

**THE CODONOPHONE.**

The codonophone (bell music) is a new instrument designed as a substitute for chimes in the theater. It consists of a series of metal tubes, which, under the action of a blow, enter into vibration and render sounds analogous to those of bells.

Mr. Gailhard, the director of the Paris opera house, when he mounted the ballet named "Le Rêve," the first representation of which took place last June, obtained from a manufacturer in England a sufficient number of tubes to form a true chime that imitated bells quite well and gave forth sounds of a very satisfactory purity.

These tubes are of brass, and of a uniform diameter of  $1\frac{1}{2}$  inch and a thickness of one-tenth of an inch. Their length varies according to the note to be obtained, and is determined by means of an iron rod that traverses the tube at each of its extremities, and is riveted externally on each side.

Mr. Lacape, a Parisian piano manufacturer, with these new elements constructed for the opera house a true musical instrument formed of twenty-five tubes, and having a range of two octaves (from *do* to *do*, key of *sol*). The heavy hammers that strike each tube have an escapement. They are set in action by means of a keyboard and of a mechanism analogous to that of a piano. The playing of this instrument is a very simple and easy matter.

The lowest note is given by a tube 6 feet long that weighs about eight pounds and is equivalent, as to sound, to a bell weighing 176 pounds. The other tubes gradually diminish in length and weight up to the twenty-fifth, which is 3 feet in length and is equivalent to a bell weighing 72 pounds. The tubes collectively weigh about 220 pounds, and are equivalent to a chime of bells weighing from 3,300 to 4,400 pounds.

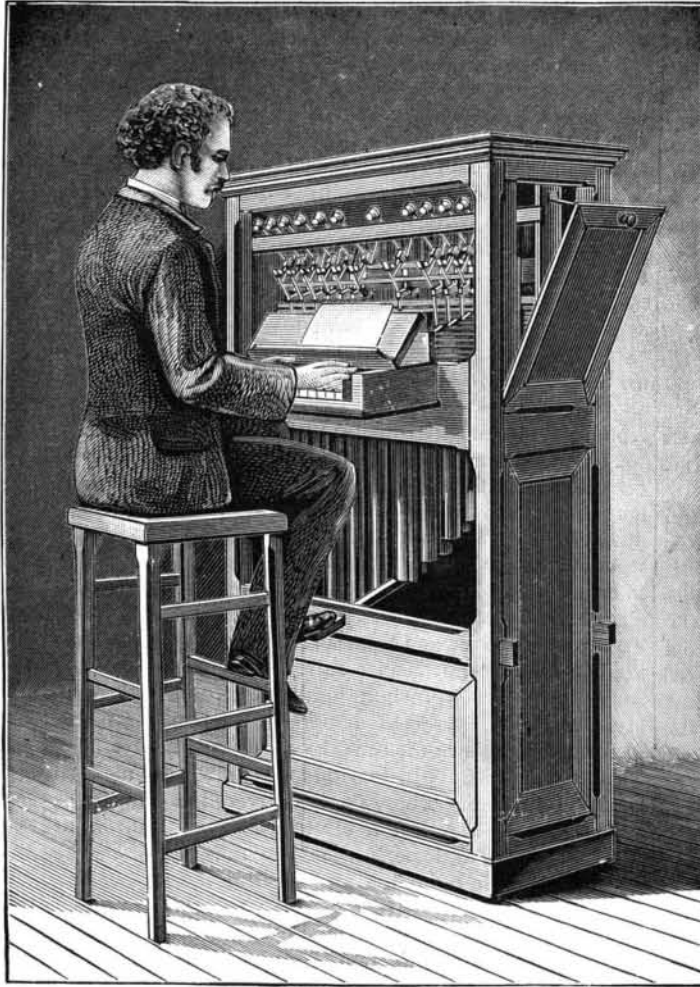
The codonophone, as now established, is capable of replacing what is called the sharp village chime. Although we thus succeed in producing sounds like those of bells, it must not be concluded from this that, as regards intensity and range of sound, we can succeed by this means in replacing those made in the open air.

