
THE REPAIR OF CASA GRANDE RUIN, ARIZONA, IN 1891

BY

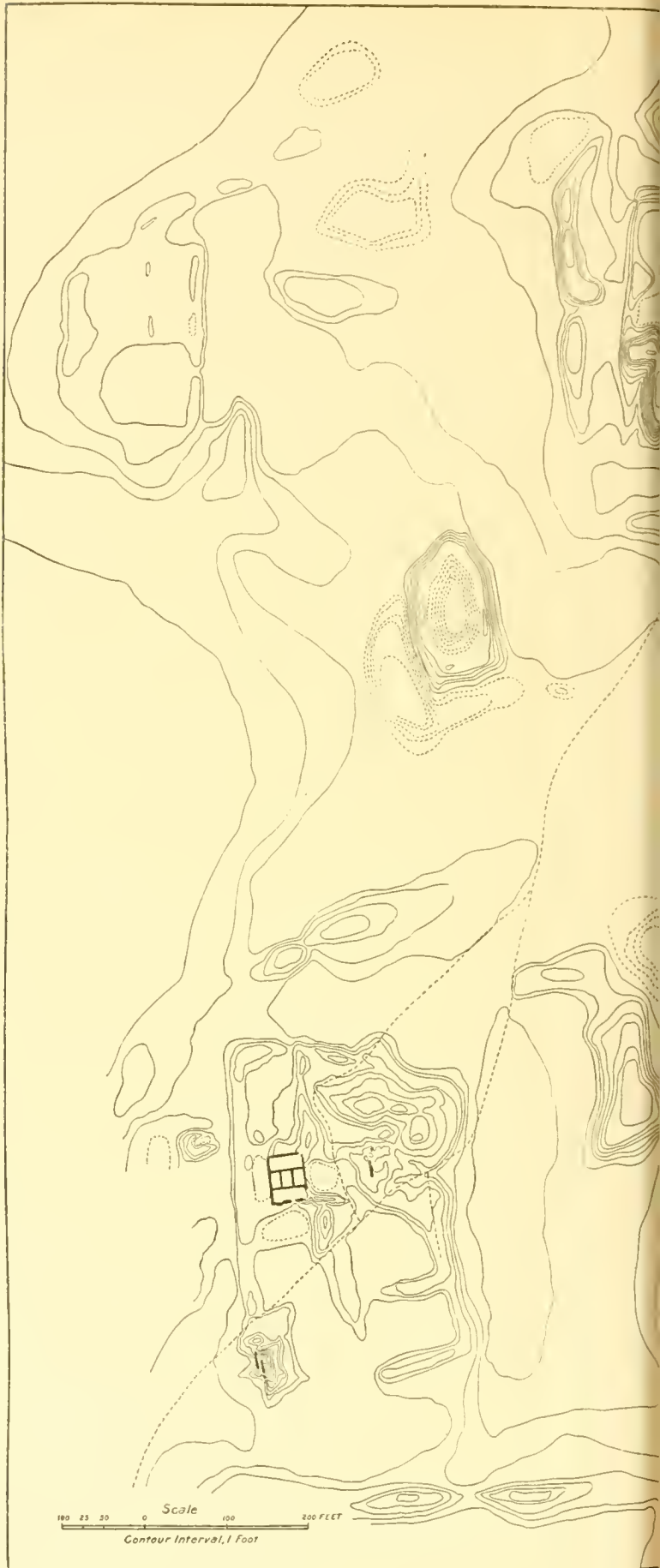
COSMOS MINDELEFF

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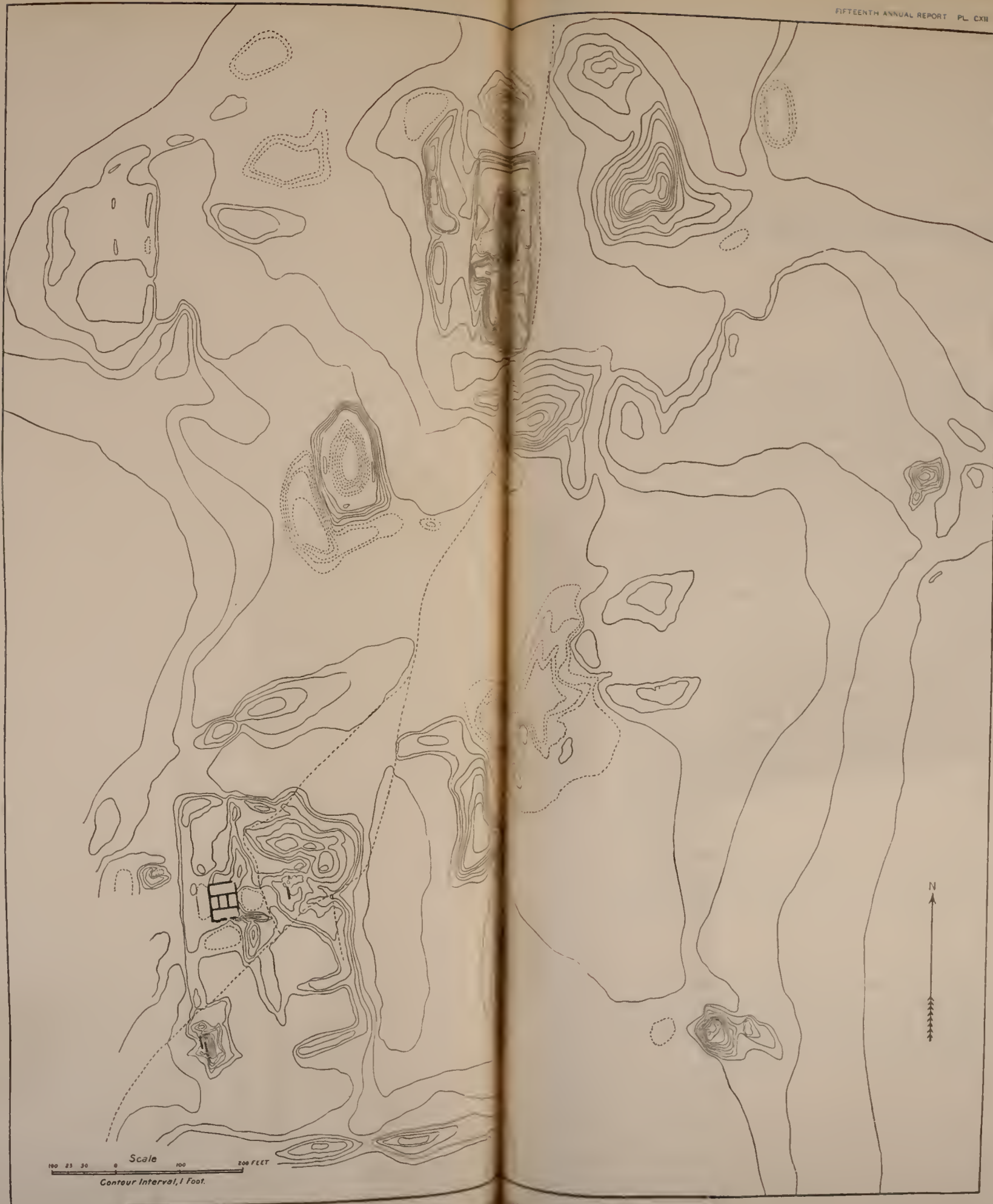
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Scale 0 100 200 FEET
Contour Interval, 1 Foot.

MAP OF ... GROUP

THE REPAIR OF CASA GRANDE RUIN

BY COSMOS MINDELEFF

INTRODUCTION

In March, 1889, an appropriation of \$2,000 was made by Congress for the repair of Casa Grande ruin in southern Arizona. This amount was insufficient for complete restoration, but under the authority of the act of Congress making the appropriation some work was done. Partly as an aid to further possible work, and partly that there may be an available record of what has been done for the benefit of future students of American archeology, this report is presented.

A full description of Casa Grande has been given by the writer in a published memoir¹ on that ruin, hence only a brief account will now be necessary to aid in making the present report intelligible. Following this description is a statement of the condition of the ruin in 1891 and of the plans formed for its repair, the latter being necessarily controlled by the amount appropriated. After this there is an account of the work done, from the passage of the bill until the delivery of the work to the agent of the United States who received it, and of the reservation of an area of land about the ruin by order of the President. This is followed by a catalogue of the articles found during the excavations in and about the ruin, which were subsequently deposited in the National Museum; a transcript of the contract under which the work was done, including specifications, plans, and sections, and the report of Mr H. C. Rizer, who inspected and received the work. Finally, there are appended the correspondence and report relating to the condition of Casa Grande in 1895, with recommendations concerning its further protection.

Casa Grande has occupied a very important place in the literature of American archeology, a place which it doubtless will continue to occupy; and as dates are frequently of importance an effort has been made to make the present report as full as possible in that respect.

DESCRIPTION OF THE RUINS

Casa Grande appears to be the sole surviving remnant of an extensive and important class of remains in the southwest. These remains occur usually in large groups or clusters, and Casa Grande is no exception.

¹Thirteenth Annual Report of the Bureau of Ethnology, p. 289 et seq.

The name has been ordinarily applied to a single house structure standing near the southwestern corner of a large area covered by mounds and other débris; but some writers have applied the term to the southwestern portion of the area, others to the whole area.

Probably no two investigators would assign exactly the same limits to this area, as its margins merge imperceptibly into the surrounding country. The accompanying map (plate CXII) shows the limits of the ruins as interpreted by the writer. The surface covered by well-defined remains, as there shown, extends about 1,800 feet north and south and 1,500 feet east and west, or a total area of about 65 acres.

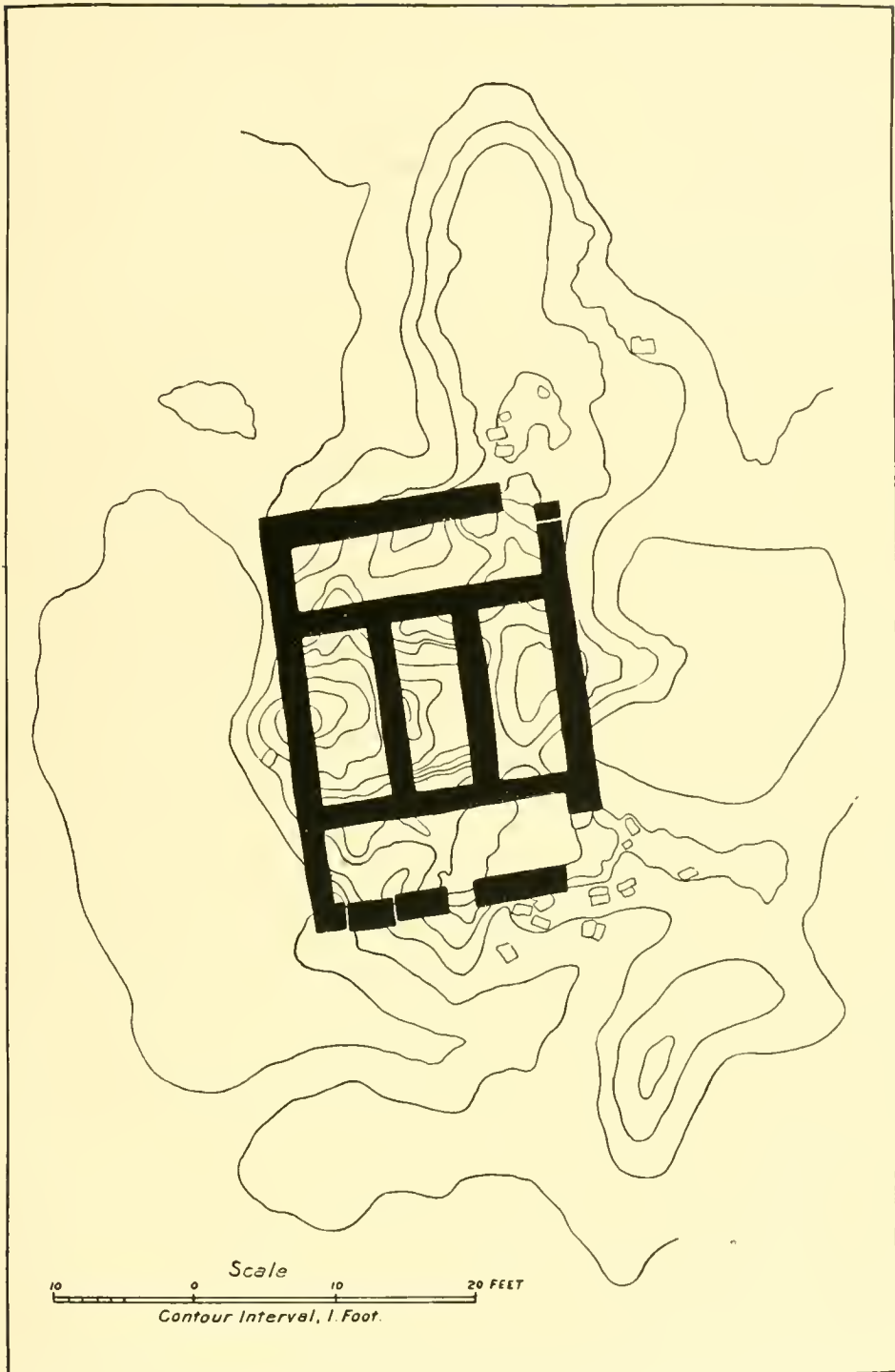
Casa Grande ruin occupies a position near the southwestern corner of the group, and its size is insignificant as compared with the entire cluster of ruins, or even with the remains of the large structure which occupied the north-central part of the area. The contour interval on the map is 1 foot, sufficiently small to show much surface detail. The depressions are indicated by dotted contours.

