most familiar, recognizing fully their limited applicability. When offered without pretense such data have great intrinsic interest. X. de Planhol, in discussing traditional craft industries in the Sahara and the Middle East, is notably successful in exciting the reader's interest and in presenting well-grounded speculations as to origins and projections of future trends. Still another approach is exemplified by T. N. Jewitt's discussion of desert soils. It is a fine short course on soil genesis and morphology; but it tells little about which soils occur where and to what areal extent.

It is unlikely that a superior group of experts, in terms of topical coverage or individual specialized knowledge, can be assembled to write on arid lands. This reader is forced to conclude, however, that if a satisfying geography of a systematically defined but vast and discontinuous region is to be written it will have to be by a single author. A counterpoint of broad generalization and specific example must recur throughout the topical treatments, but they can be introduced in accordance with some plan, not as a random set of authors' predilections.

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Ichneumon Flies

A Catalogue and Reclassification of the Neotropic Ichneumonidae. HENRY TOWNES and MARJORIE TOWNES. American Entomological Institute, Ann Arbor, Mich., 1966. 371 pp. $11. Memoirs of the American Entomological Institute, No. 8.

This catalog and reclassification is a major work on one of the most important families of insects. The Ichneumonidae are not only, in number both of species and of individuals, among the most abundant terrestrial invertebrates, but also are of great economic value because they parasitize other arthropods, finding hosts especially in the multitudinous and destructive insect orders Lepidoptera and Coleoptera. This family has long been one of the least-known groups of animals, and it is only within the last few decades, and primarily through the efforts of the Townes, that progress has been made toward a workable classification of this difficult complex. Even in studying the more familiar Nearctic and Palaearctic faunas, it has until recently been necessary to consult the type specimens in order to identify most ichneumonids. With regard to such less-known regions as the Neotropic, anyone who has considered those faunas will attest that before the work of Townes the modern student was little better off than his predecessors in the days of Linnaeus, because most literature on the Latin American Ichneumonidae has consisted only of the random and generally inadequate description of isolated species.

Faced with overwhelming taxonomic and nomenclatural chaos, the Townes were obliged to examine, in museums throughout the world, almost all extant types of Neotropic ichneumonids. Thus they made authoritative synonymies and assigned the described species to their proper genera in the practical and coherent system they have elaborated during a lifetime of work on the parasitic Hymenoptera. In this way 1771 valid species were cataloged for the Neotropic realm and a secure basis was established for all future research on this fauna. Such research will be voluminous, as the Townes estimate that 90 percent of the Neotropic species remain undescribed.

This memoir also contains Henry Townes's "A Key to the Genera of Ichneumonidae Recorded from the Neotropic Region." I have used this key on large collections of Ichneumonidae from Costa Rica, Peru, Chile, and Argentina. My experience has been that it permits relatively easy identification of the majority of Central and South American genera. There remains, however, a large unclassifiable residue. This is both because many genera are presently undescribed and because Townes bases his definitions of described genera only upon their published species and, consequently, in certain cases his diagnoses will not quite fit some of the numerous unnamed forms which almost all genera still contain. I point out also that the Townes are now completing a revisional study of the ichneumonid genera of the world which will contain keys, descriptions, and illustrations of each genus. This, when it appears, will supplement and in part supersede the more abbreviated treatment given here. Meanwhile, the present key opens to study an ichneumonid fauna which previously confounded even those fortunate to work at institutions with comprehensive libraries and collections.

In the words of the Townes: "With this catalogue all of the described ichneumonids of the world are now covered except for those in Europe, Asia Minor, and Africa. . . . There are plans for cataloguing the Ethiopian species, and certain European colleagues are working on the species of the western Palaearctic. With these, the taxonomy and nomenclature of the ichneumonids will have become more precise and orderly than in any other major group of animals. . . ."

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Spectroscopy Method

Second Quantization and Atomic Spectroscopy. G. H. Dieke Memorial Lectures. BRIAN R. JUDD. Johns Hopkins Press, Baltimore, 1967. 71 pp., illus. $5.95.

The lectures which this book contains were presented to commemorate the major contributions of G. H. Dieke to the development of spectroscopy, especially with respect to the configurations of *f*-shell electrons as found in the rare earths. The advantages of second quantization are shown as an amplification of the tensor calculus developed by Racah. Second quantization is introduced with simple illustrations of the commutation of creation and annihilation operators which can be worked out by the reader and from which he can gain a real grasp of what is going on. The correspondence between matrix elements and Feynman diagrams is shown in an understandable way, another of the mysteries of the modern approach being thus dispelled. Diagrams offer an elegant method of writing matrix elements and lead, as usual, to methods of counting to see that all the relevant interactions have been included. In fact the whole idea of applying second quantization to a subject understood in its customary form is an excellent way of introducing the new methods.

The book pulls together many of the results of atomic spectroscopy, bringing out the connections between them and thereby leading to an understanding of the underlying theory. It must be borne in mind that this is a series of lectures, the details of which will be more understandable the better one knows the conventional methods. It helps if the reader is familiar with Racah's work.