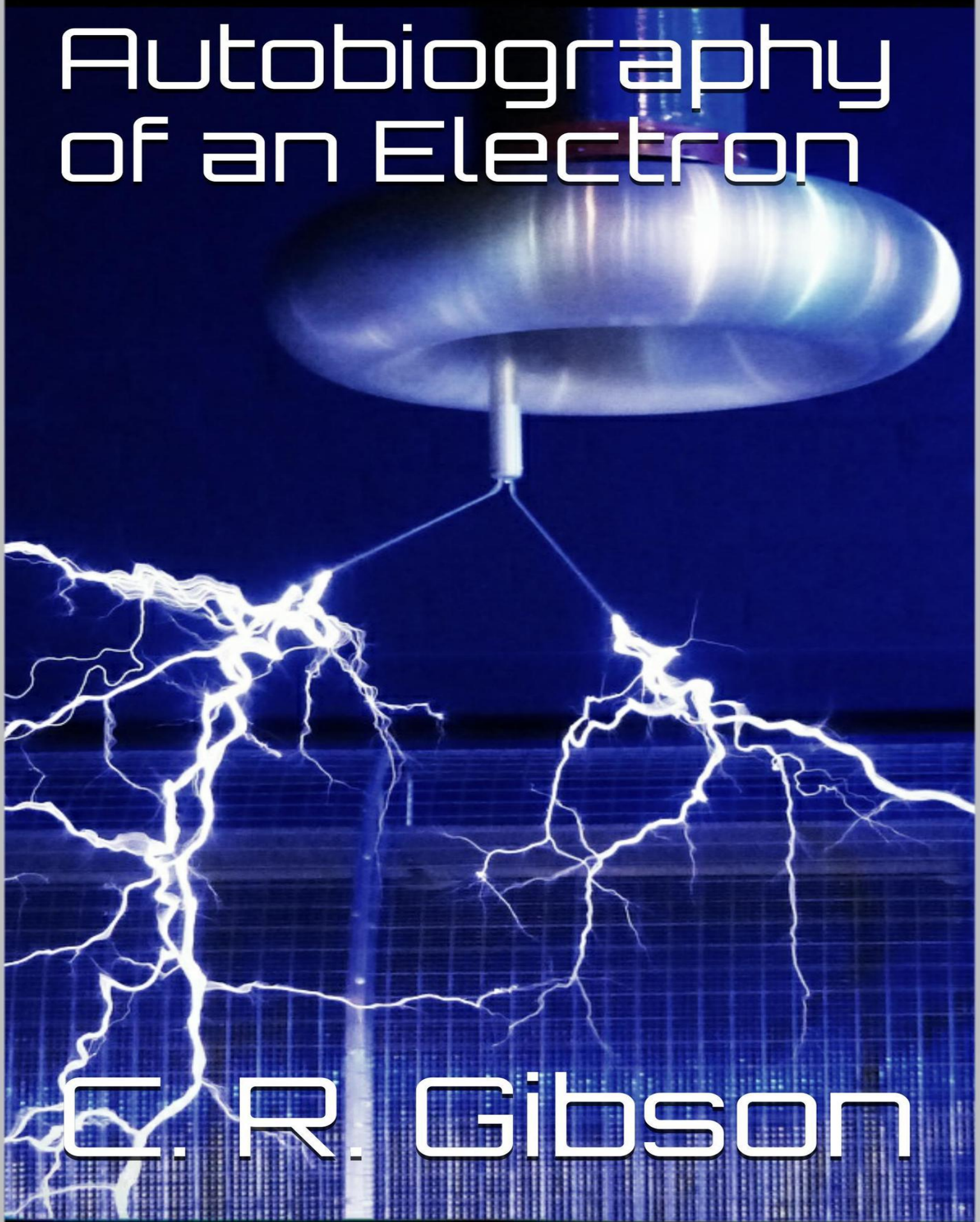
Autobiography of an Electron



C. R. Gibson

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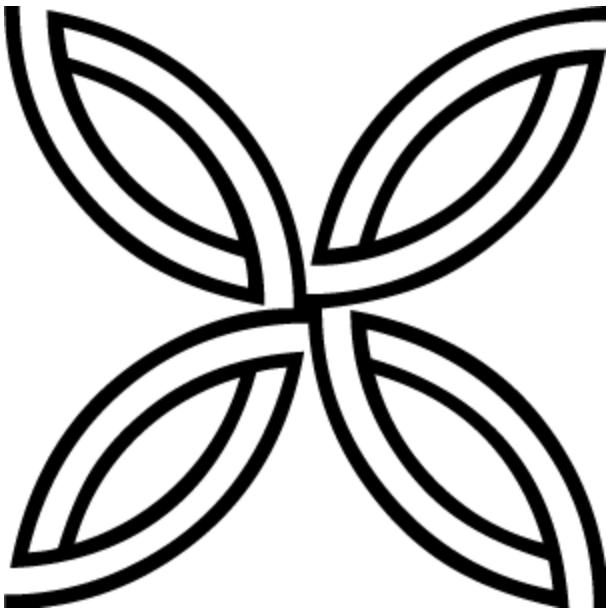

CHAPTER I

WHAT THE STORY IS ABOUT

The reason for writing this story is given in the Preface, but the title is so strange that the reader will wish naturally to know what the story is about. What is an electron? Is it an imaginary thing, or is it a reality?

