CHAIN VS. WIRE CABLES IN THE NEW EAST RIVER BRIDGE.

It is quite possible to make too much of the controversy which has arisen over the decision of the Bridge Commissioner to use chain instead of wire cables for the latest East River bridge, known officially as the Manhattan Bridge. At the time when the present Bridge Commissioner went into office, plans of the bridge had been prepared, which called for a wire-cable structure of extremely unprepossessing appearance, having even less pretensions to architectural beauty than the Williamsburg Bridge, a little further up the East River, which is now nearing completion. There were two principal objections to the design; the first being, as mentioned, that of its inherent lack of beauty, and the second being the fact that the city was in most urgent need of the services of the bridge, and judging from the fact that the cables were to be of wire construction, it was probable, if the new East River Bridge was any criterion, that the completion of the new structure would be subject to serious delays. Moreover, it was realized that although there was no question of the stability or strength of the wire cable design, it was, nevertheless, of a type that did not embody the improved principles which mark the thoroughly up-to-date long-span bridge.

The broad distinction between the present eye-bar and the discarded wire-cable design lies in the different methods adopted for giving the stiffness to the bridge which is necessary to prevent deformation under moving loads. In the wire-cable type, such as the present Brooklyn Bridge and the Williamsburg Bridge, rigidity is afforded by a series of stiffening trusses which are worked into the floor system. These trusses are entirely distinct from the cables, and represent so much added dead load which the bridge must carry in order to supply that resistance to deformation which the cables entirely lack. Judged from the artistic standpoint, this is distinctly unfortunate, for the reason that although shallow trusses, such as those of the Brooklyn Bridge, conform very well from the point of balance and proportion with the light, thread-like cables above them, they are certain to prove, as they have done in this bridge, entirely too light for their duty. On the other hand, if these trusses are made of sufficient depth and weight to provide the necessary stiffness to the floor system, they become so heavy as to entirely destroy the harmonious appearance of the structure, and rob it of that grace and symmetry which should be a distinguishing characteristic of every suspension bridge. This effect will be noticeable at once to anyone who approaches the present Williamsburg Bridge by water. Whatever pretensions to good looks this bridge may have had in the earlier stages of its construction, they have gradually disappeared as the heavy mass of the deep, 50-foot stiffening truss was built in place from anchorage to anchorage. Although there is no doubt that the proportion between the cables and the mass of floor system is correct for the work that it has to do, there is no denying that, looked at from the standpoint of architectural effect, the result is exceedingly harsh and dissatisfying.

In the new design, which possesses every element of architectural beauty, it has been shown that by making the cables share in the work of giving proper vertical stiffness to the floor system, it is possible to give a great suspension bridge such as this an appearance of harmonious proportion without doing any violence to good engineering practice, or making use of superfluous material worked in merely for architectural effect. In the new design, the cables are not merely strung over the towers from anchorage to anchorage to act as a flexible support to a flexible floor that must be heavily stiffened before it is practicable to send a live load over it, but each of these cables is made to act as the top chord of a stiffening truss which gives the necessary rigidity to the bridge. Here, at once, there is an obvious economy of material, and the unpleasing contrast between the thread-like cables and the ponderous stiffening trusses is avoided, the two being blended in one and producing a most harmonious and handsome effect. Of course, the steel wire possesses, unit for unit, a greater strength than the nickel-steel chain cable; that is to say, for the same strength of cable, there will be less weight in the wire than in the chain, and for this reason it would be desirable to use a trussed wire cable, in preference to trussed eyebars. This, however, cannot be done, for the reason that it would be impracticable to make satisfactory connections between the web members of such a truss and the wire cable. Were it not for this difficulty, trussed wire cables such as were proposed for the Hudson River Bridge might be employed.

