their rightful place as techniques for testing hypotheses, and <u>not</u> for exploration and discovery.

Not only is it imperative that collecting surveys and excavations be undertaken only as testing procedures, but it is vitally important as well to assess the probability of successfully accomplishing the research objectives prior to mining the archeological record. This assessment, so rarely made and so seldom explicitly stated, can be formulated on the basis of a non-destructive evaluation of the physical parameters of the task and on the basis of the experience and knowledge of the investigator. If intellectual honesty prevails, many resources will be saved from premature disturbance for future and more advanced removal methods that will yield greater returns in data.

Further, it seems incredible that the finite, fragile, and diminishing data source of our discipline should be physically manipulated by untrained school children and dabbling amateurs. In the past, there may have been some economic rationalization for this, but there is no scientific justification for employing the methodology of dilettantism in data gathering and analysis of the perishable archeological record. The academic community has the responsibility to reassess its obligation to produce properly trained professionals and scholars and de-emphasize its role in summer session baby-sitting of undergraduates who often have only a casual and unsustained interest in anthropology.

Technology provides a greater quantity, high quality and wider variety of relevant data than can be acquired by any other approach. While the initial capital outlay may appear to be high, the use of remote sensing is cost-effective, because it provides not only significant increases in the quantity, variety, and quality of data, but also because it produces an archival record. This record not only captures the state of the resources at a given time, but also is amenable to a wide range of analyses in the future with no additional data acquisition costs. In many instances, it allows study of the resource base at an overall lower net outlay and without physical disturbance as would be the case with traditional archeological practices involving exploratory excavations, that is, it is non-destructive in its application. It provides the heretofore missing synoptic view so critical not only to research, but also to the planning of visitor use facilities and conservation of resources. Additionally, it enhances the possibility of discovering resources such as old springs, fields, battle lines, and roads that were undiscoverable by prior methods and techniques. The overall result is the ability to make critical planning decisions concerning the development, protection, and use of resources based on hard data and real knowledge of the locations, characteristics, potential significance, and relationships of a study area's cultural and related natural resources.

The ability to monitor the state of the health of the resources over time is acquired. This is particularly important to the effective management of cultural resources. Resources do not deteriorate overnight; rather, deterioration is a slow, inexorable process. The human senses, in combination with the limits of the human memory, even memory augmented by written record, simply do not detect what is happening to resources until problems are well advanced. This is particularly true of such impacts as changes in land use practices, heavy visitor use, coastal erosion, vibrations, and sonic booms. However, through the use of archival imagery as a kind of long-term, time-lapse photography, problems of resource deterioration can be detected and strategies for correcting adverse situations devised.

And finally, there is the real world consideration of what share of the citizens' tax dollars our society is both willing and capable of devoting to cultural resources management. We can no longer use the standard techniques of the past, such as the measured drawings of buildings, of transit or plane table surveys, or of scores of archeologists trooping over the ground to explore for archeological sites. Using the slow field methods of the past as our primary strategy will doom us to failure, for we will be unable to make significant progress on the massive problems confronting the conservation and management of cultural resources.

Remote sensing is not a panacea. But, it is a sophisticated set of tools which can be efficient and cost-effective when applied to inventorying, evaluating, planning, managing, and conserving cultural resources. The application of remote sensing techniques is, in our judgment, a sine qua non of both research and management.

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# JOINT NATIONAL GEOGRAPHIC SOCIETY NATIONAL PARK SERVICE PROGRAM PROBES THE LAST FRONTIER IN AMERICAN ARCHEOLOGY

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In 1724, Peter the Great sent Danish adventurer, Vitus Jonassen Bering, to the North Pacific to determine whether Asia and America were connected by land. By sailing through the strait that now bears his name, he determined that Asia and North America were, indeed, two separate continents. Little did he know that under the strait through which he had sailed was a continental shelf which had, at certain intervals in the past, been a l,500-miles-wide land bridge connecting Asia and America. Much of this landmass, called Beringia, had surfaced as the ocean waters were locked in the gargantuan glaciers of the various ice ages. The peopling of America is believed to have occurred during the time that the Bering land bridge connected Asia and America. Although it is fairly certain that people first entered America over the Bering Land Bridge, there is currently a great scientific debate regarding the time period of this occurrence. Some scientists suggest that this period may have begun as early as 70,000 years ago, while others favor a more recent time period of 20,000t o40,000 years ago.

