Abstracts of Technical Articles by Bell System Authors

Lodgepole Pine Poles—Full Length Treatment Under Pressure—Butt Treatment in Open Tanks.[1] C. H. AMADON. Lodgepole pine ("Pinus contorta") forms extensive forests in Colorado, Wyoming, Idaho and Western Montana. The timber has been used widely for mine props, railway ties and telephone and telegraph poles by the various industries in the general region in which it grows. Like most of the pines, lodgepole pine in its natural state is classed as a non-durable wood in contact with the soil, and where a relatively long service life is desired the timber has been treated with creosote or some other wood preservative.

Lodgepole pine poles are exceptionally straight, free from knots of objectionable size, fairly soft and when well seasoned weigh about 30 lb. per cu. ft.

The purpose of this paper is to present information on the behavior, under actual service conditions, of lodgepole pine poles that had been pressure-treated in closed cylinders or butt-treated in open tanks, and to describe the development of a process for the pressure treatment of lodgepole pine poles to meet specific penetration and low retention specification.

Sound Measurement Objectives and Sound Level Meter Performance.[2] J. M. BARSTOW. The standardization of sound level meters is shown to have improved conditions in the field of sound measurement, although several characteristics thought to be desirable in visual indicating sound measuring devices are not fully realized in instruments conforming to the present standards. The extent to which certain sound measurement objectives have been realized in present sound level meters is discussed. Further work will undoubtedly be necessary before some of these objectives may be more completely realized. Present indications are that sound level meter limitations in regard to the approximation of sound jury loudness levels will be difficult to remove and at the same time retain reasonable apparatus simplicity. Some consideration is given to possible courses of action in regard to such limitations.

Coordination of Power and Communication Circuits for Low-Frequency Induction.[3] J. O'R. COLEMAN and H. M. TRUEBLOOD. Where power

[1] *Proc. Amer. Wood-Preservers' Assoc.*, 1940.
[2] *Jour. Acous. Soc. Amer.*, July 1940.
[3] *Electrical Engineering*, July 1940.

and communication facilities are in proximity, electromagnetic induction from the power system may cause disturbances in the communication system. The avoidance or minimizing of such disturbances, with due regard to the service and other needs of both systems, is a problem of coordination, which is conveniently divided into two parts, one dealing with low-frequency inductive coordination and the other with noise-frequency coordination.

The present paper undertakes a general examination of the problem of low-frequency inductive coordination in the light of developments during the past decade. The situation as it existed at the beginning of the decade is to be found well set forth in a paper presented in 1931 at the A.I.E.E. winter convention by R. N. Conwell and H. S. Warren. The present paper, like its predecessor, derives from the work of the Joint Subcommittee on Development and Research of the Edison Electric Institute and the Bell System. It is largely concerned with induction from currents due to power system ground faults and the transients which accompany such faults. It gives relatively little attention to continuous low-frequency effects since, up to the present at least, such effects have not been a primary concern in the low-frequency coordination of commercial power circuits and Bell System communication circuits.

A further object of the paper is to outline the various factors that require consideration in practical situations and to discuss their significance under present-day conditions. To provide necessary background for this, recapitulations of fundamentals are included at appropriate points. Detailed discussions necessarily omitted from the paper itself are to be found in the papers listed in the bibliography, many of which, particularly the Conwell-Warren paper, contain further references.

Insulating Paper in the Telephone Industry.[4] J. M. FINCH. This article discusses briefly a few of the more important types of paper insulations used by the telephone industry, and shows the relation the manufacturing procedures bear to the initial properties, the permanence, and the uses of the product. Special emphasis is placed on chemical properties as criteria of permanence. The specification control of paper is discussed with emphasis on the simplification of chemical test methods and on minimizing the number of such tests. Finally, mention is made of some of the modified forms of cellulose, which possess insulating characteristics superior to paper and which are already replacing it for some uses.

[4] *Indus. and Engg. Chemistry*, August 1940.

Rectilinear Electron Flow in Beams.[5] J. R. PIERCE. Electrodes are devised by means of which rectilinear electron flow according to well-known space charge equations can be realized in beams surrounded by charge-free space. It is shown how these electrodes can be used in the design of electron guns having desirable characteristics.

High-Gain Amplifier for 150 Megacycles.[6] G. RODWIN and L. M. KLENK. An ultra-high-frequency amplifying system is described which operates at about 150 megacycles with an over-all gain of 114 decibels and transmitted band of over 2 megacycles. An output power of 2.5 watts is available with a signal-to-distortion ratio of 60 decibels. By a frequency-shifting modulator in the amplifier chain the input and output are made to differ by 10 megacycles. A filter-type circuit is used as the interstage coupling to give the necessary band width.

Room Noise at Subscribers' Telephone Locations.[7] D. F. SEACORD. The effect of room noise on the ability to hear speech is roughly equivalent to a partial deafening of the listener; hence the study of room noise conditions at telephone locations is of considerable interest to the telephone engineer since these conditions have an important bearing on the degree of satisfaction with which speech is received over a telephone connection. As a consequence, various studies of room noise have been made from time to time and information of increasing value has been obtained over a period of years with the development of improved measuring equipment and technique. This paper is based on the results of recent room noise surveys carried out in the Bell System and gives a broad picture of the magnitude of room noise at subscribers' telephone locations under present-day conditions. The data presented are a part of the information required in the work of devising and applying methods for taking into account the effects of room noise on telephone transmission in the design of the telephone plant.

Temperature Effects in Secondary Emission.[8] D. E. WOOLDRIDGE. Measurements have been made on the effects of temperature changes on the emission of secondary electrons from iron, nickel, cobalt, and molybdenum. Abrupt changes of one or two per cent were observed to accompany the $\alpha-\gamma$ transition of iron, while the hexagonal to face-centered cubic transformation of cobalt was accompanied by a change in secondary emission of only about 0.4 per cent. The magnetic trans-

[5] *Jour. Applied Physics*, August 1940.
[6] *Proc. I. R. E.*, June 1940.
[7] *Jour. Acous. Soc. Amer.*, July 1940.
[8] *Phys. Rev.*, August 15, 1940.

formation was found to alter the secondary emission coefficient of nickel by less than 0.3 per cent. The temperature coefficient of secondary emission, in the cases of nickel, cobalt, and molybdenum, was found to be much less than the volume coefficient of expansion of the metal. The smallness of the temperature coefficient and the effect of the magnetic transformation are shown to lend support to the view that the secondary electrons are scattered or "absorbed" by an excitation process similar to that whereby they are originally produced.