THE GREAT ST. PANCRAS RAILWAY STATION.

This week we give an engraving of the interior of the new St. Pancras Station, Midland Railway, London. Occupying, as it does, a site of nearly ten acres, it is undoubtedly, if not from an architectural, at least from an engineering point of view, the finest terminus in the world. Its most interesting and peculiar feature is the roof. While it has the widest span of any roof in existence, the space beneath is unbroken by ties or braces, common to all others. Its style is subdued Gothic, with segments meeting at its crown. As shown in the engraving, the roof springs from the platform level, the principal ribs each having the form of a four-centered arch, the radii of the curves being 57 feet and 160 feet, respectively. The two central curves—those of 160 feet radius—meet at an angle in the center at a hight of 96 feet above the platform level. The length of the roof is 690 feet with a clear span of 240 feet, covering five platforms, ten lines of rails, and a cab stand 25 feet wide, thus making a total area of 165,600 square feet. Its hight at the ridge is 125 feet above the level of the road. There are twenty-five principal ribs in the roof, each weighing about 50 tuns. Between each of these, which are about 29 feet 4 inches apart from center to center, are three intermediate ribs, carried by trussed purlins, constructed so as to stiffen the bottom flanges of the main ribs laterally. The station walls rise behind the spring of the principal, the space at the top being filled in with open iron-work.

The roof is glazed about 70 feet on each side of the center, and the remainder is covered with slates on boarding one inch and three eighths thick, grooved and tongued and chambered, the underside being varnished. The slates are best Welsh, and securely fastened to the boarding with copper nails weighing about 7 lbs. per 1,000. The lap is not less than 3 inches. The timber work throughout is well protected by varnishing, painting, or Burnettizing, according to the situation in which it is fixed.

The transverse girders which support the floor of the station take the thrust of the roof. They are connected so as to form continuous girders across the station. Besides being tied to them, the feet of the ribs are each secured by four 3-inch bolts to an anchor-plate built into the wall and strongly fastened.

The rail level of the station is about 17½ feet above that of the adjoining streets, thus affording very extensive cellarage. The hight of the basement story is 13 feet 6 inches, and under this basement the connection of the Midland line is carried to that of the Metropolitan system. To enable vehicles to reach the station level from the street, inclined approach roadways have been constructed on arches. Each side of the station is flanked by a row of picturesque shops and other buildings. The platforms have edges of dressed stone, and are floored with red deal planks, dressed, close-jointed, and tongued with hoop iron. The decorations include a tesselated frieze about two feet deep, inlaid with colored tiles, and a dado round the base to the foot of the principals. The molding above the frieze is surmounted by an iron cresting of floral design, the leaves to curve inward from the cornice. The lighting arrangements of the station are very effective. They were intrusted to the Messrs. Sim and Barff, of Parliament street, London, and to their patent hydrocarbon process is to be attributed the brilliant light obtained, while a saving of sixty per cent is said to be effected.

In the construction of the station about sixty millions of bricks, 80,000 cubic feet of dressed stone, and many thousand feet of glass and timber have been used. Over 9,000 tuns of ironwork have been employed, the weight of some of the principal portions of which are given as follows:

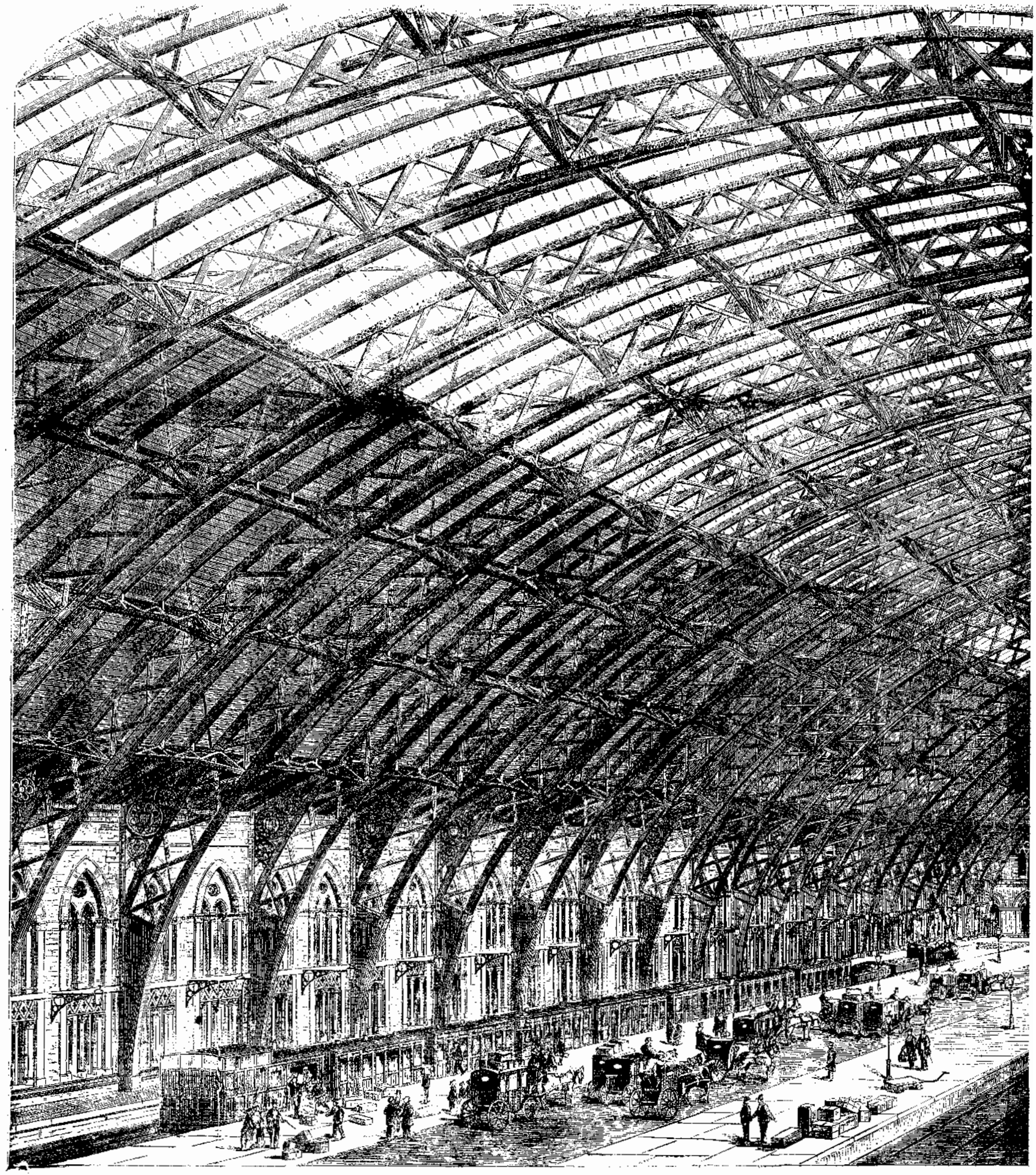
	Tuns.
Main-floor girders	500
Intermediate	390
Cross-girders of floor	1,020
Buckled plates	820
Main roof, ribs, and spandrel framing	1,270
Intermediate ribs	320
Purlins and connections between ribs	230
Cast-iron columns and caps below flooring	1,080

The traveling stage and hoisting gear, by means of which the ribs and roofing were erected, were very ingeniously designed by J. C. N. Alleyne, of the Butterley Iron-works. The principle on which he acted was never to lose hold of the main rib until the wind ties were finally fixed to the walls. The staging was divided into three sections, the center consisting of six divisions, the side ones of five divisions each, and from front to rear there were four divisions. The standards consisted of die-square backs of timber, 12 inches square; the horizontal traverse pieces were double 12 inches by 6 inches each, except the lower one, which was 12 inches square, with iron shoes bolted down to receive the feet of the standards and braces. These were connected by cross braces, and the whole was moved, either together or separately, on 123 wheels, each 2 feet 8 inches in diameter, turning on a balk of timber 18 inches square. A large hotel is being constructed at the end of the station.

THE ORIGIN OF CANDLES.

The tallow candle is the offspring of the tallow torch used in the twelfth century. When tallow candles were first introduced their cost was so great that only the most wealthy could afford the luxury, and it was not till the fifteenth century that they were sufficiently cheapened to come into general use.

Think of a tallow candle—that dripping, guttering, greasy thing, being considered a luxury. But the tallow candle, now used only where more convenient and economical lighting materials cannot be obtained, is, as we now know it, no more to be compared to the candle of the twelfth century, than the best illuminating gas to lard oil. Its wick was of tow, hard to light, and burning so rapidly as to melt a large portion of the tallow into rivers of oil, so that the drip of four candles would buy a new one.



INTERIOR OF THE FINEST

What would the quaint old revelers of that period have thought if, in the midst of one of their drinking bouts, their tallow dips with tow wicks could have been suddenly eclipsed in the splendor of the oxy-hydrogen light of to-day. Verily, both the physical and mental darkness of that age has given way to the light of a brighter and nobler period.

Can it be that in centuries to come, the luxuries of the present will be regarded as contemptuously as we now regard the obsolete appliances of the middle ages?

LIFE-SAVING GUNS.

