TRIAL TRIP OF THE BARTON AIRSHIP.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

After many months of waiting for propitious weather, the trial voyage of the Barton airship from the Alexandra Palace, London, was carried out on July 22 last. This vessel, which was fully described in the Scientific American several months ago, possesses many ingenious and notable features, the principal of which is the combination of aeroplanes to assist the ascent and descent of the vessel in conjunction with the ordinary gas bag.

The vessel is a mammoth structure. It comprises an elongated cigar-shaped balloon 180 feet in length by 40 feet in diameter, with a capacity of 200,000 cubic feet of gas. Slung from the balloon is a bamboo car 127 feet in length by 18 feet in height. The car is built triangular in form, the horizontal bamboo members being carried through the corners of the triangles, while by pointing the apexes of the triangles downward the lower horizontal bamboo member constitutes a keel. The deck runs the full length of the car and varies in width from 2 to 8 feet. Fore and aft are fitted two four-cylinder Buchet gasoline motors of 50 horse-power each. The motors are carried on cast-iron frames rigidly fixed to the bamboo. On either side of each engine are fitted two propellers carried on brackets. The propellers are of the two-bladed type, of 7 feet diameter with a fine pitch, and revolving at 1,000 revolutions per minute. The drive from the motors is transmitted to the propellers through belts and pulleys. At the end of the car is a large rudder 12 feet 6 inches wide by 18 feet high, giving a total area of 225 feet. In the center of the car is the aeronaut's deck, from which the control of the airship is maintained, while midway between this deck and the rear motor is the steering wheel for actuating the rudder, steering being carried out with a hand wheel similar to that of a ship. The trim of the vessel is controlled by water ballast tanks fore and aft. The movable aeroplanes, of which there are normally thirty-two, are placed in front of both the bow and stern motors, and by their inclination up or down the vessel can be made to rise or fall irrespective of the balloon itself. The total weight of the craft is 14,000 pounds. For the generation of the hydrogen for the inflation of the balloon 600 carboys of concentrated oil of vitriol were decomposed by 50 tons of iron borings.

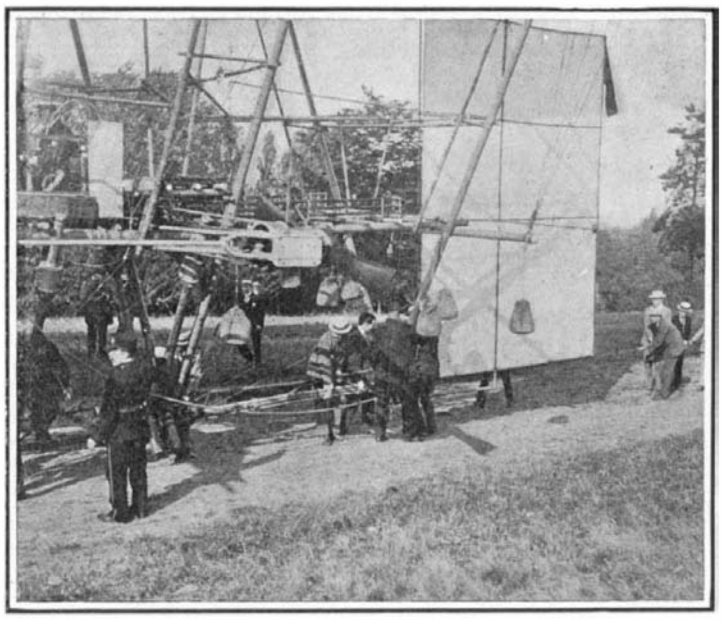
The day selected for the trial trip was not attended with the best weather conditions. Furthermore, owing to the rapid deterioration of the gas within the balloon, due to the fact that it had been standing for a few days, 300 pounds of ballast, two members of the crew, and twenty-eight aeroplanes had to be discarded. Five aeronauts ascended in the vessel, comprising Dr. Barton, the designer; Mr. A. E. Gaudron, who had charge of the aerostat; Mr. Rawson, at the helm; and Mr. Henry Spencer and Mr. Newton, in charge of the fore and aft propelling motors respectively.

