section near Toronto scarcely does justice to the evidence indicating great climatic changes so well described by Prof. Coleman.

In England, only one out of many so-called inter-Glacial deposits is considered to have stood the test of critical examination, viz., the shell-bearing clay of Kirmington, which is overlain and underlain by Boulder Clay. It indicates a recession of the ice-margin between the periods of deposition of the purple and Hessle Clays, when the sea stood at a higher level in the estuary of the Humber than it does at present. The sequence of the drifts, the oscillations of the ice, the westward shifting of the centres of glaciation, and the Glacial drainage as worked out by Mr. Lamplugh, Prof. Kendall and others is clearly set forth.

The classification of the culture stages of Palæolithic man is based on that of G. de Mortillet, and of Neolithic man on that of Montelius. Special emphasis is laid on the great break between the Palæolithic and Neolithic industries of Europe. The transition phases (Campignien, Tardenoisien, and Asylien), which are supposed by archæologists to bridge this gap, fail to demonstrate a passage between the two.

One of the most interesting chapters in the volume is that dealing with the isostatic theory of the Quaternary oscillations of sea-level. This theory was first advanced by Dr. Jamieson to account for marine sediments of late Glacial age in Scotland. He believed that the earth's crust sank under the weight of ice and rose again when the ice disappeared. The author argues with much ingenuity that the late-Glacial and post-Glacial changes of level in Scandinavia may be accounted for by isostatic recovery from the effects of ice-load combined with a single oscillation of the sea-level.

This volume will be useful to students as a synopsis from a particular viewpoint of modern research in Quaternary geology. The illustrations deserve special mention. In selection and execution they are excellent. Two of them (Figs. 1 and 2) are here reproduced. JOHN HORNE.

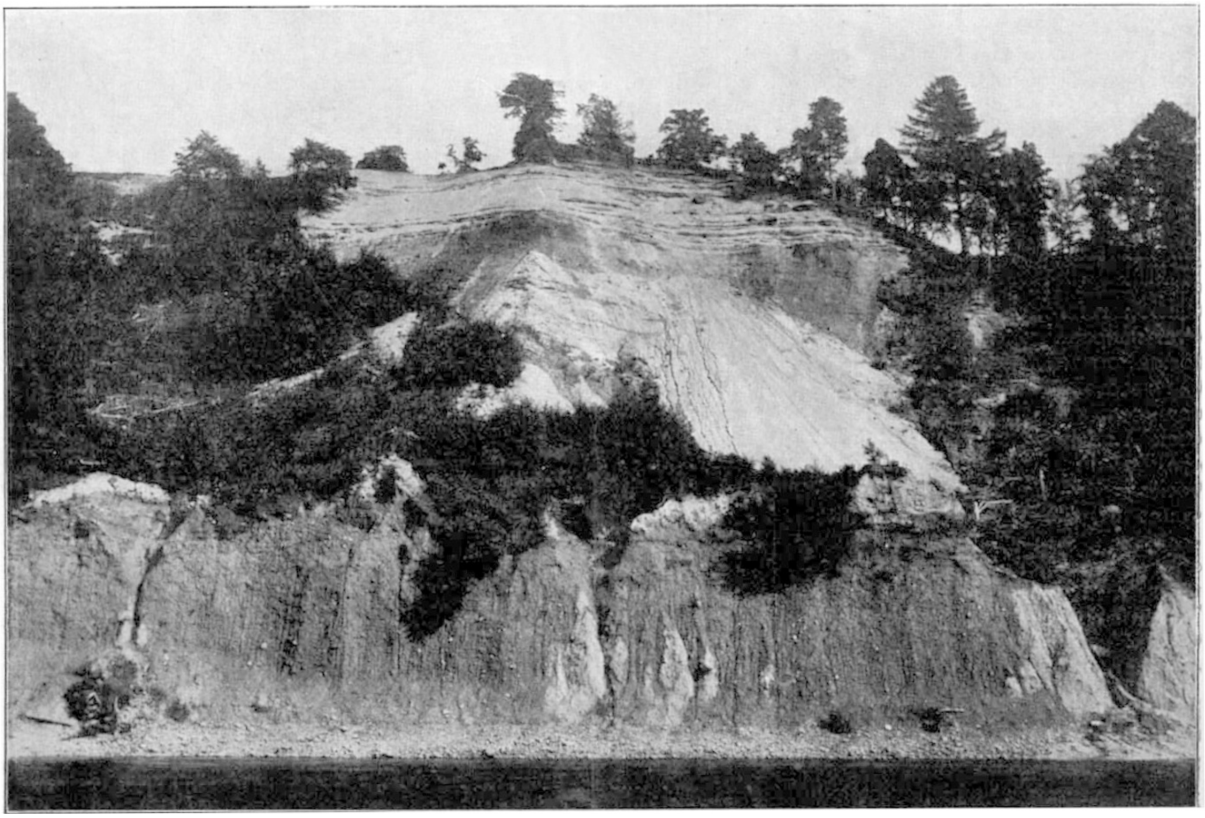

Photo.] [*R. Lunn.*
FIG. 2.—Section of glacial sand and gravel resting on Boulder Clay on the river Spey, opposite Rothes, Banffshire, Scotland. From "The Quaternary Ice Age."

WIRELESS TELEPHONY.

