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The Importance of Small, Surface, and Disturbed Sites as Sources of Significant Archeological Data

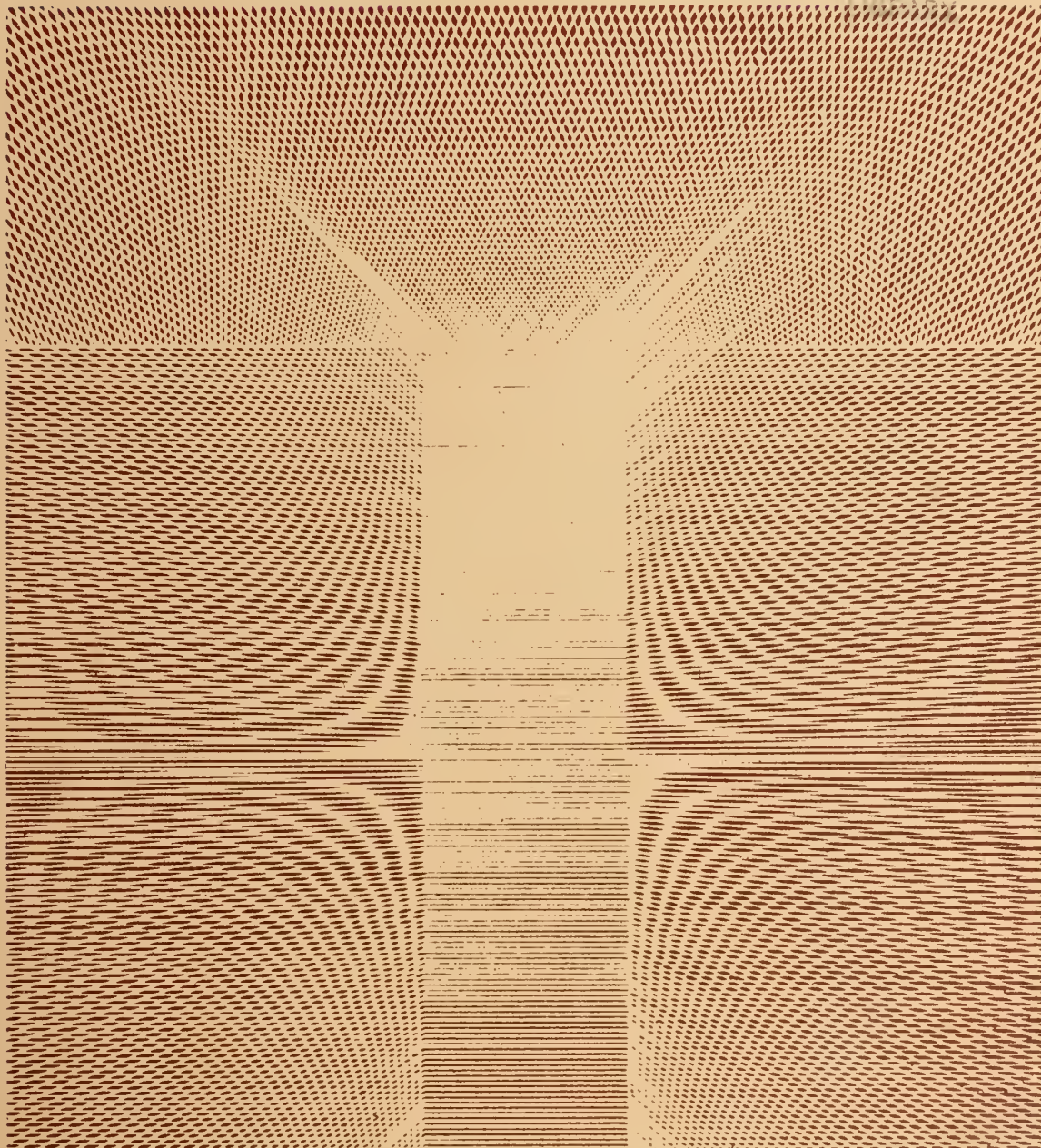
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Cultural Resource Management Studies

THE IMPORTANCE OF SMALL, SURFACE, AND DISTURBED SITES
AS SOURCES OF SIGNIFICANT ARCHEOLOGICAL DATA

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Services

National Park Service
U.S. Department of the Interior
Washington

1977



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Foreword

This small volume is part of the continuing effort of the Interagency Archeological Services Division to prepare and disseminate information useful for cultural resource management. We are attempting here to shed light on a chronic problem faced by public officials who need to make, or understand, decisions about the disposition of archeological sites. Small, surface, or disturbed sites are commonly thought by the public to be of little value for producing important archeological information. Consequently, archeological recommendations for data recovery from such sites, or even mere evaluations that significant data are thought to be present, often elicit feelings that are less than enthusiastic.

In order for archeology to explore the full dimensions of past human experience, we must develop and nurture the clear vision to see our data wherever they exist. The fact is that small, surface, and disturbed sites often are significant and frequently do contain important data. The report that follows attempts to describe what some of these data are and to offer examples of how they have been discovered, studied, and utilized by archeologists.

The conclusion is inescapable that all archeological sites, including small, surface, and disturbed sites, should be approached with care and be treated as potentially significant sources of information until proper assessments can be made. It is not acceptable to decide, independent of other facts, that small, surface, or disturbed sites should be given little or no consideration in mitigation decisions. On the other hand, it is also the case that, more often than not, these classes of sites are more amenable than others to satisfactory treatment in accordance with Advisory Council on Historic Preservation's Guidelines for No Adverse Effect Determinations.

Other topics are in preparation for this series on a wide range of archeological subjects. Any comments on the series, on specific reports, or on suggestions about topics that should be presented, are welcome.

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THE IMPORTANCE OF SMALL, SURFACE, AND DISTURBED SITES AS SOURCES OF SIGNIFICANT ARCHEOLOGICAL DATA

ABSTRACT

Federal agencies are occasionally advised by archeologists, or assume on their own, that small, surface and/or disturbed sites are of limited value to the study of prehistory. As a result, these types of cultural resources frequently have been ignored in the development of local and regional archeological research designs. This paper shows that such sites often yield significant information relating to a variety of prehistoric activities. Techniques exist for recovery of important data in these sites pertaining to settlement patterns, activity loci, demographic parameters, site utilization, etc.

INTRODUCTION

Archeologists have traditionally preferred to work on large, undisturbed sites of long-term, intensive occupation. By ignoring small, surface or disturbed sites which are generally characteristic of short-term occupations and limited ranges of activities, archeologists have disregarded a considerable amount of prehistoric data. In those areas where large, deeply-stratified sites do not exist, or in other areas where these kinds of resources exist along with surface and/or plowzone deposits, the small-site resources should be systematically recorded and studied, or else an entire component of the archeological record will be lost.

