Abstracts of Technical Articles from Bell System Sources

North Atlantic Ship-Shore Radio Telephone Transmission During 1930 and 1931.[1] CLIFFORD N. ANDERSON. Considerable data on radio transmission were collected during the years 1930 and 1931 incidental to the operation of a ship-shore radio telephone service with several passenger ships operating in the North Atlantic. This paper discusses briefly the results of an analysis of these data. Contour diagrams are given which show the variation of signal fields with distance and time of day for the various seasons on approximate frequencies of 4, 9, 13, and 18 megacycles. Similar diagrams show the distributions of commercial circuits. Curves are also shown which enable the data to be applied more generally for other conditions of noise and radiated power.

Short-Wave Transmission to South America.[2] C. R. BURROWS and E. J. HOWARD. The results of a year's survey of transmission conditions between New York and Buenos Aires in the short-wave radio spectrum are presented in this article. Surfaces showing the received field strength as a function of time of day and frequency are given. These show that frequencies between 19 and 23 megacycles were best for daytime transmission, and those between 8 and 10 megacycles for nighttime transmission. A transition frequency was required in the early morning, but the useful periods of the day and night frequencies overlapped in the evening.

No variations that could definitely be traced to a seasonal effect were found. This path is much less affected by solar disturbances than the transatlantic.

Frequencies above 30 megacycles appear to have but little commercial value over this path. Frequencies a few megacycles higher could not be received.

The International Telegraph and Radio Conferences of Madrid.[3] L. ESPENSCHIED and L. E. WHITTEMORE. A combined meeting of the International Telegraph and Radio Conferences at Madrid in the fall of 1932 was attended by delegates of government communication administrations and representatives of communication companies from

[1] *Proc. I. R. E.*, January, 1933.
[2] *Proc. I. R. E.*, January, 1933.
[3] *Bell Telephone Quarterly*, January, 1933.

practically the entire world. The conference formulated a treaty, known as the International Telecommunication Convention, to which are attached Regulations relating to (1) the allocation of frequency bands for radio services, the reduction of radio interference and the operation of marine radio service, (2) the transmission of telegrams over international telegraph and cable circuits, and (3) the handling of telephone calls over the European telephone system.

Directional Studies of Atmospherics at High Frequencies.[4] KARL G. JANSKY. A system for recording the direction of arrival and intensity of static on short waves is described. The system consists of a rotating directional antenna array, a double detection receiver and an energy operated automatic recorder. The operation of the system is such that the output of the receiver is kept constant regardless of the intensity of the static.

Data obtained with this system show the presence of three separate groups of static: Group 1, static from local thunderstorms; Group 2, static from distant thunderstorms, and Group 3, a steady hiss type static of unknown origin.

Curves are given showing the direction of arrival and intensity of static of the first group plotted against time of day and for several different thunderstorms.

Static of the second group was found to correspond to that on long waves in the direction of arrival and is heard only when the long wave static is very strong. The static of this group comes most of the time from directions lying between southeast and southwest as does the long wave static.

Curves are given showing the direction of arrival of static of group three plotted against time of day. The direction varies gradually throughout the day going almost completely around the compass in 24 hours. The evidence indicates that the source of this static is somehow associated with the sun.

A Note on an Automatic Field Strength and Static Recorder. W. W. MUTCH.[5] Many types of instruments have been used to record field intensities, both of signals and static, and the varying requirements have produced many widely different pieces of apparatus. One may desire to study the changes taking place over a period as short as one millisecond, or as long as an eleven-year sun-spot period. Obviously the same instrument would not do for both studies. The development work on the recorder described here was started some years ago with

[4] *Proc. I. R. E.*, December, 1932.
[5] *Proc. I. R. E.*, December, 1932.

the aim of producing an instrument capable of recording the energy received from a fading signal during periods of the order of ten seconds. A device for making a continuous record of the energy received from a signal or from static is described. Simple modifications are suggested by means of which peak or average voltage may be recorded.

Short-Wave Transoceanic Telephone Receiving Equipment.[6] F. A. POLKINGHORN. The commercial importance of a single radio channel used for transoceanic telephone communication is such as to permit considerable effort being placed upon obtaining the most efficient and satisfactory operation from each unit of equipment. In this paper there are discussed, in a general manner, the receiving equipment used on the short-wave transatlantic telephone channels to England and some of the methods of analysis used in attacking problems encountered in the design of the receiving equipment.

Observations of Kennelly-Heaviside Layer Heights During the Leonid Meteor Shower of November, 1931.[7] J. P. SCHAFER and W. M. GOODALL. This paper describes the results of radio measurements of the virtual heights of the Kennelly-Heaviside layer during the Leonid meteor shower of November, 1931. While the results are not conclusive, due to the fact that a moderate magnetic disturbance occurred during this same period, there is some reason to believe that the presence of meteors in unusual numbers causes increased ionization of an intermittent nature in the region of the lower layer.

The Ionizing Effect of Meteors in Relation to Radio Propagation.[8] A. M. SKELLETT. From a study of available meteor data it is concluded: (1) that meteors expend the larger part of their energy in the Kennelly-Heaviside regions, that is, in the regions of the upper atmosphere which control the propagation of all long-distance radio waves; (2) that the major portion of a meteor's energy goes into ionization of the gases around its path; (3) that this ionization extends to a considerable distance from the actual path,—in some cases several kilometers or more—and lasts for some minutes after the meteor has passed; (4) meteor trains are produced only in the lower Kennelly-Heaviside layer.

A table of the various sources of ionization of the upper atmosphere is given with values for each in ergs cm^{-2} sec^{-1}. These include sunlight, moonlight, starlight, cosmic rays, and meteors. During meteoric

[6] *Radio Engineering*, February, 1933.
[7] *Proc. I. R. E.*, December, 1932.
[8] *Proc. I. R. E.*, December, 1932.

showers the ionizing effect does not appear to be negligible compared with that due to other ionizing agencies occurring at night.

A meteor of one-gram mass or greater will produce, on the above assumptions, sufficient ionization to affect propagation. One explanation of the general turbulent condition of the ionized layers may be provided by the continuous bombardment of meteors.