NEW 14-INCH GUN FOR COAST DEFENSE.

BY CHARLES A. SIDMAN.

Plans have been perfected for the new 14-inch caliber guns which are to be added to the existing coast defense system now in place along the coast from Maine to Washington State, and Gen. Crozier, Chief of Ordnance, United States Army, has the Watervliet arsenal engaged in the manufacture of these new pieces.

The 14-inch gun will be something new in ordnance design, and although fully two inches larger in caliber than the standard coast defense gun of the first grade (a 12-inch caliber), the new gun will be shorter in length, and the outside diameter will be smaller. The powder chamber will be less than the gun now in use, and it will be lighter in weight.

It is proposed to make a weapon that will have a range and striking force at least equal to the present standard 12-inch gun, but which shall greatly exceed the very limited life of that gun. One strong point also in favor of the new gun is the fact that its first cost will be less than that of the 12-inch gun, while the addition to the life of the piece will result in a greater economy.

In speaking of the new gun, Gen. Crozier said:

"There will be a vast difference between the present standard 12-inch gun and the new 14-inch gun. The 12-inch gun fires a projectile of 1,000 pounds weight, with a velocity of 2,550 feet per second, using 366 pounds of powder, and only has a life of between sixty and seventy rounds, before it has to be relined. This necessitates dismantling and shipping back to the factory for that purpose. The new gun, which is much shorter in length than the 12-inch gun, will fire a 1,600-pound projectile, use nearly 100 pounds of powder less than the 12-inch gun, and only gives a muzzle velocity of 2,150 feet per second, while its life will be nearly four times that of the present standard.

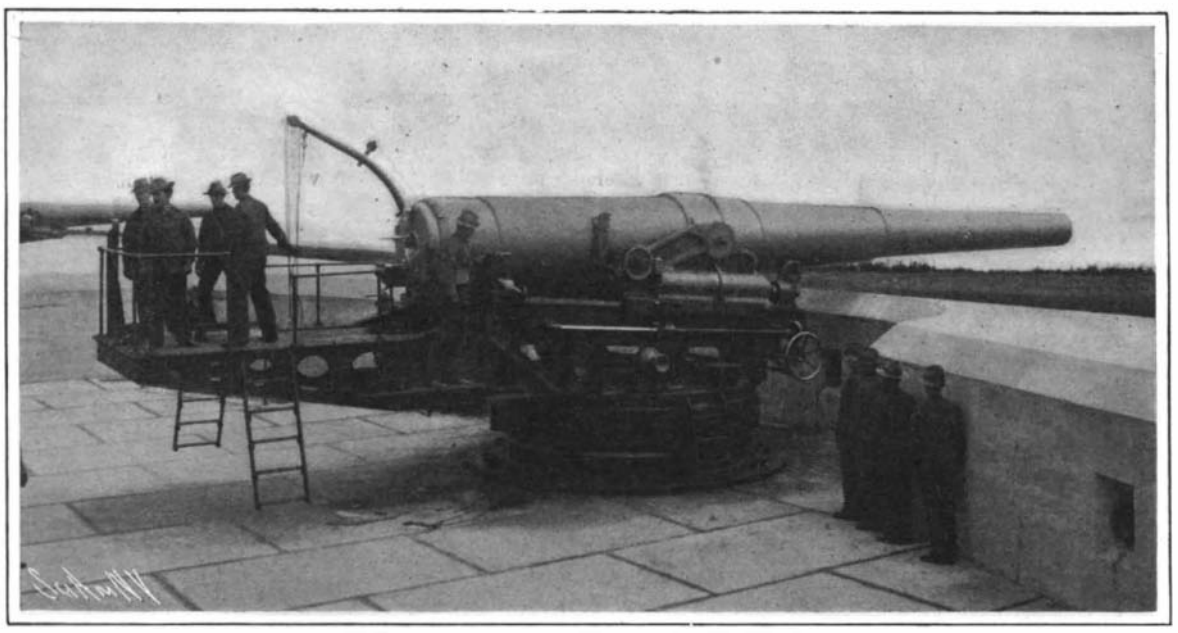
"By reason of the lower velocity required and the consequent smaller charge, it is possible to make the 14-inch gun proportionately shorter than the 12-inch gun, and the smaller charge of powder also involves a less diameter of powder chamber, and therefore, with the same thickness of wall of the chamber in caliber, a less exterior diameter of the gun over the breech. These elements of saving are so considerable that the weight of the 14-inch becomes actually less than that of the 12-inch; and as a lower maximum pressure is needed, it is possible to attain all the strength which will be used without employing the most expensive steel.

