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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

CABLES FOR THE NEW EAST RIVER BRIDGE.

Within a few days the preliminary work for stringing the great cables of the new East River Bridge will be in full swing, and such have been the improvements in this important and very special line of work since the construction of the Brooklyn Bridge twenty years ago, that it is likely all four cables will be in place before the close of the present year.

The four main cables will be 18¾ inches in diameter, and each will consist of thirty-seven strands, each strand being made up of 282 steel wires 1-6 of an inch in diameter. In each cable, therefore, there will be 10,434 wires, with an ultimate or breaking strength of about 20,000 tons, a total of 41,736 wires with a combined strength of 80,000 tons. This means that the four cables would be equal to lifting by a direct vertical pull a fleet of eight warships of the size of the armored cruiser "Brooklyn." That the cables should have such an enormous aggregate strength will be fully understood, when we remember that each square inch of section of the wire is required by contract to have an ultimate strength of 100 tons.

Preparatory to stringing the wires of the main cables four temporary footbridges will be erected for the construction of each cable. Each pair of footbridges will be thoroughly braced together, and also at intervals there will be transverse footways connecting the two pairs. The four footbridges will be double-decked, the lower deck being about 15 feet below the upper deck. The upper deck will be utilized for making the thirty-seven strands of which each cable is composed, and, as each strand is completed, it will be lowered several feet to the position which will be occupied by the finished cable.

The working platforms or footbridges, although they are merely temporary affairs, will require four cables, of an aggregate strength of 2,500 tons, to carry them, and the cost of constructing these platforms will be not less than $200,000. The stringing of the footbridge cables will be carried out in a novel manner, as follows: A lighter, on which will be placed the reels of cable, will be moored at the foot of the New York tower. A line will then be attached to one end of the cable, which will be hoisted to the top of the tower, carried over a temporary saddle, and down to the New York anchorage, where it will be made fast. The lighter will then be towed across the river and the cable being paid out as it advances, and allowed for the time being to lie upon the bottom of the river. The end of the cable will then be drawn up over the Brooklyn anchorage. When the four cables have been swung, floorbeams will be laid across them, and the planking and handrails will be put in place, thus affording a continuous footway or working platform from the anchorages up to the towers and across the whole wide span of the river. After the cables are completed they will be clamped with bands of steel to which will be attached the suspenders from which the stiffening trusses and floor will be hung. The cables will be filled in with a protecting substance composed of oil and pitch, etc., and then they will be completely inclosed with half-round steel plates which will overlap each other so as to completely shed the rain water and give a thorough protection against the weather.

THE RETIREMENT OF REAR-ADMIRAL HICHBORN.

The retirement of Rear-Admiral Philip Hichborn on account of age limit, which takes place on the fourth of this month, marks the close of an official life which has been the most intimately associated with the history of the United States navy, not merely in connection with what might be known as the steam-and-steel period, but also with that of the wooden hull and sail-power. The retiring chief naval constructor forms a link between the old and the new schools of construction. His first practical experience in the navy consisted of five years of apprenticeship to the government as a shipwright in the Boston navy yard, where for a few years he acted as assistant secretary to Admiral F. H. Gregory. After a course of theoretical training in ship designing, Mr. Hichborn moved to the Pacific coast, where we find him at Mare Island as a journeyman shipwright, timber inspector, draftsman shipwright, and finally in 1862 as master shipwright, a responsible position for a young man but twenty-three years of age. In 1869, seven years later, he was appointed assistant naval constructor with the rank of lieutenant. The following year he was ordered to report to Portsmouth navy yard, where he supervised the building of the wooden steam vessel "Essex," which, by the way, was recently refitted at the New York navy yard and is now doing duty as a training ship. In 1875 he received his commission as Naval Constructor.

