REVIEWS

GENETICS AND COTTON IMPROVEMENT. By Sir Joseph Hutchinson. Cambridge University Press. Pp. 85. 15s.

Thanks to the wise policy of the Empire Cotton Growing Corporation the cotton plant is a classical example in plant genetics and plant physiology. It is also a plant which has been greatly improved by breeding. Over the last half century, the cultivated cotton plant has been transformed from a perennial to an annual, has had its seed hair increased from one inch to two inches in length, and has become world-wide in its cultivation. A genus with diploid species and primitive cultivated types in Africa and India and allopolyploid species and modern cultivated types in America is full of interesting problems to genetics and plant breeding. Sir Joseph Hutchinson has surveyed the history, taxonomy, origin, genetics and improvement in cotton. The emphasis of the survey is on the application of genetics to cotton breeding. It does not set out to be an exhaustive review or a source book for cotton breeders, but attempts to draw certain conclusions from the intensive study of the genetics of cotton.

The study of wild populations has revealed that cotton does not conform to Vavilov's theory of decreasing variation away from the centre of origin. The greatest variation in cotton is not in the centres of origin. Hutchinson relates this difference to the type of breeding system. When a species has spread, and at the same time has adopted an inbreeding system, then its greatest diversity is at the centre. When a species spreads and retains its outbreeding system, it retains its variation at the periphery.

The study of gene substitution is discussed from the excellent example of Knight's work on Black Arm Resistance. The transfer of a single gene for resistance from *Gossypium hirsutum* to *G. barbadense* has resulted in good resistant cultivated varieties. But these varieties are not as good as those lacking the foreign gene except under conditions of bad disease epidemics, which under good cultivation do not often exist. The moral is that one gene or at most a small chromosome segment is not without its ancillary effects and makes this promising method of plant improvement less attractive than it appeared on theoretical grounds.

The crucial problem of the breeder is the type of breeding system to adopt ; this is discussed at some length. Is it better to maintain genetic heterogeneity and preserve the possibility of later improvement or to aim at purity and future stagnation ? Our knowledge of the merits of long-term breeding policies is scanty, so that all concerned in plant and animal improvement should profit by the cotton experiments.

D. Lewis.

DARWIN'S PLACE IN HISTORY. By C. D. Darlington. Oxford: Basil Blackwell. 1959. Pp. 101. 9s. 6d.

The Darwin-Wallace centennial (1858), and the centennial of Darwin's " On the origin of species " (1859), have yielded the hoped-for bounteous crop of books and articles on Darwin and on evolutionism. The appraisals of Darwin's work and personality form a spectrum, from eulogies in veritably

hagiographic style at the " red " end, to doubts and critical questioning of the originality of many of Darwin's teachings at the " violet " end. The book under review inclines towards the " violet " extremity. The author's thesis is that " It seems incredible that the apostle of evolution should have been so deficient in historical sense ; so much so that, although deeply interested in his own priority, he never realised that his own ideas were second hand. He thought he had worked them out himself, even when he had only sorted them out. Moreover, his ideas were less clearly sorted out and less clearly maintained than the ideas of those who first thought of them."

With bold strokes of his pen, the author traces the " second hand " ideas of Charles Darwin to Erasmus Darwin, Lamarck, W. Lawrence, E. Blyth, J. C. Prichard, W. Ch. Wells, P. Mathew, Ch. Naudin, and R. Chambers. The fairly long Appendix (pp. 75-94) to the relatively short book contains well-chosen quotations from some of these first-hand sources, the more useful since to most biologists the originals are not readily accessible. The book under review has all the stylistic brilliance, hard-hitting thrusts, and razor-sharp dialectics for which its author is deservedly famous. One may or may not agree with his opinions and evaluations, but there is no denying that the book will be exciting reading to some, nettling to others, but valuable to all who are interested in the history of ideas, and particularly in the intellectual climate under which the tree of modern evolutionism started its most vigorous growth.