Small site investigations are particularly necessary in settlement pattern studies where the configuration of the full range of archeological data must be sampled in order to obtain a viable base to make inferences relevant to prehistoric procurement activities, socio-political systems, culture contacts and demographic patterns. Also, since small sites often represent "instant" archeological time (Moseley and Mackey 1972) where assemblages are short-lived, un-mixed and "ethnically pure," investigation of small, limited-activity sites should be helpful in establishing artifact distributions unclouded by the complexities of larger sites. After the nature of artifact distributions for specialized activities is delineated, significant patterns of association can be fed back to studies on larger sites.

METHODOLOGICAL APPROACHES TO SMALL AND/OR DISTURBED SITES

Investigation of small sites usually presents methodological problems in both fieldwork and analysis of data. Since most sites are shallow and on or near the surface, they are particularly sensitive to disturbances from both natural and cultural phenomena. Hayden (1965) has pointed out that these type sites are characteristically "fragile"; the value of the remains often rests in the spatial pattern of the artifacts which is disturbed and broken by pot-hunting, erosion, agricultural activity and construction.

However, recent investigations of small and/or disturbed sites (cf. Binford 1970; Leeds 1974; McManamon 1976; Robertson 1976; Roper 1976) indicate that destruction due to disturbances is often not as great as superficial examinations might indicate, and important data can be obtained from careful field examination of the disturbed remains.

A theoretical framework useful for approaching the study of disturbed sites is Michael Schiffer's recent work on archeological and systemic contexts (Schiffer 1972, 1976; Schiffer and Rathje 1973). Although the assumption that spatial patterns of artifact remains reflect past activities is almost an axiom in archeological theory, in reality, this assumption is much too simplistic as a general guide to interpretation of archeological data. Schiffer suggests investigating the formation processes involved in deposition of the archeological record and discussing how both the cultural and natural deposition processes affect the pattern of material remains. In order to fully account for the deposition of artifacts, both the systemic (the condition of the element in the behaviorial system) and the archeological (the element at rest) contexts must be delineated. Thus, Schiffer points out that the archeological record is the result of the interaction of extremely complex phenomena and is not simply the residue of past activities.

Although the processes are complex, modern cultural disturbances such as pot-hunting and plowing, or natural phenomena like flooding and drifting which disturb sites are only additional variables which must be studied while doing field archeology; disturbance to sites does not necessarily preclude investigation of the archeological resources once the regularities of the disturbance are defined.

This paper is a review of the literature concerning two types of archeological resources: (1) small, shallow, unobtrusive sites which may or may not be intact, and (2) sites, large and small, which have been disturbed by agricultural activities, pot-hunting or other destructive forces. Both these types of sites have often been considered valueless and frequently have been ignored by archeologists. Only in rare cases when a particular site has demonstrated an unusual degree of distinctiveness and uniqueness by virtue of its artifact content or temporal circumstances (e.g., Paleo-Indian sites) has work other than survey been recommended. Usually small and disturbed sites are simply noted in a regional survey, and since they are deemed valueless, are subject to destruction with no mitigating action taken. The plowzone in stratified sites is often removed without any controlled data collection since such data is viewed as useless for further interpretation.

This paper reviews specific instances in which surface and/or disturbed sites have been actually investigated, with special focus on the methods which have been used to study these sites, and the types of information which excavators have been able to retrieve from this kind of data base. The first part of the paper, then, will be devoted to a general discussion and evaluation summary of the methodology which has been developed to deal with shallow, disturbed sites. The second section will consist of a review of specific examples of disturbed site investigation.

DETERMINATION OF THE NATURE AND EXTENT OF SITE DISTURBANCES

Profitable investigation of small, surface sites is dependent upon determination of the nature and extent of disturbances which have altered the depositional record and obscured relationships among material remains resulting from normal, systematic processes of discard, burial or loss. Methods used to determine the nature of disturbance ordinarily include discussions with owners, tenants, local collectors, contractors, geologists, soil scientists, and other specialists, as well as library research and field observation.

Natural Processes of Erosion

Processes of erosion which have affected the archeological resources must be clearly outlined. Artifacts subjected to wind and water erosion, slope displacement, soilcreep, wave action, and flooding will be moved from their original depositional

clusters. Recent studies have shown that, in some cases, the post-disturbance spatial distribution of the eroded remains indicates both the process involved in the redeposition and suggests reconstruction of the original configuration (cf. Reid, Schiffer, and Neff 1975; Rick 1976).

Agricultural Disturbances

Disturbances to archeological sites due to agricultural activity also exhibit regularities which can be outlined and used in the reconstruction of the original deposition record. Information on the number of years of plowing, depth of the plow, type of crop planted, manner of clearing the field, type of equipment used in clearing and plowing, erosion due to agriculture, land remodeling, and leveling, etc. is revealing when one is trying to sort out patterns in artifact remains due to past behavioral systems from patterns which are the result of modern cultural behavior.

Agricultural practices vary from region to region and even from field to field, but consistencies in their effects on archeological resources should be able to be worked out in specific instances. Medford assessed the site destruction due to agricultural practices in northeast Arkansas (Medford 1972) and found that in the first two to five years after clearing, fields were plowed shallowly, to a depth of only four inches. Deep cultivation (8") and changeover to row crops led to increased erosion and more site destruction. The next logical step was precision land leveling, which is dramatic and extensive in its damage to archeological resources as it involves grading the area until there is a grade of between 0.1 to 0.3 feet per 100 feet.

Besides the length of time a field has been under cultivation, the type of equipment used is also an important factor in assessing damage to archeological resources. Robertson (1976) studied agricultural practices in Virginia and Maryland and found that the normal type of plow used was a moldboard plow which cut through the soil, sliced it, spiraled it upward, turned the soil 90-180 degrees and produced a furrow. However, in some fields where the soil was "sticky," the normal type of plow was a disk plow which cut less deeply into the surface than the moldboard and thus affected archeological sites less. Other factors important in assessing the amount of disturbance were the speed of the plow (the faster the plowing, the more the earth was disturbed), and the soil itself (the moister the soil, the more adhesion

and less movement; the sandier the soil, the greater the disturbance). Despite the disturbance to archeological resources resulting from agricultural activities, several field investigations which carefully evaluate the patterns and spatial distributions of highly disarranged sites have been able to successfully account for much of the agricultural disturbance and explicate the original character of the archeological deposition (cf. Binford et al 1970; Fowler 1969; Leeds 1974; Roper 1976; Sterud, McManamon and Rose n.d.; McManamon 1976). Sterud et al (n.d.) sum up this philosophy by suggesting "...that the archaeologist, equipped with the knowledge that a superficial plough zone may indeed contain data relevant to some of our current research interests, investigate such areas with appropriately sensitive excavation and analytical procedures before writing off this segment of the past" (p. 13).

