

EXPLORATIONS IN STONE VILLAGES.

WORK OF DIRECTOR J. W. POWELL.

During the summer of 1885 the Director, accompanied by Mr. James Stevenson, revisited portions of Arizona and New Mexico in which many structures are found which have greatly interested travelers and anthropologists, and about which various theories have grown. The results of the investigation have been so much more distinct and comprehensive than any before obtained that they require to be reported with some detail.

On the plain to the west of the Little Colorado River and north of the San Francisco Mountain there are many scattered ruins, usually having one, two, or three rooms each, all of which are built of basaltic cinders and blocks. Through the plain a valley runs to the north, and then east to the Little Colorado.

Down the midst of the valley there is a wash, through which, in seasons of great rainfall, a stream courses. Along this stream there are extensive ruins built of sandstone and limestone. At one place a village site was discovered, in which several hundred people once found shelter. To the north of this and about twenty-five miles from the summit of San Francisco Peak there is a volcanic cone of cinder and basalt. This small cone had been used as the site of a village, a pueblo having been built around the crater. The materials of construction were derived from a great sandstone quarry near by, and the pit from which they were taken was many feet in depth and extended over two or three acres of ground. The cone rises on the west in a precipitous cliff from the valley of an intermittent creek. The pueblo was built on that side at the summit of the cliff, and extending on the north and south sides along the summit of steep slopes, was inclosed on the east, so that the plaza was entered by a covered way. The court, or plaza, was about one-third of an acre in area. The little pueblo contained perhaps sixty or seventy rooms. Southward of San Francisco Mountain many other ruins were found.

East of the San Francisco Peak, at a distance of about twelve miles, another cinder cone was found. Here the cinders are soft and friable, and the cone is a prettily shaped dome. On the southern slope there are excavations into the indurated and coherent cinder mass, constituting chambers, often ten or twelve feet in diameter and six to ten feet in height. The chambers are of irregular shape, and occasionally a larger central chamber forms a kind of vestibule to several smaller ones gathered about it. The smaller chambers are sometimes at the same altitude as the central or principal one, and sometimes at a lower altitude. About one hundred and fifty of these chambers have been excavated. Most of them are now partly filled by the caving in of the walls and ceilings, but some of them are yet in a good state of preservation. In these chambers, and about them on the summit and sides of the cinder cone, many stone implements were found, especially metates. Some bone implements also were discovered. At the very summit of the little cone there is a plaza, inclosed by a rude wall made

of volcanic cinders, the floor of which was carefully leveled. The plaza is about forty-five by seventy-five feet in area. Here the people lived in underground houses—chambers hewn from the friable volcanic cinders. Before them, to the south, west, and north, stretched beautiful valleys, beyond which volcanic cones are seen rising amid pine forests. The people probably cultivated patches of ground in the low valleys.

About eighteen miles still farther to the east of San Francisco Mountain another ruined village was discovered, built about the crater of a volcanic cone. This volcanic peak is of much greater magnitude. The crater opens to the eastward. On the south many stone dwellings have been built of the basaltic and cinder-like rocks. Between the ridge on the south and another on the northwest there is a low saddle in which other buildings have been erected, and in which a great plaza was found, much like the one previously described. But the most interesting part of this village was on the cliff which rose on the northwest side of the crater. In this cliff are many natural caves, and the caves themselves were utilized as dwellings by inclosing them in front with walls made of volcanic rocks and cinders. These cliff dwellings are placed tier above tier, in a very irregular way. In many cases natural caves were thus utilized; in other cases cavate chambers were made; that is, chambers have been excavated in the friable cinders. On the very summit of the ridge stone buildings were erected, so that this village was in part a cliff village, in part cavate, and in part the ordinary stone pueblo. The valley below, especially to the southward, was probably occupied by their gardens. In the chambers among the overhanging cliffs a great many interesting relics were found, of stone, bone, and wood, and many potsherds.