Now, the National Park Service, in cooperation with the National Geographic Society, has joined with scientists around the world to attempt to settle this debate. The NPS-NGS Early Man Studies Program is developing a research strategy and organizing research projects to answer questions on the culture and the time period of these first New World peoples. The National Geographic Society has appointed a Scientific Advisory Committee composed of such eminent American and Canadian early hominid specialists as Dr. T. Dale Stewart, Physical Anthropologist Emeritus, Smithsonian Institution; Dr. Robert E. Ackerman, Professor of Anthropology, Washington State University; Dr. Douglas D. Anderson, Associate Professor of Anthropology, Brown University; Dr. C.S. Churcher, Vertebrate Paleontologist, Royal Ontario Museum, Ontario, Canada; Dr. David M. Hopkins, Geologist, U.S. Geological Survey, Menlo Park, California; and Dr. W. N. Irving, Professor of Anthropology, University of Toronto, Canada. The role of this Committee is to provide advice on the direction of the program and to appraise the progress and results of the projects.

The initial phase of this program draws to a close with completion of the Dry Creek Site excavations, conducted by Drs. W. Roger Powers (archeologist) and R. Dale Guthrie (paleoecologist) of the Institute of Arctic Biology, University of Alaska. The Dry Creek Site is one of the few stratified archeological sites in Alaska and dates back at least 10,000 years. Since many sites in the contiguous states and in South America are beginning to indicate that people were living in the New World at least 20,000 years ago, the Dry Creek site has proved to be too late in time to provide significant insights into the central research issue of the peopling of the Americas. This summer, the program moves into a second phase with a geological/preliminary archeological survey of the North Alaska Range under the leadership of Dr. Norman W. Ten Brink, Professor of Geology, Grand Valley State Colleges, Michigan. The purpose of this project is to determine areas that have a high potential for discovering early archeological sites. The geological survey project is a crucial first step in a landscape where glaciers may have destroyed the traces of America's earliest inhabitants. The project seeks to determine areas that have a high potential for the discovery of archeological sites that are at least 14,000 years old. Based on the results of Dr. Ten Brink's work this summer, a research strategy and a project plan for the intensive archeological survey and evaluation of the area north of the current boundaries of Mount McKinley National Park can be developed.

The study is currently being restructured to become a more effective, systematic research program. Based on points raised by Dr. Betty J. Meggers (Smithsonian Institution), Dr. T. Dale Stewart (Smithsonian Institution) and other members of the National Geographic Sub-Committee on Research and Exploration, it became apparent this past year that an overall research plan was necessary. A fundamental design is needed to guide the selection, evaluation and approval of projects which will be jointly funded by the National Park Service and the National Geographic Society. To achieve this objective, Dr. W. James Judge, Chief, Chaco Research Center and Dr. Dennis Stanford, Director of the Smithsonian Institution's Paleoindian Research Program, are collaborating on the preparation of a long-range research program strategy. The issues and problems of the peopling of the New World is acknowledged world-wide as the last frontier of American Archeology and is the focus of the Fifth Quaternary Association being held in Edmonton, Alberta, Canada in September 1978. The theme of the conference is: "The Ice-Free Corridor and Peopling the New World." Members of the Scientific Advisory Committee and key National Park Service professionals plan to participate in this conference which will bring together scientists from Canada, the United States and other nations to exchange knowledge, debate viewpoints, and gain insights into the issues surrounding the questions of when humans arrived in the New World, how they got there, and what their lifestyles were like. The National Park Service - National Geographic Society Early Man Studies Program will be the first systematic long-term program in Alaska to focus on the question of the peopling of the New World. As Dr. Stanford states, "The problems of the origin of occupation in the Western Hemisphere present some of the most important and controversial questions in World Archeology. The absolute chronology of early people in North America and the specific Old World sources from whom these cultures have descended are not well known and are the subject of considerable disagreement among scholars. Consequently, this new NGS-NPS program will illuminate, if not solve, these last basic burning issues in World Archeology."

Diane Gelburd is a staff archeologist with the CRM Division, WASO. Douglas H. Scovill is the Chief Archeologist of the National Park Service

# DANGER! COMMONLY USED CONSTRUCTION MATERIALS AND METHODS MAY BE HAZARDOUS TO YOUR HEALTH!

**By Hugh C. Miller, AIA**
CRM Division, WASO

Materials often used in the construction and restoration of buildings and common to building maintenance can be a health hazard not only to the workers using them, but residues from these materials may also pose a threat to the health of visitors to those structures.