Human Interference

Sites which have been pot-hunted and collected by amateurs are likewise not hopelessly lost to professional archeological interpretation. Schiffer (1976) points out that pot-hunters exhibit certain regularities in behavior such as consistencies in the types of artifacts picked up, the locations of sites hunted, and the methods used to determine locations and collect specimens. Also, local collectors are sometimes helpful to professionals working in the area by supplying information and allowing their collections to be examined. By studying consistencies in pot-hunting processes, archeologists should be able to account for the loss of selected artifacts from the assemblage remaining on the disturbed site, and thus reconstruct the original configuration of artifact clusters.

Archeologists who work in sites of disturbed context must be ready to investigate aspects of modern behaviorial systems in trying to account for disturbance and loss of archeological material. Given the present rate of destruction of archeological resources (for example, Medford (1972) predicts the "absolute destruction of all prehistoric sites in northeast Arkansas is soon to become a fact, possibly within as little as ten years"), archeologists must be willing to study the effects of disturbance on resources or must resign themselves to the cessation of archeological field work since no intact pristine resources will remain.

RESEARCH DESIGNS AND FIELDWORK STRATEGIES

The actual fieldwork involved in investigating archeological resources in disturbed contexts presents some methodological challenges to the researcher. Several suggestions for profitable fieldwork have been outlined in the literature. Research in different areas obviously demands different techniques (e.g. survey plans devised for desert regions may not be economically or pragmatically feasible for heavily wooded areas), but some of the general aspects of field methods will be universally applicable. Most techniques which have been developed fit into the general outline of multi-stage investigations described by Redman (1973).

Initial Reconnaissance

When working in disturbed contexts the initial reconnaissance of the area is extremely important, and may be more comprehensive than for investigations of intact sites, since the original deposition patterns must be recreated. Thus, discussions with owners (past and present) to discover the land modifications which have occurred during their ownership are extremely revealing.

In addition to talking with concerned people, library research, especially close examination of references to the area prior to disturbance, are invaluable when trying to interpret field data and reconstruct aboriginal deposition processes (cf. Leeds 1974; Roper 1976). A large scale and inclusive reconnaissance before an extensive field investigation not only saves time by not duplicating previous work, but helps indicate target areas and preliminary patterns of spatial distribution of artifacts which may need further investigation.

Systematic Regional Survey

An integral component in research designs emphasizing regional prehistoric behavioral patterns is a systematic regional survey. Almost all archeologists who have conducted regional surveys in areas with small sites have recommended a "non-site sampling" methodological orientation in which artifacts rather than sites are the smallest unit of research (Dancey 1974; Thomas 1975; Bettinger 1976). Dancey refers to this type of regional survey which emphasizes small surface clusters of artifacts as a "re-oriented" survey in order to distinguish it from more traditional intuitive approaches essentially unchanged since the 19th century; Thomas calls it "Easter egg hunting" since separate artifacts and features rather than sites are the minimal units of study.

In a re-oriented survey, the problem of considering some sites as valueless because of their small size or insignificance disappears since artifact clusters and not sites are being investigated. Dancey (1974) outlines a series of rules governing the methodology of a re-oriented survey: (1) inspect the surface for artifacts, not sites; (2) systematically sample the environmental diversity of the survey area; (3) work within defined units; (4) cover the ground in a patterned course; and (5) record exact location.

By sampling tracts throughout the entire biotic diversity of a region, small, specialized activity sites which are normally not located or researched and which can add invaluable insights into the archeological record, can be identified. For example, Bettinger (1976) was able to pinpoint the emergence of pinyon exploitation in Owens Valley, California and to suggest possible reasons for initiation of this activity by the data recovered from an adequate survey of the scattered surface remains. Similarly, Dancey (1974) located a preponderance of projectile points in a saddle-like depression of the Priest Rapids area, Washington; he identified the cluster as an area of cross-fire where game was driven and channeled into gulleys. Since this area is considered inhospitable for human occupation, the site would probably not have been located in a traditional survey; yet, the site is a clear indication of an important prehistoric subsistence activity. Systematic regional surveys which emphasize artifacts and artifact clusters, and which disregard criteria such as size and apparent significance of sites, help clarify aboriginal subsistence and procurement activities, thereby demonstrating the importance of small surface sites in archeological explanation.

After a regional survey is complete and the spatial distribution of artifact clusters is analyzed, decisions on where to conduct further investigations can be made; although the decisions will be grounded in the research orientation of the investigator, they should be based on the relative degrees of destruction and disturbance of particular sites. As long as the cause and pattern of disturbance can be outlined, the archeologist can add disturbance variables into interpretation of the remaining distribution of artifacts.

Field Techniques

Three basic field techniques have been developed for intrasite investigation of shallow or disturbed remains: (1) intensive, systematic surface collection (Hayden

1965; Binford et al 1970; Redman and Watson 1970; Davis 1973; Clark 1976; Roper 1976) with some variations of this theme developed in Chomko (1974), Fisher (1974), Clark (1976) and McManamon (1976); (2) aerial photography (Fowler 1969; Leeds 1974); and (3) excavation (Binford et al 1970; Redman and Watson 1970; Aten n.d.; Dillehay 1973; Butler 1974; Hartley 1975; Knoerl 1976; Roper 1976). Whether the site has been disturbed or not, field methodology has been developed for specific goals: either to (1) determine the meaning of spatial distributions of artifacts and features; (2) determine techniques of tool manufacturing; (3) determine chronological placement of the artifacts; or (4) determine the amount of correspondence between surface and subsurface remains, both in spatial distribution of artifacts, and item-to-item presence and frequency.

1) Systematic Surface Collections

The usual field plan for investigating plowed sites is to replot the field to redistribute artifacts evenly in the plowzone; Al Dekin (personal communication) recommends also disking the field as this will break up clumps of earth and further aid in distributing the artifacts. After plowing, surface collection should await rain so that the soil will be washed down and artifacts will come to the surface. Then, intensive collection should be implemented; if the site is small enough, it should be gridded and collected in its entirety. However, the areas investigated are usually too large to "vacuum" collect the whole site, and systematic sampling is recommended.

The most popular sampling procedure developed to date is the stratified unaligned random sample; although, most investigators supplement this statistically valid technique with a "judgmental" sample. Because of the impracticalities and expenses of using a stratified unaligned sampling procedure in certain areas, some investigators have suggested alternative methods to cope with special problems. Chomko (1974) recommends "flagging" the artifacts before deciding where to collect; Fisher (1975) suggests that in areas where artifacts are distributed widely but sparsely, selective collection of the entire field is more profitable than sampling strategies; Dekin (personal communication) suggests that plowing the field only in the tracts to be sampled is more economical than plowing the entire field.

