Book reviews


Subsequent to 1931 (the foundation year, incidentally, of the Agricultural Research Council) farming was transformed into a protected and state-subsidized sector of the economy and although the industry was to remain, to all intents and purposes, in a relatively depressed state until the outbreak of war, it was never again to be completely subject to the chill winds of international free market forces. During the course of 70 years official agricultural policy, emanating initially from Whitehall and by the 1970s, substantially from Brussels, shifted from that of stimulating immediate post-war food production and thence, by way of a period of selective expansion and a drive for self-sufficiency, to adopt a series of measures to control surpluses and enhance environmental management and protection. In John Martin’s admirably balanced and wide-ranging account we revisit all those pivotal features of the modern history of agriculture: the Wheat Act of 1932, the Marketing Acts of the 1930s, the WAECs of wartime Britain, the 1947, 1953 and 1957 Acts, the accession to the European Community and so on. Standard quantities, deficiency payments, structural amalgamation and retirement grants, the myriad subsidies and plethora of state intervention on the part of the nation’s most basic of industries are dealt with by Martin in a text ideally suited to anyone requiring an introduction to this complex and fascinating period. Drawing upon a wide and sometimes esoteric range of sources, both agricultural and historical, Martin (as becomes a man with farming antecedents) deals as confidently and competently with his expose of the various schools of thought engaged with post-war policy as he does with his description of the past half century of scientific and technological developments in the industry. Unlike many contemporary agricultural historians, Dr Martin steers clear of the abstractions of historical theory and confines his narrative to a consideration of the basic facts of the last 70 years of agricultural development, giving us an account which is replete with statistics and common sense practical judgements. If the writing is occasionally terse and the use of the comma mildly eccentric, the book is well-structured and the text direct and to the point. It is essentially a work about farming and the way in which the farming industry and its satellites (the worlds of agricultural research, education, advice and marketing) adjusted to the temper of the times. We read little of the land market, the farm labourer or the landed estate and, apart from an impressive later chapter covering environmental issues and plural activity, there is little here to satisfy the student of rural communities.

Inevitably a book covering so broad a canvas raises many questions, depending upon the perspective of the reader. Was agriculture really ‘incapable’ of meeting domestic demand in the 1930s or (as Sir Oswald Mosley never tired of suggesting) was it the victim of injudicious British investment overseas? Again, to what extent was the post-1945 agricultural revolution a function of farmer competence/confidence under stable market conditions and not merely a consequence of technological evolution? How dictatorial were many of the WAECs with their powers of coercion and eviction; did they, as is sometimes hinted, use their authority to settle old scores? Was the low uptake of tractor technology in the early 1930s merely a reflection of capital shortage or a recognition of the sheer unreliability of many machines? Questions of this sort, and others besides will be raised in many an undergraduate seminar. How significant, for example, was the myxomatosis outbreak of the 1950s, in enabling the expansion of both crop and livestock production? In the process of discussion students will raise an eyebrow at some of Dr Martin’s terminology (‘strong land’; ‘intensity’), ponder the process whereby sheep production was ‘rationalized’ in the 1930s and (it is fondly to be hoped) draw breath when they read of 4 tons/ha as a decent yield for wheat in the 1990s! But this is to cavil. Martin has produced an excellent book which will be required reading for the present generation of students of the rural economy.

These things are, of course, a matter of taste, but there is little in Martin’s narrative to indicate just what it was like to be a farmer in the troubled thirties, the glory-days of the sixties and seventies, or even the appalling times of the present when agricultural suicides are all too frequent. In a future volume, perhaps, he might explore the enormous corpus of fictional and non-fictional agricultural writing to expose the world of the ‘dog and stick’ to highlight the sheer hard slog of farming in wartime with a coterie of land girls and prisoners-of-war and to flesh out the trauma and heartbreak of working in an industry assailed on all sides by ill-informed critics and highly-paid lobbyists bent upon the destruction
of many cherished rural values. As he does so he
might take the opportunity of reminding readers from
outside the industry that despite the undoubted
environmental changes consequent upon three-
quarters of a century of agricultural development,
farmers have, by and large, discharged their duties as
custodians of the landscape. After all, to anyone who
takes the trouble to abandon their car and walk the
lanes and by-ways of Britain, the managed countryside
remains self-evidently a place of great beauty.

R. J. MOORE-COLYER

Forage Evaluation in Ruminant Nutrition, ed. D. I.
GIVENS, R. F. E. Axford & H. M. Omed. xii + 480
ISBN 0 851993443.

The contribution of forages to ruminant diets cannot
be understated and therefore evaluation of forage
composition is of critical importance for any ruminant
production system. This multi-author book makes an
excellent and detailed contribution to the field of
forage evaluation. It is targeted at researchers and
advanced students and certainly addresses this audi-
ence, although it will also be a useful source of
material for all students with an interest in animal
nutrition.

