STUDIES IN ARCHEOLOGY
Consulting Editor: Stuart Struvever
Department of Anthropology
Northwestern University
Evanston, Illinois

Charles R. McGimsey III. Public Archeology
Lewis R. Binford. An Archaeological Perspective
Muriel Porter Weaver. The Aztecs, Maya, and Their Predecessors: Archaeology of Mesoamerica
Joseph W. Michels. Dating Methods in Archaeology
C. Garth Sampson. The Stone Age Archaeology of Southern Africa
Fred T. Plog. The Study of Prehistoric Change
Patty Jo Watson (Ed.). Archeology of the Mammoth Cave Area
George C. Frison (Ed.). The Casper Site: A Hell Gap Bison Kill on the High Plains
W. Raymond Wood and R. Bruce McMillan (Eds.). Prehistoric Man and His Environment: A Case Study in the Ozark Highland
Kent V. Flannery (Ed.). The Early Mesoamerican Village
Charles E. Cleland (Ed.). Cultural Change and Continuity: Essays in Honor of James Bennett Griffin
Michael B. Schiffer. Behavioral Archeology
Fred Wendorf and Romuald Schild. Prehistory of the Nile Valley
Michael A. Jochim. Hunter-Gatherer Subsistence and Settlement: A Predictive Model
Stanley South. Method and Theory in Historical Archeology
Timothy K. Earle and Jonathon E. Ericson (Eds.). Exchange Systems in Prehistory
Stanley South (Ed.). Research Strategies in Historical Archeology
John E. Yellen. Archaeological Approaches to the Present: Models for Reconstructing the Past

Behavioral Archeology

Michael B. Schiffer
Department of Anthropology
University of Arizona
Tucson, Arizona

ACADEMIC PRESS New York San Francisco London
A Subsidiary of Harcourt Brace Jovanovich, Publishers
3. All knowledge of the past is inference in the sense that there is no epistemically tenable or otherwise useful distinction between direct and indirect knowledge of the past. All knowledge of the past acquired through archeological means is made accessible by the use of laws.

The brief examination of the inference model in light of archeological inferences has indicated the vulnerability and weaknesses of implicit approaches to both the explanation of archeological observations and the derivation of knowledge of the past. Although many laws of archeological knowledge are shared widely, others are contradictory, and still others appear hopelessly embedded and inadequate. The case made earlier for extricating, systematizing, and testing of extant laws still seems to be an appropriate strategy for expanding the small set of explicit, reliable laws of archeological knowledge. Some investigators may feel such an activity is relatively unproductive because of the great amount of effort required to find the extant laws. Individuals who hold this view may desire to expend their energies in Strategy 2 of behavioral archeology. The remainder of this study demonstrates the viability of both approaches for deriving laws.

The examination of a body of archeological inferences and the unorthodoxy of inference in particular has given substance to my previous claim (Schiffer 1972b) that the cultural formation processes of the archeological record are poorly known at present. In order to increase the set of useful c-transforms, a general framework for understanding the operation of cultural formation processes is required. It is to the construction of such a framework that the next chapter is devoted.

3
Cultural Formation Processes

It is established in the previous chapter that knowledge of the past is accessible only when formation processes are considered. In order to build models that explicitly take these processes into account, it is necessary to understand in more detail the varied cultural processes responsible for forming evidence of the past. The primary purpose of this chapter is to identify and describe in one encompassing framework cultural formation processes (Schiffer 1972b, 1973a). The record or evidence of the cultural past exists in two forms. The first, used principally by historians, consists of material—documents and other items—present within an ongoing cultural system. The second form is made up of materials in the archeological record, and these are studied primarily by archeologists. I designate the two types of evidence as the historical record and the archeological record. Let the reader note that my use of these terms differs from customary usage: In the present framework, a clay tablet at Babylon is part of the archeological record, whereas a nineteenth-century loom in a museum is a historical record.

ARCHEOLOGICAL CONTEXT AND SYSTEMIC CONTEXT

Before one can understand the formation of the archeological record, it is necessary to emphasize its principal characteristic. The archeological record
differs from other cultural phenomena because the materials that comprise it—artifacts, features, residues—are no longer participating in a behavioral system. The nonbehavioral state of cultural materials is known as the "archaeological context" (Schiffer 1972b). On the other hand, materials within an ongoing behavioral system—they are handled or observed—are in systemic context (Schiffer 1972b).

