

in our very fragmentary knowledge of what goes on within the substance of the earth, we have means of explaining and interpreting the greater part of the facts known to us regarding the character of earthquakes. I shall, therefore, conclude by summing up the conclusions which have been put forward as to origin and cause. These are, first, that earthquakes are not due to any slow-acting process of secular duration, but to a rapid development of strain, which may, in extreme

cases, be almost instantaneous—a conclusion which I believe to be true of the greater part at least of those usually classed as tectonic, and of all those of great magnitude; and, secondly, that the development of strain is not the result of processes which have produced the tectonic structures, recognised by surface observation, but of changes and displacements in the matter which lies below the cooled and solid outer crust.

Telegraphic Transmission of Photographs.

A NUMBER of experimenters have attained varying measures of success in solving the problem of transmitting photographs, drawings, handwriting, etc., by line and wireless telegraphy, and a good deal of attention has been directed recently to the latest developments of the system on which M. E. Belin has been working in France for some time. His apparatus has been used with good results between the large French wireless station near Bordeaux and a naval station in the United States, as well as over land telephone circuits, etc. A brief description of the

included in a suitable circuit, arranged so that a current of varying strength is produced, owing to the variations of the resistance of the microphone according to the thickness of the part of the film that is being passed over. This varying current can either be sent directly over the line, or can be employed to control the strength of the waves sent out, in the case of wireless transmission.

The manner in which the variations in the signal current, or wave train, are retranslated into a photograph by the receiving apparatus is scarcely more

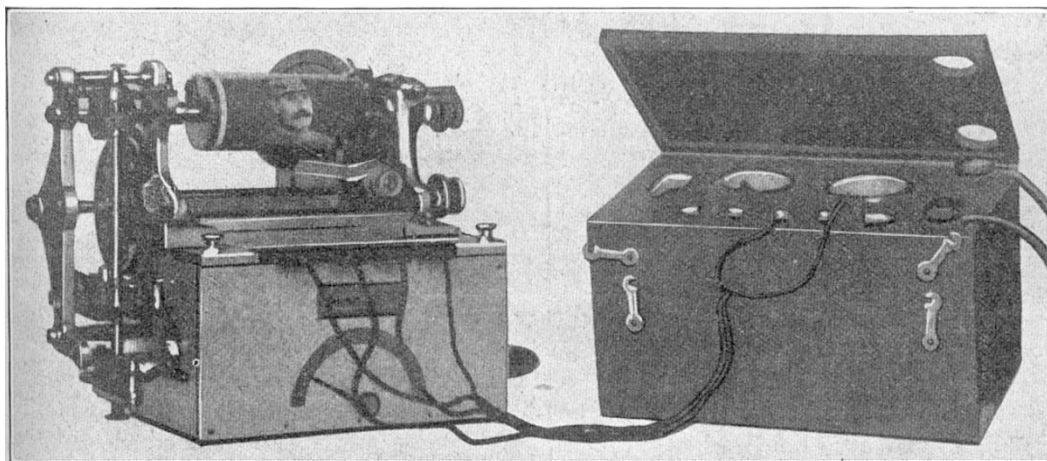


FIG. 1.—Portable apparatus for the telegraphic transmission of photographs.

latest form of the apparatus appeared in the *Comptes rendus* of the Paris Academy of Sciences of March 6, from which the accompanying illustration is reproduced (Fig. 1).

As in most of the experimental systems of "telephotography," synchronously rotating drums are made use of in the sending and the receiving apparatus respectively, with a simple arrangement of correcting signals to keep them in step. Mounted on the cylinder of the sending apparatus is a print of the photograph to be transmitted, made on a special bichromatised film which gives an image in appreciable relief. It is not necessary, however, to metalise this image to render it conducting, as is necessary in some systems, and it will be seen that the use of selenium cells, which forms a feature in other systems, is also avoided. A stylus, in a holder which is given a slow axial feed, is caused to pass over all portions of the relief film in succession, after the manner of the needle of a phonograph. This stylus is attached to the diaphragm of a simple but sensitive form of carbon granule microphone,

complicated. The varying current from the line (or the wireless receiving apparatus) is passed through a delicate reflecting galvanometer such as a Blondel oscillograph, the mirror of which is deflected by an amount depending on the strength of the current, *i.e.* on the thickness of the film where it is being passed over by the stylus of the transmitting apparatus. The light from the mirror passes through a screen of graduated capacity, and the optical system is arranged so that an image of the mirror, varying in brightness according to the deflection, is projected on to a photographic film on the drum, which is moving synchronously with that in the transmitting instrument. The photographic effect produced at any point is therefore always proportional to the thickness of the original film, so that a duplicate photograph formed of a screen of fine lines, but with a full range of "half-tones," is produced. In a simpler form of the apparatus, for pure black and white or "line" work only, a contact-maker replaces the variable resistance microphone in the transmitting apparatus, and a diaphragm, which

cuts off the light altogether when the mirror is deflected, is used in place of the graduated screen in the receiving apparatus.

