

ARCHAEOLOGY IN TUCSON

Vol. 4, No. 2

Newsletter of the Center for Desert Archaeology

Spring 1990

Thousand Year Old Census: Tucson in A.D. 990

Every decade the United States invests a tremendous effort to conduct and tally a national census. Census results determine Congressional representation, federal financial assistance levels, and they are the basis for a diversity of planning activities for governments and the private sector. The importance of an accurate census cannot be underestimated for a modern nation.

During the past decade, archaeologists in the Tucson area have been conducting project after project, pining a much better understanding of the local archaeology. This effort has yielded new information that enables us to venture an estimate of what a census would have looked like a thousand years ago.

Archaeology Week Report

The Center for Desert Archaeology began Archaeology Week with a visit to the sites of Cerro Prieto and Pan Quemado northwest of Tucson. *Archaeology in Tucson* members made the steep climb to the residential areas on Cerro Prieto, getting a feel for what prehistoric life on this volcanic hillslope might have been like. We then moved on to the impressive petroglyphs of Pan Quemado. Our thanks go out to Chris Downum and Henry Wallace, who served as our guides to these sites.



Shell bird pendant from surface of Valencia site.

At mid-week, the Center offered tours of the Valencia site, a large Hohokam village on Tucson's south side, to school groups. Carol Ellick and Bill Doelle guided over 200 fourth and fifth grade students around the surface of the site. Harris Abassi, a fourth grader from Blenman School, quickly showed his potential as a future archaeologist. He spotted the shell bird pendant that is illustrated here amidst the abundant broken sherds and discarded stone tools at the site.

For the archaeologist, many basic questions depend on having at least a general knowledge of the size of population represented at prehistoric sites. Population growth or decline are believed to have major social consequences. For example, a growing population brings with it a need to produce more food and craft products, to resolve more disputes between people, and perhaps to expand one's territory. Generally, evidence for such changes should be detectable in the archaeological record, but without reliable estimates of prehistoric population size it is difficult to explain why such changes occurred.

It is almost impossible to be unaware of the controversies that the 1990 national census has generated. Despite massive expenditures of time and money, the counts that are obtained are frequently faulted for being inaccurate. If a wealthy nation with nearly 200 years of experience at taking censuses cannot make a *direct* count of its populace that is judged complete and accurate, how do we dare attempt a census for the year 990 when we must rely entirely on *indirect* estimates? The key to archaeological population estimates is to carefully specify the methods used and the assumptions made and to recognize that it is not final answers that are being sought. Rather, we are looking for a credible estimate. Were there 500, 5,000, or 50,000 persons living here a thousand years ago?

An ideal tool for building an estimate of prehistoric population is to use a census that was taken by the first Europeans as a baseline. Some good observations on population size and distribution were made in the Tucson area, but unfortunately they date to the 1690s. This is nearly two centuries after the arrival of the Spaniards in the New World, and many major changes are believed to have taken place in the native population of the Tucson area. Still, the information is of value to us.

Captain Juan Matco Manje, Father Kino's military escort on several journeys that passed through Tucson, reported the populations of settlements along the Santa Cruz River. These figures were obtained by counting the number of native houses that were visible in each

village and multiplying that number by five. This indirect method of coming up with a population estimate very closely resembles the most common archaeological method of counting prehistoric rooms and multiplying by some constant estimate of persons per room.

Captain Manje's figures tally to slightly less than 1,700 persons. Unfortunately, we do not know whether there were villages in the eastern portion of the Tucson Basin that were never visited and therefore were not considered. However, the fact that Father Kino used information obtained from the Indians to plan his travel routes suggests that *major* villages probably were not omitted. We can come back to consider the implications of these numbers when we have developed our own estimates of the local population a millennium ago.

The method proposed here is to first estimate the population of a few of the villages that we know the most about. Second, we consider the sizes of other villages to help us assess whether our well-known sites can serve as a basis for estimating an average village size for the entire Tucson Basin. Once we feel comfortable with this average, we simply multiply the known number of villages by that figure.