The casual manner in which organic chemicals are used is appalling. Most of us use acids and alkalis knowing that they can burn the skin and eyes and that their fumes can damage lung tissue. But, in our cure-all-product crazy world, we use much more dangerous organic chemicals without even reading the labels or understanding the consequences of their use. These compounds can not only burn the eyes and skin and scar lung tissue, but may be absorbed through the skin, dissolving body fats, changing blood chemistry, and accumulating to a lethal concentration. Some stand-bys are known or are suspected carcinogens. Depending on the length and intensity of exposure to these materials, illness will result in a matter of hours, weeks, or years. Continual exposure can be fatal.

Many of these toxic organic chemicals are found in household cleaning agents, paints, and adhesives. The conventional removal of paint is perhaps one of the most dangerous restoration and maintenance activities. There are health hazards from the toxicity of removers themselves and from the paint being removed. And, to add to the excitement, there is a real danger of fire.

The methylene chloride (dichloromethane) found in many commercial paint removers can be inhaled easily and broken down in the body to form carbon monoxide. Exposure of two hours or more can result in levels of carbon monoxide in the blood sufficient to place stress on the cardiovascular system. In cases of individuals with heart diseases or otherwise weakened cardiovascular systems, this short exposure to paint remover can be fatal. Toluene (toluol) can cause damage to the heart, liver, kidneys, and bloodforming bone marrow in concentrations of about 200 ppm. (parts per million of air by volume).

These solvents and others not only are dangerous if inhaled, but they also can be absorbed through the skin and cause the same damage. Very volatile solvents with high health hazards generally are not found in commercial paint removers, but may be purchased in the pure form. These chemicals should be avoided and substitute compounds used.

The precautions necessary in handling these materials include: wearing protective clothing (particularly gloves and goggles), having facilities for washing before eating and cleanup at the close of the workday, having good ventilation, and being prepared with first aid supplies, eyewashes, and safety shower equipment. Working outside may eliminate some of the health hazards, but may have undesirable environmental hazards if the repercussions of the process are not understood. No smoking is the rule! Work with paint removers and other volatile solvents should never be carried out in basements or depressed floor areas since the vapors are heavier than air, and would accumulate at floor level where they could be easily ignited by sparks, a furnace, or water heater. The combination of paint removers, electrical outlets and steel wool, found for example when stripping paint from a baseboard, is an explosive situation which may result in fatal shock or fire. As described in the item on hot air blowers (CRM BULLETIN Vol. l No. 1, March 1978), the heating or burning of paint in the removal process can release toxic vapors.

Another health hazard is presented by the careless use and misapplication of wood preservatives. Wood preservatives function by poisoning the wood used for food by wood destroying organisms. These materials are effective because they are toxic. In most cases, they are not only toxic to termites, wood borers,

carpenter ants, marine borers, and rot forming funguses, but are also toxic to humans and animals. Wood preservatives are dangerous for the user during application, and since they have a long lasting toxic effect, they can poison the people, animals, and plants that come in contact with the wood way after application. In some cases, preservatives leach into the soil or water, and thus have far-reaching environmental impacts.

Wood preservatives are basically coal or petroleum derivatives, salts of heavy metals, and organic compounds. They are generally applied as waterborne fluids, in an oil vehicle (such as a liquid or in an emulsified or grease base), or as a vaporized fumigant. The best application of preservatives is by pressure impregnation which must be done before installation of the wood. Treatment of wood in brush, or spray method does not provide good penetration. Rather, the toxic preservative tends to accumulate on the surface. The emulsified or greasebase preservatives are effective when used on timbers in situ, and the health hazard is low assuming the material is not ingested or does not come in contact with the skin. The base will stain anything that it touches, and may leach into adjacent masonry and plaster, thus staining the finish. Fumigants such "Wood Fume" or "Timber Fume" are effective for field use on poles, piles, and open structures, but are untested for the effects of gas on humans and animals using enclosed buildings that have been treated with the material. At this time, wood preservative fumigants are not recommended for the treatment of buildings.

Most cases of acute or chronic toxicity can be attributed to unnecessary exposure resulting from poor practices in the application of the preservatives, the misapplication of the preservatives, or excessive use of preservatives. Body damage can be caused by direct contact with the preservative liquids or solids to the eyes or skin. The poison can be inhaled as vapors during their application or as solids in dust from sawing or sanding the treated wood. With some preservatives, the poisons can be absorbed through the skin or contaminate human or animal food upon contact with the treated surface.

