

Preface

This book tackles the notion of duration and the structure of our Now using a phenomenological approach. We shall look into a number of temporal distortions, correctives and compensatory actions. The main focus will be on our perception of duration and possible ways of modifying it. A model of fractal time will be introduced, which will differentiate between two mutually exclusive temporal dimensions that manifest themselves as simultaneity and succession: Δt_{depth} and Δt_{length} . The temporal fractal perspective, which results from nesting simultaneous levels of description can be shown to determine our estimation and experience of duration and even lead to a perceived reversal of the causal order of events.

Duration and the Now are primary experiences of time and therefore precede physical and semantic concepts of time. We have to take account of the limitations of our perceptual apparatus and the integrative performances of our brains. These constraints and performances have to be considered *a priori* when we set up or evaluate a model of reality. While many such constraints are not accessible via introspection, distortions which arise as a result of compensations carried out by our brains are a blessing in disguise, as they reveal to us the – usually invisible – structure of our temporal perspective.

Corrective distortions within the Now reveal the internal structure of our interface with the rest of the world: a nested, temporal fractal, whose structure changes with every boundary shift we perform. Boundary shifts occur when we change the assignment conditions – that is to say, decide what to assign to the external world and what to the observer-participant. The internalization of the exterior and, *vice versa*, the externalization of the interior can have bizarre consequences: the individual concerned

may, for example, incorporate a fake hand or disown a part of his body. When spatial or temporal boundaries become transparent – that is to say, no longer visible from the endo-perspective – a new systemic whole will emerge, which has truly assimilated the external structure. This structure could be a rhythm to which we entrain or a delay which we compensate by means of compensatory anticipation.

The art of nesting and de-nesting – that is to say, of contextualization and de-contextualization – will be explored by looking at how we focus against the background of different emotion- or attention-driven arousal, entrainment and predictability.

We shall see that temporal dilation correlates with such diverse phenomena as stressful situations, synchronization, the compensation of delays (compensatory anticipation), lack of perceived contrast and reduction in perceived complexity. The common denominator which connects all of these is a lack of Δt_{depth} . Too little simultaneity is counter-balanced by an increase in succession (Δt_{depth}).

Humans appear to show a preference for fractal structures, both spatial and temporal ones. This manifests itself in our aesthetic appreciation of fractals, such as the golden ratio, in the visual arts and architecture. In the temporal dimensions, our fractal predisposition shows itself in the abundance of musical structures which resemble pink noise – that is to say, those which display $1/f$ behaviour.

The formation of gestalts reduces complexity around us. These may come in the shape of cluster formation, the anticipation of delays and as trust – our most powerful anticipatory faculty and reducer of social complexity. In this connection, we shall look at the role of complexity in dynamical diseases and temporal misfits and the impact of entrainment.

Eventually, we shall address the phenomenon of insight, which is a collapse of Δt_{depth} – that is to say, the instantaneous reduction of a broad range of rhythms to a single one. In a nutshell, duration is portrayed as a kind of friction which results from a lack of Δt_{depth} and the subsequent generation of Δt_{length} : succession. A watched kettle never boils because we narrow our fractal temporal perspective by focussing on one level of description, which means that simultaneity almost ceases to exist and succession is perpetually generated instead.

In the Appendices, the three pioneers of fractal spacetime, Garnet Ord, Laurent Nottale and Mohamed El Naschie, summarize their theories against the background of the current state of the art.