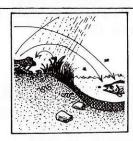
CONTENTS

Preface, $ix \bullet$ Author's note, $ix \bullet$ Permaculture defined and its use, $ix \bullet$ Conventions used, $x \bullet$ Access to information, $x \bullet$ Cover story, xi



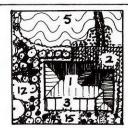
CHAPTER 1 INTRODUCTION, 1

1.1 The philosophy behind permaculture, 1 • **1.2** Ethics, 2 • **1.3** Permaculture in landscape and society, 6 • **1.4** References, 9.



CHAPTER 2 CONCEPTS AND THEMES IN DESIGN, 10 2.1 Introduction, 10 • 2.2 Science and the thousand names of God, 11 • 2.3 Applying laws and principles to design, 12 • 2.4 Resources, 16 • 2.5 Yields, 18 • 2.6 Cycles: a niche in time, 23 • 2.7 Pyramids, food webs, growth and vegetarianism, 28 • 2.8 Complexity and connections, 30 • 2.9 Order or chaos, 31 • 2.10 Permitted and forced

connections, 30 • 2.9 Order or chaos, 31 • 2.10 Permitted and forced functions, 31 • 2.11 Diversity, 32 • 2.12 Stability, 33 • 2.13 Time and yield, 33 • 2.14 Principle summary, 34 • 2.15 References, 35.



CHAPTER 3 METHODS OF DESIGN, 35

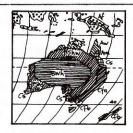
3.1 Introduction, 36 • 3.2 Analysis: Design by listing characteristics of components, 37 • 3.3 Observation: Design by expanding on direct observations of a site, 43 • 3.4 Deduction from nature: Design by adopting lessons learnt from nature, 44 • 3.5 Options and decisions: Design as a selection of options or pathways based on decisions, 47 • 3.6 Data overlay: Design by map overlays, 47 • 3.7 Random assembly: Design by assessing the results of random assemblies, 47 • 3.8 Flow diagrams: Design for work places, 48 • 3.9 Zone and sector analysis: Design by the application of a master pattern, 49 • 3.10 Zoning of information and ethics, 57 • 3.11 Incremental design, 58 • 3.12 Summary of design methods, 58 • 3.13 The concepts of guilds in nature, 59 • 3.14 Succession: evolution of a system, 64 • 3.15 The establishment and maintenance of systems, 65 • 3.16 General practical procedures in property design, 68 • 3.17 Principle summary, 69.



CHAPTER 4 PATTERN UNDERSTANDING, 70

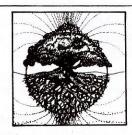
4.1 Introduction, 70 • 4.2 A general pattern model of events, 71 •
4.3 Matrices and the strategies of compacting and complexing components, 72 • 4.4 Properties of media, 75 • 4.5 Boundary conditions, 76 • 4.6 The harmonics and geometries of boundaries, 78 •
4.7 Compatible and incompatible borders and components, 79 •
4.8 The timing and shaping of events, 81 • 4.9 Spirals, 83 • 4.10 Flow over landscape and objects, 83 • 4.11 Open flow and and flow patterns, 87 • 4.12 Toroidal phenomena, 88 • 4.13 Dimensions and potentials, 88 • 4.14 Closed (sperical) models; accretion and

expulsion, 88 • 4.15 Branching and its effects; conduits, 89 • 4.16 Orders of magnitude in branches, 91 • 4.17 Orders and dimensions, 92 • 4.18 Classification of events, 93 • 4.19 Time and relativity in the model, 93 • 4.20 The world we live in as a tessellation of events, 94 • 4.21 Introduction to pattern applications, 95 • 4.22 The tribal use of patterning, 96 • 4.23 The mnemonics of meaning, 99 • 4.24 Patterns of society, 100 • 4.25 The arts in the service of life, 100 • 4.26 Additional pattern applications, 101 • 4.27 References and further reading, 102 • 4.28 Designers' checklist, 105.



CHAPTER 5 CLIMATIC FACTORS, 106

5.1 Introduction, 106 • **5.2** The classification of broad climatic zones, 107 • **5.3** Patterning in global weather systems; the engines of the atmosphere, 107 • **5.4** Precipitation, 110 • **5.5** Radiation, 113 • **5.6** Wind, 121 • **5.7** Landscape effects, 132 • **5.8** Latitude effects, 134 • **5.9** References, 134 • **5.10** Designers' checklist, 135.

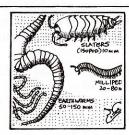


CHAPTER 6 TREES AND THEIR ENERGY TRANSACTIONS, 137 **6.1** Introduction, 138 • **6.2** The biomass of the tree, 138 • **6.3** Wind effects, 139 • **6.4** Temperature effects, 142 • **6.5** Trees and precipitation, 142 • **6.6** How a tree interacts with rain, 147 • **6.7** Summary, 150 • **6.8** References, 151.



CHAPTER 7 WATER, 152

7.1 Introduction, 152 • 7.2 Regional intervention in the water cycle, 153 • 7.3 Earthworks for water conservation and storage, 155 • 7.4 Reduction of water used in sewage systems, 170 • 7.5 The purification of polluted waters, 172 • 7.6 Natural swimming pools, 180 • 7.7 Designers' Checklist, 181 • 7.8 References, 181.



