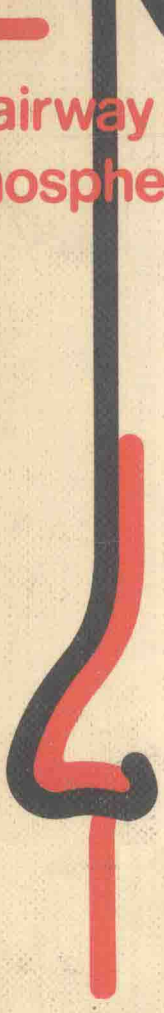
THE NOSE

upper airway physiology and the atmospheric environment



DONALD F. PROCTOR AND IB ANDERSEN EDITORS

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THE NOSE

Upper Airway Physiology and the Atmospheric Environment

edited by

DONALD F. PROCTOR
The Johns Hopkins Schools of Hygiene and Public Health and of Medicine, Baltimore, Maryland, U.S.A.

and

IB ANDERSEN
Danish National Institute of Occupational Medicine Hellerup, Danmark

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THE NOSE
Upper airway physiology and the atmospheric environment

Preface

I have asked my co-editor Ib Andersen to allow me to write our preface, since this is the only way in which I can give him appropriate credit for so many of the ideas behind our research and the actual performance of much of the work reported herein.

In 1967 two young Danes visited my laboratory at Johns Hopkins in Baltimore at the time I was engaged, with Drs. H.N. Wagner, Jr. and M. Quinlan, in the development of a technique for the accurate measurement of nasal mucociliary clearance in man. These young men, Ib Andersen and Gunnar Lundqvist, were building an environmental chamber for human studies at the Institute of Hygiene, the University of Aarhus, Denmark at the time. Only later did it become apparent to me that they approached environmental hygiene with the foresight to understand the necessity for studies of the effects of indoor air on human health. They were thus years ahead of most investigators in this field whose efforts were concentrated upon and largely limited to studies of outdoor air pollution.

In 1969 Andersen proposed to me that we collaborate in a series of experiments in Aarhus using our methodology in their climate chamber. He was successful in procuring funds from the North Atlantic Treaty Organization (NATO) to support such a joint effort. The following year we carried out the first such study at the University of Aarhus. During the succeeding ten years a total of 15 human volunteer investigations were done, ten of them in the environmental chamber in Aarhus, two at the Karolinska Institute in Stockholm, one at the common cold unit in Salisbury, England, and two in the field. I have had the privilege of working with Andersen and his colleagues in 12 of these experiments exploring the effects of ambient humidity, temperature, and various air pollutants.

Meanwhile work continued in Baltimore on the study of mucociliary clearance and the role of airway secretions in this defense mechanism, the nature of the upper airways and the characteristics of nasal airflow, and the measurement of nasal airflow resistance. As information accumulated from these combined efforts it occurred to both Andersen and myself that a monograph collecting all of our methods and data might serve a useful purpose. The most recent major treatise addressed to the questions of nasal physiology and the environment had been that of A.W. Proetz, Applied Physiology of the Nose. This excellent and stimulating book came out in 1941 and the second edition was published in 1953. Quite a significant body of new questions and new findings and methods had developed since that time. The increasing recognition of the importance of the environmental air and human health sharpened our determination.

Thus, in 1977, Andersen and I determined to start this project and this volume culminates our efforts. As our plans developed it became obvious that we must call upon the special expertise of many others to assist us. There seemed to be a wide recognition of the need for such a monograph, and those 17 contributors have worked hard and patiently with us toward our goal.

The book is organized to provide pertinent information on upper airway morphology and physiology in Chapters 2 through 11, and on the interaction between that airway and the atmospheric environment in Chapters 12 through 17. In Chapter 18 some additional considerations are discussed, but special emphasis is placed on pointing out a few of the areas most in need of further research. In many instances the authors have been rather dogmatic in stating their views, but the extensive lists of references provide the opportunity for those interested to explore the views of others. In many respects the current state of our knowledge raises more questions than it provides answers. At least the point has been reached where appropriate and ingenious new research may provide the integration of information which can lead to the ultimate goal of workers in health related fields, effective preventive medicine.

