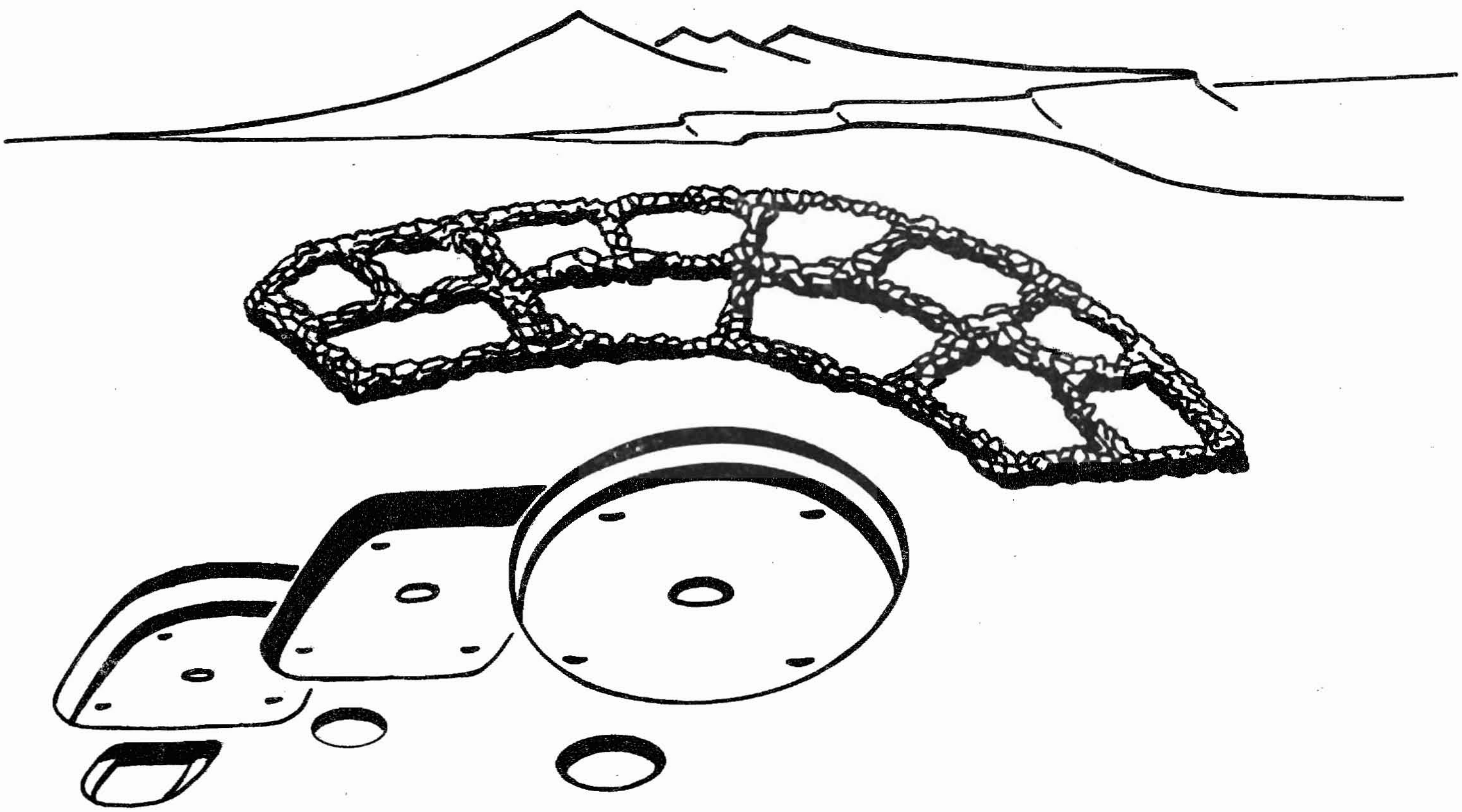
Dolores Archaeological Program:

Anasazi Communities at Dolores: Early Small Settlements in the Dolores River Canyon and Western Sagehen Flats Area



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16. ABSTRACT

This volume reports on a series of investigations in the Dolores River canyon and the western Sagehen Flats area of the Dolores Project. Included in the collection are an overview of the Grass Mesa Locality (with a summary of Dolores Archaeological Program systematics), the results of the 1979-1980 Grass Mesa Locality Testing Program, and 6 site reports that describe excavations undertaken between 1979 and 1983.

