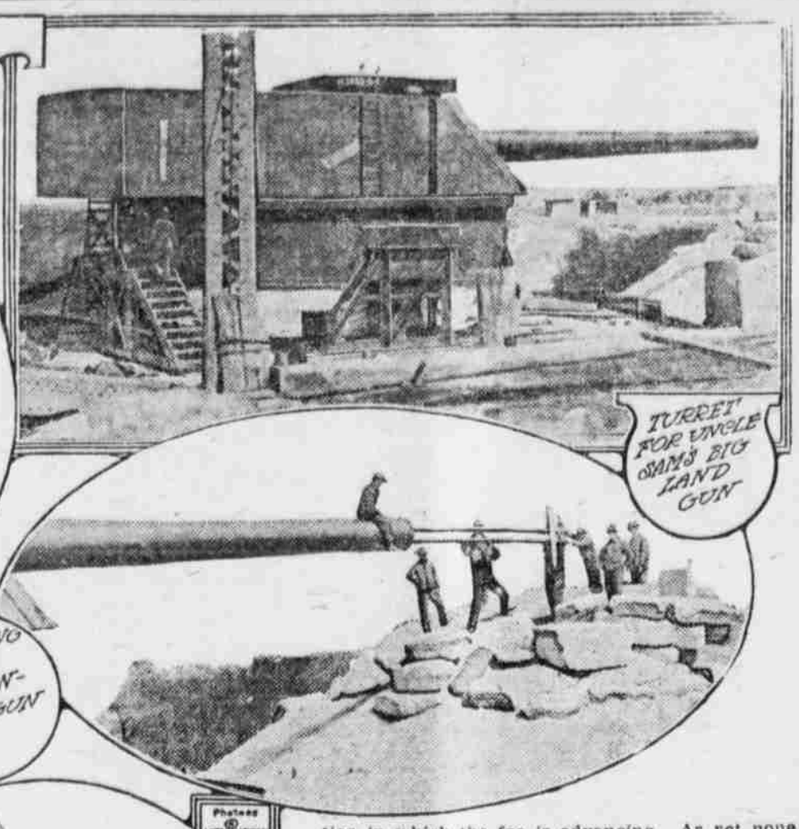
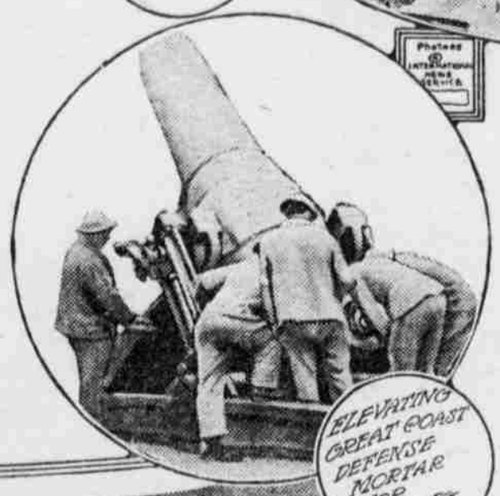
HOW COAST GUNNERS ARE TRAINED