Houses and Households

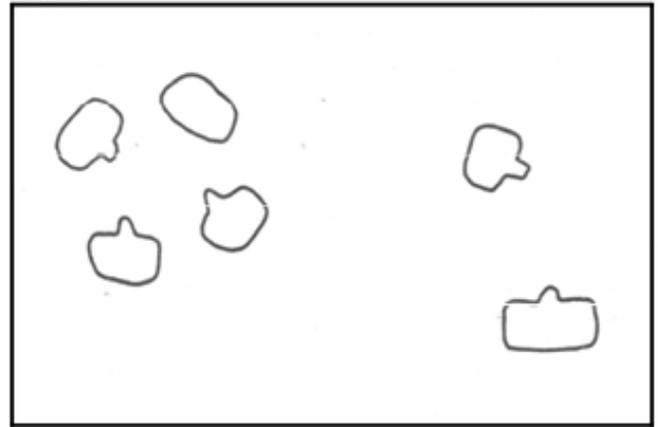
A thousand years ago the Hohokam of the Tucson area were living in pithouses. This presents the prehistoric demographer with two problems. First, it is impossible to get an accurate count of houses from the surface of a site. Second, even if we carry out enough excavation to get a good count of the houses, it is difficult to determine precisely which ones were lived in at the same time.

A consistent result from recent Hohokam excavations has been the discovery of large numbers of buried pithouses. Does this prove that prehistoric populations were very large? Not necessarily. It is important to know how long an individual pithouse may have been used by its prehistoric occupants. Furthermore, some pithouses may have been used solely for storage. These issues of the use-life and possible special functions for pithouses require further discussion.

In theory, a pithouse could have been repaired regularly, thereby lasting a long time – longer than 25 years, for example. But there are several reasons to believe that in practice a pithouse was used for a relatively short time. Most importantly, excavations have shown that many Hohokam pithouses in the Tucson area were burned intentionally by their occupants. Based on ethnographic information about O'odham (Pima and Papago) practices, it seems likely that this intentional burning was in part a response to the death of one of the household members. A family history from the Tohono O'odham village of Nolie,

where a similar practice was followed, showed that the family moved its house once every 15 years on average.

Termite damage to structural posts, insect infestation of the brush interior of the pithouse, and erosion of the mud exterior are all additional reasons that a pithouse might have been used a shorter, rather than a longer time. Furthermore, general observations of the rebuilding of pithouses based on excavations seem to correlate quite well with the Tohono O'odham example cited above of a 15 year average use-life for a pithouse. When we are dealing with averages, it is important to remember that some houses may have lasted only a short time, while other households may have invested the effort to keep a structure in use for longer periods.



Hohokam pithouses arranged around courtyards, representing households. Left, large household. Right, average household. West Branch site, excavated by Desert Archaeology.

Recent advances in our understanding of Hohokam village organization provide some useful concepts for estimating prehistoric population at a site based on archaeological evidence obtained from the site surface. Initially, Hohokam villages were believed to represent scattered single houses, loosely arrayed to form a village. There were occasional notes in the archaeological literature that suggested that pairs of houses might be related to one another, but in 1981 David Wilcox, now with the Museum of Northern Arizona, carefully re-examined the architectural information from the site of Snaketown on the Gila River. He noted consistent patterns in which two or more pithouses opened onto a common space. Subsequent work throughout the Hohokam area has shown this to be a widespread pattern, and these courtyard groups are generally believed to represent households.

