

THE KEY OF THE GULF—THE TORTUGAS ISLANDS.

BY C. F. HOLDER.

Dry Tortugas is an erroneous term applied to the group of keys or islands which constitute the extreme outer Florida reef. Key West is the most important as regards inhabitants, now boasting a large Cuban or Spanish-American contingent. Continuing to the southwest, we come to the Marquesas Islands, and finally, about sixty miles from Key West, lies Garden Key, on which is situated the finest fort of the old class in the United States; a magnificent structure, three tiers of brick masonry, filled in with concrete—the whole forming a defense which, while of not much service to-day against modern guns, was, during the late war, considered a formidable fort.

The Tortugas Islands have been almost neglected since the war, when the Dry Tortugas obtained a somewhat unenviable reputation by being used as a military prison.

Tortugas was not so disagreeable a place as it was painted.

For thirty years it has been almost deserted. The old guns are lying where they were left by the troops, some unmounted, the carriages rusting in the sun and rain, and the fort has an appearance not creditable to the government that has expended millions upon it. But now indications point to the belief that the old fort will be rehabilitated, and the garrison, which has been commanded by some of the best known officers in the army, will again assume an air of life and activity.

For some time it has been in the hands of the Department of State, which established a quarantine station here, and army surgeons have been studying the yellow fever germ theory. But the threatened trouble with Cuba has resulted in the re-establishment of the post as an army and naval station. The White Squadron is lying off the fort; coal has been sent there for the fleet, and a large contract has been given for the deepening of the harbor near Garden Key, so that the largest cruisers can run in and coal.

It is a singular commentary on the inactivity of the government for the past three decades that this post or fort, the most important strategical position in the South, the key of the Gulf, the Gibraltar of America, should have been left in charge of a sergeant all these years and practically ignored. In 1819, the United States purchased these keys and the whole of Florida for the sum of \$5,000,000; and considering the fact that the keys are but a few hours' run from Cuba, it was deemed necessary to fortify the exposed points; so Fort Jefferson was begun in 1847, and Fort Taylor, at Key West, some time later.

The laboring work was done almost entirely by slaves hired from their masters in Key West, the skilled mechanics coming from the North. In 1859 and

1860 Fort Jefferson was near completion, but war being declared, it was hurriedly fortified, and has never been entirely completed nor has the original plan been carried out, which would have made it one of the strongest fortifications in the world.

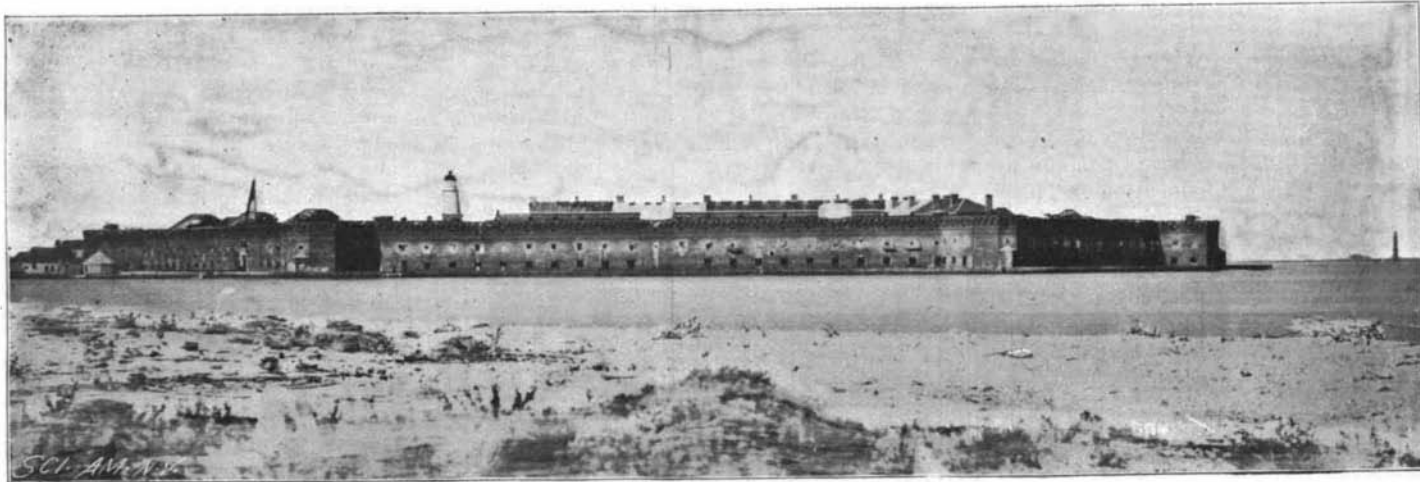
Approaching the group from the east, the keys gradually take shape—East, Middle, Sand, North, Loggerhead, Bird, Garden, Long and Bush Keys. East Key is the largest; Loggerhead the longest and bearing the light of that name. They are all made up of coral sand and shell, washed up by the sea, and capped by a thicket of bay cedars, and in some instances mangroves. The entire group, roughly speaking, including the outlying reef, occupies an area of seventy square miles; being about ten miles in length from north to south and perhaps five or six from the Bush Key reef to the outer reef west of Loggerhead. It is really an atoll, cut by a maze of deep blue channels

