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A METHOD FOR DISTINGUISHING BETWEEN PREHISTORIC AND RECENT WATER AND SOIL CONTROL FEATURES

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ABSTRACT

Rock alignments built for controlling the flow of water and its effects on soil, and known by a number of terms including check dams, terraces, linear borders, and *rrincheras,* have troubled Southwestern archaeologists for years. Especially problematical are attempts to determine the ages of such features; recently built rock alignments can be easily confused with prehistoric ones. This paper identifies 13 morphological elements of rock alignments and discusses their value in determining age. It offers a method for distinguishing between prehistoric and recent water and soil control features when no other evidence is available.

RESUMEN

Los alineamientos de piedras construidos para controlar el flujo del agua y reducir su efecto en el suelo, y que se conocen con iina diversidad de tdrminos tales como represas, terrazas, bordes lineares y trincheras, *han sido por muchos aiios un problema para los arqiredlogos del Suroesre de America. Especialmente ha sido dijicil determinar la antigiiedad de estas estriicturas, ya que alineamientos de rocas construidos recientemente pueden ser facilmente confundidos con estructuras prehispdnicas. Este trabajo identijica 13 elementos morfológicos de estas edificaciones de piedra y discute su valor para determinar temporalidad. Se propone un metodo util para distinguir entre construcciones prehispdnicas y modernas de control de agua y sirelo que puede ser usado cuando no se dispone de ninguna otra evidencia fechable.*

> To people off alone, as we were, there is something stirring about finding evidences of human labour and care in the soil of an empty country. It comes to you as a sort of message, makes you feel differently about the ground you walk over every day (Cather 1925:194).

Archaeologists have long been intrigued and perplexed by features on the Southwestern landscape that can best be described generically as rock alignments. Such features are typically found on gentle slopes or in association with shallow, ephemeral streams — either across them in higher elevations or on the floodplains of arroyos in lower elevations. They are situated perpendicular to slope or stream in series ranging up to a few dozen. Construction involves rocks being piled without mortar. The features vary in height, width (thickness), and length, but are usually less than knee high, a half-pace wide, and a few paces long.

Obviously human-made, these features are interpreted as having served various water and soil control functions, and, accordingly, are known by a number of different terms. Some are called check dams because it is thought they impeded runoff and mitigated soil erosion (Doolittle 1985). Others are envisioned as having created nearly level, well-watered, fertile planting surfaces, and are known as terraces (Sandor and others 1990). Yet others are interpreted as devices that resulted from clearing areas to be cultivated and are referred to as linear borders (Woodbury 1961). Some features undoubtedly performed more than one function simultaneously (Woosley 1980), and other terms, such as boulder-bench terrace (Stewart and Donnelly 1943), have been used interchangeably. Indeed, all such features are known to have served a multitude of purposes, and in the Sierra Madres of northern Mexico are referred to collectively as ***trincheras*** (Herold 1965).

Determining the precise function of rock alignments is problematical but not impossible. Analyses of topographical and cultural setting, hydrology, soil, and sediment aid in interpretation. What is especially difficult, however, is determining age. Unfortunately for archaeologists, the people who constructed these features rarely left datable artifacts (for example, ceramics) in direct association, and items that are sometimes found in fill upslope of alignments could have washed in at a later date. As a result of these problems, rock alignments are most commonly dated indirectly by association with other features in their vicinity, such as dwellings, which can have their ages determined with some degree of accuracy. This method is, however, less than perfect.

Confounding the issue of age is the fact that some rock alignments may be more than one thousand years old, while others were built in the twentieth century (for example, Herrington 1982). In many cases, rock alignments have been built only recently, but in proximity to prehistoric habitation sites. That such conditions exist has led many archaeologists to be rightfully suspicious of some water and soil control features. At the very least, a method is needed to distinguish between rock alignments that are prehistoric and those that are recent. The purpose of this paper is to provide such a method.

The method discussed here is admittedly neither foolproof nor ideal. It should, however, go a long way toward helping archaeologists reduce the likelihood of misinterpreting ages or dates, especially confusing recent and ancient features. The method is based on personal observations of rock alignments on numerous water and soil control sites throughout the Greater Southwest, including northern Mexico. During the past several years we have, individually and together, inspected what must be hundreds, if not thousands, of features on at least scores, or perhaps even hundreds, of sites. Some of the rock alignment sites we inspected have been described and confirmed as prehistoric by others (for example, Graybill 1975; Herrington 1979; Masse 1979; Doyel and Elson 1985; Luebben and others 1986; Peterson 1988). Only one of the confirmed recent sites has been reported previously (Ellis 1991). Stated succinctly, we have assessed rock alignments and derived, albeit intuitively or impressionistically, what we think are morphological characteristics diagnostic of age.