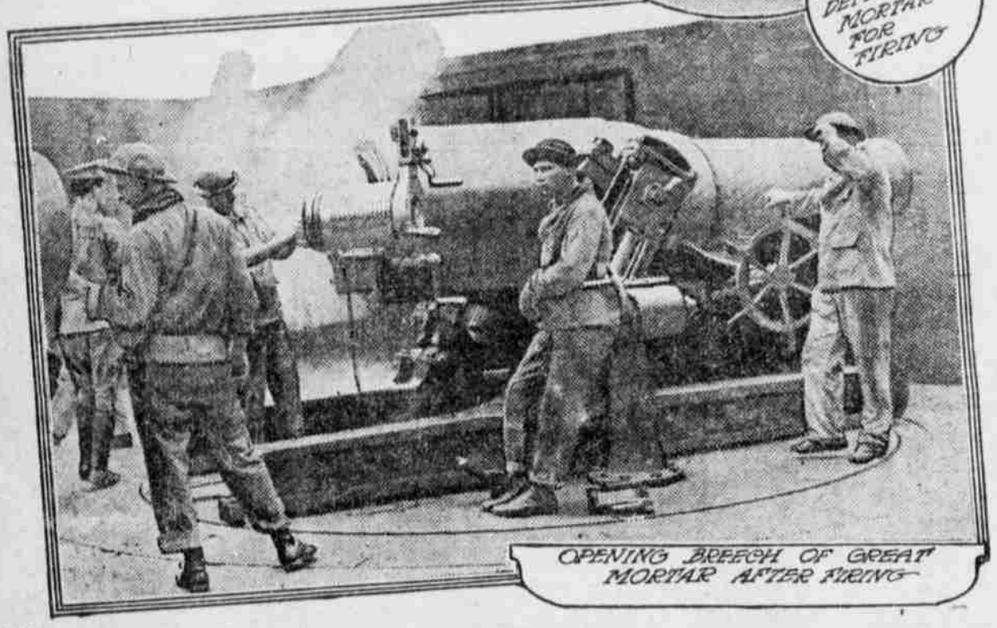


TURRET FOR UNCLE SAM'S BIG LAND GUN

SWABBING OUT A FOURTEEN-INCH GUN



ELEVATING GREAT COAST DEFENSE MORTAR FOR FIRING



OPENING BREECH OF GREAT MORTAR AFTER FIRING

IT is upon the seaboard guns that the security of the nation will depend should an enemy succeed in crippling our far-flung line, the navy, and drive our dreadnaughts to the cover of the harbors and the protection of the heavy rifles and mortars of the army. The question is, can these seaboard batteries hold a foe at bay?

On our continental shores we have a total of 26 coast defense commands, and 21 of these are located upon the Atlantic littoral. But even though there are fewer stations on the Pacific coast, still those are very formidable. Without considering weapons of eight-inch caliber and under, we already have mounted a total upon our two shores of 372 12-inch mortars, 105 12-inch rifles, and 132 10-inch heavy guns. The strength of the personnel of the coast artillery, according to the latest figures, is 758 officers and 17,901 enlisted men. This is a shortage of soldiers of 1,420 agreeably to the force authorized by law, and this is an intimation of the extremely heavy work that the men would have to face in case of hostilities, because we are minus a vitally necessary reserve.

The average layman has but the slightest knowledge of the extremely technical character of the Coast Artillery corps, and to be proficient these soldiers receive a many-sided education. Theirs is the task of getting the advantage of the enemy before the foe can locate the position of our guns and mortars, and the whole system of defense is the exact opposite of the way in which a hostile squadron would approach its aggressive task.

From the very beginning of the planning of our existing seaboard batteries the idea of concealment was the first concern. The mortars were designed to be hidden away in pits—each of them holding four of these weapons. The heavy rifles were not to be in plain sight, with their threatening muzzles peering over the crests of parapets. Instead, the disappearing carriage was invented for a mount. These gave the rifles the power to crouch while loading or awaiting service, and then, when the moment for action arrived, to spring up suddenly from behind their embrasures, to fire directly at the foe, and by the force of their own recoil to sink from view and into position for reloading.

How is it possible for weapons of this sort to be aimed at their targets? It is commonly known that in naval service the guns are held upon their quarry by means of electrically operated mechanisms that swing and elevate the rifles so that the cross hairs of the telescopic sights can be kept right on a moving target even though the sea be rough and the vessel roll. The gun pointers are undisturbed by this motion, and at 12,000 yards and more are able to do some wonderful shooting. But the gun pointers and trainers in the mortar pits and the emplacements of the big rifles do not, themselves, see the enemy. Yet despite this seeming handicap still they are able to do some extraordinarily effective work.

