1977

The Anasazi Yucca Ring Basket

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THE ANASAZI YUCCA RING BASKET

BY

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

TEXTILES, CLOTHING, AND RELATED ART

UNIVERSITY OF RHODE ISLAND

1977

ABSTRACT

This study considers the Anasazi yucca ring basket of the Southwest, which is the oldest continuous form of plaited textile in North America. Four technological criteria, the method of manufacture, form and size, decoration, and materials used, are analyzed visually and statistically for both archaeological and ethnological specimens. Three culture periods are considered: the Basketmaker Period of ca. A.D. 1 to 700, the Early Pueblo Period of ca. A.D. 700 to 1300, and the Late Pueblo Period of ca. A.D. 1300 to the present.

Three hypotheses which pertain to continuity and change within the Anasazi sequence are tested. These hypotheses are:

H_1: Variations in the four technological criteria reflect cultural continuity and change through time.

H_2: Variations in the four technological criteria reflect varied cultural distribution and ecological adaptation in space.

H_3: Changes in life patterns, such as development ofagriculture, climatic variability, and new trade outlets, have affected production of the ring basket.

For each hypothesis, the three criteria of method of manufacture, decoration, and materials used are explored visually. Six variables of the fourth criterion, that of dimension, are analyzed statistically. T-tests of means are used to evaluate the first two hypotheses. Analysis of variance (f test) and rho correlation are used to test the third hypothesis. All three hypotheses are confirmed through both visual and statistical evaluation. Ultimately, the results of this inquiry suggest that the study of the ring basket, as an element of material culture, can illuminate the nature of human adaptation and culture processes in the Southwest.

ACKNOWLEDGMENTS

Both deep appreciation and thanks are extended to Dr. Virginia Carpenter who has served as advisor and major professor during my graduate work in the Department of Textiles, Clothing and Related Art at the University of Rhode Island. In addition, Mrs. Patricia Weeden and Mr. William Wallace have been extremely helpful and courteous thesis advisors. Listing the numerous individuals and institutions who have assisted in this project is impossible but most certainly should include Marian Rodee, Registrar of the Maxwell Museum of Anthropology in Albuquerque, New Mexico, and Sally Bond, Cataloguer at the Peabody Museum of Archaeology and Ethnology in Cambridge, Massachusetts, both of whom made their museums' collections available for study, and my husband, Dr. William Turnbaugh, for his understanding, support, and encouragement. Lastly, thanks is due to Mrs. Kathleen Schlenker of the U.R.I. Inter-Library Loan Office for locating many of the references which were essential for this study, to Valerie Morgan for her expert advice, and to the faculty members and graduate students in the Department of Textiles, Clothing, and Related Art.

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INTRODUCTION

Anthropologists and archaeologists have studied the nature of human adaptation in the Four Corners Region of the Southwest for more than seventy-five years. While excellent preservation of material culture has reduced disagreement in interpretations of culture processes, the actual nature of subsistence patterns and regional and temporal variation of cultural adaptation is contested. Two major positions which address the specific nature of human adaptation in the Southwest prevail. The first view, formulated by Jennings[1] on the basis of previous research, suggests that subsistence patterns from 8,000 B.C. to the Historic-Contact Period were stable, regionally similar, were based on the exploitation of all available resources, and were unaffected by climatic fluctuations.

On the other hand, Baumhoff and Heizer[2] contend that regional subsistence patterns were diverse, varied considerably due to climatic fluctuations and specific adaptation to local microenvironments, and were based on the exploitation of a few abundant resources to the exclusion of other

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1 Jennings, Jesse, "Danger Cave," Memoirs of the Society for American Archaeology, Vol. XXIII, No. 2 (1957).

2 Baumhoff, M. and R. Heizer, "Postglacial Climate and Archaeology in the Desert West," In The Quaternary of the United States (H. Wright and D. Frey, editors), pp. 697-707. Princeton, N.J.: Princeton University Press, 1965.

possibilities. Climatic variation is the crux of this second argument and has been the focus of much research. Hevly,[3] for example, has discussed two basic patterns of climatic variation on the Colorado Plateau, both of which emphasize fluctuations in the amount of precipitation. Herold[4] has addressed the interrelation of physical and climatic environment and settlement patterns in the Mesa Verde region.

While several researchers have attempted to integrate the two theoretical views, Bettinger[5] has partially resolved the dilemma for the Great Basin region. His data support the second position and indicate that the nature of human adaptation in eastern California varied both through time and space.

Through analysis of the twill plaited ring basket, the present study explores these two theoretical positions for the Southwest culture area. The yucca ring basket is considered to be the oldest continuous form of plaited textile in North America.[6] In addition to ethnological

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3 Hevly, R. H., Pollen Analysis of Quaternary Archaeological and Lacustrine Sediments from the Colorado Plateau. Unpublished Ph.D. dissertation. Tucson: University of Arizona, 1964.

4 Herold, Joyce, Prehistoric Settlement and Physical Environment in the Mesa Verde Area. Salt Lake City: University of Utah Press, 1961.

5 Bettinger, Robert, "Aboriginal Human Ecology in Owens Valley," American Antiquity, Vol. XLII, No. 1 (1977), pp. 3-17.

examples, many archaeological specimens of this type of basketry have been preserved due to arid climatic conditions of the Southwest. While modern day Puebloan peoples produce and sell ring baskets, the uninterrupted tradition of making such vessels can be traced back fifteen centuries to the early Anasazi people, ancestors of the modern Hopi and Pueblo Indians. Since this particular type of basketry has unusually good temporal and spatial control, its study should illuminate the specific nature of human adaptation in the Southwest.

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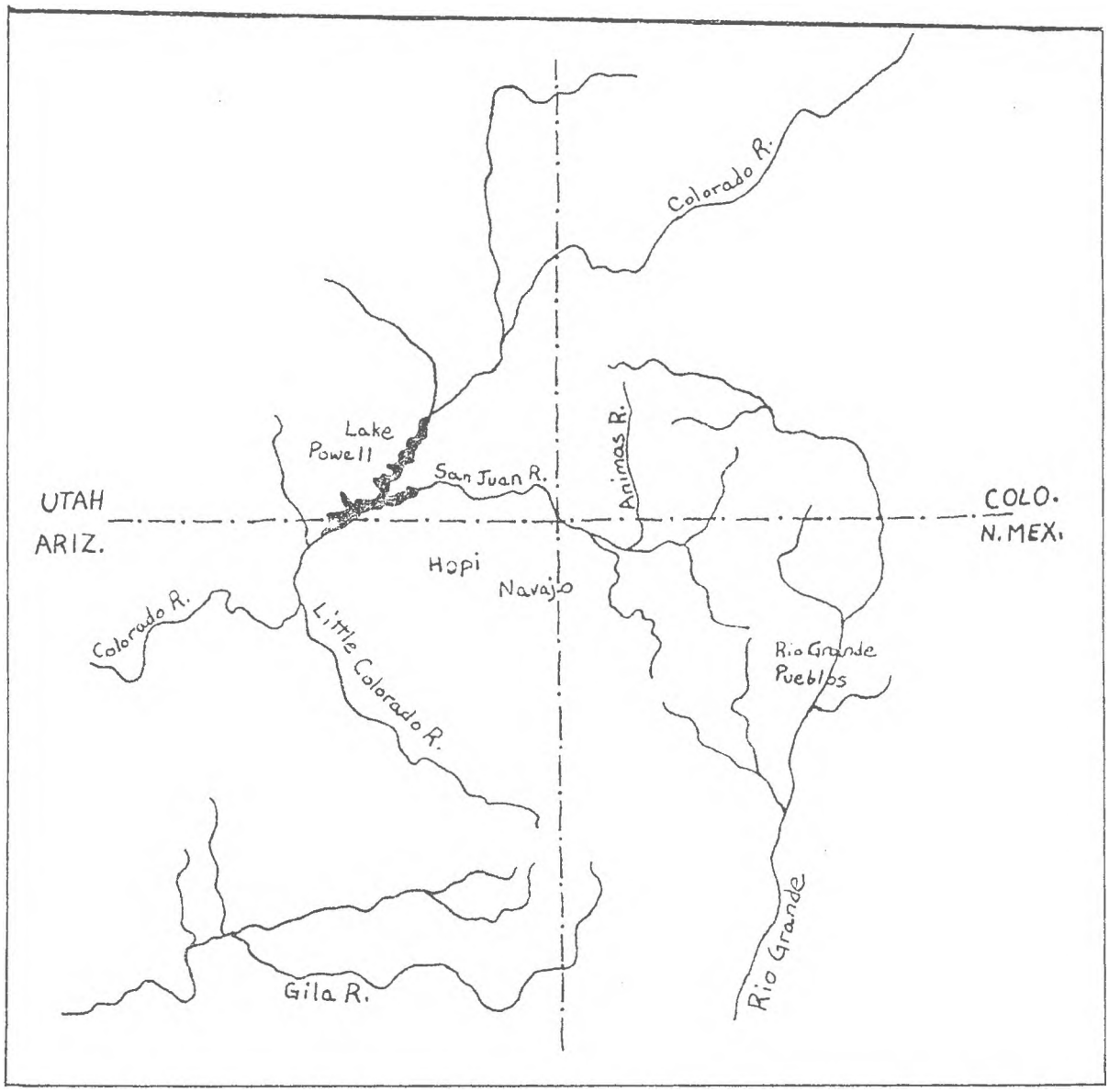
6 Morris, Earl and Robert Burgh, "Anasazi Basketry," Publications in Anthropology and Archaeology, Vol. 533 (1941), p. 20. Washington, D.C.: Carnegie Institution.

