DOLORES ARCHAEOLOGICAL PROGRAM

TECHNICAL REPORTS

Volume VI, Chapter 2

Additive Technologies - 1979

by William A. Lucius

Prepared For

Cultural Resources Mitigation Program: Dolores Project

Bureau of Reclamation, Upper Colorado Region

Contract 8-07-40-S0562

Under The Supervision Of

David A. Breternitz, Senior Principal Investigator

Final Submission

30 April 1982

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DAP-VI(2)		

4. Title and Subtitle	5. Report Date
Dolores Archaeological Program Technical Reports: Additive Technologies - 1979	April 1982 (Submitted)
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
William A. Lucius	

9. Performing Organization Name and Address	10. Work Unit No.
University of Colorado - DAP Rural Route 1, 17219 CR 26 Dolores, Colorado 81323	11. Contract or Grant No. 8-07-40-S0562
	13. Type of Report and Period Covered Contractual FY 1979
12. Sponsoring Agency Name and Address U.S. Bureau of Reclamation P.O. Box 11568 Salt Lake City, Utah 84147	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The Additive Technologies Group of the Dolores Archaeological Program (D.A.P.) completed inventory analysis of ceramic materials recovered during the 1978 and 1979 D.A.P. field seasons, and during the 1974-1976 Dolores River Project survey. Analysis, which consisted of the microscopic and macroscopic examination of the ceramic materials, was followed by the input of the data into the computerized project data bank. The results of inventory analysis were used to define specific culture categories, wares, and types in the ceramic assemblage. Various ancillary ceramic studies, such as vessel reconstruction and thin-section analysis, were undertaken. The contribution made to the project Research Design by ceramic analysis was evaluated. Appendix A describes the methods and results of the Reconstructable Ceramics Program and provides dates for various site proveniences based on the reconstructable vessel data. Appendixes B and C consist of the ceramic coding format and descriptions of the traditional types identified in the ceramic assemblage.

17. Key Words	18. Distribution Statement
Dolores Archaeological Program, SW Colorado, Anasazi, Archaeology, ceramic, vessel reconstruction	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
		128	

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ABSTRACT

The Additive Technologies Group of the Dolores Archaeological Program (D.A.P.) completed inventory analysis of ceramic materials recovered during the 1978 and 1979 D.A.P. field seasons, and during the 1974-1976 Dolores River Project survey. Analysis, which consisted of the microscopic and macroscopic examination of the ceramic materials, was followed by the input of the data into the computerized project data bank. The results of inventory analysis were used to define specific culture categories, wares, and types in the ceramic assemblage. Various ancillary ceramic studies, such as vessel reconstruction and thin-section analysis, were undertaken. The contribution made to the project Research Design by ceramic analysis was evaluated. Appendix A describes the methods and results of the Reconstructable Ceramics Program and provides dates for various site proveniences based on the reconstructable vessel data. Appendixes B and C consist of the ceramic coding format and descriptions of the traditional types identified in the ceramic assemblage.

INTRODUCTION

This report documents and summarizes the activities of the Dolores Archaeological Program (D.A.P.) Additive Technologies Group from 1 March 1979 to 29 February 1980. The group is charged with analysis and interpretation of the prehistoric artifacts which reflect an additive mode of manufacture. The majority of materials routed to the laboratory are ceramic items, usually in sherd form. The volume of ceramics requiring inventory analysis and the priorities assigned for translating the materials into descriptive and interpretive data, have precluded giving any attention to other artifacts of an additive nature. These other artifacts are primarily fibrous (sandals, baskets, and cordage); due to the generally poor preservation of such items in the local archaeological record, only a small quantity awaits analysis and description. At present, they are undergoing plant-species identification at the University of Colorado.

The following report primarily discusses the procedures for and immediate results of the inventory level of ceramic analysis. Continuing difficulties in the retrieval and manipulation of computerized data prevented integration of the data bases of the various artifactual and provenience analyses prior to reporting deadlines; therefore, interpretive and explanatory statements are severely truncated. The requirements of the inventory level of ceramic analysis have also precluded any attention to the development and implementation of intensive-analysis routines. It is expected that intensive analysis of specified portions of the ceramic data base will begin in the spring of 1980.

This report is primarily administrative; the intent is to document the time and labor allocations that were required to accomplish analysis

tasks and to summarize the structure and results of analysis procedures. A full description of the procedures for and justifications of the analysis is available in Lucius [1].

The results of the inventory analysis are not presented here. Site-specific data are included in the site reports. All data are available for professional use through the Bureau of Reclamation (BOR) at the D.A.P. The ceramic artifacts are being curated by the Bureau of Land Management (BLM) at the D.A.P. Lebanon Laboratory Facility, Dolores, Colorado.

TIME AND LABOR ALLOCATIONS

The following discussion summarizes the staffing of the Additive Analysis Group and those tasks which required the attention of the crew. The figures given in the text can be calculated from time sheets and monthly reports that document the activites of the Additive Technologies Group.

Inventory analysis of all ceramic materials recovered during the 1978 and 1979 D.A.P. field seasons was completed by 15 March 1980. In addition, the Dolores River Project (D.R.P.) survey materials recovered from 1974 through 1976 were processed by the group.

Inventory

Analysis

Analysis of the ceramic artifacts recovered from field activities involves the microscopic and macroscopic examination of each ceramic item. Sorting of the materials and bagging them for maintenance of integrity in storage requires a large allocation of personnel. Review of the time sheets from June 1979 to February 1981 indicates that an average of 42 percent of the available crew time was spent on analysis. (All discussions utilize percentages of the total hours available for crew labor. Fluctuating crew size and availability of crew members preclude the use of actual person days in this report.)

Recording

Following inventory analysis, the resultant data are transferred to computer forms for input into computer files. This procedure allows for sequential recording of the field provenience units. An average of 10 percent of available crew time was utilized in the completion of the

recording phase of analysis. The system being utilized requires a fairly constant ratio of one hour of recording time for every four hours of analysis time.

Input

Prior to September 1979, ceramic crew members performed keypunch activities, using the facilities at the D.A.P. Laboratory. At present, computer input of the recorded data is being done by professional keypunchers at the Salt Lake Office of the BOR. The use of professional services results in a considerably more error-free data base; however, the lengthy turn-around time has slowed down data verification and use.

Quality Assurance

After review of the computer printouts, it became apparent that re-input of a significant percentage of the data from the analysis of the 1978 ceramic materials was required. A consistently high proportion of incorrect data in some of the site records, due in part to crew errors and in part to changes made in the analysis program to better document the ceramics, made review of all site data a necessity. This quality-assurance step was instituted in September 1979 and has been integrated into the analysis program; all data undergo review prior to being entered into the computer. In addition, the data are reviewed again by use of a computer program once they have been input. Data editing was initially accomplished by the Task Specialist, but the responsibility for editing was later transferred to the crew members and accounted for between 7 and 16 percent of their time each month from December 1979 through February 1980.

Field Specimen (FS) Match Procedure

Another time-consuming activity of the laboratory is the recognition and reconstruction of vessels from archaeological sherd debris. A full account of the FS Match Procedure is available in Appendix A, The Reconstructable Ceramics File. As reconstruction of ceramic vessels occurs in association with the analysis procedure, estimation of the time required to accomplish the task is difficult. However, it is probable that for most sites up to 10 percent of analysis time is spent on reconstruction.

Supervisory Activities

The primary duties of the Task Specialist involve summary and verification of ceramic data and articulation of the Additive Technologies Group with other facets of the D.A.P. Full review of the validity and utility of the ceramic data and interpretation of the data for use in descriptive and interpretive reports is the responsibility of the Task Specialist. Communication of information between the Additive Technologies Group and the crew chiefs, administrative personnel, and other task specialists requires a major expenditure of time. Included in this process is discussion with each user of ceramic data about its interpretation and limitations. Documentation of the analysis effort by means of memoranda, correspondence, and formal reports has grown to be a major responsibility of the position.

The Task Specialist, and to a lesser extent the Assistant Task Specialist, must perform activities other than those directly concerned with inventory analysis. The assistant maintains work records, reviews ceramic data for accuracy and completeness, and supervises the Recon-

structable Ceramics Project. The assistant is also responsible for developing a stylistic analysis project and performing necessary supplementary tasks, such as completing a compilation and summary of present knowledge of the Cibola ceramic tradition.

The duties of the Task Specialist require delegation of the major responsibilities for ceramic analysis to the assistant. However, the Task Specialist does oversee the operation and maintains final authority in interpreting ceramic materials. The Task Specialist is also involved in an active program for the development of a comparative type collection and a bibliographic reference file. Communication with other ceramic specialists for the proper interpretation of exotic ceramics is ongoing.

Training

Training is an ongoing process in the Additive Technologies Laboratory, but the introduction of new personnel into the system requires periods of special attention. Due to the influx of new employees in June 1979, 25 percent of laboratory work time was spent in training activities.

Other Activites

Other activities, including meetings, reading, and laboratory cleaning and maintenance take a significant amount of work time, sometimes approaching 25 percent. Because a large portion of the work is repetitious, analysts must have sufficient variety in their schedules to permit maintenance of interest and attention. Technicians are allowed to determine their own schedules (within the constraints of the eight-hour work day) to help maintain the quality of their work. The Task Specialist

and his assistant supervise their activities to insure a respectable work/pay relationship.

The months of August, September, and October were marked by a restriction in the flow of ceramics from the processing laboratory. In order to best utilize group personnel during this slowdown, various crew members were loaned to other departments of the program during this period.

Absenteeism

Absenteeism was variable, with as little as 1 percent and as much as 17.5 percent of work time lost to illness or other time off in any one month.

DESCRIPTION OF THE INVENTORY ANALYSIS

Procedures

Reference should be made to Figure 2.1 for support and clarification of the following discussion concerning the principal steps of ceramics inventory analysis as performed at the D.A.P. laboratory. The procedures described here have been developed by laboratory personnel to meet the needs of the analysis and structure of the laboratory flow of materials and data. Inventory analysis begins when ceramic materials and their accompanying paperwork are delivered to the Additive Technologies Laboratory and terminates when those materials are deposited in BLM Permanent Storage. When ceramic materials are received in the ceramic laboratory, they have already been cleaned and sorted according to FS designation within each site. The materials are initially sorted by the ceramic group to reflect administrative priorities. As each site becomes due, the materials are sequentially removed (by FS) from their storage bags and each FS lot undergoes analytical processing. During microscopic and macroscopic analysis, the ceramic materials from a given FS are divided into lots which, for those variables being utilized in the anlaysis, are identical. Each item in the lot is fractured to create an unweathered break which is then viewed at 20x magnification using a binocular microscope. Higher powers of magnification are occasionally used to view finely tempered pastes. The microscopic examination magnifies the tempering agents to a size that allows for recognition of the temper type present in the sherd; it permits the evaluation of surfaces in cross section in order to determine the presence or absence of slips, washes, or fugitive red; and it reveals abnormalities in the paste, such as vitrification or refiring indicators.

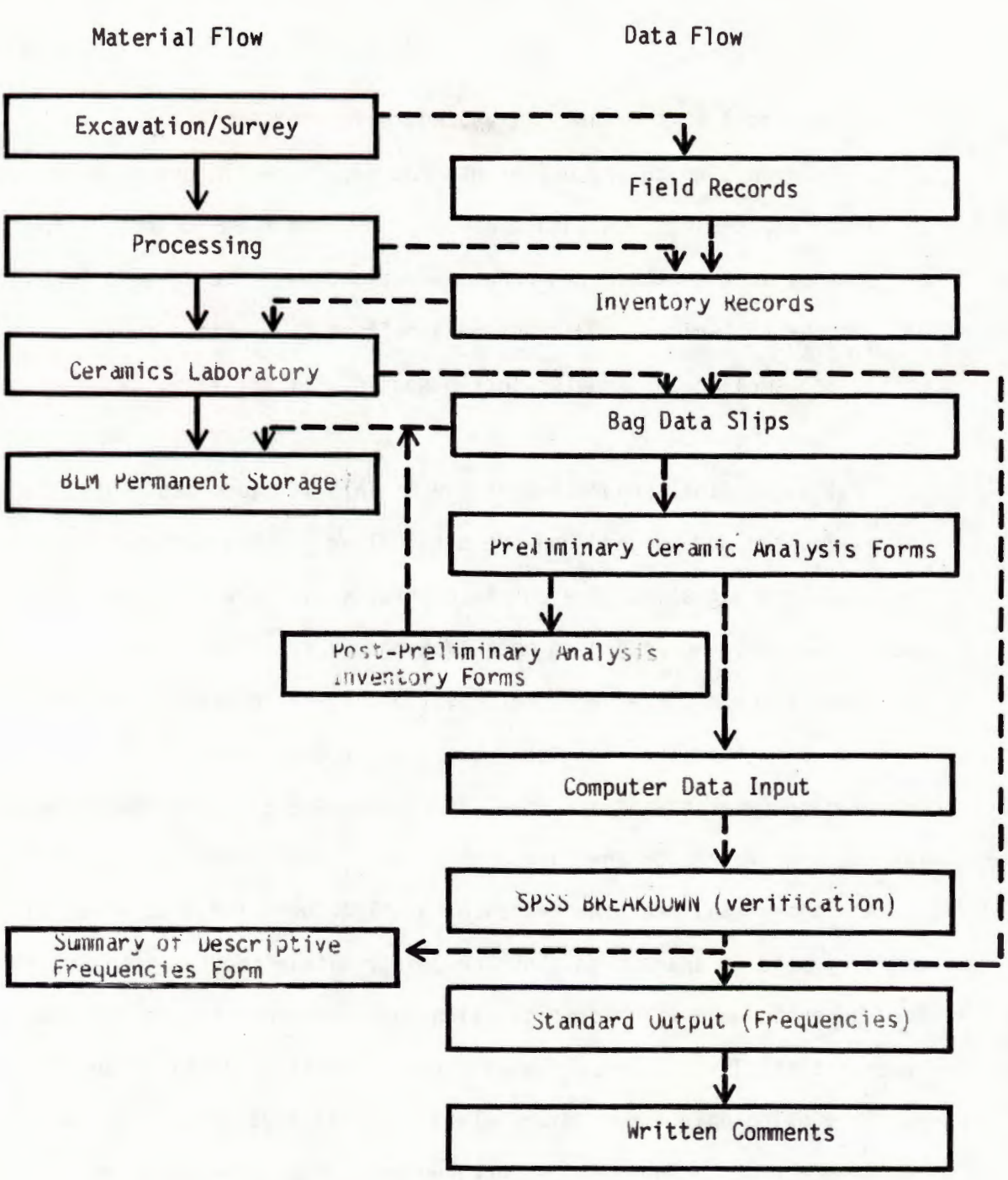

Figure 2.1 Material and data flow chart of the inventory analysis procedure for ceramic artifacts.

A main goal of the analysis procedure is the separation of the FS unit into groups which are different from each other in one or more attribute expressions. Within a given group, the items do not differ from one another in the attributes under investigation. The ceramic technician divides the FS (which has already been defined as a unique provenience unit) into smaller and smaller lots based on artifact form, temper type, etc.

Following final separation of the FS into its component lots, each lot is counted and weighed and the data values for all variables are recorded on a bag slip. The bag slip remains with the lot in a plastic sack throughout the recording operation and is stored with the lot in permanent storage for ease of retrieval and characterization of each lot.

The data from the individual bag slips are recorded on the Preliminary Ceramic Analysis Form (PCAF, Figure 2.2). The data from each lot are transferred to one line of the form. The technological attribute expressions of any one line represent a "signature" for that group which not only sets it apart from other groupings within the FS, but also allows for correspondence with identical signatures in other FSs in the same or other sites. These attribute signatures allow finer distinctions than are possible using only the traditional type classification approach that is common practice in Southwestern archaeology. Each type (such as the grouped type, Early Pueblo White, recorded in lines 2 and 4 in Figure 2.2) may be represented by multiple data lines, each distinct in one or more variables (such as paint color or general form). The analyst does not actually treat the analysis routine as discrete steps; rather, once microscopic viewing has permitted initial differentiations based on the observations of temper type, slip, and paste abnormalities, the analyst

DOLORES ARCHAEOLOGICAL PROGRAM
U.S. Bureau of Reclamation

PRELIMINARY CERAMIC ANALYSIS FORM

Site Number ☐☐☐☐☐☐☐☐☐

F.S. Numbers ☐☐☐☐☐☐ through ☐☐☐☐☐☐

F.S. Page ______

Prepared by ☐☐☐☐

Field Specimen Number	Material I.D.	Catalog Item Number	Special Specimens		Point Locations	Artifact Form	Technological Attributes							Traditional Type			Item Inventory					Special Handling
			Type	Number			Atmosphere	Temper	Surface: Manipulation	Surface: Compaction	Surface: Cover	Paint: Type	Paint: Color	Cultural Category	Ware	Type	General Form	Item or Lot Weight	Lot Count	Rim Sherd Count	Modified Item Count	
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Figure 2.2 The Preliminary Ceramic Analysis Form (PCAF): data recording form for inventory analysis.

sorts the lot using all sorting criteria simultaneously. Thus, the relatively slow microscopic routine is offset by the rapidity of the sorting procedure.

The analyst recording the data on the PCAF is expected to spot obvious coding errors or "illegals" during recording. Each bag is recorded sequentially by catalog number with its FS designation. Thus, retrieval of data and error corrections are easily accomplished. One notebook is used for each site and the resultant file system is compact and portable.

After the information has been recorded on the PCAF, an edit procedure is usually undertaken. This edit compares the typological assignment of the lot with variable values or ranges of variable values that must be consistent with that assignment. The Assistant Task Specialist is responsible for the review and corrections.

Following the data-edit step, the Post-Preliminary Analysis Inventory Form (PPAIF) is completed (Figure 2.3). These forms record the field provenience lot divisions which have been created by the analysis routine, and are submitted to the BLM with the artifacts for permanent storage and curation.

Completion of the editing process leads to the submission of the PCAFs to the Data Processing Group for input. Following the transfer of the paper records into computer files, an SPSS BREAKDOWN (Nie et al. [2]) is applied to the data. At present, the resultant printouts are being utilized for recognition of illegal values in the data and preparation of a Summary of Descriptive Frequencies Form (SDFF) (Figure 2.4).

POST PRELIMINARY ANALYSIS INVENTORY

SITE #__________ MATERIAL__________ INITIALS__________ PAGE____ OF____

FS#	CAT. IT. #	PL #	#	#	#	#	

Figure 2.3 The Post-Preliminary Analysis Inventory Form (PPAIF): bookkeeping form of the inventory analysis.