Within the area shown on the map there are a large number of mounds, more or less leveled by long-continued exposure to the elements. Some appear to be quite old, others represent buildings which were standing within the historic period, and many interesting features are presented which can not even be alluded to here.

Casa Grande proper was one of the smallest of the house clusters, but it is unique in that the walls are still standing to a height of more than 25 feet. While fragments of standing wall are not uncommon, either in the area mentioned or in the valleys of Gila and Salt rivers generally, no other example exists, so far as known, so well preserved as the one under consideration.

For miles around Casa Grande the ground surface is so flat that from the summit of the walls an immense stretch of country is brought under view in every direction. In the whole southwest, where there are thousands of ruins, many of which represent villages located with especial reference to outlook, there are few, if any, so well situated as this.

A ground plan of the ruin is shown in plate CXII and a general view in plate CXIV. The area covered and inclosed by standing walls is about 43 by 59 feet, but the building is not exactly rectangular, nor do its sides exactly face the cardinal points, notwithstanding many published statements to that effect. The building comprised three central rooms, each approximately 10 by 24 feet, arranged side by side with the longer axes north and south, and two other rooms, each about 9 by 35 feet, occupying, respectively, the northern and southern ends of the building, and arranged transversely across the ends of the central rooms, the longer axes running east and west. Excepting the central tier of rooms, which was three stories high, all the walls rose to a height of two stories above the ground. The northeastern and southeastern corners of the structure have fallen, and large blocks of the material of which they were composed are strewn upon the ground in the vicinity.



GROUND PLAN OF CASA GRANDE RUIN

The exterior walls rise to a height of from 20 to 25 feet above the ground. This height accommodated two stories, but the top of the wall is from 1 to 2 feet higher than the roof level of the second story. The middle room or space was built up three stories high, and the walls are still standing to a height of 28 to 30 feet above the ground level. The tops of the walls, while rough and greatly eroded, are approximately level. The exterior surface of the walls is rough, as shown in the illustrations, but the interior walls of the rooms are finished with a remarkable degree of smoothness, so much so that it has attracted the attention of everyone who has visited the ruin. Plate CXV shows this feature. At the ground level the exterior wall is from $3\frac{1}{2}$ to $4\frac{1}{2}$ feet thick, and in one place over 5 feet thick. The interior walls are from 3 to 4 feet thick. At the tops the walls are about 2 feet thick. The building was constructed by crude methods, thoroughly aboriginal in character, and there is no uniformity in its measurements. The walls, even in the same room, are not of even thickness; the floor joists were seldom in a straight line, and measurements made at similar places (for example, at the two ends of a room) seldom agree.

Casa Grande is often referred to as an adobe structure, but this use of the term is misleading. Adobe construction consists of the use of molded brick, dried in the sun, but not baked. The walls here are composed of huge blocks of rammed earth, 3 to 5 feet long, 2 feet high and 3 to 4 feet thick. These blocks were not molded and then laid in the wall, but were manufactured in place.

Plate CXVI shows the character of these blocks. The material employed was admirably suited for the purpose, being when dry almost as hard as sandstone and nearly as durable. A building with walls of this material would last indefinitely, provided a few slight repairs were made at the conclusion of each rainy season. When abandoned, however, sapping at the ground level would commence and would in time bring down all the walls; yet in the two centuries which have elapsed since Padre Kino's visit to this place—and Casa Grande was then a ruin—there has been but little destruction from the elements, the damage done by relic hunters during the last twenty years being, in fact, much greater than that due to all causes in the preceding two centuries.

The building was well provided with doorways and other openings, arranged in pairs, one above the other. There were doorways from each room into every adjoining room, except that the rooms of the middle tier were entered only from the east. Some of the openings were not used, and were closed with blocks of solid masonry, built into them long prior to the final abandonment of the structure.

CONDITION OF CASA GRANDE IN 1891

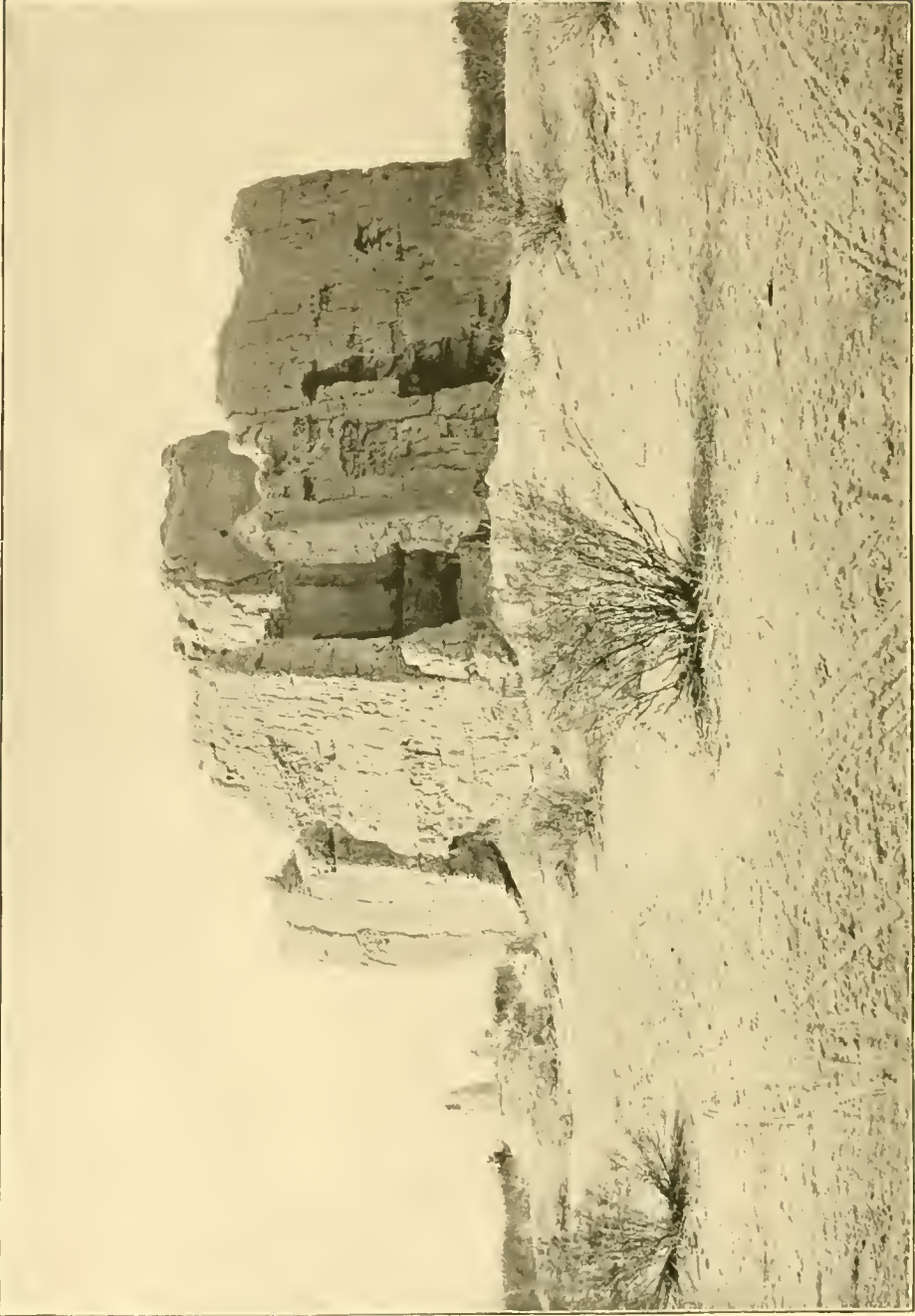
The south and east fronts of Casa Grande seem to have suffered particularly from the weather, and here rainstorms have probably caused some of the damage. The outer faces of the walls are of the same material as the wall mass, all the masonry being composed of

earth from the immediate site. In the construction of the walls this soil was laid up in successive courses of varying thickness, whose limits form clearly defined and approximately horizontal joints. The northeast and southeast corners of the building have entirely fallen away, and low mounds of their débris still show many knobs and lumps, parts of the original wall mass.

The destruction of the walls was due mainly to undermining at the ground level. The character of this undermining is shown in many of the illustrations to this report, especially in plate CXVI, and its extent is indicated on the accompanying ground plan (plate CXVII) by dotted lines within the wall mass. Although the material of which the walls are composed is very hard when dry, and capable of resisting the destructive influences to which it has been subjected for a long time, yet under certain conditions it becomes more yielding. The excessively dry climate of this region, which in one respect has made the preservation of the ruin possible, has also furnished, in its periodic sandstorms, a most efficient agent of destruction. The amount of moisture in the soil is so small as scarcely to be detected, but what there is in the soil next to the walls is absorbed by the latter, rising doubtless by capillary attraction to a height of a foot or more from the ground. This portion of the wall being then more moist than the remainder, although possibly only in an infinitesimal degree, is more subject to erosion by flying sand in the windstorms so frequent in this region, and gradually the base of the wall is eaten away until the support becomes insufficient and the wall falls en masse. The plan shows that in some places the walls have been eaten away at the ground level to a depth of more than a foot. Portions of the south wall were in a dangerous condition and likely to fall at any time.

Visiting tourists have done much damage by their vandalism. They have torn out and carried away every lintel and every particle of visible wood in the building. After the removal of the lintels a comparatively short time elapses before the falling in of the wall above. Apparently but a small amount of this damage can be attributed to rainstorms, which, although rare in this region, are sometimes violent. There is evidence that the present height of the walls is nearly the original height, in other words, that the loss from surface erosion in several centuries has been trifling, although numerous opinions to the contrary have been expressed by causal observers. The eastern wall has suffered more from this cause than the others; a belt on the northern half, apparently softer than the remainder of the wall, has been eaten away to a depth of nearly a foot. The interior wall faces are in good condition generally, except about openings and in places near the top.

Evidences of the original flooring are preserved in several of the rooms, especially in the north room. The flooring conformed to the pueblo type in the use of a series of principal beams, about 3 inches in diameter, above which was a secondary series smaller in size and placed



GENERAL VIEW OF CASA GRANDE RUIN

quite close together, and above this again a layer of rushes with a coating of clay. All the walls show evidences of the principal series of beams in the line of holes formed by their ends where they were embedded in the walls. In the south wall, in parts of the east wall high up on the level of the upper roof, and in parts of other walls a few stumps of floor beams remained. These specimens of aboriginal wood-work have survived only because they are not in sight from the ground, and their existence therefore was not suspected by the tourists. Evidence of the other features of the floor construction can be seen on the walls in places where they have left an imprint, as described in the memoir previously cited.

No single opening remains intact, as the lintels have been removed from every one of them. This is particularly unfortunate, for openings at their best are an element of weakness in a wall, and here each opening, after the lintel was removed, became, as it were, a center of weakness from which the destruction of the wall mass gradually proceeded further and further.

PLANS FOR THE REPAIRS

The plans for the repair of the ruin and its preservation included the reservation of the area covered by remains and, if possible, its inclosure, for within that area are exhibited all the various degrees of decay and disintegration which clearly link the comparatively well-preserved Casa Grande with the numerous almost obliterated ruins along the Gila and the Salt, whose vestiges will become even less distinct as time passes and cultivation increases.

It was deemed necessary to remove all the rubbish and débris within the building and from an area measuring 10 feet from the outer walls in every direction. Plate VI shows the extent of this area, and six sections are shown in plates VII and VIII, three on east-and-west lines and three on north-and-south lines. The lines along which these sections were made are indicated on the plan, plate CXVII. The ground level was determined by excavation, and is of course only approximate. The sections show the estimated amount of débris which was to be removed. Aside from other considerations, it was necessary to uncover the walls to the ground level in order to do the necessary underpinning.

It was planned to underpin the walls, where erosion at the ground level had weakened them, with hard-burned brick laid in cement mortar. Plate CXVII shows in a measure the extent of this erosion. The brick surface was to be set back an inch or two and faced with that thickness of cement mortar. Plate CXX shows the south front and plate CXXI the south and east fronts when the brickwork was completed, but before it was plastered, and will illustrate what was planned better than can a description.

This treatment, it was believed, would give a surface capable of effectually resisting atmospheric influences and the destructive action of flying sand, and at the same time would not disfigure the ruin by making the repairs obtrusive.

The broken-out lintels of openings were to be replaced, and the cavities above them filled in with brick faced with mortar similar to the underpinning.

The south wall, which was in a dangerous condition, was to be supported by three internal braces, as shown in the plan, plate CXVII. The longest brace or beam was necessarily of wood, as the wide range of temperature in this region, even between day and night, would produce so much expansion and contraction in an iron rod 60 feet long that without some compensating device the wall would be rocked on its base and its rapid destruction necessarily follow.

