surprising is the absence of the familiar genus *Callimorpha* with its European and Asiatic species. If this genus belongs to the Noctuidæ by the author's classification, we think the scheme is some way at fault, for the insects are certainly Arctains in their broad characters. *Holomelina* (*Eubaphe*) *immaculata* Reak. has escaped notice, doubtless owing to Kirby's erroneous reference of it to the genus *Eudule* (Geometridæ). The species *Euhalesidota otho* Barnes, *Dodia albertæ* Dyar and *Pseudalypia geronimo* Barnes, appeared too late in description to be included. Most of these omissions are, we presume, intentional, but some seem due rather to the method by which the work has progressed, by which one family is completed before the critical study of the next one has been begun. Thus species which have been wrongly referred by cataloguers are liable to be overlooked. On page 79 *Bertholdia braziliensis* is described as new. The name must fall before *B. soror* Dyar (*Proc. Ent. Soc. Wash.*, IV., 391, May 3, 1901), which seems unquestionably the same species. On page 267 our author places *Spilosoma congrua* Walk. as a synonym of *Diacrisia virginica* Fab. We cannot agree to this, since it has been shown that a part of Walker's types were a distinct species, *antigone* Streck., and to this his description applies. *Arctia complicata* Walk. is made a synonym of *A. quenseli* Payk. We had always supposed it to be a form of *ornata*, which occurs in the same region (British Columbia), whereas *quenseli* is an Alpine form from the Alps, Labrador, White Mts., etc. But the author has Walker's type and should know. We shall be interested to see if *quenseli* can be found again in Vancouver Island.

Condensed descriptions of the larvæ of several species are given, but in a sporadic manner. Most of the life histories published within the last few years are included, but practically all the older ones published more than ten years ago are omitted. Doubtless it would have added greatly to the author's labors to have made a thorough search for all larval descriptions, but surely the North American species might have been included as they have been very completely catalogued in a bulletin issued by the U. S. National Museum in 1889. We do not, of course, desire to depreciate the value of this work, which, as we have before remarked, is a great boon to working entomologists, enabling us to identify our species far more readily than ever before. For, unlike many published synopses, Hampson's tables are practicable, not containing contradictions nor hair-splitting differences. Variation within specific limits may invalidate some of the characters which he uses, but we find this a very minor objection.

Harrison G. Dyar.

Gaupp's Anatomy of the Frog.*

This is not the first time that the present work has been noticed in this journal. The other parts as they have appeared have been reviewed as follows: Parts I. and II., Science, Vol. VII., p. 463; Part III., Science, Vol., X., p. 491.

The present part deals with the viscera, the next and concluding 'Heft' is to take up the integument and sense organs. The organs are discussed in the following order: Digestive tract, respiratory organs, thyroid gland, derivations of the pharyngeal region, urogenital organs, cloaca, and the cœlomic cavities. As with the portions of the work already published it is impossible with this to analyze the facts presented and to point out the features which are novel. Attention, however, must be called to the broadly morphological aspects of the work. Dr. Gaupp has given us not only the anatomy of the adult frog but has emphasized the bearings of the various structures. Thus at the beginning we have an account of the developmental history of the head-gut region without which the account of the derivatives of the branchial region would lose much of its interest. In the same way the urogenital structures are introduced by a longer account of their history. Then there is a valuable summary of what is known concerning hermaphroditism in the frogs. The illustrations throughout illustrate the frequent use of the

*A. Ecker's und R. Weidersheim's 'Anatomie des Frosches auf Grund eigener Untersuchungen durchaus neu bearbeitet,' von Dr. Ernst Gaupp. Dritte Abtheilung, erstes Hälfte. Lehre von den Eingeweiden. Braunschweig, Fr. Vieweg und Sohn. Pp. 438. 95 figures. Mk. 15.

color making them more readily intelligible, and the German is everywhere easy of comprehension.

In general terms we can say of this part, as of those which have previously appeared, that it maintains the highest standard of descriptive anatomical work, and when the treatise is completed we shall have in accessible form details of the structure of the frog only exceeded in anatomical literature by those relating to man. One can only wonder how a man, turning out so much research in other lines, can find time to produce such a monumental work as this. Not only has practically all of the existing literature been analyzed (the list of papers relating to the viscera includes 877 titles, some of course duplicate), but every point has been, as the title page says, 'neu bearbitet.' It is not possible to hope for a translation of such an extensive work, but the original must have a place in every biological laboratory in the country.

J. S. KINGSLEY.

A Laboratory Guide to the Study of Qualitative Analysis. By E. H. S. BAILEY, Ph.D., Professor of Chemistry, and HAMILTON P. CADY, A.B., Assistant Professor of Chemistry in the University of Kansas. Fourth edition. Philadelphia, P. Blakiston's Son & Co. 1901.

In the preface to this edition the authors say, "At the present time there seems to be an opportunity to broaden the methods of instruction in qualitative analytical chemistry, and to teach not only the facts and the mechanical methods of carrying out the various operations of analysis, but also to render them more intelligible and interesting to the student by a proper application of the theory of electrolytic dissociation and of the mass law. * * * The aim of the authors has been to produce a book which would enable the careful student to successfully carry on the work without the constant assistance of the instructor."

