PALEODEMOGRAPHY IN THE SOUTHWEST

by

GEROLD F. GLOVER

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Prehistoric demography, as the study and analysis of prehistoric populations, attempts to generate absolute numbers of people living within a particular spatial area and temporal period. In addition to determining numbers of a given population, paleodemography also attempts to determine average lifespan, sex ratios, and mortality rates for different age groups. Unlike the study of modern populations, the problems of ascertaining the various aspects of a prehistoric population are much more complex and unfortunately have, in the past, been treated rather subjectively by archaeologists. One of the purposes of this paper is to look at some of the different methods that have been developed in the past few years for determining population size in a more objective manner, if only in terms of models for discussion of changes in population through time. Also, the author hopes to point out the errors that have been made in the past by the subjective evaluation of date.

Populations of prehistoric peoples cannot be studied in isolation from their culture because of the complex ways in which populations are affected by the culture and the ecological effects of the area in which they lived. Populations did reflect changes within their cultures due to the changing characteristics of the population; and by studying

prehistoric populations, especially in terms of social organization, a clearer understanding of changes can be gained. G. J. Gumerman said it most clearly in a recent article:

> It is necessary to consider the demographic variable within a holistic cultural ecological framework, rather than as a "primemover," for culture change; by so doing it should be possible to understand the relationship between types of short-term culture changes and similar types of demographic change. Prehistoric demographic studies viewed within cultural and natural framework should provide a clearer understanding of the process of culture change. (Gumerman, 1975, p. 104).

Numerous methods have been utilized by archaeologists in attempting to establish population counts in different parts of the world. Minor methods such as simulation models, computation of biomass, and counts based on specific numbers of artifacts have all been used in particular locations with limited success. The two methods which have found the greatest applicability have been the study of burial populations and the determination of the number and size of living areas utilized by past peoples, such as house structures.

The analysis of burial populations can provide a valid data base, but many problems are inherent with this type of information. As this method does not play a part in the evaluation of data within this paper, we shall turn directly to the second method used in generating gross numbers of a prehistoric population which is that of site counts and room counts. The use of this concept has broad applicability throughout the world. Of course, there are a multitude of

problems to be confronted when using site counts and room counts. The most important is determining the contemporaneity of sites and occupation of specific rooms within a site through time.

If, within a specific area and with the basic housing type remaining the same, there are changes through time in gross numbers of housing units, then it will be possible to show the curve of growth or decline in numbers of people living in that particular area. On a large scale this type of information can show the general trend of a culture's population. Unfortunately, this generalized curve can offer no information about population movement into or out of the area or changes brought about by variation in the culture itself. Also, this large scale analysis of population curves offers insight into only relative changes. It does very little in generating absolute numbers.

Several attempts have been made to produce absolute numbers of individuals within a given unit. Naroll (1962) developed a cross-cultural formula for predicting the number of persons living within a particular amount of floor area. Others such as Casselberry (1974), worked from the concept of too much sensory stimulation in developing cross-cultural formulae.

In searching for the best possible method with which to establish population estimates of the prehistoric Southwest, the writer studied all of the methods listed above, but the

work of Turner and Lofgren (1966) provided the best possible method for the purposes of this study.

The method developed by Turner and Lofgren uses both archaeological and ethnohistoric work to establish both prehistoric and historic population counts based on numbers within an average household. In studying multitudes of excavation reports for the Southwest, they discovered that the size of many of the bowls and dippers remained constant through time while the size of the large cooking jars increased. They reasoned that this trend was due to the fact that the bowls were eating bowls and the size of the individual serving remained the same, as did the size of the dippers which were used to serve the food. They then assumed that the size of the cooking jars increased through time due to increases of household size. By computing the volumetric ration between cooking jars and the constant size of eating bowls, they could arrive at an accurate reading of the number of people eating within one household.

