

of one of the most fascinating and certainly one of the most difficult problems in the field of zoology.

Dr. Patten's paper, "On the Origin of Vertebrates from Arachnids" appeared in 1890; since then he has published many admirable studies in morphology, many of which have dealt with sections of the larger problem that has occupied his mind for so many years.

In presenting the arguments in support of his well-known "Arachnid Theory," the author covers a very large morphologic field and offers an immense amount of valuable material, concisely and clearly presented. The summary at the close of the chapters is an excellent feature. There are 309 very fine illustrations, many diagrammatic and all of them instructive. The relegation of the "Explanation of the Lettering" to the close of the volume saves much space, but is rather inconvenient to the reader.

At the close of the last chapter the work of the comparative morphologist is earnestly impressed.

"Hence, comparative morphology and phylogeny must always constitute the fountain head whence comes our knowledge of creative evolution. Such problems as the phylogeny of vertebrates are, therefore, the most important ones the biologist has to deal with, for on their solution depends our conception of the way in which evolution actually has taken place.

The cytologist is too intent on the raw material of life; his field of operation is both too remote and too narrow to give either measurable detail or perspective. To discover the immediate causes of any given stage in the evolution of the nervous system or of the endocranium, by a study of chromosomes, or of protoplasm, or by juggling with imaginary hereditary units is as hopeless a task as it would be for the geologist to explain the delta of the Ganges by an appeal to the composition of cosmic matter.

The naturalist is bewildered by the amazing detail of the finished product, and so much absorbed in the social organization of the present moment, or in the relation of one plant, or animal to the other, and to the environment at large, that he fails to acquire an adequate historic perspective.

The experimental evolutionist, for a few hours, or months, arbitrarily narrows the environment of an organism and measures the results, if any, with instruments of precision, or with the aid of higher mathematics; but he generally ignores or looks with contempt on the vast experiments already performed for him, where the laboratory is nature, and the results are expressed in species, genera and classes.

The comparative morphologist aims, not merely to trace