cally distinct vessels were associated with ritual activities. Vessels of these types were also associated with the burials, suggesting grave-side ritual.

A cemetery of three separate areas was excavated in the midden east of the site. In the northern midden were interments that were oriented east-west, whereas the southern midden had burials oriented north-south. An analysis of design elements on the ceramics in the graves indicated that the burials in the northern section of the midden were associated with the localized descent group in the northern part of the village, and that the southern burial area was associated with the descent group localized in the southern portion of the site. The burials in the center of the midden were mixed, both in terms of their orientation and the occurrence of design elements. Almost all of the ornaments and unusual items that probably reflect differences in status, included as grave goods from the entire sample of burials, were from this central area. Likewise, the burials in the central portion of the midden had twice as many vessels per burial as the burials in other areas of the midden. This central cluster of burials probably represents individuals of relatively high status from all localized social groups in the community, buried in a separate section of the cemetery. The importance of the site as a ceremonial focal point suggests that high status would have been earned by individuals through participation in ritual activities rather than acquired through inheritance.

The regression analyses of artifacts reflect a rigid division of labor at the site. For example, weaving implements were found with a male burial indicating that weaving was a male activity, and these items were strongly correlated with artifacts used in ritual activities associated with the kivas. This suggests that weaving was a masculine task and was carried out in the kiva, just as it is today in the western Pueblos. The distribution of tools associated with female activities was quite different from that of items associated with male activities. Most tasks were evidently performed by groups organized according to sex.

These analyses permit comparisons to be made between the modern western Pueblos and one portion of their prehistoric background. The presence of localized matrilineages and lineage segments at the Carter Ranch Site demonstrates continuity for this western Pueblo trait for more than 700 years. A similar pattern for the household as the basic local unit can now be documented. Other stable processes are now demonstrable. These include the basic form of the rigid division of labor and particular activities associated with each of the sexes.

Significant differences can be shown as well. One of the most striking is the change in inter-community integration and a related change in the intra-community pattern itself. Communities made up of from one to three localized matrilineages (probably corresponding to single clans as well) were united through the mechanism of centralized ritual. Strong mechanisms for multi-community integration are not present among the modern western Pueblos.

Related to these changes was a change in the nature of the organization of the community itself. Villages up to A.D. 1300 probably were more commonly composed of single localized lineages. The economic advantages accruing to larger aggregates of people in the face of environmental pressures resulted in the establishment of communities of more than a single lineage after 1300. Strong localized lineages are not conducive to a strong village integration when a village consists of several lineages. I would expect the development of integrative ties that crosscut social groups to develop within the village under these circumstances. These would be such things as the development of societies with strong ritual functions, the breakdown of the association of kiva with clan, and the assumption by the kivas of more village-wide significance (for example, by association with societies). Cross-cutting integrative mechanisms such as these would promote community solidarity at the expense of the disruptive lineage strength, and this is the pattern today among the western Pueblos.

These examples serve to document my case for the potential use of this approach in investigations of prehistoric communities. The method and theory incorporated in this study can be used to advantage in testing hypotheses of reconstruction, as well as for providing background to aid in understanding the development of certain sociological phenomena.

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Coenzyme Q: Intracellular Distribution in Rhodospirillum rubrum

Abstract. *Whole cells and cell membranes of* Rhodospirillum rubrum *prepared by lysozyme treatment and osmotic lysis of cells were analyzed for coenzyme Q. All the coenzyme Q was localized in the cell membranes.*

In photosynthetic bacteria, coenzyme Q appears to participate in photophosphorylation (*1*). The cell membranes or ghosts of *Rhodospirillum rubrum* derived from lysozyme treated and osmotically ruptured cells contain the functional photochemical apparatus which catalyzes photophosphorylation of adenosine diphosphate (*2*). Accordingly, such membranes should contain coenzyme Q. The coenzyme has been detected in chromatophores obtained from photosynthetic bacteria (*3*). Its presence in chromatophores, however, does not necessarily mean that it is

present in the cell membrane since such particles appear to be artifacts of preparation (*2*, *4*).

