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(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 386,

For the Week ending May 26, 1883.

Price 10 cents. For sale by all newsdealers

OPENING OF THE GREAT BRIDGE.

The time of our going to press slightly antedates the day of the opening of the great bridge connecting New York and Brooklyn; but our readers will be interested in knowing the intended order of proceedings.

The initial ceremonies have been appointed to take place in the Brooklyn station of the bridge on Sands Street, at 2 P. M., on Thursday, May 24, 1883.

The marshal of the day will be Major-General James Jourdan. The President of the United States and Cabinet, the Governor of the State of New York and staff, with others, will be escorted from the Fifth Avenue Hotel to the New York anchorage by the 7th Regiments, Colonel Emmons Clark commanding, and there received by the trustees and escorted to the Brooklyn anchorage, from which point the 23d Regiment, Colonel Rodney C. Ward commanding, will act as escort to the Brooklyn approach.

Seats will be reserved for the President and Cabinet, the Governor and staff, United States Senators, members of Congress, Governors of other States, members of the Legislature, the Common Councils of New York and Brooklyn, city and county officials of New York and Brooklyn, Army and Navy, the National Guard, the Press, especially invited guests, and the employes of the bridge.

At 2 o'clock the exercises will begin at the bridge station, Hon. James S. T. Stranahan presiding. The programme is as follows:

1. Music ..... 23d Regiment Band.
2. Prayer ..... Bishop Littlejohn.
3. Presentation address in behalf of the trustees, William C. Kingsley, vice-president.
4. Acceptance address in behalf of the City of Brooklyn, Seth Low, Mayor.
5. Acceptance address in behalf of the City of New York, Franklin Edson, Mayor.
6. Oration ..... Abram S. Hewitt.
7. Oration ..... Richard S. Storrs, D D.
8. Music ..... 7th Regiment Band.

In the evening a grand display of fireworks from the bridge takes place, and also a reception, at the Brooklyn Academy of Music, to President Arthur and Governor Cleveland.

But these exercises, however interesting to the comparatively few who can witness them, will be as nothing compared to the great popular pageant, the sight of the millions of the two cities increased by the multitudes of strangers who will march over the bridge on the opening day.

PLACING THE STATUE OF LIBERTY.

Attention is called to the description and illustrations, published on another page, of the method proposed by Mr. John C. Goodridge, Jr., C.E., of New York city, to erect the Bartholdi statue of "Liberty Enlightening the World," and to build the pedestal upon which it is to stand. There is a reason for speaking first of the "erection of the statue," for that, by Mr. Goodridge's plan, will precede the construction of the pedestal.

Although no comprehensive or detailed plan has been accepted and published for the work of building the pedestal and raising the statue, it is generally supposed that it is to be done in the usual way of constructing the masonry—by means of false work, or staging, extending not merely to the top of the pedestal, 150 feet, but also to the top of the statue, and beyond, another 150 feet or more. At the best, this will be a very costly job, requiring much time and money, probably more than the cost of the entire statue.

Mr. Goodridge, however, proposes to dispense with the staging, and he proposes also to remove the apprehensions of those who fear the weakening and overthrow of the statue from the effects of the wind in its very exposed situation. It is claimed—and with good show of reason—that the statue, being composed of plates of comparatively light weight, and yet presenting a large surface to the wind, will be unable to sustain itself on its proportionally narrow base, and will require some internal support to give it the required rigidity. This is considered in Mr. Goodridge's plan; and he also proposes to make the use of the statue a present possibility instead of a future probability. He would erect and equip the statue at once with the electric light; and hereafter carry up the pedestal, the statue being lifted and taken up with the pedestal. The plan is simple, economical, and apparently very practical. This latter—the practical—is a quality for which the works of this engineer have always been especially distinguished.

THE DRIVE WELL PATENT.

In a recent trial in the United States Circuit Court, Des Moines, Iowa, the judge decides that the original drive well patent of N. W. Green is null and void. This decision might be important if it were not contrary to a number of other previous decisions by eminent judges of the United States courts, by whom the patent has heretofore been upheld. The present case will now go on appeal to the Supreme Court of the United States.

