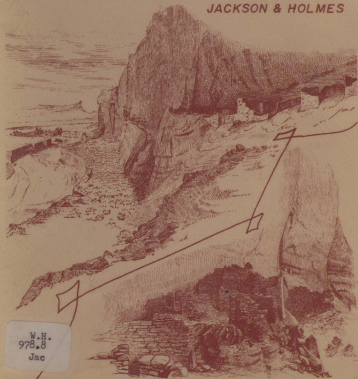


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HAYDEN SURVEY
1874-1876

MESA VERDE
and the
Four Corners

JACKSON & HOLMES



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Jackson, William
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MESA VERDE and the Four Corners

By
William H. Jackson
William M. Holmes

with a new Publishers Preface and Introduction

BEAR CREEK PUBLISHING CO.
514 MAIN STREET
OURAY, COLORADO
81427

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The centerfold map appearing in this booklet, has been reproduced, in part, from Plate LXXIV of the Tenth Annual Report and was included with the Jackson reports.

The cover sketch has been modified from William H. Jackson's sketch of De Chelly Cave-Town which he discovered during 1875 in northeastern Arizona.

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ERRATA
Title page - 5th line should
read, "William H. Holmes "

Page 381 - line 5 and 7
should read, "..... William H. Holmes "

PUBLISHER'S PREFACE AND INTRODUCTION

Between the years 1867 and 1879 four United States geographical and geological survey teams, the King, Wheeler, Powell and Hayden parties, later known as "the Great Surveys," tromped over the vast deserts and mountains of the lands west of the 100th meridian to discover "what was there" and report it. Their purpose was to explore and map the west. They surveyed the mountains, rivers, and deserts, mapped and interpreted the geology, classified the rock types, minerals, ores, plant and animal life including insects and fossils. Each winter the men returned to Washington to write and complete their reports for publication.

Stories from the West made good newspaper copy during this time and many periodicals assigned journalists to one party or another to report their progress. One party, under the leadership of Ferdinand Vandiveer Hayden, medical doctor turned geologist, received the best publicity and became the most widely known of all the survey parties, due in part to the skill of its photographer, William H. Jackson, who captured the rugged beauty and wonders of the region now included in the present day Yellowstone-Teton area of Wyoming and the Colorado Territory. The Photographs of Jackson and the articles written by the reporters assigned to the Hayden Survey Party, made Hayden world-famous.

During the summer months the Hayden party normally fielded from six to eight divisions numbering eight to twelve men each. There were usually three or four divisions, each of which included a geologist working with a topographer, two packers and a cook. Those accompanying the division at any one time included a naturalist, journalist or a guest. The Hayden party also had a survey division for primary triangulation, a supervisory division, a quartermaster division that supplied the others with food and provisions, and, of course, Jackson's photographic group that roamed between the other divisions looking for good picture material.

In the fall of 1874 Jackson and his photographic division were returning to the Silverton area located in the San Juan Mining region of southwestern Colorado (see map centerfold section) when he learned of the discovery of ancient cliff dwellings in the

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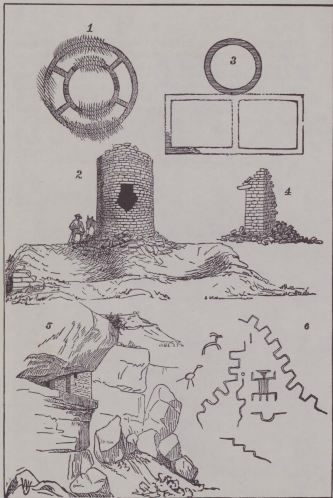
lower Mancos River area, a few miles south of Parrott, an early mining camp in the La Plata Mountains. Having no assignment at the time, Jackson and his 5-man photographic division, which included journalist, Ernest Ingersoll, whom Hayden had recently hired as a shell collector, headed for Parrott in early September. Rumors had persisted for years that Aztec ruins and ancient cities lay hidden in southwestern Colorado. Jackson intended to investigate the rumors and, if possible, bring back photographic evidence of their existence. With the founder of Parrott, "Captain" John Moss, as guide, they journeyed down the Mancos River and discovered their first cliff house about 16 miles below Merritt's Ranch. They continued on, discovering cave dwellings, cliff houses and towers until, near the mouth of the Mancos, they swung north to the Ute Peak area—south of present day Cortez. From here their exploration took them into McElmo Canyon and Hovenweep Canyon in Utah, where the party turned eastward and returned to the Silverton area. Their 350 mile journey had taken two weeks; they had encircled the prominent plateau named Mesa Verde (time did not allow for the exploration of the canyons tributary to the Mancos River) and W. H. Jackson had taken 40 negatives of the ruins discovered along the way. Ingersoll published his article in November and the Hayden Survey Party had made another Great Discovery.

Jackson continued his investigation of the ancient ruins in the Four Corners area in 1875, and in 1877, the year of his last expedition, he photographed many of the ruins in northern New Mexico. During 1875 and 1876 William Holmes, who was an excellent geologist, artist and topographer, was also assigned to making examinations of the ruins found to be within the area covered by the survey division's triangulation network.

The discovery of the ancient Indian ruins of southwestern Colorado was the last Great Discovery of the Hayden Survey. The fact that the parties missed the great apartment dwellings that lay hidden deep within the canyons of the Mesa Verde and the major ruins in McElmo Canyon, in no way diminishes their accomplishments, as their photographs, sketches, descriptions and artifact collections gave the world the first accurate knowledge of the ancient cities of southwestern Colorado.

Photographer W. H. Jackson's investigations, descriptions and sketches were included in Hayden's Eighth Annual Report, being a Report of Progress for the year 1874, to the Secretary of the Interior. His report included on the following pages has been reproduced in its entirety. As a sidelight, Ernest Ingersoll, the journalist-turned-zoologist who was now wearing "two hats" since becoming a permanent member of the Hayden Party, also had a section devoted to his zoological investigations.

REPORT OF W. H. JACKSON.



ANCIENT RUINS IN SOUTHWESTERN COLORADO.

By W. H. JACKSON.

In the extreme southwestern corner of Colorado Territory, west of the one hundred and eighth degree of longitude, are groups of old ruined houses and towns, displaying a civilization and intelligence far beyond that of any of the present inhabitants of this or adjacent Territory.

We will endeavor, in the few pages following, to describe these with as much minuteness and circumspection as a very hasty trip enabled us to observe; depending more upon the pictorial illustrations accompanying this article for clear exposition of the subject than upon any choice of words.

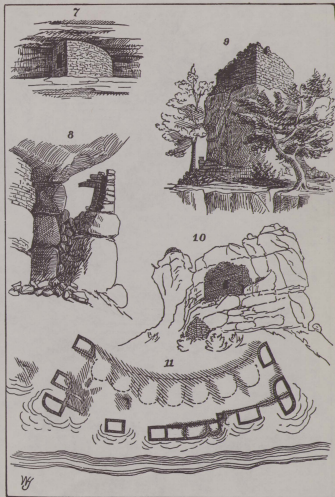
Although ruins in considerable number and importance were said to exist along the Rio Las Animas and San Juan, we did not think it best to spare any of the little time at our disposal for their investigation. Our object being to find those in which the picturesque predominated and were the least known, we directed our course to the westward, having obtained reliable information of the existence of some which would come up to our anticipations. The Rio Mancos, one of the western tributaries of the San Juan, rises in two principal forks among the western foothills of the Sierra La Plata, flows southwesterly through fertile and beautiful valleys to a great table-land, known as the "Mesa Verde," and entering, flows directly south through it to the valley of the San Juan, and then turning west again joins that stream near the crossing of the boundary-lines of the four Territories.

Commencing our observations in the park-like valley of the Mancos between the mesa and the mountains, we find that the low benches which border the stream upon either side bear faint vestiges of having, at some far-away time, been covered with dwellings, grouped in communities apparently, but now so indistinct as to present to the eye little more than unintelligible mounds. By a little careful investigation, however, the foundations of great square blocks, of single buildings, and of circular inclosures, can be made out; the latter generally with a depressed center, showing an excavation for some purpose. The greater portion of these mounds are now overgrown with artemisia, piñon-pine, and cedar, concealing them almost entirely from casual observation. We found the surest indication of their proximity in the great quantity of broken pottery, which covered the ground in their neighborhood, the same curiously indented, painted, and glazed ware found throughout New Mexico and Arizona. It was all broken into very small pieces, none that we could find being larger than a silver dollar. We had no opportunity to make any excavations about these old mounds; but such little scratching around as we could do developed nothing new below the surface, all the pottery which covers the ground having been broken and scattered since the demolition of the homes of the makers. Nowhere among these open-plains habitations could we discover any vestiges of stone-work, either in building material or implements. It is

very evident that the houses were all of adobe, the mound-like character of the remains justifying that belief.

The "Mesa Verde" extends north and south about twenty, and east and west about forty miles. It is of a grayish-yellow Cretaceous sandstone, with a very nearly horizontal bedding, so that the escarpment is about equal upon all sides, ranging from 600 to 1,000 feet in height. The capping or upper strata are generally firmly and solidly bedded, retaining a perpendicular face of about 200 feet, with a succession of benches below, connected by the steep slopes of the talus. Side-cañons penetrate the mesa, and ramify it in every direction, always presenting a perpendicular face, so that it is only at very rare intervals that the top can be reached; but, once up there, we find excellent grazing, and thick groves of cedar and piñon-pine. From the bottom of the cañon up, the slopes of the escarpment are thickly covered with groves of cedar and piñon, guarded and dwarfed, but sucking up a vigorous livelihood from the cracks and crevices of the barren declivities. Below, the cottonwood and willow grow luxuriantly beside the streams, while dense growths of a reedy grass tower above our heads as we ride through it. Throughout its entire length, the cañon preserves an average width of about 200 yards, sometimes much wider and again narrower. The stream, meandering from side to side, frequently interrupted by beaver-dams, cuts a deep channel in the friable earth which characterizes all the valley-lands of this region, while the banks upon either one side or the other are perpendicular, so that it is an extremely troublesome matter to cross. Added to the difficulties of getting in and out of the stream is a thick-matted jungle of undergrowth, tall, reedy grass, willows, and thorny bushes, all interlaced and entwined by tough and wiry grape-vines bordering its banks upon either one side or the other. The current is sluggish, and the water tinged with a milky translucency, gathered from the soil.

Entering the cañon at its upper end, we strike into the old Indian trail which comes over from the head of the Rio Dolores, and, passing down this cañon a short distance, turns off to the left and goes over to the La Plata. About a hundred Indians had just passed over it with their horses and goats, so that it was in most excellent traveling order, although winding in and out, and over and among great blocks of sandstone and other *débris* from above; the encroaching stream, too, frequently forcing the narrow pathway high up on the slopes of the projecting spurs, the treacherous character of the banks of the stream forbidding the crossing and recrossing usual in such cases. Groped along in clusters, and singly, were indications of former habitations, very nearly obliterated, and consisting mostly, in the first four or five miles, of the same mound-like forms noticed above, and accompanied always by the scattered, broken pottery. Among them we found one building of squared and carefully-laid sandstone; one face only exposed, of three or four courses, above the mass of *débris*, which covered everything. This building lay within a few yards of the banks of the stream; was apparently about 10 feet by 8, the usual size, as near as we could determine, of nearly all the separate rooms or houses in the larger blocks, none larger, and many not more than 5 feet square. The stones exposed are each about 7 by 12 inches square and 4 inches thick, those in their original position retaining correct angles, but, when thrown down, worn away, and rounded by attrition to shapeless boulders. Being so exposed to the elements, the cementing material which bound the masonry together is entirely worn away upon the surface; but, upon pulling away a few courses, it was found binding the rocks together quite



12



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firmly. It was not, however, anything more than an adobe or clay-cement.

As we progressed down the cañon, the same general characteristics held good; the great majority of the ruins consisting of heaps of *débris*, a central mass considerably higher and more massive than the surrounding lines of subdivided squares. Small buildings, not more than 8 feet square, were often found standing alone apparently; no trace of any other being detected in their immediate neighborhood.

We now commenced to note another peculiar feature. Upon our right, the long slopes of protruding strata and *débris* formed promontories, extending out into the cañon. Upon these, and not more than 50 feet above the stream, we found frequent indications of their having been occupied by some sort of works, the foundations of which in every case were circular, with a deep depression in the center, and generally occurring in pairs, two side by side, ranging from 10 to 20 feet in diameter. There was no masonry of any kind visible, but thickly strewn all about any quantity of broken pottery. Above, were indications of habitations in the face of the cliff, but not marked enough to warrant further search.

At those places where the trail ran high up, near the more precipitous portion of the bluff, we found remnants of stone walls, inclosing spaces of from 5 to 12 feet in length, in the cave-like crevices running along the seams. They were pretty well demolished, the stones undressed and imbedded in mud mortar. In many places, little niches or crevices in rock had been walled up into cupboard-like inclosures of about the size of a bushel-basket. We searched them eagerly, but they had all been despoiled before us. Nothing of any greater importance was found up to the time we made camp at night-fall. All that we had seen during the day was of exceeding interest, but came far short of our expectations.

Our camp for the night was among the stunted piñons and cedars immediately at the foot of the escarpment of the *mesa*; its steep slopes and perpendicular faces rising nearly 1,000 feet above us. Quantities of broken pottery were strewn across the trail, to the edge of the stream, and as ruins of some sort generally followed, close attention was paid to the surroundings; but, with the exception of a small square inclosure of rough slabs of stone, set in the earth edwise, and indicating, possibly, a grave, nothing was found to reward our search. Just as the sun was sinking behind the western walls of the cañon, one of the party descried far up the cliff what appeared to be a house, with a square wall, and apertures indicating two stories, but so far up that only the very sharpest eyes could define anything satisfactorily. We had no field-glass with the party, and to this fact is probably due the reason we had not seen others during the day in this same line; for there is no doubt that ruins exist throughout the entire length of the cañon, far above and out of the way of ordinary observation. Cedar and pines also grow thickly along the ledges upon which they are built, hiding completely anything behind them. All that we did find were built of the same materials as the cliffs themselves, with but few, and then only the smallest apertures toward the cañon; the surface being dressed very smooth, and showing no lines of masonry, it was only upon the very closest inspection that the house could be separated from the cliff.

The discovery of this one, so far above anything heretofore seen, inspired us immediately with the ambition to scale the height and explore it, although night was drawing on fast, and darkness would probably overtake us among the precipices, with a chance of being detained there all night. All hands started up, but only two persevered

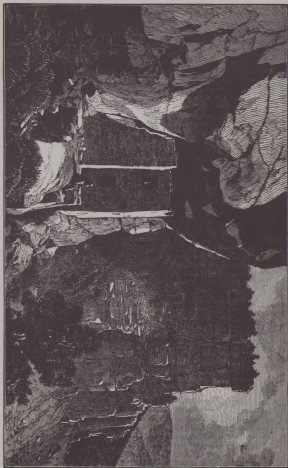
to the end. The first 500 feet of ascent were over a long, steep slope of *débris*, overgrown with cedar; then came alternate perpendiculars and slopes. Immediately below the house was a nearly perpendicular ascent of 100 feet, that puzzled us for a while, and which we were only able to surmount by finding cracks and crevices into which fingers and toes could be inserted. From the little ledges occasionally found, and by stepping upon each other's shoulders, and grasping tufts of yucca, one would draw himself up to another shelf, and then, by letting down a stick of cedar, or a hand, would assist the other. Soon we reached a slope, smooth and steep, in which there had been cut a series of steps, now weathered away into a series of undulating hummocks, by which it was easy to ascend, and without them, almost an impossibility. Another short, steep slope, and we were under the ledge upon which was our house, (Fig. 12, Plate III.) It was getting quite dark, so we delayed no longer than to assure ourselves that it was all we hoped for, and to prospect a way up when we should return the next morning with the photographic outfit.

