Prehistoric Irrigation in the Salt River Valley

By
Odd S. Halséth

Paper Presented at a Symposium on Prehistoric Agriculture Held at Flagstaff, Ariz., April 27 to 30, 1936

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The drainage areas of south-central Arizona may be said to contain remains of the only true irrigation culture of pre-Columbian North America. The highest development of this culture was reached during the late Hohokam period in the alluvial valleys of the Salt and Gila rivers.

In 1930 an aerial survey, made through the co-operation of the United States Army and the Smithsonian Institution, revealed nearly 125 miles of ancient canals in the Salt River Valley and about half that number in the Gila Valley. Many of the canals measure 30 feet, or more, from crown to crown, and reach depths of over ten feet. Some may be traced over ten miles from their intakes. (See Figs. 1 and 2).

It is apparent that such conditions mark a difference between Hohokam farming methods and those of the Pueblo people, who may be said to have been "dry-farmers" and whose only method of irrigation was one of convenient adaptation through the use of smaller ditches, or acequias. In the final analysis the Pueblo people depended upon local seasonal rains, as seen in both technology and ceremony, while the Hohokam tapped a ground supply insured by permanently flowing rivers.

In the Salt River Valley the total canal mileage consists of several independent units, each with its own intake which probably was constructed of rock and brush. Erosion of the river banks since the first Mormon farmers arrived in this valley some 65 years ago has widened the channel to over a mile in many places and destroyed original intakes and portions of canals running adjacent to the original banks, which, according to early observers, were steep and well protected with vegetation. The river seems to have been deep and narrow.


7. Based on oral information obtained from such early settlers as H. L. Hancock (Phoenix, 1874), F. Vogel (Tempe, 1877), C. Peterson (Mesa, 1878), S. C. Sorenson (Mesa, 1879), and W. A. McDonals (Mesa, 1879).
three years not only have failed to produce evidence to support the theory of Pueblo intrusion, but show indications of a purely local development as a result of conditions brought about by irrigation troubles.

The building is roughly 300 feet long by 150 feet wide. The outside walls are made of rocks laid in adobe mortar, varying in thickness from three to ten feet, consisting of two rock walls with fill between. The outside rock wall, in this case, shows a great deal of patch work, indicating threatened collapse of the wall at different periods of construction.

The depth of culture within the walls is over 30 feet and consists of some seven layers of fill, each with a plastered floor, but with no evidence of domestic occupation. The lowest fill is about eighteen inches thick, the next one three feet thick, and each succeeding fill shows a slight increase. The fill was carried in by the basket-full and
in places each load can be identified as a small heap of gravel, clay, or trashmound material, depending upon the source of the borrowing.

Between a floor and the next fill the roof material is sometimes found, while again the absence of wood material in a fill indicates it was salvaged for reuse. On one level, with over 90 postholes in a floor area of 30 feet by 40 feet, was found definite evidence that the roof structure of poles and brush was entirely independent of the masonry walls. These, instead of being bearing walls as in a Pueblo type of dwelling, seem to have served as retaining walls for a growing mass of dirt fill, and raised in height with each successive construction fill.

The building itself seems to have been a low one-story structure of a communal nature, perhaps a granary, and of post, brush, and adobe construction, with the masonry walls around it forming the limits of a base which periodically was increased in height. Around this structure stood a village of *jacal* structures, covering an estimated area of over fifty acres.

On the very top of the present mound, over the last fill, are found a few single unit structures of both adobe and *jacal* construction with not only evidence of domestic use, such as firepits, utensils, etc., but with inhumation in the adjacent adobe walls and under the floors of lean-tos on the contemporaneous talus level. These structures are like those of the village, and the material culture is the same. Having nothing to compare the skeletal remains with, it is futile to say that they are Hohokam except by inference. Numerically they are few compared to the number of cremations in this region, and at Pueblo Grande they represent almost entirely seniles and infants.

Irrigation conditions may account for both the architectural development of the big structure and for the conditions found with the domestic occupation of the abandoned top level. For the sake of illustration we may compare them with the present irrigation conditions, the only analogy to prehistoric times.

At the present time about 1,000,000 acre-feet of water are used for irrigation in the Salt River Valley. About one-fifth of this amount goes into the ground as seepage and builds up water table at the rate of from three to five feet each year. Without drainage facilities this would mean that the greater part of the valley, and all of the area comprising prehistoric farming, would be waterlogged and unfit for use in less than ten years. The volcanic pocket underlying the valley affords very poor natural drainage and the limits of this pocket

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8. Personal opinion of the author, verified by conversations with such irrigation experts as: T. A. Hayden, Phoenix; R. A. MacDonald, Phoenix; and Raymond Hill, Los Angeles.
are so well defined that nitrate, for example, can be picked up inside the limits and not a few feet further away.

From 1870 to 1920 about one-third of the area under irrigation was rendered unfit for farming, and since that time the whole project has been made possible only by the installation of artificial drainage facilities. At the present time nearly 300,000 acre-feet of water are pumped from the project each year. The ancients had no drainage facilities.

How long irrigation goes back is problematical. On the Gila River, a silt-carrying “flash” stream, irrigation may well have developed from the original farming of the lower flood plain of the river. Although the normal water table is high along both the Salt and the Gila, the latter offers no such obstacles as are found around Phoenix, and though both valleys were abandoned about the time marauding tribes made history in all southwestern farming communities, it is more than likely that irrigation was at least a contributing factor in the abandonment of the Salt River Valley.

That all of the canals and villages were used contemporaneously is unlikely. If this had been the case the valley could have been waterlogged in a couple of generations or so, a too short time to account for the amount of culture deposits within the valley. There are some indications that both canals and villages were built successively, and if there is an intra-valley chronology, it can and should be established before the whole picture can be made clear.

As to the idea of Pueblo occupation of the region during the Classic or late period, one theory is as good as another. Neither buildings nor inhumations show proof of Pueblo intrusions, although it is inconceivable that the Hohokam should not have been subjected to some influence by neighboring cultures, as found in the presence of polychrome pottery, for example. Other ideas may also have a Pueblo source, but it is just as simple, if not simpler, to account for the inhumations in this region by the fact that at the time of abandonment a small helpless group of individuals left behind sought the tops of the higher structures and other relatively dry areas and built there houses like those they had used in the villages, spent their last few days in a hopeless struggle, and changed their burial custom from sheer physical necessity.
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