About eight miles southeast of Flagstaff, a little town on the southern slope of San Francisco Mountain, Oak Creek enters a canyon, which runs to the eastward and then southward for a distance of about ten miles. The gorge is a precipitous box canyon for the greater part of this distance. It is cut through carboniferous rocks—sandstones and limestones—which are here nearly horizontal. The softer sandstones rapidly disinte-

grate, and the harder sandstones and limestones remain. Thus broad shelves are formed on the sides of the cliffs, and these shelves, or the deep recesses between them, were utilized, so that here is a village of cliff dwellings. There are several hundred rooms altogether. The rooms are of sandstone, pretty carefully worked and laid in mortar, and the interior of the rooms was plastered. The opening for the chimney was usually by the side of the entrance, and the ceilings of the rooms are still blackened with soot and smoke. Around this village, on the terrace of the canyon, great numbers of potsherds, stone implements, and implements of bone, horn, and wood were found; and here, as in all of the other ruins mentioned, corn-cobs in great abundance were discovered.

In addition to the four principal ruins thus described many others are found, most of them being of the ordinary pueblo type. From the evidence presented it would seem that they had all been occupied at a comparatively late date. They were certainly not abandoned more than three or four centuries ago.

Later in the season the Director visited the Supai Indians of Cataract Canyon, and was informed by them that their present home had been taken up not many generations ago, and that their ancestors occupied the ruins which have been described; and they gave such a circumstantial account of the occupation and of their expulsion by the Spaniards, that no doubt can be entertained of the truth of their traditions in this respect. The Indians of Cataract Canyon doubtless lived on the north, east, and south of San Francisco Mountain at the time this country was discovered by the Spaniards, and they subsequently left their cliff and cavate dwellings and moved into Cataract Canyon, where they now live. It is thus seen that these cliff and cavate dwellings are not of an ancient prehistoric time, but that they were occupied by a people still existing, who also built pueblos of the common type.

Later in the season the party visited the cavate ruins near Santa Clara, previously explored by Mr. Stevenson. Here, on the western side of the Rio Grande del Norte, was found a system of volcanic peaks, constituting what is known as the

Valley Range. To the east of these peaks, stretching far beyond the present channel of the Rio Grande, there was once a great Tertiary lake, which was gradually filled with the sands washed into it on every hand and by the ashes blown out of the adjacent volcanoes. This great lake formation is in some places a thousand feet in thickness. When the lake was filled the Rio Grande cut its channel through the midst to a depth of many hundreds of feet. The volcanic mountains to the westward send to the Rio Grande a number of minor streams, which in a general way are parallel with one another. The Rio Grande itself, and all of these lateral streams, have cut deep gorges and canyons, so that there are long, irregular table-lands, or mesas, extending from the Rio Grande back to the Valley Mountains, each mesa being severed from the adjacent one by a canyon or canyon valley; and each of these long mesas rises with a precipitous cliff from the valley below. The cliffs themselves are built of volcanic sands and ashes, and many of the strata are exceedingly light and friable. The specific gravity of some of these rocks is so low that they will float on water. Into the faces of these cliffs, in the friable and easily worked rock, many chambers have been excavated; for mile after mile the cliffs are studded with them, so that altogether there are many thousands. Sometimes a chamber or series of chambers is entered from a terrace, but usually they were excavated many feet above any landing or terrace below, so that they could be reached only by ladders. In other places artificial terraces were built by constructing retaining walls and filling the interior next to the cliff with loose rock and sand. Very often steps were cut into the face of a cliff and a rude stairway formed by which chambers could be reached. The chambers were very irregularly arranged and very irregular in size and structure. In many cases there is a central chamber, which seems to have been a general living room for the people, back of which two, three, or more chambers somewhat smaller are found. The chambers occupied by one family are sometimes connected with those occupied by another family, so that two or three or four sets of chambers have interior communication. Usually, however, the communication from one system of

chambers to another was by the outside. Many of the chambers had evidently been occupied as dwellings. They still contained fireplaces and evidences of fire; there were little caverns or shelves in which various vessels were placed, and many evidences of the handicraft of the people were left in stone, bone, horn, and wood, and in the chambers and about the sides of the cliffs potsherds are abundant. On more careful survey it was found that many chambers had been used as stables for asses, goats, and sheep. Sometimes they had been filled a few inches, or even two or three feet, with the excrement of these animals. Ears of corn and corncobs were also found in many places. Some of the chambers were evidently constructed to be used as storehouses or caches for grain. Altogether it is very evident that the cliff houses have been used in comparatively modern times; at any rate since the people owned asses, goats, and sheep. The rock is of such a friable nature that it will not stand atmospheric degradation very long, and there is abundant evidence of this character testifying to the recent occupancy of these cavate dwellings.

