

fleet at Esquimaux could take absolute possession of Puget Sound and destroy its cities and towns. We ought to have at least 200 guns and mortars on Puget Sound, and there should be 500 guns and mortars on the Pacific coast to properly protect it."

"But San Francisco is well protected, is it not?"

"By no means as well as it should be," replied Senator Squire. "It is the only Pacific coast port that is at all provided with means of defense. Seattle and Tacoma and the ports of Puget Sound could be easily destroyed. San Diego is defenseless. The great Columbia river is practically open to foreign war vessels. They could sail up it and destroy Portland. They could send smaller boats further and ruin the canal which we are building about the Cascades, and upon which we are spending millions of dollars. We ought to have a canon factory on the Pacific coast. We have coal and iron, and we could as easily build guns there as in the east. I have introduced a bill appropriating \$1,000,000 for such a factory."

"How many guns are wanted altogether for coast defenses, Senator Squire?" I asked.

"It is estimated," replied the Senator, "that it will take at least 1,500 cannon, that is, guns and mortars, to give us the proper protection. At least half of these should be eight, ten, twelve and sixteen-inch guns, and the remainder should be mortars. These guns need carriages, machinery and fortifications, behind which they can be raised and lowered. It will take at a low estimate at least \$87,000,000 to put the ports in good shape, and my bill proposes that this expenditure be begun and carried on until it is completed."

"This expenditure ought to begin at once," continued Senator Squire. "There is one thing the people do not seem to understand, and that is that it takes time to build the great modern guns. The contract was awarded to one of the great American companies for building one hundred guns in 1891. It is now 1895 and they have only twenty guns which are anywhere near complete. There are, I believe, none in actual use, though some are ready for trial. In building great guns, works have to be made for them, and the actual construction of the guns requires months. As to earthworks and defenses, they could be erected in a short time by putting a large number of men at work, but it takes time to make all kinds of arms and munitions of war. As to small arms, they can be turned out very rapidly. During the Franco Prussian war the Remington works made twelve hundred new rifles a day. They made two hundred revolvers a day in addition to remodeling two hundred other guns, making an output of sixteen hundred small arms every day. This was, I believe, the fastest work of the kind that has ever been done."

"Speaking of our sea coast cities, Senator, New York is well defended, is it not?"

"No," was the reply. "It has only about one-tenth the protection that it should have. The other cities on the Atlantic are practically defenseless. I visited the defenses of New York not long ago. Our principal works are situated at Sandy Hook, where we have two guns and sixteen mortars. The guns are twelve-inch guns. They carry

projectiles weighing over seven hundred pounds and it takes four bushels of powder for a single fire. They have a range of twelve miles, and they are only exposed at the time of firing. They are protected by an emplacement or fortification made of cement and sand. The strength of this fortification is equal to that of 180 feet of sand, and it is so great that no modern gun can send a projectile through it. The guns are loaded behind it, and then by hydraulic pressure are raised and fired. Twenty-one seconds later they have dropped behind the fortifications ready for reloading. In addition to these guns we have sixteen mortars at Sandy Hook. These send shells of cast-iron and steel weighing from five hundred to a thousand pounds a distance of six miles. They are fired from a pit, and they shoot their projectiles two miles up into the air. By a modern invention known as the range finder they have been known to be very accurate in their aim. By this invention it is ascertained at just what angle the gun should be shot. The gunners or those who fire them have a map of the sea or the harbor before them, and this map is divided up into squares. It is found in which square the man-of-war is at the time of firing. The sixteen mortars are then trained upon that square and a rain of their massive shells will fall upon it. It would be strange, indeed, if some of them did not hit her and carry her to the bottom."

"How about torpedoes? Why cannot all of our coast cities be protected by them?"

"There is little safety in depending upon torpedoes," replied Senator Squire; "and it is not everywhere that you can use them. The idea is, you know, to fasten them to a wire or rope. A strong current would, in such case, carry them to the top of the water, where they could be seen. If the water was very deep, they would not be effective, and, then, there is always the danger to our own boats. Some of the Chinese ships were, you know, blown up by their own torpedoes. They could probably be used for the defense of New York, Philadelphia, Baltimore and Washington. They could also be used for places like Portland, Oregon, but they would not be of much value in an open harbor. Besides, the guns of these big war vessels carry six to twelve miles. They can stand out at sea and shell the cities. The best way to repel them is by coast defenses, supplemented by our navy."

"How about torpedo boats?"

"That is a matter that comes under the navy. Such boats would undoubtedly be of great value, and they will be largely used. All the great nations are adding torpedo boats to their naval forces. England has a large number, and is building more. France, Germany and Russia all have scores of torpedo boats. The advantage of such vessels is that they can be built quickly and that they are comparatively cheap. They can go faster than the man-of-war. We are now building at Seattle a torpedo boat which will make twenty-nine miles an hour. It will be the fastest torpedo boat of the world."

"These torpedo boats are very destructive," said Senator Squire. "At a test of torpedo boats as against gunboats and cruisers in the English naval maneuvers not long ago it was shown that the torpedo boats did five times as much damage in proportion to their cost as the battle ships and cruisers."

"But Senator, would there not be a number of new things brought forth by our people in the event of a war with Great Britain?"

"Speaking of new inventions," replied Senator Squire, "these are being made all the time. The rapid firing gun has changed warfare to a large extent. Some of these will send shells weighing 100 pounds at the rate of six to the minute, and there are guns which throw streams of projectiles like water from a hose. One of the Maxim guns discharges rifle bullets at the rate of 900 a minute, and by the machines now connected with the big men-of-war continuous streams of cartridges can be sent out from one gun managed by two men. One form of the Gatling gun shoots 1,200 shots a minute. These rapid firing guns were used during the fight between the Japanese and Chinese. Ships within a mile of each other were exposed to a hail storm of shot and shell from them. The enormous power of the armour of the ships was shown in this war. The twelve-inch guns of the Japanese, though they sent projectiles weighing 800 pounds, could not sink the Chinese battle ships, and we are now making thirteen inch guns, instead of twelve inch guns, for our men-of-war. The shells from such guns have an enormous penetrating power. The powder used in the Chinese-Japanese war was largely smokeless powder. We are making improvements in powders right along, and new inventions are being made in all kinds of munitions of war."

"The next war will determine many new things as to high explosives," continued Senator Squire. "There is an explosive known as melinite, which is said to have some of the properties of the old stink pot used by the Chinese. I recently read an account of the use of this explosive. The article stated that the stuff was three times as powerful as gunpowder, but that its fumes were even deadly. It cited an instance in which a melinite shell had exploded on a vessel on which were some sheep and goats. All of the animals not killed by the shell were suffocated to death. Then there is emensite, which is another high explosive of wonderful power, and there is a material called explosive gelatin, said to be fifteen times as strong as gunpowder. There are numerous other means of defense than these which I have spoken of which might be adopted as to our seacoast cities. There is no telling what new war inventions may be made in electricity. Mines under the waters could be exploded by this means upon the approach of war vessels, and there are other ways, it is said, in which electricity could be used. It is practically a new science, and its enormous force will be largely developed by the wars of the future."

"I suppose the next great war will be the most costly of the wars of history, Senator," said I.

"Yes," was the reply. "A number of our battle ships have cost between three and four millions of dollars. We appropriated \$8,000,000 for two such ships last year. It costs an enormous amount to run these ships in time of peace, and a half hour's naval action will eat up a fortune. The cost of the wars of the past have been enormous, according to an estimate of French and German statisticians, which I have lately seen, the wars of the last thirty years have cost the world more than