SCIENCE:

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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.

We have received a copy of the Report made by Professor S. W. Burnham, to the "James Lick Trust," of Observations made on Mt. Hamilton, with reference to the location of Lick Observatory, but we are compelled by press of matter to postpone further reference to it until a future date.

We have authority for stating that the Rev. W. H. Dallinger, of England, has consented to become Governor and Professor of Natural Sciences, of Wesley College, Sheffield. We congratulate the trustees of this establishment on having secured the assistance of one who has done so much to elevate the standard of scientific research.

The published papers of Professor Dallinger are models of their kind, and largely quoted by the highest authorities who write on the progress of Biology.

We trust Professor Dallinger, in taking the management of Wesley College, may still be enabled to prosecute his exhaustive microscopical studies, by the methods originally devised by himself, which have already been so fruitful of results, and promise to revolutionize our knowledge of such forms of life.

We are requested to state by the trustees of the Lick Observatories that they will be glad to receive the publications of Observatories, and of Astronomical and Scientific societies, for the permanent library of the Lick Observatory. They inform us that the preliminary work on Mt. Hamilton has already been commenced, and will be prosecuted as rapidly as possible under the circumstances. The small equatorial of 12-inch aperture, has been ordered of Alvan Clark & Sons, and will be placed in position early in 1881; and the great equatorial, meridian circle, and other instruments, will be contracted for at an early day. It is not expected there will be any further delay in putting the Lick Observatory in complete working order, other than that incident to the importance and magnitude of the undertaking.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.*

GENERAL BUSINESS—MONDAY, AUGUST 30TH.

The fifth day of the meeting was devoted to general business, to essays in the departments, and to visiting Salem in the afternoon. In the general session some new members were elected, and it was agreed that when the Association adjourned, that it should be to Cincinnati, on August 17, 1881.

The following reports were made:

Mr. E. B. Elliott, on an uniform system of registering deaths, births and marriages; Prof. E. L. Youmans, on the treating of science in public schools; Mr. F. B. Hough, on the preservation of forests; Prof. Harkness also reported certain amendments to the condition of the Association, to be acted on next year. At present there are two full sections in the association, and it is proposed to establish eight, covering the following branches; A, Physics; B, Astronomy and Mathematics; C, Chemistry and its Application; D, Mechanical Science; E, Geology and Geography; F, Biology; G, Anthropology; H, Economic Science and Statistics. A permanent sub-section of Microscopy is also provided for. These changes will bring the association in close resemblance to that of the British association.

The reading of the papers in the various sections was continued, the subjects of which need not here be stated, as we shall offer a full tabulated list of all the papers read before this association, conveniently arranged for future reference.

TUESDAY, AUGUST 31ST.

The list of essays entered for reading was closed with the number 280. The following officers were elected for the Cincinnati meeting to be held in 1881:—President, Professor G. J. Brush, of Yale College; Vice-President of Section A, Professor A. M. Mayer, of Hoboken; General Secretary, C. V. Riley; Secretary, Section A, Professor John Trowbridge, of Harvard; Secretary, Section B, William Saunders; Treasurer, W. S. Vaux, of Philadelphia; Auditing Committee, Henry Wheatland, of Salem, and Thomas Meehan, of Philadelphia. Resolutions were adopted for a social re-union of the various sections on the second evening of future sessions. Resolutions were also passed recognizing the services to science of the late General Myer of the Signal Service, and the providing for the appointment of a committee to select a series of stars of stellar magnitude for standards, to be reported at the next meeting. Cable congratulations were sent to Michel Eugene Chevreul, senior member of the French Academy upon the completion of his ninety-fifth year. The reading of papers continued.

WEDNESDAY, SEPTEMBER 1ST.

The seventh and last day of the meeting was opened at the Institute of Technology, which had been found so convenient and well adapted for all purposes of the Association. Mr. George Engelman, of St. Louis, Mo., was chosen vice-president of the Natural History Section. The following gentlemen were elected a committee on stellar magnitudes: Professor E. C. Pickering, chairman, L. Boss, S. W. Burnham, Asaph Hall, William Harkness, E. S. Holden, Simon Newcomb, C. H. F. Peters, Ormond Stone and C. A. Young. The committee is to select a list of standard stars, to which the magnitudes of other stars may be referred. The following gentlemen were elected a committee on standard time: O. Stone, chairman, S. P. Langley, E. C. Pickering, J. R. Eastman, L. Boss, Leonard Waldie, J. K. Rees, G. W. Hough and H. S. Pritchett. The following resolution was passed:—

Dr. Charles T. Jackson, one of the founders and an early president of the Association of American Naturalists and Geologists, having, after many years of illness and seclusion, just passed away, it is fitting that this Association express its high appreciation of his long and valuable services, both as an original investigator in American geology and mineralogy, and as a teacher of chemistry, which will cause his name to be long held in honor and in grateful remembrance.

The following resolutions were passed on Tuesday:

Resolved, That the American Association for the Advancement of Science recognizes the value of contemporaneous observations at numerous and well-selected stations, and with standard instruments, as a first and indispensable condition of converting meteorology from a chaotic mass of useless facts into a science.

Resolved, That this Association acknowledges its obligations to the first Secretary of the Smithsonian Institution for originating, supporting and cherishing such a system of meteorological observations throughout the vast domain of the United States until it had outgrown the resources of the institution, had justified its continuance by proved usefulness, and had awakened the fostering interest of the government.

Resolved, That, in the opinion of this Association, the welfare of commerce and agriculture, and the comfort of every member of the community have been promoted by the weather reports and weather charts which have been issued by the chief signal service at Washington, while they have, at the same time, furnished food for scientific thought.

* Continuation of Report from SCIENCE, Sept. 4.

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