correspondence analysis (generalization to more than two variables, analysis of questionnaires and non-responses) 6. CA of ratings and perferences (bipolar data, doubling strategy) 7. Use of CA in discriminant analysis, classification, regression, and cluster analysis (partitioning rows and columns of a contingency table, classification by majority rules, WARD-type hierarchical clustering using CA) 8. Special topics (stability, bootstrapping, sampling distributions; Petrie matrix, horseshoe effect; constraints; missing data; symmetric matrices; large data sets) 9. Applications of CA (detailed analysis of 12 real case data sets from genetics, linguistics, ecology, palaeontology, psychology, medicine etc.) App. A. Singular value decomposition. App. B. Aspects of computation (e.g. a GENSTAT program).

The book is to be highly recommended as an introduction and a reference work on CA for applied researchers from all fields as well as for mathematicians and data analysists or statisticians.

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BURGER, H.G.: **The Wordtree: A Transitive Cladistic for Solving Physical and Social Problems.** Merriam, KS: Henry G. Burger 1984. 380 p., Hardcover. $ 149,–

1. Classificationists may well discover, in time, that Henry Burger's *The Wordtree* is an invaluable auxiliary tool to the conventional dictionary, and a systematic book of synonyms, like *Roget's Thesaurus*. Without replacing them, it adds greatly to their utility by means of a new paradigm for lexical and classificatory analysis.

Like a conventional dictionary, *The Wordtree* offers definitions of words – not of all words found in English, but surely all of its transitive verbs. Like the *Thesaurus*, it arranges its entries in a classified hierarchy, followed by an alphabetical index. However, the taxonomy proceeds by levels of abstraction/concreteness rather than by subject.

The focus on verbs reflects a *dynamic* orientation, by contrast with the *static* point of view found in nouns. According to Burger, the underlying philosophy of his work "views the world as a series of environment-affecting processes of increasing complexity – a growing tree of evolutionairly-adaptive branches." (p. 14)

Classificationists used to hierarchic schemes that proceed from the top down will have to accustom themselves to a "tree" metaphor that goes from the bottom up, from a "trunk" whose most abstract term is to CREATE, to proliferating branches that increase in complexity, number and concreteness (specificity) as they go upwards and outwards, reaching an incredible total of some 24,600 transitives, 30% more than may be found in the vast Oxford English Dictionary, according to Burger. (p. 12)

2. The trunk starts, in the hierarchical records, with the antonymic concepts of CREATE/UNCREATE – whenever a term can be found for it, each verb is paired with its antonym. The 42 "actemes" – Burger's shorthand for transitive verbs – identified as "primitives" after (above) CREATE include, for example, to: RELATE, NEED, CHANGE, AGREE, FIT, EQUAL, ORDER, FREE, MAXIMIZE, SINGULARIZE, POWER, GATHER, CENTER, MATERIALIZE, UP, DOWN, IN, OUT, TEMPORIZE, INTEGRATE, PARTNER, EMOTIONALIZE.

At the next higher level more specific actemes are identified in numbered categories that build on the 42 primary types of creating. Thus, subsumed under CHANGE we find that to AFFECT means to change (genus) and to relate (specifica). Under to EQUAL we discover that to EXCHANGE means to equal and to change; to MATCH means to equal and to fit.

After presenting each of the 2nd level actemes in a numbered series, using higher numbers for their subactemes, a third series begins headed by each of these narrower terms which, then, generate a fourth series at yet a higher level. The notation system does not identify the successive levels of abstraction. However, the sequential numbering of all actemes does facilitate reference to individual items.

Since all the defining characteristics have serial numbers that are lower than the number assigned to a definiendum, the classification scheme is truly faceted; previously identified concepts are used (entailed) in subsequent definientia. Put differently, each characteristic found in the continuous series of hierarchically numbered actemes (what Burger calls a "cladistic" or "evolutionary branchers") is defined before it is used to help define another process – i.e. every new concept is defined in serial order before it is entailed in another definition. By this means the circularity so often found in dictionary definitions – according to Burger's claims (p. 21–C25) – has been avoided.