Bright and early, as soon as breakfast was dispatched, we commenced the ascent. Mexico, our little pack-mule, with the apparatus upon her back, by sharp tacks and lively scrambling over the rocks, was able to reach the foot of the precipice of which I have spoken above. Up this we hauled the boxes containing the camera and chemicals by the long ropes taken from the pack-saddle. One man was shoved up ahead, over the worst place, with the rope, and tying it to a tree, the others easily ascended.

The house stood upon a narrow ledge, which formed the floor, and was overhung by the rocks of the cliff. The depth of this ledge was about 10 by 20 in length, and the vertical space between ledge and overhanging rock some fifteen feet. The house occupied the left-hand half as we face it; the rest being reserved as a sort of esplanade, a small portion of the wall remaining which cut it off from the narrow ledge running beyond. The edges of the ledge upon which the house stood were rounded off, so that its outside wall had to be built upon an incline of about forty-five degrees; the esplanade, too, had been extended by three abutments, built out flush with the walls of the house, upon the steeply-inclined slope, and giving support probably to a balustrade.

The house itself, perched up in its little crevice of about 12 feet, leaving a space of two or three feet between the top of the walls and the overhanging rock. We could not determine satisfactorily whether any other roof had ever existed or whether the walls ran up higher and joined the rock, but we incline to the first supposition. The ground-plan showed a front room about 6 by 9 feet in dimensions, and back of it two smaller ones, the face of the rock forming their back walls. These were each about 5 by 7 feet square. The left hand of the two back rooms projected beyond the front room in an L. The cedar beams, which had divided the house into two floors, were gone, with the exception of a few splintered pieces and ends remaining in the wall, just enough to show what they were made of. We had some little doubt as to whether the back rooms were divided in the same way, nothing remaining to prove the fact, excepting holes in the walls, at the same height as the beams in the other portion. In the lower front room are two apertures, one serving as a door, and opening out upon the esplanade, about 20 by 30 inches in size, the lower sill 24 inches from the floor; and the other a small outlook, about 12 inches square, up near the ceiling, and looking over the cañon beneath. In the upper story, a window corresponding in

CLIFF-HOUSE, IN THE CAÑON OF THE MANTON.



size, shape, and position to the door below, commands an extended view down the cañon. The upper lintel of this window was of small, straight sticks of cedar, of about the size of one's finger, laid close together, the small stones of the masonry resting upon them. Directly opposite this window is a similar one, opening into a large reservoir, or cistern, the upper walls of which come nearly to the top of the window. This is semicircular, inclosing the angle formed by the side wall of the house against the rock, with an approximate capacity of about two and a half hogsheads. From the window, and extending down to the bottom of the reservoir, are a series of cedar pegs, about a foot apart, enabling the occupants to easily reach the bottom. The entire construction of this little human eyrie displays wonderful perseverance, ingenuity, and some taste. Perpendiculars were well regarded, and the angles carefully squared. The stones of the outer rooms or front were all squared and smoothly faced, but were not laid in regular courses, as they are not uniform in size, ranging from 15 inches in length and 8 in thickness down to very small ones. About the corners and the windows, considerable care and judgment were evident in the overlapping of the joints, so that all was held firmly together. The only sign of weakness is in the bulging outward of the front wall, produced by the giving way or removal of the floor-beams. The back portion is built of rough stone, firmly cemented together. The mortar is compact and hard, a grayish-white, resembling lime, but cracking all over. All the interstices between the larger stones were carefully chinked in with small chips of the same material. The partitions were of the same character as the smooth wall outside, both presenting somewhat the appearance of having been rubbed down smooth after they were laid. The apertures, from one room to another, are small, corresponding in size and position to those outside. Most peculiar, however, is the dressing of the walls of the upper and lower front rooms, both being plastered with a thin layer of firm adobe cement of about an eighth of an inch in thickness, and colored a deep maroon-red, with a dingy white band 8 inches in breadth, running around floor, sides, and ceiling. In some places it has peeled away, exposing a smoothly-dressed surface of rock. No signs of ornamentation, other than the band alluded to, were visible. The floor, which was covered to a depth of 2 or 3 inches with dust, dirt, and the excrement of small animals, had been evened up with a cement resembling that in the walls. The back rooms were half-filled with rocky *débris* from roof and cliff.

While busied with my negatives, the others had prospected the ledge in opposite directions, coming upon ample evidence of its having been quite thickly peopled. Ruins of half a dozen lesser houses were found near by, but all in such exposed situations as to be quite dilapidated. Some had been crushed by the overhanging wall falling upon them, and others had lost their foot-hold and tumbled down the precipice. One little house in particular, at the extremity of this ledge, about fifty rods below the one described above, was especially unique in the daring of its site, filling the mind with amazement at the temerity of the builders and the extremity to which they must have been pushed. Careful views of this having been secured so as to show as well as possible its almost complete inaccessibility, we felt impelled to hurry on to new developments. Apparatus was carefully lowered to the patiently-waiting mule, and adjusted to the pack-saddle, then, mounting our own animals, we pushed on down the cañon, which now opened out into quite a valley, side cañons opening in from either hand, adding much to the space. Every quarter-mile, at the most, we came upon evidences

of former habitations, similar to those already described; the greater majority occurring in the level bottoms and on the low spurs of the escarpment.

Two or three miles below the house in Fig. 12, we discovered a wall standing in the thick brush upon the opposite side of the river. Considerable difficulty was experienced in crossing; in some places having to cut our way through the entangling vines with our belt-knives, and then, when the bed of the stream was reached, had to follow it some distance before an opportunity occurred to emerge.

The walls before us were a portion of an old tower, (see Fig. 1, Plate) in the midst of a group of more dimly marked ruins or foundations, extending some distance in each direction from it. As seen in the figure referred to, the tower consists of two lines of walls, the space between them divided into apartments, with a single circular room in the center. The outside diameter of all is 25 feet, that of the inner circle 12* feet, and as the walls were respectively 18 and 12 inches in thickness, left a space of 4 feet for the small rooms. This outer circle was evidently divided into six equal apartments, but only the divisions marked in the diagram could be distinguished. In the places where they should have occurred, the walls are so broken down and covered with *débris* as to render all details indistinguishable. Where the walls are standing, they show small window-like doors opening into the inner circle. The highest portion of the inner wall is now not more than 8 feet, and of the outer about 15. From the amount of *débris*, it could not have been much higher—not more than 20 feet at the most. The space between the walls is filled with *débris*, while outside there is very little, except where the wall is totally ruined.

The stones of which this tower was constructed are irregular in size and shape, but with the outer face dressed to a uniform surface, and of the same average size as those already described. The mortar and "chinking" had been worn out entirely from the more exposed portions, giving the wall the appearance of having been dry-laid; but upon pulling away some of the stones to a little depth, they were found to have been well cemented.

Passing on down the cañon, not stopping now to notice the more ordinary forms of ruins, we passed the mouths of numerous side-cañons, down which come great freshets during the rainy season, gouging out deep arroyos, and strewn the surface with the collected *débris* of piñon and cedar, sage-brush and cacti. About the mouth of Coal Cañon, particularly, the whole surface of the "wash" was covered with lumps of fine-looking bituminous coal, as though a thousand coal-carts had traveled that way with their tail-board out.

We camped at sunset at what our guide called the Rattlesnake Bend, within a half dozen miles of the outlet of the cañon. We had not discovered any more of the high cliff houses during the day; but there is no doubt that, if we had had a good field glass with us, many more might have been found along the crevices near the summit of the escarpment. To have verified our suppositions by a personal inspection would have involved a great deal of labor, and more time than we could have spared from our very scanty store. In the vicinity of our camp, the cañon changed much in appearance; instead of the long slope of talus capped

* These dimensions were estimated from the photograph after leaving the locality, not having the time or appliances for accurate measurement while there. The same ruin has since been examined by Mr. Holmes and accurately measured, with the following results: Diameter over all 43 feet; of the inner circle, 25 feet. Mr. Holmes also makes out ten apartments instead of six. Bulletin No. 1, vol. 3, p. 11.

by a perpendicular ledge, we have here a perpendicular ledge first, of 200 or 300 feet, and then a long receding bench, back to the higher *mesa* beyond.

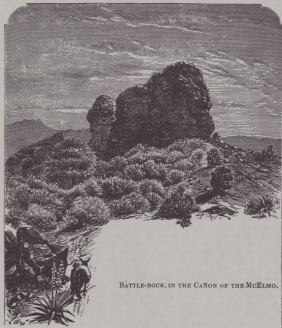
Close to our camp was one of the little towers that occur quite frequently, about 10 feet in diameter, and now some 8 feet in height, with the inside half-filled with the *debris* from the walls. Half a mile below, in the vertical face of rock, and at a height of from 50 to 100 feet from the trail, were a number of little nest-like habitations. Fig. 5, Plate I, illustrates one of them, and their general character. Communication with the outside world was from above to a small window-like door, not showing in the sketch. Two small apertures furnish a lookout over the valley. The walls are as firm and solid as the rocks upon which they are built. The stones are more regular in size than any noticed heretofore, but smaller. The chinking-in of small chips of stone is noticeably neat and perfect on the inside. This is not a commodious dwelling; 15 feet would span its length, and 6 its height, while in depth it is not more than 5 feet. Near by, upon a low ledge, and readily accessible from below, is a string of five or six houses, evidently communicating, mere kennels compared with some others, made by walling up the deep cave-like crevices in the sandstone. The same hands built them that lived in the better houses; the masonry being very similar, especially the inside chinking, which was perfect, and gave the walls a very neat appearance. Fig. 8 of Plate II is an example of the tenacity of the mortar; the view being of one of the line of little houses just spoken of. In this case, a portion of the ledge upon which the house stands has become separated from the cliff, carrying a portion of one of the buildings with it; and although torn away from the remaining wall, and thrown over at a considerable angle, yet it remains perfectly firm and unshaken.

Scratched into the face of the cliff which contains these houses are various inscriptions, one of which is depicted in Fig. 6 of Plate I. As they are not cut in very deeply, and in some places mere scratches, it is very doubtful whether they are contemporaneous with the houses themselves.

Two or three miles farther, and the cañon changes in feature again; the highest level of the *mesa* coming forward and towering over the valley with a thousand feet of altitude; the bottom-lands widening out to a half and three-quarters of a mile in breadth. Cottonwood and willow fringe the meandering stream in pleasant groves, while the dead level of the valley is heavily carpeted with a dense growth of artemisia and cacti. Everything is dry, dusty, and barren; the stream itself losing in volume, and becoming more turbid. Fig. 13 of Plate III represents in outline the characteristics of the cañon, or valley rather, at this point.

In the high bluff, on the right hand in the sketch, are some of the most curious and unique little habitations yet seen. While jogging along under this bluff, fully 1,000 feet in height, and admiring its bold outlines and brilliant coloring, one of our party, sharper-eyed than the rest, descried, away up near the top, perfect little houses, sandwiched in among the crevices of the horizontal strata of the rock of which the bluff was composed. While busy photographing, two of the party started up to scale the height, and inspect this lofty abode. By penetrating a side-cañon some little ways, a gradual slope was found, that carried them to the summit of the bluff. Now, the trouble was to get *down* to the house, and this was accomplished only by crawling along a ledge of about 20 inches in width, and not tall enough for more than a creeping position. In momentary peril of life, for the least mistake

Plate V.



BATTLE-ROCK, IN THE CAÑON OF THE McELMO.

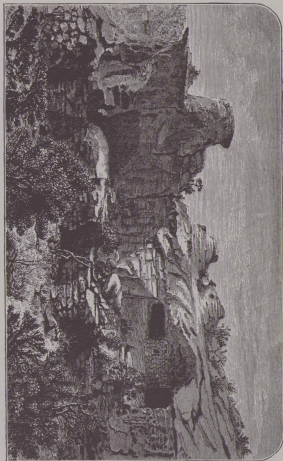
would precipitate him down the whole of this dizzy height, our adventurous seeker after knowledge crept along the ledge until the broader platform was reached, upon which the most perfect of the houses alluded to stands. The ledge ended with the house, which is built out flush with its outer edge. This structure resembles in general features the cliff-houses already spoken of. The masonry is as firm and solid as when first constructed, the inside being finished with exceptional care. In width it is about 5 feet in front, the side-wall running back in a semi-circular sweep; in length 15, and in height 7 feet. The only aperture was both door and window, about 20 by 30 inches in diameter. In Fig. 7 of Plate II, is a design of this aerial habitation as it appeared from below, its uniqueness consisting in its position on the face of the bluff. To the casual observer, it would not be noticed once in fifty times in passing, so similar to the rocks between which it is plastered does it appear from our position on the trail. A short distance to the right, and on the ledge above, is another building of somewhat ruder construction, but with corners square, and the walls truncated.

Referring again to Plate III and Fig. 13, the position of these houses, and also of the one in Fig. 12, can be seen in the dark heavy lines near the summit, just above the most precipitous portion of the bluff, generally at a height of from 600 to 800 feet above the level of the cañon.

This was the last cliff-house we noticed in this cañon. From the first to the last, all that were upon an elevation, however slight, were on the western side of the cañon, with either doors or windows facing east, overlooking the opposite bluffs. We could not find even the faintest vestige of ruins or houses upon the eastern side. Those built low down on the level land did not hold to the same rule, being scattered indiscriminately upon either bank of the stream.

Proceeding down the broad open cañon over the now very easy trail, we espied upon the opposite side of the stream a tower of apparently greater dimensions than the ones noticed above. The crossing was execrable; but, forcing a way through the tangled undergrowth to the stream, a way was found out of it to the ruin some forty rods back; (see Figs. 2 and 3.) The tower only remained; this is circular, 12 feet in diameter, and now about 20 in height, the wall being about 16 inches in thickness. Facing the valley northward is a window-like aperture, about 18 by 24 inches in size; the lower lintel some 7 or 8 feet above the base. The stones of which it is constructed are uniform in size and angle. Being so entirely exposed to atmospheric influences, the mortar has worn away entirely from between the outer layers. Inside, the *débris* was heaped up nearly to the window. By referring to Fig. 3, it will be seen that a rectangular structure, divided into two apartments, each about 15 feet square, joins the tower. Only one corner of three or four courses of masonry remains, shown in the sketch by the shaded lines; the rest being indicated by mound-like lines of loose *débris*, in which but few stones remain; from which fact, and also that the center of each square is considerably depressed below the surrounding surface, it is probable that they are underground apartments, their roofs not reaching the window midway in the tower. It would be extremely interesting to excavate upon these old foundations; for there is no doubt that many interesting relics, and possibly some clue to their manner of life, might be found. Our time, however, was too limited to admit of the experiment, much as we desired the information it might furnish.

In the same neighborhood stands a corner and a portion of a doorway of a house, (see Fig. 4), showing considerable care and skill in its con-



CAVE DWELLINGS, IN THE CAÑON OF THE MICHIC.

struction, and what we had not noticed before, the doorway facing east is a little over 6 feet in height, tall enough to enable a person to stand up in it.

With these, we finished our observations of the ruins in the Cañon de los Mancos. We were now at its mouth, the mesa ending as abruptly as it began; the river turning well westward and following approximately the course of the San Juan, joins it near the southwestern corner of the Territory, at the foot of El Late.

Striking off to the right from the stream, and following close under the bold escarpment of the mesa, we could still discern, as we bore away, group after group of standing walls and mounds, extending down the valley into the broad open plain of the San Juan. It was with many regrets that we turned our backs upon these relics of a forgotten race. Our trail now lay over the peculiar marly earths lying under the sandstones of the table-land, soft, friable, and dusty, without vegetation, our mules' feet sinking into it to the fetlocks at each step. At our right, portions of the mesa have become separated and weathered into peculiar pinnacled turrets. One particularly stands out detached some fifty rods; the trail passing between it and the mesa, forming an old and well-known landmark on the old Spanish trail from Santa Fé to Salt Lake. A little farther on, and to the right, is another mass, bearing a curious resemblance to a matron standing with a child beside her, the alternating bands of red and white strata marking off the figure into its different proportions and into flourishes and trimmings.