Although technological advances in terms of cooking jar construction have been offered as a criticism of this thinking, it would seem that the size of cooking jars would not be increased simply because of the people's capability to do so; but rather that Turner and Lofgren's original contention still holds true. They cross-checked their findings from ethnohistorical accounts of family size and through modern census data. They found that their estimation matched well

with the actual numbers of people living in historical times. Finally, they worked the ratio back through time until the arrival of utilitarian pottery. Table 1, page 6, shows that the size of the household increased slowly through time until the effects of European contact were significant, whereupon there was a dramatic increase which will be discussed later in this paper. Their technique has been used by themselves and others such as Zubrow very successfully (Turner & Lofgren, 1966; Zubrow, 1974).

Few areas of the Southwest have been adequately surveyed which could offer valid data concerning occupation of a particular area through its entire history. To be able to trace the accurate population growth of any area by using any of the methods discussed, it would be necessary to dig every site within the region and to date it accurately, so as to place it within the sequence of growth. Even within a small area, a task of this nature would take enormous funds and decades.

Since not all sites within a region can be dug, a method would need to be used from survey data alone that could offer a reasonable alternative. Plog (1974) has developed such a method which was used in conjunction with research in Hay Hollow Valley in East-central Arizona. By using regression analysis of already excavated sites, Plog developed formulae that could be used on surveyed sites that would yield accurate predictions of the number of rooms

Table 1

Family Size As Indicated between Cooking Jar Capacity and Serving Bowl Ratio

Time Period A.D.	Mean cooking jar capacity	Cooking jar/Bowl ratio Household size/Persons	Bowl capacity
500-750	3107 cc	4.495	691 cc
750-900	3328 cc	4.815	691 cc
900-1250	3536 cc	5.116	691 cc
1250-1300	3594 cc	5.199	691 cc
1300-1600	3549 cc	5.134	691 cc
1600-1900	4849 cc	7.015	691 cc

Note. From "Household size of prehistoric Western Pueblo Indians" by C. Turner and L. Lofgren, Southwestern Journal of Anthropology, 1966, 22, 117-132.

or pithouses within the area of a located site. Temporal placement of a site was determined by analysis of sherd collections made from the surface scatter of each site.

The utlization of Plog's technique requires the recognition of several problems. First, there is the requirement of a truly intensive survey of the area under study. Secondly, given the number of rooms within a site, one must remember that not all of the rooms were occupied at the same time. Thirdly, not all sites were habitation sites. Finally, there is the problem of placing the sites in the proper temporal sequence. Plog's formulation takes into account all of these various problems (Plog, 1975).

Plog's formulae which the writer utilized are as follows:

$$\text{Number of pithouses} = .0047 \text{ (site area in } M^2) + 1.2$$

$$\text{Number of Pueblo rooms} = .1 \text{ (area of rubble mound in } M^2) + 4.0$$

From these, all pithouse are counted as dwelling units. Seventy-five % of rooms are counted as dwelling rooms when dated between 900 to 1150 A.D. Fifty-nine % are counted as dwelling units when dated between 1150 to 1500 A.D. The remainder were counted as storage rooms. From ethnographic information it was determined that the maximum occupancy of a Pueblo has been only 78% of the total number of available rooms. In addition to the above figures utilized in estimating population, it must be pointed out that from Pueblo II

times onward, a household was comprised of two dwelling rooms and two or more smaller stroage rooms. This is most ably shown by the work of Rohn (1971) at Mug House and Dean (1970) at Tsegi Canyon. Thus, in computing population for sites dated Pueblo II and later, the writer has considered two dwelling rooms as one household, after determining the number of contemporaneous rooms within a site by using Plog's formulae.

By using Plog's formulae for areas other than the area for which it was originally designed, the writer is assuming that differences in architectural design were not significant within the Southwest. Of course, this is not altogether true, but, for the purposes of this general paper, it was felt that the differences could essentially be ignored.