Systematic attention to hierarchic levels also enables Burger to reduce the definition of every acteme to two characteristics that are more general concepts – i.e. the genus proximum and the differentia specifica of Aristotle's analytic definitions. However, for modern readers, Burger refers to this structure as composed of "the just-simpler procedure" and an "addendum".

3. The alphabetical index contains all the actemes, plus their two-term definitions and serial numbers, thereby enabling users to locate the point in the main structure of hierarchic records where the sub-actemes of each acteme are numbered and characterized.

The index, incidentally, contains more than verbs: it includes also nouns and other word-forms, in alphabetic order, when they can be linked to verbs. For example, cause/effect symbols indicate how verbs may be related to nouns: thus after CLOTHESPIN one finds FASTEN as a "cause" (i.e. one "fastens" a clothespin). After CLIENT one finds to PATRONIZE as an "effect" (i.e. a client "patronizes" a patron). Preventive relations are also indicated: thus after MANEUVERING one finds that to prevent it one may use FINESSE. An "instrumental" (permissive) relation also suggests one way to accomplish a result: e.g. after REACHING one finds that to SEND or to TRANSMIT *may* accomplish this effect.

4. To guide users Burger has prepared an extensive – the equivalent of about 240 ordinary pages – explanation of the theory, structure, history, and methods involved in his massive work. He warns his readers, for example, to start any inquiry with the alphabethical index because it is easier to interpret than the hierarchic text which should, of course, be subsequently consulted.

This advice is apt for classificationists who will find that the index for *The Wordtree* bears more than a casual resemblence to the structure of an indexing language, as presented in the alphabetical portion of any thesaurus. Just as each entry in such a thesaurus identifies its broader (BT), narrower (NT) and related (RT) terms, so does each *Wordtree* index entry contain its defining (broader), specifying (narrower), and overlapping (related) terms. In addition the *Wordtree* entry gives us a fourth category specifying objects of application (predications). This structure may be illustrated by the term, CLASSIFY.

The index term, CLASSIFY, first lists its two broader defining terms: to CLASS and to GROUP. (The genera of these terms may, in turn, be found at their index entries – for example, CLASS is defined as to RELATE and to FIT).

The narrow terms for CLASSIFY are found in separate sub-entries starting with their specifying characteristics: thus to classify (c.) and to clerk is to BOOKKEEP; to c. and repeat, to RECLASSIFY; to c. and store, to PIGEONHOLE; to c. and systematize, to TAXONOMIZE; to c. and tax, to IMPOST, to c. and tribalize, to TRIBE; to c. and wrong, to MISCLASSIFY.

As for related or overlapping terms, the index entry for CLASSIFY clusters, in a single sub-entry, the following words: EMICIZE, SOMATOTYPE, and TABOO.

The fourth (additional) category may be especially interesting to classificationists – they constitute the first set of sub-entries in each index entry. The entry for CLASSIFY contains 12 application objects (predications) including the following: to classify a coded object (OB) is to CODIFY; to c. a conceptualized OB is to CATEGORIZE; a dimensioned OB, to MORPHOLOGIZE; a marked OB, to TICKET; a numbered OB, to CUTTER(!); a somatotyped OB, to TYPECAST.

Terms that are co-ordinate with "classify" can be found by looking up the index entries for the broader (defining) terms. The genus proximum of "classify," as noted above, is listed as CLASS. At the entry for CLASS, therefore, we find the following co-ordinate terms. Those based on their predications are: to class a grouped OB is to CLASSIFY; an analyzed OB, TYPEREAD; an attributed OB, PREDICATE; a bred OB, GENDER, a denominated OB, DENOMINATIONALIZE; a rubricked OB, RUBRICATE; a specified OB, SPECIFICATE; and a yomaned OB, RACETAUNT.