Away to the south and west, over the broad plains of the San Juan, where roam the great flocks of sheep and goats belonging to the Navajos, the Callabassas Mountains rear themselves into distinct view; while between them and the river, a great *eristone* thrusts itself up out of the earth to a height of at least 2,000 feet, as veritable a needle as was ever christened such.

Striking into this old trail, we bore around to the western side of the mesa, and, near nightfall, arrived at the extensive group of ruins about "Aztec Springs," lying out upon the northeastern flanks of El Late, and close upon the divide between the waters of the Mancos and the McElmo. It was our intention to have camped here and worked up the surroundings at our leisure; but, very much to the surprise of our guide, the spring was perfectly dry, not even the least moisture remaining to tempt us to dig for it, for others before us had dug to the depth of three or four feet with no reward for their labor. At its best, it could have been but a very insignificant source of supply; the surplus oozing away through a few yards of very grass into the dry sand. The basin of the spring lay in quite a depression, that had evidently been excavated for the purpose. A well may have existed; for it cannot be reasonably supposed that the very large settlements which at one time existed in the neighborhood were supplied from it in anywhere near its present condition. The nearest running water was 12 or 13 miles away, and none of the surroundings indicated that this spring ever had any very considerable volume of water. Immediately adjoining the spring, on the right, as we face it from below, is the ruin of a great massive structure of some kind, about 100 feet square in exterior dimensions; a portion only of the wall upon the northern face remaining in its original position. The *débris* of the ruin now forms a great mound of crumbling rock, from 12 to 20 feet in height, overgrown with artimisia, but showing clearly, however, its rectangular structure, adjusted approximately to the four points of the compass. Inside this square is a circle, about 60 feet in diameter, deeply depressed in the center. The

space between the square and the circle appeared, upon a hasty examination, to have been filled in solidly with a sort of rubble-masonry. Cross-walls were noticed in two places; but whether they were to strengthen the walls or divided apartments could only be conjectured. That portion of the outer wall remaining standing is some 40 feet in length and 15 in height. The stones were dressed to a uniform size and finish. Upon the same level as this ruin, and extending back some distance, were grouped line after line of foundations and mounds, the great mass of which is of stone, but not one remaining upon another. All the subdivisions are plainly marked, so that one might, with a little care, count every room or building in the settlement. Below the above group, some two hundred yards distant, and communicating by indistinct lines of *débris*, is another great wall, inclosing a space of about 200 feet square. Only a small portion is well enough preserved to enable us to judge, with any accuracy, as to its character and dimensions; the greater portion consisting of large ridges flattened down so much as to measure some 30 or more feet across the base, and 5 or 6 feet in height. This better-preserved portion is some 50 feet in length, 7 or 8 feet in height, and 20 feet thick, the two exterior surfaces of well-dressed and evenly-laid courses, and the center packed in solidly with rubble-masonry, looking entirely different from those rooms which had been filled with *débris*, though it is difficult to assign any reason for its being so massively constructed. It was only a portion of a system extending out into the plains, of much less importance, however, and now only of indistinguishable mounds. The town built about this spring is nearly a square mile in extent, the larger and more enduring buildings in the center, while all about are scattered and grouped the remnants of smaller structures comprising the suburbs.

It was sunset by the time we had secured the photographic views necessary to illustrate the leading features of this group. A camp had to be found, a thing very easily done in most localities, but here one very important constituent was wanting. Sage-brush and grass abounded, but water was sadly deficient. However, by good luck, as we might call it, a few pools of the grateful fluid were found in the nearby dry bed of an old stream, about four miles distant from the ruins. This pretense of a stream known locally as the McElmo, flows westwardly into the San Juan; and is for the greater portion of the year but a deep dry gulch.

A short distance above our camp, and upon the top of the mesa, which, at this point, is not more than 25 feet above the valley, we found a tower very similar to that on the Mancos (see Fig. 1), but considerably larger, and surrounded by a much greater settlement. It is about 50 feet in diameter, and, like the Mancos one, double-walled, the space between the two about 6 feet in width, and subdivided into small apartments by cross-walls pierced with communicating doors or windows. Immediately surrounding this tower is a great mass, of which it is the center, of scattered heaps of stone *débris*, arranged in rectangular order, each little square with a depressed center, suggesting large subdivided buildings, similar to the great community-dwellings of the Pueblos and Moquis and the old ruins of the Chaco. Upon the southeast corner of this group, and upon the very edge of the mesa, are the remains of another smaller tower, and below it, founded upon the bottom of a small cañon, which ran up at right angles to the McElmo, is a portion of a heavy wall rising to the base of this lesser tower. This group covers a space of about one hundred yards square; while adjoining it on the mesa is group after group upon the same general plan,



WATCH-TOWER, IN THE CANYON OF THE McELMO.

a great central tower and smaller surrounding buildings. They cover the whole breadth and length of the land; and, turn which way we would, we stumbled over the old mounds and into the cellars, as we might call them, of these truly aborigines. The same painted, glazed, and otherwise ornamented ware, of which I have spoken, accompanies each settlement, and we were continually picking up new designs and forms.

Starting down the cañon, which gradually deepened as the table-land rose above us, we found upon each hand very old and faint vestiges of the homes of a forgotten people, but could give them no more attention than merely noting their existence. Half a dozen miles down, and we came upon several little nest-like dwellings, very similar to those in Figs. 5 and 7, but only about 40 or 50 feet above the valley. Two miles farther, and we came upon the tower shown in Fig. 9, standing upon the summit of a great square block of sandstone, some forty feet in height, detached from the bluff back of it. The building, upon its summit, is square, with apertures like windows upon two faces, looking east and north, and very much ruined, but still standing in some places about 15 feet above the rock on which it is built. At the base of the rock is a wall running about it, a small portion only remaining, the rest thrown down and covered with *débris* from the house above.

About here we crossed the boundary-line into Utah, and then, two or three miles farther, we came upon a very interesting group. The valley, at this place, widens out considerably, and in the center stands a solitary butte of dark-red sandstone, upon a perfectly bare and smooth floor of the same, dipping down to the center of the valley at a slight inclination. The butte, a remnant of a former *mesa*, worn down by time to its present dimensions, is about 100 feet in height and 300 in length; an irregular mass, seamed and cracked, and gradually going the way its former surroundings have traveled. Running about its base, in irregular lines, are remains of walls, but whether for defense or habitation would be hard now to determine. At the back of the rock, a view of which is had in Fig. 10, are the remains of two quite considerable walls, one above the other; the lower portion—one corner only of a square building, all traces of the remaining portions having entirely disappeared—seemed to serve as a sort of approach to the larger building above, the top of which came up nearly to the summit of the rock. It is about 18 feet in length and 12 feet in height. Portions only of the side-walls, connecting it with the rock, remain. The stones of which it is built are very uniform in size, angle, and finish, more so than any yet seen, but, like all similarly-exposed buildings, the mortar is washed or worn away entirely from between the outer layers; farther in, it is intact as usual. In front is a single aperture of about 18 by 24 inches, whether for door or window would be hard to guess. The only access to the top of the rock was through the window of this house. On top are evidences of some sort of mason-work, that covers it from one end to the other. All the irregular gaps and crevices have been walled up, probably to make an even surface. But few of the stones remain in position; in one or two places, three or four courses, all the rest are thrown down and scattered.

In the rear, about fifty yards removed, are other ruins belonging to the group, surrounding the rock. The better-preserved portions consist of a square tower, with one round corner, about 12 feet in diameter, and upon the lowest side—which stands in a dry run—about 20 feet in height. The walls are 18 inches in thickness with no signs of apertures. Adjoining this ruin is another, but so much thrown down as to be almost

unrecognizable; and between these and the rock were circular depressions of some considerable depth, indicating either subterranean apartments or reservoirs. No water could be found anywhere in the neighborhood. The dry bed of the McElmo was fully a mile distant, in which water occurs during the winter and spring only.

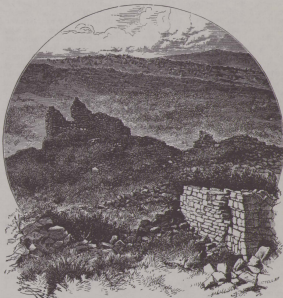
Aside from the interest attaching to the ruins themselves, there are thrown about this rock and its surroundings the romance and charm of legendary association. The story runs thus, as given us by our guide, and very excellently rendered by Mr. Ingersoll, in his article to the New York Tribune of November 3:

Formerly, the aborigines inhabited all this country we had been over as far west as the headwaters of the San Juan, as far north as the Rio Dolores, west some distance into Utah, and south and southwest throughout Arizona and on down into Mexico. They had lived there from time immemorial—since the earth was a small island, which suggested as its inhabitants multiplied. They cultivated the valley, fashioned whatever utensils and tools they needed very neatly and handsomely out of clay and wood and stone, not knowing any of the useful metals; built their homes and kept their flocks and herds in the fertile river-bottoms, and worshipped the sun. They were an eminently peaceful and prosperous people, living by agriculture rather than by the chase. About a thousand years ago, however, they were visited by savage strangers from the North, whom they treated hospitably. Soon these visits became more frequent and annoying. Then their troublesome neighbors—ancestors of the present Utes—began to forage upon them, and, at last, to massacre them and devastate their farms; so, to save their lives at least, they built houses high upon the cliffs, where they could store food and hide away till the raiders left. But one summer the invaders did not go back to their mountains as the people expected, but brought their families with them and settled down. So, driven from their homes and lands, starving in their little niches on the high cliffs, they could only steal away during the night, and wander across the cheerless uplands. To one who has traveled these steppes, such a sight seems terrible, and the mind hesitates to picture the suffering of the sad fugitives.

At the crises they halted, and probably found friends, for the rocks and caves are full of the nests of these human wrens and swallows. Here they collected, erected stone fortifications and watch-towers, dug reservoirs in the rocks to hold a supply of water, which in all cases is precarious in this latitude, and once more stood at bay. Their foes came, and for one long month fought and were beaten back, and returned day after day to the attack as merciless and inevitable as the tide. Meanwhile, the families of the defenders were evacuating and moving south, and bravely did their protectors shield them till they were all safely a hundred miles away. The besiegers were beaten back and went away. But the narrative tells us that the hollows of the rocks were filled to the brim with the mingled blood of conquerors and conquered, and red veins of it ran down into the cañon. It was such a victory as they could not afford to gain again, and they were glad, when the long fight was over, to follow their wives and little ones to the south. There, in the deserts of Arizona, on well-nigh unapproachable isolated bluffs, they built new towns, and their few descendants, the Moquis, live in them to this day, preserving more carefully and purely the history and veneration of their forefathers than their skill or wisdom. It was from one of their old men that this traditional sketch was obtained.

The bare floor of nearly white sandstone, upon which the butte stands, is stained in gory streaks and blotches by the action of an iron constituent in the rocks of another portion of the adjoining bluffs, and this feature probably gave rise to the legend. Half a mile back, or north from this historic butte, is a group of small cave-houses. A long bluff line, about 100 feet in height, of alternating bands of red and white sandstone, has, along a line of its upper strata, quite a number of shallow caves, in which are snug little retreats, securely walled in, the masonry perfect and substantial. Along the top of the bluff are traces of old walls, but now well-nigh obliterated.

While passing the mouth of a wide side-cañon, coming in from the right, a tall, black-looking tower caught our eye, perched upon the very brink of the mesa, overlooking the valley. Tying our riding-animals at the foot, and leading the pack-mule, with photographic kit, we soon



RUINS IN THE CAÑON OF THE HOFENSWEEP, UTAH.

struck into an old trail, worn deep into the rocks, winding and twisting among great boulders, and overgrown and obstructed with rank growth of sage, cedar, and cacti. In its day, the trail had been a good one; now it was anything but such. Bad as it was, however, it was the only way to the summit, and we were thankful for it. Skirting the edge of the mesa a few yards, we came to the tower, the trail passing back of it and on up to a higher level. A huge block of sandstone has rolled down from the escarpment of the mesa above, lodging upon the very brink of a bench midway between top and bottom, and upon this the tower is built, so that from below both appear as one. They are of the same diameter, about 10 feet, and some 18 feet in height, equally divided between rock and tower. In construction, it is similar to those already described, of single wall. It was evidently an outpost or watch-tower, guarding the approach to a large settlement upon or beyond the mesa lying above it. From this point we now struck out for another group of ruins lying upon a nameless stream, some eight or ten miles farther west. Four or five miles we followed the McElmo down, the trail good, the whole surface covered with a dense growth of artemisia and groves of cedar and piñon, with cottonwoods fringing the dry stream. Branching off at right angles, crossing the heads of two cañons which opened out quickly into great gorges, and then descending into a valley densely covered with greasewood, we came upon the ruins we were in search of. Through the valley ran a deep gulch, a narrow thread of warm, brackish water appearing at intervals in its bed, and gathering into pools in basins a short distance below the ruins.

In Fig. 11 of Plate III, is a sketch of a ground-plan of the "city," showing its general arrangement. The stream referred to, and shown in the sketch, sweeps the foot of a rocky sandstone ledge, some 40 or 50 feet in height, upon which is built the highest and better-preserved portion of the settlement. Its semicircular sweep conforms to the ledge; each little house of the outer circle being built close upon its edge. Below the level of these upper houses some 10 or 12 feet, and within the semicircular sweep, are seven distinctly-marked depressions, each separated from the other by rocky *débris*, the lower or first series probably of small community-houses. Upon either flank, and founded upon rocks, are buildings similar in size and in other respects to the large ones on the line above. As paced off, the upper or convex surface measured 100 yards in length. Each little apartment is small and narrow, averaging 6 feet in width and 8 feet in length, the walls being 18 inches in thickness. The stones of which the entire group is built are dressed to nearly uniform size and laid in mortar. A peculiar feature here is in the round corners, one at least appearing upon nearly every little house. They are turned with considerable care and skill, being true curves solidly bound together.

With this last our observations of these interesting relics came to an end. Our trip was short and rapid, and instituted in the first place, as I have said, in quest of the picturesque, and we found it. For a much more complete and faithful exposition of this interesting subject, the reader is referred to a series of photographic views from which the accompanying illustrations are drawn.

I cannot close without extending thanks to Capt. John Moss, of La Plata, our volunteer guide, who accompanied us over the route comprising the ruins. To his accurate knowledge of their locality, and the best way to reach them, as well as of the language of the Indians, is due much of the success of the trip.

F. V. Hayden's Tenth Annual Report, noting the progress made in the year 1876, also included the archaeological work completed in 1875, '76, and '77 as the report was not published until 1878. The report contained a major section (Part III) devoted to Archaeology and Ethnology with W. M. Holmes, W. H. Jackson and W. J. Hoffman, M.D., contributing articles. William M. Holmes, geologist and topographer, reported on his investigations of the Ancient Ruins of Southwestern Colorado and the Four Corners Area, which he made during 1875 and 1876. His report is reproduced on the following pages in its entirety.

W. H. Jackson devoted two chapters to his archaeological investigations. Chapter I covered the Ruins in the Four Corners Area, while Chapter II confined itself to his 1877 observations in the Chaco Canyon area of northern New Mexico. Walter J. Hoffman, M.D. contributed two articles, "The Chaco Cranium" and the "Ethnographic Observations of the Indians Inhabiting Nevada, California and Arizona". The Jackson and Hoffman reports are too lengthy to be included in this booklet and will be reprinted in their entirety at a later date.

PART III.

ARCHÆOLOGY AND ETHNOLOGY.

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REPORT OF WILLIAM. H. HOLMES.

LETTER OF TRANSMIT AL.

WASHINGTON, March 1, 1878.

SIR: I submit herewith my report on the ruins of Southwestern Colorado for the years 1875 and 1876. A preliminary report on the investigations made in 1875 has already been published in the second volume of the Survey bulletins. As the edition of this publication was very limited, it has been thought best to republish that report with corrections and additions, in connection with the report for 1876.

Very respectfully, your obedient servant,

WM. H. HOLMES.