FIGURE 1

THE FOUR CORNERS REGION OF ANASAZI HABITATION



CHAPTER I

THE GENERAL SETTING

The present inquiry will consider the twill plaited ring basket in order to explore the temporal and spatial variability of human adaptation in the Four Corners Region of the Southwest culture area (see Fig. 1). The general validity of considering material culture to study cultural dynamics, the history of the Anasazi adaptation in the Mesa Verde area, the technology of the yucca ring basket, and cultural-historical dynamics are first discussed. Ring baskets are overlooked in much of the recent literature. Consequently, older research reports and several syntheses were consulted more frequently in the present review of the literature.

Basketry as Material Culture

Material culture, or the objects a people make and use, constitutes the overt expression of a culture. Within each culture area, or geographical unit within which a culture or definable group of people lives, material culture is distinctive. While the method of manufacture, form, decoration, and materials used in creating each object reflect the concepts and attitudes of the makers, they are

molded for the most part by more general cultural norms.[7] Changes in material culture can be a primary indication that a people is becoming acculturated and is assuming another people's lifestyle. The North American Indian's adoption of the white man's trade goods is an example of this process.

The North America of the American Indian traditionally has been divided into culture areas numbering from seven to fifteen.[8] The basketry of each region is readily identifiable by characteristic traits of manufacture and decoration[9] which probably reflect cultural norms. As a trait complex of material culture, basketry would seem to lend itself to study as a means of learning more about a total cultural system.

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7 Whiteford, A., North American Indian Arts. New York: Golden Press, Western Publishing Co., Inc., 1970; and Newcomb, W., North American Indians. Pacific Palisades, Calif.: Goodyear Publishing Co., Inc., 1974.

8 Wissler, C., "Material Cultures of the North American Indians," American Anthropologist, n.s., Vol. 16, No. 4 (1914), pp. 447-505; Driver, H., Indians of North America. Chicago: University of Chicago Press, 1961; Kroeber, A., Cultural and Natural Areas of Native North America (Fourth printing). Berkeley: University of California Press, 1963.

9 Mason, O., "Aboriginal American Basketry," Report of the U. S. National Museum for the Year Ending June 30, 1902, Part II, pp. 171-548. Washington, D.C.: Government Printing Office, 1904; Weltfish, G., "Prehistoric North American Basketry Techniques and Modern Distributions," American Anthropologist, n.s., Vol. 32, No. 3 (1930), pp. 454-495; James, G., Indian Basketry (Fourth edition). New York: Dover Publications, Inc., 1972.

In The Study of Man, Linton[10] justified theoretically the consideration of material culture when attempting to describe and explain culture processes. Both Tschopik[11] and Shreve,[12] respectively, applied versions of this theoretical approach to the 19th-early 20th century Navajo and Papago basketmaking complexes and illustrated specifically its practical validity for increased cultural understanding. The present inquiry combines the functional approach of Linton with the historical method to examine the nature of cultural variation in space as well as cultural change through time.

Subsequent consideration of the cultural significance of the ring basket is set in the framework of Anasazi culture history. Consequently, brief discussions of the Anasazi adaptation and of the technology of the ring basket seem in order.

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10 Linton, Ralph, The Study of Man. N.Y.: D. Appleton-Century, 1936, p. 397.

11 Tschopik, H., "Navajo Basketry: A Study of Cultural Change," American Anthropologist, n.s., Vol. 42, No. 3 (1940), pp. 444-462.

12 Shreve, Margaret, Modern Papago Basketry. Unpublished M.A. thesis. Tucson: University of Arizona, 1943.

FIGURE 2

THE ANASAZI SEQUENCE

General Period	Specific Period	Date Range
	Pueblo V	ca. A.D. 1600-present
LATE PUEBLO		
	Pueblo IV	ca. A.D. 1300-1600
	Pueblo III	ca. A.D. 1100-1300
EARLY PUEBLO	Pueblo II	ca. A.D. 900-1100
	Pueblo I	ca. A.D. 700-900
	Basketmaker III	ca. A.D. 400-700
BASKETMAKER		
	Basketmaker II	ca. A.D. 1 - 400

Anasazi Culture History

The Anasazi chronology is the most complete and well-controlled chronology in North America.[13] It provides reliable dates for each Anasazi period from Basketmaker II (ca. A.D. 1 to 400) to the present (see Fig. 2). Throughout this sequence, the Anasazi population occupied the San Juan and Little Colorado river drainages in the Four Corners Region of the Southwest.

During the early 20th century, archaeologists suggested that the Basketmaker--Pueblo periods represented a discontinuous human population. The favored argument at present, however, contends that the Anasazi population was continuous and at no time absorbed large influxes of foreign peoples. Specific studies of physical morphology and of material culture such as sandals, maize, cotton, and basketry support this position.[14]

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13 Willey, G., An Introduction to American Archaeology: North and Middle America (Vol. 1), p. 187. Englewood Cliffs, N.J.: Prentice-Hall, 1966.

14 Ibid., I, pp. 206-207; Baldwin, G., "An Analysis of Basketmaker II Sandals from Northeastern Arizona," American Anthropologist, n.s., Vol. 40, No. 3 (1938), pp. 465-485; Brown, W. and E. Anderson, and R. Tuchawena, "Observations on Three Varieties of Hopi Maize," American Journal of Botany, Vol. 39 (1952), pp. 597-609; Haury, E. and C. Conrad, "The Comparison of Fiber Properties of Arizona Cliff-Dweller and Hopi Cotton," American Antiquity, Vol. 3 (1938), pp. 224-227; Morris, E. and R. Burgh, "Anasazi Basketry," Publications in Anthropology and Archaeology, Vol. 533 (1941).

The present inquiry accepts the argument for the continuity of one population in the subsequent summary of Anasazi culture history. More detailed considerations of Anasazi history are available elsewhere in the literature.

The terms 'Basketmaker' and 'Pueblo' are used to refer to the sequence of cultural change.[15] Although somewhat arbitrary, the term 'Basketmaker' characterizes the earlier periods in which the most highly developed form of material culture was the basket. 'Pueblo' refers to the later five periods during which the population built and lived in architectural structures called pueblos.[16]

The Basketmaker Period (ca. A.D. 1-700)

Basketmaker II (ca. A.D. 1-400)

Cave sites and occasional open village sites characterize the Anasazi culture of this period. Material culture such as grinding stones, baskets, remains of domesticated squash and maize, wild food remains such as amaranth and sunflower seeds and tansy mustard, atlatls, and spear points implies both a semi-hunting and gathering and a semi--agricultural adaptation of these early people. Basketmaker II

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15 Plog, Fred, The Study of Prehistoric Change. N.Y.: Academic Press, 1974.

16 Willey, G., An Introduction to American Archaeology: North and Middle America (Vol. 1). Englewood Cliffs, N.J.: Prentice-Hall, 1966.

sites are located in the northern San Juan and Animas River region near Durango, Colorado and in northeastern Arizona and northern New Mexico. The probable prototype of the true ring basket, a simple over-two/under-two twill plaited bag-like basket, appears during this period. This receptacle differs from the later ring basket in that it has no wooden ring-rim, is made from an entire yucca plant, and is deeper.

Basketmaker III (ca. A.D. 400-700)

Basketmaker III open village sites are larger than those of the previous period and are located in major drainages such as those of the San Juan and Animas rivers. The larger size of villages, the production of coarse pottery, and the cultivation of the bean in addition to maize and squash imply increased sedentism of the population. During this period, the first true ring baskets appear, along with the earlier form.

The Early Pueblo Period (ca. A.D. 700-1300)

Pueblo I (ca. A.D. 700-900)

During Pueblo I, transition from shallow pithouses to above-ground pueblos occurred. Sites are located in a larger geographic area which encompasses the upper Little Colorado region of eastern Arizona, the Piedra region of Colorado, and the northern San Juan drainage of Utah. Domestication of the turkey and increased production of pottery and cotton textiles are characteristic of this period.

Pueblo II (ca. A.D. 900-1100)

Pueblo II settlements are smaller and more widely scattered in river drainages of Utah, Arizona, and New Mexico. Most remains of perishable materials which date to this period are fragmentary. However, it appears that agriculture continued to develop and that the makers of ring baskets were beginning to manipulate the structural elements to create decorative twilled patterns of concentric diamonds and zigzags.

Pueblo III (ca. A.D. 1100-1300)

The widespread presence of large communal pueblos in villages is characteristic of this period. Stone masonry, agriculture, water control, trade, and arts and crafts initially flourished. Settlements were most dense in the northern San Juan, northeastern Arizona, and northern New Mexico regions such as Mesa Verde. The early years of this period mark the height of Anasazi florescence. Not surprisingly, the ring basket achieved its greatest aesthetic elaboration at this time. Toward the end of Pueblo III, large towns such as Pueblo Bonito were abandoned. From the archaeological evidence, a combination of war and prolonged drought seems to be the most plausible explanation for

cultural decline.[17]

The Late Pueblo Period (ca. A.D. 1300-present)

Pueblo IV (ca. A.D. 1300-1600)

During this period, the total area of Anasazi occupation shrank, particularly in the more southern areas of occupation. Population grew smaller in size and number, and material culture, including the ring basket, became simpler and less elaborate in construction.[18] Irrigation continued to be practiced in the eastern pueblos.[19]

Pueblo V (ca. A.D. 1600-present)

Pueblo V is the period of European contact. The Anasazi/Puebloan adaptation remained essentially similar to that of Pueblo IV until the early 20th century. However, the population declined rapidly and continuously from ca. 1600 to 1850 when it stabilized and, by 1900, slowly began to increase.[20] During this period, material culture remained simple. However, with the stimulation of

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17 Willey, G., An Introduction to American Archaeology: North and Middle America (Vol. 1). Englewood Cliffs, N.J.: Prentice-Hall, 1966; Judd, N., "The Material Culture of Pueblo Bonito," Smithsonian Miscellaneous Collections, Vol. 124 (1954).