After an examination of the various ways in which archaeologists have computed prehistoric populations, and, with the belief that many of the estimates of prehistoric peoples had been made in a subjective manner, the basic groundwork is now prepared for the reevaluation of some of the surveys that are available. Operating with the assumption that many of the population counts were too low, we are now ready to proceed.

To conduct such a reevaluation of population estimates, the region of the Northern San Juan drainage was chosen, more specifically the Mesa Verde area, because of the available survey reports.

Before the introduction of cultigens into this region, the inhabitants were scattered bands of people following an economic system of hunting and gathering. They followed a way of life which Jennings (1964) has designated as the "Desert Culture." Attempts to estimate the population inhabiting the region at this time are extremely vague because of the lack of material remains of the people and their culture.

The introduction of cultigens, especially corn, caused a change in the subsistence pattern of the people. The people began living in permanent, or, at least, semipermanent habitations. The earliest remains of these habitation sites are located near Durango, Colorado. The earliest date is from around 46 A.D. This more settled way of life probably developed about the time of Christ, but, as the remains are sketchy, this date is rather tentative (Reed, 1964, p. 178).

Even at this time, we become aware of one of the most important resources that centered in the life of the inhabitants of the Southwest. The early Basketmaker II sites, as reported by Herold (1961), were located in the northernmost part of the San Juan region, which is among the best watered in the area and lies nearest to the verdant mountain country that has the greatest abundance of animals and vegetation. This is explainable by the continued use of hunting and gathering that was still of primary importance to the people of Basketmaker II times (Herold, 1961, p. 65). The important factor in site location for the entire history of the

Southwest is that of water. Jennings (1968) simply has stated: "As is obvious, the key to understanding the Southwest lies in water and its use in gardening" (p. 250).

The introduction of new strains of corn along with squash and sometime later the arrival of beans into the region heralded a radical change in the lives of these people. The sedentary subsistence pattern allowed a settled way of life and caused the population of the area to begin to grow above the levels that had previously existed during the hunting and gathering stage.

Now we can turn to an analysis of the first of the surveys reexamined in this study. It was conducted by Rohn (1966) on Chapin Mesa in Mesa Verde National Park in the late 1950's and early 1960's. That part of Chapin Mesa that was surveyed is approximately 10 miles square in area and appears much like a finger of flat mesa surrounded on three sides by steep cliffs. Environmentally, the area is similar to all of the Mesa Verde proper. In the canyons are found stands of Douglas fir, the mesa tops are covered with Piñon-Juniper forests, and in higher elevations is found a brush zone composed of sage and similar plant life.

This intensive survey recorded a total of 856 habitation sites, extending in time from Basketmaker III through late Pueblo III, after which the entire region was abandoned. Rohn pointed out some problems encountered while conducting the survey, in that such factors as erosion and

destruction of sites by later sites undoubtedly caused some sites to be completely overlooked or totally destroyed prior to the survey. Rohn (1966) stated: "It may even be quite presumptuous to estimate that 80% of the sites on Chapin Mesa have been recorded" (p. 8).

Since this survey was initially a surface survey with relatively little testing of sites, estimations were made as to the number of rooms or pithouses in each site. Fortunately, he did record the area of surface scatter or rubble mound and thus enabled the Plog formula to be used. Rohn did not discuss the methods he used to determine estimated room counts, but he did concede the possibility of error when he stated: "Nearly every excavation or test conducted on a surveyed site showed discrepancies between what actually was found and the surveyor's estimate of what he would expect to find" (p. 9).

The major difficulty encountered in using Rohn's data was the lack of temporal placement of the many sites. The sites are recorded by their location or the major architectural material used in their construction. Also, some of the sites have estimated numbers of rooms, without a corresponding description of the area of rubble mound that could be checked by Plog's method. It must be noted that for the purposes of this study only those sites listed by Rohn which contained both a room estimate and a description of the size of the rubble mound are to be found on the

tables contained in this paper. Thus the total number of sites used in this report are much fewer than the total number listed by Rohn.

