A ONE THOUSAND FOOT TOWER.

In January, 1874, the SCIENTIFIC AMERICAN gave the drawings and details of a one thousand foot tower which was proposed to be constructed by Clarke, Reeves & Co., in Fairmount Park, Philadelphia, Pa., near the Centennial Exhibition grounds. This idea was not carried out, but it has just been taken up again in France.

The example of the largest buildings that have been constructed up to the present shows that it is difficult, with materials in which stone plays the chief role, to exceed a height of from 490 to 525 feet, which may be considered as a limit rarely reached. In fact, the principal heights of known buildings are as follows:

	feet.
Washington Monument	555
Cologne Cathedral	520
Rouen Cathedral	490
Great Pyramid of Egypt	478
Cathedral of Strassburg	465
Cathedral of Vienna	452
Saint Peter's of Rome	433
Capitol, Washington	288
Spire of the Invalides	344

In order to exceed these heights it is necessary to have recourse to the use of metal, which is the only material that permits not only of supporting the vertical reactions of the structure, but also of resisting the stresses of flexion resulting from the action of the wind, and which is considerable for great heights.

It is such an application that has permitted the authors of the project of which we are speaking to propose a monumental tower that they have no fear of carrying up to a height of 300 meters (984 feet), and which will thus be nearly double that of the highest monuments known. This height of 300 meters might again, if need be, be notably exceeded.

The tower is designed, in the mind of its projectors, to form part of the structures that will be erected on the occasion of the Universal Exhibition of 1889.

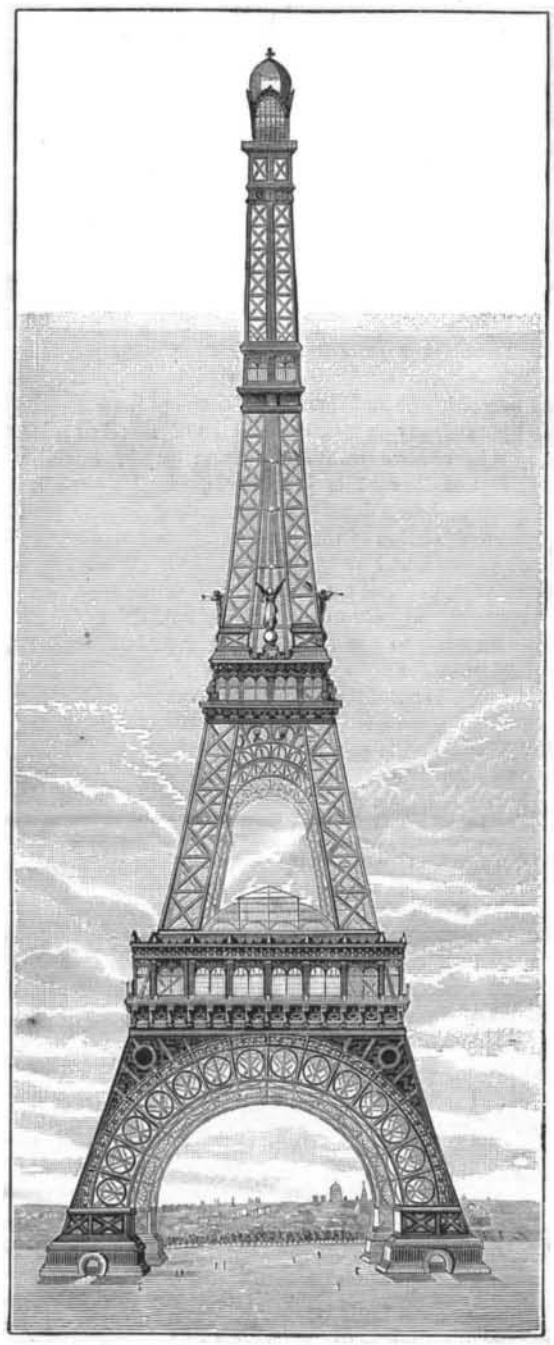
The metallic columns that have been constructed in recent times have usually reached a height of about 195 feet, and, in the present state of engineering art, there are no very serious difficulties in the way of reaching 260, and even 325 feet; but the question is entirely otherwise with the projected height of 984 feet, and in the detailed study there occur difficulties analogous to those that would be met with in the study of a bridge were it desired to pass from a span of 490 to one of 984 feet.

