

**EXAMINATION OF
WATER. (CHEMICAL AND
BACTERIOLOGICAL)**

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Examination of Water. (Chemical and Bacteriological) by William P. Mason

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WILLIAM P. MASON

**EXAMINATION OF
WATER. (CHEMICAL AND
BACTERIOLOGICAL)**

WORKS OF PROF. W. P. MASON

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EXAMINATION OF WATER.

(CHEMICAL AND BACTERIOLOGICAL.)

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PREFACE.

KNOWLEDGE of ordinary quantitative analysis is here necessarily assumed; therefore the merest suggestions are given for determination of the mineral matters present in a water, while the items properly lying within the scope of a sanitary examination are dealt with more at length.

Upon the bacteriological side, only so much is touched upon as has been demonstrated to be of real service to the water examiner; leaving the great field of ultimate differentiation to be further explored, and rendered still more practically useful, by the professed bacteriologist.

RENSELAER POLYTECHNIC INSTITUTE, TROY, N. Y.,
February, 1899.

PREFACE TO SECOND EDITION.

THE text of this edition differs considerably from the former one, since in it the analytical methods will be found up to date.

April, 1901.

EXAMINATION OF WATER.

CHAPTER I.

INTRODUCTORY.

A GREAT deal of popular misconception exists upon the subject of the analysis of potable water, and it is commonly supposed that such an examination may be looked upon from practically the same point of view as the analysis of an iron ore. That this belief is founded on fallacy may, however, be readily shown. When an iron ore is submitted for analysis, the chemist determines and reports upon the percentages of iron, phosphorus, sulphur, etc., found therein ; and at that point his duties usually cease, inasmuch as the ironmaster is ordinarily capable of interpreting the analysis for himself. Even should the analyst be called upon for an opinion as to the quality of the ore, the well-known properties of the several constituents make such a task an easy one, and, assuming the sample to have been fairly selected, the opinion may be

written without any inquiry as to the nature of the local surroundings of the spot whence the ore was taken.

A water-analysis, on the other hand, is really not an analysis at all, properly so called, but is a series of experiments undertaken with a view to assist the judgment in determining the potability of the supply. The methods of conducting these experiments are largely influenced by the individual preferences of the analyst, and are far from being uniform or always capable of comparison, thus often introducing elements of confusion where two or more chemists are employed to analyze the same water. Some of the substances reported—"albuminoid ammonia," for instance—do not exist ready formed in the water at all, and are but the imperfect experimental measures of the objectionable organic constituents, which our present lack of knowledge prevents our estimating directly.

Thus the numerical results of a water-analysis are not only unintelligible to the general public, but are not always capable of interpretation by a chemist, unless he be acquainted with the surroundings of the spot whence the sample was drawn, and be posted as to the analytical methods employed.

It is very common for water to be sent for analysis, with the request that an opinion be returned as to its suitability for potable uses, while at the same time all information as to its source is not only unfurnished,

but is intentionally withheld, with a view of rendering the desired report unprejudiced in character.

Such action is not only a reflection upon the moral quality of the chemist, but it seriously hampers him in his efforts to formulate an opinion from the analytical results.

For instance, a large quantity of common salt is a cause for suspicion when found in drinking-water, not because of any poisonous property attaching to the salt itself, but because it is usually difficult to explain its presence in quantity except upon the supposition of the infiltration of sewage. Thus an amount of salt sufficient to condemn the water from a shallow well in the Hudson valley could be passed as unobjectionable if found in a deep-well water from near Syracuse, N. Y.

The writer once saw the contents of an ice-cream freezer dumped within a few feet of the mouth of a domestic well. So large an amount of salt thrown upon the ground naturally increased the quantity of chlorine in the water, and might have led to the condemnation of the well had not the source of the chlorine been known.

Hence we see how important it is for the chemist to be fully acquainted with the history of the water he is to examine in order that he may compare his results in "chlorine" with the "normal chlorine" of the section whence the sample is taken,