The army gun pointers near New York, with 10-inch disappearing rifles, have been able to fire four shots in a total elapsed time of less than one minute, and these were concentrated upon a target four miles away being towed at the rate of something over five miles an hour. All four shots struck the target and actually passed through a rectangle 24 feet high by 53 feet long. At 4,600 yards the same caliber guns at Fortress Monroe scored six hits out of six shots at a moving target. The total elapsed time of the firing was slightly over two minutes, the batteries scoring 1.4 hits per gun per minute.

The science of surveying has made these achievements possible, even though, as has been said, the guns and mortars must be trained and elevated by men who cannot see their targets. It is a well-known theorem in plane geometry that the length of the two sides of a triangle may be found if the length of the base and the degree of the two angles formed by the sides in question with this base are known. In the case of the coast artillery problem the distant ship of the foe is at the remote tip of the imaginary triangle, and the known base is the span between two observing or range-finding stations. This interval may be a mile or more and, within some limits, the longer the better for accuracy.

Many have seen from afar at our coast defense stations what seemed to be big bird boxes mounted upon towering tubular supports or webwork of steel. There are always two of them, and officially they are known as the primary and secondary range stations. In each of them, in time of service, there are at least two men. One turns by means of a delicately graduated mechanism a powerful telescope from right to left, and his function is to keep the moving target continually at the point of intersection of two cross hairs in the field of his instrument. His companion reads off at prescribed intervals the angle made by the telescope with the permanent base and the far-away foe.

The same thing is being done at the other range station at the opposite end of the base. A time bell rings at each of these stations every 20 seconds, and at the third stroke the man reading the angular scale telephones that measurement to the plotting room located where the enemy cannot see it and itself in telephonic communication with each gun or mortar division.

In the plotting room a group of men make use of the information coming to them intermittently from the range-finding towers and by a graphic process determine with great nicety the distance off of the steaming foe. The plotting table or board where the information from the observers is applied is a big semicircular affair—the curved edge being graduated to fractions of a degree, while the straight edge or diameter represents on a definite scale the length of the base line between the two spotter towers. At each end of this base line is a pivoted ruler. One is called the primary and the other the secondary—corresponding to the range-finding station with which its operator is in touch by telephone. Here is what follows:

The soldiers at the primary and secondary pivoted rulers or arms bring the free ends toward one another in accordance with the separate angles telephoned to them. A third man operates another ruler called the gun arm, which measures the distance or range of the axis of this triangle. At the word of command from the range officer the observers at the two telescopes bring these powerful instruments to bear in unison upon a chosen part of the remote ship. At the order "Take," the scale readers telephone the figures to the operators at the plotting board. In a few seconds the man in charge there has placed on a large sheet of paper a dot at the point where the two straight edges meet and has marked this pencilled point No. 1.

Again, 20 seconds later, another dot is made where the shifting straight edges meet, and this is numbered 2. Similarly positions are thus recorded for No. 3 and No. 4, and if the distance between these dots is uniform the plotters know that the target is moving at a steady speed and the path dots gives a visible trace of the direction in which the foe is advancing. As yet none of the weapons has been pointed, nor, if mortars are to be used, even been loaded.

The plotters marks upon his paper a fifth point ahead and in line with the four other dots. This is his "predicted point" where the enemy vessel should be a minute later. In this interval of time it is necessary for the men in the plotting room to do a number of things necessary to make it possible for the weapons to score a hit. The mere range is not enough to know. Let us assume that the foe is to be attacked by means of mortars and that the projectiles are to soar thousands of feet into the air upon their long flight that may take the better part of two minutes before plunging upon the vulnerable decks of the hostile dreadnaught.

