

Numerical taxonomy. The principles and practice of numerical classification.

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**Numerical taxonomy. The principles and practice of numerical classification.**

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Book : [Numerical taxonomy. The principles and practice of numerical classification](#)  
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Abstract : On a chart showing the development of numerical taxonomy in the first chapter of this book the authors characterize 1963 as the year of publication of "Principles of Numerical Taxonomy" [HcA 35, 280]. This was indeed a pioneer work on the subject, and the present volume is an extensively revised, updated and expanded version of it, sufficient to justify a change in title and in the ordination of the

names. "Principles" have disappeared from the main title but are still prominent in the development. This is surely right, since most of the "practices" are carried out on a computer. The authors insist on a phenetic rather than a phyletic or cladistic taxonomy, and maintain the superiority of a polythetic approach to classification in which all attributes of the taxonomic units should be incorporated simultaneously in a single scheme rather than one at a time. Perhaps more controversial is the principle that all attributes should be equally weighted when used for classification. However, clear distinctions should be drawn. Firstly, weighting is correctly distinguished from standardization of attributes to unit range or variance, which is often desirable. The word "classification" is restricted to the formation of taxa and does not include identification, the assignment of taxonomic units to predefined taxa. Identification and discrimination techniques are the subject of a completely new chapter, in which all methods of attributes, as in discriminant analysis, and monothetic methods, especially keys, play an important part. Numerical taxonomy has developed so greatly in the last ten years that the book is now necessarily more of a reference work than it was. There is an extensive bibliography, and two very useful appendices of references to applications and techniques respectively. The chapters on phylogeny and phenetics are new, and non-biological applications of numerical taxonomy are covered in a chapter, though hardly long enough to cover the increasing use of clustering and discrimination techniques in a wide variety of applications. The central part of the book consists of chapters four and five. In chapter four, the whole range of similarity and distance coefficients is surveyed and compared. This is in general well-presented, and the practice of converting all attributes into two-state characters seems to be emphasized in view of methods now available for combining quantitative, multi-state characters into a single coefficient. Chapter five describes cluster analysis and ordination techniques, again as a survey of methods in use. The different methods are informatively presented, and the distinction between ordination and clustering kept clear. The traditional nomenclature for taxonomic rank is replaced in favour of the "phenon", to which is attached a quantitative measure of similarity. Experimental scientists may well be daunted by a book which expects of the reader a knowledge of statistics and of elementary set and graph theory, as well as of "matrix algebra", especially when the authors' own presentation of the mathematical concepts is occasionally careless. (The matrix algebra, in fact, plays only a minor role and is passed over fairly easily). However, numerical taxonomy is here to stay, and all taxonomists will find the book a valuable guide to the state of the subject today.

MARTIN.

ADDITIONAL ABSTRACT:

In this new, re-organized edition [RAM 43, 3114] the authors present an up-to-date theoretical basis for numerical taxonomy and discuss its aims, procedures and applications, both biological and non-biological. There is an extensive appendix listing publications on applications.

systematics, a 60 pp. bibliography and author and subject indexes.<new para>ADDITIONAL ABSTRACT:<new para>This book replaces Principles of Numerical Taxonomy, published by the same authors in 1963, and deals also with applications in biology and in other fields. There is an extensive bibliography and an appendix listing biological taxa (including ca. 10 tree genera) to which numerical taxonomic methods have been applied.

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