

SANTIAGO DE CUBA—ITS ENVIRONMENT AND DEFENSES.

Next to that of Rio de Janeiro, the bay of Santiago de Cuba is, admittedly, the most picturesque in the western hemisphere. In reality, the bay forms two harbors, an inner and an outer, both landlocked, and approached by a very contracted and more or less tortuous channel, beset with rocks and shoals. In fact, the entrance to the outer harbor is difficult to locate, and would be almost impossible but for peculiarities of topographical outline and the fortifications that loom up against the hillsides. Santiago City, generally known as "Cuba" to the natives, lies at the further extremity of the inner bay on its right bank, consequently is not at all visible from the sea. Dirty and squalid for the most part, with ill-kept streets and dilapidated dwellings, it, nevertheless, is most attractive when viewed from the water front and at a distance; the yellow and blue houses literally rise from the water's edge, extending almost to the summit of a hill that, but for the dwarfing effect produced by the hazy blue peaks that encompass both valley and bay, would be termed a mountain. Indeed, the shores of the harbor are almost uniformly high and rugged, being merely the foothills and spurs of the Sierras.

As a military and naval station, Santiago dates from 1514, when Diego Velasquez here founded a settlement and erected rude defenses for its protection. Thus, after Baracoa, Santiago is the oldest city in Cuba, and for more than two centuries enjoyed the distinction of being the capital of the island. In 1553 it was raided by the French and the fortifications in part destroyed. Ten years later a new series of defenses were undertaken, that in 1663-65 were replaced by the obsolete brick, stone and mortar structures now known as Morro Castle, and Estrella, Punta Gorda and Santa Catalina batteries. Of later date are batteries Aquadores and Blanca—the one an outlying defense to Morro, the latter occupying the place of the ancient artillery barracks just below the city—and the fortress of La Zocapa (or Socapa). Of still later date are water batteries on Isla de Smith, where the lower bay debouches into the narrow gut that connects it with the Caribbean Sea.

Morro, which is practically a duplicate, though on a slightly reduced scale, of the castle of the same name that guards the entrance to Havana, is perched high upon the cliff that at the right hand entrance of the harbor forms Morillo Point. Its ancient crumbling look and weather-beaten and discolored walls cause it to have the appearance of being ready to topple into the waves below; but for all, it is stronger and more defensible than its exterior would indicate, and the least salient portions lie beneath the masonry, having been excavated from solid rock. It will be recalled this structure once held the cells, offices and torture chambers of the Inquisition at the time when the "Holy Office" assumed to be arbiter of the destinies of all Spanish America. How far the Morro and its sister and outlying fortifications have been strengthened in order to meet the exigencies of modern warfare, and specially of the present conflict, is chiefly a matter of conjecture, and it is not safe to rely too much upon the indolent habits and procrastinating traits of the Hispano-Latin race.

Diagonally across the outer entrance of the harbor, to the west of Morro,

and exactly opposite to the fortress of Santa Catalina on Cañones Point, stands the castle of La Zocapa. Here is the narrowest part of the channel, there not being more than 120 yards between the opposing shores. By a glance at the harbor plan, as published in the SCIENTIFIC AMERICAN of last week, it is possible to more fully realize the nature of the defenses of Santiago, remembering also that the natural topography of the region constitutes the strongest

Punta Gorda has again to be considered, for if it has not been completely silenced, it is still capable of delivering an enfilading fire, and over the stern, instead of over the bow as before, of the foe. Again, certain charts indicate that in the vicinity of Rat Island the only navigable channel in certain spots shoals to 24 feet, which is prohibitive to the passage of battleships and the heavier class of cruisers, which require 26 feet.

Thus Santiago is eminently fitted by nature to be a western Gibraltar. Properly fortified and defended, the harbor could defy any attack from the seaward; and to the landward the rugged characters of the hills and mountains are such as to offer almost unparalleled advantages for either offensive or defensive operations. But since the early history of the province of Santiago, no measures have ever been taken to defend its capital city and chief seaport from the rear, except those of temporary and flimsy character that have been necessitated by the raids of insurgents.

