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THE PROTECTION OF AMERICAN GAME.

In our last issue we mentioned the convention which was recently signed in London for the preservation of wild animals, birds, and fish in Africa. It is gratifying to note that America has not been backward in the movement, which may be called international, to protect animals of certain species from wanton destruction.

A careful inquiry recently made by the New York Zoological Society reveals the startling fact that throughout thirty States and Territories the decrease in the volume of bird life during the last fifteen years has reached an average of forty-six per cent. The decrease in the number of edible birds has even been greater than that, and a number of our finest species are now approaching practical extinction and many of our song birds are being killed for food.

The sportsman has long realized the need of protective measures, but the farmer has only recently learned to appreciate the full value of birds as insect destroyers. Cheap guns, lax laws, the mania for collecting and shooting, and more especially the enormous demands for the market and millinery trade, are responsible for this reduction in bird life. The protection of birds is a national not a local question; it deals largely with migratory species which breed in one section, winter in another, and traverse several States in passing to and from the breeding grounds. In the SUPPLEMENT of the current week will be found an abstract of a bulletin issued by the Biological Survey of the Department of Agriculture in which many significant facts are mentioned. There are 1,125 species and sub-species of birds inhabiting North America north of Mexico, and of these only about 200 or 18 per cent can be considered game birds. From this will be seen the importance of protecting birds other than game birds. As an instance of the lack of uniformity in the State laws take the common dove, for example; in twelve States it is protected at all times, in nineteen at certain times, while in the others it has no protection at all. Several protective associations have done excellent work.

The League of American Sportsmen was organized for the purpose of creating in every State and Territory a well organized standing army of game protectors, which shall secure the enactment of more stringent general laws, which shall see that lawlessness is punished, which shall discourage game slaughter, and protect the wild creatures that still remain.

At present the League has working divisions in twenty-four States, and in two provinces in Canada, the membership including the governors of several States, members of Congress, presidents of colleges, judges, etc. The League has been very prominent in securing the passage of the Lacey bill, which is considered to be the greatest victory ever achieved in the interest of game and song bird protection.

The States can now enforce their laws, and wherever they fail the Federal authorities will interpose, and where States do not take measures to prevent the smuggling of game out of their boundaries, the Interstate Commerce Commission, backed by the Lacey law, will come to the rescue. This will prevent the shipping of prairie chickens from Minnesota or other States to Chicago or New York labeled "poultry." There will be no more shipping of venison from Wisconsin or Minnesota to Chicago or New York labeled "veal" and "mutton"; there will be no more slaughter of seagulls on the New England coast or elsewhere in violation of the laws of the State, and shipping them to millinery dealers in New York, no matter how labeled. The League will have a force of detectives at work in all of the large cities watching for any violation of the Lacey law, which imposes a penalty of \$200 for every infraction of said law.

The League of American Sportsmen does not wish to curb sport in any way. It believes in a reasonably filled gamebag, but considers that the killing of game and the taking of fish should be limited by law, not only as to seasons, but that the bag for one man for a day and for a season should be defined by law. The league has rendered efficient service in ascertaining the fact that seven of the hotels in New York, and several game dealers, had been selling game in closed

season, and has secured from them written pledges to stop violating the game laws. It has also absolutely stopped the selling of game in New York at all times except in open season.

The people of the country are becoming satisfied that some organized measures must be taken to preserve the feathered tribes which inhabit our woods from the wicked and ignorant slaughter which bids fair to render some varieties of our birds extinct species.

HIGH SPEED IN WAR VESSELS—THE "VARIAG" AND THE "VIPER."

