illustrations. Psoriatic arthritis gets just a few lines with no illustration of the arthropathy. Juvenile chronic arthritis is inappropriately—at least in a British textbook—referred to as juvenile rheumatoid arthritis. In addition, hypertrophic osteoarthritis is incorrectly called acute pulmonary osteoarthropathy, even though there are multiple causes for the occurrence of this condition, other than pulmonary tumours.

I enjoyed looking at the illustrations of this book, some of which are of historical interest, as it is unlikely that one is going to see patients with syphilis with destroyed hard palate and nasal septum. A major criticism of this book is that the opportunity for up-dating the text has not been taken with this paperback edition. If the contents were brought up to date then this book would prove valuable to undergraduates, MRCP candidates, and clinicians such as rheumatologists, geriatricians, and orthopaedic surgeons.

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A collection of the papers presented at the second international symposium on biomedical engineering held in June 1987 in Taiwan, this book is a strange mix of three only loosely linked topics: musculoskeletal mechanics, cardiac mechanics, and biophysics and mass transfer.

The book’s opening message is given by Y C Fung who uses pulmonary blood flow to illustrate how mathematical modelling, with appropriate experimental support, may lead to more useful and satisfying explanations of the behaviour of physiological functions. This sets the scene for what is to follow. A trilogy of papers from the Mayo Clinic has been written by Ed Chao with the subjects of muscle forces, modular endoprostheses, and body segment motion. The first and last of these, in particular, are true to the theme of mathematical modelling and all are very well written and illustrated. Readers without a mathematical background may prefer to concentrate on the introduction and conclusions. Another very useful feature of all the papers is the extensive list of references quoted in each area.

The paper on a modular prosthetic system for segmental bone and joint replacement after tumour resection is a clear review of early attempts to replace malignant tissue with artificial components. The Mayo clinic’s programme is described with clarity and purpose and is a pleasure to read.

The third of this set of papers looks at body segment motion measurement. Stereometry, goniometry, accelerometry, and magnetic field coupling are all evaluated as techniques. The author resists the temptation to tell us which method he favours, preferring to emphasise the difficulty of kinematic studies and encouraging the reader to analyse the results with care.

The paper on spinal motion by S S Wu did not help me a great deal. The aim was to predict dynamic behaviour of spinal motion segments using mixed finite element models and poroelastic theory. I had difficulty with the author’s abbreviated style, however, and the explanations of the mathematics were not clear to me. In contrast, the biohoreology and deformation of spinal cord injury was well described and argued. I have to say that I could not have carried out the experiments described, but the results were interesting and applicable. As with many animal experiments, the link to human subjects is not always totally clear. In cats and rats a clear link between permanent loss of function and severity of cord strain was shown, however. This may be an obvious conclusion, but the authors put quantitative values on the strain levels which cause damage. A very well presented paper on the biomechanics of traumatic subdural haematoma completed this section. Monkeys were subjected to neck injuries and these were modelled using finite element analysis of stress levels in the parasagittal bridging veins of the brain. The importance of the direction of impact in an accident was emphasised in the findings.

The mid-section of the book consists of 11 papers on various aspects of blood flow. These range from studies using one-plane cineangiocardiography, through a new method of analysing myocardial function using wall stress-areal strain relation—that is, a method of defining regional work, to ultrasonic echocardiography. This work is interestingly written and covers a broad spread of research in the blood flow field. The approach using fibre optic methods to transmit laser light to the coronary arteries and veins and then to measure blood velocity using laser Doppler shift was described. This is already finding considerable use while being developed further. A long review of cardiovascular responses to reduce gravity relates very obviously to manned space flights but has interesting lessons for the fundamental mechanics involved as well as the factors which develop tolerance to it. Following clinical cases of changes in blood rheology, in which viscosity, red cell rigidity, platelet aggregation, and plasma protein concentrations were all investigated in patients with total artificial hearts, the conclusions reached were tentatively that changes in microcirculation might be due to rheological changes induced by the total artificial heart itself.

I was fascinated to read about ‘pulse feeling’ in Chinese medicine where the clinician originally felt at least nine areas of the body (three at the head, three at the hand, and three at the foot). In modern times this tends to be more restricted in its application, though essentially it relates to the pressure pulses passing through blood vessels owing to inertia, compliance, and resistance. There is a delightful scattering of Chinese symbols throughout the paper and essentially the pressure waves are felt by the clinician using his fingers as transducers to help in diagnosis.

In the final section dialysis, filtration, and absorption properties of blood are considered together with hyperthermia as a treatment for tumours. The whole of the book is true to its title—Biomedical Engineering, but does not really have a consistent theme. This is emphasised even more by the camera ready production, which means that each paper is typed in a different font. The binding is superb, however, and almost everyone who has passed my desk during the past few weeks has commented on how good the book looks. Undoubtedly it is a library volume as the book is essentially a reference work. I imagine not too many clinicians will buy it, but I hope that at least those interested in orthopaedics or blood flow will take it from the shelf from time to time.

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A UNSWORTH

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