on each key surrounding the fort, the place could be made impregnable.

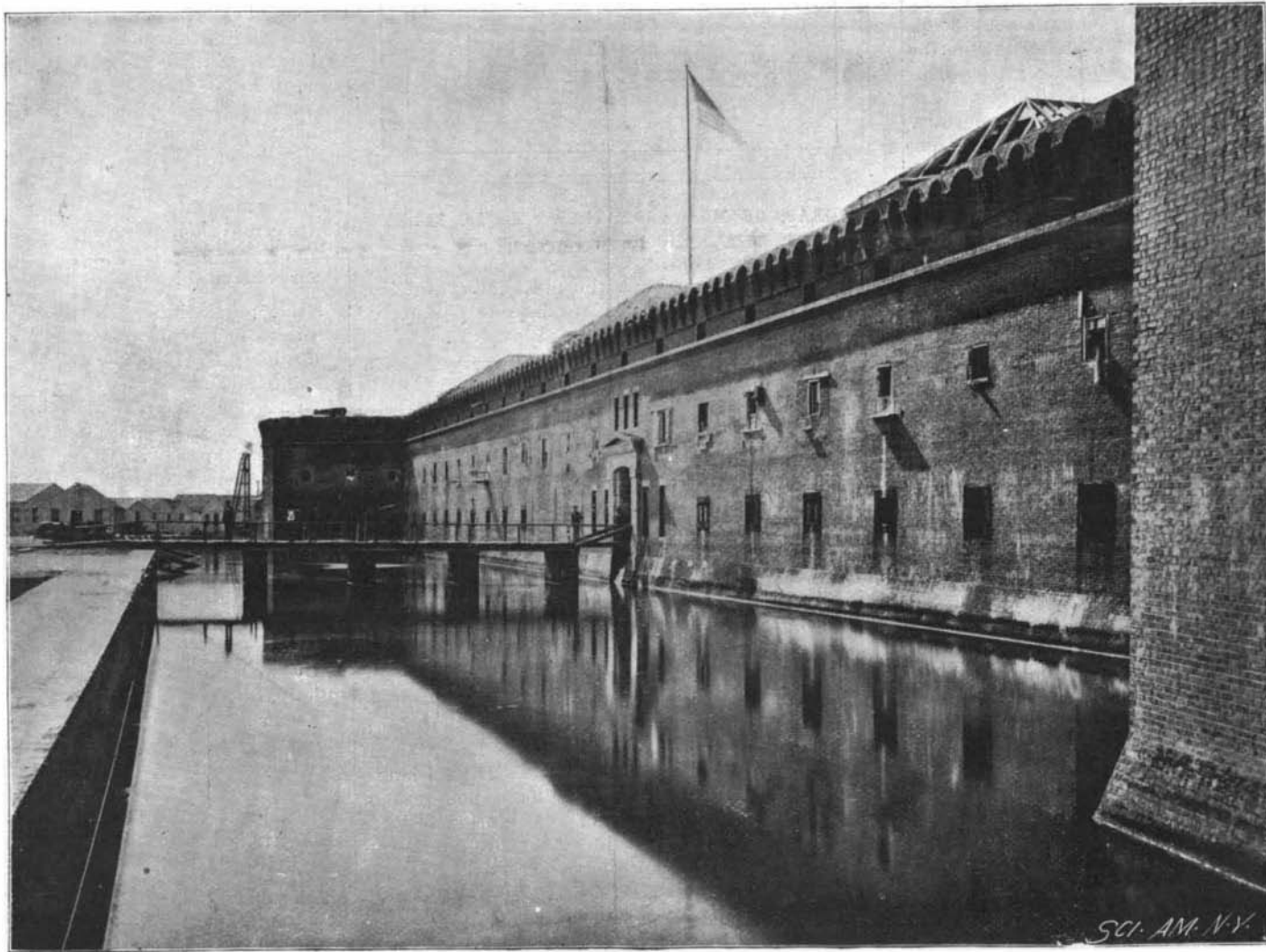
The old fort presents a picturesque appearance, and seems to rise directly from the water. The key contains thirteen acres, and the fort almost surrounds it, there being about an acre of ground on the outside; but on the north, west and south fronts the sea wall breasts the sea, and between it and the fort there is a wide moat ten or twelve feet deep at high water, beyond which rise the walls with their frowning ports. Each face is pierced for one hundred and thirty large guns; and as there are five faces, the total equipment would be about five hundred guns. The two lower tiers are in casemates; the third on the parapet, where at each angle there is a bastion tower, reached from below by a winding granite stairway, all of which gives the old fort an attractive and castellated appearance. The writer well recalls standing here at the out-

