THE NEW TOWER BRIDGE, LONDON.

Our illustrations give two views of the intended bridge across the Thames, immediately below the Tower of London, which the Corporation of the City of London are about to erect, having received the sanction of Parliament. The want of a bridge at this spot has long been recognized, for the relief of the congested traffic over London Bridge, as well as for the accommodation of the East End of London, and for the improvement of the communication between the north and south sides of the river, below London Bridge. Mr. Horace Jones, the city architect, past President of the Royal Institute of British Architects, had, by direction of the corporation, at various times since 1876, prepared a series of schemes and reports on this subject. A committee of the House of Commons had reported strongly on the propriety of improving the means of communication between the north and south sides of the river below London Bridge, and had suggested that the corporation should take upon itself the task of erecting a bridge, with mechanical openings, below the Tower. The corporation referred the question to the Bridge House Committee, of which Mr. Frank Green was then chairman, and the committee directed Mr. Horace Jones to prepare designs for this purpose. After mature deliberation the committee selected one on the bascule principle, and the Court of Common Council adopting this selection in October, 1884, referred it back to the Bridge House Committee, by whom, with Mr. Thomas Beard as chairman, the necessary steps were taken for obtaining an act of Parliament. This design is in effect that which has been approved by Parliament, and which received the royal assent on August 14, 1885. The plan of the constructive ironwork, and the machinery necessary to work the mechanical openings of the central span, had been indicated in the general design; but these features of it have received great consideration, and some important and valuable improvements have been added, by Mr. T. Wolfe Barry, the well known engineer, who was associated with Mr. Jones; and his skill and experience have signally contributed to successfully obtaining the act of Parliament.

Our illustrations show the bridge open and closed. As will be seen, the bridge portion is carried by two massive picturesque Gothic towers, in which provision is made for the necessary machinery for opening and closing the center span, so as to allow the largest shipping to pass through. Lifts are provided on either side, as well as an internal staircase, for the use of foot passengers; these lifts communicate immediately with the upper footway, so that the foot traffic will never be interrupted. The center leaves of the bridge, when open, will be flush with the pier, thus leaving a clear opening or freeway of 200 feet for the shipping to pass. When the bridge is closed, there will still be sufficient height, at high water, for the ordinary traffic of the river to pass under. The approach roads and footway will be 60 feet in width; the land spans of the bridge about 62 feet, and the center span will be 50 feet wide. The two land spans will be suspended, as shown in our illustration. The materials proposed to be used are, for the lower part of the piers, up to the parapet line of the bridge, gray granite; for the upper portion of the towers, a hard red brick, with Portland or other hard stone dressings. The style of architecture will be that of the sixteenth century, allowing scope for a picturesque treatment.

The opening, the passing of a vessel, and the closing of the bridge could be accomplished in four or five minutes; but if it took even double that time, once or twice in the course of a day, it would be no material interference with the road traffic.—*Illustrated London News.*

A Chemical Water Sounder.

In connection with the preliminary investigations for the introduction of the Improved Sewerage Scheme into Boston, Mass., an ingenious, if not novel, method was successfully tried for obtaining the height of water in small test pipes driven into the ground. The purpose of the experiment was to test the effect of pumping upon the height of the ground water, and as the method may be of use elsewhere, we give it as follows:

About twenty small pipes were driven into the ground below the surface of the soil water, and measurements taken twice a day of the height of water standing in these tubes. The elevation of the top of each pipe being accurately determined, the exact distance to the water surface in the pipe was obtained as follows: To the ring of an ordinary metallic tape a small lead plumb was attached by a wire hook; the top of this plumb was flat, and in a hole to one side of its center was forced a cork, and in this cork a needle was fixed upright, eye down, so that its point was just on a line with the bottom of the tape ring. A small bit of metallic potassium was put on the needle point, and the tape lowered into the pipe; the instant the potassium touched the water it ignited explosively, and the flash and sound both gave the exact moment for reading on the tape the required depth of the water line.