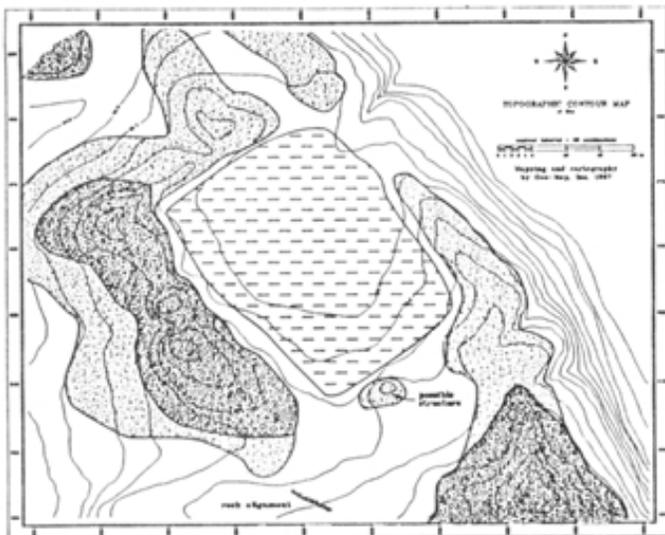
Village Segments and Villages

As more fieldwork has taken place, it has become apparent that several households often group together to form a slightly larger residential group. These groups are sometimes called *village segments*, for they

seem to represent the basic social units that combine to form a village.

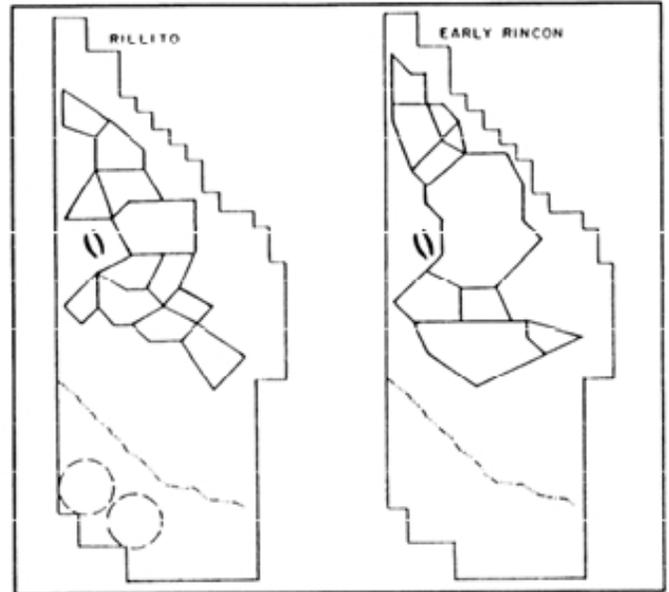
These groups have two very important characteristics that can help us to develop population estimates. First, they seem to have maintained their existence over several generations. Second, because of their larger size and longer duration, these groups are much easier to detect archaeologically than is a single house or even a household. It appears that for many sites, intensive surface study can form the basis for identifying the general distribution of such groups.

Surface studies by Desert Archaeology at two large villages with ballcourts illustrate this point. At the Romero Ruin in Catalina State Park, a detailed surface map was made of the site by AIT member Jim Holmlund, of Geo-Map, Inc. One area on the site displays particularly well the probable location of a village segment. The low, relatively flat area is believed to represent an area of pithouses, perhaps arranged around a central open-space or plaza. The large trash mounds that surround these houses represent the accumulation of trash discarded by the residents as well as the piling up of large numbers of cobbles that were encountered when digging pithouses and cooking facilities into the rocky soils of the Romero area.



Contour map of a portion of the Romero Ruin believed to represent a single village segment. Dark shaded areas are trash deposits, dashed lines indicate residential area.

At the Valencia site in the southern Tucson Basin, the mounds are not as large and obvious as is the case at Romero. However, the high density of trash on the site surface has made it possible to gain an even finer-scale resolution of the probable distribution of village segments at that site over several centuries. In this case the distribution of time-sensitive pottery types was mapped. Interestingly, pottery concentrations from different time periods were found at numerous points over the site's surface. When lines were drawn on



Possible village segments identified at the Valencia site from surface distribution of artifacts and features. Dashed circles are village segments identified by trenching.

maps between those concentrations, a network of nearly similar-sized polygons resulted. The diameters of these polygons range between 50 and 75 meters. This is comparable to the probable village segment noted at the Romero Ruin, and it is similar to results from excavations at other sites such as Tanque Verde Wash, Los Morteros, and many sites in the Phoenix area.

