



THE NEW EDISON PHONOGRAPH.

THE PHONOGRAPH.

BY CONSTANCE GORDON-CUMMING.

That "a little knowledge is a dangerous thing" is never more vividly illustrated than when men, grasping some half-developed scientific theory, which at first sight has seemed to run counter to Scriptural teaching, have straightway assumed that revelation was at fault. Happily a deeper insight into Nature's mysteries leads most candid minds to acknowledge that science is in truth the most loyal handmaid of the Holy Scriptures. Never has this been more strikingly illustrated than by the latest marvellous discovery in the possibility of recording and transmitting sound.

How many of us, reading in the Bible that "by our words we shall be justified, and by our words we shall be condemned," have accepted this in any literal sense? Still more surely have we assumed that the saying, "For every idle word that men shall speak they must give account in the Day of Judgment," was simply a strong form of speech; whereas now a very wonderful scientific discovery enables even clumsy human beings, not only to capture every word spoken by a human voice, or by a score of voices, but to transmit this record by post across sea and land for thousands of miles, there faithfully to repeat every syllable it has heard in the exact intonation of each speaker, and, having done this once, the tiny box containing this indisputable evidence may be put away, to be brought out again a thousand years hence, when there is every reason to believe that it will repeat the whole conversation as accurately as it does at the first moment.

Marvellous as this undoubtedly is, we know that we as yet stand only on the threshold of what there must yet be to learn in regard to this extraordinary discovery,—just as our grandparents, hearing with wonder and awe of the first capture of a spark of lightning, little dreamt how soon homes would be lighted by electricity, and the whole earth encompassed with telegraph wires and electric cables.

A good many years ago, the possibility of recording and reproducing sound first occurred to Mr. Edison,—indeed, more than ten years have elapsed since he constructed a phonograph, which clearly proved that it contained the germ of some truly marvellous scientific fact to be evolved at leisure. But so many startling discoveries presented themselves about the same time, that it was impossible to develop them all at once. Just then the telephone, for the simple transmission of sound, began to secure its position as a commercial enterprise; and though various inventors lay claim to its parentage, Mr. Edison certainly receives the lion's share of the credit.

About the same time he invented the microphone for magnifying sound, and in order the better to display its power, he applied it to the telephone, with the result of causing the most insignificant sounds to

be heard, startlingly intensified, at a distance of many miles. Thus the buzzing of a fly, imprisoned at Bradford, was distinctly audible at Leeds, while the ticking of a watch was clearly heard at a distance of ten miles.

But as there are limits to the working capacities of the most brilliant human genius, Mr. Edison found that the task of adapting electricity to purposes of public and domestic illumination, and bringing all details of his electric light to perfection, and into commercial working order, fully engrossed his powers until the present year, when he was able once more to turn his attention to the transmission and perpetuation of sound by his infinitely more wonderful permanent process. After devoting eight months of steady work to the subject, he now announces that his invention is ready to take its place in the commercial world, and that he expects very soon to see the phonograph established in every business office. Just conceive what this means! No shorthand reporter ever noted speech so faithfully or so indisputably as will these invisible recorders.

By the end of January, Mr. Edison expected to have five hundred phonographic machines ready for distribution. The apparatus will not occupy more space than an ordinary type-writer, and can be fitted into a box which can stand beneath a table, nothing being visible except the mouthpiece and a revolving cylinder. The owner of the machine touches a little switch to secure its attention, and adjusts the mouthpiece to the cylinder, which is made of a sort of sensitive material specially manufactured to register the very faintest atmospheric movement. At present the simple phonograph requires that the lips of the speaker should talk into it, but Mr. Edison is now preparing and testing instruments like funnels, which will collect from a large area, and bring it in concentrated form to the receiver.

When the sound condensers are perfected, then, in truth, the phonograph will work absolutely independently of any intentional aid from the speaker. It will be quite a new illustration of the "little pitcher with long ears," and will be found to be also a most dangerous tell-tale—indeed, to venture on a private conversation in any room which has not been minutely examined in every corner, will be very much like talking in one of those halls we find in old houses, with an upper gallery opening into other rooms—a regular trap!