Wild-type cells of *R. rubrum* (*5*) were grown anaerobically in 2.5-liter flasks illuminated by tungsten lamps (75 to 95 lu/m^2 at 30° ± 2°C). Flasks were filled to the neck with the G3X medium of Kohlmiller and Gest (*6*), the surface of which was overlayered with sterile light paraffin. Cells were harvested after 3 to 4 days of growth, centrifuged at 0°C, and resuspended in 0.01*M*, *p*H 6.8 phosphate buffer containing 10 percent sucrose. The cells were then treated with lysozyme according to the method of Karunairatnam *et al.* (*7*) to obtain a spheroplast suspension free of walls. Microscopic examination showed practically complete conversion to wall-free spheroplasts. After osmotic lysing of spheroplasts with water the lysed material was centrifuged and washed once with water. The sedimented cell membranes or ghosts were then lyophilized until they were dry. Lyophilized materials (cells or cell membranes) were extracted with *n*-heptane, the extract was evaporated to dryness, and the residue taken up in ethanol and run on a thin-layer silica gel G chromatogram in a benzene : iso-octane : acetone (25 : 25 : 1.5 by volume) system (*8*). Coenzyme Q^{10} was estimated spectrophotometrically (*9*) by the decline in extinction with sodium borohydride at 275 mμ.

Separate analyses were made on three different batches of cells and the results are presented in Table 1. Coenzyme Q was quantitatively recovered in the cell membranes. Bishop and King (*10*) have shown that in the nonphotosynthetic bacteria *Escherichia coli* and *Micrococcus lysodeikticus*, coenzyme Q and vitamin K are localized in the cell membrane. Since coenzyme Q participates in photosynthesis (*11*) our data support the view that the photosynthetic apparatus of *R. rubrum* is built into a continuous membrane which also serves as the cytoplasmic membrane (*2*, *4*).

Table 1. Analyses of cells and ghosts of *Rhodospirillum rubrum*. The results for the whole cells are expressed as milligrams of coenzyme Q per gram of dry weight, and for the ghosts as milligrams of coenzyme Q per gram dry weight of ghosts (A), or per gram dry weight of whole cells (B).

Expt. No.	Whole cells	Ghosts	
		A	B
1	1.54	2.75	1.94
2	1.98	2.32	1.64
3	1.78	2.32	1.64
Average	1.77	2.46	1.74

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Adhesion and Emigration of Leukocytes Produced by Cationic Proteins of Lysosomes

Abstract. *A cationic protein fraction isolated from rabbit polymorphonuclear leukocyte lysosomes causes adhesion and emigration of leukocytes and petechial hemorrhage in the microcirculation of the rat and rabbit mesentery.*

In studies of lysosomes de Duve (*1*) suggested that, under pathological conditions, these subcellular particles may liberate hydrolytic enzymes capable of injuring living cells and their surrounding tissue components. In support of this, Thomas and Weissmann have recently reported the production of inflammation and necrosis in several tissues after local injection of intact lysosomal granules combined with systemic administration of bacterial endotoxin (*2*), or the local injection of dissolved contents of frozen thawed lysosomes alone (*3*). In addition, Golub and Spitznagel have recently published (*4*) observations on dermal lesions induced in rabbits by homologous polymorphonuclear leukocyte (PMN) lysosomes, and they suggest that such lysosomes are potent sources of tissue damage in the Arthus reaction.

One mechanism for the tissue injury attributed to these granules implicates the action of cathepsins and other of the acid hydrolases contained within the particles (such as phosphatases, nucleases, polysaccharidases, and lysozyme). A precedent for this assumption is the observed degradation of cartilage matrix by acid cathepsins released from lysosomes in vivo under certain experimental conditions (*5*). However, in addition to the enzymes known to be present within lysosomes, a basic protein fraction possessing marked bactericidal and agglutinating properties has been extracted from PMN lysosomes of the guinea pig by Zeya and Spitznagel (*6*). Moreover, Frimmer and Hegner (*7*) recently reported that histone-like, basic polypeptides isolated from calf thymus nuclei had leukotactic and permeability-increasing effects upon the microcirculation of the rat mesentery. In view of these findings and because adhesion and emigration of leukocytes through the walls of capillaries and venules is a cardinal feature of the inflammatory process, we tested rabbit polymorphonuclear leukocyte lysosomes and especially the cationic proteins of these particles for their capacity to induce leukocyte sticking and emigration in homologous and heterologous tissues.

Rabbit peritoneal leukocytes were obtained in large numbers from exudates induced by administration of 0.1 percent glycogen. Total and differential white cell counts were made on each exudate, and the cell suspensions collected from all animals were then pooled. After washing in sucrose, the leukocytes (95 to 100 percent polymorphonuclear cells) were lysed in 0.34*M* sucrose by the technique of Cohn (*8*). The lysate was centrifuged at low speed (400*g* for 10 minutes), and the sediment, consisting largely of nuclei and unbroken cells, was discarded. Leukocyte granules were then collected by centrifuging at 8500g for 15 minutes. The particles were re-