

THE
FAIRY-LAND OF SCIENCE

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'BOTANICAL TABLES FOR YOUNG STUDENTS,' ETC.

ILLUSTRATED

"For they remember yet the tales we told them
Around the hearth, of fairies, long ago,
When they loved still in fancy to behold them
Quick dancing earthward in the feathery snow.

"But now the young and fresh imagination
Finds traces of their presence everywhere,
And peoples with a new and bright creation
The clear blue chambers, of the sunny air."

Folk Lorr.

SIXTEENTH THOUSAND.

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PREFACE.

The Ten Lectures of which this volume is composed were delivered last spring, in St. John's Wood, to a large audience of children and their friends, and at their conclusion I was asked by many of those present to publish them for a child's reading book.

At first I hesitated, feeling that written words can never produce the same effect as *viva-voce* delivery. But the majority of my juvenile hearers were evidently so deeply interested that I am encouraged to think that the present work may be a source of pleasure to a wider circle of young people, and at the same time awaken in them a love of nature and of the study of science.

The Lectures have been entirely rewritten from the short notes used when they were delivered. With the exception of the first of the series, none of them have any pretensions to originality, their object being merely to explain well-known natural facts in simple and pleasant language. Throughout the whole book I have availed myself freely of the leading popular works on science, but have found it impossible to give special references, as nearly all the matter I have dealt with has long been the common property of scientific teachers.

I am much indebted to Mr. J. Cooper for the zeal and assiduity he has shown in carrying out my suggestions for illustrations. All the engravings, with one exception, were executed under his superintendence.

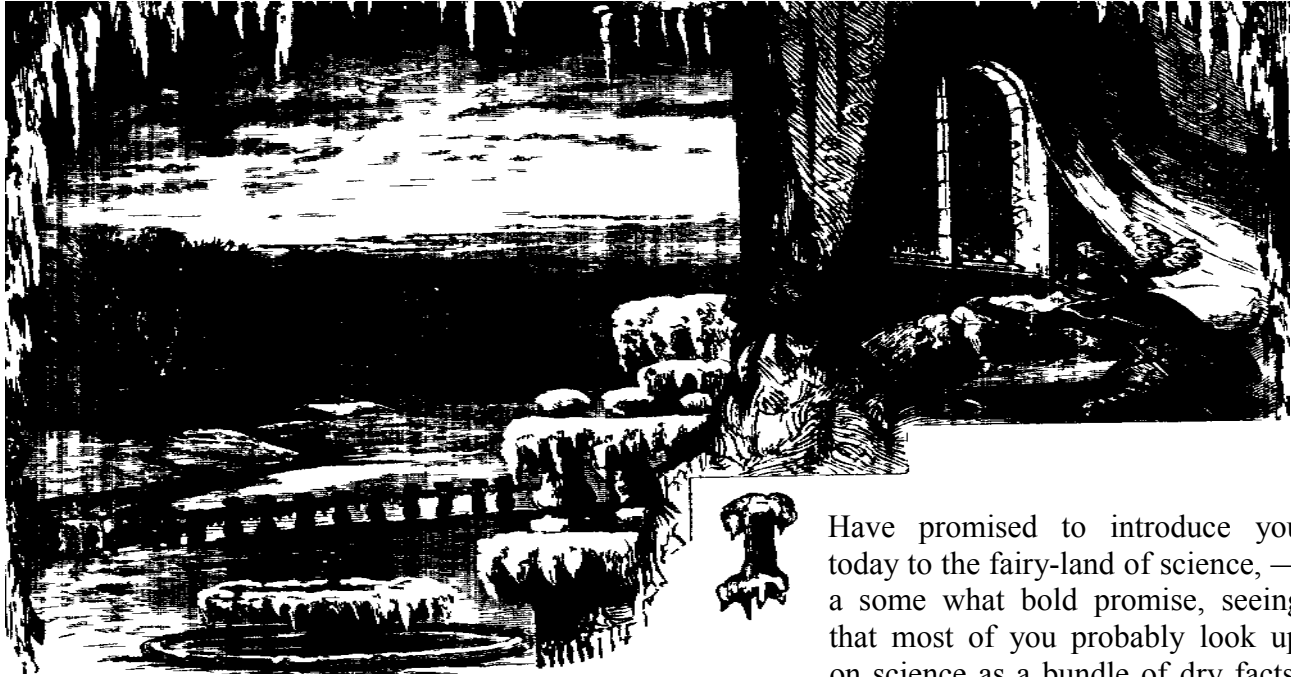
ARABELLA B. BUCKLEY.

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LECTURE I.
THE
FAIRY-LAND OF SCIENCE.
HOW TO ENTER IT; HOW TO USE IT; AND HOW TO ENJOY IT.



