the Canadian river northward to the corner, a distance of about 75 miles, in the summer of 1900. This was done by direction of the General Land Office and his MS. report is now on file in that office. Of the 12 monuments set by Clark in 1859 on this part of the line Preston identified 3 certainly and, doubtfully, 4 in all. Clark's line, according to Preston, bears N. 0° 08′ W.

In 1882 W. S. Mabry, county surveyor of Dallam county, the northwesternmost county of Texas, retraced a part of the Clark line and assisted in building a pasture fence for the XIT or Capital Land and Cattle Company. The corner of that pasture was established at the point supposed by Mabry to be Clark's corner. This XIT corner is now locally recognized as the N. W. corner of Texas. According to Preston's survey it is 'within 150 links of the proper position east of the Johnston monument.' It is about 2¼ miles east of the lost Major monument of 1874 and is 2 miles 14.05 chains west of the Chaney monument of 1881. Clark's monument, according to Clark, is in longitude 103°. Chaney's monument, according to Chaney, is in longitude 103°. These monuments differ in longitude by more than 2 miles. Which one is the better determination is unknown. Both longitudes are weak—Clark's is a fair determination by a weak method, Chaney's a weak determination by a strong method. A new and strong determination by a strong method is much to be desired.

SCIENTIFIC BOOKS.

Biologia Centrali-Americana, Insecta, Lepidoptera-Rhopalocera. By FREDERICK DUCANE GODMAN, D.C.L., F.R.S., and OSBERT SALVIN, M.A., F.R.S., etc. Vol. I., Text, pp. i–xlvi + 1–487; Vol. II., Text, pp. 1–782; Vol. III., Plates, I.–CXII. and XXIVa. Published by the authors. Royal 4to. 1879–1901.

In the present age it is recognized as one of the functions and duties of wealth to minister at the altar of learning. The upbuilding of great institutions, the object of which is the ascertainment of truth and the diffusion of knowledge, is regarded as one of the high prerogatives of those who have command of material resources. Splendid have been the achievements in recent years of those who have consecrated their wealth to founding or aiding in the endowment of colleges, universities, libraries and museums; but perhaps no enterprise undertaken by wealth is likely in coming years to be regarded as more important and monumental in its character than the great work to which Messrs. Frederick Ducane Godman and Osbert Salvin addressed themselves when they conceived the idea of preparing and giving to the world the encyclopedic work known as the Biologia Centrali-Americana. Of this work it may be said that it constitutes *monumentum aere perennius.*

It is with profound satisfaction that we welcome the appearance in final form of the three volumes devoted to the Rhopalocera of Mexico and the Central American republics. For twenty-two years these volumes have been slowly appearing in parts. The delay is most reasonably explained by the surviving editor and author, Mr. Godman, as due 'to the constant pressure of other work, the ever-increasing amount of material, the gradually failing health and subsequent death of Mr. Salvin, and the great difficulty of dealing with the Hesperiidæ.' The work, however, has not lost, but has rather profited by delay. The exceedingly satisfactory treatment of the Hesperiidæ, which a few years ago would have been impossible, and the supplementary pages and plates cause the student, now that the work is completed, to feel thankful that the editors followed the good maxim, *festina lente.* Had they completed the work before the region had been traversed by the various collectors whom their munificence placed in the field, and had they not been able to profit by the researches in the family of the Hesperiidæ made by Captain E. Y. Watson, the work would not have been the eminently satisfactory work which it now proves to be. There is yet much to be

learned in reference to the lepidopterous fauna of Central America, and the last word has not been spoken even by the learned authors in the three stately volumes before us, but a foundation has been laid so broad and solid and enduring that all who come hereafter will be compelled to build upon it. These three volumes in a peculiar sense reflect the intelligence as well as the generosity of the two lifelong collaborators, Messrs. Godman and Salvin. With the exception of the volume upon the avifauna of the region, written by the same two gentlemen, they most strongly illustrate their learning. Other volumes in the great work reflect the excellence of their editorial supervision, as well as their munificence, but the parts of the 'Biologia' which have issued from their own hands and most strikingly display their scientific accuracy and the vastness of their learning are the volumes dealing with the birds and these three volumes treating of the butterflies.

Eighteen hundred and five species of butterflies are enumerated in the work as occurring within the region, three hundred and sixty of them being described as new to science. Of these species about twelve hundred and fifty are figured in the one hundred and thirteen hand-colored plates drawn by Rippon and by Purkiss. It will be seen from the foregoing statement that the region chosen is far richer in the number of the species of Rhopalocera than the continent of North America north of Mexico or the Palæarctic region, the latter covering Europe and northern Asia. The last published list of the diurnal lepidoptera north of Mexico cites but six hundred and forty-five species, a few of which, however, are doubtful, to which must be added a few others recently described. There are probably not more than seven hundred valid species of butterflies to be found on the entire continent of North America from Florida and the Rio Grande of Texas to the Arctic Ocean. Staudinger & Rebel's Catalogue, which has just appeared, enumerates seven hundred and sixteen species as found in the Palæarctic region, covering the Barbary States, Europe, Asia Minor and temperate Asia north of the Himalayan ranges. Within the comparatively small area of Mexico and Central America more species of butterflies occur than are found in all temperate North America, Europe, North Africa, and temperate Asia put together.