The objections urged by the small minority of experts who are attacking the proposed eye-bar cable—most of whom, by the way, are identified with wire cable-making interests, either as owners or employes—are more formidable on paper than in reality. The eye-bar cable is certainly as durable as one of wire. That there is no wear of the pins in the eyes is proved by the perfect state of preservation of some long-span European chain bridges, built long ago, notably the one across the Menai Straits in England, which after nearly a century of existence is in perfect condition. As a matter of fact, there is no rotation of the eye-bars about the pins, frictional resistance to turning being greater than the resistance to flexure in the body of the bars themselves; that is to say, the changes of curvature in the chain are taken care of by the flexure of the eye-bars, the chain from tower to tower acting as a continuous piece of metal. This is proved by the fact that the paint at the pins shows no signs whatever of cracking.

Not only is the eyebar design greatly superior in appearance, but it can be unquestionably built more rapidly than a wire-cable bridge. The New York public wants this bridge very badly. It is now smarting under the inconvenience of the unpardonable delay in the construction of the new East River Bridge, a large part of which delay was due to the slowness of the construction of the wire cable. It is stated by the Bridge Commissioner that his design for the new bridge can be built within three years' time, which is several years less than the East River Bridge has taken to grow even to its present incompleted state. It is true that the eyebar bridge may possibly cost something more than a wire-cable structure; but the difference is slight, and certainly not so great as to compare with the enormous inconvenience to which New York city would be subjected by any delay in the opening of this greatly-needed thoroughfare. There are some things that cannot be estimated in terms of dollars and cents; and anyone who stands during the rush hours at the terminals of the Brooklyn Bridge and watches the daily riot there, will feel that a year or two saved in the opening of another bridge in its near neighborhood, is well worth any slight increase in the cost of its construction.

COMBS AND CIGAR HOLDERS MADE OF MILK.

At the Hygienic Milk Supply (Hygienische Milchversorgung) Exhibition, which was lately held at Hamburg, the Vereinigten Gummiwaren-Fabriken of Harburg and Vienna exhibited a number of objects which seemingly had nothing whatsoever to do with hygienic milk supply. There were shown, nicely arranged in glass boxes, combs seemingly made of horn; cigar holders with amber-colored mouthpieces; knives and forks with handles similar in appearance to ebony; ferrules for umbrellas and sticks, and balls, rings, chess figures, dominoes, etc.; also a small table with an inlaid marble slab, and finally a number of thick slabs and staves with every imaginable variation of marble colors, but of considerably less weight than real marble. These objects were made of "galalith"—i. e., milk stone.

Skimmed milk, in spite of its many valuable qualities, has so far been little used; it contains a considerable portion of nutritious matter, i. e., 1 liter (1.05 quarts) of skimmed milk is of about equal value to a quarter of a pound of meat. It is by far too little appreciated as a cheap food for the people, hence what the German peasant cannot sell to milk-sugar factories or use for the manufacture of cheese is given to cattle and pigs as food. The principal albumenoid substance of skimmed milk, the casein, is the raw material out of which the new product galalith is manufactured. More than fifteen years ago the idea was originated to manufacture various articles like buttons, handles, ornamental plates, and colored pencils out of casein. The inventor took out a patent for a manufacturing process, which is described as follows:

Fresh casein—i. e., ordinary or dried curds—was dissolved in hot soap water; to this solution the required coloring ingredients and a metallic salt were added, and a firm substance consisting of casein and metallic soap was produced, which, by drying and pressing into molds, could be given any desired shape. It is to be supposed that the inventor had found out by continued trials that casein by addition of a metallic salt becomes brittle and softens easily in water. With a view to counteracting this latter drawback soap was added, but the articles produced thus were soft and brittle, and the invention was not a success. The chemical factory of Schering at Berlin then invented a process, the idea of which was to make casein insoluble by the addition of formaldehyde, but the disadvantage of this invention was that the articles produced distended considerably in water.

