WATER ANALYSIS FOR SANITARY PURPOSES, CHEMICAL AND BIOLOGICAL

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649396993

Water analysis for sanitary purposes, chemical and biological by Charles H. Clark

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

www.triestepublishing.com

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FOR

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CHEMICAL AND BIOLOGICAL

BY

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BOSTON

WILLARD SMALL, PUBLISHER

No. 24 FRANKLIN STREET

1892

PREFACE.

The following pages, with the exception of the last two chapters, were originally compiled for use in the writer's classes, making as he believes a fitting conclusion to a year's work in General Chemistry and Qualitative Analysis by introducing the student to some of the processes of Quantitative Analysis. The work is given in the simplest form and does not even presuppose a knowledge of Qualitative Analysis. It has been successfully performed by a number of different classes and has been found not too difficult for the average student. Interest has always been aroused.

In giving these pages to the public the writer hopes to serve his fellow teachers by saving them a large measure of the labor it has cost him to put the subject of water analysis in a form to be presented to young students.

He trusts also that physicians may find these pages useful. The busy physician feels the lack of suitable simple processes for forming accurate judgments on the potableness of water. The writer would suggest that if time does not permit a complete examination, the analysis for albuminoid ammonia and chlorine and the testing for poisonous metals may be very quickly accomplished, and that much dependence may be placed in the results. The apparatus is not at all expensive and the solu-

tions may be compounded at the drug store. It is also hoped that physicians may be interested in the simple processes for the microscopical and biological examination.

Nearly all the apparatus and chemicals called for in the chemical analysis will be found even in a small laboratory. Processes calling for costly apparatus and unusual chemicals have been excluded. The balance and platinum evaporating dish are the only expensive pieces used. A porcelain evaporating dish may be substituted for the platinum; the results will be less accurate, but with careful work the errors will not be large enough to preclude the drawing of correct conclusions. A distilling apparatus of the form known as Liebig's Condenser may be purchased complete or easily improvised from glass tubing. It is desirable to have a burette for each standard solution, but one burette may be used for all the work. It should be carefully washed after use and left full of water. It has not seemed necessary to describe the method of using it, as such descriptions may be found in almost any treatise on chemistry.

Indebtedness is acknowledged to existing works on this subject for the facts and processes described. Material has been gathered from all available sources. An effort has been made to be concise in statement and clear in description with the aim of awakening an interest in this important subject.

C. H. C.

KINGSTON, N. H., July 29, 1892.

CONTENTS.

CONVENIENT DATA.

Parts per 100,000 × .7 = grains per imperial gallon.
Grains per imperial gallon ÷ .7 = parts per 100,000.
Parts per 100,000 × .583 = grains per U. S. gallon.
Grains per U. S. gallon ÷ .583 = parts per 100,000.
Grains per imperial gallon × .8339 = grains per U. S. gallon.
Parts per 100,000 × .01 = grams per liter.
Grains per imperial gallon ÷ 70 = grams per liter.
1 liter = .264 U. S. gallon = .22 imperial gallon.
1 U. S. gallon = .8339 imperial gallon = 3.785 liters = 58,372 grains.
1 imperial gallon = 1.2 U. S. gal. = 4.543 liters = 70,000 grains.
1 cubic foot = 7.48 U. S. gallons = 6.232 imperial gallons = 28.315 liters.
$\frac{5}{9}$ (degrees Fahrenheit — 32°) = degrees Centigrade.
$\frac{9}{5}$ degrees Centigrade + 32° = degrees Fahrenheit.