are observed in which the penumbra alternately expands and contracts on both sides of the umbra. Since such changes are also frequently accomplished without any apparent effect on the striation of the penumbra, the question may be asked whether they are real or illusionary. The writer believes that all such changes, in which the striation is not affected, are only apparent and due to the masking effects of flocculi moving above the penumbra.

The striation of the penumbra may be used to separate real from apparent changes quite readily. Remembering that this whole structure is gaseous, it is clear that any profound alteration in the penumbra itself will certainly affect the striation by disturbing the currents which produce it.

Consider the case of a spot which suddenly appears to be dichotomized, say 24 hours after first observation, the penumbra appearing to vanish on one side while it remains whole and unaffected on the other and with no sensible disturbance of the striation in the visible half. Assuming such a change to be real we would have to believe that a vortex existed in which there was an indraught *only from one side,* an obvious impossibility.

The simplest explanation for such an appearance (by no means rare) is that some bright, opaque screen has come between the penumbra and the eye of the observer. This is most strongly suggested when the missing half of the penumbra reappears, the striation in the unaffected half meanwhile remaining undisturbed.

In order to cause apparent changes in the shape and area of the penumbra, without actually altering it physically, it seems clear that the agent effecting the apparent change must be in the nature of a screen superimposed upon but at a considerable altitude *above* the spot. Indeed the phenomenon is analogous to the projection of prominences on umbrae, which give rise to the bright bridges often observed; but the difference in volume between the slender umbral filaments and the obscuring masses which blot out whole areas of the penumbra make it fairly certain that the latter are floccular in nature. By learning to distinguish between physical changes in the penumbra and those caused by obscuring flocculi, it is thus possible to study their local movements by direct vision.

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PERTUSSIS IMMUNE ROOSTER SERUM

AS a member of the American Association for the Advancement of Science I am greatly interested in the current article by Hilleman and Gordon in SCIENCE for October 15, 1943, relative to the preparation of a protective rooster antiserum against mouse pneumonitis virus.

I wonder whether or not the authors are familiar with the work of Dr. John Bailey, of the University of Indiana,[1] who in 1933 described an anti-serum of high potency produced in the rooster by repeated intraperitoneal inoculations of suspensions of live *H. pertussis.*

Bailey's serum was effective in alleviating to a considerable degree the paroxysmal cough in the early stages of pertussis in a limited number of children when administered intramuscularly. However, local reactions were at times severe and wide-spread usage of the serum was not attempted.

Three years ago I again became interested in the rooster as a possible source of immune serum particularly against type b *H. influenzae* for the treatment of influenzal meningitis in children, as past experience had demonstrated the failure of chemotherapeutic agents and antisera in the treatment of this disease. Approximately two years ago I submitted a problem to the research committee of the Michael Reese Research Foundation, Chicago, involving an attempt to produce a potent rooster immune against type b *H. influenzae* for the treatment of influenzal meningitis. The initiation of this work was curtailed when I entered the Army.

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A PROPOSAL CONCERNING THE KILGORE BILL

BECAUSE its arguments were based on generalities L. A. Hawkins (SCIENCE, January 14) criticizes my letter on the Science Mobilization Bill (SCIENCE, November 26, 1943). Since I was attempting to answer an earlier letter of Dr. Harlan T. Stetson (SCIENCE, October 22, 1943), to whose generalizations I objected, my reply was not an answer to specific objections to the bill.

Mr. Hawkins's interpretation of my remarks perverts my meaning and intention, perhaps because they were not clear. However, instead of offering specific answers to his specific objections to my general statements, I urge opponents and proponents of the bill to direct their efforts in exactly the manner he desires. If the less informed scientific public could have before it objective and specific analyses prepared by competent persons of divergent views, I believe the formulation of sound judgment would be hastened. I suggest, therefore, the publication and wide circulation of specific objections and specific answers to them.

[1] *Jour. of Infect. Dis.* 52: 97, 1933.

Such analyses should be in compact and understandable form and free from extravagant subjective opinion and emotional appeal.

I propose this in the interest of creating an informed opinion, though I do not concede the irrelevance or unimportance of certain far-reaching generalities that must form a background of any opinion that is reached.

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SCIENTIFIC BOOKS

THE HISTORY OF BOTANY

A Short History of the Plant Sciences. By HOWARD S. REED. 323 pp. 37 figs. Volume VII of A New Series of Plant Science Books, edited by Frans Verdoorn. Waltham, Mass.: The Chronica Botanica Company. 1942. $5.00.

REED'S "Short History" is more than a dry record of progress. Through the kind and appreciative eyes of one of America's best-liked botanists the kaleidoscopic change in scenes and actors on the stage of botanical progress becomes a vivid adventure. This book will be enjoyed not only by professional botanists but also by students and others.

The first half of the book will appeal especially to those already versed in the history of botany, since it discusses many salient but generally neglected aspects of botany. Among these should be mentioned the chapters entitled "The Gardeners and Herbalists of Antiquity" and "Gardens and Other Things." In both of these the role of primitive agriculturists and horticulturists in the development of our knowledge of plants is stressed. Even though no written records of their activities are preserved, thus making the task of the historian difficult, their actual contributions, in the form of domesticated plants and cultural practices, are of such magnitude that our own work—although properly recorded and published—is dwarfed by them.

The middle portion of the book is most detailed, and the botanists of the seventeenth and eighteenth centuries receive considerable attention. This part conforms most closely to existing texts, but the evaluation of the work of these scientists is based on original research and is not a mere restating of current opinions. One might expect such conformity, since after more than 200 years the historian can estimate the influence of his predecessors with far greater certainty than that of more recent investigators in fields which are at present in a state of flux. In the latter case only a person actively engaged in research in such fields is in position to give a proper historical account, in which more than mere facts are recorded.

In the third part of the book a limited number of fields of research have been selected, and the development of each is traced to the present time. The choice of these fields was mainly determined by Dr. Reed's own interests and research activities, which are of a remarkably wide scope. In this manner plant geography, morphology, cytology, mycology, plant pathology and various plant physiological topics are dealt with in eleven chapters. Although some readers might wish the inclusion of certain other subjects, such as taxonomy, agriculture or growth and plant movements, the reviewer, for one, is glad that the author has chosen the adequate treatment of a selected number of subjects rather than an abbreviated encyclopedic treatment of all phases of botany. As it stands, the book is very readable and should be required reading for all more advanced students in biology. It gives a welcome addition to the diet of currently accepted facts on which most students are reared, and it will help in giving them a proper perspective, which becomes harder to attain as specialization progresses.

This book is thoroughly original, in scope and treatment as well as in illustrations. We do not find the traditional portraits of the paragons of science, which often are of questionable authenticity and usually are entirely non-committal as to the character of the subject. Instead, original illustrations of significant experiments, laboratories or publications are depicted, with delightful originality. One of the special values of the book is the adequate, though not undue, stress laid on the contributions of American scientists. The reviewer was surprised to find how seldom he disagreed with the author, which can only be attributed to the care with which Dr. Reed has considered each contribution and the sympathy with which he has treated each contributor. It is easier to criticize mistakes than to appreciate positive advances, which become incorporated in our general body of knowledge and which can be recognized as advances only after careful consideration.

The Chronica Botanica Company and its active editor should be commended for their initiative in bringing this book, for which a definite need existed, before the public.

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THE THEORY OF RINGS

The Theory of Rings: Mathematical Surveys, No. 2. By NATHAN JACOBSON. vi + 150 pp. New York: The American Mathematical Society. $2.25. 1943.

THIS is the second book in a new series of expository books entitled "Mathematical Surveys" which is edited and published by the American Mathematical