There are 21 chapters divided into five sections. The
introductory section includes chapters dealing with an
overview of forage evaluation and forage intake. Readers
would be advised to look at Chapter 2 on ‘Forage evaluation for efficient ruminant livestock
production’ before reading further: it gives a critical
and excellent overview of all evaluation methods,
highlighting in particular the problem of validating
any new technique. The second section focuses on
estimation of the energy value of forages. Included is
a chapter describing the prediction of energy supply
which emphasizes that future systems for energy
evaluation will need to move from predicting energy
supply per se to supply of individual nutrients which
will pose added challenges for forage evaluation
techniques. The remainder of the section provides
detailed accounts on evaluation techniques ranging
from the classical in vivo digestibility trial through the
in situ, nylon bag technique to the gas-production
technique which has received much recent interest.
The third section deals with estimating protein value
of forages using a similar approach to that used for
energy describing in vivo, in situ and in vitro techniques
for measuring, principally protein degradation in the
rumen. The final methods section comprises three
chapters dealing with laboratory techniques for
measuring forage composition and prediction of
digestibility, the background and application of the
widely used near infrared spectroscopy technique and
finally a chapter describing other physicochemical
techniques which at present are used only in a
research environment. The remaining section differs
from the three methods sections in that it contains
largely descriptive but none the less valuable material
on the occurrence of major minerals, trace elements
and vitamins in forages. There are few omissions from
the subject coverage in the book. Two items which
might have benefited from more detail are the
prediction of forage intake, which only receives a
brief description, and methods for assessing rates of
outflow of material from the reticulo-rumen, a
measurement critical for measuring effective degra-
dation of material in the rumen. In general, the multi-
author approach works well as the chapters are
compiled by experts in their field and contain extensive
bibliographies. The individual authors have clearly
been requested to make a critical evaluation of the
techniques involved in forage evaluation and this is
one area where the response has perhaps been a little
patchy.

Overall, the book is a valuable resource for
university and college libraries and for individual
workers in the field of ruminant nutrition and animal
production. It will be of interest both to researchers
and those involved in the evaluation of forages for
consultancy purposes and should prove a standard
reference in the years to come.

J. ROOKE

BENGOUCH, C. ENGELS, M. VAN NOORDWIJK, S.

In his preface, the senior editor poses the question
‘Why a new handbook on root methods?’ The
answer, apparently, is that it forms one of the
deliverables of a project on roots sponsored by the
European Union. As a result, an impressive list of
authors, some from outside Europe, has been brought
together to provide this considerable collection of
information on how to study roots. Each of the 16
chapters has been reviewed by ‘at least two in-
dependent’ experts, an admirable effort, and one that
is reflected in the final quality of the product.

There are separate text boxes included in each
chapter. These are used to illustrate the main text with
examples and case studies to help the reader. Also
included in each chapter is a section dealing with
future trends in the topic area.

The first chapter provides a basic introduction to
the topics covered in the following papers. It deals
with the reasons for studying roots, summarizes the
key parameters of root systems and the functional
significance they have, and provides a definition of
those parameters together with the usual means of
measurement. Perhaps surprisingly, root turnover
and demography are missing from the list of measurements presented. The author raises the important point of functional redundancy in root systems, a feature that can be interpreted in terms of insurance against the risk of adverse conditions, but also a feature that confounds links between root characteristic and functional activity.

Chapter 2 is a detailed account of methods used in studying root anatomy and histology under both light and electron microscopy. Fixing, staining and mounting methods are described, and appropriate recipes are included. Other than how the depth of the field of view can be determined, no details of microscopic techniques are given for light microscopy, or for either transmission or scanning electron microscopy. Special attention is given to investigating the root soil interface, and to the interaction between microbes and roots. In the latter case, techniques for studying free-living microbes as well as rhizobia, arbuscular mycorrhizas and ectomycorrhizas are provided. Particular prominence is given to techniques appropriate for studying root hairs. The next chapter concentrates on characterizing and controlling the physical environment relevant to root studies. Inevitably much attention is given to controlling water content and potentials, but oxygen supply and mechanical impedance are well covered. Discussions on temperature and soil structure are included in the section on the characterization of conditions in the field.

Chapter 4 provides an account of the mathematical modelling that is available to describe the growth of root systems and their architecture. The authors divide models into those which aim to describe the distribution of roots on the basis of a per unit of soil volume, and those which use morphogenetic rules to simulate root architecture, which is then modified by local environmental impacts. In the first group are models that describe rooting depth, root length density and combination models. The authors cover the key driving variables used in the models, and how internal regulation by the plant (including mortality) and external constraints (nutrients, water, temperature, mechanical constraint) are used to modify the final form of the simulated root system.