The more specific (narrower) varieties of classing are given as: TYPING (to c. and mark); GRADING (to c. and order); DISTINGUISHING (to c. and separate), SPECIALIZING (to c. and singularize); MISCLASS (to c. and wrong). The actemes that overlap (RT) with "class" are listed as PECULIARIZE, SECTARIANIZE, and SOCIOLOGIZE.

5. Going to the hierarchic *record* for CLASSIFY we find a somewhat different array of sub-actemes: MISCLASSIFY, COGNIZE/NIXIE, MORPHOLOGIZE, IMPOST, and CONCHOLOGIZE. We do find COGNIZE in both locations, but it is handled differently in each. As noted above, in the index *entry* COGNIZE is defined as "to classify a particularized object," but in the hierarchic record for this term it is defined as "to classify and to particularize." The antonym of COGNIZE is listed as to NIXIE (to misclassify and to particularize) in the record, but it is not given in the entry.

In the hierarchic record we often find nouns that correspond to the recorded acteme: e.g. for COGNIZE we find COGNITION and DURCHARBEITUNG. However, this information is not always given: for example, the record for CLASSIFY (under CLASS), fails to list any corresponding nouns.

The records also may identify verbs that are near-synonyms, but less precise, than the recorded acteme: for example, in place of COGNIZE, we learn, the following terms are sometimes (carelessly) used as synonyms: APPRECIATE, ENCODE CULTURALLY, INTELLECTUALIZE, and REMEMBER. The records often add cause/effect relations not given in the index entries for the same terms. For example, the record for COGNIZE gives, among its consequences, CONSCIOUNESS, INSIGHT, and SCHEME – and as a cause, EIDOS. But this data will not be found in the index entry for COGNIZE.

6. Users will have to master a variety of technical obstacles. To accomodate so vast a quantity of information within the compass of less that 400 pages, miniaturization of the computer print-out has been used – placing the contents of four ordinary pages on one. It would take a volume of 1,755 pages in ordinary type to cover the same quantity of information. Yet, Burger assures us, readers will find the type no more difficult to read than that found in unabridged dictionaries.

To save space within entries and records several arbitrary signs and abbreviations are used – they are conveniently summarized on the insides of the covers, but they should be memorized by anyone planning to consult *The Wordtree* frequently.

7. A more formidable barrier for many users arises from Burger's appetite for neologisms found in what he calls the "technolect," i.e. the technical vocabulary of a great many fields. Every such word is carefully attributed to a printed source, with enough (though abbreviated) bibliographic information to guide users to it. To illustrate, we may mention the fact that Burger lists the verb for classifying a collected OB as CONCHOLOGIZE, and for classing an analyzed OB as TYPEREAD. To divide and understand is to RAUD (according to an essay in the *Psychological Quarterly*), and to touch and misdirect is to RAUST (according to a work by D.W. Mauer).

Ultimately, I believe, we must thank Burger for his comprehensiveness. It will help us recognize and name distinctions that are useful but elusive. Nevertheless, readers will do well to make a clear distinction in their work between lexiconized words (i.e. those reported in ordinary dictionaries) and the many unlexiconized terms quoted by Burger. It is especially important to know the prior context of usage for any of the unlexiconized words one chooses to employ.

Linguists use the word "technolect" in a sense that differs somewhat from Burger's – it refers to a language variety developed by specialists for their own professional communications. The correct use and interpretation of technical terms found in such a technolect requires one to have a good understanding of their contextual basis. The definitions given in *The Wordtree* cannot supply such an understanding, but the bibliographic

clues so generously provided by Burger should at least give users a head start.

To use a technical term that originated in one technolect in quite a different field of application always risks misunderstanding and possible ridicule. However, when carefully used, such adaptions can be quite stimulating or illuminating. Consider, for example, the implications of extending the use of Cutter numbers to generate an acteme, CUTTER, for the process of classifying any numbered object. Librarians will readily recognize this term as applied to the production of a call number for a library book. Can it be applied to the other contexts? Let us suppose that a mail-order house wants to identify precisely every kind of item offered for sale in a catalog. Each commodity type is given a serial number, but one could "cutter" the additional refinements to specify color or grade. However, anyone proposing such an extension of the term would want to have a good knowledge of its original context of use, and be able to explain the extension to good natured critics.