Compared with the fauna of the West Indian Islands so far as known, the latter are exceedingly poor in the number of genera as well as species of butterflies. While strictly correct lists of the species of Rhopalocera found on the various West Indian Islands are not available for purposes of comparison, enough is positively known to make it certain that all of these islands together do not contain more than one third of the number of species which are accredited to the region covered by the 'Biologia.' In fact, it is doubtful whether these islands have more than one fourth as many species as are found in the territory of which we are speaking, provided the Leeward Islands and Trinidad be excluded, as appears to the writer proper, in view of their close contiguity to the South American mainland.

An examination of the exceedingly interesting table given in the introduction to the work, which is devoted to the display of the geographical distribution of the various species, shows that the region in and about Panama is probably the most prolific, Costa Rica and Guatemala following closely. It is here, in the humid tropical forests, that we have the fullest development of the Rhopalocerous fauna of the territory. The table of distribution is summarized as follows:

Nymphalidæ, ...	588	species
Libytheidæ, ...	1	"
Erycinidæ, ...	240	"
Lycaenidæ, ...	234	"
Papilionidæ, ...	186	"
Hesperiidæ, ...	556	"
Making a total of.....	1805	"

Comparing this list with the great list of the 'Rhopalocera Ethiopica,' recently published by Professor Aurivillius, and adding the Hesperiidæ from the Ethiopian subregion, which number about three hundred and seventy-five species, we find that the continent of Africa and the adjacent islands have up

to the present time only yielded us about two thousand species of Rhopalocera. It is evident, therefore, that the Neotropical region, which includes tropical South America as well as Mexico and Central America, is likely to prove to possess, when a final and exhaustive catalogue of the species is made, the richest Rhopalocerous fauna in the world. The family of the Hesperiidæ is far richer in species in this region than anywhere else. More species of these interesting and often puzzling insects occur in Mexico and Central America than are found either in the tropics of the Indo-Malayan region or in the tropics of Africa. The Erycinidæ are also characteristic of the region, and the number of species of this family in the total vastly exceeds the number of species found in all other regions of the globe combined. The Nymphalidæ lead all other families in the number of species, but the number of species, while great, is not equal to the number that is found in the Ethiopian subregion, nor is the number of species as great as that known to occur in the Indo-Malayan subregion.

The general conclusions reached by Mr. Godman as to the distribution of species within the territory are best expressed in his own language. He says: "Our study of the Central American butterflies proves conclusively (1) that the fauna is mainly a northern extension of that of tropical South America, extending on the Pacific side to Mazatlan and on the Atlantic to a little beyond Ciudad Victoria in Tamaulipas, some few species on each coast reaching the southern United States, with, of course, many peculiarly modified forms in the region; (2) that there are a considerable number of Nearctic genera and species coming down the central plateau a certain distance into Mexico, and some even into Guatemala, as *Argynnis, Vanessa, Limenitis, Grapta,* various *Colias,* etc.; (3) that there are no strictly alpine forms, the insects met with above the tree-line being mostly stragglers from below, such species as occur at the highest limits of the forest being very like those of similar Andean localities, these mostly belonging to the genera *Euptychia, Archonias, Catasticta, Pereute, Enantia,* etc.; (4) that the fauna of the Atlantic slope to perhaps as far south as Costa Rica is incomparably richer than that of the Pacific, this being particularly noticeable in the Ithomiina, the Erycinidæ, the genera *Thecla* and *Papilio,* etc.; and (5) that some of the purely tropical genera do not reach north of Nicaragua, Costa Rica or Panama, as *Eutresis, Scada, Cœrois, Callitæra, Hetœra, Oressinoma, Narope, Panacea, Megistanis, Hypna, Zeonia, Ithomeis,* etc."

Within the limits of a brief review such as this it is impossible to take up and consider many of the interesting details in reference to distribution which present themselves to view upon a careful study of the work. The writer commends to the careful attention of all students of entomology the introductory chapter of Volume I., which epitomizes in a masterly manner the results of the years of study which have been devoted by the learned authors to the subject in hand. To the comparatively few who are devoting themselves to a critical study of the Hesperiidæ that portion of the work devoted to this family is of extreme value. It is no exaggeration to say that it is one of the most perfect examples of careful monographic work which has ever appeared in the English language. The amount of painstaking and microscopic research which has been performed in order to attain the results which are given has been prodigious. It is certainly to be hoped that the work will find a place in all the great libraries of the New World, for without access to it the student of entomology in America is certain to find his labors greatly retarded.

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A Laboratory Course in Bacteriology, for the use of Medical, Agricultural and Industrial Students. By Frederic P. Gorham, A.M. Philadelphia and London, W. B. Saunders & Co. 1901. 8vo. Pp. 192.

In this unpretentious laboratory guide the author has succeeded in combining technical accuracy with sound pedagogy in a manner which will commend the book to teaching bacteriologists. The directions for even the commonest processes have very obviously stood the