ary little digit (post minimus). His paternal greatgrandfather had supernumerary digits, as had a paternal uncle, and this uncle's children had supernumerary digits. Two of his own brothers and two of his sisters had a like conditions as well as his sisters' and brothers' children. In another case also there was a hereditary history for some generations on the father's side. Another case was stated and the photographs shown where, in a man aged 22, there was no thumb on the left hand and only a very rudimentary one on the right hand; no history of heredity. Another, where there was absence of the thumb of right hand and a rudimentary little finger with absence of the fifth metacarpal bone. The father had a similar deformity. A remarkable skiagram was exhibited which showed a fusion anteriorly of the proximal phalanges of the middle and ring fingers, and a complete fusion of the middle and distal phalanges of these fingers; also a case of fusion of the ring and middle fingers of the right hand in a boy age 20. In neither case was there any history of heredity. In the case of polydactylism, Dr. Shepherd thought some of the cases might be due to reversion, but the majority he thought were probably the result of dichotomy.

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SCIENTIFIC BOOKS.

Kongl. Svenska Vetenskaps-Akadamiens Handlingar, Bandet 31. No. 5. Rhopalocera Æthiopica. Die Tagfalter des Æthiopischen Faunengebietes. Eine Systematisch-Geographische Studie. CHR. AURIVILLIUS. Pp. 571. Six chromo-lithographic plates containing 50 figures. Numerous figures in the text. Large 4to. Stockholm, 1898.

Without the aid which learned societies are sometimes able to supply, important works, like the Rhopalocera Æthiopica of Professor Aurivillius, would not often see the light. The demand for such treatises is restricted, being largely confined to specialists, and the expense of producing them is necessarily very great. For many years the learned author has been gathering the material for his undertaking, which having been completed, was laid before the Royal Academy of Sciences in Stockholm on the 10th of June, 1898. The work was issued from the press in June of 1899.

After a brief introduction the author defines the limits and subdivisions of the Ethiopian Region, closely following Wallace, Sclater and others, and excluding the regions immediately bordering upon the Mediterranean from consideration, because the fauna of the northern coast-lands is distinctly palæarctic, and including southern Arabia, the tropical islands, and Madagascar.

This chapter is followed by a bibliography of the subject, arranged according to the political subdivisions of the region. The list of books and papers, while extensive, is, nevertheless, not as complete as might be desired, a number of titles having been apparently overlooked in preparing the bibliography, although in most cases they are subsequently referred to in the text.

The systematic position of the Rhopalocera is next discussed. The author follows Haase and E. Reuter in excluding the Hesperiidæ from the Rhopalocera, regarding them as an independent group, the *Grypocera*, of equal value with the butterflies, and intermediate between them and the moths, or Heterocera. In this view, he will probably find few followers, although a good deal may be said in favor of such a procedure. The Hesperiidæ are accordingly excluded from consideration in the treatise, which enumerates sixteen hundred and thirteen species of Rhopalocera, in this restricted sense, as occurring in the Ethiopian region. Of these species thirty-three, or 2.04 per centum of the whole, also occur in other faunal regions. If we include the Hesperiidæ enumerated by the present writer in his 'Synonymic Catalogue of the Hesperiidæ of Africa and the Adjacent Islands,' published in the Proceedings of the Zoological Society of London in 1896, to which some twenty or more species, described since then must be added, we have a total of nineteen hundred and eighty, or, in

round numbers, two thousand species of Rhopalocera in the usually accepted sense of the term occurring in the Ethiopian region. Further explorations are likely to bring to light many species as yet unknown, and the student who is familiar with the subject will see that this is from the standpoint of the lepidopterist one of the richest regions on the globe, the number of species greatly exceeding that represented by the butterfly-faunæ of the Palæarctic and Nearctic regions combined. In extra-tropical North America there occur about six hundred and fifty species, and in Europe and extra-tropical Asia together not more than seven hundred species all told.

A chapter is devoted to terminology. The author's views as to what properly constitutes a generic name are clear, logical, and forcibly expressed. He rejects as *nomina nuda* the generic terms employed in Hübner's 'Tentamen,' Billberg's 'Enumeratio,' and other "equally worthless publications, which have been regarded as establishing priority for a name, although these names are unaccompanied by any description of the genus, and are only applied to one, or at most several species."

The bulk of the work, four hundred and sixty-three pages, is taken up in presenting a Synonymic Catalogue of the species, keys to the various families, subfamilies, and genera being provided. This portion of the work cannot fail to be exceedingly useful to the student, and may in general be said to be very well done. Here and there errors are discoverable, owing to the fact that the author did not have access to the types of some of the species which he enumerates. It is not, however, the purpose of the writer in the present brief review to point out these occasional blemishes, as attention would be more properly called to them in a journal specifically devoted to entomology.

The concluding portion of the text, pp. 493–537, is devoted to a discussion of facts relating to the distribution of species in the various zoögeographical subregions of the Ethiopian territory, and the relationship of the butterfly-fauna of Africa to the lepidoptera of other portions of the earth, followed by some observations upon seasonal dimorphism and protective mimicry. This is to the general student the most interesting part of the entire treatise, and brings into light some highly interesting facts.