Pentachlorophenol, Penta or "Wood Life," is a commonly used wood preservative that is highly toxic to humans, animals, and plants. Chloracne, eye irritation, damage to the liver, kidneys or neurological system, and death attributed to Penta have resulted from its improper formulation, ill-advised use, and inadequate precautions in application. Clearly, Penta must be used with caution!

Pentachlorophenol wood preservatives are manufactured and packaged for mass distribution, but often are formulated by small wood treatment plants. If the formulation is incorrect, the solution may bloom after application allowing the highly toxic pure Penta crystals to form on the surface of painted or unpainted wood. The choice of the oil vehicle is important. It should match the lumber species and proposed use. In theory, the heavier the oil, the greater the penetration. However, if there are excessive quantities of Penta in heavy oil, much of the material will remain on the surface where it can be absorbed by the skin or contaminate foodstuffs. The same effect can result from the repeated flooding of the surface in the name of good maintenance (depending on the situation, recoating with preservatives on a two to five year cycle is probably a safe and satisfactory maintenance practice assuming the surface has not been sealed with Hydrozo or silicon). Some woods are either so dense or their cellular structure has been closed with a sealer or water repellent so that repeated coatings will not be absorbed regardless of their formulation and the penetrating quantities of the solvent. When the surface is required to be "clear" or paintable, a light oil or hydrocarbon solvent is used. This formulation may complicate the health hazards since many of the solvents used, such as methylene chloride, are highly volatile, flammable, and toxic. In these cases, more than normal caution is needed.

It is ill-advised to use preservative treatments for lumber that will be exposed to contact by people, animals, plants, and food. Most wood preservatives are not suitable for picnic tables, counter tops, bins, and other surfaces that will come in contact with food stuffs. Most wood preservatives, particularly Penta, should not be used where there can be repeated skin contact (as on benches, decks, rails, fences, and animal stalls or pens). Whether it's from poor formulation or misapplication, the accumulation of wood preservatives on the surface does not increase the protection of the wood, but does increase the health hazards.

Employees of wood preservative manufacturers, large wood preservative treatment plants and utility companies have good records with respect to health problems. This is the result of following the precautions of avoiding overexposure, using protective clothing (gloves, goggles, and where needed, masks or respirators), practicing good personal hygiene (washing before eating and showering after each work day), and working in an adequately ventilated space. These precautions tend to be forgotten in construction and building maintenance. The shop and field applications of wood preservatives are often specified as "brush-on," "spray," "flood," or even "slop" the surface with ample preservative and let dry (if it will). This process with all the related splash, splatter and drip is often done by people with bare hands and arms--sometimes bare legs--and usually no eye or breathing protection.

This casual approach to highly toxic chemicals is foolhardy and unnecessary. There is no reason for not understanding the materials and the methods we use in the construction and maintenance of buildings and using them in a safe manner.

The following simplified list can be used as a guide to selecting the material best suited for a specific wood preservation application. However, performance should not be the only criterion, since health hazards of toxic materials and safety hazards of flammable substances must be considered. Where the hazards are high substitute materials should be used.

Creosotes are the most commonly used preservatives. These are distillates of various tars that are sometimes mixed with petroleum oils for penetration. They are highly toxic to wood destroying agents and relatively insoluble water, but since they leave a strong odor and bleed through the surface, they are generally unsatisfactory for finished building use, particularly where painted surfaces are required.

Pentachlorophenol, or Penta, or “Woodlife" is an organic compound that is usually used in a five percent solution with an oil vehicle. It is highly toxic to destructive wood organisms and has good penetration qualities, depending on the weight of the oil. It is highly resistant to leaching and can be painted when the oil vehicle evaporates. As discussed earlier in this article, Penta is highly toxic to humans, animals, and plants in direct contact with treated wood or its fumes.

Naphthenate solutions are very common for wood preservation and are generally compounds of copper or zinc. Copper naphthenate is bright green and difficult to cover with paint. Zinc naphthenate is very easy to paint over, but is less effective as a preservative. Both have persistent, strong, objectionable odors and generally do not lend themselves to use with buildings. Copper or zinc naphthenate are often used as additives in wood resistant stains and repellents, which are manufactured for brush-on application.

