

with it. In spite of some later revision it must be taken as no more than a substantial fragment. It suffers more than most of Collingwood's work from a tendency to rash statements and occasional labouring of small points. Nevertheless, the book is a valuable contribution to philosophy, and supplements what we have already of Collingwood's highly original and distinctive way of thought.

The central thesis is that cosmological theories at all periods are based upon analogy. Some familiar aspect of experience is taken as a clue to the character of the whole realm of Nature. Ancient Greek thinkers, almost without exception, conceived of Nature as a living organism. They drew no sharp distinction between the material, the living and the conscious, and they saw the orderliness of the natural world as an expression of its intelligence. After the Renaissance, when machines became familiar, it was conceived as a machine. "The word 'matter' had acquired a new sense: it was no longer the formless stuff out of which everything is made by the imposition upon it of form, it was the quantitatively organized totality of moving things" (p. 112).

Then comes the most challenging part of Collingwood's argument. Since the eighteenth century a new view of Nature has been displacing the older one, a view that does not stress permanence, but rather process, change, development. This means, according to Collingwood, that the natural world is conceived on the analogy of human history, whence these ideas are derived. There follow interesting comments on Hegel, Bergson, Alexander, Whitehead and others, showing how in their hands old conceptions have given place to others, but the process has not gone to completion.

It is here that one sees most clearly that Collingwood's own thought has not reached its own full development. Not only has he cut out the sketch of his own cosmology at the end, but also he has not co-ordinated the stages of the historical process to make clear the way older views have given place to later, as he should have done according to his theory of philosophical method. Moreover, there is only cursory treatment of one of the chief problems: how far at any stage of thought the natural world could be conceived as self-contained and self-subsistent.

Like all Collingwood's work, this book effectively jolts the reader out of common habitual modes of thought. The pity is that it is really no more than a fragment.

A. D. RITCHIE.

SCIENCE AND CRAFT OF BEE CULTURE

A Manual of Bee-Keeping

For English-speaking Bee-keepers. By E. B. Wedmore. Second edition, revised. Pp. xxiv+389+9 plates. (London: Edward Arnold and Co., 1945.) 18s. net.

THE honey-bee has been more extensively and deeply studied than any other insect. The craft of bee-keeping has perhaps the most complex technique that has ever been developed for the domestication, or perhaps it is safer to say the exploitation, of any livestock. This is due to the highly developed social life of the bee, with its infinite variety of possible reactions to stimuli not always understood or controllable by man. It is not surprising, therefore, that

there is a very extensive literature dealing with the science, art and craft of bee culture.

The author of "A Manual of Bee-Keeping" deals entirely with bee-life, its science, and the technique of bee-keeping, and does not interpolate extracts from the classics or the poets. He deals in facts. After a life-time spent in research work, he has a keen sense of scientific caution, and adroitly avoids giving unproved theories or indulging in flights of fancy. All the time he presents facts in clear and critical form. It is to be hoped that readers will appreciate that when the author of this book gives instructions for an operation involving a sequence of steps at intervals indicated in precise words, no deviation from literal accuracy in taking those steps is allowed for, otherwise trouble will be encountered.

The general arrangement is encyclopaedic, and all paragraphs are numbered—some 1,600 of them—with cross-references to all related subjects. There is nothing to tie the book to bee-keepers in one country and render it unsafe to use in another. It gives facts about honey-plants and current practice in both hemispheres, and general management of bees is much the same all over the world, so that it may be described as of international application.

It is significant that among the traditional notions that the author discredits is the persistent belief that each baby bee that emerges from its cell leaves behind its cocoon skin adhering to the walls and base so that the size of the cradle diminishes with each successive generation that uses it until only undersized bees can be reared. Much searching has failed to reveal any comb with cell walls more than six thousandths of an inch in thickness, whatever their age.

Pollen, which was for so long regarded as a nuisance in the combs that writers used to give elaborate instructions for getting rid of it, receives full recognition of its value in no uncertain terms. Some readers will be surprised to learn that well over one hundredweight of pollen is used annually in a normal bee colony, and that in summer the daily gathering of pollen may exceed two pounds. Annual consumption of honey will be about four hundredweights, with some few gallons of water, so that the total food consumed by the bees is considerably in excess of a quarter of a ton per hive.

Bees have normally been cleared from filled super boxes of honey by use of a device called a Porter escape, which causes the bees to walk between two delicate springs through which there is no return—as long as nothing happens to jam the springs. The author illustrates a device of his own designing which has no movable parts to become fixed. It operates on principles similar to those employed in some fly or crab traps.

The important discovery that bees will tolerate a space of about $\frac{1}{4}$ in. between frames of comb and the sides and floor of the hive without filling it with comb was published in 1852 by L. L. Langstroth. It appears, however, from evidence adduced by Mr. Wedmore, that Debeauvoys published in 1851, in his "Guide de L'Apiculture", a description of a space of 6 mm. which could be used in the same way, so that he would appear to have anticipated Langstroth's announcement. There was, however, the difference that in France the discovery passed unnoticed, while in the English-speaking world the American's book made a great stir.

Altogether, Wedmore's "Manual" is a book for the serious student, for the practical man, and for aspirants to both classes.

H. J. WADEY.