WARE TRADITIONAL TYPE	BY COUNT												WEIGHTS	
	BOWL		JAR		OTHER		TOTAL		RIMS		MODIFIED			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Indeterminate Gray			1	.04			1	.03	1	.4			6	.02
Mesa Verde Gray														
Dolores Brown	1	.2					1	.03					54	.2
Moccasin Gray			1	.04			1	.03					6	.02
Mancos Corr.			27	1			27	.8	26	11.4			173	.7
Dolores Corr.			26	1			26	.8	26	11.4			2256	8.8
Mesa Verde Corr.			1	.04			1	.03	1	.4			4	.01
Early Pueblo			7	.3			7	.2					15	.1
Late Pueblo			662	25.0	11	34.4	673	20.8	27	11.8	8	23.5	4041	15.8
Corr. Body Sherd			1376	51.9			1376	40.5			2	5.9	6295	24.5
Mesa Verde White														
Cortez B/W			1	.04			1	.03					3	.01
Mancos B/W	77	13.9	55	2.1	1	3.1	133	4.1	41	18.0	6	17.6	2730	10.6
McElmo B/W	39	7.1	3	.1	3	9.4	45	1.4	22	9.6	3	8.8	4361	18.9
Early Pueblo	1	.2					1	.03	1	.4			1	< 1
Late Pueblo	403	73.0	483	18.2	17	53.1	903	28.0	80	35.0	14	41.2	5078	19.8
Mesa Verde Red														
Early Pueblo	1	.2					1	.03					3	.01
Late Pueblo	5	.9					5	.2	1	.4			25	.1
Cibola White														
Chaco-McElmo B/W	2	.4	5	.2			7	.2					28	.1
Late Pueblo	5	.9					5	.2			1	2.9	9	.03
Cibola Red														
Unclassifiable	4	.7					4	.1					17	.1
Kayenta Gray														
Corr. Body Sherds			1	.04			1	.03					6	.02
Kayenta White														
Late Pueblo	3	.5	1	.04			4	.1	2	.9			10	.04
Kayenta Red														
Early Pueblo	1	.2					1	.03					1	<1
Late Pueblo	10	1.8					10	.3	1	.4			32	.1
TOTALS	552		2650		32		3234		239		34		25,653	

ESTIMATED AGE: RANGE A.D. 775-1250
OCCUPATION A.D. 1100-1150

Figure 2.4 The Summary of Descriptive Frequencies Form (SDFF): frequencies reporting form for inventory analysis.

When errors are spotted in the printout--at present, only two variables (traditional type and general form) are being closely checked for accuracy--the analyzed materials and data forms are rechecked and corrected if necessary. The SDFF, with its temporal and cultural data, is channeled to the crew chief in charge of the site(s) under consideration. The SDFF data for all sites are included in individual site reports.

Once the final quality-assurance step of data verification has been accomplished, the data are considered usable for further SPSS manipulation. A list of the analytical provenience groups of spatially and temporally comparable units within the site is developed by the site archaeologist. This is submitted to data-processing for manipulation with the ceramics data. The resulting standard output is reviewed and commented upon by the Ceramic Task Specialist. The written comments and printout are then routed to the responsible archaeologist for use in the writing of the site report. The computer-generated standard output is summarized in table form to allow for inter- and intrasite comparisons. The standard output for applicable sites is presented as an appendix to each site report.

The PCAF Coding Format

Implementation of analysis was necessarily preceded by the development of a coding scheme to represent those data derived from the analysis in machine-readable format. The amount of data generated by the activities of the D.A.P. required that all major data systems be computerized. The variables used in the ceramic analysis were formulated to meet the requirements of inventory and the ceramic research design (Lucius [1]), but their actual values as expressed in the ceramics could not be wholly

predicted given the lack of comparably derived data. In an attempt to determine the approximate range of values possible in the project ceramic collections, a representative collection (Site 5MT2198) was examined prior to the formalization of the coding format to allow for estimation of the range of values for each variable. With that background, a variable/value list (Appendix B) for the PCAF was developed.

In order to allow for project-wide correspondence, the first nine variables in the coding format (VAR 01-VAR 09) are replicated on all coding formats used for data entry. Those variables constitute the provenience data section of the analysis and those data--with the exception of the catalog item number (VAR 06)--are generated in the field and remain with the artifacts through processing and storage. The catalog item number documents analytical subdivisions within the FS unit and is assigned by the ceramics laboratory.

The remaining portion of the coding format is divisible into two main sections: analytical variables (VAR 10-VAR 21) and numerical variables (VAR 22-VAR 25). The former represent those data which are used to sort the ceramics into distinct and definable groupings based on shared attribute values. It should be emphasized that the analytical variables are continually modified, and often renamed, as analysis documents new variables and values. The numerical variables record the inventory data (weight, count, rim, and modified item counts) of the final analytical divisions of the lots. The final column on the PCAF, special handling, is used to document any special handling that has occurred (photography, thin-section analysis, etc.).

SPECIAL CONSIDERATIONS OF THE ANALYSIS

The taxonomic system used for the reduction of the ceramic artifacts into data for descriptive and interpretive reporting generally follows Colton and Hargrave [3]. The indigenous types of the project area are the regional types defined by Breternitz et al. [4]. However, the institution of previously undefined analytical categories and the definition of additional types not previously described requires elaboration of the taxonomic methodology.

Culture Categories

The largest divisions of ceramic artifacts recognized in the analysis are culture categories. Four culture categories are recognized in the D.A.P. ceramic assemblage: Mesa Verde, Kayenta, Chuska, and Cibola. Figure 2.5 illustrates the general geographical boundaries of each category. The definition of a culture category is based primarily on the presence of distinctive tempers that have been shown to be affiliated with a geographical area. These geographical locales roughly correspond to the recognized branches of the Anasazi (Colton [5]). The proposed boundaries of Figure 2.5 are expected to be altered with the further documentation of ceramic data by the present analysis system. The Kayenta category is poorly represented in the ceramics of the project area; Chuska and Cibola tradewares comprise the majority of trade ceramics for that period of time represented by project sites. Definition of two subdivisions (the Mesa Verde and San Juan) within the Mesa Verde Culture Category is based on the distinction of two separate crushed-rock tempering agents in the D.A.P. collections. Recent examination of survey

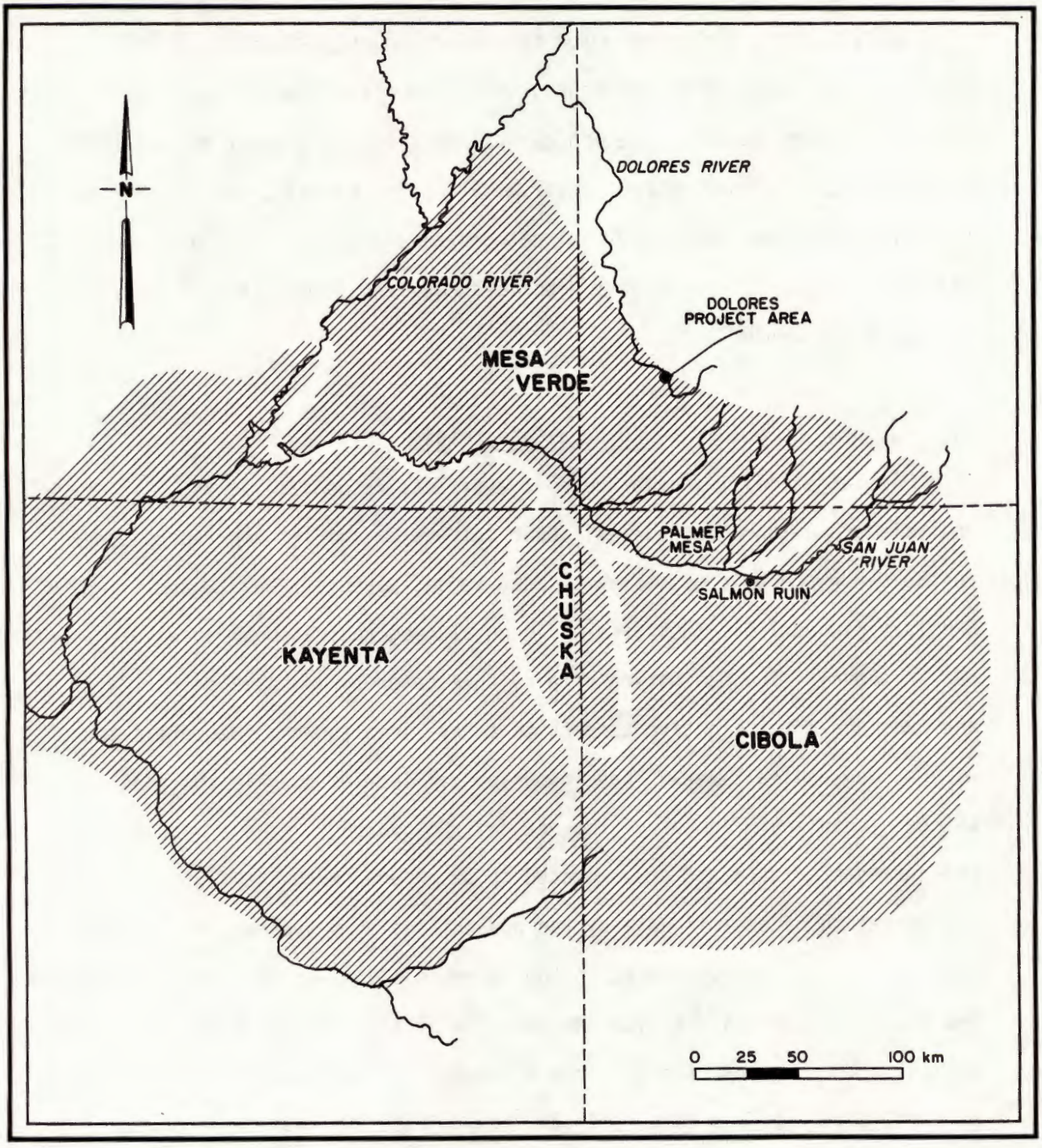


Figure 2.5 Geographical boundaries of the Mesa Verde, Kayenta, Chuska, and Cibola culture categories.

collections from the Palmer Mesa area of northern New Mexico (Lucius [6]) and review of type collections derived from the Salmon Ruin area along the San Juan River indicates a definable distinction between the tempering agents used in these portions of the San Juan River drainage and those tempers occurring in the Dolores Project area ceramics. However, until petrographic verification of those visual differences can be accomplished and the source materials tied to specific locales, the two subdivisions, which have been kept separate in the analysis, will be reported as combined. The similarity of those two tempering agents, even under magnification, precludes any effective use of the temper distinction, without petrographic verification and source identification, to address questions of interregional trade.

Ceramic items exhibiting crushed trachybasalt as the tempering agent appear in the project area by A.D. 850. The similarity of the temper, paste, and paint attributes with those of the Chuska types described by Windes [7] and Peckham and Wilson [8] has led to the assignment of those materials to the Chuska Culture Category. Both mineral and organic paint series are represented in the white wares. Gray wares are also recorded in the collections. Assignment of trachybasalt-tempered sherds to the Chuska Culture Category is necessarily tentative due to the presence of trachybasalt resource materials in the Mesa Verde Culture Category. Until petrographic analysis of the trachybasalt-tempered sherds can be accomplished and the exact source of the tempering materials located, all sherds with trachybasalt are placed into the Chuska category. Definition of the Cibola tradeware ceramics is more difficult, as quartz-sand temper can indicate either Cibola or Kayenta affiliation. Painted white ware ceramics of the Cibola category are distinctive because of their use of

mineral paint. Conversely, Kayenta White Wares utilize an organic paint. Gray ware sherds of the two categories are indistinguishable and all such items have been tentatively coded as being affiliated with the Cibola Culture Category. The effect of this muddling of culture category distinctions is probably minimal due to the small numbers of unpainted quartz-sand-tempered sherds.

Two sherds of what appear to be smudged Mogollon ceramic items were documented in the analysis of remains from Site 5MT2193 and Site 5MT4644. Both sites appear to date to between A.D. 750 and 850. Proper identification of those sherds has not yet been accomplished so no firm interpretations can be made at this time. Occasional Shoshonean ceramics, as defined by their brown to tan pastes with quartz-sand and mica temper and rough exteriors, were recovered from survey operations and represent protohistoric or historic Ute activity in the project area. Those sherds were assigned to the Shoshonean Culture Category.

Wares

Within each culture category, a series of wares, defined as developmental sequences of ceramics that can be characterized by their color and probable use, have been defined. Gray wares are defined as ceramic items with plain or manipulated surfaces which exhibit a gray to white paste and which were used for storage or cooking purposes. Jars are the predominant form in the gray ware category. White wares are usually painted and/or polished and have a gray to white paste. These wares appear to have been constructed for serving or ceremonial uses, and the name is partially drawn from the white-burning clays used in their manufacture. Slips, which cover the paste and provide a medium for

painted designs, appear on white wares at approximately A.D. 900. Red wares are similar to the white wares in that they appear to have been used for the same activities and are usually painted. An oxidation regime of firing allows the natural iron of the clay to oxidize resulting in the orange to red surface color. Rare slipped Mesa Verde Red Ware sherds have been found on sites dating to as early as A.D. 800. (It should be noted that Mesa Verde Red Ware refers to those ceramics usually referred to as San Juan Red Ware.) Bowls and jars are common shapes for both red and white wares.

No typable red ware sherds attributable to the Cibola and Chuska culture categories have been documented in the analysis. All oxidized ceramic items of the Anasazi area which exhibit an orange to red paste and an orange to red surface color, but are otherwise untypable, are placed into a red ware class within their respective culture categories (e.g., Kayenta Red Ware).

Two additional red wares have been documented in the collections. Recovery of quartz-sand-tempered, red-slipped ceramics at Site 5MT2236 and Site 5MT0023 required evaluation of their possible source of manufacture. The sherds reflect a Lino style of manufacture and therefore were considered tradewares. Analysis of survey collections made from the Canyon de Chelly area by Navajo tribal archaeologists (Lucius [6]) revealed identical sherds. Library research revealed the documentation of the same type of ceramics at Jeddito 264 (Daifuku [9]). Because this type description characterizes the ceramics from the project area, that type name has been adopted. The type, Tallahogan Red, has been placed under the Kayenta Culture Category as a red ware. Its presence in the two sites noted above is interpreted as an indication

of contact with the Kayenta area. Site 5MT2236 is securely dated, and is thought, based on tree-ring dates, to have been built in A.D. 765. Daifuku assigns a date range of A.D. 660-780 to the type based on tree-ring dating. The lack of Tallahogan Red in sites of the project area prior to A.D. 775 indicates that trade with the Kayenta area was established at, or about, A.D. 775. The duration of Kayenta contact cannot be determined at present.

Another red ware, found in post-A.D. 900 contexts at Sites 5MT2235, 5MT2151, and 5MT0023, cannot be found to have been previously described. This ware is distinctive in that it exhibits an extremely white clay body with a bright red surface wash and no painted decoration. Bowl and jar forms were recorded. It is apparent that a white clay with a minimal iron content was being slipped with a hematite-based wash and fired in an oxidation atmosphere (at least during the final stages of firing). Finely crushed river-cobble temper or crushed-sherd-and-rock temper has been observed in those sherds. It is apparent that the type dates prior to A.D. 900, but, due to the scarcity of the type in the collections and the lack of comparative descriptions, full determination of its status awaits further analysis. At present, it is being placed in the Mesa Verde Red Ware category as a Dolores Red Ware. Formal description of the types defined by ceramic analysis is available in Appendix C.

Traditional Types

Each ware is further divided into traditional types. Types are defined as temporally and spatially diagnostic ceramic groupings which are determined on the basis of shared attributes. The analysis routine documents seven technological attributes for the determination of type

status. Reference should be made to Lucius [1] for a description of those attributes, their possible value range, and the definition of types by analysis of their technological and stylistic atributes. Types utilized in the analysis follow those of Breternitz et al. [4] for the indigenous types of the Mesa Verde region. Crushed igneous rock, possibly andesite/diorite, is the most frequent temper type found in project area ceramics. Site 5MT4545, dated to around A.D. 600, shows a high percentage of crushed sandstone and sand temper in the ceramics, but by A.D. 700, locally available crushed igneous rock is the overwhelming choice for temper in D.A.P. ceramics.

Three previously undescribed types were documented in the analysis, and type status has been ascribed to those ceramics (Appendix C). Previous archaeological investigation of the Mancos Canyon has demonstrated that it would be useful to define a new corrugated type representing the middle range of the continuum currently represented by Mancos Corrugated and Mesa Verde Corrugated (Euler [10]). Rim sherds with an intermediate eversion angle of approximately 45° have been assigned to the new type, Dolores Corrugated, and the definitions of Mancos and Mesa Verde Corrugated have been narrowed to accomodate the new type. Figure 2.6 illustrates the criteria used for type distinction among the corrugated rims. Recovery of Dolores Corrugated sherds in archaeological contexts is used to denote an approximate time range of A.D. 1100 to 1200.

The second type has been named Dolores Brown reflecting its distinctive brown clay. The type appears to represent a short time period of manufacture (A.D. 700-800) and the only restorable forms are effigies and small (miniature) jars. The greatest number of items made of the sandy alluvial clay were recovered from Site 5MT2854. The type also has been

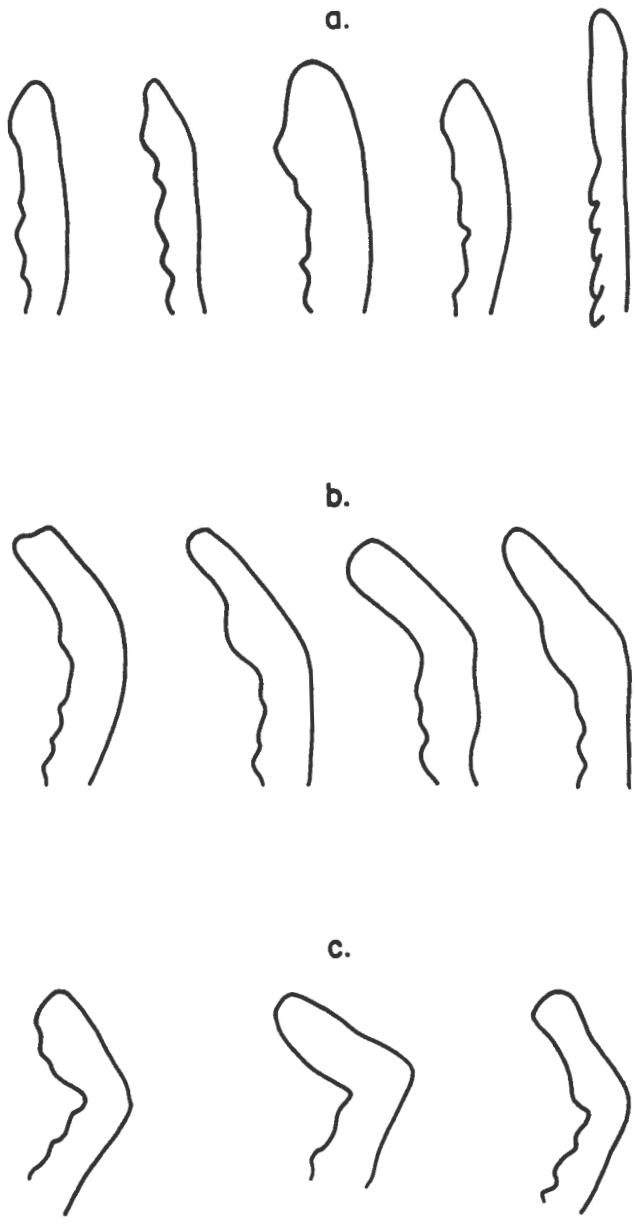


Figure 2.6 Corrugated rim forms of (a) Mancos, (b) Dolores, and (c) Mesa Verde corrugated types.

documented at Sites 5MT2151, 5MT2161, and 5MT0023, all in Grass Mesa Locality. The type is distinctive in its composition of a naturally sand-tempered alluvial clay. The resulting ceramic is extremely soft--weathered breaks are normally eroded and rounded--and friable. The most likely source for such clays is in shallow rainwater pools. Examination of such pools has revealed that the deposits are composed of roughly sorted sands of multilithic derivation with quartz as the primary component. Sufficient clays are present in the deposits to form mud cracks upon drying. Color, texture, and mineral comparisons of the brown ware sherds and the alluvial clays indicate that the most likely source for the clay is from the pools. No similar clays have been recovered from alluvial deposits. The type has been included as Dolores Brown under the gray ware category of the Mesa Verde Culture Category. No relation with the Mogollon Brown Ware types is being assumed.

