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Book reviews

Principles of Plant Breeding, *2nd edn*, by R. W. ALLARD. ix + 254 pp. Chichester: John Wiley & Sons, Inc. (1999). £48.50 (hardback).
ISBN 0 471 02309 4.

I was interested to see the second edition of this book because as a student I made a lot of use of the first edition published in 1960. Plant breeding has progressed considerably over the past 40 years and to some extent this is reflected in this new edition. The book is very different from its predecessor and it is really difficult to recognize it as a second edition of the same book. It contains less detailed information which tends to make it rather more accessible to the general reader. Interestingly, the first three chapters of the Introductory Part I are devoted to Darwin and the relationship of his concepts to agriculture and the domestication of crops. This was given relatively little attention in the first edition and I wonder whether it is emphasized to counter some rather anti-evolutionary attitudes which tend to surface in some parts of the USA. Part I finishes with two chapters which deal with mating and reproductive systems and the major effects these have on the improvement of cultivated plants together with the influence of genetic linkage and epistasis. Part II deals with genetic principles including mendelian inheritance and its application in quantitative genetics and the intricacies of long-term selection response. The final two chapters in this section consider the use of new DNA technologies to investigate and deal with plant breeding problems. Interestingly, Allard chooses to discuss marker-assisted analysis of adaptedness in nature and marker-assisted dissection of adaptedness in cultivation, rather than marker-assisted selection in plant breeding. Perhaps, this is not surprising as these topics comprise some of Allard's own research interests and some aspects are considered in great detail. However it is a pity that more attention is not given to the use of marker-assisted selection in the modern breeding plans discussed in Part III. Operational breeding programmes have considerable potential to increase their efficiency and effectiveness through the use of molecular markers. However markers are not mentioned at all in the discussion of the development and operational features of breeding plans applicable to self-pollinated, outcrossing and clonally reproducible species and the breeding of hybrid varieties of selfing and clonally propagated species. The final chapter of the book deals with plant breeding for low-input agriculture and considers the problems of dealing with genotype–environment interaction which has considerable importance in global agriculture. Allard points out that although resource-poor farmers conduct about 60% of global agriculture, they only produce 20% of global food supply. Also, plant breeding has not served resource-poor agriculture as well as resource-rich. Use of new techniques of genetic modification offer some potential to rectify this situation, but this rather contentious subject is completely avoided in the book. Although it was not what I expected, for the most part I enjoyed reading the book. Allard has been involved with plant breeding and its underlying principles for a long time and I recommend his book as being a stimulating introduction to a very complex subject.

M. O. HUMPHREYS

Grass: Its Production and Utilization, *3rd edn*, ed. A. HOPKINS. xiii + 440 pp. Oxford: Blackwell Science (2000). £35.00 (paperback).
ISBN 0 632 05017 9.

Blackwell's highly praised and authoritative book, *Grass – Its Production and Utilization*, is once again brought up to date. Under the new editorship of Alan Hopkins, the third edition appears 20 years after the first edition broke new ground by combining the science of grassland with husbandry in 1980 and 11 years after the appearance of the revised and updated second edition in 1989.

The management of grassland and its role in the countryside has changed considerably during the 11 years since the second edition was published. Although the emphasis continues to be on the agricultural management of grassland, the book has been completely reorganized and rewritten to reflect these developments, the most notable changes or additions being the areas of nature conservation and landscape, impact on the environment, amenity uses and organic farming.

The third edition is much enlarged reflecting an increase from 8 to 15 chapters and from 270 to 428 pages. Much of the reorganization emanates from the sub-division of the previously extremely long chapter devoted to Herbage Production into several logically titled and sequenced chapters, including Herbage Seed Production. The number of contributors has increased significantly from 10 to 23 reflecting an extremely wide range of expertise and, although relying heavily on I.G.E.R. staff as might be an-

ticipated given the subject area, combining experience and knowledge from a comprehensive and balanced array of sources.

Each chapter is self-contained with a detailed list of references attached to each one, allowing the reader to use the book as a relatively simple and ready source of reference on specific issues or topics as well as an all-embracing text in its own right.

Emanating from the chapter on Herbage Production in previous editions, Sward Establishment and Renovation is much more detailed with attention paid to post-sowing management, renovation and establishment in special situations. The Principles of Pasture Growth and Utilization chapter is extended with greater attention paid to interactions between utilization and growth whilst Herbage Production is much more concise and specific. Weeds, Pests and Diseases are dealt with logically and Herbage Seed Production represents an authoritative account of a relatively small but specialized component of the world's grassland production systems. The Feeding Value of Grass and Grass Products has been significantly updated e.g. degradability, prediction of digestibility and protein supply while The Conservation of Grass outlines recent advances in technology, particularly additive use. The latter chapter does highlight one potential weakness of the book, however, in that opportunities to refer to information in other chapters are missed e.g. yield or production and feed value in this instance, and the relatively inexperienced reader might find it difficult to link some information across chapters to best effect.

