Abstracts of Technical Articles from Bell System Sources

Determination of Ferromagnetic Anisotropy in Single Crystals and in Polycrystalline Sheets.[1] R. M. BOZORTH. Following the work of Akulov and of Heisenberg on the magnetic anisotropy of cubic crystals, it is shown that by taking account of an additional term in the expression for the energy of magnetization the [110] direction may under certain conditions be the direction for easiest magnetization in a crystal, instead of [100] or [111] as given by previous theory. This is in accord with experiment. Magnetization curves for single crystals are calculated using the additional term and some peculiarities are recorded. The anisotropy constant appropriate for a single crystal (of iron) has been calculated from measurements on hard-rolled sheet in which there is preferred orientation of the crystals.

Impact Bend Testing of Wire.[2] W. J. FARMER and D. A. S. HALE. This paper comprises a discussion of a machine designed to make rapid determination of the ability of wire to resist permanent deformation by bending.

Two types of machine used in the industry for wire bend testing are described and their features discussed with regard to their suitability for use as standard test methods.

A bend tester operated by the impact of a pendulum has been developed by the Bell Telephone Laboratories in collaboration with Subcommittee IV on Mechanical Tests of the Society's Committee B–4 on Electrical-Heating, Electrical-Resistance and Electric-Furnace Alloys. Results of typical tests with this machine are given, together with information gathered from ultra-rapid motion pictures taken of the machine in operation.

It is concluded that the impact bending machine described offers a simple, rapid and accurate means of measuring the bending properties of wire and that the information acquired from the test is directly applicable to design problems.

Positions of Stimulation in the Cochlea by Pure Tones.[3] JOHN C. STEINBERG. The relation between tone frequency and position of

[1] *Phys. Rev.*, December 1, 1936.
[2] *Proc. 39th Ann. Mtg. Amer. Soc. for Testing Materials*, Vol. 36, 1936—Part II, Technical Papers.
[3] *Jour. Acous. Soc. Amer.*, January, 1937.

stimulation on the basilar membrane has been calculated from data on differential pitch sensitivity. The calculations involve assumptions concerning the choice of the upper and lower pitch limits of hearing and the choice of tone levels which should be used in obtaining differential pitch sensitivity data. It is shown that for quite different assumptions the positions of stimulation for tones in the range from 500 to 10,000 cycles are not greatly affected. Outside this range the positions depend on the assumptions. The calculated positions for tones of 1000, 2000 and 4000 cycles fall, respectively, at points on the membrane about $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{2}{3}$ of its length away from the helicotrema. The calculated positions are compared with positions obtained from post-mortem studies of human cochlea and with positions obtained from electric response measurements on the cochlea of anesthetized guinea pigs. The differences between various methods for the most part are no larger than calculated differences between observers.

Some Uses of the Torque Magnetometer.[4] H. J. WILLIAMS. The history of torque measurement as an index of ferromagnetic anisotropy is outlined. A simple magnetometer for torque measurement is described in detail and uses for the instrument are discussed. These include the measurement of anisotropy constants, coercive force, complete magnetization curves for single directions, and rotational hysteresis losses. With auxiliary ballistic measurement residual inductions and demagnetizing factors are obtainable.

[4] *Rev. Scientific Instruments*, February, 1937.