EXECUTION OF THE WORK

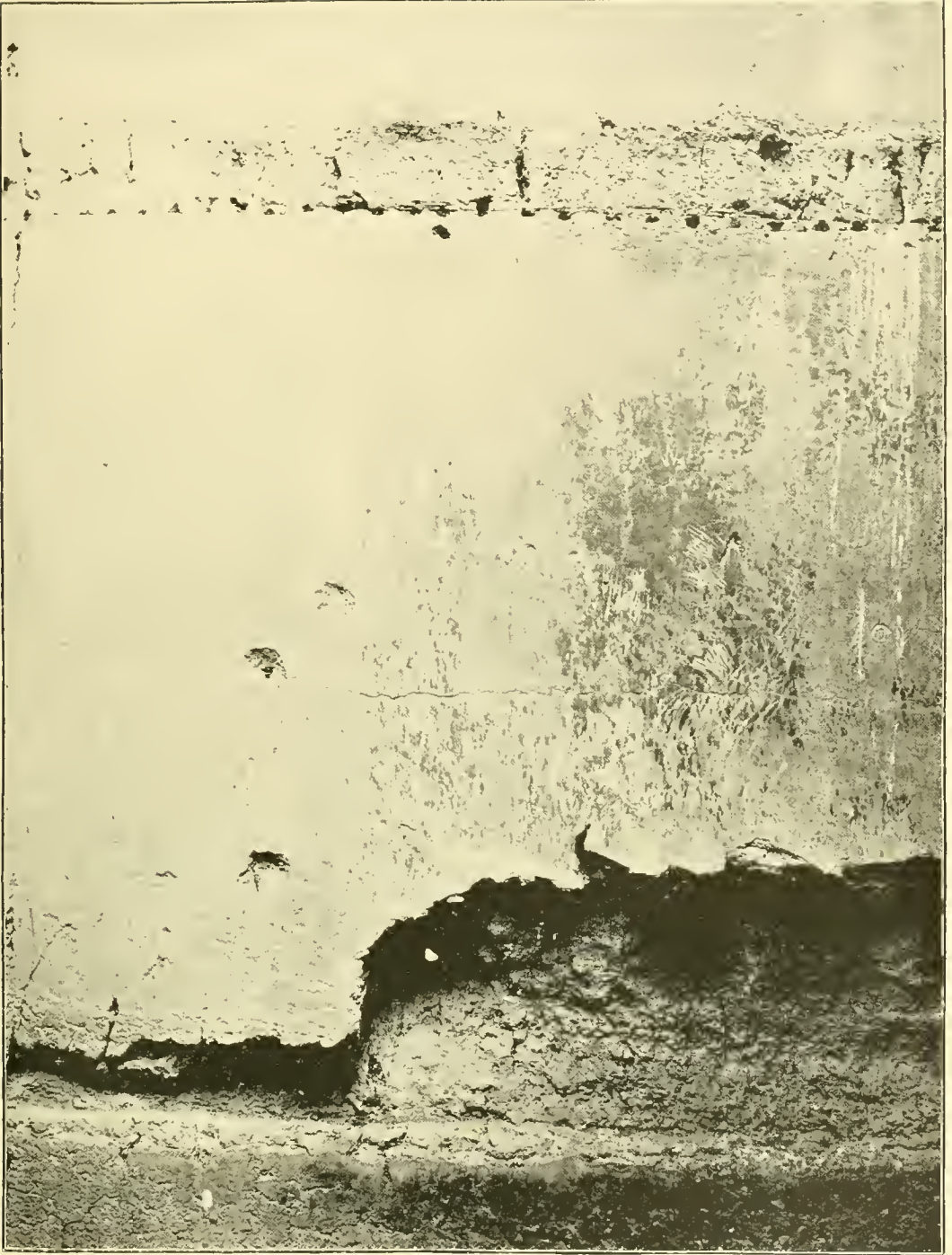
Appended to that portion of the sundry civil appropriation act approved March 2, 1889,¹ in which certain expenses of the United States Geological Survey are provided for, is the following item:

Repair of the ruin of Casa Grande, Arizona: To enable the Secretary of the Interior to repair and protect the ruin of Casa Grande, situate in Pinal County, near Florence, Arizona, two thousand dollars; and the President is authorized to reserve from settlement and sale the land on which said ruin is situated and so much of the public land adjacent thereto as in his judgment may be necessary for the protection of said ruin and of the ancient city of which it is a part.

On the 12th of April, 1889, there was a conference between the Secretary of the Interior and the Commissioner of the General Land Office looking to the execution of the law, and on the 16th of that month the Commissioner submitted a statement on the subject, calling attention to the fact that the appropriation would not be available until July 1 following, and suggesting that a special agent should be sent out to examine the ruin. This suggestion was approved, and on April 27, 1889, Special Agent Alexander L. Morrison, of the General Land Office, was instructed to proceed to the ruins for the purpose of investigating and reporting as to what method should be adopted for their repair and protection. Mr Morrison was further instructed to report "all the facts obtainable as regards said ruins of 'Casa Grande,' in order that appropriate action may be taken by the Department for its preservation."

On May 15, 1889, Mr Morrison submitted a report to the Commissioner, describing his journey, the location of the ruin, the ruin itself, and other ruins in the vicinity. He stated that danger to the ruin was of three kinds—(1) by vandalism, (2) by elements, (3) by undermining. He recommended the construction of a roof and an underpinning of

¹25 Statutes, p. 961.



INTERIOR WALL OF CASA GRANDE RUIN

stone for the walls. Finally, he gave some historical notes, and closed with a peroration.

Mr Morrison's plans were found impracticable, as their execution would require an expenditure of many times the sum appropriated, and on September 23, 1889, all the papers in the case were transmitted by the Secretary to the Director of the Geological Survey, "for appropriate action under the clause of the act referred to, as being within the province of your Bureau." It was ordered that the work be commenced without the least delay, and November 27, 1889, Mr Victor Mindeleff, of the Bureau of Ethnology, was detailed by the Director and ordered to proceed to the ruin and report on the best means of repairing it and protecting it from further destruction. He was also directed to make other investigations in the vicinity, which have no relation to the present case.

On July 1, 1890, Mr Mindeleff submitted a report. He described the ruins of which Casa Grande is the type, and also Casa Grande itself. He also made a statement of the condition of the ruin and suggested that the main destruction was due to the undermining of the walls, and stated that much damage had been done by tourists. He recommended (1) that an area about the ruin be fenced in; (2) that a man be located permanently on the ground to watch the ruins; (3) that the ruins be cleaned out; (4) that the walls be underpinned with brick instead of stone, as previously suggested; (5) that the tops of the walls, after removing several inches to afford a good bearing surface, be treated with a coping of cement. It was regarded that this plan, if carried into effect, would afford sufficient protection against the weather, but a plan for a roof was submitted should such a structure be deemed desirable and practicable. Mr Mindeleff also recommended a number of tie-rods and beams, the replacement of the broken-out lintels, and the filling of the cavities above.

This plan was approved in its general features, but the means provided for its execution were found insufficient. A further complication arose from the fact that a few months later Mr Mindeleff severed his connection with the Bureau of Ethnology and his knowledge became no longer available.

November 20, 1890, the writer was ordered to proceed to the ruin and inaugurate the work of repair, following, so far as practicable, the plans already approved. He left Washington soon afterward and reached the ruin late in December. It was found necessary to make a detailed survey of the ruin and of the group of which it forms a part, and to make plans and sections showing the probable amount of excavation for the use of those who were invited to bid on the work. Furthermore, the amount appropriated was so well known to be inadequate that great difficulty was experienced in obtaining bids, and it was only through the efficient cooperation of the Reverend I. T. Whittemore at Florence and of Mr C. A. Garlick at Phoenix that success was finally

achieved. Two bids were received from the former place and one from the latter; but this was not accomplished until March 17, 1891, the date when the last bid was received. In the meantime the writer, having completed his work at Casa Grande, so far as he could, had entered, in January, on an archeologic investigation of the valley of the Rio Verde, in compliance with his orders to that effect.

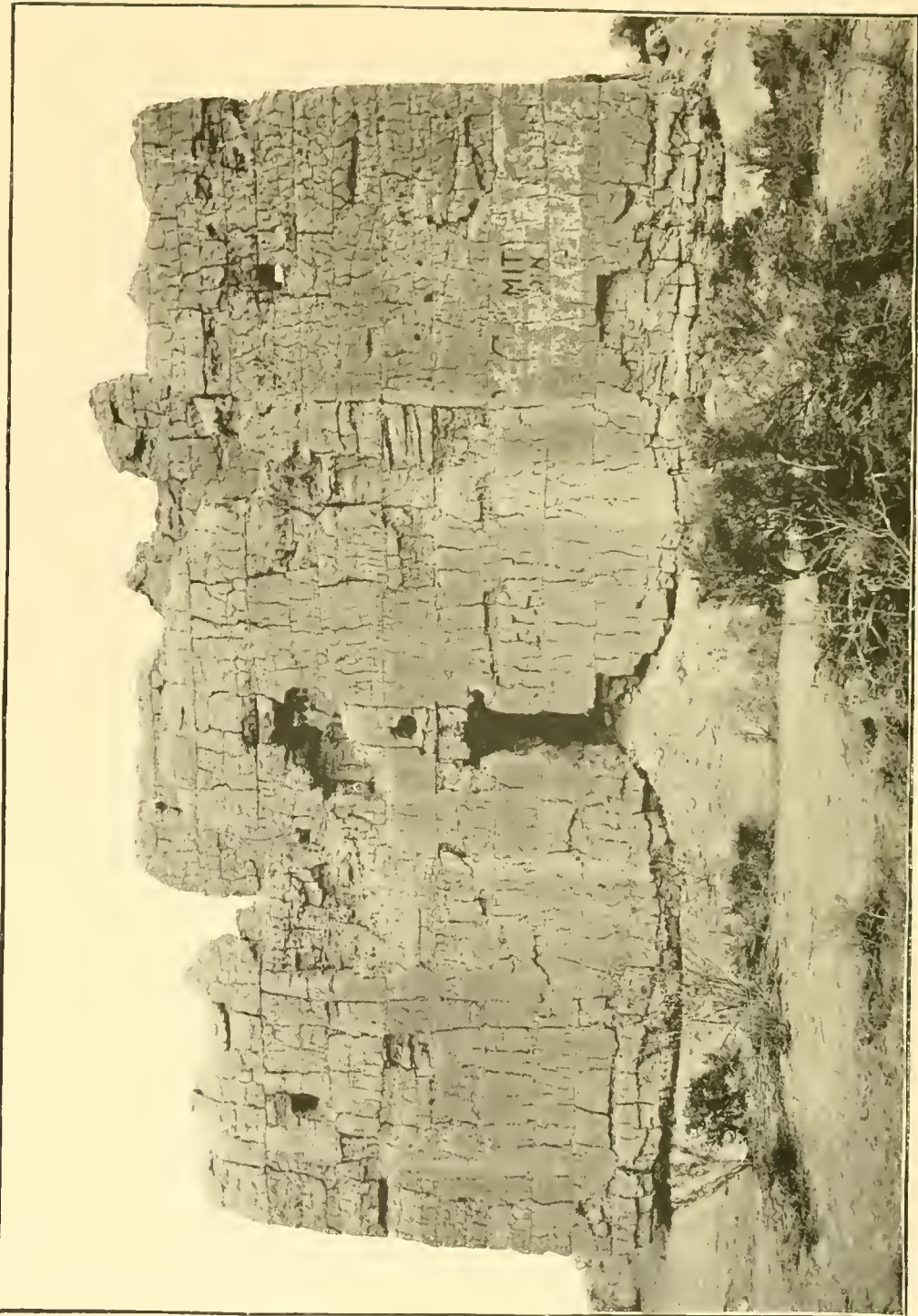
It was found impossible to execute all the work deemed requisite for the preservation of the ruin within the limits of the appropriation. A selection of items became necessary, therefore, and those which were of most importance were chosen. Even in this, however, it was found that a maximum limit on the amount of work to be done on each item must be set, and this limit was considerably below the amount of work estimated to be necessary.

The first thing to be done was, of course, the clearing out of the rubbish and débris. The item next in importance was the underpinning of the walls with brick wherever it was needed. The third item was the restoration of the lintels and the filling of the cavities above them. The fourth item was the tying in of the south wall, or of the several parts of it, with braces. This was the only feature of the plan which would appreciably disfigure the ruin, but some such device was deemed essential for the preservation of the south wall.

These four items consumed practically all of the amount appropriated, and the other items of the original plan were therefore omitted. The bid of T. L. Stouffer and F. E. White, of Florence, Arizona, covering the four items, was accepted, and a contract was made with them, under date of May 9, 1891, for the execution of the work for the sum of \$1,985. This contract, together with the specifications, plans, and other drawings which formed part of it, accompany this report. It was transmitted to the Director of the Geological Survey, and by him approved and forwarded to the Secretary of the Interior June 6, 1891. It was approved by the Acting Secretary June 20, 1891. Finally, on July 20, 1891, it was placed on file, together "with the bids, proposals, and all the original papers."

A time limit of two months was made in the contract, expiring August 20, 1891, but it was changed to four months from July 1, 1891, expiring October 31, 1891. Before the time expired, however, Mr H. C. Rizer, then chief clerk of the Bureau of Ethnology, was ordered to proceed to Casa Grande ruin to examine the work done and, if in accord with the terms of the contract and the specifications, to certify the amount due the contractors. He submitted a report, under date of November 24, 1891, which is appended hereto. He also obtained six photographic negatives of the work as it stood a short time before its completion, and two of these (reproduced in plates CXX and CXXI) have been utilized in the preparation of this report.

Mr Rizer found that a considerable amount of work had been done by the contractors in excess of that authorized, and also that not sufficient



WEST FRONT OF CASA GRANDE RUIN, SHOWING BLOCKS OF MASONRY

work had been done to render the repairs permanently effective. Under the terms of the contract, no amount in excess of that stated (\$1,985) could be paid, and payment of this amount was made late in 1891. On January 7, 1892, the contractors filed a claim for extra work on the ruin amounting to \$600.40. The work was actually performed, but the terms of the contract were clear, and the claim was therefore disapproved January 28, 1892.

It would have been desirable to have had a supervisor of the work, but as the contract consumed practically all of the amount appropriated no provision could be made for one. It is fortunate, therefore, that the Reverend I. T. Whittemore, who had in the meantime been appointed honorary custodian of the ruin, generously undertook to look after the work without compensation, and on its conclusion the small sum remaining (\$15) was turned over to him, thus exhausting the appropriation. In the sundry civil appropriation act for the year ending June 30, 1893, provision was made for a salaried custodian of the ruin, and Mr Whittemore was appointed to this position. Similar provision has been continued from year to year to the present time.

