

test ; a report was given in *The Intelligence of Scottish Children* (University of London Press, 1933). It was intended that the survey should be repeated on some later occasion. A repeat was in fact made in 1947, and the book under review constitutes a preliminary report on it. The investigation was organised by a Committee under the chairmanship of Sir Godfrey Thomson. The main part consisted of a group intelligence test and a brief sociological enquiry, applied to all children born in 1936, or rather to as many as possible of them, about 94 per cent. This was supplemented by some special small-scale sampling enquiries, in which an individual intelligence test (Terman-Merrill revision of the Binet test) was used and more detailed sociological information was obtained.

The successful conduct of such a survey involves making many compromises between conflicting needs. Much information that one would like to have is either too costly to obtain or of a sort that many persons questioned would refuse to give. For one as little acquainted with the background of this work as the reviewer, it would be rash to express an opinion as to the soundness of the compromises actually made. But one can say at least that the book is written with admirable clarity, and its authors show themselves always fully aware of the difficulties of interpreting their material. The very great task of carrying out the survey seems to have been accomplished remarkably successfully ; and a detailed account of it is given, from the preliminary circularising of schools to the marking and coding of scripts and schedules. Some of the results are summarised here, and it is intended that further volumes will be issued when more detailed analyses have been completed.

The immediate reason for conducting this survey only fifteen years after the 1932 survey was the fear that a negative correlation between size of family and intelligence of children was leading to a decline in average intelligence. The 1947 survey has shown this negative correlation clearly, but has surprisingly also shown a small but significant rise in average score in the group test, not a fall ; while the individual tests have revealed no significant change in Binet I.Q. Possible reasons for this effect are suggested.

The investigation is clearly of great general interest, and may prove eventually to be also of great value. It is proposed that further researches should include a follow-up of the careers of a sample of the children. Professor Thomson remarks in the preface : " Our hope is that from this work we, or rather our successors, may learn how to smooth the path of the able, to help along the less well endowed, to give guidance about schooling and careers, to advise those in authority who make regulations and control finance, and generally to help Scotland and Scots yet unborn to a life of greater happiness, of less hardship, and less frustration." If that hope is realised, not only Scots will benefit. F. J. ANSCOMBE.

DISCUSSION ON THE PRESENT STATUS OF RADIATION GENETICS, given at Information Meeting for Biology and Medicine of the Atomic Energy Commission sponsored by The Biology Division, Oak Ridge National Laboratory, U.S.A., March 1948. Published by The Wistar Institute of Anatomy and Biology, Philadelphia. 1950. Pp. 210. *J. Cell. Comp. Physiol.*, 35 : Sup. 1.

The present symposium (held at Oak Ridge in 1948 and published in 1950) covers nearly all aspects of present inquiry into the biological effects of radiation. It was the first conference to use "Declassified" information on this subject in the United States.

The materials and methods are highly diverse. Muller treats the theory of induced mutation in *Drosophila* in a technical, controversial and highly detailed way of great interest to the specialist. Sax treats the theory of chromosome breakage in a lucid introductory manner omitting discussion of the underlying disputed points, some points indeed which might have been disputed by other participants if the account had been more detailed. Others describe the effects of treatment of bacteria, protozoa, and fungi (but not viruses) as measured by mutation frequency while Randolph records the precise effects of the Bikini bomb on the growth of maize seed within range of its action. Sewall Wright concludes that, even after making a number of uncertain and perhaps inadequate assumptions, he is unable to predict the long-term consequences of irradiation for populations.

Three papers are perhaps of special interest. Wyss and others discuss the effects of ultra-violet irradiated substrate in inducing mutation in *Escherichia coli*. Mazia and Blumenthal show the dose-inactivation effect of X-rays on an enzyme substrate film. And Carlson reveals the direct action of X-rays on prophase stages of mitosis. These last three papers came nearest to discussing what connection the different aspects of the subject have with one another. Unfortunately the study of the connections between the physical, the physiological and the genetic is just the troublesome part of this as of other biological problems. This symposium is valuable. But let us hope that before many more are held someone will undertake to formulate the problem as a whole. C. D. DARLINGTON.

A REVIEW OF THE CHROMOSOME NUMBERS IN ANIMALS (1944) appended with recent additional data (1948). By Prof. S. Makino. Tokyo : Hokuryukan Publishing Co. Ltd. 1950. Pp. 28 213.

Makino has revised and enlarged his list of 1937. It includes some 2800 species and covers the whole animal kingdom (excluding the Protozoa). The list is not critical nor apparently meant to be so, but it will be useful as a general reference book since the bibliography is fairly complete up to 1948. The nomenclature is always a problem in such works, but here it is not consistent. The families are new but the species are old. Important and particularly reliable works ought to be marked out in some way. There are a large number of misprints, but fewer than in McClung's list of 1939. It is to be hoped that the American edition will be enlarged to include references since 1948. SYLFEST MULDAL.

PRINCIPLES OF HUMAN HEREDITY. By Curt Stern. San Francisco, California : W. H. Freeman & Co. Pp. xi 617 ; 198 figures, 99 tables.

This will become one of the indispensable textbooks of genetics ; one may hope also that it may be thought indispensable by those who arrange the work of medical students, though medical courses do not on the whole encourage that belief. For here we have a book written by an accomplished Geneticist and distinguished research worker in a clear and uninvolved style ; and Dr Stern's knowledge of human genetics well fits him to produce such a study. It is the misfortune of a reviewer that he must draw attention to what he regards as omissions or errors ; so that he must devote a relatively large amount of space to criticising a book which he admires.

One serious lapse in Dr Stern's book relates to his treatment of "continuous variation." For here the entire subject of "multifactorial