tenance of roads, bituminous macadam, etc. The theory and practise of foundations for pavements are presented in chapter six. Chapter seven relates to brick pavements, and contains complete information as to the most approved method of testing paving brick, and the construction and maintenance of brick pavements. The use of asphalts and bitumen in paving is discussed fully in chapter eight. The treatment and testing of wood blocks and the construction of streets of this material are treated in chapter nine. Chapter ten presents the most approved method of building pavements of granite and sand-stone blocks. The eleventh and last chapter presents various methods of arranging city streets so as to best accommodate the traffic. This is a practical book, and is advanced in character. On the whole the author covers his subject well. However, the first chapter could have been more complete, especially the portions relating to the economic value of good roads, cost of wagon transportation, and the benefits derived from road improvement. In the paragraphs relating to the testing of road materials, Mr. Spalding draws from what appears to be the latest published information on the subject, and fails to include a number of important improvements which have been made recently by road-material laboratories, notably the Office of Public Roads in Washington, both in testing machines and in the methods of testing road materials. The chapters on brick and bituminous pavements are probably the strongest features of the book.

ALLERTON S. CUSHMAN

SCIENTIFIC JOURNALS AND ARTICLES

The American Naturalist for December has as its first article a paper on "Some Physiological Effects of Radium Rays" by Charles S. Gager, the author concluding that, up to a certain point the effect of radium is to stimulate growth, while beyond that it causes retardation or death. W. A. Cannon discusses "The Origin of Structures in Plants" and Braxton H. Guilbeau the "Origin and Formation of the Froth in Spittle Insects." His conclusion is that this is made up from two sources; the fluid portion being the anal secretion into which air is introduced by the caudal appendages, while the mucilaginous part is secreted by the glands of Batelli. William A. Hilton has a note, with an illustration, of "Peculiar Abnormal Teeth in a Jack Rabbit"; David Starr Jordan furnishes an unusually large number of "Ichthyological Notes," relating to many papers, and H. E. Jordan gives a "Digest of C. Correns's Memoir on the Inheritance of Sex in Higher Plants." The number is accompanied by the index to Vol. XLII.

Bird-Lore for November-December has articles on "The Sea Birds' Fortress (Bird Rocks)," by A. C. Bent; "The Drumming of the Ruffed Grouse," by E. J. Sawyer, with a picture from life; "The Use of a Blind in the Study of Bird Life," by Frank M. Chapman; "A Thrasher Friend," by Emeline Maddock and the seventh paper on "The Migration of Fly-catchers," by W. W. Cooke. The number contains the Report of the Annual Meeting of the National Association (of Audubon Societies) and the Reports of State Societies. This portion of *Bird-Lore* has grown in size and importance and now constitutes one half the number.

BOTANICAL NOTES

NOTES ON RECENT GENERAL PAPERS

PROFESSOR H. M. RICHARD'S admirable lecture on "Botany" delivered in the Science, Philosophy and Art course at Columbia University is a concise answer to the questions as to the content and scope of the science of botany. Answering the question that it considers "all the questions as to the form, the functions, the classification and distribution" of plants, the author rapidly sketches the history of the science from Aristotle to Darwin in a few pages, and then discusses the present aspects of the different departments of the subject. Its reading will well repay any botanical student who wishes to be better informed as to the place that botany fills to-day in the world of science.

Here may be noted Mr. B. C. Gruenberg's thoughtful paper on "Some By-products of