PHOTOGRAPHIC NOTES.

Photographing the Recent Flood Rock Explosion.—Owing to the advantages offered by the extreme sensitiveness of the modern dry plates for recording rapid motion, no better opportunity was afforded for their employment in this respect than the recent explosion of Flood Rock. Such a large area under water, of nine acres, had never been exploded at a single flash before; and, in view of its uncertain extent and the height to which it might rise, it presented difficulties which the average photographer was not familiar with. The Society of Amateur Photographers of this city, with the facilities of access offered by General Newton and the Commissioners of Public Charities and Correction, undertook to photograph the explosion simultaneously from five different points —from the foot of East 93d Street looking east; from 89th Street, looking northeast; from the south end of Ward's Island, from the north end of Blackwell's Island, and from Astoria, looking west, the nearest point. Groups of four or five cameras were stationed at each location, with a leader who gave the word when each man should snap the shutter, general instructions having been given that they should operate at different periods of time, for the purpose of recording the commencement, the full height, fall, and finish of the explosion. It is estimated between fifty and seventy-five cameras were directed toward it. The results obtained by the Amateur Society were extremely satisfactory, inasmuch as the pictures show a complete record of the event, how the island appeared a minute or so before the explosion, the beginning, its climax, its fall, and the appearance of the water immediately after.

In Astoria four points of view were selected—one included the flat roof of a two story wood dwelling, on which were located five cameras, and from which a broadside view of the explosion was obtained. When the earth shock struck the house, the vibration was of such amplitude as to throw down two of the five instruments, resulting in the loss of the pictures intended to have been secured by the same. The shock was also sufficient to set off the shutters of some of the others before it was intended they should go. Altogether, however, the photographic record of the explosion was eminently successful, and will doubtless prove to be a valuable memento for General Newton, as well as a matter of special interest to those who took part in making it.

Improved Method of Development.—Following the lines suggested by Mr. Andra, at a meeting of the Photographic Society of France, wherein he advised the separation of the pyro solution from the alkaline, and the immersion of the plate in each separately for developing, the *British Journal of Photography* has conducted a series of experiments which appear to confirm the advantages claimed by M. Andra.

The plate should first be soaked in water from one to four minutes, according as the film appears to be hard or soft; then it is immersed in the following solution for two minutes:

A.

Pyrogallol	30 grs.
Sodium sulphite	120 grs.
Water	10 oz.

The solution may be poured back into the measure, and saved for use on several succeeding plates.

Sufficient of the following is then poured on, and allowed to remain until the development is complete:

B.

Ammonia, 0·880	1 drachm.
Potassium bromide	30 grains.
Water	20 ounces.

If the exposure is known to have been short, the full strength may be used at once; but, under ordinary circumstances, it will be found better to dilute the above with half its volume with water, subsequently strengthening it from a concentrated solution. In place of ammonia, for ordinary exposures twenty minims of the following solution added to two ounces of water will be sufficient:

POTASH SOLUTION.

Water	4½ ounces.
Carbonate of potash (chem. pure), 437 grs. to oz.	3 "
Sulphite sodium (chem. pure) dissolved in 3 oz. water, 437 grs. to oz.	2 "

If the development then proceeds too slow, twenty minims should be added at a time until it is accelerated.

For instantaneous exposures, the following is equal if not superior to ammonia, there being 480 grains to each ounce of salt.

POTASH AND SODA SOLUTION.

Water	32 ounces.
Ferrocyanide potash	3 "
Carbonate potash	3 "
Carbonate soda	3 "

Of the above add ¼ ounce to 2 ounces of water, increasing the quantity up to ¾ of an ounce if the details do not appear sufficient in the shadows.

By this system of development the image appears rapidly yet very harmoniously, the high lights not gaining in strength out of proportion to the shadows, and only the amount of pyro necessarily absorbed by the film is consumed. The pyro solution can be poured back into its measure, and be repeatedly used until it is exhausted. A fresh alkaline solution should be employed on each plate. The fingers are not stained, and there is less waste of the pyro.

