REPORT OF THE SUBCOMMITTEE ON
NUMERICAL TAXONOMY
(1962 - 1966)

The Subcommittee on Numerical Taxonomy met in Moscow in July, 1966. The following report, prepared for submission to the ICNB, was accepted and forwarded.

The activities of the Numerical Taxonomy Subcommittee since its inception at the VIIIth Congress in Montreal fall under five headings: (1) a list of type and reference strains, (2) the choice of type and reference strains, (3) standardization of testing methods, (4) list of computer programs for classification, and (5) Conference on Microbial Classification.

1. List of type and reference strains

The Subcommittee has considered the difficulties experienced by workers in choosing strains for numerical taxonomy work. It is often difficult to determine whether type strains exist and whether typical or authentic strains are available in culture collections.

A list of type and reference strains of bacteria has been prepared on behalf of the Subcommittee and has been published in the International Journal of Systematic Bacteriology (Sneath and Skerman 1966). It is hoped that those working both with numerical and other techniques will use where possible the appropriate listed strains. This will assist in the orderly development of taxonomy by providing reference points for taxa. It will also help workers to have confidence in the identity of these taxa when taxonomic revisions are being undertaken. Although primarily intended as reference strains for numerical taxonomy, they should be useful to workers in all fields of systematic bacteriology.

For many taxa suitable strains are not available, so that emendations and additions will be welcomed. The list aims to cover the species in the 7th edition of Bergey's Manual of Determinative Bacteriology, together with new species described more recently. Certain genera in which many minor varieties have been given specific status have been listed more selectively, with the aim of representing the main centers of variation. The list does not, of course, prejudice the powers of International Subcommittees to propose such neotypes as they see fit.

2. Choice of type and reference strains

The Subcommittee has considered methods for the selection of type and reference strains. They recommend that numerical methods for such selections should be given careful consideration and note that proposals on these have been made by Silvestri *et al.* (1962) and Liston *et al.* (1963). The problem falls into two sections:

The first is the selection of a type or reference strain where none exists, where it is, in general, desirable to represent the centre of variation of the species. This means choosing a typical strain, which has in the past often been largely an intuitive process. The strain nearest the centre of the cluster representing the species (the centrotypic of Silvestri *et al.*) or the strain nearest the Median Organism of Liston *et al.* would usually be acceptable for this purpose.

The second is the selection of reference strains that are not properly nomenclatural types in the accepted sense, but which are intended to give an idea of the range of variation that an author considers should be included in the taxon under study. This would assist in the circumscription of a taxon by numerical methods. It appears that statistical methods will need developing for this purpose (see however Glyenberg 1965), and no recommendations are at present made. However, the Subcommittee feels that this will repay further effort. In addition, it is felt that a special terminology will be needed to distinguish clearly these strains from type strains.

3. Standardization of testing methods

A very large number of tests used in systematic bacteriology has been collected by Prof. V. B. D. Skerman as a step toward the efficient standardization of testing methods for taxonomists. The Subcommittee feels that substantial progress can be made in this in the near future. It is hoped that the document, Abstracts on Microbiological Methods, will be published shortly. It should prove of the greatest assistance to systematic bacteriologists.

4. List of computer programs for classification.

A list of computer programs for numerical methods of classification has been compiled by the Medical Research Council Microbial Systematics Research Unit (Leicester University, Leicester, England). This is available on request, but since it covers methods that are chiefly of use in higher organisms, it is hoped to publish a short extract of

those programs most useful in bacterial systematics. It is hoped that the full list will be included in a forthcoming issue of the newsletter Taxometrics.

5. Conference on Microbial Classification

The Subcommittee sponsored jointly with the Canadian Committee on Culture Collections (with generous support from the U.S. National Science Foundation and the American Society for Microbiology) a Conference on Microbial Classification at Laval University, Quebec City, Canada, in the fall of 1964. This was attended by 48 persons representing nine countries, and covered with success a wide field. Although the proceedings were informal, a report was published in *Nature* (1964, 204:425-426). The Conference was a great success, and the Numerical Taxonomy Subcommittee is looking into the possibilities of a second such meeting in the future.

6. Membership of the Subcommittee

The membership of the Committee at the time of the Moscow Congress as contained in the report was:

Skerman, Prof. V. B. D. (Chairman), Microbiology Dept., University of Queensland, Herston, Brisbane, Australia
Silvestri, Prof. L. C. (joint Secretary), Institute of Molecular Biology, University of Oregon, Eugene, Oregon, U.S.A.

Sneath, Dr. P. H. A. (joint Secretary), MRC Microbial Systematics Research Unit, Leicester University, Leicester, England

Clark, Dr. W. A., American Type Culture Collection, 12301 Parklawn Drive, Rockville, Maryland, U.S.A.

Colwell, Prof. Rita R., Dept. of Biology, Georgetown University, Washington, D. C., U.S.A.

Lysenko, Dr. O., Entomologický Ústav Čsav., Pathologie Hymzu, Na Cvicisti 2, Prague 6, Czechoslovakia

Prof. Skerman has agreed to continue as Chairman and Prof. Silvestri and Dr. Sneath as joint Secretaries pro tem, pending replacement of Dr. Sneath, who has been appointed as Chairman of the Judicial Commission of the International Committee on Nomenclature of Bacteria.

Following discussions at the Moscow meeting the Subcommittee has agreed:

1. that a subgroup should be formed to initiate proposals for standardisation in molecular biology (Prof. J. De Ley, Institute of Microbiology, State University of Ghent, Ghent, Belgium, has accepted appointment to the membership of the Subcommittee, and will take charge of this work).
2. that Prof. Skerman should initiate proposals on standardization of methods in association with the other taxonomic subcommittees, and
3. that a second conference on microbial classification be sponsored and that the Chairman should communicate with Dr. Martinec with the view of joint sponsorship of the conference by the Subcommittee on Numerical Taxonomy and the Czechoslovak Collections of Microorganisms to be held in Brno in September, 1968.

This proposal was discussed with Dr. Martinec, and it was suggested that the meeting in Brno be for 2 days, with four half-day sessions on Numerical Taxonomy, Molecular Biology, Problems of Different Taxonomic Groups, and Structure, respectively. The meetings will have one or two speakers to introduce each session, followed by discussion, any other submitted papers being taken as read. It is proposed to limit attendance to approximately 50.

Dr. Lysenko undertook to discuss the preliminary arrangements with Prof. Martinec.

The Subcommittee considered the list of strains published by Sneath and Skerman (1966) and agreed that corrections should be invited and published as soon as possible.

References

- Gyllenberg, H.G. 1965. A model for computer identification of micro-organisms, *J. gen. Microbiol.* 39:401-405.
- Liston, J., W. Weibe and R.R. Colwell. 1963. Quantitative approach to the study of bacterial species. *J. Bacteriol.* 85:1061-1070.
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- Silvestri, L., M. Turri, L.R. Hill and E. Gilardi. 1962. A quantitative approach to the systematics of actinomycetes based on overall similarity. *Symposia Soc. Gen. Microbiol.* 12:333-360.
- Sneath, P.H.A. and V.B.D. Skerman. 1966. A list of type and reference strains of bacteria. *Int. J. Syst. Bacteriol.* 16:1-133.

L.G. Silvestri - P.H.A. Sneath
Joint Secretaries