

mired his pictures, but he would give us no satisfaction as to how they were made, although we offered to pay him handsomely for his trouble. We were obliged to depart without information of any kind; in fact, he positively refused to do anything more than show his pictures. We departed much chagrined after traveling 160 miles for nothing. We had strong surmises that there was really nothing in the process, and time proved we were correct. In 1856 he published a book giving partly his life history and a few formulas and many long letters extolling him on his great discovery. His formulas are very curious and complicated, but those who have tried them never succeeded in taking a picture even with the greatest care and accuracy. Whenever a failure occurred he always made the excuse that "the chemicals were impure, or your manipulation was not careful enough." Several friends and myself tried his formulas, keeping to the very letter, but produced nothing.

Thus it will be seen that photographs in colors have been the great desiderata, and have occupied the mind of every sincere worker more or less. Yet it has ever escaped perfect realization, even by such men as Sir John Herschel, the first to photograph spectral colors, and his successor, Sir Robert Hunt. That it can be done is evident from Dr. Diamond's accidental color picture, but as yet the full secret has eluded the grasp of the most patient investigator. I do not doubt we are on the eve of some revelation respecting it, especially as much more study has been lately given to the properties of light, a subject so vast, yet still wherein there are startling discoveries every year. Professor Lippman has made a step in advance in the right direction, and as far as he has made known his formula it is more simple than any of those of his predecessors. It remains to be seen whether any progress can be made so as to apply it to the arts and sciences. Should he succeed in perfecting this branch, it would be one of the greatest discoveries of the age. There would be "millions in it," for it would revolutionize photography.

NICOLAS PIKE,

First President of the Brooklyn Photographic Society, 1864.

A NOTABLE NEW PULLMAN PASSENGER TRAIN.

The superiority of the accommodations generally provided by our railways for the American traveling public is frequently commented upon by European visitors. It is to be remembered, too, that the comparisons usually made on this score are with the first-class passenger service of foreign countries, neglecting entirely the third and fourth class passenger cars, which carry three-fourths of the passengers, as with us substantially all the travel is known as first class. In most foreign countries it is never possible to be oblivious of the numerous class distinctions among the people, and the corresponding variations in the service are very numerous.

Our front page illustration represents a notable new train of Pullman cars just put into service, and which has been styled by the railroad men the "ghost train," because it is composed throughout of cars which are exteriorly of a creamy white. The lettering and outside decoration is done in gold, and the cars present a striking contrast with the cars of all other trains on the road. This train leaves New York for Boston at 3 o'clock every afternoon, except Sunday, over the consolidated road of the New York and New Haven and New York and New England lines, arriving in Boston at 9 P. M. A similar train, made up exclusively of the same style of cars, leaves Boston at 3 o'clock every afternoon, arriving in New York at 9 P. M. As the distance between the two places, by the route traveled, is only 227 miles, it will be seen that no special effort is made to attain a high speed, the rate of travel being a little under thirty-eight miles an hour, including stoppages, but for its clock-like regularity and comfort the service leaves nothing to be desired.

These cars have paper wheels, which is said to contribute to their easy running, and are brilliantly lighted by gas at night, their platforms also having special burners. The gas supply is carried in cylinders nine feet long under each car. No bell cords are employed, but each car has a conductor's signal connecting with the engine, there being just over the door a short lever working in a pipe connecting with a rubber hose under the car supplied with compressed air, whereby a whistle may be blown in the engine cab. Near this lever is another lever by means of which the conductor or any passenger can open a valve to operate the air brakes for stopping the train. The cars are at present fitted with the Baker heaters.

Each train has a combination car, regular passenger coaches, and drawing room cars, there being thirteen in all of these specially built cars provided for the daily make-up of the two trains. The combination car has a small portion of its forward end adapted for a baggage room, the remainder being fitted up for a smoking room, with upholstered willow chairs, a rich carpet on the floor, and the windows fitted with white shades and draperies. The drawing room cars have each twenty revolving chairs and six reclining chairs,

and all modern conveniences to promote comfort in traveling are provided. The cars cost about \$8,500 each.

