

## Hard versus Soft Water.

While the water question is before the people of Rochester it is well that they should be informed as to the results of inquiry and research made by scientific men as to the relative merits of hard and soft water. This question has been submitted in Europe to the closest scrutiny and tried by the best tests known to scientific men. We have in the discussion of this water question alluded to the reports of Dr. Letheby, Medical Officer of Health of the city of London. He is regarded as the highest authority on sanitary questions, and is famous as an analyst. In his report on the sanitary condition of London for 1869 and 70 he presents statistics of mortality from nineteen large towns in England and Scotland which show that the death rate is much larger in the towns using soft water. The following is an extract from this report:

As public attention has been again directed to the question of supplying London with soft water, I have taken some pains to ascertain the comparative salubrity of the places in England and Scotland which are supplied with hard and soft water; and in addition to the nineteen large towns whose death rates are constantly reported by the Registrar-General, I have obtained from his office the average birth rates and death rates of many other cities and towns of England during the five years (1861-1866), and the general results of these inquiries are expressed in the following tables:

*Comparative Mortality in the Nineteen Large Towns of England and Scotland Referred to in the Registrar General's Weekly Report for 1870, Arranged under the Heads of Hard-water and Soft-water Supply—Ten Degrees of Hardness being taken as the Standard.*

### HARD-WATER SUPPLY.

Towns.	Rate per 1,000 of Population.	
	Births.	Deaths.
London.....	35.3	24.1
Portsmouth.....	31.4	29.1
Norwich.....	32.9	27.4
Bristol.....	38.5	29.9
Wolverhampton.....	39.4	21.8
Birmingham.....	35.2	21.1
Nottingham.....	31.4	24.1
Hull.....	33.7	21.8
Sunderland.....	37.4	20.1
Newcastle-on-Tyne.....	33.2	24.1
Leicester.....	33.9	26.6
Average.....	35.7	23.7

### SOFT-WATER SUPPLY.

Towns.	Rate per 1,000 of Population.	
	Births.	Deaths.
Liverpool.....	37.0	34.1
Manchester.....	36.6	27.8
Salford.....	40.1	26.1
Bradford.....	39.1	27.4
Leeds.....	40.2	28.1
Sheffield.....	39.5	25.3
Edinburgh.....	37.7	26.1
Glasgow.....	41.3	29.5
Average.....	38.9	28.1

Average for England—Birth rate, 35.0; Death rate, 23.5.

But the results are still more striking when

But the results are still more striking when we take the averages of several years, as I have done in the following table, where the annual birth rates and death rates of twenty-four English and Scotch towns are classified for the years 1861 to 1865 inclusive:

*Comparative Mortality in Twenty-four English and Scotch Towns During the Years 1861 to 1865 Inclusive, Arranged under the Heads of Hard-water and Soft-water Supply—Ten Degrees of Hardness being the Standard.*

HARD-WATER SUPPLY.

Towns.	Rate per 1,000 of Population.	
	Births.	Deaths.
London.....	34.76	24.39
Guildford.....	30.29	19.45
Dever.....	32.81	20.96
Southampton.....	34.35	22.11
Reading.....	35.12	22.19
Bedford.....	32.69	20.72
Ely.....	33.83	21.55
Chelmsford.....	31.71	19.83
Gloucester.....	35.76	23.83
Cheltenham.....	25.98	18.52
Birmingham.....	39.42	26.42
Sunderland.....	41.30	23.99
Average.....	34.12	22.00

SOFT-WATER SUPPLY.

Towns.	Rate per 1,000 of Population.	
	Births.	Deaths.
Exeter.....	39.73	24.72
Plymouth.....	34.06	22.56
Liverpool.....	35.98	26.41
Manchester.....	36.71	31.89
Bradford.....	40.33	26.74
Leeds.....	40.34	30.22
Sheffield.....	42.18	29.40
Northampton.....	39.01	26.15
Carlisle.....	33.39	24.05
Preston.....	37.60	26.63
Edinburgh.....	—	26.73
Glasgow.....	—	30.90
Average.....	37.02	28.04

England—Birth rate, 35.36; Death rate, 22.63.

In the former table the soft-water districts gave a death rate of 28.1 per 1,000 of the population, against an average of only 23.7 in the hard-water; and in the last table it stands as 28.04 per 1,000, to 22.00. In point of fact, after making every allowance for the differences of birth rates in the two cases, there is a large excessive mortality in the soft-water districts. This is quite in accordance with the facts which I submitted to your notice in my last annual report, and it is sufficiently striking to command attention.

It will be seen that Dr. Letheby thinks 10 degrees of hardness about the standard for healthy drinking water. As the Genesee has but 6.47 degrees, it is a little too soft to be healthy.

A proposition was made a year since at Edinburgh to introduce to that city the water of Loch St. Mary. The proposition was successfully combatted on the ground that the water was too soft for health—this water having but  $1\frac{1}{2}$  degrees of hardness. It seems to be now settled on the highest European medical and sanitary authorities that water moderately hard is the best for man to drink.