The excavated sites reported include: (1) LeMoc Shelter (5MT2151), which exposed 5 Anasazi occupations between A.D. 750 and 950; (2) Prince Hamlet (5MT2161), a Pueblo I habitation occupied between A.D. 720-840; (3) Hamlet de la Olla (5MT2181), with a primary occupation between A.D. 780 and 810 and a later field house manifestation; (4) Kin Tl'iish (5MT2336), with multiple occupations assigned to the A.D. 760-850, A.D. 850-975, and A.D. 1050-1200 periods; (5) Pozo Hamlet (5MT4613), a pithouse and associated features with construction traits of both Basketmaker III and Pueblo I periods, between A.D. 600 and 780; and (6) Poco Tiempo (5MT2378), a Basketmaker III site dating between A.D. 690 and 730.

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Dolores Archaeological Program: Anasazi Communities at Dolores: Early Small Settlements in the Dolores River Canyon and Western Sagehen Flats Area

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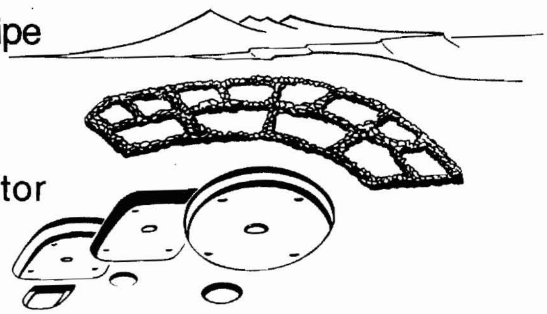

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Chapter 5. *Excavations at Prince Hamlet (Site 5MT2161), a Pueblo I habitation site.*
by Lynne Sebastian

APPENDIX 5A

RESULTS OF GRAIN SIZE ANALYSIS OF SEDIMENT SAMPLES FROM PRINCE HAMLET

Donald Howes

The masonry-lined pithouses at Prince Hamlet are among the unique features of this habitation site. In Pithouses 1 and 2, excavated masonry walls remain standing to a height of approximately 2 m, indicating that the complete walls stood even higher. The function of these walls is uncertain. The walls may have been at least partially free-standing during the prehistoric occupation and that downslope movement of colluvial material buried the walls upon abandonment of the site. Alternatively, it is possible that the 2 pitstructures could have been excavated into unconsolidated cultural fill (midden) that was not capable of holding a vertical wall, necessitating the construction of a masonry lining to stabilize the walls of the pithouse. Partial masonry walls that appear to serve this latter function have been located in other pitstructures in the project area. However, the inferred total (or near total) masonry wall construction of both pithouses at Prince Hamlet points to a function that is qualitatively different from that of the other known occurrences of masonry pitstructure walls.

To determine which of the 2 possible explanations is most plausible, sediment samples were taken from within and around the 2 pitstructures. It was thought that differences in the grain size parameters among the samples would provide data that would support one or the other of the 2 arguments.

Sampling Strategy and Rationale

A total of 7 samples was taken from within and around the 2 pithouses. These included samples from the fill of the 2 pithouses, from the fill south of Pithouse 1, from the midden, and from the subsoil. It was postulated that distinctions in grain size parameters could be made between those samples that were primarily colluvial in nature and the midden sample, which was assumed to be primarily an in situ deposit.