THE system of wireless telephony upon which Capt. Colin and Lieut. Jeance, of the French Navy, have been at work for some years has recently been considerably improved, and some very successful experiments were carried out last June, when, during some tests in which long-distance communication was established in France by means of an aerial only 164 ft. high, speech was incidentally overheard on a small amateur installation in Lincolnshire. The continuous waves used for transmission are produced by three arcs connected in series. Each has a negative electrode or carbon only 1·5 mm. diameter, and a copper disc negative electrode above it, which forms part of the bottom of a cylindrical tank filled with paraffin and cooled by water circulation. The carbon electrodes are beneath this disc, and their height is regulated by means of a crank outside the arc chamber. The arcs, which are very short, burn in an atmosphere produced by mixing acetylene and hydrogen generated from calcium

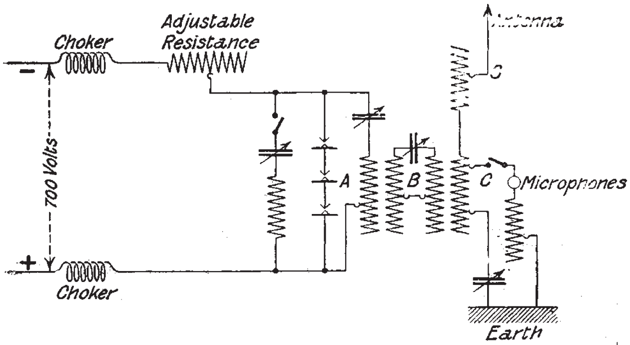

FIG. 1.—Diagram of connections.

carbide and calcium hydride respectively, and this not only prevents the burning away of the carbons, but actually increases their length slightly during operation.

A 750-volt dynamo supplies the three arcs in series, and there is means to regulate its pressure between 500 and 750 volts. Two choking coils (to prevent high-frequency currents from flowing back to the dynamo) and an adjustable resistance reduce the voltage at the terminals of the three arcs to between 250 and 350 volts. A current of from $3\frac{1}{2}$ to $4\frac{1}{2}$ amperes is employed.

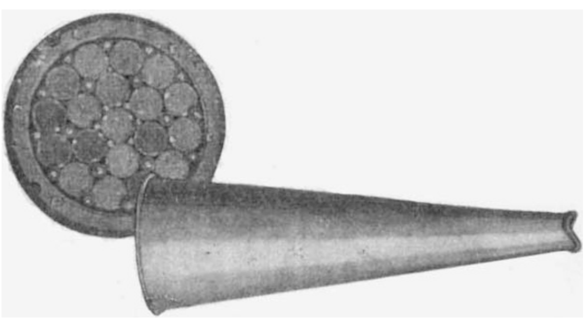

FIG. 2.—The microphone and megaphone.

The diagram (Fig. 1) shows the connections of the microphone and the oscillatory circuit. The principal oscillatory circuit consists of an inductance and variable condenser, connected in parallel with the arcs A. An intermediate oscillatory circuit B, consisting of an inductance and variable condenser, is utilised to couple the principal circuit with the aerial, and ensures that multiple waves generated in the main circuit are not transmitted to the aerial, the result being that only a single wave is emitted. The aerial circuit consists of an inductance coupled with the circuit B and a variable condenser. A variable self-induction is also used in the aerial.

In the microphone circuit are nineteen carbon microphones connected in series, and so arranged that they are all acted upon by the voice simultaneously by means of a megaphone. The microphone and megaphone (drawn to different scales) are seen in Fig. 2; the large end of the megaphone covers the microphone. The microphone cells are connected between the variable inductance of the oscillation transformer and earth, as shown at C. This has the double advantage of avoiding sparking, such as always occurs in the microphones when they are placed directly in the aerial circuit, and does not limit the energy which can be taken by them. The station has two complete microphone equipments, with a change-over switch, so that each can be used for a short time and the other microphone allowed to cool, as naturally very large currents are employed.

The transmitting coils consist of flat spirals of copper strip, and the condensers are of the glass-plate type. Arrangements are provided for very exact tuning by means of variable air condensers. The wave-length of transmission can be varied between wide limits; in the official tests a wave-length of 985 metres was used.

HIGH EXPLOSIVES IN WARFARE.

AT the present time explosives are playing such a prominent part in the war that the interest and attention of the most peace-loving citizen are necessarily aroused by the terrible results undoubtedly produced, or are more morbidly affected by the tales of the alleged marvellous effects which are yet to be experienced. A few notes on the most important explosives being used in war may therefore be of special interest just now.

The explosives which can be advantageously employed in warfare are by no means the most powerful which the chemist can produce, or which may even be used in civil engineering or mining operations. The military high explosive must be sufficiently insensitive to shock to prevent its being exploded when struck by projectiles or when submitted to the shock of being fired from a gun as the charge of shell, else it might prove as dangerous to the user as to the enemy. Thus the nitroglycerine class and many other explosives are excluded.

For many years gun-cotton, containing a considerable amount of moisture, was largely used for naval and military purposes. In the moist state it is extremely safe, but can be easily detonated when a small primer of dry gun-cotton is fired in contact with it. The explosive effect is great, and it provided an excellent and safe explosive for military mines and purposes of destruction, and as a charge for torpedoes. It was not, however, suited for use in shells.

The high explosives chiefly being used in the present war for shell-filling are picric acid, trinitro-