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Front and Back Cover - Selected lepidochromes of Venezuelan butterflies by the Martinican naturalist Théophile Raymond.

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On the life of Théophile Raymond, his legacy and some of his lepidochromes (butterfly wing transfer prints)

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Abstract: This note presents a brief biography and details of the life and work of the Martinican naturalist Théophile Raymond while living in Venezuela during the last years of the 19th century until his death in 1922. It also presents a list of butterflies collected and printed on plates by Raymond, using the old-fashioned technique known as lepidochromy (butterfly “transfer prints” or “wing prints”), as well as their current names.

Keywords: biodiversity, lepidochromes, lepidochromy, Lepidoptera, Venezuela, wing prints.

Resumen: Esta nota presenta una breve biografía y detalles de la vida y trabajos del naturalista martiniqueño Théophile Raymond mientras vivió en Venezuela durante los años finales del siglo 19 y hasta el año 1922. Igualmente, se presenta una lista de mariposas recolectadas e impresas por Raymond utilizando la antigua técnica conocida como lepidocromía (“transferencia de escamas” o “transferencia de alas” de mariposas), así como su taxonomía actualizada.

Palabras clave: biodiversidad, impresiones de alas, lepidocromía, Lepidoptera, Venezuela.

In December, 1982 many Venezuelan institutions, personalities and investigators (mainly entomologists) received a beautifully illustrated book as a Christmas gift from the Venezuelan oil company CORPOVEN and the Sociedad Venezolana de Ciencias Naturales (Aveledo Hostos, 1982) (Fig. 1). This work included a set of 53 plates depicting Lepidoptera, mostly butterflies, almost exclusively from Caracas and surrounding areas of the Cordillera de la Costa, which were painted life-size by Théophile Raymond (18??-1922) mostly during the early 20th century (Delgado Dugarte, 1959; Lichy, 1962; Fernández Yépez, 1982a,b; Raymond, 1982b,c, 1994; Orellana, 2000; Orellana *et al.*, 2002, 2019; Orellana & González, 2003; González, 2012, 2017). The book also contained facsimile reproductions of the author’s stylized handwritten notes and index, in Spanish, of a planned first volume of “*Fauna Entomologica Venezolana. Lepidópteros – Rhopalóceros. Atlas N° 1*” (Delgado Dugarte, 1959; Viloría, 1990) (Fig. 2). An English edition, of larger format, was published years later, but only a couple of the handwritten pages were printed in facsimile style; the remaining pages were translated and printed using a font that was intended to resemble handwriting (Raymond, 1994). Similarly, using this same format, the editor printed a limited edition with texts in German in 2001 (Orellana *et al.*, 2019; Raymond, 2001).

Venezuela has long been considered a megadiverse country, containing an abundant and diverse fauna, but only a few efforts have been focused on showing the variety of insects, most especially those in the order Lepidoptera (Aguilera *et al.*, 2003; González, 2005; González & Orellana, 2014; Rodríguez *et al.*, 2015; Rull *et al.*, 2019). Discounting the scientific literature whose access is limited mainly to researchers, little has been written about the Lepidoptera of Venezuela that can be easily accessed by the general public. After the pioneering book of Schmid & Endicott (1968), only a few works have subsequently been published (González, 2009; Viloría *et al.*, 2019). The books that followed were written by Manara (1982, 1994), Álvarez-Sierra & Álvarez-Corral (1984), and Raymond (1982b,c, 1994, 2001). The last was originally intended to be a larger work to be presented to the scientific world in several volumes, but it remained unpublished after the author’s death, and only part of the intended volumes and plates survived. A selection was posthumously published, first in Spanish and later in English and German, as a single volume which “masterly combines art and science” (Fernández Yépez, 1982a; Viloría, 1990; Orellana & González, 2003; González, 2005; González *et al.*, 2005; Orellana *et al.*, 2019). At a lesser scale, providing information on some of the Lepidoptera from four Venezuelan regions, we can also mention the works of Pittier (1923), Osuna

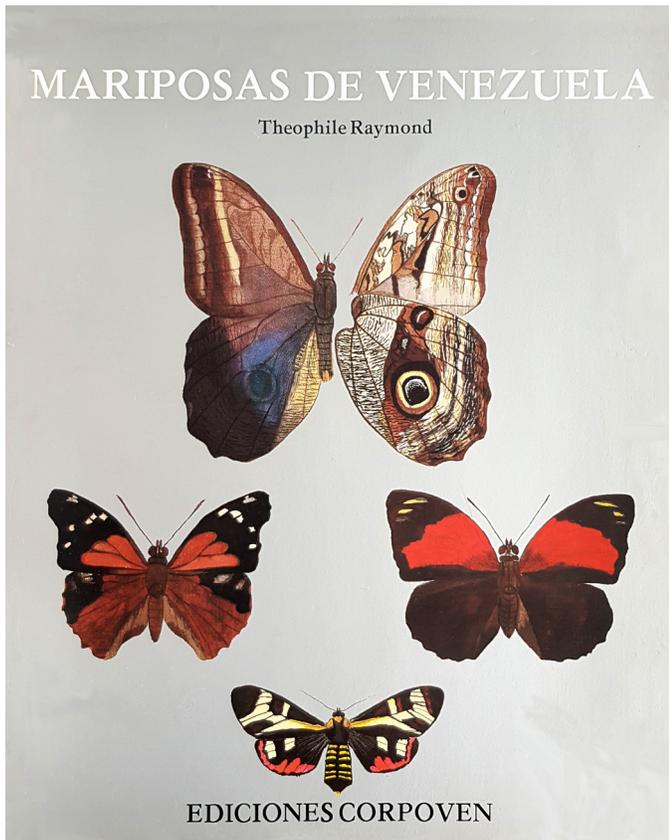


Figure 1. The cover of the first edition of Raymond's work (1982b), published by the Venezuelan oil company CORPOVEN and the Sociedad Venezolana de Ciencias Naturales.



Figure 2. Frontispiece of Raymond's planned first volume of "Fauna Entomologica Venezolana. Lepidópteros – Rhopalóceros. Atlas N° 1°".

(2000), Levin *et al.* (2009), and Vilorio & Costa (2019). On the other hand, Neild's (1996, 2008) *The Butterflies of Venezuela*, Parts 1 & 2, are comprehensive for the family Nymphalidae but are intended mostly for researchers and advanced amateurs (González, 2009).

Little is known about the life of Théophile Raymond, who was born on the Caribbean island of Martinique, especially regarding his childhood (Raymond, 1934a; Aveledo Hostos, 1982; Fernández Yépez, 1982a,b; Vilorio, 1990; Orellana & González, 2003; Texera, 2003; González, 2012, 2017; González & Orellana, 2014). He arrived in Caracas as an adolescent, around 1890 (Delgado Dugarte, 1959; González, 2012, 2017). In a note written in 1905, he mentions that he had been collecting butterflies for over 12 years (Delgado Dugarte, 1959; Fernández Yépez, 1982b). However, one loose sheet with notes about certain specimens clearly states the names of several butterflies collected in Caracas even earlier, in 1890 (Fernández Yépez, 1982b). Fascinated by the tropical natural world, Raymond would become acquainted with several young Venezuelan naturalists, including Luis Ramón Oramas (1884-1967) and Eduardo Röhl (1891-1951) (Delgado Dugarte, 1959; Lichy, 1962; González, 2012, 2017).

Raymond seems to have had a broad background in the natural sciences and wrote scientific articles on several topics from minerals to plants and animals (see Raymond, 1909, 1910, 1912, 1913a,b, 1914). However, there is no doubt that he was interested in insects and most especially in the Lepidoptera,

amassing a large and "marvelous collection" and planned to publish a treatise of the insects of Venezuela, with special emphasis on this group (Raymond, 1934a; Fernández Yépez, 1982a,b; González, 2012, 2017). He became a disciple and friend of Friar Cornelio de Tafalla (18??-1946), from the Franciscan convent of La Merced in Caracas (Raymond, 1982a; González, 2017). Tafalla was a well-known expert in taxidermy and had created a natural history museum in the convent of La Merced (Röhl, 1932; Phelps, 1944; Carrocera, 1946; Anonymous, 1954; González, 2012, 2017). It seems that the friar taught Raymond (as well as many other amateur naturalists (Röhl, 1932; Phelps, 1944)) all he knew about taxidermy, and besides preparing materials to be sent to several museums in Venezuela and abroad, they spent time studying and discussing scientific publications, mainly from Europe, obtained by the convent's library (Fr. C. de Armellada, pers. comm.). Raymond sent prepared insects, as well as bird and mammal skins, to museums in Europe, primarily to France (Raymond, 1934a; Delgado Dugarte, 1959; Texera, 2003; González, 2012, 2017).

Raymond was a member of the Société Impériale Zoologique d'Acclimatation in Paris, France (Fernández Yépez, 1982b). Together with several naturalists, such as Oramas and the composer and naturalist José Ángel Rodríguez López (1880-1966), he founded the short-lived Sociedad para las Ciencias Naturales Aplicadas (Society for the Applied Natural Sciences) in Caracas (Raymond, 1934a; Fernández Yépez, 1982b; González, 2012; González & Orellana, 2014). Unfortunately,



Figure 3. Unfinished colored pencil drawing of *Acherontia atropos* (Sphingidae), illustrating the first page of a notebook containing lepidochromes of Venezuelan Lepidoptera by Raymond.

he was able to produce only two issues of its scientific journal, entitled *El Naturalista Venezolano* (Fernández Yépez, 1982b). This short-lived society was the second of its kind in Venezuela, and was founded in an attempt to restart the study of the natural sciences that were somewhat neglected after the death of Adolf Ernst (1832-1899), who had created the first Venezuelan scientific society (Aveledo Hostos, 1982; Fernández Yépez, 1982a,b; González, 2012).

