Correspondence.

THE STEAMSHIP "REPUBLIC."

To the Editor of the Scientific American:

Your editorial entitled "Lessons of the 'Republic' Disaster," in the Scientific American of February 6th, is misleading in certain respects, if the facts as I have learned them are correct. With reference to the building of this ship, you state "had she been built for a company that was hampered by a shortage of funds," etc. This, with what you say further, would imply that she was built for the famous and substantial White Star Line Company, who have a system of contracts peculiarly favorable to first-class construction. I have been informed with positive assurance that this ship was built for the Leyland Line as a freight and cattle steamer, and before completion, on account of finances, she was taken over by the Dominion Line for Boston service, and before being put in commission was again transferred to the White Star Line Company, her name being changed from "Columbus" to "Republic." I have been informed that the "Republic" was not a first-class ship, and could not be compared with the other boats of the White Star Line. If this is true, it seems to me your editorial hardly does credit to the White Star Line, since it reduces their other boats to the level of the "Republic." O. A. Weiss.

Minneapolis, Minn.

END VERSUS CENTER DOORS FOR EXIT ON SUBWAY CARS

To the Editor of the Scientific American:

The articles in the daily papers together with a personal experience leads me to say a few words concerning the question of "side doors" in the New York Subway. The problem of loading and unloading passengers with ease and speed is a great one, and before any plan is adopted and with great expense installed, all should be given a fair test. In my opinion, the plan now being tested is faulty in principle and not conducive to the best results.

My idea is essentially this: To put two wide doors for the purpose of exit, in the middle of each car, one on each side, and to use the present doors for entrance. The plan now being tried requires four new doors, two at each end, also providing for separate means for entrance and exit.

With a car comfortably filled and nobody standing, little or no difficulty is met in loading or unloading passengers. Therefore the plan for separate entrance and exit will show its efficiency chiefly in crowded hours and under crowded conditions. It is, in other words, a rush-hour improvement.

When one enters a crowded car, the tendency is naturally to stop near the door—the standing is no different and it is easier to get out. This idea carried out by a few immediately causes congestion; and this is what I would emphasize—the new doors are practically at the ends of the car and will not eliminate this congestion or help it to any great extent. The two streams of people will still conflict, not at, but just inside of the door. What is the difference?

A door in the middle of the car is going to effectually solve this problem for the reason that as the crowd enters it will instinctively move toward the middle, or exit. A natural circulation will thus be established, the comers and goers will move without opposition and congestion will not arise at any one point. The saving of expense also, in installing two instead of four doors in each car, is manifestly evident, and if cost is considered, this point is strongly in its favor.

The two great disadvantages of the plan are, first, the distance between the door and the guard who operates it, with corresponding danger to the passengers, and second, the space that would occur between the door and platform when the station is located at a sharp curve. These two, however, are mere mechanical incidentals, easily solved, and should in no way interfere if the fundamentals are right, which I think they are.

I am hoping for your consideration of this matter and a comment through your columns will be appreciated, for I am sure that there are others who feel the same as I do in the matter. It is something for every strap-hanger to consider.

Brooklyn, N. Y. H. B. Forman.

SEAWORTHINESS OF PASSENGER STEAMSHIPS.

To the Editor of the Scientific American:

Regarding the letter of your correspondent bearing on the foundering of the steamship "Republic," permit me to say that as regards structural strength, or indeed, the general seaworthiness of large mail and passenger steamers, the specification of the owners does not make any material difference with good shipbuilders. It may sound strange, but I can assure you that there are certain shipbuilders who do not know how to construct a bad ship. I know several of such who never have built a bad ship. On the other hand there are builders who, apparently, do not know how to construct a good ship. I have known many of such who never have built a really good ship, and all the specifying and superintendence possible cannot bring forth a good ship from their works. I incline toward the opinion that the builders of the "Republic" never built a bad ship, i. e., as regards materials and workmanship. They built some vessels of faulty proportionate dimensions, but that was the fault of the times. They also made a mistake in designing the "Britannic" with a lowering screw shaft and a large open tunnel exposed to the sea, but they were almost warranted in adopting that novelty in ocean navigation, as the very same arrangement gave at least satisfactory results in their little steamship "Camel," 170 feet in length, which they built in 1870 to carry the boilers, etc., for the first "Oceanic" and "Republic" and others. This was a very instructive experiment and it proved conclusively that a mechanism which may work well on a small scale will not necessarily do good work and be safe on a very large scale. This mistake cost the builders $300,000 before the "Britannic" and her machinery were restored to normal design.