M. Belin has perfected a portable form of the transmitting apparatus for connection to any telephone line. Considerable possibilities, both in illustrated journalism

and in police work, by the prompt transmission of portraits, finger-prints, handwriting, etc., are opened up by apparatus of this kind, and obviously the system preserves secrecy, as regards all ordinary listening-in apparatus, as the actual signals sent furnish no clue to the nature of the picture being transmitted.

Current Topics and Events.

ON May 17 the House of Lords, again prompted by Lord Sudeley, asked the Government to encourage the educational use of museums, and the Government, by the mouth of Lord Hylton, expressed the willingness of the Treasury "to consider in a very sympathetic spirit any further requests" for the appointment of guide-lecturers, also its own "desire to encourage all steps that can be taken to develop the sale of" photographs and other reproductions of objects in the national museums. Fair words! And progress has been made since the debate initiated by Lord Sudeley fourteen months ago. How does the Government translate word into act? It has just cut down the grant for the production of these popular publications, and, if its threat to reimpose admission by payment be enforced, it will deal a severe blow at the whole business and at the usefulness of the guide-lecturers. Never was anything so ridiculous perpetrated in the name of economy. That the sale of publications is a source of income is admitted by the Treasury. At the British Museum (Bloomsbury) an advanced policy has raised the receipts under this head from 3400*l.* in 1920-1921 to 6200*l.* in 1921-1922, thus more than paying for the whole cost of guide-lecturers. The introduction of pay-days will inevitably check this sale, and what will it bring in? The average receipts from admission at the Victoria and Albert Museum during the twelve years the system was in force were about 650*l.* per annum. At the Natural History Museum an expensive stall has just been fitted and saleswomen engaged, and now the authorities expect to have to spend 250*l.* on turnstiles and to lose 400*l.* on sales. One after the other the leaders of industry tell us that the secret of recuperation is more production; yet the Government, when it has a paying business, proposes to economise by checking production.

THE Metropolitan-Vickers Electrical Co., Ltd., which has a large works at Trafford Park, Manchester, devoted to the manufacture of electrical machines and apparatus, proposes to take up the manufacture of radio receiving equipment, and for this purpose will work in conjunction with the Radio Communication Co. of London. The Radio Communication Co., which is associated with the Indo-European and Eastern Telegraph Cos., was formed in 1919 to carry on business in connection with the establishment of radio telegraph and telephone installations and is well known for its important work during the war. The manager of the Metropolitan-Vickers Co.'s Research and Education Departments, Mr. A. P. M. Fleming, has been negotiating during the last few months with the Postmaster-General with reference

to the establishment of broad-casting stations, and the companies propose to establish two stations immediately, one at Trafford Park, Manchester, and the other at Slough. Other stations are projected as required. Immediately the official arrangements are made with regard to the areas to be covered and sites of the broad-casting stations, active steps will be taken to provide suitable programmes for broad-casting and to manufacture the necessary receiving equipment. The Westinghouse Co. of America initiated the broad-casting of information and entertainment by radio telephony and has very extensive experience in connection with it. The Metropolitan-Vickers Co. is technically very closely associated with the Westinghouse Co. and will be able to draw upon this unique experience, which with the utilisation of a number of fundamental patents in connection with wireless telephony, the experience of the Radio Communication Co. and its own selling, manufacturing, and research organisation, should place the Company in an exceptionally favourable position in entering this new field.

A TELEGRAM has been received from Fiji reporting the successful treatment of more than 12,000 hookworm cases by carbon tetrachloride with 90 per cent. of cures with one dose, and the removal of 98 per cent. of the worms. This method was tried first on dogs by Dr. Maurice C. Hall of the United States Bureau of Animal Industry, who found that 0.3 c.c. of the drug for every kilogram of live weight expelled all the hookworms of those animals, a result he had never previously obtained by any other method of treatment, while it could be given after fasting in hard gelatin capsules without purgation being necessary. As the new drug is much less toxic and far cheaper than either thymol or oil of chenopodium, the last of which has given rise to a number of fatalities owing to the uncertain amount of the active principle in different samples, these are matters of great practical importance, and the remarkable success of the trial now reported will, if confirmed by further observations, prove a notable advance in dealing with this the most widespread health- and labour-destroying scourge of immense areas of the world.

WITH reference to the reported discovery of a stage of the *Leishmania donovani* parasite of kala-azar in the salivary gland of a bed bug in Assam, information has now been received that Lt.-Col. Christophers, I.M.S., has reported the specimens of Mrs. Aidie to show only a normal parasite of the bed bug, which has no relationship to the organism of kala-azar, so the solution of the problem of the carrier of that disease is still incomplete.