Under some circumstances, it is tempting to use archaeological context and systemic context in other ways. With respect to the archaeological record, for example, the systemic context is both inferentially derived and distant in time, but the archeological context can be observed directly in the present. Thus, some would use "systemic context" to mean past or inferred, and "archaeological context" to mean present and observable. These usages are perfectly acceptable if one keeps in mind their limitations. For instance, in Strategy 2 of behavioral archeology, the systemic context is both presently existing and observable. In the remainder of this discussion, I will adhere to the original, strict definition of the two contexts based on behavioral criteria (Schiffer 1972b). Less rigorous usages have their place, but, for proper understanding of the formation of the archeological record, the behavioral-nonbehavioral dichotomy is crucial.

To summarize, the archaeological record consists of materials in archeological context (prior to excavation by the archeologist). The historical record is simply defined as those items in systemic context which can provide information about prior system states. The meanings of these latter terms are clarified in a following section.

**TYPES OF CULTURAL FORMATION PROCESSES**

It is very difficult to construct a definition of cultural formation processes that is narrow enough to exclude cultural activities not of interest and broad enough to encompass all the phenomena that directly affect the formation of the archeological and historical records. Instead of attempting such a definition, I will define the four types of cultural formation processes.

The first type of process corresponds roughly to what many archeologists recognize as "cultural deposition" (Willey and McGimsey 1954). In any ongoing system, many of the activities performed will result in tangible contributions to the archeological record of that system. These activities exemplify the major type of cultural formation process, whereby materials are transformed from systemic context to archeological context. I name them S-A processes. My previous writings and definitions have emphasized, perhaps overemphasized, S-A processes (Schiffer 1972b, 1973a; Schiffer and Rathje 1973).

Quite clearly, S-A processes constitute the dominant factor shaping the archeological record. However, if attention is focused on the archeological record itself, it can be seen that still other processes of a cultural nature must be considered when providing explanations for its structure. Activities such as scavenging, collecting, pot hunting, and even archeological excavation remove and modify materials in archeological context. These activities, which comprise the second, or A-S, type of cultural formation process, transform materials back from archeological context to systemic context.

A greater number of processes, which nevertheless are markedly affecting archeological deposits in many parts of the world, transform materials from state to state within archeological context. Examples include plowing, land leveling, channelization, and other land-modification activities that disturb culturally deposited items. Although A-A processes cause materials briefly to enter systemic context, they really do not participate in a behavioral system in the same way as do other materials.

Together, S-A, A-A, and A-S processes account for most properties of the archeological record; yet they do not exhaust the domain. To interpret correctly some aspects of the archeological record, it is necessary to understand processes entirely internal to the past sociocultural system, those which do not result in cultural deposition or in modification of extant deposits. This type of process is also primarily responsible for formation of the historical record. That is, because some items do not leave systemic context, they can inform on prior states even though they still may be in use. As the reader may have guessed already, the processes by which materials are transformed through successive system states are termed S-S processes. Chipped-stone bifaces, trade pottery, ornaments, documents, and an assortment of other items persist through numerous system states by changes in form, use, and transfers from individual to individual, and by deposit in entities such as shrines, museums, libraries, and archives.

Clearly, it is difficult to definitively S-S processes precisely; it all depends on the minimal change an investigator deems necessary to constitute a new systemic state. Fortunately, a somewhat arbitrary, object-centered definition can resolve this problem quite productively. For any object, an S-S process has occurred if, after a period of use, there is a change in the social unit of use (user) or the activity of use. For example, when Aunt Millie gives away her darling old lamp, when a lawnmower is bought at the thrift shop, when that lawnmower is stolen 2 weeks later, and when a house is sold to permit a family to move into a crime-free neighborhood, S-S processes (known as "lateral cycling") have occurred. Other types of re-use (for example, recycling), more widely appreciated, are also S-S processes.

Of the four types of cultural formation process, S-A processes are perhaps the best-known—although by no means are they very well-known; A-S, A-A, and S-S processes have received scant attention. As a consequence, their effects on the formation of the archeological and historical records are scarcely perceived.
In the remainder of this chapter, I shall discuss generally what is known about each kind of process, delineate subtypes, and, especially, indicate gaps in present knowledge. Although this survey is not comprehensive, it should provide the foundation needed to generate models in the next chapter by which these processes can be taken into account.

