The two outstanding results appear to be, first, that the season at which the cuttings are taken governs to a large degree the percentage of rooting, and second, that treatment with indole butyric acid seems to retard rooting. The greater the concentration of this chemical the more rooting was retarded. In addition, long cuttings were superior to short cuttings and cuttings without heels rooted in greater numbers than those with heels. Placing the bases of the cuttings in tap water for 24 hours prior to planting in sand retarded rooting somewhat.

Terminal and lateral twigs of lateral branches located between six to eight feet from the ground were used when making the cuttings. Best rootage was secured from plain cuttings 10 to 20 cm long made in December and planted directly in the sand bench. In 14 weeks 90 per cent. of these cuttings were rooted. Both the December and January cuttings had larger roots and more advanced top development by May 1 than cuttings collected in October or November. In May more than a thousand rooted cuttings were planted in a tree nursery outdoors and in pots so that tests of their degree of immunity to spruce gall aphids could be conducted in the late summer.

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PHYSIOLOGY OF THE NERVOUS SYSTEM

IN his painstaking appraisal of my book, "Physiology of the Nervous System," which appeared in SCIENCE for July 7 (the anniversary of its publication), Dr. Forbes has suggested that I deliberately omitted treatment of the nerve impulse and certain basic problems of neuromuscular transmission. The statement is true and lest misconception should arise from the review, it must be pointed out that the book deals primarily with the *central* nervous system, including the autonomic division. Dr. Ralph Gerard will describe the special physiology of peripheral nerve, *i.e.*, the nerve impulse and neuromuscular transmission, in a separate monograph of this series, which will appear in the near future. This will also deal with the principles of electrophysiology.

Since Dr. Forbes likewise offers a friendly accusation of prejudice with regard to the humoral theory of synaptic transmission, may I take this opportunity of stating once again that I know of no evidence fit for critical examination that would place the liberation of acetylcholine as a *primary* event essential for synaptic transmission, in any division of the nervous system, central or peripheral. The work of Rosenblueth and Simeone cited by Dr. Forbes was published after my book had left the press. A full statement of the evidence for the electrical concept of synaptic activity will appear in a series of five papers by Drs. Gasser, Erlanger, Bronk, Lorente de Nó and Forbes in the September number of the *Journal of Neurophysiology*, which is now in the press. It seems therefore unnecessary to offer here any further defense of my position in this interesting and important controversy.

Save for those points, which might mislead the uninformed reader, Dr. Forbes's review is fair, generous and much appreciated.

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SCIENTIFIC BOOKS

The Distribution of the Stars in Space. By BART J. BOK, associate professor of astronomy, Harvard University. xvi + 124 pp. Chicago: University of Chicago Press, 1937. $2.50.

THE editors of the *Astrophysical Journal* are currently engaged in sponsoring a series of astrophysical monographs, which are designed to bring up to date the state of knowledge in the various fields of stellar astronomy. The first volume in the series, by Dr. Bok, is a critical exposition of the information available in 1937 on the distribution of the stars in the galactic system. A truly amazing number and variety of researches have been carried out in this field during the past fifteen years. To organize and discuss critically the results of these multitudinous investigations is an imposing task, and one which the author accomplishes with clarity and dispatch.

The fundamental problem of stellar statistics is to deduce the true stellar distribution in the galaxy from observational data on the apparent numbers, brightnesses, colors, spectral types and motions of the stars. Chapter I of "The Distribution of the Stars in Space" deals with the many statistical methods, both analytical and numerical, that have been devised for this purpose. Methods for detecting deviations from random stellar distribution in any area of the sky are valuable for promoting the discovery of inconspicuous dark nebulae. With regard to the problem of the determination of space densities, Dr. Bok discusses the relative merits of analytical and numerical methods and presents strong arguments in favor of the latter procedure. Simple analytical formulae are inadequate to represent the complex variations in stellar distribution over the sky. The most serious obstacle in the path of attaining a complete understanding of the details of stellar structure is the presence of clouds of obscuring material in the galaxy. The author describes how stellar statis-

ticians have been attempting to cope with this vexatious problem, with encouraging results.

