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Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Aqueduct, N. Y., gate house for, proposed', 'Arms, small, manufacture of in Belgium', 'Boiler, safety, Abendroth & Root', etc.

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 568.

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Table listing contents of the supplement by subject: I. CHEMISTRY, II. ELECTRICITY, III. ENGINEERING, IV. MINING AND METALLURGY, V. NAVAL ENGINEERING, VI. ORDNANCE, VII. PHYSICS.

THE GOVERNMENT SUIT FOR THE CANCELLATION OF THE BELL TELEPHONE PATENTS.

A suit for the cancellation of the Bell telephone patents was brought by the United States before an Ohio circuit court, in the city of Columbus. Much was hoped for from this action, but it has received one defeat already. The question of jurisdiction by a circuit court over a company not in its district was raised. It was decided that the Bell Company, being a Massachusetts corporation, was outside of the jurisdiction of an Ohio court.

The objections to bringing the case in Massachusetts were that, it being the home of the company, a bias favorable to its interests was to be feared. This decision, unless overruled by the higher court, virtually restricts the place of proceeding to the Massachusetts circuits. It is in another sense an unfortunate decision.

On January 24 the united telephone suits come before the U. S. Supreme Court on appeal. Burdened by concessions and incomplete as records of the full facts, a great deal is not to be hoped for from these cases. If, as the final outcome, the patent can only have its claims restricted to conform in some sense to the specification, some good will then have been done.

THE STATUE OF LIBERTY, NEW YORK.

Now that Liberty has been dedicated to her task of enlightening the world, there are some timorous minds who fear that something will happen to overthrow her. Where such a mass towers aloft in an exposed position, there are, of course, dangers; but investigation shows that all that human forethought could do probably was done to insure her safety and permanency.

There are five dangers to be feared, namely, earthquake, wind, lightning, galvanic action, and man. If we should have an earthquake of such force as to bring down the goddess, the ruin of New York would be so universal and complete that little thought would be wasted on her disappearance from her pedestal.

Man may some day pull down the statue, just as he has built it up—as the Communists overthrew the Colonne Vendome in Paris. Or a hostile fleet may take it for a target—as the Turks bombarded the Acropolis, in sheer wantonness. But such a fate could not be averted by any mechanical device in connection with the statue's "setting up."

The statue's power to withstand the shocks of the wind may be considered as satisfactorily provided for. There are four upright iron posts, which support the whole framework inside. According to the plan designed by Mr. C. C. Schneider, civil engineer, these posts are bolted to six steel girders set upon the pedestal, having four similar girders let into the masonry at right angles to and below them.

Mr. Schneider found the greatest amount of surface exposed to the wind to be 3,475 sq. ft., and the central point of the wind's pressure to be 62 ft. above the base. Then, estimating the greatest wind pressure to be looked for in this latitude at 100 pounds to the square foot—a pressure that would be reached only when the wind was blowing at the rate of 140 miles an hour—the pressure of the wind at the foot would be 3,475 x 100 x 62 = 21,545,000 foot pounds. The centers of the main posts rest upon the girders at a distance, or one side, of 17.38 ft. from the centers of the bearings of the girders in the masonry, and, on the other side, at a distance of 13.78 ft.; consequently, the utmost possible wind strain on the points of support of the statue would be 21,545,000 / 17.38 = 1,239,600 on one side, and 21,545,000 / 13.78 = 1,568,100 on the other side.

The weight of the statue was given to Mr. Schneider as 160,000 pounds by one authority, and as 400,000 pounds by another. The greater weight was taken in calculating the bending moment on the girders, while the lighter weight was used in calculating the wind strains, thus producing in each case the greatest strain to be provided against. It was then found that the greatest moment of resistance required in the supports was 3,083, or for each upper girder 2083 = 694. Assuming 3

ing an outside resistance of 20,000 pounds to the square inch for the girders, which were made of 5/8 in. steel, the moment of resistance of each one was found to be 737, or 43 more than required. The steel, moreover, was tested for a breaking pressure of 80,000 pounds to the square inch instead of the 20,000 allowed in the calculation, so that the safety of the girders may be regarded as assured. But there are also backing plates and rods attached to the main posts and girders, greatly increasing the strength, and there is little doubt that before the statue could be overturned by the wind the pressure on its plates would be sufficient to tear them apart.

