## **Contents**

A Matter of Lubic Awareness	J
Tropical Rain Forest Characteristics	1
Geographical Occurrence of Rain Forest	2
Peculiarities of the Rain Forest	4
Rain Forest Picture Books	6
Tropical Forest Inventories	7
An Expression of Concern	8
The Speed of Forest Destruction	10
Some Misunderstandings Corrected	12
A Difficult Message	13
2 How Rain Forests Are Studied	14
Outline of the Chapter	14
A Handful of Terms	14
The Growth of a Vision	15
Regional Differences	17
Collaboration Between Botanists and Foresters	19
How to Recognize Plants in the Forest	19
Research Plots	21
Plant Collecting for Taxonomic Purposes	23
Botanical Gardens	26
The Work in a Herbarium	26
The State of Inventory	28
Books Describing Rain Forest Trees	31
How to Name Plants	31
The Profile Diagram	32
How to Look into the Canopy	34
Radio-Tracking Animals	36
By Canoe	36
El Verde	37
Looking down from the Air	38
Monitoring from Satellites	38
Simplifications	39
3 Climate	42
The Decisive Factor: Heat	42
Precipitation: The Second Limiting Factor	43
Averages and Exceptions of the Rain Forest Climate	44
11. orașe and 2. reproduct de ram restat cumate	77

Wind. Thunderstorms, Downpours	44
The Headherens Chimate 111111111111111111111111111111111111	45
Vapour Pressure Deficit Inside and Outside the Forest	45
	47
	47
	48
	49
The Structure of the Tropical Rain Potest	7)
A Calle and Contra	52
4 Soils and Cycles	
Geomorphology	52
Weathering	52
Erosion	53
Transport, Sedimentation	54
Soil Poverty	55
The Shade Community	57
Humus	58
The Mosaic of Species	58
The Module of Openes 1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	-
5 The Trees	60
General Remarks	60
Trunk	60
Roots	63
Leaves	63
Flowers	63
Architecture	63
	-
6 Other Life Forms	66
Lianas	66
Epiphytes	68
Epiphylls: A World Apart	70
Bamboos	70
Hemi-Epiphytes	71
Tree Stranglers and Banyans	72
Mistletoes and Other Hemi-Parasites	72
Holoparasites	73
Saprophytes	73
Terrestrial Herbs	74
Terrescriat Heros	/ <del>- 1</del>
7 Composition	77
Aspects of the Composition	77
Heterogeneity of Data	77
Species Richness: A Few Figures	78
Species per Area	79
Woody Plants Predominate	79
Species Richness and Diameter Classes	80
Few Individuals per Species	
Dominance No. Mosaic Yes	81
FIORDIDADCE NO MOSAIC LES	- x 4

. .

Altitudes Above Sea Level	85
Summary: The Implication of Species Richness	87
•	
8 Primary and Secondary Forest	89
Germination in Shade or Light	89
The Life-Styles 'r' and 'K'	90
The Relationship Between Secondary and Primary Forest	91
Accessibility	93
The Speed of Travel	96
The Primary Forest as Climax Vegetation	97
Summary: The Dynamics of the Forest	97
Strata in the Primary Forest?	98
Agricultural and Silvicultural Aspects	99
Agricultural and Shvicultural Aspects	,,
9 Tropical America	100
Knowledge of the American Rain Forests	100
The Caribbean	103
The Mountainous Backbone	106
The Guyanas	108
The Amazon	112
	115
<del></del>	116
Animals	116
Useful Plants	118
Estates	
Jarí	120
Conservation	123
10 Malesia	125
Geography	125
Flora	126
Useful Plants	127
Threats	128
Dipterocarps	128
11 Tropical Africa	132
General	132
Climate	132
Subdivision	133
The Poverty of the Flora	134
Human Influence	136
12 Relationships of Plants and Animals	138
The Numbers of Animals	138
The Distribution of Animals	139
An Overview	140
Big. Free-Hanging, Odorous Fruits	140
The Man of the Forest	141
Reproduction of Figs: A Case of Co-Evolution	143
Reproduction of rigs. A case of Co-Livitution	140

