THE TELEPHONOGRAPH.*

THE telephonograph is a combination of the phonograph with the telephone, and is intended to take and record telephone messages by automatic means, and, to a limited extent, give an answer in the same way. It is the invention of Mr. J. E. O. Kumberg, and an example of the instrument is to be seen at the office of Messrs. H. F. Joel and Co., 31 Wilson street, Finsbury. The combination is simple in general principle, but some ingenious mechanism has been introduced to make the working effective. The message is spoken by the person sending it into the telephone in the usual way, and the vibrations set up by the voice are caused to act upon a recording stylus by the impact of the sound-waves. In this way the wax cylinder in the office of the person spoken to is indented and a phonogram is produced. This, of course, can be read off at leisure in the usual way. The vibrations are transmitted either directly or indirectly, in the latter case an electrical current effecting the object. A highly-sensitive transmitter of any well-known form is used. If it is desired, the instrument may be so arranged that two wax cylinders, or phonograms, may be inscribed, the one being in the office of the sender, to be retained as a record, and the other, an exact duplicate of the first, being produced in the office of the receiver. To effect this end, the transmitter instrument has two channels or tubes for the sound-waves produced by speaking into the mouthpiece. One of these channels leads to the speaking or recording diaphragm of the instrument at the transmitting station, which engraves them upon the phonogram blank. At the same time identical sound waves are electrically conveyed to the receiving instrument at the distant station of the person spoken to, and are there imprinted on another phonogram blank. It is possible to throw the phonograph action out of play and use the telephone in the ordinary way.

Neither the telephone nor the phonograph is perfect in its action, and unpracticed persons are apt at times to experience some difficulty in translating the sounds either one or the other produces into articulate speech; and when the deficiencies of the two are combined difficulty is still more likely to arise, although proficiency is retained to a remarkable degree by practice. In order to overcome this defect a special design of recording diaphragm cell has been devised by the inventor. It consists of a double cell micro-diaphragm having two compartments, one of which is fitted with a multiple, or other suitable microphone diaphragm disc, and the other with a sensitive disc of glass. This receives the undulations produced by the sound-waves and communicates them to the recording stylus. Below the glass diaphragm is a guard, which serves to confine the sound, and also as a shield against the scraping noise which the stylus makes by cutting into the wax cylinder. One of the most important features of the invention is a floating weight controlled by a spring which is attached by means of a pivoted lever and a fine wire to the two discs, already mentioned, of the double cell micro-diaphragm. The pivoted lever carries the recording and reproducing tools by which the sound vibrations are respectively engraved upon or reproduced from the wax cylinder. The action of the weight is to give additional power, or perhaps, rather, additional certainty and steadiness to the reproducing tools. Such weights have before been used to supply what may be described as a fly-wheel effect, thus enabling the cutting tool to overcome any irregularities in the composition of the wax. The weight, however, is apt to rebound through its own momentum, and thus defeat the end for which it is provided. To overcome this defect a spiral spring is fitted in the machine under notice, with the result that the jumping or vibratory motion is damped. It is claimed that by this device a deeper cut is made in the wax cylinder than has been before obtained, and the reproduction of the sound waves is thereby made more perfect.

We lately had an opportunity of testing this invention to the extent of transmitting a message from one room to another adjoining, although the length of wire represented a considerable distance. As reproduced by means of the phonogram, on which the message was recorded, the words were distinctly audible, the

* From the London *Times*.

result being equal to that of an ordinary phonograph. Mr. Higgins, chief engineer to the Exchange Telegraph Company, has tested the apparatus over a line five miles in length. He reports that under favorable circumstances 'articulation is good, the impressions on the cylinder being as deep as the impressions made when speaking into an ordinary phonograph.' Large battery power was needed and a reinforcing current is required at the receiving and registering line.

In regard to the practical utility of the apparatus those who had experience with the telephone and the phonograph will be able to judge from the description here given. It would be most applicable in small offices where a limited staff is employed. Thus if the office is left without an attendant and a call is made the phonograph can be so set as to reply, "Mr. —— is out. The instrument is fitted with a telephonograph which will automatically take down any message you may send and Mr. —— will read it on his return." The arrangement of the mechanism is such that any number of messages up to an aggregate of 15,000 words may be taken in this way.

SCIENTIFIC NOTES AND NEWS.

SIR WILLIAM HUGGINS, the eminent astronomer, will succeed Lord Lister as the president of the Royal Society. The other officers of the Society will remain as at present with the exception of certain members of the council. They will be as follows: Treasurer, Mr. Alfred Bray Kempe; secretaries, Sir Michael Foster, D.C.L., LL.D., Professor Arthur William Rücker, D.Sc.; foreign secretary, Dr. Thomas Edward Thorpe, C.B.; other members of the council, Professor Henry Edward Armstrong, V.P.C.S., Mr. Charles Vernon Boys, Mr. Horace T. Brown, F.C.S., Mr. William Henry Mahoney Christie, C.B., Professor Edwin Bailey Elliott, Dr. Hans Friedrich Gadow, Professor William Mitchinson Hicks, Lord Lister, F.R.C.S., Professor William Carmichael McIntosh, F.L.S., Dr. Ludwig Mond, Professor Arnold William Reinold, Professor J. Emerson Reynolds, D.Sc., Dr. Robert Henry Scott, Professor Charles Scott Sherrington, M.D., Mr. J. J. H. Teall, Sir John Wolfe-Barry.

THESE officers will be elected at the anniversary meeting of the Society on November 30th, when medals will be presented as follows: The Copley Medal to M. Berthelot, For. Mem. R.S., for his services to chemical science; the Rumford Medal to M. Becquerel, for his discoveries in radiation proceeding from uranium; a Royal medal to Major MacMahon, for his contributions to mathematical science; a Royal medal to Professor Alfred Newton, for his contributions to ornithology; the Davy Medal to Professor Guglielmo Koerner, for his investigations on the aromatic compounds; and the Darwin Medal to Professor Ernst Haeckel, for his work in zoology.

LORD AVEBURY has given the first Huxley Memorial Lecture which the Anthropological Institute of London has established to commemorate Huxley's anthropological work.

F. H. SNOW, Chancellor of the University of Kansas and professor of organic evolution and entomology, has been given a year's leave of absence by the Board of Regents, on account of ill health.

DR. L. O. HOWARD, chief of the Division of Entomology, U. S. Department of Agriculture, has been elected an honorary member of the 'Allgemeinen Entomologischen Gesellschaft.' The other honorary members are: Fr. Brauer, Vienna; Charles Janet, Paris; Sir John Lubbock, London; A. S. Packard, Providence, R. I.; J. A. Portchinsky, St. Petersburg; M. Standfuss, Zürich; E. Wasman, Luxemburg; Aug. Weismann, Freiburg.

DR. RAMON Y CAJAL, the eminent histologist, has been awarded a pension by the Spanish Government, and additional funds have also been provided for the enlargement and maintenance of his laboratory.

YALE UNIVERSITY has conferred the honorary degree of M. A. on Professor H. S. Graves, director of the Yale Forest School.

PROFESSOR BEMIS, director of the New York State School of Ceramics at Alfred University, has been awarded a silver medal at the Paris Exposition for a collection of the economic clays of the United States.