

Machiavellian weed

Wild Oats in World Agriculture: An Interpretative Review of World Literature. Edited by D. P. Jones. Pp. xi+296. (Agricultural Research Council: London, 1976.) £3.

It is unusual, if not unique, for a weed to achieve the distinction of having such a comprehensive publication devoted to itself, an accolade most often accorded to a crop species. The impetus for a review at this time has been dictated primarily by the requirements of agriculture for greater understanding of the biology and control of this pernicious species. It is perhaps Joan Thurston at Rothamsted, however, who must be acknowledged as having foreseen in the post-war period the emergence of this species as a primary constraint to the cereal producer and initiated much needed research and the collection of material from throughout the world, on which so much of the information on distribution of *Avena fatua* is based.

The significant contribution to the systematic appraisal of the biology and agronomy of wild oats by the Weed Research Organisation in the last decade is reflected in the authorship of this book. A leavening of the text, however, with some contribution from outside the UK, would have been useful in consolidating the purported world aspect of the review. Research in Canada with respect to the fundamental mechanisms of seed dormancy and at a more general agronomic level has been considerable. The whole nature of the problem in North America, with its extensive low input cereal production system, stands in stark contrast to the situation in Western Europe: the role of Government and statutory controls could also have been treated in a somewhat wider perspective.

A wealth of information has been gathered together in this volume. In this topic, there undoubtedly exists the basis of a classic contribution, not just to agriculture or botany but of relevance to many areas within the broad biological discipline. There are so many elements in the biology of the wild oat of wide and general significance—a weed par excellence and one whose resources and versatility, strengths and weaknesses, have been so well documented to exemplify the myriad facets of a successful weed—that it is to be hoped that this volume will achieve a circulation outside that of the specialist agriculturalist for whom it was mainly intended. The mechanisms of seed

dormancy and seed dissemination, the population dynamics in the context of agricultural practice, the niceties of selective herbicide usage which now allow a distinction to be drawn between the 'wild' and cultivated varieties of oats, are examples of situations of wide biological relevance.

My prime reservation is that the authors have aimed this work at a specialist readership, whereas the subject has a great deal of popular appeal and that the fascinations of this Machiavellian weed have been subjugated, if not totally submerged, by the bulk of references and verbiage.

On a more specific level, although the chapters follow a logical sequence there are incongruous aspects to the

section and subsection headings in certain chapters. A degree of unnecessary duplication of material between topics is also to be found although, with the exception of minor omissions in pagination, the difficult task of adequate cross referencing has been well accomplished.

In all, this volume stands as a novel concept within, and a valuable contribution to, the field of the biology and control of weeds, and at such a modest price represents exceptional value.

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Laser applications

CO₂ Lasers: Effects and Applications. By W. W. Duley. Pp. xiii+427. (Academic: New York, San Francisco and London, 1976.) \$31; £18.40.

THE preface to this book is more informative than its title: the volume outlines a very wide range of laser applications in physics, chemistry and engineering, with the CO₂ laser receiving special rather than exclusive attention. In places the treatment is distinctly pragmatic. For example, in the forty or so pages dealing specifically with CO₂ laser devices, optimisation of optical cavity transmission is treated entirely experimentally, with no discussion of Rigrod's formulation. A second example is provided in the surprisingly brief treatment of unstable optical resonators, where there is no interpretation of the specific experiments cited.

Readers may feel that chapter 3 redeems itself with the very detailed information provided on infrared detectors, windows, modulators and mirrors, although diamond turning techniques receive no mention. The first half of the book concludes with selected solutions to the heat-conduction equation, a subject previously, exhaustively and authoritatively treated by Carslaw and Jaeger. Moving heat sources, liquid phases and vaporisation do, however, provide interesting variations to this theme, and are required for a proper understanding of surface heat treatment and welding; here, an important reference (Swift-Hook and Glick, 1973) has been inadvertently omitted in the references.

An interesting survey of drilling by argon, ruby, Nd-YAG and CO₂ lasers is followed, in chapter 6, by a somewhat dated discussion of welding and machining. In particular, Table 6.5

contains several errors and omits any specification of spatial mode quality of the laser, or of focal conditions—factors which may account for some of the relatively poor cutting speeds tabulated. The laser-induced reactions, evaporation and thermal effects touched on in chapters 7–9 are uniformly intriguing, and could interest a diverse selection of *Nature's* readership. These applications include: laser cleansing of surfaces, the deposition of thin films, chemical vapour deposition, surface studies and reactions, geological analyses, laser-triggered spark gaps, resistor-trimming, pyrolysis of coal and oil shale, gas-phase reactions and spectroscopy, crystal growth, metallurgical effects, and controlled stress generation in solids and liquids. This coverage is clearly too wide to permit detailed evaluation of specific topics; in particular, isotope separation and (thermal) surface heat treatment are both treated too briefly to be of interest to specialists in these fields. The book concludes with a chapter discussing propagation, atmospheric monitoring and the communications possibilities of the CO₂ laser. Pollution monitoring to parts in 10⁻⁹–10⁻⁸ using tunable diodes, spin-flip CO, CO and CO₂ lasers, and the back-scattering efficiency for typical particulate atmospheric constituents, are discussed in some detail. A systematic comparison of LIDAR performance using a range of laser sources is however, not attempted. Three appendices provide a useful compendium of thermal constants for a range of engineering materials.

The book is well produced, reasonably priced, and provides an interesting introduction and bibliography to the scientific and technical literature.

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