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NEW YORK, SATURDAY, JULY 6, 1907.

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.

OUR NAVAL FORCES IN THE PACIFIC.

When the British Admiralty decided, a few years ago, to call home the squadrons which she had been in the habit of maintaining on the Halifax and West Indies stations, reducing the garrisons both at the famous Nova Scotian fortress and also on the Island of Bermuda, the step was interpreted by the world at large, and very properly so, as an evidence of the cordial relations existing between Great Britain and ourselves. The concentration of the weightier portion of a country's fleet in any particular place may be taken as indicating where that country considers that its interests are, for the time being, most threatened. It is equally true that the withdrawal of naval forces is invariably accepted as indicating that the relations of the two powers affected are thoroughly amicable.

We have heard a great deal of loose talk, lately, about the possibility of a war with Japan. Had the Japanese been a less highly civilized people, this irresponsible chatter might easily have blown the war spirit of that warlike people to a white heat long before this. We hold it to be a proposition indisputable, that if the Japanese press and certain Japanese officials had discussed the possibility of war with the United States with as much reckless abandon as a certain daily journal in this city and certain men of more or less prominence in the country have done, Congress would long ago have resounded with threats and denunciations, and not a small section of the country would have been eagerly awaiting the call to arms.

Fortunately, the governments both of the United States and Japan have been entirely unaffected by this foolish and utterly baseless talk of possible conflict; and that the Navy Department, at least, is satisfied that Japan is friendly, and intends to remain so, is proved by the fact that our naval forces in the Pacific have been reduced to a very conservative peace footing. By way of proving our proposition, we submit below a statement of the number and type of the ships of our navy which are stationed at present in those waters which the alarmists would have us believe are shortly to witness a disastrous naval conflict.

Stationed on the home coast, then, we have at present in commission not a single battleship. Of the three which are there, the "Oregon" is just now undergoing reconstruction; the "Wisconsin" is repairing; and the new "Nebraska," very much behind her date of completion, is only now getting ready to go into commission.

We have no coast defense vessel in commission, the "Wyoming," which is the only vessel of that type at present on the Pacific coast, being now at the yard undergoing repairs. The most effective ships in commission on the coast are the three semi-armored cruisers "Charleston," "St. Louis," and "Milwaukee," vessels of 9,700 tons and 22 knots speed, protected by a partial and light belt of 4-inch armor and a 3-inch deck, and carrying a battery of fourteen 6-inch guns. Two more powerful armored cruisers, the "California" and "South Dakota," of 13,400 tons and 22 knots, protected by a 6-inch belt, and armed with four 8-inch and fourteen 6-inch guns, will shortly be placed in commission, the "California" during the present summer, and the "South Dakota" during the autumn. We have also in commission on the home coast the protected cruisers "Chicago" and "Albany," old boats, built respectively in 1885 and 1897, and the gunboat "Princeton." In the same class, but out of commission, are the cruisers "Boston" and "New Orleans" and the gunboats "Bennington," "Marblehead," "Petrel," and "Wheeling." Of destroyers on the coast we have in commission the "Preble" and "Perry," and out of commission the "Paul Jones"; while there are three torpedo boats in commission and two out of commission.

Out of commission also are the two submarines "Grampus" and "Pike." Among the fleet auxiliaries we have in commission the collier "Saturn" and the transport "Buffalo," while out of commission are the transport "Solace" and the hospital ship "Relief." Down in Central American waters is stationed the gunboat "Yorktown."

On the Asiatic side of the Pacific the strength of our fleet lies in its armored cruiser squadron, which consists of four vessels of the "California" class, namely, "Colorado," "Maryland," "Pennsylvania," and "West Virginia," all of which are in commission. In addition to these we have the old monitor "Monadnock," and out of commission the monitor "Monterey." In the protected cruiser class the United States is represented by the sister vessels "Cincinnati" and "Raleigh," built in 1892, each carrying eleven 5-inch guns, and three sister ships "Denver," "Chattanooga," and "Galveston," of 3,200 tons and 16½ knots speed, each armed with ten 5-inch guns; while two other vessels of the "Chattanooga" class, the "Cleveland" and "Denver," are now en route to the Asiatic station. Our representation in gunboats is quite numerous, but if we exclude the comparatively modern "Concord," "Helena," and "Wilmington," of between 1,400 and 1,700 tons, the other seven, which are small and very much out-of-date gunboats, captured from Spain during the last war, must be reckoned as of little value. The Asiatic fleet also includes five destroyers, two of which, the "Barry" and "Chauncey," are in commission, and the others in reserve. The fleet auxiliaries attached to this station include three colliers and three supply vessels in commission, and a transport and a collier out of commission at Cavite in the Philippine Islands. Down in the south mid-Pacific, at Samoa, is stationed the gunboat "Annapolis."

In summing up, then, it will be evident that the Navy Department of this country has no apprehension of any near or even remote hostilities, inasmuch as there is not a single battleship in commission, and our fighting strength is represented only by the six armored cruisers of the "California" class, the three semi-armored cruisers of the "Charleston" class, eight small protected cruisers from ten to fifteen years of age, four modern gunboats, four destroyers, and three torpedo boats.

THE ENEMIES OF STRUCTURAL STEEL.

Too much cannot be said of the excellent qualities of structural steel of the standard composition and workmanship. Its reputation for the combined qualities of elasticity, toughness, resistance to compression, and shear and durability has been established by years of useful duty in a thousand different forms and under a thousand different conditions. Steel, however, is subject to two insidious forms of attack, the peril of which lies in the fact that the damage is done under conditions where inspection is difficult and in many cases impossible. We refer to rusting and electrolysis.

