POTABLE WATER. HOW TO FORM A JUDGEMENT. SUITABLENESS OF WATER FOR DRINKING PURPOSES. ADRESSED TO MEDICAL OFFICERS OF HEALTH, AND SANITARY AUTHORITIES, ETC.

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POTABLE WATER.

HOW TO FORM A JUDGMENT ON THE SUITABLENESS OF WATER FOR DRINKING PURPOSES.

ADDRESSED TO MEDICAL OFFICERS OF HEALTH, AND SANITARY AUTHORITIES, ETC.

BY

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SECOND EDITION.

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PREFACE

TO THE

SECOND EDITION.

Since the publication of the first edition, the views I have ventured to put forward, as to the fallacy of judging chiefly of the wholesomeness of drinking water by the amount of organic matter it may contain, have received unexpected confirmation from no less an authority than Prof. Huxley, who, at a discussion at a recent meeting of the Chemical Society, gave it as his opinion, speaking as a biologist, "that a water may be as pure as can be as regards chemical analysis, and yet as regards the human body be as deadly as prussic acid; and, on the other hand, may be chemically gross and yet do no harm to anyone." "I am aware," continued he, "that chemists may consider this as a terrible conclusion, but it is true, and if the public are guided by percentages alone they may often be led astray. The real value of a determination of the quantity of organic impurity in a water is, that by it a very shrewd notion can be obtained as to what has had access to that water."

This opinion, so tersely and forcibly expressed, accords

entirely with the results of my experience, and is in strict conformity with what may fairly be called the common sense view of the subject, as I have endeavoured to show in the following pages.

C. E.

SEPTEMBER, 1880.

WHAT CONSTITUTES POTABLE WATER?

THE difference of opinion that unfortunately exists amongst analysts of undoubted eminence with reference to what may or may not be pronounced a fit water for drinking purposes forms the *raison d'etre* of this *brochure*. That this difference exists widely, and threatens to become still more marked, is assumed to be within the knowledge of those to whom these pages are addressed, as there are few people interested in the health of the community who have not experienced the inconveniences, resulting often in a dead-lock, that arise from it.

Now that the Public-Health Act has conferred powers on Sanitary Authorities to institute proceedings with a view to closing impure wells and other sources of supply, and has left the decision to the local magistrates, it becomes more than ever desirable that some standard should be set up as a guide in such matters. The bench of magistrates listening to the conflicting statements of experts is like a rudderless ship at sea, without any exact knowledge to guide their decisions, or data upon which to form an opinion. It is hoped and believed that a consideration of the question conceived in an unbiassed spirit may tend to reduce order out of chaos, and that here as in most other things common-sense will come largely to our aid.

A practical experience afforded by the analysis of nearly two

thousand samples of water is not so much put forward by the writer as a reason and proof of his ability to deal with this question with a view to its elucidation, as the fact that in a large number of cases he has had the opportunity of personally investigating the conditions under which the waters were collected; and further, that owing to the kindness of medical friends, he has enjoyed ample opportunities of examining waters that have given rise to enteric fever and other hardly less serious disorders. He has had, too, the good fortune to practise as an analyst in a district where, within a radius of 30 miles, every geological formation from the Chalk down to the Silurian is represented, and has thus had considerable experience of the diversities in the composition of water taken from the various strata.

The arguments in favour of this or that view have hitherto been conducted too much on *a priori* lines and an attack on the position from the other side,—an appeal to experience as opposed to mere anticipation,—will show us that pet theories are not only not always supported by facts, but must sometimes be very much modified by them.

It is not proposed to enter into the consideration of any technical details relating to water analysis and happily it is unnecessary. The processes by which chemists arrive at their results, and which during the last few years have been much improved in the direction of extreme accuracy, are not the subject of variance, with one notable exception however, viz: —that of the estimation of organic matter. Of the several methods in use for the estimation of organic matter, each is vaunted by its originator, as being the best and only reliable one, and the only agreement that seems so far possible amongst analysts (though here it must be admitted the unanimity is complete), is in decrying every other person's process.

Notwithstanding this exception, as we shall see further on, the general conclusions that have been arrived at are in no

way affected. The facts then, so to speak, in connection with water analysis are not the subject of dispute, but the deductions to be derived from the facts; and here we enter a region which is altogether outside the province of a chemist pure and simple, his usurpation to the contrary notwithstanding, and the question becomes one rather for the medical expert. The chemist has no special knowledge or experience, beyond that pertaining to all intelligent educated men who take an interest in sanitary matters, to guide him in forming an opinion as to what may or may not be the conditions under which diseases may arise that are the outcome of unwholesome surroundings, and the sooner this is recognised and the matter relegated, in disputed cases, to those who are alone competent to give an authoritative opinion, viz:—those, who, practising medicine have made hygiene a special study, so much the better will it be for the health of the community.

In order to properly understand the subject it will be well to take a brief review of the various sources from which we take our water supplies.

To begin with rain water. This as being distilled from the clouds one would naturally expect to be as free from impurities as it is possible to obtain water: as a matter of fact however it ranks amongst the more impure supplies. Rain falling in the neighbourhood of dwellings and cultivated land washes out from the air the impurities, the result of emanations from the earth, which exist there, and is collected too on surfaces, such as roofs, which are in themselves more or less dirty. The Rivers Pollution Commissioners calculate that "half a pint of rain water often condenses out of about 3373 cubic feet of air, and thus in drinking a tumbler of such water, impurities, which would only gain access to the lungs in about 8 days, are swallowed at once," and they are of opinion, "that it is in vain to look to the atmosphere for a supply of water pure enough for dietetic purposes."