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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 ELECTRIC RAILROAD WRECK AT ATLANTIC CITY.

It is a most unhappy coincidence that on the same date on which we publish in the SUPPLEMENT a description of the very fine work of electrifying the West Jersey and Sea Shore Branch of the Pennsylvania Railroad, we should have to comment in the SCIENTIFIC AMERICAN upon a tragic accident which occurred soon after the opening of that road, whereby between fifty and sixty people lost their lives. As we go to press, the coroner's jury is at work upon the investigation of the wreck, which occurred on October 28, and it is too early to give any definite opinion as to the cause of the derailment, by which a whole train was thrown from the drawbridge into the water, and three-fourths of its passengers drowned in over 20 feet of water. Pending the findings of the jury and the report of other investigations which will be undertaken by experts who are qualified to judge of the conditions, it is only an act of common fairness to the company to state that this work of electrification, as described in the SUPPLEMENT, seems to have been carried out with that thoroughness and disregard of cost which characterizes first-class work. Shortly before reaching the "Thoroughfare"—a tidal estuary which flows beneath the railroad at a point about two miles from Atlantic City—the tracks of the new electric road are carried by an elevated viaduct over the tracks of the Pennsylvania and Reading line, and this work is thoroughly up-to-date, consisting of a steel superstructure carried on concrete piers. Other evidences of the high character of the work are that over a considerable part of the 65 miles from Camden, N. J., to Atlantic City, the tracks are laid with 100-pound steel, which is the heaviest weight used on any steam railroad to-day, while over the rest of the distance 85-pound rail is used. The rolling stock is also of the most modern type, and broadly similar to that which will be used on the Pennsylvania Railroad main line improvements.

The cause of this terrible accident, then, is to be sought for, not in poor construction, but in certain accidental conditions which developed at the drawbridge at the time the fatal train was crossing. The track, the bridge, and the car would seem to have been of first-class construction, and the accident would seem to have been due to some misplacement, either of the draw or the rails, or possibly to the slipping of one of the wheels on its axle—the cause to which a recent derailment in the New York Subway was attributed.

As far as one can glean the truth from the confused and contradictory statements of railway employees, passengers, and onlookers, and from the incomplete evidence at the inquest, we are inclined to think that the draw, which had been opened for the passage of a small yacht shortly before the train approached, was not perfectly aligned when the wheels of the first trucks passed from the approach on to the draw itself. That these were the conditions is strongly suggested by the reported testimony of the bridge tender at the inquest, who stated, according to press accounts, that the rails at the drawbridge buckled at times; that he had to hammer them back into place, and that he had received instructions to saw them shorter if they buckled again. This would indicate that the rails on the downgrade of the overhead crossing over the Pennsylvania and Reading Railroad track had been creeping toward the draw, and that possibly on this Sunday morning there was interference trouble between the rail ends, which prevented a proper closure of the draw and alignment of the track. In the interests of future railroad operations, particularly at drawbridges, it is to be hoped that the underlying causes of this disaster will be accurately determined.

SINGLE-PHASE ELECTRIC ROAD BETWEEN BALTIMORE AND THE NATIONAL CAPITAL.

Single-phase electric traction has come to stay. The latest evidence of this is shown in the announcement that a single-phase electric road is about to be built connecting Baltimore and Washington, D. C. Some three years ago a company was formed to carry out this project; but after the contract had been let for the equipment the plans were abandoned. Owing to the failure of the first single-phase project, a most careful engineering study was made of the conditions; and the final solution of the problem, and the construction of the road by an entirely new company, are proof of the merit of the present single-phase system. The contract for the entire electrical equipment of the rejuvenated road has been let to the General Electric Company.

The total length of the new road is about 60 miles, double-tracked throughout. The main line will connect Baltimore and Washington, and there will be a branch line, from a point on the main line near Odenton, extending to Annapolis. A very complete rolling-stock equipment will be provided for both express and local service between the cities mentioned. Nineteen express cars will be operated, each capable of making 60 miles an hour on a level track; and two heavy construction cars will be equipped, each powerful enough to haul a train of five ordinary passenger coaches at 45 miles an hour. Four of the new type General Electric single-phase railway motors will be installed to drive each of these cars. These motors will each have a capacity of 125 horse-power, and as in the case of the New Haven equipment, they can be operated not only on the single-phase electric trolley of the main line, but also on the direct-current trolley sections within the city limits of Baltimore and Washington.

Two motors of this same size will be used on the local service cars. All the cars will be equipped with the multiple-unit system of control, by means of which the cars can be operated singly or in trains, on direct current or alternating current, by one motorman. Express cars will run every 15 minutes between Baltimore and Washington, the total time being 72 minutes. Power for the new road will be purchased from the Potomac Electric Company at Washington, D. C., and will be delivered by that company to suitable substations located along the line, which will supply single-phase current to the trolley at a potential of 6,600 volts. As this is one of the largest installations of exclusively single-phase railway equipment, the construction and operation of this road will be watched with great interest in railway and engineering circles.

NEW RATING OF THE WORLD'S FLEETS.

If the system of rating the fighting values of the world's fleets adopted in the latest issue of "Fighting Ships" be correct, we must entirely revise our estimate of the relative power of some of the leading navies. France yields second place to the United States, and Germany, which before the Japanese war was considered to be at least equal if not superior to the United States, moves down to fifth position with Japan ahead of her, Russia being sixth, Italy seventh, and Austria in the eighth position. The placing of the German navy below that of Japan in an estimate of relative fighting power would seem, at the first blush, to savor of absurdity; but when we begin to examine into the basis of comparison adopted in "Fighting Ships," we find that the change has been made on grounds which are at least plausible.