ROCK ALIGNMENT CHARACTERISTICS

Rock alignments have at least 13 diagnostic elements; eight are aspects of construction, while five pertain to current condition, or state of preservation. Each element has at least two, but some have up to four, possible characteristics (Table 1). Although it is impossible to correlate characteristics and ages with absolute certainty, some characteristics tend to be associated with features built at particular times. No single characteristic is, by itself, diagnostic. However, when all are considered in concert, mosaics or assemblages emerge that seem to reflect ages.

Aspects of Construction

Material Source. Rocks used in the construction of water control features come from either local or remote sources. That is, they were collected in the immediate vicinity, or in locales quite distant. For the most part, determination of the material source is quite easy. One only needs to look at a feature, and compare the materials with rocks nearby, within 100 m according to one source (Wilken 1987: 101). If they are similar, the feature was probably built with materials at hand (Figure 1). If not, materials were in all likelihood hauled in (Figure 2).

In terms of chronological correlation (Table 1), prehistoric features tend to be built of local materials while recent ones principally involve rocks brought in from remote sources. This association is most likely a function of historic and recent builders having wheeled vehicles.

Courses. Some water and soil control features consist of nothing more than a simple row of rocks one course high and wide (Figure 1). Others are comprised of rocks layered in multiple courses (Figures 2 and 3). Typically, single course features involve rocks the size of basketballs or greater, whereas features with multiple courses frequently incorporate rocks of virtually any size.

As for age, multiple course rock alignments were frequently built in both prehistoric and recent times; no correlation with age is, therefore, possible (Table 1). Single course features, in contrast, are rare in recent contexts. Most of them are, therefore, prehistoric. If there is an explanation for this relationship, it may well be that prehistoric farmers were more intimately familiar

Table 1. Rock Alignment Characteristics and Probable Ages.

Aspects of Construction			
Material Source		Profile	
Local	P[a]	Vertical	P
Remote	R	Sloping	B
Courses		Elevation	
Single	P	Level	P
Multiple	B	Dipped	R
Consistence		Setting	
Variegated	P	On slopes	P[b]
Uniform	R	On floodplains	B
		Across unincised channels	B
Placement		In gullies	R
Stacked	B		
Dumped	R		
Plan			
Straight	B		
Arched Downstream	P		
Arched Upstream	R		
Current Conditions			
Integrity		Trees	
Center-breached	P	Absent	B
Side-breached	B	On or through features	
Intact	R	Small	B
		Large	P
Eroded Materials		Around which features curve	R
Immediately downstream or downslope	P		
Gone	R	Lichens	
		Presence	B
		Absence	R
Interstices			
Sediment-filled	P		
Clear	R		

a. P, R, and B refer to the ages for which the characteristics tend to be diagnostic. P = prehistoric; R = recent; B = prehistoric and recent.

b. Except in southern Arizona where they are B.

with the local environments than their recent counterparts and did only the minimum amount of work necessary to achieve their goals. Being less familiar with the environment than their earlier native counterparts, recent builders, especially young workers in the Civilian Conservation Corps (CCC) who came from all over the country, built much more than what was actually needed.

Consistence. Determining the ages of multiple course alignments can be improved by observing consistencies in the sizes of materials used. Some water and soil control features are variegated, composed of rocks of a mul-