The invention of the drive well was made in 1861, by Nelson W. Green, an officer in one of the New York regiments then serving in the war. There was a rumor that the enemy had poisoned the wells. To make sure of a pure supply of water for his own regiment and for the Union forces generally, wherever they might march, he conceived the idea of driving into the earth small tubes of iron, perforated at the bottom, and of attaching a pump to the upper end of the tube. He reasoned that, when the pump was worked and suction produced, the water would rise in the tube, and thus serviceable wells might be made anywhere, by a few minutes' work, at small cost. His invention was found to be completely successful, was immediately adopted in the army, and our troops seldom lacked for good water wherever it was practical to drive down Colonel Green's tubes. From the army the use of the invention quickly spread through this country, then to foreign countries; it was adopted by the British army; it is now an adjunct of the military equipments of all nations, and is in common use throughout the world.

The patent to Col. Green was not issued to him until 1868, owing to the inability of the inventor to attend to the business of taking the patent until after his relations with the army were finally closed. Such, in brief, is the history of the drive well patent. It is one of the most useful inventions of the day, and has conferred vast benefits upon the people of this country and the world in general.

When Col. Green received his patent, he became entitled to demand compensation for the use of his invention from that time onward for seventeen years, and he established a general tariff or patent fee of ten dollars for each well made in accordance with his discovery. Many thousands of the Green drive wells were put into use before his patent was granted; for such prior use he could make no claim; but for the continued use of these wells after the grant of the patent, he was entitled to demand payment.

There are regions of country where every farmer has from one to ten of the Green wells on his premises; where, in fact, people have them in their kitchens, cellars, yards, and fields; wherever they want water, they drive a tube and put on the pump.

These people knew nothing about the patent when they put in the wells; and the appearance of the patentee's agents, asking for ten dollars' payment on each tube, with threat of a law suit if the demand is refused, naturally excites surprise and indignation. They feel as if their rights as American citizens were being invaded. What business, they ask, has the Patent Office to grant a patent to prevent us from pumping water out of the ground? We have always been accustomed to stick a tube with its pump into our cisterns and cellars to draw water; and we claim a free right to stick the tube into the ground and get water wherever we can. For reasons such as these many have refused payment; but the courts have decided adversely in various test cases, and the legality of the patent has been fully sustained.

But the costs of the law suits, and the expenses of collecting the royalties have greatly diminished the patentee's receipts. The patent will expire by its own limitations on January 14, 1885. If the Supreme Court should decide adversely to the patent in the present case, the inventor and his associates will probably lose more money than they have received from the invention. If the court sustains the patent, they may possibly realize a profit, as they will be enabled hereafter to collect damages from all who made use of the patent during its lifetime.

USES OF PAPER.

Under the generic term of paper, other substances used in combination with paper pulp are comprehended in general descriptions and occasional notices. When some wonderful story is read of the substitution of paper for wood, stone, the metals, for mortar, and plaster, and concrete, and other compositions, the reader should not understand that it is the material defined by Webster as "a substance formed into thin sheets or leaves, made of pulp obtained from rags, straw, bark, or like materials, pressed and dried." Paper, for so many and so differing uses as are attributed to it, must have something besides a vegetable pulp in its composition. In fact, the term "paper" is a misnomer for products that derive all their special qualities from foreign materials, held together by the paper pulp acting as a matrix. Thus, asbestos, in filaments, or powder, may be mixed with paper pulp to form a convenient uninflammable and possibly an incombustible material, shaped while plastic to convenience for special uses. So, clays in almost impalpable dust may become a part of the paper pulp production, and be a substitute for other materials. Other mineral substances may be mixed with the pulp, and, in short, there appears to be scarcely any limit to the uses that may be made of paper pulp mixed with foreign substances, moulded and pressed to form.

BELT WIDTHS.

An exchange says that "the true way to belt up machinery, and have it to do good service and last well, is to get a belt a little wider than your machine calls for; instead of getting a three-inch belt where you ought to get four, get five-inch instead, if you can possibly use it."

Indefinite advice of this character is of little value. Not only is it impracticable in most cases to substitute a five-inch belt for a four-inch, but in most cases, also, the builders of machinery have adapted the width of the pulley faces to the work the machine should be called upon to perform. Of course, no more work can be got out of a five-inch belt on a pulley with four-inch face than from a four-inch belt, and all the overplus in width is a weight and drag to be carried. There was a time, in the early history of manufacture in this country, when the home-made (shop-made) leather belts were run, at first, as wide as possible to allow for stretch and consequent narrowing. But belt-making is now an art, and the belts come from the factory fully stretched and of exact, unvarying width, a width that will