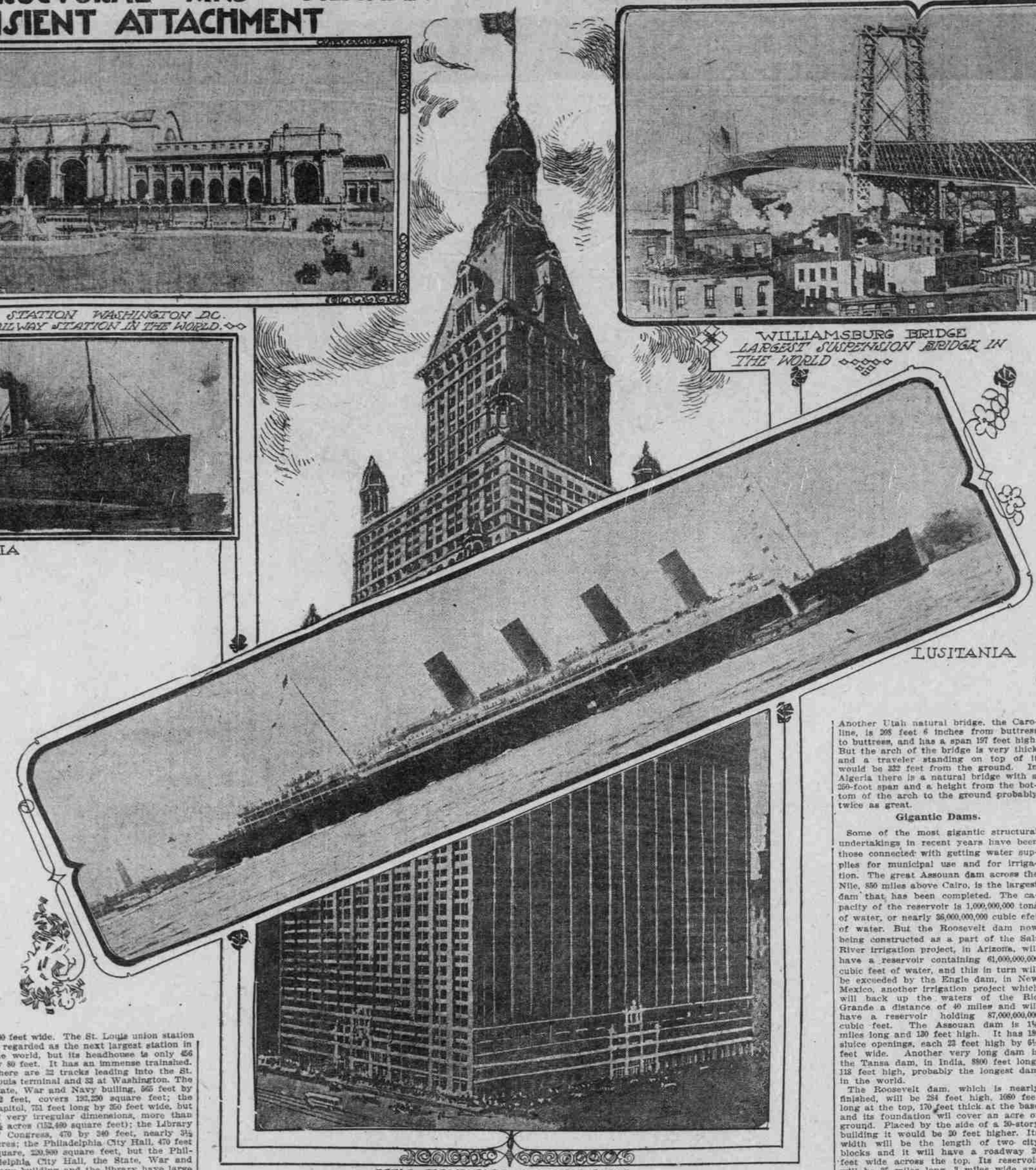
"THE BIGGEST IN THE WORLD, PRO TEM"

GREAT STRUCTURAL AND MECHANICAL ACHIEVEMENTS FOR WHICH THE SUPERLATIVE HAS TRANSIENT ATTACHMENT

NEW UNION STATION WASHINGTON DC. LARGEST RAILWAY STATION IN THE WORLD.