The destructive effects of rusting are so well understood, that the efforts to protect the steel commence at the very time that the material receives its finishing pass in the steel mills. In all well-regulated works the finished work receives a coat of protective paint before it is placed in the storage yard, or shipped to the purchaser. If the paint be applied to thoroughly clean surfaces, quite free from rust, and if the steel work be again carefully painted before it is inclosed in the concrete, terra cotta, or other fireproofing material of the building, and the space between the fireproofing and the steel is carefully filled in with cement, experience has shown that it will probably be safe against deterioration by rusting for all time to come. But these theoretical conditions are seldom perfectly fulfilled. Too often the finished shapes at the mill are exposed to the moisture and acids of the atmosphere long enough to take on a coat of rust; and unless this be very carefully removed, the mere application of the ordinary paint of commerce will not prevent oxidation from taking place under the paint on the surface of the steel. In proof of this, we direct attention to the case of the reconstruction of the Mutual Life Insurance Company's building in San Francisco, when, in tearing down the six upper stories, an excellent opportunity was afforded to observe the behavior of structural steel in a steel and masonry building. We made editorial reference to this subject in our issue of March 16. From the account there given it seems that, where the steel had not been thoroughly cleaned before painting, there were occasional instances of some rust under the paint, and although these were rare, they indicated the necessity for a thorough cleaning of the steel before it is painted. Furthermore, there is a sense in which the preservative paint may defeat the very object at which it aims, by serving to conceal badly-rusted surfaces from inspection. The ideal protective covering, both for steel which is to be inclosed from view, and that which will be permanently exposed to the attack of the weather, would be a covering which, like varnish, would be sufficiently transparent to enable the condition of the underlying steel to be carefully

inspected. If some composition could be produced, which combined transparency with protective qualities, a long step would be taken in the direction of rendering all steel work, whether exposed or concealed, imperishable.

The problem of the electrolysis of steel is one that we have always with us. Interest in the question was recently revived by the presentation before the American Institute of Electrical Engineers of the experiments of Mr. Knudson of this city, an account of which will be found in our issue of April 13. In these experiments three lengths of wrought-iron pipe were set in three blocks of Portland cement sand concrete. When the blocks were three years old, one of them was placed in a tank of sea water, another in a tank of fresh water, and direct current was fed to them, pieces of sheet iron being placed in the tanks to act as negative electrodes. The third block was placed in sea water; but no current was fed to it. After the blocks had been immersed for thirty days, the third block was found to be in perfect condition and the embedded pipe perfectly bright; but the two blocks to which current had been fed had developed cracks during the test; the pipes were considerably corroded; and the concrete had so greatly deteriorated, that it could be cut with a knife. In drawing deductions from this experiment it must be remembered, of course, that the conditions were unusually severe; but they were not so severe but that the ever-present danger of electrolysis is strongly emphasized. We mention this case, because it not only illustrates the action of electrolysis upon steel work as shown in the corrosion of the embedded pipes, but it indicates how increasingly necessary it is, in these days of reinforced concrete, to prevent the leakage of current from conductors. Although the evils of electrolysis have undoubtedly been greatly exaggerated, we believe that the mischief done is more far-reaching than the electrical companies and the owners of large electrical power plants are willing to admit. The remedy lies in more careful insulation. In the case of armored concrete buildings or buildings of skeleton steel, care should be taken to absolutely insulate the foundations and all that portion of the building which lies below the line of saturation of the earth. Much of the insulation of underground electrical conduits is undoubtedly very faulty, and it has become a question whether the thorough insulation of all forms of conductors should not be made the subject of legal enactment.

SIX MONTHS ELECTRIC OPERATION OF THE GRAND CENTRAL STATION.

The results of electric operation at the Grand Central station and terminal yard, as shown during the six months which have intervened since the electric current was turned on, have been very gratifying. Already the new system has loosened up the congestion, practically abolished the delays to incoming and outgoing trains, and restored the spirits and good temper of the company's patrons to their normal reading.

In proportion to the size of the yard, there was no other terminal in this country, or probably in the world, which was placed at such a disadvantage, from the operator's standpoint, as the Grand Central terminal. The area was so restricted that, outside of the express and mail cars, which of necessity had to be unloaded there, it was possible to store very few trains in the yard, and therefore the majority of the trains, after discharging their passengers, had to be run back over the main lines for a distance of 5½ miles to the Mott Haven yards. Furthermore, these yard movements had to be made in the midst of the regular train movements, and all of them through the two and a quarter miles of the Park Avenue tunnel, which was as badly steam- and smoke-obscured in winter as it was insufferably hot in summer.

At the present time, in spite of the inexplicable, but seemingly inevitable, delay of the New York, New Haven and Hartford Company in getting its electric system into operation, the New York Central Company, by the use of its multiple-unit local trains, and the almost complete substitution of electric locomotives for steam locomotives on its through trains, has made a vast improvement in conditions, both in the tunnel and the station yard. The atmosphere in the tunnel is greatly improved, and were it not for the continuing nuisance of the New Haven steam locomotives, the air of the tunnel would to-day be absolutely clear and sweet. The reduction in the number of train movements in the yard and station has been remarkable. Formerly, every time a steam train entered the station and left it, there were four separate operations connected with the train, involving eight signal operations. First, the train pulled into the station; secondly, a locomotive backed up to the rear end of the train; thirdly, the train was pulled out from the station; and fourthly, the locomotive which brought the train in backed out of the station. But the multiple-unit train merely enters the station and leaves it again, the only transfer being that of the motorman, who walks from one train to the other.

When the electric operation was commenced in De-