S-A PROCESSES

S-A processes are broadly divisible into two types: normal and abandonment processes. Normal processes are those which characterize an activity area throughout its duration of use. The three major kinds of normal S-A processes are discard, disposal of the dead, and loss. Abandonment processes begin operation only when activity areas are being abandoned.

Discard

When objects break or wear out and are not recycled and when useless waste products are produced, the materials will be discarded, perhaps in one or more specialized activity areas known as “dumps.” If trash is discarded at its location of use, it forms primary refuse, and if away from its location of use, secondary refuse (Schiffer 1972b). Thus, an olive, used and broken inside a dwelling, is discarded as secondary refuse in the dump at the edge of the village, whereas flakes used for skinning a rabbit in the plaza may be discarded there casually as primary refuse when they become dull. Additional varieties of refuse could be defined, based on other dimensions of variation in discard processes.

There is an increasing body of descriptive material concerning discard processes, most of which is widely scattered in the literature and borders on the inaccessible. In many ethnographic monographs, one sometimes finds passing reference to the customary way this or that object or waste product is discarded. Because information of this sort is so dispersed and un systematized (not even Murdock has tried to deal with it), it cannot readily play a role in generating and testing e-transforms. Although some useful knowledge might result from a concerted effort to comb the ethnographic literature for these archeologically relevant morsels, I suspect that the returns probably would not repay the investment in time. Archeologists have resolved this dilemma in two principal ways: by invention and by ethnoarchaeology.

The term “invention” applies to the numerous attempts made by archeologists to generate e-transforms, in the absence of relevant ethnographic test data, to account for their archeological observations. Invention has yielded a not insignificant quantity of e-transforms. For example, many of the reconstructions of dietary and population variables from shell midden data (Ascher 1959; Heizer and Cook 1956; Cook 1972) are based on assumed quantitative e-transforms. In Chapter 5, several of these laws are made explicit and formalized. Potentially quantifiable e-transforms pertaining to the discard of faunal remains also are found in the archeological literature (e.g., Thomas 1971; Daly 1969; Read 1971; Ziegler 1973; Medlock 1975; Chaplin 1971).

Other e-transforms have been invented to account for differential discard activities. For example, I have hypothesized that the larger the population of an activity area, and the greater the intensity of occupation, the larger the ratio of secondary to primary refuse produced (adapted from Schiffer 1972b). Although this e-transform still awaits testing (but see Yellen 1974), like others that have been invented, it does make intelligible a realm of archeological variability not understood previously. Many similar e-transforms are embedded in the literature and require only extraction and testing.

Ethnoarchaeology, wherein an archeologist studies an ongoing sociocultural system, has become a respectable research activity (see Donnan and Clewlow 1974). More and more investigators are realizing that the best place to test e-transforms (and some other archeological laws) is in living communities. McKellar (1973), who observed discard behavior on the campus of the University of Arizona, noted that object size has an effect on whether materials become primary or secondary refuse. Several other ethnoarchaeological studies have paid cursory attention to discard activities, although the absence of relevant questions and hypotheses somewhat diminishes the usefulness of these investigations (e.g., Robbins 1973). Richard Gould and Lewis R. Binford (personal communications) are conducting promising ethnoarchaeological studies of discard processes.

Disposal of the Dead

Activities involved with disposal of the dead comprise another major type of normal process. Even though burial practices have been a serious area of archeological study for centuries, it is remarkable how few explicit and formalized e-transforms are presently available. Burial practices sometimes are well described ethnographically, and a systematic review of that literature would reward the investigator with a wealth of material useful for generating and testing e-transforms. Invention has been applied fruitfully to burial practices. Howells (1960), a physical anthropologist, devised a quantitative e-transform that relates the variables concerning the population of a community and duration of activity to the size of the burial population (see also Collins and Fenwick n.d.; Longacre n.d.). Although most archeologists recognize that basic elements of social organization determine patterns of grave good accompaniment, only since the early 1960s have any appropriate e-transforms been framed explicitly.
these hypothetical c-transforms in their most general form as statements of conditional probability and defined important varieties of loss behavior.

As our appreciation for the nature of loss processes increases, we will be able to make better use of our archeological data. For example, if one excavates the remains of a log cabin, it makes a considerable difference whether the material found resting on the original ground surface arrived there through the loss processes of the cabin's inhabitants or the discard processes of the previous use of the area. The same holds true for the materials recovered from a privy; some will have resulted from loss, and others from discard. For many kinds of research problems, it is absolutely essential to identify which process(es) is responsible for deposition of the material under study, although this point certainly is not appreciated as widely as it should be.