18 Haury, E., The Canyon Creek Ruin. Lancaster, Pa.: Lancaster Press, Inc. (1934).

19 Anderson, D. and B. Anderson, "Chaco Canyon," Popular Series No. 7 (1976).

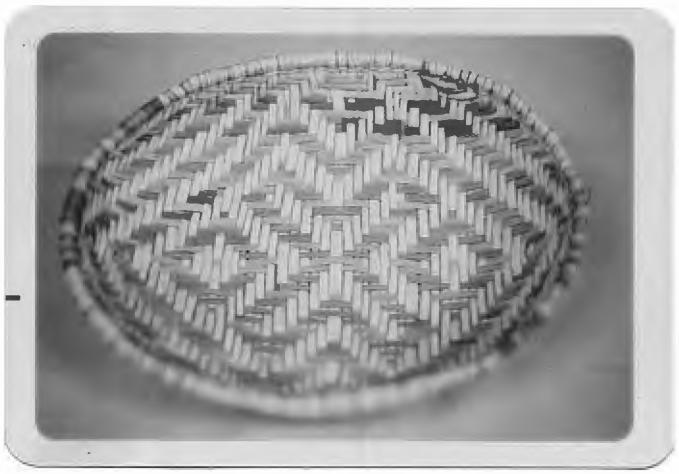
20 Dozier, E., The Pueblo Indians of North America. N.Y.: Holt, Rinehart, and Winston (1970).

trade and the white market, many contemporary crafts have assumed new elaboration. The production of the ring basket, for example, was coarse until this century when aesthetics again became important as the baskets could be produced for sale.

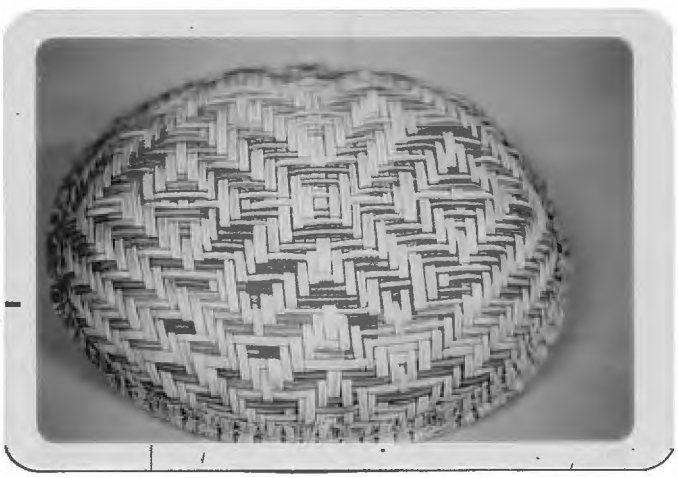
This section has summarized general characteristics of each period. The rate of Anasazi cultural growth and change is uneven and seems, in part, to reflect different environmental conditions which, in turn, affected the peoples' ability to reach certain stages of socio-economic organization such as development of sedentary villages and successful agriculture. Similarly, material culture such as the ring basket evolved unevenly and seems to reflect the varying complexity of Anasazi culture.

FIGURE 3

THE ANASAZI RING BASKET



Hopi Ring Basket (front view)--Note the generally 3/3 rhythm of twill plaiting, the unusual oval shape, the use of two natural shades of yucca, and the decorative motif which is a variant of the double diamond.



Hopi Ring Basket (back view)--Note the use of a rod for the rim of the basket, the short fringe at the rim, and the width of the fringe-binder in comparison to the weaving strip width.

The Ring Basket

This section considers the technology of the ring basket (see Fig. 3) and discusses the attributes which are used for analysis in subsequent chapters. In addition, the function of the ring basket is considered in relation to Anasazi culture history.

Technology

Morris and Burgh[21] comprehensively described the Anasazi basketmaking complex and emphasized the construction of coiled basketry. The present inquiry analyzes twill plaited baskets according to four general technological criteria: method of manufacture, form and size, decoration, and materials used (see Appendix B). The attributes of analysis are discussed subsequently.

Method of manufacture

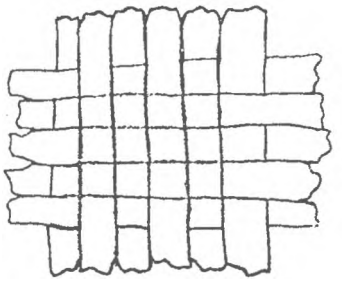
The ring basket is invariably twill plaited. Twill plaiting is a variant of plain plaiting (see Fig. 4). Warp and weft elements of equal width and pliability are interwoven at right angles to each other in rhythms other than over-one/under-one. By varying the over/under rhythm or interval, decorative structural patterns such as diamonds or meanders may be created.

The interval or rhythm of weave may vary significantly between cultures or between different periods of one culture.

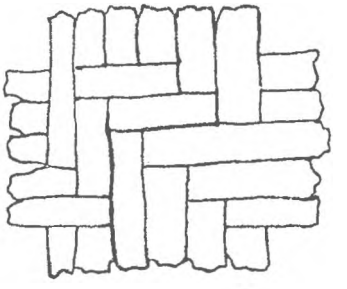
21 Morris, E. and R. Burgh, "Anasazi Basketry," Publications in Anthropology and Archaeology, Vol. 533 (1941).

FIGURE 4

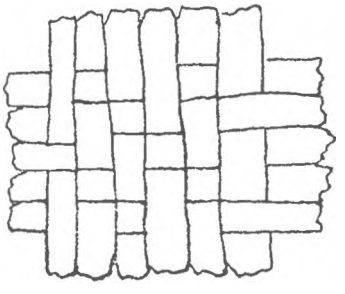
PLAITING



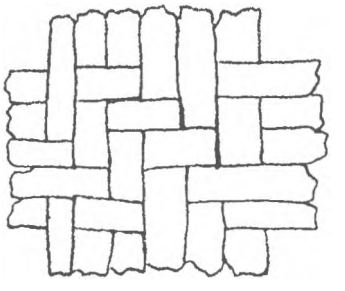
Plain Plaiting (1/1 rhythm)



Twill Plaiting (3/3 rhythm)



Twill Plaiting (2/1 rhythm)



Twill Plaiting (2/2 rhythm)

The larger intervals, such as 3/3, permit the creation of more elaborate structural patterns; motifs created primarily in 3/3, for example, can incorporate variations in 3/2, 3/1, 2/2. 2/1, and 1/1 rhythms. Smaller intervals such as 2/2 or 2/1 provide less opportunity for structural manipulation and variation.

Form and Size

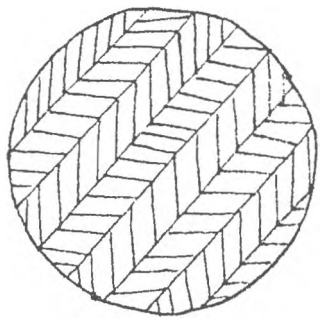
Six dimensional variables of ring baskets are pertinent to this study. The diameter and depth of a basket are very important since these variables were probably controlled consciously by the basket makers. Additional criteria include the width of the weaving strips, the thickness or diameter of the rod used in the rim, the length of the rim fringe, and the width of the rim binder. Ring baskets occasionally exhibit additional features such as plaited handles which also were noted during research. The six dimensional variables are illustrated in Figure 3.

Decoration

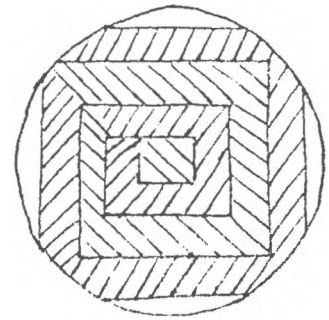
A ring basket has several decorative possibilities. Structural manipulation of the twill plaited interval may create a motif such as a diamond, meander, herringbone or zigzag (see Fig. 5). In addition, weaving elements of more than one color may be used. Black in early baskets was probably obtained with charcoal. Modern specimens use aniline dyes such as black and orange. Several shades of yucca, ranging from greenish to yellow to white, may be obtained

FIGURE 5

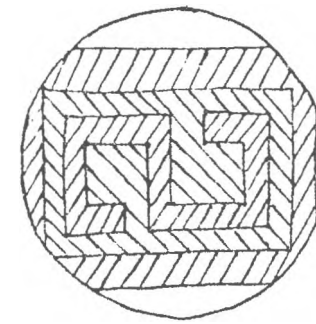
RING BASKET MOTIFS



Herringbone
(#1)

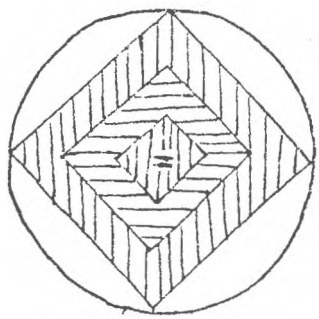


Meander
(#2)

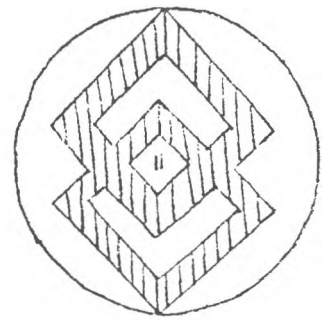


Central Isolate
(#3)

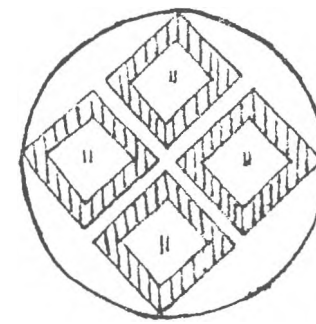
Diamond Varieties:



Diamond
(#4)



Double Diamond
(#5)



Quartered Diamond
(#6)

naturally by varying the curing and drying process. A third possibility is that the rim of a ring basket may have a braided finish in lieu of fringe (see Fig. 6).

