ON THE WORK DONE BY PUBLIC ANALYSTS DURING 1880 UNDER THE
SALE OF FOOD AND DRUGS ACTS.

*(Compiled from Returns furnished by the Members of the Society of Public Analysts
and others).*

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THE Members of the Society of Public Analysts, and a few of the other Public Analysts who are yet outside the ranks of the Society, have again furnished us with the results of their work in detecting adulteration during the past year, and it is now my duty, for the fifth time, to summarise this work.

The Blue Books, which contain the national returns on the subject, are necessarily delayed until a later period of the year, and they give what, from our point of view, is considered somewhat scanty details in regard to the distribution of the samples in different districts, and in the hands of different analysts. Adulteration is essentially a crime, and as such it is our desire to point it out and show its extent in such a way that the discredit attaching to it shall not be unjustly placed on any particular class of traders, or on any particular district, but that each shall bear the responsibility in proper proportion. These yearly summaries have for this reason been compiled in such a manner as to show in what particular line of business adulteration is most rampant.

The importance of these returns increases each year, because most civilized countries are following the example of England in passing laws for repressing adulteration. No nation has, however, up to the present time, taken any step in advance of us, although several are following closely on our lines.

During this transition stage, exaggerated statements in reference to the prevalence of adulteration, and the small amount of good which has been effected by our English laws,

are being published by persons who have had insufficient practical acquaintance with the subject, and the only way to prevent false inferences being drawn is to take care that accurate and reliable statistics are readily available for those who may need them.

These statistics, unfortunately, prove that our legislation on the subject is not yet perfect, but, on the contrary, that the rate of adulteration prevailing now, although a vast improvement upon the condition of things prior to the passing of our Acts, does not show a continued decrease, and although we may stand better in this respect than some other European countries the amount of fraud disclosed is much greater than should be the case.

Nor is the reason far to seek. The total number of official samples analysed in the year is but little more than one for every two thousand of the population, and probably not more than one sample out of every million articles purchased is submitted to any proper and reliable scientific test. It is no wonder, then, that repression has at present failed to effect all the good it was expected to do, but wonder should rather be expressed that such marked results have already been obtained.

The numbers of returns received by us of samples analysed and reported upon during the last six years have been as follows :—

Year.	Districts.			Samples Examined.		Samples Adulterated.		Percentage Adulterated.
1875-6	..	..	109	..	15989	..	2895	.. 18·10
1877	..	..	127	..	11943	..	2371	.. 17·70
1878	..	..	168	..	15107	..	2505	.. 16·58
1879	..	..	212	..	17574	..	3032	.. 17·25
1880	..	..	237	..	17919	..	3132	.. 17·47

Once more, therefore, 1880 follows 1879 in showing an increase in the percentage of adulteration. Since no reason for this is apparent, it will be well, as in previous years, to trace this percentage as it exists in reference to each class of samples.

I will first consider the number of samples purchased by the Inspectors and submitted to the Public Analysts. The total of 17,919 shown in the table necessarily includes waters—not because these are strictly under the Act, but because, in some cases, they become mixed up in the returns. The articles purchased have been divided into various classes, as follows :—

SAMPLES PURCHASED, 1879 AND 1880.

					Numbers.		Percentage.	
					1879.	1880.	1879.	1880.
Milk	..	..	..	..	6036	7251	.. 36·1	40·40
Butter	..	..	..	..	969	892	.. 5·7	4·97
Groceries	..	..	..	..	4197	3845	.. 25·0	21·48
Drugs	..	..	..	..	615	390	.. 3·6	2·17
Wines, Spirits, and Beer	..	..	..	..	1615	2220	.. 9·7	12·36
Bread and Flour	..	..	..	..	1471	1326	.. 8·7	7·40
Water	..	..	..	..	1240	1604	.. 7·5	9·04
Sundries	..	..	..	..	629	391	.. 3·7	2·18
					16,772	17,919	100·0	100·00

The adulterated samples, 3132 in number, are divided in the following proportions, the results for the year 1879 being appended, as before, for comparison. The percentages are calculated on the total number of samples found to be adulterated in each year.

