the "Christian Topography" is the text of two important historical inscriptions which he copied at Adulis, the modern Zulla. One of these was set up by officers of Ptolemy Euergetes, and commemorates that great king's conquests in the East; the other was added by a local king of the Axumite dynasty, probably in the second century A.D., to chronicle his conquests in Abyssinia. Historians have to be grateful to the "Christian Topographer" for the preservation of these two documents, and also for the valuable information which he gives us here and there as to the history of his own time. Thus he copied the Adulite inscriptions at the request of Asbas, the Axumite governor, who had been ordered to send copies of them to his master, King Ellatzbaas, who was just then about to set out on his famous expedition to Arabia against Dhu Nuwâs, king of Himyar, which was so brilliantly successful. This was about the year 525 A.D. He gives us also invaluable information as to the great spread of Christianity in the East by the sixth century, especially in Persia and India.

The book, therefore, was fully worthy of an adequate English edition, and, having made our *caveat* as to certain blemishes in dealing with the comic side of the subject, we can say that the editor has done his work well, especially, no doubt, upon the textual side.

TROPHOBLAST AND THE EARLY DEVELOPMENT OF MAMMALS.

Die Säugetierontogenese in ihrer Bedeutung für die Phylogenie der Wirbeltiere. By Prof. A. A. W. Hubrecht. Pp. v+247. (Jena: Gustav Fischer, 1909.) Price 7 marks.

IT is now twenty years since Prof. Hubrecht published, in the pages of the *Quarterly Journal of Microscopical Science,* his classic researches on the trophoblast and allantoic placenta of the hedgehog, *Erinaceus europaeus.* This work, along with the investigations of Eduard van Beneden and M. Duval, may be said to have revolutionised our knowledge of the placental phenomena in the mammalia. By it new light was thrown on the egg-cleavage, the so-called gastrulation, and, especially, on the mode of origin and the nature of the "fœtal membranes," the chorion (trophoblast), amnion, and allantoic placenta. For the Dutch investigator this was the starting-point of a long period of painstaking researches into the placental conditions of diverse mammals, and of these the present work is an author's translation of the English version, published (November, 1908) in the journal containing his earlier results.

So long ago as 1894, under the title "Spolia nemoris," an appetising account was given of the wonderful array of material of mammalian development, which, in the Dutch East Indies, had either been collected personally or obtained and sent to Utrecht by others. We do not recall any similar journey in quest of embryological material which has been attended by such remarkable success in enlisting, and retaining, the altruistic help of so many different collectors. Other embryologists remember, to their sorrow, the failure of attempts to increase their collections by the aid of others and amateurs. This vast material, much of it of rare and interesting species of mammals, has served as the basis of Prof. Hubrecht's researches, and with great generosity he has placed it at the service of other investigators in the Zoological Institute of Utrecht. The limits of space assigned to this notice allow only a general reference to the work before us.

What is *trophoblast?* The word and the thing may be described as the main theme of the work, even though it treats also of the egg-cleavage, germinal layers, allantoic placenta, and the descent of mammals. According to Hubrecht, trophoblast is a specialised portion of the outer layer, the epiblast, of the embryo, and he identifies it more particularly as equivalent to that portion of this layer which in amphibians, for example, forms the outer or covering layer. This latter, admittedly, takes no share in the formation of embryonic structures, and it, and trophoblast also, is regarded by Hubrecht as larval and transitory in character. On the other hand, another mammalian embryologist, Mr. Richard Assheton, has recently again urged the view that trophoblast is in reality a derivative of the inner layer or hypoblast. Apart from other considerations, this identification is, in our opinion, negatived by the circumstance that nowhere in the animal kingdom is the hypoblast known to be formed, as is the trophoblast, as a product of the first cleavages of the egg. Prof. Hubrecht's own recognition of its embryonic epiblastic nature (that it is really a part of "the embryo") seems to be disproved by his own researches on Tupaja. Of the eight products of the egg-cleavage here, seven are destined to become trophoblast, while out of the eighth the whole of the embryo, including presumably its epiblast, is unfolded. If the two foregoing objections be valid, the explanation of the nature of trophoblast must be sought elsewhere, for as yet no one has had the temerity to suggest the remaining alternative, the third germinal layer or mesoblast, as its source of origin.

The truth is, as so often happens in embryology, far too little account has been taken of physiological considerations. The trophoblast arises early in development, and never takes part in the formation of embryonic organs, but instead thereof it eats and erodes its way into the uterine wall, and in doing this it destroys the epithelial lining and much besides. If this happens to be in a tubal (oviducal) gestation, the erosion is finally through the oviduct, with sudden and often fatal hæmorrhage into the abdominal cavity. A mass of cells, trophoblast, which can do this, and in the absence of a normal embryo may become the most deadly form of cancer, chorio-epithelioma, can have no nutritive import for the embryo, as its name falsely implies, nor by any stretch of the imagination can it be assigned to either epiblast or hypoblast, for there is nothing in embryology to indicate that embryonic epiblast or hypoblast possesses this property of eroding and destroying maternal tissues. It is not intended as a reproach to the author, or in depreciation of the immense value of his published researches to science, when this lack of information on the physiological and biochemical side is insisted upon. In fine, like so much in embryology,

these researches would appear to fall short of their object in that they ignore the foundations and principles, and even the existence, of a science of stereochemistry, founded so long ago as 1860 by Pasteur for chemists—and biologists. In his two lectures "On the Asymmetry of Naturally Occurring Organic Compounds," Pasteur wrote :—

"Who can foresee the organisation that living matter would assume if cellulose were lævo-rotatory instead of being dextro-rotatory, or if the lævo-rotatory albumens of the blood were to be replaced by dextro-rotatory bodies? These are mysteries which call for an immense amount of work in the future, and to-day bespeak consideration in the science."