MAURETANIA

WILLIAMSBURG BRIDGE LARGEST SUSPENSION BRIDGE IN THE WORLD



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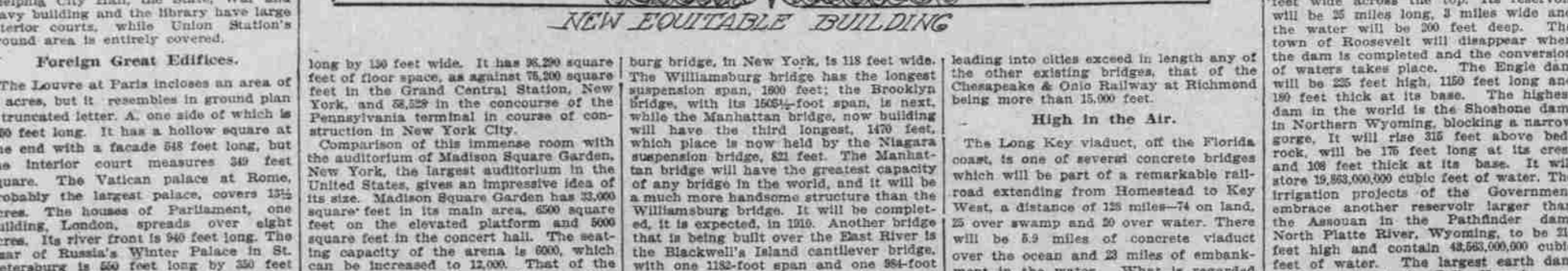

NEW EQUITABLE BUILDING

BY W. R. HAMILTON.

"THE biggest in the world, pro tem," is a descriptive phrase applied to structural and mechanical achievements that is becoming popular, and is an index to the spirit of the times. Often the distinction that it conveys is held but for a brief time, a few weeks or months. Then the fickle superlative passes to some new wonder. A list of the most stupendous buildings and other products of architectural and mechanical genius, to be comprehensive and accurate, must be revised almost every day. A tall building holds the record for a short time, then one reaching a little nearer the clouds is built, and a still taller one projected. A dam containing a billion tons of water elicits amazement for a few years in an era when marvels are commonplace, but it is to be surpassed by two reservoirs much larger. One ocean liner is the leviathan of the seas today, others that will displace it in pre-eminence are being built. The fickleness of the superlative has been bewildering in the first few years of the twentieth century, and it applies to a miscellaneous assortment of marvels, such as bridges, clocks, railroad stations, telescopes and tunnels.

New York City is the most generous contributor to the bigness of big things, but honors are well distributed. Washington has, among other things, the biggest railroad station and the biggest printing office, and it has had for years the biggest monument. Philadelphia has the biggest city hall. Jersey City, N. J., has the biggest clock. Cambridge, Mass., the biggest telescope, and Baltimore claims the biggest pumps. The fickleness of the superlative extends even to natural wonders, due to the diligence of explorers, a familiar instance being the discovery of Victoria Falls, much greater than Niagara, and in recent years, of natural bridges in Utah much larger than the one in Virginia.

Record-Breaking Office Buildings.

