

Archeology and Speleology: The Case for Conservation

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ABSTRACT

Caves and rock shelters have proven significant sources of information for archeologists. The recovery of archeological remains in undisturbed context from such sites is vital to the interpretation of past human behavior. Similarities in research interests, the nature of their respective resource bases, and a history of cooperation link archeology and the speleological community. Cooperation between archeologists and speleologists in the fields of conservation and resource management is needed and can prove of mutual benefit. Mechanisms for cooperative interaction include increased research opportunities, effective utilization of federal legislation, and programs of public education and involvement. Archeological remains discovered in the course of speleological investigation should be left alone, and the proper authorities contacted.

Introduction

Caves and rock shelters around the world have long proven rich sources of archeological data. In the investigation of these resources, archeologists have often been assisted by specialists in other fields of speleological research. Through this interaction, it is apparent that archeologists, in dealing with their resource base, face many of the same problems and challenges which are before the speleological community in general. It is argued that archeologists and speleologists can greatly assist each other's interests, both in the area of research and in the development of resource conservation strategies. Public education, public opinion, and relevant federal legislation are seen as highly effective mechanisms capable of being channeled toward the resolution of common problems.

Historical Perspective

Archeologists have long been aware of the value of caves as sources of information relevant to the interpretation of past human behavior (figs. 1, 2). The archeological literature is filled with reports of significant discoveries from cave sites. Furthermore, it is apparent that the history of archeological and speleological research has been long intertwined. Thomas Jefferson, the author

of the first detailed report on excavations at a prehistoric American Indian site, has also been called the first American speleologist (Schmidt, 1965, p. 82). Jefferson's excavations introduced the concept of stratigraphy to American archeology; as a technical achievement, the work was a century ahead of its time (Ceram, 1971; Willey and Sabloff, 1973). His speleological investigations include commentary on blowing caves (Schmidt, 1965, p. 82) and a description of prehistoric sloth remains found in Organ Cave, West Virginia (Davies, 1955, p. 133).

In Europe, speleology and archeology were associated at an early date. Scientific acceptance of the antiquity of man, an event crucial to the development of modern archeology, occurred in the middle of the nineteenth century. Speleological investigations, notably in England and France, contributed significantly to this achievement.

Early in the nineteenth century, William Buckland, a pioneer in British cave science and the first professor of Geology at Oxford, investigated and reported on associations of extinct animal remains with human artifacts at a number of cave sites in England (Boylan, 1967). Buckland repeatedly denied that direct association existed, however, and discouraged further investigations. His reluctance stemmed partially from a strict adherence to the climate of scientific opinion of the period, which did not favor acceptance of a great age for man (Gruber, 1965, p. 379).

Evidence suggesting the association of human remains with extinct fauna continued to accumulate during the first half of the nineteenth century, however, particularly from a number of cave sites in England and on the Continent (Gruber, 1965). The field of geology was itself changing at this time, as the concepts of Hutton and Lyell regarding the age of the earth and the nature of geologic change became increasingly accepted.

The critical turning point came in May of 1859, when Joseph Prestwich reported to the Royal Society on his visit, with Sir John Evans, to the Sommes gravel pits in France. There, in deposits near Abbeville and Saint-Acheul, Bocher de Perthes had for years been recovering flint handaxes and other tools in association with extinct fauna. This evidence, like that from excavated cave sites, had previously been largely ignored or discredited. Prestwich's paper, entitled "On the Occurrence of Flint Implements Associated with the Remains of Animals of Extinct Species in Beds of Late Geological Period at Amiens and Abbeville and in England at Hoxne" marked the beginnings of the formal acceptance, by the scientific community, of a great antiquity for man (Daniel, 1967).

In September of 1859, William Pengelly, a Devonshire geologist, reported on what appeared to be indisputable associations of human remains with extinct fauna at Brixham cave (Davies, 1964). The findings, complementing the report of Prestwich and Evans, created a great deal of excitement in the British scientific community, and within a few years were widely accepted (Gruber, 1965). Pengelly continued to contribute to the field of archeology; his excavations at Ken's Cavern further confirmed and elaborated