Dr. F. V. HAYDEN,

United States Geologist in charge.

REPORT ON THE ANCIENT RUINS OF SOUTHWESTERN COLORADO, EXAMINED DURING THE SUMMERS OF 1875 AND 1876.

BY W. H. HOLMES.

In addition to my duties as geologist to the southwest or San Juan division of the survey for 1875, I was assigned the very agreeable task of making examinations of such ancient remains as might be included in the district surveyed; also in 1876, in company with Mr. Wilson, director of the primary triangulation, I revisited the northern border of the same district and made additional observations.

Previous to 1875 much information had already been given to the public in relation to the ruins of Southwestern Colorado by Mr. Jackson, who paid them a short visit in 1874, and many similar remains had been described by early explorers in New Mexico and Arizona, but nothing like a complete survey of this particular region had been made.

The district examined by our party covers an area of nearly 6,000 square miles, chiefly in Colorado, but which includes narrow belts in the adjacent Territories of New Mexico, Utah, and Arizona. It lies wholly on the Pacific slope, and belongs almost entirely to the drainage-system of the Rio San Juan, a tributary of the Colorado of the West.

Lying along the west base of the mountains is a comparatively flat country, the eastern border of the great plateau-region that reaches westward toward the Sierras. The surface-geology is chiefly Cretaceous, and the various large streams formed on the west slope of the Rocky Mountains have cut long cañioned valleys down through the nearly horizontal beds. In the greater part of this region there is little moisture apart from these streams, and, as a consequence, vegetation is very sparse, and the general aspect of the country is that of a semi-desert. Yet there is bountiful evidence that at one time it supported a numerous population; there is scarcely a square mile in the 6,000 examined that does not furnish evidence of previous occupation by a race totally distinct from the nomadic savages who hold it now, and in many ways superior to them.

At first, it seems strange that a country so dry and apparently barren as this now is could support even a moderate population, and it is consequently argued that the climate has grown less moist since the ancient occupation. Be this as it may, I observe the fact that the great bulk of remains are on or in the immediate neighborhood of running streams, or by springs that furnish a plentiful supply of water during the greater part of the year. The ever-present pottery in many cases have been broken and left by hunting and wandering parties, and the remnants of dwellings far out from water may have been but temporary abodes used only in the winter or during rainy seasons.

I also notice that the country is by no means an entire desert. All along the stream-courses, there are grass-covered meadows and broad belts of alluvial bottom, affording, if properly utilized, a considerable area of rich tillable land.

The ruins of this region, like most others of the extreme West and South, are the remnants in a great measure of stone structures. To what extent wood and adobe were used can hardly be determined. It is evident, however, that a great portion of the villages and dwellings of the lowlands have been of material other than stone, frequently doubtless of rubble and adobe combined.

As to situation, they may be classed very properly under three heads: (1) lowland or agricultural settlements; (2) cave dwellings; and (3) cliff-houses or fortresses.

Those of the first class are chiefly on the river-bottoms, in close proximity to water, in the very midst of the most fertile lands, and located without reference to security or means of defence.

Those of the second are in the vicinity of agricultural lands, but built in excavations in low-bluff faces of the Middle Cretaceous shales. The sites are chosen also, I imagine, with reference to security; while the situation of the cliff-houses is chosen with reference to security only. They are built high up in the steep and inaccessible cliffs, and have the least possible degree of convenience to field or water.

As to use, the position for the most part determines that. The lowland ruins are the remains of agricultural settlements, built and occupied much as similar villages and dwellings are occupied by peaceable and unmolested peoples of to-day. The cave-dwellers, although they may have been of the same tribe and contemporaneous, probably built with reference to their peaceable occupations as well as to defense, but it is impossible to say whether or not they made these houses their constant dwelling-places. The cliff-houses could only have been used as places of refuge and defense. During seasons of invasion and war, families were probably sent to them for security, while the warriors defended their property or went forth to battle; and one can readily imagine that when the hour of total defeat came, they served as a last resort for a disheartened and desperate people.

In form, the parallelogram and circle predominate, and a considerable degree of architectural skill is displayed. Where the conformation of the ground permits, the squares are *perfect* squares and the circles *perfect* circles. The greater part of the ordinary structures are square or rectangular; while attached to each group, and sometimes without indications of contiguous buildings, are circular mounds frequently resembling towers. These are the most pretentious structures, being often as much as forty feet in diameter, and in many cases having double or triple walls. They are solidly built of hewn stone, dressed on the outside to the curve, neatly jointed, and laid in mortar.

In the larger towers the space between the outer walls is invariably divided by heavy partition-walls into a number of apartments, while a circular depression, or *estufa*,* occupies the centre of the enclosure.

It seems evident, from the extraordinary form of these structures and the unusual care shown in their construction, that they were not designed for the ordinary uses of dwelling or defence. It has been observed that, among nearly all the ancient tribes of North America, the grandest and most elaborate works of art were the offspring of their superstitions, and it does not seem at all improbable that these great towers had a religious origin.

In the inhabited pueblos of to-day there are underground rooms, frequently circular, used as council-chambers as well as for the performance of the mysterious rites of their religion. Similar chambers occur,

* A Spanish word signifying "sweat-house" or council-house.

according to Lieutenant Simpson,* in all the ruined cities of New Mexico, but having single walls of no great height or thickness. It is stated by Squier and Davis† that in Mexico the sacred enclosures were also used for defensive purposes, and it certainly seems probable that these curious structures served both as temples and fortifications, and that the apartments between the walls were the receptacles of sacred or valuable property.

The smaller single-walled towers, which are scattered at intervals along the river-courses and cañons, frequently in commanding situations, were probably watch or signal towers.

The cave-dwellings are made by digging irregular cavities in the faces of bluffs and cliffs formed of friable rock, and then walling up the fronts, leaving only small doorways, and an occasional small window at the side or top.

The cliff-houses conform in shape to the floor of the niche or shelf on which they are built. They are of firm, neat masonry, and the manner in which they are attached or cemented to the cliffs is simply marvelous. Their construction has cost a great deal of labor, the rock and mortar of which they are built having been brought for hundreds of feet up the most precipitous places. They have a much more modern look than the valley and cave remains, and are probably in general more recent, belonging rather to the close than to the earlier parts of a long period of occupation. Their position, however, has secured them in a great measure from the hand of the invader as well as from the ordinary effects of age.

Of works of art other than architectural that might assist in throwing light upon the grade of civilization reached by these people, but meagre discoveries were made; although I imagine that careful search and well-conducted examination might develop many things of great interest. A considerable number of arrow-heads, stone implements, ornaments, and articles of fictile manufacture, that may fairly be attributed to the age of the cliff-builders, were collected. The greater part of these are figured in plates XLIV, XLV, and XLVI.

There are no evidences whatever that metals were used.

Numerous rock-inscriptions were observed, both engraved and painted upon the cliffs. Drawings of a large number were made, and some of the more notable examples are given in plates XLII and XLIII. A large number of burial places, or what we are led to believe are such, were visited. The only localities which have yielded human remains are in the valleys and in the vicinity of ancient ruins. Three entire skeletons were obtained; one from the banks of Hovenweep Creek, near the ruin known as Hovenweep Castle;‡ the others from a freshly excavated arroyo in an ancient village near Abiquiu, New Mexico.§ A skull was obtained by Captain Moss from a grave on the Rio San Juan near the mouth of the Mancos, but no particulars of the position of the skeleton or manner of burial were obtained. Two entire specimens of earthen vessels|| were found with the skeleton.

The greater portion of what are supposed to be burial places occur on the summits of hills or on high, barren promontories that overlook the valleys and cañons. In these places considerable areas, amounting in some cases to half an acre or more, are thickly set with rows of stone

slabs, which are set in the ground and arranged in circles or parallelograms of greatly varying dimensions. At first sight the idea of a cemetery is suggested, although on examination it is found that the soil upon the solid rock surfaces is but a few inches deep, or if deeper, so compact that with the best implements it is very difficult to penetrate it.

On the west bank of the Dolores, near the second bend, I came upon a cluster of these standing stones on the summit of a low, rounded hill, and in the midst of a dense growth of full-grown piñon pines. Scattered over the ground were many fragments of the ordinary varieties of pottery, together with arrow-points and chips of obsidian, agate, and quartz.

The rows of stones were arranged to inclose a number of parallelograms that would probably average 3 feet by 8 in dimensions. The stones were generally quite flat, and never more than 2 feet in length or width. They were not perceptibly cut or dressed. Many of them had fallen over and lay strewn irregularly about, while few of them were buried deeper than a few inches. The soil, however, was unusually firm, and it was with the greatest difficulty that we succeeded in penetrating to the depth of 2 feet. Near the surface were a few thin layers of bits of pottery and charcoal, but at 6 inches in depth the soil had apparently never been disturbed.

That the placing of these stones occurred at a very early date is attested by the growth of forest, which is at least three or four hundred years old. In a number of cases the stones are deeply embedded in the sides and roots of the trees.

At two other localities near the south bend of the Rio Dolores I observed similar groups of standing stones, about which was the usual accompaniment of pottery and flint chips.

On a high promontory between the McElmo and Hovenweep cañons, at their junction, I discovered a fine group of similar remains. Here a number of the enclosures were circular, and in a few cases were as much as 20 feet in diameter. A full description of this locality will be found in Mr. Jackson's report.

The impression that these places, if not actually burying-grounds, were at least places used for the performance of funeral rites is confirmed by the well-known fact that many of the American tribes perform these rites in similar situations, the remains of the dead being burned or left to decay in the open air.

The occurrence of such quantities of pottery and arrow-points suggests the idea that these, and perhaps other more destructible articles, may have been left with the dead to be used by the departed spirit on its way to the "happy hunting grounds."

The accompanying plates are, with a few exceptions, reproductions of pen-drawings. The plans are not drawn to a uniform scale, because of the inconvenience of such an arrangement; but measurements are so frequently given on the plates themselves that no confusion need occur. Measurements were taken by tape-line in all the more important structures; but in many of the ordinary ruins, where exact dimensions were not considered essential, the distances were estimated. It is to be greatly regretted that extreme haste frequently prevented close and accurate work.

The map which follows this report will give the location of all the more important groups of ruins.

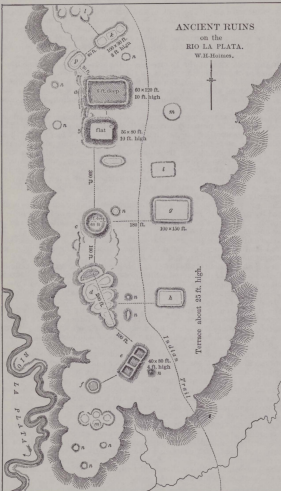
* Expedition to the Navajo Country, p. 78, &c. See also, Mr. Jackson's report.

† Ancient monuments of the Mississippi Valley, p. 192.

‡ Described by Mr. Jackson, Report U. S. Geol. Surv., 1874, 1876, p. 381.

§ The crania obtained are described by Dr. Benalla in Bulletin U. S. Geol. Survey, Vol. II, No. 1, pp. 47-63.

|| Mr. Jackson's report.



RUINED VILLAGE ON THE RIO LA PLATA.

Plate XXX.

The first group of ruins observed is situated on the Rio La Plata, about twenty-five miles above its junction with the San Juan, and five miles south of the New Mexican line. It is doubtless the remains of a large irregular village, and stands on a low terrace, some 20 feet above the river-bed, and near the centre of a large, fertile valley.

It will be seen, by reference to the plate, which includes only the more important part of the town, that the buildings have been isolated, and, in a measure, independent of each other, differing in this respect from most of the groups of ruins farther south and west.

The forms are chiefly rectangles and circles; one or two seem to have been elliptical, while a number have consisted of irregular groups or clusters of apartments. All that now remains to mark the site of these ancient structures are the low, rounded heaps and lines of *débris*, composed of earth, water-worn pebbles, and small fragments of sandstone. The walls of four of the main structures are quite distinctly marked. That of the circle *c* is still 4 feet high on the outside, and incloses a depression, probably an *estufa*, which, in the center, is 2 or 3 feet below the terrace-level.

North of this, about 300 feet, is a truncated rectangular mound, 9 or 10 feet in height and 50 feet in width by 80 in length. On the east end, near one of the angles, is a low, projecting pile of *débris* that may have been a tower. There is nothing whatever to indicate the use of this structure. Its flat top and height give it more the appearance of one of the sacrificial mounds of the Ohio Valley than any other observed in this part of the West. It may have been, however, only a raised foundation, designed to support a superstructure of wood or adobe.

North of this, again, and 100 feet distant, is a rectangular inclosure about 60 by 100 feet. It is slightly excavated in the centre, and the rounded and irregular wall is from 4 to 6 feet in height. The space between this and the last-mentioned structure is filled in to the depth of 2 or 3 feet, and the amount of *débris* about their bases indicates original walls of considerable height. North of this are scattered a number of inferior ruins, the walls of which are not always distinctly marked. These extend back toward a row of low hills, the remnants of a superior terrace, on the summits of which a number of artificial depressions were found. Such "dug holes" are generally quite numerous in the vicinity of these ruins, and have doubtless in many cases been made by throwing up earthworks for defensive purposes. South of the large circle is a mass of ruins covering some 15,000 square feet, but so much reduced that nothing further could be determined than the fact that it had contained a large number of irregular apartments. Next to this is a rectangular ruin, containing three well-marked apartments. Its walls are 6 or 7 feet high, and, unlike those of the preceding examples, do not coincide with the cardinal points. South of this, and occupying the extreme southern end of the terrace, are a number of small circles and mounds, while an undetermined number of diminutive mounds are distributed among the other ruins.

To the east of the Indian trail, as shown in the plate, are a number of inclosures of lesser importance, which, from want of time, were not closely examined.

Nowhere about these ruins are there any considerable indications of defensive works, and the village, which is scattered over an area fully

two miles in circuit, has no natural defensive advantages whatever. Neither are there traces of ditches, nor of anything that might throw important light upon the habits or occupations of the people. A few arrow-heads and minute cutting-implements were picked up. Countless chips of jasper, obsidian, and flint were scattered around, and the soil was literally full of fragments of painted and indented pottery.

On the opposite side of the river, and at intervals above and below, are isolated groups of ruins and heaps of *débris*—certainly the remains of dwellings. These seem to be distributed very much as dwelling-houses are in the rural districts of civilized and peaceable communities.

It is possible that there are undiscovered ruins on this stream equally important with those described; for, in pursuing my geologic investigations, I was compelled to take a long detour to the westward from this point, returning to the La Plata again a few miles above its junction with the San Juan. On this occasion, while riding through a desert-like locality, quite naked and barren, much resembling the well-known *Mauvoisies terres*, I was surprised to observe fragments of pottery strewn around, and presently a number of ruins, in a very reduced state and almost covered by the drifting sand, and this six or eight miles from water. On the high, dry table-lands, on all sides, fragments of pottery were picked up. What could have induced people to build and dwell in such a locality it is useless to surmise.

GROUP OF CAVE-DWELLINGS AND TOWERS ON THE RIO SAN JUAN.

Plate XXXI.

On the San Juan River, about thirty-five miles below the mouth of the La Plata and ten miles above the Mancos, occurs the group of ruins figured in Plate II.

The river is bordered here by low lines of bluffs formed from the more compact portions of the Middle Cretaceous shales. At this particular place, the vertical-bluff face is from 35 to 40 feet in height.

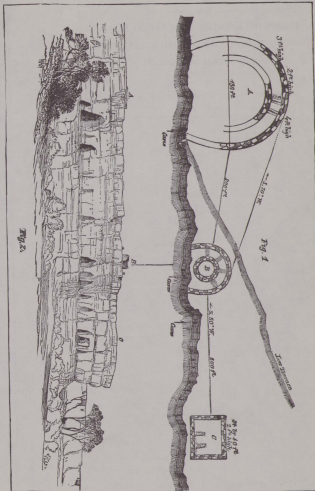
I observed, in approaching from above, that a ruined tower stood near the brink of the cliff, at a point where it curves outward toward the river, and in studying it with my glass detected a number of cave-like openings in the cliff-face about half-way up. On examination, I found them to have been shaped by the hand of man, but so weathered out and changed by the slow process of atmospheric erosion that the evidences of art were almost obliterated.