break of the war, watching an incoming steamer which was supposed to be the Alabama or some Confederate cruiser. There was not a gun on the fort at that time, and as the vessel refused to stop at the command of the health officer, those on the fort, of whom the late Quarter-master-General Meigs was one, supposed that they were to be captured. The vessel proved, however, to be a transport loaded with guns and troops, and from then on Fort Jefferson was well equipped. It was here that the conspirators were sent, and some of their efforts at escape made life at the fort extremely exciting at the time.

From the water the great fort presents a frowning front, but, landing at the wharf and passing over the drawbridge into the interior, one understands fully why the term Garden Key was given to this island. Here are groups of lofty coconut palms on either side of the



THE FORT AT DRY TORTUGAS.



MOAT SURROUNDING THE FORT AT DRY TORTUGAS.

which wind in and out in a marvelous manner, forming an ideal and perfect harbor, but so narrow that it would be difficult for the largest cruiser to turn. During the war the largest transports entered the port; even the large ship "Vanderbilt," afterward changed into the sailing ship "Three Brothers," entered the harbor, which is very deep.

The main entrance is from the east, vessels sailing for Loggerhead Light, three miles away, almost passing Tortugas, then a buoy is suddenly seen, and the vessel nearly doubles on her tracks and steams into a narrow, intensely blue channel, which completely encircles the key, so that a vessel passing in the main channel is not obliged to turn, but passes directly around the key and out again.

Fort Jefferson stands in the center of the group, and the original plan was to have the various islands, Bird, Sand, East and Loggerhead Keys, provided with batteries. This can now be done, and with sand-bag forts, and one or two disappearing guns of the largest caliber

walls, while beneath a grove of mangrove trees is the path lined with out-of-date shell and solid shot which have stood here for nearly forty years.

The quarters for officers and men are perhaps among the finest in the country, and are large three-storied buildings following the general direction of the faces. The one on the north and west is the officers' quarters, while that to the east is for the men. It was here that Billy Wilson's men mutinied during the war. An old-fashioned lighthouse rises a few feet above the parapet, and at its base is the keeper's cottage, where for years lived old Capt. Benner, who, it was said, found twenty thousand dollars in doubloons at the wreck of an old galleon on East Key, eight or ten miles away. This house and light are made the location of "Jack Tier," one of Cooper's novels.