The problem of differential erosion and scattering of rubble on a site was such that, for this study, only the data from Pueblo III sites were utilized, since they would have had the least amount of destruction due to natural forces and later occupation.

Table 2, page 13, shows a difference between the two estimates as 8%. This table estimates room numbers for sites contained pecked-faced building stones that are characteristic of Pueblo III architecture. Of the 53 listed sites located on the mesa top, 46 were compared.

It is felt that the small difference between the two estimates is due to the lesser effect of erosion and destruction of sites at this later time and the increased accuracy of Rohn's estimate because of this. A small percentage of the total sites listed are responsible for the majority of increase, but, in using this methodology, removing these few from the sample would further bias the estimates. The older the site, the greater the chance for error in estimating the number of rooms because of the longer time period destructive forces would have had to work.

The comparison of these two estimates presents only the possibility of a somewhat larger population living on Chapin Mesa, but does indicate the applicability of Plog's formulae for determining population. Now we can turn to other phases

Table 2

Pecked-Faced Building Stones, Pueblo III

Site	Rohn	Plog
72	4	5
74	10-12	14
75	8-10	12
79	5	9
82	8-10	14
149	5- 8	13
200	20-30	22
202	2	4
203	2	5
204	3- 4	5
241	5- 6	6
299	20-30	50
303	15-20	26
325	25-30	27
328	20-25	21
703	10-15	24
728	3- 4	6
747	20-25	17
751	12-15	13
773	20-25	20
782	40-50	27
790	7- 8	8
818	10-15	24
820	30-40	49
821	30-40	43
822	2- 4	5
823	20	33
828	10-15	13
835	14	15
840	25-40	36
851	10-12	17
856	20-25	21
857	7- 8	8
864	7- 9	10
867	10-15	22
872	10-12	22
875	15	37
881	10-15	22
888	9-12	27
902	5	6
906	20	27
919	2- 3	7
920	8-10	11
932	7- 9	7
933	6- 8	13
1909	4-	6
TOTAL	555-722	786
Mean	12-5	17

of this study.

Rohn utilized the concept of communities located on the mesa which integrated a number of contemporaneous sites within a given area. For one such area that he called the Twin Trees locality, he presented a population trend from Basketmaker III through Pueblo III. These data are presented in Table 3, page 15, and show both the population estimates determined by Rohn and a comparison using both the formulae from Plog and the household number determined by Turner and Lofgren. The two estimates are surprisingly similar in all respects.

In way of further confirming the applicability of using these different methods, it can be seen in Table 4, page 16, that a comparison of Rohn's Pueblo III site clusters and population estimates from the outlined methods is made. It must be pointed out that in computing estimates of population, Rohn's original estimates of room numbers were used in both Tables 3 and 4. If each of the specified sites from the survey data had been recomputed with Plog's formula, it is probable that the estimates would have been larger on the same order as the percentage of difference displayed in Table 2, page 13. Even so, the population for the Pueblo III sites would not have significantly increased over those of Rohn.

An additional point worthy of notice in discussing the survey conducted by Rohn and the subsequent estimates of population seen in Tables 3 and 4, is that he laid little

Table 3

Population Trend in Twin Trees Locality

Community or Phase	Estimated Rooms	Pithouse or Kiva	Rohn's Pop. Est.	Glover's Pop. Est.
Earth Lodge B	--	8	40- 50	36
Twin Tree I	--	7	35- 45	34
Twin Tree II	27-41	9	50-100	72-115
Early Pueblo II	17-25	2	20- 35	25- 36
Late Pueblo II	15-20	4-5	20- 30	20- 31
Early Pueblo III	30-35	4	35- 45	36- 42
Square Tower House	111	12	120-150	135

Note. From "Cultural continuity and change on Chapin Mesa, Southwestern Colorado," unpublished doctoral dissertation, Harvard University, 1966, by A. H. Rohn.