Discard, disposal of the dead, and loss constitute the three major types of normal S-A process. These processes most certainly do not exhaust the variety of activities that transform materials to archeological context during the use of an activity area. For example, "caches" of various sorts are produced by normal S-A processes and also deserve attention (cf. Baker n.d.). However, I leave the identification of additional processes for future occasions.

Abandonment

When activity areas are abandoned, another set of S-A processes is set in motion. The most important of these is de facto refuse production. De facto refuse consists of the tools, facilities, and other cultural materials that, although still usable, are abandoned with an activity area. The nature of de facto refuse deposited in an activity area should relate not only to what was used there, but also to the conditions under which abandonment took place, to available means of transport, to distance to the next occupied activity area, and to whether or not return is anticipated (see Schiffer 1972b). One would expect that, whereas transport is limited to what people can carry on land, heavy objects, stationary facilities, and easily replaced light objects will be deposited as de facto refuse when distance to the next site is appreciable (adapted from Lange and Rydberg 1972:430). Knowledge of c-transforms pertaining to de facto refuse production is limited at present. Again, the ethnographic literature contains scattered observations; such information remains to be synthesized, systematized, and tested. Some ethnoarchaeological observations, however, are becoming available (Binford 1973; Longacre and Ayres 1968; Bonnichsen 1973).

Abandonment of an activity area results not only in de facto refuse production but sometimes in the modification of other S-A processes. For example, if abandonment is anticipated by a group, its members may begin to accumulate refuse in areas like house interiors, which usually would have been kept rela-
tively free of debris. Such materials might be considered primary refuse but they really are formed by an abandonment, not normal, process. Naturally, serious errors could creep into one’s interpretations if the correct process is not identified.

**A-S PROCESSES**

The second major type of cultural formation process (A-S)—responsible for transforming materials from archaeological context to systemic context—is even more poorly understood than S-A processes. We have not progressed even to the point at which major varieties are definable. We can, however, find examples of potentially recurrent activities which eventually may be classed as distinct types of process.

Ascher (1968), in carrying out an ethnoarchaeological study of the Seri, observed that, in unoccupied areas of a community, previously abandoned items were removed (or scavenged) for use by the remaining inhabitants. Scavenging behavior probably occurs to some extent in every community that is differentially abandoned. It is necessary to note, however, that this type of scavenging behavior involves an A-S transformation of de facto refuse. When materials produced by various normal A-S processes, such as primary refuse or burials, undergo A-S transformations, different types of scavenging behavior have occurred. I shall refrain myself and not give names to these important varieties of scavenging behavior, although names eventually will be required so that cumbersome constructions like “A-S transformation of secondary refuse” can be avoided.

To this point, attention has been directed to A-S transformations of materials; some A-S processes act on the deposits themselves as a unit. For example, in Mesoamerica, deposits of primary and secondary refuse were scraped up and used as a fill material in construction of monumental architecture (see Hoelder 1967 for an additional example of deposit modification in New Guinea). Clearly, when an A-S process operates on a deposit as opposed to an artifact, a qualitatively different type of activity has taken place. Again, I defer to others in the task of describing and defining varieties of this A-S process. Let us simply keep in mind their existence and the fact that their operation has important effects on the nature of the archaeological record.

Archaeological excavation itself comprises a major kind of A-S process. And, although that fact is sufficiently obvious, its implications may not be. In the first place, the investigator must be aware of possible effects of previous archaeological work at a site. J. Jefferson Reid informed me (personal communication 1973) that, during recent investigations at the Grasshopper Ruin (Reid 1974; Thompson and Longacre 1966), Longacre attempted to test the hypothesis that certain surface modifications resulted from the previous excavation of rooms by Hough in the earlier part of this century. Although the hypothesis tested negatively, the example suggests how knowledge of such formation processes can lead to better interpretations of the archaeological record and to the design of more appropriate data-gathering strategies (see Reid, Schiffer, and Neff 1975). In the second place, when one attempts to assess the archaeologist’s use of the data, it is necessary to view his activities as cultural formation processes. For example, the extent to which counts of artifact types in a report correspond to artifact type counts in the original deposits depends on the nature of recovery and processing activities. It is gratifying to see archaeological procedures now being considered as a process having tangible and predictable effects on the archaeological record as described by the archaeologist (e.g., Wilcox n.d.; Collins 1975).