In fact, to cite but one special point, if we do not wish to multiply the uprights of the framework, we are forced to put in diagonal stays which exceed practical limits, and which at the base of the column reach lengths of more than 325 feet.

If, on the contrary, we multiply the uprights, we get a structure which is extremely heavy and of a deplorable architectural effect. It was necessary, therefore, to find a mode of construction which should limit the number of uprights, and nevertheless permit of doing away with the diagonal stays. This has been achieved in the present project, presented by Mr. G. Eiffel, the builder of the Garabit Viaduct. The framework of the tower consists essentially of four uprights that form the corners of a pyramid whose faces form a curved surface. The curve of such surface is determined by certain theoretical considerations of resistance to the wind that are characteristic innovations of the project, and to which we shall have occasion to revert when the latter is definitely established.

Each of these uprights has a square section that diminishes from the base to the summit, and forms a curved latticework 49 feet square at the base and 16 at the top. The bases of these upright are spaced 328 feet apart. They unite at the apex and form a platform 33 feet square. These uprights are anchored to a solid masonry foundation, and are connected at different heights by horizontal platforms that serve as a support for vast halls which will be utilized for the different services that will be installed in the tower. The one on the first story, the flooring of which will be 230 feet from the ground, presents a superficies of about 5,400 square feet.

At the lower part, and in each of the faces, is a large arch of 230 feet opening, forming the principal element of the decoration. It gives the tower that monumental aspect which is indispensable for the purposes for which it is intended. At the apex there is a glass cupola from whence a vast panorama may be seen by the spectator. This part will be reached by elevators in the interior of the uprights, so



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arranged as to give absolute security. Aside from the attraction and monumental aspect that will be presented by this tower, the boldest manifestation of engineering art of our epoch, it will be susceptible of different uses that will be taught by experience, and, among which, we can already foresee the following:

1. *Strategic Observations.*—In case of war there may be seen from the tower all the movements of the enemy within a radius of ten miles.

2. *Communications by Optical Telegraphy.*—In case of an investment, or of suppression of the ordinary telegraph lines, it will be possible from this elevated post to communicate by optical telegraphy with places at a considerable distance, such as from Paris to Rouen, for example, where the second observer will be placed upon a high hill.

3. *Meteorological Observations.*—An observatory at 984 feet above ground does not as yet exist, and a large number of questions, notably the direction and violence of atmospheric currents at such a height, has not yet been solved.

4. *Astronomical Observations.*—At this great height, the purity of the air, and the absence of the fogs that often cover the horizon of Paris, will permit of a certain number of observations that are now nearly impossible in ordinary weather in this city.

5. *Electric Lighting at a Great Height.*—By arranging electric lights of sufficient power upon this tower, as has been done in certain American cities, it will be possible to obtain a general illumination whose advantages have long been recognized, but which has not yet been realized on a vast scale. In this way the entire exhibition and its approaches may be lighted in the completest and most agreeable manner, by means of a single luminous center.

Still other applications may be foreseen, either in the domain of practice, such as the indication of time to a great distance, or in the domain of science, which will for the first time have at its disposal a height of 984 feet that will permit of studying the fall of bodies, the resistance of air at different velocities, certain laws of elasticity, the compression of gases or vapors, the planes of oscillation of the pendulum, etc., etc.—*Les Annales des Travaux Publics.*

MACHINE FOR MAKING COMPRESSED YEAST.

The engraving which we present herewith is sufficiently clear to enable the apparatus to be readily understood. After the device is properly mounted, a force pump is connected with the chamber in which the yeast has been placed.

The filters consist of fabrics which are stretched in frames, these being held firmly pressed against one another, so that the yeast may not escape between the points of contact of the frames.

In order to put the apparatus in working order, the wheel screw is turned until the filtering plates press firmly against one another. The machine is charged by means of the force pump which is connected with it. At first it is necessary to pump quite slowly, until the liquid passes through all the chambers of the filter, and then the pump is worked more rapidly until it becomes quite difficult to move it.

