

LETTERS TO THE EDITOR.

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A Simple Telephonic Receiver for Wireless Telegraphy.

WHILST engaged in some testing experiments with an installation for wireless telegraphy (Popoff system) between the Hook of Holland and the Government lightship, lying at a distance of 16 km. from shore, it occurred to me to try telephonic communication. As the necessary apparatus, now constructed by different companies, could not be procured without much delay, I made myself a most simple arrangement, yet yielding excellent results, an account of which may interest those occupied in similar experiments.

I fixed two parallel pieces of carbon (as used in an ordinary arc lamp) having a length of 5 cm. on a square piece of wood, and made with it a circuit including a couple of dry elements (small size) and an Adèr telephone; the circuit was completed by placing three or four common sewing needles loosely in transverse direction on the carbon rods. The apparatus is ready for use when the insulated wire of the signal mast (antenna) is joined to one carbon and the other is connected to the earth conductor. The letters from the Morse alphabet are very distinctly heard by this most simple device as shorter and longer taps in the telephone, and at the given distance the telegrams were easily read by sound, by a trained operator, as they were sent from the ship, and more quickly, of course, than they could be delivered by the usual coherer arrangement combined to the Morse writer; besides, it does not require special care to keep it in working condition. Yet it is sensitive enough to make audible the peculiar noise which accompanies the motion of the interrupter combined with the induction coil when it is operated by hand to produce the spark.

I believe that such a receiver may prove very useful for temporary installations of wireless telegraphy, as any one may carry it, along with all its accessories, in his pocket and put it at once in action when an insulated wire can be fixed to some elevated post, earth connections being always at hand.

I also investigated this arrangement in my laboratory with the view to ascertain whether it is really auto-decohering, as has been claimed recently for circuits where a telephone is used and carbon as coherer substance. Indeed, it seems that no tapping or any other arrangement is required to keep the telephone in good receiving condition. But when I substituted a sensible aperiodic galvanometer (Weston's construction) for the telephone, and operated with a small induction coil and Leyden jar (spark 3 mm.) in an adjacent room, every discharge produced a deflection of the needle, which did not return to its former position, unless a slight tapping was applied near the carbons, otherwise each new spark increased the deflection obtained by the former. It may be that the self-induction of the coil of the telephone is sufficient for decohering, which factor is not so active when a galvanometer is substituted.

I examined other substances than the steel needles, namely, copper, nickel, platinum, carbon, this also in powder (as used in the Mix and Genest telephone), and they all gave the same result, and this was obtained in the best way when, before the sparking of the coil, the transverse wire, by slightly tapping, had obtained a contact sufficient to transmit a small portion of the circuit current. But I observed that sometimes with platinum, and also with carbon, the deflection was reduced to zero, when the sparks set in, indicating that the resistance was increased by the electric waves, instead of diminishing, as was usually the case.

I found that a certain pressure exerted on the transverse wire, lying on the carbons, did not prevent the influence of the electric waves on the contact surfaces. When a load of 1.5 kg. and even of 5 kg. was placed on the needles (protected from immediately touching them by a glass plate), the deflection of the galvanometer set as well in and the telephone answered as distinctly to the sparks, produced in another room, as before.

It is obvious that the described arrangement proves also to be a very delicate microphone, but a slight pressure applied in the same way on the transverse wires makes it directly insensible to sound impulses, as was to be expected.

The Hague, July.

L. BLEEKRODE.

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The Future of the Victoria University.

PROF. SCHUSTER (p. 319) does not challenge the accuracy of my statements and I have nothing to alter in them. I have enjoyed reading his playful comments, but I have no desire to enter upon a mere dialectic contest with him, especially if it is to be fought with dynamical metaphors. I only wish now to disavow the predilection for federal universities, which Prof. Schuster artfully attributes to me. I have certainly acquired belief in one existing federal university which includes Lancashire and Yorkshire, but if that "experiment" is to fail, I do not see that I should necessarily favour another of the same kind. I must therefore decline with thanks the consolation that is offered me in the contingent possibility of my being able to take part in a federal university for Yorkshire. The immediate need of those who are or may be charged with university organisation seems to me to be an authoritative and impartial pronouncement on the causes which are alleged to warrant the disruption of the Victoria University. This is what I await before agreeing to any fresh experiment.

ARTHUR SMITHELLS.

August 1.

M. Faye and the Paris Observatory.

I THINK the addition of the following to the excellent article on Hervé Faye in NATURE of July 17 (p. 277) is of interest. I had the facts from Le Verrier and Faye; they have not been reported in the speeches delivered, and should not be lost to history.

It is known that one of the great things done by Le Verrier was the creation of the Central Bureau of Meteorology, as part of the Paris Observatory. When the celebrated astronomer was dismissed, in 1870, by the Emperor, no change took place in the organisation of this establishment. When Le Verrier was recalled, in 1872, after Delaunay's accidental death, he filled, as in former times, the double position of head of French astronomy and of meteorology. But he was told that steps were being taken by the Administration to form a Central Bureau, independent of the Observatory, when he should have breathed his last. This idea grieved Le Verrier; he complained bitterly of it to his friends and to the Academy.

When Le Verrier died, M. Yvon Villarceau was appointed intermediate director, and filled this office for some months. M. Bardoux, a member of the Senate, sent a message to the Academy of Sciences asking its opinion on the idea of creating an independent "Météorologie." The question was warmly discussed in secret session, and M. Faye, like many others, raised objections. The Academy accepted their opinion, and answered in the negative to the official proposition. As the advice of the Academy was not binding, M. Bardoux had a right to disregard it, which he did. The reputation of M. Faye was such that he was generally considered as being the only possible successor of Le Verrier. M. Bardoux advised M. Faye to accept the directorship of French astronomy, as meteorology would henceforth form a separate department. M. Faye thanked M. Bardoux, but declined under such conditions.

WILFRED DE FONVIELLE.

Electrical Resistance of Iron at very Low Temperatures.

OWING to the kindness of Dr. M. W. Travers in providing me with some liquid hydrogen, I have recently been able to observe the resistance of a specimen of iron wire at a temperature of about 20° absolute. The specimen was the same that had been used in previous experiments on resistance between 1100° and -200°, and the result of continuing the resistance-temperature curve is of considerable interest. In two papers on this subject Profs. Fleming and Dewar reach the conclusion that the resistance of pure metals tends to vanish at the absolute zero, but that the presence of impurity in the specimen reduces the rate of decrease of resistance with temperature, and that this behaviour may even afford a test of the purity of a conductor. This bears out a remark made by M. Edmund Van Aubel (*Annales de Chimie et de Physique*, 1899) that the purity of bismuth can be gauged by the variation of its electrical resistance between 0° and 30°.

The temperature coefficient of bismuth is abnormal when the element is in certain physical conditions, its resistance increasing with fall of temperature in more than one position over the range indicated, a behaviour which is less surprising if bismuth really contains a small percentage of polonium. An observation