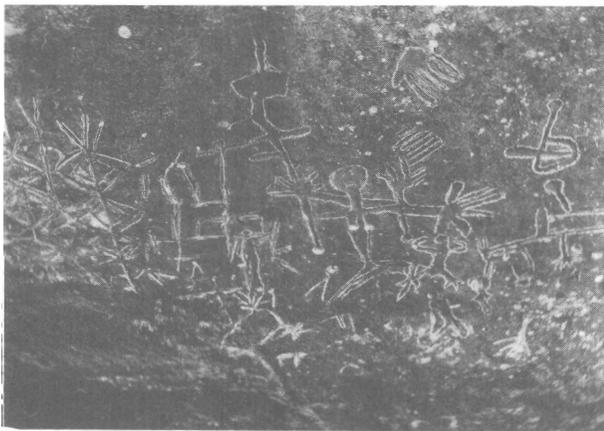


Fig. 2 Pictographs from the walls of an Ozark bluff shelter. Highly visible archeological remains such as these are easily subject to defacing and vandalism by ignorant or malicious visitors. (Courtesy, University of Arkansas Museum)

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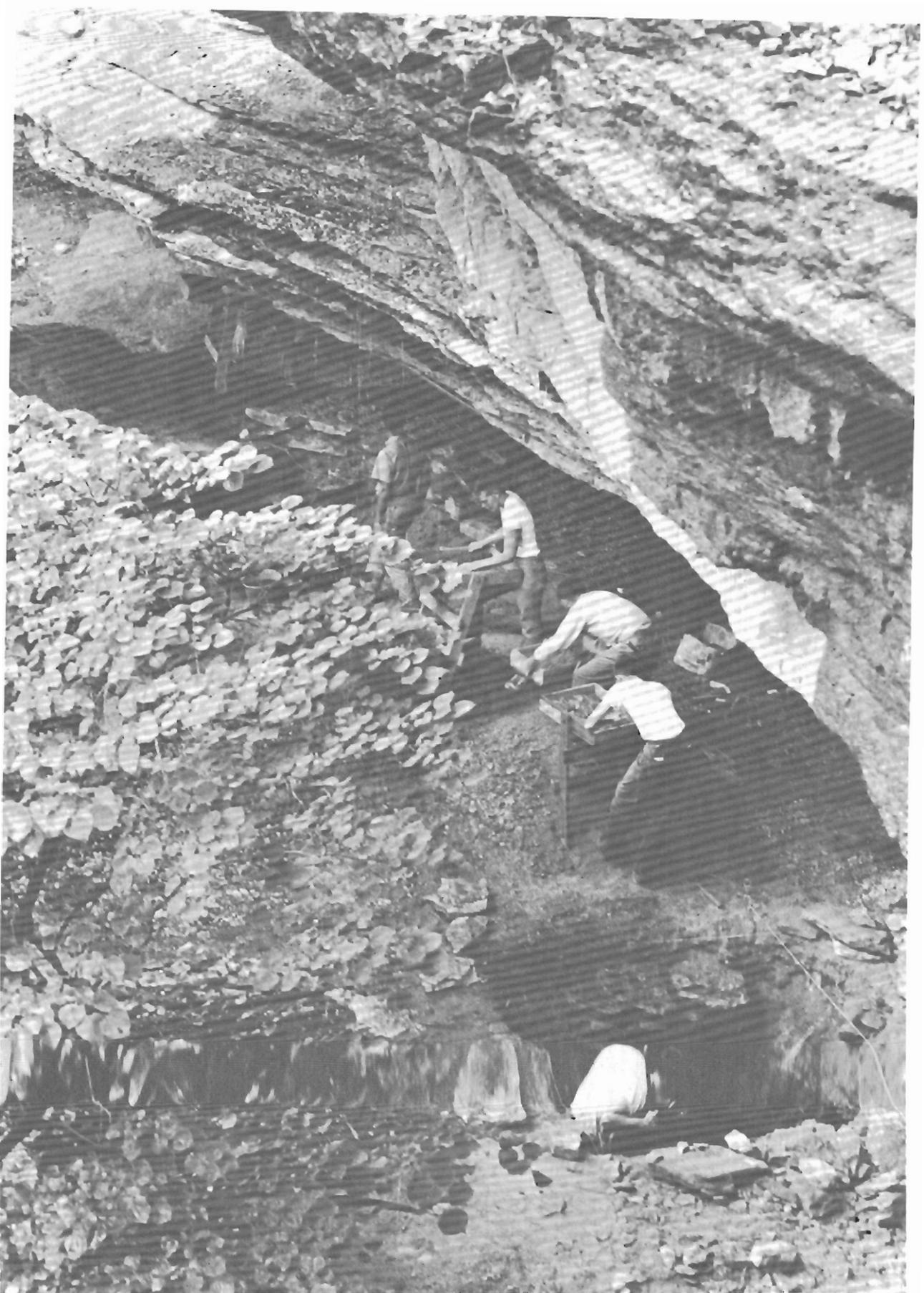