Raymond made collecting trips to Cata, Ocumare de la Costa and San Esteban, located in the states of Aragua and Carabobo (Fernández Yépez, 1982b). In 1908, accompanied by Röhl, he also conducted the first known expedition from the Naiguatá Peak, above Caracas, to the coast (Delgado Dugarte, 1959; Fernández Yépez, 1982b).

During his final years, Raymond worked as an inspector in a match factory (Raymond, 1934a). In 1917, he and his friend Antonio Carranza Rojas (1854-1924) presented displays of their insects (Lepidoptera and Coleoptera respectively), and Raymond included also an herbarium with many plant species collected in Caracas and surrounding areas, as part of an exhibition to promote the recently created Museums of “Historia Natural y Arqueología” and “Bellas Artes” in Caracas (González Rincones, 1918).

Raymond died of tuberculosis in, or days before, May of 1922, as can be attested by the disinfection seals printed on the unpublished volumes of his above-mentioned monograph, and signed by the Oficina Central de Sanidad Nacional, Servicio de Desinfección (Central office of National Health, Disinfection Service) (Raymond, 1934a; Fernández Yépez, 1982b; González & Orellana, 2003; Texera, 2003; González, 2005, 2012, 2017; see Raymond 1982b,c, 1994, 2001). Some

authors have suggested that Raymond died earlier, in 1915 (Lichy, 1962), but tuberculosis was such a scary and serious disease early in the 19th century in Caracas, that it is doubtful that the Disinfection Service in charge of contagious disease prophylaxes, quarantines, and sanitary records, waited years to disinfect Raymond’s belongings (Martin-Frechilla, 2008; Barboza Wulf, 2012; H. Lindorf & J. M. Ayala, pers. comm.).

Théophile Raymond’s legacy

As soon as Raymond arrived in Venezuela, he became so impressed with the beauty, number, and diversity of butterflies and moths, that he started collecting and studying them (Raymond, 1934a,b,c; Fernández Yépez, 1982a,b; González & Orellana, 2003; González, 2012, 2017). According to Röhl and Oramas, he amassed a large collection of Lepidoptera (Fernández Yépez, 1982b), and decided to write a book, in several volumes, to present Venezuela’s stunning biological diversity to the world. To illustrate his specimens, he first experimented with a technique known as lepidochromy, which is the almost forgotten art of printing the natural colors and patterns of butterflies and moths by pressing and thereby transferring the insect’s wing scales to a paper surface that has been previously covered with glue (Edwards, 1770; Poulin, 1876; Maindron, 1889; André, 1899; Orousset, 2008; Péru, 2016). Some scales in Lepidoptera are capable of producing colors by differential absorption of visible wavelengths, while others can produce structural colors by physical interactions of light waves (Prum *et al.*, 2006). Even though scales have different shapes and complex microstructures with parallel ridges and cross ribs placed on a basal lamella, every scale is basically formed from three “plates”, and one of them, with the property of reflecting



Figure 4. Notable butterfly taxa illustrated by Raymond. A. *Evenus felix* Neild & Bálint. B. *Brangas neildonatus* Bálint & Faynel (Lycaenidae). C. *Epiphile boliviana lamasi* Neild. D. *Perisama patara patara* (Hewitson). E. *Prepona amydon bogotana* (Fruhstorfer) (Nymphalidae). F. *Memphis maria* Pyrcz & Neild. Had Raymond published his treatise during his lifetime, these and several other lepidopterans would have represented first records for the country, or even new taxa.

colors, is attached to, or laid on, the membranous wing of the butterfly or moth (Prum *et al.*, 2006; Gu *et al.*, 2015). The most basic lepidochrome technique reproduces the scales inversely, and exposes the reflective part of the scale to the outside, affecting the way the colors are seen (Poulin, 1876; Maindron, 1889). This technique, and modifications of it, was relatively popular until the end of the 19th century. A clear example of the use of this technique is found in the epic *Moths and Butterflies of the United States East of the Rocky Mountains*, written and published between 1898 and 1900 by the naturalist and skilled artist Sherman Foote Denton (1856-1937). All the illustrations in Denton's limited edition of only 500 printed copies are direct transfers from butterflies and moths found in the eastern United States. Even though the wings are reproduced in their natural beauty, their bodies, antennae, and legs were engraved, and brought to life by painting (Edwards, 1770; Poulin, 1876; Denton, 1898-1900; André, 1899; Orousset, 2008).

Most of Raymond's lepidochromes are contained in a couple of notebooks covering over 30 pages. Curiously, the first page of one of the notebooks presents an unfinished crayon drawing showing the life cycle, not of a Venezuelan species, but of a hawkmoth, most likely *Acherontia atropos* (Linnaeus) (Sphingidae) (Fig. 3). Twenty sheets (27.5 x 21.5 cm) with lepidochromes of butterflies and day-flying moths were found in those notebooks (Plates 1-20). The remaining 13 sheets include lepidochromes of non-diurnal moths, dated from 1899-1902. A separate envelope and folder included 23 "cards" with single lepidochromes. Some were unfinished, and a few were dated between 1900 and 1902. Only eight show butterflies or day-flying moths (Plate 21). Two other sheets (27.5 x 21.5 cm) dated 1911 and 1912 were also included in this folder.

The results obtained with the sheets (plates) using lepidochromes did not seem to appeal Raymond, as he decided instead to paint the insects with watercolors (Fernández Yépez, 1982a,b; Vilorio, 1990; Orellana & González, 2003; Orellana *et al.*, 2019). Curiously, several of the single lepidochromes were made during a period when various watercolor plates were being painted (see Raymond, 1982a,b, 1994, 2001). It appears that they could have been used as "models" for the colors, wing patterns, phenotypes, and other details, for the painting of the plates, or just to keep in his collection, or to display them or even to give away. Moreover, among the manuscripts and other plates remaining, there are some sophisticated and attractive lepidochromes dated 1911 and 1912, signed "Lepidocromías por T. Raymond S.", showing a specimen of *Thysania agrippina* (Cramer, 1776) (Erebidae) in the center, surrounded by smaller moths. These two plates look like they were made for decorative purposes, either for sale or as gifts for his friends and acquaintances.

Even though Raymond painted some watercolor plates as early as 1900, it seems that he formally started writing what would be his *magnum opus* by 1902 (see Raymond, 1982b,c, 1994, 2001). His observations, research, and work made him the pioneer of studies on Venezuelan Lepidoptera (Lichy, 1962; Aveledo Hostos, 1982; Fernández Yépez, 1982a,b). By 1905 he had prepared several plates and finished a good part of the text to be included in his work. The first volume is basically complete and starts with a heartfelt dedication to the Capuchin Monks of the order of Saint Francis of Assisi in La Merced in Caracas, and most especially to Friar Cornelio de Tafalla (Raymond, 1982a,b,c, 1994, 2001). On the back of a leaflet with ten Caracas lottery tickets dated August 10, 1905, found

inside one of the volumes, Raymond had written the draft of a dedication to his friend Carranza Rojas for his second volume (Delgado Dugarte, 1959; Fernández Yépez, 1982b; González, 2012). The plates and texts for the finished volume, as well as parts of the unfinished ones, regrettably remained unpublished in Raymond's lifetime and were almost lost after his death in 1922 (Fernández Yépez, 1982a,b).

Raymond collected mainly in Caracas, its surroundings, and other localities in the neighboring Cordillera de la Costa (Fernández Yépez, 1982a,b). However, some of the butterflies he illustrated have not been found, so far, in that area, for example *Perisama patara* (Hewitson, 1855) (Neild, 1996). We presume these specimens were collected in other regions of the country that he visited and collected, or were perhaps collected by others and given to him, but the possibility remains that these are rare and localized species that have yet to be rediscovered in the Cordillera de la Costa. Had Raymond been able to publish his work when he was alive, his would have been the first treatise on the Lepidoptera of Venezuela. Furthermore, many of the species he depicted would have represented first records for the country, and even included undescribed taxa (Lichy, 1962; Fernández Yépez, 1982a; Orellana, 2009; Vilorio *et al.* 2010; González, 2017; Orellana *et al.*, 2019). Some notable examples (Fig. 4) include *Evenus felix* Neild & Bálint, and *Brangas neildonatus* Bálint & Faynel (Lycaenidae), *Epiphile boliviana lamasi* Neild, *Memphis maria* Pyrcz & Neild, *Perisama patara* (Hewitson), and *Prepona amydon* (Hewitson) (Nymphalidae), *Papilio polyxenes costarum* Orellana (Papilionidae), *Pyrrhopyge thericles raymondi* Orellana and *P. caribe caribe* Orellana (Hesperiidae), all illustrated in his proposed book but published posthumously in 1982 (Raymond, 1934b, 1982b,c, 1994; Delgado Dugarte, 1959; Lichy, 1962; Orellana, 2008, 2009; Orellana *et al.*, 2019).

Raymond's manuscripts resurfaced in 1933 when Henri Pittier (1857-1950), acting secretary of the Sociedad Venezolana de Ciencias Naturales (Venezuelan Society of Natural Sciences), mentioned in a December 6, 1933 meeting that he had received from the Society member Francisco Izquierdo (1880-1943) a set of manuscripts by the deceased naturalist, including drawings and lepidochromes (Fernández Yépez, 1982a,b). Pittier encouraged the Society to publish those works.