The vessel rose into the air smoothly and calmly, but when it had ascended, a wind blowing at the velocity of 30 miles an hour was encountered. The airship's head was brought round against the wind, and although it could hold its own, the tendency of the balloon to buckle caused the aeronauts to swing her round again in the wind's favor. The wind blew fitfully, the velocity varying from 20 to 35 miles an hour. Whenever the vessel's nose was brought up against the wind at the former speed it could make slight headway, but the treacherous gusts rendered it hazardous to persist in a forward course. It was therefore resolved to cut across the wind in a southeasterly direction. The dirigibility of the machine was successfully demonstrated, for she was successfully turned round on two or three occasions, the circle required being of 200 yards. With a larger prow rudder, however, the aeronauts state that it would have been possible to swing round in a much smaller circle.

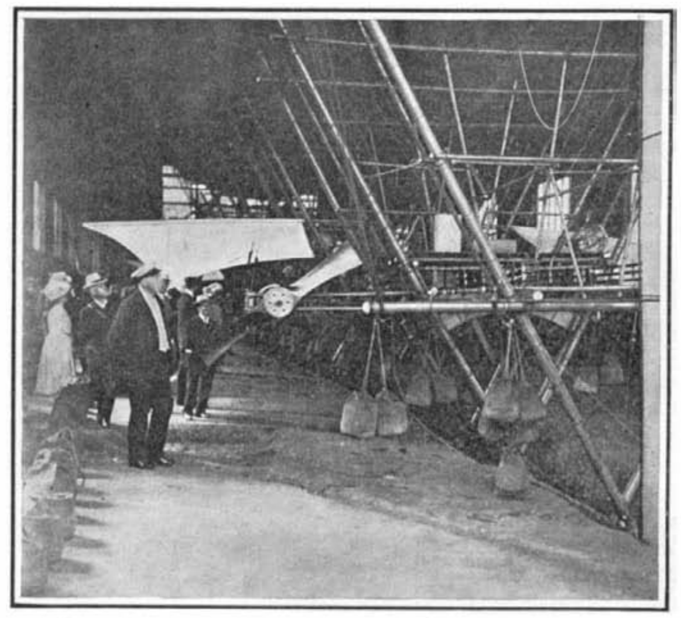
The machine traveled for several miles in a southeasterly direction with every success and was maneuvered to within a height of 200 feet of the ground. As the wind had dropped somewhat, the vessel's head was brought round toward the starting point, and for some distance she succeeded in making progress against the wind. When, however, the wind increased again, the engines were stopped, and the vessel was allowed to drift at an altitude of 2,400 feet for some eight miles, descent being finally made 16 miles from the starting point.

The maneuvering capacity of the vessel was clearly demonstrated during the descent. The machine was brought to the ground quite smoothly, without any signs of bumping, generally characteristic of balloon descents. A slight mishap occurred at this juncture, however. The aeronauts gathered together in the bow, with the result that the stern mounted swiftly in the air to a height of some 40 feet. One of the party immediately seized the ripping valve and a huge rent was torn in the balloon fabric, liberating the gas with a roar. The force of the escaping gas ripped the balloon completely in halves and the fabric collapsed, bringing the framework to the ground with a crash. Fortunately, no one was hurt, and owing to the elasticity of the bamboo the only damage to the car was one broken propeller.

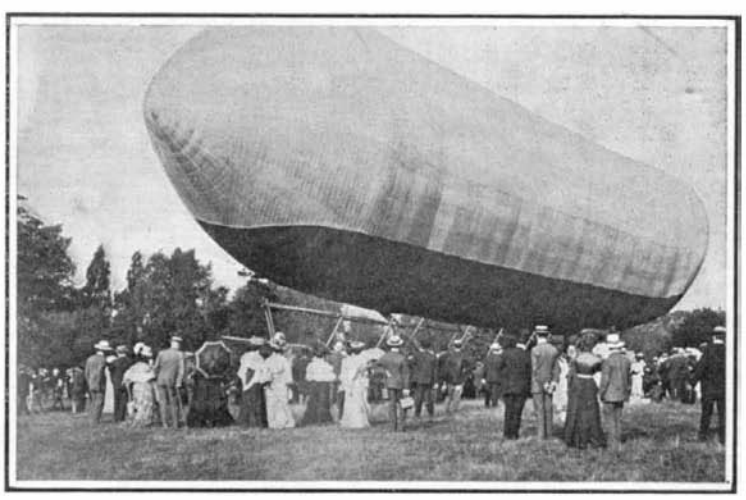
Although the trial was but a qualified success, it emphasized one or two cardinal points. The most vital is the impossibility of attaining success with an airship which depends for its buoyancy upon a gas balloon. Dr. Barton has already decided to discard the gas bag in his new machine which is now approaching completion. This new vessel will depend for its buoyancy upon the aeroplanes, which, although only four were carried upon this initial trip, proved highly satisfactory. Another inherent danger of such a balloon is buckling when brought head against a strong wind. The motors proved sufficiently powerful, but the propellers were found to be somewhat too small and pitched at the wrong angle. Many valuable details were obtained during the trial which are to be incorporated in the new aeroplane, which is to be submitted to a trial within the next few weeks.