Electricity in Foreign Countries.

Experiments are now going on in Germany with electric currents of very high tension, which have a good deal of interest to architects, who are called upon, each day more and more, to plan and direct the introduction of electric appliances in their buildings. Every one will remember, says *The American Architect*, the somewhat acrimonious discussion of a year or two ago about the danger of alternating currents of electricity at one thousand volts pressure, and the proposition of a company in England to use a ten thousand volt current was looked upon as wildly reckless. Now, however, a line is in process of construction to carry a current of twenty-five thousand volts. The line is to be about a hundred miles long, and is to extend from the Falls of the Neckar, at Lauffen, to Frankfort-on-the-Main, along the railway route, through Heilbronn, Jaxtfeld and Hanau. It is to be used to convey a force of about three hundred horse power, obtained from the cataract by a turbine wheel, to the building of the electrical exhibition in Frankfort, and the object of using a current of such high tension is to reduce the cost of the wire, under the rule that the smaller the wire, the greater the resistance, and the higher must be the electrical pressure of the current to force its way through it. The current is obtained from a dynamo which delivers it at a pressure of one hundred volts, and is passed through a transformer, which changes it into one of much higher tension. On arriving at its destination, a second transformer changes the current back again into one of one hundred volts, suitable for actuating motors and for feeding incandescent lamps. In the experiments which have already been made, the two transformers were connected to dynamos, a wire about three miles long being stretched between them, passing in various directions about the territory connected with the station. On setting the dynamos in motion, a current of thirty-three thousand volts, as measured by a Thomson voltmeter, was developed, which was reduced without difficulty to one hundred volts by the second transformer. A trial was then made to determine how great would be the tendency of such a current to leave the wire, it having been asserted that a far more feeble current would jump several feet from a wire, to strike a man standing below. With this object, the wire was cut, and the two ends cut brought slowly together. Under a difference of tension of twenty-two thousand volts between the two pieces of wire, no spark forced its way across the intervening space until the ends had been brought within twenty-two millimeters of each other—less than an inch. Another experiment was tried, to see whether the ordinary safety cut-off could be used with so strong a current. A ball of lead was interposed in the circuit, and the effect of the fall of a loose wire, or of a tree, was imitated by dropping a piece of wire across the circuit. The short-circuiting thus caused was instantly felt by the lead ball, which melted, with a flash and small explosion, cutting off the current.

The New Circuit Court of Appeals.

The act to establish a Circuit Court of Appeals, which was approved by the President on March 3, provides for a Court of Appeals of three judges, in each judicial circuit, of which two are to constitute a quorum. The Chief Justice of the Supreme Court, the associate justice assigned to each circuit, and the district judges, are competent to sit in the respective circuits. Any judge before whom a case has been originally heard in the district or circuit court is prohibited from sitting at the hearing of the case on appeal. The term of the court commences the second Monday in January in the cities of Boston, New York, Philadelphia, Richmond, New Orleans, Cincinnati, Chicago, St. Louis, and San Francisco. Appeals from existing district or circuit courts to the Supreme Court may be taken in cases involving the construction of the Constitution, but in admiralty and patent cases the decision of the circuit court of appeals is final. The circuit courts may, however, certify to the Supreme Court "any question or proposition of law concerning which it desires the instruction of that court for its proper decision." In any of the classes of cases made final, which includes patent cases, "it shall be competent for the Supreme Court to require, by *certiorari* or otherwise, any such case to be certified to the Supreme Court for its review or determination."

Patentees of inventions, owners of patents, and inventors have, says the *Electrical Engineer*, abundant cause to congratulate themselves upon the passage of this much needed act. Heretofore, more especially during the past ten years, many of the decisions of the Supreme Court in patent cases have been, to say the least, far from satisfactory. Not only have appealed cases been compelled to wait many years for hearing and final determination, but the crowded state of the calendars has rendered it wholly impossible for the justices to bestow upon intricate and complicated questions anything like the amount of consideration neces-

sary to the proper disposition of them, and in fact many of the opinions themselves are quite sufficient to show that the technicalities of the case could have been but imperfectly understood. The assertion which has often been made, that in cases difficult of comprehension the decision of the Supreme Court has uniformly been adverse to the patent, does not appear to be altogether without reason. The establishment of the new court will not only insure a much more speedy determination of appealed cases, but a far more careful consideration of the points at issue than has heretofore been possible, and we feel well assured that interests of honest litigants, as well as of abstract justice, cannot but be greatly promoted. Such a result must necessarily have a most favorable effect upon the value of patent property, as well as upon the progress of invention and the development of the electrical arts.

