

Water analysis.

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WATER ANALYSIS.

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ONE of the many facts brought out, incidentally, in the course of the various public and private discussions that have taken place in Perth, during the bygone year, concerning Water-supply, is this: that many chemical analyses of waters have been obtained by public bodies or private persons for their own satisfaction: which analyses have not been made public. These parties having borne all the costs, and taken all the trouble, of procuring the said analyses, have, of course, a perfect right to keep the results to themselves. But, on the one hand, we can see great public advantage from giving such results publicity; while, on the other, we cannot see any good ground for withholding such publicity. There cannot be too great a multiplication of such analyses at a time when so vivid and general an interest is taken in the important question of extended Water-supply. The collection, tabulation, and comparison of all the analyses—made recently, or during the last forty years—of the water used in and around Perth for domestic purposes, could not fail to produce results highly instructive and suggestive. Such a comparison would enable us, for instance, to estimate the value of chemical in relation to other kinds of evidence, as regards the bearing of Water-supply on public health. We should see—

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1. How differently different chemists analyse the same waters.
2. How the results vary
 - (a) In the hands of different analysts : and
 - (b) At different seasons—in summer and winter—according to the amount or abundance of rain.
3. How chemists decry each other's methods of analysis; and how difficult—if not impossible—it is to determine what chemist should be employed, and what mode of analysis is to be trusted

All this being the case, we venture, in the public interest, to invite those who possess hitherto unpublished chemical analyses of water, in or about Perth, to send them to us for publication, in order to the accumulation of a sufficiency of exact data for future use.

In connection with this invitation,—which we trust will be responded to,—it is desirable that the sender should give some description of the locality of the water analysed;—its general characters;—its special advantages or disadvantages as to drinking, cooking, washing, boiler-feeding, and so forth. There is, indeed, much that the sender can tell us that may be of quite as much value as the mere professional analysis and report. For instance, he can tell us whether the water is a spring or well water; whether gardens or fields drain into it; whether it is hard—as tested by its leaving white stains on caraffes, or requiring a large use of soap and soda for cooking or in boilers; whether it has given rise to diarrhœa, typhoid fever, dyspepsia, or other disorders in adults or children. Of course, in every instance, the name of the analyst should be given.

Further, we have every reason to believe that many other chemical analyses will yet be ob-

tained, at the cost of public bodies or private individuals, for their own guidance in connection with the Water Bill now before Parliament, and the results to which that Bill may or must lead. To those who have yet to procure such analyses, we have this to say : that it is most desirable all analyses should be conducted and drawn up on some uniform plan, so as to be comparable with some recognised standard. Such a standard is to be found in the Government Blue-Book of 1874 (on Water-supply), which contains no less than 2000 chemical analyses of waters of all kinds, from all parts of Scotland and England : these analyses having been made under the auspices of Professor FRANKLAND, in his laboratory in London. In order to obtain additional analyses, comparable with the series in question, it is only necessary to select as the analysts either Professor FRANKLAND himself or some of his former assistants or pupils. One of the latter now makes and publishes periodic investigations of the varying quality of the Loch Katrine water as supplied to Glasgow, viz., Professor MILLS, the Director of the Young Laboratory of Technical Chemistry in the Andersonian University. The fee of either of these first-rate chemists—both of whom are Fellows of the Royal Society, while Professor FRANKLAND is a D.C.L., and Professor MILLS a D.Sc.—is only five guineas for each sample of water analysed and reported upon : a piece of information that may encourage those who are in any doubt as to the quality of their Water-supply to put an end to their difficulty by application to either of the eminent chemists just mentioned.

We have incidentally stated that chemical analysis is but one form of water analysis. It is the only form of water analysis known, apparently, to the citizens of Perth. But there is another

kind of analysis quite as important in its way;—so much so, that in certain Battles of the Waters in large cities it has, for the moment at least, bulked more largely in the public interest than that which is chemical. We allude to *microscopical* analysis. Only last year, one of the most distinguished Professors of the Army and Navy Medical School at Netley,—a Fellow, too, of the Royal Society, and an eminent Zoologist—published a copiously-illustrated “Guide to the Microscopical Examination of Drinking Water.” The other day, a son of Dr STEVENSON MACADAM—the chemist employed by Perth, Forfar, and so many other of our towns in the investigation of their Water-supply—pointed out before a learned Society in Edinburgh the value of the presence or absence of water-fleas as a test of the purity of potable water. And those of our readers who remember anything of the fierce civil war that raged in our Scottish metropolis, some years ago, concerning St Mary’s Loch and its water as a source of supply, must also remember the part played in the said warfare by water-fleas and other living organisms, animal or vegetable.

