The sewage passes through the filter at the present rate as freely as when it was first started. The coating of slime on the brushwood is in a condition of stability where it appears neither to increase nor diminish, and, as there is no sign of clogging, it is probable that the flow may yet be somewhat increased. The most noticeable change which took place was the shrinking of the brushwood, which in a few months settled down until the depth of medium was only about 4 ft. 6 ins. This shrinking apparently stopped after about 18 months working, and

Forming a Mattress.

the brushwood shows no signs as yet of rotting or breaking down.

The slag filter, which has been kept under observation alongside the brushwood, is filled with washed and screened steel slag, graded as follows:—

Bottom,	1 ft. 0 in.,	3-inch to 5-inch slag
Middle,	3 ft. 0 in.,	1½-inch to 3-inch slag
Top,	1 ft. 6 in.,	⅝-inch to 1½-inch slag

It was started at a rate of 1¼ million gallons per acre per day, and worked up to 2½ millions in 6 months; the rate was increased for a short time to 3 millions, but this resulted in clogging and ponding on the surface, and the rate had consequently to be reduced. The effluent from this filter has always been satisfactory, but its capacity is limited to about 2 million gallons per acre per day, the rate at which the sewage will pass through without clogging.

The effluent from both filters contains usually from .1 to .2 cubic centimetre of sediment per litre; this is a fine humus which is settled out by a half-hour retention in tanks; it is liable to increase with sudden rushes of storm water, but is easily got rid of.

Samples of sewage and effluents have been taken regularly five days in the week, until three months ago, since when samples have been taken on only two days in the week. These are always taken between 10 a.m. and 12 noon—about the time of maximum flow. Analyses are made in the laboratory of the Medical Health Department of the city, and the following tables give the average results obtained, *viz.*:—

January to December, 1915.

	Free amm.	Alb. amm.	Putrescibility.	Nitrates.
Tank effluent	12.63	2.83	32	
Brush filter effluent	10.70	1.52	95·7	
Slag filter effluent.	4.13	1.09	98.4	

December, 1915, to May, 1916.

	Free amm.	Alb. amm.	Putrescibility.	Nitrates.
Raw sewage	12.50	3.84	..	2.36
Tank effluent	11.45	3.06	32	2.50
Brush filter effluent	10.59	1.56	90	2.55
Slag filter effluent.	5·37	1·34	98	6.00

May to November, 1916.

	Free amm.	Alb. amm.	Putrescibility.	Nitrates.
Raw sewage	27.6	7·92	..	
Tank effluent	22.3	3·94	35	
Brush filter effluent	16.9	2.41	99·7	
Slag filter effluent.	11.4	2.20	100	

The methylene blue test is used for putrescibility, and value 100 equals stability for 10 days.

The filter effluents are settled for one-half hour before analysis.

Although the sewage is getting stronger in character, as shown by the average results for the last six-monthly period, the effluent from the brushwood filter is more stable than it previously has been, and the rate of flow at the same time is greater. This seems to indicate that the filter has not yet reached the limit of its capacity. The only tests for nitrates were taken during March and April, 1916. The average results given in the table go to show that nitrates are not formed in the brushwood as readily as in the slag filter, which is no doubt due to the rapidity with which the sewage passes through the brushwood. Unfortunately, this period included the time of the spring thaw, and the sewage was very much diluted. The filter was also taking considerably over 7,000,000 gallons per acre per day for practically the whole of the two months, so that further tests are necessary before a definite opinion can be formed on this point.

The accompanying photographs show the method of making and placing the brushwood mattresses in the filter, also the filter in operation and a section whilst under construction. The floor, as will be seen, is formed with a

Removing Mattress from Press.

slope each way to the under drains. The brushwood is placed in the filter in the form of mattresses of 2 cubic yards each. These were made by filling the brush into a wooden box of the required shape, and pressing it down with a follower on a long lever. The mattresses were wired up whilst under a pressure of about 80 lbs. per square foot, and after this was released the shape was retained and they were easily handled. Witch hazel was found to be the best material for making up, but almost any kind of brush is suitable, provided no dead wood is