kovitz in using the name *Dama* (for generations always applied to distinctive Old World deer) for the American deer that everyone else calls *Odocoileus*. This compounds confusion and is an obvious case of a situation in which official sanction of the practically universal usage should be sought.

At just one or two points the authors have injected personal views, and the result is not always happy. The worst example is a passage, initialed "E.R.H.," which seeks to justify inclusion of gibbons and apes in the Hominidae. "E.R.H." argues that previous family separation was made "because of an assumed wide gap in intelligence," which is at best an inadequate statement of the case. He then expresses the astonishing opinion that "the gap in intelligence between some microgeographic races of man and some races of apes is . . . no wider than that between genera in some other families, for example, that between the two genera *Canis* and *Dusicyon* of the family Canidae." This is only one spot in a large work, but it is too egregious to be passed over in silence.

In view of some advertising for which the authors are not responsible, general students and nonprofessional readers should be advised that their purposes will almost certainly be better served by any of several less expensive books on North American mammals. For its own properly intended audience, the professional mammalogists, this publication truly deserves the frequently misused adjective *indispensable*. Henceforth no one can work at the technical level in this field without reference to Hall and Kelson.

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Fundamentals of Ecology. Eugene P. Odum. Saunders, Philadelphia, 1959. xviii + 546 pp. Illus. $7.50.

The popularity of this well-written text is attested to by this thoroughly revised and enlarged second edition, which appears less than six years after publication of the first edition. The "statement-explanation-example" treatment of principles has been retained.

The three parts, "Basic ecological principles and concepts," "The habitat approach," and "Applied ecology," have been enlarged by 74, 14, and 41 pages, respectively. There are 41 additional figures. Much of the text has been rewritten to incorporate more recent thinking.

As in the first edition, the ecosystem approach is emphasized. Most of the sections have been enlarged, in particular those on the ecosystem, energy relations, the biotic community, and phytosociology. Some new sections have been added, such as those on biogeochemical cycles and ecological indicators. The new chapter on radiation ecology is comprehensive, clear, and most important at this time.

I have a few—perhaps trivial—criticisms: The extensive use of exclamation points may be somewhat irritating to some readers; the useful term *stand* has apparently been omitted; the "sand sage grassland community" occurs more widely than is stated on page 27; and the section on phytosociology is very brief.

The science of ecology has been criticized, often unjustly, for cumbersome terminology. In this book the meaning of concepts is not lost in unnecessary, abstruse words. Commendable, also, is the procedure of precisely defining words that are used widely in a general sense to explain their meaning in a more specific ecological sense—for example, *community, competition,* and *population.*

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Physics of Meteor Flight in the Atmosphere. Ernst J. Opik. Interscience, New York, 1958. viii + 174 pp. Illus. Cloth, $3.85; paper, $1.95.

The title clearly defines the scope of this book. By treating only the physical phenomena associated with the flight of high-speed objects through the earth's upper atmosphere, the author has been able to present an exhaustive, theoretical treatise covering most of the possible combinations of circumstances involved in this problem. The main purpose of the physical theory of meteors is "to predict the variation of mass, velocity, luminosity, and ionization along the meteor trajectory."

In the first three chapters the author provides the necessary introductory material by (i) defining the problem, (ii) briefly describing the characteristics of those regions of the upper atmosphere in which meteoric phenomena take place, and (iii) classifying and describing meteoric particles and phenomena. The primary divisions in the theoretical problem are made on the basis of whether the molecular mean free path in the upper atmosphere is large or small as compared with the size of the meteoric particle, and whether the particle is solid iron, solid stone, or a "dustball" skeleton of cosmic dust.

In the next three chapters the details of energy transfer, particle dynamics, and ablation are presented. The large number of possible processes at work in the disintegration of the various meteoric particles is treated efficiently by the author, with the aid of a very large number of tables. In chapters 7 and 8, the formation of heat, light, and ionization in the coma near the particle and in its wake is described. The final chapter, "Some applications," treats briefly the "dustball" characteristics of certain sporadic and shower meteors.

Opik is well known for his extensive theoretical and experimental work on meteoric phenomena over the past 37 years. He writes with considerable authority on this subject. There is some tendency, however, to state as fact certain interpretations upon which there is no general agreement.

Meteoric phenomena not treated in this monograph include the astronomical characteristics of meteors and the physics and applications of radio reflections from meteor trails. In staying within the intended scope of this book, the author could not of course survey the extensive literature on radio detection of meteors. However, the results of some of these studies are applicable to his theoretical models—for example, the radio studies of trail diffusion, the size of the rapidly formed coma, particle deceleration, and turbulence. The author also treats only slightly the results of photographic studies of meteors and refers mainly to the earlier visual studies. Little or no specific mention is made of the application of meteoric phenomena to upper-atmosphere studies, radio communication, space-vehicle hazards, and ballistic vehicle reentry. However, the author has certainly been successful in his announced intention of providing a basis for further research on the physical theory of meteors.

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Science Students' Guide to the German Language. A. F. Cunningham. Oxford University Press, London, 1958. xiii + 186 pp. $2.

This guide, although well printed, carefully worked out, and with many individual excellences, will probably not be of much assistance to Americans who are impelled to study German. The chapters are not organized to provide an orderly pedagogical progression into the grammar. Chapter 4, "Declension of nouns," treats only the singular inflection (one and a half pages) and includes no exercises; chapter 7, "Verbs" (ten pages, including exercises), lists the forms of 117 strong verbs and devotes a half page to detailed discussion of the