

timing of serial movements (Semjen), the pre-programming of temporal aspects of responses (Vidal, Bonnet and Macar), and the tracking of temporally-variable events (Shulze, and Vos and Helsper).

The fifth section, on cognitive representations of time, illustrates the range of phenomena and approaches in time psychology, perhaps even more than the others. Freyd discusses psychological representation of temporally dynamic events, such as objects which move, or which appear to, including a discussion of her discovery of 'representational momentum'. DeWied, Tan and Frijda, based in a department of Film and Television Studies, show how film-makers distort the duration of events portrayed so as to manipulate the feeling of suspense in the viewer. Bree, whose ultimate concern is with the computer translation of temporal semantics, illustrates, with examples from English, Dutch and German, the complex and subtle ways in which different languages employ temporal prepositions. In a similar vein, Jackson and Michon explore metaphors for time ('time flies', etc.). Szamosi, in the final chapter of this section, discusses time in physics and music.

Before Fraisse's concluding address comes a chapter by Richelle, another well-known European contributor to time psychology, who bravely attempts to draw together some threads from the preceding material, optimistically emphasizing possible similarities between the French-speaking tradition in time psychology and North American studies using modern cognitive or psychophysical frameworks.

Overall, therefore, a reader wishing to obtain the flavour(s) of contemporary time psychology could hardly do better than to peruse the chapters of this book. Like an exotic menu of *nouvelle cuisine* (now *passé*, I know) the book offers a vast selection of diverse and sometimes exotic ingredients, all delivered in small, usually readily digestible, portions. The general psychological reader will find almost all chapters accessible; those with other backgrounds may choke on some, but almost everyone should find something to their taste here.

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Held, M. and Geissler, K. (eds), *Ökologie der Zeit – Vom Finden der rechten Zeitmasse* (Ecology of Time – On Finding the Right Measures). Stuttgart: Universitäts, Hirzel, 1993. 185 pp.

The ecological crisis should be regarded as a crisis within industrial society, which, although caused by the paradox of our forgetfulness of time and yet our obsession with it, can only be overcome within and over time. The

editors of this book *Ökologie der Zeit*, published in 1993 in Germany, have allowed sufficient space for all aspects of the problem to be raised. Fifteen authors examine the apparently enigmatic question, 'what is the nature of time', from the perspective of diverse scientific disciplines, thereby revealing its full complexity.

The remarkable thing about this book is that it does not take a purely scientific and theoretical approach to its subject but also incorporates visual representations. The cycle of drawings, *Zeiten* (times), illustrates aspects of the theme which remain inaccessible if one adheres to a strictly rational approach. Through her drawings, Kirchhof-Stahlmann opens our eyes to a new perspective on time. In the first part of the cycle, *Zeitmaschine – Maschinenzeit* (time machine – machine time), she displays the process of acceleration, as we experience it as an internal phenomenon up to the point when the conception of the world shatters and disintegrates. In the second part, *Zeitenwende – Wendezeit* (changing times – time of change), the artist gives her idea of *Eigenzeit* (own time) a form (Gestalt) which is linked to an inner organic and sensual rhythm. The spectators are quite literally swept away by the dynamics of the first part of the cycle and are then allowed time to consider the second part. The idea of progress is integral to the concept of time expressed by the first part of the cycle of drawings. Yet, as Geissler says in one of the articles, this type of time will never complete its passage (Geissler, 179ff). For by forgetting the rites and ceremonies which in former times determined the collective experience of beginning and end, this type of time cuts itself off from the past and the future (Schmitz, 143ff).

The discord between the external demands on individual structuring of time, the inner biological rhythms of time, and their physical and psychological effects is the subject of the papers on chronoecology (Roenneberg, 41ff; Zulley, 53ff; Lemmer, 63ff). Moreover the factors which affect our physical well-being in time apply to nature as a whole. The central question of the book therefore is: what are the inherent times of natural systems and what is their significance for *ecological politics*? Consequently, the determination of timescales for the environment (Held, 11ff) and thus the provision of a basis for physical and economic processes, is the central and extensive task of discussion and research. The authors of the book bring fresh impetus to this process but one which will necessitate a re-adjustment to our concept of nature as well as to our understanding of socio-economic and technical processes. We shall have to consider the 'timeliness' of these phenomena by re-examining how they are integrated with structures of time.

Thus nature can be seen as a product not only of natural and organic but also cultural evolution (Wuketits, 12ff). In this sense, nature is simultaneously the result of and the starting point for the inter-'evolution' of organic and technical-physical processes. According to Grassl (75ff) and Kümmerer (85ff), these may be usefully described as processes associated

with matter and energy. Such a historical concept of nature provides a sharp contrast to the timeless, ahistorical concept which dominates both ecological discussion and economic theory (Zahrnt, 111ff). These essays refute the idea of constancy in nature, a view which still pervades our thinking, underpinning the paradigm of an economy which disregards nature and a simplistic, timeless conception of ecological processes.

'Giving nature its time . . .' (Altner, 133ff) means that the environmental problems of the present must be related to underlying timescales: Grassl uses the example of global climatic change caused by anthropogenic inputs of matter into the atmosphere to point to the importance, frequently underestimated, of the spatial and temporal displacement of cause and effect. With regard to the streams of matter and energy produced by industrial societies, Kümmerer discusses the conclusions which can be drawn from the timescales of ecological systems. His plea for an *ecological politics of matter* underlines the importance of ensuring that societal influences on ecological systems are reversible. However, demands that we avoid making irreversible change to the environment and that technical developments be adjusted to the inherent system-times of the ecosystems concerned raise more questions than answers. This is not surprising in view of the complexity of ecological time structures. Similarly, many questions are raised by Stahel's reflections on ecological *product politics*, centring on uncoupling the material product and its immaterial usefulness (Stahel, 105ff).

If we take the contributions to *Ökologie der Zeit* as a whole, a suspicion is confirmed: the way 'back to nature' is barred. Only the 'way forward to nature' remains open to us — provided we understand the importance of the temporal aspects of ecological processes.

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