"The muzzle energy of the 14-inch projectile will be about 15 per cent greater than that of the 12-inch; and because of its lower velocity and its greater weight, the retarding influence of the air will be much less upon this projectile, so that the gain of energy will be in greater proportion with each increment of range. Because of its lighter weight and of the cheaper material of construction, the cost of the new gun will be less than that of the 12-inch gun, while the cost of powder will also be less than that for the 12-inch by about $70.

"The cost of the 14-inch armor-piercing shot will be about $100 more than that of the 12-inch shot, so that the total cost of a single round will be about $30 greater. Taking into consideration, however, the rapid deterioration of the 12-inch gun, and adding the cost of relining to that of the ammunition, which would correspond to the number of rounds making relining necessary, the cost per round, including the deterioration, for the 14-inch is only about 68 per cent of that for the 12-inch gun.

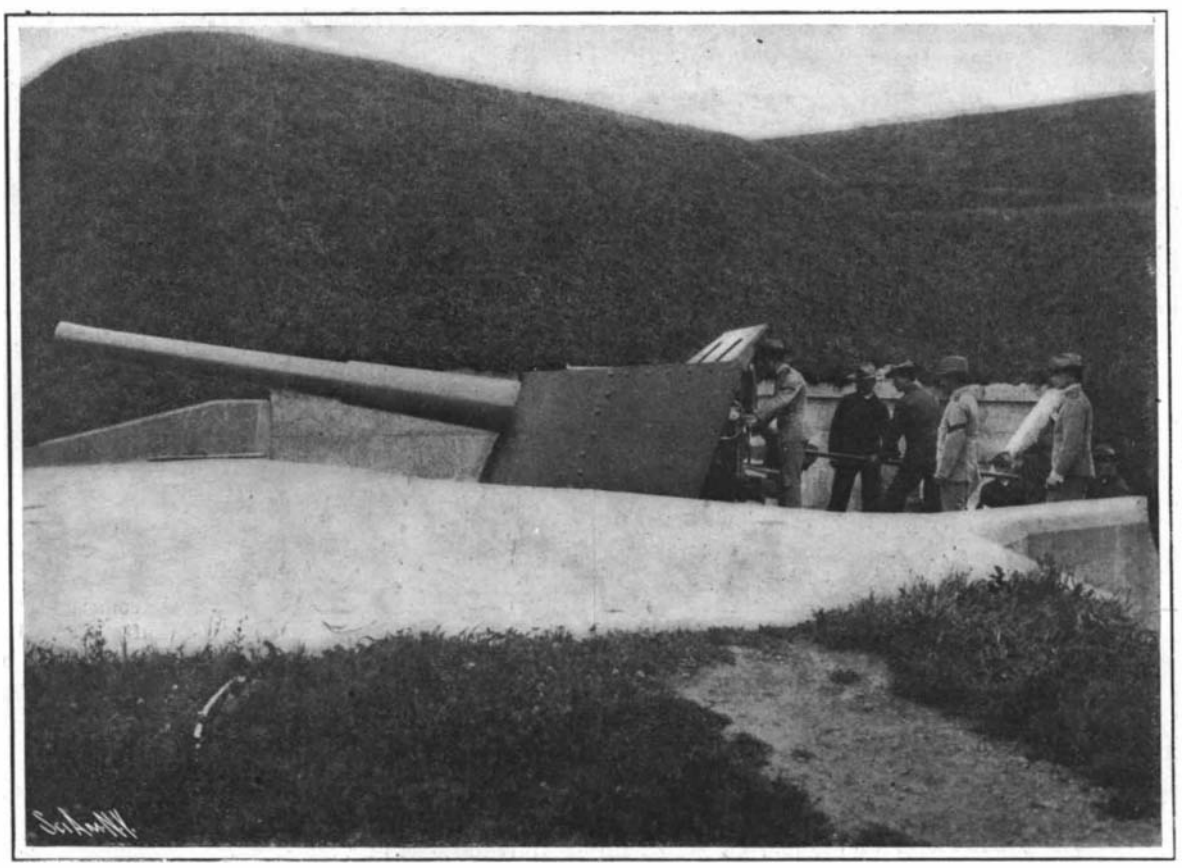
"The penetration of the 14-inch projectile through Krupp armor at 10,000 yards is about 11 inches, while that of the 12-inch is about 10½ inches; while the range at which the 14-inch projectile will penetrate 12-inch Krupp armor is about 8,700 yards, as against 8,500 yards for the 12-inch projectile.

