

## Contents

	A	CK	NOWLEDGEMENTS		iv
	IN	TR	ODUCTION		ix
1			URAL SYSTEMS AND THEIR ME	ASUREMENT	1
	A	т	ne nature of systems		1
	A	1	Organisation		1
		2	Scale		4
		3	Investigation		4
	В	M	easurement		5
		1	Its rules		5
		2	Words and numbers		6
	C	D	esigning an experiment		8
		1	Careful forethought		8
		2	Data collection and processing		9
		3	Drawing conclusions		12
	D	Н	indsight and foresight		13
		1	The past		13
		2	The future		13
		3	A warning!		14
2	GF	ROI	UND LEVEL METEOROLOGY		15
	A	Eı	nergy inputs and outputs		16
		1	Solar radiation		16
		2	Terrestrial radiation		21
		3	Radiation energy exchanges		23
					V

	B	Heat storage and transport	
		1 Conduction	25
		2 Convection	26
		3 Evapotranspiration	30
	C	Heat balances and budgets	37
		1 Advection	38
		2 The heat budget equation	39
	D	Measuring the elements	41
		1 Radiation	41 42
		2 Heat and temperature	43
		3 Evapotranspiration, condensation and air motions	47
3	LO	CAL CLIMATOLOGY	51
	A	Observations on slopes	52
		1 Sampling and station networks	54
		2 Some slope characteristics and their effects	58
	B	Relating observations on several slopes	65
		1 Topoclimatic data and mapping	66
		2 Traverses and transects	70
	$\mathbf{C}$	Studies in urban areas	77
		1 Building form and design	77
		2 Urban functions and activities	80
4	Tŀ	HE PLANT AND SOIL COMMUNITY	83
	A	Morphology of the community	86
		1 Measurements and data collection	86
		2 Soil profiles and plans	97
		3 Plant transects and quadrats	99
	B	Energetics and Dynamics	102
		1 Energy transformations and flows	102
		2 Linkages and associations	104
	~	3 Ecosystems	106
	C	8,7	106
		1 Trophic levels and efficiency	106
		2 Environmental balance	108
5	5 C	EATCHMENT HYDROLOGY	109
	A	3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -	110
		1 The water balance	110
	Įn.	2 The storm hydrograph	112
	B	How runoff occurs	112

	C	Measurement and data collection	
		1 Drainage basin morphometry	116
		2 Rainfall inputs	116
		3 Streamflow outputs	119
		4 Losses and storage	122
	D	Using the data	127
		1 Flow duration curves	130
		2 Flood recurrence intervals	130
		3 Use of hydrographs	131
		4 Trends in rainfall and streamflow	132
			133
6	CI	HANNEL AND SLOPE GEOMORPHOLOGY	135
	A	Channel forms and Dynamics	135
		1 Typical profiles and plans	137
		2 Work in channels	140
		3 Size and shape of sediment	141
		4 Sediment load and flow	145
		5 Dissolved load	148
	В	Slope forms and Dynamics	149
		1 Analysis of slope data	151
		2 Slope development	152
		3 Slope processes	154
	C	Rates of erosion	156
		1 Periods of rapid erosion	159
7	SH	IORELINE GEOMORPHOLOGY	161
	A	The moving shoreline	161
	11	1 Changing sea levels	161
			163
	D		168
	В	Shoreline dynamics	168
		1 Wave forms and motions	170
		2 Currents and tides	
		3 Beach material and its movement	172
		4 Models	174
	C	Storms and tidal surges	176
8	TH	HE HISTORICAL DIMENSION	178
	A	Climatic changes, when and have?	180
	В	Climatic changes: when and how?	182
	~	The present as the key to the past?  1 The Tertiary physiographic system	184
		1 The Tertiary physiographic system	
			VII

	2 The Quaternary physiographic system	187
C	Our glacial inheritance?	189
	1 How much erosion?	190
	2 Forms of deposition	192
	3 Sediment fabric	195
D	Beyond the glaciers?	200
	1 Freeze-thaw: a neglected topic	201
	2 The flowing soil	203
E	Since the glaciers?	205
	1 Land and sea	205
	2 How fossil is our landscape?	208
F	Can we be sure about time?	208
	1 In relative terms?	208
	2 Absolutely?	211
G		211
9 0	PRGANISATION AND OPPORTUNITIES	213
A	Summary and conclusions	213
В	Sources of information	216
	1 General method	217
	2 General information	218
	3 Further reading	221
I	NDEX	225