Sampling strategies, and the associated statistical background are covered in Chapter 5. The next 3 chapters go into details of (field) techniques for studying roots. These include auger sampling, ingrowth cores and pinboard methods (Chapter 6), profile wall techniques and core-break methods (Chapter 7), root windows (plane transparent walls) and minirhizotrons (Chapter 8). Sections on the evaluation and transformation of data are very useful.

One chapter is devoted to the measurement of fine root longevity.

Chapter 10 is devoted to analysis and interpretation of images made of roots washed out from cores or taken in situ using minirhizotrons. The theme of imaging roots is continued in the next chapter, but deals with computer-assisted tomography and the use of nuclear magnetic resonance.

Chapter 12 covers nuclear techniques used in root investigations. There is some duplication with Chapter 11 because a section on NMR is included here as well, but in the main, this chapter deals with the use of stable and radioisotopes used in studies of nutrient acquisition. There is a comprehensive coverage of the measurement techniques available for the different isotopes. Techniques to study the capability of roots and symbiotic structures to access nutrients are covered (Chapter 13), as are those for studying water uptake by roots (Chapter 14). In the latter, some techniques for investigating transport within woody plants are also included. Although very comprehensive in its covering of the range of techniques, Chapter 14 falls far short of the requirements for a handbook on methods. The section on the neutron scattering technique does not warn new users of the need to make special provision near the soil surface and comments on calibration are sketchy. Surprisingly, the section on time domain reflectrometry is equally sketchy, and gives no basic references on the technique. One can only assume that the lack of detail in the basic techniques was deliberate, but it contrasts markedly with other chapters in this regard. It would have been helpful to have some examples of results of particular investigations, both to give the reader some sense of the values they are likely to obtain and to indicate how results can be interpreted.

Chapter 15 discusses the modelling of nutrient and water uptake by roots.

The final chapter deals with the anchorage of plants, and includes an overview of the key aspects of anchorage and sections on the techniques available to measure the components of anchorage as well as integrated assessments.

No other publication on root investigation comes close to providing such comprehensive coverage, so it will undoubtedly become a standard reference. However, readers must be prepared to undertake their own cross-referencing – that provided is rudimentary – and the order of chapters often requires reference to later chapters, to gain a full understanding.

M. J. GOSS


This substantial volume considers the analysis, summarization and presentation of data from a soybean trial. The intention is to convey the underlying
principles of using graphical methods to illustrate the results of a variety of analyses. A secondary aim is to communicate a clear understanding of the strategies involved in dealing with multi-attribute data so that both statisticians and non-statisticians can then apply them to their own data.

There are three main sections: Part A introduces the types of analysis that are useful in analysing multi-response data; Part B illustrates more fully the application of these techniques to the data set; and Part C, the longest of the three, deals with the technical details of the calculations used in A and B.

The graphical approaches are confined to four main types: all variable pairwise scatter plots represented as scatter plot matrices; graphical and semi-graphical plots of confidence intervals for genotype means; profile plots of individual genotypes and groups; and smoothed profile plots.

The book is remarkable in that the authors have chosen to illustrate graphical exploration methods using a single data set obtained from a plant breeding trial. This general framework works extremely well and many of the applications of the methods in this book are inspiring.

Those who prefer to learn by example will benefit most from reading this book, although it should be noted that it is not an easy book to draw upon for cursory instruction. There are many techniques here that can be usefully added to a statistician’s toolkit, but not without some devoted effort nor without first reading most, if not all, of the 41 pages of Part A.

My main concern is that the authors too readily assume that the reader will gain a tacit understanding of the concepts from the graphs; knowing the difficulties experienced by non-statisticians, I was often left asking why? For this reason, I recommend the book primarily to statisticians involved with large multi-response data rather than the wider scientific community.

L. BROADFOOT


This is a large book of over 1000 pages which at first sight promises to be a veritable mine of information. The preface, however, reveals that it is based on existing chapters published in Ullmann’s Encyclopedia of Industrial Chemistry. It is further stated that most of the chapters have been updated and extended.

A cursory examination immediately invites comparison with The Pesticide Manual published by the British Crop Protection Council, but Agrochemicals goes much further than the Manual in that it also provides information on fertilizers and biological control agents. It also provides what can best be described as introductory textbook information on fertilizer science and application extending to over 200 pages. This could be useful to students starting their training in agronomy or general agriculture. Similar approaches are taken with the other specialist sections, namely Methods of Crop Protection, Insecticides, Acaricides, Fungicides, Molluscicides, Rodenticides, Herbicides and Biological control agents. Unfortunately the information presented in these sections is very elementary and although it could suffice for a general readership or maybe a first-year student, more serious study would require a more extensive text.