It is to be regretted that the necessities of the case, imposed by the limited amount appropriated, compelled the fixing of a maximum amount of work so far below the amount necessary that the repair of the ruin is incomplete. Had it been possible to carry out the plans, it is believed that the ruin would have stood unchanged for many decades, if not for a century. Should further provision be made for the continuation of the work, it should include an item for the fencing of the area covered by the ruins or of the reservation, and possibly an item for the construction of a roof.

It is not clear that a roof is absolutely necessary, but it is certain that it would be very undesirable. The region where this ruin occurs has probably less rainfall than any other part of the United States, but it must not be forgotten that while rainstorms are infrequent they are sometimes violent, and what damage they do may be done in a few hours. All the items for the repair of the ruin, except that pertaining to a roof, were so devised that the ruin was not materially disfigured or changed, and were they fully carried out the ruin would present much the same general appearance as before. It is important that this appearance should be preserved as far as possible, but it can not be maintained if a roof is erected over the walls. As four years have elapsed since the completion of the work, it should be possible now to determine whether atmospheric erosion has played a material part in the work of destruction.¹

In the original plans and in the specifications which formed part of the contract (although this section was not operative) a plan for a roof was included. Such a structure, if erected at all, should be made as

¹See the letter of the Director of the Bureau of American Ethnology to the Secretary of the Interior regarding the examination of Casa Grande by Mr W J McGee in the supplement to the present paper.

inconspicuous as possible and should be supported entirely from within the building. The system of framing employed might safely be left to the contractor if he were made responsible for the strength of the completed structure.

RESERVATION OF THE LAND

The final step in the execution of the law quoted was taken June 22, 1892. On that date the recommendation of the writer to the Director of the Geological Survey, referred by him to the Secretary of the Interior and by the latter to the President, was finally approved, and it was ordered that an area of land sufficient for the preservation of the ruin, and comprising in all 480 acres, be reserved under authority of act of Congress approved March 2, 1889. This area is shown on the map reproduced in plate CXXV, the base of which is a map accompanying the report of Mr H. C. Rizer.

The letter of the Secretary of the Interior recommending the reservation of the Casa Grande tract, with its indorsement by the President, is as follows:

DEPARTMENT OF THE INTERIOR,
Washington, June 20, 1892.

SIR: I have the honor to recommend that the SW. $\frac{1}{4}$ SW. $\frac{1}{4}$, SE. $\frac{1}{4}$ SW. $\frac{1}{4}$, SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ section 9, NW. $\frac{1}{4}$, NW. $\frac{1}{4}$ NE. $\frac{1}{4}$, SW. $\frac{1}{4}$ NE. $\frac{1}{4}$, NW. $\frac{1}{4}$ SW. $\frac{1}{4}$, NE. $\frac{1}{4}$ SW. $\frac{1}{4}$, and NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ section 16, all in township 5 south, range 8 east, Gila and Salt river meridian, Arizona, containing 480 acres more or less, and including the Casa Grande ruin, be reserved in accordance with the authority vested in you by the act of March 2, 1889 (25 Stat., 961), for the protection of the ruin.

The Director of the Bureau of Ethnology requests that the reservation be made, and the Acting Commissioner of the General Land Office knows of no objection to such action.

Very respectfully,

JOHN W. NOBLE,
Secretary.

The PRESIDENT.

[*Indorsement by the President*]

EXECUTIVE MANSION, *June 22, 1892.*

Let the lands described within be reserved for the protection of the Casa Grande ruin as recommended by the Secretary of the Interior.

BENJ. HARRISON.

The limits of this reservation are laid down on the plat of the survey of said township in the General Land Office, and the reservation is now under the control of the Secretary of the Interior.

SPECIMENS FOUND IN THE EXCAVATIONS

In the course of the excavations a number of specimens of archeologic interest were unearthed. These were all preserved and on the conclusion of the work were forwarded to the National Museum in Washington, in compliance with the terms of the contract. Following is a list showing the collection number and also the Museum number.

H Limits of K work

M

A

B

C

D

E

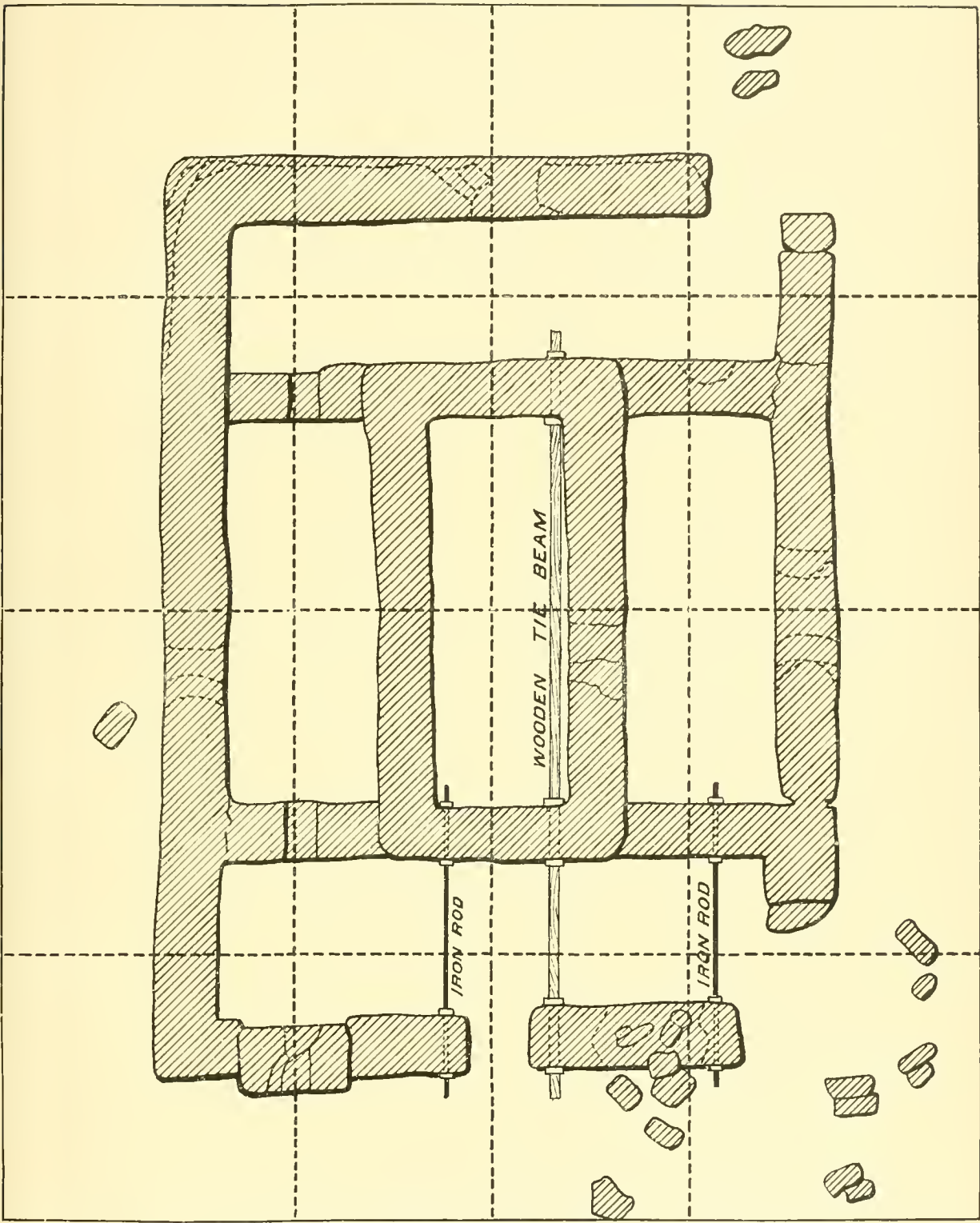
F

Limits of work

Limits of work

G Limits of I. work

L

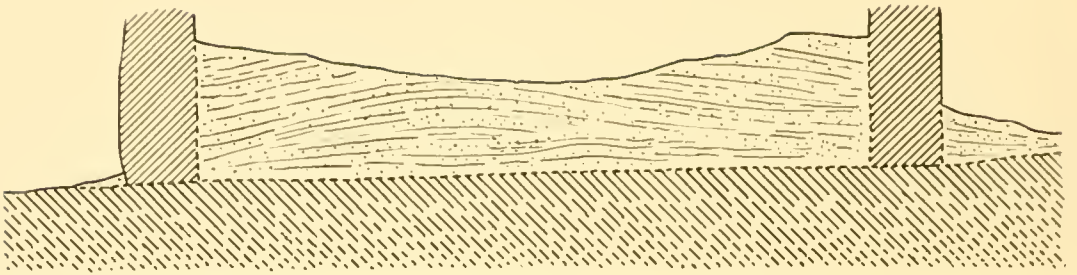


PLAN SHOWING GROUND-LEVEL EROSION, TIE-RODS, LIMITS OF WORK, AND LINES OF GROUND SECTIONS

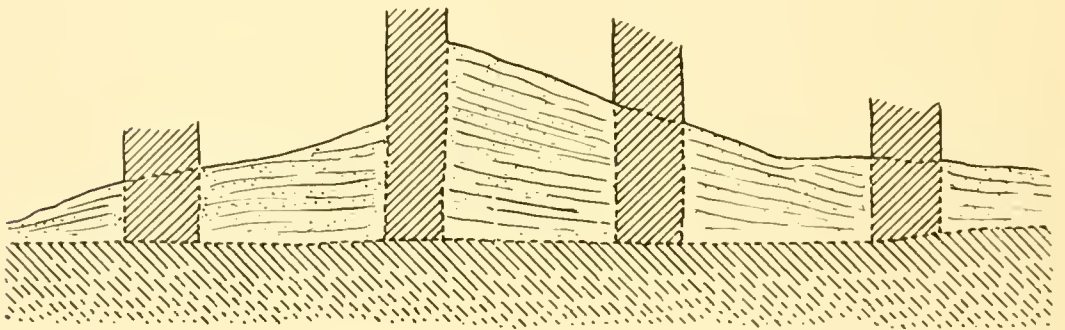
Specimen number 627 B. E. was not obtained from the ruin itself, but was found in that vicinity by Mr Whittemore and presented by him:

National Museum number	Bureau of Ethnology number	Article	Number of specimens	Remarks
155088	595	Fragments of large earthenware vessel.	Lot.	Plain red on both sides.
155089	596	Large bowl	1	Red outside; black, polished inside; restored.
155090	597	Large vase	1	Decorated outside; restored.
155091	598	Pottery fragments	14	Decorated.
155092	599	Pottery vase (toy)	1	Small, dark brown.
155093	600	Pottery bowl (toy)	1	Small, black.
155094	601	Pottery disk or spindle	4	
155095	602	Pottery toy (mountain goat).	1	Dark brown.
	603	Adobe	2	Lumps; 1 showing impression of cloth, the other of a human foot.
	604	Small shells	Lot.	
	605	.....do	Lot.	
	606	Small shells (lonus?)	Lot.	
	607	Small shells (cut and perforated).	Lot.	For use as pendants.
	608	Small shells, beads, and pendants.	Lot.	1 string and 2 fragments.
	609	Bone awls	3	
	610	Bone fragments	6	Partly charred.
	611	Chalk, obsidian chips, and brown adobe.	Lot.	
	612	Charred wood, 2 nuts, and a corn cob.	4	
	613	Charred textiles, cloth	2	
	614	Wooden joist fragments	3	3, 6, and 9 inches long; 4 inches diameter.
	615	Reed	1	12 inches long.
	616	Stone axes	7	And 3 broken, grooved.
	617	Pounding stone and fragment.	2	Of sandstone, with ring-shape handle.
	618	Stone pestles	2	One 12½ inches long, 1½ inches diameter; one 9½ inches long, 1½ inches diameter; also a fragment.
	619	Stone mullers	4	
	620	Stone hammers	6	1 pitted.
	621	Stone mullers, flat	6	5 broken.

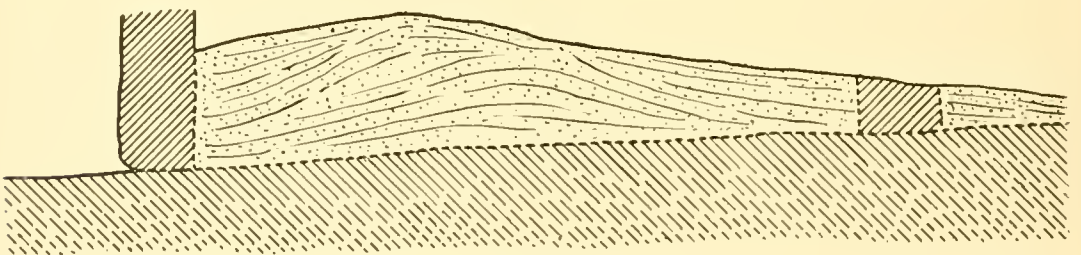
National Museum number	Bureau of Ethnology number	Article	Number of speci- mens	Remarks
	622	Stone mortar, flat.	1	6½ by 12 inches; 2 inches thick.
	623	.....do	1	13 by 22 inches; 6 inches thick.
	624	Stone, polished.....	1	22 inches long, 6½ inches diameter; restored.
	625	Stone hoes or chopping knives.	2	
	626	Limestone ornament.....	1	Carved; fragmentary.
	627	Small stone vessel	1	Serpent carved on the outside.
	628	Stone arrowhead	2	1 of obsidian, very small, and 1 of flint; also a broken specimen.