Trophoblast, which, by means of its intracellular ferments, pulls down the living "lævo-rotatory albumens of the blood," cannot itself be made up of such bodies, but by all the canons of stereo-chemistry must consist of dextro-rotatory ones. B.

PLANT-LIFE IN THE BALKANS.

Die Vegetationsverhältnisse der Balkanländer (Mösische Länder). By Prof. Lujo Adamović. Pp. xvi+567; with 49 plates, 11 text-figures, and 6 maps. (Leipzig: W. Engelmann, 1909.) Price 32 marks.

THIS bulky volume on the vegetation of the Balkan district is the eleventh in the series of monographs of plant geography, edited, under the title "Die Vegetation der Erde," by Profs. A. Engler and O. Drude. The district includes Servia, Bulgaria, East Rumelia, North Thracia, and North Macedonia, and the volume therefore forms a companion one to Dr. Beck von Mannagetta's account of the vegetation of the Illyrian district, comprising the western part of the Balkan peninsula, which formed the fourth volume of the same series.

In an introductory chapter, Dr. Adamović gives a sketch of the history of the botanical exploration of the Balkan territory. This began in earnest with the work of Josef Pančić on the flora of Servia (1846–88), which has been supplemented by that of numerous other botanists, especially of Dr. Adamović himself, who has worked continuously from 1890 onwards. The bibliography includes a long list of papers.

The subject-matter of the book falls under four sections. The first is a sketch of the physical geography of the area, in which chapters are devoted to the orographic, hydrographic, geognostic, and climatic conditions respectively. Climatic conditions are regulated by the position of the area under consideration, in the interior of a broad peninsula bordered only by small seas, while in the south high mountain ranges—the Rhodope system in the south-east and the Dinaric system in the south-west—hinder the approach of warm winds, and in the north the cold northern winds find a free entrance. Three climatic zones are recognised—(1) the West Mœsic, which stretches westward from the two mountain systems just mentioned, and is characterised especially by the prevalence of northerly and easterly currents; a cold winter is followed by a cool and damp spring, a fairly warm summer, and usually a warm and fairly long autumn; (2) the East Mœsic zone, to the north of the Balkan range, characterised by easterly currents and a climate similar to that of southern Russia; and (3) a southern zone, including almost the whole of East Rumelia, Thrace, the southernmost part of "Alt Servia" and North Macedonia, which has a climate approaching that of the Mediterranean region.

The second section deals with the vegetation, and is divided into three parts, in the first of which, "Œcological Factors," the author discusses the influence on the plant-life of external influences. Such are the so-called tectonic factors—disposition of land, mountain, plain, and valley, difference of exposure and the like, composition of the soil—chalk, serpentine, volcanic sand, or salt. A good deal of matter of general biological interest is included in the chapter dealing with climatic factors and the effect of many animals and plants themselves on the vegetation. The remainder of the section is an account of the various plant-formations; these are arranged under two heads, representing the two great constituents, those characteristic respectively of the Mediterranean and Central European floras. Under the former are included the "Ornus-Mischlaubwald," the mixed deciduous forest which forms a characteristic high-wood on the hilly and submontane districts of the Balkan peninsula; the diversity and abundance of its constituents render it comparable with no other European formations. Here also is the horse-chestnut-formation and the pseudo-maquis, the latter analogous to the evergreen bush-formation or maquis of the Mediterranean area, but adapted to a necessarily shorter vegetative period; the most frequent and widely distributed element of the pseudo-maquis is *Juniperus oxycedrus*, while the arborescent *Juniperus excelsa*, the box, and *Phillyrea media* are characteristic elements. These and other formations comprise the arborescent and bush vegetation, besides which is a series of steppe, rock, salt-marsh, aquatic, meadow, cultivated land, and other formations. The third and largest portion is an account of the plant-formations of a Central European type, the submontane woods of oak, sweet chestnut, and black pine, the mountain woods of fir, pine, spruce (*Picea omorica*), birch, and beech, the bush-formations, the rock, steppe, meadow, marsh, and aquatic formations, and, finally, the subalpine and alpine.

In the third section the author suggests zonal arrangements, both horizontal and vertical, of the two great type-groups of the vegetation; and in the fourth and last section attempts to trace the developmental history of the flora by a consideration of the fragmentary evidence afforded by the plant remains from successive geological strata.

A notice of Dr. Adamović's exhaustive and painstaking survey of the vegetation of the Balkan area would be incomplete without an appreciation of the plates, most of which are reproduced from photographs taken by the author. A. B. R.