When pyro is not used, Dr. Liesegang finds excellent results may be obtained by the use of separate saturated solutions of sulphate of iron and oxalate of potash. An instantaneously exposed plate is placed first in a saturated solution of sulphate iron for two minutes, after having had a preliminary soaking in water for one and a half minutes. The iron solution was next washed off, and the plate immersed in a saturated oxalate of potash solution. The development proceeded very rapidly, the image remaining absolutely clear in the shadows and gradually acquiring full printing density. Over-exposed plates were easily developed by using dilute iron and oxalate solutions. In such cases the addition of a small quantity of potassium bromide is recommended.

Red and Purple Ribbons Suppressed.

In consequence of a letter written by Examiner Antisell, of the Patent Office, the Secretary of the Treasury has ordered the use of red and purple ribbons in the government type writers to be discontinued in preparing papers intended for permanent record.

In reply to queries of the Acting Secretary of the U. S. Treasury, the examiner says: There are ten different ribbons used, five being copying ribbons, and five record ribbons.

The word "permanent," which appears in the inquiries presented, should be understood as referring to the power of resisting obliteration by the action of light, of washing, of treatment with acids and alkalies, as ordinarily practiced by those operating to remove the ink. The color of the ink may be changed by such treatment (as from blue to black, black to green, and other similar changes of shade), but, whether change of color be produced or not, the ink is not effaced; it is legible, the letters not obliterated, and therefore such ink may be said to be permanent.

This is eminently true of the black record ribbons.

Another ink is furnished, called the black indelible copying ink, which has also the above-mentioned properties of permanence.

The ribbons of other colors than the foregoing are . . . found to be fugitive—red and purple particularly so. They, for this reason, should not be used for recording permanent records. These inks cannot be styled permanent. It may be stated here that the same ink has different results as it is applied on paper by the ordinary writing pen and as applied to similar paper by the type writer; in the latter instance, from its soaking more deeply by the impact of the machine, and being forced below the surface of the paper, it is more difficult to be removed or reached by chemical agents applied; therefore, an advantage accrues in the use of the type writer over the pen. "Are copies made on the type writer by the use of carbon paper permanent in their nature?" may be answered as follows: If these carbon paper copies do not require to be frequently referred to, they may be said to be permanent in their nature. Owing to the light pressure upon the paper, the ink is not deeply embedded, and may be easily removed by friction. This appears to be an objection to the use of carbon paper. In all cases where permanence is desired, the paper should be as thin as may be consistent with its cohesive strength, and bearing as little thickening material or size as possible.

The American Institute Fair.

The fifty-fourth annual exhibition of the American Institute, now being held in New York, presents a favorable comparison with any of its predecessors, and is attracting great numbers of visitors, as is almost invariably the case with any show of general interest in New York city. While there are no very striking novelties in the great array of articles this year presented, there is a sufficient variety of objects of interest, representing good specimens of many different manufactures, and of machinery in motion, to be highly interesting to most visitors, and afford valuable instruction to the majority. There is a good display of steam and gas engines and their appurtenances, of wood working and agricultural machinery, and of stoves, ranges, and household furniture. The New York Trade Schools, the operation of which was fully described in the SCIENTIFIC AMERICAN in March last, have a fine exhibit, showing the work which young men are able to do after a few weeks' intelligent instruction in carpentering, wood carving, stone cutting, plumbing, and other departments of the building trades. Although the fair is always open for several weeks, intending visitors should not put off the matter too long, for it is but seldom that one is content with a single visit.

The McKeen Automatic Car Coupler.

In connection with our illustrations of car couplers in the SCIENTIFIC AMERICAN of Oct. 10, it was inadvertently stated that the McKeen device, when used with the old style couplers, necessitated coupling by hand. Mr. McKeen writes us that no hand coupling is required, as in his coupler the link can be guided from the side of the car to couple to any other device at present in use.

