result from stimulation of nerves arising in muscles. He suggests that there are two types of afferent nerve fibers: (a) inhibitory fibers, easily narcotized and having a low threshold of stimulation and (b) excitatory fibers which are less susceptible to narcotization and have a high threshold. Kato has isolated these two types of fibers and has demonstrated that the central effect of the inhibitory fibers, which are about 9.5μ in diameter, is only inhibition with stimuli of any strength or frequency even after the application of strychnine. Stimulation of the excitatory afferent fibers, whose diameter is 6 to 7μ, results only in summation with crossed excitation. Kato has also localized an inhibitory center at the level of the *lamina terminalis* from which fibers are projected into the cord decussating slightly caudal to the crossing of the motor tract.

Kato does not offer experiments that would refute the view, now generally prevalent, that the nerve impulses which give rise to inhibition do not differ fundamentally from those whose central effect is excitatory. Evidence is accumulating from many sources tending to show that not only are impulses in nerve fibers non-specific but also in intra-central terminals as well. Therefore, whether a discharge into the cord gives rise to excitation or inhibition depends upon the nature of the reactions set up at the particular point on the neurone at which the discharging nerve terminal forms a synapse. The significance of Kato's experiments lies in the fact that they lend support to the hypothesis that a particular synapse when discharged by its nerve fiber always produces the same non-reversible effect; one synapse when activated always develops excitatory state, and another always inhibitory state. However, a single afferent fiber may end not only in nerve terminals (boutons terminaux) which contribute to the development of an excitatory state in one neurone, but it may also send collateral branches to another nerve cell or cells on the same side of the cord, which end in boutons whose discharge results in inhibition.

EBBE HOFF

LABORATORY OF PHYSIOLOGY
YALE UNIVERSITY

THE GRASSES OF THE UNITED STATES

Manual of the Grasses of the United States. By A. S. HITCHCOCK. U. S. Dept. Agr. Miscel. Publ. 200: 1–1044. figs. 1–1696. 1935. Superintendent of Documents, Government Printing Office, Washington, D. C., $1.75.

No family of plants is of such outstandingly great importance to man as is the grass family, including as it does all our cultivated cereals, the basic foods of the majority of mankind, most of the wild and cultivated species on which the grazing and dairy industries are based, and numerous species otherwise of great economic importance. It is thus fitting that the first comprehensive treatment of the entire family, as represented in the continental United States, should appear under government auspices. It is a botanical contribution of first magnitude and one of great economic and scientific moment. In the introductory pages the uses, distribution, morphology, classification and nomenclature of grasses are considered, followed by a key to the tribes and genera, while under each genus is a key to the species. There are 159 numbered genera and 1,100 numbered species, with additional data appertaining to casually introduced and cultivated forms. Each species is illustrated, while the accompanying maps graphically indicate the geographic distribution in each case. The descriptive text is not encumbered with synonyms, but for those who must consider synonymy, a full list of synonyms, by accepted species in alphabetic sequence, is given at the end of the work, pages 771–982. Here and there in the synonymy critical notes are given and for all originally published species, as contrasted to transfers, the type locality is indicated. How complex synonymy has become may be evidenced from the fact that for a number of species more than 20 synonyms are listed, and for at least one species more than 70 synonyms are given. This list of synonyms provides the basis of selection of the accepted name in each case, the nomenclature following the International Rules. The compilation of this list, a major task, shows evidence of most careful and critical bibliographic and herbarium work, and there seems little chance that few if any "earlier" names will be detected by future workers that would replace those accepted in this important work.

The work is planned to meet the needs of the botanist, the agronomist, the forester and the agriculturist, hence the inclusion of supplementary economic notes under the various genera. Common names of cultivated species follow "Standardized Plant Names," while those for native and naturalized species have apparently been arbitrarily selected, as were many of those in that work; for these the author is not responsible (p. 14). Thus under *Muhlenbergia* one notes the most unusual and apparently new common name "muhly," while fox tail, which is widely used for *Setaria,* is replaced by bristle grass and the name for fox tail is associated with *Alopecurus.* These arbitrary changes can not conceivably effect accepted usage, and unquestionably it would have been better to apply common names, as does the man on the land, rather than to have invoked arbitrary selection.