Fig. 1. Archeological excavations at the Breckenridge rock shelter (3CR2), a prehistoric habitation site in the Arkansas Ozarks. Controlled excavations at sites such as this can greatly add to our knowledge of past human behavior. (Courtesy, University of Arkansas Museum)

the relationship between human populations and extinct fauna during the late nineteenth century.

Throughout the 19th and 20th centuries, the interests of archeologists, geologists, and a number of other specialists have increasingly intersected at cave sites. A wide range of techniques from the physical and natural sciences have been recognized as applicable to the resolution of archeological problems (Brothwell and Higgs, 1970). The application of these techniques often requires direct interaction with specialists in other disciplines. For example, concern with stratigraphy and the age and manner of deposition of archeological remains has led to increased cooperation between geologists and archeologists. When archeological investigations occur in cave or rock shelter sites, this interdisciplinary approach brings archeologists into close contact with specialists in areas of speleological research.

The Nature of Archeological Data

Archeological interest in caves and rock shelters is generated by a number of factors, some of which may be better understood in their relation to the goals and methods of the discipline. Archeology has as its goals the tracing of the origin and history of culture, the reconstruction of past lifeways, and the interpretation of cultural change and adaptation over time (Binford, 1968). Instrumental to the success of these goals is the careful investigation of archeological data *in context*. Context refers to the environment in which archeological remains are found (Hole and Heizer, 1969, p. 99), and includes the locational relationships between artifacts in addition to the nature of the matrix they are found on or in. The disturbance or removal of archeological remains from their original context without record greatly reduces their capability to inform on past human behavior.

For large areas of the globe, archeology provides virtually the only means for understanding past human behavior and for reconstructing any kind of history of human events. Historical documents and the records of modern observers provide data from only a tiny fraction of the period man has existed on earth. The destruction of archeological materials, or the loss of the full interpretive value of archeological remains through their improper removal from context, is, in effect, a piece of human history lost forever. Even in areas where historical records are available, archeology has come to be recognized as a valuable adjunct to historical and anthropological research. The tremendous growth in classical archeology in the last century (Ceram, 1949), and the recent rise of the discipline of historical archeology in North America (Noel Hume, 1969; South, 1976) bear witness to this phenomenon.

A major area of modern archeological research involves the investigation of spatial distributions and interrelationships among artifacts. Artifacts, as remains of past systems of behavior, can often, by their manner of deposition, inform on those past systems. The vertical positioning of artifacts within a site, for example, is often used to establish temporal sequences. This follows from the principle of superposition, where the lowest remains are assumed to be the earliest, those above them later, and those on top the most recent. Through the study of artifacts associated horizontally, on occupational levels or living floors, event reconstruction may be possible. Important to both forms of investigation is the assumption that disturbance of the remains, accidental or otherwise, has been minimal. By investigating how artifacts pass from living cultural systems into the archeological record (Schiffer, 1975), and through an awareness of the post-depositional changes that might occur to that record (Butzer, 1971; Schiffer and Rathje, 1973), archeologists hope to achieve an understanding of cultural history, cultural reconstruction, and cultural process.

The Archeological Significance of Cave Deposits

In caves and rock shelters, depositional conditions favorable to archeological investigation often occur. Caves have long been recognized as providing both temporary shelter and a place of habitation for early man. Artifacts found within them may therefore be at or near their original place of use or discard in the past cultural system under investigation. In addition to the possibility of containing artifacts in a highly desirable context, the factor of unusual preservation may also obtain. The presence of a rock overhang or ceiling reduces the amount of direct weathering that the archeological remains and deposits might normally undergo.