Table 4

Late Pueblo III Site-Clusters

Site-Clusters	Est. Rms.	Est. Kivas	Rohn's Pop	Glover's Pop.
Cliff-Fewkes Canyon	530-545	60	600-800	608-649
Spruce Tree House	160-175	11	150-200	187-207
Square Tower House	111	12	120-150	135
Balcony House	81	6	65- 110	99
Middle Navaho Canyon	92-100	8	100-150	109-120
Upper Soda Canyon	56- 64	3-4	50- 70	68- 78
Painted Kiva House	31	2	30- 40	36
Site 596	20	2	20- 35	26
TOTAL	1081-1127	104-105	1135-1555	1268-1350
Spruce Canyon	17- 20	2	20- 30	21- 35
Upper Navaho Canyon	16- 17	1	15- 25	20- 21
Sites 599-609	25	0	25- 40	31
TOTAL	58- 62	3	60- 95	72- 87
Left-over Sites	18	1	19- 32	21

Note. From "Cultural continuity and change on Chapin Mesa, Southwestern Colorado," unpublished doctoral dissertation, Harvard University, 1966, by A. H. Rohn.

stress on either the minimum or maximum estimate that he reported. It would appear that he offered the range of the two figures as probably the most accurate estimate using the information available. Minimum and maximum estimates based on the reported number of rooms during each time period or site cluster using methods discussed here also are shown. With the given data, this is how the figures should be presented in the hopes that the actual population numbers would fall somewhere between the two figures.

Now let us turn to brief examination of another survey as reported by Hayes (1964) on Wetherill Mesa, also part of Mesa Verde National Park. In area, Wetherill is the same as Chapin Mesa, some ten square miles. Hayes did not discuss population, except in terms of Pueblo III times, the final phase of occupation of the Mesa Verde area. Table 5, page 18, shows the breakdown of the total number of sites recorded by Hayes, with the estimated number of rooms from each of the phase classifications he utilized for temporal placement of sites. The estimates produced for this paper are felt to be largely in error, because the author was unable to check any of his room estimates through the use of survey data concerning the size of the rubble mounds of the various sites as in the case of the previous survey.

It is in Hayes' discussion of the final Mesa Verde Phase, concerning its population and the way he arrived at his estimate, that the author strongly disagrees. Hayes

Table 5

Sites by Phase of Wetherill Mesa Survey

Phase	Total No. Sites	Est. No. Rooms	Glover's Pop. Est.
La Plata & Piedra	147	1,166	--
Ackmen	208	1,248	3281
Mancos	166	996	1401
McElmo	60	540	635
Mesa Verde	168	1,512	1808
TOTAL	749		

Note. From "The Archaeological survey of Wetherill Mesa" by A. C. Hayes (Archaeological Research Series No. 7A, U.S. Department of the Interior), Washington, D.D.: U.S. Government Printing Office, 1964.

listed 168 sites of this phase and estimated a total of 1,512 rooms had been contained in these sites. From this he stated:

> We know that not all the 1,512 rooms were used simultaneously. . . . An estimate of 1,000 rooms with concurrent use would probably be generous. 27% of the rooms are small cubbyholes thought to have been for storage. (Using this 27% to estimate the number of rooms of contemporary use) we are left with 730 rooms. . . . If we allow an average of 1 or 2 to a room, our figures run from 730 to 1,460. I feel that the lower figure would be a safer estimate, and even this figure represents a heavy population for an area of 10 sections of marginal land. (Hayes, 1964, p. 110).

First, it goes without saying that all of Hayes' estimated rooms were not occupied simultaneously, but the method in which he arrived at the figure of 1,000 rooms in concurrent use is open to question. It appears that he simply "pulled that figure out of a hat." Secondly, his statement that 27% of the rooms were for storage purposes is puzzling for such a low number of storage rooms when Rohn (1971) used the concept of "suites" of two dwelling rooms in conjunction with two or more storage rooms at Mug House, also part of the Wetherill Mesa survey. Lipe (1970) found 73 stroage rooms out of a total of 183 rooms, or 40%, at the same time period for the Red Rock Plateau area of Southwestern Utah. Finally, Plog's formula has accounted for 41% of the rooms as storage rooms. In addition, we are confronted with his estimation of 1 or 2 persons per room. This has no relationship to reality in any way, because he is not basing his figures on the recognition of a nuclear family using these rooms (Lipe, 1970; Plog, 1974; Rohn, 1971).