Herbivory	148 148
Scarcity of Minerals	149
The Usefulness of Hollow Trees	150
Defence Mechanisms	151
13 Evolution	153
A Car Drive into the Past	153
The Approach	153
The Thick-Stemmed or Pachycaul Form	155
The Thin-Stemmed or Leptocaul Form	157
The Development of the Fruit	158
Old Characteristics and New Functions	159
Chemical Defence	160
Outside the Rain Forest	160
What Does a Geologist Say?	162
what Does a Geologist Say:	102
AA TH. C. L. A. T. I.	1//
14 How Species Are Formed	166
Problems	166
Plants and Animals. Their Different Evolutionary Pace	166
Genetic Exchange	167
Selection: Edaphic and Biotic	168
Dispersal, Growth. Flowering	169
Distance: Dioecism	170
Four Categories	170
Coenospecies	171
'Blocks' of Closely Related Species	171
Hopeful Monsters	173
Remaining Species	175
Ecological Niches	175
Deviogred Menes	175
15 At the Fringes of the Rain Forest	178
Once Again, The Climan	
Once Again: The Climax!	178
Coastal Forests	179
Riverbeds	179
Mountain Forest	180
Subtropical Rain Forest	183
Monsoon Forest and Savanna	183
Deciduous Forest	186
Kerangas, Wallaba, Caatinga	188
Freshwater Swamp Forest	189
Peat Swamp Forest	191
Long-Isolated Rain Forest	194
	• • • • • • • • • • • • • • • • • • • •
16 Values of the Rain Forest	197
Twelve Points of Value	197
a) Supply of Wood	197
b) Retention of Soil	199

c) Regulation of Run-Off	. 200
d) Stabilization of Climate	. 200
e) Source of 'Minor Forest Products'	. 201
f) Pool of New Useful Plant Species	. 204
g) Pool of Useful Genetic Material	. 205
h) Shelter and Food Source of Animals and Hunting-Gathering Tribes	
i) Matrix of Evolution	
j) Source of Knowledge	
k) Object of Respect for the Creation	
l) Medium for Education and Recreation	
Conclusions	
A Note on the Value of Secondary Forest	
A Note on the value of secondary Potest	. 210
17 Damage and Destruction	. 212
An Outline of the Factors Involved	
The Fragility of Rain Forest	
Collection of Minor Forest Products	
Extraction of Timber	
Effects of Mechanical Logging	
Silvicultural Measures and Systems	
Effects of Silvicultural Measures	
The Paradox of Logging	. 224
Shifting Cultivation	. 226
Planned Destruction of Forest	. 229
Species Threatened with Extinction	. 230
Causes of Forest Destruction	. 232
Obsolescent Values	
18 Protection	. 237
The Place of Conservation	. 23
Protection Versus Management	. 238
Intentions Towards Protection	
Evaluation of a Forest	
Points to Note when Evaluating a Forest for Protection	
Setbacks	
Conservation and Research	
Buffer Zones	
Minimum Size of Rain Forest Reserves	
How Can the Potential of Nature Reserves Be Put to Use?	
A Ban on the Import of Tropical Hardwoods?	
Organizations	. 248
10 Facest and Man	. 250
19 Forest and Man	
Was the Earth Made only for Us?	
The Situation in Indonesia	
Corruption	
The UNESCO Book	
Renewability, a Complex Matter	. 250

So what Amount of Exploitation Is Possible?	256
Large Capital, Small Interest	258
	259
Ecological Guidelines	262
Again: Minor Forest Products	264
Agroforestry	266
Forestry and Rural Development	266
Development Assistance	267
The Position of the Biologist: A Summary	269
The Sacred Forest	270
Last Look	271
D.4	
References	273
Name and Subject Index	285
Traine and Dubject index	200