**SAMPLES FOUND ADULTERATED, OR IN THE CASE OF WATERS, UNFIT TO DRINK,
1879 AND 1880.**

						Numbers.		Percentage.	
						1879.	1880.	1879.	1880.
Milk	..	..	..	..	..	1332	1595	44·72	50·98
Butter	..	..	..	..	..	135	179	4·53	5·73
Groceries	..	..	..	..	..	492	402	16·52	12·90
Drugs	..	..	..	..	..	164	79	5·52	2·52
Wines, Spirits, and Beer	..	..	..	..	..	457	480	15·36	15·18
Bread and Flour	..	..	..	..	..	68	84	2·28	2·68
Waters	..	..	..	..	..	266	287	8·93	9·18
Sundries	..	..	..	..	..	64	26	2·14	·83
						2978	3132	100·00	100·00

It is important to observe how the percentages of adulteration stand as compared with previous years when each percentage is calculated on its own class of samples and not on the general total of samples analysed.

**PERCENTAGES OF ADULTERATION FOUND FROM 1877 TO 1880, CALCULATED ON THE NUMBER
OF SAMPLES OF EACH CLASS ANALYSED.**

						1877.	1878.	1879.	1880.
Milk	..	..	..	..	..	26·07	18·38	22·06	22·00
Butter	..	..	..	..	..	12·48	13·23	13·93	20·08
Groceries	..	..	..	..	..	13·00	12·89	11·73	10·43
Drugs	..	..	..	..	..	23·82	35·77	26·66	20·26
Wine, Spirits and Beer	..	..	..	..	..	47·00	29·31	28·30	21·31
Bread and Flour	..	..	..	..	..	6·84	2·97	4·62	6·33
Water	..	..	..	..	}	21·63	14·98	{ 21·45	17·73
Sundries	..	..	..	..				{ 10·17	6·66

Taking the samples examined in 22 of the Metropolitan Districts by themselves, we find that the total number purchased was 2672, of which 406 or 15·19 per cent. were adulterated.

The samples are divided thus :—

METROPOLITAN DISTRICTS—PERCENTAGE OF ADULTERATION, 1880.

								Examined.	Adulterated.	Percentage.
Milk	..	..	..	..	..	..	..	1043	276	26·46
Butter	..	..	..	..	..	..	..	196	40	20·41
Groceries	..	..	..	..	..	..	..	743	63	8·48
Drugs	..	..	..	..	..	..	..	116	11	9·40
Wines, Spirits and Beer	..	..	..	..	..	..	..	164	10	6·09
Bread and Flour	..	..	..	..	..	..	..	235	6	2·55
Waters	..	..	..	..	..	..	..	42	0	—
Sundries	..	..	..	..	..	..	..	114	0	—
								2653	406	Avge. 15·19

Again, taking the returns from 150 of the towns of the Kingdom, we find that 7149 samples have been examined, of which 1279 or 17·87 per cent. were adulterated. These are divided as follows :—

TOWNS IN THE UNITED KINGDOM—PERCENTAGE OF ADULTERATION, 1880.

								Examined.	Adulterated.	Percentage.
Milk	..	..	..	..	..	..	..	3743	816	21·80
Butter	..	..	..	..	..	..	..	288	75	26·13
Groceries	..	..	..	..	..	..	..	1105	75	6·78
Drugs	..	..	..	..	..	..	..	23	5	21·74
Wines, Spirits, and Beer	..	..	..	..	..	..	..	459	110	23·97
Bread and Flour	..	..	..	..	..	..	..	560	38	6·79
Waters	..	..	..	..	..	..	..	829	128	16·30
Sundries	..	..	..	..	..	..	..	142	10	6·04
								7149	1279	Avge. 17·87

Again, taking the 65 returns from the counties and divisions of counties we have a total of 8117 samples examined and 1447 adulterated, the total being divided as follows :—

COUNTIES IN THE UNITED KINGDOM—PERCENTAGE OF ADULTERATION, 1880.

	Examined.	Adulterated.	Percentage.
Milk	2465	503	20 40
Butter.. .. .	408	64	15 69
Groceries	2044	252	13 15
Drugs	215	83	33 07
Wines, Spirits, and Beer	1597	341	22 10
Bread and Flour	531	40	7 55
Waters	722	148	20 50
Sundries	135	16	11 85
	8117	1447	Ave. 17 84

In order to enable a ready comparison to be made, I will now place side by side the percentages of adulteration as shown to exist in London, the larger towns and the counties respectively, simply premising that 14·9 per cent. of the total samples were purchased in London, 39·9 per cent. in the towns, and 45·3 per cent. in the counties.

METROPOLIS, TOWNS, AND COUNTIES—PERCENTAGE OF ADULTERATION, 1880.