Hayes, in his estimating, laid stress on the lesser number persons for this time period, saying that only 730 persons occupied Wetherill Mesa, when at the same time just a few miles away on Chapin Mesa, which is the same ecologically, we have two different population estimates that are more than doubled that projected by Hayes. His calling Wetherill Mesa "marginal land" is also an error. It seems that he has forgotten that Mesa Verde was the most heavily occupied portion of the entire Northern San Juan drainage and was the last area abandoned when the people moved out of the entire region in the Thirteenth Century (Rohn, March, 1976, personal communication). This was not, in any way, marginal land by the standards of the prehistoric inhabitants.

The population estimates produced on the Chapin Mesa data shown in Table 5 concerning the Wetherill Mesa data show the need for much finer temporal control to produce reasonable projections and render these figures completely useless except possibly for the Mesa Verde Phase, where the number of estimated rooms is probably close to the actual number because of the better state of preservation of these later sites, many of which are cliff dwellings.

A reexamination of Hayes' figures for the Mesa Verde Phase shows a somewhat different picture of its population. Let us begin by using his estimate that 1,000 rooms were in simultaneous use. Hayes' estimate of the percentage of the storage rooms is far too low, so we will continue with the

percentage supplied by Plog (1974), 41%. Using this percentage gives us 590 dwelling rooms used by families. Since families used more than one room room for their household, we will use the information previously discussed and consider two rooms per family. Thus there are 295 families living at this time. Turner and Lofgren (1966) computed a household for this time period to be 5.199. This figure would give a population of 1,534 persons living during the Mesa Verde Phase, or more than double that felt by Hayes to be the actual number. This number corresponds quite well with the estimates of population on Chapin Mesa, which had somewhat fewer numbers of sites and rooms for this period.

Now that a comparison has been made between two major works dealing with specific areas of the Northern San Juan drainage, one of which the author feels was very well done, while the other is of the class which falls under subjective and speculative archaeology, let us turn to some of the implications of demographic analysis that have come out of the Southwest.

The introduction of agriculture into the Southwest, as stated earlier, was the significant force in the increase of population throughout the region. It can readily be assumed that population increase and the resulting stress on the ecology led to changes for these people. One indication of this is the noticeable drop in population in specific areas of Mesa Verde at the end of Pueblo II times. This drop is

observable in both Table 3, page 15, which concerns a small part of Chapin Mesa, and in Table 5, page 18, covering the entire Wetherill Mesa. This shift in population was not a localized problem on Mesa Verde alone. Plog (1974) observed the same phenomenon in Hay Hollow Valley in East-central Arizona.

Many persons have addressed themselves to this decrease in specific areas and have offered almost as many explanations. Rohn (1966), in discussing the population drop on Chapin Mesa, stated: "I favor the idea that some families moved away, because there is evidence that the total population on Chapin Mesa was increasing and that many Chapin Mesans were shifting their site locations at about this time" (p. 431).

Others such as Jennings and Gumerman spoke of relatively short movements of families as the population grew, and as Jennings put it "hived off" in search of new farm land which in many cases was in less desirable area (Gumerman, 1975, p. 105; Jennings, 1968, p. 274). Finally, Schoenwetter and Dittert (1968) expressed this opinion: "The evidence points to populations moving in response to environmental and cultural pressures upon the economic base of their culture, rather than some ideal of colonization or expansive movement" (p. 53).

It is quite possible that the increase of population was not only too much for the land to bear but also the

social organization at that period of time was not equipped to handle the larger numbers of people. This is similar to the idea expressed by Plog (1974) in that the major problem was in developing a new system of social organization to handle the larger number of persons. After this was accomplished, there was a rise in population within specific areas such as Mesa Verde.

