

Book reviews

Kornberg, A.; Baker, T.: DNA Replication. Second edition. New York: W. H. Freeman and Co 1992. 931 + xiv pp., 352 figs., 119 tabs and 15 plates. Hard bound \$ 64.95

DNA replication, second edition, by Arthur Kornberg and Tania Baker, is now available and sure to be as great a success as the first edition was when published back in 1980. It will be remembered that there was such a rapid development in the field after this time that a supplement to *DNA Replication* was published by Arthur Kornberg in 1982. Now, so much more knowledge has accumulated on this subject that a further supplement would be unwidely. Instead Arthur Kornberg and coauthor Tania Baker have come up with a second edition, giving the reader the very latest on DNA replication. In a single volume they have managed to include all the latest relevant information: all chapters have been rewritten, some condensed to make way for new material. A feature of this second edition are the additions on mechanisms of replication initiation in prokaryotes and eukaryotes, as well as summaries of the replication cycles of many prokaryotic and eukaryotic viruses and plasmids through life-cycle presentations. While the first edition had very clear and informational diagrams and figures, the second edition is exceptional with its general standard of diagrams and figures. Colour plates 1 through 15 in the front of the book are of great value in showing DNA structures and the interaction of various proteins with these structures. Clever use of colour shades in all of the figures throughout the book adds to their illustrative and instructional value. This volume has a full author and subject index. The book should be on the reading list for all scientists and would-be-scientists working in the molecular biology area, not only for its immense informational content, but also as a record of the writings and problem-solving approaches by one of the greatest scientists of our times. This book puts into the right context his and others' research findings in the DNA replication field. If you also include in your library one of his other books, *For the Love of Enzymes*, published in 1989, you have an excellent record of the impact of Arthur Kornberg on our understanding of DNA synthesis and how it was all achieved through the approaches of enzymology. *DNA Replication* concludes with the statement "Clearly the ease of analysing and creating DNA has diverted the spotlight from the laborious isolation and characterization of enzymes", emphasizing that his impact has largely been achieved through the discipline of enzymology.

J. F. Jackson, Glen Osmond

Nitecki, M. H.: Evolutionary Innovations. Chicago London: University of Chicago Press 1990. 304 pp., 51 figs., 5 tabs. Soft bound £ 20.75.

When fossil records are examined, an abundance of innovations are observed, in particular the appearances of new structures and invasions of new environments. Thus, in evolution innovations have occurred without any doubt. However, much is still unclear. As Charles Darwin already recognized, for a complex structure to evolve, numerous different component parts must be mutually adjusted if the whole is to function efficiently. In the book under review, the basic ideas of innovations are discussed in a series of excellent specialistic papers from the viewpoints of various components of the 'Modern Synthe-

sis': genetics, developmental biology, morphology, physiology, and paleontology.

In this book, molecular biology has been omitted completely. While I agree that molecular biology is many times emphasized far too much and that it often unjustly steals the show, with respect to the topic of this book a lot can be learned from evolution on the molecular level. The evolution of proteins, for example, is very well studied and its study had the advantage that the establishment of an amino acid sequence does not depend upon the eye of the observer and that comparisons between sequences can be made more objectively. From these molecular studies, François Jacob developed his concept of tinkering, a concept that might also have been very useful for various presentations in the present book.

Another omission is a general discussion of the concept of innovation. Actually, all structures that evolve, either a polypeptide at the molecular level or an organ at the morphological level, absorb knowledge about their outside world. As Konrad Lorenz has put it: the shape of a fin contains knowledge of the characteristics of water. This knowledge has been acquired over millions and millions of years of evolution. Innovations of structures during biological evolution can be compared, for example, with Kuhnian scientific revolutions during the development of science. Psychologists and philosophers have developed many concepts and theories about innovations. Of course this would have been a very broad topic to cover in a chapter. Nevertheless, it might have been very illustrative to see how the same questions have emerged in very different areas. Such discussion would have given the book not only a broader scope but also a better framework for future research. G. J. de Klerk, Lisse

Wills, C.: The Wisdom of the Genes. Oxford: Oxford University Press 1991. 351 pp., 26 figs., Soft bound £ 6.99.

The theory of evolution covers all areas and levels in biology and is, in turn, affected by the scientific progress in each of these areas and levels. It is for one person virtually impossible to keep pace with all of the relevant facts and theories. Therefore, most new ideas and books originate from only relatively few of the available data. The book under review also does not present an all-embracing new view on evolution, but only tries to incorporate new discoveries in the areas of molecular and developmental biology. It advocates as a main thesis that the ability to evolve has itself evolved and brings together much data and speculation in support.

