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The Lepidoptera Collection of Henry Walter Bates at the Oxford University Museum of Natural History



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Abstract

Evaluation and research into the Lepidoptera collections at the Oxford University Museum of Natural History find part of Bates' personal collection, complete with his original labels, as well as syntype material from his paper *New Species of Butterflies of Guatemala and Panama*, which was published in *The Entomologist's Monthly Magazine* 1864 - 1866.

Keywords: Bates, Lepidoptera, Henry Walter Bates, Oxford University Museum, Nymphalidae, Butterflies

Introduction

The Oxford University Museum of Natural History (OUMNH) houses over six million entomology specimens. Approximately two million of these specimens are Lepidoptera (butterflies and moths) and the collection is rich in both scientific and social history, with specimens collected by Alfred Russel Wallace, Herbert Druce, and G.C. Champion (Smith, 1986). The main collection also contains material associated with naturalist Henry Walter Bates. According to archival records in the OUMNH, the collection also contains material that once formed part of Bates' personal collection, and made its way to the museum via Frederick DuCane Godman and Osbert Salvin. While records in the Hope library indicate that the Godman-Salvin collection did indeed contain part of Bates' personal collection, this material was not immediately recognisable due to a lack of literature on how to identify Bates' personal labelling system. Examination and comparison of labels in Oxford's collection with Godman-Salvin material in the Natural History Museum, London, have now put the specimens under a new light. This includes material that was collected by Bates, but also material that was in his possession and was used to describe new species of Nymphalidae.

Bates' Collections

Born in Leicester in 1825, Bates left school at the age of 13 to carry on in his father's and grandfather's footsteps by starting an apprenticeship with a hosiery manufacturer. He worked 13-hour days and spent the evenings studying Latin, Greek, and French. During his free time, he collected insects with his brother Frederick in the nearby Bradgate Park. Bates studied in the library of the Leicester Mechanics' Institute. It was here that he met Alfred Russel Wallace, who had just started as an assistant teacher at the Collegiate School. The two men found that they shared a love of the natural world. Wallace was originally a botanist, but Bates introduced him to the field of entomology, and it wasn't long before the two men were planning a joint expedition to the Amazon, where they arrived in 1848. The expedition was funded almost entirely through the sale of specimens that they collected while there. Wallace returned to England after four years, but Bates spent a further seven years in the Amazon. When he finally returned to England in 1859, he had amassed a collection of over 14,000 species. 8,000 of these were new to science. (See Moon, 1976 for an extensive biography of Bates' life).

The larger portion of Bates' collections gradually



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passed into private hands. He sent several consignments to his dealer, Samuel Stevens, while in the Amazon (Stevens, 1849), and they were subsequently sold on to private collectors. Unfortunately, many of Bates' specimens met an all-too-common fate in Victorian entomology practices, namely that many of the private collectors purchasing his specimens then removed his careful labelling to add their own labelling system, a practice that Bates himself was highly critical of (Moon, 1976).

Bates was also critical of what he considered to be 'stamp-collecting' among entomologists. He argued that naturalists should adopt an interpretive attitude to science while still using hard data. In a letter to Joseph Hooker dated March 19, 1861, he remarks:

"I know you are one of the very few who has striven against much opposition to elevate natural history into the rank of an inductive science. It certainly has not been one hitherto, but merely the observation and cataloguing of facts. An immense multitude of curious, isolated facts, accumulated; but they are unfruitful, simply because of the foregone and illogical conclusion that species are absolute and immutable". (Bates, 1861)

The Bates material in the Oxford University Museum's Lepidoptera collections is assimilated into the main historical collection, housed in 149 wooden cabinets. This collection comprises most of the historical butterfly material in the museum, and is taxonomically arranged.

Because much of the material was scattered through dealers and his original labels were sometimes removed, it is impossible to quantify just how much material in the collections was originally associated with Bates. What can be quantified is traceable through archival documents in the Hope Entomology Library at OUMNH and examination of specimen labels.