McManamon (1976) stresses the importance of using a multi-phase sampling design to systematically investigate the surface distribution of cultural materials. In the initial stage, the field is placed within a grid system and sampled via the unaligned random sampling procedure. After locating separate loci, several locations within the total area but which have not yet been sampled, are examined. Lastly, the areas of discovered loci are enlarged (Sterud 1975, in McManamon 1976: 4). This approach enabled McManamon to determine the distribution of plowzone materials and variations in this distribution, and to delimit the site area, thereby revealing that "although the context of the site has been disturbed by years of plowing, the artifacts have not become randomly distributed in the plowzone" (p. 7). Indeed in his paper, McManamon demonstrates that a good deal of information about activities of past populations can be extracted from sites disturbed by many years of plowing (p. 28).

Clark (1976), on the other hand, claims that by employing the exact provenience method of controlled surface collection over a period of three years, he was able to obtain a more complete and representative sample of total artifact inventory in the plowzone and on undisturbed surface areas of two sites (18Ba106; 18Ba112). The results led him to conclude that "controlled surface collections can obtain comparative data which would otherwise require complete screening of the entire plowzone of a site; a procedure which is not always feasible or practical" (p. 229).

After studying the spatial distribution clarified in analysis of the systematic collection and accounting for the displacement of artifacts due to disturbance and erosion, more intensive collection or excavation can be conducted in "target" areas. Analysis of the spatial distribution of artifacts resulting from systematic surface collection enables the discovery of certain facts about the nature of the resources before excavation, and guides future work. For example, at Hatchery West (Binford et al 1970), analysis of the surface distribution of cultural items resulted in the definition of the boundaries of the site and three broad types of activity areas defined by the spatial distribution of artifacts and features: (1) mainly ceramic areas; (2) mixed ceramic and non-ceramic areas; and (3) mainly non-ceramic areas. Since the surface distribution of these gross categories was not isomorphic, the investigators concluded that the site was occupied at different times. Areas of the most intense and prolonged occupation were able to be distinguished. Field decisions on where to place control excavations were based on the observations of the nature of the spatial distribution of artifacts.

In a similar study of spatial distribution of features and cultural items, Chomko (1974) reports that by flagging and mapping surface artifacts, target areas could be determined quickly as activity and group areas became visible. After flagging, the boundaries of the site were determined; the "village" area was outlined; two small, almost destroyed mounds were located; and, an area of ceramic concentration was observed. From this information, future work was guided in an economically and archeologically profitable manner.

Most investigations of the nature of the surface of sites have demonstrated a considerable degree of correspondence between surface to subsurface remains (cf. Binford et al 1970; Redman and Watson 1970; Baker and Schiffer 1975; Knoerl 1976; Roper 1976). However, Reid, Schiffer, and Neff (1975) warn that surface/sub-surface correspondence at the Joint Site in Arizona was evident only after the effects of wind erosion were accounted for. In Maryland, Robertson (1976) experimented with placing bricks one inch beneath the surface prior to plowing a site in order to study the displacement of bricks. Although her sample was small (only 18 bricks), the results of her experiment indicated rather more displacement than was expected based on other archeological data. Only 50% of the bricks were recovered in the surface collection, and the mean distance of movement was 8'11", ranging from as little as 30" to as much as 22'1". Apparently, the extent of disturbance to sites must be judged after assessing the special circumstances of each site.

2) Aerial Photography

The second method used with success when dealing with disturbed surface sites in intra-site analysis is aerial photography. Leeds (1974), studying the leveled Richard Woods Site in southeast Missouri, demonstrated that by an analysis of "easily obtained, cheap data" such as a ground level topographic survey, USDA Soil Conservation Service records, land owner information and standard cartographic and air photographic information, he was able to reconstruct mound formation on the site. Low altitude photos taken with a variety of emulsions and filters, picked up soil changes which, with the help of the previous literature and information search, enabled the reconstruction of the original configuration of features, even for the highly disturbed site. Similarly, Fowler (1969) was able to find evidence of small occupation areas and prehistoric garden plots by examining low level aerial photographs in Illinois.

3) Excavation

Excavation procedures adapted to small, shallow or plowzone sites, as well as the results obtained from these studies are both varied and fruitful. Analyses of the tool technologies and distributions of artifacts and subsurface features have yielded information pertaining to chronology, change over time, site utilization, activity loci, surface/subsurface correspondence, along with a host of other questions relating to prehistory and/or history. Since excavation procedures are often dependent upon the particular problems being addressed, as well as location, geography, and geology of each site, nature of the deposits, etc., the reader is referred directly to the Appendix: Case Studies (Section B) for a selection of excavation strategies utilized at disturbed or shallow sites.

CONCLUSION

One of the most frequent problems in traditional investigations of archeological resources has been the establishment of minimum criteria for value under which the information gained from investigation of a site would not be worth the return of time and investment. For instance, Glassow *et al* (n.d.) have suggested seven criteria for the evaluation of significance of individual archeological resources of an area: (1) habitat uniqueness vis-a-vis resources; (2) physical characteristics (i.e., spatial dimension, depositional complexity, component distinctiveness and spatial clustering of debris); (3) temporal distinctiveness; (4) kind and variety of aboriginal activities; (5) quality of preservation; (6) significance to the local public; and (7) significance to the regional research design.

There are many areas of the country where large, deeply-stratified sites simply do not exist, and other areas where such sites exist along with small, surface and/or plowzone sites. In these instances, an investigation of both types of cultural resources is crucial to understanding the settlement system and cultural adaptation of the locality or region. For example, in the semi-desert region of Priest Rapids, Washington, Dancey (1974) has been able to locate small, seemingly insignificant sites and to use such resources to reconstruct regional prehistoric subsistence activities and settlement patterns. Thus, all sites (large and small, deeply-stratified and shallow, undisturbed and disturbed) should be considered with respect to Glassow's criteria.

Careful examinations of small, surface, and plowzone sites (e.g. Witthoft 1952; Fowler 1969; Binford et al 1970; Chomko 1974; Leeds 1974; Healan 1975; Knoerl 1976; Roper 1976; McManamon 1976; Sterud et al, n.d.) have shown that although the archeological materials may have been exposed to natural elements or plowing, the destruction is not necessarily sufficient to remove artifacts from their functional clusters, and that areas of prehistoric activity may still be defined. It is no longer acceptable to conclude, as did Patterson and Ford (1974) that "due to disturbances and scattering of the archaeological remains by both land cultivators and current looting by relic hunters no controlled or reliable scientific data can be compiled on the sites" (p. 13); for it is possible to control for many kinds of disturbances (e.g. Schiffer 1976). In addition, the necessity to consider plowzone sites with the same degree of thoroughness with which one approaches all other archeological resources is exemplified by McManamon's (1976) study of sites in central New York in which he concludes that "it is absolutely essential that the collection of sites in plowzones be approached with more care" (p. 28). Cowgill (1975), in response to a suggestion by Asch (1975) that archeologists may consider discarding or stripping off material in the plowzone, also argues that "this layer, however disturbed, may contain unique information about the latest phase of occupation, and we surely risk gross errors by ignoring it altogether" (p. 273).

