

Contents

1	Introduction	1
	Plants are no Less Complex than Animals:	
	They are Just Different	2
	Natural versus Human Selection	4
	The First Gardens	5
	Plants versus Animals	7
	Plant Blindness	8
	Popular Science	10
	Complexity	12
2	Basic Plant Organisation: How it Differs	
	from that of Animals	17
	Plants are Nutritionally Self-sufficient	19
	Nutritional Self-sufficiency Renders	
	Movement Redundant and Determines	
	Plant Design and Construction	24
	The Concept of Death in the Plant Kingdom . . .	32
	Plants as Modular Organisms with	
	Increased Autonomy of their Parts	42
3	Why Trees are Almost Immortal and Other	
	Related Issues	45
	Annual Rings as Climatic Memory	46
	Longevity Elixirs	52
	Plants as Environmental Engineers	63
	Chemical History of the Atmosphere:	
	Photosynthesis and Plants as the Main Players . .	74
	Planetary Aspects of an Enzymic Reaction	85
	Size and Age are not Always Related	94
	How Tall can a Tree Become?	97
	Life Span and Species Immortality	108

4	Short Evolutionary History of Plants	113
	Which Organisms are Characterised as Plants? . . .	114
	Life on Planet Earth before the Appearance of Plants: Some Key Biological Episodes that Paved the Way	117
	Required Structural and Functional Innovations that Enabled Land Colonisation	128
	Interactive Systems: Plants, Climate, Animals, Soil	136
	Violent Environmental Perturbations and their Evolutionary Significance	140
	Why did Plants not Suffer Mass Extinction?	145
	Reproductive Idiosyncrasies of Plants: Resistance to Extinction	151
5	Sex in Nonmotile Organisms	161
	Hermaphroditic in Form, Yet Sexually Segregated with the Help of Chemistry	162
	Solitude and Self-pollination	168
	As Always, Heterosexuality Carries a High Price; However, in the Case of Plants, it Is the Middleman that Profits	171
	Colours and Scents	179
	Trick and Truth	191
	Why do Plants Manufacture Costly Fruits?	199
	Plant Migration Takes Place at the Embryonic Stage	203
6	The World through the Eyes of Plants	209
	In the Beginning, there was Light	212
	What do Plants 'See'?	217
	How do Plants Measure Time?	228
	What else do Plants Perceive?	232
7	The Defence of a Stationary Organism	243
	The Complex Chemistry of Plants Determines the Dietary Habits of Herbivores	244
	Cost of Armaments, Defensive Strategies, Alliances, and Nonconventional War	256
	How do Plants Communicate with One Another?	277
8	Symbioses Galore	285
	The Fine Balance between Symbiosis and Parasitism	286

Too Close a Symbiosis Leads to Deformation	290
The Nitrogen Problem on Planet Earth and a Plant–Bacteria Symbiosis of Huge Impact	293
Fungi and Plants Connected in an Underground Web	300
Animals that Photosynthesise, or an Evolutionary Episode in the Making	304
9 Deviations from the Basic Biological Type . . .	311
Carnivorous Plants	312
Plant Movements	319
10 Are Plants Intelligent Organisms After All? . .	323
Towards a Biological Definition of Intelligence . .	324
Examples of Intelligent Plant Reactions	327
Recognition and Decision Making	336
Memory?	340
Epilogue	343
Additional Reading	361
Index	369