Estimating Village Population

The Valencia site pattern suggests that there may have been as many as fourteen village segments during the Rillito phase and nine for the Early Rincon subphase. If areas now under a road to the west of the mapped area are also considered these numbers rise to 15 and 12, respectively. The Romero Ruin also may have had as many as a dozen village segments during the Rillito phase. Now, if we can come up with an average size for a village segment, we can proceed with an estimation of population size for these sites.

At the south end of the Valencia site a systematic, low intensity backhoe trenching program was used to search for buried pithouses. Based on the 20 pithouses that were found, it was estimated that approximately 75 pithouses, representing two village segments, could be expected to be buried within the tested area. The pottery recovered from the tested pithouses and from the surface provides a means for predicting how many houses would date to a particular time period (see Table).

A simulation of the use and abandonment of these 75

Phase or Subphase	Approx. Date	No. of Houses
M. Rincon	1000-1100	11
E. Rincon	950-1000	11
Rillito	850-950	49
C. del Oro	775-850	

4

houses was developed. The simulation was guided by the assumption that the use life of a pithouse is roughly 15 years as was suggested earlier. The results showed that nine pithouses was the largest number of houses that would have been occupied at a single time. If there were an average of five persons per house, this would represent a maximum population of 45 persons. Because this is distributed over two village segments, the average population for a village segment can be estimated at 22.5 persons.

Another way to estimate village segment population is to consider a fully-excavated site. The Tanque Verde Wash site was excavated by Mark Elson of Desert Archaeology in 1984-85. This site was occupied for 75 years or less and is believed to represent a single village segment. Elson's reconstruction of the occupation pattern indicates that a maximum of 6 houses were in use at the same time. This suggests a population of 30 persons, a slightly higher estimate than was obtained for the Valencia site. Review of several other excavated sites suggests that 30 persons is a reasonable upper limit for village segment size, with 20 persons representing the lower size range.

We can now return to our goal of obtaining a population estimate for the Valencia site at AD. 990. The Early Rincon subphase ended around AD. 1000, so the Early Rincon village segment distribution can provide a basis for our estimate. Because the Early Rincon subphase represents a time span of roughly 50 years, and because this appears to have been a time of rapid change, it seems likely that no more than 10 of the 12 village segments identified at the site were occupied at a single time. Using the average village segment sizes just calculated yields a population estimate of 200 to 300 persons for the Valencia site at AD. 990. The Romero Ruin, also, may have had up to 10 village segments during Early Rincon times. If no more than 8 were occupied at once, the Romero population would have been about 160 to 240 persons. If we average the figures for these two sites, a village-level population range of 180 to 270 persons is obtained.

We must ask ourselves how representative the Valencia and Romero sites are in comparison to other large

villages in the Tucson Basin. A review of village size for the 20 large villages that were occupied during the Early Rincon subphase suggests that about one-third of these could be considered "very large" villages. Both the Valencia and Romero sites fall in this very large group. Thus using these numbers may result in population estimates that are somewhat too high. This actually may be desirable, because it seems likely that there were one or two large villages along the Santa Cruz River that have been destroyed by urban expansion.