The great value of a good specification is in securing good furnishings and fittings. The specifications for these, for the old P. & O. steamers frequently covered one hundred pages of close print. The owners in those days would not look at veneer; they demanded maple, mahogany, and such woods, all solid. However, there is one thing which I would like to see specified, that is, that all large ocean passenger steamers should be arranged with a large augmentation of bilge pumps, which, with their boilers, should be placed from 7 to 10 feet above the maximum load water line. It would also be a safeguard, as collisions must occur, to have a few large sheets of canvas reinforced with wire netting and loaded at one end with cast iron pipes to sink them over the fractured bow or side. These could be rolled up and placed in large hooks just below the boat deck. In these days without sails I think you could find many passenger steamers without sufficient strong canvas to check a large inrush of water. Tarpaulins on passenger steamers' hatches are not sufficiently large and it requires considerable time to get them in place.

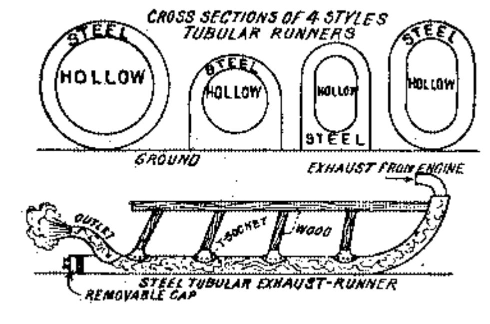
Cleveland, Ohio. Joseph R. Oldham.

DEFECTS IN MOTOR-SLEIGHS.

To the Editor of the Scientific American:

In reading the article on motor-sleighs in the Scientific American for February 27th, 1909, I saw that the main trouble with motor-sleighs is their sticking when standing still, so that it is hard to get them under way. To facilitate their getting under way, the runners can be warmed. It is to let the engine exhaust through tubular steel runners, at the will of the operator, who can switch the exhaust from the regular exhaust to the runners for starting and then switch it back to its original place, as soon as the sleigh is under way. As may be seen, the exhaust will warm the runners so they will not stick. To use this device on the Austrian Wells motor-sleigh: In starting, you would start the engine and switch the exhaust into the runners and start the propeller, behind the sleigh, going fast enough so that when the runners did not stick any more, the sleigh would glide ahead. This done, you would switch the exhaust to its original place.

To use this scheme on a belt driven or planetary transmission, you would switch the exhaust into the runners after starting the engine, and put on a little power, either letting the belt slip until the sleigh starts or not quite entirely throw in the planetary transmission clutch. The same would hold good on



SCHEME TO OVERCOME DIFFICULTY IN STARTING A MOTOR-SLEIGH.

a friction drive, for you could put on a little power and let the disk slip until the sleigh started. The whole operation is quite simple.

The back end of each runner has a cap which can be unscrewed to allow the runners to be cleaned inside. Near the back end of each runner a pipe branches upward and backward; this is the place the exhaust leaves, in order that snow will not clog the runner-pipe in backing.

The braces to the runners can be fastened to the runners by means of T sockets, which are fastened to the runners by welding, rivets, or screws.

The exhaust pipe from the engine can divide into two pipes, one for the regular exhaust, and the other divides into two pipes, each to a runner. A valve is to direct the exhaust through either the regular exhaust or through the runners.

Washington, Conn. Meredith Clark.

The Current Supplement.