Following the general subject scripts is a listing of the various molecules in each discipline. The list is not exhaustive but does cover most of the more important chemicals, at least up to about 1998. A casual search for information on an individual molecule provides basic information on its biology, manufacturing route and, in separate sections, information on toxicology. Knowing that manufacturing routes can change during the lifetime of a product, I suspect that although the published route may be correct for many molecules, some will have changed to give improved yields or fewer impurities.

However, if the book is used as a more extensive guide, the reader is in for some nasty surprises as there are many errors that should not be present, and which could seriously mislead the reader unless they know differently already. To cite some examples from the Fungicides section: the section is subdivided into general fungicide groups, e.g. organometallics, dithiocarbamates, benzimidazoles. There are no major problems with these but when we reach the Inhibitors of Sterol Biosynthesis (SBI) things go very wrong. Morpholine fungicides are clearly SBI fungicides but dimethomorph (a cinnamic acid derivative) is included here and is not an inhibitor of sterol biosynthesis. In contrast, spiroxamine and fenpropidion should be classed as SBI fungicides within the morpholine class but are placed in the ‘Miscellaneous’ section.

Cyprodinil and pyrimethanil, both anilinopyrimidine fungicides, are put in the pyrimidines in the SBI section while they are not SBI fungicides. Both are close analogues of mepanipirim, which has been misplaced in the ‘Miscellaneous non-systemics’. Strobilurins, which act by inhibition of mitochondrial respiration at the bcl complex, have similarly been placed as a subsection of the SBI while famoxadone, which has a similar mode of action is placed in the ‘Miscellaneous’ section.

There are many other mistakes like this, including separate references to metalaxyl and metalaxyl-M. Careful editing would have put them together as they share a common synthesis route apart from eventual separation of isomers. There is no reference to
diethofencarb at all, a point I found surprising in view of its important negative cross-resistance with the benzimidazoles.

Other sections also leave much to be desired. There have been great advances in biological control in recent years, yet the biocontrol of plant pathogens warrants only just over 11 lines, and they contain little information of value. The section on Regulatory aspects provides good basic information on the regulatory process that may encourage the lay reader to accept that the industry is well regulated. Yet there is no mention of the harmonisation procedures that commenced in Europe in the early 1990s and led to the adoption of the ‘new directive’ EC 91/414.

But is the book useful? The answer must be a very cautious ‘yes’. For basic information on molecules it is fair, but the classification of them is useless. Students could be easily misled and would be well advised to invest in specialist texts rather than rely on the extra information provided here. Is the book a serious competitor to the ‘Pesticide Manual’? The answer must be ‘no’.

I am afraid that given the choice I would advise people to invest in the ‘Pesticide Manual’ (which is updated regularly) and supplement their knowledge by reference to specialist texts.

P. E. RUSSELL


The authors apparently set out to produce an informative and authoritative book that was not necessarily exhaustive, and I have to agree with them that they have achieved their objective. The book does not explain in great detail how to grow a commercial crop of peppers, but it does give a reasonable overview of the various aspects to be considered, including soil preparation, direct sowing v. transplant production, irrigation, nutrition, and the control of pests and diseases. It also provides an introduction to the wide range of different peppers that are grown around the world, including their environmental and nutritional requirements, and the biotic and abiotic problems that a grower might encounter. The peppers referred to in this book are not relatives of the true pepper, although by misnaming them ‘pepper’, Christopher Columbus may have involuntarily assisted their rapid uptake as a spice, and their rapid spread to the rest of the world. The authors suggest that, to avoid confusion, perhaps they should now be referred to as ‘capsicums’, after the botanical name of the genus to which they all belong. Capsicums are indigenous to the Americas and were cultivated by the native peoples of that continent well before their discovery by Columbus. It is entirely appropriate, therefore, that the authors of this work should be based in New Mexico but I was disappointed to find that the cultivation of capsicums in glasshouses, which is the main method of cultivation in northern Europe, is dealt with rather superficially and there are few references to research in Europe. However, there is interesting information about the taxonomy of the genus, the anatomy of their flowers and other organs, the production of seeds, harvesting of fruits, the post-harvest handling and marketing of fresh and preserved fruits, as well as the genetics and breeding of capsicums. There is also a useful and important chapter on the chemical composition of capsicums. This chapter mentions that consumption of fresh capsicum fruits might confer health benefits because they contain vitamin C, carotenoids and, most importantly, the pungent, ‘hot’ flavour that makes them so sought after. An additional attraction to many modern consumers is that they are also ‘fat-free’ and low in calories. I detected relatively few errors in the book, although the light level recommended for pepper seedlings is said to be ‘35 PAR’ (page 129) without any units being specified. Overall, I found the book to be readable, informative, well illustrated and a useful introduction to capsicums. I also much enjoyed the passing references to the reverence that native Americans had for the fruit, ‘Scoville Heat Units’ for measuring pungency, and ‘Red Savina’ the hottest pepper in the world.

K. E. COCKSHULL