A selection of the manuscripts, with a general introduction on the Lepidoptera, and with extensive notes on the Venezuelan Papilionidae, was then assigned to the French-Venezuelan entomologist René Lichy (1896-1981) (González, 2018) for publication (see Raymond, 1934a, 1934b, 1934c; Lichy, 1962). The remaining works were placed in the Society's library and unfortunately forgotten until the 1950s (Delgado Dugarte, 1959; Avelledo Hostos, 1982). Once the ornithologist Ramón Avelledo Hostos (1922-2002) became president of the Society in 1953, he decided to completely fulfill Pittier's wishes. Unfortunately, the opportunity to publish only arose many years later, when the Venezuelan oil company CORPOVEN agreed to finance the publication of a selection of texts and plates as a posthumous homage to the Martinican naturalist (Avelledo Hostos, 1982). The identifications of most species shown in Raymond (1982b,c, 1994, 2001) were done by the recognized Venezuelan entomologist Francisco Fernández Yépez (1923-

1986). However, he clearly expressed that it remained "open to specialists and investigators ... to complete and rectify the names of the illustrated species" (Fernández Yépez, 1982b). Thus, many names have been updated over the years by various authors (see Orellana, 2000; Orellana *et al.*, 2002, 2019; Orellana & González, 2003; González *et al.*, 2005; González & Orellana, 2014).

Raymond's lepidochromes with current taxonomy for the depicted specimens

As previously mentioned, Raymond first experimented with the process of lepidochromy. He was probably dissatisfied with the results he obtained with these "wing transfer prints" and switched to watercolors for his definitive plates (Fernández Yépez, 1982b; González, 2012, 2017; Raymond, 1982b,c, 1994) (Figs. 4, 5, 6). A couple of notebooks have survived which contain over 30 large plates with lepidochromes. Eighteen of these plates consist only of butterflies, and two include day-flying moths (Plates 1 and 20), while the remaining plates contain nocturnal moths. Almost every large plate has a margin drawn along the four edges of the page, made in light blue, but now faded on most. In addition to these large plates, there are seven small sheets of paper, each showing a single lepidochrome; these have been digitally cut out and pasted onto a single large composite digital page (Plate 21). The paper used to create all these plates has suffered a significant amount of foxing, and this has created an illusion of a more yellowish color where the wings are translucent or transparent.

Some of the lepidochromes are cruder than others. Most butterflies look fine, but some of the moths, especially those with bodies covered with many scales, look a little "blurred". Most have their bodies, head, and antennae painted in, between the wings, as was customary for the technique (Poulin, 1876; Denton, 1898-1900; Orousset, 2008). Many were identified by Raymond, at least to genus, and for some, the sex is provided. The represented taxa seem to follow a somewhat loose pattern, and species of a particular family might be slipped in with specimens of another, as can be clearly noticed in the already published watercolors (see Raymond, 1982b,c, 1994, 2001).

Presented here are all the butterflies and day-flying moths that appear on Raymond's lepidochromes. Our main purpose is not just to show part of Raymond's work and provide the current taxonomy for some of the depicted lepidopterans, but also to present a selection of species that were of common occurrence in Caracas, its surroundings and some other places in the country during the late 19th and early 20th centuries, as has been done in other similar works (Orellana, 2000; Orellana *et al.*, 2003, 2019; Orellana & González, 2003; González *et al.*, 2005; González & Orellana, 2014). Sadly, the growth of Caracas has since relegated many of these depicted species to secluded sites along the Cordillera de la Costa to the north of the city, while others have disappeared entirely from this highly developed region. The taxa presented broadly follow the higher-level rank (family/subfamily) sequence and the generic and specific taxonomy in Lamas (2004), with some modifications based on Neild (1996, 2008) and Warren *et al.* (2016). The skippers (Hesperiidae) were identified by Bernard Hermier (France).

The original lepidochrome plates were photographed by one of the authors (HT) using the digital camera of an iPhone 7 Plus with a 3.99 mm f/1.8 optical lens (equivalent to a 28 mm lens on a 35 mm film camera). The exposure time varied from 1/40s-1/60s at ISO25. The plates were removed from the folders and placed individually on a larger sheet of paper with a color similar to the paper of the plates to avoid color distortions and to obtain a better contrast. The photographs were then taken in a Polaroid portable photo Studio box with two Polaroid LED 20 W lights which enhanced the details of the wing scales in all the lepidochromes. Due to the fragility of the plates, they were carefully manipulated using medical gloves in a clean photo studio to avoid contact with contaminated surfaces.

The plates have been organized to loosely follow the currently known phylogeny of Lepidoptera. Identifications for each plate run from left to right, from the top row to the bottom, except for Plates 1, 9, and 21. General comments associated with some species appear within square brackets.

Plate 1 (Notes by Bernard Hermier, pers. comm.). The sequence of specimens on this plate (only) runs from top to bottom, starting with the central column figure, then the two lateral figures from left to right on the row below, then the next central figure, and so on.

Astrartes Hübner, [1819] species, sex undetermined, Hesperidae [there is a small possibility it is a *Narcosius* Steinhauser, 1986, but more likely it is either *Astrartes enotrus* (Stoll, 1781) or *Astrartes janeira* (Schaus, 1902).] [Raymond (1982a,b, 1994, 2001) figures *Astrartes enotrus* on Plate 47 (fig. 1) (Orellana *et al.*, 2002).]

Perichares colenda (Hewitson, 1866) ♀, Hesperidae (dorsal at left, ventral at right)

Antigonus erosus (Hübner, [1812]) ♂, Hesperidae

Quadrus cerialis (Stoll, 1782) ♂, Hesperidae (ventral at left, dorsal at right)

Vettius aurelius (Plötz, 1882) ♂, Hesperidae

Unidentified species in the Moncini (Hesperinae), sex undetermined, Hesperidae

Pyrrhopyge caribe caribe Orellana, 2010, ♀, Hesperidae

Falga jeconia jeconia (A. Butler, 1870) ♂, Hesperidae

Polygonus species, sex undetermined, Hesperidae [this could be either *Polygonus leo pallida* Röber, 1925 or *Polygonus savigny savigny* (Latreille, [1824]).] [Raymond (1982a,b, 1994, 2001) figures *Polygonus leo leo* (Gmelin, [1790]) on Plate 5, fig. 13 (Orellana *et al.*, 2002).]

Plate 2

Mimoides ariarathes evagorides Brown & Lamas, 1994 ♂, Papilionidae

Heracles thoas nealces (Rothschild & Jordan, 1906) ♂, Papilionidae

Dismorphia cristia foedora (Lucas, 1852) ♂, Pieridae

Plate 3

Lieinix nemesis nemesis (Latreille, [1813]) ♂, Pieridae

Dismorphia amphione broomeae A. Butler, 1899 ♂, Pieridae

Plate 4

Phoebis agarithe agarithe (Boisduval, 1836) ♀, Pieridae

Phoebis argante argante (Fabricius, 1775) ♂, Pieridae

Phoebis philea philea (Linnaeus, 1763) ♀, Pieridae

Aphrissa statira statira (Cramer, 1777) ♂, Pieridae

Plate 5

Pereute charops venezuelana (Hopffer, 1878) ♀, Pieridae

Pereute charops venezuelana (Hopffer, 1878) ♀, Pieridae

Plate 6

Pyrisitia proterpia (Fabricius, 1775) ♂, Pieridae

Pyrisitia venusta venusta (Boisduval, 1836) ♂, Pieridae

Eurema xantochlora xantochlora (Kollar, 1850) ♀, Pieridae

Eurema albula marginella (C. Felder & R. Felder, 1861) ♂, Pieridae

Eurema xantochlora xantochlora (Kollar, 1850) ♀, Pieridae

Perrhybris pamela malenka (Hewitson, 1852) ♀, Pieridae

Leptophobia aripa aripa (Boisduval, 1836) ♂, Pieridae

Leptophobia penthica stammata (Lucas, 1852) ♂, Pieridae

Eurema xantochlora xantochlora (Kollar, 1850) ♀, Pieridae

Plate 7

Rekoa meton (Cramer, 1779) ♀, Lycaenidae (left)

Lucilda danaus (C. Felder & R. Felder, 1865) ♀, Lycaenidae (right)

Plate 8

Hades noctula Westwood, 1851 ♀, Riodinidae

Hades noctula Westwood, 1851 ♀, Riodinidae

Melanis electron electron (Fabricius, 1793) ♂, Riodinidae

Lasaia agesilas agesilas (Latreille, [1809]), ♂, Riodinidae

Plate 9. For the sequence of specimens on this plate please see the notes for Plate 1.