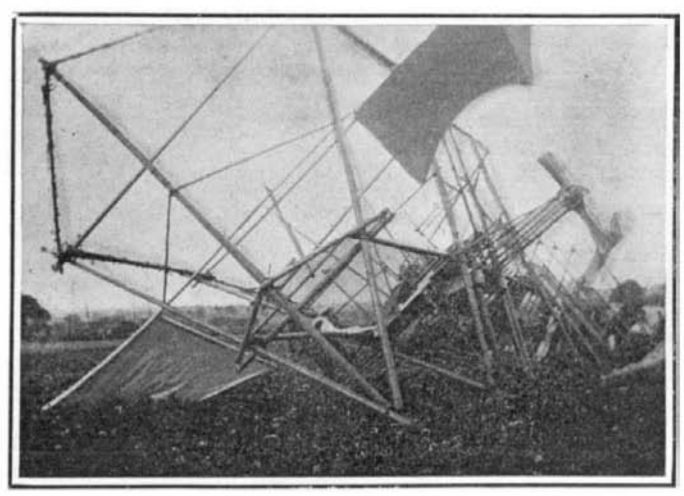
Preparing for the Ascent.



The Propellers and the Ballast Bags.



Just Before the Ascent.



After the Descent.

TRIAL TRIP OF THE BARTON AIRSHIP.

An Improved Submarine Signal.

Arthur J. Mundy has invented an improvement in the system of submarine signaling, described some months ago in these columns.

The invention relates to that portion of a submarine signaling system which includes the means for taking the sound-signals conducted by the water from a submerged signaling apparatus from the water and transmitting them, preferably electrically, to a telephone receiver on a vessel. This portion of the apparatus as a whole has been named a "hydrophone." The part of the hydrophone which is immersed in the water and receives sound impulses from it and transmits them is called the "hydrophone-transmitter," or, for short, the "transmitter." The part which receives the impulses from the transmitter and delivers the sound to the hearer is known as the "hydrophone-receiver," or, for short, the "receiver."

For use on vessels carrying machinery making noise—like, for instance, steamships—Mundy has discovered that it is desirable to take and transmit the sound signals conducted by the water from the water at a point away from the vessel and below the surface of the water and also while the vessel is in motion; and his present invention, or hydrophone, comprises a device the sound-transmitting portion of which is adapted to be let into the water from the stern of a moving vessel and to be towed in the water by the vessel at any desired distance therefrom and at any required depth below the surface of the water, and the receiver portion of which is adapted to be carried on the vessel and to receive from the submerged sound transmitter the sound signals conducted to it by the water and to deliver them audibly to the hearer on the vessel. Mundy prefers to employ, as a means for holding the hydrophone transmitter submerged, a transmitter holder, which has a shape resembling that of a fish. This holder is provided with means whereby, while being towed, it is caused to assume an upright or vertical position below the surface of the water in the water and to maintain such position so long as it may be towed or be in motion. The transmitter preferably is so mounted in the holder as to present a sound-receiving diaphragm on each side of the holder, which preferably is flush with said side. The towline for towing the holder in its submerged plane also serves to provide an electric circuit between the transmitter and battery on the vessel and the receiver. The holder preferably is attached to the towline by means which may form a part of the towline, which acts to prevent sound vibrations from being delivered by the towline to the transmitter of the holder and which sound-insulating means has been termed an "antihummer." The electric relation between the transmitter and the battery on the vessel is such that the electric circuit from the transmitter to the battery and receiver is automatically established upon the submerging of the holder, remains established while it is submerged, is automatically broken upon the removal of the holder from the water, and remains broken while it is so removed from the water and inactive. A means for accomplishing this result is the employment as a part of the circuit of the water itself when the holder is submerged.

