
Book reviews

Agricultural Extension and Rural Development: Breaking out of Traditions, eds R. ISON & D. RUSSELL. xii+239 pp. Cambridge: Cambridge University Press. £35.00 or \$59.95 (hardback). ISBN 9 780521 642019.

At the recent International Rangeland Congress (July 1999, Townsville), participants came to the sobering conclusion that the ‘best practice’ recommendations of scientists over the last 30 years had performed no better and often worse against a range of objective measures, than ‘top’ pastoralists’ practice in maintaining range productivity, ecological function and profitability. The contributors to this book provide theoretical and methodological insight into why this might be so, as well as how research and extension professionals, together with industry stakeholders, from producers through to processors and marketeers, might choose in the future to go about the business of knowledge development and shared learning in a different way. They illustrate their case by reference to their interaction over a number of years with sheep producers and the wool industry in the semi-arid Western Division of New South Wales (NSW), Australia. But the implications have far wider application and are in fact consonant with what is emerging as the leading edge of thinking and practice wherever research funding, research management and extension aim to sustain farming and rural communities in ways which are both environmentally safe as well as profitable.

The book introduces a number of key concepts, presented initially in Part I but elaborated and illustrated at numerous points throughout. An important opening concept is that of *multiple traditions of understanding*. It draws attention to the way that science works within intellectual traditions that serve both to offer new perspectives through the doors that are opened but also to constrain perception and understanding by the doors that remain closed. Pastoral science has proceeded on the basis of traditions which have obscured as much as illuminated, not least because of the tendency to avoid recognition that multiple traditions do exist and, moreover, that pastoral producers themselves work within their own traditions of knowledge and learning. The authors recognize, as scientists, that what they call *first order change*, that is, change *within* existing

traditions of understanding and practice, is both useful and necessary. But they argue for complementary commitment to *second order change*, that is, systemic change which brings about change in the structure of traditions. The varying, sometimes contradictory, traditions of understanding that have guided policy, research and extension in the Western Division of NSW since nineteenth century settlement began are elaborated in Part II, together with an analytic report of semi-structured interviews with extensionists, middle managers and senior executives in R&D organizations with a stake in the Western Division. The SSIs suggest, as other research elsewhere has done, that explanations of experience are explained in terms of experience, and that ‘the generated experience always remains secondary to the world of daily living’ (p. 157). In plain words, the ways we understand the world are coloured by the world we experience; the structures within which we work matter.

Ison, Russell and Fell in Part I thus argue that, theoretically, second order change requires attention to the biology of cognition and here they draw largely on the work of two Chilean neurobiologists, Humberto Maturana and Francisco Varela. A foundation concept is that it is impossible for biological organisms to directly apprehend the world (the mind is informationally closed). People are structurally coupled to their environment via triggered response mechanisms. The coupled structure co-evolves as people determine the world they experience. Each person’s perceptions of the world they experience is unique: we can have an experience in common but literally cannot share a common experience. *Adaptive learning*, and the articulation and sharing of learning through *linguaging*, thus bring forth a world (rather than reveal, as the tradition of normal science would have it, the nature of *the* world). Perception at a distance (through technology or theory) mediates and extends the networks of shared learning.

This opens the way to understanding how stakeholders can be invited to *co-create* future worlds by engaging together in systematic knowledge generation and shared learning processes to bring about second order change. A key notion here is that of *enthusiasm*, which the authors use as an organizing principle for how they approach their work as researchers and extensionists, as well as to describe what they aspire

to recognize and support among the wool growers in the co-researching process. Intellectually in its root meaning it draws attention to the possibility of understanding being generated from within. Emotionally it signals the inner motivation that gives energy and direction to identifying and achieving what it is we want to do. Methodologically, it moves the research process toward *narrative*, conversations that allow someone to tell their story rather than impart 'facts', stories that convey meanings, share interpretations, reveal enthusiasms. Common enthusiasms then form the basis of working together in more focused research and action (which may indeed involve some first order science).

The reader is taken in Part III through the history of a research project which aspired to bring into being the concepts outlined above, whilst as yet the researchers themselves had scant experience in how to act or guide such a process. Mistakes are honestly reported as well as the delights and excitements that arose as the process began to generate the energy, commitment, and systemic effects anticipated by theory. The first-person views and experiences of some of the wool growers are presented in chapter 8 and largely confirm, in the view of the producers themselves, the importance of the complementary role of the new way of 'doing research', 'extension', and 'development' in helping families, communities, and indeed whole industries, to learn how to survive in a fast-changing world.

