

**BRITISH AND BOER GUNS—A LESSON FROM THE SOUTH AFRICAN WAR.**

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There is a lesson to be learned from the war in South Africa which can well be taken home by every nation not supplied with field artillery the equal of the best. England, despite her great gun shops and enormous resources, has found herself outclassed from the start by the field-gun equipment of the Boers. The results, so far, have been checks, reverses, and defeats.

The superiority of the Boer field artillery over the English field-guns is not surprising, when it is known that the forces of the Transvaal are provided with Creusot and Krupp pieces. The only wonder is that England has been content to possess artillery weapons known to be inferior to the best guns on the Continent. We use the term "known" advisedly, since attention to this very fact has been called by prominent artillerists during the past two years. Reports from Gen. White's forces state that the effective range for his field-guns did not exceed 4,000 yards. If Gen. White is provided with the standard 3-inch Woolwich field-gun, which we understand is the case, the only surmise is that the range referred to shrapnel. For shell proper the Woolwich gun claims a range of 6,500 yards.

From late reports it is announced that a large number of the Boer field-guns consist of Creusot 14-pounder pieces of 2.96 caliber, employing muzzle velocities of 1,837 foot-seconds. The range claimed for these weapons is 8,744 yards. A peculiar feature of the 14-pounder is its narrowness of carriage track—3.56 feet—as compared with the standard 5 foot 2 inch gage English field carriage. The shrapnel shell of the 14-pounder contains 234 bullets. There is sufficient remaining velocity, it is asserted, at 4,500 yards to enable this French shrapnel to do effective work.

Within the past ten days the dispatches have stated that the British authorities, recognizing the inferiority of the Woolwich-made field-pieces, have placed an order for one hundred Vickers 12-pounder guns of the rapid-fire type. The Vickers weapon is said to be one of the most effective guns turned out to-day in England. It is a comparatively new piece, and this order of the British government is practically the first recognition it has received at English hands. Quite recently several mountain guns of the Vickers variety were purchased by the United States government for use in the Philippines. When we consider that the British forces at Ladysmith were only saved from early destruction or capture by the arrival of the naval 4.7-inch guns from Durban, the importance of range is brought home with marked emphasis. These naval guns were mounted on the rudest kind of structures, and happily the mounts held. Rapidity of fire and mobility were in this instance sacrificed for range and with the result that the Boer fire was dominated.

In view of the lessons of the South African war, the progress of the ordnance authorities of this country in developing a rapid-fire field-gun will be watched, naturally, with keen interest. Experimental guns have been designed, it is learned, at the Watervliet arsenal, and comparative tests are to be made between these government pieces and special guns designed by the Driggs-Seabury Company and the American Ordnance Company. The gun submitted by the Driggs-Seabury Company has a caliber of 3 inches (the proposed standard caliber for this country) and a muzzle velocity of 1,800 foot-seconds. The carriage is remarkably light and simple, and both the gun and carriage weigh less, respectively, than the service piece and carriage now in use.

The present field-piece of the United States has a caliber of 3.2 inches. It was introduced into the service about seventeen years ago. It is this gun which it is proposed to replace by a weapon of 3-inch caliber, having a muzzle velocity of about 1,725 foot-seconds and using a shell weighing 15 pounds. Two years ago the Chief of Ordnance, in his report, indicated that a muzzle velocity of 1,600 feet per second would suffice, since this velocity would afford effective shrapnel results at 3,500 yards. Now it is proposed to obtain 1,725 foot-seconds, and it is gratifying to note that one of the competitors considers it practicable to use 1,800 foot-seconds at the muzzle under ordinary service conditions. When one considers that field artillery in the United States is apt to encounter country roads incomparably worse than in Europe, there is some excuse for making carriages stronger and heavier. There has been doubt expressed by many artillerists of the ability of the high-velocity Creusot carriages to stand rough service, and it will be interesting to learn how far these forebodings have been borne out. So far no complaint has been heard from the Boer side.

