CONTENTS

FOREWORD v

PREFACE ix

LIST OF CONTRIBUTORS xiii

ACKNOWLEDGEMENTS xvii

INTRODUCTION xix

SECTION 1

CHAPTER I THE TECHNIQUES OF THE STUDY OF MOVEMENT — 1
N. Bernstein

CHAPTER Ia *THE UNIT OF ANALYSIS* — 27
R.B. Wilberg

CHAPTER Ib *ON METHODOLOGY IN THE STUDY OF HUMAN MOVEMENT* — 35
H.J. Woltring

SECTION 2

CHAPTER II THE PROBLEM OF THE INTERRELATION OF CO-ORDINATION AND LOCALIZATION — 77
N. Bernstein

CHAPTER IIa *FREQUENCY ENCODING IN MOTOR SYSTEMS* — 121
K.H. Pribram, A. Sharafat, G.J. Beekman

CHAPTER IIb *FROM ACTION GESTALTS TO DIRECT ACTION* — 157
E.S. Reed

SECTION 3

CHAPTER III BIODYNAMICS OF LOCOMOTION — 171
N. Bernstein

CHAPTER IIIa *HOW CONTROL OF MOVEMENT DEVELOPS* — 223
C. Trevarthen

CHAPTER IIIb *BIODYNAMICS OF LOCOMOTION, FORTY YEARS LATER* — 263
R.H. Rozendal

SECTION 4

CHAPTER IV **SOME EMERGENT PROBLEMS OF THE REGULATION OF MOTOR ACTS** 343
N. Bernstein

CHAPTER IVa *AN ECOLOGICAL APPROACH TO PERCEPTION AND ACTION* 373
M.T. Turvey, P.N. Kugler

CHAPTER IVb *SOME COMPUTATIONAL SOLUTIONS TO BERNSTEIN'S PROBLEMS* 413
G. Hinton

SECTION 5

CHAPTER V **TRENDS AND PROBLEMS IN THE STUDY OF INVESTIGATION OF PHYSIOLOGY OF ACTIVITY** 441
N. Bernstein

CHAPTER Va *BERNSTEIN'S PURPOSEFUL BRAIN* 467
J. Requin, A. Semjen, M. Bonnet

CHAPTER Vb *TOWARDS A HOLISTIC CONCEPTION OF MOVEMENT CONTROL* 505
L. Pickenhain

SECTION 6

CHAPTER VI **TRENDS IN PHYSIOLOGY AND THEIR RELATION TO CYBERNETICS** 531
N. Bernstein

CHAPTER VIa *FROM SYNERGIES AND EMBRYOS TO MOTOR SCHEMAS* 545
M.A. Arbib

CHAPTER VIb *CONTROL THEORY AND CYBERNETIC ASPECTS OF MOTOR SYSTEMS* 563
G.C. Agarwal, G.L. Gottlieb

REFERENCES FROM ORIGINAL TEXT OF BERNSTEIN 571

AUTHOR INDEX 577

SUBJECT INDEX 605