Manhattan Island, hemmed in so that its growth naturally takes a skyward direction, making its streets resemble canyons, has for years had the tallest building, excepting the tower of the Philadelphia City Hall, but one succeeded another in holding the distinction with startling rapidity, until even the Philadelphia tower was exceeded in height. At present the 46-story Metropolitan building holds first place, with a tower rising 700 feet from the curb line. Soon it may be the 62-story Equitable building, 909 feet in height. Recently it was the Singer building, having 47 stories above ground, and rising 612 feet from the sidewalk to the base of the flagstaff. But the tallest building is not the largest building. The largest office building in the world is now the 32-story Hudson Terminal building in New York, embracing two twin skyscrapers, connected by an arcade, rising above a large underground station. The two structures are in every respect similar and are practically a unit. This building takes up 18,-150,000 cubic feet of space, of which 14,500,000 are above ground. The claim is made that it exceeds in bulk any building in the world. It has 25 acres of floor space, 20 of which are rentable, compared with 12 acres of rentable space in the City Investing building, the next largest office building, 9½ acres in the Singer building, and 15 acres of floor space in Philadelphia's massive City Hall. A more striking comparison is afforded, however, by the number of offices—4000. The State, War and Navy Departments at Washington was formerly the largest office building in the world, and it has but 500 offices. Two large clubs have suites of rooms in the Hudson Terminal building and the directory system is most elaborate. There are office directories on each floor, supplemented by information desks in each main hall. The building has a population of nearly 10,000.

National Public Buildings.

Washington, the Nation's capital, excels, however, in buildings that cover an extensive area of ground. The Union Station at Washington is not only the largest railway station in the world, but there are very few buildings that exceed it in the area of ground that it covers. Exclusive of its train shelter, which is not a building, but a series of umbrella sheds, the area taken up by Union Station is 235,000 square feet, more than five and three-eighths acres. The station building comprises a headhouse 620 feet long by 220 feet wide, ranging in height from 65 to 120 feet, and a passenger concourse of 760 feet long by 130 feet wide. The St. Louis union station is regarded as the next largest station in the world, but its headhouse is only 456 by 80 feet. It has an immense trainshed. There are 32 tracks leading into the St. Louis terminal and 33 at Washington. The State, War and Navy building, 565 feet by 342 feet, covers 192,230 square feet; the Capitol, 751 feet long by 350 feet wide, but of very irregular dimensions, more than 3½ acres (152,480 square feet); the Library of Congress, 470 by 340 feet, nearly 3½ acres; the Philadelphia City Hall, 470 feet square, 220,800 square feet, but the Philadelphia City Hall, the State, War and Navy building and the library have large interior courts, while Union Station's ground area is entirely covered.

Foreign Great Edifices.

The Louvre at Paris incloses an area of 48 acres, but it resembles in ground plan a truncated letter A, one side of which is 2260 feet long. It has a hollow square at one end with a facade 548 feet long, but the interior court measures 349 feet square. The Vatican palace at Rome, probably the largest palace, covers 13½ acres. The houses of Parliament, one building, London, spreads over eight acres. Its river front is 940 feet long. The Czar of Russia's Winter Palace in St. Petersburg is 550 feet long by 350 feet wide, covering 194,250 square feet. But this handsome house is not sufficient for the Czar, for the hermitage, another palace and art gallery, is near it, measuring 512 by 375 feet, while the Taurida Palace, which has a ballroom 320 by 70 feet, is another great structure. The Czar's palace at Tzarskoe Selo is reported by travelers to have a front from 800 to 1000 feet long, but its width is not given. The Escurial in Spain and the Alhambra are palaces embracing an extensive group of buildings. The principal facade of Versailles Palace is 400 yards long. The Windsor Castle enclosure embraces 12 acres. The Admiralty Building in St. Petersburg is a half mile long, with two wings 650 feet long, and forms three sides of a hollow rectangle, but it is not very wide. The British Museum is a mammoth structure, covering perhaps as much ground as the houses of Parliament. St. Peter's Cathedral at Rome, 613 feet by 446 feet, covers 273,398 feet of ground, more than six acres, and is the largest church edifice in the world. The Colonge Cathedral is 490 feet long and 231 feet wide, with a spire rising 511 feet high. The ground area of St. Paul's Cathedral in London, is 58,700 square feet, while that of the Hudson Terminal Building is 70,000 square feet. The largest church in America is St. Patrick's Cathedral, New York, which is 332 feet long and 174 feet wide. It has 330 foot spires.

Some factories are also among the world's largest buildings, the Baldwin Locomotive plant in Philadelphia, for instance, covers 16 acres in the heart of the city.