Have promised to introduce you today to the fairy-land of science, — a some what bold promise, seeing that most of you probably look up on science as a bundle of dry facts,

while fairy-land is all that is beautiful, and full of poetry and imagination. But I thoroughly believe myself, and hope to prove to you, that science is full of beautiful pictures, of real poetry, and of wonderworking fairies; and what is more. I promise you they shall be true fairies, whom you will love just as much when you are old and greyheaded as when you are young; for you will be able to call them up wherever you wander by land or by sea, through meadow or through wood, through water or through air; and though they themselves will always remain invisible, yet you will see their wonderful power at work everywhere around you.

Let us first see for a moment what kind of tales science has to tell, and how far they are equal to the old fairy tales we all know so well. Who does not remember the tale of the "Sleeping Beauty in the Wood," and how under the spell of the angry fairy the maiden pricked herself with the spindle and slept a hundred years? How the horses in the stall, the dogs in the court-yard, the doves on the roof, the cook who was boxing the scullery boy's ears in the kitchen, and the king and queen with all their courtiers in the hall remained spell-bound, while a thick hedge grew up all round the castle and all within was still as death. But when the hundred years had passed the valiant prince came, the thorny hedge opened before him bearing beautiful flowers; and he, entering the castle, reached the room where the princess lay, and with one sweet kiss raised her and all around her to life again.

Can science bring any tale to match this? Tell me, is there anything in this world more busy and active than water, as it rushes along in the swift brook, or dashes over the stones, or spouts up in the fountain, or trickles down from the roof, or shakes itself into ripples on the surface of the pond as the wind blows over it? But have you never seen this water spell-bound and motionless? Look out of the window some cold frosty morning in winter, at the little brook which yesterday was flowing gently past the house, and see how still it lies, with the stones over which it was dashing now held tightly in its icy grasp. Notice the wind-ripples on the pond; they have become fixed and motionless. Look up at the

roof of the house. There, instead of living doves merely charmed to sleep, we have running water caught in the very act of falling and turned into transparent icicles, decorating the eaves with a beautiful crystal fringe. On every tree and bush you will catch the water-drops napping, in the form of tiny crystals; while the fountain looks like a tree of glass with long down-hanging pointed leaves. Even the damp of your own breath lies rigid and still on the window-pane frozen into delicate patterns like fern-leaves of ice.

All this water was yesterday flowing busily, or falling drop by drop, or floating invisibly in the air; now it is all caught and spell-bound — by whom? By the enchantments of the frost-giant who holds it fast in his grip and will not let it go.

But wait awhile, the deliverer is coming. In a few weeks or days, or it may be in a few hours, the brave sun will shine down; the dull-grey, leaden sky will melt before him, as the hedge gave way before the prince in the fairy tale, and when the sunbeam gently kisses the frozen water it will be set free. Then the brook will flow rippling on again; the frost-drops will be shaken down from the trees, the icicles fall from the roof, the moisture trickle down the window-pane, and in the bright, warm sunshine all will be alive again.

Is not this a fairy tale of nature? and such as these it is which science tells.

Again, who has not heard of Catskin, who came out of a hollow tree, bringing a walnut containing three beautiful dresses — the first glowing as the sun, the second pale and beautiful as the moon, the third spangled like the star-lit sky, and each so fine and delicate that all three could be packed in a nut? But science can tell of shells so tiny that a whole group of them will lie on the point of a pin, and many thousands be packed into a walnut-shell; and each one of these tiny structures is not the mere dress but the home of a living animal. It is a tiny, tiny shell-palace made of the most delicate lacework, each pattern being more beautiful than the last; and what is more, the minute creature that lives in it has built it out of the foam of the sea, though he himself appears to be merely a drop of jelly.

Lastly, anyone who has read the 'Wonderful Travellers' must recollect the man whose sight was so keen that he could hit the eye of a fly sitting on a tree two miles away. But tell me, can you see gas before it is lighted, even when it is coming out of the gas-jet close to your eyes? Yet, if you learn to use that wonderful instrument the spectro-scope, it will enable you to tell one kind of gas from another, even when they are both ninety-one millions of miles away on the face of the sun; nay more, it will read for you the nature of the different gases in the far distant stars, billions of miles away, and actually tell you whether you could find there any of the same metals which we have on the earth.

We might find hundreds of such fairy tales in the domain of science, but these three will serve as examples, and we must pass on to make the acquaintance of the science-fairies themselves, and see if they are as real as our old friends.

Tell me, why do you love fairy-land? what is its charm? Is it not that things happen so suddenly so mysteriously, and without man having anything to do with it? In fairy-land, flowers blow, houses spring up like Aladdin's palace in a single night, and people are carried hundreds of miles in an instant by the touch of a fairy wand.

And then this land is not some distant country to which we can never hope to travel. It is here in the midst of us, only our eyes must be opened or we cannot see it. Ariel and Puck did not live in some unknown region. On the contrary, Ariel's song is

"Where the bee sucks, there suck I;
In a cowslip's bell I lie;
There I couch when owls do cry.
On the bat's back I do fly,
After summer, merrily."