In order to produce sounds analogous to those of large bells, it might be possible to use tubes of great length and wide diameter. This, in fact, is the method employed at the Bayreuth Theater in Richard Wagner's "Parfait;" but, in order to re-enforce the sound, large counter-bass cords and tam-tams are made to vibrate in unison, while the tubes are struck with hammers. In the "Rheingold" of the same author, an endeavor has likewise been made to imitate the sound of bells by means of a heavy cord that is made to vibrate within a sonorous box.

Again, we may mention a powerful chime composed of large bronze tam-tams, which is installed in the new Burg Theater of Vienna.

In the opera theater, in order to produce the sound of large bells in "Patrie," they use Mr. Sox's bell, which weighs but 15 pounds and gives the same notes as

an ordinary bell of several thousand pounds. This is formed of a sheet of brass six one-hundredths of an inch in thickness, in which several concavities have been made with the hammer. But, in order to re-enforce the sound and prolong the vibrations of this bell, it is necessary at the same time to produce the same note in unison with saxhorns, while an ordinary 220 pound bell gives it also, but two octaves higher.



THE CODONOPHONE A NEW MUSICAL INSTRUMENT, DESIGNED TO IMITATE THE RINGING OF BELLS.

We shall recall the fact, *apropos* of this, that, according to what is generally admitted, the number of vibrations of a bell varies in inverse ratio of the cube root of its weight, that is to say that the latter increases very rapidly with the lowness of the sound. As bells are always very heavy and pretty high priced, relatively to the note that they give, we may see how advantageous it is to be able to produce the same note with lighter instruments, such as metal tubes, especially in a theater, where we have no need of the same intensity of sound as in the open air. For our figure of the codonophone we are indebted to *La Nature*, and for the description of it to *Le Gentle Civil*.

**Ribbed Boiler Tubes.**

The Serve tube is a French invention, and differs from the common boiler tube in having a number of thin longitudinal ribs on its inside, usually eight, which extend radially toward its center. The boilers tested were each 10 feet 6 inches in both diameter and length, and were each provided with 126 tubes,  $3\frac{1}{4}$  inches diameter and 7 feet 6 inches long. The heating surface of each plain tube was 5.95 square feet and that of each ribbed tube 10.42 square feet. The total heating surface of the ordinary boiler was 956 square feet and that of the ribbed tube boiler 1,536 square feet. The furnaces were alike, two furnaces to each boiler, each 2 feet 10 inches diameter. The area through the tubes for the passage of the gases was decreased by the ribs, being 802 square inches in the ribbed tube boiler and 852 square inches in the plain boiler. The grate surface in each boiler was 31 square feet. In a twelve hour test, in which the induced fan draught was carefully regulated so as to cause the same amount of coal to be burned in each boiler, the amount of coal burned in each was 11,872 pounds, and the water evaporated, from a temperature of about 60 degrees into steam at about 10 pounds pressure, was in the case of the ribbed boiler 114,600 pounds, and in the case of the plain boiler 103,000 pounds, an advantage in favor of the ribbed boiler of over 11 per cent. In another test of three hours' duration the gain in economy was over 14 per cent.

