promises a long period of confusion. Somewhere between the complete word and the arbitrary and ambiguous form of abbreviation, there is a well-established tradition which should not be entirely ignored if wide-spread use rather than mere official adoption is to be achieved.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE MICROPHONE AMPLIFIER

In the transmitter of the ordinary telephone, the vibrations of the diaphragm produce varying pressures upon carbon granules or a carbon button. The electrical resistance of the carbon varies with the pressure: so that an electrical current may be made to vary in accordance with the impressed sound waves. This current, although controlled by the sound vibrations, has much more energy. Hence, the carbon button acts as an amplifier for sound vibrations.

It is, therefore, possible to make use of the carbon transmitter as an amplifier for wireless signals. The circuit is shown in Fig. 1. The output from an ordinary detector valve AB is passed through the coils of a wireless receiving telephone. The type used in this circuit is a Brown telephone. The diaphragm of the Brown telephone is set in vibration by a little metallic reed which is itself actuated by the rectified current from the detector tube. The diaphragm of the Brown receiver is removed and a short light metallic rod is connected from the reed C to the middle of the diaphragm D of a telephone transmitter. Then when the reed vibrates in unison with the incoming signals the diaphragm of the transmitter D presses against the carbon button E. The current

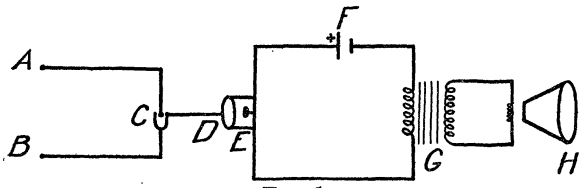

Fig. 1.

supplied from the six-volt storage battery F varies with this pressure. Accordingly a variable current passes through the primary of the audio transformer G. This causes a current in the secondary which actuates the loud speaker H. The audio transformer is inserted to prevent the direct current generated by the battery F from passing through the coils of the loud speaker.

This arrangement gives plenty of amplification, but the quality is rather poor. The device is not very sensitive, as the carbon button will not respond to weak vibrations.

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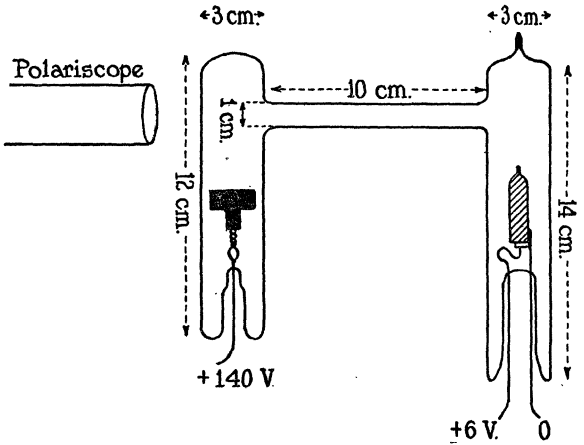
THE USE OF A HOT CATHODE HELIUM LAMP AS A SOURCE OF MONOCHROMATIC LIGHT FOR THE POLARISCOPE

A continuous spectrum in conjunction with suitable prism and diaphragms is not well adapted for precise measurement of rotatory power. The mercury arc unfortunately gives only two lines suitable for polarimetric purposes ($\lambda = 5460.7$Å and $\lambda = 4358.3$Å). The two yellow lines, 5790.7Å and 5769.7Å, are too near to one another to permit an easy separation, especially as a great intensity is needed for measurements of rotatory power. The helium spectrum shows two intense lines, a yellow one ($\lambda = 5875.6$Å) and a red one ($\lambda = 6678.1$Å). The yellow line permits measurements of great accuracy and can be used to great advantage in place of the inconvenient mercury yellow lines. Furthermore, it presents a second advantage in being situated very near the sodium doublet for which the rotations of the majority of organic compounds have been determined.



Hot cathode helium lamp

Except for the red line furnished by the Cd arc, which is difficult to operate for routine work, there is no red light readily available which is intense and pure enough for the purpose specified. The helium red line is located very far towards the red and is ideal for measurements in that part of the spectrum.