tion. It is to be regretted that the author did not bring out the homology of these two great regions of the notum and devote his energies to the determination of the real boundaries of these regions.

The interpretation of the origin of the post scutellum or pseudonotum, as he calls it, was suggested by myself in the paper previously referred to, though I can not agree in considering this region belonging more to the segment in front than to the segment behind, particularly when the phragma is considered as part of this interpolated sclerite.

The great dorsal muscle of flight for which the phragma was developed is probably only a dorsal intersegmental muscle. These extend from the anterior edge of one segment to the corresponding part of the next. The anterior phragma is mesoprescutal, the posterior is a part of the first abdominal segment. The hymenoptera appear to be an exception in regard to the position of the first abdominal segment, only because of the great constriction between the first and second segment.

It may be impossible on anatomical grounds to locate the division between segments after the articular membrane has become wholly chitinized. The phragma may be, as this author says, a "chitinization of the infolded intersegmental membrane," but if so, why is not the deepest point of the fold the point of demarkation between the segments?

A more reasonable position would seem to be that the infolding for the attachment of intersegmental muscles marks the posterior boundary of the prescutum that the phragma belongs therefore entirely to the following segment and that with the completion of the chitinization of the articular membrane, the division is lost somewhere immediately anterior to the phragma.

The region designated by this author as pseudonotum developed as a chitinization of the articular membrane is probably therefore made up of two elements, one of which is continuous with the prescutum of the following segment.

The articulation of the wing has been studied in much detail, but scarcely anything is added to the work of Amans except the application of the Comstock-Needham nomenclature to the veins. The veins are said to be "connected or associated in a very definite and constant manner with the sclerites of the wing base," but speaking of the chief vein in the wing he says: "The base of the radius is nearly always more or less closely fused with the base of the subcosta but it is clearly connected also in a great many cases with the anterior end of the second auxiliary. In other examples its head is only contiguous to the third auxiliary." This does not seem to be very definite nor constant.

The study of the articulation throws but little light on the question of the homology of the veins because of the fact that in all orders except Odonata and Ephemerida, the basal connection of the veins has been disturbed to enable the wing to fold back against the body. Indeed the basal connections of the veins are very unreliable and are not depended on by any one in the determination of the homologies of the veins.

The presenting of theories is condemned by the author in numerous places and this article is offered as an accumulation of facts and conclusions, but it is very difficult to see the distinction. Theories in truth constitute the whole of science. Facts are nothing unless they mean something, and our interpretation of that meaning is what we really present. A drawing is at best a crude representation of the object and its only use is to represent our theory of what we see. The present paper contains over two hundred excellent drawings with very full explanations which will enable subsequent students to comprehend exactly what the interpretation of the structures were and I feel sure that in most particulars they will concur with his conclusions.

C. W. WOODWORTH
UNIVERSITY OF CALIFORNIA

A Short Handbook of Oil Analysis. By AUGUSTUS H. GILL, S.B., Ph.D. Fifth Edition. Philadelphia, Lippincott & Co. $1.50.

A book on chemical analysis which has five editions in twelve years is very nearly beyond criticism; fault finding is disapproved in advance, and praise is but gilding the re-

fined gold of royalty. But a man so generally popular as Dr. Gill gets all the praise that is good for him, anyway; so it may be observed that there are some things in which this book may yet be improved. The illustrations are better than none, but not much; and the directions for using flash-test apparatus are not quite as complete as a beginner ought to have. It should always be remembered that a metallurgical or cement chemist, for example, skilled in using ordinary apparatus, may know nothing at all about a flash-test; and it is in little details that the manipulation of the expert excels and has its greatest value. In most cases the directions given in this book are full and clear.

The inclusion of refractive indices would probably be generally approved, since the refractometer has come into general use. In general, the book would be better if there were more of it; and while its value is partly due to leaving out information not useful to the analyst, some further remarks as to the nature of the various oils, as well as to changes produced by reagents, from one so experienced as the author, would be of much use to the student.

Somewhat more than half of the book is given to physical and chemical tests; then there are descriptions, including preparation, uses, tests and constants for the chief petroleum products, for seventeen vegetable and nine animal oils, and certain waste fats and greases. There is an appendix of tables and other information. The book has been largely rewritten and has a good index; it appears to be free from typographical errors.

A. H. SABIN

SCIENTIFIC JOURNALS AND ARTICLES

The American Naturalist for May presents two papers, and notes: "The Categories of Variation," by S. J. Holmes, in which the author discusses the differences between fluctuating variations and mutations; going to some length in the analysis of elementary species, retrograde varieties and fluctuations, as distinguished by De Vries; with the general conclusion that the evidences, so far presented, do not sufficiently distinguish between unstable mutations and fluctuations. "The General Entomological Ecology of the Indian Corn Plant," by S. A. Forbes. "Notes on Some Recent Studies on Growth," by Raymond Pearl; "Cuénot on the Honey-bee," by T. H. Morgan; "Poulton and Plate on Evolution," by V. L. K[ellogg].

The American Naturalist for June presents four papers, and notes: "Heredity and Variation in the Simplest Organisms," by H. S. Jennings. "The Color Sense of the Honeybee: is Conspicuousness an Advantage to Flowers"? by John H. Lovell; with the adduced evidence that the query is to be answered affirmatively. "Variation in the Number of Seeds per Pod in the Broom, *Cytisus scoparius*," by J. Arthur Harris. His conclusion is that for this species variability due to habitat is not more noticeable where it is introduced than where it is native. "Present Problems in Plant Ecology." These are presented in two articles read before the Botanical Society of America at the Baltimore meeting, 1908: (1) "The Trend of Ecology," by Henry C. Cowles, and (2) "Present Problems of Physiological Plant Ecology," by Burton E. Livingston. Under "Notes and Literature" V. L. K. makes note, under the heading of Evolution, on the retirement of Ernst Haeckel from his chair in the University of Jena, with emphasis upon the establishment and care of his new Phyletic Museum. He also notes the recent German discussion of mechanical versus vital basis for explaining phenomena of nature. George H. Shull notes the literal translation into French of Hugo De Vries's "Species and Varieties: their Origin by Mutation." J. F. McClendon presents a note on "The Totipotence of the First Two Blastomeres of the Frog's Egg."

SPECIAL ARTICLES

ON THE CONNECTION BETWEEN STIMULATION AND CHANGES IN THE PERMEABILITY OF THE PLASMA MEMBRANES OF THE IRRITABLE ELEMENTS

EVIDENCE of a varied and highly conclusive kind now exists that the phenomena of stimu-