If the archaeologist’s activities are A-S processes, then so, too, must be pot hunting and other kinds of collecting behavior. Pot hunting has been an ongoing A-S process for many years in most areas, although seldom does the archaeologist consider the extent to which such behavior—sometimes difficult to detect after a long period of time—can influence the structure of the site being studied. James Ford’s work at the Menard Site in Arkansas provides a rare example. In comparing the quantity of burial goods per burial in his excavation sample with that obtained from the same site in 1908 by C. B. Moore, Ford found a significant increase in the number of burials without accompanying artifacts. He explained this discrepancy in terms of the recent occurrence of pot hunting (Ford 1961:156). Pot hunting, like all cultural formation processes, exhibits certain regularities. In the Southwest, for example, the first areas dug in “pristine” pueblo sites are extramural secondary refuse deposits where graves, and thus grave goods, frequently occur. In sites with severely disturbed secondary refuse deposits or no obvious extramural deposits, rooms will be dug in search of de facto refuse. I have observed these processes in operation over a 4-year period in the Hay Hollow Valley of east central Arizona.

Not only does pot hunting materially affect the archaeological record at a site but so does surface collecting. Some information on the nature of collecting behavior is beginning to accumulate, although it is not yet in the form of fully general o-transforms. It is certain, however, that collecting activity is characterized by some regularities; for example, the items usually collected are finished tools in which a great deal of effort was invested during manufacture. These artifacts often are collected for the purpose of selling them, especially in parts of the Mississippi Valley (House and Schiffer 1975; Morse 1973, 1975).

In the face of widespread damage to, and destruction of, archaeological sites all over the world, it may seem peculiar for an archaeologist to suggest that we begin to study the nature and effects of pot hunting and collecting processes. Nevertheless, there are compelling reasons for doing so. In some areas of the United
States, almost any site an archeologist wishes to investigate has been subjected already to a variety of A-S processes. In future years, unless collecting and pot hunting decrease—an unlikely prospect—most sites to be scientifically investigated will have been modified already by collecting and pot hunting. Even if that gloomy future fails to arrive, many modified sites will be excavated. It thus becomes a practical necessity, when using data from such sites, to consider the nature and effects of collecting and pot hunting. To do this effectively requires one to use information on the regularities of these processes.

A-A PROCESSES

Other destructive activities of modern society (and prehistoric ones as well) are viewed as A-A processes. Land-modification activities, such as dam construction, channelization, suburban sprawl, farming, oil exploration, and myriad others, either directly modify the archeological record or bring into operation various noncultural processes that do. In all A-A processes, one must consider both cultural and noncultural factors. For example, plowing and discing not only damage and disperse archeological materials and deposits but also subject once-buried items to a wider range of noncultural processes, such as alternate freezing and thawing, oxidation, and erosion, which further affect the structure of the archeological record. As another example, dam construction will affect sites in areas where construction activities are conducted. But, once the dam is in operation, the noncultural processes operative in reservoirs, such as currents, fluctuating levels, and siltation, have other effects on archeological remains (Garrison n.d.).

Only in recent years have archeologists, under the impetus of federal and state legislation, begun to study the regularities in these processes. When called upon to assess the direct and indirect impacts of a proposed project on sites, archeologists must utilize these all-too-scarce c-transforms (and n-transforms) to make predictions. Studies have been conducted to determine effects of various agricultural practices on archeological sites (Medford 1972; Ford and Rolleston 1972; Baker 1974; Schiffer and House 1975), and others now are planned or in progress to examine processes operative in reservoirs (e.g., Garrison n.d.). But this information is useful beyond the confines of conservation archeology or cultural resource management studies, for again, many archeologists will scientifically study sites subjected to the operation of one or more of these processes. Although some effects are obvious upon excavation, such as mixing of levels, deflation, and sedimentation, others, like chemical changes in soil and horizontal artifact displacements, are more subtle. If archeologists are to succeed in approximating aspects of the systemic context of such sites, much more refined knowledge concerning A-A processes must be forthcoming.

The varieties of A-A processes enumerated here serve only to illustrate the diversity of this domain. By and large, A-A processes are poorly studied—although this situation is beginning to change. I believe we have a clear practical mandate, as well as scientific need, to study in detail all of the cultural processes that act on a site following (and even during) its original deposition.

