of twenty feet. The capacty is three million gallons daily, although the quantity actually filtered for distribution at the time of the report was only two million gallons. The cost of the filters and clear-water basin was $55,000, and the daily expenses eight dollars for alum and two dollars and fifty cents for labor.

So much experience has been gained in the construction of these filters that filtration can no doubt be effected more rapidly and economically under the supervision of the patentees, than on new plans which must be at first regarded as merely experimental. But if the attention of boards of health, water companies, and sanitary engineers were directed to the development of the best filtering plant, other and better methods might be suggested and carried into practice; or, if the patent process were proved to be superior to all others, the ability to express a prompt approval would be substituted for our present hesitancy. The passage of water through a filter-bed, the regular cleaning of the filtering material, and the addition of alum iron, lime, or other precipitant to the water are essentials of the process; but the patents necessarily cover only the specific mechanism by which these are brought into operation in that particular process. The natural laws of filtration, and of mechanical and chemical action, are open to the ingenuity of the world.

Recently Mr. L. H. Gardner, of New Orleans, has been experimenting on the large scale with solutions of iron, not as an adjuvant to filtration, but to hasten sedimentation in the settling basins. Iron as a precipitating or filtering agent has been used in various forms and to a considerable extent, on the large scale, as a water-purifier since Medlock, in 1857, patented a process in which water was treated by contact with metallic iron. Spongy iron attained even a popular repute as a filtering material, but at the present time in Europe it has been displaced by the Anderson process, which is said to be in successful operation at Antwerp, Ostend, Paris, and Vienna. The water in this process is first partially sedimented and then forced through a revolving purifier consisting essentially of a wrought-iron cylinder mounted on hollow trunnions, which serve for inlet and outlet pipes. Curved ledges, running lengthwise of the cylinder on its inner surface, scoop up and shower down fine borings of cast iron through the current of the water. By the combined action of the cylinder and the water-current every portion of the latter is brought into contact with the iron, the particles of which are kept constantly bright by friction against each other and the sides of the cylinder. After this the water is passed through sand filter-beds to remove excess of iron. The results claimed are that the organic matter is altered in its chemical nature, and the albuminoid ammonia lessened from one fourth to one half of its original amount; that the water is softened, the scale in boilers becoming greatly reduced, open, friable, and loosely adherent to the plates; and that the microscopic life of the water is, to a large extent destroyed or removed. At Antwerp the quantity of water thus treated is two million gallons daily, and the engineer in charge of the works and the municipal authorities have expressed their satisfaction with the results attained.

The various methods of purification by iron that have been tried in Europe involve the contact of the water with natural or prepared ore or cast-iron borings or turnings, with a subsequent filtration through sand to eliminate any excess of iron; but Mr. Gardner has suggested the introduction of a solution of iron in the precise quantity needful for the desired purpose. He tried a solution of red hæmatite ore in hydrochloric acid on Mississippi water at the New Orleans water-works, and the clarified water gave satisfactory results to Professor Chandler, of New York, and other chemists. Later, he treated a body of thirteen million gallons in the St. Louis settling basins. The solution used, the water in various stages of precipitation, and the clear resultant water, all met with favorable reports from the analysts. The action is chemical, not mechanical. The combinations of lime and magnesia in the Mississippi water become converted into chlorides by the chlorine of the iron solution, and the precipitated oxide of iron settles promptly, carrying the suspended