

FOREWORD	xi
PREFACE	xiii
Chapter 1 INTRODUCTION	1
1.1 Definition and Classification of Biometeorology.....	1
1.2 Historic Development of Human Biometeorology	4
1.3 Significance of the Weather and Climate for Human Activities.....	6
1.4 Chemical and Physical Properties of the Atmosphere (Normal Components, Trace Elements, Physical Structure of the Higher Atmosphere, Physico- chemical Properties of the Planetary Atmospheres) ...	11
1.5 Meteorological Concepts in Biometeorology	23
1.6 Methods Applied in Biometeorology	28
Chapter 2 INFLUENCE OF THE WEATHER AND CLIMATE ON PLANTS AND ITS PRACTICAL IMPLICATIONS	34
2.1 The Micro-meteorological Environment of Plants	34
2.2 Influence of the Meteorological Environment on the Water Balance of Plants.....	36
2.3 Significance of Thermal Stimuli for Plant Responses..	37
2.4 Effects of Solar Radiation on Plant Growth, Crop Pro- duction and Flowering	38
2.5 Effects of Wind	38

2.6	Plant Diseases and Plant Pests	39
2.7	Specific Meteorological Conditions for Major Food Crops	41
2.8	Influence of the Weather and Climate on the Development of Forests	42
2.9	Influence of the Plant Environment on Humans	42
Chapter 3	CENTRES IN THE HUMAN BODY REGISTERING METEOROLOGICAL STIMULI	54
3.1	Simple Methods to Demonstrate the Effects of the Weather and Climate on Humans	54
3.2	Principal Registering Centres	55
3.3	Location and Mechanism of the Thermoregulatory Centres in Humans	58
3.4	Control of other Centres in the Brain by the Thermoregulatory Centre	66
3.5	Mechanisms of Acclimatization and Habituation (to Thermal Stimuli, High Altitude, Weightlessness)	72
Chapter 4	INTERACTION BETWEEN EXTERNAL WEATHER CONDITIONS AND MICROCLIMATES IN BUILDINGS	79
4.1	Studies on the Electrical Conductivity of the Air	79
4.2	Studies on Electric Space Charges	80
4.3	Studies on Wall Temperature and Air Movement	80
4.4	Studies on Humidity	80
4.5	Measurement of Air Exchange	81
4.6	Comfort Indices	84
Chapter 5	EFFECTS OF METEOROLOGICAL STIMULI ON BASIC PHYSIOLOGICAL PROCESSES IN HUMANS	88
5.1	Effects of Thermal Stimuli (General Effects of Heat and Cold, Effects on Different Important Physiological Centres)	88
5.2	Effects of Solar Radiation (Infrared Radiation, Visible Light, UV Radiation, Photodynamic Substances)	99

5.3	Biological Effects of changes in Atmospheric Pressure (>125 and <50 mm Hg)	108
5.4	Effects of Natural Air Ionization	112
5.5	Effects of Aerosols.....	115
5.6	Effects of Electrostatic and Electromagnetic Fields....	117
5.7	Effects of Cosmic Radiation	121
5.8	Effects of Magnetic Fields.....	123
5.9	Effects of Gravitational Fields	124
5.10	Effects of Radioactive Fall-out	126
5.11	Effects of Air Pollution (Particles: Organic and Inorganic; Chemical Pollutants)	128
5.12	Effects of Acoustic Waves (Noise).....	131
5.13	Factors Affecting the Result of a Biometeorological Stimulus	134
Chapter 6	INFLUENCE OF METEOROLOGICAL STIMULI ON THE PRINCIPAL HUMAN DISEASES	140
6.1	Seasonal Diseases	140
6.2	Allergy	140
6.3	Asthma and Bronchitis	148
6.4	Cancer.....	155
6.5	Cardiovascular Diseases.....	158
6.6	Eye Diseases.....	161
6.7	Infectious Diseases.....	164
6.8	Mental Processes and Mental Diseases	166
6.9	Rheumatic Diseases	172
6.10	Skin Diseases	178
6.11	Diseases due to Extreme Heat and Cold	182
6.12	High Altitude Diseases	186
6.13	Other Meteorotropic Diseases (Dental Diseases, Diabetes, Föhn Diseases, Geriatric Diseases, Multiple Sclerosis).....	188
Chapter 7	METEOROTROPIC EFFECTS OF CLOTHING, NUTRITION, AIR CONDITIONING AND TRAVELLING.....	203
7.1	Effects of Clothing on the Resistance against Meteorological Stimuli.....	203
7.2	Effects of Nutrition in Relation to Meteorotropic Resistance	205

	7.3	Effects of Air Conditioning	207
	7.4	Effects of Travelling.....	208
Chapter 8		MISCELLANEOUS METEOROTROPIC EFFECTS.....	214
	8.1	Effect of Month of Birth on Mental Development and Proneness to Disease	214
	8.2	Meteorotropism of Congenital Malformations.....	217
	8.3	Effects of Thermal Stress and Altitude on the Response to Drugs.....	222
	8.4	Effect on Sex Ratio	224
	8.5	Effect on Mortality	225
	8.6	Effect on Reaction Time, Performance Capability and Accidents (Road and Industrial).....	227
	8.7	Sport Performance	228
	8.8	Restlessness of Schoolchildren.....	231
	8.9	Reproduction in Humans.....	231
Chapter 9		THERAPEUTIC APPLICATIONS OF BIOMETEOROLOGICAL EFFECTS.....	236
	9.1	General Climatotherapy (Thalassotherapy, Balneotherapy, High Altitude Therapy, Travelling to Favourable Climates)	236
	9.2	Aerosol Therapy	245
	9.3	Climatic Chamber Therapy (Hypobaric and Hyperbaric Therapy)	248
Chapter 10		ARCHITECTURAL AND URBAN APPLICATIONS (INCLUDING SELECTION OF HOSPITAL SITES).....	256
	10.1	General Meteorotropic Considerations.....	256
	10.2	Wind Effects	258
	10.3	Temperature Effects	259
	10.4	Air Pollution Effects	259
	10.5	Effects of Noise.....	259
	10.6	Practical Proposals for the Design and Siting of Buildings.....	260

Chapter 11	INFLUENCE OF THE WEATHER AND CLIMATE ON ANIMALS AND ITS PRACTICAL ASPECTS	263
11.1	Physiological Effects of Meteorological Stimuli (Thermal, Light and Altitude) on Cattle, on Sheep, on Pigs, on Wild Ungulates, on Ruminants, on Birds, on Fish, on Insects, on Diseases caused by Insects and on Arthropods	263
11.2	Biometeorological Effects on Meat Quality; Milk, Wool and Egg Production	297
11.3	Effects of the Weather and Climate on Fertility and Reproduction	303
11.4	Effects of the Weather and Climate on the Causation and Development of Animal Diseases	306
11.5	Design of Animal Houses	312
11.6	Crossbreeding for Improved Resistance against Extreme Climatic Conditions.....	312
Chapter 12	PRACTICAL APPLICATIONS OF BIOMETEOROLOGY IN DEVELOPING COUNTRIES	319
12.1	Applications of Plant Biometeorology	319
12.2	Applications of Animal Biometeorology	322
12.3	Applications of Human Biometeorology	326
GLOSSARY		332
INDEX		339