

acteristic of life. Man's freedom to understand his situation must be absolute, but the primary issue is not how we are to treat materials but how men are to treat each other and the life of the earth which endows them. To realize the full potentialities of an ordered freedom within the delicate structure of life, we must first create within the wide estate of Nature the conditions which that freedom implies and demands. Whether or not we agree with all Dr. Barlow's conclusions, no one can question the sincerity or the dignity of this call to the fundamental and creative thinking on the adventures of ideas out of which alone we can hope to build a social and an industrial order which will serve man's twin desires for order and for growth.

R. BRIGHTMAN.

## BIOLOGY OF THE CUCKOO

### Cuckoo Problems

By E. C. Stuart Baker. Pp. xvi+207+12 plates. (London: H. F. and G. Witherby, Ltd., 1942.) 25s. net.

THIS is the most exhaustive work on the biology of the cuckoo that has yet appeared. The author's qualifications for writing it are unique, for not only has he studied the habits and economy of birds of this family for nearly seventy years, but also he has obtained far and away the most complete collection of cuckoos' eggs, together with the eggs of their fosterers, that has ever been got together, for practically all the known genera, species and races of Europe and Asia are represented, besides some from other countries. Moreover, the work of other investigators is not neglected in discussing the various problems dealt with in this book.

The first part deals with the necessity for cuckoos' eggs being adapted to those of their fosterers. Mr. Baker's evidence clearly shows that the owners of the selected nests often display discrimination, for they may either desert the nest in which the cuckoo's egg has been deposited, or they may eject the egg or in some other way destroy it and so prevent it being hatched. Such discrimination has resulted in the evolution of adaptation between the eggs of the cuckoo and those of their fosterers in size, colour and general appearance. Since individual cuckoos normally keep to the same foster parent, there comes to be a close resemblance between the eggs of the parasite and those of the dupe. Thus, the case would appear to be one of simple Darwinian selection. The evidence for all this is very fully set out, not only for the common cuckoo, but also for other species and varieties of Cuculidæ, and Sir Edward Poulton in a foreword fully endorses Mr. Baker's conclusion. The beautiful coloured plates which are reproduced from Miss Edna Bunyard's original drawings showing the types of eggs of various kinds of cuckoos, together with the eggs of their respective fosterers, add to the value of the treatise.

In the last chapter dealing with adaptation, the author discusses the origin of the parasitism, and points out that the habit of laying eggs without nests was probably primitive in birds, being normal in their reptilian ancestors. Hence the practice of so many cuckoos may be regarded as being partly of the nature of a reversion to a state when birds laid their eggs in various places without making nests.

The next part of the book deals with the question as to how the cuckoo deposits its egg in the fosterer's nest. The author accepts Chance's evidence as

proving beyond contention that cuckoos very usually lay their eggs in open nests, as do so many other birds, but without the cuckoo placing its feet and weight upon the other eggs. In other cases, however (as with some cuckoos in India), the eggs may be projected into nests within holes which the cuckoo cannot enter. Further, in addition to these two proved methods, the author thinks that there is a third way whereby eggs are placed in nests in which they can be neither laid nor projected, and he discusses the evidence for the old assertion that the bird may lay its egg on the ground and then carry it in its beak. Without coming to any definite conclusion, Mr. Baker is of opinion that this method is adopted in cases where the bird could not insert its egg in any other way. This probably happens sometimes with the plaintive cuckoos of India and with some other species.

The last part of the book treats of other cuckoo problems such as territories, the ejection of fosterer's eggs and young, numbers of eggs and provision of nests before laying, and the evidence in all these matters is fully given. The author states that with all the species of *Cuculus* the eggs are laid at intervals of forty-eight hours, once the process has started. The number of eggs is usually from twelve to eighteen. It is very unlikely that the eggs are fertilized in the ovaries, as the author appears to assume, for the observations of Warren and Kilpatrick clearly indicate, as pointed out by Hartman and Hammond, that in the fowl the gametes unite at the anterior end of the oviduct. In the turkey and various other birds (and possibly in most or even in all) the eggs of the entire clutch are fertilized as a result of one treading, so that the spermatozoa must survive for twenty to thirty days within the body of the hen. In gallinaceous birds, however, ovulation takes place spontaneously, whereas for most other birds there is general evidence that the first ovulation does not occur without coition, or in any event without a stimulus from the male, and further, that the process in nearly all birds depends also upon the number of eggs in the nest, since it may be repeated many times if the eggs be removed. One would like to know if similar considerations apply to the cuckoo. The observations indicating that cuckoos are promiscuous suggest that they copulate several times during the short single breeding season. One would like to ascertain if the oviduct normally contains living spermatozoa through the whole period. The existence of suitable nests within the territory may well constitute the main stimulus for repeated ovulation. Assuming this to be so, when the cuckoo lays in the nest of an unsuitable fosterer such as the wren, or outside its territory, it is probably because the bird has already ovulated as a result of an earlier stimulus, and holds in the oviduct an egg that must pass out. The absence of available nests would presumably inhibit ovulation but not the actual laying, once the egg has left the ovary.

The book concludes with valuable appendixes containing data of the weights and measurements of eggs, dates of laying, desertion and rejection of eggs and various other interesting matters. It may profitably be studied in conjunction with Friedmann's book on the cowbirds and Davis's article on the American cuckoos of the sub-family *Crotophaginae*, recently published in the *Quarterly Review of Biology*, in which similar problems are discussed. It is to be hoped that a new edition will be provided with an index.

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