
REVIEWS

Concise General Astronomy. By O. R. Walkey and H. Subramania Aiyar. (Sri-dhara Printing House, Trivandrum), 1940. Pp. 442. Price Rs. 5-8-0.

Popular works on Astronomy published in India are very rare. Probably there is none. If so the present work is a pioneer in the field, and is to be warmly welcomed on that account. Its special feature, and in our opinion, its most valuable feature is the very interesting information it contains about Hindu Astronomy, and the incorporation of this information in a general scheme gives one a proper perspective regarding the achievements of Hindu Astronomy. The first three appendices make, from this point of view, fascinating reading indeed.

The other appendices contain information on such diverse topics as Arabian, Chinese and Egyptian lunar mansions, sundial design and map-projections, all subjects of a practical interest. The several tables brought together in one place from a large number of sources and arranged in a definite order are bound to be of great value even to those who are not merely "laymen". It would have been better if the source of information had been indicated in each table, for in this rapidly growing subject new data supplant the old ones with astonishing quickness. One is, however, constrained to say that the star maps on pages 414 and 415 are very bad, indeed the second map definitely disfigures the page.

The book proper consists of twenty-seven chapters, three of an introductory and historical nature, nine devoted to the solar system and the remaining fifteen to the study of stellar systems. Four out of these fifteen chapters give descriptions of the several constellations, and will be found to be of great use to amateur sky-gazers. The authors have taken pains to be up-to-date in the information on the several topics dealt with in the book. As examples in point we might mention the Lyot device for solar coronal observations, the number of satellites of Jupiter, the elements of Pluto's orbit, the mention of supernovæ, galactic rotation, the local cluster, Trumpler's stars the physical constitution of planetary atmospheres and several other data regarding galactic and extra-galactic

nebulæ and star clusters. The book is an accurate and reliable guide to the lay reader in understanding the great developments in Astronomy that have taken place in recent years on the observational side. The numerous facts and figures are arranged clearly and succinctly, and presented in a racy and vigorous style, highly reminiscent of a popular evening lecture.

This idea of the popular appeal has throughout been kept in the forefront in the book, but, we are afraid, it is a little overdone. One such instance is the rather too frequent reference to the Creator whose aid is invoked even on occasions when it is not quite imperative. Thus, for example, the authors remark on p. 205 that the source of stellar energy cannot be accounted for on any known laws, and one has only to acknowledge the direct interposition of the Creator. In view of the recent work of Bethe and Gamow on the nuclear theory of stellar energy, it is difficult to justify such a stand. Even from a general point of view, such an attitude spells an air of superficiality about it and appears out of place in a book which is entitled as a *Concise General Astronomy*, and which is scientifically accurate in the details of the subject it gives.

Nor are the references to the theory of relativity quite happy. It is unfortunate that the book should contain a sort of a contemptuous reference to the "mathematician's square-root-of-a-negative quantity and purely imaginary concept of some fourth or other inside-out dimensional existence", for this gives an entirely erroneous impression that the concept of time in relativity is purely imaginary. The reference to "a mathematical explanation of the sudden disappearances of angelic beings after delivering their messages" (p. 51) is unworthy of a place in a scientific book on general astronomy. Also the relativistic explanation in §295 of the meeting of two bodies as meaning the agreement in their space and time co-ordinates is definitely wrong since it contradicts the relativity of simultaneity as can be shown by considering the Lorentz transformation. We consider it an error of discrimination on the part of the authors to mention (p. 280) Sulaiman's

theory as an alternative to the theory of relativity without taking the trouble of examining the foundations of the former theory.

In the Preface to the book, we are duly warned against the "desertion of the standard of Science for the banner of speculation, often Science, falsely so called", and against placing implicit faith in Mathematics, the intellectual barrel-organ. We must, however, confess that the book itself abounds in speculation of a mystical nature. We must also protest against the book ending in a "Dream". The aim of a book on Astronomy ought to be the instilling of a scientific curiosity in the reader, and a wide-awakeness to the problems which still challenge a solution.