One of the reasons for writing this story in its present form is to help the reader to realise that electrons are not mythical, but real existing things, and by far the most interesting things we know anything about. The discovery of electrons has shed a new light upon the meaning of very many things which have been puzzles until now. They give us a reasonable explanation of the cause of light and colour. They provide a new idea of the constitution of matter. They enable us to picture an electric current, and they give us definite, though by no means final, answers to the why and wherefore of magnetism, chemical union, and radio-activity. The story is imaginary only in so far that one of the electrons itself is supposed to tell the tale. But in the endeavour to make the story interesting, there has been no sacrifice of accuracy in the statements of fact.

While all names and dates, and many other details, have been kept out rigidly from the story, a note of the more important of these has been added in an Appendix for the sake of those readers who may wish to refer to them.

It will be well to introduce the electron to the reader before leaving it to speak for itself. We have definite experimental proof of the existence of electrons, and yet it is very difficult to realise their existence, for two reasons. In the first place, they are so infinitesimally small. We count a

microbe a small thing; we can see it only with the aid of a very powerful microscope. Yet that little speck of matter contains myriads of particles or *atoms* . An atom of matter is therefore an inconceivably little thing, but even that is a great giant compared to an electron. Our second difficulty in realising the existence of an electron is that it is not any form of what we call *matter* ; it is a particle of *electricity* , whatever that may be.

From the earliest experiments it became evident that there were two distinct kinds of electricity. These were described by the pioneer workers as *positive* and *negative* electricities. To-day we have definite experimental proof that negative electricity is composed of separate particles or units. Just as matter is composed of invisible atoms, so also is negative electricity of an atomic nature. These particles of negative electricity have been christened electrons, *electron* being the Greek word for *amber* , from which man first obtained electricity. Of course no one can ever hope to see an electron, but physicists have been able to determine its size and *mass* , its electric charge, and the speeds at which it moves.

While it has been known for more than a century that *light* is merely waves in the all-pervading æther of space, set up by incandescent bodies, it has been a puzzle always how matter could cause waves in the æther, as it offers no resistance to the movement of matter through it. Here we are on the back of a great planet, flying through space at the enormous rate of one thousand miles per minute, and yet our flimsy atmospheric blanket is in no way disturbed by the æther through which we are flying. In the following story we shall see that these electrons help us towards a solution of this and many other problems; they provide the missing link between matter and the æther.

But what is this *æther* of which one hears so much in these days? The truth is we know nothing of its nature. We cannot say whether it is lighter than the lightest gas or

denser than the densest solid. The æther, whatever it may be, is as real as the air we breathe. It is the medium which brings us light and heat from the sun, and which carries our wireless telegraph and telephone messages. The whole universe is moving in this great æther ocean.

In order to make the electron's story perfectly intelligible to every reader, I have added a short explanatory note at the beginning of each chapter. These notes merely state the facts about which the electron is speaking.

To make the electron's story as realistic as possible, it has been necessary to give the imaginary electron perfect freedom of knowledge concerning itself and its surroundings. In our schooldays we had to write the autobiographies of steel pens, and such-like, but these inanimate things had to be endowed with powers of thought, feeling, and desire. It is very important, however, to remember that an electron is a particle of negative electricity— *a real existing thing* .

CHAPTER II

THE ELECTRON'S PREFACE

While many scientific men now understand our place in the universe, we electrons are anxious that every person should know the very important part which we play in the workaday world. It was for this reason that my fellow-electrons urged me to write my own biography. My difficulty has been to find a scribe who would put down my story in the way I desired. The first man with whom I opened negotiations wished me to give him dates and names of which I knew nothing. And he asked such stupid questions about where I was born and who my parents were, as if I were flesh and blood.

I am pleased to say that my relationship with the scribe who has put down my story in the following pages has been of the most friendly description. Apart from a little tiff which we had at the outset, there has been no difference of opinion. He complained that I related things in too abstract a form. However, we got over the difficulty by a compromise; I have allowed him to place what he calls "The Scribe's Note" at the beginning of each chapter, but it will be understood clearly that these are merely convenient embellishments, and that I am responsible for the story of my own experiences.

CHAPTER III

THE NEW ARRIVAL

THE SCRIBE'S NOTE ON CHAPTER THREE

It will be well to keep clearly in mind that an electron is a real particle of negative electricity.

Electrons have been discovered only within recent years.

No matter from what substances we take them, they are always identical in every respect.

Some electrons are attached to the atoms of matter in such a way that they may be removed easily from one object to another.

When a surplus of these detachable electrons is crowded on to any object, we say that it is charged with negative electricity.

We speak of the other object, which has lost these same electrons, as being charged with positive electricity.

In this chapter the electron refers to the old-world experiment in which a piece of amber when rubbed attracts any light object to it.

For many ages man believed this to be a special property belonging to amber alone.

One of Queen Elizabeth's physicians discovered that this property was common to all substances.

It is most amusing to me and my fellow-electrons to hear intelligent people speak of us as though we were new arrivals on this planet. Dear me! We were here for countless ages before man put in an appearance. I wonder if any man can realise that we have been on the move ever