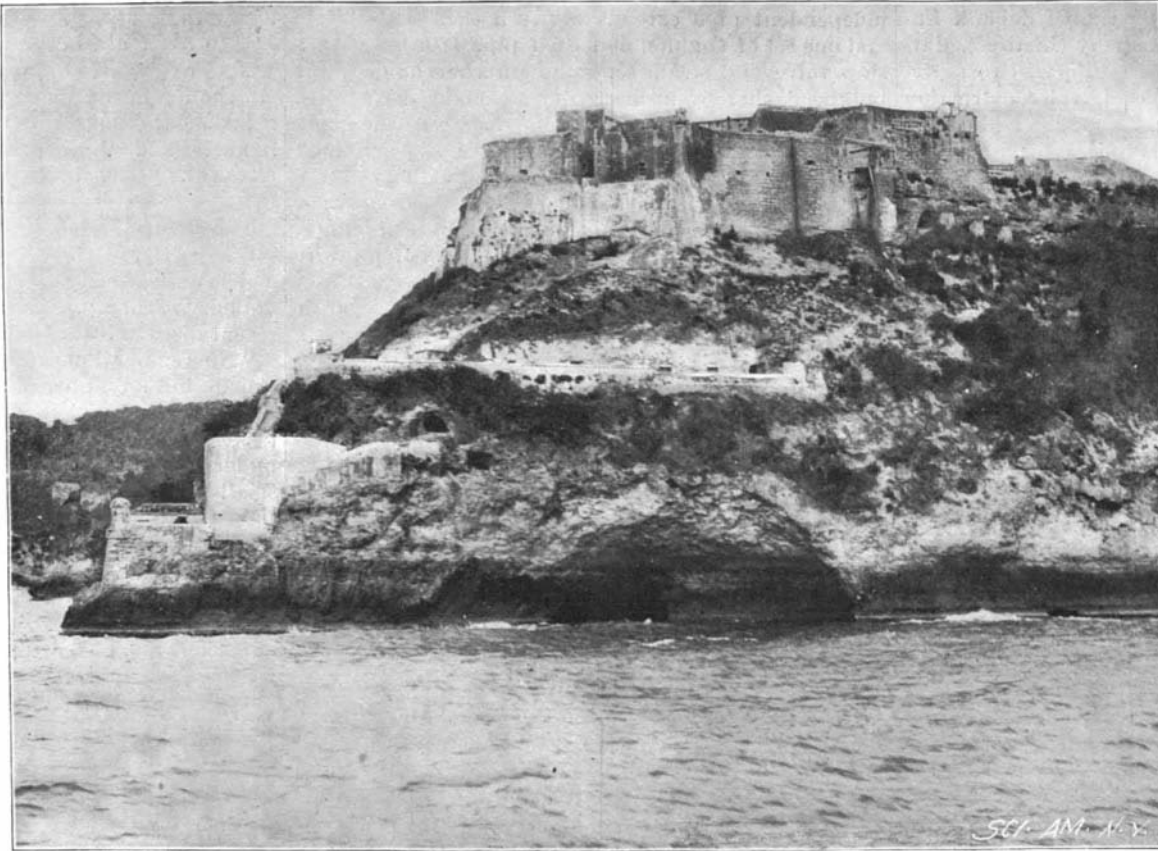
In the light of the foregoing, the feat of Lieut. Hobson, in blockading the lower bay of Santiago, by sinking the collier "Merri-mac" in the narrowest part of the channel, between Santa Catalina and La Zocapa, acquires new interest and further evidences the act was of a more daring and difficult nature than has generally been imagined. It is evident the strongest battleships could hardly hope to

escape scathless under the fire of three fortresses—with all the advantages of elevation—and as many batteries, to say nothing of the Spanish fleet, not even if all the guns employed by the foe are of an obsolete type and comparatively deficient penetration. That the "Merri-mac" and her volunteer crew suffered so little from the batteries must be ascribed, first, to surprise, and, second, to the distraction afforded by the fire of the United States squadron. To surely and certainly perform the task set demanded a cool head, insouciance to surroundings, and dogged persistence, since the enterprise was of the nature of a naval forlorn hope. The results to the country in practically, and for the present, at least, disposing of the Spanish fleet as regards future offensive operations in western waters, are incalculable.

The Cavalry Horse.

The army regulations prescribe the kind of horses desired for cavalry as follows: "The cavalry horse must be sound and well bred, gentle under the saddle, free from vicious habits, with free and prompt action at the walk, trot and gallop, without blemish or defect, of a kind disposition, with easy mouth and gait and otherwise conform to the following description: A gelding of uniform and hardy color; in good condition; from 15 1-4 to 16 hands high; weight not less than 950 nor more than 1,150 pounds; from four to eight years old; head and ears small; forehead broad; eyes large and prominent; vision perfect in every respect; shoulders long and sloping well back; chest full, broad and deep; forelegs straight, and standing well under; barrel large and increasing from girth toward flank; withers elevated, back short and straight; loins and haunches broad and muscular; hocks well bent and under the horse; pasterns slanting and feet small and sound."

THE average walking pace of a healthy man or woman is said to be seventy-five steps a minute.



ENTRANCE TO SANTIAGO DE CUBA'S MORRO CASTLE.

portion thereof, being such as to defy any improvement at the hands of man beyond fortifications and armament. The hostile vessel that essays Santiago Harbor is not only subjected to the fire of Morro and the water batteries below and behind to the east of this castle, but must likewise run the gauntlet of the Estrella, Santa Catalina and Zocapa; further, from the moment she is well inside Morillo Point she is subjected to an enfilading fire from Punta Gorda, an ordeal that is supplemented by a like fire from Isla de Smith as soon as the narrowest part of the channel is reached. At present this gut is additionally defended by the Spanish warships, Admiral Cervera having manifestly taken an advantageous position with this view. Presuming, however, all these obstructions and dangers are safely encountered and passed, to reach the city there still remains to be forced the second narrow channel, only about double the width of that guarded by Morro and Zocapa, et al., in order to enter the upper bay. Guarding the upper end of this channel is Rat Island (Isla de Ratones), now believed to be well defended by modern earthworks; and the battery on



THE BAY AND CITY OF SANTIAGO DE CUBA.