VAPORIZATION IN TUBES.

The steam boiler is certainly one of the appliances of modern industry that has received the most study, and one that has been gradually modified in its different parts in measure as experience has supplied new information. Manufacturers and engineers have especially endeavored to assure the circulation of water in order to prevent overheating and other accidents of the kind; and every one knows the interesting arrangements adopted in multitubular boilers. There has been much discussion as to the theory of these apparatus, and many explanations have been proposed, that have been based upon the differences of density of the hot and cold water, to account for the circulation that occurs. It is unnecessary to revert to these different theories, as we desire merely to set forth the results of two suggestive experiments carried out by Mr. Solignac, and easy to repeat. Let us take (as shown in Fig. 1) a glass vessel that is provided with a tubulure, E, at the side. Let us put this tubulure in communication with a metallic tube placed above a gas burner, and connect it with a glass one curved at the upper part and returning at G above the glass vessel. Let us cause the gas to burn with a moderate flame. In a few minutes, we shall observe in the vessel, at E, a disengagement of steam at the top of the tube and a re-entrance of water at the bottom. At the same time, the tube becomes red hot at the place that is exposed to the flame, and we see that a column of water is rising slowly in the prolongation of the tube, and that it but very rarely overflows at G. This first experiment plainly shows us that, with the arrangements adopted, there is no circulation of water properly so called. And yet the water in the left part of our tube is certainly hotter than that derived from the vessel. Let us not forget, either, that the part of the tube exposed to the flame becomes completely red after a few moments of heating.

Let us now very slightly modify the first arrangement by adapting, at E, to the exit orifice of the metallic tube, a pierced plug of a diameter smaller than that of the tube. This plug is seen held in the hand in Fig. 1 and placed in position in Fig. 2. Everything leads to the belief, in the first place, that since the section of the tube is diminished, the result will be that the water will have more difficulty in passing, and that it will be possible to succeed in heating to redness a tube that is traversed by but a very small quantity of water. Yet we shall soon see the red color of the tube gradually disappear, and shall be able to follow the gradual progress of the water that arises and circulates, through the shadow that we shall see advancing; for at the passage of the water the tube becomes cool.

Fig. 2 refers to this phase of the experiment. The phenomenon is so striking that we reproduce it in a cartouche so as to show perfectly what occurs in practice. After a few instants, the tube resumes its dark color, and upon withdrawing the flame, it will be possible to touch it with impunity. The temperature does not exceed over 35°. It is not without a certain amount of apprehension that the fingers are moved toward the tube at this instant, and we must confess that when Mr. Solignac repeated these experiments in our presence and invited us to touch the tube, we did it only upon seeing him act without any backwardness.

The experiment teaches still another thing. In this latter case, the hot water and the steam make their exit at G in a regular manner and in abundance. There is then, in this particular case, a true circulation of water.

These changes were effected through the putting in place of the plug, E. It must therefore be really concluded that, in order to assure a proper circulation of water in a boiler, it is necessary to reduce the diameter of the tubes at the points where they detach themselves. Under such circumstances a resistance is created near the boiler, and the liquid, through that fact, displaces itself at the opposite side. The motion once produced, as in the priming of a siphon, a circulation is established in the tube and easily keeps up. Let us remark, too, that in the second case the heating was carried as far as possible by increasing the flame, and that the highest limits, corresponding to a combustion of about 880 pounds of coal an hour and per square meter of grate surface, were attained. In the first experiments the combustion did not exceed 220 pounds of coal. In order to render the experiment still more striking, Mr. Solignac repeats these experiments with tin tubes. In the first experiment the tube is rapidly melted, but in the second it resists and withstands the heat.

In practice the consequences of this simple experiment may be important. In order to prevent accidents due to superheating and to defects of circulation of the water, it will therefore suffice, according to Mr. Solignac, to adopt the arrangements that we have just pointed out.