While individual cave environments are highly variable, a number of common factors influence preservation (Butzer, 1971, p. 205). The greater the distance from the entrance within a cave, the lower the probability of direct weathering and the consequent reduction of archeological remains through mechanical and chemical action. In limestone caves, the calcareous, alkaline environment favors the preservation of bone materials (Butzer 1971, p. 212). The near-uniform temperature and humidity common to the interiors of many caves reduce weathering activity and favor preservation. In caves where extremely low humidity characterizes the interior, preservation through desiccation may occur. The exceptionally well-preserved, mummified human remains found in Kentucky caves (Meloy, 1971; Watson, 1974), and the excellent preservation of basketry and other woven artifacts from caves and rock shelters in the Ozarks (Scholtz, 1975; Raab, 1976) (Fig. 3) and the Southwestern United States (Jennings, 1957; Haury, 1950) are examples of this form of preservation.

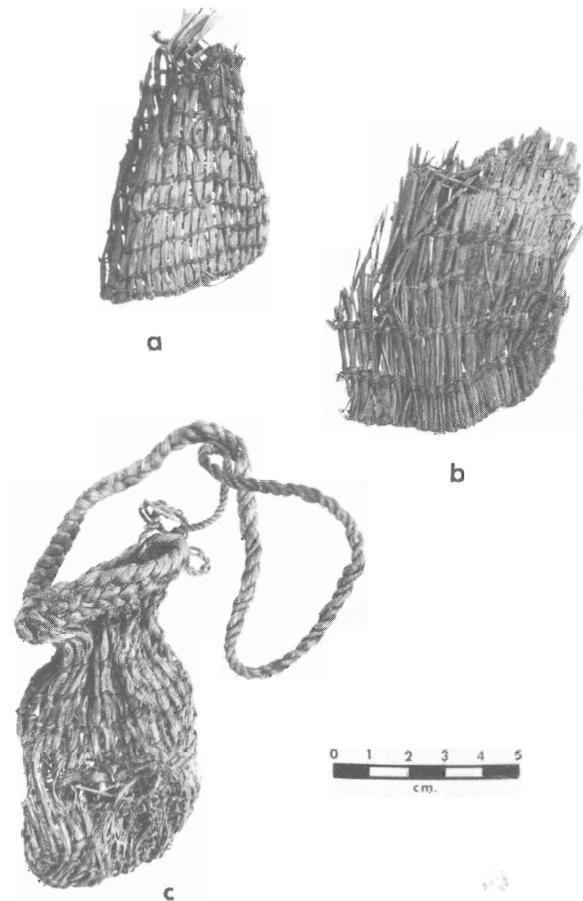


Fig. 3. Twined fabric bags recovered from Ozark bluff shelters; a-b fragments, c, complete (Scholtz, 1975, p. 117). Courtesy, University of Arkansas Museum

Natural sedimentation processes within caves are also of interest to archeologists. Through thermoclastic weathering—the effect of the alternate freezing and thawing of moisture on and within pores and crevices—rock shelters may form and be enlarged (Bordes, 1972), and archeological deposits may be covered over with rock spalls of varying sizes (Rosenfeld, 1964; Butzer, 1971). This erosional process is greatest near the entrances to caves, in the same area where human occupation is most likely to have occurred. The ensuing debris (éboulis) effectively cover or cap the archeological deposits. This seals and protects the remains, and separates earlier deposits from those of later occupations. Massive ceiling collapse may occasionally trap occupants, providing for the preservation of skeletal material in situations where such preservation may otherwise be rare—for example, where cremation was practiced or where disposal of the dead normally occurred in the open, away from cave sites. At least some of the Neanderthal remains from Shanidar Cave, Iraq were preserved in this manner (Solecki, 1963). As Kleindienst has recently indicated (1975, personal communication), much of the controversy over Early Pleistocene hominid evolution and tool use might be reduced or resolved by new discoveries of occupation areas or skeletal remains; cave or rock shelter sites could well prove excellent sources of such information.

The protection caves provided against the weather resulted in their widespread and repeated use by human populations. The extensive use of caves as habitation sites, both prehistorically and by historic and modern human populations, has been well documented (e.g., Bauer, 1971). Many cave sites were repeatedly utilized over time and contain long records of human occupation. At Niah Cave, in Borneo, for example, a 100,000-year span is represented, from the present day to the middle Paleolithic (Harrisson, 1964). From these well-preserved sequences, the human occupation of a region, over a long period of time, may be investigated. Such a temporal perspective is often invaluable to studies of human adaptation and cultural change.