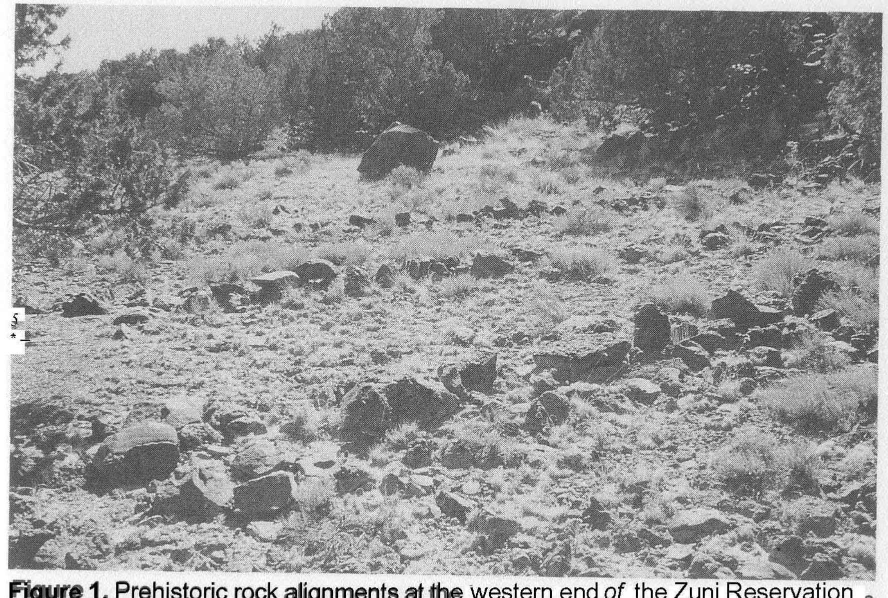

Figure 1. Prehistoric rock alignments at the western end of the Zuni Reservation near the New Mexico-Arizona border. Note (1) the materials used in construction are identical to those on the surrounding slope, (2) the single course construction, (3) the slope setting or location, and (4) the lack of sediment behind features. (Note: All photographs were taken by the senior author.)

titude of sizes (Figure 3). Others are uniform, consisting largely of rocks of one size (Figure 4).

In terms of chronological association (Table 1), those features constructed with rocks of numerous sizes tend to be prehistoric. Features consisting of rocks of uniform size are nearly always recent in age. This finding is probably linked to that involving material source. Rocks trucked in from remote sources tend to be sorted by size. Builders loading materials in one locale to be carried to another usually select, either consciously or subconsciously, rocks of one convenient size. In contrast, builders using local materials would be less concerned about the sizes of rocks used and hence the consistency of the finished product.

Placement. As is the case with consistence, the ages of multiple course features can be better approximated by observing how materials were actually placed during construction. Rocks can be placed in one of two ways. They can either be stacked or they can be dumped. Features built by stacking differ somewhat in appearance from features built by dumping. Although admittedly intuitive, the former look as if they were built with deliberation (Figures 3 and 4), while the latter often seem to have been built with little care (Figure 2).

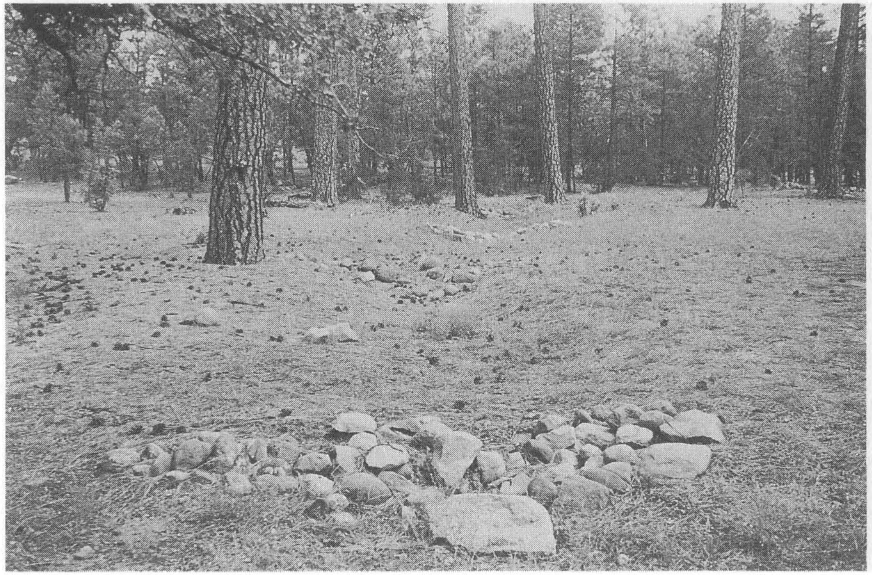

Figure 2. Rock alignments constructed in 1984 in the Pueblo Creek Campground, Apache-Sitgreaves National Forest, New Mexico. These features are located within 100 m of a Pueblo room block. Note (1) the difference between the rock used in construction and the surrounding slopes, (2) the multiple course construction, (3) that the one in the foreground appears to have been built by simply dumping rocks on the surface, (4) that they are set in an unincised channel, and *(5)* the lack of breaching.