Materials

Ring baskets usually are woven of yucca (Yucca sp.) and have willow (Salix sp.) or sumac (Rhus sp.) rods for rims. However, beargrass (Nolina microcarpa) occasionally was substituted for yucca. The wooden rod used as a rim in recent times has often been replaced with wire or other types of wood.

Cultural-Historical Dynamics

Throughout Anasazi prehistory, the ring basket pertained primarily to utilitarian, economic aspects of Anasazi adaptation. Archaeologists, for example, have excavated specimens containing beans and shelled corn from sites which date to early periods.

The predecessor of the ring basket may have been twill plaited matting which dates to early Basketmaker II times, if not earlier. The prototype of the ring basket, a twill plaited baglike basket made from the yucca plant, first appeared during Basketmaker II, along with initial cultivation of squash and maize (see Appendix C). As sedentism and agriculture developed through subsequent periods, the true ring basket emerged. Its frequency and aesthetic elaboration increased as both agriculture and the Anasazi culture flourished.

By Pueblo IV times, settlements were smaller and simpler, and the ring basket was also less elaborate. Early in Pueblo V, the Contact Period or ethnohistorical present, population rapidly declined, and production of the ring basket was less refined. During the early 20th century ring baskets were used as winnowing trays and as containers and storage vessels. Stimulation of trade and the white market has resulted in new aesthetic elaboration. Motifs and dyed or colored weaving elements once again are being incorporated. Today, the ring basket is manufactured primarily for sale and secondarily for native use by Indian women who can find nothing at the trading post which will work as well for winnowing.[22]

Ultimately, the ring basket has played an important role in the Anasazi/Puebloan economy. Initially, this basket served in a utilitarian capacity which seems to have been associated with agriculture and subsistence. More recently, the sale of the ring basket to traders and tourists has helped to integrate the traditional Indian economy with the market economy of the United States. The changing function of the ring basket from purely utilitarian to utilitarian plus aesthetic to primarily aesthetic uses has been delineated in

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22 Underhill, Ruth, "Pueblo Crafts," Indian Handcrafts No. 7 (1944).

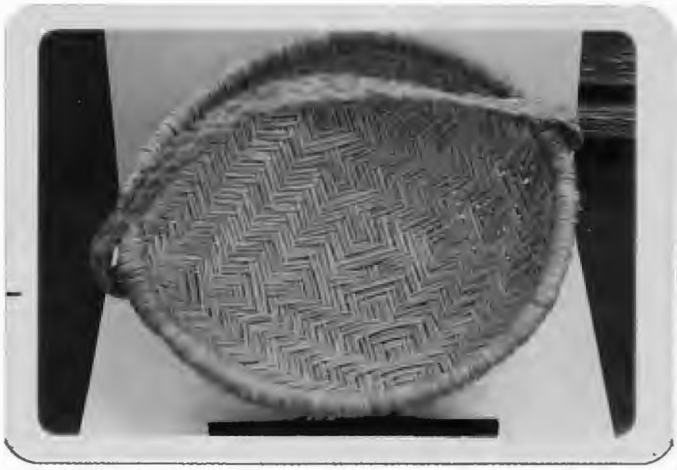
relation to the changing economic emphasis in this framework of Anasazi culture history.

FIGURE 6

ARCHAEOLOGICAL AND ETHNOLOGICAL RING BASKETS
(photographs courtesy of Maxwell Museum)

Above: Archaeological, Pueblo III
Note braided fringe

Right: Modern Navajo, 2/2 rhythm



Above: Modern Jemez with handle
and diamond motif

Right: Modern Hopi with two-toned
yucca diamond motif

CHAPTER II

METHODOLOGY

This chapter presents the research strategy which was followed. The significance of the study is first justified, then objectives and hypotheses are presented, and finally the research design is outlined.

Justification of the Study

Consideration of the ring basket is important for several reasons. First, early basketmaking seems to have laid the foundation for the development of the loom, the spun fiber, and the woven soft textile in North America.[23] The ring basket provides excellent opportunity to study the roots and development of aboriginal textiles in North America due to its continuity and excellent preservation which result in good, documented time-depth. Second, the ring basket was, and still is, produced continuously by a single population in North America, that of the Anasazi and their descendants the Puebloans. The temporal continuity of the ring basket implies that it served a significant, continuous cultural need. Thus, study of such

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23 Tanner, Clara, Southwest Indian Craft Arts. Tucson: University of Arizona Press (1968).

basketry provides new information and insight into the culture and ecological adaptation of this single population.

Although Morris and Burgh studied Anasazi basketry in 1941, the technical consideration of the manufacture of plaited basketry in their classic publication included virtually no discussion of the cultural role and context of such basketry.[24] Therefore, the present study updates and adds to the early work, particularly in the areas of cultural significance and production of ethnological ring baskets.

Presentation of Objectives and Hypotheses

The objectives of this study pertain both to the technical manufacture of the ring basket and to its cultural role and may be enumerated as follows:

(1) To survey archaeological and ethnological ring baskets in selected museum collections to determine temporal and spatial variation in four technological criteria: 1. method of manufacture, 2. form and size, 3. design motif(s), and 4. material(s) used.

(2) To examine the role of the ring basket in the social and economic concerns of Anasazi and Puebloan life.

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[24] Morris, E. and R. Burgh, "Anasazi Basketry," Publications in Anthropology and Archaeology, Vol. 533 (1941).

(3) To determine whether change in the four technological criteria is related to the cultural role of the Anasazi ring basket.

These objectives serve primarily in an informal capacity since they have been used as guidelines during research and analysis. The objectives also have been used to generate three hypotheses which are:

H_1: Variations in the four technological criteria reflect cultural continuity and change through time.

H_2: Variations in the four technological criteria reflect varied cultural distribution and ecological adaptation in space.

H_3: Changes in life patterns--such as development of agriculture, climatic variability, and new trade outlets--have affected production of the ring basket.

These hypotheses are discussed and tested statistically in subsequent sections of this inquiry.

Approach to the Study

Following a preliminary search of literature, a questionnaire was designed (Appendix A) and was sent to selected museums which owned promising collections of Southwest basketry. Of these, two major archaeological and ethnological museums were visited, the Maxwell Museum of

Anthropology in Albuquerque, New Mexico, and the Peabody Museum of Archaeology and Ethnology in Cambridge, Massachusetts. In addition, modern ring baskets in several shops and trading posts in Santa Fe, New Mexico, were examined as completely as possible. The extensive collections of the Museum of the American Indian in New York City might have rounded out this survey, but they unfortunately were being inventoried at the time of this study and were inaccessible to outside researchers.

An observation form was used for the compilation of data and is included as Appendix B. Observational data are presented in Appendix C. In addition to archaeological and ethnological data obtained during examination of museum collections, quantitative information published in primary references such as archaeological site reports was incorporated where needed. These data are also included in Appendix C.

Finally, statistical analysis was used during the testing and discussion of each hypothesis. For Hypothesis 1, a t-test of means was used to determine whether significant change in manufacture of basketry occurred through time between basketry of different cultural periods. An alpha level of 0.05 was used. For Hypothesis 2, a t-test of means was used to determine whether significant variation occurred

in space between basketry of different geographic areas. Again, an alpha level of 0.05 was used. All t-tests considered data with unequal variances and, as a result, used the "option #3" t-test. For Hypothesis 3, both an f-test of variance and rho correlation were used to delimit the differences in ranges of the four technological criteria for ring baskets. Statistical results were interpreted in relation to changes in life patterns in an attempt to define the nature of cultural dynamics operating in Anasazi and Pueblo culture.

Summary

Ultimately, consideration of the Anasazi plaited ring basket should increase knowledge of both the origins of aboriginal textiles in North America and the cultural dynamics of the single population which has produced ring baskets for 15 centuries. Three hypotheses which relate to variation and change in the production of the ring basket through time and space and to cultural dynamics will be addressed statistically and visually in relation to quantitative data pertaining to the manufacture of the ring basket. Results of such analysis will be interpreted in subsequent chapters in relation to processes delimited in the cultural-historical framework which was presented in the chapter "The General Setting".

CHAPTER III

RING BASKETS THROUGH TIME

This chapter examines the degree of change in the manufacture of ring baskets through time. Three general cultural periods are considered. These periods are: Basketmaker (Basketmaker II-III), Early Pueblo (Pueblo I-III), and Late Pueblo (Pueblo IV-V). Both visual evaluation and descriptive statistics are used to address the first hypothesis that "variations in the four technological criteria reflect cultural continuity and change through time." Population continuity and variation in the four criteria are discussed.

Cultural Continuity

Researchers have observed that the manufacture of the yucca ring basket has remained essentially unchanged through time. From such evidence, scholars have argued for the presence of one continuous Basketmaker-Pueblo population and have discounted the possibility of large or influential influxes of new peoples into the Four Corners region. Both visual and statistical evaluation of the construction of ring baskets confirm this observation.

