RECOGNITION OF SEROTYPES IN THE
FAMILY ENTEROBACTERIACEAE AS SPECIES

Preliminary Statement

Editorial Board¹
Judicial Commission

The following preliminary statement has been submitted to the Judicial Commission in conformity with the request of Dr. Kauffmann (1959a, 1959b).

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Dr. F. Kauffmann has proposed that each serotype recognized in the bacterial family Enterobacteriaceae be regarded as a species, that genera be defined as including a group of related species, and has requested an OPINION on these two proposals. This request apparently calls for an examination of the authority of the Judicial Commission to issue Opinions relating to problems of taxonomy (classification) as contrasted to problems of nomenclature.

The following background statement and draft proposal has been prepared by the Editorial Board of the Judicial Commission for submission to you as a member of the Judicial Commission for approval, disapproval, or emendation.

Draft Proposal for Opinion

Dr. F. Kauffmann has submitted the following request:

"The Judicial Commission is requested to give an Opinion on the following proposals:

1. The species in the Enterobacteriaceae are the established serotypes.
2. The genera are groups of related species."

In support of this proposal Dr. F. Kauffmann has published two papers (1959a, 1959b). He concludes that the established serotypes in the genus Salmonella constitute elementary species and should be recognized as species. He extends this concept to all serotypes recognized in the family Enterobacteriaceae.

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Is the Judicial Commission (under the directives of the International Committee on Bacteriological Nomenclature and of the International Association of Microbiological Societies) authorized to issue OPINIONS that do not relate directly and primarily to problems of nomenclature?

The functions of the Judicial Commission are detailed in "Chapter 4, Provisions for Exceptions to the Rules and for the Interpretation and Modification of Rules", International Code of Nomenclature of Bacteria and Viruses, 1958. pp. 131-134. The pertinent paragraph (No. (2)) gives as one of the Commission's functions

"(2) To consider all requests for Opinions relative to the interpretation of the Principles, Rules, Recommendations and Provisions of the International Code of Nomenclature of the Bacteria and Viruses where applications are doubtful."

The Bacteriological Code is concerned with nomenclature, with names given to the several ranks of taxa and with names given to the several taxa.

Principle 1 states:

"The essential points in nomenclature are

- (1) To aim at fixity of names;
- (2) To avoid or to reject the use of names which may cause error or ambiguity or throw science into confusion."

Principle 5 states:

"Nomenclature deals with:

- (1). The terms which denote the categories of taxa (taxonomic groups or units, such as species, genus, family) and the relative ranks of these categories.
- (2). The names which are applied to the individual taxa (taxonomic groups), such as Bacillus subtilis, Streptococcus, Spirillaceae, Spirochaetales."

Principle 9 states:

"Each order or taxon of lower rank with a given circumscription, position and rank can bear only one correct name, . . ."

There is no provision in the Code for determining the circumscription, description, position or rank of any or-

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ganism or group of organisms (i.e. of any taxon). Only after the taxon (species, genus, etc.) has been defined does nomenclature come into play. The nomenclator applies the rules of nomenclature to determine the correct name of each taxon when once its circumscription, description and rank have been fixed by an investigator. The circumscribing and defining of taxa is a problem of taxonomy, of classification, of study of relationships, not of nomenclature. There are no fixed rules governing the defining of taxa in biology. This does not mean that taxonomy must be chaotic. In practice there comes essential agreement among taxonomists who are specialists in the respective taxa. Determinative bacteriology has made great advances, but classification must remain flexible as new discoveries are made and techniques developed.

The International Committee on Bacteriological Nomenclature has as one of its functions:

"To authorize or appoint special subcommittees of experts to consider and report on the classification of special groups of microorganisms and other phases of their taxonomy, to sponsor one or more sessions of a Section on Taxonomy and Classification at each International Congress at which these reports of subcommittees may be presented and discussed; to receive and recommend for publication the reports of these subcommittees, and to refer to the Judicial Commission any special problems that have been raised or recommendations that have been made respecting nomenclature."