Above the cliffs, on the mesas, which have already been described, evidences of more ancient ruins were found. These were pueblos built of cut stone rudely dressed. Every mesa had at least one ancient pueblo upon it, evidently far more ancient than the cavate dwellings found in the face of the cliffs. It is, then, very plain that the cavate dwellings are not of great age; that they have been occupied since the advent of the white man, and that on the summit of the cliffs there are ruins of more ancient pueblos.

Now, the pottery of Santa Clara had been previously studied by Mr. Stevenson, who made a large collection there two or three years ago, and it was at once noticed that the potsherds of these cliff dwellings are, both in shape and material, like those now made by the Santa Clara Indians. The peculiar pottery of Santa Clara is readily distinguished, as may be seen by examining the collection now in the National Museum. While encamped in the valley below, the party met a Santa Clara Indian and engaged him in conversation. From him the history of the cliff dwellings was soon obtained. His statement was that originally his people lived in six pueblos, built of cut stone,

upon the summit of the mesas; that there came a time when they were at war with the Apaches and Navajos, when they abandoned their stone pueblos above and for greater protection excavated the chambers in the cliffs below; that when this war ended part of them returned to the pueblos above, which were rebuilt; that there afterward came another war, with the Comanche Indians, and they once more resorted to cliff dwellings. At the close of this war they built a pueblo in the valley of the Rio Grande, but at the time of the invasion of the Spaniards their people refused to be baptized, and a Spanish army was sent against them, when they abandoned the valley below and once more inhabited the cliff dwellings above. Here they lived many years, until at last a wise and good priest brought them peace, and persuaded them to build the pueblo which they now occupy—the village of Santa Clara. The ruin of the pueblo which they occupied previous to the invasion of the Spaniards is still to be seen about a mile distant from the present pueblo.

The history thus briefly given was repeated by the governor and by other persons, all substantially to the same effect. It is therefore evident that the cavate dwellings of the Santa Clara region belong to a people still extant; that they are not of great antiquity, and do not give evidence of a prehistoric and now extinct race.

Plans and measurements were made of some of the villages with sufficient accuracy to prepare models. Photographic views and sketches were also procured with which to illustrate a detailed report of the subject to be published by the Bureau.

WORK OF MR. JAMES STEVENSON.

After the investigations made in company with the Director, as mentioned above, Mr. Stevenson proceeded with a party to the ancient province of Tusayan, in Arizona, to study the characteristics of the Moki tribes, its inhabitants, and to make collections of such implements and utensils as illustrate their arts and industries. Several months were spent among the villages, resulting in a large collection of rare objects, all of which were selected with special reference to their anthro-

pologic importance. This collection contains many articles novel in character and with uses differing from any heretofore obtained, and forms an important addition to the collections in the National Museum.

A study of their religious ceremonials and mythology was made, of which full notes were taken. Sketches were made of their masks and other objects which could not be obtained for the collection.

Mrs. Stevenson was also enabled to obtain a minute description of the celebrated dance, or medicine ceremony, of the Navajos, called the Yéibit-cai. She made complete sketches of the sand altars, masks, and other objects employed in this ceremonial.

WORK OF MESSRS. VICTOR MINDELEFF AND COSMOS MINDELEFF.

Mr. Victor Mindeleff, who had been engaged for several years in investigating the architecture of the pueblos and the ruins of the southwest, was at the beginning of the fiscal year at work among the Moki towns in Arizona, in charge of a party. Mr. Cosmos Mindeleff left Washington on July 6 for the same locality. He was placed in charge of the surveying necessary in the Stone Village region, and the result of his work is included in the general report of that division.

Visits were paid to the Moki villages in succession, obtaining drawings of some constructional details, and also traditions bearing on the ruins in that vicinity. The main camp was established near Mashongnavi, one of the Moki villages. A large ruined pueblo, formerly occupied by the Mashongnavi, was here surveyed. No standing walls are found at the present time, and many portions of the plan are entirely obliterated. Typical fragments of pottery were collected.

Following this work, four other ruined pueblos were surveyed, and such portions of them as clearly indicated dividing walls were drawn on the ground plans.

Many of the ruins in this vicinity, according to the traditions of the Mokis, have been occupied in comparatively recent times—a number of them having been abandoned since the Spanish conquest of the country. In several cases the villages

now occupied are not upon the same sites as those first visited by the Spaniards, although retaining the same names.