Protection of Timber from the Teredo.

Naturally, where the damage possible to be inflicted by the teredo is so great, every art has from time to time been employed in attempts to counteract the effects. The old method of coppering the vessel's bottom has been long in vogue, and is, of course, successful. It was found impracticable, that is, too costly, to use this method of preserving piling and wharves. It was thought that the timber could be poisoned, and many rank poisons, such as arsenic, strychnine, corrosive sublimate, etc., were tried, but the teredo seemed to thrive as well upon timber so treated as in unprepared timber. Solutions of metals, such as zinc, copper, and iron, were also infused in the wood, but proved of no value for the purpose of defense against the mollusk. Some of the properties of coal tar have been found effective, but in the pure state are so soluble in water as to quickly wash out. It was found by experiment that, when combined with creosote oil—which is a colorless fluid of strong antiseptic qualities, distilled from wood—the properties of coal tar were practically insoluble in water, and that the oil remains in timber after years of submersion as strong as when first injected. This result seems to be the perfection of prevention, for creosoted piles and timber which have been exposed to the teredo for as many as forty years show no evidence of having at any time been attacked, and are as good as when first placed in the water.

It is impossible to say what there is in creosote oil which makes it destructive to animals of cold blood. It seems to those who have studied the matter that, aside from being obnoxious in itself, the creosote oil so changes the appearance and smell of the wood that the teredo fails to recognize it as such.—*N. W. Lumberman*.

The Tomb of St. Francis Xavier at Goa.

This tomb itself must be admired as a masterpiece of art. It surpasses all one's expectations, and it is doubtful whether another mausoleum in the whole of India, or even Asia, excepting the Taj Mahal, could be found to equal it. Its three stages are built of rich marble of variegated colors. The lowest is of red and purple jasper and Carrara alabaster, adorned with statuettes of cherubs. The middle stage is of green and yellow jasper, the principal decorations of which are four beautiful bronze plates representing incidents in the life of the saint. The highest stage is surrounded by a beautiful railing of red jasper marked with white spots. This railing is adorned with figures of angels, and its middle portion is graced with columns elegantly carved, and standing at equal intervals. The intervening spaces are surmounted with arches, and have several incidents in the life of the saint represented on them. The friezes of its four lateral columns are of black stone with white stripes, while the plinths are of yellow jasper. On the top of this stage lies the far-famed coffin, overlaid with silver, in which the remains of the saint are deposited. It is a gorgeous receptacle, divided on each side into seven panels containing some exquisite plates presenting in relief some of the more important incidents in the life of the saint.—*Indian Engineering*.

Building in America.

New York, Brooklyn, and Chicago put up a great many structures in 1890, and made alterations to many others. The three cities spent over \$158,000,000 in new buildings, and in New York and Brooklyn the cost of alterations amounted to \$9,000,000. Permits were given in New York for the erection of 3,537 buildings, at a total cost of \$74,900,812, and plans were approved for alterations in 2,417 buildings at a cost of \$7,188,250. In Brooklyn 2,577 permits were issued for the erection of 4,800 buildings to cost \$24,334,290, and for alterations in 1,275 buildings at a cost of \$1,633,290. In Chicago over 50½ miles of frontage of new buildings were erected and \$59,000,000 expended. This is the largest amount ever spent on new buildings in one year in that city, and it is expected that preparations for the fair will keep up the boom. New York and Brooklyn together spent nearly twice as much on new buildings as Chicago, but while the western city spent more than in 1889, New York spent \$5,000,000 less, and Brooklyn \$2,100,000 less.