To flower or not to flower . . .

Photoperiodism in Plants. (European Plant Biology Series.) By Daphne Vince-Prue. Pp. xiv+444. (McGraw-Hill: London and New York, May 1975.) £9.95.

PHOTOPERIODISM is one of the most exciting, and yet one of the most mystifying, aspects of the regulation of plant development. It is an extremely difficult topic to teach, and consequently often receives scant attention in university courses. That is unfortunate, since it offers an almost unique opportunity to study the mechanisms of developmental control. The induction of flowering involves a change from the steady-state, non-determinate formation of vegetative organs at the shoot apex, to a completely new, determinate, sequence of events in which a series of organs, never previously produced by the plant, are formed. Those organs—which together form the flower or inflorescence—although having morphological homologies with the vegetative organ are anatomically and structurally quite different and often produce metabolites and secondary products not synthesised under vegetative conditions. This major redirection of development, inducible merely by a subtle change in the daily length of the dark period, must surely involve, as a causal step, the selective and qualitative regulation of the expression of genetic information. In no other organisms can the whole pattern of organ development be so readily manipulated, and one might justifiably hope that investigations into photoperiodism in higher plants would yield information and concepts of central importance to our understanding of development.

That this happy outcome has not yet materialised, is probably largely attributable to the diffuse nature of our current knowledge of photoperiodism. Many potential investigators must be discouraged by the need to cope with so much apparently unrelated information. What Dr Vince-Prue has attempted to do in this book is to assist the reader to see the wood through the trees. The easy way to do that, of course, is for the author to ignore the great diversity of information, and merely present a personally selected, unified view. Dr. Vince-Prue has eschewed that approach, and throughout the book has unflinchingly provided the reader with the available information, presented in an admirably clear, concise, and, above all, readable form; where logical conclusions can be drawn, she draws them, but she is not

unwilling to leave unresolved questions open. In my opinion, that is exactly the right approach, and Dr Vince-Prue succeeds in her formidable enterprise through her immense knowledge and exceptional understanding of the topic.

The book is logically organised and covers all those aspects necessary for a sound understanding. It will prove to be an excellent book for university teachers and research workers, and many undergraduates will find it invaluable as a source-book. Particularly useful are several chapters on the photoperiodic control of development other than flowering.

After reading the book with enjoyment, however, I still find myself impressed more by the diversity of the information available, than by the power of the unified concepts derived from that information. This is a reflection of the subject though, not of the book, and it may be why Dr Vince-Prue has quoted in her Preface a beautifully enigmatic line from Hamlet: "Why day is day, night night, and time is time."

Harry Smith

More than black and white

Race Differences in Intelligence. (A Series of Books in Psychology.) John C. Loehlin, Gardner Lindzey and J. N. Spuhler. Pp. xii+ 380. (Freeman: San Francisco and Reading, June 1975.) £3.00.

THE goal of this book is to consider the available evidence on the relative importance of genetic and environmental variation in accounting for racial-ethnic IQ differences in the United States. The book is divided into three sections. The first considers the background and recent history of the race-IQ controversy and deals with three of the key concepts on which the controversy focuses: the concepts of race, intelligence and heritability. The second section deals with the empirical evidence, and considers a wide number of studies. The final section contains the conclusions and also the authors' views on the implications of these conclusions for the formulation of social policy.

The value of this book is that it provides an excellent summary of the available data on studies dealing with the race-IQ question. But my initial enthusiasm for the book gradually declined as I realised that the authors have skimmed over some of the most important issues. Their discussion of the controversy is far from complete.

The authors consider some of the problems associated with cultural bias

in IQ tests and point out that it may be impossible to identify test items "culturally fair" to a particular group. But then they side-step the question of whether the existence of cultural bias in tests makes all attempts at cross-cultural comparison meaningless. But it is when discussing heritability that this book really falls down, as in fact do all arguments concerning race-IQ differences. The authors do not seem to have grasped that fact.

They still subscribe to the belief that a knowledge of the heritability of a trait within a population can tell us something about between-group differences. That is just not so. A measure of heritability is only relevant within the population and environment in which it was measured. No comparison between populations can be made from a heritability measure. It is well known that American blacks are far worse off than whites for a number of environmental factors known to influence performance on IQ tests substantially. These include educational inferiority, lower nutritional levels, cultural biasing in tests, racial prejudice, lack of incentive, to name but a few; as well as the fact of being black in a white dominated society. We have no way of correcting test scores for these systematic differences to obtain unbiased figures. It is impossible to make *a priori* judgements of different aspects of the environment, as every ecologist and plant physiologist knows.

The authors believe that a heritability measure is of use in the present controversy since we are discussing the effect of the modification of environmental variables which are within the existing range of environments. This assumes an additivity of effects, for which there is no evidence. Large differences in traits which are highly heritable can be caused solely by environmental differences. Environmental changes such as the amount of trace elements in the soil can have profound effects on genotypic expression. On the other hand, even if an observed difference is genetic it does not mean that a trait cannot be altered substantially by an appropriate environmental change. An example is the treatment of phenylketonurics with a diet deficient in phenylketonuria. It is meaningless to try and separate genetic and environmental contributions to IQ differences between racial groups.

The authors conclude that some research on differences in ability between US racial-ethnic groups seems to be of fairly high scientific and social priority. It is difficult to see how they can reach that conclusion. From their extensive discussions on the studies quoted the authors have demonstrated that the whole race-IQ question is in fact unanswerable.

Glenys Thomson