Specific chemical substitutions are accompanied by definitely orientated changes of the crystal structure, indicating that particular chemical atoms occupy definitely localized positions in the chemical molecule, and therefore, as the molecule is the structural unit of the space-lattice, in the crystallographic structural unit.

This last principle, first definitely established by these researches, is regarded by the author as the most marked step in advance he has made.

Despite its highly specialized character the book is written in a style that is delightful and should surely be in the possession of every student of physical crystallography.

CHARLES PALACHE

Elements of Mineralogy, Crystallography and Blowpipe Analysis from a Practical Standpoint. By ALFRED J. MOSES, E.M., Ph.D., Professor of Mineralogy, Columbia University, and CHARLES L. PARSONS, B.S., Professor of Chemistry, New Hampshire College. Fourth edition, with 448 pages of text and 583 figures. Cloth, $6 \times 9\frac{1}{2}$. New York, D. Van Nostrand Company. 1909. $2.50 net.

The fourth edition of this well-known textbook differs in no essential matters from the previous edition. The statistics of production of minerals of economic value have been revised, the figures given being those for 1907 and in part 1908. The book gives an excellent presentation of the main facts of mineralogy and deserves to be, as it doubtless is, largely used by teachers of the subject.

It is unfortunate that advantage has not been taken of the opportunity offered by this new edition to improve some of the very poor illustrations that mar certain pages, as well as to eliminate several confusing errors in the crystallographic figures and lettering.

CHARLES PALACHE

Indian Insect Life. A manual of the insects of the plains (Tropical India). By H. MAXWELL-LEFROY, Entomologist, Imperial Department of Agriculture for India, and F. M. HOWLETT, 2d Entomologist, published under the authority of the Government of India, Agricultural Research Institute, Pusa. 4to, pp. 786, plates 84 (many colored), text figures 536. Calcutta and Simla, Thacker, Spink & Co.; W. Thacker & Co., 2 Creed Lane, London. 1909.

This attractive and well-illustrated volume gives, in convenient form, a summary account of the varied insect life of tropical India, in particular. This limitation necessarily precludes the discussion, except in an incidental manner, of the splendid fauna of the Himalayan region. There is much of interest in the work for the professional entomologist, while the amateur will find a large number of the more conspicuous or common insects noticed, accompanied in many instances by facts of great practical value.

The author finds it convenient to treat the varied forms under nine orders, namely, Aptera, Orthoptera, Neuroptera, Hymenoptera, Coleoptera, Lepidoptera, Thysanoptera, Diptera and Rhynchota (Hemiptera) following, in a large degree, the classification adopted by Sharp. The author's aim has been to produce a readable, convenient volume rather than to rigidly follow a classification with possible inconvenience to his readers. The introduction gives some observations upon the principles of classification, the relation of instinct and habit, the sources of information, and a discussion of the zoogeographical divisions of India, the faunal limits of the work thus being plainly defined. At the outset, insects are roughly classified according to food habits, they being divided, for example, into fruit insects, seed-eating insects, flower insects, etc. There is an illuminating chapter on insects and their relations to man, a much more vital topic in the tropics than in the temperate zone.

The space given to the discussion of the orders is necessarily unequal, owing to the fact that representatives of many Indian groups are comparatively unknown. A most attractive feature for the general student is found in the independent chapters or interludes dealing with such topics as: Where Insects Live, Cosmopolitan Insects, Deceptive Coloring, Relative Duration of Life, Insects and Flowers, How Insects Protect Themselves, etc., each of these summarizing from the en-

tire class. The discussion of the various orders or groups is frequently supplemented by brief observations on collecting methods, a most suggestive departure for the amateur. One of the strong features of the work is the extended discussion of the termites, a very important group in tropical countries. The chapter on galls (p. 167) might possibly have been amplified to advantage, since there are a large number of species known to produce deformities in plants. It is doubtful if the author's generalization to the effect that the parent gall insect stimulates the tissues to an abnormal growth, will be sustained by a reexamination of the facts. The paragraphs dealing with the fig insects are of special interest to Americans since the establishment of Blastophaga on the Pacific coast. Another statement open to question is the author's assertion (p. 191) to the effect that there is no real information as to how the two sexes find each other. We are under the impression that some experiments[1] demonstrate beyond all question that certain male insects find their mates through the highly developed, olfactory organs of the antennæ. The observations on the methods employed by Salius (p. 196) in capturing its prey, are particularly commendable. The plugging of rifle barrels with clay, by Sceliphron (p. 207) appears to be a novel record and the same is true of the wasp, *Icaria ferruginea* (p. 215), rendering houses uninhabitable. It is interesting to note that *Xylocopa* on the plains and *Bombus* in the hills, are the dominant flower-visiting insects, the latter being comparable to American conditions. The practicability of using one insect to fight another is strikingly illustrated by the natives employing certain species of true ants to check the depredations of white ants. Similarly, the author mentions the introduction in the Hawaiian Islands, of species of dung beetles, in the hopes that by quickly destroying the droppings of cattle they would abate the plague of horn flies. The chapter on insects as food is exceptionally full and certainly timely, in view of the high price of meat. There seems to be no reason, as observed by the author, why man should "refuse to consider a nice, clean, white termite queen or a dish of locusts" when he includes in his diet shrimps, whelks and even dried sea slugs. A practical suggestion for protecting wood from borers is found in the fact that general experience in India has demonstrated the value of soaking bamboo in water prior to using it for structural work, for the purpose of preventing attack by scolytids. This latter group, despite its importance in temperate regions, receives scant notice.