History of science should be concerned with much more than priority claims of this or that scientist ; it may even be argued that such claims may as well be relegated to autobiographies and obituaries. What we really want to understand is how the scientific movement as a whole and its many branches and tributaries progress onward despite their meandering courses. And ultimately we must face the mystery of the creative act in the mind of an individual scientist, and of the collective creative process in the scientific community. Ideas grow and change gradually ; where and how an idea was foreshadowed ; how it became recognisable ; when and how it became useful ; and what nurtured its growth—these are matters of real interest. Now, it cannot be gainsaid that in recent years we came to appreciate more clearly than ever before how widespread were the germs of the evolutionary ideas during the time when " On the origin of species " was in gestation. Loren Eiseley has exhumed the writings of Edward Blyth, who had all but the name for a theory of natural selection, but who used it to uphold the doctrine of permanence of species. We owe thanks to Darlington for having directed, or re-directed, our attention to the works of other pre-Darwinian proto-evolutionists. Not all of his interpretations can, however, be accepted without reservations.

Darlington infers that the writings of Erasmus Darwin " prompted " Malthus to write his work on populations, and cites approvingly Samuel Butler's opinion that they converted Lamarck to his belief in transformation of species. The interesting essays of Wells, Lawrence and Prichard are traced also to Erasmus Darwin, although none of the three authors acknowledged their indebtedness to this source. The book of Lawrence was " inspired, we can hardly doubt, by Erasmus Darwin and encouraged by Prichard ". Mathew had " evidently " read Lawrence. Blyth " might have picked up " ideas from Lawrence or Prichard (whom he cites), or from Erasmus Darwin

(whom he does not cite). Spencer surely read Lamarck, and so did Wallace. Darwin presumably read all, but did not see fit to divulge which ideas he got from whom.

All the above inferences may well be correct; but on the other hand they may not be, and proof or disproof will in the nature of things be hard to come by. The writer A may have actually read and copied some ideas from the publication of B; or A may have merely heard about these ideas from a third party, C, who may or may not have mentioned B's authorship; again, these ideas may have become lodged in A's brain long after the reading of B or the conversation with C have been forgotten; and finally, A may have re-invented them independently of direct or indirect influence of B. It is a fact of life that man is conscious of only a part of his thinking processes; it requires effort to trace the sources of one's own political, philosophical, scientific, and other ideas, not to speak of those of anybody else. Finding out whether evolution has occurred, and if so, what brought it about, occupied Darwin understandably more than facilitating the task of the future historians of evolution theories. This does not mean, of course, that ". . . one of the greatest of our figures should not be dissected, at least by one of us". By all means, let us dissect and study Darwin's work and personality; but in so doing, should we not hold him entitled to the benefit of doubt before we conclude that " Darwin was slippery "?

THEODOSIUS DOBZHANSKY.

BLAKESLEE: THE GENUS DATURA. By A. G. Avery, S. Satina, and J. Rietsema. New York: Ronald Press. 1959. Pp. xli+289. $8.75.

When Dr A. F. Blakeslee died in 1954 he had devoted forty years largely to the study of *Datura*. Between 1915 and 1943 working at the Carnegie Institution and directing numerous collaborators, he had published 154 papers; three also had been published by John Belling on the chromosomes of *Datura*. Since 1944, 71 other papers have appeared by various authors. It was, however, the work of Belling between 1920 and 1927 which inspired the whole of the later development. Abnormal " mutant " plants had been discovered by B. T. Avery between 1915 and 1920. Belling found that these were not due to gene mutation but to trisomic and other whole-chromosome variants. In 1921 he classified them and in the same year a haploid *Datura*, and the first haploid flowering plant, was discovered. The other work on the implications of unbalance, structural change and polyploidy followed.

Blakeslee's contribution to the following years was a discriminating judgment, forceful management and unremitting, repetitive, publication. He believed in keeping the work (and publication) entirely in his own hands: he would part with nothing. This policy of a closed shop his successors (headed by Dr H. H. Plough of Amherst College) are to be congratulated on reversing. They offer seeds of the *Datura* stocks to their colleagues throughout the world.

The present book represents an authorised version of the *Datura* work of the kind Dr Blakeslee would have liked. As such it is a period piece; but it is also a record of experimental versatility implemented with prudence and thoroughness. It reveals innumerable interesting details such as the chromosome chimaeras, the feeble hexaploids and octoploids, the new types