Section A—B



Section C—D



Section E—F

EAST-AND-WEST GROUND SECTIONS

EXHIBITS

I. CONTRACT FOR REPAIRING AND PRESERVING CASA GRANDE RUIN, ARIZONA

This contract, made and entered into this ninth day of May, eighteen hundred and ninety-one, between Theodore Louis Stouffer and Frederick Emerson White, both of Florence, Arizona, as principals, and Augustine Gray Williams, of Florence, Arizona, Andrew James Doran, of Florence, Arizona, as sureties, of the first part, and the United States of America, by Cosmos Mindelett, acting for the Secretary of the Interior, of the second part:

Witnesseth, That the said parties of the first part do hereby contract and agree with the United States of America, as follows: That for the consideration hereinafter mentioned they will at their own expense and risk perform and execute the work upon the Casa Grande ruin, described and specified in the specification hereto annexed and forming a part hereof, in the manner and with the conditions specified, items of said work to be as follows:

Item No. 1. Clearing out the débris: To excavate and remove 350 cubic yards of earth and débris, or less, as specified, amount of excavation not to exceed 350 cubic yards.

Item No. 2. Underpinning walls: To underpin the walls as specified, requiring 750 cubic feet of brick masonry, or less, amount of masonry not to exceed 750 cubic feet.

Item No. 3. Filling in cavities: To fill in cavities and openings as specified, 500 lineal feet of 2 by 4 inches squared lumber and 800 cubic feet of masonry, or less, whole amount of filling not to exceed 825 cubic feet.

Item No. 4. To brace the walls as specified in the annexed plan and specifications.

Items numbered five and six of the specifications hereto annexed, together with the plans, specifications, and conditions pertaining especially and only to them and not to the other items, are omitted.

The said parties of the first part further contract and agree to deliver over the work, completed and finished, to such person as the Secretary of the Interior may designate, within two months after receipt of notice that this contract has been approved by the Secretary of the Interior.

It is further stipulated and agreed, That should the parties of the first part fail to complete the work within the time specified, or should they deliver work which is not in accordance with the plans and specifications hereto annexed, only such sum shall be paid for the work as may be agreed upon by the said parties of the first part and the Secretary

of the Interior; and it is further stipulated and agreed on the part of the parties of the first part that if the work is not completed in the time specified and according to the specifications hereto annexed they will pay to the United States a sum not exceeding fifty dollars for each and every week after the time specified, such payments to be deducted from the amount due for work done: *Provided*, That the Secretary of the Interior, or such person as he may authorize to do so, may extend the time for the completion of the work.

And the United States of America, by the said Cosmos Mindeleff, acting for the Secretary of the Interior, do hereby contract and agree with the said parties of the first part that for the aforesaid work, performed and executed in the manner and under the conditions aforesaid, there shall be paid to the said parties of the first part the following sums:

For item No. 1. For clearing out the débris, as specified and as above limited, sixty cents (\$0.60) for each cubic yard.

For item No. 2. For underpinning walls, as specified and as above limited, one dollar (\$1) for each cubic foot.

For item No. 3. For filling in cavities, as specified and as above limited, one dollar (\$1) for each cubic foot, including lumber.

For item No. 4. For bracing walls, as specified, two hundred dollars (\$200). *Provided*, That payments for the work here contracted for shall be made only after the inspection and approval of the work by such person as the Secretary of the Interior shall designate.

It is an express condition of this contract that it shall have no force or effect until it is submitted to and approved by the Secretary of the Interior.

It is a further condition of this contract that no Member or Delegate to Congress, or any other officer or agent of the United States, either directly or indirectly, himself or by any other person in trust for him, or for his use and benefit, or on his account, is a party to or in any manner interested, in whole or in part, in this contract, or in the enjoyments, benefits, profits, or emoluments arising therefrom.

(Signed) THEODORE LOUIS STOFFER. [SEAL]
 FREDERICK EMERSON WHITE. [SEAL]
 AUGUSTINE GRAY WILLIAMS. [SEAL]
 ANDREW JAMES DORAN. [SEAL]

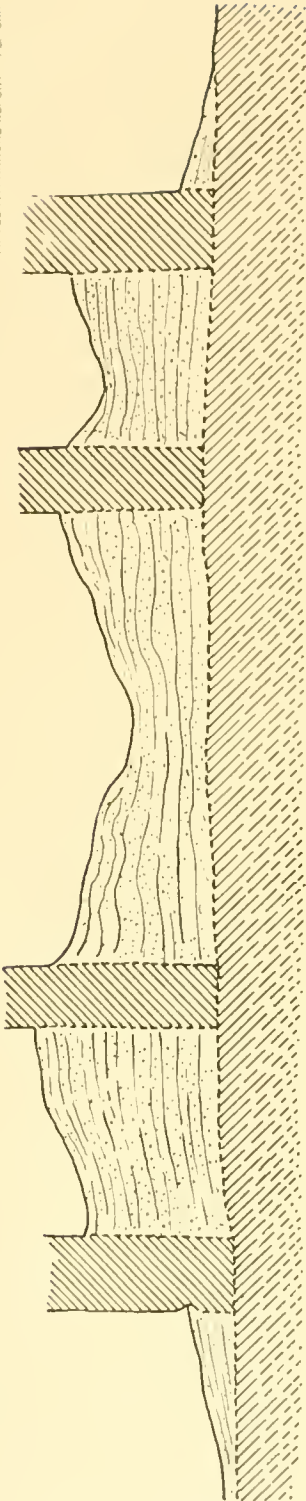
Witnesses as to Stouffer, White, Doran, and Williams:

(Signed) FRANK C. KEBBEY,
*Clerk District Court, Second Judicial District,
 Territory of Arizona.*

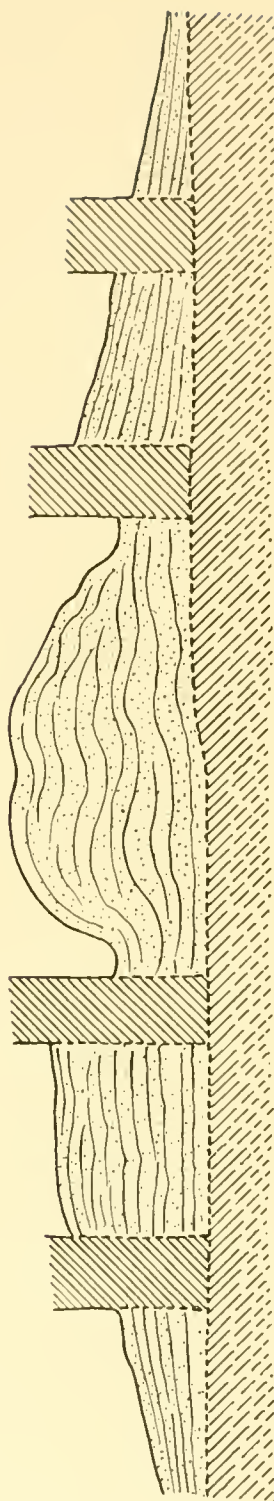
COSMOS MINDELEFF, [SEAL]
Acting for the Secretary of the Interior.

Witnesses as to Cosmos Mindeleff:

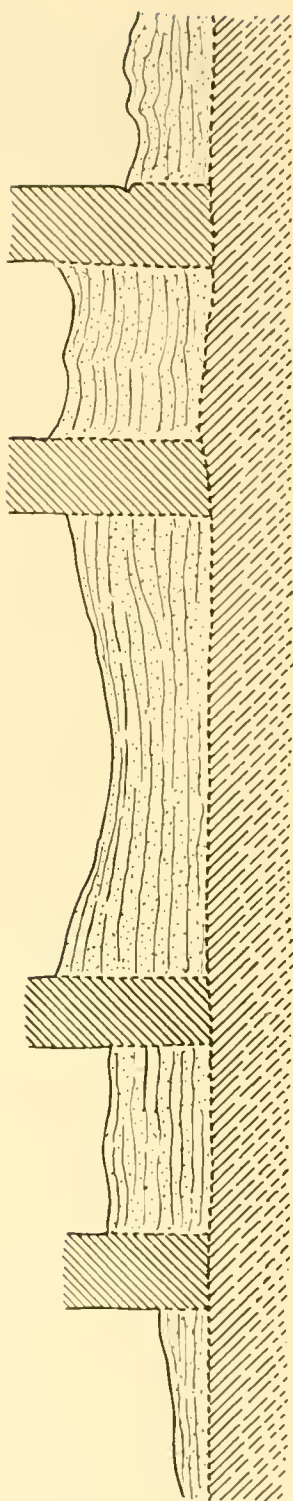
(Signed) JEFF HUNT.
 CHAS. B. EAMAN.



Section G—H



Section I—K



Section L—M

TERRITORY OF ARIZONA, *County of Pinal, ss:*

Augustine Gray Williams and Andrew James Doran, subscribers to and sureties in the contract hereto annexed, being duly sworn, depose and say, each for himself, that he is worth the sum of two thousand dollars over and above all debts and liabilities which he owes or has incurred, and exclusive of property exempt by law from levy and sale under execution.

(Signed) AUGUSTINE GRAY WILLIAMS. [SEAL]

ANDREW JAMES DORAN. [SEAL]

Sworn to and subscribed before me this ninth day of May, A. D. 1891.

[SEAL.] (Signed) FRANK C. KEBBEY,

Clerk District Court, Second Judicial District,

Territory of Arizona.

TERRITORY OF ARIZONA, *S Ct:*

I, Joseph H. Kebbey, associate justice of the supreme court of the Territory of Arizona, certify that I am personally acquainted with Augustine Gray Williams and Andrew James Doran, sureties, and that in my opinion they are good and sufficient to the amounts in which they have bound themselves in the foregoing contract.

Florence, Arizona Territory, 9th May, 1891.

(Signed) JOSEPH H. KEBBEY,

Associate Justice Supreme Court, Arizona Territory.

II. PLANS AND SPECIFICATIONS FOR THE PRESERVATION OF THE CASA GRANDE RUIN, ARIZONA, 1891

(Attached to and forming part of contract)

GENERAL REQUIREMENTS

All the work upon this ruin is to be carried out in such a manner as to interfere as little as possible with the present condition and appearance of the building, and the contractors will be held responsible for any injury to it.

The work is to be carried on under a supervisor, acting for the United States, who shall have power to reject any materials it is proposed to use in the work which are not in his judgment equal to those specified, and he shall have power to have torn down any work done which he has reason to suspect is not such as required by the specifications, but if such work shall prove upon inspection to have been well done the contractor may make a charge of the amount which would have been allowed for that part of the work had it passed inspection.

When the work is completed it must pass the final inspection of the supervisor, or such person as the Secretary of the Interior may designate for the purpose.

1. CLEARING OUT THE DÉBRIS

The débris now filling up the interior is to be removed down to the floor level, or the original ground level. The débris covering an area

measuring 10 feet from the exterior walls of the building in every direction is also to be removed. This work is to be carried on in conjunction with the underpinning of the walls, and is to be dependent upon the progress of the latter, the work being done as required by the person holding the contract for the underpinning. All proper precautions must be observed during the progress of the work to prevent any injury to the building, the walls being properly braced and supported before excavation is commenced. The contractor will be held responsible for any injury to the building. Any objects found of archeologic or other value properly belong to the United States and must be deposited in the National Museum. The material removed from the building and from the area about it is to be removed to a proper distance, not less than 100 yards from the building. Proper drainage channels must be provided to keep the excavated area permanently clear of water.

2. UNDERPINNING WALLS

The walls where eroded at the ground level are to be underpinned with hard-burned brick, laid in good cement mortar and extending to a depth of at least 12 inches below the original ground level. This work must be carried on gradually and very carefully in conjunction with the clearing out of the débris. The under surfaces of the overhanging walls must be carefully trimmed to afford solid horizontal bearings against the brickwork. The face of the brickwork is to be set back at least 1 inch and not more than 2 inches from the face of the wall, and the brickwork is to be plastered with a coating of cement mortar, 1 to 2 inches thick, bringing it out flush with the outer wall.

3. FILLING IN OPENINGS

The broken-out lintels of openings are to be replaced by wooden lintels composed of squared lumber, 2 by 4 inches in size, laid side by side across nearly the whole thickness of the walls, with not more than 1 inch space between the boards, and of the same length as the original lintels. The broken-out walls are to be trimmed to afford solid resting places for the new lintels, which are to occupy the same horizontal planes that the old ones did. The openings above the lintels are to be filled in in the same manner as the underpinning previously described, the under wall surfaces being carefully dressed to afford solid horizontal bearings, the brick work being set back 1 inch from the wall surfaces and plastered with a coating of cement mortar to bring it out flush with the wall.

4. BRACING

One wooden brace and two iron braces are to be put in, as shown upon the plan hereto annexed. The wooden brace is to be of one piece, or of two pieces well bolted together, of selected lumber, free from knots and other imperfections, squared, and measuring 6 by 8 inches in



SOUTH FRONT OF THE RUIN, SHOWING UNDERPINNING AND ENDS OF TIE-RODS

cross section. The iron braces are to be of 1 inch diameter, best quality wrought-iron rods. The bearing plates, four to each rod, are to be not less than 10 inches in diameter, of sufficient strength, and securely and permanently fastened to the braces.

5. WIRE FENCING

Such area as may be determined is to be fenced with the best quality of galvanized iron barbed wire, strung upon posts placed 20 feet apart. The posts are to be of mesquite, not less than 3 inches in diameter and of a reasonable degree of straightness (not varying more than 5 inches from a straight line). The posts are to be at least 6 feet 6 inches long and are to be planted perpendicularly with 4 feet 6 inches clear and at least 2 feet below the ground surface. Three lines of double wire are to be stretched upon and securely fastened to the posts, the first at a distance of 2 feet from the ground, the second at 3 feet, and the third at 4 feet from the ground. Two gateways are to be provided, at such points as may be directed, the side posts to be of squared timber, 6 by 6 inches in cross section, and the gates to be made of sawed lumber 1 inch by 5 inches, hung upon good iron hinges, and leaving a clear space of not less than 12 feet when open, the whole to be executed in the best and most workmanlike manner.