Copper-8-quinolinolate (solubilized) is an odorless oil-borne preservative that provides excellent decay resistance. It is neither toxic nor irritating to humans or animals. It is the only wood preservative permitted by the FDA for wood that is in intimate contact with food. It does have a tendency to leach and should not be used in the ground.

Water-borne preservatives are generally salts of heavy metals and are used where the surface must be clean, odorless and paintable. However, they have a tendency to leach out in water, may be corrosive to metal fasteners and can conduct electricity. In order to be effective, these preservatives must be pressure impregnated, a procedure which limits their use on existing structures. Since water is added in the process, treated wood must be air-or kiln-dried before use. It is conceivable that with improperly fabricated materials, salts may crystallize on the treated surface providing a potential health hazard. However, the leaching of the material is not normally a hazard to individuals using the wood if normal precautions are taken.

The following water-borne preservatives are formulations marketed under proprietary brand names.

Acid copper chromate (ACC) is marketed under the trade name "Celcure," is corrosive to metals, and is not recommended for use in or on the ground.

Ammoniacal copper arsenate (ACA) is marketed under the trade name "Chemonite." It is one of the water-soluble preservatives that will resist leaching, is suitable for ground contact, and will not bleed through concrete, plaster, or paint.

Chromated copper arsenate (CCA) is available in several types Type A-Greensalt, or Langwood Type B-Boliden CCA, Koppers CCA-B, Osmose K-33; Type C-Wolman CCA, Wolmanac CCA, and Osmose K-33C. CCA is clean, odorless and paintable, and since it does not leach, it is suitable for inground use. It will not bleed through concrete, plaster, or paint, and has good resistance to electrical conduction.

Fluor-chrome-arsenate-phenol (FCAP), is marketed as Osmossalts, Osmosar, Tanalith, Wolman FCAP and Wolman FMP, is somewhat fire retardant and does not corrode metals. However, it is subject to leaching and is not suitable for ground contact.

Vaporized wood preservatives such as Vorlex, Vapam (Wood Fume or Chloropicrin (Timber Fume) used by utility companies for protection of poles in situ are untested for use on structures, but preliminary findings indicate that these highly toxic materials may release vapors or fumes and should not be applied to enclosed structures.

# A NEW IDENTITY FOR THE LIST OF CLASSIFIED STRUCTURES

**Carla Van West**
**Midwest Archeological Center, NPS**

A newly assembled team of seven employees at the National Park Service's Midwest Archeological Center, that includes five archeologists, is exceptionally busy these days. Their tasks include researching prior archeological work, reviewing management documents, checking mapped locations and updating and recommending requests for future archeological work in the parks within the Rocky Mountain Region. The team's goal: to assemble site inventory forms, base maps, updated 10-238's and a synthetic management "briefing statement" for each park in the six Rocky Mountain Region states within the next sixteen months. Current estimates call for approximately l0,000 archeological sites to be recorded in the forty-two Park Service units.

Formerly referred to as the "List of Classified Structures, Archeology," the Lincoln based team has renamed its program the "Rocky Mountain Region Inventory of Archeological Sites" to reflect the broadened scope of the project. Until now, no successful attempts at completing the archeological portion of the LCS for the Rocky Mountain Region have been made. However, funding for FY78 and 79 was approved in the fall of 1977. Carla Van West, an archeologist with the Southwest Cultural Resources Center, Santa Fe, was selected to head the program at the Midwest Center. Along with Center Chief F.A. Calabrese and Archeologist Adrienne Anderson, Carla built new approaches to data collection and data usage into the program design. The LCS was restructured to evaluate the coverage and quality of previous archeological investigations in the parks, and to derive a firm understanding of the number, nature, location, and condition of archeological sites in each park area to meet current research, administrative and managerial needs.

As currently envisioned, the Inventory Data Base will be a significant tool for archeologists, planners, park managers, and interpreters to better understand the significance and management needs of archeological resources in our parks. Additionally, information generated by the compilation and synthesis of data by the Inventory Program will be extremely useful for short-and long-range park development planning, programming, and budgeting.

Team members are obtaining needed data by researching original sites records and reports, making field inspections, and discussing problems and concerns with Regional and Washington office personnel as well as with park managers and field researchers. Data obtained are used to complete newly designed Inventory forms, and plot site locations by UTM coordinates.