Apart from these criticisms of a general nature, we must admit that the book gives a valuable account of the advances in modern astronomy and is eminently readable. We wish it many more editions quite soon.

B. S. MADHAVA RAO.

Atoms in Action (The World of Creative Physics). By George Russell Harrison. (George Allen & Unwin, Ltd., London), 1940. Pp. 370. Price 12sh. 6d. net.

Much of the material presented in this book formed the basis of a series of Lowell Lectures entitled "Modern Physics and Human Welfare" given by Professor Russell in Boston. Some of his contributions to *The Atlantic Monthly*, *Harper's Magazine*, *The Scientific American* and the *Technology Review* have also been used in writing various chapters. When the American Institute of Physics suggested to Professor Russell the desirability of putting all these labours in the form of a book, it is no wonder that the author took nearly two and a half years in sifting and collating his material. The result is this fascinating book. As a physicist who has done considerable work in the field of spectrum photometry and spectrum analysis, he has presented in the book an extremely interesting picture of the diverse ways in which the recent advances in the world of atoms cross the paths of human civilization, in an easy style so as to be understood by the wider public interested in scientific themes.

The aim of the author in writing this book is set forth in these words "Almost every material problem of living turns out in the last analysis to be a problem of the

control of energy. The wheels of civilization are kept turning by energy; and all this energy, whether we draw it from a gallon of gasoline, a ton of coal, or a pound of butter, has come to us from the sun. Energy is wealth, and in the case of apprenticed sunlight, wealth of a particularly desirable kind, for it is freshly created, free to him who can discover how to capture and control it". In the sixteen chapters of which the book is composed, the central theme "How energy is used" has been fairly comprehensively treated in practically every aspect in which man has utilised this "Spirit" of physical science. All the chapters have popular and arresting titles (Starting with "The Taming of Energy" to "The End is not Yet") and are provided with apt quotations somewhat in the Waverly fashion. It has the rich and wholesome atmosphere of a banquet about it, and the promised fare will satisfy the most epicurean appetite. The reader is taken through a wonderful field of the achievements of physics, which man has used for his cultural pleasure and material profit, and few readers will miss the delight of enjoying the vivid and impressive pictures portraying the power of the principles of physics in directing and controlling human activities. The chapters "The Ransomed Electron, Sound Borrows Wings, Eyes for the Memory and Sight Conquers Space" are of absorbing interest and the other chapters are written with the same clarifying force and imaginative insight. Those who wish for a generous and deeper understanding of some of the marvellous creations of science, Radio-telephony, Colour photography and so forth, will find in "Atoms in Action" every information they may desire. It is one of the very few books in its line, which is at once authoritative and entertaining, and in both respects, it constitutes a valuable contribution to modern scientific literature.

Chemistry, Life and Civilization (A Popular Account of Modern Advances in Chemistry). By Hubert T. S. Britton. (Chapman & Hall, London), 1940. Pp. vi + 266. Price 5sh.

This book is well written, well got up and well illustrated. The type is bold and gratifying to the eye. The matter dealt with, it need scarcely be said, is of vital importance. Human Society is at bottom chemical, and it progresses by the advancement of

researches in the physical sciences. There is hardly any phase of human activity,—politics and statistics excepted,—which has not been influenced and made better by the improvements in chemical technique and processes in industries.

The author has used an easy language and an elegant style in the presentation of the subject matter. For the benefit of those who may not possess a previous knowledge of chemistry, the general principles of the science are treated in a way which any intelligent person can easily follow. Having equipped the general reader with this preliminary acquaintance, the author takes him from Chapter VI on through a wonderland of achievements which have a tonic effect on the intellectual appetite. Chemistry has added to the richness of the enjoyment of life, its gifts have also been prostituted, undermining the very civilization they have helped to build. Before the advent of science, the world was a great puzzle and the progress of scientific knowledge has solved a great many riddles and incidentally has materially tended to make life comfortable and civilized. The book reveals the processes by which human advancement has been accomplished, and should therefore present irresistible attraction not only to the inquisitive youngmen, but also to the older generation of the reading public, endowed with the spirit of enquiring into the "how" and "wherefore" of things by which they are surrounded. We have no doubt that there are few books in the field which offer so much interest and so much information as Professor Britton's work. There is a short supplement in which the author gives an account of the latest advances in our knowledge of vitamins, new drugs of the sulphanilamide group, protamine insulin, synthetic rubber, artificial wool and artificial silk. We have a fairly complete picture of the romance of chemistry in relation to human life and civilization.

