Exercise and Altitude

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Exercise and Altitude

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With 47 figures and XXIV tables

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This volume is dedicated to
Ben Eiseman .D.
surgeon, sportsman, friend

S. Karger AG, Arnold-Bcklin-Strasse 25, 4000 Basel 11 (Switzerland)

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Editor's Preface

The publishing house of S. Karger, Basel has decided to issue a
series of monographs devoted to selected themes that have a bearing on
Medicine and Sport. The subject occupies an important place in two different
academic disciplines. First, in the Sports Sciences, second in Medicine. In
the former, it stands alongside scientific studies in other fields such as
Psychology of Sport, Sociology of Sport, History of Sport, Underwater
Medicine, Biomechanics, Biochemistry of Sport, Sport and Leisure, Sport
and Work, Sport and Law, Sports Facilities, and Ergometry. All of these as
well as others are under investigation by the Research Committee and by
Working Groups of the International Council of Sport and Physical Education
(ICSPE) of UNESCO. Medicine and Sport or Sports Medicine has
been dealt with competently for many years by the Federation Internationale
de Medicine Sportive (FIMS), the recognized world organization of sports
physicians. The discipline falls into four categories: Applied Physiology,
Clinical Medicine, Traumatology and Rehabilitation. Each of these also encompasses issues other than exercise even though no other science is thus integrated. However, the emphasis which Sports Medicine lays upon the practical application as well as on the systematic study of physical activity has decisively contributed to their conceptual growth and to their pragmatic relevance.

Medicine and Sport or Sports Medicine is a branch of clinical medicine. Thus, the Karger series of monographs will appear under the editorial supervision of physicians. At the same time, it is appropriate to point out that medicine owes a debt of gratitude to experts in biophysics, biochemistry, engineering, and mathematics. Many contributions made by specialists in these fields will receive attention in subsequent volumes of this series, among them one on Biomechanics, whose editorial board includes Professor J. WARTENWEILER of Zurich, and Professor M. HEBBELINCK of Brussels; and one on Biochemistry of Exercise, edited by Professor J. POORTMANS of Brussels; while others will review specific medical problems of exercise that have been identified only in recent years. One will be concerned with the current knowledge of Physical Activity and Aging, a second with Neuro-Psychiatric Aspects of Boxing, and a third with Sudden Cardiac Death during Exercise. Since independent media of communication have been established in the various specialities of the Sport Sciences, other than Medicine and Sport as enumerated earlier, due reference will be made to them. They include such important publications as the Proceedings of the First International Congress on Sports Psychology, edited by Professor F. ANTONELLI of Rome, and the International Review of Sport Sociology, edited by Professor A. WOHL of Warsaw.

An attempt has been made to include in the Advisory Board for the Karger monographs physicians from all over the globe drawn from the membership of the leading medical organizations in the sector under reference, more particularly the FIMS, the Medical Committee of the IOC, the Medical Committees of the International Federations, the ICSPER and the ICSPE. The last named body will sponsor the manuscripts with a view to consolidating and coordinating the world wide activities in Sports Medicine. Also, the Research Committee of the ICSPE desires thus to pay a tribute to the pioneering work in Sports Medicine of the Fdration Internationale de Mdcine Sportive which issues the authoritative Journal of Sports Medicine and Physical and Physical Fitness under the able guidance of Professor G. LA CAVA of Rome.
Since the Editor has the privilege to belong to several of the medical
groups referred to above, he hopes to be able to benefit from the unmatched
knowledge of their members on all aspects of Medicine and Sport.

Table of Contents

I. Historical

ERNST JOKL: Introduction and Pictorial Atlas 2

II. Performance Analyses

ERNST JOKL and PETER JOKL: The Effect of Altitude on Athletic Performance 28

ERNST JOKL, HELGA BRAUER and EMANUEL SIMON: Interpretation of
Performance Predictions for Tokyo Olympic Games 1964 with Extrapolations
for Mexico City Olympic Games 1968 35

JOHN T. REEVES, PETER JOKL and JEROME E. COHN: Performance of
Olympic Runners at Altitudes of 7,350 and 5,350 Feet 49

ERNST JOKL: Notes on Doping 55

III. Physiological and Clinical Observations

S. M. TENNEY: Physiological Adaptations to Life at High Altitude 60

ERNST JOKL: Indisposition after Running 71

L. G. C. E. PUGH: Muscular Exercise on Mount Everest 77

HERBERT N. HULTGREN and EINAR LUNDBERG: Medical Problems of
High Altitude 110

IV. The Pulmonary Circulation

JOHN T. REEVES, PETER JOKL, JOAQUIN MERIDA and JAMES E. LEATHERS:
Pulmonary Vascular Obstruction following Administration of High-Energy
Nucleotides 122

HANS H. HECHT: Certain Vascular Adjustments and Maladjustments at
Altitudes 134
S. GILBERT BOUNT, Jr. and JOHN H. K. VOGEL: Altitude and Pulmonary Hypertension 149

ROBERT F. GROVER, JOHN H. K. VOGEL, GUSTAV C. VOIGT and S. GILBERT BLOUNT, Jr.: Reversal of High-Altitude Pulmonary Hypertension 155

INDER SINGH, C. C. KAPILA, P. K. KHANNA, R. B. NANDA and B. D. P. RAO: High-Altitude Pulmonary Oedema 165

V. Bibliography and Indexes

Selected Bibliography: Compiled by R. ELSEN and M. HEBBELINCK 182
Subject Index 190
Authors Index 195

Introduction

The problem of exercise at altitude has occupied the attention of the Research Committee of the International Council of Sport and Physical Education of UNESCO since its inception. Early in 1963, members of the International Olympic Committee and of the International Federations presented requests to be supplied with information on the effect of altitude on athletic performances. The immediate reason for doing so was their desire to be able to discuss the then pending proposal to hold the 1968 Olympic Games in Mexico City. The paper which appears on p. 28 of this volume was prepared in response to these requests. Also in 1963, the Research Committee suggested to its Swiss member, Professor Schnholzer of Berne, cooperation with the International Council of Sport and Physical Education in the organization of a Scientific Seminar on Sport in mittlerer Hhe.


The present volume contains a number of papers whose publication as a monograph seems timely. The four main sections are devoted to a Historical Introduction, to Performance Analyses, Physiological and Clinical Observations, and The Pulmonary Circulation, followed by a Selected Bibliography.
The Research Committee of the International Council of Sport and Physical Education expresses its sincere thanks for permission to reprint the articles included in this volume, given by the authors and by the editors of the journals in which they were originally published, as detailed in footnotes to the opening pages of each chapter.

Because of their desire to present the different contributions in this monograph in the same manner in which they were originally written, the editors have abstained from insisting upon adoption in this treatise of a unified pattern of style, abbreviations, bibliographic references and other technical details.