Where Audiences Assemble.

Washington's Union Station contains the largest room under a single roof in the world. It is the passenger concourse, the interior dimensions of which are 756 feet long by 130 feet wide. It has 98,280 square feet of floor space, as against 75,200 square feet in the Grand Central Station, New York, and 58,328 in the concourse of the Pennsylvania terminal in course of construction in New York City.

Comparison of this immense room with the auditorium of Madison Square Garden, New York, the largest auditorium in the United States, gives an impressive idea of its size. Madison Square Garden has 33,000 square feet in its main area, 6500 square feet on the elevated platform and 5000 square feet in the concert hall. The seating capacity of the arena is 6000, which can be increased to 12,000. That of the concert hall is 12,000. Other large auditoriums are the convention halls at Kansas City, Chicago and Denver, and it is said that the largest audience ever assembled at a theatrical performance was when Sarah Bernhardt played "Camille" in the convention hall at Kansas City.

New York has probably the largest hotel and the largest apartment house, but it would be reckless to specify the superlative here, on account of its transitory nature. New York also has the largest statue, the Statue of Liberty, and Washington has the largest monument, the stately shaft in memory of the Father of His Country, rising 550 feet near the banks of the Potomac. The Eiffel Tower at Paris is 984 feet high, but is not classified as a monument.

Colossal Bridges.

While New York does not have the longest bridge in the world, the highest bridge or the longest span, its bridges are regarded as the largest in general dimensions and capacity, and it has the bridge with the longest suspension span. From an engineering standpoint the length of span is the most notable achievement in bridge building, mere multiplication of arches and trestles, producing a bridge of great length, being of minor interest. The longest span in the world is found in the cantilever bridge over the Firth of Forth, which has two spans 1710 feet long. The cantilever bridge of the St. Lawrence River at Quebec was to have had a span 1900 feet long, but it collapsed in construction. The Firth of Forth bridge is 8296 feet long and is probably the heaviest and most expensive bridge in the world. It cost $16,000,000 and its building occupied several years. It is not a bridge of great capacity, taking into consideration its magnitude, as it narrows to a width of 27 feet in the center, whereas the Williamsburg bridge, in New York, is 118 feet wide. The Williamsburg bridge has the longest suspension span, 1600 feet; the Brooklyn bridge, with its 1595½-foot span, is next, while the Manhattan bridge, now building will have the third longest, 1470 feet, which place is now held by the Niagara suspension bridge, 821 feet. The Manhattan bridge will have the greatest capacity of any bridge in the world, and it will be a much more handsome structure than the Williamsburg bridge. It will be completed, it is expected, in 1910. Another bridge that is being built over the East River is the Blackwell's Island cantilever bridge, with one 1182-foot span and one 984-foot span. No bridge with a span that is now regarded as long was built before the Eads bridge was erected at St. Louis, in 1874. This has 520-foot spans. The Schuykill arch truss bridge at Philadelphia, built in 1812, has 345-foot spans, probably the longest when built. There is a cantilever bridge at Memphis with a span of 790½ feet.

The longest metallic arch spans are as follows: Niagara highway bridge, 840 feet; Viaur railway bridge in France, 721 feet; Bonn highway bridge in Germany, 614 feet; but if the Pennsylvania Railroad builds its projected bridge over the East River at Hell Gate it will have a metallic arch span of 1000 feet and be the heaviest bridge in the world. It will have a total length of 17,000 feet, or more than three miles. The stone arch bridge with the longest span is that over the Petrusse River at Luxemburg, 275½ feet, built in 1903. The next longest stone arch span is Cabin John bridge, near Washington, 232 feet. It is said that the span of the stone arch bridge at Trezzo, Italy, destroyed in 1416, was 251 feet long. The bridge at Poughkeepsie, over the Hudson River, it is said, has the longest truss span, not arch, 790 feet. A similar span at Thebes, Ill., is 671 feet long.