The third new type, Dolores Red, was identified on the basis of its white paste and deep red slip. The area of manufacture of Dolores Red is not known, but it is believed to be an area other than that hypothesized for San Juan Red Ware.

Grouped Types

The major percentage of the archaeologically derived ceramics cannot be placed within a diagnostic type cateogry; sherds without the basic criteria for type definition often account for the majority of ceramics from an excavated site. Type distinction is normally based on rim shape or surface manipulation for the gray wares, and on painted elements and formats for the white and red wares. Body sherds without distinctive attributes for type placement are placed into grouped-type categories to

allow for temporal control within each ware. With the exception of Corrugated Body Sherds, which indicate a post-A.D. 900 date, grouped types are either Early Pueblo (A.D. 600-900) or Late Pueblo (A.D. 900-1200). Definition of the early/late dichotomy for body sherds is based on several criteria. Vessel-wall thickness, surface finish, fracture type, firing, hardness, and overall sherd morphology are used to determine correct grouped-type placement. The distinctions were derived from definition of the characteristic differences found in the sherds from sites of known age affiliation and projection of those differences for use in the separation of early and late body sherds. The process is successful except with remains from sites dating between A.D. 900-1000; the separation process breaks down as the ceramics appear to have been transitional from the early to the late at this time.

Grouped types are useful in determination of age affiliation for survey sites from which there are no diagnostic types. Also, the presence of early and late grouped types at a site may indicate a later reuse; several sites in the project area are characterized by such an assemblage. Fortunately, the presence of diagnostic types at most excavated sites minimizes the necessity for use of the grouped types for dating of most of those archaeological remains.

SUPPORTIVE PROGRAMS

The development of an inventory analysis procedure necessarily required the concurrent development of supportive activities. Figure 2.7 illustrates those programs developed to aid and reinforce ceramic analysis and reporting tasks. Many of the programs are ongoing in order to provide the assistance needed to effectively implement the inventory-level analysis.

Training

A tripartite training effort has been designed to introduce new crew members to the analysis program, insure familiarity with the procedure through experience and supervision, and broaden the interpretive base by exposure of the crew members to archaeological and ceramic experience. New crew members are introduced to the analysis routine through formal seminars involving lecture and response. Following this formal training session, each crew member learns the step-by-step procedures of the analysis routine by on-the-job training. The Task Specialist and experienced crew members provide guidance and critical review. The interaction of all crew members in the process of analysis results in a unified approach to ceramic analysis.

Occasional field trips, lectures, and classes in ceramic technology support the day-to-day learning and experience of laboratory work. These programs account for less than 1 percent of the time available for analysis and serve to enhance the validity of analysis by exposing analysts to differing facets of ceramic knowledge.

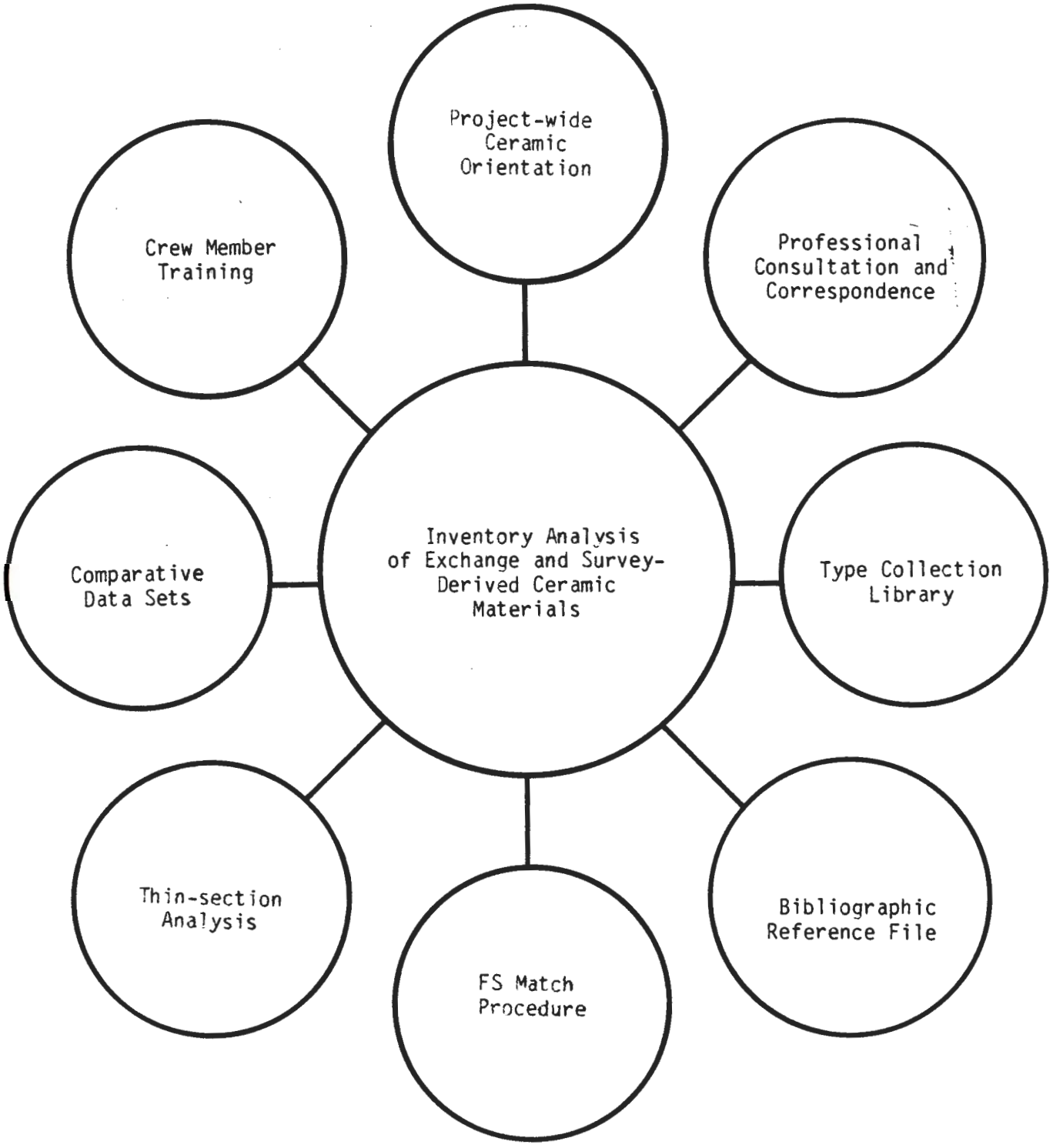


Figure 2.7 Supportive programs of the inventory ceramics analysis.

In addition to crew member training, the Task Specialist provides program-wide training regarding the scope and utility of the ceramics analysis project through lectures, tours, and individual contacts. Laboratory-trained personnel have also been released to field duties, thereby enhancing the recognition and preliminary interpretation of ceramics by field crew personnel.

Professional Resources

In order to insure proper interpretation of analytic data, consultation with other professionals in the field, accumulation of a comparative type collection of defined ceramic types, and compilation of a bibliographic reference library are ongoing facets of the analysis.

Contact has been made with ceramic specialists in areas adjacent to the project area in order to invite transfer of data, interpretations, and materials across project and political boundaries. Thus, the available range of knowledge concerning regional and area ceramics is improved.

Another facet of this cooperation is the transfer of documented collections which are being used to construct a reference library of ceramic types. Such a collection is necessary in dealing with exotics and regional variations in the ceramic record. D. Breternitz, Senior Principal Investigator for the D.A.P., has also been instrumental in the development of a broadly based ceramic reference collection.

Due to the relative isolation of the program from professional or academic information sources, the ceramics laboratory is developing a bibliographic reference file to aid in the development and interpretation of ceramic research. Copies of publications relevant to ceramic analysis

and interpretation are being gathered in order to provide the best reference library possible under the circumstances.

FS Match Procedure

After inception of the inventory analysis in early 1979, it became apparent that a ceramic reconstruction program was required in order to document vessels in the analysis program. The excavation of point-located ceramics from floor surfaces during the 1978 field season provided the opportunity to develop a procedure to determine the original forms represented by those sherds. The procedure allows for recognition of fragments of particular vessels and documents their distribution (provenience). Sometimes, the vessel portions are reconstructed, resulting not only in whole or partial vessels for display and evaluation, but also in interpretation of the uses and distribution of those fragments in the site. A full discussion of the FS match procedure and its results can be found in Appendix A.

Thin-Section Analysis

An important facet of the analysis is the recognition of temper classes for determination of local versus trade ceramics. Due to a lack of mineralogical expertise among project personnel, it was considered imperative that petrographic verification of the temper categories of inventory analysis be accomplished. Such an analysis requires that representative sherds be selected and their tempering agents isolated by means of petrographic analysis of sherd thin-sections. The analysis is being programmed not only to verify the temper classes but also to determine source areas for those temper materials. Selection of the

samples has begun and a petrographer has been contacted to perform the analysis. Due to a delay in sample selection, the results of the analysis are not yet available.

Comparative Data Bases

No standardized program for the analysis and interpretation of Anasazi ceramics exists. Because analysts' abilities and research goals differ, previous ceramic analyses are difficult to compare with the inventory analysis of the D.A.P. In order to make proper evaluations of the data recovered from the present study, it was considered imperative that comparative data in the standardized format of the present analysis be available. To practically meet this need, the D.R.P. collections, made prior to the granting of the current contract, were retrieved from their storage location with the BLM and reanalyzed under the inventory analysis routine described herein. Unfortunately, the collections made during the 1973 field season have not been located and, therefore, cannot be included in the comparative data base. The ceramics resulting from the excavation of Dominguez and Escalante Ruins (Reed et al. [11]), located immediately adjacent to the project area, have been made available. However, funding and priority restrictions have thus far precluded reanalysis and use of these materials for comparative data.

The author has also provided two data bases for comparative use. Surface survey materials from the Palmer Mesa of northern New Mexico and the Tsaile area of northern Arizona were analyzed for the Navajo Tribe. Those data are fully integrated into the analysis system of the D.A.P. (Lucius [6]).

INPUT INTO THE PROJECT RESEARCH DESIGN

The articulation of the ceramic analysis program and the general Research Design which serves to guide the activities of the D.A.P. (Kane et al. [12]) has been discussed previously (Lucius [1]). This review serves as an evaluation of the role of ceramic analysis in approaching various domains of the Research Design and identifies those sections of the design which are not addressed by the current analysis program.

Problem Domain 1 of the Research Design, Economy and Adaptation, is concerned with the cultural exploitation of the resources which were available to the prehistoric populations in the D.A.P. area. Due to funding and personnel restrictions, and the continuing priority schedules of the analysis, the Material Source Sampling Program described in Lucius [1] has been suspended. It is assumed, based on a modicum of field investigation of the ceramic resource base, that the locally available clays and temper sources represent an inexhaustible and varied resource base which was utilized for the local manufacture of prehistoric ceramics. No attempt to identify specific resource utilization is presently possible.

Problem Domain 2, Paleodemography, is ultimately concerned with the estimation of prehistoric population units and the characteristics of those populations. At present, no direct input from ceramic analysis has been developed.

Problem Domain 3, Social Organization, is concerned with social organization and is divided into subdomains concerning social, economic, political, and ideological organization. The inventory-level of analysis has the potential of input into questions of economic social organization and a proposed stylistic analysis should also address this problem domain.

The greatest contribution to the Research Design by the inventory level ceramic analysis is to Problem Domain 4, Foreign Relationships. The types being recorded in analysis are spatially as well as temporally diagnostic. In addition, there is a strong possibility that interregional trade ceramics can be defined, thereby increasing the knowledge of the interaction of the prehistoric peoples of the D.A.P. area with populations in adjacent areas.

Problem Domain 5, Cultural Process, will not be addressed to any extent by the ceramic analysis program until methodological guidelines for its study can be formulated.

SUMMARY

Inventory-level analysis of the ceramic complements of excavated and surveyed prehistoric sites in the D.A.P. area has resulted in the derivation of a descriptive data base which is temporally and spatially sensitive. Due to the demands of data reduction and the distribution of the data to project personnel for completion of required reports, the proposed activities of the Additive Technologies Group have been restructured to meet that goal. Therefore, the goals of the additive laboratory, especially the proposed intensive analyses that were expected to provide input into the various problem domains of the Project Research Design, have been modified to allow for the derivation of a standardized and quality-assured data base for the determination of temporal and spatial derivation of the ceramics under scrutiny.

The structure of the analysis procedures and the supportive programs that allow for interpretation of the resultant data have been reviewed. The time and labor allocations of the project have also been reviewed in order to document the range of activities of the additive laboratory. Two important interpretations have been derived from this review of activities of the additive laboratory.

First, the procedures of the analysis have proven to be effective in producing excellent and interpretable ceramic data. However, the sorting procedures of the analysis step of the data reduction are overly time-consuming and are presently being streamlined. The changes are expected to have no major effect on the provenience, taxonomic, and numerical data of the program. The documentation of the technological attributes, which

are not being reported on at this time, will be restructured. The effect of the changes on overall results of the analysis program will be negligible.

Second, the success of the analysis program in the definition and description of the prehistoric ceramics derived from the archaeological investigations is offset by the difficulty in comparing those results with previously derived ceramic data. Derivation of comparable data bases and consultation with ceramic specialists in adjacent areas have been undertaken to partially alleviate this problem but the difficulty in comparison continues. The derivation of well-controlled ceramic data has also resulted in the realization that unless comparable analysis is performed on existing collections and future ceramic complements, the level of comparison between this and other data bases is necessarily and unfortunately limited.

APPENDIX A

THE RECONSTRUCTABLE CERAMICS FILE

by

Suzanne Bradley and William A. Lucius

INTRODUCTION

This manuscript represents a review of the Additive Technologies Reconstructable Ceramics Program. The occasional recovery of whole or fragmentary vessels from the excavation activities of the D.A.P. and the recognition of matching sherds in provenience lots led to the development of a program for the documentation and reconstruction of whole or partial ceramic items. The ceramic inventory analysis program is sherd-oriented; the ceramics from the field specimen lots rarely contain ceramic items other than sherds. Documentation of whole or partial vesels, especially those which were assembled from scattered sherds, required the development of a file which would link with the inventory analysis data file and which would document the provenience, typological, and attribute data associated with the vessels.

The following discussion represents a review of the Reconstructable Ceramics Program in terms of its justifications, techniques, and documentation. Also included in the manuscript is a review of the ceramic materials of the program in terms of stylistic comparison of the reconstructable (RC) vessels with those illustrated in the archaeological literature. This report represents an interim attempt at description of the Reconstructable Ceramics File. The discussion has been limited to those ceramics recovered from the testing and excavation of sites in the 1978 and 1979 field seasons.

RATIONALE

The reconstruction of ceramic vessels provides data for the inventory counts necessary to test research hypotheses aimed at interpreting the cultural dynamics of the prehistoric population. More specifically, vessel reconstruction allows for statistical testing of hypotheses concerning social behavior and organization. Often in discussions of research biases, much is written about "discontinuities" such as differential preservation of ethnobotanical samples. There seems to be little alternative for the researcher other than taking these discontinuities into account during analysis and interpretation. Duplicated data are rarely considered biases in published reports and absolute sherd counts without benefit of the reconstruction process can cause a duplication of data which can seriously interfere with distributional studies used to form the basis of statements concerning cultural processes or social organization. The degree of bias introduced by absolute sherd counts can be considerably reduced through identification of reconstructable vessels. For example, the designation of a storage area based on a ratio of 20 corrugated jar sherds to one white ware bowl sherd would be extremely misleading if all 20 jar sherds actually belonged to the same vessel. An area with one corrugated vessel and one white ware vessel could not legitimately be called a storage area on the basis of ceramic evidence alone.

Vessel reconstruction also provides synchronic and diachronic control for stratigraphically uncertain areas of excavation. Finding sherds from a single vessel scattered throughout a stratum lends material support to the continuity of that stratum whether it is a floor, trash, or

occupational fill. Vessel reconstruction also provides evidence for strata contemporaneity between different areas of a site. The recovery of reconstructable vessel fragments found in a trash stratum in one room and on a floor surface of the adjoining room could be used to argue for contemporaneity of the excavation units.

Vessel reconstruction also aids in accurate identification of design layouts, motifs, and elements and in testing the applicability of the traditional typology to the Research Design Problem Domains. Ceramic classification remains one of the most important factors assessed in temporal assignment of sites or strata; design configurations are a primary diagnostic of ceramic types. However, since the typology is an analytic tool which represents a more abrupt, artificial delineation of artifactual change than may have actually occurred, diagnostic elements, motifs, and design configurations may overlap type boundaries. For example, the checkerboard motif is found on various northern Anasazi pottery types beginning with Piedra Black-on-white (approximately A.D. 750) and continuing through Mesa Verde Black-on-white (approximately A.D. 1300). The placement of a checkerboard pattern on the vessel and its combination with other design elements and motifs will determine which type classification is most appropriate.

Symmetry analysis is another analysis technique that can be applied to reconstructable ceramics (Sheppard [13], Washburn [14]). Since symmetry is primarily an analysis of the motion of element repetition, a more complete design is necessary than is usually available on sherds. An equilateral triangle pendant from the vessel rim is obviously a trilateral finite element, but a series of these triangles becomes a one dimensional strip utilizing motions of reflection, translation, and/or half turns.

Reconstruction of vessels or vessel fragments can allow for the determination of design formats and, therefore, symmetry class.

Finally, vessel reconstruction increases the number of artifacts of exhibitable quality for the Anasazi Heritage Center, the proposed repository for all cultural materials retrieved by the D.A.P.

VESSEL RECONSTRUCTION TECHNIQUES

Vessels or partial vessels are often recovered by D.A.P. fieldwork. They are almost always broken into sherds, and the sherds may be found in widely separated proveniences on a site. These vessels can be used to support arguments of contemporaneity of deposits within sites as well as to support spatial descriptions and functional interpretations of surfaces. RCs are assigned numbers sequentially by site, and items or groups of sherds are designated as RCs if it is analytically useful to consider them as aggregates rather than only as attribute frequencies. This flexible definition results in RCs that range from three or four contiguous sherds to whole vessels, and not all RCs warrant physical reconstruction or photographic documentation. Due to the volume of sherds analyzed and to contraints of time and budget, specific RC searches were not carried out for other than point-located items from the 1979 field season. RCs were defined from other contexts, but their discovery was usually fortuitous.