Research designs, therefore, must not a priori dismiss as insignificant or uninteresting, whole classes of archeological sites and data simply because they may be difficult to study or be unprepossessing in form. Surface and plowzone disturbance problems may now be adequately dealt with via a field methodology which includes comprehensive reconnaissance, systematic survey, intensive controlled surface collection, and methodical excavation. Original deposition clusters, even in highly disarrayed sites in fields which have been precision leveled, may be reconstructed. Disturbance of sites is just one more variable which must be carefully examined and considered when explaining the formation of the archeological record.

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The Hopper Site, 23B01-A, Missouri (Chomko 1974)

Site: The Hopper Site lies on a long, low ridge overlooking a creek. A plowed field covers only a portion of the site.

Methods: Investigation was limited to surface activity and was carried on by undergraduates from a class taught by Carl Chapman, at the University of Missouri. The purpose was to investigate spatial relationships representing activity areas, using a technique developed by Chapman. Flags (3"sq. polyethelene) were placed to mark the location of archeological surface material prior to its collection in order to aid in the determination of the spatial extent of the site and the delineation of activity areas within the site. Flagging readily defined activity areas so that subsequent collections had a bearing on the research design as opposed to following a stratified, unaligned procedure which is both time consuming and costly. Different colored flags marked off artifacts assumed to be associated with specific activities (such as butchering, food preparation, etc.); the flags indicated where this activity took place in processes of manufacture, use or discard. After the area was marked with flags, a grid system was established and the flags were mapped. Areas for controlled collection were then chosen with confidence. This method has the advantage of being quick, easy, and more accurate than "intuitive" processes; however, the rigorous statistical accuracy of stratified, unaligned sampling is lost.

Productivity: Flagging of the site enabled the determination of the boundaries of the site as well as three separate activity areas: (1) a village area; (2) two low-lying, almost destroyed mounds; and (3) an area of ceramic concentration. Analysis of the mapped flags pointed to target areas which needed further investigation and which were subsequently intensively collected.

Onesquethaw Creek region, Albany County, New York (Fisher 1974)

Site: Surface debris was scattered over ten acres of plowed fields in the Onesquethaw Creek region eight miles west of the Hudson River. Fisher needed to systematically

collect meaningful data from this area for study of prehistoric settlement patterns under the constraints of minimal time and minimal money.

Methods: Fisher tested two different methods for surface collection in plowed areas. First, he gridded a knoll into 10' x 10' squares. Following the stratified, unaligned sampling method recommended by Redman and Watson (1970), he collected a 10% sample. The results of this survey were poor as few artifacts, consisting only of chert debris and fire cracked rocks, were recovered. No datable materials were found. Fisher thought he might be able to identify three separate, small occupation areas on the knoll.

The second type of collection was developed to fit the situation where an area contains a small amount of material which is so widely distributed that total collection is impossible. This method involved walking the entire plowed field but collecting only selective artifacts, in this case emphasizing bifacially worked flints and ignoring debris and chips. Artifacts were located by compass readings to two known landmarks.

Productivity: Fisher felt selective collection was justifiable since no attempt to define the range of activities was projected, only their presence. Also, uncollected material was left on the ground for further study.

Hatchery West, Illinois (Binford et al 1970)

Site: Hatchery West is on the east bank of the Kaskaskia River, near Carlyle, Illinois on a broad second terrace which adjoins a hill of glacial till. The site was advantageously located near the conjunction of four biotic sub-climaxes, so that the inhabitants could have taken advantage of exploiting a variety of natural resources.

Methods: The site was investigated in hopes of studying spatial patterning of artifacts and determining the degree of correlation between surface finds and cultural features. Accordingly, the field in which the site lay was freshly plowed prior to surface investigation. After rains came to settle the soil and bring artifacts

to the surface, the entire area was gridded and a controlled surface collection ensued. Based on the results of the surface collection, block excavations through the plowzone were begun by hand to a depth of 45 inches. Once the sample from the control excavation was considered large enough to judge artifact density, etc., the plowzone was removed by machinery and the undisturbed portions of the site were excavated.

Productivity: Analysis of the spatial clustering of surface finds indicated target areas to continue intensive investigation. The surface investigation pointed to areas of the site which were used for different activities and areas of the site which were occupied in different time periods. The spatial complexity of the site was well defined even before excavation was begun.

Cayönu Site, Turkey (Redman and Watson 1970)

Site: Cayönu is a site in Turkey with two mounds. Redman and Watson investigated the area specifically to establish what relationship existed between the surface and subsurface archeological remains in general, as well as to analyze demographic patterns in this area of Turkey. The site had been cultivated for many years but apparently had not been subjected to mechanized farming.

Methods: The study at Cayönu involved a 10% stratified unaligned surface collection of both mounds. The range and variation of the debris, and distribution patterns were studied. Excavation of key areas to test the degree of isomorphism followed.

Productivity: Redman and Watson claim that the collection from the first 50 cm. of excavation was almost identical to the surface collection. This study has become a keystone in investigating the disturbed surfaces of sites. However, the near perfection of the results of this surface/subsurface correlation has not been duplicated in most archeological investigations in the United States; and, many archeologists feel that the special circumstances of working on a tell in Turkey (e.g. a semi-desert region with no mechanized farming) preclude enthusiastically delving into plowed U.S. sites and expecting such nice results.

Beckwith's Fort, Missouri (Healan 1972)

Site: Beckwith's Fort is on the east side of Pinhook Ridge, a natural levee flanking a cutoff of the Mississippi River; the area is now a state park and named Towasahgy.

Traces of the fort are still visible in aerial photographs and the remnants of seven mounds inside the fortification boundaries are visible from a ground survey. The site had been plowed. Beckwith's Fort is a fortified ceremonial center dating to the Mississippian period.

Methods: Healan investigated the site to develop a method for locating and defining functional areas using only surface data. Accordingly, he followed the methodology outlined in Redman and Watson (1970) on conducting controlled, surface collection and factor analysis of the large amount of data recovered. He also used sub-type units of ceramic description (attributes) for intra-site comparison. A preliminary reconnaissance showed that the area outside the fortification was only sparsely distributed with artifacts (only 24 pieces in a 300 yard wide survey), so work was concentrated inside the boundaries of the fort. A 50' square was the basic unit of collection.