Mr. Hichborn's connection with the new navy dates from the year 1880, when he was selected to serve as a member of the first Naval Advisory Board. In 1884 he made a tour of investigation of the navy yards of Europe and on his return published a report on European dockyards, the demand for which was so great that Congress authorized the printing of two editions. On his return from Europe he was ordered to the Navy Department at Washington as Assistant Chief of the Bureau of Construction and Repair, and on July 12, 1893, he was appointed chief of the same bureau, a position to which he was reappointed four years later and from which, by virtue of age limit, he now retires. For a more detailed account of Rear-Admiral Hichborn's life and work, we refer our readers to an article in the current issue of the SUPPLEMENT.

AERONAUTICAL CONGRESS.

REPORTED BY THE SPECIAL CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The Congress of Aerostatics has been one of the most interesting of the series held at Paris during the Exposition. It was presided over by M. Janssen, Director of the Observatory of Meudon, in which the meetings were held. The different governments sent official delegates; those of the United States were Messrs. Chanute, Gallice, Langley, Marvin, Rotch, Poëy, and Zahm. The list of delegates included a great number of names prominent in aeronautic and scientific work, such as Aimé, Bereau, Bonaparte (Prince Roland), Bruce, Saint Victor, De Dion, Giampetro, De Fonvielle, Lieut. Hinterstoesser, Hammer, Count de la Valette, Morani, Richard, Santos-Dumont, Tissandier, Tzerseleff (Prince Dimitry), etc. The French army and marine were represented by a number of delegates. The principal address was delivered by M. Janssen, in which he reviews the progress already made in aerostatics and the results hoped for in the future. Since the last Congress, held at Paris in 1889, a considerable progress has been made in the different branches. In France and the leading nations the governments have taken up the subject, and its importance in military operations is becoming more clearly recognized. If it is considered that the armies are constantly increasing, as well as the range of the arms of artillery and infantry, a like extension of the theater of combat is to be predicted, and in consequence the use of balloons will become indispensable, and these will be provided with more powerful optical appliances. It must not be forgotten that balloons play an important part in indicating to the artillery the efficacy of its fire and the corrections to be given. If, on one hand, it is pleasing to record the progress which military aerostatics has accomplished in the hands of the skilled officers charged by their governments with the establishment and operation of these services, it must be acknowledged that great desiderata still exist. In fact, if it is possible to leave a besieged place almost with impunity, it is not the same for re-entering; it is to this second phase of the question that the subject of the direction of balloons is attached. Since 1889 the great problem of the dirigibility of balloons has occupied many workers, but it should be said that in spite of the very interesting attempts, the question has not made a decisive step. The experimenters are, however, still at work. M. Santos-Dumont is preparing for the competition for the Deutsche prize of $20,000, and Count Zeppelin is making a great effort with his balloon of 360 feet on Lake Constance. Although the question of dirigibility is the most important, it is also of the greatest interest to improve the aeronautic conditions, either as to remaining as long as possible in the air or to rise to a great height. In this order of facts may be cited the remarkable voyage of Count de Castillon de Saint-Victor from Paris to Sweden, where the balloon covered more than 800 miles, and that of Count de la Vaulx, who kept his balloon in the air for more than 30 hours without landing. M. Mallet has made with the same balloon a tour of France lasting eight days, landing in different places. As regards the altitude reached, the record has been made by M. Berson, of the Meteorological Institute of Berlin, who has risen several times to a height of 28,000 feet, exceeding the highest summits of the Himalayas; it is by the use of oxygen that M. Berson was able to support the rarefaction of the air at this great height. Scientific ascensions have made great progress in Germany owing to the initiative of the Society of Aerial Navigation of Berlin, which is sustained by the liberality of the Emperor. During the last five years the number of these ascensions has reached no less than seventy-five, and the results obtained have lately been discussed in the extensive treatise of Assmann, Berson, and Gross. But the heights attained by these balloons carrying observers are necessarily limited. Even with the use of oxygen, the observer must contend with the depression which surrounds him, and from which results an expansion of all the gases contained in the system, which, in spite of the respiratory reparation due to oxygen, may lead to death. M. Janssen then speaks of the scientists and aeronauts whose loss is to be regretted, among others Eugene Godard, originator of siege balloons, and from whom the author obtained excellent counsels at the time of leaving Paris the 2nd of December, 1870, during the siege with the balloon "Volta;" Hureau de Villeneuve, one of the founders of the Society of Aerial Navigation; Gaston Tissandier, Coxwell, and others. M. Janssen closes his address by a review of the advantages which would result from the mastery of the air and the effects this would have upon civilization.