Hyaliris coeno coeno (Doubleday, 1847) ♀, Danainae, Nymphalidae

Mechanitis menapis caribensis Fox, 1967 ♂, Danainae, Nymphalidae

Mechanitis menapis caribensis Fox, 1967 ♂, Danainae, Nymphalidae

Ithomia ipianassa ipianassa Doubleday, 1847, ♀, Danainae, Nymphalidae

Episcada hymenaea hymenaea (Prittwitz, 1865) ♂, Danainae, Nymphalidae

Eutresis hypereia hypereia Doubleday, 1847 ♂, Danainae, Nymphalidae

[The broad (painted) abdomen looks female, but male androconial 'hair pencils' are clearly visible on the hindwing costa]

Greta andromica (Hewitson, [1855]) ♀, Danainae, Nymphalidae

Pteronymia oneida asopo (C. Felder & R. Felder, 1865) ♂, Danainae, Nymphalidae

Plate 10

Athesis clearista clearista Doubleday, 1847 ♀, Danainae, Nymphalidae

Dircenna jemina jemina (Geyer, 1837) ♀, Danainae, Nymphalidae

[The represented specimen is an aberration]

Hypothyris euclea euclea (Godart, 1819) ♂, Danainae, Nymphalidae

Plate 11

Eueides isabella huebneri Ménétrés, 1857 ♂, Heliconiinae, Nymphalidae

Eueides isabella huebneri Ménétrés, 1857 ♂, Heliconiinae, Nymphalidae

Eueides isabella huebneri Ménétrés, 1857 (var. x *E. i. isabella* (Stoll, 1781)) ♂, Heliconiinae, Nymphalidae

Altinote dicaeus laverna (E. Doubleday, [1847]) ♀, Heliconiinae, Nymphalidae

Altinote dicaeus laverna (E. Doubleday, [1847]) ♂, Heliconiinae, Nymphalidae

Eueides isabella huebneri Ménétrés, 1857 ♀, Heliconiinae, Nymphalidae

Plate 12

Dione glycera (C. Felder & R. Felder, 1861) ♂, Heliconiinae, Nymphalidae

Agraulis vanillae vanillae (Linnaeus, 1758) ♂, Heliconiinae, Nymphalidae

Dione junio junio (Cramer, 1779) ♂, Heliconiinae, Nymphalidae

Plate 13

Heliconius hecale anderida (Hewitson, [1853]) ♂, Heliconiinae, Nymphalidae

Heliconius erato hydara (Hewitson, 1867) ♂, Heliconiinae, Nymphalidae

Heliconius ethilla metalilis A. Butler, 1873 ♂, Heliconiinae, Nymphalidae

Plate 14

Caligo oileus oileus C. Felder & R. Felder, 1861 ♂, Satyrinae, Nymphalidae

Dynamine theseus (C. Felder & R. Felder, 1861) ♂, Biblidinae, Nymphalidae

Memphis acidalia acidalia (Hübner, [1819]) ♀, Charaxinae, Nymphalidae

Anartia amathea amathea (Linnaeus, 1758) ♂, Nymphalinae, Nymphalidae

Siseme pallas pallas (Latreille, [1809]) ♂, Riodinidae

Plate 15

Marpesia corinna (Latreille, [1813]) ♂, Cyrestinae, Nymphalidae

Hypanartia dione dione (Latreille, [1813]) ♂, Nymphalinae, Nymphalidae

Morpho helenor corydon Guenée, 1859 ♂, Satyrinae, Nymphalidae

Plate 16

Vanessa braziliensis (Moore, 1883) ♀, Nymphalinae, Nymphalidae

Castilia ofella (Hewitson, [1864]) ♂, Nymphalinae, Nymphalidae

Vanessa virginiensis (Drury, 1773) ♂, Nymphalinae, Nymphalidae

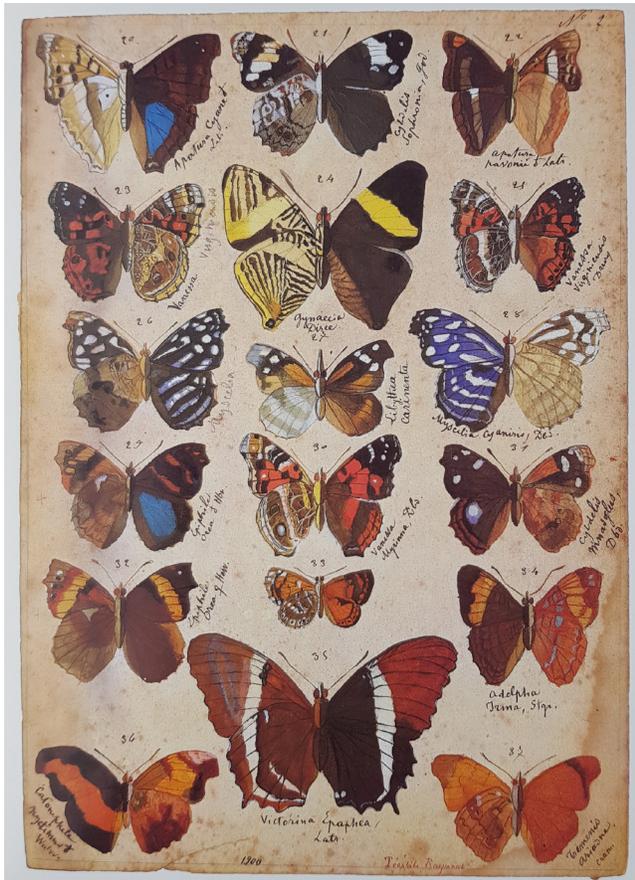


Figure 5. Selected watercolor plates of Venezuelan butterflies painted by Théophile Raymond (Raymond 1982b,c, 1994, 2001).

Adelpha irmina irmina (Doubleday, [1848]) ♂, Limenitidinae, Nymphalidae
Dynamine tithia salpensa (C. Felder & R. Felder, 1862) ♂, Biblidinae, Nymphalidae
Junonia evarete (Cramer, 1779) ♂, Nymphalinae, Nymphalidae
Colobura dirce dirce (Linnaeus, 1758) ♂, Nymphalinae, Nymphalidae
Diaethria euclides metiscus (Doubleday, 1849) ♂, Biblidinae, Nymphalidae

Plate 17 (Notes by Ángel Viloría, pers. comm.).

Magneptychia libye (Linnaeus, 1767) (probably ♂), Satyrinae, Nymphalidae
Magneptychia libye (Linnaeus, 1767) (probably ♂), Satyrinae, Nymphalidae
Panyapedaliodes panyasis (Hewitson, 1862) ♂, Satyrinae, Nymphalidae
Graphita griphe (C. Felder & R. Felder, 1867) ♂, Satyrinae, Nymphalidae
 [Male androconia are not noticeable, probably because the impression of the scales is reversed, and may not be distinguishable this way. The wing shape, however, is distinctive.]
Euptychoides laccine (C. Felder & R. Felder, 1867) ♀, Satyrinae, Nymphalidae
Ypthimoides renata (Stoll, 1780) (probably a male), Satyrinae, Nymphalidae
 [This is the most likely identification, the species belongs to a group that is difficult to identify based on the dorsal surface only. This specimen has a very small ocellus, and is probably a male, since females typically have a bigger one.]
Pedaliodes pisonia (Hewitson, 1862), ♂, Satyrinae, Nymphalidae [This is most probably *P. pisonia*, based on size, wing shape and the natural abundance of this species. The entire sample of the satyrines collected and illustrated by Raymond (1982a,b, 1994, 2001; and those in this work) came from middle elevations, where one of the most common *Pedaliodes* Butler, 1867 is *P. pisonia*, but due to the low quality of the lepidochrome, there is also the possibility that it may represent several other pronophiline species known from the region.]
Lymanopoda obsoleta (Westwood, 1851) ♂, Satyrinae, Nymphalidae

Plate 18

Mygona irmina irmina (E. Doubleday, [1849]) ♂, Satyrinae, Nymphalidae

Plate 19

Chetone angulosa (Walker, 1854) ♂, Erebidae
Rhosus pulverosa (Rothschild, 1896), Noctuidae [... specimens exist from Colonia Tovar and other localities in northern Venezuela. (H. Thöny, pers. comm.)]

Plate 20

Urania leilus (Linnaeus, 1758) ♂, Uraniidae

Plate 21. This is a composite plate made up of eight single-specimen lepidochromes, cut out using Adobe Photoshop® and pasted onto a digital background. For the sequence of specimens on this plate please see the notes for Plate 1; however, we include the central figure in the last row (thus comprising three specimens).

Cosmosoma helotes (Druce, 1900), ♂(?), Erebidae [This specimen is possibly a male based on the thickness of the antennae. It seems to be a day-flying moth, even though we do not possess data to confirm that hypothesis. However, the related *Cosmosoma remotum* Hampson, 1898, has been collected by day on pyrrolizidine baits in French Guiana. Also, genera close to *Cosmosoma* Hübner, [1823], such as *Mesotheron* Hampson, 1898 or *Loxophlebia* Butler, 1876, can be collected by day on the same baits. (M. Laguerre, pers. comm.)]
Heraclides thoas nealces (Rothschild & Jordan, 1906), ♂, Papilionidae
Archonias tereas critias (C. Felder & R. Felder, 1859), ♂, Pieridae
Calodesma amica (Stoll, [1781]), ♀, Erebidae [...very likely a female. The male is black & white but this species is polymorphic with at least two male and three female forms. Generally, they can be collected at light but are commoner on flowers, typically *Eupatorium* L. 1753. (M. Laguerre, pers. comm.)]
Heraclides homothoas (Rothschild & Jordan, 1906), ♂, Papilionidae
Catasticta prioneris araguana Eitschberger & Racheli, 1998, ♂, Pieridae
 [The specimen is labeled as collected in “Yagrumal, Venezuela”, a small community near the town of El Junquito, west of Caracas.]
Esthemopsis jesse jesse (A. Butler, 1870), ♂, Riordinidae
Heliconius antiochus araneides Staudinger, 1897, ♂, Nymphalidae

