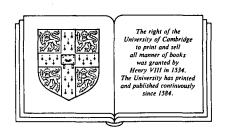
# Climate and plant distribution

#### F. I. WOODWARD

Lecturer in Botany and Fellow of Trinity Hall, University of Cambridge



### CAMBRIDGE UNIVERSITY PRESS

Cambridge 1947 London New York New Rochelle Melbourne Sydney

## **Contents**

	Preface	page ix
	Acknowledgements	xi
1	History and demonstration	1
	Introduction	1
	Theory	1
	The fourth dimension: time	3
	Palaeoecology	4
	Palaeothermometry	7
	Correlations between climatic and vegetational change	9
	Conclusions	15
	References	17
2	Scale	19
	Introduction	19
	Response times	20
	Catastrophes	24
	Climatic analyses	27
	Spectral analyses	32
	Relationships between periodicities and plant processes	34
	Conclusions	37
	References	37
3	World climate	· 39
	Introduction	39
	Solar radiation	39
	Long-wave or terrestrial radiation	44
	The global energy balance	46
	Climatic change	51

#### viii Contents

	Deterministic mechanisms of climatic change	52
	Stochastic mechanisms of climatic change	56
	References	58
4	Climate and vegetation	62
	Introduction	62
	An ecophysiological basis	63
	Solar radiation and growth	64
	Water relations	65
	Low temperatures	68
	Frost drought	72
	Low temperatures and plant distribution	74
	Geographical limits and climate	80
	Predictive model for geographical distribution	83
	Model for hydrological balance	84
	Tests of the hydrological model	96
	Global predictions	97
	References	107
5	Climate and the distribution of taxa	117
	Introduction	117
	Global perspective	117
	Dispersal and migration	121
	Vertical diversity	131
	The impact of variations in life-cycle characteristics on	
	plant distribution	136
	Competition for space	147
	References	155
	References	
6	Digest	161
-	Climate and the distribution of vegetation	161
	Climate and the distribution of taxa	162
	References	165
	Indax	167