Mylar overlays for standard U.S.G.S. maps are also being made to indicate intensity and areas of survey coverage. In addition, new or revised Development/Study Package Proposals (10-238's) are being prepared whenever necessary. Finally, a short, plain language "briefing statement" summarizing the data contained on the forms and maps, and outlining the preservation/stabilization needs and interpretive potential for selected resources is being prepared for each park. Eventually, computerization of the data will be accomplished. Use of INQUIRE for a data base storage and retrieval system has been discussed in some depth.

For further information on the program, contact F. A. Calabrese or Carla Van West at the Midwest Archeological Center, National Park Service, Federal Building, Room 474, 100 Centennial Mall North, Lincoln, Nebraska, 68508; Telephone: FTS 867-5392 (commercial 402-471-5392).

# BANDELIER NATIONAL MONUMENT RECEIVES PRESERVATION AWARD

Ben Moffett of the Southwest Regional Office informs us that an unprecedented act to save prehistoric archeological ruins from damage during a forest fire has earned the National Park Service a Historic Preservation Award.

The award was presented to the Service by the New Mexico Cultural Properties Review Committee at a recent meeting of the New Mexico Historical Society. The honor was jointly shared by Bandelier National Monument, where the fire raged out of control for more than a week during June of last year, and by the Southwest Region Office for its support of the firefighting effort.

Bandelier National Monument was established in 1916 to preserve hundreds of prehistoric Indian ruins. When heavy equipment used to cut firelines threatened to unearth many of the unexcavated ruins, a cadre of archeologists, in a precedent setting display of cooperation, worked with dozer operators to guide them around the ruins. Of the hundreds of ruins in the monument, only three were damaged, despite the size of the fire which spread over 15 ,000 acres in the area.

John Hunter, superintendent of Bandelier, accepted the award for the monument. Deputy Chief of the Southwest Cultural Resources Center, Cal Cummings, accepted the award on behalf of Regional Director John E. Cook.

Cummings noted that special thanks for the success of the project should go to Dr. Milford Fletcher, NPS research biologist, who was one of the first at the fire scene and who took the lead in arranging for involvement of the archeologists.

# NATIONWIDE RESERVOIR INUNDATION STUDY UNDERWAY

**Toni Carrell**
**Southwest Cultural Resources Center**
**Santa Fe, New Mexico**

The National Park Service's Southwest Cultural Resources Center in Santa Fe, New Mexico is the coordinating body **for a** multi-phase study designed to determine the effects of freshwater inundation upon archeological sites. It is jointly funded by the U.S. Army Corps of Engineers, Bureau of Reclamation, Soil Conservation Service, and the National Park Service. Focus for the National Reservoir Inundation Study is the examination of sites prior to inundation, while flooded, and during periods of drawdown, in order to assess the impacts on data retrieval potential; the degree of preservation or destruction of archeological remains; and the efficacy of salvage operations versus direct protective measures.

This program has been undertaken to provide agencies involved in land alteration activities with procedures that will facilitate their land managing functions in areas where impoundments now exist or are currently being planned. Decisions relating to cultural remains, whether they result in long-term protection, mitigation of adverse impacts, or a combination of procedures, must be based upon thoroughly documented and researched scientific data, rather than upon educated guesses as to how sites are affected once they have been immersed.

The goal of the National Reservoir Inundation Study is to develop management-oriented guidelines for cultural resources, which will provide the additional information needed to deal intelligently with cultural remains affected by Federal projects, or on Federal lands where the primary impacts will result or currently result from inundation, and which will enable managers to remain in full compliance with extant environmental legislation. The results of this study will also provide involved agencies and archeologists with a greater understanding of the resource and a set of alternatives to the questionable techniques of traditional salvage archeology.

The Inundation Study has moved into its second year of operation and project archeologists have recently completed the Preliminary Report of the National Reservoir Inundation Study which details the research design to be implemented over the next 3 years. The report outlines a series of testable hypotheses which are aimed at developing a body of knowledge regarding specific impacts, both adverse and beneficial, upon the data-bearing components and physical integrity of archeological sites. Guidelines for data collection and site preparation, designed specifically to test inundation impacts, are included in this document. Information on protective measures and general predictions on their efficacy are also provided, although the emphasis of the study thus far has been on determining the nature of the impact-a necessary first step before providing comprehensive mitigation procedures.

The Inundation Study personnel have also completed an annotated bibliography which contains over 250 references to freshwater inundation and related topics. It is entitled, The Effects of Freshwater Inundation of Archeological Sites Through Reservoir Construction A Literature Search.

