a useful and comprehensive source of information, being well supplied with tables and concise directions on the various systems available, labelling and detection methods and patents. I particularly liked the list of properties of an ideal label. One of the most useful parts of this and chapter two is the enormous set of references provided.

The second chapter provides a very good account of both enzymatic and chemical labelling methods. The descriptions of the enzymatic techniques are also extremely useful for die-hard users of radioactivity. I appreciated the presence of a table comparing the sensitivity and availability of different techniques. The chapter concludes with overviews of factors affecting hybridization and detection systems. I anticipate that these two chapters will provide most of the information needed by the reader.

After such a promising start I was slightly disappointed with the chapters on detection. Whereas each chapter was well written and full of information on various hybridization strategies as well as the detection, the book overall was disjointed and inconsistent and would have benefitted from more stringent editing. There was a great deal of repetition of information, most of which was adequately covered in the first two chapters. Very often, although the information given was of a high quality and potentially useful, it was not readily accessible. For example, a good account of *in situ* hybridization was found in a chapter entitled 'Colourimetric detection of alkaline phosphatase'. Another disappointment was the heavy bias towards indirect enzymatic detection of probe labels rather than use of the enzymes as labels themselves. The ubiquitous nature of biotin was demonstrated as it 'popped up' in several chapters.

I would personally have preferred to have seen a chapter devoted to hybridization techniques, covering subjects such as sandwich, filter and *in situ* hybridizations that were scattered throughout the book, and giving general protocols for different probes. The detection chapters could have concentrated more upon practical and most suitable applications. The availability of instrumentation and reagents for each technique was generally well presented although I did not approve of the extreme bias demonstrated by the writer of one chapter, employed by Tropix Inc., towards the products of that company, with no suggestion of alternatives.

My review of the book may appear unjustly critical but I must emphasize that I am putting forward my personal preferences. On the whole the book contains a very comprehensive account of non-radioactive hybridization techniques not found elsewhere and is well supplied with tables and illustrations. For those well initiated into non-radioactive hybridization and with the time to 'wade through', the book provides a wealth of information although I fear the scientist, baffled by the choice of methods available, could leave the book equally confused. As a final gripe, I had two copies sent to me, the first had pages falling out, the second had some pages that had been double printed making them almost illegible. For £40 I would expect better quality.

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Biotechnological Innovations in Animal Productivity. Biotol (Biotechnology by Open Learning). Butterworth-Heinemann, Oxford. 1991. Pp. 217. Price £19.95, paperback. ISBN 0 7506 15117.

This book is a considerable achievement by the authors and publishers. They have succeeded in providing a broad review of the principal areas of biotechnology in animal production and have created a text which is readily comprehensible to readers not expert in these areas. There are chapters on endocrine regulation of the oestrus cycle, manipulation of reproduction, *in vitro* embryo production and manipulation, the production of transgenic animals, somatotrophins in animal production, and vaccines and diagnostics. In addition, there is a useful introductory chapter on 'animals in biotechnology-state of the art,' and there are several helpful appendices.

Most of each chapter is concerned with scientific and technical principles. In addition, a brief mention is made of the economic, ethical and regulatory aspects. Some of these would have been worthy of greater consideration. Inevitably in a book of this type there are over-simplifications, for example the claimed benefits of anti-PMSG antibodies in superovulation. In some cases the perspective of future developments in animal production may be considered optimistic. For example, whilst cloning of cattle embryos has been achieved very few normal calves have been produced, and many are abnormal.

This book assumes an undergraduate level of knowledge in biochemistry, physiology and cell biology. As an open learning text it has many useful features including an index, margin notes and self-assessment questions, however, the almost complete lack of references (other than to other Biotol books!) is a serious omission which neither facilitates nor encourages further enquiry and reading.

Overall, this book will be valuable to readers requiring a technical overview of the principles and applications of biotechnology in animal production. It is not only a student text but a useful reference book for libraries.

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Variance Components. S. R. Searle, G. Casella and C. H. McCulloch. John Wiley, Chichester, 1992. Pp 501 + xxiii. Price £56.00, hardback. ISBN 0 471 62162 5.

This appropriately titled book is devoted exclusively to the theory of ANOVA and the estimation of variance components. Its 12 chapters and three appendices offer a comprehensive treatment of the subject. Chapter 1 introduces the subject through definitions of the most commonly used terms in the book and chapter 2 provides a brief but up to date history