Some very long bridges are as follows: Over River Tay, at Dundee, 10,612 feet; over Ohio, at Cairo, Ill., 10,560 feet; Long Key viaduct, being built as part of the Florida & East Coast Railway, 10,500 feet; Victoria bridge, Montreal, 9144 feet; Firth of Forth bridge, 8296 feet; Blackwell's Island (under construction), 7636 feet; Brooklyn bridge, with extensions, 7580 feet; Williamsburg bridge, 7205 feet; Poughkeepsie bridge, 6767 feet; Manhattan bridge (under construction), 6500 feet, and Long Bridge, at Washington, 4677 feet. But the Norfolk & Southern Railway is building a bridge across the Albemarle Sound eight miles long, and some viaducts leading into cities exceed in length any of the other existing bridges, that of the Chesapeake & Ohio Railway at Richmond being more than 15,000 feet.

High in the Air.

The Long Key viaduct, off the Florida coast, is one of several concrete bridges which will be part of a remarkable railroad extending from Homestead to Key West, a distance of 128 miles—74 on land, 25 over swamp and 20 over water. There will be 5.9 miles of concrete viaduct over the ocean and 23 miles of embankment in the water. What is regarded as the largest concrete bridge in the world at the present time is the Connecticut-avenue bridge, at Washington, a quarter of a mile long.

The highest bridge in the world is probably the Nooeschlact highway bridge at St. Giustina, Tyrol, which has a 197-foot span that is 453 feet high. The bridge over the gorge of the Zambesi River below Victoria Falls, in Africa, which forms part of the Cape to Cairo Railroad, has a single span of 600 feet which is 420 feet above the rapids. The first train crossed this bridge in 1905. The Garabit bridge over the Truyere River, France, has a 541-foot span, 401 feet above the gorge; the Kaiser Wilhelm bridge spans the Valley of Wupper, near Mungsten, Germany, at a height of 350 feet, and the bridge over the River Loa, in the Upper Andes, is 336 feet above the waters. Niagara suspension bridge is 425 feet above water. Some high bridges which are moderately long are the Gotkeik viaduct, Burma, India, 335 feet high, 2260 feet long; Pecos River viaduct, 321 feet high, 2180 feet long; Kinzua viaduct, on the Erie Railday, in McKean County, Pennsylvania, 301 feet high and 2063 feet long.

For many years the Natural Bridge in Virginia was regarded as the largest of its kind, but in 1895 three natural bridges were discovered in Utah, the longest of which is more than twice as high and has a span three times as great as the one in Virginia. It is named the Augusta bridge and is a solid arch of sandstone 60 feet thick and 40 feet wide, with a clear span of 327.7 feet from wall to wall, and the bottom of the arch is 357 feet above the ground. It would overspan the Capitol dome at Washington, or if located among California's redwoods it would overspan the tallest of them. Another Utah natural bridge, the Caroline, is 205 feet 6 inches from buttress to buttress, and has a span 197 feet high. But the arch of the bridge is very thick and a traveler standing on top of it would be 322 feet from the ground. In Algeria there is a natural bridge with a 250-foot span and a height from the bottom of the arch to the ground probably twice as great.

Gigantic Dams.

Some of the most gigantic structural undertakings in recent years have been those connected with getting water supplies for municipal use and for irrigation. The great Assouan dam across the Nile, 850 miles above Cairo, is the largest dam that has been completed. The capacity of the reservoir is 1,000,000,000 tons of water, or nearly 36,000,000,000 cubic efet of water. But the Roosevelt dam now being constructed as a part of the Salt River irrigation project, in Arizona, will have a reservoir containing 61,000,000,000 cubic feet of water, and this in turn will be exceeded by the Engle dam, in New Mexico, another irrigation project which will back up the waters of the Rio Grande a distance of 40 miles and will have a reservoir holding 87,000,000,000 cubic feet. The Assouan dam is 1¾ miles long and 130 feet high. It has 180 sluice openings, each 23 feet high by 6½ feet wide. Another very long dam is the Tansa dam, in India, 8800 feet long, 118 feet high, probably the longest dam in the world.

