and a few electron microphotographs) illustrate one species from each of 162 genera of bacteria. The illustrations are well chosen, a large proportion original. The reproductions are adequate.

Skerman devotes 64 pages to an original and stimulating discussion of methods. His media and techniques as outlined bridge the gap between those particularly adapted to the cultivation of the saprophytic and parasitic bacteria and the less known methods for cultivation and study of autotrophs. Much of the material is the product of Skerman's laboratory. The presentation should stimulate research on many groups of bacteria poorly known and little studied.

The final section is a thought-provoking "Guide to Study". He places the genera of bacteria in thirty-two groups, on the basis of certain common characters. Actually he presents the outline of a revised classification which should be carefully studied.

An adequate index is included. The typography is excellent.

The Skerman Guide should prove to be a significant aid in the orientation of the student in the taxonomy of the bacteria.

Staphylococcus pyogenes and its relation to disease. By Stephen D. Elek. 767 pp. E. and S. Livingstone Ltd., Edinburgh and London. 1959.

The author notes that the task of monographing a single species of pathogenic microorganism such as "Staphylococcus pyogenes" from the standpoint of medical bacteriology is particularly difficult because of frequent lack of appreciation on the part of workers in this field of the value of contributions from related fields. He says:

> "The biology of a pathogenic micro-organism is common ground to chemists, geneticists, veterinarians, physicians, pathologists and workers in the field of public health, as well as to others."

The volume is a mine of information growing out of its

wide survey of pertinent literature. The fifteen chapters include in more or less detail abstracts of the contents of the 4300 references listed in the bibliography. The author notes the absence in his bibliography of a great number of references to papers "dealing with classical aspects of disease caused by staphylococci." The indices are adequate. The volume introduces the student to the many scientific and economic aspects of this species.

Elek emphasizes that "It is comparatively easy to be dogmatic (and right) about matters which have become clarified through more recent work. Many aspects of staphylococci are, however, still sub judice and it was felt better to refrain from judgement and to present the facts and claims as they appear. The expression of an opinion on such matters is merely to expose a personal bias, due to one's own inadequate experience in the field." The author in general follows the directive he has laid down, with a very few exceptions.

The reader is surprised and puzzled to find in a monograph devoted to a single species of microorganism an apparent lack of understanding of the real meaning and significance of the type concept recognized by international agreement by all biologists working in the field of taxonomy; by botanists, zoologists and bacteriologists. There is no reference in the subject index to "type species" or "type strain". That there should be no effort to relate the organism under study to the type concept dominant in all fields of biology, except perhaps in medical bacteriology is regrettable.

Dr. Elek's summary relative to taxonomy and nomenclature will serve to illustrate. He states that "there appear to be strong feelings about the correct name that should be applied to the coagulase-positive species," and further "it is generally conceded that the most appropriate term is Staphylococcus pyogenes (Breed, 1956)". The Breed article referred to is primarily a discussion of whether Rosenbach intended Staphylococcus pyogenes aureus (a ternary combination) to designate a species S. pyogenes var. aureus or whether it should be regarded as an illegitimate species name, later corrected by Rosenbach to S. aureus. However, Dr. Breed as editor of the 1948 and 1957 editions of the Bergey's Manual of Determinative Bacteriology did not recognize Staphylococcus pyogenes as the

correct name of this species. In the 1957 edition the name recognized as correct is Staphylococcus aureus. Dr. Elek notes that Cowan maintains that under the rules of bacterial nomenclature the correct binomial is S. aureus. The author ignores the fact that these rules have been adapted from the older Botanical and Zoological Codes of Nomenclature, formulated by an International Committee on Bacteriological Nomenclature representing more than thirty countries and approved by unanimous vote by the plenary sessions of two International Microbiological Congresses. Cowan urged that the rules laid down in the international agreement be followed. Dr. Elek counters by a seemingly irrelevant statement: "It seems that the question is like that of the correctness of the oft-disputed frontiers of certain European countries; it largely depends on how far one is prepared to go back in history." Here is evident a wholly unnecessary confusion between the definitions of the taxon (the fixing of the circumscription of the species) and the name to be applied to it. The author apparently agrees "that the name should be applied to the coagulase-positive species." In a sense he has circumscribed the species whose name he seeks.

He suggests that going back in history to Rosenbach (1884) is appropriate, but proposes that an "even earlier view" be taken and that "Staphylococcus pyogenes Ogston be regarded as justifiable," an apparently reasonable appeal to priority. Ogston's contributions (1880, 1881, 1882, 1883) antedate that of Rosenbach (1884). The Bacteriological Code recognizes priorities in bacteriology as beginning with 1753, the starting point of modern binomial nomenclature. When one searches for Ogston's proposal of Staphylococcus pyogenes, he is surprised to find that in none of the Ogston papers cited did this author propose Staphylococcus as the scientific name of a genus, and nowhere did he propose or use the binary combination Staphylococcus pyogenes. Ogston should not be held responsible for a name he did not propose. One wonders at the meaning of Dr. Elek's statement that Staphylcoccus pyogenes "dispenses with the unimportant adjective and refers to the organism by the name its discoverer gave to it." Elek apparently misses the point. If Ogston had named the species described by him there probably would have been no question raised as to its correctness. Unfortunately many important bacteria have been given vernacular names only by the discoverer.

There are numerous examples of such lapses in medical bacteriology. The organism significant in actinobacillosis was described but not named by Lignières et al., the tubercle bacillus was not named by Koch.

The inadequate treatment of taxonomy by Elek is in marked contrast to his treatment of other segments of his monograph. The chapter on Problems of Taxonomy is followed by thirteen others in which there is every evidence of wide acquaintance with the literature and ability to bring together pertinent material. Two chapters are devoted to morphology and staining reactions. Antigenic structure and serological classification, bacteriophages and lytic phenomena, distribution of S. pyogenes in nature, the specific serum-coagulase, the relation of diffusible products to tissues, virulence and disease, immune phenomena, effects of physical environment, antiseptics, chemotherapeutic agents, antibiotics and clinical problems are all extensively discussed. The literature is abstracted with care and accuracy, the gaps in knowledge pointed out clearly. One is sometimes disappointed in the author's refusal in many cases to synthesize answers from the evidence presented.

The treatise is encyclopedic in scope. Illustrations (usually photographs) are adequate. This book is a "must" for reference in the bacteriological laboratory.