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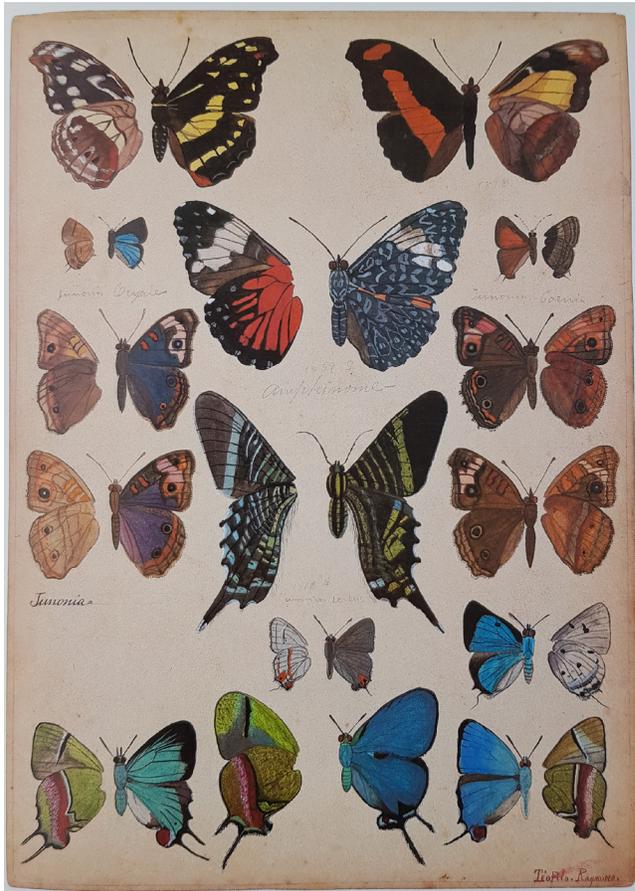
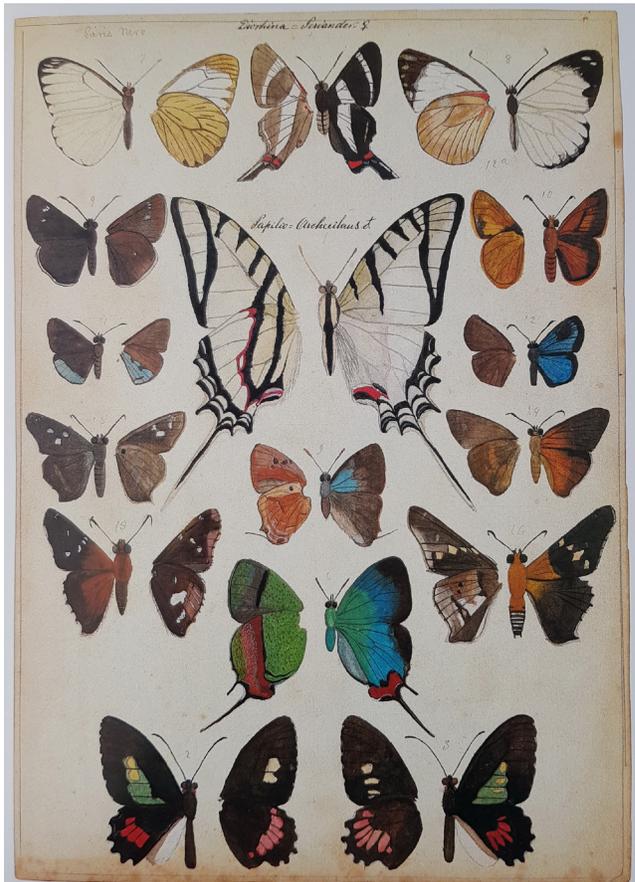


Figure 6. Selected watercolor plates of Venezuelan butterflies painted by Théophile Raymond (Raymond 1982b,c, 1994, 2001).

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Plate 1. HesperIIDae (top to bottom; left to right): *Astraptus* sp.; *Perichares colenda* ♀ (left & right); *Antigonus erosus* ♂; *Quadrus cerialis* ♂ (left & right); *Vettius aurelius* ♂; unidentified species of Moncini (HesperIIDae) (sex?); *Pyrrhopyge caribe caribe* ♀; *Falga jeconia jeconia* ♂; *Polygonus* sp. [either *P. leo pallida* or *P. savigny savigny*].



Plate 2. Papilionidae (top to bottom): *Mimoides ariarathes evagorides* ♂; *Heraclides thoas nealces* ♂; Pieridae (bottom): *Dismorphia crisia foedora* ♂.

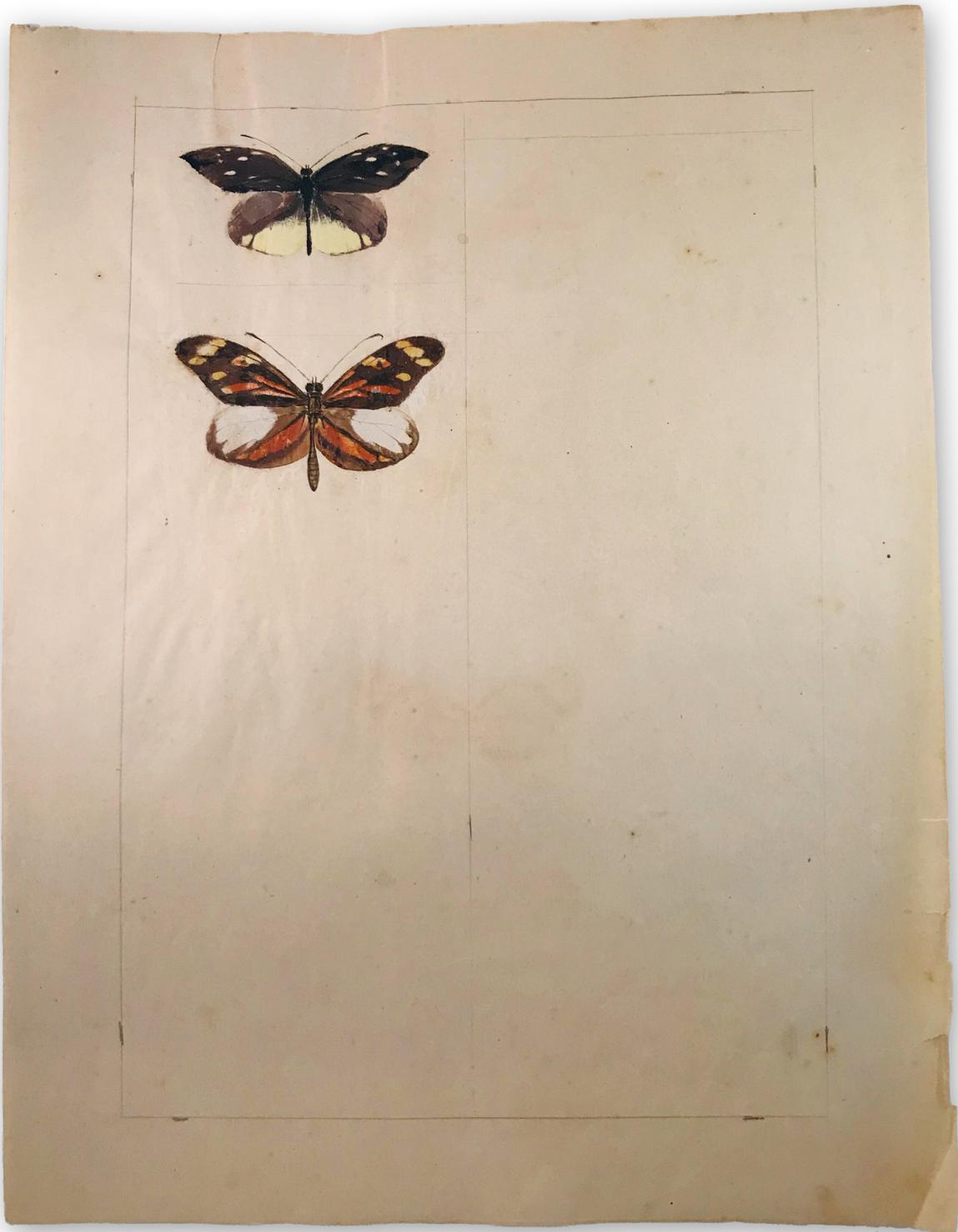


Plate 3. Pieridae (top to bottom): *Lieinix nemesis nemesis* ♂; *Dismorphia amphione broomeae* ♂.