Most of the material was sold by Bates directly to John Obadiah Westwood, Hope Professor of Zoology from 1861 to 1892, who prior to this was conservator for the Entomology collections at Oxford University Museum (Smith, 1986). A fine collection of diurnal Lepidoptera was purchased from Bates in 1859 and labelled by Westwood, simply with the information 'Amazons, Bates'. This purchase included a rare example of a moth from the family Urodidae, complete with its net cocoon. A further batch of butterflies (mostly Erycinidae, now classed under the modern name Riodinidae) was purchased in 1860 and is labelled 'Amazons, Bates, 1860', also in Westwood's hand (Bates, 1860) (Figure 1). Bates was fond of this group of diurnal butterflies, and one of his Amazon notebooks, which is now housed at the Natural History Museum, London, is almost completely devoted to this group. One of the specimens in the Oxford collection is notable as a probable candidate for a specimen mentioned in his second notebook. On one page of this he notes: "306-310 inclusion applied to 4 new additional species [for] monograph of Erycinidae." (Bates, 1851 - 1859) The specimen in the Oxford collection bears the number



Figure 1. Letter from H. W. Bates to J. O. Westwood with attached invoice and a corresponding specimen from the Oxford collections. Photo by G. Allnatt © Copyright Oxford University Museum of Natural History.

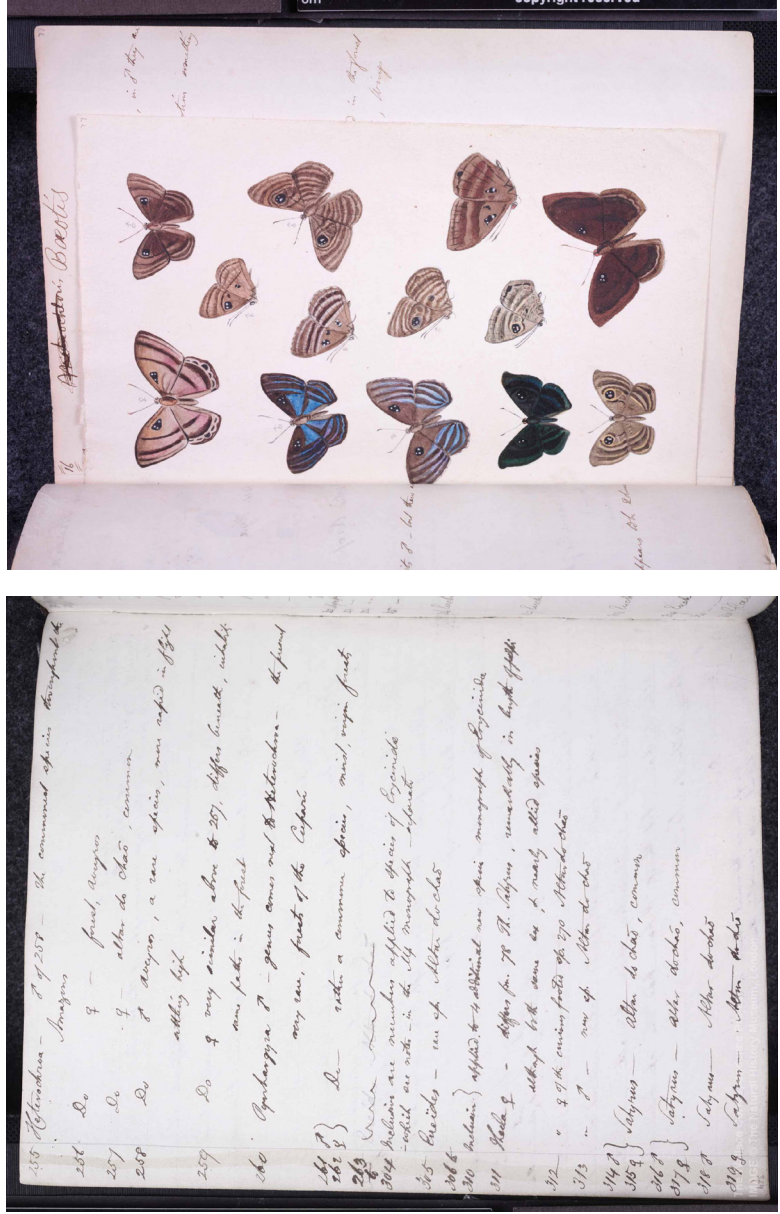


Figure 2a-c. a) Specimen that may correspond with numbers in H. W. Bates' original field notebooks. Photo of specimen by G. Allnatt Copyright © Oxford University Museum of Natural History. b-c) Notebook pages. The third specimen down from the left of the page of Bates' watercolours corresponds with the specimen in 2a. Pages courtesy Natural History Museum, London.