The sampling locations were as follows: sample 1 was taken from the southwest corner of Pithouse 2, at the base of the wall approximately 200 cm below modern ground surface. This sample was thought to constitute subwall sediments, but the results of analysis indicate that this sample might have been taken from a large, intentionally filled cist (not recognized in the field or assigned a feature number). Sample 2 was taken from a stratigraphic profile on the east side of Pithouse 2, at a depth of 60 cm below modern ground surface, and was comprised of pitstructure fill from above wallfall. (When the fill of both pithouses was sampled, care was taken to avoid the numerous disturbed areas that were present in an attempt to minimize contamination due to mixing of stratigraphically distinct sediments.) Sample 3 was taken from the west wall of Pithouse 2, at a depth of 90 cm below modern ground surface, and was comprised of fill from above unmodified subsoil. Sample 4 was collected from Pithouse 1, at a depth of 60 cm below modern ground surface, and was composed of fill from above wall fall. Sample 5, taken from a depth of 70 cm below modern ground surface, was from the trench that cut through the south wall of Pithouse 1; this sample was comprised of fill from the area immediately south of Pithouse 1. Sample 6 was collected from the midden, at a depth of 20 cm below modern ground surface. Sample 7 was taken from subsoil west of Pithouse 2, from a depth of 165 cm below modern ground surface.

Grain Size Analysis

The samples were analyzed by dry sieving and hydrometer techniques. After air-drying all samples at room temperature, a subsample of 100 g was obtained by splitting the field sample. Samples were pretreated with hydrogen peroxide (H_2O_2) for the removal of organic matter. After pretreatment, the samples were disaggregated and dispersed using sodium hexametaphosphate (5.5 g/ℓ) and mechanical stirring. The silt and clay fraction of the sample was then separated by wet sieving, using a 4-phi mesh screen. The sand fraction of the sample was oven dried at 50° C, then dry sieved through phi interval screens using a Rotap shaker. The silt and clay fraction was analyzed using the hydrometer technique. Corrections were made for the weight of the dispersant, the temperature of the solution, and the falling height. Cumulative weight percentages were calculated, and these data were plotted on normal probability paper using the phi scale for the plotting of particle size. The relevant percentiles were obtained from these graphs, and the mean, sorting, skewness, and kurtosis were calculated using the formulae developed by Folk and Ward (1957). This method follows the standard procedure for grain size analysis at the Geoarchaeology Laboratory at Washington State University (Hassan 1980).

While organic material had been removed from the samples by the use of hydrogen peroxide, this technique is not well suited for the calculation of the amount of organic material present in the sample, due to the numerous steps that have to be undertaken and the consequent possibility of accumulated error. Instead, the amount of organic material present was calculated by combustion. For this method, a 10-g sample obtained from the field sample was combusted in an oxidizing oven at 600° C for one hour. After the sample had cooled, it was weighed, and the difference in the weights taken before and after the combustion constituted the amount of organic material present.

The results of the grain size analysis (table 5A.1) indicate that six samples (samples 2 through 7) can be characterized as muddy sand and that one sample (sample 1) is a silty sand. All seven samples are extremely poorly sorted (table 5A.2).

Distinct groupings of samples are evident in figure 5A.1, where a ternary plot of relative proportions of sand, silt, and clay indicates three clusters. Although less distinct than these data, binary plots of other grain size statistics also indicate, in general, this same clustering (fig. 5A.2).

Interpretations

The midden sample (sample 6) could not be separated from the rest of the site sample on the basis of strict granulometric analysis. The midden sample is similar to samples 2, 4, and 5, which are, respectively, fill samples from the 2 pitstructures and the sample from the south of Pithouse 1. Since the pithouse fill samples are suspected to be colluvial in nature, this close correspondence suggests that sample characteristics probably are being strongly influenced by the large amount of culturally derived sediment that is present within them (examples of these cultural materials are adobe fragments, sherds, and fragments of flaked and nonflaked lithic material). Apparently, any grain size differences that may be present between the colluvial pithouse fill and the in situ midden deposits are masked by the considerable cultural material present in these samples. Because of this, it cannot be determined from the grain size analysis whether sample 5 (from the south of Pithouse 1) represents a culturally impacted colluvial deposit or an in situ midden deposit.

That unmodified colluvial deposits can be separated from culturally impacted deposits is shown by the separate cluster of samples 3 and 7. These samples show marked similarities in grain size characteristics. Although the fill sample (sample 3) was visually distinct from the underlying yellowish subsoil where sample 7 was taken, the amount of cultural input into this fill was probably very minimal. Characteristics of the gradient upslope from Pithouse 2 may have led to cultural material being diverted into the intermittent drainage on the west margin of the site so that such material was not incorporated in the fill of Pithouse 2. However, this explanation does not account for the obvious cultural admixture to the fill of Pithouse 2, which should also have been affected by any gradient. At present, this problem cannot be resolved.

