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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 NEW HUDSON RIVER STEAMER "ROBERT FULTON."

The year 1909 being the centennial celebration of the inauguration of passenger steamboat service on the Hudson River, and also the three hundredth anniversary of the discovery of the river, it is fitting that the name "Robert Fulton" should be given to the handsome steamer, illustrated in the current issue of the SUPPLEMENT, which will form the latest addition to the fleet of the Hudson River Day Line. There is considerable interest, moreover, in the historical coincidence that, while the new "Robert Fulton" is under construction, work should also be progressing upon a facsimile of the "Claremont," the first boat to make the passage under steam up the Hudson. After careful search, sufficient data have been secured to make it possible to build a close facsimile of Robert Fulton's famous craft, and the contract for its construction has been let to the Staten Island Shipbuilding Company. The original "Claremont" was 150 feet long; 13 feet wide, and had 7 feet depth of hold. She was able to make from 4 to 6 miles an hour. In the forthcoming celebration, the 1909 reproduction of the "Claremont," in company with a facsimile of Henry Hudson's "Half Moon," which is being built by the Dutch in Holland, will form the most interesting feature of the great naval parade up the historic river.

## THE RENAISSANCE OF THE SPANISH NAVY.

No little interest attaches to the fact that the Spanish nation has at length determined upon a scheme for the systematic upbuilding of her navy. In view of the brilliant records of her medieval naval history, there is no reason why, under her young and exceedingly popular King, the Spanish flag should not fly over a modern navy that in everything but size will compare favorably with those of the leading maritime peoples. The scheme of reconstruction contemplates the building at Ferrol of three battleships of about the size of our own "Connecticut," and the construction at the same place of what will be, in effect, an entirely new naval yard. A similar reconstruction is to be undertaken at Carthagena, where four 800-ton gunboats, three 350-ton destroyers, and twenty-four 180-ton torpedo boats are to be built. The construction of the new docks and of the ships themselves will be undertaken by three leading British firms, and the total outlay will be between \$35,000,000 and \$40,000,000. The most important part of the new programme is three big-gun battleships which, although they are to be of only about 15,000 tons displacement, will have in some respects greater gun power than the 18,000-ton British "Dreadnoughts." Each ship will mount eight 50-caliber 12-inch guns of 52,000 foot-tons muzzle energy. Two of these will be forward on the center line, two aft, and one on each beam. The two last-named pair of guns, placed *en echelon*, will be capable of firing across the deck, and therefore will command either broadside. This will give a concentration of six guns ahead or astern, and eight on each broadside, which provides an all-round fire equal, in the number of guns engaged, to that of the "Dreadnought," and, because of the more modern character of the guns, considerably more powerful. The ships will carry a 9-inch belt with 7-inch side armor above the belt. The barbettes will be protected by 10 inches of armor, and the battery of torpedo-defense guns will everywhere be protected by 7-inch armor. As a protection to the machinery and magazines against torpedo attack, interior armored bulkheads are to be built into the ship. The ships will stow sufficient coal for a radius of 5,000 miles at cruising speed, and they are required to show 19½ knots speed on trial.

The Spanish authorities are to be congratulated upon securing so much fighting power on so relatively small an expenditure of money, for these three ships will mount among them no less than twenty-four 12-inch guns of the most modern type, every one of which will be available on either broadside. Moreover, in an engagement these guns will be contained within a battle line not over two-thirds of a mile in length; and these three little battleships will thus secure those advantages of big-gun concentration, which our own Capt. Simms has shown to be such an important factor in winning the line-of-battle engagements of the future.

## CENTER VERSUS SIDE DOOR CARS.

It is surprising that so much conservatism should exist in the planning and operation of great public utilities, and particularly those having to do with city and suburban transportation. Although it has long been recognized that the speed with which large bodies of people can be kept moving is determined by the least area of the passageways, entrances, and exits, through which they must pass, it is only recently that the railroads have begun to act upon this principle, which so vitally affects the passenger-carrying capacity of their systems. If we but take a comprehensive view of the problem of city transportation, it appears nothing less than amazing that our railroad men should have been satisfied for so many years, to cut down the capacity on certain congested roads, fully twenty-five to thirty per cent, by the foolish expedient of providing only a single narrow door at each end of the cars for loading and unloading passengers. It has been known for years that the total traffic that can be carried over a given stretch of road is determined by the number of trains that can pass over that road in a given time. It has also been well understood that it is not so much the speed of the train, as the length of the stops at stations, which determines the frequency of the trains; and lastly, it is well known that the length of the stops at stations is determined by the length of time which it takes to get people into and out of the cars.

The quickest and cheapest way to loosen up congestion on a railroad is to remove obstructions to the transfer of passengers between the station platforms and the cars. We have known this for years. The Illinois Central Railroad, during the World's Fair at Chicago, introduced the European practice of providing a side door at the end of every pair of seats; and they proved that the quick and easy handling of vast crowds at stations is, other things being equal, directly proportional to the number of side entrances provided on the cars. Conservatism, however, proved to possess an inertia which not even this notable lesson of the Chicago Fair could overcome; and the absolutely stupid practice of building big cars of large seating capacity with single end-doors lives and flourishes in our midst to-day.

