

The periodical replacing of the sand in the bed must be done carefully of course, but should not cost, including whatever is necessary to be done to the permanent layer, more than 40 cts. per cu. yard.

The cost of these various operations will of course depend upon the scale on which they are carried on. It will obviously be easier to keep the price low with a large plant than a small one. In the case of the former a force of gatemen and laborers can be permanently employed. In the smaller plants the operations of scraping and sand washing only take place at intervals, and are performed by laborers hired temporarily for the purpose, or by employees from other parts of the water system.

In using the above data to make an estimate of the total operating expenses, we shall employ as a unit the cost per million gallons of water filtered.

Assuming an average yield of 50 million gallons per acre between scrapings, the total cost would be as follows:

Scraping and removing @ \$45 per ac.....	\$0.90	per mill. gals. filtered.	
Washing 100 cu. yds. sand @ 25 cts. yd...	0.50	"	"
Replacing, etc., @ 40 cts " ...	0.80	"	"
Superintendence, etc.....	0.25	"	"
Total.....	\$2.45	"	"

To this should be added the cost of bacterial analyses of the effluents which should be made as frequently as possible in order to test the working of the filters. In many of the European plants a fully equipped laboratory is included in the equipment; and some of the superintendents, like Pieské, Chief Engineer of the Berlin Works, are also expert bacteriologists.

The actual cost of the operations discussed above for some American filters is as follows:

Poughkeepsie, N.Y., for 20 years averaged	\$2.90	per mill. gals. filtered.
Hudson, N.Y., is given as	\$1.38	" "
Mount Vernon, N.Y., a little less than....	2.00	" "
Ashland, Wisconsin, estimated to cost....	2.25	" "

The following table furnished by W. B. Bryan, Esq., Chief Engineer East London Water Co., gives the yearly cost of filtration of the London Water Companies from 1880 to 1895.