Unfortunately, there is little that can be done to discriminate between structures that were built by stacking in prehistoric and recent times (Table 1). The technique of placing one rock at a time has remained consistent from ancient to modem times. Dumping, in contrast, is most diagnostic in that it involves relatively new technology. Features built by dumping are always recent in that they were built with the aid of wheeled vehicles, either wheelbarrows or trucks, not available to ancients. Relatedly, placement by dumping typically involves material of uniform consistency from remote sources.

Plan. When viewed from an aerial perspective, rock alignments can either be straight or arched. The term "arch" is used here rather loosely, as there exists at least one confirmed case in which the arch is not curved, as the term connotes, but is L-shaped (Neely 1992a, b). Those alignments that are arched can curve either upstream, with the concave side facing downstream (Figure *5)* or they can curve downstream, with the concave side facing upstream.

As for chronologically diagnostic relationships (Table 1), none is apparent for straight features; many prehistoric and many recent water and soil control structures are not arched. In contrast, there appears to be a rather discrete relationship between ages and the directions of arches. Features that arch downstream are usually prehistoric. Ancient builders were usually farmers and one of their goals was to create agricultural plots. The downstream arch apparently maximized the planting area behind or upstream of each alignment. Features that arch upstream are typically recent. Builders of such structures were rarely, if ever, farmers. They were laborers commissioned to control erosion. Recognizing the strength of the arch, these builders constructed small structures seemingly modeled after larger structures such as Hoover Dam.

Profile. When viewed from the side, multiple course rock structures appear either vertical or sloped slightly, with the top further upstream or upslope than the base. To be sure, profiles are in large part a function of feature height, which itself is related to stream or slope gradient. Water and soil control features built on gentle grades are typically widely spaced and low in height. Stress and load are relatively low, and hence, structures can be built with vertical profiles. In contrast, features constructed on steep grades are closely spaced and relatively high. Because stress and load are considerable, features are built with bottoms that are wider than tops, and therefore have sloping profiles.

As for correlating the ages of rock alignments with profile types, the situa-

Figure 3. Prehistoric rock alignment at Sample Area A, Rio Gavilan, Chihuahua, Mexico (Herold 1965). Note (1) the multiple course construction, (2) the variety of rock sizes, including boulders that were probably in place before construction, (3) restacking of rocks that required some degree of care, (4) the level or flat top, *(5)* the setting across an unincised channel, and (6) the large, and hence old, oak trees growing through the feature.

Figure 4. Water and soil control structure built by the Civilian Conservation Corps (CCC) in the 1930s near Mogollon, New Mexico. In addition to the multiple course construction, note (1) the uniformity in the sizes of the rocks, (2) the stacking of materials that involved a certain amount of deliberation, (3) the dipped elevation, **(4)** the way in which rocks were stacked in the channel, abutting the banks, (5) the lack of breaching, and (6) the sediment accumulation behind the structure.

tion is just the reverse of that for placement (Table 1). Whereas structures with sloping profiles can be either prehistoric or recent, those with vertical profiles are nearly always prehistoric. Of course, the association between vertical profiles and prehistoric times is limited only to comparatively small, especially low, structures. Ancient builders, it seems, simply stacked rocks wherever and as high as they thought was needed. When exceptionally high features were needed, they gave considerable thought, exerted much care, and sloped the profiles (for example, Herold 1965; 90-98). Builders of recent water and soil control features also sloped profiles, but it is doubtful that they did so with much thought. Nearly every feature of recent age is sloped, whether it needs to be or not. High structures were sloped because of need. Those whose placement involved dumping were sloped axiomatically. Even very low features, those with only two or three courses built by stacking small materials, were sloped. Clearly overbuilt, these structures show signs of being modeled, at least superficially, after large-scale modern dams.

Elevation. When viewed from the front, (that is, from down slope) the tops of rock features are either level (Figure 3) or dipped, slightly lower in the center than at either end (Figure 4). In terms of age (Table 1), level elevations

Figure 5. Rock structure built by the CCC in the 1930s south of Glenwood, New Mexico (Ellis 1991). Note (1) the upstream arch, *(2)* that the feature is set entirely within a gully, with the ends abutting the banks, and (3) the lack of sediment accumulation.

tend to be characteristic of structures that are probably prehistoric whereas clipped profiles seem to correlate with structures of a more recent age (Ellis 1991:7). Exactly why recent water and soil control structures in the Southwest have dipped elevations is not known. However, similar structures being built elsewhere in the world today have "spillways" that are similar in appearance and help control the flow of runoff (Geyik 1986:22-24).