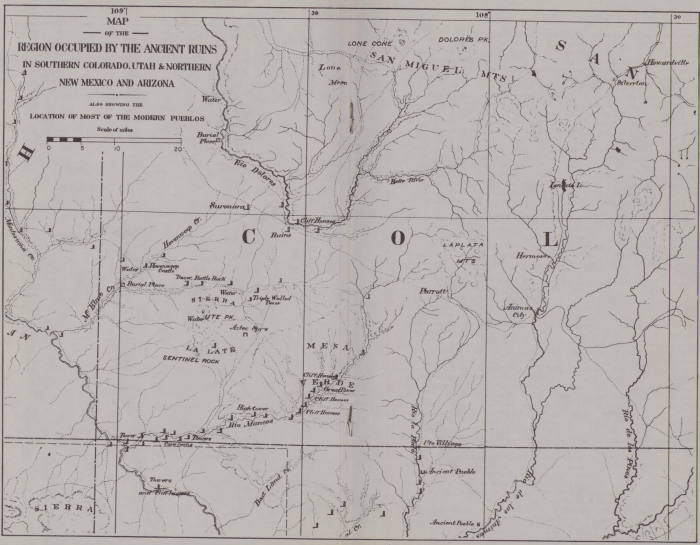
The openings are arched irregularly above, and generally quite shallow, being governed very much in contour and depth by the quality of the rock. The work of excavation has not been an extremely great one, even with the imperfect implements that must have been used, as the shale is for the most part soft and friable.

A hard stratum served as a floor, and projecting in many places made a narrow platform by which the inhabitants were enabled to pass along from one house to another.

Small fragments of mortar still adhered to the firmer parts of the walls, from which it is inferred that they were at one time plastered. It is also extremely probable that they were walled up in front and furnished with doors and windows, yet no fragment of wall has been preserved. Indeed, so great has been the erosion that many of the caves have been almost obliterated, and are now not deep enough to give shelter to a bird or bat.

This circumstance should be considered in reference to its bearing





109°

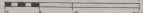
MAP

OF THE

REGION OCCUPIED BY THE ANCIENT RUINS
IN SOUTHERN COLORADO, UTAH & NORTHERN
NEW MEXICO AND ARIZONA

ALSO SHOWING THE
LOCATION OF MOST OF THE MODERN PUEBLOS

Scale of miles.



108°

107°

LONE CONE DOLORES PK.

Lana Mesa

SAN MIGUEL MTS.

S

A

Howardsville

Alvarado

Water

Barial Place

Rio Dolores

Navajo

Navajo Cr.

Hopi

C

O

LAPATA MTS.

Hermosa

Anasazi City

Mc Elroy Cr.

Water

Barial Place

Tower, Battle Rock

Water

SIERRA

Water

UTE PK.

Acton Spire

LA LATA

SENTINEL ROCK

MESA

Cliff House

Water

Cliff House

Cliff House

Cliff House

High Tower

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Barcroft

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

SIERRA

Theraps

with Cliff House

Barial Loma Cr.

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Cliff House

Ancient Pueblo

Rio de la Piedad

Rio de la Piedad

Rio de la Piedad

Rio de la Piedad

Rio de la Piedad

Rio de la Piedad

upon the question of antiquity. If we suppose the recess to be destroyed is six feet deep, the entire cliff must recede that number of feet in order to accomplish it. If the rock were all of the friable quality of the middle part, this would indeed be the matter of a very few decades; but it should be remembered that the upper third of the cliff-face is composed of beds of comparatively hard rocks, sandstones, and indurated shales. It should also be noted still further that at the base of the cliff there is an almost total absence of *débris*, or fallen rock, or even of an ordinary talus of earth, so that the period that has elapsed since these houses were deserted must equal the time taken to undermine and break down the six feet of solid rock, plus the time required to reduce this mass of rock to dust; considering also that the erosive agents are here unusually weak, the resulting period would certainly not be inconsiderable.

Figure 2 gives a fair representation of the present appearance of these dwellings, while their relations to the group of ruins above will be understood by reference to Figure 1. These ruins are three in number— one rectangular and two circular. The rectangular one, as indicated in the plan C, is placed on the edge of the mesa, over the more northern group of cave-dwellings; it is not of great importance, being only 34 by 40 feet, and scarcely 2 feet high; the walls are $1\frac{1}{2}$ feet thick, and built of stone.

The small tower B is situated on the brink of the cliff, directly above one of the principal groups of cave-houses. It is neatly built of stone, which, although not hewn, is so carefully chosen and adjusted to the curve that the wall is quite regular. That the stone was procured from the neighboring cliffs is indicated by the presence of great numbers of characteristic fossils. The wall is 18 inches thick and from 2 to 6 feet in height.

Long lines of *débris*, radiating from all sides, indicate that it has been much higher, and has but recently fallen. This tower is enclosed by a wall, also circular in form, but open toward the cliff, as seen in the drawing; the ends projecting forward and irregular and broken as if portions had fallen. Its construction is like that of the inner wall, but the height is not more than 3 feet at any point. The diameter of the inner circle is 12 feet, that of the outer 22 feet; the distance, therefore, between the walls is a little less than 4 feet. In this space there are indications of partition-walls that have originally divided it into a number of apartments.

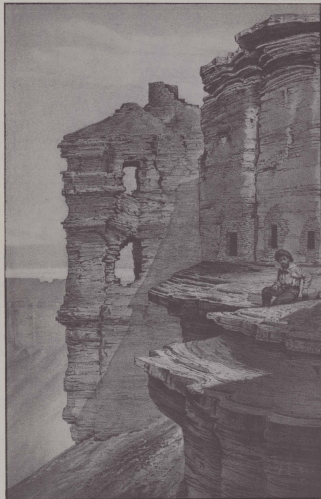
About one hundred and fifty yards to the southwest of this ruin are the remains of another similar structure. It has been, however, on a much grander scale. The walls are 26 inches thick, and indicate a diameter in the outer wall of about 140 feet. They are not above 4 feet high at any point, and in the parts toward the cliff can only be traced by a low ridge of earth. The remaining fragments of wall are at the remoter parts of the circles, and are in every respect like the walls already described. The inner wall, which can be traced but a short distance, is $8\frac{1}{2}$ feet from the outer, and has been connected by partition-walls, as in the other case.

The first impression given by this curious enclosure is that it was designed for a "corral", and used for the protection of herds of domestic animals; but since these people are not known to have possessed domestic animals, and when we further consider that enclosures of pickets would have served this purpose as well as such a massive and extraordinary structure, we can hardly avoid assigning it to some other use, which use, doubtless similar to that of the smaller tower, is very naturally suggested by its location and construction.

That they both belonged to the community of cave-dwellers, and served as their fortresses, council-chambers, and places of worship, would seem to be natural and reasonable inferences. Being on the border of a low mesa country that rises towards the north, the strong outside walls were doubtless found necessary to prevent incursions from that direction, while the little community by means of ladders would be free to pass from dwelling to temple and fortress without danger of molestation.

The original height of these structures must necessarily be a matter of conjecture, and it is true that although there is every evidence of age, both in the cave-dwellings and in the walled enclosures above, the lack of great quantities of crumbling walls and *débris*, and the general bareness of the ruins, give rise to the notion that they were but meagre affairs. If we conclude, however, that the outer walls were constructed for defence, and their thickness and form favor such a hypothesis, their height would probably have been as great as fifteen or twenty feet, while the inner walls, being equally heavy and well built, would be sufficiently high to accommodate two or three stories.

The manner of walling up the fronts of the cave dwellings, as here given, was observed frequently on the Rio Mancoes, where, in corresponding cliffs of shaly sandstones, there are many well-preserved specimens. A large group situated on this stream, about ten miles above its mouth, was subsequently examined. The walls were in many places quite well preserved and new-looking, while all about, high and low, were others in all stages of decay. In one place in particular, a picturesque outstanding promontory has been full of dwellings, literally honey-combed by this earth-burrowing race, and as one from below views the ragged, window-pierced crags (see Plate XXXII), he is unconsciously led to wonder if they are not the ruins of some ancient castle, behind whose mouldering walls are hidden the dread secrets of a long-forgotten people; but a nearer approach quickly dispels such fancies, for the windows prove to be only the door-ways to shallow and irregular apartments, hardly sufficiently commodious for a race of pigmies. Neither the outer openings nor the apertures that communicate between the caves are large enough to allow a person of large stature to pass, and one is led to suspect that these nests were not the dwellings proper of these people, but occasional resorts for women and children, and that the somewhat extensive ruins in the valley below were their ordinary dwelling-places. On the brink of the promontory above stands the ruin of a tower, still twelve feet high, and similar in most respects to those already described. These round towers are very numerous in the valley of the Mancoes. From this point alone at least three others are in view, some of the higher promontories, others quite low, within twenty or thirty feet of the river-bed. I visited and measured seven along the lower fifteen miles of the course of this stream. In dimensions they range from ten to sixteen feet in diameter and from five to fifteen feet in height, while the walls are from one to two feet in thickness. They are in nearly every case connected with other structures, mostly rectangular in form. At the mouth of the Mancoes, however, a double circle occurs, the smaller one having been the tower proper. It is fifteen feet in diameter, and from eight to ten in height. The larger circular wall is forty feet in diameter and from two to four feet high, and is built tangent to the smaller. This ruin is at the point where the Mancoes reaches the alluvial bottom bordering the Rio San Juan, and about one mile above its junction with that river. On the opposite or south side of the river are traces of somewhat extensive ruins, but so indistinct that the character of the original structures cannot be made out, and indeed no single mile of the lower fifty of the Mancoes is without such remains.



THE ENGRAVER & SON, LONDON.

CAVE TOWN RIO MANCOS.

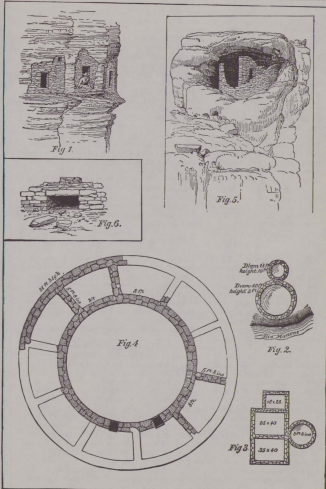


Fig. 1.

Fig. 5.

Fig. 6.

Fig. 4.

Fig. 2.

Fig. 3.

CAÑON OF THE RIO MANCOS.

Fifteen miles from its junction with the San Juan, this stream emerges from the southwest border of the Mesa Verde, through which it has cut its way, producing a most remarkable cañon. This cañon has already been once or twice described; but, in order to make my subsequent descriptions better understood, I shall give here an outline. The Mesa Verde is a somewhat irregular table-land, comprising an area of about seven hundred square miles, and is formed of a great series of nearly horizontal sedimentary rocks, of which the surrounding country has been denuded. This series of strata consists, in the upper part, of massive sandstones; in the middle part, of alternating sandstones and shales; and in the lower one thousand feet, chiefly of shales and clay. These softer beds are, when once exposed to the erosive agents, carried away with great rapidity, and, as a consequence, the firmer rocks above are undermined and break down in vertical cliffs, and, where soft and hard beds alternate, a series of steps, with intervening slopes, is formed. It will readily be seen that a cañon thus formed would consist in general of a narrow, irregular river-bottom, long steep slopes of *débris* rising like the arms of a letter V from this, then a succession of steep and slopes, culminating above in a series of lofty, embattled cliffs. The cañon is nearly thirty miles in length, and ranges from one to two thousand feet in depth. It seems to have been a favorite resort of the cliff-building people, and traces of their industry may be found everywhere, along the bottoms, in the cliffs, and on the high, dry table-lands above.

The six following plates will be taken up in the delineation of the more interesting portions of these remains.

PLATES XXXIII AND XXXIV.

Figure 1, Plate XXXIII, illustrates the method of walling up the cave-fronts as described on a preceding page. This sketch was made at the last-mentioned locality on the Rio Mancos. The group occurred in the cliff about thirty feet from the base. The three door-ways opened into as many small apartments, and these were connected with each other by very small passage-ways. The farther door could not be reached from the outside, as the platform of rock had broken away. See foreground in Plate XXXII.

Figure 2 gives a plan of the double tower near the mouth of the Mancos; it has already been described.

The ruin, of which a plan is given in Figure 3, occurs on the left bank of the Mancos about eight miles above the foot of the cañon. It is one of the best preserved specimens of the ruined towers, and seems to have been built with much skill. (See Plate XXXIV.) It is 9 feet in diameter on the inside and about 16 feet high. There are three rectangular apartments attached, the walls of which are almost levelled with the ground. In the side of the tower facing the river is a window, about 8 feet from the ground and 2 feet high by $1\frac{1}{2}$ wide. I had been previously led to the conclusion that these towers were in all cases built without windows or openings of any kind within reach of the ground from without, and it is not improbable that this opening did not communicate with the outside, but served as a door-way between the tower and one of the adjoining apartments. The advantage of such an arrangement in a defensive work, such as we may suppose this to have been, is clearly apparent, and evinces not a little intelligence and forethought on the part of the builders. Being built in connection with dwellings and places

of resort, they could, in case of alarm, be reached with ease from within, but be altogether secure from without.

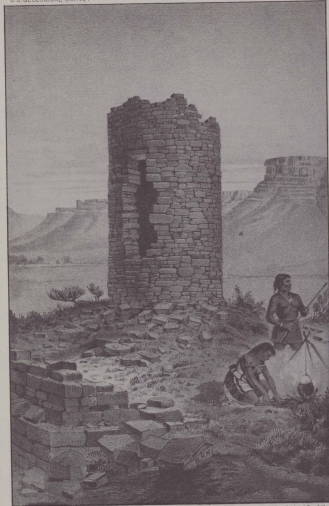
Figure 4. The large circular ruin, of which a ground-plan is given in this plate, was also visited by Mr. Jackson, photographs were made, and a brief description given; but I deem it best to give a more detailed description, the result of such observations and measurements as could be made in a period of time entirely too short for a work of such importance.

This ruin is situated on a narrow strip of alluvial bottom about midway in the cañon of the Mancos. On first approaching it, one does not observe that it differs greatly from the ordinary fragmentary structures below, as it is much decayed and almost hidden by artemisia and vines. Closer inspection, however, develops the greater part of the outline, and I imagine that a little excavation would bring all the foundations to light. The inner wall can be traced throughout the entire circle, and is in places 6 or 8 feet high. A portion of the outer wall, at the point farthest from the river, is still 12 feet in height and in a fair state of preservation. The space between the walls has been divided into cells, as in the two examples given in Plate XXXI. Four of the cross-walls are still a number of feet high, while others can be traced by lines of *débris*. The diameter of the outer wall is 43 feet; that of the inner, 25 feet. They are faced up with larger stones than usual (the heaviest of which, however, could be lifted with ease by a single workman), and have been filled in with rubble, adobe, and wood. The outside courses have been dressed to the curve, and the implements used, judging from the appearance of the picked surfaces, have been of stone. The main walls are 21 inches in thickness, while the partition-walls are somewhat lighter, and seem to have been but slightly built into the circular walls.

In order to determine the probable number of these cells, I measured the two having complete walls, and found the inner side of each to be 8 feet. As these were both on one side of the circle, I had but to measure the remaining space to complete the semicircle, and on so doing found that there was just room for three additional cells and the necessary partition-walls; two of these were still traceable. To complete the circle, therefore, ten apartments would be necessary. Being desirous of confirming this conclusion, I took the diameter of the inner circle, as given in my notes, and, by adding twice the thickness of the wall, obtained a circumference of 89½ feet; just sufficient space to accommodate ten apartments, with an equal number of partition-walls a fraction less than 12 inches in thickness.