Generally, in an archaeological laboratory, ceramics are not actually restored (i.e., rebuilt with missing areas filled in and molded with resins or cellulose and the design painted on). Restoration, being extremely time consuming and expensive, requires considerable training in chemistry and art; it has not been attempted by the D.A.P. Rather, a program for the recognition and reassembly of vessels from sherds, which results in partial or whole vessels and other ceramic forms, has been instituted.

The methods described below have been developed by the D.A.P. ceramics laboratory and are used in the reconstruction of fragmentary

vessels. They represent the experience gained from a long-term reconstruction effort.

Preparation

Sherds from an RC should be thoroughly washed after careful separation of unfired or low-fired sherds which might not survive complete water immersion, or sherds which have fugitive red coating on either surface. Special care should be taken in cleaning the edges of each sherd; otherwise the adhesive bond will not be strong enough to hold, or tight enough to allow a good fit as the vessel is reconstructed. A neutral, soapless detergent may be used if the sherd is throughly rinsed after cleansing.

Unfired and very low-fired sherds should be consolidated prior to any cleaning beyond a superficial dusting with a soft brush. Surprisingly, some conservators recommend controlled firing to at least 750°C as an efficient method of consolidation (Plenderleith and Warner [15:327]). This process is irreversible, however, and because the foremost principle of conservation and reconstruction is that any treatment to an object must be immediately reversible, the refiring method should not be used. Alternatively, applications of a 5 percent solution of a soluble nylon and ethanol forms a protective film on the object's surface which is permeable enough to allow any necessary salt removal. Since the local soils are rather dry, salt removal should rarely be required. Further consolidation may be accomplished by impregnating the object with a synthetic resin solution, i.e., polyvinylacetate, methacrylate, or nitrocellulose.

Fugitive red is a covering of red mineral, similar to a slip, on the surface of an object. Unlike slip, fugitive red is the result of a postfiring application of iron oxide to the vessel exterior or the

vessel's use as a storage container for the pigment. These sherds should never be submerged in a liquid solution. Liquids wash away the fugitive red because there is no fusion of the pigment to the surface of the ceramic body. Lightly brushing the surfaces and broken edges will remove any loose dirt. A cotton swab dampened with acetone or ethanol, lightly brushed over the edges, should remove the remaining dirt. Stubborn grains may have to be mechanically picked out. Care should be taken not to overrun the edges onto either surface. The overlap would remove the fugitive red and emphasize the seams after reconstruction.

Calcium deposits or encrustations on surfaces of sherds are often encountered. These can be removed with a 50 percent or stronger solution of hydrochloric acid (HCl). If calcium carbonate is suspected of being a component of the sherds, dilute HCl acid applied drop by drop onto the deposit will dissolve or sufficently loosen the deposit. Finally, the sherd should be throughly rinsed under running water to remove all traces of the acid, which can stain (Gedye [16:110]).

Sherds should be completely dried and labeled before reconstruction. At the D.A.P. ceramics laboratory, labels note field provenience data (site number, field specimen number, and point location) and a consecutively assigned vessel number. Any such label should be applied directly to the dry sherd with permanent India ink sandwiched between layers of clear nail polish. The top layer of polish inhibits deterioriation or chipping of the label. The bottom layer allows easy removal of the label if necessary. Placement of the label depends on the vessel shape (labels are placed on the interiors of jar sherds and exteriors of bowl sherds).

The bonding agent should be colorless, quick-drying, and soluble. Cellulose-based bonding agents, soluble in acetone, are preferred over casein-based agents which are water soluble but require heat application for best results. Duco brand cement diluted with acetone is used in the Dolores Laboratory. Knives, dental picks, and clean tissue paper or cotton swabs dampened with acetone should be used to clean away any excess glue which may ooze from the seams. A sandbox and dowels of various diameters and lengths are necessary tools used to hold the vessel in place during reconstruction and while the glue dries. The sandbox should be large enough to hold the vessel but small enough to place in a well-lighted work space where reconstruction can be carried out comfortably.

The Assembly Process

Experience is the best teacher for reconstructing vessels, but here are some hints which will aid the process:

1) Make a trial run: assemble the pieces without glue to avoid "lockouts" (a "lockout" is knowing where a sherd fits, but not being able to put it in because of interference from sherds which have already been set in place) and to identify areas which are missing. Identification of missing areas will allow the conservator to look for pieces which may have been overlooked when various sherds were classified as part of the vessel being reconstructed (Figure 2.A.1).
2) Build from the bottom up and raise the sides of the vessel as evenly as possible, given the varying sizes and shape of sherds.
3) Assemble beginning with smaller pieces, then fit the larger pieces together.

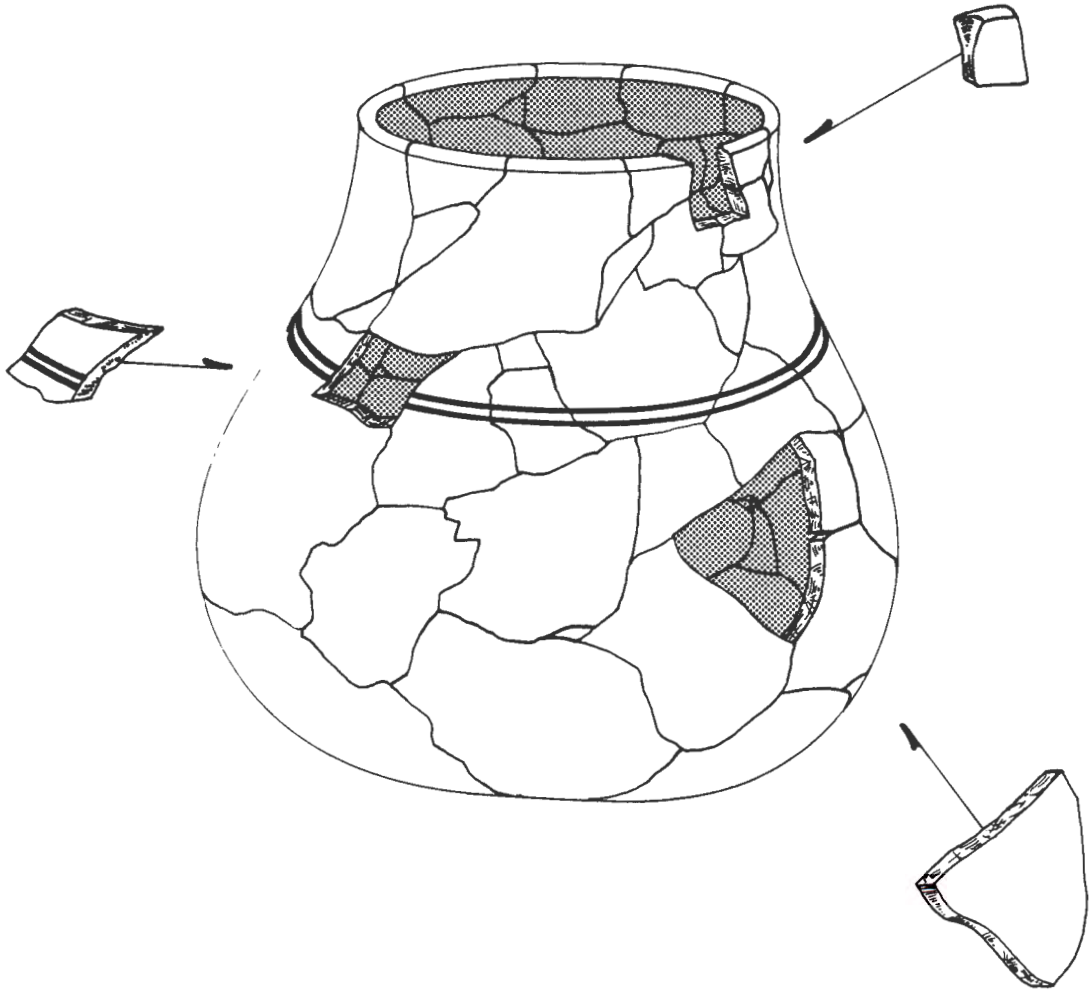


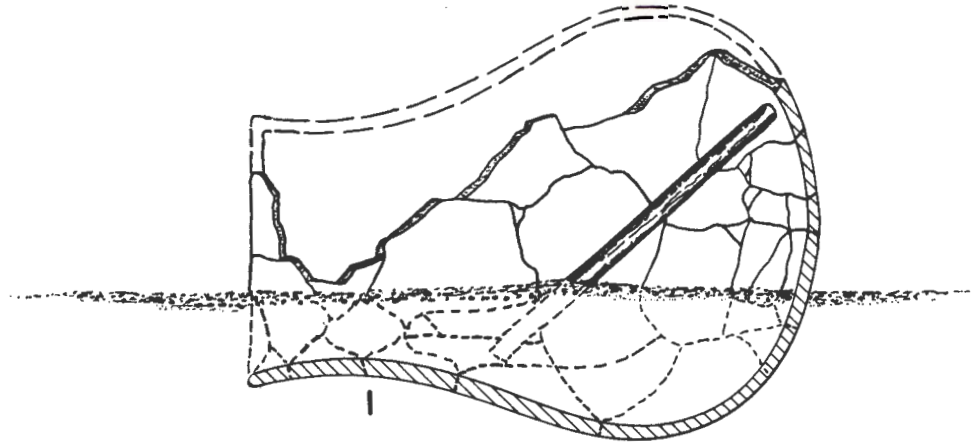
Figure 2.A.1 Reconstruction techniques: "locked out" sherds.

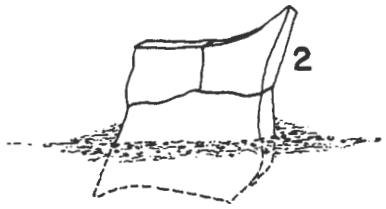
4) Feel the seam before the glue is dry to be sure the curvature at the joint is consistent with the overall curvature of the vessel wall.

5) While the glue is drying, prop the sherds in a sandbox so that the weight of the top sherd rests evenly on the bottom sherd. Dowels contribute additional support and help prevent buckling at the seam. These techniques are illustrated in Figure 2.A.2.

6) Allow enough time for each seam to dry completely before gluing additional sherds. Seams which have not completely dried are still quite fragile and can fall apart with extra handling. Allow 30 minutes drying time for small sherds and an hour for larger sherds. This period should be extended if the working area is humid.

7) Always carry a reconstructed vessel with both hands.





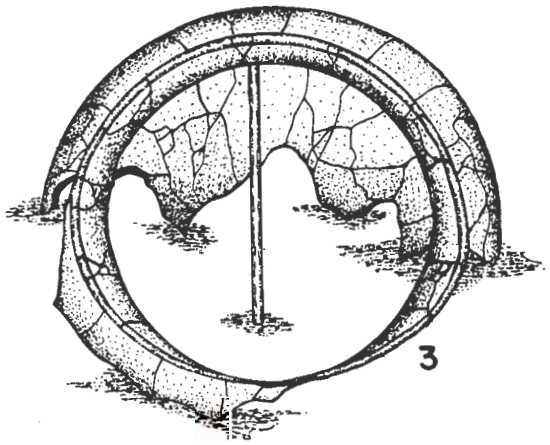


Figure 2.A.2 Reconstruction techniques: support techniques.

DOCUMENTATION

An important step in the reconstruction procedure is the analysis of each sherd of a reconstructable or whole vessel according to the inventory analysis procedure of the D.A.P. (Figure 2.A.3). Sherds belonging to a single vessel are defined during the initial sorting procedure. The PCAF documents the sherds in each FS unit, and notes those that are recognizable as being from a particular vessel. Those sherds are also assigned an RC vessel number and the inventory analysis data for the item is recorded on a separate PCAF page, one line per vessel. In Figure 2.A.4 (the PCAF), the upper lines are examples of two RCs from the same site. Note that the field specimen number and point location columns are blank for the lower set of lines because the RCs are usually from multiple field proveniences. The catalog item number for reconstructable vessels is always 003 and the special specimen type is always 81. The special specimen number is an assigned vessel number and begins with one for each site. The technological variables and the traditional type data are recorded in the same format as for regular FS lots. The item or lot weight variable is the total weight of the vessel. The lot count is the number of sherds in an RC; the rim count and modified item counts reflect how many sherds of each category were included. A "1" is also entered in the special handling column if the quality of the RC rates photography. The original of this form is placed in individual site notebooks and photocopies are placed in a special notebook (the RC Notebook) for reconstructable vessels, organized numerically by site number. Since the sherds from RC items are represented twice - once in sherd form in the inventory analysis data and once as part of an RC vessel - care must be

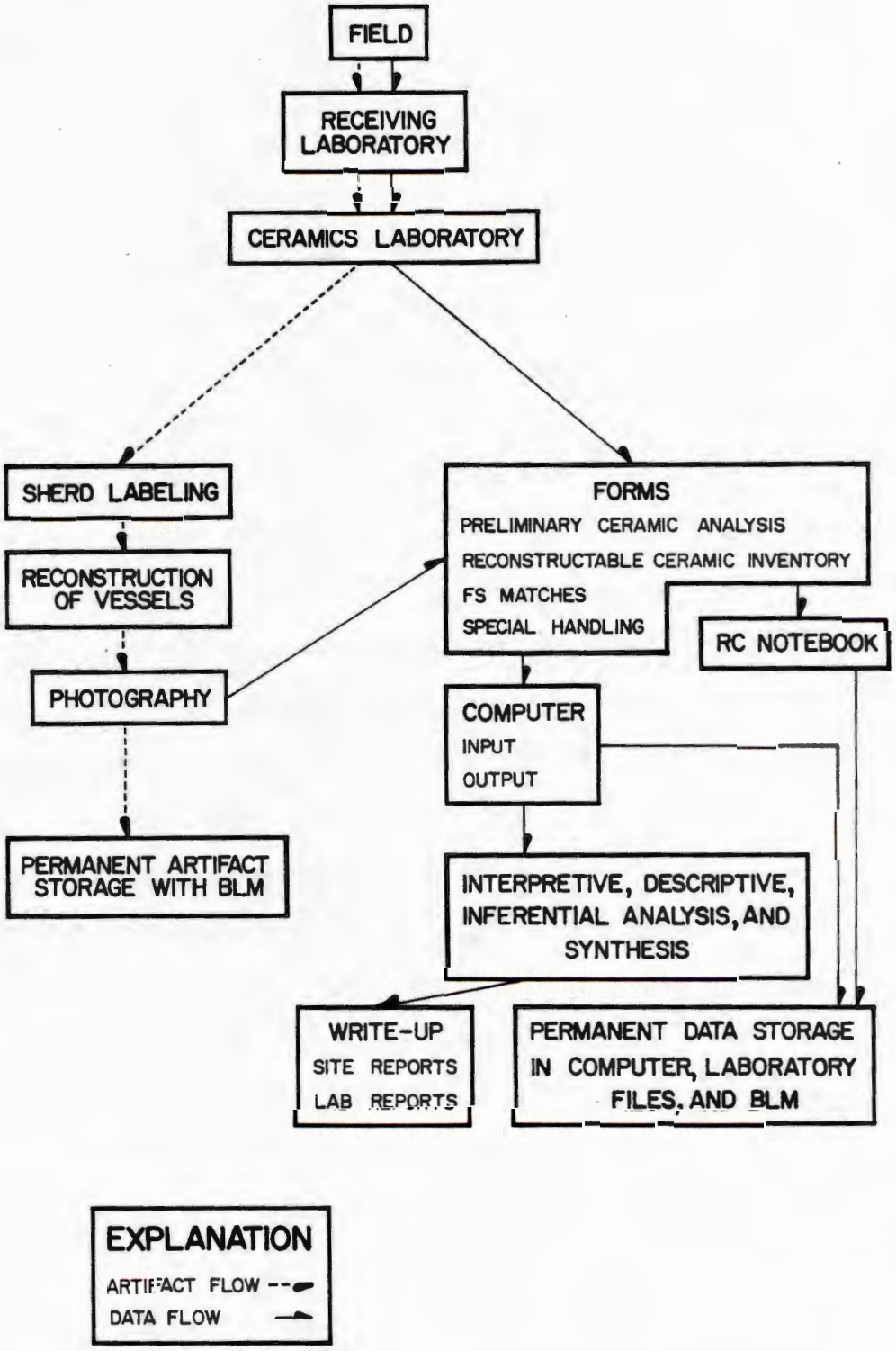


Figure 2.A.3 Reconstructable ceramics procedure flow chart.

DOLORES ARCHAEOLOGICAL PROGRAM
U.S. Bureau of Reclamation

PRELIMINARY CERAMIC ANALYSIS FORM

Site Number ____

F.S. Numbers ____ through ____

F.S. Page ____

Prepared by ____

Field Specimen Number	Material I.D.	Catalog Item Number	Special Specimens		Point Locations	Artifact Form	Technological Attributes		Surface			Paint		Traditional Type			Item Inventory					Special Handling
			Type	Number			Atmosphere	Temper	Manipulation	Compaction	Cover	Type	Color	Cultural Category	Ware	Type	General Form	Item or Lot Weight	Lot Count	Rim Sherd Count	Modified Item Count	
	0 1																					
	0 1																					
	0 1																					
	0 1																					
	0 1																					
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Figure 2.A.4 Preliminary Ceramic Analysis Form (PCAF) showing documentation of reconstructable vessels.

taken to specify that computer output only select for one of the values. Otherwise, data duplication is possible.

After preliminary analysis, sherds from the smallest recorded provenence units (i.e., point locations for floor, and feature material and FS numbers for surface and fill material) are weighed and recorded on the FS Matches Form (Figure 2.A.5). The vessel number is identical to the special specimen number on the PCAF. The form is the same as the general form coded on the PCAF (e.g., bowl, jar, pipe, effigy). The item number is the same as the PCAF catalog item number (since it is always 003 and the form is specifically for RCs, this column is already filled in). The FS number and point location columns record the provenience data and the weight is measured in grams and recorded. The last column contains a decimal place to record tenths of grams. The total of the weights entered individually must equal the item or lot weight recorded on the PCAF. Since this form is the link between the preliminary analysis data and the proper field provenience unit, accuracy is vital. The originals are kept in the RC Notebook behind the PCAF for each site. Copies are inserted in the RC Notebook.

After the documentation forms are filled out and the vessel is reconstructed, color and black-and-white photographs are made for record-keeping and inclusion in reports. Photographs are taken of selected whole or partial vessels, especially if the vessel is a good example of a ceramic type or is aberrant in form or design. If the RC is photographed, a "3" is entered in the last column of the PCAF, indicating that reference should be made to the Special Handling Form (Figure 2.A.6). This form records any sort of special handling for any sherd whether or not it is part of an RC. A slight deviation from other RC forms occurs in the

DOLORES ARCHAEOLOGICAL PROGRAM
U.S. Bureau of Reclamation

CERAMIC ANALYSIS: F.S. MATCHES

Site Number ____________ Prepared by ________

Vessel No. ______ Form ______				Vessel No. ______ Form ______			
Item No.	F.S. No.	Point Location	Weight	Item No.	F.S. No.	Point Location	Weight
0 0 3				0 0 3			
0 0 3				0 0 3			
0 0 3				0 0 3			
0 0 3				0 0 3			
0 0 3				0 0 3			
0 0 3				0 0 3			
0 0 3				0 0 3			
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Figure 2.A.5 FS Matches Form.