Population of the Tucson Basin

The definition of the Tucson Basin used here is the area bounded by the mountains visible from atop "A" Mountain: the Tortolita, Catalina, Rincon, Santa Rita, Sierrita, and Tucson mountains. Multiplying the 20 Tucson Basin large villages by the population ranges just calculated yields an estimate of 3,600 to 5,400 persons. However, there are numerous small sites that have thus far been intentionally ignored. Many of these are believed to represent sites that were occupied only on a seasonal basis. One of the large villages was most likely the primary place of residence for the small-site inhabitants. Therefore, if the small sites were added to the population estimate, it is likely that a significant number of persons would be counted twice. It seems unlikely that more than 25 percent of the local residents are uncounted by our estimate that considers large villages only. Therefore, if we add 25 percent to our estimates, we come up with a probable range of 4,500 to 7,000 persons living in the Tucson Basin in AD. 990.

Discussion

If the reader is frustrated by the broad range of this population estimate, it is understandable. However, there are some very important implications of the preliminary and imprecise population figures that have been derived here. First, it appears that village size in the Tucson area probably did not exceed about 300 persons a millennium ago. Second, even if our assumptions have been too conservative, thereby underestimating population, it appears that total population figures are in the thousands, not the tens of thousands. What we have established then, is a comfortable estimate of the order of magnitude of Tucson's prehistoric population. This is actually a giant first step in a very difficult process.

There were major changes in population *distribution* that occurred in the century following AD. 990 that make it very difficult to determine if there were changes in population *magnitude*. However, it is the author's subjective impression that the local population size may have remained relatively constant between AD. 990 and 1300. It is possible that there was a slight decline in local population between AD. 1300 and 1400, but this

is difficult to assess without new information.

In closing, some interesting comparisons can now be made with the population figures for the 1690s that were discussed earlier. First, either end of the range of our population estimate indicates a *massive* population decline between prehistoric and early historic times. A critical research question is whether a substantial part of this decline occurred in prehistoric times or whether it is mostly due to the impact of new diseases introduced from the Old World.

Second, despite the much lower population size during the 1690s, at least some of the early historic villages were much larger than the villages of AD. 990. For example, San Xavier del Bac had a population of more than 800 living in a relatively compact area near the modern community of San Xavier. And south of the junction of the Rillito and Santa Cruz rivers, the relatively dispersed community of San Agustín had a population of about 750. It is likely that the prehistoric villages of the 1300s were also larger than those of AD. 990. Again, a very interesting topic for research is highlighted by these population figures. What motivated the large village sizes of the early historic period, and what were the social mechanisms that prevented them from being torn apart by internal disputes?

These are just a few of the research questions that come into sharper focus when we start to assign actual population estimates to prehistoric time periods. The importance of a larger setting for the Tucson Basin information also becomes apparent when we try to study prehistoric demography. This is one of the reasons that the Center's work has pushed out into the Avra Valley (Gunsight and Coyote Mountain surveys) to the west and to the San Pedro River on the east.

By William H. Doelle, Center for Desert Archaeology.

San Pedro Survey Update

Desert Archaeology's volunteer survey of the Lower San Pedro River that was introduced in the last newsletter has had a productive first season. Between February 3 and May 5, 87 person-days of volunteer survey were accomplished. We covered nearly 15 miles along the river, discovered over 50 new sites, and generally had a very good time. Details will follow in a later newsletter.

New Books

Two new Technical Reports from the Center for Desert Archaeology have been released recently. Both were authored by Mary Bernard-Shaw, and they report on the excavations at the Redtail and Lonetree sites near

the northern end of the Tucson Mountains. Each book is available for \$12. Another bargain that should be considered for purchase is the volume *Recent Research on Tucson Basin Prehistory: Proceedings of the Second Tucson Basin Conference*, edited by William H. Doelle and Paul R. Fish. Cost is only \$10. The following is a list of the major Technical Reports available from the Center for Desert Archaeology. Remember, *members receive a 10 percent discount.*

84-6 \$12.00. *Hohokam Settlement Patterns in the San Xavier Project Area.* William H. Doelle and Henry D. Wallace. 143 pages, 16 figures, spiral bound.

85-3 \$8.00. *The Southern Tucson Basin Survey: Intensive Survey along the Santa Cruz River.* William H. Doelle, Allen Dart, and Henry D. Wallace. 103 pages, 11 figures, spiral bound.

