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## OUR SHIPBUILDERS AND THE PROPOSED NEW CRUISERS.

Among the more important lessons of the late Spanish war are the supreme value to a warship of a powerful battery, of high speed, and large coal supply. The United States navy needed no admonition with regard to its batteries, for its policy has ever been to mount upon the decks of its ships every gun that they could conveniently carry. With regard to speed and coal supply, however, there was room for improvement, and one of the first effects of the war was to produce a demand for a higher speed than 16 knots in the three battleships of the "Maine" class, whose construction had only recently been authorized.

The events of the war showed that it is scarcely possible to attach too much importance to the question of speed in warships. It was the good average sea-speed of the "Oregon" that enabled her to make her rapid run around Cape Horn and be in at the death of Cervera's squadron, and it was the fine condition of her engines and boilers that enabled her to overtake the "Cristobal Colon" and force her surrender. On the other hand, had the motive power of the Spanish fleet been in good condition and the boats capable of their proper speed of 18 or 19 knots instead of the 10 knots at which the majority made the run, it is possible that all of them, except the torpedo boat destroyers, would have run through the zone of our fire in time to escape without mortal injury, for it is a fact that the highest average speed of the pursuing ships during the chase was only about 13 knots, the "Indiana" indeed being capable of only about 7 knots an hour and the "Iowa" a few knots more.

In the days of the sailing frigate, to possess the "weather gage" of the enemy was to have the battle, other things being equal, half won; to-day, superior speed gives a similar advantage, for the faster ship can accept or decline an engagement, and when in action she can choose the fighting position which enables her to bring her battery to bear to the best advantage. So clearly are these advantages recognized, particularly with respect to cruisers, that naval designers are willing to sacrifice other elements of a ship's efficiency before they will cut down the speed. A glance at the tabular comparison, given elsewhere, of our new cruisers with those of other navies shows that while none of the foreign ships has a speed of less than 20 knots, one of them is credited with 22.4 knots and another, the latest design of them all, with 25 knots.

Our Naval Board of Construction, we greatly regret to see, has produced a design for the six new cruisers recently authorized, which is possessed of two exceedingly grave faults, as we have clearly shown on another page of this issue. Although these vessels are to carry a battery of normal strength, they are to be practically of the obsolete unprotected type, and they are to have a speed of only 16½ knots, which is from 3½ to 8½ knots less than that of the fully protected cruisers of the same size which are under construction or already completed for foreign navies.

We do not hesitate to say that these designs are the least attractive that have ever been produced by the department, and are altogether unworthy of a bureau which has turned out such efficient ships as the "New York" and the new "Maine." As compared with these ships, the proposed cruisers are a distinct retrogression, and in the interests of the country and for the reputation of the department, it is sincerely to be hoped that the ships, as designed, will never be built.

Fortunately, there is a loophole of escape in the fact that shipbuilders will be allowed to make proposals for the construction of the ships, either in accordance with the plans as so laid down, or in accordance with plans and specifications submitted by themselves; and there is a suggestion that the department is not very well satisfied with its own design in the fact that "preference will be given, other things being equal," to those bids "which guarantee the greatest speed, the greatest coal capacity, and the greatest amount of hull protection in the form of a protected deck."

Here then is a splendid opportunity for our private shipbuilding firms to show what advance they can

make upon the best work of foreign designers in producing an up-to-date cruiser of 3,500 tons full load displacement on a maximum full-load draught of 16 feet 8 inches. We are fully satisfied that working under these conditions such firms as the Union Iron Works, Newport News and the Cramps will be able to produce a high-speed protected cruiser which will embody all the essential elements of the class and be at least the equal, if not the superior, of any of the fine ships enumerated in the comparison given elsewhere in this issue. In any case, whether the designs of the contractors are accepted or not, the department's designs as they now stand must never be built. The idea of the United States navy entering upon the construction of six unprotected cruisers of 16½ knots speed in this year of our Lord eighteen hundred and ninety-nine is simply preposterous and certainly does violence to its brilliant traditions.

## ENGLISH AND AMERICAN LOCOMOTIVES.

The present importation of American locomotives for use on leading English railroads is certain to exercise a far-reaching influence on the locomotive-building industry of Great Britain. Decidedly the most interesting phase of the controversy which has been awakened by this significant event is the attitude of The Engineer, the leading English journal devoted to the interest of civil and mechanical engineering. Time was when this journal was wont to steadily ignore criticism of English engineering work and practice, particularly if it happened to come from this side of the water, and the publication of any remarkable work performed by American locomotives either in the way of hauling heavy loads, or the accomplishment of high speeds in passenger service, was sufficient to bring forth an indignant and clumsily facetious repudiation of these performances, and a cumbersome demonstration of their impossibility on general theoretical principles. Of late, however, The Engineer has shown that it has taken a broader outlook upon the situation, not merely as regards the locomotive industry, but the engineering trade in general. This is particularly noticeable in a recent editorial, which was provoked by letters from two correspondents of the The Engineer who happened to live at opposite corners of the earth, one of whom makes a series of sweeping condemnations of the English-built locomotive because of its utter unfitnes to run over the uneven and curved tracks which are found in the colonies and newly developed countries, while the other attempts to make an entire rebuttal of the charges so laid down.