My personal feelings about this book are mixed. Apart from being very biased in the choice of the relevant theories and data it is not a scientific book in the sense that the author does not critically examine the pros and cons of his own theories. He also does not examine (or quote) similar theories by other authors. The other side of the coin, however, is that the book is excellently written and enthruses its readers. I must confess that I enjoyed reading it very much and also learned a lot. As the cover mentioned it was difficult to put the book down. Sometimes Wills' jokes are poor. In the glossary, for example, the explanation of *NAD* starts with 'This is not a misprint for DNA'.

G. J. de Klerk, Lisse

Prakash, J.; Pierik, R. L. M.: Horticulture – New Technologies and Applications. Proceedings of the International Seminar on New Frontiers in Horticulture organized by Indo-American Hybrid Seeds, Bangalore, India, November 25–28, 1990. Current Plant Science and Biotechnology in Agriculture. Dordrecht Boston London: Kluwer Academic Publ. 414 pp., several figs. and tabs. Hard bound \$ 105.00.

This volume comprises 67 articles presented as key-note lectures and contributed papers in an International Seminar on 'New Frontiers in Horticulture' organized by the Indo-American Hybrid Seeds. The proceedings of the seminar are divided into six sections: (1) Advances in production technology, (2) Plant genetic manipulation, (3) Plant cell and tissue culture, (4) Greenhouse technology, (5) Plant health and crop protection, and (6) Post-harvest and landscape horticulture. The main theme of the proceedings has been the utilization of recent advances in plant science for crop improvement and the efficient development of useful plant products. The advances that have been made in recent years in the application of tissue culture and genetic manipulation in horticultural plants become very evident in these proceedings.

In these 67 lectures, the authors presented not only an overview of the present state of the art, but also results aimed at fulfilling commercial goals. Several important topics were dealt with, such as mass propagation, resistance to diseases and insects, tolerance to herbicides, pesticides, drought, salt, frost and metals, and improvement in nutritive value and yield. In addition, agronomic and breeding goals emphasized various items, like easy harvesting, enhanced keeping quality, efficient transportation, and the processing and production of secondary metabolites, novel compounds, flavours, colours, and sweeteners.

This book is very informative for those scientists and students who wish to know the current state of the art as well as the needs of the future in the improvement of various horticultural plants.

K. S. Ramulu, Wageningen

Gupta, P. K.; Tsuchiya, T. (eds.): Chromosome engineering in Plants: Genetics, Breeding, Evolution. Part A (Developments in Plant Genetics and Breeding, 2A) Amsterdam: Elsevier Science Publ. 1991. 639 pp., many figs., many tabs. Hard bound \$ 211.50.

In their preface the authors refer to *Cytogenetics of Crop Plants*, published in 1983, of which the first editor of the present volume was co-editor. For regrettable reasons the book was not distributed outside India. The price was unbelievably low, and for those outside India who managed to obtain a copy, it was and still is a most valued possession. The present two volumes are a successful attempt to elaborate the theme, using some of the original chapters in an updated version and adding several new ones. The original set-up was somewhat changed, as is reflected in the title. The price, however, is now practically prohibitive for individual scientists and even more so for students.

Part A, reviewed here, contains 30 chapters. The first 11 (section A) deal with certain specific aspects of cytogenetics, not necessarily all to be considered chromosome engineering, using different plant species as examples. Section B of Part A is oriented specifically to cereals; in the second volume (Part B) other crop plants are considered. Understandably, in spite of the large number of chapters, the editors have not been able to cover the entire field, but they have also failed to make a homogeneous overview of the sector of the field covered. Shortcomings and heterogeneity are especially evident in the first, general section. In both sections, the space available for each chapter is too small to deal with large subjects (to name a few: polyploidy in the first section and cytogenetics of wheat and triticale in the second,

even though both topics are discussed in more than one chapter). The more restricted topics could be treated much more satisfactorily (for example: monosomics in diploids, A–B translocations in maize, balanced tertiary trisomics in barley). It is especially from such chapters that the book derives its value. However, not all restricted topics are urgently needed (maize nucleolus, chromosomal effects of seed storage) nor are all complete (apomixis and several more). The superficial and occasionally biased discussions of some of the central topics (such as polyploidy) must be regretted. With so many chapters and authors some less successful sections may be forgiven, but in a few cases the editors should have been more strict.

It is interesting to note that in both parts A and B a previously published article is reproduced (1963 and 1973, respectively).