Setting. The final aspect of construction is different from the others in that it does not pertain to the rock alignments themselves, but rather to where they are located. Rock alignments were built, and hence are found, on slopes (Figure 1), on the lower terraces or floodplains above incised channels, across small, unincised, normally dry stream channels (Figures 2 and *3*), and in incised channels or gullies (Figure *5*). For the most part, those on slopes seem to be ancient (Table 1). There is only scant evidence that such structures were built recently, and this is limited to southern Arizona (Fish and Reichhardt 1983: 13,26). By and large the modem rationale for building rock alignments on slopes is lacking. As was mentioned in the case of downstream arching, prehistoric builders were farmers. They built alignments on slopes to stabilize soils for planting. Recent builders were more concerned with stopping gullying rather than preventing it (Francis 1957; Otis and others 1986:29-33). They

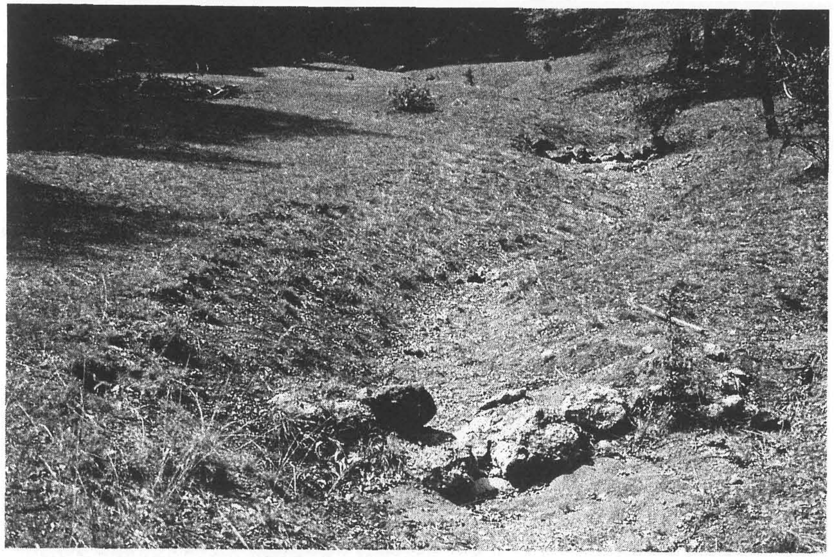

Figure *6.* Upstream view of rock features in a gully near Corral Cave, Chihuahua, Mexico (Lister 1958). The alignments were built in prehistoric times on the floor of what was an unincised tributary of the Rio Piedras Verdes. They were later covered with sediment and only recently exposed by gullying. Note that the features extend into and under the channel banks, and that center-breaching appears similar to a dipped profile.

rarely built on slopes, prefemng instead to build in stream bottoms (Salmond and Croft 1955).

Rock alignments located either on floodplains or across unincised channels are especially problematical in terms of determining their ages (Table 1). Such features are known to have been built during virtually every era. In the case of rock alignments on floodplains overlooking channels, many have been constructed recently in conjunction with farming activities (Doolittle 1984:129, Fig. **3),** and are nearly identical to those built prehistorically and long abandoned (Doolittle 1980:334, Fig. 3). As for rock alignments across unincised channels, some were essential to cultivation prehistorically (Figure 3), and others were built recently in attempts to forestall gullying (Figure 2).

In contrast to those built on slopes, floodplains, or across unincised channels, rock alignments situated entirely within the confines of gullies are nearly always recent (Figure 5). In no small way this is related to increased erosion since the late 1800s and attempts to control or halt it (De Bano and Heede 1987). Indeed, the CCC is known to have built thousands of such structures, which were referred to in the vernacular as "gully plugs" (Ellis 1991; see also Geyik 1986:28). One must be extremely cautious, however, when inspecting

