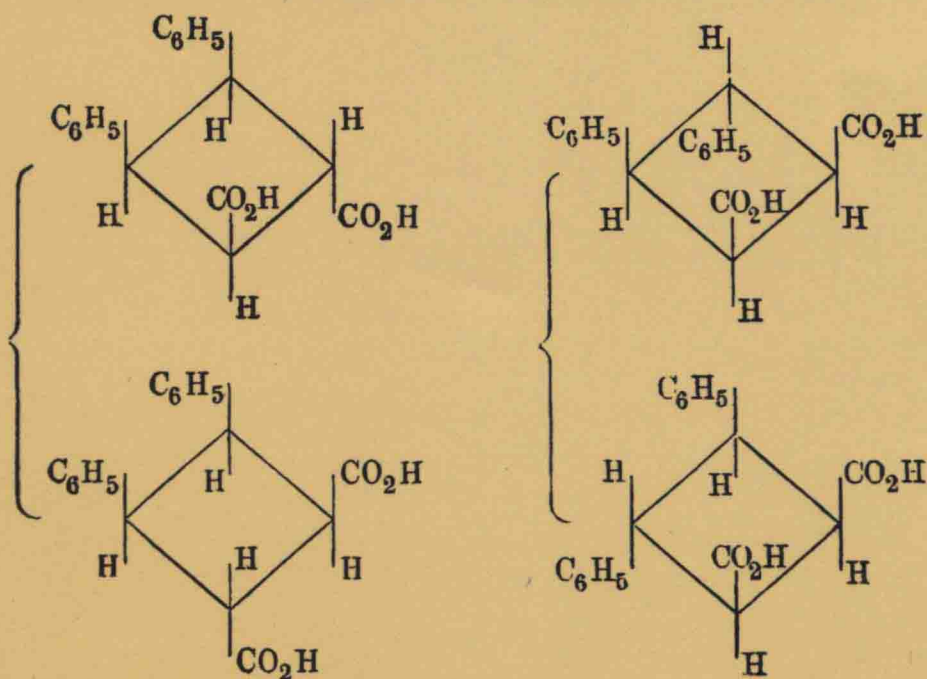


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THE ARRANGEMENT OF ATOMS IN SPACE

JACOBUS HENRICUS VAN 'T HOFF

EDITED AND TRANSLATED
BY ARNOLD EILOART

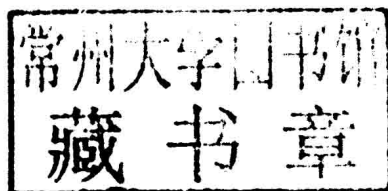


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The Arrangement of Atoms in Space

Awarded the first Nobel Prize in Chemistry in 1901 for his work on chemical dynamics and on osmotic pressure in solutions, the Dutch scientist Jacobus Henricus van 't Hoff (1852–1911) was also a pioneer in the field of stereochemistry – the three-dimensional analysis of chemical structures. This 1898 publication is based on the revised and expanded German translation of his *Dix années dans l'histoire d'une théorie* (1887), itself an updated version of his major work *La chimie dans l'espace* (1875). Translated and edited by the English chemist Arnold Eiloart, it covers the stereochemistry of carbon and nitrogen compounds, and contains an appendix on inorganic compounds by the Swiss chemist Alfred Werner (another future recipient of the Nobel Prize in Chemistry). Using experimental results, van 't Hoff shows how the varying spatial arrangement of similar compounds leads to differing chemical and optical behaviour.

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ARRANGEMENT
OF
ATOMS IN SPACE

THE ARRANGEMENT
OF
ATOMS IN SPACE

BY
J. H. VAN 'T HOFF

SECOND REVISED AND ENLARGED EDITION

WITH A PREFACE BY JOHANNES WISLICENUS

Professor of Chemistry at the University of Leipzig

AND AN APPENDIX

STEREOCHEMISTRY AMONG INORGANIC SUBSTANCES

BY

ALFRED WERNER

Professor of Chemistry at the University of Zürich

TRANSLATED AND EDITED BY

ARNOLD EILOART

LONGMANS, GREEN, AND CO.

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1898

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PREFACE

TO
THE FIRST EDITION

THE first edition of this little book appeared in 1877, in the form of Dr. F. Herrmann's free rendering of my brochure, 'La Chimie dans l'Espace,' and Wislicenus, as long ago as that, helped the work by a warm recommendation.

As the original views still survive in Stereochemistry, this second edition presents once more a freely revised version of that brochure; but a section on nitrogen derivatives has been added. Besides this, in the part devoted to carbon, the greatly increased number of facts has been taken into account, and finally the amount of the rotation of active bodies has received special attention. Accordingly the book may serve as a reference book for stereochemistry and optical activity.

At the publishers' wish, I have studied brevity as far as compatible with thorough treatment.

J. H. VAN 'T HOFF.

AMSTERDAM : *February* 1894.

PREFACE

TO

THE SECOND EDITION

FOR this second edition of the 'Arrangement of Atoms in Space,' as for the first, the publishers and the author desire a short preface from my pen. This can have now no such purpose as in the case of Dr. Herrmann's edition. Then I had to address to German chemists a letter of recommendation in favour of the little-known hypothesis of a very young colleague; now the name of the author has a renown so high, based on such an extraordinary series of important and far-reaching researches, that my recommendation would be altogether superfluous for his book, even if the theory here set forth had not acquired for itself the position in chemistry which in fact it possesses.

Indeed, the old opposition to the principle has almost died out; where it still lives it is directed

against the ultimate basis—against the Atomic Hypothesis itself—and does not deny that the doctrine of atomic arrangement in three dimensions is a logical and necessary stage, perhaps the final stage, in the chemical theory of atoms. For the most part the opposition is directed—often quite rightly—against special applications of the principle to the explanation of particular facts, leaving the principle itself untouched. That the hypothesis itself has proved its own justification—at least, as much as any other scientific theory—none can dispute.

It has already effected to the full all that can be effected by any theory; for it has brought into organic connection with the fundamental theories of chemistry facts which were before incomprehensible and apparently isolated, and has enabled us to explain them from these theories in the simplest way. By propounding to us new problems the hypothesis has stimulated empirical investigation on all sides; it has caused a vast accumulation of facts, has led to the discovery of new methods of observation, has become amenable to the test of experiment, and has at the same time started in our science a movement full of significance—in a certain sense, indeed, a new epoch.

How and to what extent the hypothesis has effected this, is told in this book, briefly, clearly, com-

pletely. The book is now not so much a new edition of the first German work, as a German revision of van 't Hoff's '*Dix Années dans l'Histoire d'une Théorie*,' enriched by the growth of our knowledge during the last seven years. In this new form, also, the book will win many friends, and be a welcome guide to the comprehension of stereochemistry and to its already very extensive literature.

I may well be pardoned if I find an especial satisfaction in this new edition of van 't Hoff's pioneer publication. When it first appeared as '*La Chimie dans l'Espace*' it bore as motto a sentence uttered by me as early as 1869.¹ I was then able to do something towards making known the new theory, and later to contribute to its development and to the experimental testing of it. Accordingly it is with great pleasure that I accept the honour of introducing the new revision, and send my thanks and regards to my honoured friend at Amsterdam.

JOHANNES WISLICENUS.

LEIPZIG : *April* 1894.

¹ *Ber.* 2, 550, and especially p. 620.

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