Preface and Acknowledgement

Aviation medicine is a medical specialty which combines aspects of preventive, occupational, environmental and clinical medicine with the physiology and psychology of man in flight. It is concerned with the health and safety of those who fly, both crew and passengers, as well as the selection and performance of those who hold aviation licences.

This book provides practice-oriented information on evaluation of fitness to fly and medical certification of those who want to acquire or maintain an aviation licence. The focus is on uniform methods of examination and assessment of pilots, both professional and private, cabin crew members, and air traffic controllers. In order to increase the book's clarity and usefulness for practical application, common diseases and disorders are discussed; those rarely encountered in aviation medicine practice are excluded.

A symbolic summary of this book is depicted on the cover by the "aeromedical homunculus." As the area of anatomical representation increases with the complexity of the sensory-motor function, the sensory-motor homunculus represents the connection between different body parts and the corresponding areas in the hemispheres of the brain. The body on the left side is the *motor homunculus,* lying in front of the central sulcus (CS) of the brain. The bigger the body parts in this picture are, the more brainpower is required to control them. The body half on the right is the *sensory homunculus*, lying behind the CS. It is similar to the motor homunculus except that it

depicts how much brain power is dedicated to receiving sensory input from the different body parts. By analogy, the "aeromedical homunculus" in the middle has organs whose relative size symbolizes their aeromedical significance. The dominance of the heart (and therefore of aviation cardiology) makes an extracorporeal depiction necessary. The importance of the eyes and ears (and therefore of aviation ophthalmology and otology) leaves hardly any room for the brain, which — being the most important of all organs — has been moved to the front and given its own, separate space. The gap where the liver should have been alludes to the easily overlooked exogenous and toxic risks.

The different sizes of the organs of the "aeromedical homunculus" are also correlated to the selection of medical topics and the degree of detail and comprehensiveness with which they are treated in the various chapters of the book.

Regarding the significance of clinical aviation medicine, one should not overlook the fact that aviation incidents and accidents have remained relatively constant in recent decades, with human factors causing or contributing to about 80 percent. This gives emphasis to the importance of aviation psychology. The criteria for mental fitness and psychological testing as well as the significance of crew coordination and cockpit resource management are described. A separate chapter deals with the less understood and often underestimated influence of psycho-social stressors. Through disruption of the man-machine interface, the problems of daily life may become a threat to aviation safety. Consequences of head injuries or diseases affecting the brain are sometimes overlooked as licence holders construct facades to hide their loss of flying skills. This is discussed in depth in a chapter on the relevant neuro-psychological conditions and disorders.

An aeromedical book intended for an international readership constantly collides with transcultural issues. In order to minimize the risk inherent in all aviation activities, international regulations (ICAO International Standards and Recommended Practices, SARPs) have been developed and agreed to by virtually all countries in the world. In this context, it is surprising that aviation medicine still exhibits

a large degree of international variation. Each country issues its own aeromedical requirements in accordance with, but not necessarily identical with, the international SARPs of ICAO, but each country has it own aeromedical traditions and a national understanding of the medical problems involved in flying. Even the nomenclature of medical certification is not uniform, e.g. FAA Class 3 medical certification corresponds to JAA Class 2. In addition, there are still national differences with regard to the retirement age for commercial pilots, although the international age limit of 65 years is gaining global acceptance.

The editors are proud to have succeeded in acquiring the cooperation and contributions of several of the leading experts from the various fields of operational aviation medicine. The majority of these experts have for years been engaged in both the clinical and the regulatory aspects of aviation medicine in their capacity as members of the Aviation Medicine Committee of the Federal Minister of Transportation.

The physiological basis for aviation medicine, outlined by two eminent experts, provides the basic theoretical foundation for the following clinical sections.

A chapter on the history of aviation medicine gives the interested reader a stimulating insight into the methodological development of a very specialized field of medicine which, in the words of Dr. Silvio Finkelstein, former Chief of Aviation Medicine Section of ICAO is "invisible but essential."

In addition to the International Standards and Recommended Practices of ICAO, the JAR-FCL 3 medical requirements as well as the FAA rules for licensing are described.

Finally, a chapter on passenger health, written by Dr. Petra Illig, has been added. It deals with several aspects of aviation medicine of importance not only for those who practise aviation medicine but for all medical practitioners who in their daily practice meet people who fly.

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