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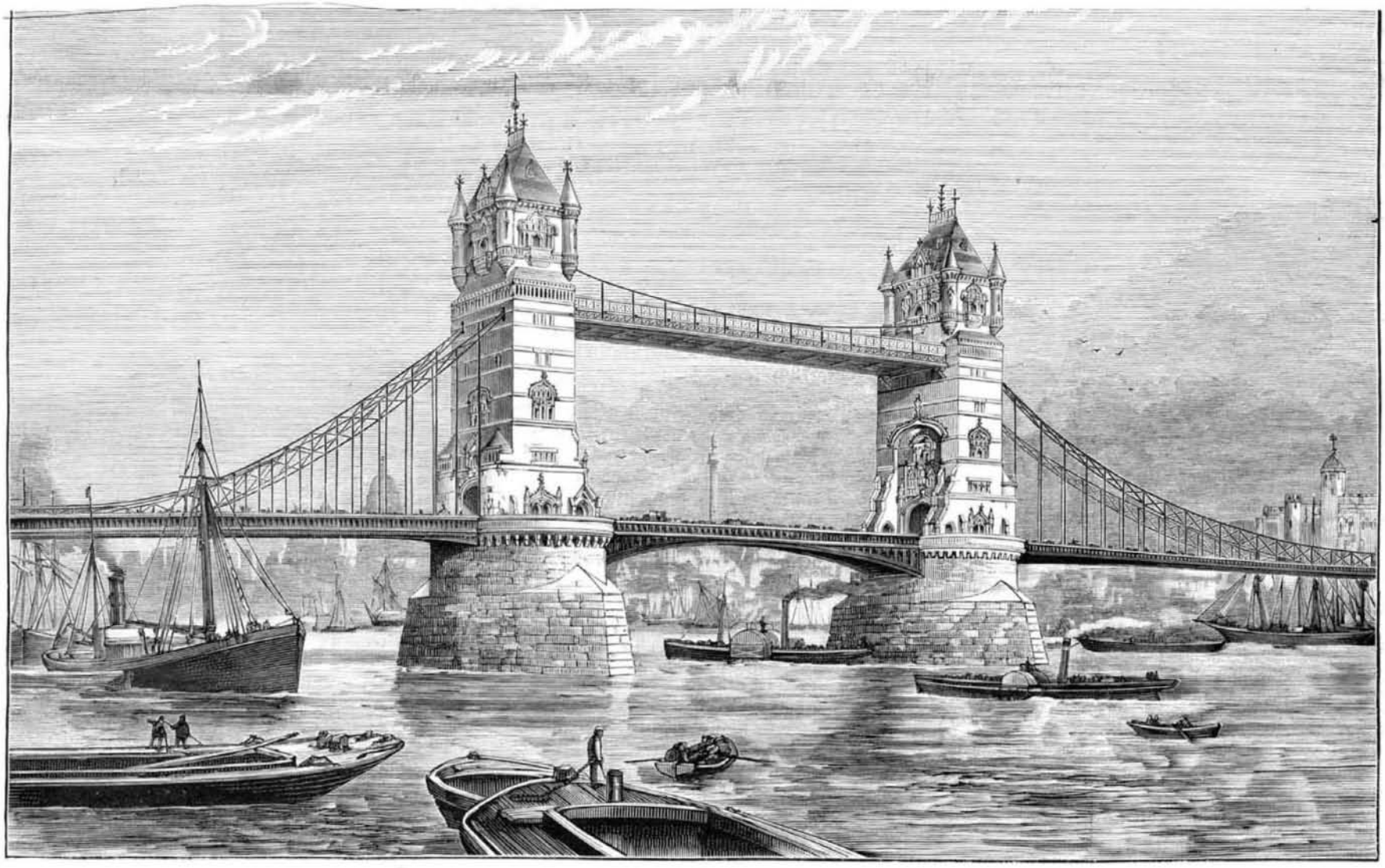

