much welcome guidance for thesaurus specialists wanting to take advantage of contemporary technology.

Section 7 (on screen display) recommends that the needs of each anticipated class of users, defined as thesaurus maintainers, expert users, and end-users, be taken into account in the design of displays. In suggesting ways of presenting informaiton on the screen, it is the capabilities of the new medium that are emphasized: the types of displays (alphabetical, permuted, hierarchical, graphic) remain similar to those displays traditionally recommended for printed editions. Differences between screen and printed displays are noted. In a screen display, for example, a more generous entry vocabulary might be needed (6.1.3). A few examples of screen displays are provided in Appendix A, following numerous examples of traditional displays in existing printed thesauri.

Section 10 offers recommendations for features of thesaurus management software to be used by thesaurus maintainers (typography, sorting, display, searching, editing, error checking, automated cross-referencing, etc.) Although the section brings the standard more in touch with the real needs of contemporary thesaurus designers, it reads like a wish list, it remains very general and one wonders how useful it can really be for software designers. It should be noted in passing that the possibility of using definitions as well as scope notes in a thesaurus, which is not at all evoked in section 3 (Scope, form and choice of descriptors), is presented as a valid option and even as a requirement for thesaurus management systems in section 10 (see 10.10 field definitions).

This reviewer has been particularly impressed with the number, simplicity, and usefulness of the examples provided everywhere they might be needed. Most examples are original to this text. An interesting addition to the body of the standard, is a "Minithesaurus of thesaurus terms" which, as Appendix B, serves as an illustration of several optinal features of thesaurus display described in previous sections (flat display, generic structure, node labels, typeface, etc.).

The text of the standard is neatly laid-out. Underlining, highlighting, and italicizing are typographical processes that are used for emphasis. Because many of the sub-sections (e.g. 3.6.1, 3.6.1.1, 3.6.1.2 etc.) are in fact single and short paragraphs, some pages may appear "crowded", with little blank space and too many highlighted headers: one has to get used to the density of most pages.

Specific parts of the standards are easily accessed by way of a detailed table of contents (p.III-VII) or through a good index of significant concepts and terms. Within the text itself, there are numerous references to related sections and sub-sections, allowing for easy navigation into the standard. It was also a good idea to have put the table of abbreviations and conventions used in the standard at the very beginning of the document (p.XII). It was noticed that one code, however, is missing from the list: In section 3.4.2.2 (Economy of cross-references), a *see also* is used as a means of linking an adjective used alone to descriptors beginning with a corresponding noun, e.g. **cardiac** *see also* the descriptors beginning with **heart**. Since this form would seem more appropriate in a list of subject headings, the signification of the *see also* in a thesaural structure should be clearly explained.

The text of a standard is never easy to read, but this one is well written, not too wordy, and obviously carefully edited. Thesaurus designers and specialists will find this a useful addition to their basic reference collection. the new standard will attract by the fact that it looks and "sounds" very modem and up to date at a time when ISO-2788 is showing its age. Michèle Hudon

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ARNOPOULOS, Paris: **Sociophysics: Chaos and Cosmos in Nature and Culture**. Commack, N.Y.: Nova Science Publ. 1993. 357p. ISBN 1-56072-108-1

Professor Amopoulos is a political scientist who teaches political theory and international politics at Concordia University in Canada. In the past fifteen years he has been engaged in the development of analytic frameworks and theoretical models to describe and explain relationships among various natural, sociological and political factors and variables that contribute to political life. This latest book is an attempt to break down more barriers between the social and natural sciences as can be readily grasped by the title. The work builds on many diverse studies in the areas of micro-analysis and macro-analysis, history and philosophy of science, methodology, systems analysis, chaos theory cosmology, social science theory, theory-building, new physics, quantum mechanics, neurophysiology, bio-philosophy, cybemetics and self-regulation. For the author, 'sociophysics' is a new field of transdisciplinary studies which combines the latest natural and social science theories into a set of significant generalizations about phenomena recognized in a conceptualization process. Professor Arnopoulos attempts to extend the Principle of Universality whereby fundamental laws that apply through space and time are applied to areas of study in the social realm. He does not subsume the social under the natural order but rather subsumes both under a 'larger cosmic order'. A synergistic effect is produced because both areas of knowledge are appropriately broadened. Fundamental similarities between natural and social sciences emerge even though differences remain. Because the differences tend to be emphasized in comparative studies, the author believes that the similarities need more research. *Sociophysics* is an attempt to provide such a perspective. The process of building a new model is part of the larger process of paradigm shift. The author puts forth a 'triadic interface paradigm' which attempts to resolve contradictions in old and new ways of knowing, leading to an eclectic synthesis of old and new elements. The author recognizes that grand unification theory represents an ideal system that may not be applicable to reality as we perceive it. Nonetheless, all theory is to some extent or another unable to fit closely any specific case. Furthermore, what is more important in a period of paradigm shift is to break down the perceptions that natural, and social sciences are inherently different. Such differences

may stem more from conceptualized differences rather than actual differences. If one can appreciate universal abstractions, one can perhaps perceive in reality universal similarities within natural and social realms.

Hence, a new field of study - socio-physics - by its very existence, by its coupling of desparate areas of science may help science to advance and to accelerate paradigm shift.