Individuals in various areas of the country are currently involved in the on-going research and are implementing many of the field testing procedures outlined in the Preliminary Report. In the states of California, Oregon, Washington, Arizona, and Idaho, studies are either in progress or are in the planning stages. Any information that is available regarding inundation impacts or on-going research being conducted in reservoir areas, due to the recent drought and drawdown, or in preparation for initial closing, would be appreciated.

Requests for copies of the abovementioned reports or information relating to inundation impacts should be sent to the National Reservoir Inundation Study, Southwest Cultural Resources Center, National Park Service, Post Office Box 728, Santa Fe, New Mexico 87501.

# THE FOLKS THAT KEEP THE OFFICE GOING

**By Doug Caldwell**

The first issue of this illustrious publication featured an article on members of the CRM Division's professional staff. While we can't deny the importance of that staff, neither can we overlook that group of people that really keeps the work flowing--that long suffering and endurable group of employees, our secretaries! So, we present them in the following paragraphs, and thank them for all the support they have given us over the years we have worked together.

Mary Jo Gebbia, Secretary. Our answer to Gina Lollabrigida, Mary serves very ably as Ross Holland's secretary and general office manager for the Division. An employee with the Service for 13 years, Mary has worked in many phases of Park activities, from personnel and public information to interpretation. In addition to her duties with us, Mary is very concerned with the working woman in the Service, and has been active in the WASO Federal Woman's Program. She also serves as an *EEO* Counselor for Washington Office personnel, and has been a real booster for the Interior Department Toastmasters Club. Married and the mother of two active boys, Mary commutes to D.C. every day from the "land of pleasant living" (the Annapolis, Maryland area), and is wellknown for her "if-I-get-caught-in-onemore-traffic-tie-up-after-oversleeping-on-Monday-morning" blues.

Shirley Gould, Secretary. Before coming to the Park Service as an assistant to the Division's architects, Hank Judd and Hugh Miller, and to the LCS Registrar, Clarence Meek, Shirley worked as a secretary in the Department's Office of the Solicitor. Born in New York City and raised in "Philly," Shirley confesses to being a "Bicentennial freak" of the first order. Her long-standing desire is to get official recognition of the "rightful place in our historic and cultural heritage" for Philadelphia’s Betsy Ross House. Shirley is still searching for the Betsy Ross file in the Division's files, much to the consternation, chagrin, frowns, and glares of our historians and architects! Shirley attended secretarial school, frequently attends adult education classes at Catholic University, and has as her main ambition, the completion of her degree work begun at George Washington University. Known up and down Interior's corridors for her distinctive laugh, it is rumored that Shirley's cachinnations have been recorded by a major TV network for use in the laugh track of a new situation comedy show premiering this fall!

Murlene F. Lash, Administrative Clerk. Murlene has been with our division for almost four years now, and with the Park Service for nearly seven years. She serves as the administrative clerk, secretary, and "chief counsel" to the Chief Archeologist, NPS. Before joining us, Murlene worked with the Service's Division of Land Acquisition. Active in the Washington Office's Federal Women's Program, she has served in that organization as Chairperson for the Membership Committee, and has filled in as recording secretary for Doug Scovill (Chief Archeologist) when the latter's schedule found him on a junket in the wild west! Against our advice, Murlene went and committed marriage this past year, has developed some fantastic survival techniques, and has hung out her shingle to counsel those looking for a sympathetic ear!

Karen G. Rehm, Clerk-Typist. Karen, who has been with us now for about a year, is responsible for recording data on the List of Classified Structures master file, and assists in processing NPS nominations to the National Register of Historic Places. An American history major at the Virginia Polytechnic Institute and State University (how's that for a

short name?) Karen hopes to obtain a permanent position someday with the Service as a park technician. She has been getting good experience as an interpreter while serving in a VIP position at Arlington House. While her soft Tidewater accent (her home is in Richmond) serves her well at the Custis-Lee Mansion, don't be fooled by it! When it comes to sporting events, particularly those involving her alma mater, she can give a Bronx cheer as good as the next person!

## CAL CUMMINGS HONORED WITH TWO NATIONAL OFFICES IN ARCHEOLOGICAL FIELD

Calvin R. Cummings, Deputy Chief of the National Park Service's Southwest Cultural Resources Center, Santa Fe, has been elected President of the American Society for Conservation Archeology and has also been selected to serve on the Advisory Council for Underwater Archeology.