It is needful to know how long the shells will be in the air at that range; how far the target will move during the flight of the missiles; how much the path of the projectiles will be influenced by drift due to their own rotation and the effect of the prevailing wind; the exact powder charge that will be needed to propel the shells—this being determined by the range and the state of the atmosphere; and finally, how much ahead the mortars must be aimed in order to allow for these factors. These complications are due to the method of indirect fire employed, and in this particular the mortars are not so accurate as the big rifles and, therefore, are more difficult to handle in order to insure good results. The final point set in the plotting room is No. 6 and two minutes further along than No. 5, the "predicted point," the latter being verified by the angles given by the observers at the spotter stations when the vessel is duly reported at the proper moment.

All of this has taken longer to describe than actual performance calls for, because the error factors which have been just mentioned are tabulated and are quickly worked out graphically by means of cunningly devised apparatus. It must be evident that in an interval of four minutes a big ship 12,000 or 16,000 yards off would not get measurably closer, and once the proper range is found and the mortars loaded the shifting range is quickly verified and the guns set accordingly.

The men in the towers and those in the plotting room are at work all the while. At definite intervals the instructions are sent by telephone from the plotting room to each battery or mortar pit, and lest these vocal directions be misunderstood the figures and orders are visibly reproduced. For this work the telautograph is employed, and thus words and numbers in writing check the telephone calls.

As has been said, there are four mortars in each pit, and as a general thing there are four of these pits at each defense station. In other words, a salvo of 16 high explosive shells can be launched by indirect fire at a foe. If but two of these hit the enemy she would either be destroyed or gravely damaged, because none of her decks would be able to withstand such an assault. In practice the performances of such a battery have been splendid. As a matter of record, one mortar company has fired as many as ten shots in 6 minutes 49 seconds, and in that interval made six hits, while another company has scored eight times out of ten shots during a span of 9 minutes 28 seconds. These mortar projectiles weigh from 800 to 1,000 pounds, and are charged with from 30 to 60 pounds of high explosive.

For the disappearing guns the modus operandi differs in some particulars. The time of flight of the shot is far shorter than in the case of the mortar shell, the powder charge is not varied to suit different ranges, and the state of the atmosphere is not a deciding factor. Therefore, corrections are more easily made, for the rifle, when it does fire, is pointed right at its target. The principal concern of the battery commander is to know the range, and this is telephoned and reproduced by the telautograph at the firing stations.

The battery commander also follows the enemy ship with a telescopic range finder that employs a short vertical instead of a horizontal base. This serves as a check and at each gun there is a telescopic sight which is functioned independent of the weapon—the operator looking over the parapet and following continually the moving quarry. By swinging his telescope horizontally he causes the lateral angle to be indicated at the gun station below, and there the trainer swings the weapon in unison and the elevator raises the muzzle agreeably to instructions from the range-finders.

When the rifles have been loaded and the moment for action arrives these great war dogs rise upon their steel haunches and thrust their muzzles above the heavy parapets of concrete. Instantly there is a thunderous boom—the speeding projectiles are on their murderous mission. Before the thin veil of smoke has been swept aside the guns have sunk behind cover, and but for the momentary flashing of their muzzles there is nothing to show the spotters on the hostile craft where the attacking guns lie.

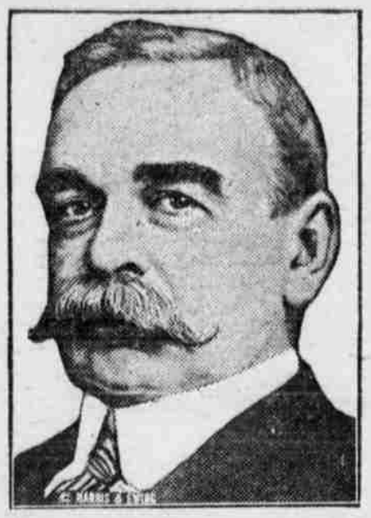
HER EQUIPMENT.

"That girl is fishing for a husband."

"Then I suppose she uses a beauline in hopes of a good catch."