6. ROOF

The building is to be crowned by a roof of corrugated iron, supported in the manner shown in the accompanying plan and sections. The uprights are to be of selected squared lumber 4 foot square, each in a single piece, the lower ends planted at least 3 feet below the original ground level, and to be braced and tied to each other, as shown in the plan. The tie pieces are to be of selected squared lumber, 4 inches by 6 inches in cross section. The roof is to be framed and braced in the ordinary manner, and this framing is to extend beyond the outer wall 6 feet. The covering is to be a good quality of corrugated iron roofing, securely fastened to the framework, and painted with three good coats of the best quality of roof paint. The whole to be constructed and executed, in the best and most workmanlike manner, of good materials throughout, and to be of a strength sufficient to withstand the windstorms to which it may be subjected.

III. PLANS AND SECTIONS—PRESERVATION OF THE CASA GRANDE RUIN, ARIZONA. SCALE OF ALL THE PLANS AND SECTIONS. 0.1 INCH = 1 FOOT

Plans and sections accompanying specifications are as follows:
Plan showing tie-rods, limits of work, and lines of ground sections.
[Plate CXVII of this report.]
Three east-and-west sections to show estimated amount of excavation
necessary. [Plate CXVIII of this report.]

Three north-and-south sections to show estimated amount of excavation necessary. [Plate CXIX of this report.]

Plan showing roof support. [Plate CXXII of this report.]

Two sections showing roof support. [Plate CXXIII and plate CXXIV of this report.]

IV. OATH OF DISINTERESTEDNESS

I do solemnly swear that the copy of contract hereunto annexed is an exact copy of contract made by me personally with Theodore Louis Stouffer and Frederick Emerson White; that I made the same fairly, without any benefit or advantage to myself, or allowing any such benefit or advantage corruptly to the said Theodore Louis Stouffer and Frederick Emerson White, or to any other person or persons; and that the papers accompanying include all those relating to the said contract, as required by the statute in such case made and provided.

(Signed)

COSMOS MINDELEFF.

Sworn to and subscribed before me at Washington, D. C., this 18th day of July, 1891.

[SEAL]

(Signed)

JNO. D. MCCHESENEY,

Notary Public.

V. BIDS

I

Bid for repairs on the Casa Grande ruins, in Pinal County, Arizona, bidders to furnish all labor and materials according to specifications:

Item No. 1. Cleaning out débris, 60 cents per cubic yard.

Item No. 2. Underpinning walls, \$1 per cubic foot.

Item No. 3. Filling in openings, \$1 per cubic foot.

Item No. 4. Bracing walls, \$200.

Item No. 5. Wire fence, 3 cents per foot complete.

Item No. 6. Roof, \$2,000.

(Signed)

T. L. STOFFER,

F. E. WHITE.

FLORENCE, ARIZONA, *January 28, 1891.*

II

Bid for putting a roof on the Casa Grande ruins as per plans and specifications furnished, \$3,000.

(Signed)

C. D. HENRY.

III

Bid for fencing in the Casa Grande ruins: Furnishing the posts and barbed wire for 100 feet of fence, \$7 per 100 feet.

(Signed)

C. D. HENRY.



VIEW FROM THE SOUTHEAST BEFORE THE COMPLETION OF THE WORK

IV

Bids for restoring the Casa Grande ruins:

First. Removing debris from interior of the ruins, 320 cubic yards, more or less, \$1 per yard; 140 cubic yards from exterior of the ruins, at 60 cents per yard.

Second. Eight hundred cubic feet of brick masonry underpinning, more or less, at \$1.30 per cubic foot.

Third. One thousand cubic feet, more or less, of brick masonry to fill in cavities, at \$1.40 per cubic foot.

Fourth. Bracing walls, as per plans. \$120.

Fifth. Five hundred lineal feet of 2 by 4 square timber at 8 cents per foot, lumber measure.

(Signed)

C. D. HENRY.

V

PHOENIX, ARIZONA. *February 11, 1891.*

COSMOS MINDELEFF, Esq.,

Tempe, Arizona.

DEAR SIR: I hereby submit for your consideration, in reference to the plans and specifications for the preservation of the Casa Grande ruins of Arizona, bids upon the following propositions, to wit:

First. "Cleaning out the débris." For the removal of 470 cubic yards of material, more or less, at \$2.65 per cubic yard.

Second. "Underpinning walls." For 800 cubic feet of brick masonry, more or less, laid and plastered as specified, at \$4.25 per cubic foot.

Third. "Filling in openings." For filling in cavities in walls and restoring lintels of openings, as specified, 1,000 cubic feet, more or less, at \$2.25 per cubic foot.

Fourth. "Bracing walls." For bracing walls, \$85.30.

Fifth. "Wire fencing." Twenty-five dollars and twenty-five cents per 100 feet of completed fence.

Sixth. "Roofing." As per specifications, \$4,722.

Respectfully submitted.

(Signed)

M. E. CLAUTON.

VI. INDORSEMENTS

Contract for the repair and preservation of the Casa Grande ruin, Arizona, 1891

DEPARTMENT OF THE INTERIOR,

U. S. GEOLOGICAL SURVEY,

June 6, 1891.

Respectfully forwarded to the Secretary of the Interior, recommending approval.

(Signed)

J. W. POWELL, *Director.*

DEPARTMENT OF THE INTERIOR,

June 20, 1891.

The within contract is hereby approved.

(Signed)

GEO. C. CHANDLER,

Acting Secretary.

June 30, 1891. Transmitted by J. W. Powell, Director, to the Secretary of the Interior for file in returns office.

July 1, 1891. Returned for oath.

July 20, 1891. J. W. Powell, Director, transmits amended contract, with bids, proposals, and all original papers attached.

VII. REPORT OF MR H. C. RIZER

SMITHSONIAN INSTITUTION,

BUREAU OF ETHNOLOGY,

WASHINGTON, *November 24, 1891.*

HONORABLE J. W. POWELL,

Director of the Bureau of Ethnology.

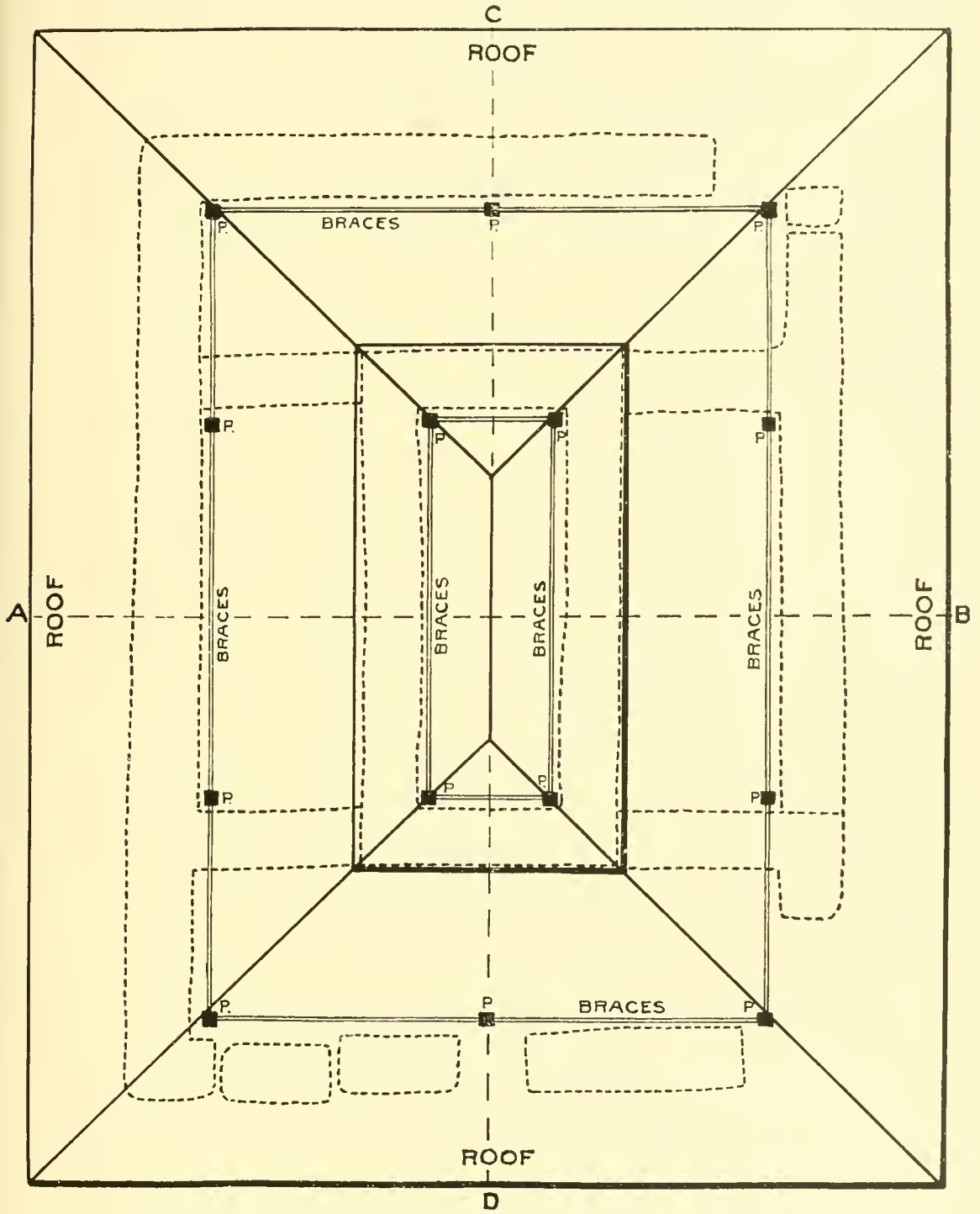
SIR: Complying with your order directing me to proceed to Florence, Arizona, to witness the closing up of the work under contract for the preservation of Casa Grande ruin near that place, and to report to you the amount and character of the work accomplished, certifying the amount due the contractors under each item, I have the honor to submit the following report:

I visited the ruin first on October 20, and found the work well advanced. Steady progress was made from said date until October 31, the limitation expressed in the contract for prosecuting it.

In order to ascertain the exact location of Casa Grande ruin and to aid me in the determination of the amount of work performed by the contractors, I employed Mr Albert T. Colton, a civil engineer and the official surveyor of Pinal county, Arizona, within the limits of which the ruin stands. From actual measurements made by Mr Colton, based upon official notes in his custody, he informed me the ruin was located in the northeast corner of the northwest quarter of the southwest quarter of section 16 of township 5 south, range 8 east. A congressional township plat on which Mr Colton has marked the exact location of the ruin is filed herewith, marked Exhibit A, and made a part of this report [plate CXXV].

On October 29 Mr Colton at my instance took measurements of the brickwork in underpinning and filling in cavities in the walls and of the excavation done by the contractors. His estimate, based upon these measurements, was submitted to me in writing. It is filed herewith, marked Exhibit B, and is made a part of this report.

I find from these measurements that the contractors excavated and removed to a point 100 yards from the ruin 570 cubic yards of débris, 271 cubic yards of which were removed from the interior and 299 cubic



SUGGESTED PLAN OF ROOF AND SUPPORT

yards from the exterior walls of the building, within an area of 10 feet of said walls.

I also find the amount of underpinning done by the contractors to be 919 cubic feet, and the amount of filling in openings to be 1,161 cubic feet. The underpinning is done with hard-burned brick laid in good cement mortar extending to a depth of 12 inches below the original ground level. The face of the brickwork is set back from 1 to 2 inches from the face of the wall and plastered with a coat of good cement mortar, making it flush with the outer wall.

In filling in cavities more than 500 lineal feet of 2 by 4 inch squared lumber was used to replace broken-out lintels and laid side by side across nearly the whole thickness of the walls, with not more than 1 inch space between the boards. They occupy the same horizontal planes as the original lintels, and the walls are trimmed to afford solid resting places for them. The openings above the lintels have been filled in the same manner as the underpinning, with hard-burned brick set back 1 inch from the wall surfaces and plastered with a coating of cement mortar, bringing it out flush with the original wall.