Chapter II gives the present available sources of information on star counts, spectral types and the distribution of dark nebulae. A gratifying feature of Dr. Bok's discussion of the observational material is the manner in which he points out where new observations are most sorely needed. This feature, which is characteristic of the entire monograph, should prove highly stimulating to future research.

The third and final chapter deals with the general problems of galactic structure. Studies of the distribution of stars in directions perpendicular to the galactic plane are not complicated by the bogey of interstellar absorption, and considerable progress has been achieved in those directions, particularly by Oort. The author makes a critical survey of the arguments for and against the hypothesis of a local system of stars in which the sun is approximately central, and concludes that the hypothesis may at least be accepted as a working model. The monograph concludes on a highly optimistic note. Although only the most general features of galactic structure are now well established, Dr. Bok feels that the current rapid accumulation of observations will soon begin to reveal the finer details of stellar structure, and suggests that, as a working model, the galactic system may be regarded as a rather open spiral system, similar in form to Messier 33. On this basis, and accepting the hypothesis of a local system, the sun would be located in a spiral arm about two thirds of the distance from the center to one edge.

"The Distribution of the Stars in Space" is an extremely important contribution to the field of galactic structure, invaluable alike to both students and research workers in the field.

LEO GOLDBERG

THEORETICAL MECHANICS TREATED VECTORIALLY

Theoretical Mechanics, a Vectorial Treatment. By CARL JENNESS COE. New York: The Macmillan Company, 1938, 13 + 555 pages. Price, $5.00.

THIS text-book combines effectively an introduction to theoretical mechanics with training in the notation and methods of three-dimensional vector analysis (Gibbs's notation). Save for some words of caution in view of modern developments in relativity theory and quantum analysis, the selection of topics follows the classical tradition of such authors as Appell, Love, Routh, Webster and Whittaker. Rarely do mere physical facts intrude. Damped motion and sliding friction are touched upon, but the notions of elastic limit, atom, fluid, Young's modulus, oscillograph, viscosity or other commonplace terms of the physical laboratory find no place in this theoretical mathematical study. Included are chapters on the general principles of mechanics, on vector calculus and on potential theory (using three-dimensional vector calculus). But no attempt is made to introduce a generalized vector-space or tensor methods. Some prior training in calculus is assumed on the part of the student. An abundance of numerical exercises is provided which should give him facility and power in working with concepts which thereby can not but acquire clear significance.

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SOCIETIES AND MEETINGS

THE ALABAMA ACADEMY OF SCIENCE

AT Montgomery, the capital, in the shadow of the spot where Jefferson Davis took the oath of office as president of the Confederacy, the Alabama Academy of Science held its sixteenth annual meeting, on April 14 and 15, with Huntingdon College as host. P. H. Yancey, of Spring Hill College, Mobile, presided. The historic background of this beautiful old southern "city of homes," together with the burst of bloom which is characteristic of the season, and the gracious hospitality of the college and of the Montgomery members, made this a memorable occasion. Eighty members, a number of visitors and over a hundred members of the Junior Academy, representing twenty-one schools, which met at the same time, registered. A certificate of award for the best paper and four certificates for the best exhibits in the various scientific fields were given the juniors by the senior academy. P. P. B. Brooks, head of the science department, Sidney Lanier High School, counselor at the place of meeting, assisted by James Holt Starling, head of the biology department, Troy High School, counselor to the president of the Junior Academy, had charge of arrangements for the Junior Academy, for which James H. Kassner, associate professor of chemistry, university, is acting permanent counselor.

Two symposia featured the program of the academy, which included forty-eight scientific papers, presented in four sections at Flowers and Bellingrath Halls and the Haughton Library on Friday afternoon and Saturday morning. Section I held a symposium on "The Biological Control of Malaria." This was presented by members of the health and safety department of the Tennessee Valley Authority, Wilson Dam, and the Alabama State Departments of Public Health and