Productivity: Three kinds of mounds were distinguished from analysis of the surface debris: (1) large pyramidal mounds located at the ends of the plaza and without surface material; (2) low, domed mounds along the west side of the plaza with large amounts of debris, and (3) large conical mounds with large amounts of debris on the east side of the plaza. Factor analysis of pottery attributes led to the delineation of several functional activity areas, especially related to a rectangular configuration of house sites around the plaza complex. Within this rectangular pattern, there was an assemblage of polished vessel remains of fine shell temper, which were functionally distinctive from the rest of the configuration. Healan concludes that Beckwith's Fort was primarily a ceremonial or administrative center even though it housed adequate space for a large population. The complex was made up of one large plaza and at least six mounds. Along the perimeter of the plaza, a series of structures (probably of politico-religious function) were situated both on top and between the mounds. Some of these structures were functionally distinct, as, for example, the remains of the structure on top of Mound A, opposite the main temple mound which may have had a paramount function (e.g. headquarters of the head priest). Healan's entire analysis is based solely on surface finds in a disturbed context. He recommends further excavation in order to test the functional hypotheses he has suggested from analysis of the surface material.

The Newtown Neck Site, 18St17, Maryland (Robertson 1976)

Site: The Newtown Neck Site is on a low-lying flat near St. Clements Bay and the Potomac River. The site consists of a series of shell fields, mixed by plowing.

Methods: Robertson's investigation of the site followed two parts:

- (1) examination of the spatial distribution of artifacts on the site; and
- (2) experimentation with measuring the effect of plowing on bricks planted at the site.

- (1) A grid was laid over the site in five feet squares. Two different techniques were used in collecting material: (a) a "vacuum" technique in which any visible hard object was collected; and (b) a "partial" technique in which only artifacts were collected. An initial collection was made in this manner before plowing, and then the field was collected after plowing (the field was disked two times and harrowed). Artifact clusters from each sample were compared. In general, more information and a larger sample was obtained from the first group of materials. Although there was not a direct one-to-one correlation, each collection produced the same basic types of data.
- (2) Numbered halved bricks were planted one inch under the surface in every other row prior to plowing. Each brick was placed near the center of its respective grid square and the exact location was mapped. After plowing, the pieces which surfaced were re-mapped and the distance moved was measured.

Productivity: From the results of the brick experiment, it seems that plowing disturbs artifacts more than had previously been expected based on prior archeological investigations of plowed sites. The average distance of displacement was 8'11"; the modal distance (the most frequent) was 5' or 5'2"; the smallest distance moved was only 30" but the longest displacement was 22'1". Only 50% (9 out of 18) of the bricks resurfaced after plowing. Although the sample is small, the results are characterized by confusion and disparity in how individual pieces will be disturbed by the plow. However, the results from the first set of collections where plowing had relatively little effect on the spatial distribution of remains, contradicts the experimental results. Robertson concluded: "it would seem possible that, even though artifacts are scattered by plowing and even though they are scattered for unequal distances and in different directions, still the effect may

be minimal. It may be small enough that the 'clusters' are still apparent, especially when an overview of a large area is involved, such as the Newtown Neck Site" (p. 229). The amount of disturbance to archeological sites resulting from agricultural activities will depend on such variables as the number of passes of the plow, the slope of the surface, resistivity of the soil, and size of the artifacts.

Loder Cornfield Site, New York (Knoerl 1976)

Site: The Loder Cornfield Site is located in the Cobleskill Creek Valley of Schoharie County, New York. Knoerl investigated this area with an orientation to account for Woodland village movement. The site is in the right of way along I-88, and had been cultivated.

Methods: Knoerl followed multi-stage techniques recommended by Redman. He conducted an intensive controlled surface survey which was systematic, stratified, and unaligned. A 500 x 100 m. grid was laid along the right of way from which 125 units (500 sq. m. or 1%) were sampled. Collections consisted of (1) all natural flint; (2) prehistoric chipped stone; and (3) historic material. Surface distributions were subsequently analyzed, and test excavations to below the plowzone were conducted in 8.4% of the sampled surface area.

Productivity: Analysis of the distribution of field flint followed geological expectations; this distribution was, therefore, used as a control against which the distribution of the cultural material was compared. Three density areas of prehistoric chipped flint were defined. Some congruency between distribution patterns was found between the surface and subsurface. Knoerl indicates that "although the plow moves material horizontally in space, it does not destroy the integrity of the site as a whole" (Knoerl 1976: 4-21).

Airport Site, Springfield, Illinois (Roper 1976)

Site: The Airport Site is a shallow Late Archaic mortuary site which has been badly disturbed by plowing for 20 to 30 years.

Methods: Roper does not explicitly explain the methods used to collect the site except to say that the area was gridded into three m. squares. Five bifaces found on the surface were broken, but were reconstructable. Four of the 13 fragments were found by surface collection; nine fragments were recovered during excavation of the plowed area. Exact proveniences for seven of the nine excavated pieces were recorded; the other two were found in the screen and could be traced to a particular three m. square. The location of all fragments was plotted.

Productivity: The mean relative displacement was calculated for each artifact. Most displacement was in a north-south direction (which is how the present owner says he has always plowed the field). Plowing was the chief agency of displacement, since there was little relief in the field and therefore no erosion problems, and since the site was not known to local collectors. Roper concluded that the lateral displacement due to plowing was not as great as is sometimes supposed and the surface scatter could be used to indicate the distribution of the subsurface remains.

San Pedro Harbor Site, CA-LAn-283, California (Butler 1974)

Site: The San Pedro Harbor Site is a large shell midden located on the eastern slope of the Palos Verdes Peninsula on a terrace 100'-120' above sea level. The site covered more than six acres (five city blocks) and averaged 30" in depth. The entire area had been built up prior to 1930, with houses and associated features (streets, cellars, sewers, and gas lines). Subsequently, the area had been graded and smoothed during freeway construction. Butler's investigation in 1968 was a salvage situation due to the extension of a bridge.

Methods: The area was gridded and 172 pits (5' x 5') were excavated in six inch levels; soil was screened in 1/4" mesh. No information was reported on the sampling technique employed at the site. Fifty-seven percent of the pits were disturbed and contained intrusive historic items such as nails, coins, sewer and gas lines, and a fish pond.

Productivity: Because of the disturbed nature of the site, no attempt was made at synchronic or diachronic studies or examination of change over time. Culture change was inferred by comparison with other sites. Artifacts spanned a period

of several thousand years. Butler concludes that the site was seasonal in nature (by examination of the faunal material), and that it was probably occupied by centrally based wandering communities.

Lunsford-Pulcher Site, Illinois (Fowler 1969)

Site: The Lunsford-Pulcher Site is seven miles south of Cahokia in Illinois. It is a well known, compact site on agricultural land; it extends over 300 acres and contains several pyramid mounds.

Methods: Fowler investigated the site, attempting to determine the role of agriculture, particularly maize cultivation, during Woodland times. Accordingly, he obtained inexpensive photos taken from a small plane with a hand held Rolliflex or 35 mm. camera.