86-6 \$10.00. *The Valencia Site Testing Project: Mapping, Intensive Surface Collecting, and Limited Trenching of a Hohokam Ballcourt Village in the Southern Tucson Basin.* Mark D. Elson and William H. Doelle. 140 pages, 30 figures, spiral bound.

87-4 \$10.00. *Archaeological Survey in Catalina State Park with a Focus on the Romero Ruin.* Mark D. Elson and William H. Doelle. 142 pages, 31 figures, spiral bound.

87-6 \$10.00. *Archaeological Assessment of the Mission Road Extension: Testing at AZ BB:13:6 (ASM).* Mark D. Elson and William H. Doelle. 96 pages, 13 figures, spiral bound.

87-8 \$8.00. *Archaeological Investigations at Los Morteros, AZ AA:12:57 (ASM), Locus 1, in the Northern Tucson Basin.* Mary Bernard-Shaw. 103 pages, 21 figures, perfect bound.

87-9 \$8.00. *The Prehistory of Sun City Vistoso, Arizona.* Douglas B. Craig. 81 pages, 18 figures, spiral bound.

89-1 \$7.00. *The Gunsight Mountain Archaeological Survey: Archaeological sites in the Northern Sierrita Mountains near the junction of the Altar and Avra Valleys Southwest of Tucson.* Allen Dart. 135 pages, 20 figures, spiral bound.

89-5 \$10.00. *Archaeological Investigations of Petroglyph Sites in the Painted Rock Reservoir Area, Southwest Arizona.* Henry Wallace. 242 pages, 122 figures, perfect bound.

89-6 \$6.00. *Archaeological Testing at Honey Bee Village (AZ BB:9:88 ASM).* Douglas B. Craig. 76 pages, 20 figures, perfect bound.

89-8 \$12.00. *Archaeological Investigations at the Redtail Site, AA:12:149 (ASM), in the Northern Tucson Basin.* Mary Bernard-Shaw. 289 pages, 60 figures, perfect bound.

90-1 \$12.00. *Archaeological Investigations at the Lonetree Site, AA:12:120 (ASM), in the Northern Tucson Basin.* Mary Bernard-Shaw. 294 pages, 54 figures, perfect bound.

If you order by mail, please include \$1.75 for shipping the first! volume, \$0.75 for each additional volume.

Membership Application

Archaeology in Tucson Membership Application

Name _____

Address _____

City _____ State _____

Zipcode _____ Telephone _____

Annual Membership Dues Enclosed _____

Annual Membership Rates

Individual	\$10	Corporate Rates:	<u>MAIL TO:</u>
Family	\$15		
Supporting	\$25	Active	\$100
Contributing	\$50	Supporting	\$200
Sustaining	\$100	Sustaining	\$500
Patron	\$500		

Center for Desert Archaeology
245 South Plumer, Suite 14
Tucson, AZ 85719
602-622-6663

Inst. for. Amer. Research
Archaeology in Tucson 245
South Plumer #14 Tucson,
AZ 85719

The Center for Desert Archaeology

The Center for Desert Archaeology is a nonprofit, research and educational organization that specializes in the study of the archaeology and history of desert regions. Our Primary research focus has been southern Arizona.

Archaeology in Tucson is the membership program of the Center for Desert Archaeology. The *Archaeology in Tucson* Newsletter is published quarterly, and is one of the benefits that members receive. Lectures, site tours, discounts on publications, and participation in archaeological field projects are additional membership benefits. Memberships run for a full year from the time they are received.

Annual Membership Rates

Individual \$10, Family \$15,
Supporting \$25, Contributing \$50,
Sustaining \$100, Patron \$500.
(Formerly the Arizona Division of
the Institute for American Research)



Center for Desert Archaeology
300 E. University Blvd., Ste. 230
Tucson, AZ 85705