

sleigh, as is also a string of bells for the purpose of simulating the music of a similar horse-drawn vehicle. The long lever at the side operates the clutches for obtaining the different speeds. The sleigh is 14 feet in length and has runners 22 inches high. Its weight is 1,400 pounds. Its inventors claim for it that it has carried twenty people eight miles an hour through the snow. Its normal speed is from 20 to 35 miles an hour over good, well-packed roads, and carrying a load of from four to eight people. On ice, when fitted with a special wheel for speed, it will travel around 90 miles an hour, and the inventors claim that it has pulled two tons at a rate of speed of 36 miles an hour on ice. On account of the light weight and great carrying power, it should be of use at some places in the Arctic regions and in all countries where it is possible to travel many months of the year on snow or ice.

THE NEW CUNARDERS.

The Cunard Steamship Company are building their new twenty-five-knot transatlantic liners with the expressed intention, among other things, of bringing back to that line the "blue ribbon of the Atlantic"; and that they will succeed in doing this is generally considered to be a foregone conclusion. The fastest average time for the eastward passage is 23.58 knots per hour. This record is at present held by the "Kaiser Wilhelm II." of the North German Lloyd line, which ship also holds the distinction of being the longest, broadest, and deepest of the fast transatlantic liners, her length being 706 feet, her beam 72 feet, and her molded depth 52½ feet. Her engines are of something over 40,000 horse-power when working up to their full power, as they did on the occasion when they drove this fine vessel day and night, for the whole eastward passage, at an average speed of 23.58 knots per hour.

The builders of the new Cunarders have guaranteed that they shall maintain an average speed of 24½ knots an hour for the whole transatlantic passage, and in view of the great size of the ships, their exceedingly fine underwater form, their great momentum when under way, and the enormous horse-power which their quadruple turbines will develop, 24½ knots should not only be easy of accomplishment, but should be greatly exceeded, at least on the trial trip. Judging from the fact that recent turbine steamers have invariably exceeded their contract speeds, the new liners should make 25½ knots on trial. It would not be surprising to see them touch the 26-knot mark.

It is difficult to gather from a mere statement of dimensions an adequate idea of such great structures as these new ships will be, and to assist in appreciating their size, we give a comparative table of eight of the largest Atlantic liners of the present day; while on the front page will be found a graphic comparison, in which one of these ships is shown standing on end amid a group of five of the most notable tall buildings in existence.

Referring to the tabular comparison we note that the new ships will be larger on every point of comparison even than the famous old "Great Eastern," whose great depth and beam, even at the present day, exceed that of any ship afloat. Comparing the Cunarders with the largest ships that have yet been built, we

THE BIG STEAMSHIPS OF THE WORLD.

	Length Over All in Feet.	Beam, Feet.	Depth, Feet.	Displace- ment,	Horse- Power.	Speed.
Great Eastern	692	83	57½	27,000	8,000	14.25
Lucania	625	65	42	19,000	30,000	22.01
Oceanic	704	68	49	28,500	28,000	19.50
Deutschland	686	67	42	23,000	37,500	23.51
Baltic	725	75	49	40,000	18,000	16.25
Kaiser Wilhelm II.	706	72	52½	30,000	40,000	23.58
Amerika	680	74½	53	36,000	15,000	16.00
New Cunarders.	786	88	60	43,000	75,000	25.00

find that they are 61 feet longer than the "Baltic," 13 feet broader, and will have 11 feet more of molded depth; that is to say, their plating will be carried up one deck higher. Yet, in point of dead weight or displacement they will be only 3,000 tons larger than the "Baltic," a fact which shows at once how greatly the under water body of these ships must have been cut away and fined down in order to obtain the easy lines necessary to their great speed. The "Baltic" has maintained 16.25 knots an hour across the Atlantic, when her engines were indicating 18,000 horse-power; but to drive the Cunarders 9 knots faster will require over four times as much power.