Pointing out the drop in population at specified localities does not say that the population throughout the region decreased because of calamity but rather that the population spread over a larger area; and the population continued to increase through this period--which is basically true for the entire Southwest (McGregor, 1965, p. 278).

Later, during Pueblo III times, after these problems were overcome and with results stemming from improved water conservation techniques, we find areas being utilized probably to their maximum. We find Rohn projecting a population of 4,000 persons living on Mesa Verde proper, with an additional 20,000 persons living in the remainder of the Northern San Juan drainage (Rohn, 1976, personal communication).

Southward, in Chaco Canyon, we have projections of more than 3,300 people living within the canyon. These were probably the maximum numbers of people that the land could support, because we find areas such as the Red Rock Plateau region of Southeastern Utah occupied for the first time in over 500 years--which is believed to be directly attributed

to population pressure from the Kayenta district to the south (Lipe, 1967; Vivian & Mathews, 1969).

The idea that many of these areas such as the Mesa Verde were being utilized at their maximum carrying capacity has been explored by archaeologists such as Zubrow (1971), who developed the concept in Arizona. Cook (1972) pointed out the basic assumption of carrying capacity and its relationship to population at least implicitly: "The human aggregate will always multiply until it reaches the upper limit of size imposed by the carrying capacity of the environment" (p. 25). The carrying capacity of an area in conjunction with the population would also have to take into account the technological ability the people possessed. The Hopi of Arizona between 1890 and 1930 farmed about 3 to 4 acres of land per person, not counting infants (Martin & Plog, 1973, p. 205). Unfortunately, this type of ethnographic evidence has too many inherent dangers to allow it to be applied to the past.

We do know that when the Spanish arrived in the Southwest, the ancestors of prehistoric Puebloans were living in a much smaller area than they had occupied some 200 to 300 years earlier. The first census was carried out under the orders of Oñate in 1592 and counted a total of 60,000 occupants of some 110 Pueblos. Within 80 years the population had shrunk by 75% to only 16,000. In 1643 there were only 43 occupied Pueblos remaining. This was caused by several

factors, disease and force amalgamation by the Spanish being the primary reasons (Schlesier, March, 1976, personal communication).

This sudden change is reflected in Table 1, page 6, with the sudden increase of household size for historic times. This was probably due to the amalgamation of Pueblos plus the introduction of disease which caused family remnants to cluster together. Additionally, there was probably an increased solidarity of the people as they attempted to withstand the cultural onslaught of the Spanish.

After a brief discussion of the methods that have been developed in the past two decades to assist archaeologists in determining prehistoric population numbers, we turned to the primary purpose of this paper, which dealt with the hypothesis that many of the reports pertaining to prehistoric population counts were arrived at in a subjective and offhand manner. This was done by utilizing what was felt to be the best available methods for determining population counts. The two reports used for basic data varied in this respect more than had been originally suspected. The first report that was used to compare their estimate with that computed herein was surprisingly similar and even supplied indications that they came very close to reality. In addition, the estimates produced added a great deal of credence to Rohn's original estimates.

The second report examined is of the subjective type

that started the author's thinking concerning prehistoric population estimates. Even if the methods used were incorrect--which is not felt to be the case--it is believed that the subjective manner in which the population for Wetherill Mesa was arrived at has been demonstrated. Computations showed a population double that originally projected by Hayes.

In addition to the comparison between the two reports and the use of the outlined methods, we attempt to show some of the ways in which population figures have assisted in displaying some of the various changes that took place through time as the prehistoric inhabitants were confronted with the problems of overpopulation and the inadequacy of social organization because of this population growth. This brief discussion is in no way meant to be the final word on the subject of population growth in the Southwest, but merely to denote how paleodemographic studies can lead to a better understanding of many of the changes that did take place in the Southwest.

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