$6,700) in return for the free treatment of poor lupus patients.

Within the last few years many arc lamps with metallic electrodes have been invented, which emit a far larger proportion of violet and ultra violet rays than the ordinary carbon arc lamp produces, chief among which is the mercury vapor lamp.

The Kromayer lamp, which is a modification of the Couper-Hewitt lamp and finds considerable employment in light treatment of disease, contains a tube of fused quartz, two-thirds of an inch in diameter, having the form of an inverted V. The air is completely removed from the tube, the ends of which form mercury cups, which constitute the electrodes and are connected to the lighting wires. This luminous tube is inclosed in a globe, which is also made of fused quartz, and the globe is inclosed in a water-tight case of nickled brass, provided with a quartz window, which can be pressed directly against the skin of the patient. The

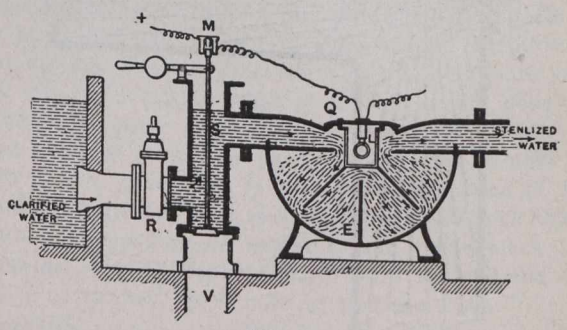

Fig. 3.

space between the quartz globe and its metal case is filled with cold water, which enters continuously through a tube at the bottom of the case and flows out through a tube at the top. The lamp is ignited by tipping it and thus causing a thin stream of mercury to flow along the tube and establish connection between the electrodes. When the lamp is righted and the thread of mercury is broken a powerful luminous arc is formed in the mercury vapor which fills the tube. Local treatment, with or without pressure, can be applied very conveniently with this lamp, but great care must be taken to avoid burning the skin. This treatment is efficacious in all forms of eczema, carbuncles and ulcers of the legs and various parts of the skin and mucous membranes, but especially in "wet" eczema and in circular baldness. Treatment with pressure is employed especially in lupus and burns.

When science had demonstrated her ability to cope with the diseases of men through these mystic rays, mankind in turn bethought himself of using this agency for the purification of his water supplies. The first serious attempt at this appears to have taken place at Marsailles, France. A description of the apparatus used and some details were given in the pages of this journal in the issue of July 13th, 1911, page 47. However, some further details will be of interest at present.

In order to find the best solution of the problem, the municipal council of Marsailles organized a concourse of sterilizing apparatus. Such a plant was required to deliver 200 cubic metres (261.5 cubic yards) of water per 24 hours, and was to be run continuously for one month. The inspection committee included some of the leading specialists in hygiene, mining and civil engineers, and professors of universities. The results of the tests showed that the ultra-violet-ray process was undoubtedly the best for municipal use, as it has none of the defects mentioned below. It uses a small amount of current, and this has now been lowered in the new apparatus. Neither taste nor smell is given to the water, and the sterilizing is very effective. At the same time the process is easy to carry out and the apparatus needs but little attention. The first cost of the plant is low, and it occupies but a small space.

There seems to be a great future in store for the new method, seeing that it has none of the drawbacks which are found with the other processes when it comes to using it on a large scale.

In the sand-filtering method, for instance, the filters occupy a large surface of the plant, and when not properly operated the results are very imperfect. Besides, the first cost of installing the filtering plant is high. Chemical products added to the water for sterilizing have the disadvantage of giving a bad taste to the water, and the method is not much favored for that reason. One of the best methods, to recent date, for municipal plants has been the ozone process, it has been used in some large cities. However, it gives a certain taste to the water which disappears but slowly, and on the other hand there must be a great care taken in the ozone production in order to avoid forming any nitrogenous products, which would vitiate the water. Hence the process is somewhat difficult to carry out, or at least needs great care and attention.

The ultra violet ray apparatus was used in connection with a Puech-Chabal filter in order to act upon clear water, and this was necessary from the fact that the Duvance water is very heavily charged with impurities which render it turbid. After leaving the filter it passes at a continuous rate through the ultra violet ray apparatus.

Fig. 2 shows the appearance of the Marseilles apparatus and Fig. 3 the sectional view. In the former apparatus, the lamps were placed above the surface of the water upon floats, so that all of the radiation from the lamp could not be used, and in fact there was only one-third of the rays actually employed for the sterilizing. A means was sought of utilizing greater proportion of the rays without changing the manner of working the arc. Ii is recognized that the working of the lamp depends essentially upon the temperature of the electrodes and the luminous tube, so that if we cool the lamp too much we will not obtain the same yield in ultra violet rays as before, and to reach the same yield, the current must be considerably increased. For instance, if we immerse the quartz lamp in the water itself, according to Messrs. Courmont and Nogier's method, we are obliged to double the current in order to obtain the same yield as in air.

A great improvement is obtained by the Marseilles apparatus in this respect, as it allows of utilizing more than three-quarters of the rays given by the lamp, and here the lamp burns in air at its best conditions of working, and immersing it in the water is avoided. The lamp is placed in a rectangular case whose three sides lying parallel to the lamp tube are formed of quartz plate. The tight box Q containing the lamp L is placed in a semi-circular apparatus having five partitions in the inside. The water is taken from a tank of filtered water and passes through a gate valve and a cylinder chamber S, then entering the main tank E. It follows around the path which the arrows indicate, and in this way it is exposed for some time to the action of the ultra violet rays, so that we have a powerful sterilizing effect. It is found best in practice to use an automatic valve at the water inlet and it operates in the chamber S. A valve in the lower part of the chamber is normally closed and is held up in this position by an electro-magnet M which attracts an armature mounted on the end of the valve rod. A counterweight is used to give the proper adjustment of the weight. The electro-magnet is connected in series with the lamp, so that when current passes in the lamp circuit the magnet acts and the valve is held closed. Should the current fall or the lamp break, the magnet allows the valve to