The Ethiopian butterfly-fauna includes one hundred and twenty-eight genera, of which eighty-six, or nearly 68 per cent. are peculiar to this region. Of the forty-two genera, which occur in the other regions of the earth, eight, *Danais*, *Pyrameis*, *Libythea*, *Cupido*, *Heodes* (*Chrysophanus*, *Auctorem*), *Pieris*, *Colias*, and *Papilio* are more or less cosmopolitan, while *Acraea* (sens. lat.), *Catopsilia* (sens. lat.), and *Terias* are common to the tropics and sub-tropics of both hemispheres. Of the remaining thirty-one genera which the Ethiopian region possesses in common with other regions, twenty occur in the Indo-malayan, and to some extent also in the Austro-malayan Regions, but are altogether wanting in the Palæacrtic region. These genera are *Euplœa*, *Elymnias*, *Melanitis*, *Henotesia*, *Atella*, *Salamis*, *Hypolimnas*, *Kallima*, *Eurytela*, *Ergolis*, *Biblia*, *Cyrestis*, *Abisara*, *Deudorix*, *Hypolycæna*, *Spalgis*, *Lycænesthes*, *Leptosia*, *Appias*, and *Eronia*. The genera *Yphthima*, *Precis*, *Charaxes*, *Spindasis*, and *Teracolus* are Indo-malayan, although they are represented by one or other species in the extreme southern portion of the Palæarctic Region. *Argynnis* and *Neptis* are well represented in the Palæarctic and Indo-malayan Regions, *Pararge*, *Brenthis* and *Phyllocharis* are to be classed as Palæarctic genera, though they are represented in the northernmost portion of the Indo-malayan Region, and *Brenthis* is found in North America, and extends along the western Cordilleras to the extreme southern end of the continent of South America. The only remaining genus, *Hypanartia*, is peculiar to Africa and the tropical and subtropical regions of the Western Hemisphere.

Of the forty-two genera which Africa possesses in common with other regions, all except the three palæarctic genera and *Hypanartia* are found in the Indo-malayan region. Whether they migrated from Asia into Africa or from Africa into Asia cannot well be determined, but that, if such migration occurred, it must have been at a time when climatic and other conditions were widely different from what they now

are, is plain. A wide barrier of sea and arid lands devoid of suitable vegetation separates at the present time the regions in which these insects, for the most part forest-loving, occur. The sandy wastes of Arabia and the rocky plateaus of Abyssinia are a great and impassable barrier, to say nothing of the Indian Ocean, to the transfer of genera which frequent the hot and dense forests of tropical West Africa and the equally hot and heavily timbered lowlands of India and the Malay archipelago. In Arabia, the present dividing region, many of these genera are altogether wanting.

Pararge and *Phyllocharis*, palæarctic genera, may have entered the region in which they now occur by migration along the Nile. It is quite different with the genus *Brenthis*, which occurs isolated upon the slopes of Kenia, Kilimanjaro, and Ruwenzori, the lofty volcanic peaks which dominate the plains of eastern and southeastern Africa. The nearest locality in which this genus finds representation at the present time is in the Alps of Switzerland, the Himalayas in India, and the Andean region of Patagonia. That the genus *Brenthis* should occur on the lofty summits of the East-African mountains and be there as the result of a migration from Switzerland, the Himalayas, or Patagonia, under conditions such as exist at the present time, is an untenable hypothesis, which no student would venture to advocate. The occurrence of *Hypanartia* only in Africa and South America, and the existence in Africa of the genus *Crenis*, so closely related to the South American genus *Eunica*, as scarcely to be separable from it, are facts pointing strongly to the existence in some remote time of a land connection between the continents of Africa and South America. Correlated with the facts as to the distribution of these genera of butterflies is the fact that in the avifauna of Africa and South America we find the *Struthionidæ*, or ostriches represented in both localities, and the species of the genus *Rhipsalis*, of the Opuntieæ occurring in the Cameroons and Madagascar, are witnesses in the floral world to the ancient bond between two now widely separated continents. To these facts cited by our author the writer may add the fact that in the elder groups of the arthropoda, as for example the Phrynidæ, similar instances of the occurrence of closely related forms in Africa and tropical America occur. These things all go to confirm the view which is coming to be generally held by geologists and paleontologists upon apparently strong and sufficient grounds, that in the mesozoic and elder tertiary, a union between the Eastern and Western Hemispheres existed by means of an Antarctic continent, which has largely disappeared, but which at that time, in some way united Africa and Madagascar, and very probably likewise Australia, to the land-mass now known as South America.

Under the head of 'Mimicry' the author gives a list of forty-nine species which are mimicked and sixty-six species which mimick them. It is very doubtful whether this list is correct in representing certain species as mimes, especially where a species of *Terias* is represented as mimicking a *Pieris*, or a *Catopsilia* the female of *Teracolus*. The cases cited, with which the present writer is very familiar, do not come under the head of 'protective mimicry' at all, but fall into the common category of general resemblance or family likenesses. This part of the work, while interesting, gives evidence of less care in preparation and less familiarity with essential facts than any other part of the work.

Upon the whole the student of African entomology has great reason to be grateful to Professor Aurivillius for having had the patience and zeal to prepare this monumental volume, which must for years to come serve as a key for unlocking the treasures of knowledge as to the butterfly-fauna of the Dark Continent.

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WESTERN UNIVERSITY OF PENNSYLVANIA,
February 24, 1900.

Zoological Results based on Material from New Britain, New Guinea, Loyalty Islands and elsewhere, collected during the years 1895, 1896 and 1897, by Arthur Willey. Cambridge, Eng., the University Press. 4to. Part III., May, 1899; pp. 207–356; plates XXIV.–XXXIII.

Part III. of Dr. Willey's 'Zoological Results' opens with an account by Gadow of the variations in the number and arrangement of the