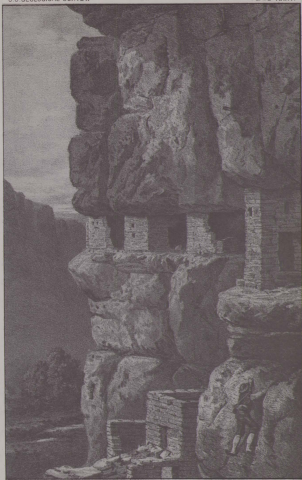
By adding to the diameter of the inner circle the total thickness of the walls, plus twice the distance between them, I obtained a diameter of 43 feet for the outer circle. The circuit of the structure is, therefore, 135 feet. Although these figures are greater than those previously given (estimated), I am confident that they cannot vary greatly from the truth.

There were no indications of windows or doors in the fragment of outer wall, but two nearly rectangular openings in the inner wall seem to have served as door-ways between the central enclosure and the cells. We may suppose that each cell had similar means of communication with the interior. The one door-way that remains entire is 6 feet from the ground, and measures 2 feet in width by 3 in height. The stone-work of the facing is very neat and exact, and the lintel is of a single slab of sandstone. It may be fairly presumed that the outer wall had no door-ways or windows within reach of the ground, and that entrance was obtained, by means of ladders, through high windows or by way of



THOMAS H. HENNING & SON, 1894.

HIGH TOWER, RIO MANCOS.



T. HENNING & SON, JAN. 1896.

CLIFF HOUSES, RIO MANCOS.

the roof. The central enclosure has doubtless served as an *estufa*, and there are still evidences of a considerable depression.

That this ruin is quite ancient is attested by the advanced stage of decay, and that it has been of considerable height may be inferred from the large quantities of *débris*. A similar and somewhat more perfect example of double-walled tower is illustrated in Plate XXXIX.

There seem to have been no buildings of importance in connection with this ruin, but many in the vicinity. On the point of a low rocky promontory that extends down from the mesa on the west to within a few yards of the circular ruin are some masses of decaying wall, and a large circular depression, not differing in appearance from the usual *estufa*.

It is probable that there are other remains higher up on the rocky slope; indeed, others could be seen from the trail, but I found no time to visit them.

A few hundred yards below the great tower, and very near the trail, a smaller tower occurs, having other ruins connected with it, and in a weather-worn cavity in a massive crag near by is the cosy little dwelling shown in Figure 5.

The rude little fire-place illustrated in Figure 6 was observed by Mr. Brandegee in connection with a cliff-house on the opposite side of the cañon, a little farther up. It is remarkable as being the only example discovered by our party. There seem to be no traces whatever of fire-places, ovens, furnaces, or chimneys in or about any of the ruins described, which is rather remarkable, since fires must have been used in baking pottery and for domestic purposes, and we cannot suppose that a people so well advanced in architectural skill were unable to build fire-places and furnaces.

PLATE XXXV.—CLIFF-HOUSES OF THE MANCOS.

This plate illustrates one of the more interesting groups of cliff-houses, or fortresses of the Rio Mancos. It occurs about ten miles from the foot of the cañon in a subordinate cliff on the west side. This low cliff is of massive sandstone, and is washed by the river, the trail being crowded back against the steep wall. At the height of about 40 feet above the river, a bed of shale occurs in the sandstone, which, being easily disintegrated, has been weathered out and carried away, leaving a sort of horizontal groove some 4 feet high and from 4 to 6 feet deep. In this a row of diminutive houses has been built. Three of these are almost perfect, having a fresh new look that certainly belies their age. Four others are much more decayed, and fragments of wall only cling to the cliffs. They have been made to occupy the full height and depth of the crevice, so that when one reaches it at the only accessible point, he is between two houses and must pass through these to get at the others. The door-ways are quite small and bear no evidence of the fitting or hanging of doors; and the windows, of which a number open to the front, are but a few inches square.

The walls are strongly built and are from eight to ten inches thick. The stones are small, dressed roughly on the outside, and laid in mortar.

In many places the heavier seams of mortar have been chinked with bits of pottery and small flakes of sandstone. The marks of the masons' pick are as fresh as if made within a few years, and the fine, hard mud-mortar which has been applied with the bare hands, still retains impressions of the minute markings of the cuticle of the fingers.

The house at the left hand in the drawing has two apartments, the

farthest of which has a curved wall conforming with the rounded end of the crevice floor, which, beyond this for some distance, is broken down.

Specimens of the mortar and of the dressed stone were procured from this house and brought East. Below the middle part of this line of houses, on an irregular projection, are the remains of a number of walls, in such a state of ruin, however, that the character of the original structure could not be made out. In digging among the *débris* of this ruin, I came upon a bin of charred corn, in which the forms of the ears were quite perfect. This corn seems to be of a variety similar to that cultivated by the tribes of the neighborhood at the present time.

That this corn had been placed there by the ancient occupants seems probable from the fact that it occupied a sort of basement apartment or cellar, and had been buried beneath the fallen walls of the superstructures. Embedded in this mass of charcoal, I found the very perfect specimen of stone implement figured in Plate XLVI (Figure 3). Many large fragments of the ordinary painted pottery were also picked up here. A certain new look about portions of this group leads one to suspect that it cannot boast of great antiquity; but it is very difficult to calculate the effects of age upon walls so perfectly protected and in such a climate.

PLATE XXXVI.

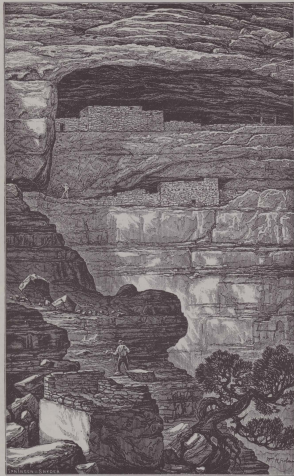
The group given in this plate is of a very interesting and remarkable character. It was first observed from the trail far below and fully one-fourth of a mile away. From this point, by the aid of a field-glass, the sketch given in the plate was made. So cleverly are the houses hidden away in the dark recesses, and so very like the surrounding cliffs in color, that I had almost completed the sketch of the upper house before the lower or "sixteen-windowed" one was detected. They are at least eight hundred feet above the river. The lower five hundred feet is of rough cliff-front slope, the remainder of massive bedded sandstone full of wind-worn niches, crevices, and caves. Within one hundred feet of the cliff-top, set deep in a great niche, with arched, overhanging roof, is the upper house, its front wall built along the very brink of a sheer precipice. Thirty feet below, in a similar but less remarkable niche, is the larger house, with its long line of apertures, which I afterward found to be openings intended rather for the insertion of beams than for windows.

PLATE XXXVII.

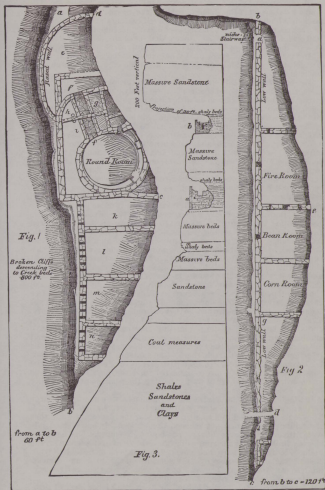
I subsequently climbed the cañon-walls to make a closer examination of these ruins, and the plans given in Plate XXXVII were obtained.

The lower house was easily accessible, and proved to be of a very interesting character. It occupies the entire floor of a niche which is about 60 feet long and 15 in depth at the deepest part. The front walls are built flush with the precipice, and the partition-walls extend back to the irregular wall of rock behind. Portions of the wall at the left, viewing the house from the front, are greatly reduced; but the main wall, that part which contains the window-like openings, is still 13 or 14 feet high.

The arrangement of the apartments is quite complicated and curious, and will be more readily understood by a reference to the ground-plan (Figure 1). The precipice-line, or front edge of the niche-floor, extends from *a* to *b*. From this the broken cliffs and slopes reach down to the



Cliff Town, Rio Mancos.



trail and river, as shown in the accompanying profile (Figure 3). The line *b c d* represents the deepest part of the recess, against which the walls are built. To the right of *b*, the shelf ceases, and the vertical face of rock is unbroken. At the left, beyond *a*, the edge is not so abrupt, and the cliffs below are so broken that one can ascend with ease. Above, the roof comes forward and curves upward, as seen in the profile.

The most striking feature of this structure is the *round room*, which occurs about the middle of the ruin and inside of a large rectangular apartment.

The occurrence of this circular chamber in this place is highly significant, and tends greatly to confirm my previously-stated opinion that the circle had a high significance with these people. Their superstitious seem to have been so exacting in this matter that, even when driven to the extremity of building and dwelling in the midst of these desolate cliffs, an inclosure of this form could not be dispensed with; a circular *estufa* had to be constructed at whatever cost of labor and convenience.

Its walls are not high and not entirely regular, and the inside is curiously fashioned with offsets and box-like projections. It is plastered smoothly, and bears considerable evidence of having been used, although I observed no traces of fire. The entrance to this chamber is rather extraordinary, and further attests the peculiar importance attached to it by the builders, and their evident desire to secure it from all possibility of intrusion. A walled and covered passage-way, *f, f*, of solid masonry, 10 feet of which is still intact, leads from an outer chamber through the small intervening apartments into the circular one. It is possible that this originally extended to the outer wall, and was entered from the outside. If so, the person desiring to visit the *estufa* would have to enter an aperture about twenty-two inches high by thirty wide, and crawl, in the most abject manner possible, through a tube-like passage-way nearly twenty feet in length. My first impression was that this peculiarly-constructed door-way was a precaution against enemies, and that it was probably the only means of entrance to the interior of the house; but I am now inclined to think this hardly probable, and conclude that it was rather designed to render a sacred chamber as free as possible from profane intrusion. The apartments *l, k, m, n* do not require any especial description, as they are quite plain and almost empty. The partition-walls have never been built up to the ceiling of the niche, and the inmates, in passing from one apartment to another, have climbed over. The row of apertures indicated in the main front wall are about five feet from the floor, and were doubtless intended for the insertion of beams, although there is no evidence that a second floor has at any time existed. In that part of the ruin about the covered passage-way, the walls are complicated, and the plan can hardly be made out, while the curved wall enclosing the apartment *e* is totally overthrown.

In digging among the *débris* with our hammers, we came upon a large earthen vessel at *h*, and shortly afterward discovered another near *i*. They were so situated in a small recess under the sheltering walls that the falling rubbish had not reached them. Roughly-hewn stone lids were fitted carefully over the tops, but both were empty. One had been slightly broken about the rim, while the other had been pierced on the under side by some sharp instrument, and had been mended by laying a small fragment of pottery over the aperture on the inside and cementing it down with clay. They are of the ordinary corrugated pottery, and have a capacity of about three gallons.

Beneath the vessels, spread out on the floor, was a large piece of rush-

matting, and beneath this a quantity of fine vegetable tissue from the interior bark of some kind of tree. The vessels are illustrated in Plate XLIV, and the matting in Plate XLVI.

The rock-face between this ruin and the one above is smooth and vertical, but by passing along the ledge a few yards to the left a sloping face was found, up which a stairway of small niches had been cut; by means of these, an active person, unencumbered, can ascend with safety. On reaching the top, one finds himself in the very doorway of the upper house (*a*, Figure 2) without standing room outside of the wall, and one can imagine that an enemy would stand but little chance of reaching and entering such a fortress if defended, even by women and children alone. The position of this ruin is one of unparalleled security, both from enemies and from the elements. The almost vertical cliff descends abruptly from the front wall, and the immense arched roof of solid stone projects forward 15 or 20 feet beyond the house (see section, Figure 3). At the right the ledge ceases, and at the left steps stop against a massive vertical wall. The niche stairway affords the only possible means of approach.

The house occupies the entire floor of the niche, which is about 120 feet long by 10 in depth at the deepest part. The front wall to the right and left of the door-way is quite low, portions having doubtless fallen off. The higher wall, *f, g*, is about 30 feet long, and from 10 to 12 feet high, while a very low rude wall extends along the more inaccessible part of the ledge, and terminates at the extreme right in a small enclosure, as seen in the plan at *c*.

In the first apartment entered, there were evidences of fire, the walls and ceiling being blackened with smoke. In the second, a member of the party, by digging in the rubbish, obtained a quantity of beans, and in the third a number of grains of corn, hence the names given. There are two small windows in the front wall, and door-ways communicate between rooms separated by high partitions.

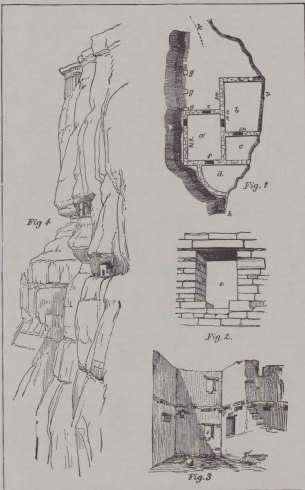
The walls of these houses are built in the usual manner, and average about a foot in thickness.

The upper house seems to be in a rather unfinished state, looking as if stone and mortar had run short. When one considers that these materials must have been brought from far below by means of ropes, or carried in small quantities up the dangerous stairway, the only wonder is that it was ever brought to its present degree of finish.

Figure 3 is given for the purpose of making clear the geologic conditions that give shape to the cliffs as well as to show the relations of these houses to the cliffs. The hard and massive beds of rock resist the erosive agents; the soft and friable beds yield, hence the irregularity—the overhanging cliffs, the niches, and benches. *a* is a section of the lower house, *b* of the upper.

It has heretofore been supposed that the occupants of these houses obtained water either from the river below or from springs on the mesa above; but the immense labor of carrying water up these cliffs, as well as the impossibility of securing a supply in case of a siege, made me suspect the existence of springs in the cliffs themselves. In three or four cases these springs have been found, and it is evident that with a climate a very little more moist than the present, a plentiful supply could be expected. Running water was found within a few yards of the group of houses just described, and Mr. Brandegee observed water dripping down the cliffs near a group of small houses on the opposite side of the cañon.

About one mile further up the cañon, I came upon the ruin photo-



graphed by Mr. Jackson in 1874, and minutely described by him as the two-story cliff-house of the Rio Mancos. It is also in the cliffs of the north side, about 700 feet above the river, and although not so large or complicated in design as the house just described, it shows higher skill in construction and is in a better state of preservation. It is also exceedingly difficult of access. It seems hardly necessary for me to enter into a detailed description, as little can be added to what has already been published;* but for the purpose of having as much of the matter together as possible I present Plate XXXVIII, illustrating some of the interesting features of this house.

Figure 1 gives the ground-plan, and shows the position of the house in relation to the floor of the niche. There are four small apartments only; the front one, *a*, being 10 feet long by 6 wide. Of the back rooms, one is 9 by 10 and the other 6 by 6 feet, while the apartment with the curved wall is much smaller. The walls are about twelve feet high and reach within from 2 to 3 feet of the overhanging roof. They are built in the ordinary manner of stone and adobe mortar, and what is rather remarkable are plastered both inside and out. This plaster does not differ greatly from the common mortar, is lightly spread over the walls, probably with the hands, and in color imitates very closely the hues of the surrounding cliffs, a pleasing variety of red and yellow grays. Whether this was intended to add to the beauty of the dwelling or to add to its security by increasing its resemblance to the surrounding cliffs, I shall not attempt to determine.

Another remarkable feature of this house is the consummate skill with which the foundations are laid upon and cemented to the sloping and overhanging faces of the ledge. The buttresses *b*, *b*, which have probably at one time supported a superstructure of wood or stone, now totally obliterated, are most striking illustrations of this; and just here is a fact that has an interesting bearing upon the question of the antiquity of this structure. These wall-supports or buttresses have originally been four in number, one evidently having fallen off, and are built in continuation of the front wall, on a smooth sloping surface of rock. Now, the sandstone of which this rounded slope is composed is rather coarse and soft, and hence easily disintegrated. It is here also not greatly protected from the weather, since the cliffs above do not overhang to any extent, and must, year by year, yield a little to the elements; but I observe that since the construction of these foundations no perceptible change has taken place; the thickness of a sheet of paper has hardly been washed from the surface of the rock, and the mortar, which is of almost equal firmness with the rock, lies upon it as if placed there within a dozen years, and the appearance of the plaster on the outer wall, although somewhat cracked and broken off, does not add greatly to our impressions of their antiquity.

