

students personal potential to perceive and, most important, to decide critically. Culture as the totality of history, environment, and tradition is reduced - similar to the fate of the person - to a mere point-like state of social being. Orientation, judgement shrink to the same niveau. It is only consequent if the emerging human beings tend to utilitarianism, scientism and their political equivalents. Systems movement in education, the systemic approach to learning/teaching tends to bring the existence of the environment, the question of how our life circumstances have grown in history, and the cultural context into focus. And in this respect the multidimensional facetting of knowledge will help the student to find a richer identity and with it the potential to learn and to adapt to rapid cultural change.

Again, the special issue of SR, which envisions the future not only of systems science itself, but also of the culture it arises from, is worth careful study. If there is anything left to be desired for the next issue, then it is this: that it may enlarge the field covered from the individual's level. Maybe it will prove a good idea, too, to include more non-American contributors, e.g. from the English, the French or the Russian science, to name only a few complementing and rather different backgrounds. It will be advantageous to compare the differing empirical, rational and idealistic surmises from the European campus. It will, as this issue did, establish the periodical even more as a forum for a systems dialogue.

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BRODIE, M.L., MYLOPOULOS, J., SCHMIDT, J.W.
(Eds.): **On Conceptual Modelling. Perspectives from Artificial Intelligence, Databases, and Programming Languages.** New York, etc.: Springer-Verlag 1984. 510p., ISBN 0-387-90842-0 and 3-540-90842-0

Knowledge representation/conceptual modelling is a key problem in expert systems, problem solving, language understanding, and other areas of artificial intelligence, in data base and information storage and retrieval systems, in programming languages, and last, but not least, in classification theory. Until recently, the problem has been dealt with largely independently in these areas. A volume that brings together contributions from three of these areas is, therefore, most welcome, even if contributions from classification theory are lacking. The papers were presented at a symposium so that the authors had an opportunity to consider other viewpoints in the final version, and the discussions are also included. All this strengthens the effect of crossfertilization.

The volume is nicely unified through introductions to the problem in Part I: *Artificial Intelligence, Database, and Programming Language Overviews*, which consists of the following three papers: *An overview of knowledge representation* by John Mylopoulos and Hector J. Levesque; *On the development of data models* by Michael L. Brodie; *The Impact of modelling and abstraction concerns on modern programming languages* by Mary Shaw; and through Part V: *Concluding Remarks from Three Perspectives. - An artificial intelligence perspective* by Carl Hewitt; *A database perspective* by Michael Stonebraker; and *A programming language perspective* by Stephen N. Zilles.

In between are the individual contributions. They are arranged into three parts according to perspective, but there is, fortunately, much overlap between these parts, as it should be if one searches for common principles. These contributions are:

Part II: *Perspectives from Artificial Intelligence. Generalization/specialization as a basis for software specification* by Alexander Birgida, John Mylopoulos, and Harry K.T. Wong; *Some remarks on the semantics of representation languages* by David J. Israel and Ronald J. Brachman; *Open systems* by Carl Hewitt and Peter de Jong; *The logic of incomplete knowledge bases* by Hector J. Levesque; *Towards a logical reconstruction of relational database theory* by Raymond Reiter; *A formal representation for plans in the programmer's apprentice* by Charles Rich.

Part III: *Perspectives from Databases. On the design and specification of database transactions* by Michael L. Brodie and Dzenan Ridjanovic; *A unified model and methodology for conceptual database design* by Roger King and Dennis McLeod; *Adding semantic knowledge to a relational database system* by Michael Stonebraker.

Part IV: *Perspectives from Programming Languages. The functional data model and its uses for interaction with databases* by Peter Buneman and Rishiyur Nikhil; *Types in the programming language ADA* by Bernd Krieg-Brueckner; *Data selection, sharing and access control in a relational scenario* by Manuel Mall, Manuel Reimer, and Joachim W. Schmidt; *Types, algebras and modelling* by Stephen N. Zilles.

The papers are not for the faint of the heart. They are all rigorous and often couched in quite formal language as required by the topic. The integrated bibliography and the index further indicate that this volume is more than just the sum of the individual papers presented.

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