Biology in the Making. By Emily Eveleth Snyder. (McGraw-Hill Publishing Co., Ltd., London), 1940. Pp. x + 519. Price 18 sh. net.

Undoubtedly students of General Biology and those of Medicine will be profoundly grateful to the author for placing in their hands a book at once eminently useful and extremely interesting. The author has adopted a new line of treatment. She has

selected twenty-one biological topics practically covering the field of study pursued by medical students and others following a general course, and, under each subject, she has given a lucid description of the principal facts and short biographical sketches of the scientists who made the new discoveries, thus clothing the scientific treatise with a human interest. "The purpose of the book is to trace the development of biological discoveries, not as so many facts, but as the product of real men whose lives for one reason or another made them outstanding in other fields." The author has succeeded in her task, and the simple style she has adopted makes the reading of each chapter a matter of great pleasure. It must not be supposed, however, that the book attempts to exhaust the field, nor does each chapter comprehend all that could be said under each topic. For instance, the chapter on "Chemical Messengers" makes no reference to the pituitary gland to which, however, there is a passing reference in the chapter on Calories and Vitamins (p. 344); "Learning from Fossils": this is decidedly a poor and incomplete chapter; Cuvier and Agassiz have an interest, but the modern discoveries must have a deeper interest and significance to the study of biology. Consistent with the aim of the book, principally to serve the needs of students, the subjects are adequately and admirably treated. It follows the excellent traditions of modern scientific works in providing at the end of each chapter a list of other books for further reading, profuse illustrations of leading scientists, a general bibliography, glossary, chronological list of scientists, and an ample index. The book leaves nothing to be desired, and it will be widely welcomed not only by students, but by the general reading public. We congratulate the author and the publishers on this stimulating and interesting book, whose style is as attractive and simple as the matter dealt with is informing and useful.

A Text-Book on Crystal Physics. By W. A. Wooster. (Cambridge University Press, London), 1938. Pp. xxii + 295. Price 15sh.

The discovery of the diffraction of X-rays by crystals provided the physicist with a powerful method for the analysis of crystal structures, and during the last twenty-five years he has been accumulating, at a rapid

rate, data concerning crystal structures, of great importance to both Physics and Chemistry. While engaged in this new work it was only natural that other aspects of crystal work, as for example, the explanation of the various properties of crystals in terms of their fine structures as revealed by the X-ray studies, did not engage sufficiently the attention of the physicist. In some of the recent work on crystals, however, one can see a definite reaction against this over-much emphasis on structural problems, and a swing back of the pendulum towards problems concerning the real physics of crystals. As illustrations, we may refer to the detailed investigations both theoretical and experimental, that have been made on the optical, dielectric, magnetic, and other properties of simple ionic and molecular crystals, and on the properties of metals and alloys, in relation to their structures. The publication of Wooster's book is an expression of this swing back towards crystal physics, and to one who reads the book with the background of our accumulated knowledge of the results of the X-ray studies, the book serves as a gentle reminder of the neglect in which we have allowed the subject to remain.