Extremely long occupational sequences have been found in caves from widely differing parts of the world. At the Combe-Grenal rock shelter in southwestern France, for example, a sequence exists that covers most of the period of and between the last two major Pleistocene glaciations (Bordes, 1972). In North America, cave sites have yielded some of the best continuous records of human occupation. Russell Cave in Alabama, discovered by amateur cave explorers (Pinney, 1962, p. 21), has provided a cultural sequence ranging over the past 10,000 years (Griffin, 1974). Recent excavations at the Meadowcroft rock shelter (Adovasio, *et al.*, 1975) in western Pennsylvania have produced evidence for the earliest known aboriginal occupation in Eastern North America dating to 14,000-15,000 years ago. An extensive series of radiocarbon determinations indicate more or less continuous occupations throughout the prehistoric period.

Interdisciplinary Research

The archeological investigation of cave sites can generate information that is both useful and relevant to research in a wide range of disciplines. The information gathered to help interpret the past human occupation of a given area may often be of great interest to biologists, zoologists, hydrologists, and climatologists, as well as a number of other specialists. Palynological investigations can yield information about the nature of prehistoric plant communities and help resolve questions about processes of domestication and succession (e.g., Mangelsdorf, 1974). Faunal remains encountered within archeological deposits may be of value to zoologists concerned with changes in animal communities over time. Both palynological and faunal analysis, for example, have proven important in the reconstruction of Pleistocene plant and animal communities (Butzer, 1971; Bordes, 1972). Geomorpholog-

ical environments, whose understanding is often crucial to the proper interpretation of archeological deposits, may also receive detailed investigation.

When archeologists investigate cave sites, they may enlist the aid of specialists in other disciplines. At the excavations of the Combe-Grenal rock shelter, mentioned earlier, geologists, paleontologists, pedologists, physical anthropologists, palynologists, sedimentologists, physicists, and chemists all participated, in addition to a number of archeologists (Bordes, 1972, pp 1-2). A similar interdisciplinary effort, including members of the Cave Research Foundation, has characterized recent archeological investigations in and near cave sites in the Mammoth Cave National Park, Kentucky (Watson, *et al.*, 1969; Watson, 1974). In these and other instances, archeologists have increasingly called upon specialists in other, speleologically-concerned disciplines.

The Nature of the Resource Base

In addition to common research interests, archeologists share a number of similar problems and concerns with the speleological community. The term "speleological community," as used here, includes all those concerned with the discovery, exploration, conservation, and preservation of caves. Cave scientists from a score of professions, as well as serious avocational cave investigators, are included in this rubric. The focal point for common concern centers on the nature of the resource base each community deals with.

Archeological resources may be regarded as nonrenewable cultural resources—once destroyed, their information content is gone forever. Speleological resources may be thought of as largely nonrenewable geological, cultural, and biological resources. While the geological and biological resources within a cave system may be regenerated, given enough time, from the perspective of a human lifetime they may be viewed as largely nonrenewable. Cultural resources (*i.e.*, archeological remains) within caves, or entire species of cave-dwelling organisms, are irreplaceable—once they are destroyed or become extinct, they are gone forever.

Site Protection and the Problems of Publication

Given the common fragility of their resource bases, it is perhaps hardly surprising that a strong conservation/preservation ethic pervades both communities. The position of the National Speleological Society on conservation has been widely stated and stressed within the speleological community (e.g., Schmidt, 1965, p 88; Folsom, 1962, pp. 245-246; Pinney, 1962, pp. 237-244; Mohr and Sloan, 1955). The motto of that organization: "Take Nothing But Pictures, Leave Nothing But Footprints, Kill Nothing But Time" is one that archeologists hope would become popular with members of the public who discover archeological remains. In fact, most archeologists can do without even footprints—which may indicated disturbance of the archeological deposits.

A major area of concern to professional archeologists is the problem of site protection. Both archeology and speleology have extensive avocational followings, and the record of responsible interaction between professionals and serious avocational members of each community is often excellent. Unfortunately, however, both communities face a grave problem from uninformed, unconcerned, or occasionally malicious members of the general public. The deliberate plundering of archeological sites for collector's pieces or salable antiquities has reached enormous proportions, both in the United States and around the world (Davis, 1972; Meyer, 1973; Morse, 1973). The speleological community faces a similar problem in many areas—caves may be plundered for their speleothems by mineral collectors or distributors (Schmidt, 1965), or subjected to vandalism by ignorant or malicious members of the public. Both

caves and archeological sites also suffer from the unintentional, often well-meaning acts of destruction by the uninformed, who often fail to recognize the significance of their actions.