The Engineer fully indorses the criticisms of the average English-made engine in respect of its rigidity and unfitness for pioneer railroad work. "From various parts of the world," says our contemporary, "statements reach us to the effect that the comparatively roughly made American engine is a more satisfactory machine than its beautifully finished English or Scotch made brother. We see no reason why such statements should be made if they are not true. . . . We may say that we can call to mind one instance in which six-wheeled engines, with the rigid plate frames and comparatively long wheel base, were set to work against American engines of much rougher make, with four wheels coupled and a bogie (truck). The English engines burst the road, ran off it, and did such mischief that they were thrown on one side, and the American engines did all the work. We can call to mind another case, in which two beautifully made engines, built to special design for the 5 foot 3 inch gage, made such havoc with a very bad road that they had to be practically rebuilt, the wheel base shortened and the axle-boxes cut away to give side play, before they could be used. . . . We need scarcely say that it affords us no particular pleasure to write thus; but, on the other hand, we have the best interests of the locomotive builders of this country at heart, and we should wholly fail in our duty if we said pleasant things and maintained that the typical English locomotive must be the best for Australia, or South America, or China, or Africa, just because it is the best for the railways of the United Kingdom."

While it is rather late in the day for our contemporary to have made this discovery, it is certain that if the English builders do not wish to entirely lose their trade in the colonies and more recently settled countries, they will have to adopt the American type of locomotive, with its flexible wheel base and general handiness and accessibility to parts. The typical English and American locomotives are the outgrowth of the respective conditions under which the great railroad systems of each country were built up. At the very outset it was realized in America that it was not possible, nor, indeed, desirable, to build our railroads on the expensive lines adopted by the English engineers, of which the Great Western Railway, which cost a fabulous sum per mile to construct, is a notable example. In this particular case the line was made as nearly straight and level as means and money could accomplish; hills were tunneled, costly viaducts built and deep cuttings opened, in the effort to produce a line which would be ideal for its purpose. The rails were, for that early date, unusually heavy, and the roadbed of first-class construction. With this solid, smooth, and straight roadbed

there was no necessity for giving much flexibility to the engines that ran upon it, and hence, in the early English locomotives, there was practically no provision for sideplay and easement in running around curves or surmounting vertical irregularities. English track has always continued to be of first-class construction, and although heavier curvature has been adopted in building some of the later roads, there is nothing in that country to compare with the mountain lines which exist in America and in many of the English colonies.

While it is true that the swinging truck has been adopted on many of the English roads, it still appears to be a fact that the typical English locomotive is lacking in the flexibility which is so excellent a feature of the American machine.

Here, in America, from the very first, our railroad builders and locomotive builders seem to have been governed by that broad principle of utility which has been one of the great if not the greatest secret of our success. Our engineers were able to see no reason why a locomotive should not climb a hill and go swinging round a curve, and hence in laying out our lines they have chosen to go around a hill rather than cut through it, or if that could not be done, the engineer had carried his line over the hill, skillfully laying his lines to suit the topography of the land. When his sinuous and undulating roadbed had been graded, and the light rails and ties necessitated by a not overloaded purse had been laid, the mechanical engineer stepped in and produced a locomotive and cars that were perfectly adapted to traveling upon a track that was neither level nor straight, nor smooth in its running. Swiveling and swinging trucks enabled our rolling stock to negotiate the curves, while equalizing levers served to smooth the vertical irregularities of the track. It was easier, cheaper, and obviously the more common sense policy to accommodate the locomotive to the track rather than the track to the locomotive.

## THE EDUCATION OF GERMAN CONSULS.

All attentive readers of current newspaper discussion in Germany have noticed the earnestness and intelligence with which the leading journals have seconded the plans which are now understood to be under consideration by the Imperial government for the reorganization of its consular service. The reforms have been dictated by the new and enlarged functions which are imposed upon the foreign service of Germany by the expansion of her foreign trade and by the valiant fight which this country is preparing to make for a permanent place in all foreign markets. While Germany was an agricultural state without colonies or any large export trade, her consular service organized on the old lines served satisfactorily for the protection of German subjects residing abroad, and such other incidental duties as was required of it. Under that system consuls who were educated as lawyers and diplomats underwent a period of training in the Foreign Office and became typical Prussian officials with a good command of languages, a fair knowledge of diplomacy, national law, and the history of treaties, but no practical acquaintance whatever with industrial processes, commercial values, or mercantile usages. These German officials, as it is now stated by the German press, even evinced a certain contempt for trade and those engaged in it and rejected requests for commercial aid and information as forming no part of their official duties. The last ten years have created a demand for a radical reform of the whole consular system, stimulated, it is broadly hinted, by the recognized efficiency of American and other consuls in obtaining valuable information and promoting export trade.

There are two propositions now under consideration. First, to retain practically the present consular organization and to strengthen the commercial efficiency of the consulates by assigning to them commercial attaches, a plan which has been found to work well in the German consulates in the United States. The second proposition is to abolish permanent consuls and appoint in their stead experienced and capable merchants, who will give to the consular office a definite commercial character, while its legal and purely official duties are performed by young attachés trained in the usual manner. No matter which of the plans is adopted, there is a general demand that the consular service shall remain, as now, a life career. In this they are undoubtedly correct provided that the proper men are selected in the first place, but the whole efficiency of the service rests upon this point. They also demand that the basis of its personnel shall be a corps of consular pupils selected by competitive examination for their intelligence, energy, and efficiency as students of modern languages, commercial law, and technology, trained by special studies for their career and then sent out to foreign parts to begin their life work as apprentices. For the purpose of this service the world will be divided into four or five districts, for each of which the consular pupil will be specially educated in all that relates to language, history, and commercial conditions. The consular pupil once prepared will be assigned to one of these districts, where he will remain during his career, thus saving the reckless waste of valuable knowledge and experience which occurs