STERILIZATION OF WATER BY HEAT.

Hygienists have in all times recommended the use of boiled water when there was reason to suspect the water employed for drinking purposes. This precaution is still among those that the attention of the public is earnestly called to as soon as an epidemic of diarrhœa, cholera, etc., is threatened or develops itself. But, although so general a measure is easy to indicate to private individuals, it is more difficult of application to the population in general of a crowded locality. This is the *raison d'etre* of Messrs. Rouart, Geneste & Herscher's new apparatus for sterilizing water by heat. This ingenious apparatus furnishes the solution of a problem which has for many years occupied the attention of the Consulting Committee of Public Hygiene of France, and particularly of its eminent president, Prof. Brouardel. There is not a week passes in which the committee is not informed of the existence at some point in France of some epidemic or other, such as of typhoid fever, for which there is reason to recommend the use of boiled water to the population attacked. The same is the case in the army at every instant.

Now the French Board of Health, which possesses a most remarkable *materiel* of disinfection, has for a long time desired to add thereto some apparatus designed for the sterilization of water by heat, and which it might induce cities to procure, or which it might send to localities visited by an epidemic when the necessity therefor should be demonstrated. This project has just been put in execution, after numerous tentatives, by Messrs. Rouart, Geneste & Herscher, in the following way: The drinking water is led into a pump, whence it is sent to the lower part of a metallic cylinder containing a worm. When this cylinder is filled, the water reaches the bottom of a second cylinder constructed in the same way, and then it is finally led to a receiver, in which it is heated to 120° under pressure, in contact with steam pipes connected with a boiler (Fig. 1). After the water has boiled for a certain length of time it is forced into the worms of the two cylinders designed for the reception, in the first, of the pure water; then, after cooling, and a subsequent filtration through a layer of silicious sand, it flows outside.

The boiled water must be promptly consumed, for, like all pure water, it possesses the singular power of becoming rapidly, but temporarily, self-infected. Whatever may have been said of it, it is easily digestible after it has been sufficiently aerated. It would be well, then, to obtain it in sufficient quantity, at least, for drinking purposes.

Fig. 2 gives a diagram of this ingenious apparatus, which comprises, essentially: A boiler with an independent steam reservoir, one or more exchangers, and a filter. The exchangers, which are cylinders provided with worms, constitute the most interesting and original part. The impure cold water that they receive is heated by the temperature of the boiled water circulating in the return worms, and this same boiled water becomes cooled therein by giving up its heat to the water which goes to the boiler. In this way the exchange of temperature is effected without expense, and it is possible to easily furnish, on its exit from the apparatus, water sufficiently cool to be used at once.

In fact, experience has proved that water that has been submitted in this apparatus, for at least fifteen minutes, to a minimum temperature of 120° may make its exit therefrom with a temperature but 2° higher than that which it had when it entered. As for the micro-organisms that it contained, there no longer remain any trace of them. It is absolutely sterilized. The statements of Messrs. Miquel, Pouchet & Charrin are very precise and demonstrative on this point. It remains to be known how such an apparatus can be put in use. Messrs. Rouart, Geneste & Herscher have devised several arrangements to this effect. In one, it is by the aid of a hand pump that the water is introduced; in another, much larger, a pump fed by the boiler allows the impure water to circulate in the various parts.

These different models are mounted upon wheels, so that they can be moved about and installed *in situ* in communities visited by epidemics. Fig. 1 represents an installation of this kind upon a village square, whither the inhabitants are coming to fill their pails and pitchers with water that has been sterilized by boiling, that is exempt from germs, and that is without a disagreeable taste. They obtain the water from a tube, whose extremity they lift up, so as not to soil it.

The low net cost of water thus boiled favors the application of this industrial process, which has already rendered signal services in the barracks of the marine at Brest, where typhoid fever prevailed for many years almost in an epidemic state.—*La Nature.*

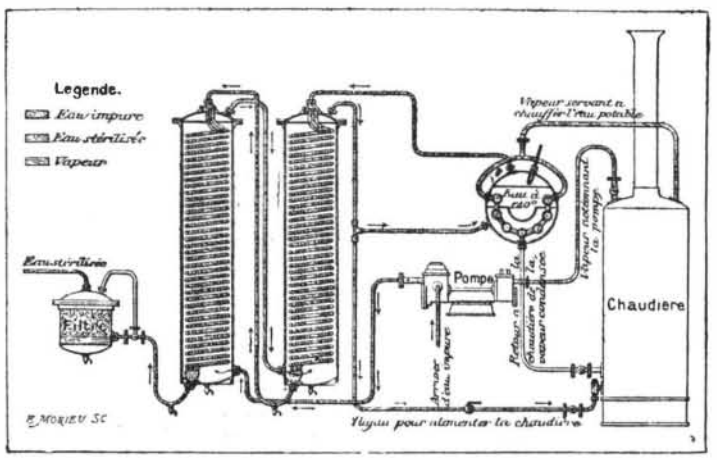

Fig. 2.—DIAGRAM OF THE APPARATUS.