A novel system of automatic railway signaling is described and illustrated in the opening article of the current Supplement, No. 1735. An authoritative life of Thomas A. Edison will shortly be published from the pens of Frank L. Dyer and T. Commerford Martin. From this life we abstract a chapter which sets forth in figures the commercial value of Edison's inventions. In an article entitled "Testing the Hardness of Metals," the various methods of testing hardness are reviewed at length. W. R. Turnbull writes on his original studies of the efficiency of the aerial propeller. Modern Experimental Biology is again discussed in an excellent article entitled "Artificial Mutations of Animals and Plants as the Basis of Technical Biology." K. Sajo writes on the sense of hearing in insects. "Silver Plating" is the title of a good technological article.

A Chance for Rubber Heel Inventors.

The inventor of a well-known, widely-advertised rubber heel for shoes has expressed a desire to examine patents covering rubber heels, or even mere ideas. Inasmuch as many readers of this journal are inventors of rubber heels, it will give the Editor pleasure to place them in communication with this manufacturer. Inquirers should send in printed copies of their patents to be forwarded, if their ideas are patented.

OUR NEW 26,000-TON BATTLESHIPS.

The recent decision of Congress authorizing the construction of two battleships of 26,000 tons displacement, assures to the United States navy the possession of the two largest battleships ever built; for 26,000 tons is about 5,000 tons greater than the displacement of any foreign battleship now under construction. The next in point of displacement are the latest "Dreadnoughts" of the Japanese navy, of about 21,000 tons, and the latest British "Dreadnought" of about 20.000 tons.

So that if there is any cause for congratulation in the fact of the possession of the biggest fighting ship in the world, we are entitled to no small amount of national self-felicitation. The time is approaching, however, when we may well begin to ask if we are not somewhat overdoing this question of size; whether, indeed, the total displacement of 52,000 tons represented in these two ships could not be divided up to better advantage in three "Dreadnoughts" of more moderate dimensions. But that is another story.

The two big ships will be a logical development of the "North Dakota" and her successor the "Florida," now building at the Brooklyn navy yard. The "Florida" will displace 22,000 tons, and a ship of her size does not require much increase in the individual dimensions to secure the additional 4,000 tons. The length over all is increased from 521 feet 6 inches, to 545 feet; the beam from 88 feet 2½ inches to 92 feet; and the draft from 28 feet 6 inches to 29 feet. In general outline, in the disposition of the guns, masts, smokestacks, superstructure, etc., the new ships will conform very closely to the "Florida." The principal change is in the addition of a two-gun turret, containing a pair of 12-inch guns. By comparison with the drawings of the "Florida" or "North Dakota," it will be noticed that the additional turret is placed between the two after turrets, and that it is elevated sufficiently to permit its guns to fire on the axial line, astern, over the roof of the turret astern.

All of the guns are carried on the median line of the ship. Turrets Nos. 1 and 2 will be mounted on the forecastle deck, which has a freeboard of 28 feet. The axes of the guns in No. 1 turret will be about 34 feet above the water and the axes of those in No. 2 turret will be about 40 feet above the water. Aft of this turret will be the conning tower and the comparatively small bridge which is characteristic of the latest battleships. Abaft of the conning tower will be the fore fire-control mast, flanked by searchlight towers. This type of mast has been adopted as standard for our new ships. Abaft of this is the forward stack, abreast of which are two small open-work towers, carrying each a large searchlight. Then follow in their turn the main fire-control mast (both masts rise 120 feet above the water) and the after smokestack, and immediately abaft of the smokestack is a second open tower surmounted by a searchlight. The ship's boats are carried in two nests, one on each beam, and they are handled by a pair of boat cranes, the masts of which are surmounted by searchlights.