The Congress was divided into four sections, and in each a number of interesting papers were read. The following is a list of the sections and some of the communications for each: Section 1. Aerostatics. Aimé; dirigible thermosphere. Angelot; new system of balloons. Dibos; signals from balloons at great distances. Giampetro; use of sails in direction of aerostats. Jaguaribe, new apparatus (velo-aerian). Regnard; ascensional propeller. Zahm; theory of balloon direction, etc. Section 2. Aviation. Ader; military aviation. Alexander; force of helices. Bretonnière; study of flying and aeroplanes. Canovetti; experiments on the resistance of air. Herard; new propeller. Mortureux; aerocycle with four wings. Rotch; use of kites at Blue Hill, United States. Roux; study of the flight of birds. Santi; aeroplanes, etc. Section 3. Instruments. Assmann; scientific aerial voyages. Batut; aerial photography from kites. Bouquet de la Grye; aerial telegraphy from balloons. Bruce; luminous balloons for military signals and exploration. Dibos; project of exploring voyage in Central Africa. Rotch; kite apparatus. Triboulet; method of triangulation by panoramic apparatus, etc. Section 4. Legislation. Formation of a scientific commission for the study of aerostatic patents. De Villiers; role of military aeronauts in the Egyptian campaign. Pesce; aeronautic and maritime rights, etc. A number of these papers, which are of great interest, will be reproduced in full or in abstract.

LOTUS POISON.

Messrs. Dunstan and Henry have recently read a paper before the Royal Society, treating of the nature and origin of the poison of the Lotus Arabicus. This is a small leguminous plant, indigenous in Egypt and the north of Africa. It grows abundantly in Nubia and especially along the borders of the Nile, from Luxor to Wadi-Halfa. It is known to the inhabitants under the name of "Khuther;" the plants whose grains are ripe serve as fodder, but at certain epochs of its growth the plant is quite poisonous for horses, sheep and goats, the poisonous properties are most strongly marked in the young plant and continue up to the time that the grains appear. As this plant has caused considerable trouble to the civil and military authorities of Egypt, a complete study of it has been made at the Royal Institute of London, after the material collected by Mr. E. A. Flayer, Director of Egyptian Telegraphs. The dry plant is of a brilliant green color and has the odor of freshly-cut hay. When wet with water and ground, the leaves of the plant give off a considerable quantity of hydrocyanic acid. This quantity is a maximum in the plant just before or just after flowering. It is found that the prussic acid comes from a crystalline yellow glucoside, having the formula O_{22} H_{19} NO_{10}, which is called *lotusine* by the experimenters. Under the influence of an enzyme, also contained in the plant, the lotusine is transformed into prussic acid, sugar, and a new yellow coloring matter, called *lotoflavine*. The action takes place also under the action of acids, but is produced only slowly with emulsine and not at all with diastase. The experimenters propose to call the new enzyme *lotase*: it seems to be distinct from all the others known. Its activity is nullified by the action of alcohol, and it has but little action upon amygdaline. The old plants contain lotase, but not lotusine. The sugar formed by the action is identical with ordinary dextrose. The lotoflavine has a composition which corresponds to the formula $C_{15}H_{10}O_6$. It belongs to the class of pheno-y-pyrones; it is a dihydroxychrysine, isomeric with luteoline, the yellow coloring mat-