THE ELIZABETH BRIDGE AT BUDAPEST.

The handsome Budapest bridge which forms the subject of the accompanying illustrations is of especial interest to New Yorkers, because it is almost identical in design with that proposed by ex-Commissioner of Bridges Lindenthal for the new East River bridge. This "eyebar" design, though strongly recommended by the Municipal Art Commission, was rejected because of several more or less fanciful objections. In the Budapest bridge this construction was found to give the greatest strength and efficiency in proportion to the weight of material used, and at the same time it provides a structure of undoubted artistic beauty.

The Elizabeth bridge crosses the Danube in a single span. The main span from center to center of the piers is 957 feet in length. The approaches, from the center of the pier to the face of the abutment, are each 139 feet long. The total length between the faces of the abutments is 1,235.5 feet.

The bridge roadway consists of a driveway 36.3 feet wide and of two footways, one on each side. These are 11.5 feet wide on the main span, and 12.2 feet on the approaches.

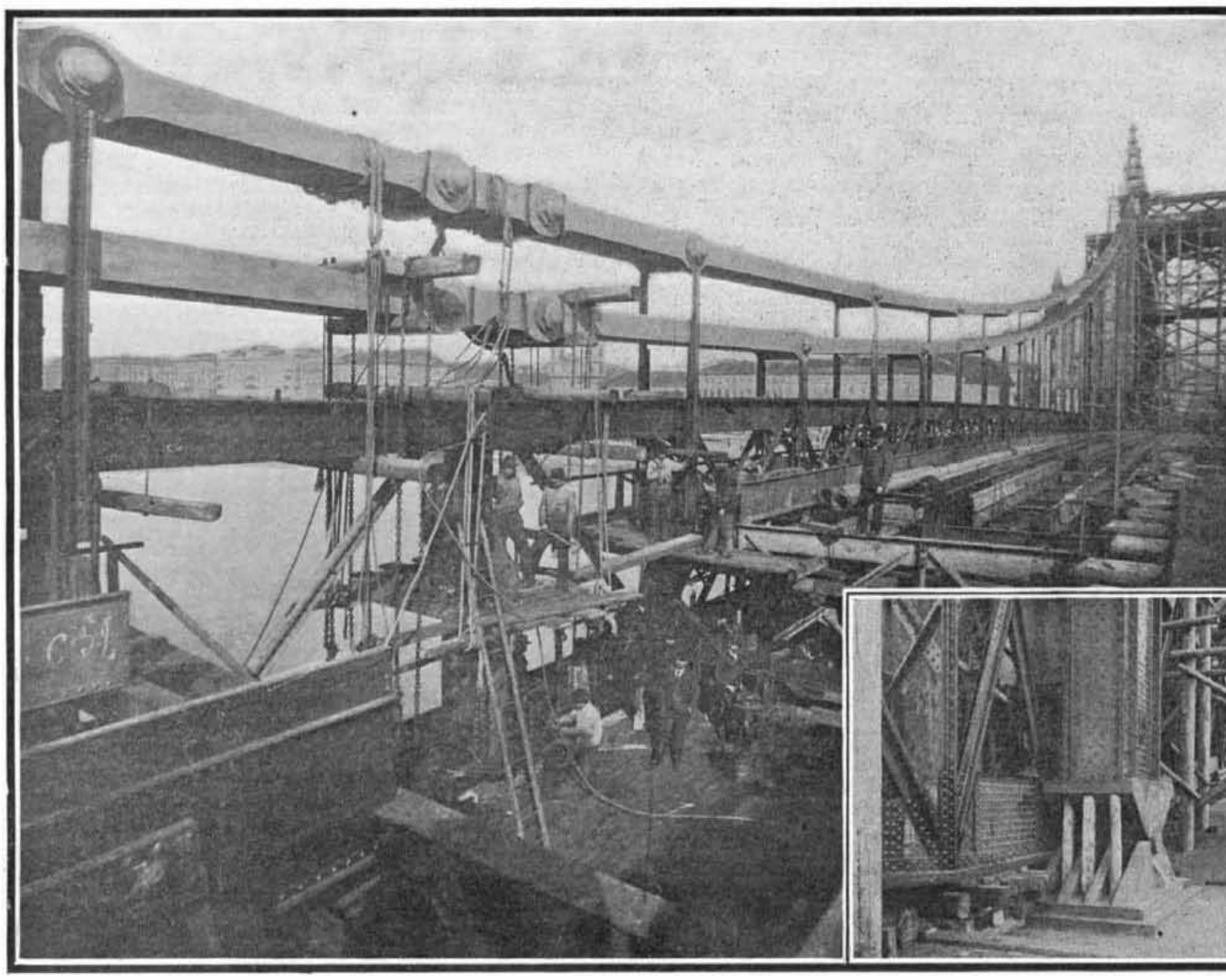
The suspension chains are arranged in two pairs, the pairs being 66 feet apart. The chains of each pair are located one above the other, and, of these, the lower ones have fixed points in the tower heads, while all four are anchored in the abutments. The towers are pivoted at their bases.