The details of the successful trial of the protected cruiser "Variag," which has been built at the Cramps' Yard, Philadelphia, Pa., for the Russian navy, show that this vessel is well able to live up to her contract requirements of 23 knots an hour. The contract specified that the speed trial should be an extraordinarily severe one. The vessel was to maintain a sea speed of 23 knots an hour for a run of twelve consecutive hours. During a preliminary builders' trial she is said to have logged for a time the remarkable speed of 24½ knots an hour, covering ten miles at 24½ knots. This, of course, will not be quoted as the official speed of the vessel, as trials by log are not regarded as fully reliable; but on the official trial, where the times are taken over a measured course, there is no possibility of error, and the fact that this vessel maintained for over seven hours a continuous speed of from 23.6 to 23.7 knots an hour, was considered by the Russian officials to be sufficient evidence that she could have maintained the same speed for the whole twelve hours, had it not been for an accident to one of the high pressure cylinders.

This splendid result is extremely gratifying both to the representatives of the Russian Navy and to the American builders of the ship. The William Cramp & Sons Ship and Engine Building Company had already achieved world-wide distinction in the construction of fast warships by the remarkably high speeds which were attained by the "Minneapolis" and "Columbia," vessels of somewhat the same character as the "Variag," and about 1,000 tons more displacement. The "Columbia" is credited with a speed of 22.8 knots an hour, and the "Minneapolis" with slightly over 23 knots. The "Variag," with her record of 23.7 knots, now takes the place of the "Minneapolis" as the fastest first-class cruiser in the world, although she is exceeded in speed by two second-class cruisers, which, strangely enough, are to be found in the Chinese Navy. The "Hai-Tien," a second-class cruiser of 4,300 tons displacement and 17,000 horse power, achieved a speed on her official trial of 24.1 knots an hour. A sister ship of the "Hai-Tien," the "Hai-Chi," made 24 knots on her official trial. These two vessels, however, are smaller than the "Variag" by 2,200 tons, and it is doubtful if in any but the finest weather they could hold their own with the American-built ship.

The "Variag" is one of the four protected cruisers which are being built for Russia in various foreign shipyards. Two of these, the "Bogatyr" and the "Boyarin," must be about completed at Stettin and Copenhagen, and a fourth, the "Askold," at the Germania Yards at Kiel. All four vessels are required to steam at 23 knots for twelve hours; and while the ships conform to a general pattern in respect of armament, coal endurance and speed, the builders have been given a free hand in matters of detail. When the quartette is completed, it will be interesting to compare the work of American builders with that of the European yards mentioned.

At the close of the trial the officers and naval experts commissioned by the Russian Government to superintend the trial of the "Variag" congratulated the builders on her performance and stated that they considered the cruiser to be one of the great triumphs of naval construction. An illustrated description of the "Variag" was given in the SCIENTIFIC AMERICAN for November 5, 1898; and the "Askold" is illustrated in the issue of June 30, 1900.

Further details at hand of the wonderful speed recently made by the torpedo boats "Cobra" and "Viper" show that the introduction of turbo-propulsion has opened up possibilities in speed, the limits of which it is difficult to predict. It is only five years since the torpedo boat destroyer "Sokol," built at Poplar, for the Russian Government, astonished the world by making a speed of 30 knots an hour; yet today 30-knot destroyers have ceased to excite interest; and the success of the "Viper" in covering a measured mile at the rate of 37.1 knots an hour is already leading us to regard 40 knots an hour as the next goal at which to aim.

The "Viper" is 210 feet long, 21 feet wide, and has a draught of 7 feet. On the recent trial she displaced 380 tons, or 10 tons more than the contract requirement. Six runs were made over the measured mile at the following speeds in knots: 26.4; 35.5; 37.1; 36.6; 37.1; 36.1, the mean speed being 36.58 knots per hour. The highest speed attained is equal to about 43 land miles per hour. The turbines indicated 12,000 horse power at 1,180 revolutions per minute, under a steam pressure of 200 pounds to the square inch.