The problem of intentional destruction of archeological or speleological resources is further aggravated by the amount of unintentional destruction resulting from construction; caves and archeological sites are both affected by urban sprawl and burgeoning economic and population growth. Recent passage of the Archeological Conservation Act of 1974 (Public Law 93-291) has greatly increased the funding available to archeologists for the recovery of information from endangered sites. Under the provisions of this bill, federal agencies initiating construction projects that endanger archeological resources are authorized to expend project monies to provide for the effective mitigation of the damage. The impact of this bill is producing profound changes in the archeological profession in the United States, and creating increasing opportunities for interdisciplinary research.

Another area of common concern to both archeologists and speleologists focuses on the publication of site locations. Recently, the National Speleological Society has been beset with an internal controversy concerning the publication of cave site locations (Medville, 1974; Rhodes, 1974; Stitt, 1974, p. 160). The argument centers on the possible use such information might be put to by various elements of the public. The NSS Board of Directors has recently gone on record as opposing the publication "of specific wild cave locations in publications intended for the general public except where such publication serves the better interest of the Society" (Rea, 1974, p. 204). While accurate information on the effect of publication on cave resources is currently not available, some evidence exists for an increase in vandalism and cave accidents (Wilson, 1974; Medville, 1974, p. 10; Schmidt, 1965,

p. 86).

Archeologists face a similar problem in reporting the results of their research. The inclusion of exact site locations in reports that reach a broad audience virtually ensures subsequent vandalism in many parts of the country. Archeology's problem in this regard differs in magnitude from that before the speleological community for two reasons. First, while there are probably no more than four or five thousand avocational cavers in the United States (based on NSS membership), there are approximately 25,000 avocational members in archeological societies (Hester Davis, personal communication). These figures do not include the great numbers of occasional cavers or casual relic collectors who may never join an avocational organization. These casual collectors are archeology's personal dilemma: while it is probable that few people can resist picking up an arrowhead they might find, only someone with special equipment and a certain bent of mind is likely to venture into a cave. No formal publication policy exists within the archeological community, although statements urging caution and discretion in reporting site locations have been made (McGimsey, 1972, p. 12).

In recent years, archeologists have become increasingly concerned with the preservation of their resource base. Much of this concern is directly related to the amount of archeological site destruction that has occurred in modern times. Excavation is increasingly becoming a "last-resort" mechanism, to be undertaken when all other preservation efforts have been exhausted (Lipe, 1974; Canouts, 1975) (Fig. 4). Where destruction is not imminent, portions of a site may be deliberately left unexcavated, so that future generations of archeologists, armed with better techniques and methods, might profitably investigate the deposits. At the Combe-Grenal rock shelter mentioned earlier, for example, this



Fig. 4 The Edgemont shelter (3BR6), a prehistoric occupation site in the Arkansas Ozarks. While archeologists rarely completely excavate such sites, their extreme visibility often attracts vandals who may churn through deposits looking for mantlepiece specimens. (Courtesy, University of Arkansas Museum)

policy has been pursued (Bordes, 1972).

Archeologists and speleologists can and should cooperate in the protection of their mutual resource base. The vandalism of archeological remains in cave sites is a problem that can be faced by both communities. Pleas for responsible action regarding archeological remains found in caves have been made by a number of archeologists in recent years (Brothwell, 1965; Vinnicombe, 1966; Grady, 1972, 1975). Recognition of the significance of historic and prehistoric archeological remains in cave sites appears to be growing among serious avocational cavers (Schmidt, 1965; Strong, 1975, p. 146). The destruction of archeological remains in cave sites is nevertheless a problem, and not one restricted to the United States. Examples of deliberate vandalism have been reported from France (Bordes, 1972), South Africa (Vinnicombe, 1966), and Venezuela (Cruxent, 1944), to give but a few examples.