Within the compass of less than 300 pages of large type, the author has managed to bring together the important results of crystal physics. The need for a book of this kind in English has indeed been felt for some time. A striking, and probably desirable, feature of the book is the use of the tensor notation throughout, which is very convenient in the treatment of the directional properties of crystals. The chapters on electric and magnetic induction, and on piezo-electricity, are well-written, and in particular the chapter on crystal optics, in which many little points that trouble the new-comer to the field, and are not properly dealt with in the ordinary text-books, are treated adequately. One wishes that an account had been included of the luminescence phenomena in crystals, which have been studied extensively during recent years. One also wishes that the diffraction of light by crystals in which are impressed ultrasonic waves, had been treated in greater detail, in relation to the determination of the elastic coefficients of the crystals, and a short account had been given of light-scattering in crystals. In the chapter on induction, though the diamagnetic

crystals are treated at some length, the paramagnetic crystals are dismissed with just one paragraph. (The formulæ at the bottom of p. 100, and the statements immediately preceding them, are correct only when a_c is large. Quaterphenyl is misprinted twice as quarterphenyl.)

The publication of this book should be particularly welcome to Indian students, since no systematic teaching of crystal physics, as far as the reviewer is aware, is given in any of the Indian Universities.

K. S. KRISHNAN.

1. **Poisons.** Their isolation and identification. By Frank Bamford. (J. & A. Churchill, Ltd., London), 1940. Pp. 344. Price 18s.
2. **Forensic Chemistry.** By Henry T. F. Rhodes. (Chapman & Hall, Ltd., London), 1940. Pp. 214. Price 12s. 6d.

Text-books on the subject of medico-legal chemistry are so rare that one welcomes any book bearing on the subject. The average chemist, who is engaged in detecting poisons for legal purposes is quite often driven to following a "hit or miss" method in the absence of adequate and accurate information regarding the mode of administration of poisons, the clinical and pathological symptoms and interval for such symptoms to appear, and the sequelæ-recovery, or death,—or other permanent residual effects, following the administration of such poisons. As is legally required in this country, the police subject all cases of suspicious death, (even paupers dead of starvation, accidental deaths, and all such cases where they feel that there is not sufficient evidence of the cause of death) to chemical examination; this necessitates the undertaking of expensive time-consuming analyses. Any relief or short cut given in this direction is very welcome indeed. The above two books cannot be said to give all the necessary and available information but represent two distinct approaches to the rather vague and ill-defined subject of Forensic Chemistry, and are in a sense supplementary to each other; both the books have made available information not always readily obtainable. One, however, longs for a complete modern text-book on the subject of medicolegal chemistry, but, this as yet is not to be!

1. Bamford's book comes well recommended. Prof. Sydney Smith, who will be

remembered by all the older medical men of this country, who have taken their final medical examinations at Edinburgh, writes a foreword to the book.

The book begins with a section on the practical equipment of a medicolegal laboratory. A considerable portion of the book is devoted to the detection of inorganic and metallic poisons. While this is in no way very new, and can be readily obtained from a standard modern text-book on Inorganic Analytical Chemistry, it has included the detection of metallic poisons by colour reactions involving extremely minute quantities of such metals by reagents which have come into recent use.

An extremely useful feature of the book is the effort to systematise the analysis for the detection of the presence of alkaloidal poisons. The various alkaloids are well classified and the usual reactions given by them are listed so as to be easily available for reference. The most useful part of the book is the section on the Stas-Otto process so necessary to be carried out in all cases of suspected poisoning; in this process one seeks to extract as far as possible in an unchanged condition, the poison which caused death. The process is tedious and it is possible to miss the poison altogether, unless great care is taken at each stage of the process. Bamford seems to be thoroughly conversant with the process and the various mistakes that one is likely to commit; he has given a very lucid account of its involved technique; it is an eminently practical account and deserves to be memorised in all its details by every medico-legal chemist.

It is regrettable, however, that the book will have only a limited appeal to the Indian student, as the poisons common in India are not treated in any very great detail. Dhatura, one of the commonest poisons in India is shelved to a second place along with *Atropa Belladonna*; some of the very common abortifacients, used all over India are not mentioned at all. Opium, and all its derivatives have been treated with great care; the myth that Smyrna Opium and Indian Opium can be easily distinguished, is exploded. Hashish, possibly so commonly used in Egypt, has been given all the importance, the subject deserves. The toxalbumins derived from the various irritants, like castor seeds, etc., have been uncritically mentioned on the authority of the Madras Chemical Analyser's Report.