Visual evaluation of three technological criteria,

the method of manufacture, decoration, and materials used in constructing the twill plaited ring basket, suggest cultural continuity through time. During each major period, twill plaiting, geometric motifs, and yucca splints were used for producing ring baskets (see Appendix C). More specifically, however, some variation in the degree of elaboration did occur; a great range of decorative motifs and a heavy use of colored splints characterize Early Pueblo times, for example, while simpler motifs and less use of color are attributed to ring baskets of both the Basketmaker and Late Pueblo periods.

Statistical evaluation of the fourth criterion, that of dimension, provides similar information. A two-tailed t-test of means (alpha level of 0.05) may be used to compare six variables of form and size for each period. As stated previously in "The General Setting"(p.18), these variables are: splint width, basket diameter, basket depth, fringe length, binder width, and rim-rod diameter. T-test data are available in Appendix D. Sample sizes consisted of four observations for the Basketmaker Period, 22 for Early Pueblo, and 12 for Late Pueblo.

As indicated in Table 1, no general significant differences were revealed through pairwise t-tests of the means of the variables for the three periods of Basketmaker (BM) versus Early Pueblo (EP), Basketmaker versus Late Pueblo (LP),

TABLE 1

T-test of Means for Cultural Continuity

Periods	Option #	df	calculated t-value	table t-value
BM and EP	3	7	0.59159	2.365
BM and LP	3	12	0.06324	2.316
EP and LP	3	8	0.59328	2.094

and Early Pueblo versus Late Pueblo. From this analysis of form and size and its corroboration of visual evaluations of method of manufacture, decoration, and materials used, it is assumed that the culture of the population producing the ring basket was continuous through time.

Variation in Variables of Manufacture

Statistical evaluation of the same data, sorted by variables of form and size, suggests specific differences in relations between variables of manufacture for the three periods of Basketmaker, Early Pueblo, and Late Pueblo. As illustrated in Table 2, significant differences in the relations between variables of form and size do exist between periods. The relation between means of only four of the

TABLE 2

T-test of Means for Six Dimensional Variables

Variables	option #	df	calculated t-value	table t-value
strip width and diameter	3	2	4.33345*	4.303
strip width and depth	3	2	6.15510*	4.303
strip width and fringe length	3	3	6.87338*	3.182
strip width and binder width	3	3	1.83910	3.182
strip width and rim-rod diameter	3	4	3.38430*	2.776
diameter and depth	3	2	3.33441	4.303
diameter and fringe length	3	2	4.12761	4.303
diameter and binder width	3	2	4.34972*	4.303
diameter and rim-rod diameter	3	2	4.26907	4.303
depth and fringe length	3	2	4.77102*	4.303
depth and binder width	3	2	6.26628*	4.303
depth and rim-rod dia.	3	2	5.71900*	4.303
fringe length and binder width	3	2	7.67570*	4.303
fringe length and rim-rod diameter	3	5	4.22462*	2.571
binder width and rim-rod diameter	3	2	4.63776*	4.303

fifteen pairs of variables of form and size did not vary significantly through time: strip width versus binder width, basket diameter versus depth, basket diameter versus fringe length, and basket diameter versus rim-rod diameter. Significant variation beyond the alpha level of 0.05 existed between the remaining eleven combinations of variables and is indicated in Table 2 by placing an asterisk (*) after the calculated t-value. Again, detailed t-test data are available in Appendix D.

While these relations between variables do not differ enough to suggest the existence of a discontinuous population, the data do imply gradual cultural change through time. As discussed previously, hunting-gathering versus agricultural subsistence patterns, settlement location and size, and climate also varied through time and similarly suggest cultural change.

Summary

Both visual and statistical evaluations confirm the first hypothesis. The Anasazi ring basket appears to have been produced by a single, continuous population throughout the Basketmaker, Early Pueblo, and Late Pueblo periods. However, specific relations between six variables of dimension do imply the occurrence of gradual cultural change through time. Specific analysis of spatial variation is persued subsequently.

CHAPTER IV

RING BASKETS THROUGH SPACE

This chapter considers the degree of spatial variation in the manufacture of ring baskets. Two general geographic areas are considered statistically: Arizona and New Mexico. The provenience of the Basketmaker specimens which were studied (n = 4) is eastern Arizona. For Early Pueblo times, ring baskets from eastern Arizona (n = 6) are compared with basketry from the Mesa Verde region of New Mexico (n = 16). Late Pueblo Period ring baskets primarily are of ethnographic origin, so basketry of the Hopi Indians of Arizona (n = 6) is compared with that of the Rio Grande Puebloans of New Mexico (n = 6). The second hypothesis, that "variations in the four technological criteria reflect varied cultural distribution and ecological adaptation in space", is tested subsequently.

Cultural Distribution

As mentioned in "The General Setting", Anasazi settlements of the Early Pueblo Period covered the most extensive area. During both the Basketmaker and the Late Pueblo periods, the total occupied region was smaller and cultural development, in terms of material culture, appears to have been less complex. As illustrated in Appendix C, which lists

the proveniences of 95 ring baskets including the 38 specimens used for statistical analysis, the spatial distribution of the ring basket partly reflects the established cultural distribution for each period.

Specimens dating to the Basketmaker Period have been excavated primarily in eastern Arizona. No ring baskets are known to have been recovered from Basketmaker sites in northern New Mexico or southern Colorado.

Early Pueblo ring baskets have been recovered from sites which also are located primarily in the more southern areas of Anasazi habitation such as eastern Arizona and Mesa Verde of northern New Mexico and southern Colorado. However, few ring baskets have been found at northern sites in river drainages of southern Utah and Colorado.

Most ring baskets dating to the Late Pueblo Period have eastern Arizona proveniences. A number of specimens attributed to the Navajo and Rio Grande Puebloans of New Mexico are also included in this period.

Distribution of the twill plaited ring basket corresponds to the southern distribution of Anasazi culture. The southern concentration of ring baskets suggests several possible explanations: 1) preservation of ring baskets was poorer at more northerly sites, 2) northern sites have not been excavated as extensively as southern sites, and 3) the occupants of northern sites did not use ring baskets as

frequently as did Anasazi residents of southern sites.

Only further research can verify the true explanation. However, the basketry evidence indicates that cultural distribution varied spatially during every major period of Anasazi occupation; the southern phase seems continually to have emphasized the ring basket more heavily than did the northern. Variation in cultural distribution seems to correspond to varied cultural adaptation. Spatial variation in construction of ring baskets is now evaluated visually and statistically.

Cultural Adaptation

All observed Basketmaker Period specimens are from eastern Arizona. Consequently, ring baskets of this period are not considered statistically. Visual analysis indicates that the earliest specimens are coarse, yucca plant containers which incorporate the heart of the plant as the base and twill plait the leaves to serve as the basket's walls. The first true ring baskets are executed in neutral-colored yucca. The twill plaited design is invariably herringbone, and the rim finish is a plain, unbraided fringe.

As illustrated in Table 3, no significant statistical difference exists spatially among the six variables of dimension for either the Early Pueblo Period or the Late Pueblo Period. Additional t-test data are included in Appendix D.

TABLE 3

T-test of Means for Varied Cultural Adaptation

Period/Areas	Option #	df	calculated t-value	table t-value
EP/Ariz. vs. New Mex.	3	11	0.19088	2.230
LP/Hopi vs. Rio Grande Puebloans	3	12	0.19159	2.179

Visual evaluation of the remaining three technological criteria, however, does reveal specific differences.

During Early Pueblo times, ring baskets of the Mesa Verde region seem to have been more elaborate than those of eastern Arizona. For example, differences between the two areas may be noted in the use of color, design motifs, and rim finishes. Of the observed specimens, Mesa Verde ring baskets have the following range of characteristics: approximately equal use of neutral-colored yucca and of a combination of black-dyed and neutral yucca; predominant use of meander design motifs with occasional examples of herringbone, diamond or quartered diamond, and central motifs; and usual construction of braided rim finishes, although plain fringe and elaborately braided rim finishes are also evident.

On the other hand, eastern Arizona ring baskets have the following range of characteristics for Early Pueblo times: predominant use of neutral yucca and less frequent use of a combination of black-dyed and neutral yucca; frequent incorporation of diamond and herringbone design motifs with occasional examples of double diamonds and meanders; and usual use of plain fringe rim finishes, although braided and elaborately braided rim finishes were also created.

Visual evaluation also reveals specific differences between ring baskets of the Arizona Hopi and the Rio Grande Puebloans of the Late Pueblo Period. Hopi ring baskets exhibit the greatest range of elaboration. During basketry construction, the Hopi use neutral yucca or a variety of combinations of colors which include black-dyed and neutral yucca, orange-dyed and neutral yucca, or neutral and bleached-white yucca. In addition, the Hopi occasionally substitute beargrass (Nolina microcarpa) for the traditional yucca (Yucca sp.) during basketry construction. Hopi design motifs explore the gamut of diamond, meander, and herringbone possibilities in both the traditional round ring basket shape and in a modern variant, the oval shape. Six-strand plaited handles are occasionally attached to Hopi ring baskets.

On the other hand, the Rio Grande Puebloans generally use only neutral yucca and weave diamond motifs into their usually round-shaped ring baskets. The fringe of Jemez and San Juan Pueblo ring baskets averages 1.6 cm. longer than that of most Hopi baskets. In addition, Jemez specimens occasionally exhibit six-strand plaited handles. Usually, the Jemez ring basket is plaited using two or three splints as one weaving element, whereas the Hopi baskets invariably use one splint as the weaving element (see Fig. 6).