Productivity: Soil discolorations at the north portion of the site were evident; soil alternated in light and dark bands conforming to square and rectangular patches. Also readily visible was a large mound in the southwest portion of the site and several stains suggesting house locations.

Texas Site, Illinois (Fowler 1969; Morrell 1965)

Site: The Texas Site is also in Illinois near Cahokia, but is less well known and smaller than the Lunsford-Pulcher Site.

Methods: Prior to the aerial photographs, the site was prepared by being freshly plowed to remove all vegetation. In addition, 50 m. squares were marked off by white crosses to assist mapping and reading scale from the aerial photos.

Productivity: A dark soil stain interpreted as a midden area was clearly visible in the photos. In addition, light/dark bands similar to those found at Lunsford-Pulcher were distinct. The Texas Site was additionally investigated on the ground. A surface collection in a 3.0 m. grid system was enacted and distributions were

plotted. Eighty percent of the flint hoe fragments recovered in the surface collection were confined to the area suggested by the aerial photographs to be aboriginal fields. The distribution of pottery followed the distribution of the areas marked as middens by examination of aerial photography. An excavation cross trench was sunk in the garden area and revealed definite rows .80 - 1.0 m. in width and 2.5 - 3.0 m. spaced. Morrell (1965) feels that these rows were formed by piling up rows and exposing light subsoil, consequently making them visible in aerial photos.

Rich Woods Site, Missouri (Leeds 1974)

Site: The Rich Woods Site is a highly disturbed site in southeast Missouri which has been precision leveled during the course of normal cultivation. Leeds investigated the site in order to demonstrate that leveled and highly disturbed sites should not be considered a priori without value.

Methods: In addition to researching standard cartographic and topographic information, and obtaining information from landowners and USDA Soil Conservation Service records, Leeds obtained a series of aerial photographs from several re-flights over the field using a variety of emulsions and filters.

Productivity: Despite the enormous amount of physical damage and remodeling which has taken place in the area, Leeds is able to demonstrate that the Rich Woods sample contains an extensive group of mounds. In the sample, Leeds concludes that although fully 25% of the area has been disturbed, only 9% (the area filled or excavated) is demonstrably valueless.

New Water Pass, Arizona (Hayden 1965)

Site: New Water Pass in the Kofa Mountains in Arizona is one of the examples Hayden cites to convey the importance of "fragile pattern" areas. A prehistoric trail, still highly visible in certain lighting conditions, runs through the area.

Methods: Hayden emphasizes the fragility of small surface sites since their value rests on the patterns of the artifacts on the surface which may be disturbed or broken by any selective artifact hunting. The article was written to discourage

the southwest field practice of picking up only diagnostic pottery from sites while surveying, since this selective hunting destroys the integrity of the resources. Hayden emphasizes that the only opportunity to properly survey a site is during the first visit, and insists that all artifacts visible on existing surfaces must be collected or recorded.

Productivity: The article is admonishing in character rather than oriented towards producing results from a specific study. Hayden mentions a variety of fragile sites existing on natural surfaces such as trails and on terraces of lakes and playas or in dune areas, which could add important insights into prehistoric settlement systems

Ccurimachay Site, Peru (Rick 1976)

Site: Ccurimachay is a rock shelter site on the slope of a gentle hill, south of Lake Junin, 140 km. northeast of Lima, Peru. Debris was strewn around the rock shelter all along the slope of the hill. The debris contained both pre-ceramic and ceramic elements.

Methods: Six contiguous lines of 33 (3 x 3m.) squares were laid from top to bottom of the slope. All cultural debris on the surface was collected. In addition, seven measurements were taken for each of the six lines: slope in degrees, absolute frequency of bone, ceramic and lithic debris, and average weight (weight/count) of bone, ceramic and lithic debris.

Productivity: In general, the greater the number of pieces of debris, the greater the measure of the slope of the hill for all recovered materials. Average weight, on the other hand, tended towards negative correlation; when the number of remains was large, the weight was small. Thus, after submitting the distribution of remains to regression analysis, it was evident that the slope explained a good deal of the artifact distribution. The explanation worked best to account for the spatial distribution of the lithics and worst with the bone. Rick concluded that the majority of the midden was originally at the top of the site near the shelter; heavier tools, in general, had moved farther and were found on lower angle slopes; lighter tools were correspondingly associated with high angle slopes. Rick suggests information for critical angles could be calculated for downsloping in other sites.

Calico and Silent Snake Springs Sites, Nevada (Layton 1973)

Sites: Both sites are located in northwest Nevada on a dissected lava plateau in the high rock country of the Great Basin. Calico (26HU202) is a small surface site, strewn with obsidian artifacts and detritus, and about 1/2 mile in diameter. Silent Snake Springs Site (26HU201) is three miles south of Calico and contains a deep midden.

Methods: Layton collected 14 surface obsidians from Calico and excavated 13 obsidians from about 30" of midden at Silent Snake Springs. He then measured the rate of hydration in both samples to determine if obsidian hydration would be useful for dating surface finds.

Productivity: The surface obsidians were found to have hydrated at double the rate of the subsurface finds. However, although the rates were absolutely different, the relative dating of both samples was exactly the same since both samples arranged diagnostic point types in the same relative position (Humbolt - Elko - Eastgate). Surface obsidians, therefore, have enormous promise for dating surface sites in regions where obsidian was commonly used for tools.

41CH170, Texas (Aten n.d.; Dillehay 1973)

Site: 41CH170 is a thin shell midden in the lower Trinity River Delta of the Gulf Coast plain in Texas. Aten intended to demonstrate that by careful investigation of this and similar shallow, limited activity sites, specific activity areas, generally masked in more complex sites, could be isolated.

Methods: Excavation was conducted by Aten. Two shell accumulations, one with a small hearth, were reported. Material recovered included sherds, one projectile point, 680 Rangia cuneata shells, one small fish, one turtle, one alligator gar and one white tailed deer.

Productivity: Aten concludes that the mound was accumulated over no more than one or two meals for four to six adults. The data produced is more readable for determining specific activity patterns than is usually obtainable from excavations in large complex sites, and can be utilized in settlement pattern studies, general site function and demographic analyses. This type of investigation may be helpful in determining the meaning of accumulation in larger more complex shell middens.

Bryson Site, Ka-5, Oklahoma (Hartley 1975)

Site: The Bryson Site covers 3/4 of an acre on a gentle ridge, 1/4 mile west of the Arkansas River. The center of the site is a wheat field which has been in use "for some time". Hartley says that even so, cultural material and features are still evident after fresh plowing and rains. The site extends beyond the cultivated field into an undisturbed pasture.

Methods: Hartley's sampling procedure is not explained. He states that the debris in the plowed area was not isolated but had coalesced into one large midden area; but, this statement appears to be an assumption untested by rigorous field examination since intensive systematic surface investigations were not conducted. All excavation was limited to the pasture area, with only a "small sample" of debris collected from the plowzone.