Up to the present time the Canet 2.95-inch, L-32, gun, and the Creusot 14-pounder 2.96-inch weapon, are recording the highest velocities among the Continental pieces. Both guns, it will be observed, are using lighter shells than the proposed new American piece. It must not be overlooked that a gun that can deliver 1,800 foot-seconds velocity to a 15-pound shell is a powerful weapon. Compare this gun with the English Woolwich-made piece, and we find the English 15-pounder

employing only 1,600 foot-seconds and mounted on a carriage unsupplied with recoil-checking device. Even the Vickers gun, splendid weapon as it is, secures its 1,720 foot-seconds velocity with a shell weighing three pounds less. Of the two projectiles, the 15-pounder, by reason of its greater shrapnel-carrying capacity, to say nothing of energy, is the superior.

But granting that the new guns of this country will yield 1,800 foot-seconds velocity, and this is slightly more than the authorities are indicating, the question arises: Will even that velocity assure our batteries a superiority over foreign field-guns in time of battle? Shrapnel balls, in order to inflict dangerous wounds upon horses, must possess an energy of about 282 foot-pounds. This requires, for bullets weighing forty-two to the pound, a remaining velocity of 874 foot-seconds. A muzzle velocity of 1,600 foot-seconds for a 15-pound shell yields 874 foot-seconds remaining velocity at 3,500 yards.

The shrapnel shells of guns in the hands of the Boers have been found fused for 5,200 yards. The English field-gun shrapnel is fused for 4,000 yards. Boer shrapnel, possibly from guns of the siege variety, though there is no definite information on this point, has been found effective at 5,100 yards; in other words, at a range of 1,100 yards beyond the possibilities of English field-guns. Not only have the British pieces been found weak in range, but they have proved altogether too heavy both in gun and carriage. The British reports from the front summarize the needs in the demand for a gun that will shoot accurately and deliver shrapnel effectively at 5,000 yards. This will probably involve a reduction in shell weight, but judging from the guns in the hands of the Boers, it should not mean a loss of mobility.

The whole question is a most important one, and now that the United States is on the eve of adopting a new gun, the lessons from South Africa have especial value. The inventive resources of this country, and the well-known mechanical skill of its people, should make it possible to evolve a weapon the superior of any abroad. We have developed naval guns and sea-coast weapons and carriages of remarkable strength and power, but the rapid-fire field gun of high power is lacking. There is every reason to believe, however, that this condition will not long exist.

**PALISADE PRESERVATION.**

The two Commissions—the New Jersey and the New York Commission—which have been investigating the question of preserving the Palisade cliffs from further devastation, have presented their reports after six months' work. The Commissions have held joint and separate sessions. The New Jersey Commission's report says that the natural beauty of the Palisades has been marred and is threatened with further spoliation in two ways, first, by the blasting away of the cliffs to procure stone for street and road-making purposes, and, second, by the occupation of the river shore by unsightly business structures. The ease with which the cliffs can be quarried and the stone removed by water makes the Palisades a peculiarly attractive field for the quarryman. Some of the quarries are now running day and night to supply the demand for their output, and there is every reason to believe that in the course of time the section above Fort Lee will become as badly mutilated and as completely destroyed as the old section has already been.

In the way of preservative measures, both the New Jersey and the New York Commissions make the following recommendations: First, that the plateau above the edge of the cliffs may be eliminated from the discussion because of the large expense which its purchase would entail. It is deemed desirable to give authority to purchase such parts of the upper plateau as shall be deemed advisable by a permanent Palisade Park Commission, in order to give the public access to the cliffs and to enable them to enjoy the view therefrom. At present there exists no corporate body having any authority to hold for public use any parcel of Palisade real estate which might come into its possession by purchase, gift or bequest. The first action to be taken in the matter should be the passage of an act by the Legislature constituting the permanent commission already referred to, with power to acquire and hold for the State as much of the land between the edge of the cliffs and low-water mark as may be deemed necessary to prevent further destruction of the Palisades. The land so acquired would constitute a park through which might run a boulevard. A bill providing for such a commission is in course of preparation and will be submitted to the Legislature. The commissions also advise the passage of an act forbidding the granting of any further riparian rights along the strip to be protected.

**THE "KAISER WILHELM" AGAIN BREAKS HER RECORD.**

The "Kaiser Wilhelm der Grosse," of the North-German Lloyd line, added another record to her many brilliant passages. She reached Cherbourg on her last trip after covering 3,077 knots in five days and sixteen hours—an average speed per hour of 22.63 knots.