No sooner is this faithful recorder told off to its work, than it at once begins to mark on the sensitive paper every vibration of the air, as influenced by different voices, and so perfectly does it succeed that, if twenty persons speak in rapid succession, the tones of each voice can be clearly recognized whenever there is occasion for this witness to reproduce the conversation! Nor is there any limit to the number of times that it will repeat the whole story without the slightest variation; a thousand times over it will, if required,

unwearily reiterate each comment in the precise intonation of the speaker, whether of anger, love, or indifference, and at the self-same pace, rapid or drawling—never was there so perfect a mimic! If we cannot all "see ourselves, as others see us," at least we shall henceforth be privileged to hear ourselves as others hear us, and a very surprising revelation that will be to many! Imagine the annoyance of the poor man with an incurable stutter at hearing it thus perpetuated, or of those who so needlessly and often unconsciously interlard their conversation with expletives—to say nothing of that numerous company who make such cruel havock of their H's!

It has been suggested that the man who dictates his will to the phonograph will secure himself against any subsequent dispute as to its authenticity, for his very voice will be heard as clearly as it was ever heard during his lifetime, and can repeat its directions again and again, to the utter confounding of all interested adversaries.

One class who are likely to benefit largely by this discovery are printers, as Mr. Edison hopes to enable them to set their type from the dictation of the phonogram, instead of having so often to puzzle over illegible manuscript, perhaps by a bad light. Already Mr. Edison has devised a method by which the printer has only to touch a lever with his foot, and immediately some half a dozen words are sounded.

To musicians the phonograph should prove invaluable, especially to such as are endowed with the delightful talent of improvising beautiful airs which they find themselves unable subsequently to reduce to notes—fleeing, fanciful dreams of melody, beautiful as the tints of the rainbow, and as evanescent. Here every sound can be reproduced with wonderful delicacy, and held captive till it is reduced to its representative symbols. Indeed, the phonograph seems peculiarly adapted to music: it whistles and sings more perfectly than it speaks. When in presence of a full orchestra, with the aid of sound condensers, it registers the whole melody with marvellous success. "Each instrument," says Mr. Edison, "can be perfectly distinguished. The strings are perfectly distinct—violins even from violoncellos, wind instruments and wood—all are heard, even the notes of the singer, and the apparatus for duplicating phonograms is so cheap that the price of music will be scarcely worth considering." Just conceive what a boon this captor of fleeting melody would have been to such a composer as Sir George Macfarren, of whom we have recently heard how, on account of his blindness, he dictated, note by note, the score of all his elaborate compositions!

One of Mr. Edison's curious experiments is that of superimposing one sound upon another. Thus "after reading a long list of geographical names, he turned the machine back and sang 'Hail, Columbia!'

directly over the previous words; then once more turning it back, he whistled 'Yankee Doodle.' The triple message was then given out by the phonograph, resulting in the most curious combination, in which each part was heard perfectly distinct"—just as you might hear the three, and a few more besides, from your window in "a quiet neighborhood!" By the application of the sound condensers, of which I have already spoken, the voices of any number of speakers can be heard simultaneously; and the noisiest debate that has ever yet been heard in Parliament could be seized, held, spell-bound, and transmitted to foreign lands, or to future generations, for their edification or the reverse.

As regards the transmission of phonograms to a distance, it is obvious that in the first instance they must be principally employed for the transmission of business letters, since it is necessary that the recipient of a phonogram should possess the corresponding machine, without which the message brought to him by the post is a dead letter indeed. But on placing the little inanimate slip into his magical box, straightway the voice of his correspondent is heard (through the ear-telephone) as plainly as though he was sitting in the next chair.

Every office in which the phonograph is adopted will have to provide itself with a stock of phonograms, just as it lays in a stock of writing paper. These will be sold in the form of small cylinders, $1\frac{1}{4}$ inch in diameter, and from one inch upwards in length. They will be made of several sizes. An additional mystery is how so much can be conveyed in so small a space. Short messages, not exceeding two hundred words, can be transmitted on a phonogram only one inch in length, of which a dozen are to be sold at 7 $\frac{1}{2}$ d. Phonograms to receive from eight hundred to a thousand words are only four inches in length, and cost about 1s. 6d. per dozen. The number of words recorded varies according to the rate of the speaker's utterance. For longer letters, sheets will be prepared capable of receiving from two to four thousand words.

Should there be no occasion to preserve the letter, the little scroll can be scraped by a tiny knife, so delicate in its operation that it will remove a shaving 1-7000th part of an inch in thickness, leaving a fresh surface ready to receive a new message. This shaving may be repeated a dozen times; and so, though the slip originally costs upwards of a halfpenny, it may perhaps do duty a dozen times over, so that the expense is not really greater than that of note-paper. Small wooden boxes, resembling old-fashioned pill boxes, will be sold with the machine. These are destined to hold the phonograph; and it is hoped that the Post-Office authorities will undertake to transmit them at the same rate as ordinary letters.



DICTATING TO THE PHONOGRAPH.