Principles of Foraging and Grazing represents a much increased subject area with invaluable information on grazing behaviour while Grazing Management is highly topical and covers aspects of pasture budgeting effectively and in detail. Grassland Management for Natural Landscapes and Wildlife is highly relevant and contains an excellent section on decision-making and management mechanisms whilst Amenity Grassland is covered in exhaustive detail. Control and Utilization of Livestock Manures reflects the increased importance of, and potential threat posed by, animal waste, although there might have been greater scope for cross-referencing relevant sections on fertilizer use in another chapter. The introduction of The Role and Management of Grassland in Organic Farming is highly laudable, yet again providing detailed background and highlighting relevant issues as well as including a lengthy list of further reading. Economic Aspects of Grassland Production and Utilization completes the third edition and, although encompassing a different science to that contained in all previous chapters, applies the technology clearly and thoroughly and places the whole subject in context.

The book continues to form an essential, and much improved, text for students at most levels, the scientific content and sheer bulk of the most recent edition possibly making it most relevant at BSc and post-graduate levels.

I. G. OWEN

The Living Land: Agriculture, Food and Community Regeneration in Rural Europe, by J. PRETTY. xii + 324 pp. London: Earthscan Publications Limited (1998). £12.99 (paperback) or £18.99 (hardback).
ISBN 1 85383 516 1 (hardback).
1 85383 517 x (paperback).

This is an important book at a time when modernist rural policy directions are increasingly questioned and rural development is being re-thought. The author sets out in detail an alternative farming future which, he claims, will regenerate natural and social capital in rural areas by means of dynamic rural economies in which farming is more sustainable, through improvement in the sustainability of food systems, and through the creation of cohesive and sustainable rural communities.

The basic challenge for a sustainable agriculture is formulated in terms of minimizing external inputs and utilizing or regenerating local natural and social resources. Such a strategy increases farmers' contact with local communities and with consumers. His suggested three steps to sustainability are the adoption of cost-reducing information-intensive technologies and practices, the incorporation of regenerative technologies to make best use of local resources, and the redesigning of agriculture as a central part of community economic and social activity. Sustainable agriculture is seen as a process of social learning rather than a fixed technological package, and this highlights the importance of policies to provide incentives and support.

The key to creating more sustainable food systems is seen as concentrating more of the value-added with farmers and rural communities. The author details the environmental and social costs of the current food industry and, in dealing with how rural communities might capture more of the value produced by rural natural and social capital, the author considers such options as direct selling, enhancing links with urban communities, farmer cooperation, labelling and traceability, and the community food security concept.

Creating sustainable rural communities is seen in terms of an endogenous rural development which builds on local natural and social resources rather than relying on external solutions. In exploring the recreation of social capital through participation and community partnerships, the author catalogues recent changes in rural areas and reviews current (exogenous) policies for rural development. Potential endogenous development patterns are then analysed, including the importance of local participation, the methodologies

by which participation might be achieved, and rural job creation possibilities.

The book's main point is that if natural and social capital were included with food production in determining agricultural efficiency, then public decisions and policy would be very different. The author argues that a significant 'sustainability dividend' is available from a system-wide transition towards sustainable agriculture, localized food systems and rural community partnerships. Boldly, he attempts to cost the benefits, suggesting that in total, depending on the extent of policy reform, the 'sustainability dividend' for rural Britain could amount to between £9 and £16 billion and to between 320000 and 590000 jobs, even before many less quantifiable benefits are taken into account. These resources come from reducing the external costs of modern food production on the environment, transferring productive activities from one group of stakeholders to another, shifting inputs to regenerative technologies, and enhanced rural tourism. The winners are farmers, rural communities, food consumers, natural resources and governments; the losers are the agricultural input companies, food manufacturers, processors and retailers. No doubt, many readers will wish to contest the precise figures (which, to this reviewer, seem heavily dependent on the extent to which tourist spending can be increased and captured by local communities), but the magnitude of the benefits is clearly non-trivial.

The book has many praiseworthy characteristics, in particular its copious references to practical examples from around the world, its clarity of exposition and argument, the relentless nature of its analysis and statistical illustration. As such, it is a valuable source of basic information on many of the policy issues in modern agriculture. Encouragingly, the overall impression it manages to produce is one of considerable hope for rural areas, not least because of the numerous promising schemes which the author catalogues and which, although often individually very small, together amount to a potential for significant change in the way rural policy might evolve.

T. N. JENKINS

Agriculture, Fertilizers and the Environment, by M. Laegreid, O. C. Bockman & O. Kaarstad. xxiv + 294 pp. Wallingford: CABI Publishing (1999). £22.50 or $40.00 (paperback). ISBN 0 85199 385 3.

The title of this book suggests a broad coverage and this is certainly fulfilled by the text which ranges from Azolla (an N fixing water fern) to zinc, from socio-economic behaviour patterns to industrial emissions and from Harpenden to Vietnam. With such an enormous subject area it is difficult to achieve a totally logical progression and the eight chapters into which the book is divided, inevitably contain some overlap and to-ing and fro-ing between topics. Some might argue that each topic is covered in too little depth but the great value of this book is as a reference source and an introduction into the complex issues of food production and its impact on the environment on a world scale. As such the authors have brought together an impressive number of facts and messages which are very relevant to the present situation and the future outlook. There are no fewer than 378 references which are quoted as much to provide sources of further reading for those seeking detail, as to justify the text.

