At first sight this idea upsets the simple reversibility of the process, but not, I think, if we confine the postulated reversibility to pairs of events actually in causal contact; in any case it is more intelligible and more in accordance with the historical development of physics than the one it has been designed to replace or supplement.

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Aug. 18.

Penetration of Radio Waves.

IN a recent letter to *NATURE* (July 2) by two of the present writers, it was pointed out that information was lacking as to the extent to which radio waves could penetrate the earth. By the courtesy of Mr. J. H. Clark, Mr. H. K. Lidstone, and other officials of the famous Caribou Mine, Colorado, an opportunity was offered on Aug. 17 to make some satisfactory tests on this point.

Mr. Guy L. Allen, of Boulder, used a nine-valve (or tube) super-heterodyne Victoreen set which he had built himself, and with which he had heard Buenos Ayres, Madrid, Lima, and London. At a depth of 220 feet below the surface, and in a cross cut clear of wire, rails, and pipes, he readily detected K F E L Denver (248 metres), and the concert was well heard from the loud speaker by all present. On proceeding to a depth of 550 feet, carrier-waves were detected, yet no clear reception was possible in the morning. But in the evening at 9.20 the party returned to the 550-foot level, and at the end of a tortuous passage 80 feet distant from all wires and pipes, speech, music, and song from K O A Denver (326 metres) was heard from the loud speaker about as clearly as on the surface earlier in the evening. In both cases the reception was by loop, and in both cases maximum intensity was obtained when the loop pointed within a few degrees of Denver, about fifty miles away.

Previous experiments at the tunnel at Montreal, Canada, had shown that 40 metre waves were weak in penetrating power; that broadcasting waves were more efficient, while longer waves of 10,000 metres surpassed both.

Details of this experiment will be published in due course in a report of the Bureau of Mines.

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Pyrex as a Container for Radium Solution.¹

SOME readers of *NATURE* may be interested to know that Pyrex glass is not suitable as a container for a solution of radium salt. About two and a half years ago, I dissolved salt containing 150 milligrams of radium and put it into a Pyrex bulb connected with a Töpler pump for removing the radon. Three months ago, when examining the bulb, I found it to be cracked in almost every conceivable direction. The bulb seemed airtight still, but the solution was immediately removed to a soft glass bulb for safety. On closer examination it was found that the cracks started from the inner surface of the bulb. Some had

penetrated only slightly, and others were nearly or completely through to the outer surface. None extended below the level of the solution. They only appeared where the radon could be expected to collect in quantity in the evacuated region just above the solution. This indicates clearly that the cracks are caused by the bombardment of the inner surface by α -rays. How this starts a crack, and causes it to continue only so far as the bombardment by the α -particles extends, is not readily understood. This difficulty is not confined to a bulb containing solution, for I have also observed that Pyrex tubes used to store purified radon behave in a similar manner. It has been known for some years that quartz is affected similarly, a fact discovered, I believe, by Madame Curie. The accompanying photograph of the bulb (Fig. 1) shows many of the larger cracks.

FIG. 1.—Pyrex bulb cracked by α -ray bombardment.

The accompanying photograph of the bulb (Fig. 1) shows many of the larger cracks.

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The Expert in the Civil Service.

MEMBERS of the professional, scientific, and technical classes in the Civil Service will welcome the leading article on "The Expert in the Civil Service" in the issue of *NATURE* of Aug. 27. The proposal for the appointment of a Royal Commission to examine and report on the present position of the professional worker in State service has the full support of the Institution of Professional Civil Servants, a body representative of the above classes. Indeed, since its inception in 1919, the Institution has been striving to obtain an official inquiry into the conditions governing the employment of its members in the Civil Service. The Institution is convinced that the improvement of the status of professional workers in the Service—the necessary precedent to fuller economic recognition—and freer access to administrative posts, will only be obtained by such an inquiry as is advocated. An impartial inquiry into the position of the professional and scientific classes in State employment is absolutely essential if the efficiency and well-being of the Service under modern conditions are to be maintained. The Council of the Institution reiterated last year its policy of pressing for a public inquiry, and welcomes the influential support of *NATURE* in the steps that will be necessary to bring to pass this long-desired event, which is of such importance in the interests of both the State and the professional worker.

F. A. A. MENZLER.
(Honorary Secretary.)

The Institution of Professional Civil Servants,
69 Victoria Street, London, S.W.1,
Aug. 29.

¹ Publication authorised by the Director of the National Bureau of Standards of the U.S. Department of Commerce.