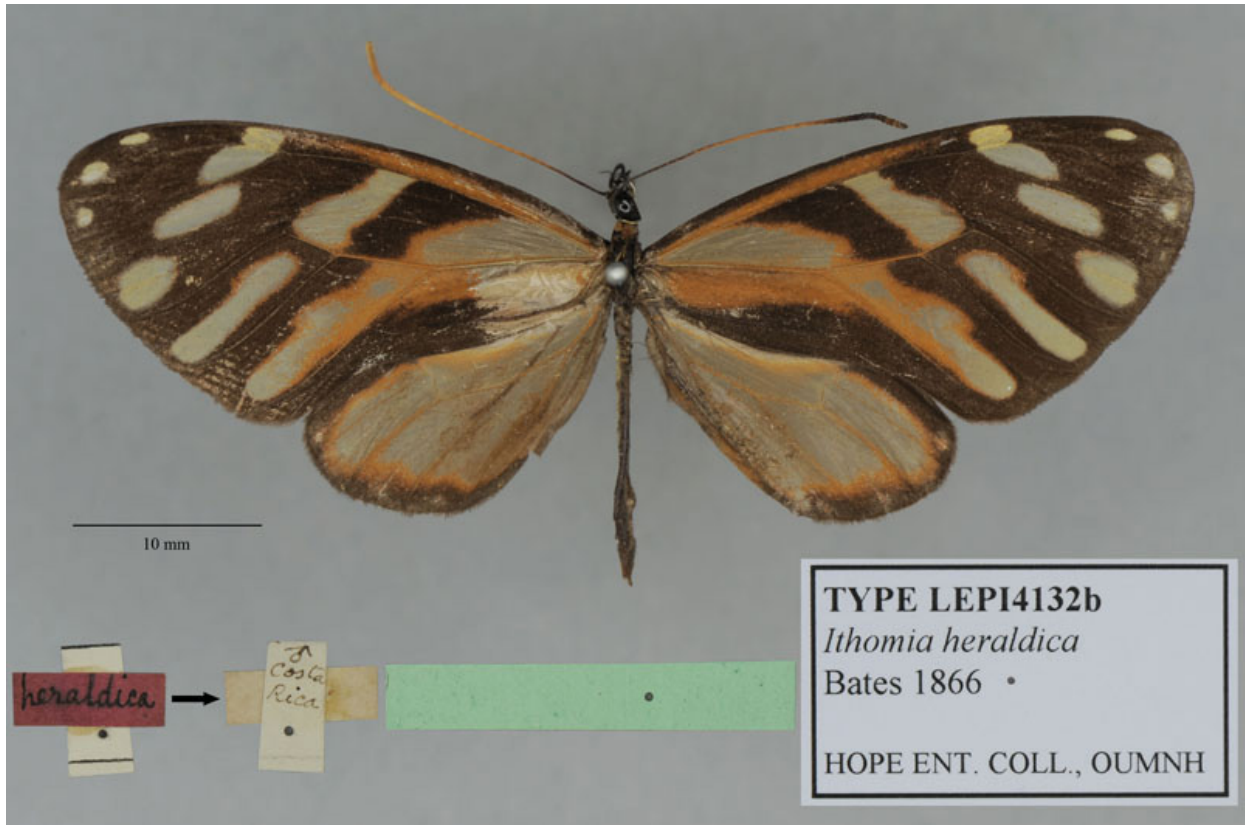
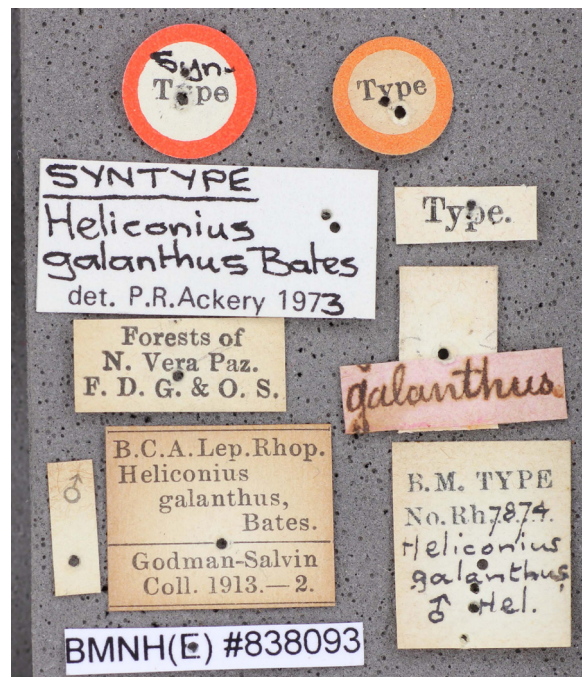
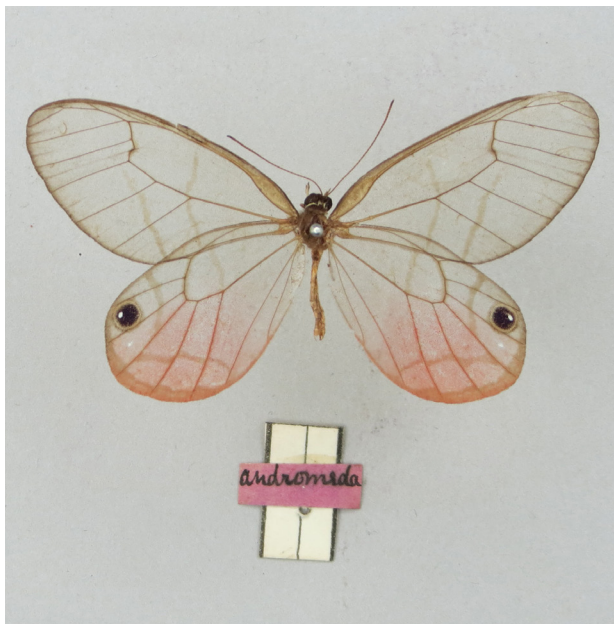