The field as delineated by the author in this book is arranged in three parts: statics, dynamics, and dialectics. In turn, each part is divided into three sections such as matter, energy life; or change, entropy, syntropy; or causality, history, humanity. In addition, each subsection such as 'matter' is broken down further into three subparts with three parts for each subpart. The author therefore prefers by design a tripartite system of conceptualization and model-building. He acknowledges that his theoretical system designed to provide universal connections between social and natural reality has been constructed with a concern for conceptual beauty and simplicity.

Second, the model is adaptable to various types of mental transformations whereby *independent* variables may enter a system and emerge as dependent variables. Premises, concepts and percepts can therefore be converted into conclusions, theories and ideologies.

The author concludes with a general model connected by causal relations and divided by three waves moving outward. With regard to the nature-nurture debate concerning human behavior, the author takes the middle ground arguing that human behavior rests more or less equally on natural and cultural pillars. Reason and emotion in human psychology are supplemented by the third and highest aspect of mind - human psyche - the spiritual summit. Here, humans may transcend both nature and society to attain a glimpse of whatever lies beyond.

At the end, the author speculates further that "if humanity becomes an organic social system with a collective mind and will, it could integrate with the natural ecosystem of Gaia in a highly symbiotic and synergistic co-existence".

Clearly, *Sociophysics* is a very ambitious attempt to synthesize a great deal of theory across discipline lines into a very beautifully constructed 'unification model'. It is of course a heuristic model - one designed to raise interesting questions about the relationships between and among various theoretical appraoches. It is also a very original example of systems analysis combined with a dialectical approach.

The book should be of interest to scientists of various disciplines, historians of science and philosophers - especially those interested in making connections among many different recent works and trends in science, philosophy, and social science.

The author's bibliography is large and diverse. Hundreds of works are listed although specific citations have been avoided to make for a compact and uncluttered presentation. This work would be an interesting and valuable addition to any academic library.

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RUGE, Gerda: **Wortbedeutung und Termassoziation.** Methoden zur automatischen semantischen Klassifikation. (Word meaning and term association. Methods towards automatic semantic classification.) Hildesheim, DE: Olms 1995. 244p. = Sprache und Computer, Band 14; zugl. München, DE: Technische Universität, Diss. 1994. ISBN 3-487-09964-0

In ihrem gemäß der herrschenden Semantiktheorien sachlich fundierten Buch: *Wortbedeutung und Termassoziation* stellt G. Ruge einen neuen Ansatz vor: Ziel der Verfasserin ist der automatische Aufbau einer semantischen Klassifikation, und zwar durch Entwicklung eines Verfahrens, „mit dem semantisch verwandte Wortpaare aus großen Korpora extrahiert werden können" (p.11). Zweck ist neben einer Verwendung dieser semantischen Wortrelationen in den verschiedensten Systemen als Teil des Weltwissens insbesondere eine Optimierung der Benutzeranfrage beim Information Retrieval; denn „es gilt als eines der wesentlichen ungelösten Retrieval-Probleme" (p.11), solche ähnlichen Wörter zu finden - „ähnlich in bezug auf ihre Bedeutung in der durchsuchten Literaturdatenbank" (p. 11). Damit soll das erarbeitete Verfahren „eine Thesaurusfunktion" (p. 16) realisieren. Die Verfasserin möchte zeigen, daß - zumal große Mengen an maschinenlesbaren Texten vorliegen - aus fließendem Text eine automatische Wissensakquisition möglich ist, da diese Texte „implizit genau das Wissen enthalten, das bei der Textanalyse fehlt" (p. 13).

Die Grundlagen der beschriebenen Arbeit sind im Rahmen des Projektes TINA (Textinhaltsangabe) der Siemens AG entstanden. Inzwischen gehört die Projektgruppe zur Siemenstochter Sietec (p. 16). Als Ausgangsbasis der Analyse dient ein Textkorpus von 195.000 englischen Abstracts dreier Jahrgänge aus dem naturwissenschaftlichen und technischen Patentbereich. Untersucht werden dabei die Nominalphrasen. Im Zentrum der Arbeit steht zunächst eine Betrachung dessen, was unter *ähnlichen* bzw. *semantisch verwandten* Wörtem zu verstehen ist. So lautet die Arbeitshypothese, „daß Wörter semantisch um so ähnlicher sind, je mehr sie in ihren Heads und Modifiers übereinstimmen" (p.121). Die Head-Modifier-Relation ist von der Dependenzgrammatik übernommen. So ist z.B. im Satz: *„Peter trinkt einen süßen und heißen Kaffee"* (p.36) *Kaffee* „Modifier" von: *trinken*, aber „Head" von: *süß* und *heiß*. Solche Head-Modifier-Relationen können als syntaktische Beziehungen u.a. bestehen zwischen: „Verb - Subjekt; Verb - Objekt; Nomen - Adjektiv; Verb - Adverb; Verb - Nebensatz; Nomen - Relativsatz, Nomen - Nomen (bei Verbindung mit Präpositionen und bei Komposita)" (p.32).

Vorab werden die Repräsentationen der Wortbedeutung der drei derzeit bekanntesten Semantiktheorien, der modelltheoretischen Semantik (Zusammenfassung von Objekten), der strukturellen Semantik (semantische Charakteristika) und der Theorie von Wittgenstein (Kontext-abhängigkeit) vorgestellt. G. Ruge fußt bei ihrem Ansatz auf den Grundlagen der modelltheoretischen Semantik, wenngleich sie deutlich macht, daß dieser auch mit Hilfe der beiden anderen Theorien erklärbar ist. Als *ähnliche* Wörter werden von ihr bezeichnet (p.29): Hyperonyme (Oberbegriffe), Hyponyme