Due to its heterogeneity and the incompleteness of several chapters the book can not be seen as an entirely successful review of chromosome engineering nor of the applied cytogenetics of specific crop plants. Because of the long period of production no papers published during the last several years before its appearance could be included. Yet, in spite of these clear but possibly inevitable shortcomings and its high price, this is a most useful and welcome collection of review papers on a subject experiencing renewed interest.

J. Sybenga, Veere

Borojevic, S.: Principles and Methods of Plant Breeding. Developments in Crop Science 17. Amsterdam, Oxford, New York, Tokyo: Elsevier 1990. 368 pp., 59 figs., 84 tabs. Hard bound \$ 102.50.

Based on a course developed for postgraduate students, this textbook on the principles of plant breeding has been written by an experienced wheat breeder. It is the second edition of a book that was first published in 1981 in Serbo-Croatian. This volume is a 40% increase over the first edition, making the information on new developments possible. Throughout the 22 chapters the reader is given the impression that the methods are evaluated from the standpoint of practical progress in plant breeding. The material is arranged in a very logical sequence, starting from the sources of genetic variability via the breeding of self-pollinated and open-pollinated plants to the various procedures of selection. One-third of the book deals with the different methods and aims of selection. Fifty pages are devoted to mutation breeding, chromosome engineering and genetic engineering. In these three chapters, only very brief statements – again through the eyes of a practical breeder – are made, due to the lack of practical results. The literature citations mostly predate 1985, which means that recent developments, such as the use of molecular markers for selection, are not yet mentioned. Before a chapter on the genetic basis of seed production and introduction of cultivars into practice finishes up the book, ten pages are devoted to the breeding of vegetatively propagated plants. Slavko Borojevic is a cereal breeder and most of the book deals with cereals, although large sections are very general and only rarely are specific examples for a particular crop quoted.

The author does not avoid statistics and his explanations are easily understood. It is questionable, however, whether or not this is a useful compromise; a specialized additional textbook on statistics is probably necessary in any case.

For an introductory textbook the price is somewhat steep. This is surprising, as the layout in terms of graphs, photographs and other illustrations is very modest. The subject index is very condensed, while an extensive authors' index lists a considerable number of references. In summary, I think it will not be easy for this book to compete with well-established textbooks such as those of Allard, Poehlman, or Falconer, although the recent developments in unconventional breeding procedures such as haploids, protoplast fusion and genetic engineering are mentioned.

G. Wenzel, Grünbach

Debergh, P. C.; Zimmerman, R. H. (eds.): Micropropagation. Technology and Application. Dordrecht Boston London: Kluwer Academic Publishers 1991. 484 pp, 43 figs., 47 tabs. Hard bound \$ 159.00.

Micropropagation is the propagation of a selected genotype using in vitro culture techniques. Starting around 1965, orchids were the first crops commercially produced by micropropagation. After a lag period lasting up to 1980, micropropagation expanded rapidly, and in 1988 the production was over 200 million plantlets in Western Europe. The main crops involved are for the most part ornamentals (*Gerbera*, *Nephrolepis*, *Saint-paulia*, *Cymbidium*, *Lilium*, *Spathiphyllum* and *Syngonium*) fruit trees (*Prunus* and *Citrus*). Many books have been published on tissue culture and on micropropagation in particular. Because the application of micropropagation is expanding very rapidly, the editors of the book under review felt that an overview of the technology is now appropriate.

The book consists of 26 chapters. After an introductory chapter and a chapter on laboratory design, four common problems in micropropagation are discussed in more detail (contamination, vitrification, acclimatization and variation). Approximately 90 pages are devoted to commercial micropropagation dealing with economic factors and current production numbers of micropropagated plants. The reader will be surprised to learn that in 1988 the number of potplants micropropagated in 15 countries of Western Europe was counted very accurately and found to be 92,337,417. He will also wonder why addresses, activities and names of contact persons of laboratories in Africa and Australia have been included, covering 8 pages in total, whereas laboratories in other countries are not mentioned at all. Then, in 7 chapters, micropropagation of a broad range of crops is presented. The book ends with several chapters discussing technologies that may become important in the near future, viz. automation, somatic embryogenesis in suspension cultures and micropropagation under photoautotrophic conditions.