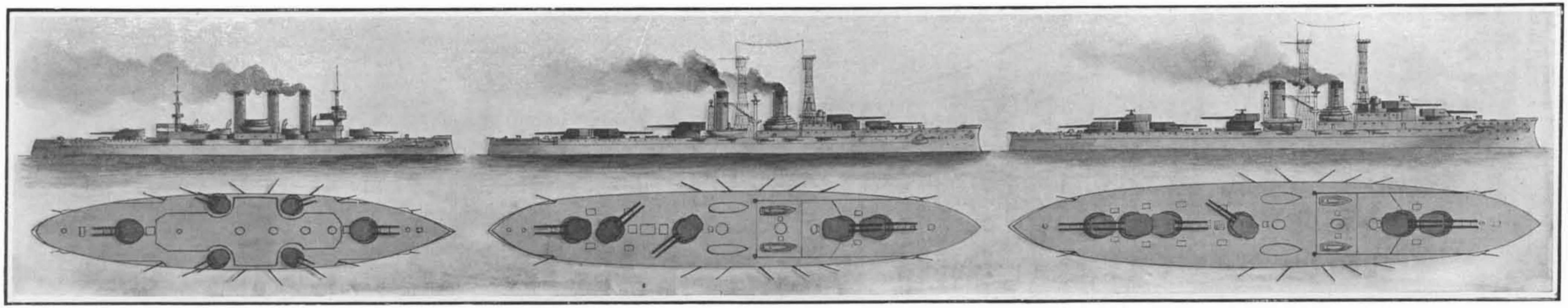
The forecastle deck is carried aft as far as the mainmast. From this point the main deck extends flush throughout the remaining length of the ship, and upon it are mounted eight of the 12-inch guns, in four turrets. Turret No. 3 is placed immediately abaft the after smokestack, and the axes of its guns are about 32 feet above the sea. Then comes the engine-room hatch and abaft of this a group of three turrets, of which Nos. 4 and 6 carry their guns at an elevation of 25 feet above the sea, while the guns of No. 5 have a command of about 32 feet.

The guns will all be of the new pattern 50-caliber type, throwing an 850-pound shell with a muzzle energy of 50,000 foot tons. Four of these guns can be fired ahead, four astern, and the whole battery of twelve can be trained through wide arcs on either broadside.

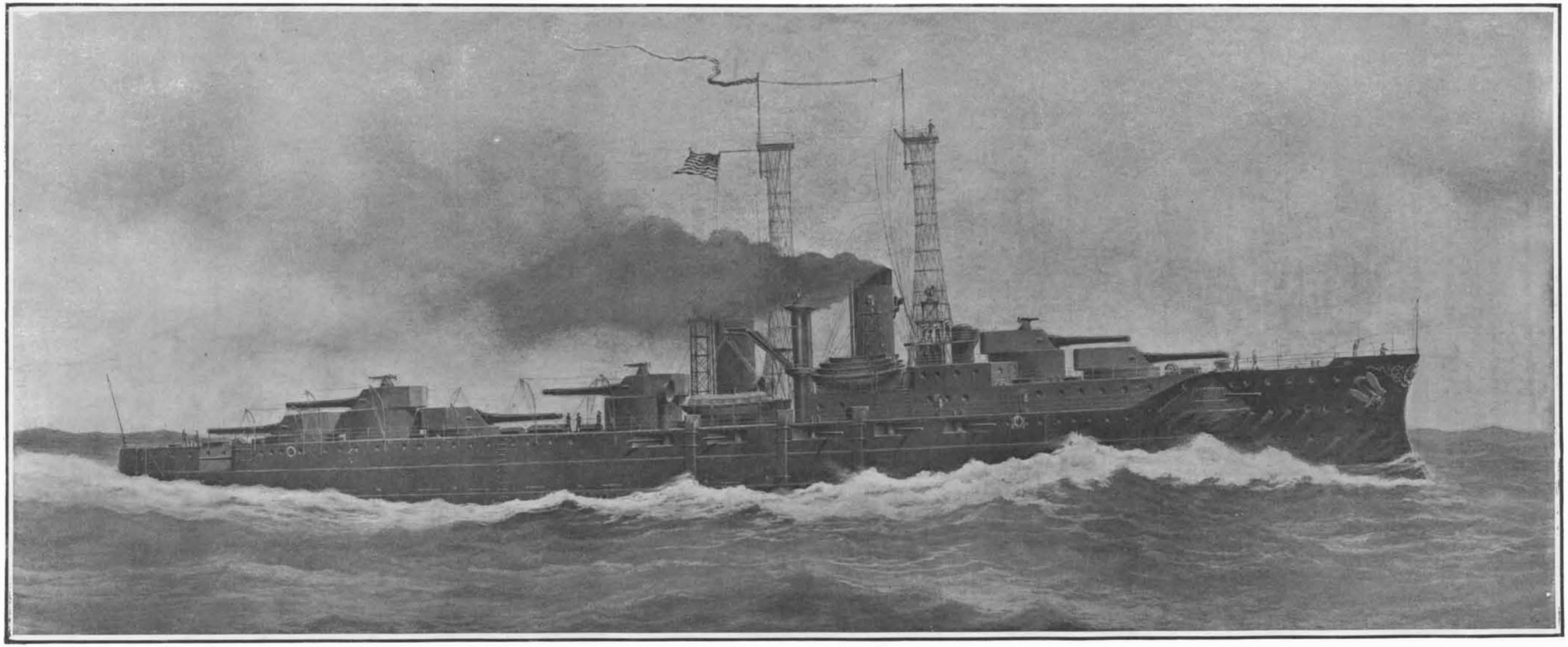
For defense against torpedo attack, the ship will mount a numerous battery of 50-caliber 5-inch guns, of high velocity. Two of these will be carried forward in sponsons under the forecastle deck, and the others in broadside on the gun deck behind 8 inches of armor protection.