There is also a fact worthy of notice in regard to the question of occupancy. I have already stated my impression that these houses were not used as constant dwelling-places, but rather as places of occasional resort. I notice that, although the building seems complete and has had its floors laid and its door-ways and windows conveniently and carefully arranged, the plastering of the interior is almost untouched, that with the exception of three names scratched in the soft, thick coat of adobe by Mr. Jackson's party, there is almost no trace of the presence of man; yet this plaster may have been applied only shortly before the final desertion, and hence no definite conclusion can be drawn.

* Bulletin No. 1, second series, p. 20.

A sketch of one of the door-ways is given in Figure 2. The outline is accurately drawn, but there is a little too much regularity in the stonework. It will be seen that the aperture is of very nearly the same width above and below, which is rather unusual, since, in these ruins, as well as in those farther south, the door-ways and windows are, as a rule, narrower at the top. This drawing also shows the manner of employing a number of small straight beams of wood as lintels, for the purpose, evidently, of strengthening the masonry above.

There are two of these exterior door-ways only, one opening into each story of the front room from the unoccupied part of the niche; these are shown in Figure 3, a sketch of the interior of the front room taken from the side *f*. There is only a low wall between this room and the room *c*, while small door-ways communicate with the other apartments. There is a small rectangular window, 22 inches high by 30 wide, in the front wall, from which a fine view can be had of the deep narrow valley below.

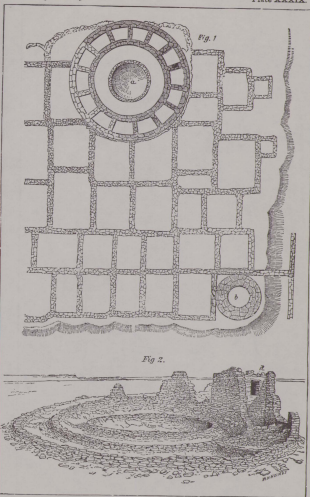
Figure 4 is designed to show the extraordinary situation of these houses. Whether viewed from below or from the heights above, the effect is almost startling, and one cannot but feel that no ordinary circumstances could have driven a people to such places of resort.

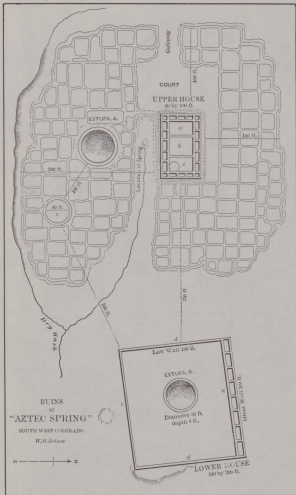
There are no ruins of importance in the cañon of the Mancos above the two-story house. Indistinct remains occur on the bottoms in a number of places, and a few small houses were observed in the cliffs. The most interesting of these is built upon a ledge about 40 feet above the trail, and is nearly midway between the two-story house and the head of the cañon. It does not differ in any essential point from the ruins already described. I shall therefore pass it by, in order to take up two very interesting groups of ruins that occur about 20 miles to the northwest.

Between the Mesa Verde and the Late Mountains, of which Ute Peak is the culminating summit, there is a long, deep valley or strip of lowland that connects the great lowland of the Lower Mancos with the cañon-cut plain that rises toward the Dolores. The southern end of this depressed strip drains into the Mancos, the northern into the McElmo. The latter stream heads along the north base of the Mesa Verde within five miles of the Mancos at the point where it enters the cañon, and flows westward, passing along the north base of Ute Mountain, curving around to the southwest and reaching the San Juan nearly 10 miles beyond the Utah line. The large depressed area drained by this stream contains a great number of ruins, many of which have not yet been examined.

PLATE XXXIX.—THE TRIPLE-WALLED TOWER.

The group partially illustrated in this plate is situated on a low bench within a mile of the main McElmo, and near a dry wash that enters that stream from the south. It seems to have been a compact village or community-dwelling, consisting of two circular buildings and a great number of rectangular apartments. The circular structures or towers have been built, in the usual manner, of roughly-hewn stone, and rank among the very best specimens of this ancient architecture. The great tower is especially noticeable on account of the occurrence of a third wall, as seen in the drawing and in the plan at *a*. In dimensions it is almost identical with the great tower of the Rio Mancos. The walls are traceable nearly all the way round, and the space between the two outer ones, which is about 5 feet in width, contains fourteen apart-





ments or cells. The walls about one of these cells are still standing to the height of 12 feet; but the interior cannot be examined on account of the rubbish which fills it to the top. No openings are noticeable in the circular walls, but door-ways seem to have been made to communicate between the apartments; one is preserved at *d*.

The inner wall has not been as high or strong as the others, and has served simply to enclose the *estufa*. This tower stands back about one hundred feet from the edge of the mesa and near the border of the village. The smaller tower, *b*, stands forward on a point that overlooks the shallow gulch; it is 15 feet in diameter; the walls are $3\frac{1}{2}$ feet thick and 5 feet high on the outside. Beneath this ruin, in a little side gulch, are the remains of a wall 12 feet high and 20 inches thick. The remainder of the village is in such a state of decay as to be hardly traceable among the artemisia and rubbish. The apartments number nearly a hundred, and seem, generally, to have been rectangular. They are not, however, of uniform size, and certainly not arranged in regular order. The walls are marked by low lines of loose rubble which show no stone in place, and I am inclined to believe that they have never been raised to any great height. It is not impossible that they have been, originally, of a species of rubble-masonry such as is seen in some of the great *casas* farther south, and that these meagre remains are all that is left of an imposing structure, but the total want of regularity both in the form and size of the apartments seems inconsistent with such a conclusion. In reality they are more like a cluster of pens such as are used by the Mogul tribes for the keeping of sheep and goats. The site of this village can hardly have been chosen on account of its defensive advantages, nor on account of the fertility of the surrounding country. The neighboring plains and mesas are as naked and barren as possible. The nearest water is a mile away, and during the drier part of the season the nearest running water is in the Rio Dolores, nearly fifteen miles away. To suppose an agricultural people existing in such a locality, with the present climate, is manifestly absurd. Yet every isolated rock and bit of mesa within a circle of miles is strewn with remnants of human dwellings.

PLATE XL.—RUINS AT "AZTEC SPRINGS."

Another very important group of ruins is located in the depression between the Mesa Verde and the Late Mountains, and near the divide between the McElmo and Lower Mancos drainage. It is stated by Captain Moss and others who have been in this locality that up to within two or three years there has been a living-spring at this place, and the spot has been christened by them Aztec Springs.

The site of the spring I found, but without the least appearance of water. The depression formerly occupied by it is near the centre of a large mass of ruins, similar to the group last described, but having a rectangular instead of a circular building as the chief and central structure. This I have called the *upper house* in the plate, and a large walled enclosure a little lower on the slope I have, for the sake of distinction, called the *lower house*.

These ruins form the most imposing pile of masonry yet found in Colorado. The whole group covers an area of about 480,000 square feet, and has an average depth of from 3 to 4 feet. This would give in the vicinity of 1,500,000 solid feet of stone-work. The stone used is chiefly of the fossiliferous limestone that outcrops along the base of the Mesa

Verde a mile or more away, and its transportation to this place has doubtless been a great work for a people so totally without facilities.

The upper house is rectangular, measures 80 by 100 feet, and is built with the cardinal points to within five degrees. The pile is from 12 to 15 feet in height, and its massiveness suggests an original height at least twice as great. The plan is somewhat difficult to make out on account of the very great quantity of *débris*.

The walls seem to have been double, with a space of 7 feet between; a number of cross-walls at regular intervals indicate that this space has been divided into apartments, as seen in the plan.

The walls are 26 inches thick, and are built of roughly-dressed stones, which were probably laid in mortar, as in other cases.

The enclosed space, which is somewhat depressed, has two lines of *débris*, probably the remains of partition-walls, separating it into the three apartments, a, b, c. Enclosing this great house is a network of fallen walls, so completely reduced that none of the stones seem to remain in place; and I am at a loss to determine whether they mark the site of a cluster of irregular apartments, having low, loosely-built walls, or whether they are the remains of some imposing adobe structure built after the manner of the ruined pueblos of the Rio Chaco.

Two well-defined circular enclosures or *estufas* are situated in the midst of the southern wing of the ruin. The upper one, A, is on the opposite side of the spring from the great house, is 60 feet in diameter, and is surrounded by a low stone wall. West of the house is a small open court, which seems to have had a gate-way opening out to the west, through the surrounding walls.

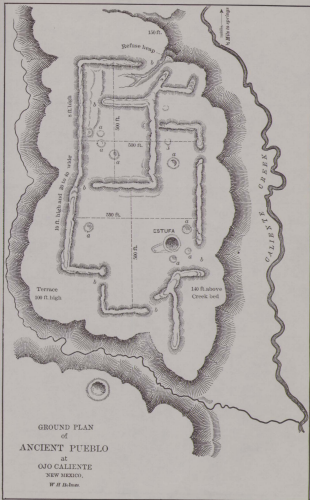
The lower house is 200 feet in length by 180 in width, and its walls vary fifteen degrees from the cardinal points. The northern wall, a, is double, and contains a row of eight apartments about 7 feet in width by 24 in length. The walls of the other sides are low, and seem to have served simply to enclose the great court, near the centre of which is a large walled depression (*estufa* B). No other ruins were observed in the neighborhood of these, although small groups are said to exist along the base of the Late Mountains, a few miles to the southwest.

The dry, sloping plain between the Mesa Verde and the Rio Dolores seems also to have been a favorite resort of the town-building tribes. Numerous ruins occur along the borders of the cañons that drain into the McElmo, and especially near the heads of these cañons where springs usually occur.

At the north bend of the Dolores there are a great number of ruins, many of which compare favorably with the lowland ruins farther south. Dr. Newberry passed through this region in 1859, and his report* gives a brief description of a few of these remains.

I made a hasty examination of such of the groups as I had an opportunity to visit, but had no time to make plans. Other ruins, including the remains of a large circular enclosure, occur on the river-bottom about two miles below the bend. I also noticed the small cliff-houses mentioned by Dr. Newberry, but did not visit them. West of the Do-

* Macomb's expedition to the junction of the Grand and Green rivers, Washington, 1826. Dr. Newberry says: "The hill from which I obtained this view is crowned with an extensive series of very ancient ruins. The principal one is a pueblo, nearly 100 feet square, once substantially built of dressed stone, now a shapeless heap, in which the plan of the original structure can, however, be traced. Like most of the ruined pueblos of New Mexico, it consisted of a series of small rooms clustered together like cells in a bee-hive. Near the principal edifice are mounds of stone, representing subordinate buildings. Among these are numerous large depressions marking the places of cisterns or *estufas*."



GROUND PLAN
of
ANCIENT PUEBLO
at
OJO CALIENTE,
NEW MEXICO.
W. H. D. Linn

lores our party was compelled to make very rapid marches, and I found it impossible to turn out of the trail long enough to make a satisfactory study of the ruins that occur by the way.

At one locality which I took to be Suronara* there appeared on our left a very extensive series of ruins, and it was a sore disappointment to be compelled to pass by without even a halt.

About the sources of the Hovenweep and Montezuma creeks there are occasional ruins of no great importance. In the vicinity of the Sierra Abajo I found no traces of ancient occupation further than a few arrow-points and fragments of chipped quartzite. Little or no trace of ancient occupation was observed north of a line between the Sierra Abajo and main peaks of the La Plata Mountains.

A very large and interesting ruin† occurs on the Animas River, near the southeast corner of our district for 1875, which seems to bear a very close relationship in its architecture to the ruins of the Rio Chaco. Unfortunately, no plans of this ruin have been made.

PLATE XLII.—RUIN AT OJO CALIENTE, NEW MEXICO.

For the sake of comparison, I present in Plate XLI the ground-plan of a ruined pueblo found at Ojo Caliente, New Mexico. It occurs on a high, almost isolated fragment of terrace near Caliente Creek. It has been constructed chiefly of adobe, and has consisted of rows of apartments surrounding a number of large open courts. Individual walls cannot be traced, and the rows of houses are reduced to smooth rounded ridges of earth. These are indicated on the plan, and are often as much as 8 feet high, and 30 feet wide at the base. The courts contain a number of small circles or mounds, *a, a*, and the single *estufa* is identical in appearance with those among the ruins of Colorado. A number of openings, *b, b*, through the walls indicate the location of gate-ways. *Metates*, arrow-heads, and many fragments of pottery were found. Many other groups of ruins similar to this occur in this as well as in the neighboring valleys. Near Abiquiu a large pueblo occurs, at which I found a stone axe and a number of arrow-heads and *metates*. A couple of skeletons were also obtained here. This ruin is described at length by Dr. Yarrow in his report for 1874.‡

PLATES XLIII AND XLIII.

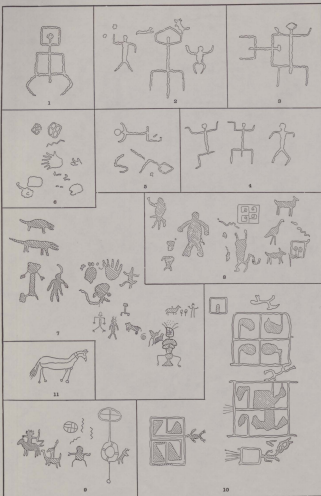
Although it is quite impossible to read the curious rock-inscriptions of unknown tribes, it is conceded that in most cases they have a meaning and represent an idea or record an event. Aside from this, however, they are valuable to the historian as records of the grade of civilization reached by the tribes who executed them.

That the examples given in the two following plates belong to the age of the cliff-builders cannot be satisfactorily proved, but, at the same

* Of these ruins Dr. Newberry says: "The houses are, many of them, large, and all of them built of stone, hammer-dressed on the exposed faces. Fragments of pottery are exceedingly common, though, like the buildings, showing great age. There is every evidence that a large population resided here for many years, perhaps centuries, and that they deserted it several hundred years ago; that they were Pueblo Indians, and hence peaceful, industrious, and agricultural. * * * The ruins of several large reservoirs, built of masonry, may be seen at Suronara, and there are traces of *acajagua*, which led to these, through which water was brought, perhaps, from a great distance."

† See Dr. Endliche's report, Annual Report of United States Geological Survey, for 1875, p. 177; also, Mr. Escoda's report, p. 240. See also Dr. Newberry's Report, Ex. edition to the Junction of Grand and Green Rivers, p. 59.

‡ Report of the Chief of Engineers for 1875, p. 1064.



time, evidence that they do is not wanting. Some are found on the cliffs and in the niches with the cliff-dwellings, while all are in localities that must have been frequently visited by these people. Some are found in the cañon of the Mancos, others on the bluffs of the San Juan, and many in the cañons farther west.

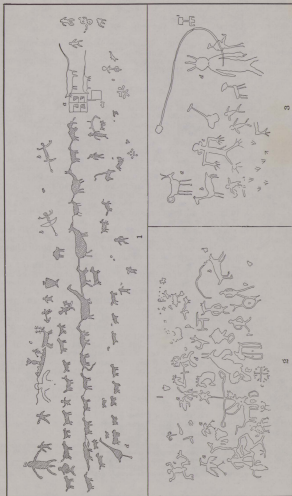
Figures 1, 2, and 3, Plate XLIII, occur on the Mancos near the group of cliff-houses figured in Plate XXXVI. They are chipped into the rock, evidently by some very hard implement, and rudely represent the human figure. They are certainly not attempts to represent nature, but have the appearance rather of arbitrary forms designed to symbolize some imaginary being.

