

manganese content of the Dresden water supply. Service pipes become filled with a black precipitate, and the water cannot always be used for the laundry. Two manganese removal plants are in operation. One consists of gravity filters built in the original reservoir. The water passes through coarse sand on which manganese removing algae have been developed. These filters are washed by reversing the current, and are probably the nearest approach to the mechanical gravity filters in use in the United States. The second plant consists of pressure filters. One-half are filled with manganese permutit and half with gravel on which a manganese removing organism has been allowed to develop. Both processes are satisfactory, but owing to the economy of the sand and manganese removing organism this process seems to be better than the manganese permutit. A very satisfactory account of the experiments performed at Dresden is given by Tillmans.

Reinsch screens have been recently adopted at Dresden for sewage treatment. The dry weather flow is taken care of by one screen. The storm water sometimes requires four to be put in operation. Without further treatment the sewage is allowed to flow into the Elbe. There is sufficient diluting water to render the sewage innocuous.

No photographs could be obtained of a sewage disposal plant at Coethen, as the plant was visited during a heavy rain storm and photography was out of the question. This plant has been designed by Baumeister Benzel with Dr. Dunbar of the Hamburg Hygienic Laboratory as consultant. By settling ninety-two per cent. of the suspended matter is removed, and the sludge is withdrawn before it has time to putrefy. In the bottom are sixteen transverse divisions, each sloping to a trough to which the sediment settles. When this sediment is to be removed, a sliding door separates the trough from the upper part of the tank. The opening of a gate on the side of the tank allows the greater part of the sludge to flow out, the balance is drawn out by means of a hoe. The gate is closed, the trough filled with water and the sliding door opened without any disturbance of the liquid above. The effluent from the tank passes to sprinkling filters which are well constructed with an outside concrete retaining wall of a special design. In the centre is a specially designed piece of concrete so arranged that the underdrains can be flushed out with hose whenever desired. Green algae were growing in the effluent drains, showing a very satisfactory purification. Owing to the fact that the plant is new, and that it takes care of both sanitary sewage and storm water, and that comparatively few sanitary connections have been made, the plant should receive a more extended trial before the design is unreservedly recommended.

At Magdeburg the Puech-Chabal filters of the Magdeburg water system were visited. Magdeburg has the only large plant of this kind. The authorities are apparently satisfied with it for they are doubling its size. At Magdeburg they use not only the prefilters, but also the so-called rapid filters and final sand filters. It may be necessary to take such precautions with the water from the Elbe, but the installation is certainly very expensive and the cost of filtration must be high.

At Munich the sewage without any purification whatever is allowed to flow into the swift flowing Isar River. Sewage purification is unnecessary because the water below the city is not used for drinking purposes and is too cold for bathing. The engineer stated that within sixty miles all traces of sewage had disappeared.

Owing to the war the London waterworks were under an armed guard, and it would have been necessary to

obtain special permission to visit the plant. Under those circumstances it seemed unwise to ask the authorities for the special favor.

An interesting plant visited in England was the water softening plant of the Woolcombers, Limited, at Bradford, where 50,000 gallons per day of water having a hardness equivalent to thirty grains per gallon were softened to zero by lime, soda and permutit. Permutit alone was not satisfactory and the combined soda ash, lime, permutit plant was installed. The water is first treated with lime and soda, passed through a settling tank, then over calcium permutit to remove the suspended matter and excess of alkalinity. A permutit filter gives the final product of zero hardness. The process is said by the chemist and superintendent to be very satisfactory. Two pounds of soap per grain per gallon per 1,000 gallons is the saving made. This is a saving of 60 pounds per thousand gallons.

The largest municipal permutit water softening plant is located at Hooten, near Liverpool. This plant was built to furnish a water guaranteed to have less than ten grains per gallon of hardness. The original water contains about thirty grains per gallon. Two-thirds of the water is reduced to a hardness of zero, and is then mixed with one-third its volume of the original water. Owing to lack of time, the plant was not visited, but, in an interview Mr. Bettie, the superintendent, stated that the process was satisfactory, and that, if it were necessary to enlarge the plant, the same process would be used.

An interesting feature in sewage purification, aëration, was observed at Manchester. The preliminary experiments have been described in the 1914 Annual Report of the Rivers Department of the Corporation of Manchester. This process in brief consists in blowing compressed air through sewage until what is known as activated sludge is developed. This sludge, added to sewage and stirred by air, has the property of purifying the sewage very rapidly. For example, with a tank containing 1,300 cubic feet in which are 300 cubic feet of activated sludge, 1,000 cubic feet of sewage can be treated every six hours, or 4,000 cubic feet of sewage can be treated daily. This allows four hours for treatment, two hours for settling, emptying and filling. It is claimed that by this process a sewage effluent can be obtained which is in better condition than an effluent which has passed through Imhoff tanks and sprinkling filters. If the claims of the process are borne out by further experience, it is expected that considerable sums will be saved in the construction of sewage purification works.

To show the stress under which waterworks men are working, it need only be stated that in one place six rifles were leaning against the wall of the office, and the superintendent stated that the three plants of his company were watched by armed guards night and day. The men in charge of the various plants visited were very cordial, and, even after war broke out, when many of the assistants had volunteered and extra work devolved on those left, most courteous attention was extended.

The 15th annual summer session of the College of Engineering of the University of Wisconsin will be held at Madison during the six weeks, beginning June 21st. Special courses will be given in electrical, steam and hydraulic engineering, gas engines, machine design, mechanical drawing, mechanics, shopwork and surveying. All courses given in the University summer session are open to engineering students.