The difficulty experienced by a chemist in the analysis of the contents of the alimentary system of a child, dead or suffering from an overdose of a purgative oil (commonly sold, under various trade names, in all bazaars), containing a number of substances, chief of which would be croton and castor oils, along with various irritants like aloes, etc., is so great, that it is not possible to distinguish, much less easy to estimate, the number of substances present or to certify as to which was the essential irritant factor; nor can much information be derived regarding such irritants by the performance of the agglutination test, as given in the text (details of which have been very meagerly given). The habit of betel chewing is discussed with the usual good-natured contempt of a habit to which a westerner is not accustomed. There is a great amount of misunderstanding about this rather pleasant æsthetic habit; the average easterner eats a good deal of soft food which he swallows without much mastication; the spices mixed with arecanut produce enough salivation to mix with the food in the stomach; soft food leaves residues in the crevices of the teeth which later undergo decomposition and produce halitosis (fætor about the mouth), betel nut chewing removes the soft residues; this habit also allows of a greater amount of calcium intake (most of which is excreted). One cannot, however, speak with enthusiasm on the indulgence of this habit at all times of the day, with or without tobacco. (Oral cancer has been attributed to the irritant action of calcium.) The unpleasant symptoms associated with arecanut alkaloid is only with reference to uncured nut and not with boiled well prepared nut.

The section of glycosides may well be enlarged in the next edition, specially with reference to the obtaining of active principles from the gummy residues obtained towards the end the Stas-Otto process; this has always been a great difficulty in the path of the chemist. A section on animal experimentation with the poisons isolated, may well be added to the book to make it more useful. The book has a very good author index as also a good subject index.

2. Rhodes's book on FORENSIC CHEMISTRY contains an extremely useful section on stains and how to identify them; details regarding technique to be adopted in individual cases are also given; but the examination of seminal stains is dismissed rather summarily.

No other book has given such a wealth of detail regarding the examination of inks—both writing and printing inks. The importance of this information so well gathered together, can only be realised by a chemist who has to examine forged notes or cheques, or questionable legal documents. Chemical examination of paper, chemical examination of inks, so many of which are available in the market, the pH of ink, age changes produced in ink by oxidative processes have all been well discussed that one is very grateful to the author for making such information available to the chemist. Unfortunately no one seems to have, as yet, handled the subject of inks prepared from vegetable sources, and the changes produced on them by age, chemicals, etc. This would be very useful in India where vegetable inks are used even now in rural parts. The section on counterfeit money is good and will be found useful by those who have to perform such analyses.

Chapter eight of the book consists of the examination of toxic agents. In forty-six pages the author has tried to give succinct information on toxicological chemistry. This portion of the book might well have been omitted, the author merely referring us to other books for such information, instead of treating the subject so perfunctorily. He might have, on the other hand, tabulated all the available information as he has tried to do in the earlier portions of the book, thus enlarging as also making the book more useful and complete.

The book gives more than a hundred and twenty references to original sources of information. An author index and a subject index have also been appended, making it easy for reference.

These books, being published as they are during war time, are priced quite cheaply.

ENNE.

The Scientific Principles of Plant Protection. By Hubert Martin. (Edward Arnold & Co., London), 1940. Pp. vii + 385. Price 22sh. 6d.

This book was first published in 1928; the present edition appears only four years after the second edition and, while following its plan, includes a discussion of the many recent developments in ways and means of controlling pests and diseases of crop-plants. Its object is to present to the entomologist

and the mycologist a detailed survey of the physico-chemical factors underlying modern control methods, and to provide the chemist and the physicist with a means of approach to the biological side, thereby promoting co-operation between workers in these various fields.

A large part of the book, roughly two-thirds, is devoted to fungicides and insecticides, fumigants, methods of treating soil and killing weeds, the toxic action and chemical constitution of substances employed in plant-protection and the like. The smaller part discusses the question of plant-resistance and the influence of external factors on the susceptibility of the plant to attack, the problems of biological control and the chemistry and tropisms involved in traps and baits; there is a final chapter on the treatment of the centres and vectors of infection. Emphasis has been given to the physico-chemical aspects of plant-protection because those who have to advise on its practical problems are primarily trained biologists, but, as the author himself recognises, this emphasis does not imply the greater importance of chemical over biological and cultural methods of control.