The book presents an adequate overview of present-day micropropagation in research and industry. However, this should also be taken as a criticism, because research in micropropagation is usually limited to the method of trial and error. In the practice of micropropagation many problems are encountered, the main ones being that proliferation is too low and that plant morphogenesis cannot be controlled sufficiently. With regard to the latter I mean the control over processes as apical dominance, dormancy, rejuvenation/maturation and storage-organ formation. What is needed in micropropagation research, is knowledge about basic processes, so that the tissue-culture protocols for the many species and cultivars can be designed more easily and with greater efficiency. A large body of data and theories has been accumulated on these topics in plant physiological research, but the flux of this knowledge to micropropagation is slow. In my opinion, a modern book on micropropagation should also include chapters on the backgrounds of the morphogenetic processes mentioned above to stimulate such a flux and facilitate the application of scientific knowledge.

Micropropagation is desirable for many crops because it is in potential many times faster than conventional vegetative propagation and because the plants cannot be attacked by pathogens once an aseptic culture has been established. However, the potentials of micropropagation are larger than this. Because developmental processes can be controlled better in vitro, the micropropagated plantlets may have other advantages over conventionally propagated plantlets. To give one example, for strawberries it was recently found by Mohamed et al. (*Plant Cell Tissue Organ Cult* 25: 75–84) that inclusion of ABA in the final propagation medium resulted in a strongly increased number of flower trusses. Such potentials of micropropagation are hardly discussed in the book, and apparently automation and photoau-

trophic culture are envisaged as the only new challenges for micropropagation research in the future.

In conclusion, this book adequately reviews the state of the art in micropropagation. However, it only infrequently presents the background knowledge that is needed both for the development of protocols for the many recalcitrant crops and for exploiting the full potentials of micropropagation.

G. J de Klerk, Lisse

Fekete, G.: Congenital Chromosome Aberrations and Tumor Predisposition. First edition. Budapest: Akadémiai Kiadó 1990. 162 pp., 44 figs., 19 tabs. Hard bound \$ 24.00.

Malignant tumours in childhood and adulthood present a very serious problem to modern medicine. Aetiological studies with the aim of prevention of malignant diseases are of great importance. G. Fekete reviews the fundamental aspects of the interrelations between genetic factors and tumor development and also includes very interesting results of his own research work in this field. The book is divided in four chapters. Chapter 1 contains the association between congenital anomalies and malignant tumors; chapter 2 the possible mechanisms of chromosomal predisposition to malignancy; chapter 3 conclusions as applicable to medical practice and genetic counselling; and chapter 4 describes the different techniques of chromosome studies. All chapters are easy to reach and understand. The chapter about genetic counselling is of practical importance to all physicians. Nevertheless, I would like to make one critical remark. It's not correct to translate foreign proper names into English: for instance, "Miller's ducts" (page 33) instead of "Müllers ducts". The illustrations, some colored, are of good quality; the tables are clearly arranged. This book is of special interest to oncologists, pediatricians, medical geneticists (especially cytogeneticists), and internists, and it is also useful for reference in all other disciplines of medical science.

G. Seidlitz, Greifswald

Geldermann, H.; Ellendorf, F.: Genome Analysis in Domestic Animals. First edition. Weinheim New York Basel Cambridge: VCH Verlagsgesell 1990. xix + 337 pp., 92 figs., 26 tabs. £ 71.00.

This book is the proceedings of a symposium held in Hanover and is a guide to the giant world of genome analysis. It contains a collection of *review* articles that present a very comprehensive treatment of the application of modern molecular biology to a rapidly growing area in animal breeding – genome analysis. The 20 contributions, ranging from basic knowledge to application-oriented reports, provide information and concepts that are very useful not only to increase our basic knowledge of the genome of domestic animals but also to evaluate the impact of modern biotechnology in animal breeding/production. The broad scope of this book can be illustrated by the topics covered or by some key words:

- organization of animal genomes
- analysis of gene functions
- molecular mechanisms of immune response
- DNA fingerprints
- RFLPs and VNTRs
- computer application in genome analysis
- patentability of genetic inventions
- application of genome analysis in animal breeding.

You may not read it from cover to cover, but everyone involved in molecular biology/genetics and animal breeding should find some reports of interest and relevance. As a compendium of reviews this book would be a valuable addition to the bookshelves in respective research facilities.

L. Bünger, Dummerstorf-Rostock

Lai, E.; Birren, B. W. (eds.): Electrophoresis of large DNA Molecules. Series: Current Communications in Cell and Molecular Biology. First edition. Cold Spring Harbor, USA: Cold Spring Harbor Laboratory Press 1990. ix + 156 pp., 45 figs., 3 tabs. Soft bound.