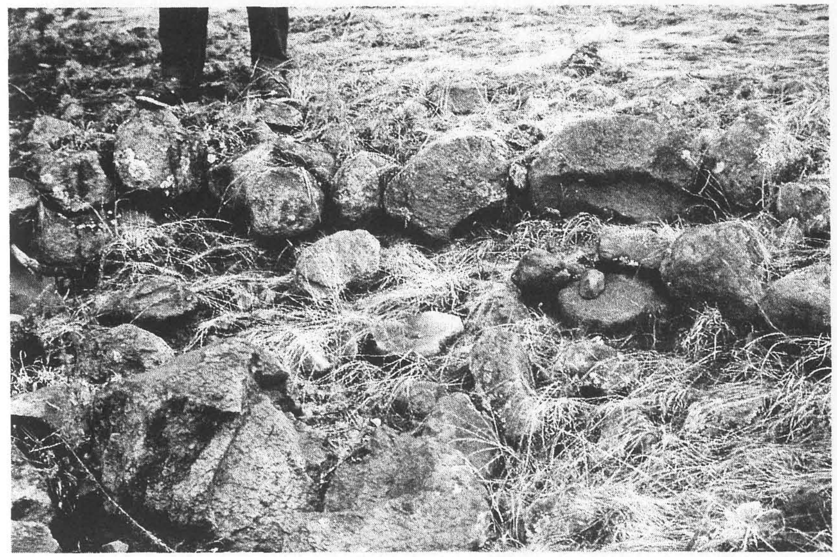

Figure *7.* Close-up view of a prehistoric rock alignment at Area III of sites near Lake Roberts, north of Silver City, New Mexico (Sandor and others 1990). Note (1) that a sufficient amount of sediment has accumulated in the interstices to allow for the growth of grasses, and (2) the sediment accumulated behind the feature.

rock structures in gullies. In some cases rock alignments were built prehistorically across unincised channels or on floodplains and later covered by sediment. Subsequent gullying has then exposed these structures, which look at first glance much like gully plugs (Figure 6). Closer inspection reveals that rocks continue into the gully banks and under the overlying sediment. Recently constructed rock alignments in gullies abut the channel banks (Figures 4 and 5).

Current Conditions

Integrity. It would certainly be nice to say that rock alignments deteriorate or fall into ruin at some constant rate after they are abandoned. If such were the case, one could determine the age of a feature by simply measuring the amount of rock work remaining intact and doing a little subtraction. Of course, rock alignments do not deteriorate uniformly. Fortunately, however, there seems to be a relationship between the nature of deterioration and age.

There exists three categories of integrity. Rock alignments can be intact, side-breached, or center- or top-breached (Table 1). Those that are intact show few, if any, signs of deterioration (Figures *2* and 4). Those that are side-breached have had one end of the alignment removed from top to bottom, but with the opposite end almost intact. Features that are center-breached have one or more courses, or the entire center section, eroded away so that only fragments of the ends remain in the channel banks. Center-breached features are sometimes difficult to distinguish from those that were built with dipped elevations, but they can be identified by an irregular or broken appearance (Figure 6). As for chronology, features that are intact are normally recent in age. Runoff begins to take its toll on water control features after even a brief period of use such that, with the exception of some recent ones, most rock alignments show at least some signs of deterioration. Side-breaching is not very diagnostic as it is found in both ancient and recent alignments. Center-breaching, in contrast, is diagnostic, being a characteristic of rock alignments that are most often prehistoric. It is unclear exactly why this is so, but the tendency is apparent. In some cases, center-breached prehistoric features have been repaired and brought back into use during recent times. This is evident in differences in material used and construction techniques.

Eroded Materials. As rock alignments deteriorate, the materials used in construction erode downslope or downstream as a function of gravity or flowing water. Accordingly, one might be tempted to think there is a positive relationship between the age of a feature and the distance eroded materials have traveled. Not so. Rocks used in the construction of prehistoric structures are not found further away than those used in recent rock alignments. Indeed, the relationship is more complex.

Prehistoric rock alignments tend to have some eroded material still visible on the ground. But, rather than being far away, rocks are just downslope or downstream of the respective features (Table 1). Recent structures, on the other hand, tend to have very little or no materials immediately beneath or in front of them, even if they are heavily eroded. This is particularly true of features in gullies. Materials dislodged from recent rock alignments tend to be flushed completely out of the local hydrologic system, undoubtedly as a result of very high flow velocities the "gully plugs" were intended to, but did not, impede.