Part IV attempts to systematize the experiences recorded in the book, to provide guidelines for designing R&D systems which can bring different, often initially antagonistic stakeholders, into concerted action for mutual benefit. The proposed process design avoids the trap of assuming there must be consensus in terms of values or understanding; what is needed, rather, is appreciation of difference and the development of a common statement of the purposes for which action should be taken. By making the procedures explicit the authors aspire to advance practice by creating the possibility for critical appraisal, or openness to public scrutiny. Without such transparency, R&D is likely to remain locked in traditions which fail to meet the needs of societies which are faced with the necessity of rapid change, but which lack procedures for generating shared understanding as the basis for effective action.

This book represents in many ways *work in progress* at the leading edge of what is emerging as 'best practice' in agricultural R&D. It presents concepts that will be unfamiliar to many readers, sometimes in a difficult prose style (perhaps evidence of the *acts of languaging* that must take place as new understanding emerges). But it is highly recommended for students, practitioners and R&D managers everywhere – and not least to science professors within agricultural universities who do not yet see how their experience

of the world within university structures is blocking the generation of the very understanding we may need to survive.

J. JIGGINS

Biologically Active Natural Products: Agrochemicals, eds H. G. CUTLER & S. J. CUTLER. xvi+299 pp. London: CRC Press (1999). £67.58 or \$99.95 (hardback). ISBN 0 8493 1885 8.

This book is based on the proceedings of a symposium held at the 214th American Chemical Society National meeting in 1997 and is a companion book to 'Biologically Active Natural Products: Pharmaceuticals'.

It highlights the relationship between agrochemicals and pharmaceuticals and how natural products can lead to active compounds in either area.

There are 22 chapters covering a variety of topics and incorporating many disciplines although there is a tendency towards North American plants and diseases as North American authors have contributed most of the chapters.

The first chapter provides an introduction to the structural crossover between the agrochemical and pharmaceutical areas. For example diazepam, a well documented pharmaceutical, possesses plant growth regulating activity. A broadleaved post-emergence herbicide, 2,4-D, bears close resemblance to clofibrate, which controls cholesterol biosynthesis. An example from the organophosphate area is dichlorvos, which has been used extensively as an insecticidal fumigant. This compound is a major metabolite of metrifonate when administered orally. Metrifonate was originally used to treat schistosomiasis but is now under investigation for treatment of Alzheimer's disease.

Plants have their own natural defence mechanisms and allelochemicals such as the volatile monoterpenes are natural herbicides. Several chapters discuss the potential of allelopathy to provide novel natural herbicides and in the development of insect resistant crops.

Other areas covered include: sequestration of phytotoxins by plants; an article on semiochemicals demonstrating their potential diverse biological roles; inhibition of aflatoxin production; saponins in both agriculture and medicine and the impact of volatile phytochemicals on long-duration space missions.

It is an informative text that crosses many disciplines and provides examples of synthetic chemistry, biochemistry, metabolism, plant pathology and many examples of bioactive compounds as lead structures for new agrochemicals. It is viewed as a text mainly for those engaged in further research in the agrochemical area although it could be of interest to the pharmaceutical industry. Each chapter has an ex-

tensive list of references with more than 1100 in total and a comprehensive index. It would be a worthy addition to any library.

J. A. MACRITCHIE

Recent Developments in Poultry Nutrition 2. Eds J. WISEMAN & P. C. GARNSWORTHY. viii + 342 pp. Nottingham: Nottingham University Press (1999). £35.00 (paperback). ISBN 1 897676 43 3.

This volume is a compilation of 20 papers presented at The University of Nottingham Feed Manufacturers Conferences from 1990 to 1998. All this material has been published previously in the series *Recent Advances in Animal Nutrition*; but there the material relating to poultry is distributed over nine volumes, whereas here it is all conveniently gathered together in a single publication.

The topics covered are diverse and do not provide any coherent coverage of poultry nutrition, but the title *Recent Developments* is apt. Each year, the organizing committee invited two or three leading scientists with interesting things to say to review their

particular field of research. The result is a series of papers which cover the growing points or the current problems in feeding chickens, turkeys and ducks, as seen from a feed manufacturer's perspective.

Only one of the papers deals with turkeys and one concerns ducks in this nine-year run of conferences, which no doubt reflects the lack of publicly funded research on these species. Aspects of feeding the broiler chicken take up half the chapters in the book whilst most of the remaining contributions deal with nutritional issues running across species, such as the addition of enzymes to feed or the utilization of dietary phosphorus and amino acids.

It is to be expected that the quality of these reviews will vary somewhat, but the great majority provide well constructed and authoritative summaries of knowledge on the subject at the time the paper was prepared. For those engaged in formulating diets for poultry and those who teach in this area, this is an invaluable compilation that should be readily available for reference. Of course, the book should be on the library shelf at every college and university which still instructs students in the science of poultry nutrition.

T. R. MORRIS