As soon as the water ceases to flow, except drop by drop, from the opening, which occurs ordinarily in 40 or 45 minutes, and as soon as the safety cock connected with the receiving pipe permits the yeast to escape (being driven back by the pump), then is it time to empty the chambers. In order to accomplish this, the wheel is turned and the movable head of the first filter chamber is removed, which leaves the yeast quite exposed; the yeast is scraped with a knife from the straining cloth into a receiver placed under the press. In the same manner each chamber is emptied in succession.

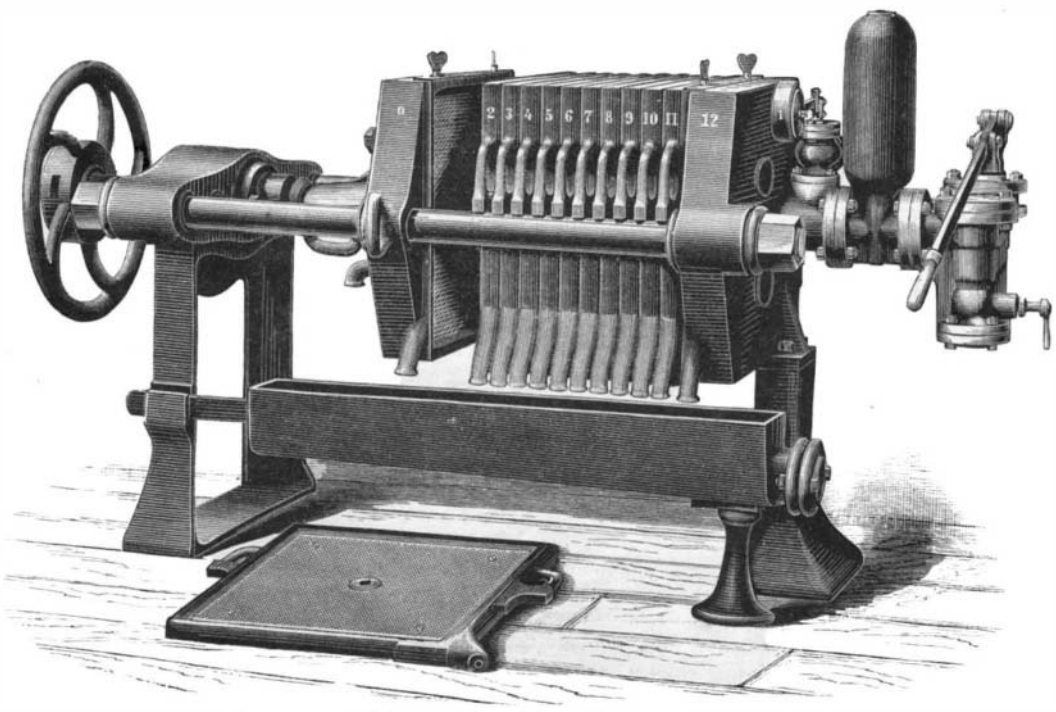
This being accomplished in order to put the press in a proper condition for future use, care must be taken to remove all the yeast that may cling to the frames and the straining cloths. If this precaution is not taken, the yeast will probably escape from the chambers during the next operation.

The improved yeast presses of Messrs. Wegelin and Hubner are constructed on four models. The largest, which are provided with 18 chambers, will produce from 3,000 to 3,500 pounds of compressed yeast in 12 hours, ready to export. As they only measure about 6 by 3 feet, the room they occupy is very small as compared with the work they accomplish.

One man is sufficient to operate the press. The liquid yeast is reduced without the slightest loss to the desired consistency, and the water which is squeezed out of the yeast is quite pure, while the preparation of the yeast is accomplished with great cleanliness. The filtering cloths used in these presses are placed in the closed chambers on frames having fine perforations.

This is a much more satisfactory process than the filtering pockets employed with presses provided with a simple lever or screw. These pockets under the weight of the press are distended laterally. The fabric is rapidly worn, and these pockets when filled with yeast give way, and a loss of the yeast is an inevitable consequence.

This defect is not to be apprehended with the filter press, and the saving resulting from its use would very soon pay the first cost of the machine.—*La Distillerie.*



MACHINE FOR MAKING COMPRESSED YEAST.

THE amount of counterfeit paper money now in circulation is said to be less than at any time in the last twenty years.