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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

THE PRESSING NEED OF OUR NAVY.

There is need for a very thorough agitation of the question of the increase in the number of our naval officers; for it is certain that neither the people at large nor their representatives in Congress appreciate the very grave crisis which has been precipitated by the failure to make adequate provision for manning the new ships of the Navy. It is easy to understand, if not to excuse, the ignorance or indifference which exists with regard to this question, which is due doubtless to the fact that we are more affected by what we can see with our own eyes in the shape of big battleships, powerful cruisers, etc., than we are by statistical figures indicating the present and future strength of the personnel for manning these ships. For several years past it has been perfectly well understood in official circles that we were building new vessels very much faster than we were providing men and officers to man them; but up to the present time Congress has shown a strange apathy in dealing with the situation. The matter, however, has come to such a pass that this question will be one of the most, if not the most, important that will confront the next Congress, and as the following figures, given by the Secretary of the Navy, prove, the matter will not admit of the least delay.

At the beginning of the present year there was a demand for the proper manning of the serviceable ships of our Navy of 1,237 officers of the line, and at the same time there were 264 officers engaged on shore duty of various kinds. The total requirement on January the first was 1,631 officers. On the same date, however, there were in the Navy only 1,023 officers, including midshipmen, or 608 less than were required. Even if we allow for the fact that about one-fourth of the ships of the Navy are out of commission during peace times, there would still be a shortage of 300 officers.

So much for the present. With regard to the future the situation is even more alarming, for we have at the present time sixty or seventy vessels authorized, or under construction, of which several are the largest and most powerful of their kind in the world. To man these vessels will require 498 additional officers, and this estimate is made on the basis of a minimum allowance of officers per ship, the allowance being far less in our Navy than in any of the first-class navies of the world. This is proved by the fact that, while in this estimate the United States allows only seventeen officers to a battleship, Germany allows twenty, France twenty-six and England thirty-three, or practically double what we do. If we estimate that the usual proportion of officers will be on shore leave, sick, on furlough, or in transit from foreign to home stations or vice versa, we must have 623 officers on the lists to man these ships with the 498 that they require. In the intervening four years between the present date and the completion of these vessels, it is estimated by the Secretary of the Navy that no less than 160 vacancies will be created by the death of officers, or by their leaving the service through disability, or by resignation. Adding these to the total already arrived at, we find that 783 officers will have to be provided for the ships now in course of construction, all of which are expected to be in commission by 1906. Add this number to the 608 officers which we are short of today, and we find that by the date named, if we are to properly officer our fleet, even on the limited number per ship which we allow, there will be required 1,391 officers, or a total of more officers than we have in the whole Navy to-day.

But even these figures would not represent our total need in case of war, for, as in the Spanish-American conflict, a considerable number of naval officers would have to be transferred to auxiliary vessels which would be taken up by the Navy to meet the emergency. These officers could not be drawn from the Naval Academy, for in the coming four years the Navy can only reckon upon receiving 355 graduates from the Academy and this would still leave us more than a thousand officers short of the proper complement. It is true that the law allows promotion from the ranks; but at present the number must not exceed six per annum, and while it might be increased to advantage, it must be remembered that the duties of a modern naval officer require a man of an exceedingly broad range of knowledge, such as can only be gained by a thorough course of study for a period of years at the Annapolis Academy.

In view of the facts given above, it is evident that no measure connected with the defenses of the empire can be brought before the next Congress that will have anything like the urgency of the naval personnel bill.

BRITISH CRITICISM OF AMERICAN RAILROADS.

Discussion of American institutions by fair-minded and competent critics is always valuable and welcome. From time to time we receive visits of inspection from accredited experts of other countries, who are given every facility to examine our social and industrial institutions. In 1901 Col. W. B. Constable, the Manager of the Eastern Bengal State Railway in India, was sent over to examine the working of our railroads, and his report, which is characterized by well considered criticism, shows that he was well qualified for the task. His tour of inspection included a great many of our leading railroads and an investigation of their shops, rolling stock, track, stations and systems of signaling. With regard to the track, he thinks that our method of laying rails with broken joints, that is to say, with the joint of one rail immediately opposite the center of the other rail, is peculiar to this country; and while we differ from the rest of the world in this respect, he presumes that we have the best of reasons for the practice. He commends our use of from 2,500 to 3,050 cross-ties per mile of track, as compared with the 1,760 to 2,000 ties per mile used in India and England, since it cannot be questioned that the greater number of ties gives a smoother and stronger track. He also commends our shorter and narrower platforms as being cheaper than those used in India, and he would imitate us in permitting level crossings at small stations, claiming that the Indian practice of requiring overhead bridges at the small stations is too costly. On this last point we must admit that we can scarcely agree with his findings; for the large number of people killed annually at railroad crossings in this country suggests surely that more overhead bridges and fewer grade crossings, as in India, would be to the public advantage. He considers with much reason that our fencing is wretchedly poor; and that while the roadbed is often indifferent, the lavish use of cross-ties, as above referred to, compensates its defects, while the great length and weight of our cars conduces to their comfortable riding compared with the roughness of the smaller cars on Indian roads. The great Southern Terminal station of Boston is considered by Col. Constable to be the finest station in the world, a conclusion in which we think he is perfectly correct. He is of the opinion that pneumatic or electric power interlocking will take the place of manual interlocking at large stations, more particularly because of the reduction in plant and the necessary staff of operators. He was very favorably impressed by the use of automatic block signals in this country, and he has no doubt that English roads will ultimately adopt some form of automatic system, which will also be found indispensable in such large cities as Calcutta, Bengal and Madras.