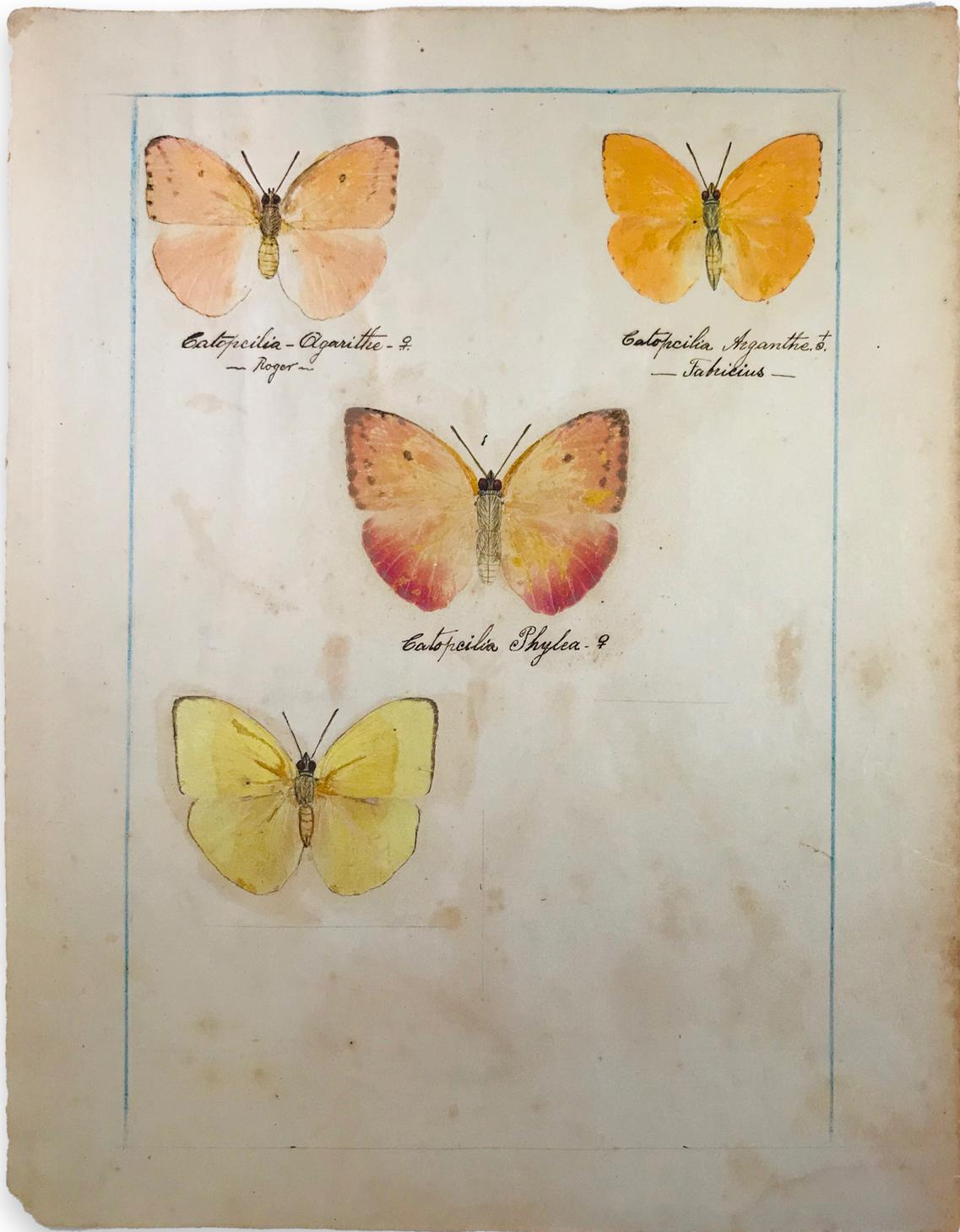


Plate 4. Pieridae (left to right; top to bottom): *Phobis agarithe agarithe* ♀; *Phobis argante argante* ♂; *Phobis philea philea* ♀; *Aprissa statira statira* ♂.

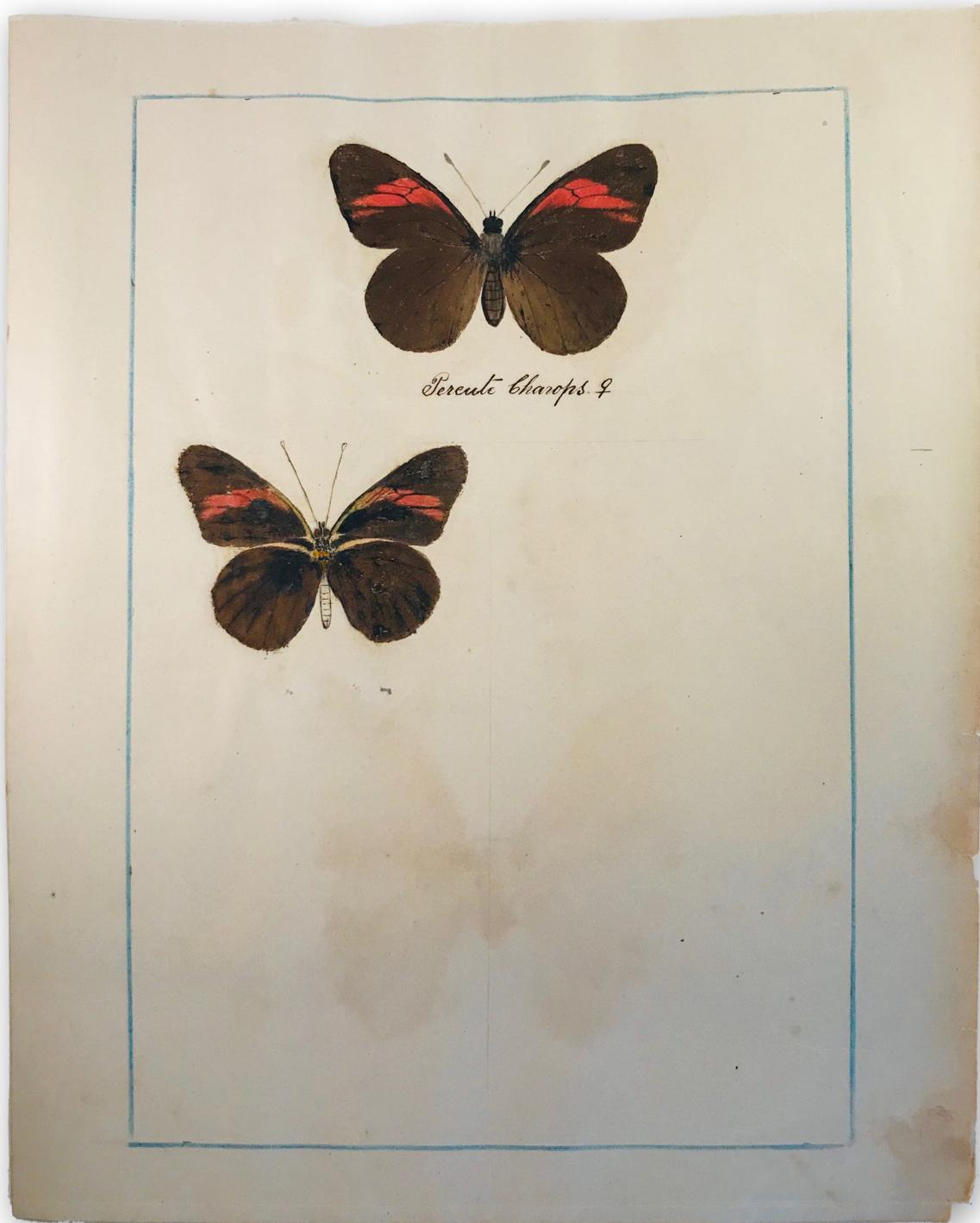


Plate 5. Pieridae: *Pereute charops venezuelana* ♀ (both specimens).



Plate 6. Pieridae (left to right; top to bottom): *Pyrisitia proterpia* ♂; *Pyrisitia venusta venusta* ♂; *Eurema xantochlora xantochlora* ♀; *Eurema albula marginella* ♂; *Eurema xantochlora xantochlora* ♀; *Perrhybris pamelalenka* ♀; *Leptophobia aripa aripa* ♂; *Leptophobia penthica stamnata* ♂; *Eurema xantochlora xantochlora* ♀.



Plate 7. Lycaenidae (left to right): *Rekoa meton* ♀; *Lucilda danaus* ♀.

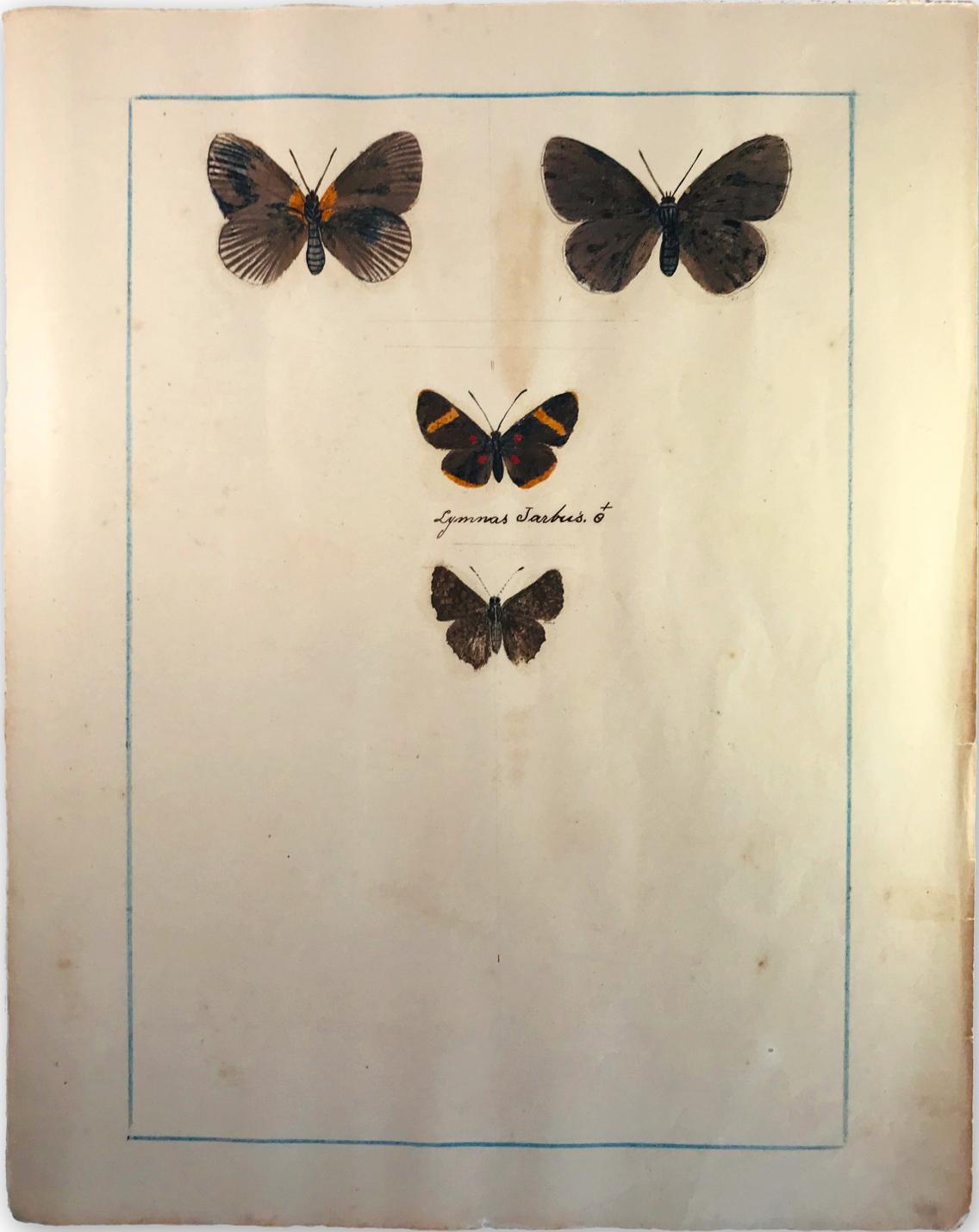


Plate 8. Riodinidae (left to right; top to bottom): *Hades noctula* ♀ (left & right); *Melanis electron electron* ♂; *Lasaia agesilas agesilas* ♂.