We find in the *Army and Navy Journal* an interesting article on "Life-saving Guns," a title that might at first seem paradoxical, as guns have been and still are employed chiefly for the destruction of life. The inventions noticed in the article are all of foreign origin. The first one mentioned is that of M. August Deloigne, of Paris. "This gun is a bronze casting, about one foot long 1 1-6 inches bore, and weighing about 66 pounds, without trunnions or carriage. Screwed into the breech is a tail-piece of iron, nine or ten inches long, which, when the piece is to be fired, is thrust into the soil at an angle of about 30 degrees. For long ranges, when firing to windward, arrows of iron are used as projectiles, and for short ranges, or for long ranges when firing to leeward, wooden arrows, which are to be preferred, as they will float. The lower or inner end of these arrows nearly fills the bore and is covered by metal which expands into a collar or rim, considerably larger than the bore, and coming nearly down to the muzzle when in place, so as to receive the full force of the explosion. Projecting out a foot, more or less from the collar, is the main body of the arrow or 'fléche,' consisting of a round or eight-sided stick of ash, about double the diameter of the bore of the gun. To this is attached the line.

"In the 'Manby mortar,' the use of which has given way to the Boxer accelerating rocket, the weight of the shot is about 1-5th that of the mortar itself, which weighs about 150 or 160 pounds. In the 'Porte Amerres,' lately got up by Deloigne, the wooden arrows are twenty to thirty meters in length, and weigh ten to twenty times as much as round projectiles, although suited to the same bore. The bore is longer in proportion to its diameter, than that of a mortar, it is actually shorter than the bore of a mortar of the same weight. The result of this is, that for the weight and caliber of the new piece, the metal is very thick, and is capable of great resistance, and therefore admits of heavy projectiles with proportionate charges. The power of resistance is greatly augmented by the peculiar mode of charging, and of firing the charge. An empty space is left behind the cartridge, varying according to the weight of the projectile, and the fire is introduced into the forward end of the cartridge.

"In 1865, Mons. Deloigne made some experiments, under the authority of the French Minister of Marine. The guns used were common 30-pound navy guns, six in number, and as nearly alike as possible. Two were charged as usual, with 7 1-2 kilos. of powder, and an elongated projectile weighing 45 kilos., an excessive charge; one of them burst at the eleventh, and the other at the twelfth fire. Two of the pieces had a space equal to 16 centimeters behind the cartridge of 7 1-2 kilos. and the shot of 45 kilos.; one of them stood 167, and the other 178 fires. The two others had a space of 20 centimeters behind the same charge; one burst at the 108th, and the other at the 162d fire, showing a great gain in firing heavy projectiles by Deloigne's process.

"The present swivels in actual use in the French 'Societe de Sauvetege,' are loaned from the public arsenals, and are not the best arms for throwing lines. They weigh about 80 kilos., and when in use as naval guns, they throw a small round ball, about one pound caliber, weighing about 500 grammes, with 130 grammes of powder. This arm when loaded by Deloigne's system, carries an iron arrow, 1 1-2 meters in length, weighing 5 kilos., with a charge of 140 grammes. No accident from bursting has ever occurred. The new gun, from its extreme simplicity, and cheapness of manufacture, being nothing but a block of gun-metal with a hole through it, with a 'monkey tail' screwed into it, is admirably adapted to the requirements of humane societies and life-saving benevolent associations. When it is to be used on the deck of a vessel, or on rocky ground, it is put upon a rough solid block of wood shaped like a quoin. This block may also be useful to use on very sandy soil, or anywhere where the heaviest charges are used. As the arrows project considerably from the gun, there is no difficulty in aiming sufficiently well to throw a line across a vessel in ordinary times.

"This system of communicating by throwing lines is not only available to establish communication with wrecks, but will be found very useful for tugs, wrecking vessels, revenue cutters, and vessels of war. The system is carried out extensively in France all along the coast, and at bathing places, and is not limited to any size of arm. The wooden arrow can be used from any gun, smooth-bore or rifle, down to a common carbine out of which Deloigne throws arrows as long as the gun itself, carrying a small line of about 100 yards. Mr. Forbes writes that he saw at Vincennes an arrow of the size of a handspike, thrown from a common 4-pound rifle field-gun, about 300 yards. Across the outer end of the arrow, when it started, were two tough iron straight bolts, 1-2 an inch to 5-8 in. diameter, and about a foot long. These bolts stand at right angles to the arrow; the shock at the start bends them to an angle of 45 degrees, and forms a grapnel.

"The 'coulant,' or 'becket,' consists of five or six turns of line round the arrow, just tight enough to allow the line which over rides these turns by a double loop, to pull it down to the butt of the arrow, and thus steady it on its mission of mercy."

WAY STATION IN THE WORLD.

ANY project of the people of Washington to raise $200,000 or $300,000, or any other sum, to hold an International Exhibition in that city, is very praiseworthy. But appealing to Congress for authority to raise half a million by taxation, for the same purpose, is quite another matter.