
Preface

This book takes as its theme the statement by the Nobel prize winning botanist Barbara McClintock in 1984; 'a goal for the future would be to determine the extent of knowledge the cell has of itself and how it uses that knowledge in a thoughtful manner when challenged'. The response to 'challenge' is behaviour and 'thoughtful' responses are intelligent behaviour. Thus, the title of this book is *Plant Behaviour and Intelligence*. The knowledge cells have of themselves derives from the complex self-organizing system that constructs the cell from its constituent molecules and directly implies self-recognition. There is a further issue less well recognized—intelligent behaviour is inextricably linked to fitness. This issue is largely overlooked by all who either discuss intelligence or behaviour.

This book in 26 chapters fleshes out McClintock's superb insight in the cells and organisms to which she was referring, plant cells and plant organisms. It describes the elements and processes that bring cells to life, their origin four billion years back, and why they became multicellular to form recognizable higher plants. Behaviour some of it surprising is shown to require integration through the cambium. A further chapter highlights how leaves control their internal temperature homeostat. The analogous organizational and behavioural properties between social insect colonies (swarm intelligence) and large plants are described. Furthermore, how plant roots adjust their sensing systems to deal with

different predominant signals, and are able to self-recognize forms three critical chapters. Games that plants play are critically assessed. The phenomenon of intelligence is illustrated with a detailed discussion and reference to the numerous descriptions from those informed scientists that have spent time examining the question. Brains are not needed for intelligent behaviour and reflex behaviour is rejected. Intelligent genomes and intelligent foraging are outlined. Finally, in the context of McClintock's 'thoughtful', the vexed question of consciousness is discussed and in that context J. C. Bose's 'plant nervous system' receives its rightful recognition. Throughout the important issue of fitness is raised.

This book represents a suitable introduction for those who have an interest in the rapid developing areas of plant behaviour. Although some of the material is technical and molecular this has been kept to a minimum in favour of whole plant behaviour. Some overlap in idea and content between chapters is inevitable, but I have tried always to ensure that chapters can be read independently of others and that necessitates small amounts of occasional repetition for those that read right through. Much of the described material is fully referenced for those that seek to investigate further. For a more general readership, many of these chapters should be comprehensible and convey to them the excitement that encompasses our increasing understanding of McClintock's imaginative insight.