The inventors of galalith succeeded, after many troublesome trials, in doing away with the deficiencies of former methods and in using the good that was in the former ones, for the working out of an entirely new process. Their first aim was to make an insoluble union of casein by the addition of salts and acids. The substance thus obtained was dephlegmated and dried, and, finally, by the addition of formaldehyde, the galalith was obtained. To produce, for instance, a material similar to ebony, which could be used for handles of table knives, they proceeded as follows: Dissolved casein was given a dark color by the addition of soot and, with the help of a metallic salt (acetate of lead), a slate-colored precipitate was obtained. This was mixed with water and the thin pap filled into a cloth stretched over a frame. The water becoming absorbed by the cloth, the pap contracted into a uniform, firm, and dark mass; this was placed in a solution of formaldehyde and, after being dried, a product resulted which in luster and color was equal to ebony. In this way a raw material is produced which the inventors have protected by numerous patents.

An advantage of the new product as compared with celluloid is the fact that it does not ignite so easily and is entirely odorless. Trials have proved that even when kept for weeks in water, it does not distend more than the best quality of buffalo horn; after one month it had not soaked in more than 20 per cent of water. Of late, trials have been made to produce, by the addition of vegetable oils, an insulating material for electrotechnical purposes.

THE "AKOUPHONE"—A CORRECTION.

In the issue of the SCIENTIFIC AMERICAN of June 13, 1903, appears an erroneous statement, in an article entitled: "New Instruments for Enabling the Deaf to Hear," to the effect that a similar instrument previously invented and used called the "akouphone" had been abandoned.

We learn from Mr. K. B. Conger, president of the Akouphone Company, of No. 36 East 20th Street, in this city, that such is not the case; but that though the "akouphone" had its inception in undeveloped inventions of Mr. Miller Reese Hutchinson, the instruments made under these inventions were quite unsatisfactory. He stated the present perfected instrument, now made and sold under the name "akouphone," is most effective and reliable, and is the result of long and careful experimentation by the company's present manager and electrical expert, Mr. Morgan D. Evans. We are informed also that the instrument is now in extensive and successful use, not only in this country, but in several foreign countries.

The principle of the instrument is similar to a telephone, but in one particular point it differs; it is not necessary to talk directly into the receiver. The receiver of the "akouphone" is especially constructed for distant sounds, and transmits them to the ear with greater power than the telephone, which is spoken directly into. The voice of a speaker using an ordinary tone of conversation at a distance is reproduced in the "akouphone" earpiece, thereby giving absolutely the same effect as if the speaker were talking loudly directly into the ear of the deaf person.

DEATH OF CHARLES C. MARTIN.

Charles C. Martin, consulting engineer of the Division of Bridges of New York city, died suddenly at Far Rockaway, in his seventy-second year. Mr. Martin's name is most closely associated with the Brooklyn Bridge, the construction of which was carried on under his supervision. He cared for the structure almost up to the day of his death.

Mr. Martin's first work was on the conduits of the Brooklyn Waterworks. Later he became rodman in the old Trenton Locomotive Works and was advanced to the position of superintendent. The company sent him in 1860 to Savannah, Ga., to construct a railroad bridge across the Savannah River. It was while he was engaged in this work that he sank the first pneumatic cylinder ever used in this country. During the war of the rebellion, Mr. Martin built several bridges, superintended the manufacture of guns, and made boiler experiments for the government at the Brooklyn navy yard. After the war he became chief engineer of Prospect Park and laid out its drainage system. On the appointment of Washington A. Roebling as chief engineer of the Brooklyn Bridge, Mr. Martin was made principal assistant, and was put in charge of the construction work. When Mr. Roebling resigned in 1883, he became chief engineer. In 1902 he was made consulting engineer.

NEW TESTS BY DR. WILEY.

In addition to his tests of adulterated foods, Dr. Wiley will begin a series of experiments for the purpose of showing the effect of pure and of adulterated tobacco upon the digestive apparatus of the human system. It is Dr. Wiley's intention to take men who are regular smokers and to ascertain their physical condition as to heart action, breathing, and digestion, while continuing the use of tobacco under normal conditions, and then to have them suddenly cease the use of tobacco entirely.

THE DEATH OF EUGENE VANDERPOOL.

Eugene Vanderpool, president of the International Gas Light Association and of the American Gas Light Association, recently died in Newark at the age of fifty-nine. He was a graduate of Princeton and of the Troy Polytechnic School. He was known the world over as an able gas engineer.