seriously depleted by wind erosion, so that nearly two-thirds of the country is affected. Remedies suggested are in the due employment of green manures, crops to be ploughed in to hold the water in the soil, and schemes of planting that will utilize the rainfall rather than encourage the formation of gullies, methods excellently shown in a series of photographs. These must be associated with considerations of the conservation and reafforestation of the woodlands, a problem of great complication since a large country is divided into many vegetative regions dependent on temperature, wind, rainfall and subsoil, each area with its own trees and undergrowth. Forest fires must be controlled, while waste in the lumber industry has to be avoided. Fortunately the questions here have become national, though the individual States and even counties are helping, appreciating the local effects on rainfall and the value of such wooded parks to the psychology of their own people. The national forests now aggregate 170 million acres, and the aim appears to be to double this amount by the planting of the high lands but mainly of the abandoned farming areas, and in this way reclaiming immense wastes.

The section dealing with the animal resources, fish, birds and game, is excellent. The decline of the supply of certain fish was inevitable in an absence of knowledge of their biology, but the Fish Commission has the matter well in hand and has already had striking success in matters of regulation, avoidance of pollution and hatcheries. The buffalo herds have gone for ever, but Pennsylvania has done fine work in the encouragement of deer, while the beavers, reintroduced from Canada less than twenty years ago, have now to be trapped—a new industry.

While in this study of the United States much is local, the analogy with Africa is striking, the terrain very similar. European countries start there with the experience of America through three centuries. This suggests the necessity for paternal governments to control unthinking settlers so that the land may not be impoverished. It may not ever require to be developed as that of the United States, but it will undoubtedly have to provide food for a teeming population. So far the agriculture of native areas is small, but the cow as the unit of wealth is disappearing and a certain change of habits in the native population must occur. The thoughts which are induced by this study of America should excite the imagination of all who have to rule in Africa, where clearly it is already time for regularized conservation.

J. STANLEY GARDINER.

FOUR-TERMINAL NETWORKS

Einführung in die Vierpoltheorie der elektrischen Nachrichtentechnik

Von Prof. Dr. R. Feldtkeller. (Physik und Technik der Gegenwart, Abteilung Fernmeldtechnik, herausgegeben von Prof. Dr. Heinrich Fassbender, Band 2.) Pp. ix+142. (Leipzig: S. Hirzel, 1937.) 8.80 gold marks.

THIS is an excellent introduction to the comparatively young theory of four-terminal networks, that is, of alternating-current transfer systems of which only the input and output pairs of terminals are accessible for measurements. After a brief outline of network analysis, the author passes in Chapter ii to a thorough theoretical investigation of linear symmetrical four-terminal networks, of which the behaviour for different terminal impedances is examined by means of circle diagrams based on the network parameters. The application in Chapter iii of this theory to the particular case of loss-free systems illuminates the theory through the relative simplicity of the circle diagrams required, while Chapter iv deals with asymmetric linear systems.

Chapter v treats the general theory of linear four-terminal networks by the use of matrix algebra, a field of electrotechnical advance in which the author was a pioneer. With this treatment, as the author remarks, the book passes from text-book to hand-book, and the two final chapters provide at once the tabular material for, and a demonstration of, the labour-saving use of four-terminal theory in matrix form. Matrices are derived for the fundamental interconnexions of the four-terminal networks, and the theory of propagation networks in cascade is touched on. In the sixth and last chapter are collected the matrices of simple four-terminal structures, including transformers and (linear) amplifying valves, while a final section shows the derivation of equivalent T- and π-networks for systems obeying the Kirchoff reciprocal principle, and for systems not so restricted.

The book is clear, neat and detailed; the few errors that have escaped the proof-reader are mainly of interest as evidence of revision by the author in the interests of clarity.