CHAPTER 8 SOILS, 182

8.1 Introduction, 182 • 8.2 Soil and health, 184 • 8.3 Tribal and traditional soil classifications, 185 • 8.4 The structure of soils, 186 • 8.5 Soil and water elements, 187 • 8.6 Primary nutrients for plants, 187 • 8.7 The distribution of elements in the soil profile, 188 • 8.8 pH and soils, 195 • 8.9 Soil composition, 199 • 8.10 Soil pores and crumb structure, 201 • 8.11 Gaseous content and processes in soils, 204 • 8.12 The soil biota, 205 • 8.13 Difficult soils, 208 • 8.14 Plant analysis for mineral deficiencies; some remedies, 209 • 8.15 Biological indicators of soil and soil conditions, 212 • 8.16 Seed pelleting, 214 • 8.17 Soil erosion, 214 • 8.18 Soil rehabilitation, 215 • 8.19 Soils in house foundations, 221 • 8.20 Life in earth, 222 • 8.21 The respiration of earth, 224 • 8.22 Designers' checklist, 225 • 8.23 References, 226.

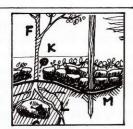


CHAPTER 9 EARTHWORKING AND EARTH RESOURCES, 227 9.1 Introduction, 227 • 9.2 Planning earthworks, 228 • 9.3 Planting after earthworks, 229 • 9.4 Slope measure, 230 • 9.5 Levels and levelling, 232 • 9.6 Types of earthworks, 234 • 9.7 Earth constructs, 237 • 9.8 Moving the earth, 241 • 9.9 Earth resources, 247 • 9.10 References, 249.



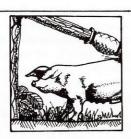
CHAPTER 10 THE HUMID TROPICS, 250

10.1 Introduction, 250 • 10.2 Climatic types, 251 • 10.3 Tropical soils, 253 • 10.4 Earthshaping in the tropics, 259 • 10.5 House design, 261 • 10.6 The tropical home garden, 266 • 10.7 Integrated land management, 277 • 10.8 Elements of a village complex in the humid tropics, 279 • 10.9 Evolving a polyculture, 279 • 10.10 Themes on a coconut– or palm–dominant polyculture, 283 • 10.11 Pioneering, 293 • 10.12 "Animal tractor" systems, 299 • 10.13 Grassland and range management, 300 • 10.14 Humid tropical coast stabilisation and shelterbelts, 303 • 10.15 Low island and coral cay strategies, 304 • 10.16 Designers' checklist, 307 • 10.17 References, 307.



CHAPTER 11 DRYLAND STRATEGIES, 308

11.1 Introduction, 308 • 11.2 Precipitation, 310 • 11.3 Temperature, 312 • 11.4 Soils, 312 • 11.5 Landscape features in deserts, 316 • 11.6 Harvesting of water in arid lands, 336 • 11.7 The desert house, 359 • 11.8 The desert garden, 371 • 11.9 Garden irrigation systems, 381 • 11.10 Desert settlement—broad strategies, 11.11 Plant themes for drylands, 390 • 11.12 Animal systems in drylands, 397 • 11.13 Desertification and the salting of soils, 401 • 11.14 Cold and montane deserts, 409 • 11.15 Designers' checklist, 410 • 11.16 References, 410.



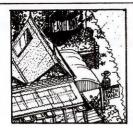
CHAPTER 12 HUMID COOL TO COLD CLIMATES, 411

12.1 Introduction, 411 • 12.2 Characteristics of a humid cool climate, 412 • 12.3 Soils, 413 • 12.4 Landform and water conservation, 413 • 12.5 Settlement and house design, 414 • 12.6 The home garden, 417 • 12.7 Berry fruits, 420 • 12.8 Glasshouse growing, 422 • 12.9 Orchards, 423 • 12.10 Farm forestry, 425 • 12.11 Free—range forage systems, 427 • 12.12 The lawn, 434 • 12.13 Grasslands, 435 • 12.14 Rangelands, 442 • 12.15 Cold climates, 446 • 12.16 Wildfire, 451 • 12.17 Designers' checklist, 456 • 12.18 References, 457.



CHAPTER 13 AQUACULTURE, 458

13.1 Introduction, 458 • 13.2 The case for aquaculture, 459 • 13.3 Some factors affecting total useful yields, 461 • 13.4 Choice of fish species (varieties, food, health) and factors in yield, 470 • 13.5 Fish pond configurations and food supply, 472 • 13.6 Farming invertebrates for fish food, 491 • 13.7 Channel, canal, chinampa, 495 • 13.8 Yields outside the pond • 13.9 Bringing in the harvest, 499 • 13.10 Traditional and new water polycultures, 500 •



CHAPTER 14 THE STRATEGIES OF AN ALTERNATIVE GLOBAL NATION, 505

14.1 Introduction, 506 • 14.2 Ethical basis of an alternative nation, 507 • 14.3 A new United Nations, 508 • 14.4 Alternatives to political systems, 509 • 14.5 Bioregional organisation, 510 • 14.6 Extended families, 514 • 14.7 Trusts and legal strategies, 515 • 14.8 Developmental and property trusts, 518 • 14.9 Village development, 519 • 14.10 Effective working groups and right livelihood, 530 • 14.11 Money and finance, 533 • 14.12 Land access, 545 • 14.13 An ethical investment movement, 551 • 14.14 Effective aid, 555 • 14.15 Futures, 557 • 14.16 References and resources, 558,

Plant list by common name, 561. Plant list by species name, 563. Glossary, 566. Resources, 567. References, 568. Index, 569.