One result of recent target practice and maneuvers and the experience gained in the cruise around the world has been to enhance the value of the 3-inch gun for torpedo defense. On the new ships and those that are now building, and on all the ships of the Atlantic squadron that have recently returned from the cruise, a large number of these pieces will be mounted—as far as possible on lofty positions. In the new 26,000-ton ships a pair of these guns will be carried upon the roof of the turrets whose guns have the loftiest command, as shown in our engraving on turrets 2, 3, and 5.

The general plan of armor protection will be similar to that of the "North Dakota" and "Florida," but with certain improvements. The main belt, which will extend from 3½ feet above to 6 feet below the normal water line, will be 11 inches thick at the top and 9



"Connecticut," 16,000 tons. Four 12-inch; eight 8-inch; twelve 7-inch; 20 3-inch. Date 1903. **"North Dakota,"** 20,000 tons. Ten 12-inch; fourteen 5-inch. Date 1907. **Enlarged "Dakota,"** 26,000 tons. Twelve 12-inch; sixteen 5-inch. Date 1909.



Length, 545 feet. **Beam,** 92 feet. **Draft,** 29 feet. **Displacement,** 26,000 tons. **Horse-power,** 33,000. **Speed,** 21 knots. **Coal supply,** 3,000 tons. **Armament:** Twelve 12-inch; sixteen 5-inch. **Armor:** Belt and barbettes, 11-inch; sides, 8-inch. **Complement,** 1,100 officers and men.

THE LATEST UNITED STATES "DREADNOUGHT" OF 26,000 TONS DISPLACEMENT.

inches thick at the bottom. Above this will be a wall of armor extending from abreast of turret No. 1 to abreast of turret No. 3, which will be about 15 feet in height and will vary in thickness from 10 inches at its bottom edge to 8 inches at its top edge, which will be flush with the main deck. Behind the protection of this wall of armor will be the greater part of the 5-inch gun battery. The barbettes and turrets for the 12-inch guns will carry armor of from 10 to 11 inches in thickness. A considerable amount of the displacement of these ships will be devoted to rendering them more stable when they have been struck at or below the waterline by shell or torpedo. This protection will consist of longitudinal and transverse bulkheads of xtra stiffness and strength, in the iveting of which particular care will be taken to secure joints that will hold water, even under the heavy stress of flooded compartments. This work is of a character that does not make a spectacular showing, or convey the impression of fighting strength that is due to the guns, turrets, and other visible portions of the ship above the waterline; but it is of vital importance for the all-round efficiency of a battleship. In this respect our new ships, and our "Dreadnoughts" in general, are believed to be superior to contemporary foreign ships of the same type.