This startling advancement of some of the navies and depreciation of others is due to the fact that the new system of rating is based strictly upon the stern lessons of the Japanese war, in which, during a few short months, the third greatest navy of the world was practically swept out of existence. Outside of its reassertion of the value of a trained personnel, that war emphasized the importance of the big, heavily armed, and heavily armored battleship. Furthermore, it is the unanimous opinion of naval experts that the war established the overwhelming value of the heavy, long-range gun. It proved, once more, that the final command of the sea, other things being equal, will lie with the navy which can bring the largest number of big guns to bear, when the rival fleets are facing each other in line of battle. This fact has been so far accepted that the building programmes of all navies for the present year are based entirely upon its recognition.

In the new rearrangement of the navies of the world in the order of their fighting importance, above referred to, the ships are set down in parallels of fighting value, with the battleship "Dreadnought" taken as the unit. In the estimate are included all the warships of the various fleets that are built, building, or proposed. The high position given to the United States and to Japan is due mainly to the fact that fortunately neither of these powers was affected by the agitation of a few years ago in favor of installing guns of medium caliber in the main batteries

of warships, and abolishing the 12-inch gun. As a consequence, not one of the first-class battleships of either navy carries, as its main armament, anything lighter than the 12-inch gun, while eight of our own ships mount a 13-inch piece of great power and accuracy. The German designers, however, in the ten years from 1890 to 1900, were leading exponents of the school which advocated the substitution of a lighter and handier gun in place of the then cumbersome, and comparatively slow-firing, 12-inch gun. As a consequence, every one of her battleships built during that date carries, in its main battery, a weapon which most of the leading powers to-day consider to be not even sufficiently powerful for use in the intermediate battery of battleships or the main battery of cruisers. The "Kaiser Friedrich III." class of five ships, and even the "Wittelsbach" class of five ships launched as late as 1901, mount nothing heavier than the Krupp 9.4-inch gun. Even the ten latest ships of the "Braunschweig" and "Deutschland" classes carry only a 40-caliber 11-inch piece, and there is not a battleship afloat in the whole German navy to-day that mounts a 12-inch gun.

In the "Fighting Ships" comparison the warships are rated under fourteen classes, with the "Dreadnought" as the unit; and it must be borne in mind that her high efficiency is due not alone to her ten well-protected 12-inch guns, but also very largely to her abnormally high speed. In the *First Class* the British have the "Dreadnought" completed and two new "Dreadnoughts" proposed. The United States has the "South Carolina" and "Michigan" and the new proposed 20,000-ton ship. France has nothing proposed of equal efficiency to the "Dreadnought." Japan has two new vessels proposed, and Germany none, of the same power as the unit ship.

In the *Second Class*, the British have two ships of the "Lord Nelson" type, carrying four 12-inch and ten 9.2-inch guns, and two so-called armored cruisers which will probably be an improved "Inflexible" type, carrying eight or more 12-inch guns. The United States has nothing in this class. The French have six of the "Danton" type carrying four 12's and twelve 9.4's. The Japanese have two "Akis," mounting four 12's and several 10's; the Germans two of the "Ersatz Sachsen" type, mounting fourteen 11-inch guns. In the *Third Class* the British have eight of the "King Edward" type carrying four 12's and four 9.2's, and three of the "Inflexible" type mounting eight 12's. In this class we have a very strong representation consisting of six of the "Kansas" and "Louisiana" type mounting four 12's and eight 8's; five "New Jerseys" of the same battery power, and two "Idahos," also carrying four 12's and eight 8's. France has six ships of the "Liberté" and "Republique" types carrying four 12's, and a numerous battery of 6.4's or 7.6's. Japan has two "Kashimas" carrying four 12's and four 10's. Germany has nothing in this class. In the *Fourth Class* Great Britain has twenty-five ships of the "London," "Duncan," "Warrior," and "Black Prince" types, the two last-named being cruisers. We have three of the "Maine" type and four of the cruiser "Washington" type, the latter mounting each four 10-inch in the main battery. The French have the "Suffren" and "Iena"; the Japanese nine ships, including those that were engaged in the war, two the former Russian battleships, the "Orel" and "Czarevitch," and four new cruisers, now under construction in Japan, which will carry 10-inch or 12-inch guns in the main battery. In this class Germany has a strong showing, including five "Deutschlands" and five "Braunschweigs," each carrying four 11-inch guns, besides two new cruisers each mounting eight 8.2's. In the *Fifth Class* Great Britain has fifteen battleships of the "Majestic" and "Canopus" types. We have three "Alabamas"; the French seven battleships and three powerful cruisers, and Japan three battleships, namely, the "Fuji" and two that were captured from Russia. Germany has no ship in this class. In the *Sixth Class* the British have twenty ships, including seven "Royal Sovereigns," the "Hood," two "Trafalgars," and ten armored cruisers of the "Drake" and "Cressy" types, the latter carrying 9.2's in their main battery. In this class also the United States is strong, having twelve ships, including two of the "Kearsarge" type, three "Indianas," one "Iowa," and the six armored cruisers of the "California" type. France has seven ships; Japan one; and it is to this class that, because of the light character of their armament, ten of the latest battleships of the German navy, launched between 1896 and 1901, are relegated.

It is not necessary to pursue the comparison further, but attention should be drawn to the new value assumed by that most efficient type of ship, the armored cruiser. The placing of some of these ships in the same class with the battleships is justified by the fact that in the engagements of the late war Togo did not hesitate to put his armored cruisers in the front line of battle. Under this method of rating, the author of "Fighting Ships" has placed those fine armored cruisers of our navy, the "Washington," and "Tennessee," and their sisters, in the same class with