S-S PROCESSES

The last basic type of cultural formation process, termed “S-S” earlier, results in a material’s transformation from state to state within systemic context. Before discussing several kinds of S-S process, I want to emphasize the dualistic perspective necessary to comprehend their operation and significance: the archeological record of a systemic state and subsequent systemic states. That is, in order to infer aspects of a sociocultural system at a point in time—the task of the archeologist, historian, and historical archeologist—it is necessary to utilize evidence that extends from that system into the present. This evidence may be in the form of materials placed into the archeological record through S-A processes of that system, or it may consist of materials transmitted through time within systemic context. An appreciation for S-S processes affects the interpretation of both kinds of evidence.

First, if one were interested in, let us say, jewelry designs of the early nineteenth century for a given city, it would be necessary to understand the nature of presently obtainable evidence of those manufacturing practices. Several lines of evidence come readily to mind: museums, where actual specimens and perhaps manufacturing equipment is stored; antique shops and jewelers, where specimens are available; libraries, where books in which jewelry designers or their contemporaries may have recorded their observations or designs in print, and where periodicals with advertising may be found; private individuals who may have heirloom jewelry from that time period; company records, where jewelry manufacture has been continuous; and others. How one finds and uses each line of evidence depends, of course, on the specific question being asked, and on a knowledge of the S-S processes that have resulted in the preservation of these materials in systemic context.

Second, an understanding of S-S processes leads to successful explanation of what is and what is not subject to the operation of S-A processes, and under what conditions. For example, an archeologist of the twenty-second century, working only in secondary refuse and cemeteries from a modern city, would erroneously conclude, were he ignorant of S-S processes, that jewelry made of precious gems was not in widespread use as indicated by its rare occurrence in his excavated samples. Of course, should this archeologist encounter a fashion magazine, a distinct anomaly would present itself. Naturally, to interpret prop-
erly this archeological record, it would be necessary to know or correctly infer that jewelry incorporating precious gems was endlessly circulated, spiraling through time in systemic context from individual to individual by gift, sale, theft, or inheritance.

It is now necessary to define and describe S-S processes in more detail. Once again, this listing is by no means exhaustive; its purpose is merely to focus inquiry on unanswered questions. Unanswered questions typify the domain of S-S processes to a large extent. It is fair to state that very few archeologists ever have considered them when making interpretations, and fewer still have offered generalizations approaching the status of a c-transform. Nevertheless, it is possible to delineate several varieties of S-S processes.

Recycling

A major type of S-S process is recycling. Recycling is an activity whereby a secondary material is introduced as a raw material into an industrial process in which it is transformed into a new product in such a manner that its original identity is lost [Darnay and Franklin 1972:21].

"Secondary materials" are those which

(1) have fulfilled their useful function and cannot be used further in their present form or composition and (2) materials that occur as waste from the manufacturing or conversion of products [Darnay and Franklin 1972:3].

Major varieties of recycling exist (see Darnay and Franklin 1972 for some definitions), but completely general types useful for archeological purposes remain to be defined. Recycling may or may not involve a change in the user. There are many archeological instances of recycling behavior in which the original user, remanufacturer, and final user are the same (for example, a dull bifacially chipped knife is rechipped into a spokeshave; a shard is ground up for use as temper in other pottery).

Secondary Use

Often, there is no need for extensive modifications to make an object suitable for its new use. The latter type of process is termed secondary use (Darnay and Franklin 1972:3). Familiar examples include: A metate is used as a wall stone; an exhausted core becomes a hammerstone; and a storage pit serves as a repository for secondary refuse. As in recycling, secondary use may involve a change in the user. "Secondary use" is a term that is sufficiently general to warrant adoption by archeologists; in fact, I recall having already seen it somewhere in the literature.

There appear to be several significant dimensions within which recycling and secondary use processes vary; variables within these dimensions eventually should permit isolation of general types of recycling and secondary use processes relevant for archeological research. Quite clearly, a major aim of future studies should be the designation of significant varieties, and the explanation of their differential occurrence within and between sociocultural systems.

Lateral Cycling

Another major type of S-S process is known as lateral cycling (Schiffer 1972b, 1973a). Lateral cycling occurs when an object is transferred from one user to another. It includes the many processes by which used, but usable, objects circulate within a sociocultural system and persist in time. Lateral cycling differs from recycling and secondary use in that no change in the object or its use occurs, although some repair or maintenance may take place between episodes of use. In modern industrial sociocultural systems, used material culture circulates by two major kinds of lateral cycling mechanisms: formal and informal. Formal lateral cycling mechanisms include auctions, thrift shops, real estate brokers, and various retail and wholesale handlers of more limited ranges of material culture. Formal mechanisms are characterized by sustained activity and sanctioning, via taxation, by local, state, and federal governments.

