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PREFACE

A marked appearance in the scientific landscape of the 1980's is the confluence of cognitive psychology, computer science, and ergonomics. What scenery is the new river – commonly named 'cognitive ergonomics' – going to offer downstream, especially to spectators of experimental-psychological origins?

During the past decade, we have observed busy traffic of methods and ideas from cognitive psychology to human–computer interaction, the latter being the most intensely researched subdomain of cognitive ergonomics, sometimes even being identified with it. This traffic will presumably broaden in the years to come.

Three types of contribution can be distinguished. The first one consists of techniques for *task analysis and description*. They enable the interface builder to develop an explicit and detailed model of the procedural knowledge users need to recruit in order to operate the interface successfully. The second contribution bears upon the *task design* stage of user interface construction. Based in part on the results of task analysis and on general cognitive-psychological theory, 'guideline packages' or 'navigation charts' have been proposed which recommend promising approaches, point out blind alleys, and suggest viable alternatives. Whether or not such recommendations derive from cognitive-psychological knowledge gained in laboratory settings, they are in need of empirical testing in realistic user environments. Accordingly, the third contribution concerns *user-oriented evaluation*: empirical methods for verifying task descriptions and task design recommendations. The new *Handbook of Human–Computer Interaction*, edited by Helander (1988), is a rich source of information on all three topics.

Is cognitive psychology receiving anything in return for these contributions? Human–computer interaction involves a large variety of behaviors, some of which result from the simultaneous deployment of manifold cognitive and other information-processing capacities. Furthermore, situations of human–computer interaction are relatively experimenter-friendly, that is, they readily lend themselves to automatic

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generation and registration of relevant stimuli and responses. I therefore expect that cognitive ergonomics will ultimately repay its intellectual debts – with interest! – in the form of more integrated and realistic theoretical conceptions of complex human behavior and innovative methods for studying it. The form that this repayment can take is illustrated by studies of computer use which have explicitly aimed to advance general psychological theory (see, e.g., Card et al. 1980; Anderson 1987).

These considerations have encouraged the Editors of *Acta Psychologica* to devote a new section of the journal to cognitive-ergonomic research. Their decision receives its first expression in this special issue. I trust that the four papers published here – two experimental studies, one theoretical analysis, and one critical notice of an important recent book – will highlight cognitive ergonomics as an important application area of experimental (cognitive) psychology and *Acta Psychologica* as a suitable medium for publishing theoretical, empirical and applied investigations into human–machine interaction and its underlying cognitive, perceptual and motor processes.

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