AN EASY INTRODUCTION TO CHEMISTRY

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An Easy Introduction to Chemistry by Arthur Rigg

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EDITED BY THE REV.

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WITH NUMEROUS ILLUSTRATIONS

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CHAPTER I.

THE CHEMIST.

CHEMISTRY. In this book you are to learn about chemistry. But what is chemistry? you may ask. I will try to explain, and I am sure that the more you learn, the more you will find how very much there is in it you would like to know.

The discoveries of chemists will surprise you. Perhaps you think each substance you see is all one thing. Chalk you think is chalk, and that is all. But the chemist has discovered that chalk is made of three things put together. One is a gas as light as air; in fact, it is a gas that forms part of the air you breathe. Another is carbon or charcoal. Yes, dark charcoal makes a part of white chalk; but the charcoal is not dark *now* because it is combined with other things. The third thing in chalk is a metal. So gas, charcoal, and metal, three things very unlike each other, make chalk.

Again, there is water. Water, simple water, *that* surely you will say, must be one thing. People used to think so—old philosophers (wise men) as well as common people and children. But chemists found out it was not one thing.

Water they found to be composed of the same gas that is in chalk, united with another gas with which they sometimes fill balloons. These two gases are continually uniting and forming water. In every fire you see, in all flames whether of wood, candle, gas or fluid, these two gases are busy, uniting to form water. You do not see the water, for as fast as it is formed it passes off into the air, and water in the air is so finely divided that you cannot see it, but you can catch it as it is formed in the flame, and so cause it to be seen. There are many ways in which you can do this. Here is one shown in Fig. 1. If a *cold* spoon, or a spoon with a little ice and salt in it, is held over ever so clear a flame, the finely-divided water as it passes from the flame is what chemists call *condensed*, and gathered upon the under side of the spoon. If you hold the spoon so high that soot is not deposited upon it, a large drop of water may be seen to hang from the bottom where you would think the spoon was hottest.

Fig. 1.

Perhaps you may have noticed that when a bright kettle of cold water is set on the fire, or over a gas flame, the outside of the kettle is not only covered with a dew, but sometimes drops of water trickle down. This water is being formed by these two gases.

But I will tell you how you can not only catch, but actually shut up the water, as you see in Fig. 2.

Here a candle is placed under a glass, and the water first makes the glass dim, but soon gathers so much as to trickle down its sides. You can try this experiment with any glass jar, but you must remember to put some little bits of wood under the edge, as you see in the figure. If you do not, the candle will soon go out, for reasons that I will explain to you in another chapter, and there will be but little water formed. As the outside of the glass must be cool, do not try this in a very warm room.

Fig. 2.

Water is *composed* of two gases. Now when the chemist takes water, and separates one of the gases from the other we say he *de-composes* the water. He does just the opposite of what is done in flame, for there the two gases *unite* and form water. So, when he separates the things that form chalk from each other, he *decomposes* the chalk.

In other parts of this book I shall tell you more particularly about these and many other wonderful things.

Perhaps you think you are too young to know anything about chemistry, and that only older persons can understand it. This is not so. There are many things in chemistry that you can understand as well as older people. I shall try to select such only as you will be interested in knowing, and leave the rest to be learned when you are older.

Chemistry is interesting because it tells about so many things you see every day. Perhaps you think that the chemist is only concerned with substances that have hard names, and with which you have nothing to do, but it is far otherwise. Many things that he can tell you about are very common. I have already spoken of chalk and water. The little I told you of their composition perhaps interests you, and you will be still more interested when told other particulars respecting them. Then there is the air we breathe—you would like to know about *that*. The chemist can tell you what part of the air is needful that we may live. You will be surprised to learn that some of it is continually becoming a part of your body, your flesh and bones, and that some of your body is all the time turning into gas, and flying off all around. But so it is, as shall by-and-by be shown.

Chemistry can tell why fires burn brightly. You will find that there is a great deal of chemistry in so common a thing as a candle. A most distinguished chemist (the late Michael Faraday) delivered six lectures to a young audience in London on the "Chemical History of a Candle," and they have been published, making a book of more than 200 pages.

Chemistry also tells what it is that makes bread rise, and how it is that bread nourishes the body; also how soaps are made, and why they cleanse clothes and other things; also how paints and dyes are mixed and employed.

About these and very many other common things chemistry can tell much of interest that will be of use in many periods of your life. You may now know more about

these and other subjects than the wisest people knew fifty years ago, for chemists have discovered much not then known.

You may have heard that chemists try experiments. In this book I shall describe experiments, many of which you can try for yourselves. You can try them with bottles and tubes that cost very little money, and by exercising a little contrivance you can try many of them with what is at your own homes.

But you need not do even this to be interested in chemistry, because there are things that illustrate the subject continually happening before you. There are experiments, so to say, going on not only around, but within you; and you have only to look and chemistry will be found everywhere in action.