It would seem from this as though the great "Deutschland," which is nearing completion for the Hamburg-American line, will have to utilize all of her 35,000 horse power to obtain the coveted blue ribbon of the Atlantic.

**MAGNETISM OF THE EARTH.**

H. A. Rowland, Professor of Physics at the Johns Hopkins University, has just announced a remarkable discovery of great importance, being no less than an explanation of the cause of the magnetism of the earth. Dr. Rowland commenced his experiments nearly a year ago. The subject attracted him, owing to the lack of explanation of the theory of the earth's magnetism. His experiments will soon be reported fully. The apparatus used consists of a simple metal wheel revolved upon a shaft by means of an electric motor. The wheel itself is wound with several miles of fine wire, and in this magnetism is developed when the wheel is revolved. About the wheel is a casing of brass about a half inch from its circumference, leaving a space between which may be said to represent artificially the layer of atmosphere about the earth. Dr. Rowland is now working to show that the faster the revolution of the wheel, the greater will be the magnetism developed. He has already shown that magnetism is produced in this revolving body; and although upon such an infinitesimal scale in the laboratory experiments, Dr. Rowland is convinced that the principle holds good for the earth and other bodies as they revolve through space. The immense weight and great speed with which these bodies rotate add to the amount of magnetism which they produce. It will take a long series of delicate experiments to bring out the various phases of the relation of magnetism to the speed of the revolving bodies. The results which have been obtained so far have been so satisfactory that work will be continued on this line.

**TORPEDO BOAT MAKES OVER 35 KNOTS AN HOUR.**

The "Viper" has recently passed through her official trials with very creditable results. In four consecutive runs over a measured mile she attained a mean speed of 34.8 knots an hour, the fastest mile being covered at the rate of 35.5 knots. The maximum speed, therefore, was equal to just 41 miles an hour. On her preliminary trial the "Viper," when indicating about 7,500 horse power, ran at the speed of 32 knots an hour. It is said that on her recent full-power trial she indicated between 10,000 and 11,000 horse power. This vessel, as our readers are aware, is an enlarged "Turbinia," her length being 210 feet, beam 21 feet, draft 7 feet, and displacement 325 tons. The record speed for any vessel was originally held by the "Turbinia," which was also propelled by a turbo-motor. Subsequently the torpedo boat "Hai Lung," built by Schichau for the Chinese navy, a boat driven by reciprocating engines, was reported to have made 35 knots an hour, which was within half a knot of the present record. It is claimed, however, that the "Viper" will be subsequently improved so as to add another knot or more to her speed.

**A REMARKABLE COLLECTION OF LAMPS.**

At the National Museum, in Washington, there is a most interesting exhibition of lamps brought together under the direction of Mr. Walter Hough, who is an expert on the subject and whose writings on the light and fire of Eskimos are most interesting. The lamps are of all ages from the time of the Pompeian and Roman lamps up to the present day. Some of the lamps are of great interest, as, for instance, the firefly lamp from the West Indies. The lamp is about 18 inches high and built in three stories, made of wicker and bamboo cages with little doors. The fireflies are imprisoned in this and cared for and fed. The Japanese lanterns suspended from sticks are of many types. Among the Chinese lamps are those made of bamboo which are used to light alleyways. They are a frequent cause of conflagration. Old English horn lanterns, or "lanthorns" as we ought to call them, would delight the heart of the collector of curios. There are also olive oil lamps, Eskimo lamps, etc. The collection is worthy of considerable study.

**A WARNING TO THE INVENTOR.**

Intending exhibitors at the Paris Exposition will do well to protect their inventions by means of foreign patents before sending their devices, for international expositions have always offered a splendid opportunity for unscrupulous imitators of new devices and inventions to pirate them if they are not covered by foreign patents. It is also believed that trademarks will be infringed in the future as in the past. The Parisian "Inventors' Academy" is also attempting to do an unusually large business, and there are so many pitfalls arranged for the inventor that it would be well before making contracts of any kind to make sure of the standing, financial and otherwise, of the firms which are to attend to American exhibits. The United States Commission will undoubtedly be glad to give information on this point and to protect intending exhibitors in all possible ways.