Figure 3: Syntype of *Ithomia heraldica* Bates, 1866 (specimen number: OXFUM-LEPI4132b), showing labelling consistent with the Godman-Salvin collection. Photo by Katherine Child © Copyright Oxford University Museum of Natural History.



Figures 4 and 5: Label from the Godman Salvin collection, Natural History Museum, London (BMNH #838093), and label from the OUMNH collection both showing the tell-tale pink strip identifying them as Bates specimens in Godman-Salvin's collection. Figure 4 courtesy and © Copyright The Natural History Museum, London. Figure 5 photographed by G. Allnatt and © Copyright Oxford University Museum of Natural History.

'310' and seems to match the watercolours in Bates' notebook, although it is not a new species (Figure 2a-c).

In 1882, Bates decided to concentrate on Coleoptera and sold his personal collection of butterflies to the taxonomists Frederick DuCane Godman and Osbert Salvin, who subsequently presented a portion of them to the British Museum (Boucard, 1892). The second half of the Godman-Salvin collection was presented to Oxford University Museum in 1896, four years after Bates' death (Smith, 1986), and is now incorporated into the main historical Lepidoptera collections. This material once formed part of Bates' personal study collection (Ackery and Goodger, 2002).

Much of this material contains Bates' original data (Ackery, 2015) in which the locality where the specimen was collected is carefully documented on the recto side of a rectangular label, and the species name is written on a pink or red strip on the verso side. Bates also recorded the sex of the insect on the recto side (see Figure 3). The majority of traceable Bates material in the collection comes from the Godman-Salvin collection, and is recognizable by this labelling. This was confirmed when comparing Oxford specimens with specimens from the collections at the Natural History Museum, London (see Figures 4 and 5). 80 specimens once belonging to Bates' personal collection have now been identified (see Appendix for a full list).

It is important to note that not all of the specimens with this labelling were collected in the field by Bates. Some of the material would have been specimens he acquired from other collectors and naturalists. For instance, one of the Bates specimens identified is a Papilio butterfly, *Papilio neptunus* (Guérin-Méneville, 1840), from Borneo (Figure 6). Bates exchanged specimens with Alfred Russel Wallace upon his return to England (Wallace, 1860), and Papilionidae

were one of Wallace's specialisms (Wallace, 1865). It is possible that this Bornean specimen could have come from an exchange with Wallace.



Figure 6. *Papilio neptunus* Linnaeus, 1758 (now placed in the genus *Losaria*) from Borneo. Photo by G. Allnatt.

After examination of the Godman-Salvin material, six syntypes described in Bates' paper *New Species of Butterflies from Guatemala and Panama*, published in the *Entomologist's Monthly Magazine* 1864-1866, were identified and catalogued (see Table 1 and Figure 3). These all belong to the family Nymphalidae.