The Public Service Commission recently made a commendable attempt to loosen up the congestion of our crowded subways by putting on an eight-car express train, in which two side doors were provided at each end of the car. The device showed its value in the few days of its operation, in spite of the fact that the officials of the Interborough Road seem to have done everything they could to hinder its success. These officials, however, claim that they are not opposed to improvements looking to the expediting of traffic, and they have announced their intention to place some fifty cars in service, which will be provided with single end-doors for the incoming, and central doors for the outgoing passengers.

This raises the question of the relative merit of the Public Service Commission system and that proposed by the operating company. Judging from the success which has attended the use of center door cars, when they are so operated as to produce an uninterrupted flow of passengers, we are inclined to think that the solution of the problem may be found rather in the use of the single center door than in the provision of double end-doors. If the end-doors are reserved for incoming and the center doors for outgoing passengers, the stream of traffic is kept flowing in one direction, and all collision is avoided. Should the Interborough Company be really building a train of center-door cars, there will be presented an excellent opportunity to try out the two systems under exactly identical conditions. We may look for an early settlement of the question, to be followed by a complete equipment of the whole Subway system, and an increase in its capacity by fully twenty-five per cent.

## RECENT FLIGHTS OF GERMANY'S FIRST ZEPPELIN MILITARY AIRSHIP.

The "Zeppelin III," airship, which was reconstructed and experimented with by Count Zeppelin last fall after the demolition of the "No. IV," was purchased by the German government and renamed the "Zeppelin I." During the past month the army officers have been making flights and tests of various

kinds with their first rigid-type airship, while the Count has been pushing the construction of his fifth vessel, which is also being built for the government and which, when completed this month, will be called the "Zeppelin II."

During the first day's tests by the military authorities, three flights were made. In the second flight, which was a speed test, the airship went from its shed to Lindau and back, a distance of about 24 miles, in 40 minutes, which is equivalent to a speed of some 36 miles an hour, thus demonstrating that it has lost none of its former speed through the use of 2-bladed propellers in place of the 3-bladed ones that have always been used heretofore. During the greater part of last month experiments and flights were made almost daily, and on March 16th it for the first time made a successful landing upon the ground instead of upon the surface of the lake. This successful demonstration of ability to land on *terra firma*—a feat which critics of the Zeppelin type of rigid airship have always claimed it could not accomplish—encouraged the officers in charge, and a few days later, on March 20th, the airship is reported to have made a 150-mile flight in 4 hours with 26 men on board. On the 29th ultimo a record for height of 6,000 feet was made.

On April 1st, at 4 A. M., the airship, with Count Zeppelin at the helm, left Friedrichshafen for Munich, a distance of a little over 100 miles. Shortly before 9 it appeared over the city, and afterward attempted to land in a nearby field. The wind against which it had battled all the morning increased in velocity, however, and it was found dangerous to attempt to land in it. The rear motor gave out, and with but half power available, the airship could no longer make headway. It drifted about 70 miles, and was finally brought to earth successfully at Dingolfing, where it was moored in a field over night. The motor was repaired, and the next morning, at 11:15, the huge vessel reascended in a moderate wind, and returned quickly to Munich in 2¼ hours. A successful landing was made on the parade ground outside of the city. Count Zeppelin was decorated with a gold medal by the Prince Regent of Bavaria and was given an ovation. At 3:30 P. M. a start was made for Friedrichshafen, and the 100 miles were covered without incident in 4½ hours.

This long-distance trip of Germany's first aerial cruiser gives one an idea of what is yet to come in the line of aerial transport for pleasure and business purposes. The main point brought out was the uncertainty of the gasoline motor. The 4-cylinder 85-horse-power engines used are the best that the Daimler Company can produce; they are fitted with three separate ignition systems, to make them perfectly reliable; and yet, at a crucial moment, one of them failed to operate, thus leaving the airship at the mercy of the wind for a period of several hours. After sending the vessel to a higher elevation in an effort to find calmer air, it was finally brought to earth without damage in a wind having a reported velocity of over 30 miles an hour. Furthermore, it was moored all night in the open, despite the strong wind which did not abate until 10 A. M. the following day.

The successful landing and mooring of this huge air craft under such extremely unfavorable conditions show it to be by all odds the most practical type of airship that has thus far been developed.

## THE FOURTH DIMENSION ESSAYS.

The Fourth Dimension competition was definitely closed on April 1 in accordance with the rules. All told no less than two hundred and forty-five essays were received, from almost every civilized country. If we needed any proof of the world-wide interest which this prize competition excited we would surely find it in the fact that the competitors are residents of England, Germany, Austria, France, Turkey, South America, Holland, India, Australia and South Africa, as well as the United States and Canada. The task of carefully reading two hundred and forty-five essays and of selecting that which is worthy of the prize is no light one, for which reason it is doubtful if the judges will reach a decision before June or July.

Many workers who employ artificial lighting largely at their work prefer the gas incandescent light, finding it softer and less trying to the eye than the light of the carbon filament. The light of the carbon filament is certainly rich in red rays, and to these some authorities ascribe in part the tiring effects. On the other hand, the light of the gas mantle is rich in actinic rays. The introduction, however, of the metallic filament changed the character of the light of the incandescent electric lamp and rendered its radiations of much the same quality as those given off by the rare-earth gas mantle. It remains to be determined whether the metallic filament is better or worse than the carbon filament so far as the action of its light on the human eye is concerned.