The "Current Communications" series, of which this volume is the first in the series, aims to examine topics on which the impact of molecular and cell biology is particularly evident. This volume, *Electrophoresis of large DNA molecules*, is assembled by E. Lai and B. W. Birren and gives an account of the principles and practice of pulsed-field gel electrophoresis, a technique first described in 1983. The book is organized into eight chapters, with a final chapter by the editors providing a wider view, fitting for responsible editors. The book begins with a chapter devoted to the measurement of resolution in gel electrophoresis, putting forward an easily determined measure of resolving power, the resolution length. The chapter is illustrated with an application to a real gel. This chapter is succeeded by one on agarose gel properties, which makes the point that the rate of cooling alters the structure. A third chapter deals with the conformational dynamics of DNA during gel electrophoresis as studied by linear dichrois spectroscopy, followed by another on the velocity of linear DNA during pulsed-field gel electrophoresis. The largest chapter in the book is on fluorescence microscopy and computer simulations of DNA molecules in conventional and pulsed-field gel electrophoresis. This includes a demonstration by videomicroscopy that DNA can reorient by a number of different mechanisms, not the least of which is that while migrating under the influence of an electric field, the DNA molecule largely follows the path selected by the leading end. There follows then a section dealing with theoretical aspects of electrophoresis, in which it can be seen that there are still many important questions which have not been adequately answered, including what processes are hindering the separation of very long chain DNA. Zero-integrated field electrophoresis is the topic of a further chapter, showing that ZIFE can substantially reduce the velocity of larger molecules while providing a large differential for intermediate-size molecules (4–6,000 kbp). Finally, the volume is rounded off by a chapter on applications of pulsed-field gel electrophoresis to long-range genetics, a technique which potentially is able to bridge the gap between the resolution of cytogenetic methods (greater than 5 mb) and DNA analysis (less than 50–100 kb). This book should be on hand for all those working in the various fields of molecular biology, and it is fitting that it is the outcome of a Cold Spring Harbor Laboratory Banbury Conference Centre meeting, since pulse-field gel electrophoresis was first described in 1983 at Cold Spring Harbor. The book has a four-page index, and each chapter has a large list of relevant references.

J. F. Jackson, Glen Osmond

Welch, Humphrey, J.: The Conifer Manual, Volume I. Dordrecht: Kluwer Academic Publishers 1991. 436 pp., 126 figs., 248 tabs. Hard bound Dfl. 275.00.

Manuals are viewed by many as excerpts from voluminous books on related subjects from which a novice can learn the fundamentals of an art or science. Humphrey J. Welch's book, *The Conifer Manual, Volume 1*, proves that this is not always so. It is a complete book on its own merit, having as it were, X-rayed the various genera, families, species, varieties and variants regrouped under the name conifer. It is an example of elaborate research that touches on individual plants as they emerge from their parent genera and shows how the ingenuity of some men has helped to create new plants (cultivars) from the original parental plants.

In spite of botanical names and jargons, Welch has presented this difficult topic with a simplicity of style and arrangement

that makes it easy to read and understand, even by someone who is hearing of Conifer for the first time.

The Conifer Manual reads like a narrative-cum-descriptive essay written by a forestry nurseryman who wants to persuade a landscape architect to learn the habit of the Conifers before placing them on his plan.

The manual tells us that even plants have dignity. On page 25 Humphrey Welch writes: "The Dwarf Conifers are serious, dignified little plants and they resent being made to look ridiculous". This is why they should always be planted in the open, away from other large plant masses. This intriguing and elusive conifer, which has confused many foresters and gardeners in its identification, classification and nomenclature, is exposed in this manual by perfect descriptions, drawings and photographs.

The Conifer Manual is indeed a handbook of indisputable quality, which should be a companion to foresters, Landscape architects and gardeners. It left nothing untouched about the history, identification, cultivation and utilization of the various plants in the Conifer.

R. C. Agoha, Owerri, Nigeria

Campbell, A.; Baker, B. S.; Jones, E. W. (eds.): Annual Review of Genetics, Volume 24. Palo Alto: Annual Reviews Inc. 1990. 718 pp., 64 figs., 28 tabs. Hard bound 42 \$.

In this time of rapid progress in genetics there is an increasing demand for reviews primarily because it is very difficult for one single scientist to get a comprehensive insight into special topics. This volume, therefore, will be a useful source of knowledge for scientists interested in different actual aspects of genetics.