Figures 4, 5, and 6 were found in the same locality, not engraved, but painted in red and white clay upon the smooth rocks. These were certainly done by the cliff-builders, and probably while the houses were in process of construction, since the material used is identical with the plaster of the houses. The sketches and notes were made by Mr. Brantledge. The reproduction is approximately one-twelfth the size of the original.

The examples given in Figures 7, 8, 9, 10, and 11, as well as those in Plate XLIII, occur on the Rio San Juan about 10 miles below the mouth of the Rio La Plata. A low line of bluffs, composed of light-colored massive sandstones, that break down in great smooth-faced blocks, rises from the river-level and sweeps around toward the north. Each of these great blocks has offered a very tempting tablet to the graver of the primitive artist, and many of them contain curious and interesting inscriptions. Drawings were made of such of these as the limited time at my disposal would permit. They are all engraved or cut into the face of the rock, and the whole body of each figure has generally been chipped out, frequently to the depth of one-fourth or one-half an inch.

The work on some of the larger groups has been one of immense labor, and must owe its completion to strong and enduring motives. With a very few exceptions the engraving bears undoubted evidence of age. Such new figures as occur are quite easily distinguished, both by the freshness of the chipped surfaces and by the designs themselves. Figure 11 gives a specimen of the modern work; it is evidently intended to represent a horse, and is done in the manner of the Navajos. It will readily be seen that among all the figures given of the ancient work there is no animal that resembles a horse, and we can hardly suppose that artists who could so cleverly delineate birds and deer and men, would fall in an attempt to represent an animal so marked a character. The curious designs given in Figure 10 have a very perceptible resemblance to many of the figures used in the embellishment of pottery.

The most striking group observed is given in Figure 1, Plate XLIII. It consists of a great procession of men, birds, beasts, and fanciful figures. The whole picture as placed upon the rock is highly spirited, and the idea of a general movement toward the right, skillfully portrayed. A pair of winged figures hover above the train as if to watch or direct its movements; behind these are a number of odd figures, followed by an antlered animal resembling a deer, which seems to be drawing a notched sledge containing two figures of men. The figures forming the main body of the procession appear to be tied together in a continuous line, and in form resemble one living creature about as little as another. Many of the smaller figures above and below are certainly intended to represent dogs, while a number of men are stationed about, here and there, as if to keep the procession in order.



As to the importance of the event recorded in this picture no conclusions can be drawn; it may represent the migration of a tribe or family or the trophies of a victory. A number of figures are wanting in the drawing at the left, while some of those at the right may not belong properly to the main group. The reduction is, approximately, to one-twelfth.

Figures 2 and 3 of the same plate represent only the more distinct portions of two other groups. The complication of figures is so great that a number of hours would have been necessary for their delineation, and an attempt to analyze them here would be fruitless.

POTTERY.

The pottery of the ancient tribes of the San Juan Valley is undoubtedly superior in many respects to that of the town-building tribes of today. It is especially superior in composition and surface-finish. In form and ornamentation it does not compare well with the highly artistic wares of the Moquis and Zunis. There is great similarity, however, in every respect, and the differences do not seem greater than could be expected in the manufactures of the same people at periods separated by a few generations, or even of related tribes of the same time surrounded by different physical features or by different neighbors.

The study of the fragmentary ware found about the ruins is very interesting, and its immense quantity is a constant matter of wonder. On one occasion, while encamped near the foot of the Mancoes Cañon, I undertook to collect all fragments of vessels of manifestly different designs within a certain space, and by selecting pieces having peculiarly marked rims I was able to say with certainty that within 10 feet square there were fragments of fifty-five different vessels. In shape these vessels have been quite varied, but by far the greater portion have been of the form of bowls and handled cups or ladles. Jugs and vases also occur. In general the forms have been so simple that with the aid of the great quantities of fragments it is not difficult, providing the rim is preserved, to say with accuracy to what form of vessel a given specimen belongs. The bottoms of the various vessels, excepting a kind of handled mug, are rounded or very slightly flattened.* The art of ornamentation seems to have been especially cultivated, as very few specimens are found that are not painted, indented, or covered with raised figures. Indeed, these ornamental designs are often so admirable, and apparently so far in advance of the art-ideas of these people in other respects, that one is led to suspect that they may be of foreign origin. But there is certainly no conclusive evidence that these people ever came in contact with Europeans or were even influenced by European art.

The material used in the manufacture of pottery was generally a fine clay (in which the country abounds), tempered with sand or pulverized shells. The modelling was done almost exclusively with the hand; no wheel has been used, and no implement whatever, except for surface creasings or indentings.

The thickness of the ware varies from $\frac{1}{4}$ to $\frac{1}{2}$ an inch. Lightness has evidently been greatly desired, and vessels having a capacity of many gallons are not more than $\frac{1}{4}$ of an inch thick in any part.

* Dr. Charles Ras says, in an article on Indian pottery, in the Smithsonian Report for 1895, p. 345, that "the oldest vessels of all nations who practiced the potter's art probably exhibited that shape (the rounded bottom), the model of which was furnished by nature in the gourd and other fruits presenting rounded outlines. A flat bottom, therefore, would denote a progress in the ceramic art."

Nearly all of the vessels and fragments collected have been baked or burned, but not to such a degree as to greatly change the color of the clay.

Most, if not all, of the painted pottery has received a thin coating of some mineral solution that gives a beautiful enamel-like surface, not greatly inferior in hardness to the vitreous glazing of our potters. Upon this surface, before burning, the color is laid, apparently with a brush. In one or two cases the indented ware has a light gray surface coating that on the broken edges has quite a perceptible thickness.

A specimen collected at Ojo Caliente, New Mexico, has been coated with a thin film of finely-powdered mica. This specimen has been ornamented by a series of slight grooves in a manner similar to much of the pottery found in the Mississippi Valley. In the entire collection there is but one specimen that shows evidence of having been formed in a basket. It was found in the lower part of the San Juan Basin.

A few specimens are covered with painted figures on the inside, and have also thumb indentations on the outside.

Fragmentary pottery, of the same character as that collected in the San Juan Valley, has been collected by government expeditions over an immense area to the south and west. By far the richest find was that made by Dr. E. Palmer at Saint George, Utah. The greater part of the collection made is now in the Government Museum. I have therefore been able to compare them with our own specimens, and find them almost identical in every respect.

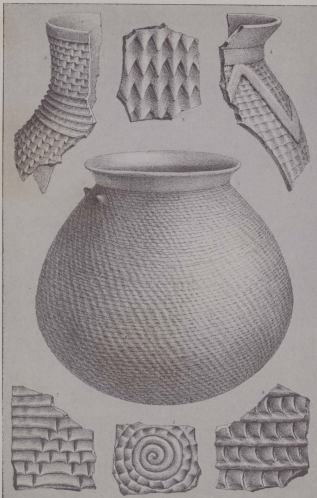
Cuts of a large number of specimens are given by Mr. Ewbank in Vol. III, Pacific Railroad Report. They are chiefly from Zuni and the Colorado Chiquito, and seem to present no features differing from the more northern examples. Lieutenant Simpson also gives a number of specimens in color in his report on "An Expedition to the Navajo Country."

In order to give to those who have no opportunity to examine and compare for themselves the various specimens of the ancient ware as complete an idea of its appearance as possible, I have made a number of restorations. The forms given are not in any sense imaginary, as there are fragments in great numbers that illustrate every part of the different vessels presented; besides, there are entire specimens at hand of every form given. I have restored from such small fragments simply because they happen to contain more elaborately-painted designs than any of the entire vessels. The peculiarities of the various varieties in form and color can be described more readily in connection with the examples given in the plates.

PLATE XLIV.

This plate is intended to illustrate the corrugated and indented ware. Heretofore specimens of this class have been quite rare, as it is not made by any of the modern tribes.

Figure 1 represents one of a pair of large vessels exhumed from the ruins of the "sixteen-windowed" cliff-house of the Rio Mancoes. It has a capacity of about three gallons, and was probably used for carrying or keeping on hand a supply of water. It is quite light, not weighing more than a common wooden pail, and is made of a light-gray clay tempered with coarse sand, and but slightly burned. The corrugated appearance is given by laying on strips of clay, in somewhat regular succession, and pressing them into place and indenting them with the thumb or a stick. Whether a thin shell of clay is first constructed and the strips laid on and pressed down so as to unite with it, or whether



W. E. Holmes. Col. & Lit.

C. G. Bailey A. S. M., 1877.

ANCIENT POTTERY

the vessel is built up by the strips alone, cannot be determined, since the inside is perfectly smooth, excepting finger-marks, and the strips are so welded into the general texture of the vessel that individual strips cannot be detected beneath the surface when examined on broken edges.

In the specimen figured the workman has begun near the centre of the rounded bottom and laid a strip in a continuous but irregular spiral (see Fig. 3) until the rim was reached, indenting the whole surface irregularly with the finger. A smooth recurved rim has then been added in a very skillful manner. Two small conical bits of clay have been set in near the rim, as if for ornament. The companion piece has a small scroll-shaped ornament similarly placed.

Figure 2 shows the manner in which the spiral is started on the bottom of the vessel. In some cases the crimping or indenting begins with the spiral, but in others the strip of clay is left quite smooth for a considerable space, as in the example.

Figure 3 represents a fragment of a large vase or jar obtained by Mr. Jackson in the valley of Epsom Creek, Southeast Utah. The original vessel has had a capacity of at least ten gallons, and has certainly presented a very attractive appearance, as the outline has been quite elegant and the surface-modelling symmetrical and highly artistic. It has been built up in the usual manner of a continuous band or strip of clay, the ornamentation has been varied by leaving occasional belts of the overlapping strips quite plain, while the indentations in the alternating belts have been made with great care, probably with the thumb. The rim is smooth and upright and has a diameter of 9 inches. The neck is narrow and straight, and the body swells to 18 inches at the greatest circumference. The specimen as given does not show this, however, as the lower part has been lost. The inside is smooth; the material is coarse clay, in which can be seen much coarse sand, apparently ground granite, as fragments of both quartz and hornblende appear. For so large a vessel the walls are remarkably thin, not being more than one-fourth of an inch thick in any part.

Figure 4. The vessel of which this is a large fragment has been much smaller than the preceding, and of greatly inferior workmanship. It has resembled more closely the specimen given in Figure 1, but is especially noticeable from the attempt at ornament. A festoon-like strip of clay has been laid on beneath the rim.

Figure 5. This is one of the best specimens of raised ornamentation in the collection. It has been modelled entirely with the fingers, and retains perfectly the most delicate markings of the skin. The strips of clay, which run obliquely across the specimen, have been indented, as usual, with the thumb, and the projecting "beads" have been slightly drawn down and pointed by pressure between the fingers. The drawing is nearly natural size.

Figure 6. The modelling of this specimen is hardly inferior to that of the preceding. The strips of clay have been laid on with great care, every other layer, only, being pressed down and indented. It can be seen that each impression of the thumb is clearly defined, and the nail-marks are as distinct as if made yesterday.

Figure 7. This specimen differs from the others given in having been indented with some sharp implement. The clay spiral has been laid on and gently pressed down by the fingers. Afterward an ornamental design has been produced by a series of sharp indentations.

If we should judge by the curvature of these fragments, the complete

vessels have exceeded in size the one given in Figure 1, and must have been for those primitive days master-pieces of the potter's art.

In form, vessels of this class have not been so varied as the painted ware; bowls, cups, and spoons or ladles are not known, but nearly every variety of narrow-necked vessels may be found in collections.

PLATE XLV.

As previously mentioned it is not difficult, when we have such a great number of specimens at hand, to arrive at an accurate idea of the shape of any vessel of which we have ordinarily large fragments. None of the more elaborately ornamented vessels have been preserved entire, and in order to do justice to the artistic abilities of the ancient potters, I give in this plate a few restorations. In preparing the lithograph the tendency is to make the surfaces too smooth and the forms too symmetrical, but we may make allowance for this and still have specimens very little inferior to those figured. As the fragments used are plainly indicated in the drawing, there need be no misunderstanding as to the method employed in making the restorations.

Figure 1 represents a bowl which, as the fragments indicate, has been decorated with beautiful designs in black both inside and out. The original has been about 6 inches in diameter and 4 inches deep.

Figure 2. This bowl has been about twice the size of the above, and has contained ornamental designs of a somewhat more intricate pattern.

Figure 3. Is restored from a large fragment which has on the inside a design in which the scroll is used. This scroll has been produced by filling in the spaces about it with dark color.

Figure 4. This bowl is entire, and was collected by Mr. Jackson, on the San Juan River, in Utah. It has a capacity of about three pints. The ornamental design is applied to the inside and is quite simple.

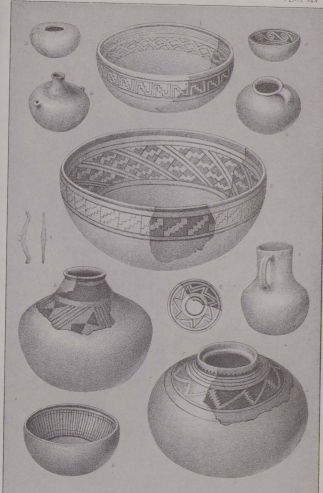
Figure 5. Fragments of vessels of this shape were found in many localities. All are covered with ornamental designs similar to those on other vessels. Two entire specimens were obtained by Captain Moss, in a grave on the Rio San Juan.

Figure 6. The fragment from which this form is drawn was found on the Rio San Juan near the Great Creston or Hogback. The enamel is dark, and the painted design has a dark metallic lustre. The upper part of the vessel has been quite handsome in design; the lower part has in all probability been as indicated in the restoration, as all whole specimens which have similarly shaped necks have the bottom round or nearly so.

Figure 7. The most striking characteristic of this specimen is the shape of the rim, which has been fashioned for the reception of a lid. The quality of the ware has been good, and the shape seems to have been quite symmetrical. It was found in the same locality as the preceding.

Figure 8. A great many disk-shaped specimens were picked up. They are of the same material as the ordinary pottery, and have in most cases been painted with rude designs. The finest example is given in this figure. They are usually from two to five inches in diameter and about one-half an inch in thickness.

Sections of two varieties are given in Figure 9. These disks were doubtless used as lids for the various narrow-necked vessels. This specimen fits the vessel given in Figure 7, although not found in the same locality.



probably from the Pacific coast. Large numbers of this and allied shells are found about these ruins. They are generally pierced, and were doubtless used as beads.

Figure 8 represents a small carved figure found on the Rio Mancos. It is made of hard gray slate. Its use or meaning cannot be determined.

My conclusions in reference to the history of the ancient inhabitants of this region, as drawn from my observations among the ruins, briefly outlined, are as follows:

The ancient peoples of the San Juan country were doubtless the ancestors of the present pueblo tribes of New Mexico and Arizona. A comparison of the ancient with the modern architecture and a consideration of the geographical relations of the ancient and modern pueblos lead very decidedly to this conclusion. They have at one time or other occupied a very extensive area which includes the greater part of the drainage of the Rio Colorado. Their occupation of this region dates back very many centuries, as attested by the extent of the remains and their advanced state of decay.

The final abandonment of the cliff and cave dwellings has occurred at a comparatively recent date, certainly subsequent to the Spanish conquest.

The lowland remains, the extensive pueblos and great towers, are generally in a very much more advanced state of ruin than the cliff defences. It is possible that the latter owe their construction to events that immediately preceded the expulsion of the pueblo tribes from this region.

The cliff builders were probably not greatly superior to the modern pueblos in any of the arts, and I doubt if they could boast of a state of civilization equally advanced.

It should be remembered that up to this time no excavations whatever have been made among these ruins, and I feel as if more information should be obtained before attempting to draw other than very general conclusions. It seems to me probable that a rich reward awaits the fortunate archaeologist who shall be able to thoroughly investigate the historical records that lie buried in the masses of ruins, the unexplored caves, and the still mysterious burial-places of the Southwest.

