## Abstracts of Technical Articles by Bell System Authors

*Stereophonic Reproduction from Film.*[1] HARVEY FLETCHER. On April 9 and 10, 1940, demonstrations of the stereophonic reproduction of music and speech, described in this article, were given at Carnegie Hall, New York, N. Y. These demonstrations represented the latest development in a series of researches by Bell Telephone Laboratories, the first step of which was demonstrated in 1933 when a symphony concert, produced in Philadelphia, was transmitted over telephone wires to Washington, and there reproduced stereophonically and with enhancement before the National Academy of Sciences.

For the present demonstrations, original recordings of orchestra, choir, and drama were made at Philadelphia and Salt Lake City; and at a later audition the artist or director was able to vary the recorded volume and to change the tonal color of the music to suit his taste. At will, he could soften it to the faintest pianissimo or amplify it to a volume ten times that of any orchestra without altering its tone quality, or he might augment or reduce the high or low pitches independently. The music or drama so enhanced is then re-recorded on film, with the result that upon reproduction, a musical interpretation is possible that would be beyond the power of an original orchestra, speaker, or singer to produce.

*Wave Shape of 30- and 60-Phase Rectifier Groups.*[2] O. K. MARTI and T. A. TAYLOR. The installation of mercury arc rectifiers with a total capacity of 82,500 kilowatts by the Aluminum Company of America at Alcoa, Tennessee and Massena, New York, was accompanied by widespread increases in the inductive influence of the interconnected power supply networks with resultant increases in the noise on exposed telephone circuits. Because of the size of these installations, and the complexity of the supply systems, it appeared impracticable to limit the rectifier harmonics by the use of frequency-selective devices, which have been successfully applied to certain smaller installations. However, the results of a cooperative study indicated that by means of a relatively simple arrangement of phase shifting transformers, the equivalent of 30- or 60-phase operation of the rectifier stations could be secured. In this way, the important harmonic components on the power systems were reduced to relatively small values, and wave shape and noise conditions were restored practically to normal.

[1] *Jour. S. M. P. E.*, June 1940.
[2] *Elec. Engg.*, April 1940.

This paper describes briefly the voltage and current relations, preliminary tests on a small-scale rectifier, the phase shifting transformers and their application to this particular situation, and presents data to indicate their effectiveness.

*A New Quartz-Crystal Plate, Designated the GT, which Produces a Very Constant Frequency over a Wide Temperature Range.*[3] W. P. MASON. In this paper, a new quartz-crystal plate, designated the GT, is described which produces a very constant frequency over a wide temperature range. This crystal does not change by more than one part in a million over a 100-degree centigrade range of temperature. This crystal obtains its great temperature stability from the fact that both the first and second derivatives of the frequency by the temperature are zero. Both the frequency and the temperature coefficient can be independently adjusted.

This crystal has been applied in frequency standards, in very precise oscillators, and in filters subject to large temperature variations. It has given a constancy of frequency considerably in excess of that obtained by any other crystal. A crystal chronometer, using this type of crystal, was recently lent to the Geophysical Union for measurements on the variation of gravity and the chronometer is reported to have kept time within several parts in 10 million, although no temperature control was used.

*Room Noise at Telephone Locations—II.*[4] D. F. SEACORD. Room-noise data, based primarily on measurements made at about 900 locations in and around Philadelphia and Chicago under winter conditions, were reported informally to the conference on sound at the 1939 A. I. E. E. winter convention. The present article supplements the earlier material and includes a summary of room-noise conditions expressed in terms of annual averages based on both the winter survey data previously discussed and the summer survey data that had been obtained at about 1,300 locations but had not been completely analyzed at the time of the earlier report. The summer survey included 500 measurements at locations previously measured during the winter in and around Philadelphia and Chicago, and 800 measurements at locations in and around Cleveland, New York City, northern New Jersey, and Philadelphia. Annual average as used in this article is the mean of winter and summer measurements. In addition, the present article includes a brief discussion of outdoor noise and the relative frequency of occurrence of several predominant sources of room noise.

[3] *Proc. I. R. E.*, May 1940.
[4] *Elec. Engg.*, June 1940.

The noise measurements were made with equipment conforming to the specifications described in the A. S. A. "Tentative Standards for Sound Level Meters" (Z24.3–1936), using the 40-decibel loudness-weighting network. The measurements are expressed in terms of sound level in decibels above reference sound level, that is, $10^{-16}$ watt per square centimeter at 1,000 cycles in a free progressive wave, each measurement being based on the average of 50 individual readings.

*Electrical Conductance Measurements of Water Extracts of Textiles.*[5] A. C. WALKER. It has been shown that the electrical properties of textiles depend upon chemical composition, water-soluble electrolytic impurities, moisture content and manner of drying the material from the wet state. Selection of a textile for electrical puposes should include consideration of the influence of chemical composition upon the properties of the material, absence of significant amounts of electrolytes, and the method of drying the material from the wet state.

This paper discusses the water extract conductivity method, its correlation with insulation resistance data, and describes a simple, durable electrolytic cell which is convenient to use for the conductivity measurements.

[5] *A. S. T. M. Proc.*, Vol. 39, 1939.