9. A more difficult problem, I believe, arises from Burger's handling of the problem of polysemy. He uses each word in one and only one sense, while admitting that it may have additional meanings. However, he seeks to restrict his usage of each word to a basic or root meaning, and to find more precise synonyms for the additional senses of each polyseme. It strikes me that in the usage of many readers it may be just such an additional meaning of a word that seems to be its "basic" sense. The suggested synonyms may then seem to be inappropriate or unnecessary. I cannot offer a solution to this problem, but I suspect it will become a real stumbling block for some users.

10. Burger asks reviewers to compare *The Wordtree* with the first editions of ordinary dictionaries or the original version of *Roget's Thesaurus*. In its first edition it cannot meet the technical standards that can be achieved years later, after many revisions and a flood of user reactions. We must remember also that this work is not the product of a large establishment – it reflects, instead, the results of 27 years of hard work by a single scholar, an anthropologist/engineer/lexicographer. Although he received contributions and suggestions from a host of collaborators, he takes personal responsibility for the final structure and content of his book, of which he is also the publisher.

In defense of his decision not to seek out an established publisher he argues that since his approach represents a great intellectual discovery and a new paradigm, it would not be appreciated by publishers who oriented to conventional entrepreneurship and unlikely to take the large risks such a venture poses. Taking these points into consideration, it would indeed be ungenerous to point out any of the numerous petty flaws that can be found in the work, or to make fun of the strange sounding neologisms peppered throughout.

11. However, as a concluding observation I would like to quibble with Burger's claim that "The language already contains a word for every idea found useful," (p. 14) and that accordingly users of *The Wordtree* will be able to find a word for whatever process they have in mind.

The truth is, I think, that we may often come up with concepts (processes) that are, indeed, useful in our work but have not yet been named. This has, of course, always been true and it has led to the continuous proliferation of new words to name new ideas. This process has scarceley stopped and, indeed, is probably accelerating as new inventions and discoveries multiply. Were it not so, the number of neologisms in Burger's collection would not be so great.

But Burger leaves untouched the many new terms that will, in coming years, be required to make newly appreciated and useful distinctions. To facilitate the introduction and evaluation of such innovations we shall need another generation of reference works. Such works will also be based on a new paradigm, one that starts with defined concepts and opens the door, not just to the identification of established terms for known concepts, but also for the coining of terms suitable for the naming of new concepts. By maintaining a continuously active computerized data base, the opportunity for openness to innovation will also be assured.

However, to say this is not to criticize what Burger has done, for his imaginative and energetic contributions are immense – I only mean to suggest that the last word has not yet been written, and we still have a great deal of work to do.

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STEVENSON, Gordon; STEVENSON, Sally: **Reference Services** and **Technical Services: Interactions in Library Practice**. New York, NY: The Haworth Press 1984. 176 p., $ 24,– (hardbound); ISBN 0-86656-174-9. Also published as The Reference Librarian, No. 9

There are two sentences in this collection of papers that, while they do not summarize the whole collection, at least light the path that most of its papers attempt to travel:

> ... library staff members have tended to look at their professional tasks as bifurcated, with the builders of the catalog and the inventory keepers on one side and the middlemen or customer representatives on the other side. The online catalog is changing all that because this tool needs to be fashioned by a collaborative effort. (53)

Pauline Atherton Cochrane's paper (from which I quote) is not consciously synoptic, nor is her point without opposition in other papers. But the overwhelming impression from the volume as a whole is that

(a) it is counterproductive for these two essential functions of every library to be organized and staffed so as to make what I call the "picket fence mentality" all too easy;

(b) the librarians in the two 'sectors' must at the very least get to know the fundamentals of the other sector's ethos in order for users' needs to be effectively satisfied;

(c) the presence of massive changes (decline of funding / the dislocations almost inevitable with the adoption of a new cataloging code / automatization, yea even