Computer-Aided Determinative Bacteriology

A Symposium held September 3, 1973 in Jerusalem, Israel during the
1st International Congress of Bacteriology

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As the capacity to characterize more and more bacterial isolates grows, so grows the motivation to do so for medical, environmental, ecological, taxonomic, and other reasons. However, the ability to manually process and communicate the data cannot increase accordingly. Hence, as in many other fields, bacteriologists are turning to the digital computer for help in the mechanics of manipulating their data.

In the process of adapting computer technology to the task of identifying bacteria, a reevaluation of the very meaning of the term "identification" is taking place. This is because it is necessary to define both the process and logic behind the concept of identification before one can codify a satisfactory procedure.

Although I recognize that many bacteriologists are not particularly adept in the areas of mathematics, statistics, or computer technology, I would still commend these articles to their reading. If necessary, skip the mathematics and look for the concepts. The article by Hill gives an overview of numerical methods available and constraints in implementation for identifying bacteria. Lapage provides an example of a working system for computer-aided bacterial identification. Sneath has chosen a normally neglected but critical area to discuss—the effect of test error upon the accuracy of identification. In the paper by Krichevsky and Norton there is consideration of the state of the art of handling the large masses of information which are being developed in determinative bacteriology.

The reader will notice some overlap in subject matter (especially in introductory material) in various papers. This redundancy was left in to present some of the concepts from differing perspectives. The application of numerical methods to bacterial identification is new enough so that there is no "traditional" approach.