DOLORES ARCHAEOLOGICAL PROGRAM
U.S. Bureau of Reclamation
CERAMICS
SPECIAL HANDLING FORM

Site Number

Prepared by

Field Specimen Number	Catalog Item Number	Photographic Data				Thin Sectioned	Refired	Type Collection	Design Analysis	Technical Analysis	Illustration	Other	COMMENTS
		Film Type	Roll Number	Exposure	Negative								

Figure 2.4.6 Special Handling Form.

catalog item number column. For RCs, only the vessel number is entered in the catalog item number column. The photographic data are recorded according to the system developed by the D.A.P. Photography Section and include the type of film, number of the roll, exposure number, and the number of the negative. Originals of the special handling form are placed in the site notebooks and photocopies of the form are placed in the RC Notebook.

The Reconstructable Ceramic Inventory Form (Figure 2.A.7) is primarily a record for the BLM curator. The date refers to the period when the vessel was reconstructed and the adhesive refers to the bonding agent used. Since the chemical composition of the adhesive changes as manufacturing firms improve products, the date will enable the curator to ascertain the exact composition of the adhesive for solubility should the vessel ever require disassembling. The photographic data (film roll and exposure numbers) records the best photograph for interpretive purposes, and it is especially helpful when numerous photographs of a single object exist. The category type reflects the taxonomic classification assignment to the vessel during preliminary analysis (called traditonal type on the PCAF). Condition indicates the completeness of the vessel. A letter code is entered: W = whole, P = partial, F = fragmentary, and U = unassembled. The comment column usually indicates an outstanding characteristic of the vessel (e.g., form, size, color). The original of this form is given to the BLM curator and a photocopy is kept in the RC Notebook. At no time is data for more than one site recorded on the same page of any form.

As indicated on the flow chart (Figure 2.A.3), the PCAF data are entered into the computer. The paper record forms are stored in the laboratory, and printouts are received from the Data Processing Group.

DOLORES ARCHAEOLOGICAL PROGRAM
RECONSTRUCTABLE CERAMIC INVENTORY FORM

SITE #	RC #	DATE	ADHESIVE	ROLL/FRAME	TYPE	CONDITION	COMMENTS

Figure 2.A.7 Reconstructable Ceramics Inventory Form.

When all of these forms have been properly filled out and the vessels reconstructed and photographed, the vessels are wrapped in plastic (sheets for large vessels and bags for smaller objects) and packed on styrofoam noodles in standardized boxes. As ceramics are sensitive to the acid in the packing noodles, there should be no gaps or holes in the plastic sheet or bags which would allow contact. The boxes are labeled with the site number, RC vessel number, and material. The packed boxes are officially accessioned into the BLM curatorship with the PPAIF (Figure 2.3). This is a multipurpose form used by all of the analysis groups for material accession into BLM permanent storage. Therefore, material is listed (always "ceramic" for RCs) as well as the site number. Again, the catalog item number code denoting reconstructable vessel is 003. The vessel numbers are listed consecutively in the fourth column to be marked off as each RC is checked in by the BLM curator for permanent storage.

A REVIEW OF THE RECONSTRUCTABLE CERAMICS DATA BASE

For the 1978 and 1979 field seasons, 214 reconstructable vessels from 20 excavated sites were identified. The types ranged from Chapin Gray to McElmo Black-on-white, representing a temporal span of approximately A.D. 600-1200. Most of the RCs represent ceramics manufactured in the Mesa Verde region. Only 35 percent of the RCs could not be assigned to a diagnostic type category (such as McElmo Black-on-white), lending support to the earlier rationale for ceramic reconstruction as a typological aid. Of these, 24.3 percent were plain gray vessels having eccentric forms or lacking diagnostic rim and neck sections. Plain (unpainted) white ware and red ware comprised 8.4 and 2.3 percent of the total 35 percent, respectively. Only the most complete or type-diagnostic vessels are illustrated in Figures 2.A.8 through 2.A.29. Table 2.A.1 displays the frequency of RCs by type and site.

Dating

Theoretically, dates from RCs should be more accurate indicators for site occupational activities than general inventory sherd counts. Inventory counts include data from all strata irrespective of stratum type; surface, fill, trash, feature, and floor materials are counted together in the site totals. RCs generally consist of point-located sherds from either a floor or feature stratum. However, the practice of assigning RC numbers to two or more sherds from different provenience units during the 1978 analysis season has resulted in only 85, or 39.7 percent, of the vessels having point-located proveniences. Of these 85 vessels, 34.1 percent were untypable portions of gray, white, and red ware

Figure 2.A.10 Mesa Verde Gray Ware: Chapin Gray. Shown approximately one-half life-size. Refer to text for discussion of vessels a-d.

Figure 2.A.11 Mesa Verde Gray Ware: Moccasin Gray. Shown approximately one-third life-size. Refer to text for discussion of vessels a-f.

Figure 2.A.8 Mesa Verde Gray Ware: Chapin Gray. Shown approximately one-third life-size. Refer to text for discussion of vessels a-f.

Figure 2.A.9 Mesa Verda Gray Ware: Chapin Gray. Shown approximately one-half life-size. Refer to text for discussion of vessels a-f.

Figure 2.A.12 Mesa Verde Gray Ware: Mancos Gray. Shown approximately two-fifths life-size. Refer to text for discussion of vessels a-d.

Figure 2.A.13 Mesa Verde Gray Ware: (a-d) Mancos Corrugated, (e) Dolores Corrugated, (f) Mesa Verde Corrugated. Shown approximately three-tenths life-size. Refer to text for discussion of these vessels.

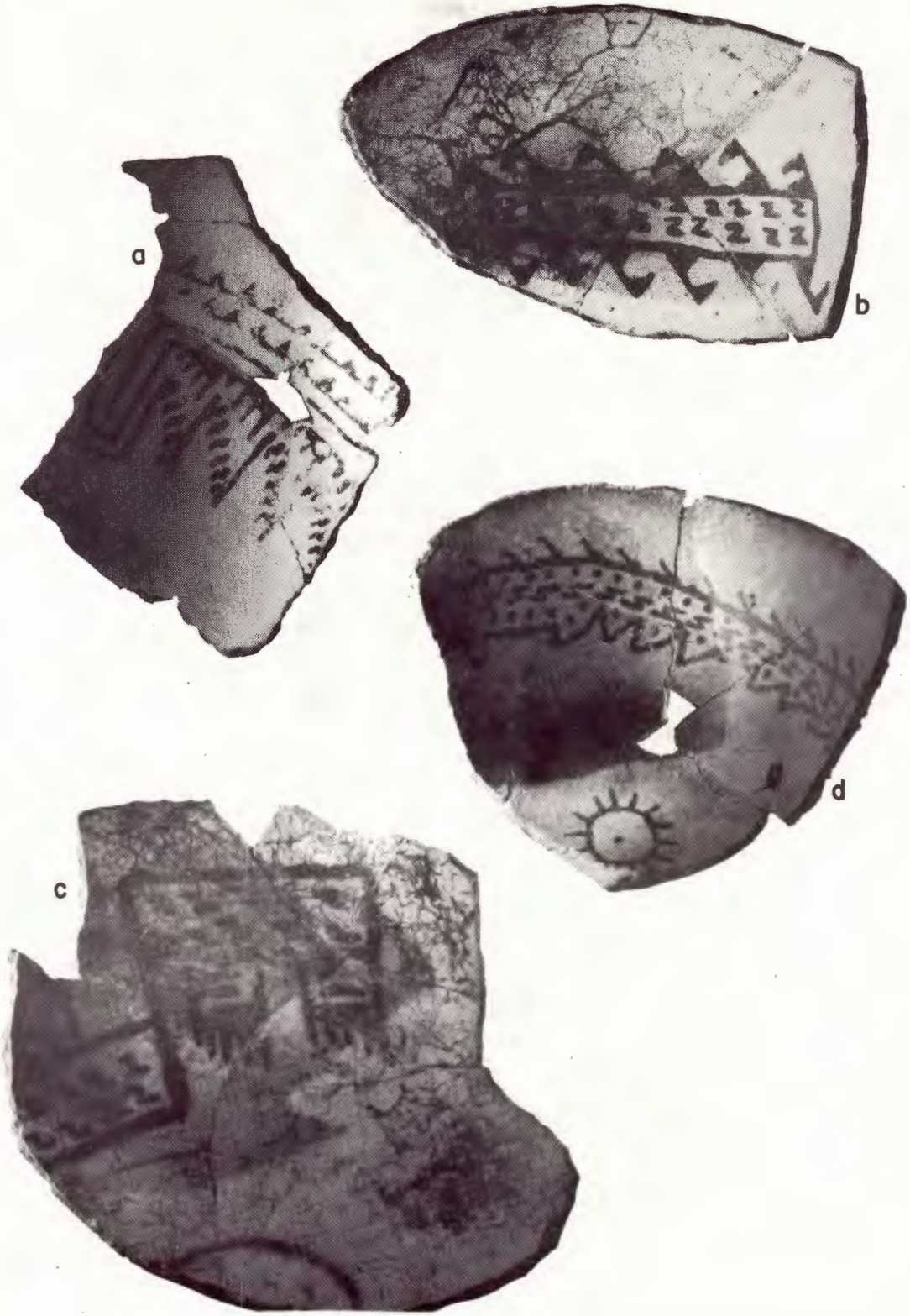

Figure 2.A.14 Mesa Verde White Ware: Chapin Black-on-white. Shown approximately one-half life-size. Refer to text for discussion of vessels a-d.

Figure 2.A.15 Mesa Verde White Ware: Piedra Black-on-white. Shown approximately two-thirds life-size. Refer to text for discussion of vessels a-c.

Figure 2.A.16 Mesa Verde White Ware: Cortex Black-on-white. Shown approximately one-quarter life-size. Refer to text for discussion of vessels a-e.

Figure 2.A.17 Mesa Verde White Ware: Cortez Black-on-white. Shown approximately two-fifths life-size. Refer to text for discussion of vessels a-e.

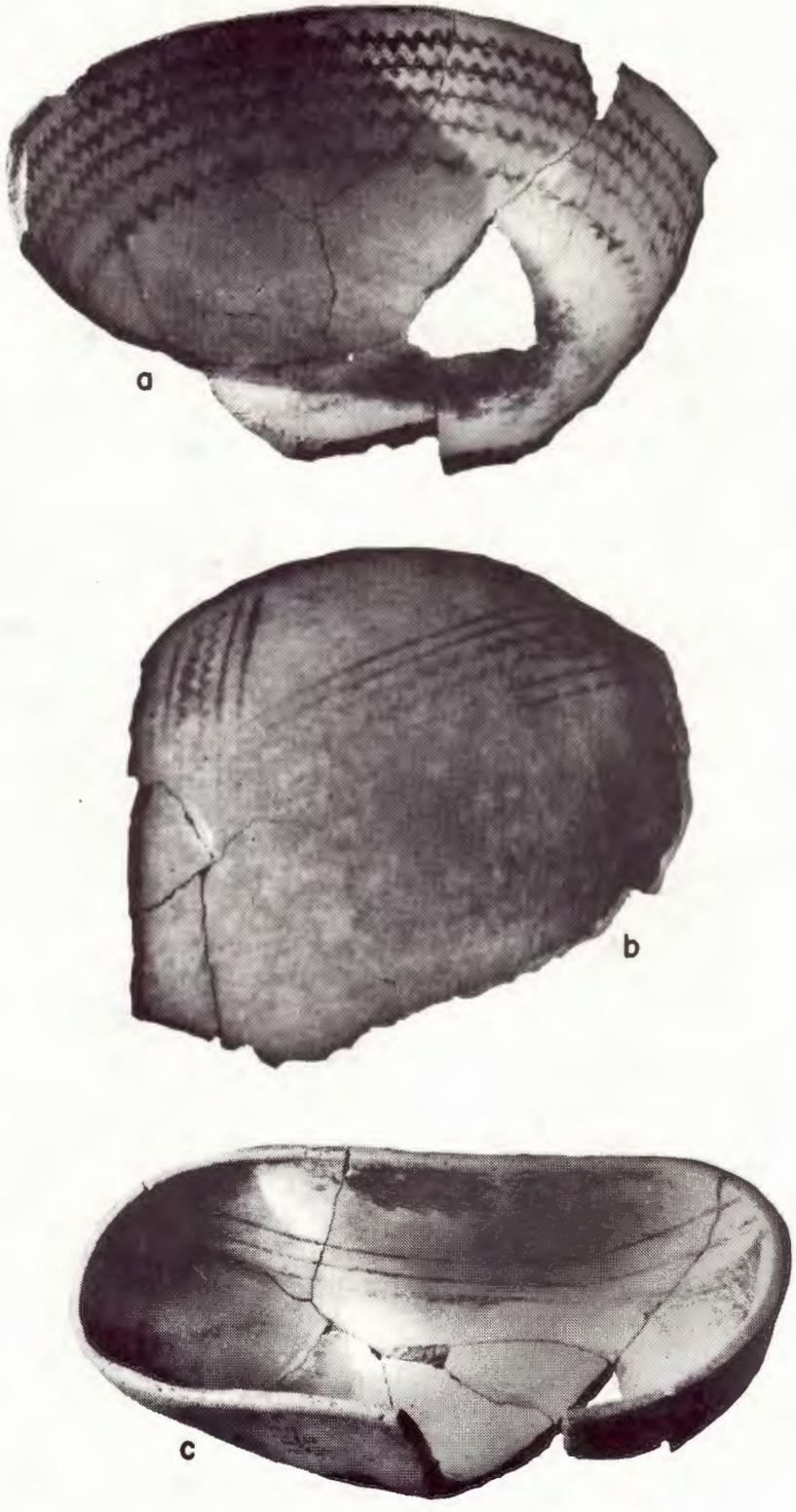

Figure 2.A.18 Mesa Verde White Ware: Cortez Black-on-white. Shown approximately one-half life-size. Refer to text for discussion of vessels a-c.

Figure 2.A.19 Mesa Verde White Ware: Mancos Black-on-white. Shown approximately one-half life-size. Refer to text for discussion of vessels a-d.

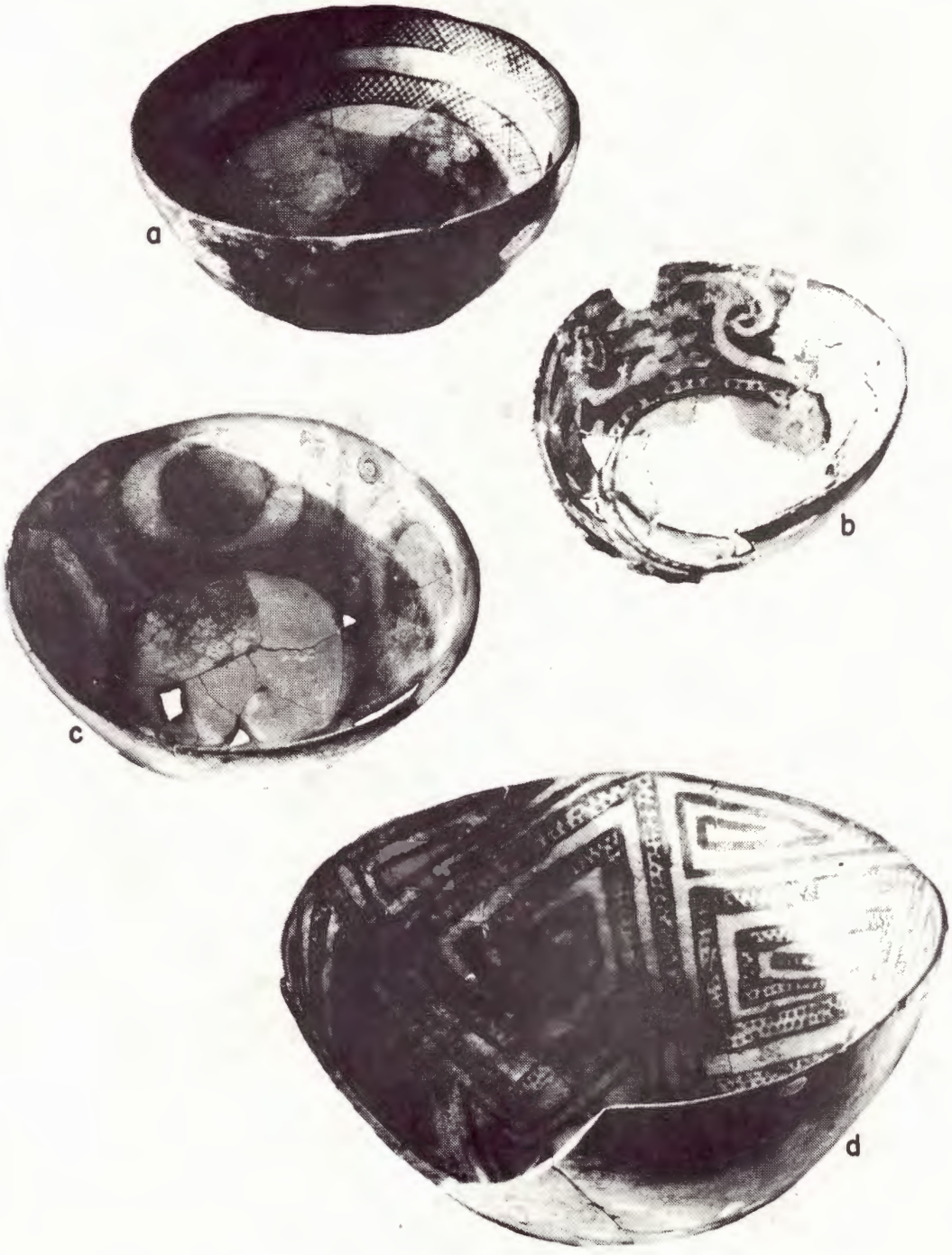

Figure 2.A.20 Mesa Verde White Ware: McElmo Black-on-white. Shown approximately one-third life-size. Refer to text for discussion of vessels a-d.

Figure 2.A.21 Mesa Verde White Ware: McElmo Black-on-white. Shown approximately one-half life-size. Refer to text for discussion of vessels a-c.

Figure 2.A.22 Mesa Verde Red Ware: Abajo Red-on-orange. Shown approximately two-fifths life-size. Refer to text for discussion of vessels a-d.

Figure 2.A.23 Mesa Verde Red Ware: Abajo Black-on-red. Shown approximately two-fifths life-size. Refer to text for discussion of vessels a-f.

Figure 2.A.24 Mesa Verde Red Ware: Bluff Black-on-white. Shown approximately five-sixths life-size. Refer to text for discussion of vessels a-c.

Figure 2.A.25 Mesa Verde Gray Ware: Dolores Brown miniature vessels. Shown approximately one and one-quarter times life-size. Refer to text for discussion of vessels a and b.

Figure 2.A.26 Chuska ceramics: (a) Blue Shale Corrugated neck and rim fragment, (b) Naschitti Black-on-white handle fragment. Shown approximately nine-tenths life-size. Refer to text for discussion.