The last of the 3 observed clusters is sample 1. This sample is markedly coarser than any of the others and has much more silt-sized material. Relative to the rest of the samples taken, this sample is the best sorted and the least skewed. The variability between sample 1 and all other samples clearly indicates a different origin for this sediment. Since sample 1 does not consist of unmodified colluvial deposits, culturally impacted colluvial deposits, or in situ cultural deposits (midden), it may consist of

Table 5A.1 – Results of granulometric analysis of sediment samples, Prince Hamlet

Sample No.	Depth (cm)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Organic matter (%)
1	200	5.52	53.90	30.16	10.42	4.4
2	60	0.89	67.07	11.86	20.18	3.3
3	90	3.59	53.43	14.25	28.73	4.9
4	60	4.73	64.26	11.36	19.65	2.8
5	70	13.16	57.87	9.74	19.23	3.8
6	20	12.59	55.99	11.77	19.65	6.3
7	165	14.55	42.48	15.09	27.88	3.3

Table 5A.2 – Grain size statistics, Prince Hamlet

Sample No.	Depth (cm)	Median phi	Folk and Ward's mean phi*	Trask's sorting coefficient†	Folk and Ward's inclusive graphic standard deviation*	Folk and Ward's inclusive graphic skewness*	Folk and Ward's graphic kurtosis*
1	200	3.4	3.95	1.74	2.82	0.16	0.91
					Extremely poorly sorted	Fine	Mesokurtic
2	60	3.1	4.97	1.64	4.33	0.74	1.97
					Extremely poorly sorted	Very fine	Very leptokurtic
3	90	3.7	6.10	1.93	5.44	0.64	1.17
					Extremely poorly sorted	Very fine	Very leptokurtic
4	60	2.9	4.82	1.71	4.93	0.64	1.94
					Extremely poorly sorted	Very fine	Very leptokurtic
5	70	2.7	4.40	1.82	5.04	0.57	2.17
					Extremely poorly sorted	Very fine	Very leptokurtic
6	20	2.7	4.45	1.83	4.92	0.56	1.81
					Extremely poorly sorted	Very fine	Very leptokurtic
7	165	3.55	5.32	1.96	5.41	0.47	1.22
					Extremely poorly sorted	Very fine	Leptokurtic

*From Folk and Ward (1957).
†From Trask (1932).