Our artist has brought together on the front page of this issue a group of some of the most famous among the loftiest buildings of the world. Of these, the Park Row office building, on lower Broadway, this city, is the smallest; and yet it only lacks 10 feet of being 400 feet in height, the measurement being taken to the top of the cupola above the dome. Fifty-eight feet above this, towers the gilded cross which surmounts the cupola above the gigantic dome of St. Peter's cathedral at Rome; and we cannot refrain from slightly digressing here from our subject to draw particular attention to

the vast size of this splendid architectural work of mediæval times. Its great dome has a diameter of 139 feet, and is so vast that it has a clear height from the floor of the church to the highest point of the interior of the dome of 333 feet. This means that if the American Surety Building, which is 82 feet square, and a trifle over 300 feet in height, were stood on the floor of the cathedral and immediately below the center of the dome its cornice, although it would reach 308 feet into the dome, would nowhere touch the ceiling. It is 448 feet from the ground to the top of the cross of St. Peter's. Sixty-four feet higher than that are the finials which surmount the two great western spires of the famous Cologne cathedral. Both of these spires extend 512 feet into the air, and they form one of the most impressive features of this world-renowned Gothic cathedral, which in point of lofty dimensions holds the same pre-eminent position among Gothic cathedrals as St. Peter's does among the great Renaissance cathedrals. The two tallest masonry buildings in the world are to be found in this country, one of these being the tower of the city hall at Philadelphia, and the other the Washington Monument, at Washington, D. C. The top of the hat of the statue of William Penn which crowns the tower of the Philadelphia building is 548 feet above the street level, and 7 feet higher than this is the apex of the pyramidal top of the Washington Monument, whose height above the ground is 555 feet. If one of the new Cunarders were to be stood on end, its bow pointing heavenward and the buildings we have mentioned grouped around it, it would tower 231 feet above the highest of them. Incidentally, our drawing serves to show how big the mass of the ship would bulk even among the colossal structures that are illustrated.

Of these two vessels, the one which is being built at the John Brown Company's works, Clydesdale, is expected to be launched about July next; but it is not likely that she will be ready for her trial trips until the following spring. The other vessel, which is building at Swan & Hunter's yard, on the Tyne, will probably be launched about September next and will be given her trial trip in about a year from that time. As we mentioned in our last issue, it has been proposed by the company to call the first of these ships the "Lusitania" and the other the "Mauritania." The announcement of these names has been received very unfavorably in this country, on the ground that they are cumbersome and have no appropriate importance or significance. The SCIENTIFIC AMERICAN has suggested that the company revive those two grand old names "Britannia" and "Hibernia," which were held by the first ships that carried the Cunard flag across the Atlantic.

The Death of Prof. R. Ogden Doremus.

Prof. R. Ogden Doremus died on March 22, at the age of eighty-two. He was one of the best-known American physicists and chemists. After preliminary training at New York and Columbia universities, he became assistant to Dr. John W. Draper in the laboratory of the Medical School. In 1848 he equipped, with Charles Townsend Harris, a laboratory where he lectured to students of the College of Pharmacy, of which he had been elected professor of chemistry. This was probably the first laboratory of its kind founded in America. From 1853 to 1903 he was professor of chemistry and physics of the College of the City of New York. The laboratory which he designed for that institution has been a model for many a college laboratory since established.

In his teaching he was greatly aided by his power of speech. He was popular as a lecturer, illustrating his addresses with experiments. On one occasion at the Academy of Music, in 1855, he took daguerreotypes of all the persons in the boxes by an arc light and exhibited an induction coil with a 6-inch spark, a marvelous achievement in those days.

Dr. Doremus was the first toxicological expert called in New York in a murder trial. For many years he was a well-known expert in litigation involving expert testimony. He was a member of the Medical Advisory Commission of the city, helped to found the municipal Department of Health and Bureau of Chemistry. He introduced the disinfection of ships by the use of chlorine, and thus did away with the necessity for prolonged detentions at quarantine.

Scientific Circus Attractions.

