Book reviews

Training for Sport and Activity

Jack H. Wilmore and David L. Costill
Leeds: Human Kinetics Publishers
(Europe), ISBN 0 87322 557 0, 1993,
436 pp, £19.50

For those who teach exercise physiology to undergraduate students, there has long been a need for a textbook that offers an alternative to the standard Astrand and Rodahl. This is probably that book. It is a wide-ranging authoritative text by two of the leading figures in exercise physiology. Jack Wilmore and Dave Costill have both made an enormous contribution to research in many different areas of exercise science and both are outstanding educators.

This is a book that students can read (and also one that they can afford to buy, which is unusual now) – the writing style is informative without being pedantic, and whole chapters can be read to get an overview of particular areas. The book is also a comprehensive reference work covering physiology, biochemistry, nutrition and anthropometry in considerable depth. Additional sections reflect the authors' own interests and expertise – as well as the basic science, there are extensive sections on the young athlete, the masters athlete and the female athlete. Further sections on physical activity and health, and on assessment of performance adopt an integrated approach to these topics. The text is profusely illustrated, and if many of the graphs and figures seem familiar, that is probably because others have copied them from the authors' earlier publications. There

must be some doubt as to whether all of the photographs make a useful contribution, but at least they do no harm.

There are some minor reservations about the material presented. In some cases, the arguments presented are biased towards the authors' own research data. An example is the information on the metabolic effects of pre-exercise feeding – there are several studies which show that pre-exercise glucose feeding does not result in reactive hypoglycaemia and premature fatigue. These are not presented to balance the one study that does show such an effect. Overall, however, these points are rather insignificant.

This is a book which I will use extensively, and it is one to be recommended.

Ron Maughan PhD

Neuromuscular Fatigue

A. J. Sargeant and D. Kernell
Amsterdam: Faculty of Human Movement Sciences, ISBN 0 444 85763 X,
1993, 212 pp, F 60.00

Thirteen years ago a seminal symposium on muscle fatigue was held in London and published in 1982 as a *Ciba Foundation Proceedings*, edited by Porter and Whelan. For many of us on the fringes of such work, and for those central to it, the Ciba book was an enormously valued and valuable guide. In 1992 the Royal Netherlands

Academy for Arts and Sciences undertook to host a similar symposium and has published the proceedings under the title *Neuromuscular Fatigue*, edited by Sargeant and Kernell. This is a superb 'state of the art' reference, with its 52 invited contributors reading like a who's who of muscle researchers, although naturally some very well known names are missing.

In 1982, RHT Edwards defined fatigue as 'a failure to maintain the required or expected force' which has been much quoted. This time, Bigland-Ritchie prefers 'any reduction in the force-generating capacity (measured as the MVC), regardless of the task performed', and indeed this makes more sense; e.g. when the task is to generate 25% MVC, the first definition would claim that no fatigue has occurred even if there has been a loss of 40% in MVC force. In sport we are also concerned with power decline, which is not necessarily correlated with force. And there is relaxation fatigue.

Throughout the publication, the collective causes of fatigue discussed include: changes in the action potential configuration; failure of T-tubule propagation; decreased calcium release; reduced calcium sensitivity of the contractile proteins; decreased contraction by cross-bridges; decreased phospho-creatine; decreased ATP; increase in inorganic phosphate; lowered pH; rise in inosine monophosphate; increase in magnesium; potassium efflux; carnitine depletion; glycogen depletion; anaplerotic limitation; central fatigue; motoneurone and muscle receptor effects; microdamage; and relaxation fatigue. And the point is made that the function of fatigue is to protect the sensitive links in the system from undesirable and potentially dangerous overuse, which many in sport tend to overlook!

The book is organized into five sections: Cellular Processes of Muscle (eight papers, 32 pp); EMG Related Processes (five papers, 25 pp); Long Term Processes – useage, ageing and damage – (seven papers, 20 pp); Muscle Performance – mechanical demand and metabolic supply (12 papers, 58 pp); Neuronal Mechanisms and Processes (eight papers, 50 pp); and the discussions have been gathered together in a final seven pages.

Quite simply, anyone who valued the 1982 Symposium, and all who have a genuine interest in muscle and fatigue, *must* have this vital reference on their shelf. For whatever reason,