"To sum up then, it appears that in situations requiring the greatest power, a 14 inch gun, with 2,150 feet per second muzzle velocity of projectile, instead of the 12-inch gun with 2,550 feet per second initial velocity, gives us a lighter gun, a cheaper gun, a heavier projectile, greater muzzle energy, a still greater proportion of energy at each distance beyond the muzzle, and a life four times as long."



A 10-INCH BARBETTE GUN READY TO FIRE.

Regarding the life of the 12-inch and 14-inch guns, it has been considered that, in attempting to run by fortifications guarding the entrance of a harbor, the period that would elapse from the time that the leading vessel of the fleet would come within range until the last vessel would pass beyond the range of the coast guns would be about two hours. It is therefore evident that a new 12-inch gun would not last through such an engagement; and considering that this gun is capable of firing for a considerable interval at the rate of forty-five rounds per hour, it is seen that the limit of its life would be reached in less than two hours. With the 14-inch gun, the life of the gun before its accuracy would show impairment would be about 240 rounds, corresponding to about six and a half hours of continuous firing at the rate at which it is thought it can be fired.



A 6-INCH ARMSTRONG RAPID FIRE GUN.

The weight of the new gun will depend greatly upon the manner in which it is built. It is yet to be decided whether the guns shall be of the ordinary built-up forged steel type or shall be of the more modern wire-wound construction. If wire-wound, the weight will be about 110,500 pounds, while the built-up type will weigh 12,500 pounds more. The present standard gun weighs about 1,500 pounds more than the average for the new gun. They will be mounted on the disappearing carriage, and will be installed wherever needed.

The Nature of Toad Venom.

In Knowledge and Scientific News reference is made to *bufotaline*, a toxic substance isolated by Herr Faust from the secretion that exudes from the glands on the back of the toad. This substance is probably identical with *phrynine*, a body of an alkaloidal nature, isolated some years ago by M. Fornara, and is not a true toxine like the active principles in snake venoms, since it does not produce a specific anti-toxine, and is not destroyed by a moderate degree of heat. The toads to which the chief attention has been given are *Bufo vulgaris* and *B. viridis*, and the poisonous secretions from these have been obtained by injecting a solution of barium chloride or stimulating the skin by means of an induction coil, either of which methods causes the glands to discharge the fluid. It is a milk-white juice, which, externally applied, has a strong irritant action upon the mucous membrane and causes burning of the eye, the effects disappearing after a few hours. Introduction of the venom into the blood kills dogs within an hour, and in the case of frogs, produces convulsions, ending in paralysis and death. Alcohol and opiates act as antidotes to the poison. Toads are not susceptible to the poisonous secretions of closely allied species, though they are so to the venom of the salamander and triton. An extract of the skin of the fire-toad, *Bombinator igneus*, causes only slight twitchings in frogs, so that the powerful poison secreted by the glands of the common toad is not present in the case of this reptile. In addition to the alkaloidal poison, which is the chief active agent in toad venom, there is also present in the skin and blood of certain toads a true toxine, which acts upon the red corpuscles of the blood. This belongs to the class of toxines known as "lysines," which change the hæmoglobin in such a way that it exudes and causes the blood to become "laked."

News of Capt. Mikkelson's Arctic Expedition.

An unconfirmed report has been published that the Arctic exploration steamer "Duchess of Bedford" has been lost. This ship sailed from Victoria, B. C., in May, 1906, with the intention of penetrating through Behring Strait and seeking for a large tract of land believed to exist in the Beaufort Sea. Early this year Capt. Mikkelsen, the commander of the expedition, headed a party of 15 in a journey over the ice northward. According to the report, one of their trains of dogs has strayed back to the ship, and this is considered an ominous sign. Since the commander left her on his northward dash, it is reported that the ship has filled with water and has sunk, or may sink. The American Geographical Society has since received a telegram from V. Stefansson stating that Capt. Mikkelsen returned safe after a 500-mile sledge trip, during which soundings were made 50 miles off the coast to a depth of 2,060 feet. It would appear, therefore, that the supposed land does not really exist. As nothing was said about the return of the expedition, and as the message was sent 500 miles overland to Eagle City for telegraphic transmission, it is supposed that if the ship was damaged the captain hopes to repair it and continue his explorations.

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