Federal Legislation Relevant to the Protection of Archeological Cave Sites

In the United States, an impressive amount of federal legislation is in existence that directly pertains to archeological resources. Properly applied, this legislation can benefit both archeology and speleology. Specific federal legislation that can be relevant to both speleologists and archeologists include the Antiquities Act of 1906 (PL 59-209), the Historic Sites Act of 1935 (PL 74-292), the Historic Preservation Act of 1966 (PL 89-665), the National Environmental Policy Act of 1969 (PL 91-190), Executive Order 11593 "Protection and Enhancement of the Cultural Environment," and the Archeological Conservation Act of 1974 (PL 93-291). Grady (1975) has briefly noted the significance of some of these measures to the preservation and protection of cave-based archeological resources and has observed that they might be advantageously utilized to further general conservation goals. The present paper will explicitly detail some of the mechanisms within these laws that can be applied to the conservation and preservation of archeological and speleological resources in the United States.

The Antiquities Act of 1906

The Antiquities Act of 1906 provides for criminal sanctions—a fine of up to \$500.00 and a jail sentence of up to 90 days—for "any person who shall appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States" (Sec. 1). In addition to affording a measure of protection to archeological resources found in caves on federal lands, this section has also come to apply to paleontological remains (McGimsey, 1972, p. 111). Thus caves containing fossilized animal remains (e.g., Hawksley, *et al.*, 1973; Ray, 1967), if located on federally owned or controlled property, would be subject to this measure of protection.

The Historic Sites Act of 1935

The Historic Sites Act of 1935 established as a national policy the preservation, for the public benefit, of historic and archeological sites, buildings, and objects of national significance. Under the provisions of this bill, a register of sites of national significance was established, and the National Historic Landmarks system established. Both served to indicate sites worthy of preservation.

The Historic Preservation Act of 1966 and Executive Order 11593

The Historic Preservation Act of 1966 established a greatly expanded National Register of Historic Places, including provisions

for the inclusion of sites significant to state, local, regional or national history, architecture, archeology, or culture. Placement of a site on the National Register affords it some measure of protection. Should any federally-funded project endanger that site, a formal review process must be undertaken, in which alternative policies must be considered. The Advisory Council on Historic Preservation reviews the situation, and makes recommendations for the resolution of the construction impact. While the Advisory Council's recommendations are merely advisory, without the authority of law, they have considerable weight.

Part of the measure of authority reinforcing the Advisory Council's recommendations stems from a recent Executive Order. Under Executive Order 11593, federal agencies are directly charged with the preservation of cultural properties both under their control and on nonfederally owned lands which their projects affect. A federal executive order carries virtually the weight of law with federal agencies; to disagree with an Advisory Council ruling would therefore go against both the spirit of the Historic Preservation Act and the Executive Order.

A great many cave sites in the United States contain archeological or historical remains of such significance as to warrant inclusion on the National Register. In addition to caves with prehistoric archeological sites in them, caves with saltpetre mining remains (Jackson, 1949; Faust, 1955) or unusual historical inscriptions, such as the records of Civil War soldiers found on cave walls in Virginia (Davies, 1955, pp. 136-137) or Alabama (Torode, 1973), may also be eligible for inclusion on the Register. Once on the Register, these sites are afforded a measure of protection, at least from federally-funded destruction. Furthermore, the Historic Preservation Act provides for a program of matching funds for the preservation, for the public benefit, of sites on the National Register.

Information on implementation procedures for the nomination of sites to the National Register may be obtained from any of the members of the Committee on Public Archeology (Appendix I) or from the State Historic Preservation Officer for each state. Guidelines for the nomination of sites to the National Register, and a detailed description of the formal review procedure for endangered sites, are to be found in the Federal Register for 25 January 1974 (Garvey, 1974).

The National Environmental Policy Act of 1969

Under the National Environmental Policy Act of 1969, any federal agency contemplating a project that may significantly affect the environment must prepare, prior to initiating construction, an Environmental Impact Statement describing the impact of the project on the environment, alternatives to this project, irreversible effects, short-term versus long-term effects, and recommendations for the mitigation of these effects. Both archeological and speleological resources must be considered under this legislation. Recent recognition of this fact has been publicized by the speleological community (Stitt, 1974, p. 160). Guidelines, delimiting what must legally be contained in an Environmental Impact Statement, are to be found in the Federal Register for 1 August 1973 (Train, 1973).

The Archeological and Historic Conservation Act of 1974

With the passage of the Archeological and Historic Conservation Act of 1974 (PL 93-291), archeologists find themselves faced with research opportunities undreamed of only a few years earlier. The increased level of funding the act provides will enable the profession to carry out a wide range of interdisciplinary research projects in the years ahead. Increased contact with specialists in other disciplines,

including those in speleologically-related disciplines, will result. Opportunities for interaction will increase, and members of several disciplines will almost certainly find it advantageous to promote mutual research and conservation goals. Archeologists are prepared to join forces with other groups towards the advancement of conservation measures (e.g., Lipe, 1974), and they have an effective battery of legislative support to enlist in this activity.