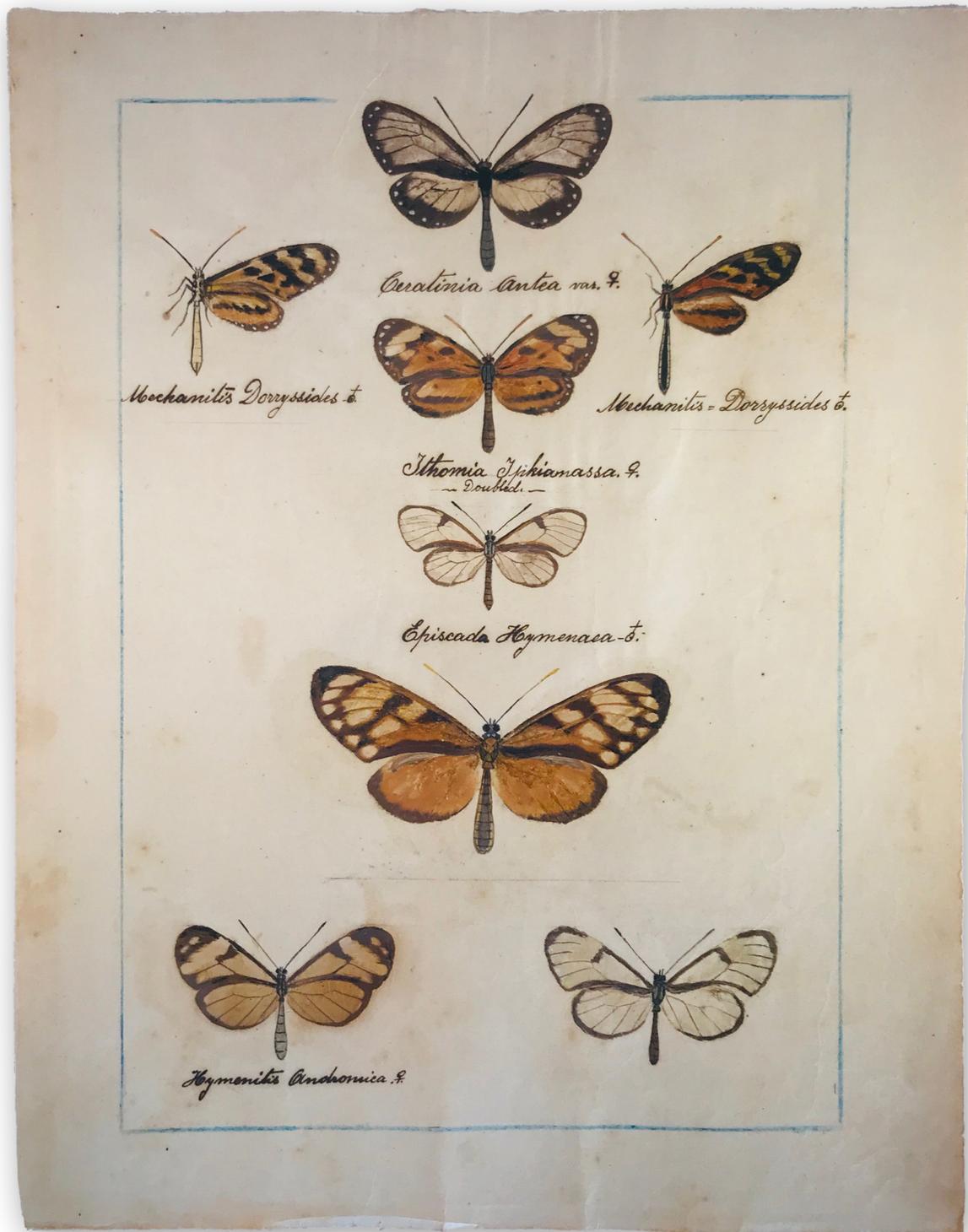


Plate 9. Nymphalidae (top to bottom; left to right): *Hyaliris coeno coeno* ♀; *Mechanitis menapis caribensis* ♂ (left and right); *Ithomia iphianassa iphianassa* ♀; *Episcada hymenaea hymenaea* ♂; *Eutresis hypereia hypereia* ♂; *Greta andromica* ♀; *Pteronymia oneida asopo* ♂.

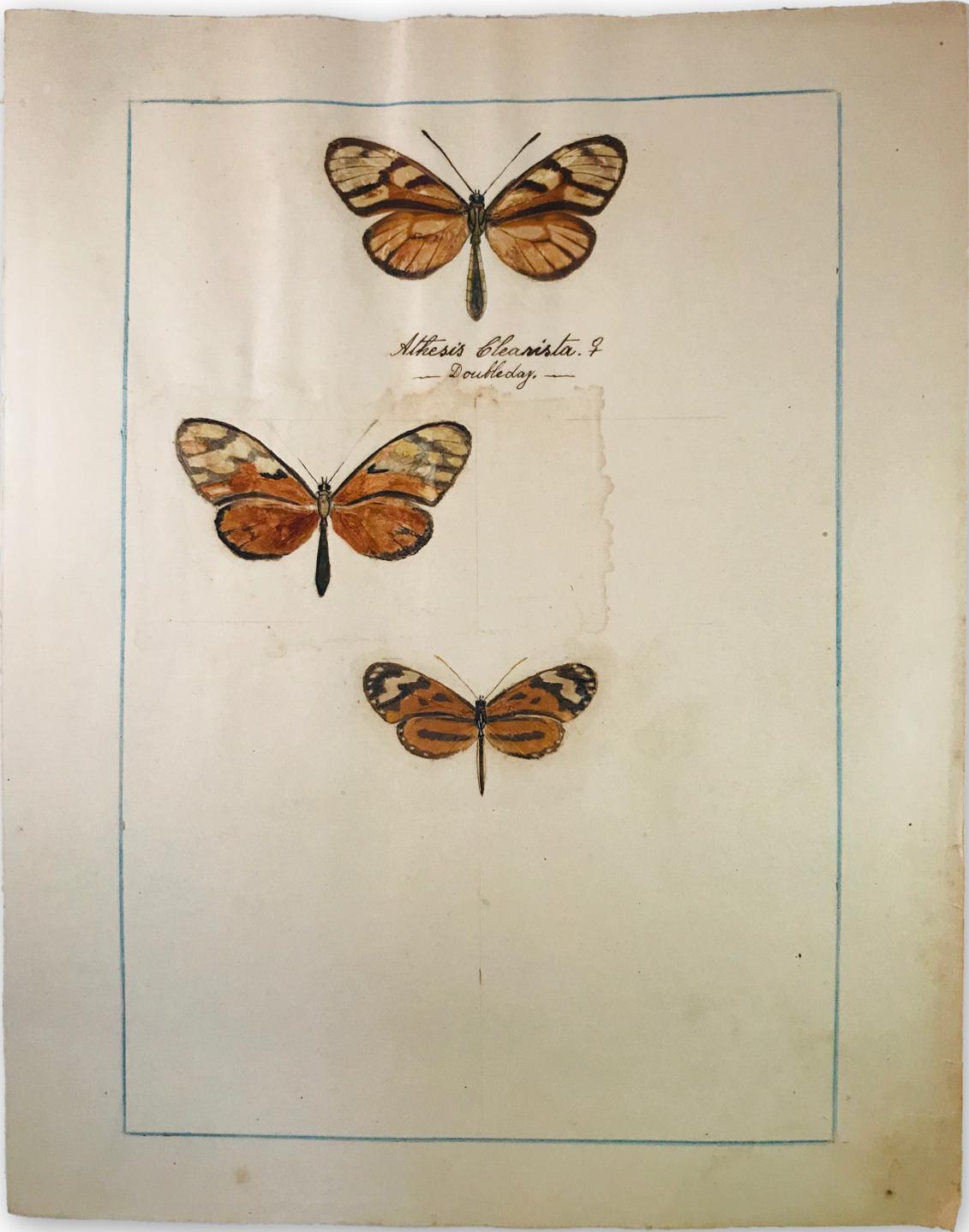


Plate 10. Nymphalidae (top to bottom): *Athesis clearista clearista* ♀; *Dircenna jemina jemina* ♀; *Hypothyris euclea euclea* ♂.



