proportional counters, Geiger-Müller counters, scintillation counters, and photographic, solid state, and activation devices are presented, together with some discussion of the appropriate fields of application for these various measuring systems. The third section, concerned with the choice and use of instruments suitable for different purposes, is subdivided into surveying, area and environmental monitoring on the one hand and individual personnel monitoring on the other. The fact that more than half of this section is concerned with protection measurements related to neutron sources and charged particle accelerators indicates the relative difficulties implicit in such measurements as compared with those associated with normal x-ray equipment and radioactive materials. The final fourth section of the Report deals with the calibration of all types of instruments used for protection measurements involving x-rays, gamma rays, beta rays, alpha rays, and neutrons.

The Report will be warmly welcomed by a wide range of readers who have technical or administrative responsibility involving radiation measurements in all branches of radiological protection. It fills a gap which had existed hitherto in providing authoritative, practical guidance on the choice of the most appropriate measuring systems for radiological protection purposes and in giving realistic advice on the accuracy and significance of the resulting measurements.

S. K. Stephenson


Both the author and Mr. Rees are widely known as authorities on the problems of clothing man. They worked together for many years on research at the Army Physiological Research Establishment into clothing for many different tasks in a variety of climatic conditions.

The book is in seven parts. The first is an historical survey of early clothing materials of prehistoric man, the uses of woven fabrics in classical times, and the early concepts of clothing hygiene held by the textile biophysicists of the 18th and 19th centuries to the relatively recent work of the new breed of clothing physiologists. Early customs, beliefs, misconceptions and superstitions are discussed. The second part written by W. H. Rees of the Shirley Institute, Manchester, a recognized authority on textile biophysics, covers the origin, basic structure, uses, and biophysical properties of clothing materials in the widest sense. Much technical information is given on the physical and functional properties of materials and much of the information on thermal insulation, radiation factors, and moisture in clothing are from his own research work. The most generally used terms in the British and Continental systems of measuring the functional properties of materials are employed. Conversion factors are given.

Part 3 refers to the relevant anthropological aspects of man's evolution, the modern concepts of body heat distribution, storage, and regulation, and the effects on the body surface of environmental changes, while part 4 provides a historical review of the evolution of clothing, discusses the physiological important properties of materials, garments and clothing systems, and the assessment of thermal insulation. It reviews the techniques and methods used by the author in his researches.

Part 5 deals with the basic purposes of clothing, the practical application of new knowledge of the properties of materials, and the health implications of variations of design and tailoring. Footwear is given an appropriate amount of attention in view of the importance of disorders of the feet which are discussed in a later chapter. Clothing for a variety of purposes including protection from occupational hazards is briefly covered.

The medical practitioner views clothing in part 6, outlining the ills arising from inadequate, badly fitting or badly designed, and unhygienic clothing, and those which clothing may prevent, or indirectly cause, through infection, infestation, irritants, sensitizers, and cleaning agents. Interesting views are expressed on clothing material which could restrict bacterial dissemination in the operating theatre. The last part is devoted to the psychology of dress. The influence of behaviour patterns on clothing and of clothing on behaviour are analysed in dealing with a multiplicity of psychological factors involving magic, ritual, ornamentation, modesty, sex, and fashion.

Dr. Renbourn mentions in this book practically every known association between clothing and man's performance, health or illness, and so draws attention to the complexity of the science of clothing. Except in essentially technical parts the author has intentionally used language which can be widely understood. The hope is expressed that the book will appeal to Human Factors Scientists such as medical graduates, para-medical workers (such as nurses, hospital technicians, and those who help the aged and handicapped), clothing materials technologists, physiologists, biophysicists, psychologists, and students of fashion. This it should certainly do. Selective readers will easily find the subjects in which they are interested, and although it is a textbook for scientific groups, well indexed and supported by references, large parts of it provide interesting historical and up-to-date reviews of clothing fashions, customs, and beliefs. The book is full of facts and critical assessments and comments, and the author passes on the benefit of his experiences, pointing out the pitfalls to the inexperienced and explaining why apparently logical assumptions prove false. It will be of value to clothing scientists and could be to all who are concerned with what people wear.

J. S. Wilson


This book is the most recent addition to the Monographs of the Physiological Society. It more than upholds the very high standards set by its predecessors and is likely to be of interest to a much wider audience than the title suggests. In his preface the author begins by pointing out that air temperature alone is not an adequate indication of environmental warmth. Although there have been
many attempts to combine all the environmental factors involved into a single figure or index, inadequate attention has generally been paid to the importance of physiological variability. The monograph therefore has as one of its aims a quantitative examination of the importance of physiological differences between different subjects.

