## SOOT FROM BOILER FURNACE

Constituents of Coal		Base of	13 feet	70 feet	Top of 110
		Chimney	from Base	from Base	ft. Chimney
Carbon	$69.30 \\ 4.89 \\ 1.64 \\ 8.48$	$ \begin{array}{r} 19.24 \\ 2.71 \\ 0.09 \\ 73.37 \end{array} $	$\begin{array}{c} 16.66 \\ 0.86 \\ 0.28 \\ 75.04 \end{array}$	$21.80 \\ 1.44 \\ 0.80 \\ 66.04$	27.00 1.68 1.14 61.80

## DOMESTIC SOOT

		Dining Room Flue		
Constituents of Coal	Kitchen Flue	Bottom, 5 ft. from grate	Top, 35 ft. from grate	
Carbon 76.80 Hydrogen 4.90 Tar 0.88 Ash 1.80	52.34 3.68 12.46 17.80	$36.45 \\ 3.51 \\ 34.87 \\ 5.09$	$37.22 \\ 3.51 \\ 40.38 \\ 4.94$	

## PER CENT OF FREE ACID IN SOOT

Sources of Sample	Base of Chimney	Top of Chimney	
Brass foundry	0.00	0.65	
Study flue Kitchen flue Boiler chimney Fire-place	$0.50 \\ 0.00 \\ 1.62 \\ 0.37$	0.56 0.00	

Dr. Russell found that the rain-water did not contain acid unless it also contained soot. The amount of free acid, calculated as sulphuric acid, in nine samples was found to be: 1.4 per cent.; 0.5 per cent; 7.2 per cent; 0.0 per cent; 4.9 per cent; 0.8 per cent; 1.2 per cent; 2.3 per cent; 0.0 per cent.

From the foregoing analyses it is seen that the amount of tar and carbon in the soot from domestic fires is much higher than that from boiler furnaces, while in the case of ash, the reverse is true. Domestic soot is thus by far the more objectionable and is produced in greater quantities from the same amount of coal. The amount of acid depends more upon the amount of sulphur in the coal than upon any other single factor, and is given off with the products of combustion whether smoke is produced or not. When, however, soot is produced, a large percentage of the acid is occluded in the soot,