

Letter from Charles Sumner Tainter to Alexander Graham Bell, March 18, 1888, with transcript

Copy of a letter written to Dr. Bell by Chas. S. Tainter. AMERICAN GRAPHOPHONE COMPANY, No. 1215 Connecticut Avenue, Washington, D. C., Mar. 18th, 1888. My dear Mr. Bell:—

I enclose an article on the Phonograph and Graphophone clipped from the Washington Capital of to-day, to which I wish to call your attention. For a long time past articles about the graphophone have appeared in the newspapers, and in most cases you have been accredited with the invention of the machine.

As you have passed through a similar experience in connection with the telephone, and have been subjected to the great disappointment of seeing your inventions attributed to others, I am sure that you will fully appreciate my position in this matter, and hope you will correct the erroneous impression that has gotten abroad.

I fully appreciate your kindly help in the first stages of the work of developing the graphophone, and no one is more ready than I am to give you all honor for what you have done in the matter, but the instrument as it stands to-day, and which forms the basis of the publications, is entirely my own work, and no feature of it can be rightfully ascribed to you. I therefore suggest that a publication from you giving the facts in the case, would place me in my correct position, and relieve you from a situation that may be embarrassing, and thus be beneficial to both.

Very truly yours, Chas. S. Tainter. Prof. A. Graham Bell.

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2-3-69 SCIENCE. [Vol. XI. No. 277 stood. I have said that we must obtain the complete mythologies of each linguistic stock of America, and we must work until we have shown what the characters of the myths of each stock really represent. This done, each stock is to be compared with that most nearly related to it, and then a general comparison of all. The final result will be a scientific American mythology. If the Aryan field is worked in a similarly careful manner, we shall have a complete Celtic, Teutonic, Greek, Slavonic, Persian, and other mythologies, and, finally, Aryan mythology as a whole.

“There still remain Africa, Australia, and the Pacific Islands, where there are materials of the highest value for the completion of mythologic science and the history of the human mind,—materials which are perishing every day, and which will never be collected if missionaries and travellers are to collect them. You could no more make a collection of myths through the agency of missionaries and travellers than you could make a geological survey of the United States if you depended on the voluntary and intermittent efforts of missionaries and travellers, some having, but most not having, definite ideas about geology or topography.

“Though mythology is as nothing on Wall Street in comparison with geology, the time, I think, is coming when a good number of men will place it higher; because mythology is to the history of the human mind what geology is to the history of the earth,—documentary evidence of the character of its different epochs. Even now there are few persons who would say that the earth on which he treads is better than man. You remember the words of the great poet,—

“The cloud-capp'd towers, the gorgeous palaces, The solemn temples, the great globe itself, Yea, all which it inherit, shall dissolve, And, like this insubstantial pageant, faded, Leave not a rack behind.’

“When that time comes, it will be found that the only real, the only permanent, results achieved on earth were those relating to the human mind.”

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copy SCIENTIFIC NEWS IN WASHINGTON. Phonographs, Graphophones, etc.; Curious Experiments with Jets of Water.—Replenishing Rivers with Shad.—More about the Water-Spouts.—United States Fish Commission Work on the Pacific Coast.

Instruments for Recording and Reproducing Speech.

Prof. Alexander Graham Bell read, at the last meeting of the Fortnightly Club, a paper upon recent inventions for recording and reproducing speech, exhibiting, to illustrate what he said, some of the latest and most curious devices that have been produced. He explained the nomenclature of the subject as he thought it ought to be used, by saying that a phonograph is an instrument for making a record of speech; phonogram, the record so made; and graphophone, an instrument for reproducing speech from a phonogram. In some cases the phonograph and graphophone are the same in most of their parts, but in many they are entirely different.

Professor Bell exhibited the graphophone, of which a number are now in practical use, and which, in its essential parts, is similar to Edison's phonograph. The record is made on a cylinder covered with wax or paraffine, and the speech is reproduced by conducting the sounds to a diaphragm connected to an open trumpet-shaped instrument, or, by wires to devices placed upon the ears, vibrations corresponding to those that were produced when the record was made.