The volume includes articles covering a broad field of genetic research. Numerous articles present problems in connection with human genetics, as for instance tumor suppressive genes, retroviruses, arteriosclerosis, familial hypercholesterolemia, in vivo somatic mutation assays and effects of radiation. With respect to animal and plant diseases slow virus (prion) infections and plant pathogen interactions are discussed. Gene expression and metabolism are the subjects of the review on protein secretion by gram-negative bacteria, protein export in *Escherichia coli*, regulated mRNA stability and gene expression in plants as well as in mitochondria of *Saccharomyces*. Of course differentiation and development as important problems in modern genetics have also received attention, for instance in articles about early neurogenesis in *Drosophila*, development of *Aspergillus*, bacterial cell division or clock genetics. The article on frameshift mutations focusses on general genetics. Reviews about polyketides, P-element transposition, premeiotic instability in *Neurospora*, phage T4 introns and P1 interactions extend the catalogue of themes.

During the last few years, the trend has been to review preferentially special topics of genetics. To my opinion it would also be desirable to publish periodically overviews of the general problems of genetics.

E. Günther, Greifswald

Bollag, D. M.; Edelstein, S. J.: Protein Methods. First edition. New York: Wiley-Liss Inc. 1991. xii + 230 pp., 41 figs., tables throughout text. Soft bound \$ 29.95.

Protein Methods is a book designed around the gel electrophoresis of proteins. The authors Bollag and Edelstein consider that gel electrophoresis is the main means of analysing the various proteins of cell extracts, and so made it the central theme of this book. The volume therefore begins with an extensive chapter on the various reagents used in the isolation of proteins from cells, including detergents, salts, buffers, reducing agents, protease inhibitors and so on. This is followed by protein extraction methods (homogenization, sonication, French Pressure cell

and others), and then a third chapter dealing with the determination of protein concentration (absorption, Bradford, Lowry and others). Gel electrophoresis often requires that the protein solutions need to be concentrated; this is dealt with adequately in a further chapter. Then follow several chapters on gel electrophoresis, including electrophoresis under denaturing and non-denaturing conditions. Isoelectric focussing and two-dimensional gel electrophoresis is well-covered. There is also a chapter on immunoblotting. The book has five appendices, dealing with molecular weights of chemicals used, molecular weights and isoelectric prints of some prints of some proteins, an ammonium sulphate precipitation table, spectrophotometer linearity and a list of suppliers' addresses (for U.S. readers).

The book presents these topics with loads of practical detail, so that the reader has little need to consult other reference sources to carry out the techniques described. The theory behind the methods, however, is kept to a minimum, but key references are provided to enable the user to expand his or her knowledge in the various topics covered. A useful index is to be found rounding off this book.

All in all, a useful book for those research workers needing routine methods for virtually all proteins, and presented in the form of a standardized laboratory protocol.

J. F. Jackson, Glen Osmond

Burke, T.; Dolf, G.; Jeffreys, A. J.; Wolff, R. (eds.): DNA Fingerprinting: Approaches and Applications. Basel, Switzerland: Birkhauser Verlag 1991. 398 pp.

Based on an International Symposium on DNA Fingerprinting (Bern, 1–3 October 1990), this volume represents a coherent and useful view of an exciting field. Perhaps one would not expect less since one of the editors (Jeffreys) is clearly implicated in the paternity of this topic. In fact, the first article, by Jeffreys (and 12 additional authors!) is one of those rare works which includes a truly useful review of initial papers and exciting perspectives on further methods and applications. It is interesting to note there a careful discussion of many problems, now considered vexing, in forensic applications.

Separate sections papers deal with: (1) the different systems of DNA typing available and the molecular genetics of hyper-variable loci; (2) the population genetics and evolutionary biology of hypervariable loci; (3) applications in plant and animal breeding and in the study of natural populations; (4) medical and forensic applications.

There are some real pleasures available in this volume, and they demonstrate the power and flexibility of this method. As an example Longmire et al. studied genetic differentiation and migration of the Peregrine (and other) falcon(s) using a minisatellite probe from the bacteriophage M13. They detected a number of loci too highly polymorphic to tag specific populations. However, certain fragments were found only in females of some populations. (Females being the heterogametic sex in birds.) These fragments map to the W chromosome, and like the Y in mammalian and most plant sex chromosome examples, the W is a highly conservative entity. As such, it serves as a useful tag for individual populations. With these it was indeed possible to mark and track different populations.

Applications with chickens, quails, salmon, pooled (binned!) samples, QTL (quantitative trait loci), and plants are provided, and perhaps because this is a fairly new technology, many of the authors provide introductions which aid entry of the uninitiated into this field. However, the papers also represent the latest efforts of those still pioneering new techniques and applications. Certainly, for anyone interested in DNA fingerprinting, this volume is the one to obtain.