By a vote of the membership of the American Society for Conservation Archeology, Cummings was chosen to serve as "President-elect" (vice-president) for the next year and then as President for the year following. The election results were made public at the May 1978 Annual Meeting of the Society for American Archeology, held in Tucson, Arizona.

The American Society for Conservation Archaeology has as its purpose the promotion and coordination of scholarly activities, scientific research, education, and high quality of standards in the preservation and protection of historic and prehistoric archeological values. The Society encourages all scientific approaches to the study of archeological remains, which by their nature, aid in conserving those remains. Specifically, the Society's purpose is to provide a forum for the specialized archeological interests in conservation and cultural resources management.

Cummings was also elected to serve as a member of the Advisory Council for Underwater Archeology at the January 1978 International Conference on Underwater Archeology, held in San Antonio, Texas and was chosen for scholarly reputation, knowledge and research endeavors in underwater archeology. The Advisory Council for Underwater Archeology is a 12-person international group, which functions in conjunction with the Society for Historical Archeology, and is dedicated to coordinating high quality scientific research, education, preservation and protection of historic and prehistoric remains located underwater.

A primary role of the Advisory Council is to advise federal and state agencies, private industries, and anyone else who needs technical information on submerged cultural resources.

# THE POLICY CORNER

From time to time, this publication will discuss policies of the National Park Service and how they relate to cultural resources management. Our purpose for doing this is to give you a better understanding of the reasons and thought behind the formulation of specific policies.

Policies, as my old compadre Denis Galvin says, are directions to help you in what you are or should be doing; they are not stumbling blocks that one seeks to get around. In other words, policies should be viewed as guides to what you can do, not what you can't do. And when common sense is applied to the reading of these policies, voila!--good resources management results. Policies cannot be looked upon as rigid rules to be strictly interpreted. Rather they offer precepts to guide your actions.

The newest policy to affect cultural resources is the one detailing guidelines on the period refurnishing of historic houses. In the review process, this policy received a mixed reaction. Some praised it; some felt it was too stringent. I think it is stringent, and it should be so.

There are many instances where furnishing a structure does add substantially to the theme of the park. The furnishings in the home at Sagemore Hill reek of Theodore Roosevelt's life and personality, and it is inconceivable that the interpreters could get across the gentleness and humanity of Longfellow without having the furnished house as the "stage setting" for their talk. The furnishings at Carl Sandburg's home speak expressively of the work habits and the lifestyle of this important literary man, while the furniture at the Andrew Johnson home accurately depicts the man and the position he attained. The furnishings in the old House at Quincy, Massachusetts bring deeper meaning to the Adamses as a family as well as a better appreciation of their contributions to this country. The laboratory buildings at Edison National Historical Site would not have the impact they do without the machinery in them. But all of these buildings came to us with their original furnishings.

The National Park System today has over 300 refurnished structures (in some instances, parts of buildings), an average of nearly one per park. Add to that number the great quantity of refurnished buildings administered by the States, local governments, and historical societies, and one quickly comes to the realization that the American public has more refurnished historic houses than it wants to see.

With but few exceptions, refurnished buildings do not do a great deal to get across the theme one *i9* trying to interpret; the houses often become display cases for an antique collection. Interpretation often becomes an explanation of the furniture, not an explanation of how the house and its occupants fit into the theme of the park.

Furnishings often get in the way of interpretation, for they distract from the theme being interpreted. Furnishing a house is often an ineffective way of using a structure for the proper interpretation of the park. Yet, when viewing a building, planners and interpreters more often than not come up with refurnishings, and don't go beyond that interpretive device in their considerations.

Conjectural refurnishings in 90 percent of the cases at best only marginally, contribute to interpretation. Often, it is a crutch for the interpreter, and it hinders his imagination in devising other techniques to get the park's story across to the visitor. Indeed, conjectural

refurnishing may be misleading and promote an impression of a person or a lifestyle that may not be true.

As Nan Rickey has noted, furnishings are expensive, usually more expensive than the interpretive benefits derived.

Thus, you have some of the thoughts behind the new policy on refurnishing structures. The policy means that careful thought should be given to any proposal for refurnishing, and that other interpretative alternatives should be examined and found inappropriate before turning to any thought of conjectural refurnishing.

F. Ross Holland, Jr.
Chief, CRM Division, WASO