Mr. Solignac proposes to adapt the new arrangement

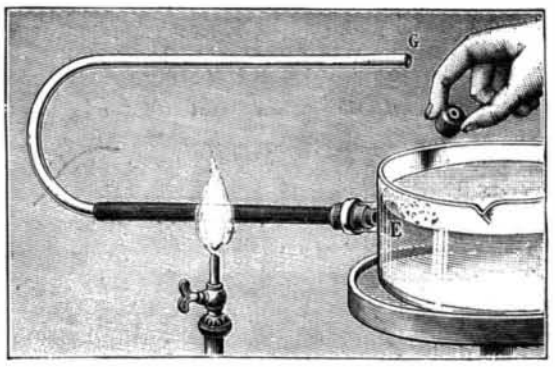


Fig. 1.—EXPERIMENT UPON VAPORIZATION IN A TUBE.

to a boiler of his devising, in tinning the tubes in order to render the demonstration still more evident. We hope that the results will prove satisfactory, and especially that they will be supported by experimen-

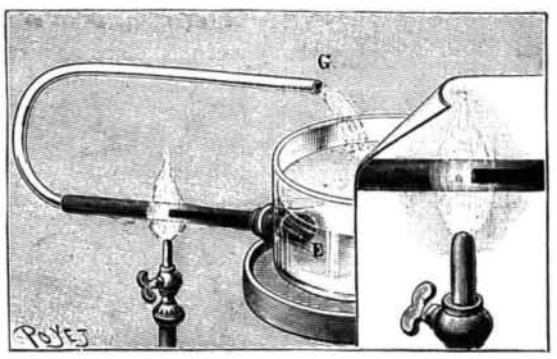


Fig. 2.—A SECOND FORM OF THE EXPERIMENT.

tally determined figures that will fix our ideas definitely as to this question, which is interesting from many points of view. We shall have here a true progress to put upon record.—La Nature.

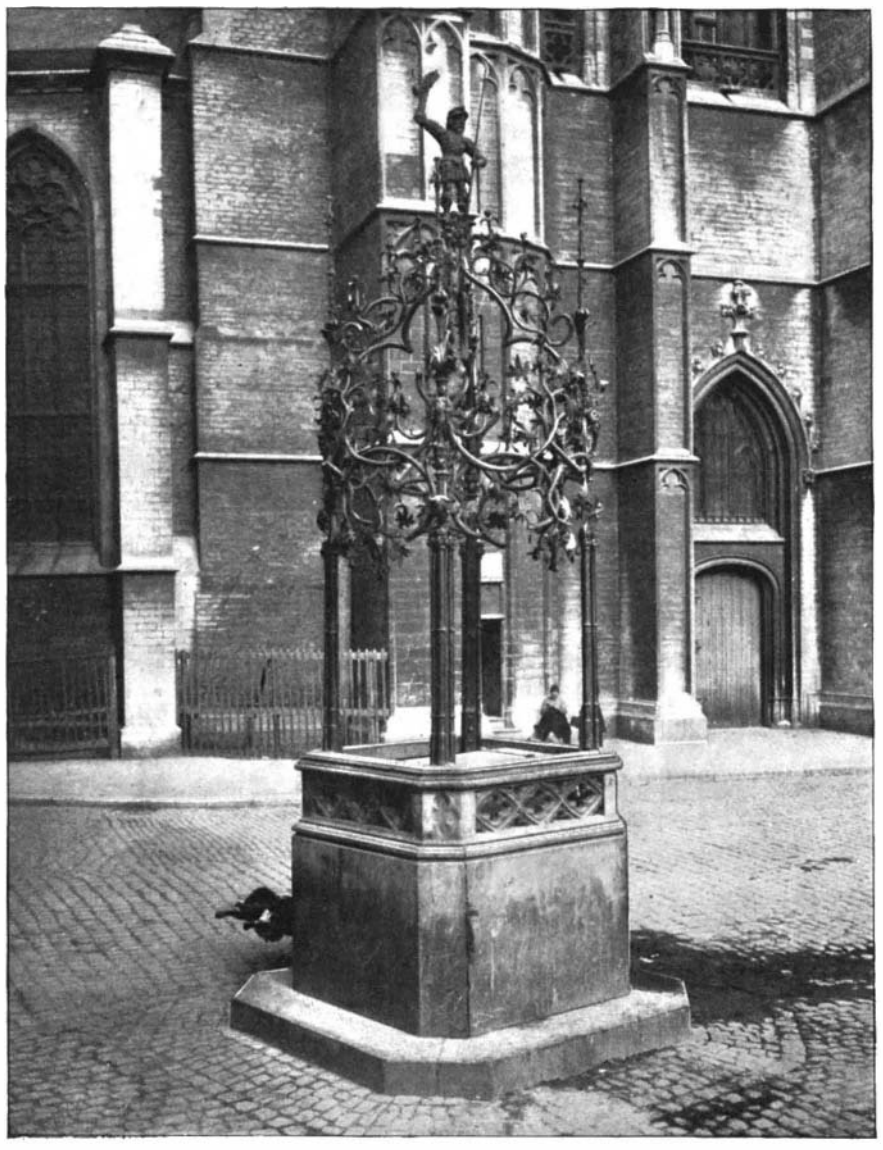
QUINTIN MASSYS' WELL.