Also within the collections are specimens with the label 'Bates, Venezuela, 1873'. Westwood's records in the Hope library indicate that this is possibly material from W. C. Hewitson or W. W. Saunders, as purchases from them correspond with this date (Westwood, 1873). However, there is no way to prove this, and the labels are of dubious origin because the species do not correspond with the geographical range on the label.

It is entirely possible that there is far more Bates material in the collection than is labelled, as much material passed through the hands of private

Table 1: Syntypes in the Oxford University Museum from the Godman-Salvin collection.

Heliconius galanthus Bates, 1864 Ent. mon. Mag. 1 (3): 58, TL: Guatemala, ♂ from Godman-Salvin collection. SYNTYPE: LEPI4130. Acquired in 1896.

Dircenna xenos (Bates, 1866) Ent. mon. Mag. 3 (27): 50, TL: Costa Rica, ♂ from Godman-Salvin collection. SYNTYPE: LEPI4133. Acquired in 1896.

Amphirene superba Bates, 1864 Ent. mon. Mag. 1 (7): 161, TL: Guatemala, ♂ from Godman-Salvin collection. SYNTYPE: LEPI4131. Acquired in 1896.

Ithomia heraldica Bates, 1866 Ent. mon. Mag. 3 (27): 51, TL: Costa Rica, ♂ from Godman-Salvin collection. SYNTYPE: LEPI4132a. Acquired in 1896.

Ithomia heraldica Bates, 1866 Ent. mon. Mag. 3 (27): 51, TL: Costa Rica, ♂ from Godman-Salvin collection. SYNTYPES: LEPI4132b. Acquired in 1896.

Heterochroa melanthe Bates, 1864 Ent. mon. Mag. 1 (6): 129, TL: Guatemala, ♂ from Godman Salvin collection. SYNTYPE: LEPI. Acquired in 1896.

collectors and dealers, but without a label this would be guesswork at best.

Conclusion

After examination of the Oxford University Museum specimens I have concluded that a total of 370 specimens collected or acquired by Bates are present in the collection. Of these, 80 are from the Godman-Salvin collection and form part of Bates' once personal butterfly collection.

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Appendix. List of Bates specimens in the OUMNH from the Godman-Salvin collection

Family	Locality	Genus	Species	Author	No. of specimens
Papilionidae	Guatemala, Polochic Valley	Eurytides	thymbraeus	Boisduval, 1836	1
Papilionidae	West Coast, Guatemala	Battus	polydamas	(Linnaeus, 1758)	1
Papilionidae	Bogota	Papilio	polyxenes americanus	Kollar, 1850	1
Nymphalidae	Ecuador	Heliconius	hierax	Hewitson, 1869	1
Nymphalidae	Unknown	Heliconius	sara	(Fabricius, 1793)	1
Nymphalidae	Bogota	Heliconius	hydara guarica	Reakirt, 1868	1
Nymphalidae	Para	Eueides	isabella	(Stoll, 1781)	1
Nymphalidae	Guatemala interior	Danadus	archippus	(Fabricius, 1793)	1
Nymphalidae	Unknown	Danadus	cleothera	Godart, 1819	1
Nymphalidae	Unknown	Danadus	hermippus	Felder & Felder, 1865	1
Nymphalidae	Ega	Melinaea	mnasias lucifer	Bates, 1862	1
Nymphalidae	Costa Rica	Ithomia	xenos	(Bates, 1866)	3
Nymphalidae	Costa Rica	Ithomia	heraldica	Bates, 1866	2
Nymphalidae	Unknown	Ithomia	dorilla	Bates, 1864	1
Nymphalidae	Costa Rica/Guat.	Dircenna	klugii	(Geyer & Hübner, 1837)	2
Nymphalidae	Bogota	Taygetis	chrysogona	Doubleday, [1849]	1
Nymphalidae	Unknown	Cithaerias	pireta	(Stoll, [1780])	2
Nymphalidae	Bogota	Haetera	piera	(Linnaeus, 1758)	1
Nymphalidae	Bahia	Haetera	piera	(Linnaeus, 1758)	1
Nymphalidae	Para	Pierella	lena	(Linnaeus, 1767)	1
Nymphalidae	Para	Antirrhaea	philoctetes	(Linnaeus, 1758)	1
Hesperiidae	Para	Astrartes	fulgerator	(Walch, 1775)	1
Hesperiidae	Pebas, Amazon	Astrartes	fulgerator	(Walch, 1775)	1
Hesperiidae	Guatemala	Astrartes	anaphus	(Cramer, [1777])	1
Nymphalidae	Rio Grande	Morpho	catenarius	Perry, 1811	1
Nymphalidae	Panama	Dasyophthalma	creusa	Hübner, 1822-1826	1
Nymphalidae	Florida	Agraulis	vanillae	(Linnaeus, 1758)	1
Nymphalidae	Panama	Dione	juno	(Cramer, [1779])	1
Nymphalidae	Guatemala, Table land	Dione	moneta	(Cramer, [1779])	1
Nymphalidae	Guatemala, Polochic Valley	Dione	moneta	(Cramer, [1779])	1
Nymphalidae	Guatemala, Polochic Valley	Metamorpha	superba	(Bates 1864)	1
Nymphalidae	Guatemala	Metamorpha	epaphus	(Latreille, 1811)	1
Nymphalidae	Guatemala, Polochic Valley	Metamorpha	epaphus	(Latreille, 1811)	1
Nymphalidae	"Venezuela"	Metamorpha	epaphus	(Latreille, 1811)	1
Nymphalidae	Bogota	Nica	flavilla canthara	(Doubleday, 1849)	1

