IODINE IN DRINKING WATERS.

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Drinking water has long been supposed to play an important part in the causation of endemic goitre. Estimations by v. Fellenberg (1923, 1924) in Switzerland and by McClendon and Hathaway (1924) in the United States have shown that, in these countries, drinking water in goitre areas contains less iodine than in goitre-free areas. The iodine content of several waters has been estimated at this Institute. The results show that in this country there is no correlation between presence of goitre and a low iodine content in drinking water. It is true that the lowest figure (Swindon) is for water from a goitre area, but the next one (Aberdeen) is not. The figures for Cumberland and Derbyshire, both goitre areas, are not low.

Table I. *Iodine in Drinking Waters.*

Samples of town supplies		Samples from goitre areas	
	Iodine γ per litre		Iodine γ per litre
London (Thames)	4·20	Cumberland (1)	1·30
,, (Kent Chalk)	0·65	,, (2)	3·90
Manchester	2·00	,, (3)	2·45
Liverpool	2·00	Derbyshire (1)	1·66
Leeds	2·55	,, (2)	2·10
Shepton Mallet	2·58	,, (3)	1·87
Canterbury	2·14	,, (4)	1·84
Cambridge	0·80	,, (5)	1·40
Swindon	0·52	—	—
Edinburgh	1·70	—	—
Glasgow	1·90	—	—
Aberdeen	0·63	—	—

The Effect of Treatment of Water Supplies. It has been suggested by Durham (1921) in this country, that goitre has increased in Hereford since the introduction of a pure water supply by the laying down of filter beds. Pennink (1924) in Holland also suggests that the increased goitre incidence in Holland during recent years may be due to the purification of water, iodine being lost in the process of filtration by adsorption in the filter bed. This has been shown by Heymann (1925) not to be true for Amsterdam water, the iodine content of the water being the same before and after filtration.

Examination of Aberdeen water sampled direct at the intake and at various stages in the process of purification, and of Edinburgh water before and after filtration, showed that in each case there is a small loss of iodine. The loss is, however, too small to be of any significance, and in the case of Aberdeen water, is less than the fluctuations in iodine content which take place from time to time.

A much larger loss of iodine was found to take place in the process of softening a chalk water by Clark's process (addition of lime). Canterbury water before treatment was found to contain 4·32 γ per litre, and after softening only 2·14 γ per litre.

Table II shows the effects of these processes on the iodine content of water.

Table II. *Effect of Treatment.*

		Iodine γ per litre
Aberdeen water supply	Direct from river	0·63
	After settling	0·58
	After settling and aeration	0·59
	After settling, aeration and filtration	0·57
Edinburgh water supply	Before filtration	1·49
	After filtration	1·20
Canterbury water supply	Hard	4·32
	Softened	2·14

Mineral Waters. The spa waters from Harrogate and Cheltenham were also analysed. In every case the iodine content was found to be much higher than that of ordinary drinking waters, and in some cases it is so high that it appears likely that the medicinal effect of the water may be partly due to the iodine. The following table shows the amounts found. Strathpeffer Sulphur Spring was also examined and found to contain only 3·20 γ per litre, the lowest figure found for a mineral water.

Table III. *Mineral Waters.*

Harrogate Waters	Iodine γ per litre	Cheltenham Waters	Iodine γ per litre
Pure Chalybeate ...	15·6	Fieldholme	28·2
Chloride of Iron Well	303·0	Chadnor Villa ...	930
Harlow Water... ...	11·4	Pittville	120·8
Well No. 36	197·0	Lansdowne... ...	1058·0
Old Sulphur	610·0	—	—
Magnesia Well ...	71·5	—	—

NOTE ON THE ESTIMATION OF IODINE IN WATERS.

In the estimation of iodine in drinking and mineral waters two possible sources of error should be noted as under:

(1) Where the water on making alkaline and evaporating gives a big precipitate of calcium carbonate or of salts, it is sometimes difficult to ensure complete extraction of the potassium iodide with alcohol. It is desirable, therefore, after the first ashing, to extract the residue with about 10 c.c. of hot water, repeating this extraction twice. The estimation of iodine in the residue and the aqueous extract is then proceeded with separately in the usual manner (Leitch and Henderson, 1926). If the aqueous extraction has been thorough very little, if any, iodine is found in the residue.

Thus Canterbury hard water gave by the usual method, 0·25 γ per litre and by the aqueous extraction method, 4·32 γ per litre. Similarly Cambridge water gave 0·08 and 0·8 γ per litre respectively.

(2) In the case of an acid mineral water with a high iodine content, there may be a marked loss of iodine between the times of collection and analysis,

unless sufficient potassium hydroxide is added to the water to make it alkaline at the time when the sample is taken. Thus, without this precaution, Chadnor Villa (Cheltenham) water gave 285 γ per litre and with this precaution 930 γ per litre.

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