The data that Dr. Martin has extracted from his wide survey of the literature of crop-protection have been concentrated with a most economical use of words and arranged in short sections each of which is followed by a list of references. There is a good subject-index which is an essential adjunct to a work of this type; there are no illustrations.

For those engaged in extending the use of insecticides and fungicides in India also in working on indigenous sources of toxic materials, the revised edition of this book will be most welcome; it will prove to be as useful to the one who has access to a well-stocked library as to another who is almost entirely deprived of these facilities. Possibly some of the terser abstracts may not be easy reading, e.g., Arsenicals "induce the inactivation of the oxidising enzymes, perhaps by an interference with the normal functioning of glutathione in the oxidation-reduction phenomena of the cell tissue" (p. 162), or "the bridging species serves to fractionate an initial mixture of biological forms" (p. 331); but nevertheless they make far less demands on the time of the reader than do the original articles.

The new edition contains much new material and the old text has been drastically pruned and reset; it should be obtained by all who need to keep up to date in a field where methods are embarrassingly many and varied.

C. F. C. BEESON.

Organisers and Genes. By C. H. Waddington. (Cambridge University Press, London), 1940. Pp. x + 160. Price 12sh. 6d.

The author who is well known for his contributions in the field of genetics and of experimental embryology attempts in this book to bring about a synthesis between these two divergent fields of study. 'The discovery of genetic factors reveals only the first line of a chain of causal events whose other end, the adult character, is known, but whose intermediate links require elucidation. The genes cannot be regarded as immediately effective in causing the successive processes of differentiation, although they are undoubtedly the fundamental elements which ultimately control them.' On the other hand, Spemann's theory of organisers founded on experimental data and supported since by a large number of investigations in the field of experimental embryology, provides the 'causal network' underlying the processes of differentiation.

After setting the problem in the first chapter, the author deals in the next few chapters with relevant problems and questions raised by the results of experimental investigations on organisers. Chapters VI and VII deal with, for an ordinary biologist, abstruse investigations on genic actions and gene reactions. In the next chapters are discussed, first, the processes which lead to the establishment of chemical differences between the various organs within the organiser; then, are considered the chemical differences produced by induction; and finally, the problems of the development of morphological patterns are dealt with. In the last chapter (Chapter XII) the new concepts of 'fields' and 'levels of organisation' in developmental processes are discussed.

The book is highly stimulating and will prove of immense value to investigators in these fields. To the student, it summarises our knowledge, up-to-date, of organisers and of genes in relation to development.

S. G. M. R.

Grassland Investigations in Australia.

(Imperial Bureau of Pastures and Forage Crops, Aberystwyth, Wales, Herbage publication series, *Bulletin* No. 29), 1940. Pp. 106. Price 5sh.

In reviewing *Bulletin* No. 26 on "Research on Grassland: Forage Crops and the Conservation of Vegetation in the United States" (this *Journal*, 1940, 9, 192), attention was drawn to the immensity of the problem of improvement of the world's grasslands. It was pointed out that one *Bulletin* (No. 14) was issued in 1934 dealing with the work on grasslands in Australia. The publication of another *Bulletin* on Australian work, within the short interval of six years, points to the great importance that is given to this problem in that country. It shows one more thing: that an agricultural country like Australia has not only taken advantage of the recent developments but has gone further at a rapid pace to increase her livestock and dairy industries on which her prosperity depends. This is fully borne out by the increase in the imports of dairy products from Australia into India. It is a sad commentary on conditions in this country that under similar conditions and with a greater and faster increasing human and cattle population than that of Australia, no co-ordinated effort is yet made to encourage research on grasslands.