The first four chapters deal with the physical principles of heat exchange at the skin surface. This part of the book is particularly successful. Complex mathematical formulae and relationships are explained in simple language and the reader is encouraged to understand their meaning through a skillful use of analogies and illustrations. The non-mathematical reader may even begin to believe he understands the significance of those mysterious dimensionless numbers—Grashof, Lewis, Nusselt, Prandtl, Reynolds, Schmidt, and Sherwood.

For any readers of this journal interested in thermal comfort, the section on clothing will be especially welcome. This is an important area of knowledge where there are still large gaps and much uncertainty.

The chapter on physiological responses is perhaps a little disappointing; the author says it 'presents a personal and not necessarily orthodox view of the current position, an indulgence which will be justified if it provokes controversy'. The chapter is certainly limited in its scope but it gives a sound and authoritative account of the control of sweating and body heat conductance.

The latter half of the book is devoted to the problems of heat stress indices. The attributes of an 'ideal' index are first carefully examined and then some of the more important indices are reviewed. Those reviewed fall into three groups:

1. Indices based on analysis of heat exchange:
   (a) Heat stress index of Belding and Hatch (HSI),
   (b) Index of thermal stress (Givoni) (ITS),
2. Indices based on physiological observations:
   (a) Predicted four-hour sweat rate (McArdle) (P4SR),
   (b) Wet bulb globe temperature index (Yaglou) (WBGT),
3. Indices based on subjective preference:
   (a) Effective temperature (Yaglou) (ET),
   (b) Equivalences en séjour (Missenard) (ES).

Unfortunately, in view of its importance, Fanger's Thermal Comfort Equation is not discussed. This is presumably because the manuscript was written before Fanger's book had come to the author's attention.

An outstanding feature of this very impressive and important book is the use of SI units throughout, including the up-dating of older work by their application. There are likely to be many people who will decide to buy the book for this reason alone. It is strongly recommended reading for all thermal physiologists and those concerned with thermal comfort in industry and commerce and, because of its clarity and style, it can be confidently recommended to a much wider audience.

R. H. Fox


At a time when the prophets of ecodeATH are gaining increased attention this book provides an excellent review of the problems associated with breathing polluted air. It sets out to present information about the fate of inhaled particles in general and in that context to review current knowledge concerning some of the important pollutants found in nature and industry. This broad approach is always difficult to achieve and is particularly elusive when many authors are involved. Dr. Muir, who edits the book, has met these problems by his thoughtful choice of authors and by underpinning the book with three excellent chapters. In addition the book is directed towards clinicians and, by looking at the clinical aspects of inhaled particles, Dr. Muir has managed to contain the scope of a potentially enormous subject and to produce a book which is readable and of considerable interest at this time.

The authors and the clinical bias cannot, however, completely disguise the difficulties encountered in producing a book with such a diverse background. At its simplest level the contents threaten to split into two; thoracic physicians will find the chapters on particle deposition and the fate of airborne microbes and allergens of especial interest while industrial physicians might largely concentrate on the chapters concerned with industrial hazards. This potential fissure is also promoted by the apparent division in the state of knowledge with far less known or understood about the extremely complex problem of particle deposition and clearance. To this confusion Dr. Muir has brought considerable understanding and has clearly explained the problems but the non-industrial side remains more difficult to understand. Even if the clinician turns to the chapter on therapeutic aerosols he cannot escape from the fact that there is much to be learned about particle deposition, and consequently our therapy, hopefully based on the use of airborne methods, has a very shaky scientific basis which must make us look at inhalation therapy with a very critical eye.

The chapters on industrial dusts are more straightforward and excellently review current knowledge. Each chapter can stand on its own and because such autonomy is inevitable the lack of a single author can be felt. A summary or linking chapter might be added with profit to provide a consistent thread of argument throughout. The underlying problem is not peculiar to this book and is of marginal importance when such a book is as well written as this one.

The book is not only well written but is also well produced and of the right size to be read over a weekend and yet remain a source of reference. I can thoroughly recommend it and look forward to subsequent editions.

T. J. H. CLARK


This book is not merely confined to the chromatography of potentially toxic substances but it contains valuable information also on the usual methods for the preparation of the substances, their common uses, and properties. Details of the applications of the methods selected are
The Stress of Hot Environments

R. H. Fox

doi: 10.1136/oem.30.1.96-a

Updated information and services can be found at:
[http://oem.bmj.com/content/30/1/96.2.citation](http://oem.bmj.com/content/30/1/96.2.citation)

These include:

**Email alerting service**
Receive free email alerts when new articles cite this article.
Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
[http://group.bmj.com/group/rights-licensing/permissions](http://group.bmj.com/group/rights-licensing/permissions)

To order reprints go to:
[http://journals.bmj.com/cgi/reprintform](http://journals.bmj.com/cgi/reprintform)

To subscribe to BMJ go to:
[http://group.bmj.com/subscribe/](http://group.bmj.com/subscribe/)