

effective element in selection. For example, in the "Origin of Species", Chapter 3, he wrote: "Variations, however slight and from whatever cause proceeding, if they be in any degree profitable to the individuals of a species, in their infinitely complex relations to other organic beings and to their physical conditions of life, will tend to the preservation of such individuals, and will generally be inherited by the offspring".

Dr. Simpson envisages the possibility of a population in which all the individuals lived lives of the same length but some produced twice the number of offspring produced by the others. This he regards as non-Darwinian selection. But if the genetic make-up of these rapid reproducers conferred any advantage whatever, even if only that of number, such an event would be fully covered by Darwin's definition of selection quoted above. Furthermore, Darwin himself showed that 'thumb-eyed' primroses set more seed than 'pin-eyed'. Dr. Simpson will therefore forgive me if I claim all natural selection as Darwinian.

Dr. Simpson has written a book which no biologist can afford not to study. He has written it in such a way that his meaning can never be misunderstood. This has meant very careful phrasing, and the reader will be all the more grateful to Dr. Simpson.

G. R. DE BEER

SUB-VITAL SYSTEMS AND THE ORIGIN OF LIFE

New Biology, No. 16

Edited by M. L. Johnson, Michael Abercrombie and G. E. Fogg. Pp. 135+8 plates. (Harmondsworth, Middx.: Penguin Books, Ltd., 1954.) 2s.

MOST of the sixteenth issue of "New Biology" is given over to discussion of the origins of life. Four articles deal with this perplexing subject, all of them showing that there is wide agreement on the main lines of thinking. Many years ago J. B. S. Haldane and A. I. Oparin suggested that the surface of the early earth could have given rise to a variety of organic compounds ready to give up their energy in a variety of reactions. Among the energy-providing materials 'sub-vital' systems are also needed which, using the energy provided, can grow and split and thus reproduce themselves. Now Haldane makes the important suggestion that complex phosphates may provide the basic mechanism, and he shows that this idea complies beautifully with the principle of continuity. J. W. S. Pringle, on the other hand, believes that the oxidation of hydrocarbons could have provided the sub-vital systems from the dynamic stability and potential growth of the complexes of intermediate substances which would be formed.

Two related problems which must be faced when such sub-vital systems are postulated are how the complex chains of reaction may be kept from disruptions by the turbulence of their surroundings, and how a concentration of organic substances approaching that of present living things can be achieved. Haldane has suggested water-logged soil as the first habitat; J. D. Bernal suggests adsorbed layers on clay.

Such sub-vital systems very probably appeared and disappeared in enormous variety. N. W. Pirie, in particular, emphasizes that present organisms are likely to represent the most successful one or few of

many diverse kinds, a point of importance when deciding how best to begin the synthesis of living things. Pirie also emphasizes the entire arbitrariness of a decision as to whether a system is living or not. There would be no disputing the attribution of life to a growing and reproducing system kept firmly together by enclosure in a membrane. No useful hypotheses are yet available as to how this vital step occurred, probably, as Bernal suggests, because not nearly enough is known about existing cells. Haldane has suggested that a highly improbable event began the first cell and all organisms as we know them.

The present symposium shows that the topic of biopoiesis, as Pirie has called the 'origin of life', though it demands imaginative thinking, is certainly not a field for unrestricted speculation. Yet hypotheses are being produced which can be checked experimentally about some of the decisive changes postulated for the origin of life.

T. H. HAWKINS

A GUIDE-BOOK FOR WORLD CLIMATE

The Climates of the Continents

By W. G. Kendrew. Fourth edition. Pp. 607. (Oxford: Clarendon Press; London: Oxford University Press, 1953.) 50s. net.

THE fourth edition of Mr. W. G. Kendrew's masterpiece has appeared some thirty years after the first. The book has maintained its unquestioned place of honour throughout this protracted period. Few authors can hope to carry out, within their own life-times, four revisions of a standard book of reference, and to be assured thirty years from first publication that the book still leads the field. Practically all students of geography who have graduated from English-speaking universities during the past generation have been brought up on Kendrew's book, and it has received widespread recognition among meteorologists. It has few real competitors in the English language, for most text-books of climatology attempt a systematic rather than a regional approach. Only the Köppen-Geiger "Handbuch der Klimatologie" outweighs "The Climates of the Continents" as a regional encyclopædia of world climate. In a review of an earlier edition, *Nature* said simply that the book was . . . "the most useful and convenient collection of climatic data available in the English language", a view to which the present reviewer wholeheartedly subscribes.

In the fourth edition, the author has substantially revised the text, and has brought the tabulated climatic normals up to date. He has made a determined effort to incorporate the new ideas that emerged from the meteorological development during and since the Second World War. The text now contains explanations of certain regional climates in terms of the typical atmospheric circulation, including fronts, frontal cyclones and air-mass distribution. In the main, however, the treatment remains descriptive, and often leans heavily on long quotations from lay accounts of the climate—very often of its horrors. Though these eye-witness accounts enliven the reader's perception of the daily weather-cycle, they sometimes shock the susceptibilities of a scientific reader. J. M. Merk, who wrote in 1880 a description of the Punjab climate, is quoted on page 189 as saying that . . .