Productivity: Hartley's work in the Bryson Site is typical of many archeological investigations in which the disturbed portion of a site is bypassed in favor of investigating undisturbed parts. No intensive work was conducted in the plowed area as the artifacts were assumed to be mixed and of no value. No definitions of spatial activities were attempted.

The Hord Site, M-175, San Bernadino County, California (Davis 1973)

Site: The Hord Site is an undisturbed surface site (in an area otherwise scoured by collectors) with a "typical" Western Desert series of Paleo-Indian artifacts. The camp is near the summit of a pass in a rugged mountain area near two major sources of water.

Artifacts were confined to the surface on a mosaic desert pavement, one pebble thick.

Methods: As the site was recognizably "fragile," extreme care was taken in collection. The site was surveyed with a plane table and alidade and measured into 5' x 5' units. Procedures followed a plan of (1) inspection and planning; (2) "harvesting"; and (3) lab analysis. Position of every artifact was recorded (838 flakes and tools were recovered).

Productivity: Although nothing was available for dating, Davis, by comparison of artifacts, concluded that the site was a product of many transient encampments from the time period between 9000-6000 B.C.

Shoop Site, Pennsylvania (Witthoft 1952)

Site: The Shoop Site is a thin ("If the site itself were any thinner it would not be a site") Paleo-Indian site in the Susquehanna Valley of Pennsylvania. It is located on an irregular plateau bounded by Armstrong Creek and two tributaries.

Methods: The site had been surface hunted by amateurs and plowed for many years. Witthoft and Farver collected the site after plowing (apparently with no rigorous methodology). Witthoft noted 11 slightly elevated areas, about 100 yards apart and less than 30' in diameter upon which a half dozen chips were evident after each cultivation. Witthoft's analysis deals mostly with the technological aspects of the chips recovered.

Productivity: The Shoop Site was for years the best study on eastern Paleo-Indian assemblages, and probably the best study on any American Paleo site until the 1960's. Witthoft analyzed the technological aspect of the Shoop material, compared it with other known Paleo-Indian sites, and hypothesized a three stage developmental sequence for fluted point cultures beginning with the Enterline chert industry (Shoop), followed by Clovis and Folsom-like complexes. His belief in the temporal precedence of the Enterline was based on the nature of the core and blade complex which Witthoft felt was closest to Old World Upper Paleolithic Cultures.

Priest Rapids, Washington (Dancey 1974)

Site: The area investigated in Priest Rapids consists of 300 sq. mi. straddling the Columbia River in the steppe zone, and bounded by Saddle Mountain and the Umtanum Ridge. Since the area is semi-desert, the region is favorable to artifact exposure and survey activity.

Methods: Dancey employed a "re-oriented" survey in which he inspected sections within major environmental zones for artifacts, not sites. Sections were walked in a patterned course. Artifacts were left in place and recorded upon discovery; recovery took place after survey of the entire section was complete. If clusters of artifacts were encountered, several crisscrosses were made to fully define the spatial boundary of the cluster.

Productivity: Because of the painstaking nature of the survey, it was possible to locate small, seemingly insignificant sites which gave insight into prehistoric subsistence activities. For example, investigation in an apparently inhospitable environmental region revealed a preponderance of projectile points in a saddle like depression. Dancey concludes that this represents a cross-fire area through which game was driven into a gully. Since this area was an unlikely place for human occupation, the site would not have been discovered in an unsystematic survey. Another site was discovered in an open field which lacked shelter or water, two variables which indicate likely occupation. Three low density clusters of chipped stone debitage with a few tools unassociated with ground modifications or soil stains were discovered. Dancey suggests that these remains are probably the product of harvesting activities exploiting camas, an edible bulb known to be ethnohistorically important in the subsistence economy of the area. The lithic debitage is interpreted as remains of tools used to maintain wooden tools to harvest the bulb. This area was only discovered by intensive, painstaking survey, and would have been overlooked in a less systematic study.

Owens Valley, California (Bettinger 1976)

Site: Owens Valley is a block faulted trough, 70 miles long and 15 miles wide, bounded by the Sierra Nevada on the west and the Inyo-White Range on the east. The Valley floor is 4,000' - 5,000' altitude. Bettinger examined the area in order

to determine the nature of the prehistoric settlement system with a special interest in the role of pinyon exploitation.

Methods: Four major biotic communities, important for subsistence, were defined: riverine, desert scrub, pinyon woodland, and upper sage brush. A grid system, stratified by the dominant biotic community, of 3920 500 x 500 meter tracts was laid over the region. A total of 95 (2.4%) of the squares were surveyed to locate isolated artifacts and artifact clusters. The raw data were analyzed to: (1) establish a functional taxonomy of archeological site categories; and (2) compare the actual distribution of archeological resources with the hypothetical distribution predicted from ethnohistorically based models.

Productivity: Bettinger located five types of prehistoric settlements: lowland occupation sites, pinyon camps, riverine temporary camps, desert scrub temporary camps, and upland temporary camps. Pinyon camps were represented only during the last 1000 years of the 5500 years of occupation in the Valley. Bettinger, therefore, refutes Jennings' idea that pinyon exploitation developed in response to climatic change and population pressure on resources.

Reese River Ecological Project, Nevada (Thomas 1975)

Site: The Reese River area is 30 miles south of Austin, Nevada, between the Toiyabe and Shoshone Mountains. Thomas investigated the area to test Stewards' model for Shoshone transhumance.

Methods: The Reese River Survey was explicitly a "nonsite" survey, an "Easter egg hunt." A 10% random sample of a 500 m. grid was investigated. Biotic communities were separated out and used as independent sampling domains. The basic sampling unit was the quadrant itself. Sites in the Reese River area were surveyed, located, recorded traditionally, but were not dealt with analytically; artifacts, not sites, were the basic units of comparative interest.

Productivity: Thomas' article is full of impressive statistics and verbiage, but presents few conclusions on the meaning of the data. In addition, the utility of his survey technique needs further demonstration.

Arkansas Archaeological Survey (Baker and Schiffer 1975)

In this article, Baker and Schiffer examine the correspondence between surface and subsurface in archaeological sites. Specifically, they want to determine: (1) is there an item to item correspondence; and (2) is there identity in relative frequencies. They suggest the hypothesis that "if objects of several kinds are distributed in a site, the probability that any item will be visible on the surface is directly proportional to its gross size." They conclude from examinations at a site (which they do not elaborate upon) that this "size effect" is working, and that large artifacts are over-represented. They suggest that this is the result of both cultural and non-cultural processes; uniform sedimentation would cover all but the largest artifacts. If an area was subject to re-occupation, the most likely artifacts to be scavenged and reused would be large artifacts such as hammer-stones, manos, etc. which would account for the differential distribution of large artifacts on the surface.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