To drive this 26,000-ton mass at 21 knots calls for a considerable increase of engine power. The ships will be driven by turbines, either of the Curtis or Parsons type. If of the latter type, they will have four screws; if of the former, two screws. Before the question of type of engines is decided, however, the full data of the competitive trials of Parsons, Curtis, and reciprocating engines on our scout cruisers will be available, and we think it is more than likely that the Curtis type will be found to have sufficient points of superiority to warrant its adoption in the new ships. The total contract horsepower will probably be about 33,000. This, if Curtis turbines are used, will call for the development of between 16,000 and 17,000 horse-power on each shaft—an amount that has already been exceeded on each of the four shafts of the Cunard liner "Mauretania," which, however, is driven by Parsons turbines. The contract speed will be 21 knots, and it is probable that the bunker capacity will be sufficient, with full stowage, for 3,000 tons of coal.

The above description and the accompanying illustrations of the ships approximate closely to the plans in their present state of completion. The main features will be as shown and described, though minor alterations may be made before the final contracts for the two vessels are placed.

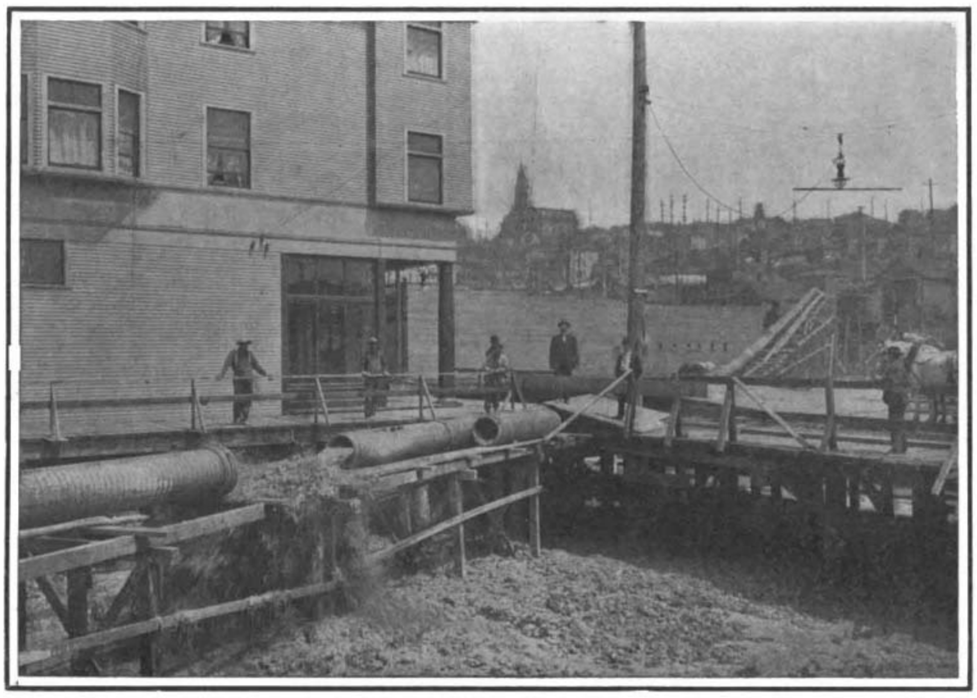
In educating users in the proper care of a storage battery, there is still a great deal of work to be done. The majority of automobiles are cared for in garages, not always to their benefit. The owner of an electric car usually does not attempt to care for his own machine and do his own charging until he has familiarized himself with the work. Moreover, he is dealing with his own property, and therefore naturally gives it special attention.

REGRADING A CITY BY MEANS OF HYDRAULIC SLUICING.

BY J. MAYNE BALTIMORE.

The city of Seattle, Wash., which has quadrupled its population in much less than two decades, has found its growth badly hampered by the succession of hills rising from the water level of the Puget Sound, over which the city has been forced to expand.