D. L. Mulcahy, Amherst

Nene, Y. L.; Hall, Susan, D.; Sheila, V. K. (eds.): The Pigeonpea. First edition. C.A.B. International – ICRISAT. Cambridge: Cambridge University Press 1990. 490 pp., 101 figs., 106 tabs. Hard bound US \$ 94.00.

This book is a true vademecum for all workers associated with this crop. Nitrogen-fixing crops, with their high nutritional value, frequently provide their own nitrogen. Through their association with vesicular arbuscular mycorrhizae they are also able to supply to some extent, depending on the soil, their own phosphorus requirement. These crops are therefore a valuable low input and ecologically clean class of crops. This complex association of organisms living as symbionts has, however, been the cause of the slow increase in yield observed in grain legumes. Books of the nature of the one under review are therefore essential for the development of these crops. The authors of *The Pigeonpea* have ably assembled experts on the various fields of study in this crop. Pigeonpea ranks only sixth among the grain legumes, but it is utilised in many diverse ways by the traditional small holders and has a potential for mechanised farmers as well. A total of 18 fields of study are covered in this volume ranging from geographical distribution, taxonomy, genetics and associated subjects, through nutrition, agronomy and farming systems and plant protection to utilisation and marketing. At the end of most chapters research priorities and bottle-necks are discussed, viz: the need for short-season, daylight-neutral cultivars, increased protein content, reduction of anti-nutritional factors, monitoring of nutrient status, improved nodulation and nitrogen fixation, low temperature tolerance, disease resistance, integrated pest control exploitation of hybrid vigour, harvest mechanisation and marketing. Each chapter is followed by the relevant references. This book can be considered a model for books on similar crops. It is recommended to researchers on grain legumes at universities and crop research institutes. It is also an excellent reference work for any student in this field.

J. A. M. Van der Mey, Potchefstroom

Ishihama, A.; Yokshikawa, H.: Control of Cell Growth and Division. Tokyo Berlin Heidelberg: Japan-Scientific Society Press, Springer 1991. 226 pp., many tabs. and figs. Hard bound DM 148.00.

The efforts made by the editors to further advance our knowledge on the molecular regulatory events associated with cell growth and division are fulfilled by the presentation of impressive data in this book. It contains 15 articles written by a team of Japanese experts and summarizes the results of research carried out on bacteria and yeast during 1987–1989. This research was supported by the Japanese Ministry of Education, Science and Culture. The 15 articles are assembled in four sections, (1) Chromosome duplication and partition, (2) Cell division and cell cycle, (3) Cell growth and gene expression, and (4) Glossary of genes and proteins for cell growth and division.

In each article, not only a review on the current state of the art of the topic in relation to the control of cell growth and division is given, but also specific data and the items that need further investigation are presented. At the end of each article, a detailed list of references is given. The mechanism of DNA replication and termination, control of mitotic and meiotic division, expression of genes during cell division and growth and mapping and isolation of genes related to cell division are some of the important topics that have been dealt with in various sections. The last section especially gives an impressive collection of data on gene mapping in *Escherichia coli*, *Saccharomyces cerevisiae* and *S. pombe*. Detailed gene maps on chromosomal localization are clearly presented in various figures or tables.

This hard-bound edition is reasonably priced. It is a comprehensive and useful source book for scientists and students deal-

ing with cell molecular biology of not only prokaryotes but also eukaryotes.
K. S. Ramulu, Wageningen

Adams, R. L. P.: DNA Replication. "In Focus" Series. First edition. Oxford, England: IRL Press at Oxford University Press 1991. ix + 86 pp., 44 figs., Nil tabs. Soft bound. £ 6.50.

DNA Replication is one book in the "In Focus" series, which so far has included 13 titles by different authors on such topics as immunology, enzyme regulation and kinetics, membrane structure, genetic engineering and so on. Series editors are D. Rickwood and D. Male. The series aims to appeal to students facing the problem of keeping up to date with key areas in biology and medicine. Each book tries to complement course work by providing in-depth knowledge of the topic. In this the present book under review, *DNA Replication*, succeeds quite well. The author, R. L. P. Adams, introduces the general model for DNA replication first, together with the various types of protein involved and the reactions occurring at the replication fork. This is followed by a chapter on initiation of replication at the replicon, highlighting the need for RNA primer molecules. The author then deals with the significance of timing and direction of gene transcription, and then goes into the various experimental approaches used to study eukaryotic origins. The book deals with termination signals and new findings regarding telomere structure. It also considers how replicated DNA is packaged prior to cell division and epigenetic information is conserved.