Several of the current manuals in their latest editions open with an introduction pointing out the significance of these theories for analysis, and in some the dissociation of the text has begun, as evinced by the furtive appearance of ions here and there throughout their pages.

The present authors are thorough; their introduction of twenty pages explains the theory of dissociation and the mass law, and the entire book is written in terms of ions; for example, "Antimony forms the positive antimonous Sb^{+++} ion, and the negative antimonite SbO_3^{---}, this antimonite, SbS_3^{---}, orthoantimonate, SbO_4 , this antimonate SbS_4^{---}, and antimonyl tartrate, $SbOC_4H_4O_6^-$ ions." Instead of acid or metal groups, we find groups of anions and cations.

The serious question is—are the operations of qualitative analysis rendered more intelligible to the student by this method? It seems to the reviewer that they are made more intelligible to an advanced student, but less intelligible to a beginner; but the authors intend this book for beginners.

For example the application of the phenomena of hydrolysis of salts of weak acids to the reactions occurring in the precipitation of basic salts is doubtless a help to a riper student. Again, while the following explanation of another reaction might be clear to an older student, might it not confuse a beginner? "If to a solution containing magnesium as ion, a solution containing hydroxyl ions in considerable concentration be added, a precipitate of magnesium hydroxid $Mg(OH)_2$ is produced. Ammonium hydroxid is a much weaker base than magnesium hydroxid, and consequently if an ammonium salt, such as ammonium chlorid, be added to a solution containing magnesium hydroxid, the hydroxyl ions from the latter will combine with the ammonium ions to form the slightly dissociated ammonium hydroxid, thereby decreasing the amount of the magnesium hydroxid in solution. Therefore the precipitate of magnesium hydroxid is readily dissolved on the addition of ammonium salts."

In connection with the clause quoted, it may be noted that in the separation of the groups Al, Cr, Fe—Co, Ni, Mn, Zn—Ba, Sr, Ca—Mg, the authors give directions with each group to add ammonium chloride if it is not already present, but give no reason for

the use of this reagent, excepting the one statement in separating Ba, Sr, Ca—from Mg, that 'advantage is taken of the fact that magnesium carbonate is not precipitated in the presence of ammonium salts and ammonium hydroxid.' Surely the common explanation of these group separations—the successive breaking down ammonium double-salts in order of their instability by the reagents ammonia, ammonium sulphide, ammonium carbonate and disodium phosphate—is better than no explanation. It may be objected that recent research has disproved, or at least rendered improbable, the existence in solutions of ions indicating ammonium double-salts. At all events, an explanation on the lines of the above quotation regarding magnesium ion might be given.

In brief, this book can be cordially recommended to those students who are trained from the start by lectures based on Ostwald's 'Grundlinien der anorganischen Chemie,' and are taught to look at chemical phenomena chiefly in the light afforded by the dissociation theory.

E. Renouf.

Laboratory Companion for Use with Thurston's Inorganic Chemistry. By W. A. Thurston, F.R.S., Lecturer on Chemistry in Clifton College, London, Edward Arnold. 1901. Pp. 110.

The author says in his preface that this little book is a reprint of most of the experiments in Part 1 of his 'Inorganic Chemistry' and is to be used only as a laboratory companion. It is intended to be used before the study of qualitative analysis is commenced, 'and may replace such work altogether in the case of those who leave school at an early age.'

Evidently it is impossible to criticise this book without a knowledge of the text-book which it accompanies. It is very different from American laboratory manuals. The author holds it 'most important that the connection between physics and chemistry should be insisted on from the earliest stages.' The first thirty-nine experiments are purely physical with exception of one on the hardness of water, which explains permanent and temporary hardness, and gives methods for determining the hardness of water; and this before a single experiment on chemical change has been made.

The experiments given in the remainder of the book are of more chemical nature, and are interesting, but seem to lack logical sequence; it is to be supposed, however, that this seeming fault would disappear if the book was used in connection with the author's lectures, and that we have in the book those experiments which he considers to be of particular theoretic or practical interest to young students. However, the book cannot be recommended as a manual in connection with the text-books in actual use in this country.

E. Renouf.

Chemical Lecture Experiments. By Francis Gano Benedict, Ph.D., Instructor in Chemistry in Wesleyan University. New York, The Macmillan Company. 1901.

This book of 435 pages contains brief, clear instructions for performing a great number of lecture experiments. The instructor who has little apparatus at his disposal and turns to Newth or Heumann for help in illustrating his lecture often finds it impossible to show the experiments described, for lack of apparatus. The author has rigorously excluded all costly apparatus, and has yet succeeded in giving so many brilliant and instructive experiments as practically to cover the whole course. This renders his book invaluable to instructors in schools and in the smaller colleges. But this is not all; any lecturer who glances through the book will find much that is new and striking. Especially is this true of the experiments on metals, which have received such scant attention in the earlier books. The reviewer has Dr. Benedict's book in use and finds it a valuable supplement to Newth and Heumann.

Edward Renouf.

GENERAL.

'The Fauna and Geography of the Maldive and Laccadive Archipelagoes, being the account of the work carried on and of the collections made by the expedition during the years 1899 and 1900,' is now in course of publication in 'Cambridge at the University Press.' Part I. of the first volume appeared