To the New York Central Road he gives credit for having the best railroad joints that he found anywhere in the United States, and the criticism is well made. The New York Central have always used three-tie joints, that is joints with a tie near the end of each rail, and an additional tie immediately below the joint. This ample bearing, combined with the use of long six-bolt angle bars, has given a joint which, when it is kept in good condition, is so smooth as to be inaudible to passengers riding on the cars. It is curious to note that the critic was struck, as many everyday passengers have been, with the difference between the joints on the New York Central and on the New Haven lines. On the latter road short four-bolt angle-bars are used with a single tie at each rail end, and none immediately beneath the joint. As a consequence the joints are generally low, a point which did not escape the eye of this critic. He was favorably impressed with the American rails, which he characterizes as being heavy, tough, stiff, of great tensile strength, and with a broad head. He himself has always been an advocate of the heavy rail section, and he considers that he found a strong indorsement of his views in the good results obtained from their use in this country.

WHERE OUR MANUFACTURES GO.

Those of us who are watching the present wonderful commercial expansion of their country will be interested to learn what countries our manufactures are sent to and in what proportions. During the year 1901, 62 per cent of our exported manufactures were carried to Europe, and 23 per cent to North America, these two countries together taking three-quarters of our exports. Of the balance, 8.2 per cent went to Asia; 7 per cent to Australia, New Zealand, etc.; 6 per cent to South America, and something less than 3 per cent to Africa. The total value of the exports to Europe was $215,000,000, and to North America, outside of the United States, $96,000,000, the exports to other countries being in the proportions as given above. An analysis of the nature of these exports shows that the largest item of European exports was $44,000,000 worth of iron and steel manufactures. It will be a matter of surprise to learn that almost an equal amount of copper manufactures was exported, the total value being about $41,500,000, while the exports of refined or manufactured oil were not far behind, the total being $40,736,000. The values of the other principal exports were, of leather and manufactured leather goods, $21,000,000; agricultural implements, $10,500,000; drugs and dyes, $6,741,000; the balance of the total exports being made up of paraffine, wood manufactures, scientific instruments, etc., in decreasing amounts. The largest item in the exports to North America was iron and steel, which were sent out to the value of $43,518,000; the next items in point of importance being cotton manufactures, $6,628,000; and cars and carriages, $3,577,000. To South America, the largest exports were of iron and steel to the value of $8,750,000; to Asia of refined or manufactured oils to the value of $12,442,000; while to Oceania the principal manufactures exported were iron and steel valued at $8,872,000. Historically, it is interesting to note that in 1790 the total exports of manufactures from this country amounted to only a little over $1,000,000 and formed only 6 per cent of the total exports; in the decade 1791-1800 exports of manufactures averaged only about $2,000,000 per annum, and they never reached as much as $10,000,000 per annum prior to the year 1840. In the year 1850 exports of manufactures had reached a total of $17,500,000; in 1860 they reached the $40,000,000 mark, and in 1870 the total stood at $68,280,000. It was not until 1877 that they passed the $100,000,000 line, the total for the year being $122,577,000. Nineteen years later, in 1896, the total value passed the $200,000,000 mark and had risen to $223,571,000. In 1899 the total was $339,600,000 and during the present century the exportation of manufactures has constantly exceeded $400,000,000 per annum.

RAILROAD EXPANSION IN SOUTH AFRICA.

Following the declaration of peace in South Africa, and the return of the country to the normal order of things, a determined effort is to be made to develop the industries of the country, in order to render South Africa a formidable competitor in the great struggle for the world's trade. Primarily, a comprehensive extension of railroads is to be carried out, since it is only by the construction of a network of railroads throughout the country that its resources can be developed to the utmost, and its produce dispatched expeditiously, easily, and cheaply to the coast for shipment to foreign markets. At present, there is a tendency toward competition between the various railroads for the traffic, but it is desired to bring the various railroads together into one homogeneous whole, stop ruinous inter-competition, and establish a fair tariff for the conveyance of freight.

There is also another very great difficulty against which the railroads have to contend—the present unsatisfactory condition and deficiency of labor supply. The far-reaching influences of this problem are exemplified in connection with the Natal-Harrismith railroad either via Reitz or Wilge River, to some point on the Central South African Railroad's main line near Vereeniging. This railroad was extended for military purposes during the war for eighteen miles beyond Harrismith to Elands River, and surveys for the rest of the route are to be carried out. These surveys will be completed in about six months. The advantage to Natal of this connection will be very great. It will save about one hundred miles of uphill haulage, and will shorten the route from Durban to Johannesburg by over forty miles. It will also shorten the distance by rail from Durban to Cape Town considerably. But unless a solution is found to the native labor difficulty, or some means are adopted to provide skilled white labor, this railroad, in common with many others equally important, will be a long time in course of construction, even if work is immediately commenced upon it. The present railroad extensions scheme comprises the surveys for the following lines in the Transvaal:

1. A track from Springs over the High Veldt to a junction with the main railroad near Machadodorp.
2. The remaining unsurveyed portion of the railroad from Vereeniging to Johannesburg (direct route).
3. A track from Krugersdorp to Rustenburg.

In the Orange River Colony the projected railroads are:

1. A track from the present terminus at Elands River, near Harrismith via Reitz, or the Wilge River, to Vereeniging.

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