Atkins' Molecules

This is a brand new edition of the book that was called 'the most beautiful chemistry book ever written'. In it, we see the molecules responsible for the experiences of our everyday life – including fabrics, drugs, plastics, explosives, detergents, fragrances, tastes, and sex. With engaging prose Peter Atkins gives a non-technical account of an incredible range of aspects of the world around us, showing unexpected connections, and giving an insight into how this amazing world can be understood in terms of the atoms and molecules from which it is built. The new edition has dozens of new molecules, a completely new graphical presentation, and an even more accessible and enthralling account of the molecules themselves.

Peter Atkins

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Second edition

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Preface

. . .from the first edition

Joy may be inarticulate, but reflection is empty without understanding. There is delight to be had merely by looking at the world, but that delight can be deepened when the mind's eye can penetrate the surface of things to see the connections within.

The following pages are intended to augment our delight when looking at the world. They introduce one facet of chemistry – its portrayal of the structure of substances – and they aim to show what makes up the things that make up the everyday world. These pages are an introduction to *molecules*. They are meant, among other things, to show the shapes of molecules and the connections between them, to show why some molecules behave as they do, and to reveal the economy of nature. In short, this book aims to make the molecular familiar.

I have purposely included molecules that I find interesting. Even so, I could have chosen any of a thousand others and still remained with the familiar. However, limitations of space dictate the brevity of the selection, and I must ask readers to quell the irritation they will certainly feel when they look in the index for a substance and find it ignored. There are several million known compounds, and manufacturers of pills, potions, and detergents – and nature especially – have at their disposal a vast chemical organ on which they can conjure symphonies of mixtures. It is inevitable that a book such as this will be incomplete. Its purpose is only to open an eye, not to show the world.

There is no particular order in which the book should be read; indeed, it is not necessarily meant to be read in any order: it is a book for occasional delectation. I wrote it, however, with a particular flow of thought in mind, so it is not completely amorphous and can profitably be read from front to back.

I tried to avoid technical terms throughout, but some inevitably (or at least unintentionally) crept in and are explained in the Glossary. Where possible, I also tried to explain; but do not expect too much fulfilment here, for some explanations are not yet known to

anyone, and others require too much technical background. Moreover, I did not want to diminish delight by overloading the text with too much explanation: this is only an *introduction* to understanding. I particularly wanted to show that *some* appreciation of the features of molecules can be achieved without a college degree (or even a freshman course) in chemistry. Most of the information presented here has been culled from a dozen or so books that I have come to respect. I hope that, if the authors find their thoughts on these pages, they will regard that as a tribute. Many of the points I mention are discussed in more detail in those books, and readers would be well advised to check them before using the information I provide – for I have also cut corners in my wish to simplify and render palatable a sometimes tough and complex dish.

. . .and for the second edition

My, what a change there has been in the fifteen years since the first edition! Most obviously, there is the change in graphical representation of molecules. For the first edition, I had to build physical models of the molecules, photograph them, process the film, then trace the images and colour them by hand. Now, of course, computer software does the whole business far more quickly and far more realistically than in those bygone days. I have used *WebLab Pro* to construct all the images. You will also find them on the website for the book, where you can fiddle with them, rotate them, and so on.

I have culled some of the less interesting molecules from the first edition and added new ones: there are about 50 new molecules in this edition. Even the descriptions of most of the original molecules have been completely revised in the light of new knowledge or because I wanted to say something different or illuminate a new feature that has come to light.

What has not changed between the editions, I hope, is the sense of the sheer joy of seeing interconnections and explanations, the sense of delight at seeing why nature is the way it is, and the sense of understanding why a little change can have profound consequences. That is the deep pleasure of chemistry, that it opens a third eye onto the inner nature of things.