Against lightning, provision has been made by soldering four 3/4 in. copper rods to the inside of the statue against the external copper plates to a height of 15 ft. above the pedestal. These rods pass through the pedestal, each inside of a 4 in. iron pipe tamped with coke dust, extending 5 ft. below low tide level in the earth. In the lower four feet of these pipes the copper rods are closely coiled like springs, thus giving a greater mass of metal in the wet ground connection. While there are some who insist that the mass of metal in the ground should equal the amount exposed to the lightning, it is probable that in this case the protection is sufficient. The statue itself is the best kind of a conductor as far as her pedestal; hence no outside rods are needed, and the copper rods extending into the ground will doubtless carry off any flashes that Liberty may attract. In any event, no damage would be done to the statue by a stroke of lightning, but only to the pedestal to the extent that the rods were unable to carry off the current.

Against galvanic action, an ingenious insulation of the copper from the iron framework has been employed, the insulating material used being asbestos cloth soaked in shellac; and the device has been managed so cunningly that in no place do the two metals come in contact with each other. It was at first feared that the durability of the statue would be threatened by the great expansion and contraction it would be subjected to under different temperatures, thereby wearing out the copper rivets, or even straining the frame. Experience so far has shown that the mottled or corrugated surface, due to the hammering the copper had received, has prevented much of the expansion that the direct rays of the sun would otherwise have caused. No two contiguous parts received the same amount of heat, and the expansion in midsummer was found to be much less than had been feared. Whether expansion and contraction will eventually produce a serious injury of any kind cannot now be decided; but the indications are not at all alarming.

EFFECT OF THE USE OF WHITE PAPER UPON THE EYES.

Many believe the eyesight is impaired by the use of white instead of colored, or at least tinted, paper, and at times the subject comes up for discussion. So far as we have seen, no positive evidence has yet been secured to prove the injurious effect of white paper on the eyes, and some recent inquiries lead us to doubt if such evidence is to be had.

A company engaged in the sale of tinted paper recently urged us to say a word against the use of white paper for "billing, letterheads, records," etc., for that it does more to keep the oculist and optician busy than any other cause. Further along they say: "There is no doubt that, in a few years, tinted paper will be used for purpose above named [billing, letterheads, records, etc.], and the white paper now used will be an exception to the rule. In the interests of the clerks and bookkeepers, we appeal to you," etc.

Dr. St. John Roosa, one of the best authorities on the eye hereabout, said, when his attention was called to this: "I have never yet noticed any special ill effects upon the eye from the use of white paper. I have treated many bookkeepers and others who work with the pen, and do not remember to have heard any complaints against white paper, nor any commendations for tinted paper. My investigations show me that a principal injury to the eye comes from improper arrangement of the light when writing."

He says he does not believe that people who use tinted paper for writing are freer from eye troubles than those who use white. As for himself, he has used both, first one and then the other, hoping to be able to note the different effects upon the eyes. None, however, were observed. Dr. Roosa might have gone a step farther, and said that instances could be cited where those accustomed to white paper having suddenly changed, and adopted that with a decided tint, found a mal-influence exerted on the eye, and were compelled to go back to white paper.

It is well known that using the eyes too much or in bad lights will serve to hasten the development of myopia, presbyopia, strabismus, and dantonism where there is hereditary inclination; but there is no record of a case, so say the authorities, where the use of white paper hastened or the use of tinted paper retarded such development. It is not likely, therefore, that tinted paper will replace white in the business transactions of the future.