Given that the author has dealt with all these aspects of DNA replication in 86 pages, including a useful two page index, I believe he has succeeded in providing a shortened in-depth presentation of the subject of DNA replication. For the student needing further in-depth knowledge, then the book by Arthur Kornberg with the same title should also be recommended. Adams' small book provides a glossary of terms used and an index, as well as a suggested list of further reading and references at the end of each of the six chapters. An eminently readable little book that can be recommended for students in biology and medicine.

J. F. Jackson, Glen Osmond

Dix, P. J. (ed.): Plant Cell Line Selection. Procedures and Applications. First edition. Weinheim New York: VCH 1990. 354 pp., numerous figs. Hard bound £ 72.00.

At present the range of basic and applied investigations in plant cell and molecular biology is very broad. In all these investigations the use of selection procedures is necessary. The idea of VCH Publishers to ask Dixon (the editor) to compose a multi-authored handbook on Plant cell line selection should be very much appreciated, because such a specialized handbook has not been available until now.

The new handbook is split into three sections: (A) methodology, (B) selection of variants of agricultural and industrial interest, and (C) cell selection in relation to genetic manipulation. In total 19 internationally well-known authors have contributed to this book, which comprise 13 chapters. Section A consists of four chapters: (1) culture systems and selection procedures, (2) in vitro mutagenesis, (3) flow cytometry for selection of plant cells, (4) micromanipulation of higher plant cells. Section B includes: (5) in vitro selection for disease resistance, (6) herbicide resistance, (7) environmental stress resistance, (8) selection for increased yield of secondary metabolites. Section C includes: (9) genetic markers, (10) mutants isolated in vitro, (11) selection of somatic hybrids, (12) selection of cytoplasmic hybrids, and (13) selection of transformed cells.

This attractive new handbook is extremely well composed, starting with the typical methodological aspects, followed by a really new look at the objectives of in vitro selection. The book also highlights current problems limiting cell selection. The editor and authors have succeeded in providing in this valuable handbook an up-to-date review of the progress in very specific areas of cell selection. Although there is some overlap in the various chapters, this is certainly not annoying to a reader. It is extremely valuable that cross-referencing between chapters is employed.

The book will certainly be a good source of information for postgraduates and especially research workers in the field of cell and molecular biology. Also for those involved in teaching, the book is very helpful. It is well printed and richly illustrated with tables and figures of good quality and contains at the end a helpful plant and subject index of 14 pages, whereas references are always given at the end of each chapter.

R. L. M. Pierik, Wageningen

Friedemann, Th.: Therapy for Genetic Disease. Oxford University Press 1991. 127 pp., 25 figs., 7 tabs. Soft bound £ 16.50.

The therapeutic tools and approaches that are presently available fall into a number of general categories, including replacement of needed metabolites, removal of toxic metabolites or interference with their accumulation, replacement of damaged organs, and restoration of the normal form of mutant gene products. Each of these approaches has been applied effectively to a number of diseases. The purpose of this volume is to summarize those successes. Six reviews deal with classical approaches to the treatment of inherited metabolic disease (W. L. Nyhan), cofactor replacement (L. Sweetman), treatment by toxin removal in Wilson's disease, cystinuria, thalassaemia, cystinosis (J. A. Schneider), enzyme replacement in lysosomal storage disease, adenosine deaminase (ADA) deficiency (M. Hershfield), organ (bone marrow) transplantation (R. Parkman), and gene therapy (T. Friedemann). The last subject is included in the present volume, not to suggest that it has become a form of therapy, but to indicate the growing level of acceptance of the concept of gene therapy in the medical and molecular genetic communities.

This book gives a good overview of special topics, and will be of interest to all geneticists and physicians as well as genetic counsellors.

F. H. Herrmann, Greifswald

Young, I. D.: Introduction to Risk Calculation in Genetic Counselling. Oxford New York Tokyo: Oxford University Press 1991. 160 pp., numerous figs. and tabs. Soft bound £ 12.50.

Genetic counselling is a multi-faceted exercise that draws upon a number of skills. These include patience, insight into human nature and, not least, a sound knowledge of genetics and the ability to calculate probabilities. This little book describes in detail how risks can be estimated or calculated for most counselling situations. All patterns of inheritance are considered. Particular attention is paid to the segregation of balanced chromosome rearrangements and risk calculation in single gene inheritance, taking into account factors such as reduced penetrance, late age of onset, consanguinity, and the extended family. The use of linked markers is also covered at length. The book will be of benefit to everyone involved in the provision and delivery of genetic counselling services.

P. Eberle, Braunschweig