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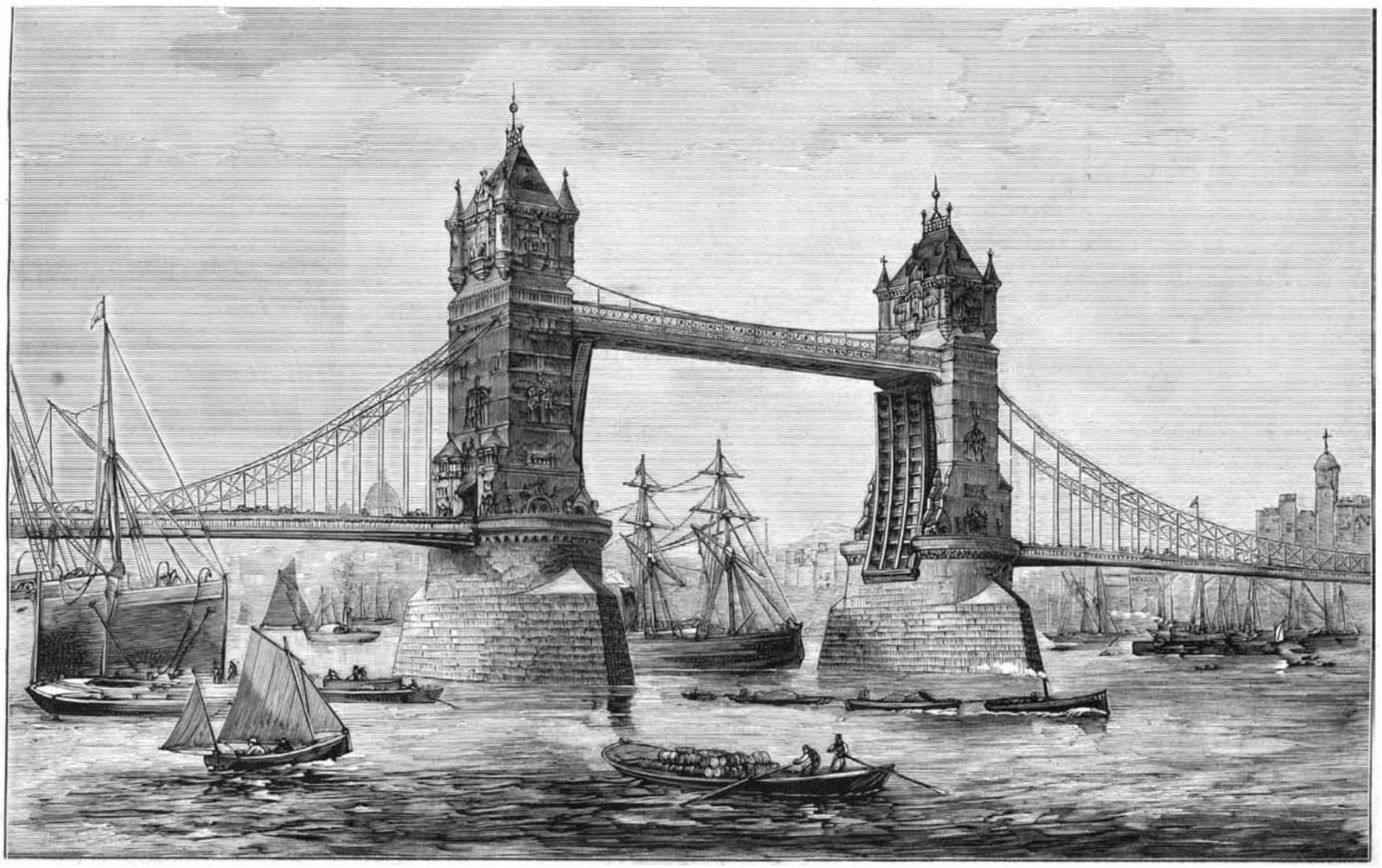

THE NEW BRIDGE OVER THE THAMES, LONDON, RECENTLY AUTHORIZED BY PARLIAMENT.—THE DRAW OPEN.—[See page 261.]