The great advance made in Australia in the improvement of its grasslands is all the more surprising when one bears in mind the fact that though it is larger by one-third than India, the net area of land available for pasture improvement is not more than half a million square miles or approximately one-sixth of the total area of Australia. The question that arises in one's mind is: How then has Australia attained its present position? Intensive research by about 15 institutes and commercial companies whose programmes are controlled by a Central Body—the Division of Plant Industry of the Council for Scientific and Industrial Research—has rendered possible this phenomenal progress.

Before undertaking pasture improvement, several surveys were carried out: (1) Soil survey by Prescott: this revealed that the podsol and red-brown earths were deficient in phosphate and nitrogen and emphasised the necessity for using phosphatic fertilizers and the cultivation of clover on these soils; (2) a survey of the density and type of

stock population of Australia; this served to mark out the regions requiring concentrated attention; (3) a survey of the types of grasslands in the northern semi-arid areas: this revealed the variations in grasses according to topographical, geographical and climatic conditions.

It may be mentioned here that one important feature of the work of the Division of Plant Industry relates to the irrigation of pastures. Nearly three quarter of a million acres of low carrying pastoral land

have been brought under intensive production as a result of irrigation.

The importance of a survey of the grasslands of India as suggested by the reviewer in 1938 (this *Journal*, 1938, 6, 600) will be readily appreciated. It is hoped that such a survey would be taken up in the near future as it would point the way for the proper utilization of about 25 per cent. of the cultivable waste lands of India.

F. R. BHARUCHA.

THE INVERTEBRATES

The Invertebrates: Protozoa through Ctenophora. By Libbie Henrietta Hyman. (McGraw-Hill Publishing Co., Ltd., London). Pp. xii + 726. Price 36sh.

A TEACHER in Zoology for advanced classes often wishes with a sigh that somebody in the English-speaking world got busy to give him a book in English comparable with the German treatises, Kükenthal-Krumbach's *Handbuch der Zoologie* and Bronn's *Klassen und Ordnungen des Tierreichs*. The obvious reason for the absence of such a book in English appears to be that generally we fight shy of a bulky book. But it also appears impossible to avoid the use of large and voluminous tomes in higher zoological teaching. All over the world fresh light is being thrown on old problems, new problems have come to being and generally, new concepts and ideas are constantly taking the place of older ones so that Zoological teaching would cease to be the useful thing it is, if it did not keep abreast with the times. Two very different kinds of scientists bend their energies to the production of apparently two different kinds of results. First, there is the researcher who is interested in tackling new problems. And there is the other kind of worker, who is constantly co-ordinating the results of the researcher and making them available in an easily assimilable form to the student. Generally, seeing how arduous the latter task is, but how less intellectual, many are drawn away from it. Its importance is nonetheless to be admitted, for the original investigations of the brilliant researcher would otherwise be lost in the oblivion of the musty tomes of Zoological journals if they were not

resurrected and reshaped to the needs of the student and placed within his reach.

It is staggering to think that it is nearly forty years since an exhaustive treatise on invertebrates appeared in English. It is sad to contemplate that during this long period Zoological teaching did not advance a step further, only because Zoological research was not correlated with Zoological teaching. In 1939 much of what was taught to the classes was based on what was found in Lankester's Treatise (which was never completed) and which was published 39 years ago. It was not because Zoological knowledge had not been furthered but only because this knowledge had not been brought within the reach of the Zoology teacher. This task, evidently a stupendous one, has just been undertaken by L. H. Hyman whose book under review forms the first part of the first volume of a series of three volumes planned for invertebrates.

We recently had an opportunity of reviewing another new book on invertebrates (Parker & Haswell's *Text Book of Zoology*, Vol. I, in *Current Science*, Sept. 1940) where the type method of treatment was employed and we felt that that method though advantageous to the beginner was full of defects where higher Zoological teaching was concerned. Dr. Hyman recognises them and adheres to the description of the phylum, emphasising the numerous morphological variations met with in it, a method which the reviewer feels is the most suitable for the needs of the advanced student. Likewise, elaborate descriptions of parasitic forms have been omitted. Parasites have recently come into their own,