Quintin Massys, or Matsys, was born at Louvain in 1466 and died in 1530. He was a notable Flemish painter, and in the well adjacent to the principal portal of the Cathedral of Antwerp he has bequeathed one of the finest examples of the smith's art—an example so fine that it ranks with the very foremost production of art iron work of any country and any time. At the beginning of the sixteenth century Antwerp usurped the position in the art world formerly held by Louvain, Ghent, Bruges and Mechlin. Though there are various legends as to his becoming a painter, still it is very possible that, like such a large number of the many-sided artists of the Renaissance, he felt that he could excel in various branches of the fine arts. As a painter he raised the school of Antwerp to a high plane, and he was one of the first Flemings to adopt the showy and effective Italian style, though in technical execution he did not fall one whit behind his predecessors. As a smith we must all admire his consummate masterpiece—the well of Antwerp.

This exquisite production of the hammer consists of an open canopy covering the stone well curb. The canopy is supported by four slender pillars and it is surmounted by a statue of Salvius Brabo, a mythical hero who defeated and cut off the hand of the giant Antigonus. Besides being a smith and painter, he was also a sculptor and woodcarver. Erasmus speaks highly of a bust of himself cast in bronze by Massys.

From a Latin poem of Sir Thomas More it would appear that Quintin carved medallions in wood. His intercourse with Erasmus and other scholars indicates that he was a man of some learning, and when Albrecht Dürer made his famous journey to the Low Countries he eagerly sought out Massys.

As Leonardo da Vinci, with all his appalling list of accomplishments, considered himself a painter, and as Michelangelo, the "man with four souls," considered himself a sculptor, saying that "painting was not his business," so we find Massys speaking of himself as "at one time a blacksmith, but now a painter."



QUINTIN MASSYS' WELL AT ANTWERP.

Curious Clocks.

The timepiece ordered by the Duc d'Aumale's grandfather from Bouchier for the Prince of Wales, afterward George IV of England, was recently sold in Paris. It is in the form of a negress' head, admirably modeled. Jewels are incrusted in the bronze around the neck to form a necklace, in the woolly hair, and in the bust as a clasp for the handkerchief. A pair of openwork gold earrings, long and delicately carved, hang from the ears. On pulling one of them the hour is shown on the right eye and the minute on the left. If the other earring is drawn, a set of musical bells, lodged where the brain should be, chimes out the time of day. A clock without works is a distinct novelty, yet one formerly stood in the splendid Cour de Marble at Versailles, where it was installed in the reign of Louis XIV. Its hand always pointed to the exact moment of the death of the last King of France, and it never moved during his successor's reign. Thus, as one writer has put it, it was a perpetual reminder to the most splendid of courts that "the paths of glory lead but to the grave."

In the private collection of a gentleman in the south of England is a timepiece which records the age of all the planets by an arrangement which gives the exact revolutions of each one. Besides giving the golden number, the dominical letter, and other similar information of equal interest, this remarkable clock records the time when it is high tide at various points in Europe. Some time ago a description appeared in an American journal of a Japanese clock standing in a frame three feet high and five feet broad, representing a landscape of great beauty. In the foreground were plum and cherry trees in full bloom, while in the rear was a hill, gradual in ascent, from which flowed a cascade of crystal. From this point a threadlike stream glided along, encircling rocks and tiny islands in its wanderings, but presently losing itself in a far-off stretch of woodland. In the sky turned a golden sun, indicating, as it passed, the striking hours, which were all marked upon the frame below, where a slowly creeping tortoise served as a hand. A bird of exquisite plumage, resting on the branch of a plum tree, proclaimed by its singing the expiration of each hour; while, when the song ceased, a little mouse sprang from a grotto close by, and running over the hill hastily disappeared in the distance.—The Keystone.

THE number of papers published in Japan during 1895 was 792, and the number of copies printed 244,000,000. Some papers are published in English and Japanese. Most political papers do not succeed, owing to the strict laws and numerous fines.—Uhland's Wochenschrift.