I further find that the contractors have placed one wooden brace and two iron braces as designated in the specifications. The wooden brace is constructed of two pieces of good, clear, squared lumber 6 by 8 inches in cross section, well bolted together, secured by plates of boiler iron three-eighths of an inch thick and 14 by 18 inches square. The specifications provide for this brace to run from the south side of the south wall through the center room with a plate on each side of the south wall and one on each side of the wall on the north side of the center room. The contractors have deviated from these requirements in having extended the said brace through the entire length of the building and placed the plates that were specified for the north wall of the center room on the respective sides of the extreme north wall of the building. While this deviation adds nothing to the security of the south wall, it is doubtless as effective as it would have been had it been placed as contemplated in the plan. It may in some degree strengthen the north wall, and I recommend that it be accepted as in compliance with the terms of the contract. The two iron rods called for in the specifications are of wrought iron $1\frac{1}{2}$ inches in diameter, secured by boiler-iron plates three-eighths of an inch thick and 12 inches in diameter, securely fastened as required in the specifications. There was a necessary deviation from the plan as to the place the rod nearest the east side of the building should be placed. Early in the prosecution of the work a portion of the débris in contact with the eastern wall was removed. During the night following this a section of the south end of the east wall fell, carrying with it that portion of the wall between the south and east rooms to which the plan required said rod to be attached. In consequence the contractors placed the rod so as to connect it with the portion of the wall

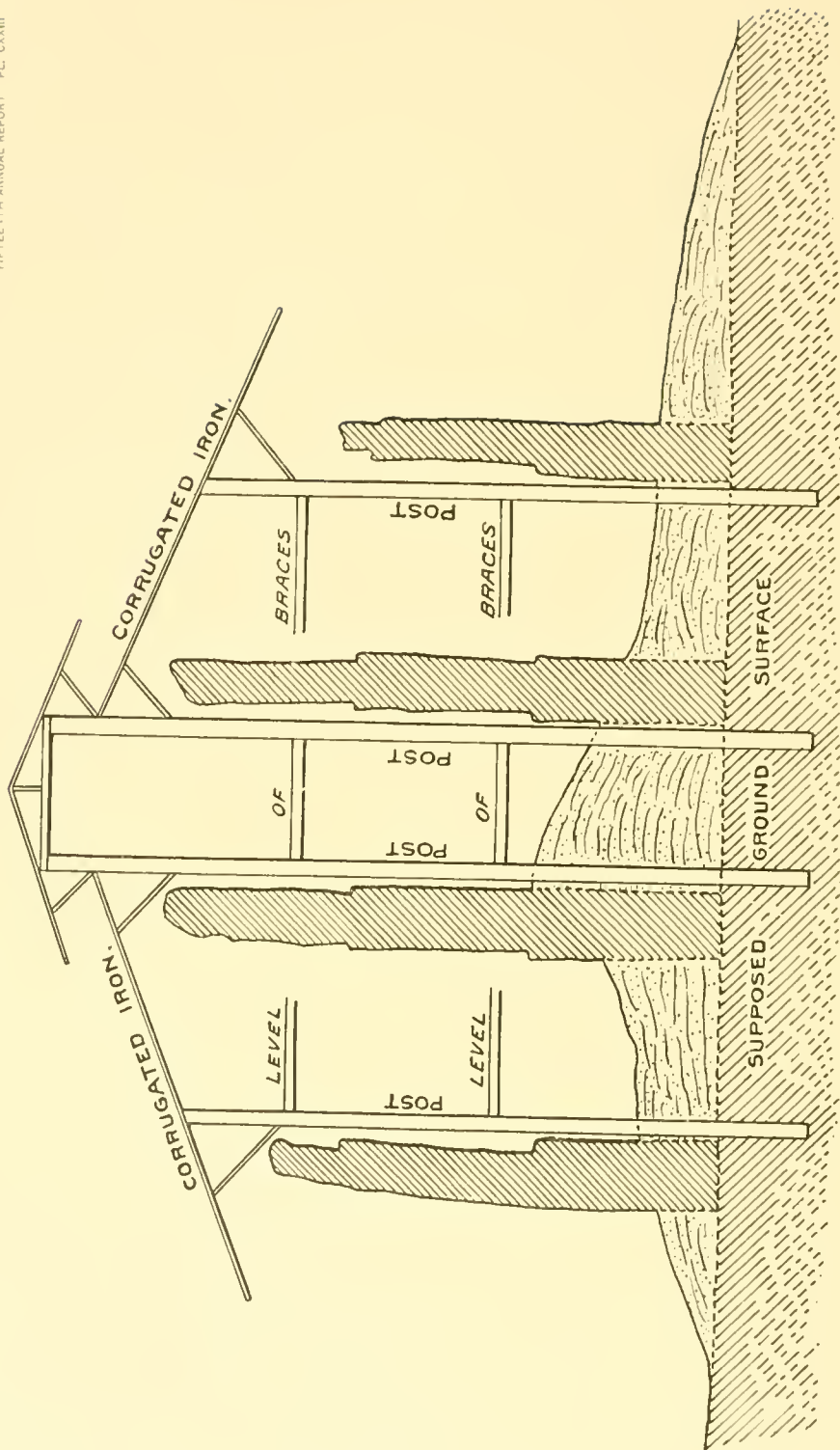
still intact. As a brace to the south wall it is placed advantageously. In excavation, underpinning, and filling in the contractors have exceeded the limitations prescribed in the contract, and have therefore performed an amount of work for the remuneration of which there is no provision. The following table shows the amount of work authorized in each of the four items with reference to which the contract was drawn and the amount actually performed by contractors:

Item	Maximum authorized	Performed by contractors	Excess	Contract price	Maximum allowance under contract	Amount contractors claim to have earned	Excess of contractors' claim over amount authorized
1. Excavating and clearing out debris.	350 cubic yards.	570 cubic yards.	220 cubic yards.	60 cents per cubic yard	\$210	\$342	\$132
2. Underpinning walls.	750 cubic feet.	919 cubic feet.	169 cubic feet.	\$1 per cubic foot.	750	919	169
3. Filling in cavities.	825 cubic feet.	1,161 cubic feet.	336 cubic feet.	\$1 per cubic foot.	825	1,161	336
4. Braces.....	1 wood and 1 iron.	1 wood and 2 iron.	.....	\$200	200	200	.....

From this it will be observed that, taking the rate of compensation provided for in the contract as a basis, the contractors have performed work in excess of that authorized to the amount of \$638 [\$637]. They are fully advised that there is no provision for the payment of this excess. The requirements of the contract are, in my opinion, fully met in the quality of material used and the work performed.

The preservation of the ruin is incomplete. There are six places where lintels have disappeared and not been replaced and a corresponding number of cavities that should be filled. Deep seams have been cut in the walls by the action of the elements, and unless far greater provision is made for its protection the work already done will be of small avail.

At many places where the debris came in contact with the wall disintegration seems to have resulted. At a slight touch it frequently crumbles. Owing to this fact two sections of the wall fell during the progress of the work when the debris was removed—one from the east wall, described above, and one from the south wall near the west extremity. These breaches may be observed as shown in two of the six accompanying photographs [plates CXX, CXXI]. These photographs



SECTION THROUGH A-B OF ROOF PLAN, SHOWING SUGGESTED ROOF SUPPORT

were taken ten days before the work was completed. There being no professional photographer in that vicinity I was compelled to take advantage of the kind offer of Mr H. H. Burrell, an amateur photographer, who happened to be there at that time. Thus the views I secured failed to show all the brickwork done. The coating of mortar was not applied until after the date on which the views were taken, in consequence of which the bare bricks are shown in the views.

During the progress of work in removing the débris a number of articles of interest to the ethnologist were found at various depths and localities. They have been packed by the contractors and will be sent to the National Museum.

The floors in the center, north, and east rooms were found to be about 8 feet above the ground surface. The material was similar to that of which the walls are composed. The west and south rooms appeared to have had floors at one time on the same level, but the surfaces had disintegrated, and there was a mass of loose earth which was removed to a depth of 6.9 feet below the floors of the other three rooms, where another floor was found slightly less firm than those.

Reverend Isaac T. Whittemore, who has been designated by the honorable the Secretary of the Interior as the custodian of the ruin, rendered me valuable assistance in the performance of my mission. He has manifested a zealous concern for the preservation of the ruin and has given time and labor to that end. There is no provision for his just compensation. I therefore recommend that if any funds be found available after the payment of the amount due the contractors the same be ordered paid to Mr Whittemore for his services.

Very respectfully,

H. C. RIZER, *Chief Clerk*

SUPPLEMENT

CORRESPONDENCE AND REPORT RELATING TO THE CONDITION OF CASA GRANDE IN 1895, WITH RECOMMENDATIONS CONCERNING ITS FURTHER PROTECTION

- I. *Letter of Reverend Isaac T. Whittemore, custodian of Casa Grande, to the Secretary of the Interior, recommending an appropriation for further protecting the ruin*

FLORENCE, ARIZONA,
July 25, 1895.

Honorable HOKE SMITH,
Secretary of the Interior.

DEAR SIR: It is with great hesitancy that I write to add to the burdens of one so busy and burdened as I presume you to be. But it is not for myself but for others that I write, and will try to be laconic.

Can you embody in your next report to Congress an appeal for an appropriation of \$7,000 or \$8,000[0] to roof the Casa Grande ruin, to fence 40 acres, and make excavations of all the mounds in the vicinity for the purpose of learning the history of the wonderful people who once lived here and erected the buildings and built canals?

* * * * *

Very sincerely, yours,

ISAAC T. WHITTEMORE,
Custodian Casa Grande.

- II. *Indorsement of the Mr Whittemore's by the Acting Secretary of the Interior*

DEPARTMENT OF THE INTERIOR,
August 7, 1895.

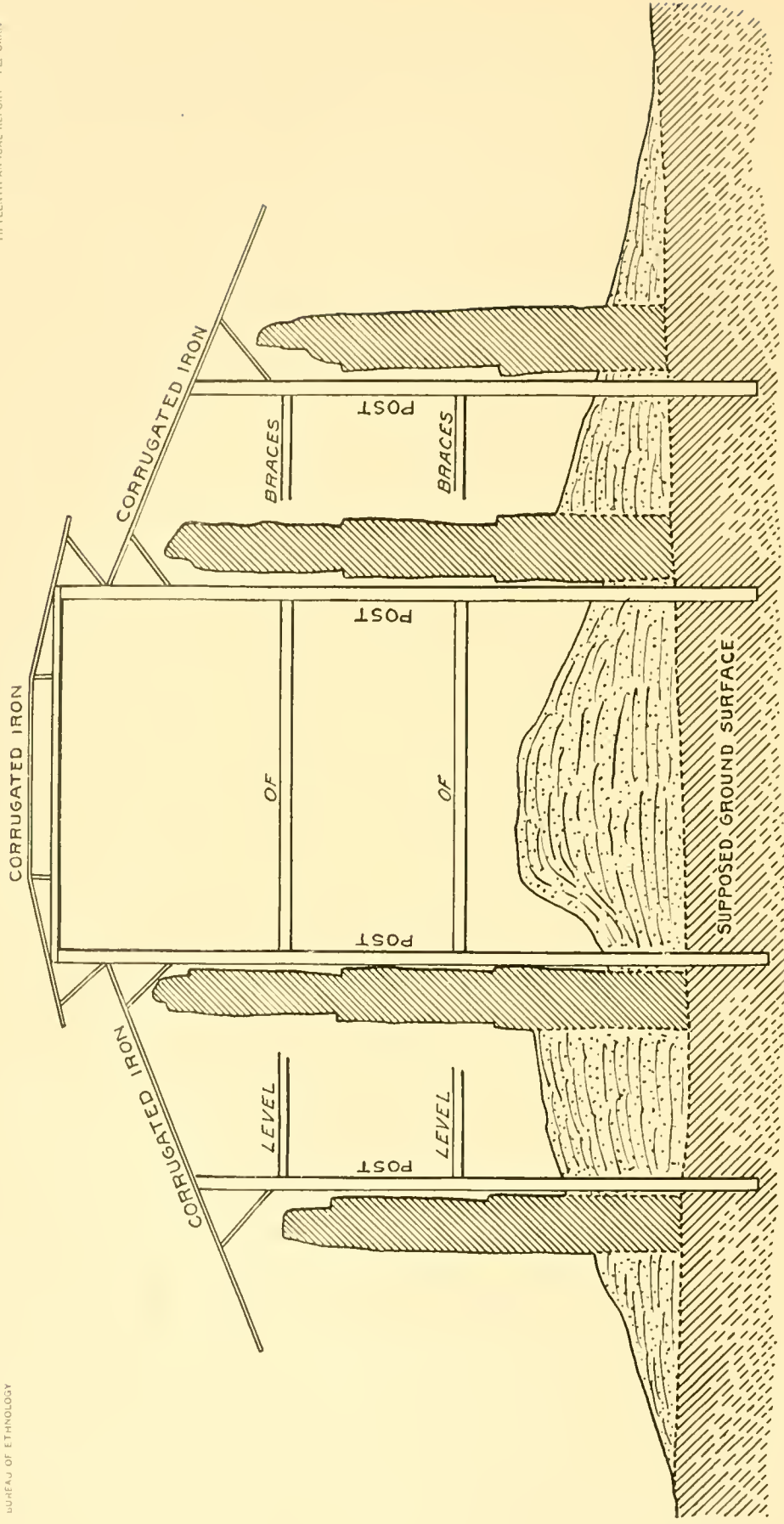
Respectfully referred to the Director of Bureau of Ethnology for consideration of so much of within letter as relates to the Casa Grande ruin, and such recommendation as the facts may warrant, and report.

WM. H. SIMS,
Acting Secretary.

- III. *Letter of the Acting Director of the Bureau of American Ethnology to the Secretary of the Interior suggesting an examination of Casa Grande with a view of its further protection*

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, August 28, 1895.

SIR: Your request of August 7 for a report concerning a recommendation by Reverend Isaac T. Whittemore, under date of July 25, that



SECTION THROUGH C—D OF ROOF PLAN, SHOWING SUGGESTED ROOF SUPPORT

provision be made for further protecting Casa Grande ruin, near Florence, Arizona, by the erection of a suitable roof, has been under consideration.

In many respects Casa Grande ruin is one of the most noteworthy relics of a prehistoric age and people remaining within the limits of the United States. It was discovered, already in a ruinous condition, by Padre Kino in 1694, and since that time it has been a subject of record by explorers and historians. Thus its history is exceptionally extended and complete. By reason of its early discovery and its condition when first seen by white men, it is known that Casa Grande is a strictly aboriginal structure; and archeologic researches in this country and Mexico afford grounds for considering it a typical structure for its times and for the natives of the southwestern region. Many other structures were mentioned or described by the Spanish explorers, but the impressions of these explorers were tinged by previous experience in an inhospitable region, and their descriptions were tinged by the romantic ideas of the age; very few of these structures were within the limits of the United States, and nearly all of these situated in the neighboring republic of Mexico disappeared long ago; there is hardly a structure left, except Casa Grande ruin, by which the early accounts of Spanish explorers in North America can be checked and interpreted—none other of its class exists in the United States. Casa Grande ruin is, therefore, a relic of exceptional importance and of essentially unique character.