The Roosevelt dam, which is nearly finished, will be 284 feet high, 1080 feet long at the top, 170 feet thick at the base and its foundation will cover an acre of ground. Placed by the side of a 20-story building it would be 20 feet higher. Its width will be the length of two city blocks and it will have a roadway 20 feet wide across the top. Its reservoir will be 25 miles long, 3 miles wide and the water will be 200 feet deep. The town of Roosevelt will disappear when the dam is completed and the conversion of waters takes place. The Engle dam will be 225 feet high, 1150 feet long and 180 feet thick at its base. The highest dam in the world is the Shoshone dam, in Northern Wyoming, blocking a narrow gorge. It will rise 315 feet above bedrock, will be 175 feet long at its crest and 108 feet thick at its base. It will store 19,863,000,000 cubic feet of water. The irrigation projects of the Government embrace another reservoir larger than the Assouan in the Pathfinder dam, North Platte River, Wyoming, to be 210 feet high and contain 43,563,000,000 cubic feet of water. The largest earth dam in the world is the Belle Fourche embankment, in South Dakota, 115 feet high and more than a mile long, forming a reservoir with a storage capacity of nearly 9,000,000 cubic feet of water. The highest earth dam is probably that at Druid Lake, Baltimore, 119 feet. The new Croton dam, New York, is 291 feet high, 2240 feet long, 18 feet thick at top and 200 feet thick at bottom. It has a storage capacity of 32,000,000,000 gallons of water and increases the storage capacity of the entire New York water system to 75,000,000,000 gallons. The Wachusetts dam, at Clinton, Mass., from which Boston derives its water supply, has a storage capacity of 62,000,000,000 gallons.

The longest railroad tunnel is the New York subway—21 miles. The twin Simplon tunnels through the Alps are 12 miles long, the St. Gothard tunnel 9 1-4 miles long, the Mont Cenis tunnel 7 3-5 miles long, and the Hoosac tunnel is 4 3-4 miles long. The tunnel systems radiating from Manhattan Island, when completed, will embrace 24 separate tubes.

The Biggest Steamships.

The growth of transatlantic travel has been accompanied by wonderful increases in the size of ocean liners, and the records for size are broken almost as frequently as the records for speed. At the present time the Lusitania and Mauretania, of the Cunard Line, each 790 feet long, are the biggest steamships afloat—each about twice as large as the biggest battleship. But the White Star Line will build a ship 840 feet long, and the Hamburg-American Line is having a ship built at Belfast which is to be 804 feet long. Before the Lusitania began her voyages the Adriatic, of the White Star Line, 725 feet long, was the largest ship afloat.

Great Britain is building the St. Vincent, a battleship with 19,250 tons displacement, 1,250 more than the Dreadnaught; and several other nations, including the United States, have slightly larger battleships under way. The United States will have 20,000-ton ships in the North Dakota and Delaware. The South Carolina, launched July 11, is 16,000 tons.

Big telescopes are two kinds—reflectors and refractors. The mirror of the first is generally much larger than the lens of the second. Harvard University recently installed the largest reflecting telescope in service, with a five-foot reflector. Lord Rosse, in 1842, set up a reflecting telescope with a six-foot reflector in his park at Parsontown, Ireland, but it has been abandoned as an astronomical instrument. It is said that an even larger reflecting telescope than Lord Rosse's or the Harvard instrument will be placed at the Mount Wilson Observatory, California. It will have a disk 100 inches in diameter.

The most famous telescopes are the refractors. The largest is one that was built for the Paris Exposition, with a refractor 49 inches in diameter. This is not equatorially mounted, its 197-foot tube occupying a horizontal position. The largest refractor telescope equatorially mounted is the Yerkes, belonging to the University of Chicago, and located at Williams Bay Lake, Michigan. It has a 40-inch lens. Lick Observatory has a 36-inch refractor and a 36-inch reflector. Other notable refractors are Naval Observatory, Washington, 26 inches; Lowell, 26 inches; Princeton, 24 inches; University of Pennsylvania, 20 inches, and Northwestern University, 20 inches.