Figure 2.A.27 Life forms or effigies: (a) Cibola Late Pueblo White, duck vessel fragment, (b, c) Early Pueblo Gray headless duck vessels, (d-f) Dolores Brown zoomorphic figurines. Shown approximately five-sixths life-size. Refer to text for discussion.

Figure 2.A.28 Miniature and other ceramic forms: (a) Piedra Black-on-white double-flared bowl fragment, (b, c) double bowls, (d) pipe, (e) miniature pitcher, (f) pipe. Shown approximately four-fifths life-size. Refer to text for discussion.

Figure 2.A.29 Other ceramic forms: (a) puki, (b, c) Chapin Gray dippers, (d, e) Chapin gray pinch pots. Shown approximately three-fifths life-size. Refer to text for discussion.

Table 2.A.1 RC Frequencies by Site and Type

Ceramic Type	Site Number																				TOTAL	%
	0023	2151	2161	2162	2191	2193	2194	2198	2203	2205	2235	2320	2848	2854	2858	4475	4545	4614	4644	4671		
Dolores Brown	1	1											1	4							7	3
Chapin Gray	2	5		1		14	1					1		3			3	1	4	1	36	17
Chapin B/W			1		1	7									3						12	6
Mocassin Gray	6		1		2	1	1					3									14	7
Piedra B/W	4		1		1	1												2			9	4
Abajo R/O		2																	8		10	5
Mancos Gray	2									1		1				1					5	2
Cortez B/W		1							3							13					17	8
Bluff B/R	3															1					4	2
Corrugated		1									4					4					9	4
Mancos B/W											4					1					5	2
McElmo B/W											9										9	4
Trade									1							1					2	1
Unident. Gray	6	2	2	1	1	17	3	1				5	1	2		2	4	2	3		52	24
Unident. White	2	2	1			3	1				3			1			3		2		18	8
Unident. Red	1		1				2							1							5	2
Total	27	14	7	2	5	43	8	1	4	1	20	10	2	11	3	23	10	5	17	1	214	
%	13	7	3	1	2	20	4	1	2	1	9	5	1	5	1	11	5	2	8	1		

B/W - Black-on-white
R/O - Red-on-orange
B/R - Black-on-red
Unident. - Unidentified

vessels. Anotner 11.7 percent were Chapin Gray and Chapin Black-on-white types, which designate little more than a pre-Pueblo II time period. Only 8 of tne 20 sites with RCs had temporally diagnostic, point-located vessels. Site 5MT0023 contained two Bluff Black-on-red vessels which would date their associated features or floors to A.D. 800-950; six Mocassin Gray RCs which date their associated floors or features to A.D. 800-900; and one Mancos Gray vessel dating that floor or feature to A.D. 850-950. Site 5MT2194 and Site 5MT2320 both contained Mocassin Gray vessels (one and three vessels, respectively) dating those floors or features to A.D. 800-900. A Mancos Gray vessel (Site 5MT2205) dates its provenience to A.D. 850-950. One Cortez Black-on-white vessel from Site 5MT2151 and three from Site 5MT2203 date those proveniences to A.D. 900-1000. Seven Abajo Red-on-orange RC items from Site 5MT4644 date their associated proveniences to A.D. 750-800. The latest site represented, Site 5MT2235, dates from A.D. 1050-1150 due to the presence of two Mancos Black-on-white vessels and seven McElmo Black-on-white vessels. Table 2.A.2 lists the eight sites with point located RC dates for comparison with the project dates determined by other dating techniques.

Table 2.A.2 Dates Ascertained from RCs

Site #	RC Date (A.D.)
05MT0023	800-950
05MT2151	900-1000
05MT2194	800-900
05MT2203	850-1000
05MT2205	900-950
05MT2235	1050-1150
05MT2320	850-950
05MT4644	750-800

The RC dates should provide a specific temporal assignment for associated proveniences of those sites, especially at Grass Mesa (Site 5MT0023) and LeMoc Shelter (Site 5MT2151), which exhibit multiple occupations.

Gray Ware Vessels

Gray wares are usually the major part of a ceramic assemblage from Basketmaker III or Pueblo I sites. The D.A.P. RC collection is no exception, with gray wares totaling 177 vessels or 54.5 percent.

The developments and changes through time of gray ware vessels, primarily jars, were recognized when Anasazi archaeology was in its infancy. The names assigned to different gray ware types were based on characteristics of surface treatment. Thus, early reports refer to plain-necked, fillet-necked, coil-necked, and indented-corrugated jars which correspond closely with period assignments of the Pecos Classification System. Gray wares are assumed to have been utilitarian, i.e., used for food storage and/or preparation. Perhaps because of this assumption, few researchers have addressed the role of gray wares in prehistoric cultural activities. One study, however, suggests that the shapes of Basketmaker III jars were not suited for food preparation such as food boiling (Linton [17:377-378]). By Pueblo III times, jar shapes had changed sufficiently to be suitable for food preparation. The corollary to this statement suggests that the Basketmakers held on to traditional, preceramic methods of food preparation which were gradually replaced as experimentation with jars produced shapes which would efficiently boil food. Turner and Lofgren [18] used volumetric capacities of gray ware jars, small bowls, and ladles to compute household size of prehistoric

western Puebloans. Sheppard, in extensive analysis of gray ware tempers, has suggested that the quality of Chuskan craftsmanship was responsible for its importation into Chaco Canyon to the considerable expense of locally made gray ware (Judd [19:237]). For an alternate viewpoint of Chuska ceramic strength, see Windes [7:295].

The following discussion does not directly address the role of gray ware in D.A.P. sites, but it does present the various types of gray ware in the RC file.

Chapin Gray

The earliest and most frequent type (36 vessels) in the RC file, Chapin Gray, accounts for 16.8 percent of the RC population. These are all general jar forms but the actual shapes of the vessels vary considerably. Figure 2.A.8 (a, b) illustrates globular-bodied jars with short vertical necks, wide mouth diameters, and very abrupt curves where the neck and shoulder join. This abruptness of curve may indicate a later phase of the Basketmaker III period, transitional into the Pueblo I period. Vessels with similarly abrupt curves were found in Pueblo I levels of a pithouse on Alkali Ridge (Brew [20:Figure 100]) and in Pueblo I contexts in the La Plata district (Morris [21:Plate 212]). Vessels (c-f) in Figure 2.A.8 show a less marked curve at the shoulder/neck join, a lengthened neck and slightly constricted mouth diameter, while vessel (a) in Figure 2.A.9 illustrates a graceful, egg-shaped body tapering into a somewhat everted wide-mouthed rim. Jars (b), (c), and (d) (Figure 2.A.9) illustrate intermediate degrees of shoulder slope, curvature of neck/shoulder joins, neck slope and height. Seed jars are represented in (e) and (f) (Figure 2.A.9). The double-lobed jar and sherd, (a) and (b) in Figure 2.A.10, were first thought to be quite unique. However, they

have been recovered at various sites throughout the Anasazi Southwest, though in small numbers. Roberts [22:107] pictures a double lobed vessel and reports that several others have been found in the Piedra District. He also reports a "double-lobed seed jar" from a burial belonging to one of the jacal sites at Kiatuthlanna (Roberts [23:125]). Hayes and Lancaster [24:101] picture a poorly made, miniature, double-lobed jar from Badger House. Nelson [25:15] pictures a double-lobed brown ware jar with vertical coil handles connecting the wide-mouthed rim to the upper part of the bottom lobe. Painted, white ware double lobed jars were reported by Brew at Alakai Ridge [20:255], at Navajo National Monument by Fewkes [26:27] and in the LaPlata area by Morris [21:207]. The painted designs are in a "Mancos style" and appear to be slipped, indicating a later, Pueblo II temporal affiliation, while the plain gray vessels affiliate more closely with early Pueblo I or late Basketmaker III. No two of these jars are exactly alike, varying in curvature or angle where the lobes join, size of the upper lobe in relation to the bottom lobe, mouth diameters, degree of rim inversion, and the presence of handles. The quality of the workmanship on the vessels from the project area (a and b in Figure 2.A.10) seems far superior to that of the vessels from other areas. Vessels (c) and (d) in Figure 2.A.10 are very common shapes for the Basketmaker III-Pueblo I period.

Mocassin Gray

Fourteen vessels, or 6.5 percent of the RC population, were identified as Moccasin Gray. The diagnostic characteristic is the presence of unobliterated fillets around the neck. Fillets are defined as coils that are flattened, i.e., the height exceeds the wall thickness. The Moccasin Gray RCs from the project area seem to fall well within the

size and shape range for neck-banded, filleted vessels in the San Juan Basin, although they do lack the distinct egg-shape illustrated by Roberts in the Piedra report [22:Plate 13]. The very thick, upturned coil handle pictured in Figure 2.A.11 (a) is not often illustrated in reports but accompanying prose descriptions indicate that this handle is common. Vessels (b-f), Figure 2.A.11, illustrate variations of the same round, full body with a neck which curves in from the shoulder to the rim. No fillets occur below the shoulder line. None of these RCs exhibit tooled grooves between the fillets although this technique does occur on some sherds recovered from the project area.

Mancos Gray

Five RC vessels, or 2.3 percent of all D.A.P. RCs, were identified as Mancos Gray. Vessels (a-b), Figure 2.A.12, are examples of Mancos Gray which exhibit the use of clapboarded fillets. Vessel (c) best illustrates the characteristic rounded coils of Mancos Gray. Vessel (d) is an aberrant vessel shape with a long plain neck and an abrupt angle where the body and shoulder join. The very even and pronounced fillets were placed so as to produce an exaggerated clapboard effect. Tooling and wiping of the coils is not documented in the program's RC vessels (Breternitz et al. [4:Figure 6b]), although such manipulation has been documented on sherds in the inventory analysis.

Corrugated Vessels

Corrugated RCs account for 4.2 percent of the RC population, a reasonable figure since ceramics from excavated sites dating to the Pueblo II period are uncommon in the collections. In Figure 2.A.13, vessels (a), (c), and (d) exhibit the slight rim angle of eversion characteristic of the Pueblo II Mancos Corrugated type. The closeup view of vessel (b)

illustrates the possible typological confusion arising from classification without benefit of the reconstruction process. Sherds from the corrugated area just below the rim provide a Pueblo II date while the lower unindented coils (justifiably typeable as Mancos Gray) suggest dates from the Pueblo I period. The technique of combining indented coil bands with unindented coil bands is a common decorative device. Indeed, it was the most prevalent technique employed at Badger House (Hayes and Lancaster [24:108]), and Breternitz et al. [4:21] list it as a common surface manipulation for Mesa Verde Corrugated. The Pueblo Bonito ceramics which alternate plain and indented areas into complex geometric patterns (Judd [19:Plate 50]), were not evident in the project area, nor at Mug House. Vessel (e) illustrates the intermediate angle of rim eversion characteristic of Dolores Corrugated; vessel (f) illustrate the sharp angle of rim eversion characteristic of the type Mesa Verde Corrugated. Note the flatness of the ridges between indentations when compared with vessels (a-d). This characteristic has been utilized to type nonrim corrugated sherds and seemed valid when tested on a stratigraphically secure room at Salmon Ruin (Franklin [27]). However, the frequent occurence of both the high and the low reliefs on a single sherd minimizes the confidence in this characteristic as a diagnostic type. The geometric patterns seen on vessel (f) are common on later corrugated types.

White Ware Vessels

White wares have commanded the attention of most archaeologists interested in understanding the cultural activities of prehistoric people. The subtle changes in design elements, motifs, and layouts are considered yardsticks by which changes in sociopolitical, economic, and ideological

processes may be measured. The data from the D.A.P. should substantially contribute to studies involving white ware ceramics and cultural processes, and the RC program has resulted in vessels useful for analysis of stylistic change.

Chapin Black-on-white

The earliest white ware type, Chapin Black-on-white, is the most numerous of its ware (12 vessels), accounting for 5.6 percent of the D.A.P. RC population. The most common vessel shape is the bowl, as though the great predominance of jars in the gray ware types so completely fullfilled the need for this vessel that painted jars were rarely manufactured. The design on bowl (a) in Figure 2.A.14 is one of the more complex designs found on this type in the project area. The most diagnostic element is the "basket stitch" (an extended z). It seems to be most frequently used as a filler in a panel, as on vessels (b), (c), and (d), Figure 2.A.14. Indeed, in the D.A.P. area, the basket stitch seems to be the most popular panel filler. If photographs in reports are quantitatively as well as qualitatively representative of the ceramic designs from the sites, the popularity of the basket stitch as a panel filler may be regionally indicative. It doesn't seem to occur on the Basketmaker III from Kayenta (Lino Black-on-gray), but it is seen on Hohokam ceramics, primarily from the later Sacaton and Santa Cruz phases (Haury [28:Figure 12.99]). Its occurrence as filler on Chapin Black-on-white from Badger House amounted to 25 percent, with dot filler preferred (Hayes and Lancaster [24:112-115]). In the Piedra and La Plata districts, basket stitches accounted for 23.5 percent and 14.5 percent, respectively, of the filler used. Dots were also preferred over basket stitches at Shabik'eshchee Village (Roberts [29]). Vessel (a) (Figure

2.A.14) shows the other most frequent use of the basket stitch, pendant from triangle radii.

Piedra Black-on-white

Piedra accounted for 4.2 percent of the RC population (nine vessels). Vessel (a) in Figure 2.A.15 shows a design very much like Abajo Red-on-orange in the use of the squiggle line, alone or in combination with straight lines. Vessel (b) is an example of the early dipper scoop shape as opposed to the bowl with attached handle prevalent in the Pueblo II and III periods. Vessel (c) is one of the earliest types of band designs which is the primary reason for its classification as Piedra rather than Chapin. Noticably absent from the project area RCs is the Piedra Black-on-white seed jar from which Roberts reported as so abundant in the Piedra District [22:94]. Morris also reported eight specimens from La Plata [21:161], noting that this vessel shape was less common in the La Plata area than in the Piedra district. Indeed, none of the project area Piedra Black-on-white RCs were jars of any kind.

Cortez Black-on-white

Cortez Black-on-white accounted for 7.9 percent of the total RC population (17 vessels). The very large, well-painted and polished, usually slipped, ollas (Figure 2.A.16 [a-e]) are associated with the early Pueblo II period (A.D. 900-1000). Vessel (a) demonstrates an elaboration of squiggle lines as filler inside another element. This motif also illustrates the beginnings of one-dimensional strip designs utilizing the bifold rotational symmetry movements which become very nearly the only type of symmetry found on Mesa Verde Black-on-white. Vessels (c) and (e), Figure 2.A.16, and vessels (a) and (c), Figure 2.A.17, are examples of the use of ticked triangles and interlocking scrolls in panel layouts which

are so common to the type. The use of angled parallel lines in vessel (b), Figure 2.A.16, and vessel (d), Figure 2.A.17, is generally considered the most diagnostic motif of types of the "Kana'a style" of design. Vessels (e), Figure 2.A.17, and vessels (a) and (b), Figure 2.A.18, may represent early Cortez styles. The use of ric-rac (zig-zag patterns covering straight lines) elements is within the range of styles included in the Cortez Black-on-white type. The shape of vessel (a), Figure 2.A.17, with a squat round body, may have developed into the pitcher common in the Pueblo II period. It is interesting to note that the designs of bowls (b-d), Figure 2.A.17, while utilizing the same design elements and motifs, display somewhat different layouts. The troughlike shape of vessel (c), Figure 2.A.18, is not very common. Morris ([21:Plate 255]) found a similar polychrome shape in the La Plata District but the sides curved in abruptly (a la later seed jars) leaving a small rectangular mouth. No other references to similarly shapes objects were found.

Mancos Black-on-white

Only five Mancos Black-on-white RCs (2.3 percent) were found, four from Site 5MT2235 and one from Site 5MT4475. The dipper (a) in Figure 2.A.19 is the bowl-and-handle type, which remained the preferred shape through Pueblo III. Pitcher (b) displays distinct similarity of form to the earlier Cortez pitcher. Vessel (c) is much like the long-necked form prevalent in Chaco Canyon. In the design and shape, this vessel exemplifies the Chaco-like quality of some Mancos sherds. The group of pitchers in Judd's Pueblo Bonito report [19:Plate 57]) displays such intermittent variations between the two shapes that it is very tempting to postulate an evolutionary explanation with cultural influences moving from north to south. Judd must surely have been labeled an archaeological heretic when

he wrote, "My own observations in Chaco Canyon and my interpretation of the data published by others lead to the conclusions that Old Bonitian pottery developed out of Pueblo I practices inherited from beyond the San Juan..." [19:234]. The direction of cultural influence throughout the Southwest is still being debated; those who contend the direction in the Anasazi area was from the south to north seem to be the majority. Bowl (d) illustrates the design range which Wasley subsumes under the "Sosi style" [30:257].

McElmo Black-on-white

There are more McElmo Black-on-white vessels (9 or 4.2 percent) in the D.A.P. RC collection than Mancos Black-on-white, and all are from Site 5MT2235. Bowls (a-d), Figure 2.A.20, are good examples of McElmo designs. The alternately wide line and hachure filled equilateral triangles on bowl (a), Figure 2.A.21, present the major problem encountered when attempting to classify ceramics according to design style. While the wide lines would fit the bowl quite neatly into the "Sosi style", the hachure triangles fit just as neatly into the "Dogoszhi style". This interferes with the accuracy of dating styles as tightly as types have been dated (Breternitz [31:66]). The band of opposing triangles and hatched diamonds on bowl (b), Figure 2.A.21, are very acceptable motifs for the McElmo Black-on-white type, with the complementary design in the bottom of the bowl and organic paint. The rows of pendant triangles on dipper (c), Figure 2.A.21, are also common on Mancos Black-on-white, but are usually not executed in carbon paint. Since the use of carbon paint has long been considered a period marker for Pueblo III in the northern San Juan area, and since Wetherill Black-on-white is given neither type nor variety status in the project typology, the dipper was classified as McElmo

Black-on-white. Recent research at Salmon Ruin has attempted to distinguish early and late manifestations of McElmo designs. It appears that the very fine line hatchure and wide line solid motifs are predominantly early occurrences, while the band layout occurs in predominantly later contexts, grading into Mesa Verde Black-on-white. The McElmo vessels from the project area do not lend support to that hypothesis. The simultaneous occurrences of the band layout with the hachure and wide line solid motifs in a single site does not support the hypotheses of temporal variation. However, the situation of the project area in the northern frontier of the Anasazi occupation area may account for differences in significant distributions between the two areas.

Red Ware Vessels

Red ware ceramics appear at about A.D. 700 on Alkali Ridge (Brew [20]) and approximately 50 years later on the Mesa Verde (Breternitz et al. [4:50]), in the Ackmen-Lowry area (Martin et al. [32:456]), and in the D.A.P. area (Lucius and Wilson [33]). The sudden appearance of the ware has led to considerable speculation about its origin, with emphasis on the possibility of Mogollon influences (Brew [20], Reed [34]). Analysis and interpretations of red wares recovered from the D.A.P. investigations has led to the proposal that red ware manufacture in the Mesa Verde region can be accounted for as an indigenous development which modified a technology of reduction firing to the oxidation firing of red ware ceramics. Any impetus for the development of the technology comes from the Kayenta region and its distinctive early red ware--Tallahogan Red (Lucius and Wilson [33]).