The remarkable success of turbo-propulsion naturally invites speculation as to the possibilities of the future, not merely in torpedo boats but in the larger field of the cruiser and battleship. Then, again, there is the question of its application to the merchant marine, where the record for speed now stands at 23 knots an hour. There is no doubt that the turbine could be applied successfully to a 25,000-ton liner, and that speeds of 30 knots and over could be realized; but it would be at a cost for fuel that would be absolutely prohibitive. Indeed, Mr. Parsons, the inventor of the turbine, has stated that he could put turbines and boilers in a Transatlantic liner that would drive her across the ocean in three days, if the owners of the vessel would be willing to burn the 10,000 to 12,000 tons of coal that would be consumed in the furnaces.

Although the Parsons turbine, in proportion to its indicated horse power, is remarkably light and compact, it has a voracious appetite for steam; so much so, that Admiral Melville once said that what surprised him in the "Turbinia" was not so much the indicated horse power of the turbines as the enormous quantities of steam supplied by the boilers. So that, if we are anxious for a three-day crossing of the Atlantic, we must make up our minds to pay for an enormously expensive luxury; so costly, indeed, that the three-day boat, using coal as its fuel and steam in its motors, will probably never pass from the theoretical to the practical stage.

AMERICAN ENGINEERING COMPETITION.

In the current issue of the SUPPLEMENT will be found the fourth article of a series on the subject of American engineering competition, recently contributed to The London Times by a special correspondent of that journal, who made an extensive trip through the manufacturing States of this country with a view to furnishing himself, by personal observation, with the necessary data. The present article deals with the steel works of this country and the methods employed by our iron masters as contrasted with those which prevail in Great Britain. The article brings out some facts of special interest tending to show why it is that steel manufacturers in this country have been able to compete with such remarkable success against the older established industries of Europe. The enormous works of the Carnegie Steel Company are selected as typical of the best American practice, and from the figures given in the article to show the vast extent of the plant, we select the following:

There are three principal works, the Edgar Thomson, the Duquesne, and the Homestead Steel Works, which included, when they were visited by The Times correspondent, seventeen blast furnaces, whose aggregate annual capacity was 2,200,000 tons. The Edgar Thomson Works produced 650,000 tons of rails a year. The Duquesne Steel Works have an annual capacity of 650,000 tons of steel ingots, while that of the Homestead Works is 400,000 tons of Bessemer steel ingots and 1,400,000 tons of open-hearth steel ingots. There is also at the Edgar Thomson Works a foundry which turns out 50,000 tons of iron, steel, and brass castings per year. The Upper Union Steel Mills of this company annually produce structural steel, steel bars, and plates to the extent of 250,000 tons; while at the Lower Union Steel Mills 150,000 tons of plates, car forgings, bridge work, angle iron, etc., are turned out annually. Another property is the Howard Axle Works, with a capacity of 100,000 tons per year. The company also possesses most extensive coke works, and a natural gas field of 206 square miles. They have built their own line of railway from Lake Erie to Pittsburg, at the Lake Erie end of which is a well-equipped dock and ore handling establishment; and they operate also their own line of steamers. These transportation facilities serve to bring 5,500,000 tons of ironstone from the company's own Lake Superior mines to the great system of forges and mills above mentioned near Pittsburg. As to the capital invested and turned over in these vast operations it is sufficient to say that, in a recent threatened litigation, it transpired that the profits of the company in 1898 were estimated at \$21,000,000, and in 1899 at the enormous figure of \$40,000,000.

It seems that the American blast furnace is not, as a rule, any larger than those used in Great Britain, and, of course, the process of reducing the ore is, broadly speaking, the same. But there is one respect in which the practice of the blast furnace managers is radically different; and this is, that in the United States it is customary to force the production much more than it is elsewhere. The larger output per furnace in America is, of course, due, in some measure, to the superior quality of the ore, but the extremely high yield is to be mainly credited to the American practice of driving the furnaces, as they expressively put it, "for all they are worth."

The deciding factor in the economics of blast furnace operation is the wear and tear of the interior lining of the furnace, which, as soon as it has been burnt away to a definite minimum thickness, has to be renewed. The work of lighting one of these huge furnaces is so costly that they are run continuously, night and day,