establishing its aims and staking its frontiers. Embryology, in the strict sense, is no longer granted automatic precedence, nor is morphogenesis the key problem. Events in any part of the ontogenetic cycle are seen in terms of the contribution they can make to an understanding of the whole.

These meetings were thus, if anything, even less restricted in scope than might be suggested by the titles of the volumes in which they are reported. Though there is remarkably little repetition of one in another, between them they touch upon a substantial fraction of all experimental biology. However, it was not intended that the series should be comprehensive and there are, inevitably, many gaps, some premeditated and others contingent upon the informal nature of the discussions. This is not a fault, but it does mean that some of the reports will be of most value to those already familiar with the background to the themes discussed. This is true, for example, of "Cytodifferentiation" and of "Environmental Influences on Prenatal Development", both of which contain stimulating presentations of recently discovered facts and recently developed ideas. On the other hand, the more formal reviews in "Regeneration in Vertebrates" provide excellent and comprehensive surveys of a few selected experimental situations.

These seven volumes do indeed vary greatly in character, partly because the meetings themselves took different forms and partly by editorial decision. At the one extreme (for example, in "Embryonic Nutrition") we are offered an orthodox sequence of papers and discussions of them, with a complete list of the authorities referred to. At the other (in "Immunology and Development") the identities of discussion leaders, participants, and absent authorities are not defined and their work is merged into a sort of collective stream-of-consciousness report. Both volumes are successful, but their usefulness is clearly of different kinds.

Formal considerations apart, it must be confessed that the series, viewed as a whole, lacks the intellectual coherence that the "unity of subject matter" claimed for it by its organizer, Paul Weiss, might lead one to expect. We have not yet a continuous spectrum of problems in developmental biology. But these meetings certainly reflected real progress towards a consciously unified approach to developmental processes, a progress that will be further stimulated by the publication of their proceedings.

D. R. Newth

THE HETEROGENEITY OF HUMAN HÆMOGLOBIN

Abnormal Hæmoglobins

A Symposium Organized by the Council for International Organizations of Medical Sciences. Edited by J. H. P. Jonxis and J. F. Delafresnaye. Pp. ix+427. (Oxford: Blackwell Scientific Publications; Springfield, Ill.: Charles C. Thomas, 1959.) 45*s*. net.

THIS volume contains the papers and discussions of a symposium on abnormal hæmoglobins held in Istanbul in September 1957. Since Pauling's demonstration in 1949 of an electrophoretically distinct hæmoglobin in sickle-cell anæmia, the discovery of new variants has proceeded with increasing momentum so that, at present, 15 hæmoglobins have been designated by letters of the alphabet. Four subfractions of normal adult human hæmoglobins, A_1, A_2, A_3, A_4 (A_2'), and one normal fœtal hæmoglobin are now known. The complexity of the situation is illustrated by reports of a further seven variants which are given provisional names derived from the place of discovery, in order to avoid confusion of the nomenclature.

The interest in abnormal hæmoglobins is spreading throughout the world, and involves many scientific disciplines. It is this widespread multidisciplinary interest which has brought the subject within the ambit of the Council for International Organizations of Medical Sciences. Participants in the symposium included eminent workers of international repute, and others who have become recognized for their work in their own geographical localities. The papers have been grouped under two main headings: "Biological Considerations" and the "Geography of Hæmoglobins". Itano (United States) opens the symposium with an introductory discourse on the "Genetic and Physical Factors in the Heterogeneity of Hæmoglobin". The identification of human hæmoglobins is described by Huisman (Holland), though practical details of technique are not given. This paper is supplemented by Cabannes and Portier (Algiers) with a description of their electrophoretic experiences of the newly discovered hæmoglobins. Two groups of workers using two different techniques bring forth evidence that the alkali-resistant hæmoglobin of thalassæmia is not fœtal hæmoglobin: a view not held by the majority of authorities. Derrien (France) bases his evidence on solubility experiments, while Dianoco and Castay (Tunis) describe immunological differences using a complement fixation test for the detection of hæmoglobin antibodies. Clinical and hæmatological aspects of the various hæmoglobin syndromes are described by Zuelzer (United States). Chapters on fœtal and sickle cell hæmoglobin are provided by Jonxis (Holland) and Vandepitte (Belgian Congo) respectively. Fessas (Greece) described the alterations of the hæmoglobin pattern in thalassæmia. The first section is concluded by chapters on the genetic aspects by Neel (United States) and on the hæmoglobin types of animals by Huisman (Holland) and his colleagues.

In the part on geography, the following authors have dealt with the position of abnormal hæmoglobins in their region: Aksoy (Turkey), Pouya (Iran), Silvestroni and Bianco (Italy), Fessas (Greece), Vandepitte (Belgian Congo), Portier, Cabannes and Duzer (Algiers), Edington (Ghana), Chatterjea (India), de Silva, Jonxis and Wickramasinghe (Ceylon), Na-Nakorn (Thailand), and Lie-Injo Luan Eng (Indonesia). Prof. Jonxis contributes some interesting comparisons of the frequencies of the sickle-cell and hæmoglobin *C* traits in the Dutch colonies of Curacao and Surinam. Two chapters by Lehmann (United Kingdom) put the subject of hæmoglobin variants in their proper geographical perspective.

The nomenclature of the newer hæmoglobin variants *H*–*N* is given in an appendix, together with the studies required before a new hæmoglobin can be designated.

This volume will provide a useful account of the abnormal hæmoglobin situation up to early 1958, whether the reader be a hæmatologist, physician, biochemist, geneticist or anthropologist.

J. A. M. Ager