Interstices. The spaces between rocks, interstices, can either contain sediment or be relatively free of it. The degree to which interstices have become filled with sediment is nearly always chronologically diagnostic, as the amount of filling seems to be a function of time. Generally speaking, the older the feature, the more sediment that has accumulated between the rocks (Table 1). Prehistoric rock alignments tend to have a great deal of sediment filling the interstices (Figure 7), historic ones have some, and recent ones have very little if any such sediment (Figure 8).

Trees. There are no known, or likely, cases in which trees were planted on rock alignments. There are, however, cases in which alignments were built around trees (Fish and Reichhardt 1983:10), and in which trees are found growing through them. These trees can be used to help determine the ages of

Figure 8. Close-up view of the feature shown in Figure **4.** Note that the interstices remainfree of sediment.

features. Rock alignments without trees on or near them can, of course, be either prehistoric or recent. Similarly, those with small trees can be of any age, as trees can sprout today on or around old features as easily as they can sprout on or near new ones. Rock alignments with large trees growing through them can only be old (Figure 3). Exactly how old, of course, is problematical. At the very least, large trees can provide an indication of minimum ages (for example, Nightengale and Neely 1986:199). Ages can be determined quickly and easily by extracting tree ring samples with an increment borer. In general, rock alignments containing trees more than 60 years old and located outside of areas known to have been utilized recently are most likely prehistoric (Table 1). Conversely, rock alignments that curve around large and old trees are usually recent (Fish and Reichhardt 1983:10).

Lichens. Although few rock alignments have trees growing through them, nearly every such feature has lichens growing on it. It should not be surprising, therefore, that nearly everyone who has considered the ages of water and soil control features has wondered about the diagnostic properties of lichens. To be sure, some lichens grow slowly and have long lives. Some grow in diameter less than 0.5 mm annually and live hundreds of years. However, there exist three problems with lichens that limit their prospects for archaeology. First, some species grow in diameter more than 8 mm annually, thereby making any correlation between size and age, species specific. Second, growth rates vary with age and with moisture, temperature, and shade conditions (Hale 1973). Lastly, one could only hope to determine the length of time that an individual rock's surface has been exposed to air and sunlight, and not the age of a feature composed of multiple rocks. Water and soil control structures can be constructed of rocks already covered with lichens. Because of these difficulties, there remains only one study that has attempted to apply lichenometry to archaeology (Follmann 1961). If there is any relationship between lichens and the ages of rock alignments, it is that an absence of lichens reflects a recent age (Table 1). Given that some species do grow fast under ideal conditions, one cannot assume, however, that all recent structures are devoid of lichens.

Miscellaneous Factors and Location

In addition to the 13 elements outlined above, there are a few other traits that can be used to distinguish between recent and prehistoric rock alignments. These traits are the use of metal materials (reinforcing bar, pipes, wire), concrete, and proximity to other features. Metal and concrete were not available to prehistoric Southwestern peoples. Their use in rock water and soil control features can, therefore, only date to recent times.

The locational context, as was mentioned earlier, can be problematical. Water and soil control features are known to have been built recently near prehistoric habitation sites, and, obversely, buildings have been constructed near prehistoric rock alignments. In many cases rock features can be identified as recent because of their association with various features on the cultural landscape that date to recent times. For example, in one case a series of parallel rock alignments built by the CCC terminates abruptly at a Township and Range survey section line (Fish and Reichhardt 1983:4). Much more common, and conspicuous, however, is the association between rock alignments and roads. Rock alignments were often built to control runoff and gullying that would otherwise jeopardize traffic as well as the integrity of roads themselves. For the sake of prudence, archaeologists should assume that if a rock alignment can be seen from a road, especially one that is paved, it is recent.

Non-Factors

Whereas many characteristics of rock alignments are diagnostic of age, others, some of which are most visible and therefore seemingly relevant, are not. Three such characteristics pertain to construction; one involves current conditions.

Material Size. The size of rocks used in the construction of water and soil control features varies considerably from very small fragments to large boulders. Typically, however, neither fragments nor boulders was the principal

material utilized. Fragments were used mainly to fill chinks (see below). Boulders, when used, were probably in location prior to construction, or they were rolled into place from locales higher up on adjacent slopes (Figure 3); they tend to be few in number and reflect builders' opportunistic tendencies. Most of the rocks used in construction range from fist- to basketball-sized. Other than in terms of consistence, the sizes of these materials have little, if any diagnostic value. Prehistoric and recent features alike, are made of rocks of all sizes.