Summary

While statistical analysis suggests cultural uniformity in variables of dimension, visual evaluation of the remaining three technological criteria confirms the second hypothesis. First, the ring basket is most common in assemblages from southern Anasazi sites. Second, spatial variation exists in three of the four technological criteria: method of manufacture, decoration, and materials used. Ultimately, visual evaluation indicates that cultural distribution and adaptation varied through space during both the Early and Late Pueblo periods. Although Basketmaker Period data are less complete spatially, they suggest similar conclusions since specimens are all from the southern area of habitation. Specific analysis of cultural dynamics follows subsequently.

CHAPTER V

CULTURAL DYNAMICS

This chapter considers the degree of influence which ecological events have exerted on the manufacture of the ring basket. Events which are considered especially important and have stimulated changes in life patterns include the development of agriculture, climatic variability, and new trade outlets. Again, both visual and statistical evaluation yield important information. Analysis of variance (f test) and rho correlation are the statistical techniques used to test the third hypothesis, that "changes in life patterns have affected production of the ring basket".

Agriculture and Climate

The excavation of archaeological specimens containing beans and shelled corn suggests a linkage between the ring basket and agricultural development. Furthermore, production of the ring basket seems to correspond to the initiation and development of agriculture. As dependence upon agriculture increased, so did the rate of production and degree of elaboration of the ring basket. During the Anasazi cultural florescence of the late Early Pueblo Period (Pueblo III), both agriculture and the ring basket simultaneously achieved their greatest elaboration. During

the Late Pueblo Period, climate changed and the extent of the Anasazi agricultural system waned, as did manufacture of the ring basket. This section suggests that both the development and control of agriculture and the demise of this control, due partly to climatic change, are reflected in the technology of the ring basket.

TABLE 4

Variances of Six Variables of Dimension

Variable($\bar{x}$)	Period		
	Basketmaker (n = 4)	Early Pueblo (n = 22)	Late Pueblo (n = 12)
strip width	.00932	.0043	.00994
diameter	51.563	33.522	194.25
depth	2.250	.725	27.629
fringe length	----	.453	1.618
binder width	.00229	.00343	.00763
rod diameter	.356	.0224	.097

Table 4 illustrates the degree of variance in the six variables of dimension for the three cultural periods. As presented, the Early Pueblo Period seems to have the least amount of variation in dimensional criteria, with the exception of binder width which varied slightly more than that of the Basketmaker Period. This degree of uniformity corresponds to the florescence of Anasazi culture and suggests a high level of cultural organization, pervasiveness, and control. The greater variances of both the Basketmaker and the Late Pueblo periods correspond to less complete control of ecological and cultural institutions, as exemplified by agricultural organization.

On the other hand, the Late Pueblo Period seems generally to exhibit the greatest amount of variation in the dimensional criterion. As stated in "The General Setting", this period is marked by cultural decline and fragmentation; at present, for example, the Hopi are distinct culturally from the Rio Grande Pueblo.

Analysis of variance similarly reflects cultural development and decline. Table 5 summarizes pairwise f tests of variance with an alpha level of 0.05 for the three cultural periods. The greatest number of significant differences in variances for two periods occurs between the Early Pueblo and Late Pueblo periods. Again, the early Late Pueblo Period marked the breakdown and fragmentation of Anasazi

culture. Increased variation in the dimensions of the ring basket and the number of significant differences between the two periods suggest that this form of material culture reflects the occurrence of cultural change.

TABLE 5

Analysis of variance between cultural periods

Variable	Period			
	Basketmaker/Early Pueblo		Early Pueblo/Late Pueblo	
strip width	2.167	(3,21 df)	*2.312	(11,21 df)
diameter	1.538	(3,21 df)	*5.800	(11,21 df)
depth	*3.106	(3,21 df)	*38.1	(11,21 df)
fringe length	----	-------	*3.57	(11,21 df)
binder	1.497	(21,3 df)	2.224	(11,21 df)
rod diameter	*15.89	(3,21 df)	*4.330	(11,21 df)

f-values are: 3.07 (3,21 df), 8.66 (21,3 df), 2.28 (11,21 df)

Cultural development from Basketmaker through Early Pueblo times seems to have been gradual and continuous. This trend may be reflected in the few significant instances of differences in Basketmaker/Early Pueblo variances which are included in Table 5.

Significant differences in variance might seem to imply the presence of a discontinuous population. Yet, correlation of the means of the six dimensional variables for each cultural period suggests cultural continuity, despite differences in the variance for each variable. The informal table below summarizes the correlation of means. As should be evident, all rho values of significant, high, and positive, which indicates excellent direct correlation between periods. Correlation data are available in Appendix D.

PERIODS	RHO VALUE	TABLE RHO VALUE (alpha of 0.05)
Basketmaker/Early Pueblo	0.984	0.754
Early Pueblo/Late Pueblo	0.998	0.754

Economic Market

Cultural fragmentation typified the Late Pueblo Period until the early 20th century. Around 1900, the declining Indian population stabilized and European tourists and traders began to take interest in the dying Southwestern crafts. With the establishment of the Indian Arts and Crafts Board and a new economic outlet, the white market, basketmaking and other Indian arts revived. The twill plaited ring basket, or winnowing tray, could be created quickly and easily in a few hours and was readily sold. Today, for example, ring baskets commonly are found in Arizona and New Mexico shops,

trading posts, and art galleries and sell for prices ranging from $10.00 to $60.00. With their new popularity has come an increased use of color, different materials, and elaborated design motifs. These criteria of manufacture were discussed in greater detail in previous chapters.

Today, the Hopi and, to a lesser extent, the Jemez, Cochiti, Zuni, San Felipe, and Laguna Puebloans make ring baskets. In addition, the Navajo recently have begun to make the ring basket for sale. Of the specimens displayed in New Mexico shops, most were of Hopi manufacture. Correlations of the six variables of dimension for six observations of Hopi ring baskets and for six observations of Rio Grande Pueblo wares are excellent and positive for both groups. However, as summarized in Tables 6a and 6b, the Hopi correlation matrix is slightly more uniform than the Pueblo matrix. The range of correlation for the Hopi is .989 to 1.00 (or .011) whereas the range for the Puebloans is both slightly lower and varies slightly more from .957 to .999 (or .042). Although no significant differences exist between the groups since all the values are significant, the minutely smaller range of correlation for the Hopi specimens may reflect slightly greater standardization of the materials used during manufacture of ring baskets. Although speculative, it would seem that the slightly greater uniformity in Hopi specimens might be a consequence of the higher rate or more frequent production of the ring basket.

TABLE 6a

Correlation Matrix of Six Hopi Baskets

Basket No.	1	2	3	4	5	6
1	1.000	0.995	1.000	0.992	1.000	0.999
2		1.000	0.995	0.999	0.993	0.993
3			1.000	0.991	1.000	1.000
4				1.000	0.990	0.989
5					1.000	0.999
6						1.000

rho-value for 5 df, 5 variables, alpha of 0.05 is 0.898

TABLE 6b

Correlation Matrix of Six Rio Grande Pueblo Baskets

Basket No.	1	2	3	4	5	6
1	1.000	0.994	0.998	0.999	0.971	0.999
2		1.000	0.987	0.996	0.990	0.996
3			1.000	0.994	0.957	0.997
4				1.000	0.980	0.997
5					1.000	0.974
6						1.000

rho-value for 5 df, 5 variables, alpha of 0.05 is 0.898

Summary

Both visual and statistical evaluation confirm the third hypothesis. Ecological events such as agricultural development, climatic variation, and new economic outlets, seem to have affected the production of the ring basket throughout the Anasazi sequence. Comparison with the development and decline of agriculture has served as a temporal example, and consideration of new trade outlets has provided a spatial instance of such influence.

CHAPTER VI

SUMMARY, DISCUSSION, AND RECOMMENDATIONS FOR FURTHER STUDY

This study has considered the Anasazi ring basket, the oldest continuous form of twill plaited textile in North America. The yucca ring basket, as a specific element of material culture, does seem to be modified by cultural norms. Continuity and change in four technological criteria, method of manufacture, form and size, decoration, and materials used, seem to correspond to more general cultural continuity and change.

This inquiry has examined three hypotheses for three cultural periods: the Basketmaker Period (ca. A.D. 1-700), the Early Pueblo Period (ca. A.D. 700-1300), and the Late Pueblo Period (ca. A.D. 1300-present). These hypotheses are restated as follows:

H_1: Variations in the four technological criteria reflect cultural continuity and change through time.

H_2: Variations in the four technological criteria reflect varied cultural distribution and ecological adaptation in space.

H_3: Changes in life patterns--such as development of agriculture, climatic variability, and new trade outlets--have affected production of the ring basket.

Each proposition has been confirmed visually and statistically. The three criteria of method of manufacture, decoration, and materials used were explored visually. In the statistical analyses, six variables of the fourth criterion of dimension--splint width, basket diameter, basket depth, fringe length, binder width, and rim-rod diameter--were considered. T-tests of means were used to evaluate the first two hypotheses and analysis of variance (f test) and rho correlation were used to test the third hypothesis.

In addition, the objectives of the study have been met. Collections of archaeological and ethnological ring baskets have been surveyed to determine temporal and spatial variation in the four technological criteria. Furthermore, the role of the ring basket in the socio-economic concerns of Anasazi and Puebloan life has been examined. Finally, change in the four technological criteria has been related to the cultural role of the ring basket. The increased use of design motifs in the Late Pueblo Period, for example, has been interpreted as a consequence of the development of new trade outlets and the integration of the American market economy into Indian life.

