# Contents

PREFACE TO THE ENGLISH EDITION	ix
Foreword	1
CHAPTER 1	
The Fundamental Laws and Differential Equations of	
Molecular Transfer	5
1. Transfer Potentials	6
2. The Fundamental Relations of the Thermodynamics of	
Irreversible Processes	9
3. Onsager's System of Linear Equations	11
4. Differential Equations of Heat and Mass Transfer in Binary	
Gaseous Mixtures	14
5. Transfer Equations of Heat and Mass in Disperse Media	
in Case of Phase Change	<b>22</b>
6. The System of Differential Equations of the Transfer of	
Heat and Matter in Capillary-porous Bodies	<b>27</b>
7. Generalised System of Differential Equations	39

#### CHAPTER 2

Non-stationary Fields of Transfer Potential of Heat and Mass with Boundary Conditions of the Third Kind	49
1. Non-stationary Fields of Transfer Potential of Heat and Mass in Medium with Constant Temperature	52
2. Non-stationary Fields of Transfer Potential of Heat and Mass. Temperature of the Medium — a Linear Function of the Time	116
3. Non-stationary Fields of Transfer Potential of Heat and Mass. Temperature of Medium an Exponential Function	
of the Time	1 <b>3</b> 8

Cont	ents
------	------

4. Generalized Solutions of the System of Equations for Heat and Mass Transfer	145
5. Special Cases of Heat and Mass Transfer. Certain Questions of Limiting Transitions in the System of Equations of Heat and Mass Transfer	152
6. Influence of the Criteria of Heat and Mass Exchange on the Process of Heat and Mass Transfer	171
7. Heat and Mass Transfer in the Presence of Phase and Chemical Transformation	186
8. Heat and Mass Exchange in a Layer of a Moist Body	193

## CHAPTER 3

Non-stationar	y Fields	of Transfer	Potential	of Heat	and
Mass with	Boundary	Conditions	of the First	t Kind	197

1. Non-stationary Fields of Transfer Potential of Heat a	nd
Mass with Constant Mass Content of the Body	197
2. Heat and Mass Transfer with Invariable Mass Content	of
the Body and in the Absence of Phase Changes	215
3. Methods of Determining the Coefficients of Heat and M	ass
Transfer	228

## CHAPTER 4

Non-stationary	Fields of	Transfer	Potential of Heat and	
Mass under	Boundary	Conditions	of the Second Kind	248

1. Infinite Plate $(\delta=0)$	249
2. Infinite Cylinder $(\delta=0)$	<b>255</b>
3. Sphere $(\delta = 0)$	<b>26</b> 0
4. Analysis of the Solutions	265
5. Infinite Cylinder ( $\delta \neq 0$ )	266
6. Sphere $(\delta \neq 0)$	270
7. Infinite Plate. Generalized Boundary Conditions of the Second Kind	272
8. Certain Special Problems with Generalized Boundary Conditions	279

### CHAPTER 5

Two-dimensional Fields of Heat and Mass Transfer Potentials	285
1. Finite Plate. Boundary Conditions of the Second Kind 2. Two-dimensional Plate. Generalised Boundary Conditions	285 290
CHAPTER 6	
Heat and Mass Exchange in Molecular and Molar Transfer of Energy and Matter	313
1. Non-stationary Potential Fields of Transfer of Energy and Matter under Boundary Conditions of the Third Kind	314
<ol> <li>Non-stationary Fields of Transfer of Energy and Matter under Boundary Conditions of the Second Kind</li> <li>The Influence of the Criteria of Similarity on High Lettersit</li> </ol>	351
Heat and Mass Exchange	357
4. Heat and Mass Transfer on Reduction of Pressure	365
Conclusion	<b>3</b> 78
List of Symbols	381
Bibliography	383