At the annual opening of the Barnum & Bailey circus for this season on March 22, in this city, in addition to the feat of Mlle. de Thiers traveling through the air gap in her inverted automobile (a novel feature last year), was the introduction of a new attraction styled "The Limit" or in Paris called "The Whirlwind of Death," both of which were illustrated and described in the SCIENTIFIC AMERICAN of October 14, 1905. For carrying out this new feat an inclined plane about 40 feet long and 4 feet wide is used. This has a starting platform at the top, and at the bottom a reverse incline for guiding the vehicle upward. Under this is a combination of springs and

levers so arranged that when the miniature automobile travels down the incline at high speed a rear shaft on it impinges against two projecting release levers above the short upward incline, thereby releasing a large spring-operated lever lying nearly level with this incline. The lever gives a sufficient impulse upward to the rear of the vehicle to cause the latter to rotate one revolution in the direction of its length while passing through an air space of approximately 25 feet. The machine is timed to land in its normal position upon a thickly-padded, guarded platform, where it gradually stops. Of course the young woman who risked her life was strapped firmly to the vehicle. The act was very successfully carried out and showed skill in securing the right degree of momentum and the correct operation of the mechanism. Were it not for the special apparatus at the bottom, the vehicle would fly off into air space in its normal position and land on the platform beyond. The act occupied about four seconds.

Another new feature was the operation of a gasoline automobile runabout by acrobatic experts much on the plan of bicycle trick riders.

A Dash for the Pole in an Airship.

Mr. Walter Wellman, that notable explorer and journalist who has twice gone to the Arctic regions in attempts to reach the North Pole, expects to start from Spitzbergen the first of August on a third expedition, which will travel through the air in the largest dirigible balloon ever built. The envelope of the balloon is being constructed by Louis Goddard, of Paris. It is to consist of two layers of rubber-covered cotton and one layer—the inside one—of rubber-covered silk. In its central zone, which is the strongest, the envelope is to have a tensile strength of 2,800 kilogrammes per square meter (about 575 pounds per square foot) thus giving a factor of safety of 6 to 1. The average factor of safety is 5 to 1, as against 3½ to 1 of the Lebaudy airship. The form of the balloon is to be maintained by an interior ballonet filled with compressed air by means of a 5-horse-power motor and compressor. On account of the triple rubber layers (which are lapped one inch at the seams and sewed together, and the stitching then covered with cemented strips) the leakage of gas is guaranteed not to exceed 1½ per cent per day. The amount of fuel and supplies consumed daily will more than counterbalance this. The length of the gas bag will be 50 meters (164.04 feet); its greatest diameter, 16 meters (52.49 feet); its surface, 1,960 square meters (21,098 square feet); its capacity, 6,350 cubic meters (224,244 cubic feet); and its lifting power (with gas having a lifting power of 1,130 grammes per cubic meter) 7,240 kilogrammes, or 16,000 pounds. The weight of the balloon is 2,860 pounds, while the framework, steel car, motors, and all other paraphernalia bring this up to a total of 7,500 pounds. This leaves an available lifting power of 8,500 pounds for the crew of 5 men, three or four motor sledges, a metallic boat, and all supplies.

The airship is to have two 4-cylinder water-cooled gasoline motors of 55 and 25 horse-power. The larger motor drives a forward propeller through reduction gearing, and the smaller one a propeller at the rear in the same manner. A speed of 15 miles an hour will be obtainable with the 50-horse-power motor, and 19 miles an hour with both. The total distance to be covered is about 1,200 miles, while the 5,500 pounds of gasoline to be carried should drive the airship nearly twice this distance. This fuel is sufficient for a 140-hour run of the main motor.

Should one motor break down beyond repair, the travelers can use the other one; and if the airship gives out from any cause, the travelers can take to the sledges. A wireless telegraph outfit is to be taken along, so that communication can be maintained with the base as long as possible.

At a meeting of the New York Motor Club on March 23, Mr. Wellman explained fully his plans for the trip, and showed how he has tried to provide for every contingency. The airship is to be transported to Spitzbergen, inflated there, and experimented with during the month of July. If everything works satisfactorily the dash will be made in August and provisions will be carried sufficient for 75 days. Everything has been so carefully planned by Mr. Wellman, who has an intimate knowledge of what is required, that the expedition through the air, if not altogether successful, bids fair to be by no means a dismal failure.

A New Comet.

A cable message dated March 19 has been received at Harvard Observatory from Prof. Kreutz at Kiel, stating that a comet was discovered by Ross at Melbourne, 1906, March 17, at 914, G. M. T., in R. A. 2h. 3m. 52s., and dec. —7 deg. 41 min. Daily motion in R. A., +3m. 36s.; daily motion in dec. +1 deg. 10 min. The physical appearance of the comet is as follows, viz.: Circular, 3 min. in diameter, magn. 8, some central condensation.

