THE TELEPHONE: AN ACCOUNT OF THE PHENOMENA OF ELECTRICITY, MAGNETISM, AND SOUND, AS INVOLVED IN ITS ACTION. WITH DIRECTIONS FOR MAKING A SPEAKING TELEPHONE

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Phenomena of Electricity, Magnetism, and Sound,

AS INVOLVED IN ITS ACTION.

WITH DIRECTIONS FOR MAKING

A SPEAKING TELEPHONE.

BY
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PREFACE.

THE popular exhibitions of the speaking-telephone during the past six months, together with numerous newspaper articles, have created a widespread interest in the instrument; and it has been thought that a small book explanatory of its action would meet a public want.

It has seemed to be necessary to call attention to the various phenomena and inter-actions of the forces involved; and hence the author has attempted to make plain and intelligible the phenomena of electricity, magnetism, and sound. Cuts have been inserted where they could be useful in making the mechanical conditions more intelligible; and a table of tone-composition has been

devised, which shows at a glance the constituents of the sounds of various musical instruments.

As the speaking-telephone, in which magneto-electric currents were utilized for the transmission of speech and other kinds of sounds, was invented by me, I have described at some length my first instrument, and have also given explicit directions for making a speaking-telephone which I know, by trial, to be as efficient as any hitherto made; but nothing in the book is to be taken as a dedication of the invention to the public, as steps have already been taken to secure letters-patent according to the laws of the United States.

A. E. DOLBEAR.

COLLEGE HILL, MASS.

THE TELEPHONE.

ELECTRICITY.

Some of the phenomena of electricity are manifested upon so large a scale as to be thrust upon the attention of everybody. Thus lightning, which accompanies so many showers in warm weather in almost every latitude, has always excited in some individuals a superstitious awe, as being an exhibition of supernatural agency; and probably every one feels more or less dread of it during a thunder-shower, and this for the reason that it affects so many of the senses at the same time. The flash may be blinding to the eyes if near to us; the thunder may be deafening to the ears, and so powerful as to shake the foundations of the hills, and make the ground upon which we stand to sensibly move: these with the remembered

destructive effects that have been witnessed, of buildings demolished and large trees torn to splinters in an instant, are quite sufficient to raise a feeling of dread in the strongest mind. In the polar regions, both north and south, where thunder-storms are less frequent, the atmospheric electricity assumes the form called the aurora borealis, or the aurora australis, according as it is seen north or south of the equator.

More than two thousand years ago it was noticed by the Greeks that a certain kind of a mineral which was thrown up on the shores of the Mediterranean Sea, when rubbed would attract light bodies, such as shreds of silk or linen and bits of paper. To this substance they gave the name of Elektron, and the property developed thus by friction was afterwards called electricity. In 1600 Dr. Gilbert, physician to Queen Elizabeth, published a book in which he described numerous experiments demonstrating that electricity could be developed by friction upon a great variety of substances, such as stones, gems, and resins. The first machine for developing electricity was made by Otto von Guericke of Magdeburg, about 1680.

His machine consisted of a ball of sulphur about six inches in diameter, which could be rotated. If the dry hand were held against the sulphur while it was being turned in a dark room, the sphere appeared to emit light: it also gave out a peculiar hissing or crackling sound. Newton experimented a little with electricity, and noticed that the rubber was an important element in developing electricity. He does not seem to have given to the subject the same attention that he gave to some other departments of science. Had he done so, it is probable that he would have advanced the study a hundred years; that is to say, he would probably have left it at the place where it actually was in 1790. So great were his abilities that in one lifetime he made greater additions to human knowledge than all the rest of mankind had made during the preceding thousand years. In the month of June, 1752, Franklin made that memorable experiment which immortalized him. He flew his kite to the thunder-cloud, practically asking the question of the lightning whether or not it was identical with electricity. The lightning came down the wetted twine to his hand, and proclaimed its identity.