Nymphalidae	Guatemala, Central Valleys	Epiphele	adrasta	Hewitson, 1861	1
Nymphalidae	Bogota	Epiphele	ibilis	C. & R. Felder, 1861	1
Nymphalidae	South Peru	Perisama	calamis	(Hewitson, 1869)	1
Nymphalidae	Unknown	Euncia	cuvierii	(Godart, 1819)	1
Nymphalidae	Ega	Euncia	mygdonia	(Godart, [1824])	1
Nymphalidae	S. Paulo	Eunica	orphise	(Cramer, [1775])	2
Nymphalidae	Tunantais, Amazon	Eunica	clytia	(Hewitson, 1852)	1
Nymphalidae	S. Paulo	Eunica	veronica	Bates, 1864	1
Nymphalidae	Mexico	Eunica	amycla	(Godart, [1824])	1
Nymphalidae	Ega	Pyrrhogyra	crameri	Aurivillius, 1882	1
Nymphalidae	Ecuador	Pyrrhogyra	edocla	(Doubleday, [1848])	1
Nymphalidae	Guatemala interior	Didonis	aganica	Boisduval	1
Nymphalidae	Pebas, Amazon	Panacea	divalis	(Bates, 1868)	1
Nymphalidae	Ega	Marpesia	berania	(Hewitson, 1852)	2
Nymphalidae	Costa Rica	Marpesia	marcella	(C. & R. Felder, 1861)	2
Nymphalidae	Ega, Amazon	Marpesia	zerynthia	Hübner, [1823]	1
Nymphalidae	Guatemala interior	Smyrna	karwinskii	Geyer, [1833]	1
Nymphalidae	Table land, Guatemala	Diaethria	pandama	(Doubleday, [1848])	1
Nymphalidae	Guatemala	Callicore	tolima guatemalena	(Bates 1866)	1
Nymphalidae	Guatemala	Diaethria	astala	(Guérin-Ménéville, [1844])	1
Nymphalidae	Guatemala	Adelpha	lycorias melanthe	(Bates 1864)	1
Nymphalidae	St. Domingo	Anaea	troglogyta	(Fabricius, 1775)	1
Nymphalidae	West Indies	Anaea	troglogyta	(Fabricius, 1775)	1
Nymphalidae	Bogota	Fountainea	nessus	(Latreille, [1813])	1
Nymphalidae	Guatemala, Central Valleys	Anaea	aidea	(Guérin-Ménéville, 1844)	1
Nymphalidae	Guatemala	Anaea	aidea	(Guérin-Ménéville, 1844)	1
Nymphalidae	Bogota	Anaea	andria	Scudder, 1875	1
Nymphalidae	Para	Zaretis	isodora	(Cramer, [1779])	1
Nymphalidae	Guatemala	Doxocopa	laure acca	(Felder, 1866)	1
Nymphalidae	Guatemala, Polochic Valley	Doxocopa	laure acca	(Felder, 1866)	1
Papilionidae	Panama	Eurytides	telesilaus	(Felder, 1864)	1
Papilionidae	New Granada	Eurytides	euryleon	(Hewitson, 1855)	1
Papilionidae	India	Papilio	paris	Linnaeus, 1758	1
Pieridae	Guatemala, interior	Leptophobia	aripa	(Boisduval, 1836)	1