

ABSTRACTS

DEPARTMENT OF METALLURGY

TANTALUM AND NIOBIUM MINERALS OF INDIA. N. R. Srinivasan, *The Indian and Eastern Engineer*, July 1954, p. 47.

Two rare metals, tantalum and niobium, have received considerable attention in view of their vital importance and military applications. This paper presents a critical review of recent literature on the discovery of new minerals, exploration and production, for the minerals in many parts of the world, studies on the pure metals, their alloys and compounds. Recent work in India and the possibilities with regard to these metals in this country have been specially emphasised.

DEPARTMENT OF POWER ENGINEERING AND ELECTRICAL TECHNOLOGY

APPLICATION OF THE A.C. NETWORK ANALYZER FOR THE ANALYSIS OF TRANSIENT STABILITY PROBLEMS OF ELECTRIC POWER SYSTEMS. H. N. Ramachandra Rao. *Jour. Institution of Engineers (India)*, July, 1954.

In the design of Power systems consideration of stability, especially transient stability, play a vital part. On complicated networks consisting of a number of generating stations interconnected, stability studies by long hand calculation are extremely laborious and difficult. The A.C. Network Analyzer is ideally suited for making such studies, and will provide a system planning engineer with data with which to design a system both technically sound and economical in cost.

The method adopted more or less follows the same pattern as that used in long hand calculation, viz., a step-by-step method is used to plot the "swing curves" the nature of which will give an idea as to the stability of the system. Stability of a system depends upon several factors such as loading prior to fault, type and location of fault, clearing time of circuit breakers, bussing arrangements, etc. An Analyzer study will show how best to improve the stability limits of an existing system. The data required and the actual procedure in using the analyzer for a study are briefly discussed.

SECTION OF HIGH VOLTAGE ENGINEERING

DEPARTMENT OF POWER ENGINEERING

1. PROGRESS IN HIGH VOLTAGE ENGINEERING AND THE FUNCTIONS OF A HIGH VOLTAGE LABORATORY. G. K. M. Pfestorf, *Power Engineer*, 1954, 4, 23-27.

The progress on the latest methods of insulator manufacture is reviewed. The problems that have to be faced in the field of high voltage transmission of power with regard to insulation, use of new insulating materials, instruments, relays and protection are given. The functions of a High Voltage Laboratory in India with regard to meeting the needs of power supply and industry are discussed.

2. DETERMINATION OF SURFACE GRADIENTS OF THREE-PHASE DOUBLE CONDUCTOR TRANSMISSION LINE WITH TWO GROUND CONDUCTORS. H. V. Gopalakrishna, *Electrotechnics*, 1954, 25.

The voltage gradient being a measure of the tendency for the formation of corona at the surface of a conductor is an important limitation in the design of a transmission line. This paper presents an analytical approach to the derivation of a suitable formula for the calculation of surface gradients of a twin-conductor three-phase transmission line in horizontal configuration with two ground wires.

DEPARTMENT OF ELECTRICAL COMMUNICATION ENGINEERING

1. VIBRATIONS OF INDIAN MUSICAL DRUMS REGARDED AS COMPOSITE MEMBRANES.
B. S. Ramakrishna and Man Mohan Sondhi, *The Journal of the Acoustical Society of America*, July 1954, 25, No. 4.

Raman first observed that the overtones of the Indian musical drums, *Mridanga* and *Thabalu*, form a sequence of five natural harmonics, and that they result from nine modes of vibration, some of which are (approximately) degenerate. After a brief review of the previous work on the subject, a theory of these drums is developed in the present paper on the basis that the drumheads of these instruments can be regarded as circularly symmetric membranes with a radial step discontinuity in the density. The eigenvalues of eigenfunctions of such a composite membrane are obtained, and it is then shown from a numerical calculation that for suitable ratios between the densities and radii of the two parts, the frequencies and the modes of vibration are in accordance with Raman's observations. Measured values of the frequencies of the first nine modes confirm the approximate degeneracies and the harmonicity indicated by the theory, and establish the adequacy of the composite membrane as a mathematical idealization of these drumheads.

2. AUTOMATIC SWITCHING OF A LARGE NUMBER OF CIRCUITS TO A COMMON CIRCUIT.
H. C. Basak and L. H. Seshu, *Electrotechnics*, March 1950, No. 22.

An arrangement, based on the switching principles of automatic telephony, has been devised, by which it is possible to connect automatically a large number of circuits to a common circuit in a selective manner. The decade system of numbering has been adopted. For selection, a uniselector is positioned by means of a set of plunger type keys, but without any dialling impulses. Ten keys are arranged in a row, the number of rows depending on the number of digits to be "dialled". Each individual circuit can be switched through by bringing the uniselector to a given unique position. The arrangement has been described for one common circuit and a hundred individual circuits.

3. SMALL UNISELECTOR AS FINAL SELECTOR. H. C. Basak, *Electrotechnics*, March 1949, No. 21.

A Final Selector circuit using an ordinary 25-pt. step-by-step uniselector has been designed. For discriminating the dialled digits as well as for homing the selector the same contact bank with the associated wiper has been employed. A fifth bank of a continuous arc with the associated wiper has been used to guard the selector while homing. Only the circuit for positioning and homing the selector has been described.