Public Education and Involvement

While legislation can provide a partial solution to the problems before both archeology and speleology, it can only provide a partial solution. Archeology and speleology have large publics: relatively small coteries of professionals and serious avocational members, and a much larger body of interested but largely uninformed citizens. It is primarily through programs of public education that effective measures of protection and conservation can be achieved. The public needs to be aware of the concept of "nonrenewable resources" as it applies to archeological remains, speleothems, endangered species, and so on. The value of these items, both as sources of scientific information and as parts of a unique and rapidly vanishing cultural and natural heritage needs to be stressed. Within archeology, the Committee on Public Archeology serves as a primary liaison body for dealing with the public (Appendix I).

One of the best ways to ensure public acceptance for the preservation of archeological and speleological remains is to stress their value intelligently and intelligibly. Abstruse theoretical appeals, or overly detailed compendiums of jargon and trivia, serve more to enervate than to educate. Appeals directed to the public must be in a language the public understands (MacLeod, 1975). A discussion of the value of archeological resources directed towards geologists or speleologists will be somewhat different from an appeal to a group of Boy Scouts or high school students.

Avocational groups can be channeled towards the protection of resources—citizens in British Columbia monitor archeological sites and report incidents of vandalism to responsible authorities (Russell, 1975). A similar program is being developed in Arkansas—the concept of "archeological site stewards" (Schambach, 1975). Avocational members can serve as environmental "gadflies" (Lipe, 1974), lobbying for relevant federal legislation, media coverage, or by becoming involved in the political maneuvering associated with major construction projects to advance environmental concerns. Finally, through effective training avocational members can be valuable sources of assistance in both speleological and archeological research.

The Discovery of Archeological Deposits in Caves: Procedures for Effective Investigation

In the course of any form of speleological activity, if archeological or paleontological remains are encountered, a number of steps should be followed. The most important is to leave the remains exactly as they are, and to try not to disturb the surrounding environment (Fig. 5). Carbon samples can be easily contaminated, throwing off a C-14 determination. A breath of fresh air in the wrong spot can cover an ancient object with modern pollen. A responsible archeologist should be contacted, particularly if the possibility of vandalism is likely. If contact with a member of the Committee on Public Archeology (Appendix I) is difficult or impossible, responsible archeologists may usually be found on



Fig. 5. Hafted deer mandible sickle, *in situ*, Putman bluff shelter (3WA4), Arkansas. An example of extremely rare and informative preservation; such remains are often quite fragile. (Courtesy, University of Arkansas Museum)

university or college faculties. Failing in this, government officials of the National Park Service or the Forest Service should be contacted. If the site is located on federal grounds both government and professional personnel should be contacted.

An additional procedure to follow is to be discrete in discussing the discovery, particularly if it is or appears important. Publication of an archeological find, without contacting a responsible authority, may only ensure the destruction of the remains. If for some reason archeological investigation is not immediately forthcoming, the information can be filed with archeological or governmental authorities, and with the NSS. The NSS cave files include a provision for the filing of "sensitive" data (Medville and Medville, 1974, p. 65). Data so labelled will not be released except with the permission of the contributor.

Archeologists are overworked in many areas of the country now, partially as a result of recent legislation. Furthermore, in many areas the nearest archeologist may be a hundred miles away or more. Unless the remains are directly and immediately threatened with destruction, however, do not attempt to remove them or enlist the aid of "amateur" archeologists to "salvage" the data. A few days or months additional waiting is likely to matter little if the remains have been there for centuries. The Cave Research Foundation in the United States operated for a number of years in the Mammoth Cave National Park without disturbing the archeological remains they encountered within a number of cave sites. Archeological investigations that were ultimately undertaken in these caves directly benefitted from this conservation attitude (Watson, 1974).

This paper has attempted to explore some of the similarities that exist between archeology and speleological research in general. Through cooperation in research and by advocating strong and effective conservation policies, the goals of both communities may be advanced. The increased education—of members inside as well as outside of the speleological and archeological communities—can facilitate these ends.

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