Informal lateral cycling mechanisms are those which occur beyond the periphery of sanctioned economic activity; records of transactions are seldom kept, locations of transactions are transient; and, often, lateral cycling occurs simply by barter or gift. Examples of informal lateral cycling mechanisms include patio and garage sales (see Young and Young 1973), some rummage sales, some swap meets, theft, and gifts within and between various social units. Claassen (n.d.) has shown that some of these mechanisms (formal and informal), which simply facilitate transfers in the ownership of used objects, also involve items that are recycled or secondarily used. Perhaps "cycling" mechanisms would be a more appropriate general term.

There are very few explicit c-transforms of lateral cycling processes in existence. Since 1972, however, a number of my students have examined some types of lateral cycling mechanisms in order to begin generating c-transforms, and, especially, to begin formulating relevant general questions. Several of these studies are described in Chapter 13.

Conservatory Processes

It should be apparent that the continuous operation of S-A processes and various types of recycling will tend to bring about the dispersal, modification, and deposition of most cultural materials. Although lateral cycling processes can postpone the time when materials are transformed to archeological context, they
cannot entirely prevent such occurrences; eventually, all objects will break, wear out, be damaged beyond usability, or be lost. In part, concern for the preservation of past remains has led to the development, especially in state-level systems, of processes that counteract the tendency of materials to enter the archaeological record. For example, libraries and archives concentrate manuscripts and books; museums accumulate material culture of all kinds; and private individuals and institutions collect everything from beer cans to toy trains. A general definition of what I call conservatory processes can be provided. A conservatory process is one that brings about a change in the function (but not form) of an object such that (often permanent) preservation is intended. Usually, the change in function is accompanied by a change in the social unit of use.

In the long run, even conservatory processes must be viewed as stopgap measures which, although serving to make materials from the past temporarily accessible to scholars and antiquarians, ultimately do not prevent materials from reaching archaeological context (as the librarian from first-century Alexandria readily could testify). The attraction of the archaeological record is an inexorable force that few objects can resist indefinitely. Even Lenin someday will be buried.

No one yet has suggested that there are any marked regularities inherent in conservatory processes, even though there clearly must be. As with other cultural formation processes, conservatory processes have yet to be widely appreciated as an important domain of unified phenomena worthy of scientific study. To be sure, in order to carry out effective historical research, one must know the kinds of materials collected by various institutions (Winks 1969:xvi–xviii). But that level of knowledge, casually acquired during scholarly training and research, is based on descriptive information, not on the comparison of variables that underlie the processes operating. A comparative study of private and public conservatory processes among different sociocultural systems doubtless could uncover significant regularities.

The processes just discussed do not, of course, cover entirely the S–S domain. It would be pointless, however, to continue subdividing and naming these processes until additional empirical studies are carried out. I have developed the discussions only to the point of indicating some broad areas of needed research.

**SUMMARY**

The processes responsible for forming evidence of the cultural past are diverse and, at present, poorly understood. Four major kinds of cultural formation process have been defined. S–A processes, also known as "cultural deposition," transform materials from systemic context to archaeological context. A–S processes, on the other hand, transform items in archaeological context back to systemic context. The third type of cultural formation process is known as "A–A"; these transform objects from state to state in archaeological context. S–S processes comprise the fourth and last type, and are often known as "re-use." They transform materials from state to state in systemic context. A small repertoire of explicit c-transforms is presently available for S–A processes; fewer are known for the other types.

Regardless of the impoverished state of knowledge concerning cultural formation processes, one general conclusion seems inescapable: The archaeological record is a complexly formed phenomenon in which the constituent materials have been transformed in many ways since their participation in a past behavioral system.

Future work is needed both to synthesize extant information about cultural formation processes and to originate and test new principles (by means of simulation studies or ethnoarchaeology). In Chapters 5 and 6, I attempt to apply both approaches for deriving c-transforms. Another area of needed investigation is the formulation of general models by means of which c-transforms and specific information about cultural formation processes can be put to use in reconstructions of the past. It is to that task that I now turn.