This is a major contribution to our knowledge of the grasses of North America, marks the culmination of more than thirty years of intensive work on the part of the author, and will be found to be of great

value not only to botanists in diverse fields, but to a great number of individuals interested in various phases of agriculture, forestry, conservation, soil erosion, irrigation and other fields. Fortunately for those who need and must have this work, it is a public document and is so priced as to be available to all.

E. D. MERRILL
NEW YORK BOTANICAL GARDEN

SOCIETIES AND MEETINGS

THE INDIANA ACADEMY OF SCIENCE

THE golden anniversary meeting of the Indiana Academy of Science was held on Thursday, Friday and Saturday, November 15, 16 and 17 at Indianapolis, with the academy as the guest of Butler University. The general meetings were devoted to its history and the honoring of its living founders. At the sectional meetings a total of ninety-eight papers on botany, chemistry, bacteriology, geology, geography, physics, mathematics and zoology were read. The meetings were all well attended.

The principal address of the historical meeting was given by Dr. Will E. Edington, of DePauw University, on the subject, "There Were Giants in Those Days." The address dealt with the various factors that led up to the founding of the academy in 1885, and was illustrated with slides showing the principal founders. Among these were David Starr Jordan, T. C. Mendenhall, John M. Coulter, John C. Branner, Daniel Kirkwood, John Sterling Kingsley, Thomas Gray, Oliver P. Jenkins, Richard Owen, Alexander Smith, Harvey W. Wiley, Joseph Swain, William A. Noyes, Amos W. Butler, Barton W. Evermann, Lillien J. Martin, Carl H. Eigenmann, Willis S. Blatchley, Joseph C. Arthur, Stanley Coulter and others. Following this address ten of the fifteen living founders who were present were introduced to the assembled members of the academy.

The president's address was delivered by Father Julius A. Nieuwland, of the University of Notre Dame, on "The Story of Synthetic Rubber," which was a report on the work for which he has been awarded the Nichols Medal by the American Chemical Society.

The Founders' Dinner was held on the evening of November 16, at the Claypool Hotel with several hundred members in attendance. Following the dinner, the ten living founders who were present gave short talks. These founders are J. C. Arthur, George W. Benton, W. S. Blatchley, J. B. Burris, Amos W. Butler, Stanley Coulter, Robert Hessler, David M. Mottier, William A. Noyes and A. J. Phinney. They were presented with certificates of appreciation for their service to science and to the academy, John S. Wright, of the Eli Lilly Company, acting as master of this ceremony.

Several scientific men from without the state were present. Of these particular mention may be made of Dr. Henry B. Ward, permanent secretary of the American Association for the Advancement of Science. Dr. Ward attended the meetings of the executive committee and made a short address at the founders' dinner in which he discussed the meeting of the association to be held in Indianapolis in 1937.

The Junior Academy, composed of a number of high-school science clubs, held its meetings on Saturday morning. These included scientific exhibits.

There were on display a number of scientific exhibits and also an exhibit of photographs of all the past presidents of the academy and a majority of the founders. It is the intention of the academy to file these photographs, slides made from them and other historical material in the State Library, so that it will be accessible for use in lectures and other work. At the request of Dr. Ward photographs of all the past presidents are to be exhibited at the St. Louis meeting of the American Association for the Advancement of Science.

The following officers were chosen for 1935: *President,* Will Scott, Indiana University; *Vice-President,* Will E. Edington, DePauw University; *Secretary,* Ray C. Friesner, Butler University; *Treasurer,* William P. Morgan, Indiana Central College; *Editor of the Proceedings,* Paul Weatherwax, Indiana University; *Press Secretary,* Thomas R. Johnston, Purdue University. The next winter meeting will be held at Crawfordsville, Indiana, with Wabash College as host.

WILL E. EDINGTON

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE NICOTINE VAPORIZER, A DEVICE FOR UTILIZING NICOTINE IN THE CONTROL OF INSECT PESTS

FOR many years nicotine has been available in commerce in the form of nicotine sulfate having a content of 40 per cent. nicotine alkaloid. In the control of insect pests attacking vegetation under outdoor conditions, this material has been utilized in two ways, as an aqueous spray solution and as a dust mixture. The insecticidal action appears to be due very largely