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<i>Mineral Nutrients in Relation to Flower Development</i> : PROFESSOR W. F. LOEWING	517
<i>Petroleum and National Defense</i> : DR. GUSTAV EGLOFF	520
Scientific Events:	
<i>University College, London; Damage to Scientific Institutions in London; Emergency Courses to Train Engineers and Technicians; The Hospital of the Medical College of Virginia; The Meeting of the Mathematicians at Baton Rouge; Award of the Medals of the American Society of Mechanical Engineers</i>	522
<i>Scientific Notes and News</i>	525
Discussion:	
<i>Dental Research at the National Bureau of Standards</i> : DR. GEO. C. PAFFENBARGER. <i>Control of Prickly Pear in Australia</i> : DR. FRANCIS RAMALEY. <i>The Dens and Behavior of the Desert Tortoise</i> : PROFESSOR A. M. WOODBURY and ROSS HARDY. <i>Electric Fences that Repel Deer</i> : J. G. BURR. <i>J. Peter Lesley and Joseph Lesley</i> : DR. LAWRENCE WHITCOMB	527
Quotations:	
<i>The British Scientific Advisory Committee. The Future of Polish Science</i>	530
Scientific Books:	
<i>Recent Publications of the British Museum (Natural History)</i> : PROFESSOR T. D. A. COCKERELL. <i>Aquatic Plants</i> : PROFESSOR ROBERT B. WYLIE	531
Reports:	
<i>The Cotton Root-rot Tour and Conference of 1940</i> : DR. WALTER N. EZEKIEL	533
Special Articles:	
<i>A Quantitative, Absolute Method for the Estimation of Complement (Alexin)</i> : PROFESSOR MICHAEL HEIDELBERGER. <i>Arthritis of Mice</i> : DR. ALBERT B. SABIN and DR. JOEL WARREN. <i>Phosphate Acceptors in "Respiratory Phosphorylation" in Muscle Tissue</i> : DR. W. A. BELITZER and K. S. GOLOVSKAYA	534
Scientific Apparatus and Laboratory Methods:	
<i>A Simple Method for Recording Electrocardiograms in Animals without Opening the Skull</i> : PROFESSOR HUDSON HOAGLAND. <i>An Inexpensive Mouse Cage</i> : PROFESSOR E. WILBUR COOK, JR.	537
<i>Science News</i>	10

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MINERAL NUTRIENTS IN RELATION TO FLOWER DEVELOPMENT¹

By Professor W. F. LOEWING

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FOR several years, the writer and his associates have investigated the role of mineral nutrients in relation to reproduction and sex expression in higher plants. From these and numerous other investigations, it is evident that the most profound metabolic and structural changes of the plant's entire life originate in the brief period between the origin of floral primordia and full bloom (Loehwing, 1938-39). Hence a detailed study, correlating chemical composition with histological structure in this particular phase of development, appeared to offer exceptional promise of valuable results, not only as to the functions of mineral nutrients in flowering but also as to their specific role in general developmental physiology.

Though interest in these investigations has centered primarily in the physiology of flowering, physiological

¹ Address of the retiring president of the American Society of Plant Physiologists, Columbus, Ohio, December 28, 1939.

studies obviously could not be confined to this phase alone. Only a continuous and detailed chronological inventory of the progress of events in root and shoot, from the vegetative, flowering and fruiting phase provides the requisite interpretative data. Because the most significant changes of the flowering phase are highly localized (Borthwick and Parker, 1939) the usual mass analyses of entire tops have to be supplemented with separate, sequential physico-chemical study of all formatively active zones of growth. For interpretative purposes, these data must be expressed in absolute amounts of the individual constituents as well as in the traditional terms of percentage composition. Determination of salts by actual weight is essential because of the fact that the relatively greater rate of carbohydrate and protein accumulation in plants tends to mask the critical changes in actual amounts of mineral matter. A progressively diminish-