**Another Proposed Large Tunnel under the Thames.**

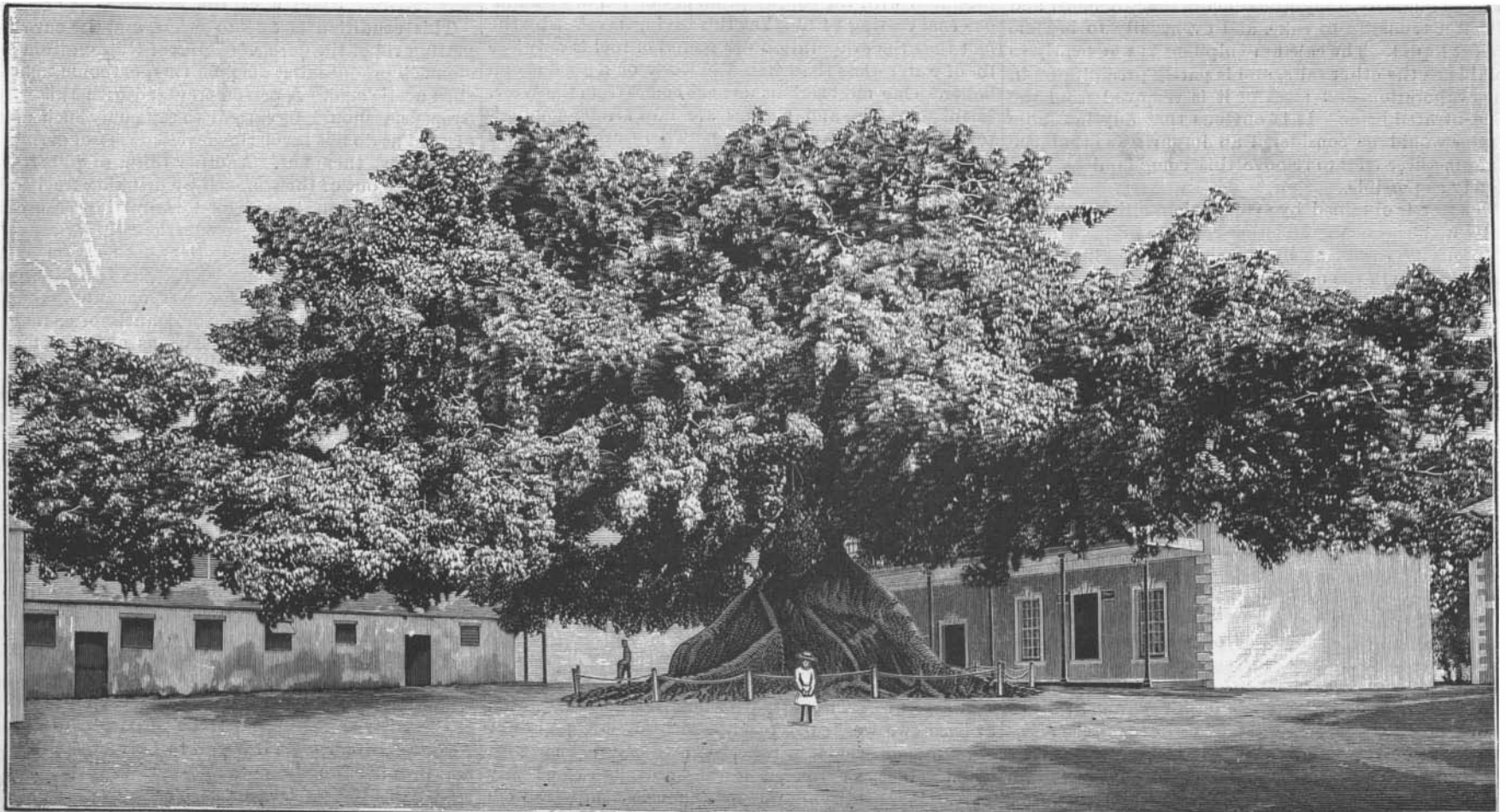
Sir Benjamin Baker, who was instructed by the London County Council to advise upon the practicability of carrying out the Blackwall Tunnel Scheme, has at length completed his labors, and his report has been issued to the members of the County Council.

It is chiefly based on observations of tunnels of a similar character in America, one of which has been successfully completed at Sarnia, while the other is in progress under the Hudson River. Sir B. Baker, who has only recently returned to England after inspecting these works, concludes, from his observations, that the proposed tunnel from Blackwall to Greenwich is entirely practicable. Sir Benjamin Baker recommends that in the first place a tunnel should be constructed of sufficient size to accommodate two lines of vehicular traffic, and that foot passengers should be provided for by a separate tunnel.

**THE SEBAE OR SILK COTTON TREE.**

BY J. F. COONLEY.

The sebae or silk cotton tree, *Eriodendron anfractuosem*, is a native of the West Indies. The one represented here is a very wonderful and interesting specimen, now existing at Nassau, N. P. Its branches spread over one hundred and seventy feet, and would extend still further, but are cut off frequently, as they



THE GREAT COTTON TREE OF NASSAU.