	London.	Large Towns.	Counties.	Whole Country.
Milk	26 46	21 80	20 40	22 00
Butter	20 41	26 13	15 69	20 08
Groceries	8 48	6 78	13 15	10 43
Drugs	9 40	21 74	33 07	20 26
Wines, Spirits, and Beer	6 09	23 97	22 10	21 31
Bread and Flour	2 55	6 79	7 55	6 33
Waters	—	16 30	20 50	17 73
Sundries	—	6 04	11 85	6 66
	Average 15 30	17 87	17 84	17 47

It will only be possible to glance comparatively briefly at the indications of these various statistics. Referring first, then, to the general summary of adulteration in the whole country we find that Milk adulteration remains almost stationary, the difference from last year being only 06 per cent. The adulteration of butter has increased very seriously from 13·93 to 20·08 per cent. It is clear that this very serious increase points to a more systematic substitution of Butterine for Butter in retail sales. This fraudulent substitution is greatly to be regretted, not only because it is an offence, but because it is standing in the way of a fair and proper trial of Butterine under its own name for purposes for which it is suited.

Groceries show 1·30 per cent. less adulteration than in 1879. The adulteration of drugs appears to have decreased in three years from 35·77 per cent. to 26·66 per cent., and is now 20·26 per cent.

There is a diminution of nearly 7 per cent. shown in the adulteration of wines and spirits.

The adulteration of bread and flour shows a most serious increase, the results of the last three years having been 2·97, 4·62 and 6·33 per cent. respectively. The percentage of adulteration as shown has more than doubled in two years.

The serious increase in the adulteration both of bread and flour and of butter, can hardly be due, as was surmised last year, to the improvements in the methods of analysis, for no noteworthy step in advance in reference to either of these classes of samples has been

brought into use during the year. It seems rather to point to the necessity for the purchase of a larger number of samples by the Inspectors.

The new feature which we have introduced into the summary this year by the separation of the London Districts, the large towns and the counties, is deserving of some few words of special notice. London appears still to be the worst part of the Kingdom for milk adulteration; the percentage, which over the entire country was 22·00, rising in the Metropolis itself to 26·46. Even, however, in the counties, where one would suppose watering milk would be less prevalent, the percentage of adulterated samples is 20·40.

Butter does not appear to follow exactly on the same lines as milk, for whereas in London 20·41 per cent. of the samples were found adulterated, the towns show more than 26 per cent., and the counties less than 16 per cent.

In groceries the counties are markedly the worst, the percentage of adulteration reaching 13 per cent. as against 8·48 per cent. in London.

In drugs, again, the county districts appear to suffer greatly. The percentage in London, however, viz., 9·40, appears large, considering the care which is supposed to be taken in the Metropolis in procuring supplies of pure drugs.

When the totals of each class of sample are put together and averaged, we find that there is little to choose between Metropolitan, urban and rural districts, and even in London the average of the whole of the samples purchased shows 15·3 per cent. adulterated.

Of the counties there are 8, where only a very small and insufficient number of samples have been analysed, viz., Denbigh, Montgomery, Shropshire, Waterford, N.R. Yorkshire, Cambridge, Carmarthen, and Northumberland, but in this respect the returns appear to show a slight improvement over last year.

There are 41 towns, viz., Barnsley, Chesterfield, Andover, Beverley, Louth, Glossop, Wenlock, Lancaster, Dumbarton, Richmond (Yorkshire), Ripon, Wakefield, Deal, Dover, Sandwich, Derby, Warwick, Hereford, Lichfield, Blandford, Stirling, Androssan, Stewarton, Arundel, Chichester, Newington, Tenterden, Bury, Southwold, Devonport, Penryn, Durham, Maidenhead, Godalming, Reigate, Bewdley, New Radnor, Droitwich, Birkenhead, and Rutherglen, and two counties, viz., Suffolk and Sutherland, where no work appears to have been done last year under the Act. In 1879 there were 44 towns in the same condition, and 19 of the towns appear in the list for both years, as do also the 2 counties of Suffolk and Sutherland.

It is to be hoped that in every one of these cases the Public Analysts have strictly complied with the Act, and made quarterly reports to the appointing authorities in order that these reports may have been duly forwarded to the Local Government Board, whose attention will thus have been called to such an anomalous state of things. It might also be desirable to draw their attention to this yearly return.

At the Meeting of the Society, on the 11th inst., I hope to be able to remark on some further details in connection with these returns, in order that some points which need consideration may be fully discussed.

LABELS.—We have received specimens of the labels for reagents issued by Messrs. Woolley, Sons & Co., for the series required for the examination of the Science and Art Department. The novel feature is that the two series are printed in two different colours, one for general and one for personal use. Under certain circumstances the advantage of this system in preventing admixture of series of bottles is obvious. The labels are clearly printed.