There is interest and value here for researchers, agronomists, students and even the general public as the ethical issues of feeding the exploding world population as well as the scientific aspects are discussed. The challenges and opportunities for the three global cereal crops (wheat, rice and maize) are reviewed together with an overview of agricultural productivity for each of the seven main regions of the world. These reveal the amazing polarity between the sophistication of the developed world with highly advanced measurements, regulations and agronomic practices and the subsistence farming practices of many developing countries. The problems of water, climate, soils, energy, education and infra-structure are also investigated in detail.

The underlying principle advanced throughout is the need for continuing efficiency of land use by integrated total agronomy (including fertilizer use) in harmony with the individual local ecology and global environment. The expansion of extensive farming onto a larger land area is clearly not an option. Some might claim fertilizer industry bias in this view, but the wealth of facts presented clarifies the issues in a fair and unbiased manner. The concerns relating to fertilizer use are defined in detail as well as the issues of sustainability and food quality. Whilst it is acknowledged that natural factors such as soil and climate present major challenges it is concluded that the greatest constraints to food production on a global scale derive from political and economic conditions which affect input use.

The attractive layout and use of clear figures and tables to illustrate the many facts, make this a worthwhile reference for those involved in agriculture, fertilizers, the environment or food.

J. HOLLIES

An Epidemiological Investigation into Bovine Tuberculosis: Towards a Sustainable Policy to Control TB in Cattle, Second Report of the Independent Scientific Group on Cattle TB, Presented to the Minister of Agriculture, Fisheries and Food, The Rt Hon Nick Brown MP, December 1999. Published 1999.

Copies of the report are available from MAFF

Publications, Admail 6000, London, SW1A 2XX. Tel: 08459 556000 or e-mail: maff@sr-comms.co.uk, Ref PB4870
Executive summary can be found at www.maff.gov.uk/animalh/tb/isg/cover.htm

The second interim report of the 'Bourne' Independent Scientific Group provides a useful update on the implementation of the 1997 Krebs Report recommendations. The scope of the programme has been greatly extended, in order to attempt to arrive at a scientifically robust, cost-effective, and sustainable policy to control or ultimately eradicate bovine tuberculosis in cattle. The government's five point strategy is hence aimed at protecting public health, possible vaccines for cattle or badgers, research into transmission of TB, and the twin aspects of cattle management and the badger culling trial in 10 'triplet' study areas, to ascertain the contribution of badgers to further cattle herd breakdowns and whether culls are a realistic local option for minimizing this risk. Blanket culls are ruled out as politically unacceptable. Cattle husbandry risk factors are being studied through improved TB 99 questionnaire surveys which are more rigorous than the previous TB 49 forms which attempted to identify the source of TB in herd outbreaks.

Clearly, this holistic approach will eventually produce answers to formulate a better TB control policy. As an academic exercise it is commendable, albeit according to some, about 20 years too late! And neither current cattle policy nor the Bourne badger cull itself in a mere 2000 km^2 will solve the current rise in cattle TB. From a low point of 89 TB herds and 600 cases in the late 1970s, there are now some 800 new herds and 7000 cases and TB is back to 1960s levels, apart from having spread from tiny southwest pockets to an area from the Midlands to Cornwall. GB had a textbook success policy up until the mid-70s, and it will be necessary to go back to annual testing and movement bans into TB free areas in order to bring TB back under control.

The Report cites three Irish studies, but regrettably fails to appreciate why they underpin the success of TB schemes over the last century in over a hundred countries worldwide. The studies explain why the doubts as to the importance of cattle-to-cattle TB transmission have arisen. TB is a progressive lung disease, such that the initial microscopic lesion or 'tubercle' grows and spawns secondary lesions in the lungs and elsewhere. Consequently, the animal becomes progressively more infectious, as well as more likely to have a measurable immune response in the skin or in other tests. The three studies show this progression (*Veterinary Record*: McIlroy 1986, **118**, 718; Neill 1988, **123**, 340 and **131**, 45; Crilly, 1997, **141**, 344). Thus when annual testing of all cattle has been in place for some years two things happen. Since it takes 11 months or so to get to the lesion stage following low natural challenge dose, although nearly three-quarters of cases had lung lesions, over half were single lesions under 1 cm in diameter, which incidentally would be missed at gross abattoir inspection. Thus reactors are removed before they get to the multi-lesion highly infectious stage. Secondly, late on in TB schemes over half of reactor cattle do not have lesions and are not infectious because they do not have TB: false positive reactors! Such non-TB cases can rise to 100% late on in TB schemes, making the finding and removal of actual TB carriers that much more difficult. However, this last 'undisclosed reservoir' must be removed, since any relaxation of testing regimes simply allows TB escape from containment. Annual testing is the gold standard worldwide. An earlier article considers such issues: Hancox 1995, *Journal of Agricultural Science*, *Cambridge* **125**, 441.

M. HANCOX