Masonry. Multiple course water and soil control structures can be built of rocks that were worked or shaped by chipping off segments in order to reduce chinks or interstices, thereby providing a fit tighter than would be achieved otherwise; or they can be built with stones that were unworked. That is, rocks can be stacked without being intentionally shaped. Few rock alignments in the Southwest were built with worked rock. Furthermore, there seems to be no relationship to age. Builders of water and soil control features, regardless of time period, only rarely bothered to shape the materials utilized.

Chinks. Spaces between rocks used in the construction of multiple course water and soil control features are sometimes chinked, or filled intentionally with small rock fragments, presumably to provide a tight fit and to help retain soil and moisture. In other cases, interstices remain unfilled. As is the case with both masonry and material size, chinks are of little, if any, chronological diagnostic value. Modern features are chinked just as frequently as prehistoric structures. The same can be said in reference to the frequency in which interstices are unfilled.

Back Areas. The areas behind rock alignments, that is immediately upslope or upstream, can either be filled with sediment or remain unfilled. It is not known at this time if any prehistoric features were artificially filled, although it seems likely in those cases where rock alignments served as terraces and the subject areas were cultivated. More work is needed in this area (Doolittle 1990). It is rather certain, however, that most rock alignments did, and do, trap sediment naturally, and that sediment has been eroded out from behind some very old features.

Given that all water and soil control features trap sediment, albeit at different and varying rates (Leopold and Bull 1979), and that erosion is an ongoing process, again at different and varying rates, it should not be surprising that the condition of back areas is of no help in determining the ages of rock alignments. Some clearly prehistoric features are sediment-free (Figure 1) while others have much sediment remaining in place (Figure 7). Similarly, some recently constructed structures have back areas full of sediment (Figure 4) while others are sediment free and appear to have never collected any (Figure 5). If there is a way of determining the age of features with sediment, it is through pedological analysis. Clearly, if soil formation is evident in the sediment, the age of the retaining alignment would have to be quite old (Sandor and others 1990).

METHOD OF AGE DETERMINATION

Given what are obviously less than perfect relationships, no single characteristic can by itself be considered chronologically diagnostic, at least with any great certainty. When all of the characteristics discussed above are considered together as an assemblage, however, a mosaic emerges that appears to reflect age. For example (Table 1), an archaeologist who finds a rock alignment while conducting a survey can feel comfortable in ascribing a prehistoric age to the feature if it has the following characteristics: (1) made from locally available materials, (2) either a single course, or (3) multiple courses with (4) a variegated consistence, (5) an arched downstream plan, (6) a vertical profile, (7) a level elevation, (8) located on a slope, (9) center-breached, (10) with eroded materials located immediately downslope, (11) sediment-filled interstices, and (12) a large tree growing through it. Conversely, the same archaeologist should ascribe a recent date to any feature characterized by (1) rocks that were brought in from a remote source, (2) multiple courses with **(3)** uniform consistence, (4) dumped in place, (5) with an arched upstream plan, (6) a dipped elevation, (7) located in a gully, (8) no signs of breaching, or (9) side breaching with (10) eroded materials no longer in proximity, (11) clear interstices, (12) built around a large tree, and (13) having no lichen growth.

But what about a multiple course rock alignment (1) with materials stacked in place, (2) a straight plan, (3) a sloping profile, (4) located on a floodplain or across an unincised channel, (5) that has been side-breached, (6) has either no trees or only small ones growing through or near it, and (7) lichens growing on it? What age can be ascribed to such a feature? Such characteristics are seen in both prehistoric and recent rock alignments.

In such cases, it is incumbent on the archaeologist to assess the other six diagnostic elements as well as the miscellaneous factors and the features locational context. The more the characteristics are usually associated with prehistoric features and not found in recent contexts, the more likely it is the subject rock alignment is ancient. Conversely, the likelihood of the feature being recent increases as the number of traits typically associated with such features becomes greater and if the alignment is in a recent context.

In conclusion, the method offered here is, again, neither perfect nor foolproof. It is, at best, a first attempt at coming to grips with a problem the solution to which has long evaded archaeologists. It is hoped this method will be useful in the short-term and will be refined and improved in the long-term. Archaeologists should find Table 1 to be useful in conjunction with their other survey forms. Used as a check-sheet, the table will allow field workers to quickly assess rock alignments and determine their probable ages. Such a systematic approach will not only improve our immediate understanding of water and soil control features, but will also establish a means by which our knowledge can be constantly improved.

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