

**HOUSEHOLD CHEMISTRY  
FOR THE  
USE OF STUDENTS  
IN HOUSEHOLD ARTS**

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Household Chemistry for the Use of Students in Household Arts by Hermann T. Vulté

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**HERMANN T. VULTÉ**

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## PREFACE

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This book is presented for the general study of the subject of chemical operations in the household. It is designed to meet the needs of secondary schools and colleges. For the former purpose, the instructor will find it possible to make such selection of material as will cover the field of work broadly in a semester. A thorough completion of the course indicated in the book would require the attention of the college student for one year. It is highly advisable in this longer course that one-third of the period be given to explanation and discussion of the topics in the form of lectures. In the shorter course the object may be accomplished by the more informal conference system.

It has seemed best to include a large amount of descriptive matter in this book, which was not a feature of former editions.

I wish to express my great indebtedness to my assistants, Mrs. Ellen Beers McGowan and Miss Sadie B. Vanderbilt, for valuable assistance and advice in the preparation of this volume.

H. T. V.

May, 1915.

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CHAPTER I.



**INTRODUCTORY.**

Courses of instruction in Household Economics group themselves principally about foods or other materials used in the household, most of which are of so-called organic origin. Hence some fundamental instruction in the nature of organic compounds is necessary, and preferably should precede a course in household chemistry, which is largely an applied chemistry of the carbon compounds. Often, however, a preliminary course in organic chemistry cannot be introduced into the curriculum. For that reason, an outline of a series of lessons in the chemistry of the carbon compounds is given here, designed to be presented as lectures and experiments running parallel with the work in household chemistry and often merging into it. In such a combined course, the outline as given will need to be adapted to the allowed time, perhaps to the exclusion of the aromatic compounds, and it may be necessary to perform many of the experiments as demonstrations. To give the study its proper emphasis and value, stress should be placed less upon individual than upon type compounds, and upon their interrelation and properties, always with a view to enriching and making more effective the practical knowledge which the student has of substances met in everyday life.

It may be pointed out, in addition, that a recent course in general chemistry of the most modern type should be required as a prerequisite of household chemistry. In

such a course the subject matter should be so selected that the material handled in household chemistry shall not be entirely unfamiliar. For example, more definite information would be useful with regard to the constitution and properties of the important metallic elements, and a few of their simpler compounds.

### Outline of Course in Organic Chemistry.

#### I. ORIGINAL AND PRESENT MEANING OF TERM "ORGANIC."

Importance of organic chemistry—Some differences between organic and inorganic compounds—Organic chemistry the chemistry of carbon compounds—The carbon atom; its valency; graphic expression of valency; tendency to combine with hydrogen.

#### II. CHAIN HYDROCARBONS.

The Methane, Ethylene, and Acetylene Series.

Development of Series—Nomenclature—Common formulae and differential—Properties—Occurrence of important members.

Application to Gaseous and Liquid Fuels.

Experiments: Preparation of Methane, Ethylene and Acetylene.

Reaction for the double bond.

#### III. ISOMERISM APPLIED TO THE HYDROCARBONS.

Nature and effect of isomerism.

#### IV. SATURATION AND UNSATURATION.

Meaning of—General formation of substitution and

addition products—Isomeric forms—Formation of iodoform and chloroform.

Experiment: Preparation of iodoform.

#### V. ALCOHOLS.

Derivation from the hydrocarbon through substitution—relation to metallic hydroxides—Nomenclature—General physical and chemical properties and reactions—Source and uses of important alcohols—Isomeric forms; primary, secondary, and tertiary alcohols—Unsaturated alcohols—Glycols and polyhydric alcohols—Sulphur alcohols or mercaptans.

Application to liquid fuels; to carbohydrates; to fats; to fermentation; preservation of foods.

Experiment: Preparation of ethyl alcohol.

Detection of methyl alcohol.

#### VI. ALDEHYDES AND KETONES.

Formation from alcohols—Comparative properties and reactions—Name, source, and uses of important examples.

Application to carbohydrates; preservatives; flavoring extracts.

Experiments: Preparation of formaldehyde, acetaldehyde and acetone.

Reduction by aldehydes, such as the Fehling's reaction.

#### VII. FATTY ACIDS.

Formation from aldehydes—Nomenclature—General properties and reactions—Occurrence and properties of