Red ware is interpreted as being used for serving and ceremonial activities. The distinctive red ware seed jars in the D.A.P. area may have served as special storage containers. The presence of red ware ceramic vessels in the form of reconstructable ceramics not only provides a data base for the evaluation of the stylistic attributes of the ware, but also the presence of those ceramics in sites of the D.A.P. and allows for an evaluation of the nature of the contact between the producers of the ware -- located in the vicinity of Blanding, Utah -- and local D.A.P. populations (Lucius and Wilson [33]).

Abajo Red-on-orange

Eleven RCs, or 5.1 percent of the RC population, were typed as Abajo Red-on-orange. This figure is quite reasonable when considering the equally low frequencies of its synchronic counterparts in the gray and white wares. Vessel (a) in Figure 2.A.22 is an Abajo Red-on-orange seed jar. The two holes in the rim of the jar may have been strung with twine to hang the jar or possibly used for securing a flap over the opening. It is difficult to suggest a reason for hanging the pot other than for storage. Red wares, being made of different clay that white or gray wares, tend to be friable, and hanging them by holes so close to the rim would tend to break the vessel, depending on the weight of the material being stored. Placing handles on or slightly below the shoulder of the vessel which seem to be a stronger method of suspension. It would then seem reasonable to suggest that the holes are there for a purpose other than hanging.

The heavy squiggle line design on vessels (a-d) in Figure 2.A.22 is one of the primary diagnostic motifs for the type. The design layout of bowl (b) exemplifies bifold rotational symmetry which Brew [20:269-270]

notes as so common on the Alkali Ridge Abajo vessels. This bifold rotational symmetry differs form the Mesa Verde layout in its exclusively finite, rather than one-dimensional, character.

Vessels (a), (c), and (d), Figure 2.A.23, illustrate various uses of triangles similar to later Pueblo II motifs. Bowls (c) and (e) are, in fact, quite similar in design motif and layout from Mancos Black-on-white. The "beaker" shape (f) is not considered a common Pueblo I shape. Morris [35:189] pictures a black-on-red beaker from the Mitten Rock group which is very similar, except the bottom is more rounded and the sides curve in slightly. One black-on-white beaker was found in a Pueblo I context in the Piedra district (Roberts [22:106-107]). In that report, Roberts speculates that the shape may have developed into the cylindrical vase of the Pueblo III periods in Chaco Canyon but concludes that such an hypothesis must await futher developments. With that caution in mind, it may also be suggested that the beaker form may hav been antecedent to the mug shape of the Mesa Verde Pueblo III period.

Vessel (b) (Figure 2.A.23) illustrates the use of zoomorphic figures in a design format. Morris [35:193] reports numerous life forms, including anthropomorphic figures, on ceramics from various sites along the San Juan drainage. Only two life forms were reported from Badger House (Swannack [36:94]); apparently none were recovered from the Piedra District (Roberts [22:141]) or from the Mancos Canyon (Reed [34]). For the Chaco area, several fragments of ceramics with life forms were reported from Shabik'eschee and near Pueblo Bonito (Roberts [29]). None were reported from the excavations at Kiatuthlanna (Roberts [23:130]). At Pueblo Bonito, painted life forms were found to be numerous, primarily on bowls (Judd [19:Figure 50]). Red ware zoomorphic figures are recognized

as a common design in Bluff Black-on-red vessels (Breternitz et al. [4:58]).

Bluff Black-on-red

Only four (1.9 percent) of the RCs were typed as Bluff Black-on-red. The two bowl sherds in Figure 2.A.24, (a) and (b), were shaped by abrading the edges. These sherds were probably used as scrapers in the manufacture of ceramic vessels. Such items are consistently associated with ceramic manufacturing activity areas. The design on jar (c) is very much like the squiggle line motif on Abajo vessels. However, the black paint was used to assign the vessel to the Bluff Black-on-red type.

Dolores Brown

Although similar items have been noted in other reports (cf. Morris [35]), Dolores Brown has never before been formally recognized by published description.

Dolores Brown is associated with sites of the late Basketmaker III-early Pueblo I periods. It does not appear to be associated with Mogollon Brown Ware. Morris [35:151], in discussing the beginnings of San Juan pottery-making, describes similar plain vessels of brown sandy clay with thick walls and uneven surfaces from Canyon del Muerto. It is difficult to be certain from the pictures, but these vessels may correspond to the new type. Figure 2.A.25, vessel (a), illustrates a small jar form with a broken strap handle. Vessel (b) is a small pinch pot in the shape of a crucible. Note the rounding of the broken edges, resulting from the large quantity of sand inclusions in the low-fired, soft clay. Since the sand appears to be a natural inclusion, the type should not properly be characterized as sand tempered, as that implies an

intentionally added aplastic. It is not apparent whether Morris distinguished between natural inclusions and intentionally added tempering material in his earlier reports.

Foreign Ceramics

Nonlocal ceramics are recognized primarily by their attributes of temper type and paste type. Specifically, quartz-sand-tempered sherds with light gray paste are typed into the Cibola series while quartz-sand-tempered sherds with dark pastes are typed into the Kayenta series. In the D.A.P. RC collection, only two vessels (Figure 2.A.26, a and b) are trade wares. They both contain varieties of trachybasalt and are typed into the Chuska series.

Vessel (a) is a neck portion of a Blue Shale Corrugated jar. Blue Shale Corrugated has been dated as occurring from A.D. 925-1150 (Windes [7:307]). Although similar tempering agents are available in the Mesa Verde National Park area (Nordenskiold [37:110], Reed [34:111]), preliminary petrographic analysis of the tempering agents in D.A.P. sites has shown that the tempering agents of vessels (a) and (b) are identical to those affiliated with the Chuska Culture Category. Vessel (b) has been identified as a Naschitti Black-on-white hollow-tube handle. Windes dates the type as occurring from A.D. 900-1000. The handle is painted with a mineral paint and the design format is similar to the equivalent types of Red Mesa and Cortez Black-on-white. Whether both ends were attached to the vessel body is not discernible, but it may have been a stirrup spout handle similar to that illustrated by Dixon [38:Figure 1]. Dixon lists 28 occurrences of the stirrup spout handle throughout the Southwest. Such

ceramics have been dated from A.D. 500 through historic times, and he suggests that the vessel was used for ceremonial transport of sacred water.

Eccentrics

Representations of life forms or effigies are illustrated in Figure 2.A.27 (a-f). Vessel (a) is the head of a duck vessel similar to the one illustrated in the Pueblo Bonito report (Judd [19:Plate 63, d-e]). Temper and paste identification of the partial vessel has identified the effigy as Cibola Late Pueblo White (A.D. 900-1200). The head is hollow with a flattened beak and a slight protuberance near the end. The eyes protrude and the design is in mineral paint with a thick and somewhat spotty slip.

Vessels (b) and (c) are examples of the "headless" duck effigy forms. Similar vessels are reported from the Durango area (Carlson [39:63]) and the La Plata District (Morris [35:63]). Vessel (b) is small and complete whereas vessel (c) is incomplete. Weathering might have eroded any painted decorations.

Items (d) and (e) are zoomorphic with four legs represented on each item. Tails were apparently once present, as were heads. Item (e) exhibits a large anal orifice and molded genitalia. The "swan" head (item f) might have been attached to a large item. Items (d-f) are made of the sandy clay characteristic of Dolores Brown.

All the effigy items in Figure 2.A.27, with the exception of (a), are associated with the Pueblo I period of occupation of D.A.P. sites.

The double-flare Piedra Black-on-white bowl (A.D. 750-900) in Figure 2.A.28 (a) appears to represent a form with a relatively wide distribution and a long time span. Morris [21:151] reported an undecorated specimen from the La Plata district and suggest that the form "originated very late

in Basketmaker III, and ...was retained for some time." In fact, Morris [21:190] does report a second bowl from the Pueblo II period. Ferg [40:91] pictures a double-flare Kana'a Black-on-white bown from the Painted Cliffs area in Arizona and reported on similar vessels. Included in the discussion is a vessel from Kiatuthlanna found in association with a child burial and typed as White Mound or Kiatuthlanna Black-on-white; a Reserve Indented Corrugated bowl from Tularosa Cave (the only corrugated double-flare bowl reported); a Cortez Black-on-white from Badger House; and a Red Mesa Black-on-white vessel from Mancos Canyon. Judd [41:199] reports fragments of several small double-flare bowls from Pueblo Bonito and one from Pueblo del Arroyo.

Vessels (b) and (c) (Figure 2.A.28) are miniature double bowls of gray ware. Little can be said about the regional distribution of these miniatures as no similar double bowls were found in the literature. Vessel (e) is a miniature gray ware pitcher. Such small pitchers are abundant throughout the Anasazi Southwest, occurring most often in Basketmaker III and Pueblo I periods.

Cloudblowers (d) and (f) in Figure 2.A.28 are equally as widespread and occur from Basketmaker II-Pueblo III times. According to Morris [21], the earliest Basketmaker II pipes were made of stone and, as ceramic techniques developed, stone pipes became obsolete. Only two stone pipes have been reported for the Basketmaker III period: one in the La Plata District (Morris [21:150]) and one in the Durango area (Carlson [33940]). The rest of the Basketmaker III pipes are ceramic. Shapes apparently varied through time beginning with the straight cone (Basketmaker II-III). The mouth diameter flared into a "trumpet" shape and, in the late Pueblo I period, the bowl and stem shape developed (Morris [21]). However, Roberts

reports a single-bowled, two-stem pipe from Shabik'eshchee [29:125] and, another aberration, "two bowls, placed side by side, served by a single stem" from the Piedra district [22]. Martin reports a curved trumpet shape in a "McElmo Black-on-white rubbish level" from Lowry [32:62]. These examples definitely do not fit into the evolutionary scheme outlined by Morris. Most often the pipes are not decorated. When decoration is present, incised lines or punctate dots occur more frequently than painted designs. It is presumed from ethnographic evidence that pipes were used ceremonially (Roberts [29:124]). According to Stanislawski [42:14], "sherds from broken ceremonial cloudblower pipes. . . used in kiva ceremonies, could not be simply discarded or reused. . . [they] must be blessed with corn meal in an appropriate ceremony, and then should be carried to one of the four nearby Tewa shrines and placed within for protection." None of the archaeological specimens have been found in any sort of shrine context.

Vessel (a), Figure 2.A.29, is a round, plain white ware bowl base with abraded edges. It might have served as a "puki," or turning platform for pottery construction. Morris [21:167] called similar items which lacked the smoothed edges "potters' trays"; they were from a Pueblo I context. Brew [20:Figure 153] recovered two "platters" from a Pueblo III refuse mound which he thought were made specifically as platters, i.e., they were not simply reused vessel bases. Six pukis were found at Big Juniper House, a transitional Pueblo II-Pueblo III site on Wetherill Mesa (Swannack [36:103]). If any sherds reported as worked or ground sherds are parts of pukis, these objects are widespread north of the San Juan River.

Vessels (b) and (c), Figure 2.A.29, illustrate gray ware dippers of the late Pueblo I occupation (A.D. 850-900). The short handle on vessel (b) would seem decorative as it would be difficult to grasp securely. There does not appear to be any regional or temporal affiliation to the variable handle lengths.

Vessels (d) and (e), Figure 2.A.29, are miniature gray ware items. No conical shaped jars with lateral openings or similar vessels were found in the literature searched. The small vessel (q) is very crudely finished. The surface is bumpy and uneven on the exterior and the coils are still visible in the interior surface. Both items are associated with the Pueblo I occupation of the Dolores River valley (A.D. 750-900).

SUMMARY AND CONCLUSIONS

The ceramic inventory analysis data file of the D.A.P. was structured in order to document ceramic sherds, which are the overwhelming artifact type in the collections. The occasional recovery of whole or partial vessels and reconstructable ceramics required the development of a subroutine for the processing of these items. The RC program was developed in order to document the occurrence of vessels in the collections. This manuscript was produced in order to document the justifications, procedures and interpretations of the program.

The value of such a presentation lies primarily in two areas. First, the methods of reconstruction are made available to those interested in pursuing a reconstruction program. By no means is the procedure the only possible route to reconstruction, nor is the reference literature concerning the subject considered to be adequate. However, the value of the procedure lies in its usability and in its record of achievement. Second, the ceramic artifacts resulting from the analysis have been presented in photographs and narrative form in order to demonstrate the results of the program. The approach to this section is basically comparative; RC items from the program collections are compared to published accounts of ceramic items and are evaluated on a stylistic basis. This approach has the alternate purpose of presenting the various vessels in the file so that individual vessels may be referenced by authors of D.A.P. site reports and other manuscripts.

The RC file has not been addressed concerning other possible information sources. Formal analysis of style has not been accomplished. Also, volumetric analysis awaits future funding. Provenience tracking of

the vessels in terms of use and breakage patterns, a study which would assist in the evaluations of sherd materials and their derivation, awaits development implementation.

This Appendix is a summary statement concerning the derivation and content of the RC program. The program as presented represents a preliminary approach to the documentation and interpretation of a special artifact class within the ceramic file. Future fieldwork will undoubtedly supplement the data base and allow for futher interpretations.

The RC program represents a viable data base which transcends the problems associated with having to deal exclusively with ceramic sherds. Together, the Preliminary Ceramic Analysis file and the Reconstructable Ceramic file will provide an interpretable data base for the explication of the Anasazi through ceramic analysis.

APPENDIX B

CERAMICS INVENTORY ANALYSIS VARIABLE/VALUE LIST

by

William A. Lucius

DOLORES ARCHAEOLOGICAL PROGRAM

VARIABLE/VALUE LIST 1/23/80

COLUMN NUMBER		VARIABLE DESCRIPTION
1-8	VAR 01 02, 03	Site Number: use Smithsonian designation with state, county, and sequential designation: right justified.
9-14	VAR 04	Field Specimen Number: right justified.
15-16	VAR 05	Material Identification 01: Ceramics
17-19	VAR 06	Catalog Item Number 003: Whole or reconstructed vessels or ceramic items 004-N Sequential sub-lot identification number
20-21	VAR 07	Special Specimen Type: numberic designator for specimens other than artifact samples, a subcategory of materials within the Field Specimen Catalog. 00: Not applicable 01: Archaeomagnetic samples 02: Radiocarbon sample 03: Dendrochronological sample 04: Material source sample (lithics-ceramics) 05: Pollen core 06: Pollen sample 07: Stratigraphic column 08: Sediment sample 09: Bulk soil sample 10-11: Unassigned 12: Botanical specimens 13: Latex peels 14: Plaster positive 15: Monolith 16: Soil peel 17: Ethnobotanical sample 18-80: Unassigned 81: Ethnobotanical sample 82-98: Unassigned 99: Isolated finds
22-25	VAR 08	Special Specimen Number: right justified.
26-29	VAR 09	Point Location: number assigned to each floor artifact, designating triangulation coordinates.
30	VAR 10	Ceramic Artifact Form: condition of the analysis lot. 1: Whole or partial vessel 2: Vessel sherd(s) 3: Ceramic form(s) other than vessel or sherds (figurines, pipes, etc.)

31 VAR 11 Firing Atmosphere: the heat treatment of clay material which induces chemical and physical changes.

0: Not applicable
1: Indeterminate
2: Unfired (none)
3: Neutral
4: Oxidized
5: Refired
6: Vitrified
7: Other

32-33 VAR 12 Temper: aplastics in a clay body which reduce shrinkage and heat shock during drying and firing.

00: Not applicable
01: Indeterminate
02: None
03: Andesite/diorite
04: Sherd (andesite/diorite)
05: Trachybasalt with hematite
06: Quartz sand
07: Multilithic sand
08: Mica
09: Sherd (quartz sand)
10: Quartz sand with hematite
11: Trachybasalt
12: San Juan crushed
13: Sandstone
14: Sherd (San Juan crushed)
15: Sherd (sandstone)
16: Conglomerate
17: Crushed quartz and sand
18: Dakota sandstone
19: Quartz sand conglomerate
20: Crushed sandstone with dark gray matrix
21: Sherd
22: Fine San Juan crushed
23: Dark andesite/diorite
24: Salmon matrix crushed sandstone
25: Sherd (trachybasalt)
26: Unassigned
27: Unassigned
28: Unassigned
29: Unassigned
30: Crushed igneous (Kayenta)
31: Stained quartz sand (Kayenta)
32: Quartz sand (Kayenta)
33: Sherd and quartz sand (Kayenta)
34: Fine quartz sand (Kayenta)

34 VAR 13 Surface Manipulation: surface indications of elements of decoration, or utility.

0: Not applicable
1: Indeterminate
2: Plain (none)

34	VAR 13 (cont.)	3: Filleted 4: Coiled 5: Corrugated 6: Pinched 7: Incised 8: Perforated 9: Other
35	VAR 14	Surface Compaction: surface indications of mechanical compression. 0: Not applicable 1: Indeterminate 2: Unpolished (none) 3: Polished 4: Other
36	VAR 15	Surface Cover: surface indications of added slips or washes. 0: Not applicable 1: Indeterminate 2: None 3: Slipped/washed 4: Fugitive red 5: Other
37	VAR 16	Paint Type: the physical composition of the paint. 0: Not applicable 1: Indeterminate 2: None 3: Mineral paint with organic binder 4: Organic paint only 5: Mineral paint only 6: More than one type of paint, each clearly defined in separate zones 7: Clay paint only 8: Paint other than those specific above
38	VAR 17	Paint color. 0: Not applicable 1: Indeterminate 2: None 3: Brown to black (including lead-based colors) 4: Orange to red 5: White 6: Combination of any of the above 7: Others not specified above
39-40	VAR 18	Cultural Category: the Anasazi branches recognizable by ceramic traditions. (See attached Type Sheets.) 00: Not applicable 01: Indeterminate 02: Mesa Verde (Dolores River) 03: Chaco/Cibola 04: Chuska

39-40 VAR 18 (cont.)

05: Kayenta
06: Little Colorado
07: Navajo
08: Pueblo (historic)
09: Shoshone
10:
11:
12:
13: Mesa Verde (San Juan)

41 VAR 19

Ware: a group of pottery types which consistently show the same means of manufacture. (See attached Type Sheets.)

0: Not applicable
1: Indeterminate
2: Gray
3: White
4: Red/orange
5: Brown
6:
7:
8:
9: Other

42-43 VAR 20

Traditional Type: a cluster of selected attributes which defines any group and distinguishes it from any other grouped attributes.

00: Not applicable
01: Indeterminate
02-09 See attached Type Sheets for type values.

44-45 VAR 21

General Form: the recognizable body form from sherd remains.

00:	Not applicable	10:	Ball
01:	Indeterminate	11:	Cone
02:	Bowl	12:	Bead
03:	Jar	13:	Pendant/pendant blank
04:	Seed jar	14:	Gaming piece
05:	Indeterminate, but not a vessel or vessel part	15:	Spindle whorl
		16:	Jar handle
06:	Figurine	17:	Ladle handle
07:	Effigy	18:	Other Handle
08:	Miniature vessel	19:	Bowl dipper
09:	Pipe	20:	Open gourd

46-50 VAR 22

Item/Lot Weight: the total gram weight of the analysis unit.