The skeletons of the towers from which the chains are suspended consist in each case of two massive posts of box section, 72.8 fet apart from center to center. These towers rest on two steel pivots, which are located on cast-iron plates, one on each side of the stiffening truss. To counteract the horizontal swinging of the chains, the suspenders are stiffened in a plane transverse to the axis of the bridge. This transmits the wind pressure acting against the chains to the stiffening trusses, and particularly to the wind-bracing.

The lateral bracing of the stiffening truss, which is continuous throughout the structure, consists in the channel span of four trussed cross girders and one counter bracing to each panel of 20-foot length, and at the intersection with each cross girder the main trusses are suspended to the chains.

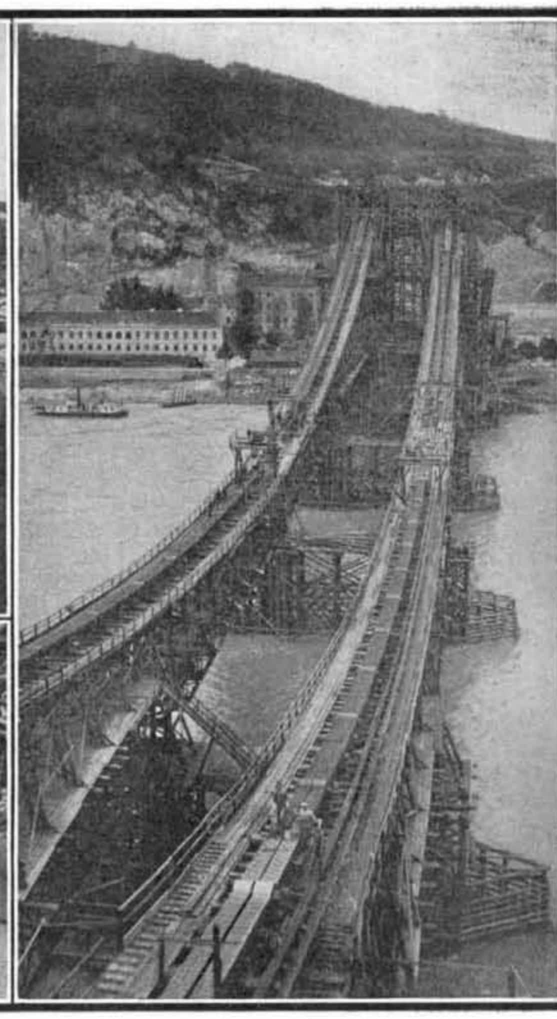
All the 66-foot trussed cross girders are attached to the verticals in the web of the stiffening trusses save at the line of the towers, and are webbed vertically between their posts by a double series of symmetrical latticing, united at the points of intersection with intersection plates.