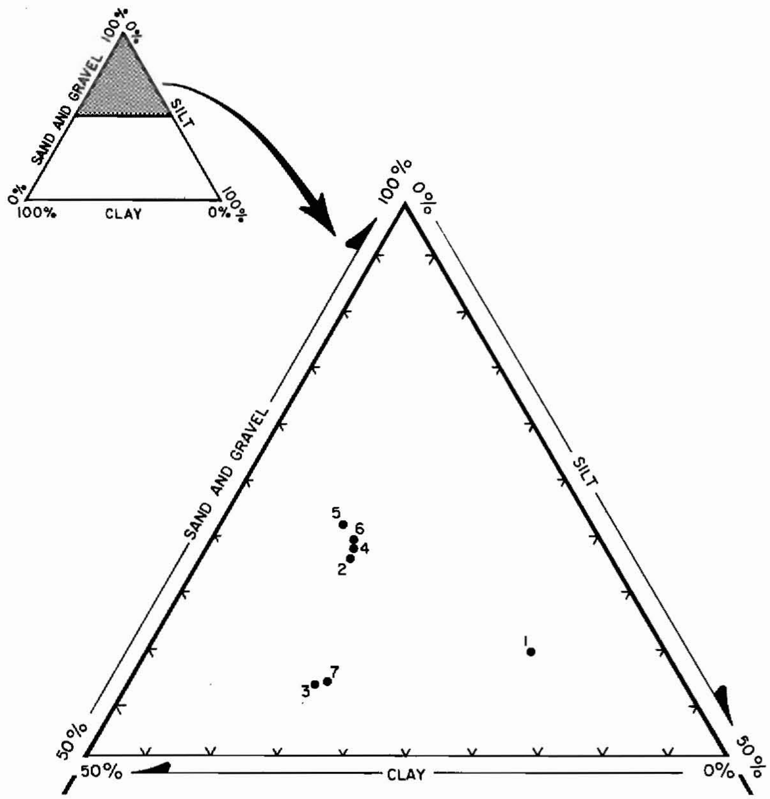

Figure 5A.1 – Ternary plot of relative proportions of sand and gravel, silt, and clay, sediment samples 1 through 7, Prince Hamlet.

intentionally sorted fill from a subfloor cist. The distinctive nature of the fill indicates that, if such a cist existed, it was filled before the abandonment of Pithouse 2 and would appear to have been associated with a floor below Floor 1.

While sample 6 (midden) cannot be separated from the rest of the samples on the basis of its grain size characteristics, the amount of organic material present within the sample is distinct. As can be seen in table 5A.1, the amount of organic material present in sample 6 is higher than that in any of the other samples. If this higher concentration of organic material can be attributed to differences in depositional history alone (i.e., in situ deposition versus colluviation), then sample 5 (south of Pithouse 1) evidently should be grouped with the colluvial samples, rather than with the midden sample. Based on this evidence, the sediments to the south of Pithouse 1 (and, by inference, Pithouse 2) are probably culturally impacted colluvial deposits, rather than in situ midden deposits. This conclusion then suggests that the southern pithouse walls might have been at least partially free standing.

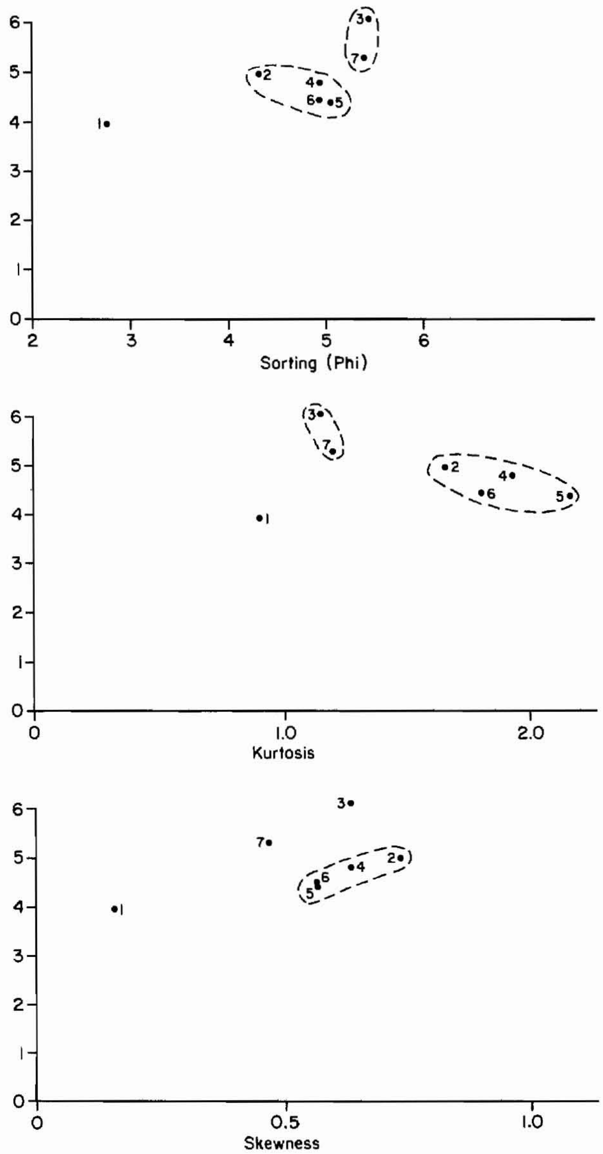

Figure 5A.2 – Binary plots showing cluster of sediment samples 1 through 7, Prince Hamlet.