The ground of the interior is white sand, here and there covered with Bermuda grass and a long wiry grass which grows like a vine, throwing out roots here and there and forming a trap to the unwary. The

parade ground is in the center, and here the writer saw many battalions of prisoners mustered during the war. They were sent down in transports, and as they marched ashore were a sorry lot. Many were manacled or secured with ball and chain, being considered desperate characters, and sentenced to Dry Tortugas for a term of years.

Prior to the establishment of Fort Jefferson, in 1847, the islands were the resort of wreckers and pirates, who reaped a rich harvest from the wrecks of the time. The writer discovered a large Spanish gun, with the coat of arms of Spain still intact, on the shoal reaching out from Bush Key. The gun was raised and placed in the fort.

More important than Tortugas is Key West, where a city has sprung up, and property valued at millions of dollars is almost entirely unprotected. The island of Key West is about five miles in length and one in breadth. The city, or rather the most prosperous portion of it, is on the southwest side, where the reef reaches away and affords protection to a fine harbor—one which would float the navies of the world, and is of great importance as a naval station. The island rises to a maximum height of twelve feet, this being a calcareous ridge. At other places it is but a few feet above the water. Yet the accumulation of soil is sufficient to afford luxuriant vegetation, the island being covered with trees, bananas, plantains, guavas, coconuts, tamarinds, and other tropical fruits being prominent.

The armament of Key West is of the ancient type, and entirely obsolete. It consists of a fine fort of the old style. Fort Taylor rises directly from the water on the southwest side, commanding the approach to the harbor. It is connected with the land by a drawbridge, having a fine front of granite and brick, with castellated walls, bastions, etc. Like Fort Jefferson, Fort Taylor is pierced for three tiers of guns. The accessory defenses consist of two martello towers. These have casemated walls, but are useless from a modern standpoint.

The question of climate is one which interests many when this region is to be repopulated with troops. The writer spent several years at Tortugas, and is prepared to say that, when the quarantine rules are absolutely lived up to, it is as healthful a place as one could wish.

The great reef which surrounds the Florida keys in former years was interesting as being the only coral reef on the American continent within the jurisdiction of the United States. At Tortugas it represents an area of seventy-five or one hundred square miles, and was a vast grove of coral polyps, cut here and there by the deep blue channels peculiar to the region; but some peculiar occurrence has changed much of this. A few years ago the coral of the reef, even so far as Key West, died, and at present it is difficult to find any in shoal water, where formerly it could be taken up by the cartload. It is assumed that an earthquake opened a crack in the vicinity, permitting sulphurous fumes or some gas to escape that destroyed the polyps. This is of course theory, but the fact remains that something occurred which resulted in the almost total destruction of coral life in this locality. But this may be only temporary. Corals grow much more rapidly than is generally supposed, and in a short time the reef will again blossom with these mimic flowers.

H. L. RUSSELL and S. M. Babcock consider that profound changes of a physical and chemical nature, which occur in milk from which bacterial fermentations have been excluded, are of a non-vital character and due to the presence of ready formed enzymes in the milk as obtained from the cow. Moreover, they have separated out proteid converting enzymes, and proved that they exert a curdling as well as a digesting function when applied to milk. They believe, therefore, that the ripening of hard cheese is caused by the joint action of bacteria and enzymes.—*Nature*, lvii., 373.

PUEBLO ARTS AND INDUSTRIES.—II.

BY COSMOS MINDELEFF.

The western tribes of the Pueblos, and especially the Moki Indians of Arizona, have been but little affected by the march of time since the Spanish conquest three and a half centuries ago, and many of their arts and industries are almost exactly the same as they were when described by Castañeda. In the eastern Pueblos, along the Rio Grande, there have been many changes in the life of the people, who have been to a certain extent Mexicanized, and the arts found in an almost aboriginal state in the West, on the Rio Grande are all more or less modified by that influence. The more primitive western tribes have, therefore, received much more attention from scientific investigators, and are naturally of more interest in the present state of our knowledge. When the purely aboriginal features of Pueblo arts have been exploited, the study of modifications due to contact with a higher culture will have an even greater interest.