Good and Simple Plumbing Idea.

One of the finest object lessons in sanitary plumbing in the United States is, according to the Philadelphia *Ledger*, the new Institute of Hygiene at the University of Pennsylvania. Throughout the building the pipes have been left outside the walls, and each painted a distinctive color. Thus a maroon pipe, wherever found, is a steam pipe, red always denotes hot water, blue stands for cold water, white means gas, and yellow shows drainage. This makes it possible to trace each system in all its branches, and test it at will, from the cellar to the roof. About everything in the way of drainage devices now known is in the building, and anything put on the market will be given a fair trial.

Cleaning Castings.

Two methods of cleaning iron castings are in general use. One, which is applicable to small castings, consists in treating the pieces in a tumbling barrel, the knocking of the castings together serving to dislodge the sand attached to the casting, but the objection to this method is that the treatment which removes the sand also defaces the castings, by removing the finer features and destroying the corners. The other method of cleaning castings consists in placing them for several hours in a pickle or acid bath (a mixture of one part of sulphuric acid to ten or twelve of water); the acid attacks the surface of the iron and releases the scale.

The sand blast has been suggested as a substitute for this latter method. It is said that it will readily remove the sand spots, leaving the castings in good condition. It would seem, however, that unless the bare portions of the casting are protected, the sand blast would attack the iron as readily as the scale. As it is obviously impracticable to protect the bare surfaces of the iron, it would seem that the sand blast method has very little of practical value.

Fig. 1.—APPARATUS FOR STERILIZING WATER BY HEAT.

Lathe Testing.

The method of lathe testing, which consists in bringing the centers of the lathe together and sighting them, is of no value for even ordinary machine work. If the centers could be adjusted exactly in line by this method, when they are separated they may be found incorrect for any other distance.

It is practically impossible to turn a true cylinder between the centers of any lathe, however perfect; true cylinders can be produced by grinding only, the work being supported upon the centers.

The first operation in testing a lathe is to put the centers in line at a distance of from two to ten feet, according to the size of the lathe. Place in the lathe a piece of shafting, stiff enough to support itself without springing; square up its ends, and center it, taking care to have the centers drilled deep enough to prevent the lathe centers from bottoming. Insert a pin in the end of the shaft, so that it can be driven without the use of the lathe dog. With a sharp tool turn the head end of the shaft for a short distance. Then, without moving the tool, take the work out of the lathe, run the tool carriage down to the tail stock, replace the work, and turn the opposite end of the shaft for a short distance. If the calipers show no variation in the size of the work at opposite ends of the shaft, the lathe is in line; if there is a difference, the tail stock must be set over until the tool, without further adjustment, turns the same diameter as it did at the opposite end of the lathe. In making this test the tool should be set exactly level with the centers.

With the lathe adjusted to this extent, remove the turning tool and insert another having a very fine point. Run the carriage back, remove the live center, replace it with a stick three feet long fitted to the spindle and firmly driven in the place of the center, run the carriage up and allow the fine-pointed tool to scratch the end of the stick as it revolves; if it makes a point, the lathe is true. If the tool describes a small circle, the lathe is out of true, and the headstock must be readjusted by scraping the surfaces which bear upon the bed, to make the necessary correction. Remove the tool and run out the tail spindle; if the dead center goes into the point made by the tool, the lathe is true. If the center does not enter the point, the tailstock must be corrected by scraping, as in the case of the headstock. This method of testing is open to the objection that the stick may spring of its own weight. Lathe builders have special apparatus for this purpose, consisting of rigid metal bars or light rods stiffly trussed.

Dr. Brown-Sequard's Treatment.

At a recent meeting of the Academy of Sciences, Paris, much interest was created by Dr. Brown-Sequard's paper on his system of treatment with injections of a solution of sperm fluid. The *savant's* address bristled with proofs of its efficacy. He instanced a patient of 80, living at Mauritius, who was restored from a paralytic and atonic state to health and vigor. Another somewhat younger man, bed-ridden, and regarded as moribund, was re-established sufficiently in a fortnight to take severe horse exercise, "and now," drily added the doctor, "his health improves so rapidly that the family have forbidden the medical man to continue the treatment." Dr. Brown-Sequard claims that the 20,000 injections made by him during the last three years have been invariably successful, and that the system is without equal in cases of weakness and debility. He specially touched on the treatment of tuberculosis and locomotor ataxy. The physical improvement, far from reacting on the patient's spirits, invigorates the mind at the same time as the body. This remark, coupled with the eminent doctor's exhaustive discourse, and his fresh and vigorous appearance, created a whisper in the assembly that Dr. Brown-Sequard had himself laid the guinea pigs under contribution, although he did not mention the fact in his discourse.

A SODA water fountain which works on the nickel in the slot plan has been invented; the customer helps himself, but cannot get more than 5 cents worth at a time.