Several months ago a clock 38 feet in diameter was erected on the top of a soap factory in Jersey City, its diameter being 13 feet greater than that of the City Hall clock, Philadelphia, and longer than the largest dial in the world, 25 feet in diameter. "Big Ben," the Westminster clock in London, in the tower of the houses of Parliament, is 22 1-2 feet. The minute hand of the Jersey City clock is 20 feet long and weighs nearly a third of a ton. It travels more than a half a mile each day. The clock is a part of an enormous sign across the top of the eight-story building. The dial is made of six-inch pine boards, spaced three inches apart. The hour marks are not numerals, but merely heavy black, tapering strokes 5 feet 6 inches long and 30 inches wide at the outer end. At night the hour marks and hands are outlined by incandescent lights. Norfolk, Va., has a clock that has a dial 25 1-2 feet in diameter. The Metropolitan Life Tower, in New York, will have a clock with a dial 25 feet 6 inches in diameter, with figures 4 feet long and hands 12 feet long.

Gigantic Other Things.

Paris continues to have the largest library in the world so far as the number of books is concerned. It is the Bibliotheque Nationale, with 2,600,000 volumes. The British Museum library is second, 2,000,-000 volumes. The Library of Congress at Washington recently moved from fifth place to third. According to the last annual report of the librarian it contained nearly 1,500,000 books and pamphlets, besides 900,000 other articles.

The Government Printing Office, the largest establishment of its kind in the world, has 400,000 square feet of floor space and occupies a building 408 feet long, 175 feet three inches wide and 125 feet high.

No modern artists, except those who have produced the mammoth cyclorama canvases, have painted larger paintings than the "Last Judgment." Michael Angelo's great work in the Sistine Chapel at Rome. This is 18 meters long and 16 meters high and contains 100 life-size figures. It is a fresco.

The ceiling canvas, by F. D. Millet, a Washington artist, in the Baltimore Custom House, is notable for its size, as well as its beauty. It is 63 feet long and 30 feet wide and was placed in the Custom House this year. It represents 10 sailing vessels bound home in a fog. Hans Makart's "Diana's Hunting Party," in the Metropolitan Museum of Arts, New York, is 31 by 14 feet. One of the largest portraits ever painted was that of Bryan, displayed at the Denver convention, an oil painting, 13 feet six inches high and seven feet wide. Denver also claims to have had during convention time the largest bar and the largest flag, one 135 by 55 feet, but the largest correctly proportioned American flag is one 60 by 30 feet, which is suspended in the court of the Postoffice Department building at Washington.

Baltimore's big pumps are connected with its new sewerage system and each weighs about 1,200,000 pounds. Each is designed to pump 27,500,000 gallons of sewage in 24 hours. The largest stone crusher was built recently for a Tennessee cement mill. It is 18 feet 11 inches high and its hopper is 20 feet in diameter. It weighs 425,000 pounds. The redwoods of California are more than 300 feet tall, but there is a big tree at Tule, in Mexico, which measures 154 feet two inches in circumference six feet above the ground. The largest snake ever brought to the United States was a 33-foot three-inch python, which arrived in New York in July, destined for the Bronx Park. It is said that a Milwaukee farmer wears a hat of 8¾ size, which he has to have made to order, but a much larger hat was a "Merry Widow," worn by an Elk in the Dallas parade. It was "five feet across." The largest postal card was sent from Baltimore to the largest candidate ever nominated for the Presidency immediately after his nomination. It is 42 inches long and 18 inches wide and the excellent likeness of Taft, which it bears, is one of the largest photographs ever taken.—(Copyright, 1908, by W. R. Hamilton.)

There were 3,962,800 cords of wood used in the United States in the manufacture of paper pulp last year, just twice as much as was used in 1899. More than 2,500,000 tons of pulp were produced. The pulp mills used 500,000 more cords of wood in 1907 than in the previous year.