This study has suggested that a single, continuous population manufactured the ring basket through both time and space. However, variation in cultural adaptation has been implied through temporal and spatial analysis. This

research would seem to support the contention of Baumhoff and Heizer, mentioned in the 'Introduction', that Southwestern human adaptation varied temporally and regionally in specific ways, despite more general cultural continuity of the Anasazi. Ultimately, specific adaptation to local microenvironments seems, in part, to have influenced variation in human adaptation, which is reflected in the technology of the ring basket.

Limitations and Recommendations

Although the conclusions of this study seem to concur with the culture history of the Anasazi, they should be corroborated in several ways by future research. First, consideration of a larger sample size of ring baskets might increase the validity of the present research. Second, parallel studies of other aspects of material culture and ecology, such as architecture, coiled basketry, the development of woven cotton cloth in the Southwest, site distributions, and specific microenvironmental and climatic data, might reinforce this inquiry. Third, more detailed analysis of specific aspects of this study, such as the effects of the 20th century American market economy on the types of basketry which the modern-day Indians produce and the technological changes which new economic outlets have encouraged, might supplement this consideration.

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APPENDIX A

Museum Questionnaire

UNIVERSITY OF RHODE ISLAND
KINGSTON, R.I. 02881

College of Home Economics

Date

Registrar
Museum name, Address
City, State

Dear Registrar:

As a graduate student in Textiles and Clothing at the University of Rhode Island, I am presently doing research for my Master of Science thesis. This work consists of studying the plaited ring basket, from both archaeological and ethnological contexts. The Anasazi in the Four Corners Region of the Southwest formerly made these baskets which today are manufactured as winnowing trays by Hopi and Puebloan peoples.

I am writing to you to ask whether your museum's collection contains specimens of this type of basket. Would you please answer the questions on the enclosed checklist and return it to me in the accompanying envelope at your earliest convenience? If specific answers are not known, approximate answers would be helpful.

Thank you for your cooperation.

Sincerely yours,

Sarah R. P. Turnbaugh

BASKETRY CHECKLIST

Museum's name_____

Respondent's name/title_____

1. Our collection contains North American Indian basketry.

   Yes_____

   No _____

   Do not know_____

   If yes, the total number of baskets is _____

2. The collection contains plaited ring baskets or fragments from prehistoric Anasazi/modern Pueblo culture.

   Yes_____

   No _____

   Do not know_____

   If yes, the total number of these baskets is _____

   Of these, the total number in each period is:

   Basketmaker II _____, Basketmaker III _____,

   Pueblo I _____, Pueblo II _____,

   Pueblo III _____, Pueblo IV _____,

   Pueblo V _____, Unknown _____.

   These specimens are primarily of _____ origin.
   (e.g., Arizona, New Mexico; Hopi, Jemez; etc.)

3. The museum's collection is accessible to outside researchers.

   Yes_____

   No _____

4. Researchers should make an appointment to study the collection.

Yes_____

No _____

5. Access is permitted on the days of _____ between the hours of _____. Access is

Free_____

Costs $____ per day

6. Photographs are permitted. Yes_____

No _____

If yes, costs for photography are: $_____

7. The museum has a photographic file which includes baskets and is available to outside researchers. Yes_____

No _____

If yes, use of the file is Free_____

Costs $____ per picture

8. Other remarks:

Thank you for your time and assistance in this project.

APPENDIX B

Observation Form

OBSERVATION SHEET

Museum	Catalog Number	Period	Plaiting Type Interval	Decoration motif color rim	Dimensions 123456*	Materials	Provenience

* Variables are: strip width, diameter, depth, fringe length, binder width, rod diameter

APPENDIX C

Observational Data

OBSERVATIONAL DATA

To simplify the presentation of these data, abbreviations are used. For the criteria listed on the Observation Sheet (Appendix B), the following abbreviations are used:

Museum-- P. is Peabody Museum of Harvard, Cambridge, Mass.

M. is Maxwell Museum, Albuquerque, New Mex.

F. is Fenn's Galleries, Santa Fe, New Mex.

PT. is Packard's Trading Post, Santa Fe

W. is Elna Ward, Indian Trader (West), Santa Fe

LB. is from the literature (Bartlett 1934)

LKG is from the literature (Kidder and Guernsey 1919: 63)

LH. is from the literature (Haury 1934)

LN. is from the literature (Nordenskiold 1973)

LR. is from the literature (Roberts 1932)

LMB is from the literature (Morris and Burgh 1941: Fig. 22)

K is Kiva Shop, Santa Fe

Period--II is Basketmaker II

III is Basketmaker III

1 is Pueblo 1

2 is Pueblo 2

3 is Pueblo 3

4 is Pueblo 4

5 is Pueblo 5 (modern-day)

Plaiting Type-- all baskets are twill plaited. Consequently, this variable is eliminated in the subsequent presentation.

Interval-- all plaiting intervals (or rhythms) are presented in the form 2/2 (over-2/under-2)

Decoration

Motif-- motif types are designated by numbers (see Fig. 5, page 19 of the text).

1 is herringbone

2 is meander

3 is central isolate

4 is diamond

5 is double diamond

6 is quartered diamond

Color-- numbers of colors used in a basket are indicated simply by a number (1 or 2).

2a is for black and neutral

2b is for bleached white and neutral

2c is for orange and neutral

Rim-- P. is for plain fringe

B. is for braided fringe

E. is for elaborately braided fringe

Materials Used-- Y. is for yucca (Yucca sp.)

B. is for beargrass (Nolina microcarpa)

Dimensions (cm.)-- in the observation form's heading,

1 is strip width

2 is diameter

3 is depth

4 is fringe length

5 is binder width

6 is rim-rod diameter

Provenience-- A. is Arizona

MV. is Mesa Verde of northern New Mexico and southern Colorado

AH. is Arizona, Hopi tribe

NP. is New Mexico, Pueblo tribes

N. is Navajo

An "h" following the provenience indicates the presence of a handle on the basket, an "o" indicates oval shape, an "r" indicates rectangular shape.

Observational Data

Museum	Catalog Number	Period	Plaiting Interval	Decoration motif	color	rim	Dimensions (cm.) 1	2	3	4	5	Materials 6	Prove-nience	
*M	60-29-4	5	3/3	1	2a	P	.25	20	6	1	.25	.7	B	AH
M	70-60-41	3	3/3	4	1	E	.375	20.5	7.5	1.8	.2	1.0	Y	A
M	A15/93	3	3/3	4	1	B	.35	19	?	.7	?	.5	Y	A
**M	69-59-4	5	3/3	4	1	P	.325	40	10	2.5	.375	1.2	Y	NP
**M	69-66-2	5	3/3	4	1	P	.3	24.5	10	1.75	.3	1.0	Y	NP
**M	69-66-5	5	3/3	4	1	P	.5	36.5	12	4.5	.35	1.2	Y	NP
**M	69-66-15	5	2/2	4	1	P	.5	42.5	5.5	4.5	.25	.5	Y	N
*M	36-29-1	5	3/3	4	1	P	.55	22.5	4.5	1.75	.3	.9	Y	AH
**M	68-51-527	5	3/3	4	1	P	.4	36	13	3.5	.25	1.2	Y	NP
*M	69-66-3	5	3/3	4	2b	P	.5	27	5	.95	.4	.5	Y	AH
*M	74-10-36	5	3/3	4	1	P	.45	64	20.5	2.0	.55	1.4	Y	AH
*M	68-51-167	5	3/3	6	1	P	.45	48.5	9.5	2.25	.35	1.1	Y	AH
*F	-----	5	3/3	3,5	2b	P	.55	24.5	5	.75	.25	.6	Y	AH.
**W	-----	5	3/3	4	1	P	.5	55	18	2.5	.35	1.2	Y	NP

* and **, see Hypothesis 3 Data in Appendix D

Observational Data

Museum	Catalog Number	Period	Plaiting Interval	Decoration motif	Decoration color	Decoration rim	Dimensions(cm.) 1	2	3	4	5	Materials 6		Provenience
P	16-9-10/ A3324	2	2/2	1	1	P	.5	24	?	.5	.3	.7	Y	A
P	------	?	2/2	1	1	P	.4	28.5	?	2.5	.3	.7	Y	A?
P	17-34-10/ A3513	II or III	2/2	1	1	P	.6	33	9	2.0	.3	.8	Y	A
P	------	2	2/2	1	1	P	.3	24	6.4	.7	.3	.5	Y	A?
P	20-5-10/ A4979	1	2/2	1	1	P	.4	23.5	6.5	3.5	.2	.8	Y	A
P	21-6-10/ A5389	1	2/2	1	1	P	.3	34.5	?	1.5	.3	.7	Y	A
P	14-5-10/ A1215	3	2/2	1	1	P	.25	9.5	?	.7	.2	.3	Y	A
PT	------	5	3/3	4	2b	P	.5	?	?	?	?	?	Y	AH
PT	------	5	3/3	4	2b	P	.5	?	?	?	?	?	Y	AH
PT	------	5	3/3	4	2b	P	?	?	?	?	?	?	Y	AH
PT	------	5	3/3	6	2b	P	?	?	?	?	?	?	Y	AH