51-54 VAR 23

Item/Lot Count: total number of items of the analysis unit.

55-58 VAR 24

Lot Rim Count: the total number of rim sherds of the analysis unit.

0000: Not applicable

59-62	VAR 25	Lot Modification Count: the total number of cultural, postfiring modified items in the analysis unit. 0000: Not applicable.
	VAR 26	FS Match
	VAR 27	Special Handling Status 0: Unassigned 1: Reconstructed 2: None 3: Photographed 4: Type collection 5: Petrographic analysis 6: Refiring 7: Temper type collection 8: Unassigned 9: Unassigned

VAR 18 MESA VERDE CULTURAL CATEGORY (02)

VAR 19 MESA VERDE GRAY WARE (2)

VAR 20 Types:

02: Chapin Gray
03: Moccasin Gray
04: Mancos Gray
05: Mummy Lake Gray
06: Mancos Corrugated
07: Dolores Corrugated
08: Mesa Verde Corrugated
09: Early Pueblo Gray
10: Late Pueblo Gray
11: Corrugated Body Sherds
12: Unclassifiable Plain Gray
13: Unclassifiable Corrugated
14: Unassigned

02-08 are classified solely on the basis of rim or distinctive neck sherds.

VAR 19 MESA VERDE WHITE WARE (3)

VAR 20 Types:

02: Chapin B/W
03: Piedra B/W
04: Cortez B/W
05: Mancos B/W
06: McElmo B/W
07: Mesa Verde B/W
08: Early Pueblo White
09: Late Pueblo White
10: Unclassifiable White
11: Unassigned

VAR 19 MESA VERDE RED/ORANGE (SAN JUAN RED WARE) (4)

VAR 20 Types:

02: Abajo R/O
03: Bluff B/R
04: Deadmans B/R
05: Unclassifiable Red
06: Unassigned
07: Late Pueblo Red
08: Unassigned

VAR 18 CHACO/CIBOLA CULTURAL CATEGORY (3)

VAR 19 CIBOLA GRAY WARE, CHACO SERIES (2)

VAR 20 Types:
02: Lino Gray
03: Wide Neckbanded
04: Narrow Neckbanded
05: Pueblo II Corrugated
06: Corrugated Body Sherds
07: Pueblo III Corrugated
08: Early Pueblo II Neck Corrugated
09: Early Pueblo Gray
10: Late Pueblo Gray
11: Unassigned
12: Unclassifiable Gray
13: Unassigned

02-08 are classified solely on the basis of rim or distinctive neck sherds.

VAR 19 CIBOLA WHITE WARE, CHACO SERIES (3)

VAR 20 Types:
02: La Plata B/W
03: Whitemound B/W
04: Red Mesa B/W
05: Escavada B/W
06: Puerco B/W
07: Gallup B/W
08: Chaco B/W
09: Chaco/McElmo B/W
10: Early Pueblo White
11: Late Pueblo White
12: Unclassifiable White
13: Unassigned

VAR 17-4, WHITE MOUNTAIN RED WARE (4)

Types:
02: Puerco B/R
03: Wingate B/R
04: Wingate Polychrome
05: St. Johns B/R
06: St. Johns Polychrome
07: Unclassifiable Red
08: Unassigned

VAR 13 CHUSKA CULTURAL CATEGORY (4)

VAR 14 CHUSKA GRAY WARE (2)

VAR 15 Types:

02: Bennet Gray
03: Sheep Springs Gray
04: Tocito Gray
05: Gray Hills Banded
06: Newcomb Corrugated
07: Captain Tom Corrugated
08: Blue Shale Corrugated
09: Hunter Corrugated
10: Early Pueblo Gray
11: Late Pueblo Gray
12: Corrugated Body Sherds
13: Unclassifiable Gray
14: Unassigned

02-09 are classified solely on the basis of rim or distinctive neck sherds.

VAR 19 CHUSKA WHITE WARE (3)

VAR 20 Types:

02: Drolet B/W
03: Naschitti B/W
04: Taylor B/W
05: Brimhall B/W
06: Early Pueblo Mineral Paint B/W
07: Late Pueblo Mineral Paint B/W
08: Tunicha B/W
09: Newcomb B/W
10: Burnham B/W
11: Chuska B/W
12: Toadlena B/W
13: Nava B/W
14: Crumbled House B/W
15: Early Pueblo Carbon Paint B/W
16: Late Pueblo Carbon Paint B/W
17: Unclassifiable White
18: Early Pueblo White
19: Late Pueblo White

02-07 are Chuska White Ware, Mineral Paint Series: 08-16 are Chuska White Ware, Carbon Paint Series.

VAR 19 CHUSKA RED WARE (4)

VAR 20 Types:

02: Sanostee R/O

VAR 18 MESA VERDE (SAN JUAN) (12)

VAR 19 GRAY WARE (2)

VAR 20 Types:
02: Chapin Gray
03: Moccasin Gray
04: Mancos Gray
05: Mummy Lake
06: Mancos Corrugated
07: Dolores Corrugated
08: Mesa Verde Corrugated
09: Early Pueblo Gray
10: Late Pueblo Gray
11: Corrugated Body Sherds
12: Unclasifiable Gray
13: Unclassifiable Corrugated
14:

VAR 19 WHITE WARE (3)

VAR 20 Types:
02: Chapin B/W
03: Piedra B/W
04: Cortez B/W
05: Mancos B/W
06: McElmo B/W
07: Mesa Verde B/W
08: Early Pueblo White
09: Late Pueblo White
10: Unclassifiable B/W

VAR 19 RED WARE (4)

VAR 20 Types:
02: Abajo R/O
03: Bluff B/R
04: Deadmans B/R
05: Early Pueblo Red
06: Unclassifiable Red
07: Late Pueblo Red

APPENDIX C

FORMAL DESCRIPTIONS OF TYPES DEFINED BY CERAMIC ANALYSIS

by

William A. Lucius and Dean Wilson

TALLAHOGAN RED

Ware: Red ware.

Culture category: Kayenta Anasazi.

Based on: Six sherds.

Description

Construction: Unknown, probably fillets.

Finishing or thinning: Unknown, probably scraped and smoothed.

Firing atmosphere and temperature: The black to gray core, reddish yellow paste, and red slip indicates a rapid reducing atmosphere followed by a short oxidation period to bring out the yellow and red oxidation colors. Lack of vitrification indicates a temperature not exceeding 800° C.

Paste:

Clay: Source unknown, apparently a yellow firing clay, possibly with high carbonaceous content.

Color: Oxidized paste is generally reddish yellow (7.5YR8/6). The reduced core ranges from dark gray to very dark gray (7.5YR3/0 to 7.5YR4/0).

Refired color: Yellow (10YR9/4).

Temper type: Coarse quartz sand without an observable matrix or cement.

Temper size: Ranges from 0.3 to 1.0+ mm in diameter with most fragments 0.7 to 0.9 mm in diameter.

Texture: Chunky with shale-like plates commonly observed under magnification.

Hardness: Medium, no measurements available.

Fracture: Irregular.

Thickness: Ranges from 0.28 to 0.54 mm with a mean of 0.41 mm.

Carbon streak: The major width of the sherd is black to gray.

Surfaces:

Color: Red (10R4/6 - 10R4/8) if slipped, reddish yellow (7.5YR8.6) if unslipped.

Firing clouds: Observed on one bowl sherd.

Sooting: Not observed.

Slip: Relatively thin red (hematite) slip without its own temper. Outside of bowls and jars and inside of bowls normally slipped.

Refired color: Very red (10R5/6) if slipped.

Polish: Observed on three sherds; weathering may have destroyed polish on remaining sherds.

Weathering: Weathering of slip observed.

Shapes and sizes: Shapes represented are bowls and jars. Actual configuration and sizes of vessels unknown.

Rims: Rounded (one rim in sample).

Decoration: None observed.

Manipulation: None observed.

Probable use: Unknown. Probably a serving as well as a trade ware.

Other characteristics: Temper is visible through the slip.

Bases for Description

Dolores Archaeological Program excavations, 1978-1979; Shiprock-Chinle Archeological Reconnaissance Project, 1981.

Bibliographic Data

Lucius [43] and Lucius [44], Daifuku [9], Wendorf [45].

Time and Place of Manufacture and Use

Period: Pueblo I.

Dates: A.D. 660-780

Ranges: Kayenta and Mesa Verde branches of the Anasazi.

Type sites: Jeddito 264, Site 5MT0023, and Site 5MT2236.

Derivation and Affiliation

Tallahogan Red possibly represents an Anasazi adaption of the Mogollon Brown Ware Tradition. No other possible antecedents are known.

Varieties and Deviations

None known.

Comparisons with Other Types

Tallahogan Red is distinctive among the Anasazi red wares due to the bright red slip and dark paste tempered with quartz sand. It is similar to Lino Gray but slipped and oxidized. Its relative thinness precludes confusion with later red-slipped red wares.

General Remarks

The type appears to be a widespread trade item.

DOLORES BROWN

(New Type)

Ware: Gray ware.

Culture Category: Mesa Verde Anasazi.

Based on: 14 whole or partial items.

Description

Construction: Fillets, pinched, or molded.

Finishing or thinning: Smoothed and wiped.

Firing atmosphere and temperature: A reducing atmosphere is indicated despite the brown to tan color of the clay. No information concerning firing temperature is available but the softness of the clay and lack of vitrification indicates a temperature not exceeding 800° C.

Paste:

Clay: Probably derived from alluvial sinks or abandoned pithouses which have been observed to contain apparently identical clays derived from rainwater runoff.

Color: Yellow-red (5YR5/8) to a very pale brown (10YR6/4).

Refired color: Yellow-red (5YR6/8 to 5RY6/10).

Temper type: Apparently naturally included aplastics consisting primarily of sandstone derived quartz sand. One sherd contained crushed igneous rock cobble temper.

Temper size: The majority of the inclusions are less than 0.1 mm in diameter with occasional quartz grains up to 0.5 mm in diameter.

Texture: Gritty if weathered, otherwise a muddy looking surface. Often mistakenly identified as a fine-grained sandstone.

Hardness: Soft, no measurements available.

Fracture: Irregular.

Thickness: Where applicable, the range is from 4.0 to 7.3 mm with a mean of 6.2 mm.

Carbon streak: None observed.

Surfaces:

Color: Same as paste.

Firing clouds: Observed on several items.

Sooting: Observed on three items.

Slip: None observed.

Polish: None observed.

Weathering: Easily weathered.

Shapes and sizes: Shapes are restricted to animal effigies, pinch pots, and small jars. Sizes are small, probably due to the structural limitations of the sandy paste.

Rims: Tapered, matching Chapin Gray rim forms.

Decoration: None observed.

Manipulation: None observed.

Probable use: Effigies and miniatures suggest ceramic training items and/or ceremonial usage.

Other characteristics: One figurine has a well-defined anal orifice and one pinch pot has been modified after firing by grinding.

Basis for Description

Dolores Archaeological Program Excavations, 1978-1979.

Bibliographic Data

Lucius [43].

Time and Place of Manufacture and Use

Period: Basketmaker III.

Dates: A.D. 650-750 as based on ceramic associations.

Range: Mesa Verde Anasazi.

Type sites: Sites 5MT0023, 5MT2161, 5MT2193, 5MT2854, 5MT4644.

Derivation and Affiliation

This ceramic type apparently represents a local resource use for special ceramic items in the Dolores River valley as well as others areas within the northern San Juan area.

Varieties and Deviations

None observed.

Comparisons with Other Types

The type represents an indigenous development and it is most comparable to Chapin Gray of the same time period. Within the Gobernador Region, it is comparable to Rosa Brown.

General Remarks

The type is defined by its brown to tan color and sandy texture. It has been recorded in D.A.P. sites and other adjoining areas and it appears to represent the occasional use of alluvial (dirty) clays for the production of miniatures and animal effigies during the Basketmaker III period.

DOLORES CORRUGATED

Ware: Gray ware.

Culture Category: Mesa Verde Anasazi.

Based on: 35 sherds.

Description

Construction: Coiled.

Finishing or thinning: Scraped and wiped on interior.

Firing atmosphere and temperature: A neutral atmosphere of firing is indicated by the gray clay color and lack of oxidation of the tempering agents. Firing duration was probably short due to the presence of carbon cores in the pastes. Temperature of firing is suspected to be less than 800° C due to the lack of vitrifiction of the clay body.

Paste:

Clay: Sources probably are located in the Dakota Sandstone and Mancos Shale formations of Cretaceous period. Similar clays are abundant across Montezuma and Dolores counties in southwestern Colorado. Stratigraphic location indicates deep-water deposition.

Color: Consistently light to dark gray (5Y7-5Y4) with occasional nearly white (10YR8/1) pastes.

Refired Color: Not refired.

Temper type: Variable. Crushed igneous rock as well as a conglomeritic sand occurs in the sherds. Under magnification, the sand temper exhibits sand grains cemented with a white matrix, often in conjunction with angular (quartzite?) fragments which probably indicates use of roughly sorted sand available in drainages cutting through the Dakota Formation.

Temper size: Variable. Under magnification, the particles grade from less than 0.1 mm in diameter to over 1.0 mm. The majority of fragments tend to be over 0.5 mm with many fragments as much as one-half the width of the vessel wall.

Texture: Chunky pastes that appear to be generally poorly mixed.

Hardness: Medium, no measurements available.

Fracture: Irregular. Fractures tend to follow coil junctures.

Thickness: Terminal fillet thickness is variable and difficult to quantify due to the general tendency of lips to taper. Ranges from 4.0 mm to 7.2 mm with a mean thickness of 5.2 mm. The corrugated

portion just under the terminal fillet shows a thickness range from 4.8 mm to 10.0 mm with a mean thickness of 5.2 mm.

Carbon streak: Common.

Surfaces:

Color: Same as paste, with sooting causing darker exteriors.

Firing clouds: None observed.

Sooting: Common.

Slip: None.

Polish: None observed.

Weathering: Minor edge modifications were observed on sherds.

Shapes and sizes: Jars with outcurving rims and an egg shape are inferred from the sherds. Sizes generally appear to be medium to large with few small orifices represented. No volumetric measurements are available.

Rims: Rims consist of terminal fillets placed to extend the corrugated body. Rim fillets range from 1.0 mm to 5.0 mm with most fillets being 3.5 mm to 4.0 mm in width. The fillet is normally evenly curved to present an eversion curve at an angle approaching 45° in relation to the body profile. Rims are generally slightly tapered to rounded with lipping common. Typological distinction of the type requires the presence of the rim fillet and sufficient bodywall to determine the eversion angle.

Decoration: None observed.

Manipulation: corrugation of the construction coils is accomplished by indention of the coils prior to the addition of subsequent coils, probably by finger or fingernail impression. No patterned corrugation or wiping of the coils was observed in the samples. Indented coil widths are variable as is the rugosity of the indentations. Rarely, coils are flattened to present an even surface dimpled by indentations.

Probable use: Cooking and storage.

Other characteristics: interior surfaces are generally lighter in color than the exteriors.

Bases for Description

Dolores Archaeological Program Excavations 1978-1979; Dolores River Project survey sites, 1974-1975.

Bibliographic Data

Lucius [43].

Time and Place of Manufacture and Use

Period: Pueblo II-III.

Dates: Approximately A.D. 1100-1200.

Range: Mesa Verde Anasazi.

Type sites: Sites 5MT2515, 5MT2151, 5MT2361, 5MT2368, 5MT3430, 5MT2490, 5MT2504.

Derivation and Affiliation

The type appears to be a development from Mancos Corrugated, with a widening of the terminal fillet and a tendency for greater rim eversion. It is considered indigenous to the Mesa Verde region.

Varieties and Deviations

Definable tempering differences within the Mesa Verde region correspond with locales and may allow for variety definition.

Comparison with Other Types

Dolores Corrugated has a wider terminal fillet and greater degree of rim eversion than Mancos Corrugated. Mesa Verde Corrugated has a greater degree of rim eversion and the coils tend to be less rugged. Kayenta and Cibola corrugated types exhibit quartz sand temper.

General Remarks

Dating of the type is poor. Further investigation is required to substantiate the date range assigned above.

DOLORES RED

Ware: Red ware.

Culture Category: San Juan Anasazi.

Based on: Seven sherds.

Description

Construction: Unknown, probably coiled.

Finishing or thinning: Unknown, probably scraped and smoothed.

Firing atmosphere and temperature: The white paste and contrasting red slip indicates that an oxidation regime of firing was utilized to produce the red ware. Tempering particles are also oxidized. No temperature of firing has been determined due to the use of a relatively pure white (expected to be high temperature of maturation) clay.

Paste:

Clay: Source unknown, nonlocal, somewhere in the San Juan area. The clay fires white under an oxidation atmosphere indicating that the clay contains little iron.

Color: Consistently white to very pale brown (10YR8/2 to 10YR8/4) with little variation within the sherd.

Refired color: Very pale yellow (2.5Y9/2).

Temper type: Finely crushed igneous rock that is composed of somewhat translucent white particles with interspersed black nodular inclusions. Under microscopic magnification a red to orange tinge is apparent in the temper particles.

Temper size: Ranges from 0.2 to 1.0 mm in diameter with the majority of fragments less than 0.5 mm in diameter.

Texture: Fine chunky pastes that appear to be well mixed with no obvious impurities.

Hardness: Medium, no measurements available.

Fracture: Snap, with sharp edges.

Thickness: Ranges from 3.5 to 5.5 mm with a mean of 4.6 mm.

Carbon streak: None observed.

Surfaces:

Color: Red (10R4/8 and 10R5/6) and dark red (2.5YR3/6).

Firing clouds: None observed.

Sooting: None observed.

Slip: Relatively thin red (hematite) slip without its own temper. Entire vessel apparently slipped.

Refired color: Red (10R5/6 to 10R6/6).

Polish: All sherds in the sample exhibit well-polished surfaces.

Weathering: None observed.

Shapes and sizes: Shapes represented are bowls and jars. Sizes are unknown.

Rims: Rounded (one rim in sample).

Decoration: None observed.

Manipulation: None observed.

Probable use: Unknown, probably a serving as well as a trade ware.

Other characteristics: None.

Bases for Description

Dolores Archaeological Program Excavations, 1978-1979.

Bibliographic Data

Lucius [43].

Time and Place of Manufacture and Use

The type represents a local manufacture within the Mesa Verde region given the crushed rock temper. Preliminary temper analysis indicates a possible manufacture in the San Juan River drainage.

Period: Pueblo I.

Dates: Approximately A.D. 700-900.

Range: Mesa Verde Anasazi.

Type sites: Sites 5MT0023, 5MT2151, 5MT2193, 5MT4644, 5MT4538, 5MT4547.

Derivation and Affiliation

Unknown, but the type may represent a variation of the red ware tradition of the San Juan region contemporaneous with both early and late red wares.

Varieties and Deviations

None known.

Comparisons with Other Types

The white paste and bright red slip make this type distinctive from red wares of the Mesa Verde region. It is similar in appearance to White Mountain Red Wares.

General Remarks

Dating of the type is tenative given the lack of dendrochronological dating in those sites in which the pottery has been recovered. It is apparently a San Juan type which may represent a special development.

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