Unfortunately this structure, like others erected by the most advanced among the native races in the southwest, is of perishable material: it is built of adobe, or rather of cajon, i. e., of a puddled clay, molded into walls, dried in the sun. Such walls would stand a short time only in humid regions; but in the arid region the material is desiccated and baked under cloudless sky and sun for many months at a time, and becomes so hard as to resist, fairly, the rare storms of the region. It is by reason of climatal conditions that cajon and adobe have come into general use for building in southwestern United States, as in contiguous parts of Mexico; and it is by reason of the same conditions that a few of the ancient structures remain, and the best preserved of all is found in the Gila valley, one of the most desert regions on the western hemisphere. Yet the best of the cajon structures is perishable; so long as the roof remains and the summits of the walls are protected, disintegration proceeds slowly; but when the projecting roof is removed, the rare but violent storms attack the walls, and they are gradually channeled and gullied by the storm waters, while the exterior surface gradually disintegrates and falls away under the alternate wetting and drying. Even in the most arid regions, the earth-built structures typical of the southwest are surely, albeit slowly, ravaged and destroyed.

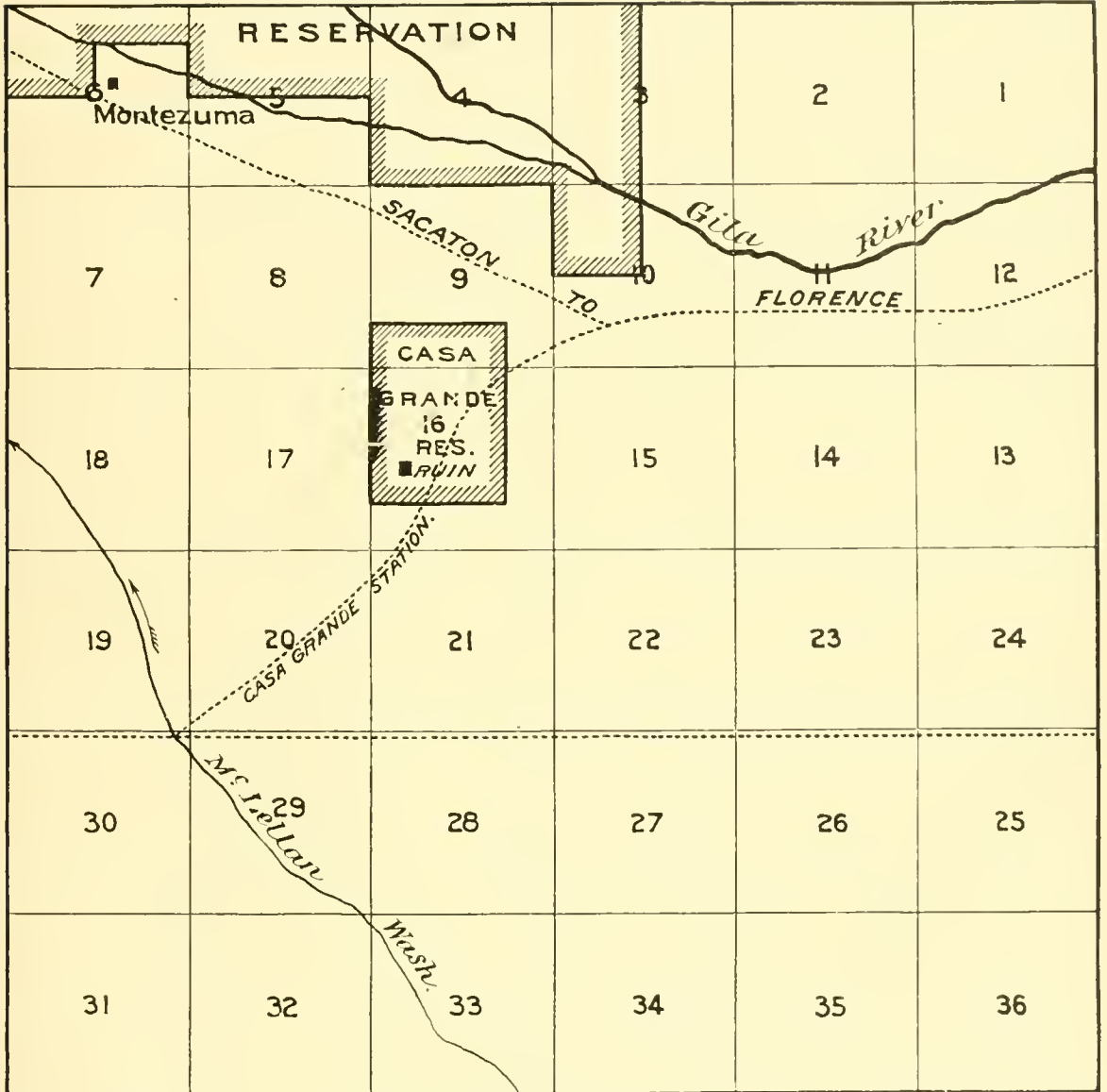
Several years ago Casa Grande ruin was brought into general notice throughout the United States in consequence of southwestern explora-

tions; and in 1889, in response to a petition from several illustrious Americans, the Congress of the United States, at the instance of Senator Hoar, of Massachusetts, made an appropriation of \$2,000 for the purpose of undertaking the preservation of this ruin. This appropriation was expended in works urgently required to prevent the falling of the walls and final destruction of the ruin; they included metal stays for the walls, with brickwork for the support and protection of the walls at their bases. Subsequently an area of about 480 acres, including the ruin, was reserved from settlement by Executive order. A custodian was also appointed, and, as this office has been informed, has been continued down to the present. This action on the part of the legislative and executive branches of the Government can only be regarded as indicating a desire and continued intention to preserve the ruin for the benefit of the people of the United States.

The expenditures thus far authorized for the preservation of Casa Grande ruin have been made in such manner as to meet the most urgent needs only, and without them the structure would probably have been, before this time, beyond the reach of preservation. The preservative works were undertaken as emergency measures, rather than as steps in carrying out a well-considered plan. From the outset it has been understood by architects and archeologists and others familiar with the structure that preservation can be insured only by throwing a roof over the entire ruin in such manner as to protect the walls from the fierce rainstorms which occasionally occur in the Gila valley. No lesser work will preserve the ruin more than a generation or two; and unless this work of roofing is contemplated and is undertaken within a few years, the emergency work will be of little avail and the money expended therein will be lost. Accordingly, assuming a desire and continued intention on the part of the Government to preserve this noteworthy relic, no hesitation is felt in recommending that a suitable roof be placed over Casa Grande ruin, at such time as may be expedient; and, in view of the rapidity with which destruction is now in progress, there is no hesitation in saying that the work should be undertaken at the earliest practicable date.

It should be added that neither the Director nor any of the collaborators in the Bureau of American Ethnology have visited Casa Grande ruin for some three years, and accordingly that there are no data in this office to indicate whether there is especially urgent necessity for undertaking preservative work at this time; but much confidence is placed in the judgment of the custodian, Reverend Isaac T. Whittemore, who is known to several collaborators in the Bureau.

The subject of the preservation of Casa Grande, in many respects the most noteworthy ruin in the United States, is deemed important; and if the Secretary of the Interior desires more specific information concerning the present condition of the ruin, as a basis for further action or judgment, it will be a pleasure to have an officer of this Bureau



MAP OF TOWNSHIP 5 SOUTH, RANGE 8 EAST, GILA AND SALT RIVER BASE AND MERIDIAN (6 MILES SQUARE), SHOWING LOCATION OF CASA GRANDE RESERVATION AND RUIN

make a special examination of, and report on, the ruin during the autumn.

I have the honor to be, yours, with great respect,

W J MCGEE, *Acting Director.*

The SECRETARY OF THE INTERIOR.

IV. *Letter of the Acting Secretary of the Interior to the Director of the Bureau of American Ethnology, approving the suggestion that Casa Grande be visited with a view of determining the desirability of its further protection*

DEPARTMENT OF THE INTERIOR,

Washington, September 12, 1895.

The DIRECTOR OF THE BUREAU OF AMERICAN ETHNOLOGY,

Smithsonian Institution.

DEAR SIR: I am in receipt of your letter of the 28th ultimo submitting a report upon the recommendation made by the Reverend Isaac T. Whittemore, custodian, that provision be made for further protection of the Casa Grande ruin near Florence, Arizona, by the erection of a suitable roof.

In response thereto I have to state that more specific information concerning the present condition of the ruin and the probable cost of providing proper protection for it is desirable in the preparation of an estimate to be submitted to Congress with a view of securing appropriation for the work. To this end the Department gladly avails itself of your offer to send an officer of your Bureau, at its expense, to make a special examination and report on the ruin during the autumn of this year.

Very respectfully,

JOHN M. REYNOLDS,

Acting Secretary.

V. *Letter of the Director of the Bureau of American Ethnology to the Secretary of the Interior regarding the examination of Casa Grande by Mr W J McGee*

SMITHSONIAN INSTITUTION,

BUREAU OF AMERICAN ETHNOLOGY,

Washington, October 18, 1895.

SIR: Pursuant to your request of September 12, 1895, Mr W J McGee, ethnologist in charge in the Bureau of American Ethnology, will in a few days repair to Florence, Arizona, for the purpose of examining Casa Grande ruin and determining the desirability of further works for its preservation. * * *

In accordance with terms of preceding correspondence, it is of course understood that the cost of the work will be borne wholly by this Bureau.

I have the honor to be, yours, with great respect,

J. W. POWELL, *Director.*

The SECRETARY OF THE INTERIOR,

Washington, D. C.

VI. *Report of the Director of the Bureau of American Ethnology to the Secretary of the Interior on the examination of the condition of Casa Grande by Mr W J McGee, with a recommendation concerning its further protection*

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, November 15, 1895.

SIR: Pursuant to a proposal made in connection with a report from this office relating to the ruins known as Casa Grande, near Florence, Arizona, under date of August 28, 1895, and to the acceptance of this proposal in a communication from the Department of the Interior under date of September 12, 1895, Mr W J McGee, ethnologist in charge of the Bureau of American Ethnology, has within a few days made an examination of Casa Grande ruin with the view of determining the need for further protection of the ruin by a roof or otherwise.

There are in this office two series of photographs representing the ruin. The first series was taken in 1892 before the protective works authorized by the Congress were commenced; the second series represents the work in progress. In the recent examination the present condition of the ruin was carefully compared with the condition represented in the photographs.

On comparing the profiles of the walls, it was found that in many cases the irregular upper surfaces retain the exact configuration of 1892, even to the slightest knobs and rain-formed crevices; the correspondence being so close as to show that the injury and loss by weathering during the interim has been imperceptible. In some other cases, notably along the southern and eastern walls, the profiles are more extensively modified; some of the points and knobs shown in the photographs are gone, some of the old crevices are widened and deepened, and some new crevices appear; and in some parts it can be seen that walls are lowered several inches. On the whole the modification of the profiles of the walls is limited, yet such as to indicate that destruction is proceeding at a not inconsiderable rate.

On comparing the scars and crevices on the sides of the walls, it was found that, while many remain essentially unchanged, most are enlarged and deepened. This is particularly noteworthy on the eastern and southern walls, which are most beaten by wind-driven rains, and which are also most modified in profile. It would appear that destruction is proceeding more rapidly along the sides of the walls than along the crests.

On examining the walls with respect to apparent solidity and stability, it was found that nearly all are in fair or good condition. The only portion that would seem in special danger is the central section of the southern exterior wall. This section seems insecure, and might at any time be overthrown by a heavy wind following a rain storm. This section was not, unfortunately, braced or tied to the stronger interior wall when the protective works were carried out in 1892.

On examining the structure to ascertain the effect of the protective works of 1892 in staying the destructive processes, particularly the undermining of the walls by spattering rain and drifting sand, it was found that in most cases the results have been excellent. On the inner side of the middle section of the southern exterior wall sapping is in progress at the ground level, and also along the rows of joist openings for the first and second stories, and in a few other places the protection seems inadequate; but in general the anticipations of the projectors of the protective works seem to have been realized.

The most serious of the destructive processes was sapping, and this process has been nearly checked by the protective works. The second was the desurfacing and subsequent eating away of the walls by beating rains and frost, and this is still in progress at a moderate rate. The least serious process was the wearing away of the crests of the walls by rain and winds, and this is still going on at a perceptible rate. It is impossible to determine, and difficult even to approximate, the rate of destruction quantitatively, especially so since it goes on cumulatively, with constantly increasing rapidity, as the cemented surfaces are destroyed and the crevices widen and deepen; but judging from the history of the ruin, and from the rate of destruction indicated by comparing the photographs of 1892 with the present aspect, it would seem safe to conclude that, if protected completely from vandalism, the ruin will be comparatively little injured during the next five years, and will stand perhaps half a century, without further protective works, before moldering into dust.

In view of the slow yet ever increasing rate of destruction of the ruin, and of its great interest as a tangible record of the prehistoric inhabitants of this country, no hesitation is felt in recommending that the structure be further protected, and practically perpetuated, by a suitable roof, so designed as to shield the walls from rain and sun and at the same time permit an unobstructed view of the ruin from any direction.

* * * * *

I have the honor to be, sir, yours, with great respect,

J. W. POWELL, *Director.*

The SECRETARY OF THE INTERIOR.

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