

Teachers of statistics, including even those who do not find it suitable as a manual of instruction, will welcome this book. Not only does the text contain detailed working of many numerical examples, but also at the end is a very fine collection of problems for further study. These are largely concerned with agricultural experimentation—indeed, throughout the book there is a curious uncertainty as to whether the intention is to discuss field experimentation alone or a broader range of experimental situations—but they are excellent material for testing the student's understanding. They are not only exercises in computation but also illustrations of the kind of thought needed for experimental planning, and their value is increased by an additional extensive bibliography. Too often, the designing of experiments is regarded as a Procrustean process of fitting the experimenter's wishes to a standard form; this book rightly encourages recognition of the statistician's responsibility for devising a design that is practicable and efficient in answering the questions that concern the experimenter.

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## AN AGRICULTURAL READER

### A Textbook of General Agriculture

By James Gillespie and P. Hathaway. Pp. 367 + 28 plates. (London: Macdonald and Co. (Publishers), Ltd., 1956.) 30s. net.

IN England and Wales there are three levels of formal education in agriculture. The universities give three- or four-year degree courses and supply the bulk of the research, advisory and other professional workers, though a fair proportion of agricultural graduates finally become farmers. The agricultural colleges give two- or sometimes three-year diploma courses for those intending to become farmers, farm managers or technicians. The county farm institutes offer one-year courses which cater for the sons of small farmers and farm workers, and for others who need a short, mainly practical, training.

As a husbandry text-book, the university student has, for many years, mainly relied on Watson and Moore's "Agriculture: the Science and Practice of British Farming", while the college student has been faithfully served by Fream's "Elements of Agriculture". Although numerically the farm institutes have the greatest output of students, they have not, until now, had the great advantage of a generally accepted and frequently revised text-book. J. Gillespie and P. Hathaway have gone some way to fill this gap, but their contribution will need a good deal of re-shaping if it is to become a standard text-book with a large enough, and a steady enough, demand to justify revised editions every four or five years.

Unfortunately, the title is misleading; the book is not a comprehensive text-book. On the contrary, it is, as the authors claim, "a series of essays that cover a number of features of scientific farming". As such, the book is simple and, on the whole, clearly written and well illustrated. The subjects of the component essays are well chosen. Their range, however, is too narrow. Whether one regards this publication as a text-book or a reader, it concentrates too much on the biological, that is, on the husbandry side of farming. In these days, the three sides of the farming triangle—husbandry, mechanization and business

management—are almost equal in importance, so it is rather disappointing to find that Gillespie and Hathaway completely overlook the business side and rather neglect mechanization, though there is a useful descriptive chapter on farm machinery.

These, however, are points which could be put right in future editions. The important thing is that the authors have had the courage to attempt to fill an awkward gap by producing a readable book for a type of student that is often unwilling to read. In later life these students frequently become small farmers or, say, herd managers, and we must welcome any book which can help to equip them to cope with the ever-growing complexity of modern farming.

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## CHEMISTRY OF LIVING CELLS

### The Chemistry of Living Cells

(Harper's Chemistry Series.) By Prof. Helen R. Downes. Pp. x+549. (New York: Harper and Brothers; London: Hamish Hamilton, Ltd., 1955.) 52s. net.

THIS introductory text-book, by one who has taught biochemistry for many years to senior students who major in chemistry or in one of the biological sciences, has a flavour of a kind which is all too unusual in modern text-books of biochemistry. The historical approach has been widely used in the belief that students should be introduced to the outstanding scientists in their field and encouraged to give them "a local habitation and a name", and short biographies of prominent investigators are included as footnotes. Delightfully appropriate quotations from literature, both scientific and non-scientific, introduce many of the different sections.

The text is lucid and extremely readable, and the illustrative diagrams apposite and clear. So far as possible, the subject-matter has been presented in conjunction with specific experimental data. Each chapter concludes with suggestions for further reading and a score or so of "Study Questions".

The first part of the book, entitled "Some Preliminary Considerations", includes sections on "Biochemical History and Literature", "Some Selected Properties of Aqueous Solutions" and "The Structure of Living Forms". Part 2 is concerned with the organic constituents of cells—carbohydrates, compounds of nitrogen, lipids and enzymes. The third part, that dealing with "Intermediary Metabolism", is naturally the largest and takes up about one-half of the whole book. The processes of metabolism in micro-organisms and in higher plants are, wherever appropriate, compared with those in the animal world.

This scholarly work constitutes an excellent key to modern biochemistry for those who have failed to keep abreast of a rapidly expanding subject, or who may be meeting it in its modern form for the first time. Of the author herself, one might perhaps without disrespect quote the lines from Thomas Hobbes's "Leviathan" with which she opens the section on History and Literature, "But this is certain; by how much one man has more experience of things past than another; by so much also he is more prudent and his expectations the seldomer fail him". The clarity and accuracy which Prof. Downes has infused into this book result from much experience, wide reading and careful writing. F. G. YOUNG