Upon the upper chords of the cross girders and immediately above each of the truss verticals is a row of seven stringers of rolled I-section. To the central part of their webs is attached a system of secondary cross girders, which in turn carry longitudinal floor beams, supporting, together with the stringers men-

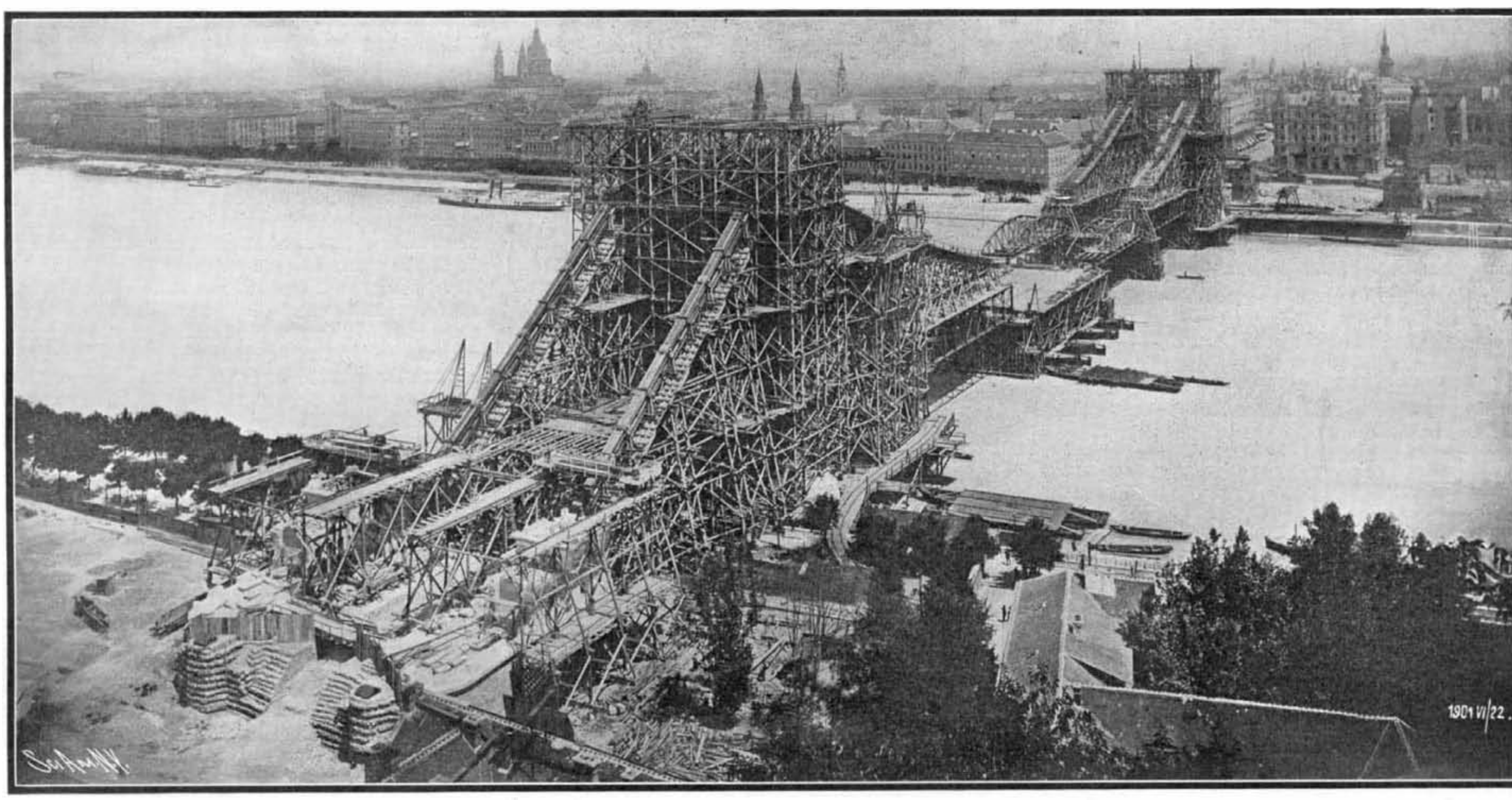


The Erection of the Center Panels of the Stiffening Trusses.

One of the Pivots at the Tower Base, and the Stiffening Truss.



View of Completed Chains Taken from Top of Tower.



The Elizabeth Bridge under Construction, Showing the Elaborate Fixed and Floating Falsework in the Channel of the Danube.

THE HANDSOME NEW CHAIN SUSPENSION BRIDGE AT BUDAPEST.