The International Committee stimulates discussion of taxonomy by the subcommittees appointed, the subcommittee reports may be accepted by the Committee, but there is no provision for approval of their taxonomic conclusions. All recommendations relative to Nomenclature are referred to the Judicial Commission.

The Subcommittees on Taxonomy are made up of individuals who are actively working on the circumscriptions and descriptions of the several taxonomic groups with which the subcommittee is concerned. The taxonomic recommendations of these subcommittees and of monographers of special groups are important and in general are widely accepted.

But by the very nature of the problems involved all such recommendations are subject to change with advancing knowledge and better techniques of study. There have not been, and probably cannot be, any set of rules adopted which can govern descriptions. Taxonomy, determination of taxon relationships, classification, cannot be static. Codes of nomenclature cannot govern. General acceptance of classifications is usually based upon consensus of opinion among experts.

The rules of nomenclature throughout biology recognize that names must be given to the various taxa as they are defined, the names to be applied should be as stable as is consistent with advancing knowledge of inter-taxon relationships. Throughout biology there is substantial agreement that nomenclatural rules are essential; such rules have international sponsorship in each of the biological disciplines.

The Editorial Board submits the following draft proposal of an OPINION to the members of the Judicial Commission for approval, rejection, or emendation.

Draft Opinion

1. The definition, circumscription and description of taxa (taxonomic groups), study of their relationships and their orderly systematic arrangement constitute in large part the content of taxonomy. The definitions of taxa must change with advancing knowledge. There are no rules which govern the definitions of the several taxa.

2. The name to be applied to a taxon when once it is defined is determined by application of rules set down in codes of nomenclature approved by international agreement in each of the biological disciplines.

3. The International Code of Nomenclature of Bacteria and Viruses recognizes clearly the distinction between describing the several bacterial taxa and determining their circumscriptions and arranging them on the basis of relationships on the one hand, and on the other determining the correct name for each taxon when once defined (the function of nomenclature). The International Codes provide rules for application of names to defined taxa, but do not lay down regulations for their definition. The Judicial Commission is empowered to formulate and issue OPINIONS relative to problems of nomenclature, but has no power

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to determine definitions and circumscriptions of individual taxa.

4. Dr. Kauffmann proposes that the established serotypes in the family Enterobacteriaceae be recognized as species. Essentially the request is that the description and circumscription of all species be fixed in the family Enterobacteriaceae.

5. Dr. Kauffmann's first request has to do with taxonomy, the criteria for species characterization in the Enterobacteriaceae, and not with nomenclature. The Judicial Commission is authorized to issue opinions only on nomenclatural problems, and therefore has no jurisdiction.

6. The second request of Dr. Kauffmann is that in the family Enterobacteriaceae there be approval of the statement "The genera are groups of related species."

The Judicial Commission agrees that not only in the family Enterobacteriaceae but throughout bacteriology the term genus may be defined as a group of related species (in a monotypic genus there may be a single species). Principle 7 of the Bacteriological Code reads in part:

"The terms which denote the rank of taxonomic groups (taxa) are defined as follows:

(a) Every individual is treated as belonging to a number of categories of consecutive rank and consecutively subordinate; of these the species is the basic one. The principal categories in ascending sequence are species, genus, family, order, class, division."

Inasmuch as the second request of Dr. Kauffmann conforms to Principle 7 and is consonant with the use of the term "genus" throughout the Bacteriological Code, the Judicial Commission concludes that an official OPINION is not required.

Addendum

In a personal letter to the chairman, Dr. Kauffmann writes as follows:

"I would agree with the Draft Opinion if a sentence is added that this problem is transferred to the Enterobacteriaceae Subcommittee which should make a proposal on the taxonomy of Enterobacteriaceae, especially on the species-definition."

In accordance with Dr. Kauffmann's request, the Judicial

Commission will be asked to vote upon Dr. Kauffmann's proposal that the problem be referred for recommendation to the Subcommittee on Enterobacteriaceae.

References

- Kauffmann, F. 1959a. On the Principles and Nomenclature of Enterobacteriaceae. Internat. Bull. Bact. Nomen. and Taxon. 9:1-6.
- _____. 1959b. Definition of genera and species of Enterobacteriaceae. id, 9:7-8.