The illustration shows the native costume of the Moki women, as also the style of hair dressing peculiar to them and described in the last paper of this series (*SCIENTIFIC AMERICAN*, January 15, 1898). The essential part of the dress is a blanket woven in a fine lozenge pattern, of native black wool, bordered with a wide band of dark blue, separated usually from the body of the blanket by a raised cord of green. The two ends are brought together and sewed, except a space of a few inches to allow the passage of the arm, thus forming a baglike garment open at both ends. In use the blanket is draped over the person in the manner shown in the illustration, passing under the left arm and over the right shoulder, the right arm passing through the opening left near the top of the seam. When the wearer is not at work, the blanket is often drawn over the left shoulder, leaving only the right arm free, as shown in the uppermost of the three figures in the illustration.

Sometimes an additional blanket is thrown over the shoulders. Castañeda says: "The women wear blankets, which they tie or knot over the left shoulder, leaving the right arm out." That description, so far as it goes, applies as well to-day as it did in 1540. He adds that "They gather their hair over the two ears, making a frame which looks like an old fashioned headdress."

The blanket dress constitutes practically all of the native woman's costume. On occasions, and especially when she goes away from home, a woman may wear moccasins, made of deer skin with rawhide soles. A large part of the deer skin is left attached to the moccasin, and is wound round and round the lower leg, forming a bulky kind of legging, but this is more often seen among the Navahos, who travel much, than among the Pueblo women, who seldom leave home. It is a common sight, however, along the railway which passes near some of the eastern Pueblos, where the women congregate on the platform at train time, to peddle fruit and pieces of pottery to the passing traveler. There also the native blanket dress can be seen, usually worn over an underdress of calico print. This underdress is rare in the West.

There is a charming simplicity about some of the customs of the western Pueblos, which still retain their aboriginal form. When a young man has determined in his own mind that life without a certain young woman would be but a dreary waste, he speaks to his own parents about the matter and they prepare for him a little bundle of gifts, in which is usually included a blanket and a buckskin. This bundle he takes to the house of the young woman and leaves it there carefully and by stealth, so as not to be seen; but usually a pair of very interested eyes watch his movements from within. If the bundle is returned, he knows that he must seek elsewhere; if it is retained,

he thereupon becomes an accepted suitor, and thereafter the young couple can be seen on any bright day in some sheltered nook on the house top, the man knitting himself a pair of woolen leggings or footless stockings and the girl dressing his hair with a bunch of grass or straw, the ends of which serve as comb and brush; for these people are very proud of their long black hair, and devote much time to its care. When all the preliminaries are arranged, the man goes to the house of the woman's people and becomes an adopted member of her family. This custom has had a marked effect on the architecture of the villages, as will be pointed out in a later paper of this series. That the custom is an old one is evidenced by the remark of Castañeda: "When any man wishes to marry, it has to be arranged by those who govern. The man has to spin and weave a blanket and place it before the woman, who covers herself with it and becomes his wife."

Although the Navahos now make only the coarsest and cheapest blankets of native-grown wool, using fine Germantown yarn in their finest work, the Moki still make their best blankets of yarn spun by themselves. Their best work is the woman's dress blanket,



HOPÍ MAIDENS, SHOWING PRIMITIVE PUEBLO HAIR DRESSING.

Perhaps the best known art of the Southwestern tribes, aside from pottery making, is blanket weaving. The blanket is an integral part of the Indian dress, and in the manufacture of the highest grade the Moki have always been pre-eminent. Oddly enough, among these Indians weaving is the work of the men, whereas in other tribes, and especially among the Navahos, who roam over the surrounding country, the weaving is exclusively done by women. Much has been written about Navaho blankets, and within recent years enormous quantities have been shipped out of Arizona and New Mexico by the traders, but the much finer Moki blankets are but little known. Among the Navahos the art has already passed through that stage of degeneration which invariably attacks a native art for the products of which a large foreign demand arises, and it is difficult now to purchase a Navaho blanket more than a year or two old, while the types, both of design and weaving, prevalent five or six years ago are now practically unknown. Such conditions are now just beginning to affect the Moki manufactures, and it is interesting to note that the changes of a year or so past are greater than those of the previous three centuries.