The discussion of the Lepidoptera is relatively full and very satisfactory as a whole, though it is difficult in a work of this character to preserve a satisfactory proportion between the various parts. The large and attractive Bombycidæ, such as *Actias, Antheræa* and *Attacus* come in for their full share of attention. In connection with these forms there is an excellent discussion of the production of silk by insects, together with notes on its composition and a technical description of the four commercial Indian silks. The Microlepidoptera of India appear to be relatively unknown for the most part, judging from the fact that the discussion of the entire series, composed of ten important families, occupies only thirty pages.

The account of the Diptera is very satisfactory as a whole. The Culicidæ, owing to recent discoveries as to the importance of this group, naturally receiving a somewhat extended notice, accompanied by an excellent schematic figure illustrating the life cycle of the malarial parasite. As in some other groups, the author gives a list of the species known to occur in India, following Theobald in this particular instance. It is interesting to note that only two species of Cecidomyiidæ, probably less than one per cent. of the native fauna, are recorded from India. The chapter on Indian blood-sucking insects gives a comprehensive notice of the species addicted to this practise and their economic relations. A considerable number of Rhynchota (Hemiptera) are briefly noticed, though comparatively few Aphididæ and Coccidæ, two groups of great importance in temperate regions, are

[1] 1900, Mayer, A. G., *Psyche*, 9: 15–20; 1906, Folsom, J. W., "Entomology," pp. 102–103.

discussed. Occasionally there appears to be a slight looseness in wording, as, for example, where the author states that members of the other orders are "deliberately mimicked" (p. 397). Presumably this is hardly what the author intends. We regret the absence of any note upon the value of birds as checks upon insect life. Members of this class rank as most important agents in controlling injurious insects in the temperate regions, and it would seem as though there should be some discussion of the relations existing between them and insect life, even in a work treating of tropical species. The book is completed by a table of contents and an index. We much prefer the general index to separate indices for plants and insects.

This volume with its large series of illustrations, most of them excellent and some surprisingly accurate, must prove of great service to Indian entomologists and of value to others desiring to make comparisons between faunæ of different regions. It is particularly serviceable to the economic entomologist, since the authors have given most of their attention to applied entomology, and many of the colored plates illustrate insect pests. They are to be congratulated upon having prepared a work which will do much to advance the knowledge of Indian entomology.

E. P. FELT

The Fauna of British India. Dermaptera. By MALCOLM BURR, D.Sc., M.A., F.E.S., F.L.S., F.Z.S. Published under the authority of the Secretary of State for India in Council. London, Taylor & Francis. 1910. 8vo, pp. xviii + 217. One colored and nine plain plates. Numerous figures in the text.

The last volume of "The Fauna of British India" to appear from the press is the monographic work upon the Dermaptera of India, Ceylon, and Burma, from the pen of Dr. Malcolm Burr. It is the first volume of the series which has been published under the supervision of Dr. A. E. Shipley, who upon the death of Lieutenant-Colonel C. T. Bingham, the successor of Dr. Blandford, assumed the editorship of this important series of publications.

The Dermaptera, or earwigs, form a compact and well-defined group of insects, which originally were included by Linnæus among the Coleoptera, by De Geer were raised to the rank of an order, and by many later writers have been treated as a family of the Orthoptera. Dr. Burr treats them as a distinct order, and rejecting the amendments of the name suggested by Agassiz and Burmeister, and the half a dozen substitutes proposed by other writers, employs the name originally applied to the group by De Geer and sanctioned by extensive use.

The species of Dermaptera found in the more temperate regions of the world are not numerous, only two occurring in Great Britain, but in the tropics they are much more abundant, and in the volume before us the author enumerates over one hundred and thirty species.

Comparatively very little has hitherto been written upon this interesting order and the bulk of Dr. Burr's work is, as is pointed out by Dr. Shipley, the result of original investigation.

After a brief preface the author gives us a Systematic List of Species. These fall into five families, containing in all fifty-one genera. There are one hundred and thirty-three species definitely allocated and two *incertæ sedis*. The three largest genera are *Diplatys* Serville, *Forficula* Linnæus and *Labia* Leach, containing, respectively, twelve, eleven and eight species. Many of the genera contain but a single species in the faunal region covered by the work.

The next section of the work is styled the introduction, and presents a full and very satisfactory account of the structure, development, habits, and geographical distribution of the Dermaptera. The bulk of the volume is devoted to a detailed description of the various families, subfamilies, genera, and species. There are three appendices, one giving directions for collecting and preserving Dermaptera, the second containing a list of the authors cited, and the third furnishing a glossary