At an expense of more than three million dollars, the hills are being washed into the fills; the tide flats are being filled level, for business and manufacturing purposes, and steep grades are being reduced to smooth the way for commerce and to encourage the growth of manufacturing and other lines of business. To do this work it has been found necessary to "make over" a large section of the city already built. Hundreds of houses have had to be moved out of the way of the work of regrading. In addition churches, schoolhouses, and business structures have been remodeled or torn down. Paved streets, water mains, and sewers, have also been dug up to be replaced with better ones, when the work of regrading has entirely been completed. The work accomplished and in progress covers 374 blocks located in the very heart of Seattle, while the work thus far completed covers 239 blocks.



One of the sluice pipes delivering mud on the tide flats.

In one place the level of Third Avenue, one of Seattle's principal streets, is being lowered 107 feet, and several blocks in the Jackson Street regraded district which extends to the Seattle tide flats have been filled to a depth of 46 feet, and more. So far over ten million cubic yards have been removed out of the total of 13,586,977 cubic yards involved in this entire colossal piece of engineering.

Washing down a hill by means of "giant" hydraulic jets. The mud is carried down to the tide flats.

REGRADING A CITY BY MEANS OF HYDRAULIC SLUICING.

The work has progressed very rapidly. At first giant steam shovels were used; but later a new method of excavating was adopted, namely, the substitution of hydraulic jets for steam shovels. This is the first time that hydraulic methods have ever been used on the Pacific Coast for street grading purposes. So powerful are these jets that they quickly tear down the hills. The vast masses of disintegrated earth are carried away through flumes and big pipes to the fills and the tide flats some distance off—often many blocks from where the hydraulicking is in progress.

The method is simply the application of hydraulic mining methods to excavating, on a very large scale. Streams of water are forced through great mains from a central pumping plant, and are directed against the hills through "giant" nozzles, and the clay and dirt crumble and melt away before these streams like snow under a warm rain.

It frequently happens that the main lines of cable and electric cars have been blocked for a day or two by some house on its way to a new location; and in many sections of the city where the grade of streets has been lowered 30 or 40 feet without lowering adjacent property, residents have been compelled to reach their front doors with long ladders, until flights of steps have been constructed.

So rapidly have the contractors been crowding forward this regrading piece of engineering work, that they expect to have it all completed within a period of three or four months.

Transferring Proofs to Celluloid.

For making slides for lantern projection, or where for any reason it is desired to transfer to a flat celluloid surface a printed proof—such, for instance, as an illustration from a book, magazine, or newspaper—a process recently made public in Germany is very simple and effective. The surface to which the proof is to be transferred is rubbed gently for about two minutes with a rag or a ball of cotton wool dipped in alcohol. For this purpose the ordinary "denatured" alcohol, if colorless, is just as good as the pure, and much cheaper. The proof to be transferred is then promptly laid face downward on the plate, and pressed firmly thereon for about fifteen seconds—for instance in a copying press—several thicknesses of paper being put below the celluloid and over the proof, to equalize the pressure. The result is that all the lines of the engraving are transferred, naturally left-handed, to the softened surface of the celluloid. The paper must be withdrawn before the celluloid hardens.

Should, however, the softened surface harden too quickly, the paper may be removed by rubbing with a wet sponge; the impression of the picture will not be injured. Fresh proofs transfer more readily than old ones; but even the oldest printed lines will leave the paper and adhere to the partly dissolved celluloid.

It is reported that some time ago Mr. Louis Brennan made an offer of his monorail to the Australian Commonwealth, and the late government was considering the proposal at the time of its going out of office. The terms of the offer were that in consideration of the Commonwealth providing $57,500 for the construction of the first full-sized car, and to enable the inventor to perfect his invention, the Commonwealth government should have the sole right for Australia to manufacture other cars on payment of a royalty of 5 per cent on the cost price of all cars built within ten years after delivery of the first car ordered by the Commonwealth.