WHO IS WHO NOW

SEES NO JAPANESE PERIL



"I am firmly convinced that a break between Japan and the United States could come about only as the result of a political crime. I found nothing in Japanese thought to lead me to believe that Japan anticipates, even in a remote degree, a disturbance of the friendly relations between the two nations."

Such were the words of Senator Willard Saulsbury of Delaware on his return from a trip to the Orient. He met the rulers and principal men of the two great eastern nations, Japan and China, and devoted himself to a study of oriental affairs.

"All of this talk of the Japanese peril is to my mind veriest humbug," said the senator. "The Japanese are very friendly to us, particularly the educated people. I am sure that the responsible men in Japan do not want to raise trouble with the United States, any more than we desire trouble with Japan. The Japanese are a very proud and sensitive people. They glory in their progress, regard their form of government as a success, and consider their country one of the important nations of the world.

"They are very resentful of any suggestion of racial inferiority, and are proud not only of their traditions, but of their achievements in modern times."

UNCLE SAM'S GRASS MAN

Grass, if you take the word of Prof. C. V. Piper for it, is the great economic necessity of the world. Professor Piper is the "grass man" of the department of agriculture, and his job is to find the kinds that are most adaptable to humanity.

Botanists have described 4,000 species of grass. It is one of Professor Piper's ambitions to try out every one of them to ascertain what they possess of economic value to any part of the United States. It is a huge task. But in laboring to the desired end Professor Piper has already made astonishing discoveries, and the greatest of these is Sudan grass.

Only three years ago, as a result of Professor Piper's experiments, Sudan grass was introduced by the department of agriculture. Already it has created a remarkable revision of land values in some parts of Texas.

A native of the north Pacific coast, where grass and everything else grows thick, Charles Vancouver Piper has been an ardent student of plant life since boyhood. At eighteen he received the degree of bachelor of science from the University of Washington. That was in 1855.

From 1892 to 1903 he was professor of botany and zoology at the Washington Agricultural college, and then he was called to Washington as agrostologist in charge of forage crop investigations.

SERBIA'S PRIME MINISTER

Next to King Peter, the most prominent man in Serbia is Nikola Pashitch, the prime minister. He is a little gray man, sixty-eight years of age, long-bearded, virile, and intellectual.

His first public appointment of any note was that of mayor of Belgrade in 1889. In this position he showed such ability that the people were able to see the worth of the man, and his advance was rapid. He was sent to Petrograd (then St. Petersburg) in 1893 as ambassador for Serbia, and again his ability so shone out that he won the admiration of all the diplomats of the Russian capital.

Twice he has been in danger of death owing to his connection, or supposed connection, with mutinies. The first time was when still a young man. Then several of his confederates were arrested and shot. In 1899 he was again accused. He was tried and sentenced, but he fought imprisonment, and finally Russia stepped in and ordered his persecution to cease. The people believed in him thoroughly, and he was made minister for foreign affairs. When Peter became king of Serbia, Pashitch became his prime minister, and has been so ever since.

ADVOCATES HOT BATHS

Hot baths are better than cold baths in the opinion of Surgeon General William C. Braisted, U. S. N.

Doctor Braisted acquired his hot-bath habit in Japan. There it is considered a matter of hygiene to indulge in baths as hot as the bather can endure. The enthusiasts take three and four parboilings a day and insist that it dissolves all the impurities on the skin. To the Japanese the cold bath is a matter of foolishness, for "how can cold water do the skin any good?" they ask.

Doctor Braisted is unique in that he does not seek to impose his ideas on everybody else. He is quite willing to let the exponents of the cold bath have their way, only he wishes to be left alone in the indulgence of his favorite plunge.

"If you feel 'braced' after a cold bath, why, take it," he says.

As for himself, Doctor Braisted feels better after a hot one, and he takes one every morning, winter and summer. It is so hot that it would scald one not accustomed to it.