Observational Data

Museum	Catalog Number	Period	Plaiting Interval	Decoration motif	color	rim	Dimensions(cm.) 1	2	3	4	5	Materials 6		Provenience
PT	------	5	3/3	4	2b	P	?	?	?	?	?	?	Y	AH
PT	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	AH
K	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	?
F	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	?h
F	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	?h
F	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	?
F	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	?
F	------	5	3/3	2,3	2b	P	?	?	?	?	?	?	Y	AH
F	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	NPo
F	------	5	3/3	4	1	P	?	70	?	?	?	?	Y	NP
F	------	5	3/3	1	2c	P	.5	26	5	?	?	?	Y	AHo
F	------	5	3/3	4	1	P	?	?	?	?	?	?	Y	AH
F	------	5	3/3	1	1	P	?	?	?	?	?	?	Y	AHr
F	------	5	3/3	3,6	2b	P	?	27	?	?	?	?	Y	AH

Observational Data

Museum	Catalog Number	Period	Plaiting Interval	Decoration motif	color	rim	Dimensions(cm.) 1	2	3	4	5	Materials 6		Provenience
---	-----	2	2/2	4	1	P	?	?	?	?	?	?	Y	LB/A
---	-----	2	2/2	1	1	P	?	?	?	?	?	?	Y	LB/A
---	-----	II or III	2/2	--	1	---	?	10	11.5	?	?	?	Y	LKG/A
---	-----	4	2/2	--	1	---	1.0	45	?	?	?	2.25	B	LH/A
---	-----	3	3/3	5	1	E	.4	19.5	5	?	?	?	Y	LN/MV
---	-----	3	3/3	2	1	E	.45	15.5	?	?	?	?	Y	LN/MV
---	-----	3	3/3	1	1	B	.4	12	?	?	?	?	Y	LN/MV
---	-----	3	3/3	?	?	B	.4	13.5	?	?	?	?	Y	LN/MV
---	-----	--	2/1	?	charred fragment	--	?	?	?	?	?	?	?	LR
---	-----	--	2/2	?	charred fragment	--	?	?	?	?	?	?	Y?	LR
CI	209	III	2/2	1	1	P	--	--	--	--	--	--	Y	LMB/A or MV
CI	507	III	2/2	1	1	P	--	--	--	--	--	--	Y	LMB/A or MV

Observational Data

Museum	Catalog Number	Period	Plaiting Interval	Decoration motif	color	rim	Dimensions(cm.) 1	2	3	4	5	Materials 6		Provenience
CI	527	III	2/2	1	1	P	.55	46	6	?	.35	.2	Y	LMB/A or MV
CI	569	III	2/2	1	1	P	?	45	?	?	?	?	Y	LMB/A or MV
CI	1145A	III	2/2	1	1	P	?	?	?	?	?	?	Y	LMB/A or MV
CI	1145b	III	3/3	1	1	?	.425	?	?	?	?	?	Y	LMB/A or MV
AMNH	29.1-8954	III	2/2	1	1	P	.65	49.5	?	?	.4	1.0	Y	LMB/A or MV
AMNH	29.1-8955	III	2/2	1	1	P	.425	45	?	?	.4	.7	Y	LMB/A or MV
UC	2618	3	2/2	1	1	P	.5	27	9	?	?	?	Y	LMB/MV
CHS	0579	3	3/3	2	1	B	.35	18	7	?	?	?	Y	LMB/MV
CHS	0580	3	3/3	6	2a	B	.3	18	4.5	?	?	?	Y	LMB/MV
CHS	0581	3	3/3	2	1	B	.3	16	6	?	?	?	Y	LMB/MV
CHS	0582	3	3/3	2	1	B	.4	15.5	6	?	?	?	Y	LMB/MV

Observational Data

Museum	Catalog Number	Period	Plaiting Interval	Decoration motif	color	rim	Dimensions(cm.) 1	2	3	4	5	Materials 6		Provenience
CHS	0583	3	3/3	2	1	B	.45	15.5	5.5	?	?	?	Y	LMB/MV
CHS	0584	3	3/3	2	1	B	.35	13	6	2	.25	.8	Y	LMB/MV
CHS	0585	3	2/2	1	1	B	.3	14.5	3.5	1.25	.3	.5	Y	LMB/MV
CHS	0586	3	3/3	4	1	B	.3	17.5	?	?	?	?	Y	LMB/MV
CHS	0587	3	3/3	4	1	P	.25	18.5	4	?	?	?	Y	LMB/MV
CHS	0588	3	3/3	4	2a	B	.25	14.5	5.5	2	.25	.7	Y	LMB/MV
CHS	0589	3	3/3	4	1	B	.4	14	6.5	1.5	.3	.8	Y	LMB/MV
CHS	0590	3	3/3	2	1	P	.25	13	5	1	.3	.6	Y	LMB/MV
CHS	0591	3	3/3	2	2a	B	.35	18	6	2	.25	.8	Y	LMB/MV
CHS	0592	3	3/3	2	2a	B	.35	17	7	2	.35	.75	Y	LMB/MV
CHS	0593	3	3/3	2,3	2a	B	.4	17	5.5	2	.3	.8	Y	LMB/MV
CHS	0594	3	3/3	2,3	2a	E	.35	16	6	2.25	.35	.8	Y	LMB/MV

Observational Data

Museum	Catalog Number	Period	Plaiting Interval	Decoration motif	color	rim	Dimensions(cm.) 1	2	3	4	5	Materials 6		Provenience
CHS	0619	3	3/3	2	2a	P	.45	30	7.5	1.75	.4	.6	Y	LMB/MV
CHS	0620	3	3/3	4	1	P	.65	24	7.5	?	?	?	?	LMB/MV
CHS	0621	3	3/3	2	1	B	.45	27	6	?	?	?	?	LMB/MV
CHS	0636	3	3/3	4	1	B	.3	27	5	?	?	.7	Y & rush	LMB/MV
CHS	0637	3	3/3	4	1	B	.45	23	6.5	?	?	?	?	LMB/MV
CHS	0642	3	3/3	double 2	2a	B	.35	16.5	6.5	1.5	.3	.7	Y	LMB/MV
CHS	0643	3	3/3	6	2a	B	.25	17.5	6.5	1.75	.3	.6	Y	LMB/MV
CHS	0644	3	3/3	4	2a	B	.35	17	6.5	?	?	?	?	LMB/MV
CHS	0645	3	3/3	4	2a	B	.35	16.5	6	1.0	.3	.8	Y	LMB/MV
CHS	0646	3	3/3	6	2a	E	.35	16	6.5	1.8	.3	.7	Y	LMB/MV
CHS	0647	3	3/3	1	2a	B	.4	19	7.5	?	?	?	?	LMB/MV
CHS	0648	3	3/3	4	2a	B	.3	16	6.5	1.8	.35	.7	Y	LMB/MV

APPENDIX D

Statistical Data

Hypothesis 1 Data

TABLE 1 Data:

Variable ($\bar{x}$) (cm.)	Period Basketmaker (n = 4)	Early Pueblo (n = 22)	Late Pueblo (n = 12)
strip width	0.556	0.343	0.440
diameter	43.375	18.386	36.750
depth	6.750	6.177	9.917
fringe length	2.000	1.591	2.329
binder width	0.362	0.284	0.331
rod diameter	1.125	0.689	0.950

computed t-values:

BM/EP (7 df) 0.59159

BM/LP (12 df) 0.06324

EP/LP (8 df) 0.59328

- -

TABLE 2 Data:

Period	Variable ($\bar{x}$) strip width	diameter	depth	fringe length	binder width	rod diameter
BM (n = 4)	0.556	43.375	6.750	2.000	0.362	1.125
EP(n = 22)	0.343	18.386	6.177	1.591	0.284	0.689
LP(n = 12)	0.440	36.750	9.917	2.329	0.331	0.950

computed t-values can be found in Table 2 of the text which includes the results of each of the 15 pairwise t-tests.

Hypothesis 2 Data

TABLE 3 Data:

Variable ($\bar{x}$) (cm.)	EARLY PUEBLO PERIOD eastern Arizona (n = 6)	Mesa Verde (n = 16)
strip width	0.354	0.339
diameter	22.417	16.875
depth	6.317	6.125
fringe length	1.267	1.712
binder width	0.242	0.300
rod diameter	0.583	0.728

computed t-value for Ariz./Mesa Verde (11 df) is 0.19088

- -

LATE PUEBLO PERIOD

Variable ($\bar{x}$) (cm.)	Arizona Hopi (n = 6)	Rio Grande Pueblo (n = 6)
strip width	0.458	0.421
diameter	34.417	39.083
depth	8.417	11.417
fringe length	1.450	3.208
binder width	0.350	0.312
rod diameter	0.867	1.050

computed t-value for Hopi/Pueblo (12 df) is 0.19159

Hypothesis 3 Data

TABLE 5 Data: These data are provided in Table 4 in the text which includes the variances of the six variables of dimension. Table 5 is the analysis of variance (f test).

TABLE 6a and TABLE 6b Data:

Variable ($\bar{x}$) (cm.)	Period Basketmaker (n = 4)	Early Pueblo (n = 22)	Late Pueblo (n = 12)
strip width	0.556	0.343	0.440
diameter	43.375	18.386	36.750
depth	6.750	6.177	9.917
fringe length	2.000	1.591	2.329
binder width	0.362	0.284	0.331
rod diameter	1.125	0.689	0.950

rho value for BM/EP is 0.984

rho value for EP/LP is 0.998

Tables 6a and 6b present the correlation matrixes for the 6 Late Pueblo Hopi baskets and the 6 Late Pueblo Rio Grande baskets. These matrixes used the individual values for the six Hopi* and six Rio Grande** baskets which are asterisked in Appendix C.