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THE PHOTOPHONE.

Mr. Alexander Graham Bell, whose contributions to electric science have been recognized at home and abroad to their fullest value, has written a paper on his latest invention, the Photophone, which we reproduce and abundantly illustrate.

It is a beautiful application of the telephone to the registration of the mechanical action of electricity set in motion by light; but it is not (as the world was lead to suppose by some ill informed journalist) a method of transmuting light pulsations into electrical ones, and then changing these back again into light. A beam of light is reflected upon a mirror diaphragm, which is set in motion by the voice or otherwise; the concentrated ray is then reflected so as to affect a piece of selenium in a telephonic circuit, which, by its varying conductivity, acts intermittently on the diaphragm of the telephone, and thus in the usual way reproduces the sound. The instrument is simplicity itself, but the results are of the highest popular and scientific interest.

That it is possible for even the ray of a star to produce a mechanical effect, was demonstrated when Edison used his Tasimeter for measuring the waves of radiant energy of Vega. We thought Bell had solved the problem, upon which Edison was at work when he became interested in the perfection of his electric light, but our hope has not been realized. The subject, however, is one of extreme interest, and it is not strange for the discoverers of the two telephonic systems to be simultaneously engaged in solving the natural corollary to their great propositions. But Edison has an advantage in the pursuit. His employment of the varying electrical conductivity of carbon allows him to introduce any amount of reserve power for mechanical purposes.

It is much to be regretted that Edison can not find leisure from the practical applications of his science to turn his attention to those problems which he is so eminently capable of solving. We vividly recall some experiments in this direction which he told us of during the Spring of 1878, while on a visit to his laboratory at Menlo Park. He allowed a beam of light to fall on the surface of a diaphragm connected with his carbon button, in the hope that by a surface and molecular action, it would be possible to transmit its motion to a receiving diaphragm, where a similar molecular tension would result in the reproduction of the original vibrations. A faint halo is said occasionally to have surrounded the diaphragm. We could not but believe this due to the excited imagination of Mr. Edison, for at the time he was enthusiastically engaged in testing the wondrous capacity of the tasimeter, which he was soon to use in eclipse observations on the Draper expedition.

He also tried to observe the effect of a beam acting on the diaphragm of a phonograph, whose cylinder revolved at enormous speed, hoping a line of phosphorescence might arise from the tinfoil where it came in contact with the needle. Mr. Edison said he employed the direct action of the light (in the last case), in preference to using electricity as a medium for it, because he feared there existed a difference between the vibratory periods of light and electricity, although their velocity was nearly the same. For a similar reason he sought to realize the instantaneous translation of light by using his motograph, in preference to the magnetic telephone which for this purpose is valueless, owing to the time required to charge and discharge the iron core. But the most interesting of these experiments is to come. He threw a beam of lamp light on a small mirror, fastened to a tuning fork, and reflected a ray upon a strip of hard rubber in the tasimeter, the button of the latter being in circuit with a telephone and battery. On setting the fork in motion, the Lissajous figure caused a movement of the rod, which resulted in the reproduction of the musical note.

But all these pretty experiments are but introductory to the more subtile question, how to translate light through other forms of motion back into light. We wish a hearty rivalry between the two discoverers; for Messrs. Bell and Edison will find the fields of science (like those of trade) yield best fruit when fertilized by competition.