While the work of surveying was in progress, in charge of Mr. Cosmos Mindeleff, Mr. Victor Mindeleff made a visit of several days at Keam Canyon, there to meet a number of the Navajo Indians to explain the purpose of the work and allay the suspicions of these Indians, a necessary precaution, as some of the proposed work was laid out in Canyon de Chelly, in the heart of their reservation. Recent restrictions to which they had been subjected, as a consequence of new surveys of the reservation line, had made them especially distrustful of parties equipped with instruments for surveying. Incidental to explanations of the purpose of the work, an opportunity was afforded of obtaining a number of mythologic notes, and also interesting data regarding the construction of their "hogans," with the rules prescribing the arrangement of each part of the frame and other particulars. A number of ceremonial songs are sung at the building of these houses, but of these only one could be secured, which was obtained in the original and translated. Whenever opportunity occurred, during the progress of the work, photographs and diagrams of construction of "hogans" were procured.

On August 17 the ceremony of the snake-dance took place at Mashongnavi, similar in every detail to that performed at Walpi, and differing only in the number of participants. Several instantaneous negatives of the various phases of the dance were secured. On the following day the same ceremony was performed on a larger scale at Walpi, the easternmost of the Moki villages.

Mr. Cosmos Mindeleff assisted in collecting from the present inhabitants of the region legendary information bearing upon ruins and in observing the snake-dances, a description of which was prepared for publication.

While the surveys of the ruins were in progress many detailed studies were made of special features in the modern villages, particularly among the "kivas" or religious chambers. In several instances the large roofing timbers of the "kiva" were found to be the old beams from the Spanish churches,

hewn square, and decorated with the characteristic rude carving of the old Spanish work. A number of legends connected with the ruined pueblos were recorded.

On closing this work in the vicinity of the Moki villages, late in August, the party moved into Keam Canyon, en route for Canyon de Chelly. A day was devoted to the survey of a small pueblo of irregular elliptical outline, situated about eighteen miles northeast from Keam Canyon. This ruin is in excellent state of preservation and exhibits in the masonry some stones of remarkably large size. The early part of September was employed in making a close survey of the Mummy Cave group of ruins in Canyon de la Muerte, this work including a five-foot contour map of the ground and the rocky ledge over which the houses were distributed. Detailed drawings of a number of special features were made here, particularly in connection with the circular ceremonial chambers. The latter were so buried under the accumulated débris of fallen walls that much excavation was required to lay bare the details of internal arrangement. A high class of workmanship is here exhibited, both in the execution of the constructional features and in the interior decoration of these chambers. Later the White House group, in the Canyon de Chelly, comprising a village and cliff houses, was examined and platted in the same manner.

The drawings and plans were supplemented with a series of photographs. Some negatives of Navajo houses were also made.

On closing this work the party went into Fort Defiance, en route for Zuñi, and thence to Ojo Caliente, a modern farming pueblo of the Zuñi, about twelve miles south of the principal village. Here two ruins of villages, thought to belong to the ancient Cibola group, were platted. One of these villages had been provided with a circular reservoir of large size, partially walled in with masonry. Here, also, the well preserved walls of a stone church can be seen. The other contains the remains of a large church, built of adobe. A series of widely scattered house-clusters, occurring two miles west of Ojo Caliente, was also examined, but the earth had drifted over the fallen walls

and so covered them that the arrangement of rooms could scarcely be traced at all.

The modern village of Ojo Caliente was also surveyed and diagrams and photographs made.

Towards the end of September camp was moved to the vicinity of Zuñi. Here four other villages of the Cibola group and the old villages on the mesa of Ta-ai-ya-lo-ne were examined. Camp was then moved to Nutria, a farming pueblo of Zuñi. From this camp Nutria was surveyed and photographed, and also the village of Pescado, which is occupied only during the farming season. Both of these modern farming pueblos appear to be built on the ruins of more ancient villages, the remains of which were especially noticeable in the case of Pescado, where the very carefully executed masonry, characteristic of the ancient methods of construction, could be seen outcropping at many points.

WORK OF MR. E. W. NELSON.

Following the return of the main party to Washington, some preliminary exploration was carried on by Mr. E. W. Nelson, who made an examination of the headwaters of the South Fork of Salt River, but did not find any ruins. Thence the Blue Ridge was crossed, and the valley of the Blue Fork of the San Francisco River visited. Here ruins were frequently increasing in number toward the south. Farther south three sets of cliff ruins were also located.