A modification of these instruments was shown, in which the record was made upon a pasteboard disk revolved upon a shaft in a horizontal plane. The upper surface of the disk is covered with wax, upon which a similar impression to that on the wax-covered cylinder is made by a stylus connected with a diaphragm which is caused to vibrate by the sound of the voice. The record is a spiral groove cut in the wax. The reproduction is obtained in a manner similar to that used in the cylindrical machine. The principal advantage which this form of the instrument is expected to present over the older, cylindrical form is in the greater facility of multiplying copies. Electrotypes are much more readily made from the flat

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disks than from the cylinders. From these electrotypes other disks covered with wax, and that with tinfoil to prevent sticking, obtain the spiral impression by pressure of the former upon the latter; and when one of these duplicates, the tinfoil having been removed, is put into the instrument, the reproduction of speech is as perfect as from the disk on which the original record was made.

The most interesting and curious part of Professor Bell's paper related to experiments based upon investigations and discoveries made by Dr. Chichester Bell in regard to the effects of sounds upon jets of fluid. It is well known that if a jet of fluid, like water, is placed in sound-waves, it is not only sensitive to them, but it reproduces them as the string of a musical instrument, tuned in unison with that of another, will vibrate, and reproduce the tones given out by the first. It is not easy to hear the sound or speech reproduced by the jet of water. The former mode was to connect the hearing-tube with a rubber diaphragm placed in the jet of water, which is discharged perpendicularly from above, at a given pressure, from a very small orifice. When the rubber is held very close to the orifice, the sound reproduced is very faint; but, as it is moved away, it increases in volume until the point of maximum loudness is reached; then it diminishes again until near the point where the stream begins to break; and then it is broken up, and is entirely unintelligible. As the sounds to be reproduced by the jet have to be made in the same room, and very near to the jet of water, it is very difficult for any but a practised ear to detect the one from the other.

In order to make this more satisfactory, Dr. Chichester Bell made the following experiment. Substituting two platinum wires for the rubber diaphragm with a small piece of some non-conducting substance inserted between their ends, he placed this in the jet at the point where the largest volume of sound has been found to be reproduced. These wires being connected with an electric battery, and a telephone placed in the circuit, it was possible to have the speaker and listener almost any distance apart. With this apparatus, speech was

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not only reproduced, but with increased volume: the jet of water not only spoke, but acted also as a microphone to magnify the sounds it made.

Upon these experiments were based those which Professor Bell explained to the club. The jet of water, somewhat colored, was discharged upon a glass plate placed in it at the point from which the greatest volume of sound was known to issue in reproducing speech. This caused the jet to spread out in a thin film over the plate. The under side of the glass was covered with an opaque substance in which there was a small slit through which a small amount of light could pass. Behind the slit a moving piece of photographic paper was placed, upon which the record was made. Then a person spoke over the plate, and the result was a very curious line upon the photographic paper. When this line was transferred to gelatine in the ordinary way, it was found that a series of elevations and depressions was produced, which could be felt with the fingers, and from which an electrotype could easily be made. This showed that the sound-waves, striking the film of water on the glass, caused constant changes in the thickness of the latter, and thus caused a variation in the intensity of the light that passed through the slit. From such a record as this, it will probably be a simple problem to reproduce the speech. Professor Bell exhibited specimens of the original record upon the photographic paper, of the negative that is made for the transfer to the gelatine, and of the gelatine after the transfer had been made. The possibility of developing from these experiments an instrument for the reproduction of sounds that may be superior to any yet made is what makes them so interesting.

Shad-Hatching.

The shad-hatching by the United States Fish Commission Sta? this year is confined to four stations,—one at Fort Washington, on the Potomac; one at Havre de Grace and another at Battery Island, on the Susquehanna; and one on board the 'Fish hawk,' on the Delaware. The season for taking eggs will continue until the last week in May or the first week in

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June; and the number of eggs captured this year up to May 19 was far greater than had been taken at the same stations at the corresponding date of 1887, when the