We are indebted to many persons in addition to those who have contributed chapters to this book. In the first place we must thank all those volunteers who have cheerfully taken part in the experiments. They have been fully informed of the nature, risks and significance of the work in which they participated. Next we are grateful for the support of our work by the University of Aarhus and the Johns Hopkins University. In addition to NATO the Danish government, Statens tekniske og laegevidenskabelige forskningsråd, OTAN 450, and the U.S. National Institutes of Health (ES 00454 and HL 10342) have provided continuing financial aid. The work in Aarhus could not have taken place without the able assistance of P.L. Jensen, G. Lundqvist, and L. Mølhave. In Stockholm P.C. Camner and K. Philipson were key to our endeavors as were S. Reed and her associates in Salisbury. For the work in Baltimore many young investigators played important roles. Among them were G.K. Adams, E.F. Aharonson, G.P. Bridger, S.F.P. Man, M. Quinlan, M. Reasor, Y. Sakakura, S. Salman, F. Shanty, D.L. Swift, Y. Takagi, J. Wolfsdorf, and E. Zuskin. Particular thanks must go to Drs. H.N. Wagner, Jr., R.L. Riley, and P.T. Macklem who have generously provided ideas and encouragement.

Dr. Andersen and I express our gratitude to the University of Aarhus, the Johns Hopkins University, OTAN, the National Institutes of Health (U.S.A.), and Statens tekniske og laegevidenskabelige forskningsråd, Denmark, for their long term support of our research, and to Inge Frisch for her patient and valuable secretarial assistance.

If this book provides a stimulus to young investigators similar to that produced by the writings of A.W. Proetz in the 1940s and 1950s, we will be amply repaid for our efforts in its preparation.

Donald F. Proctor
Baltimore, June, 1981

List of contributors

Andersen, Ib 307,423
Danish National Institute of Occupational Health, Baungaardsvej 73, DK-2900 Hellerup, Denmark

Berglund, Birgitta 279
Department of Psychology, University of Stockholm, P.O. Box 6706, S-113 85 Stockholm, Sweden

Cauna, Nikolajs 45
Department of Anatomy and Cell Biology, University of Pittsburgh School of Medicine, Pittsburgh, PA 15261, U.S.A.

Cole, Philip 163,351
Department of Otolaryngology, University of Toronto, The Gage Research Institute, 223 College Street, Toronto, Ontario, Canada M5T 1R4

Drettner, Börje 145
Karolinska Institute, Stockholm and Huddinge University Hospital, S-141 86 Huddinge, Sweden

Eccles, Ronald 191
Department of Physiology, University College, Cardiff CF1 1XL, U.K.

Gwaltney, Jack M., Jr. 399
Department of Internal Medicine, University of Virginia School of Medicine, Charlottesville, VA 22908, U.S.A.

Hayden, Frederick G. 399
Departments of Internal Medicine and Pathology, University of Virginia School of Medicine, Charlottesville, VA 22908, U.S.A.

Lindvall, Thomas 279
Department of Hygiene, National Institute of Environmental Medicine and Karolinska Institute, P.O. Box 60208, S-104 01 Stockholm, Sweden

Løwenstein, Henning 377
Rigshospitalet, Blegdamsvej 9, DK-2100 Copenhagen, Denmark

Mølhave, Lars 307
Institute of Hygiene, University of Aarhus, DK-8000 Aarhus, Denmark

Mygind, Niels 71,377
Otopathological Laboratory, Rigshospitalet, Blegdamsvej 9, DK-2100 Copenhagen, Denmark

Nielsen, Morten H. *71*
Department of Electron Microscopy, University Institute of Pathological Anatomy, DK-2100 Copenhagen, Denmark

Pedersen, Mogens 71
Cilia Laboratory, Paediatrics Department TG, Rigshospitalet, Blegdamsvej 9, DK-2100 Copenhagen, Denmark

Proctor, Donald F. 1,23,245,423,457
The Johns Hopkins Schools of Hygiene and Public Health and Medicine, Baltimore, MD 21205, U.S.A.

Swift, David L. 337
The Johns Hopkins School of Hygiene and Public Health, Baltimore, MD 21205, U.S.A.

Tos, Mirko 99
University Department, Gentofte Hospital, Copenhagen, Niels Andersen Vej, DK-2900 Hellerup, Denmark

Wells, Ursula M. 215
Department of Physiology, St Georges Hospital Medical School, Cranmer Terrace, Tooting, London SW17 ORE, U.K.

Widdicombe, John G. 215
Department of Physiology, St Georges Hospital Medical School, Cranmer Terrace, Tooting, London SW17 ORE, U.K.

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