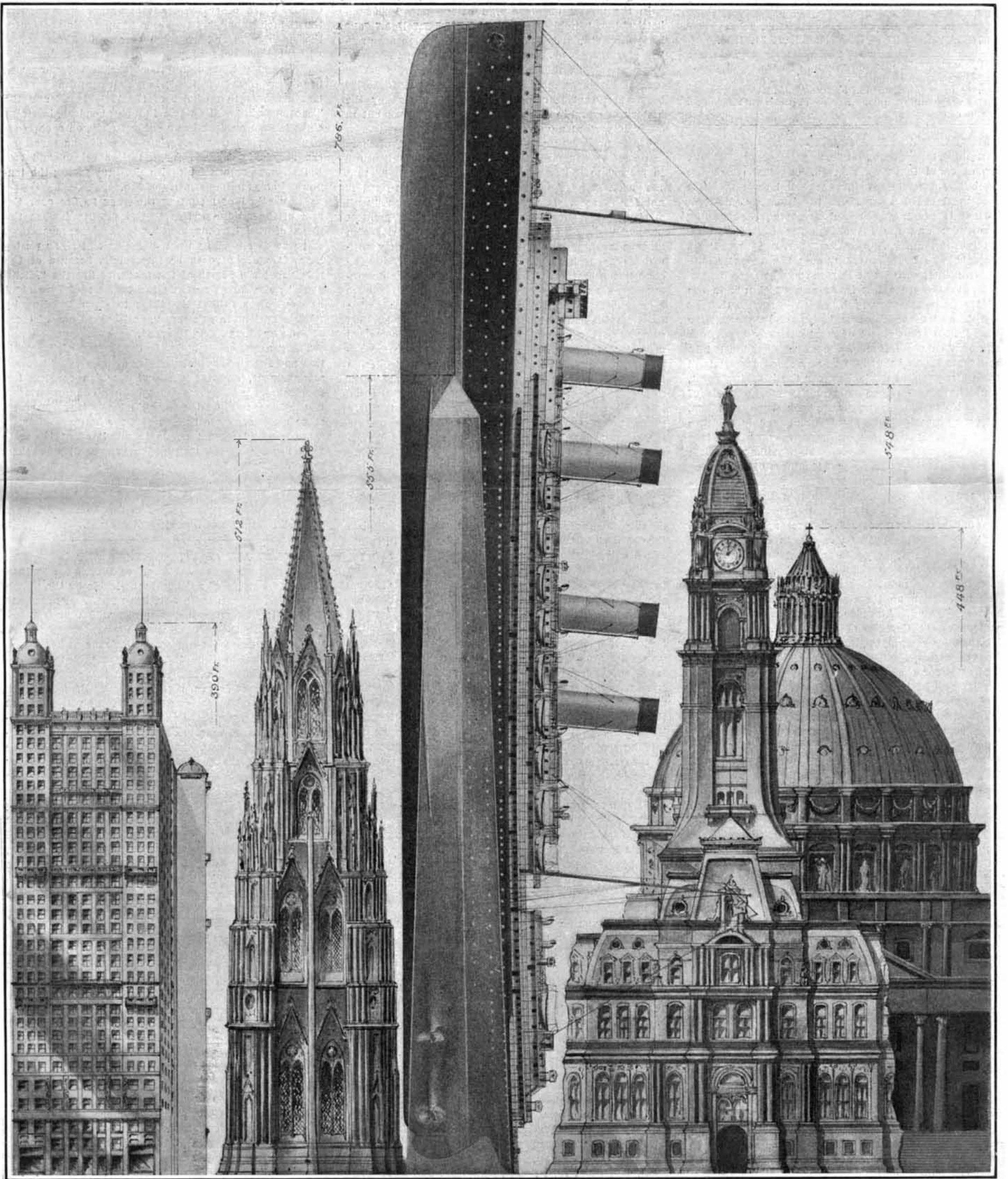
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Park Row Building, New York.

One of the Spires of Cologne Cathedral. Washington Monument.

City Hall, Philadelphia.

St. Peter's, Rome.

NEW CUNARD 25-KNOT LINERS COMPARED WITH THE TALLEST BUILDINGS OF THE WORLD.—[See page 270.]