And here by the way—and we interject this remark for the benefit of those who, during the last year, have in Perth been sneering at the connection claimed between *Science* and Water supply, and at the questionable propriety of discussing such a subject as Water-supply before a “Society of Natural Science”—it might be a sufficient reply to such sneers and sneerers, that whenever a question of Water-supply in a town, village, or household arises, the very first step that suggests itself is an appeal to the chemist. This is a practical recognition of the place and power of science—a recognition of the most emphatic kind, because it involves

pecuniary outlay. But an appeal to the microscopist is a still wider recognition of the power of science to throw light on practical questions ; for microscopical analysis of water implies a knowledge of zoology and botany—in certain of their departments at least.

We have this further reason for introducing the subject of *microscopical* analysis that, so far we know, nothing has been done in this direction in or around Perth ; while the subject is one that ought eminently to commend itself, at the present juncture, to all those members of the “ Perthshire Society of Natural Science ” who are possessed of microscopes and of the requisite zoological and botanical knowledge to make a proper use of them in the examination of the various drinking waters of the city and county. If such a local scientific Society is to be of any real use, it must be by endeavouring to throw light on questions of public and practical importance—such as this matter of Water-supply.

We have mentioned two forms or kinds of water analysis. But there is a third—of much more importance than either of the others, inasmuch as the object of all such analyses is to determine the probable effects of this or that Water-supply on the health of a community. This third kind of analysis, then,—though in a strict sense not exactly a kind comparable with either of the others,—is that which is *medical*—the sort of report given by such sanitary authorities as the well-known Medical Officer of Health of Edinburgh—Dr LITTLEJOHN. Man is constantly experimenting, as unwittingly as unfortunately, upon himself and his children, in regard to the effects of various kinds of water used for drinking or in cooking. Every now and then—in almost every town and village in

the country—we hear of an outbreak in a private household, public institution, street, or district of some zymotic disease, such as typhoid fever. Not the chemist nor microscopist, but the experienced *physician*, is called in summarily; and frequently he can trace the epidemic to water, directly or indirectly, in cases where his opinion may not be supported by the chemist or the microscopist. But the fact that a given water has produced typhoid fever, and the inference that it will do so again if it be again used without any improvement in its quality, are of infinitely higher practical value obviously than the assertion of the chemical analyst, that the suspected water is free from “previous sewage contamination,” or “organic nitrogen,” or “albuminoid ammonia,” or any other of the organic matters which are supposed by him to produce disease in man; and they are of greater value than the testimony of the microscope to the presence or absence of water fleas or infusoria. Hence we can understand how sagacious was the suggestion made the other day by Bailie LOWSON at Forfar, that the opinion of an eminent Physician should be obtained—simply as a physician—regarding the probable effects of the Water-supply of that town on the health of the community. We do not offer any opinion as to whether, at this time of day, and considering what has been said of the Water-supply of Forfar in the Government Blue-Book of 1874—any further opinions, analyses, or reports of any kind *should* be required to convince the citizens of Forfar of their need of a new and good Water-supply. But, assuming that the whole question of the quality of the present water supply is to be re-opened, the above-mentioned recommendation of Bailie LOWSON is one of the very few defensible and sensible ones that have

recently emanated, on the subject of Water-supply, from the public bodies of Forfar. And what applies to Forfar equally applies to Perth.

We have no desire, however, to decry one kind of water analysis at the expense of another. All are useful in their way, but as supplementary to one another—the chemical and microscopical as confirmatory of the medical. Wherever it is of importance to determine the character of a Water-supply, public or private: whenever especially a town, or public body, or private citizen contemplates the expenditure of thousands of pounds on new or extended supply—involving legislation for perhaps half-a-century at least—it is desirable that, as a preliminary, all three kinds of analysis or report should be resorted to or obtained., viz.—1, Chemical; 2, Microscopical; and 3, Medical.

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