Plate 11. Nymphalidae (left to right; top to bottom): *Eueides isabella huebneri* ♂ (left and right); *Eueides isabella huebneri* (var. x *E. i. isabella*) ♂; *Altinote dicaeus laverna* ♀; *Altinote dicaeus laverna* ♂; *Eueides isabella huebneri* ♀.

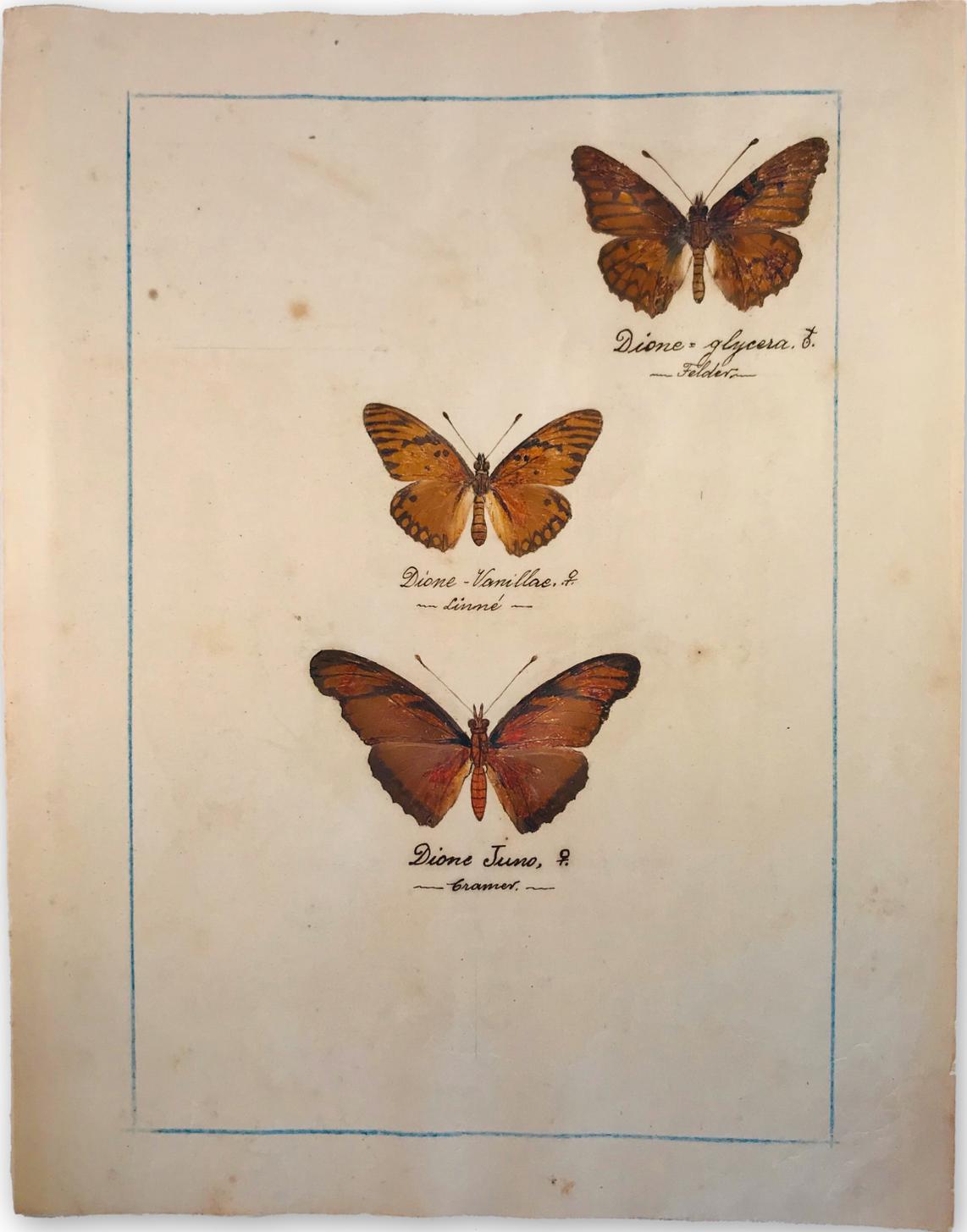


Plate 12. Nymphalidae (top to bottom): *Dione glycera* ♂; *Agraulis vanillae vanillae* ♂; *Dione juno juno* ♂.



Plate 13. Nymphalidae (top to bottom): *Heliconius hecale anderida* ♂; *Heliconius erato hydara* ♂; *Heliconius ethilla metalilis* ♂.



Plate 14. Nymphalidae (top to bottom; left to right): *Caligo oileus oileus* ♂ (left and right); *Dynamine theseus* ♂; *Memphis acidalia acidalia* ♀; *Anartia amathea amathea* ♂; Riodinidae: *Siseme pallas pallas* ♂.



Plate 15. Nymphalidae (top to bottom): *Marpesia corinna* ♂; *Hypanartia dione dione* ♂; *Morpho helenor corydon* ♂.

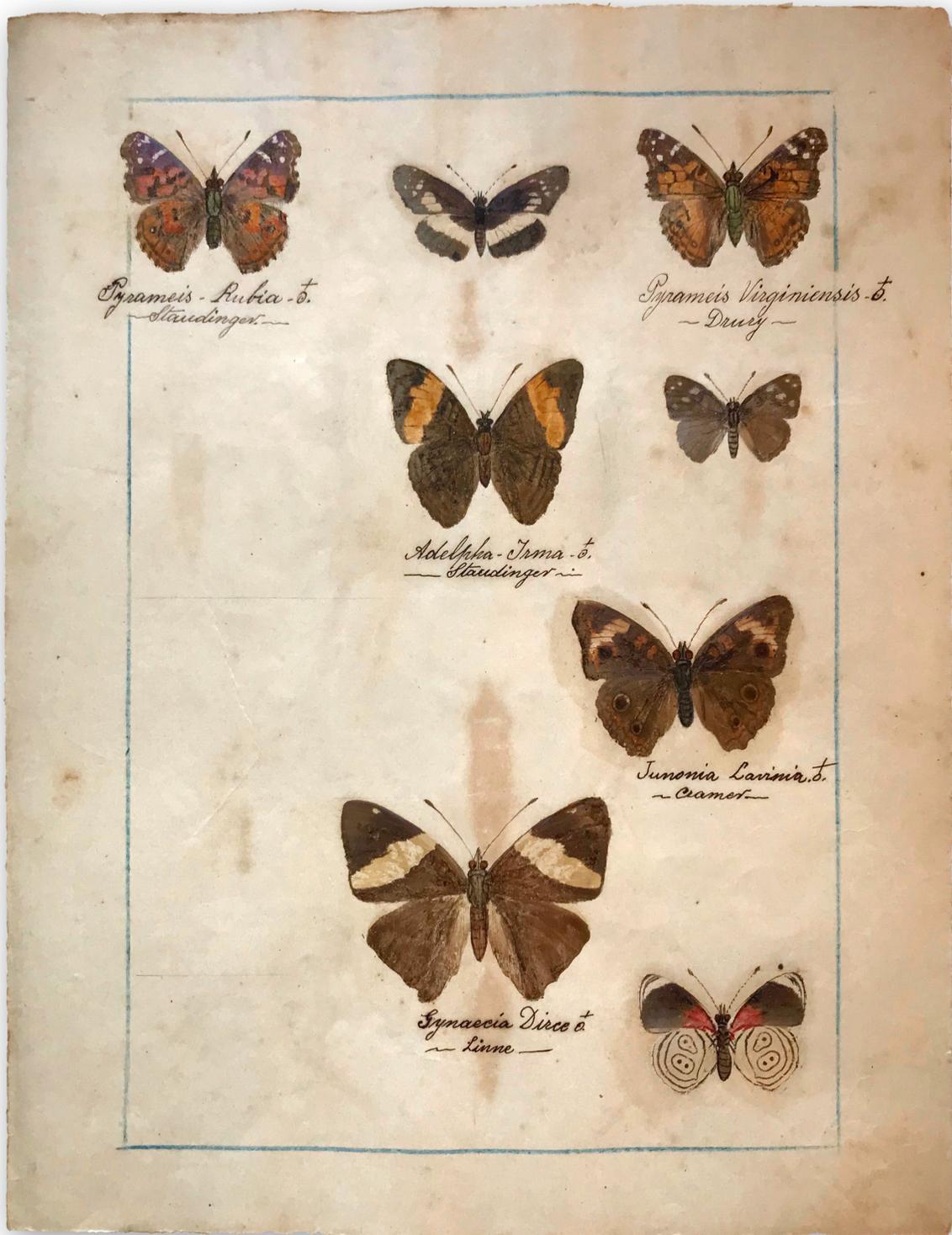


Plate 16. Nymphalidae (left to right; top to bottom): *Vanessa virginiensis* ♀; *Castilia ofella* ♂; *Vanessa braziliensis* ♂; *Adelpha irmina irmina* ♂; *Dynamine tithia salpensa* ♂; *Junonia evarete* ♂; *Colobura dirce dirce* ♂; *Diaethria euclides metiscus* ♂.



Plate 17. Nymphalidae (left to right; top to bottom): *Magneptychia libye* (♂?) (left and right); *Panyapedaliodes panyasis* ♂; *Graphita griphe* ♂; *Euptychoides laccine* ♀; *Ypthimoides renata* (♂?); *Pedaliodes pisonia* ♂; *Lymanopoda obsolata* ♂.



Plate 18. Nymphalidae: *Mygona irmina irmina* ♂.

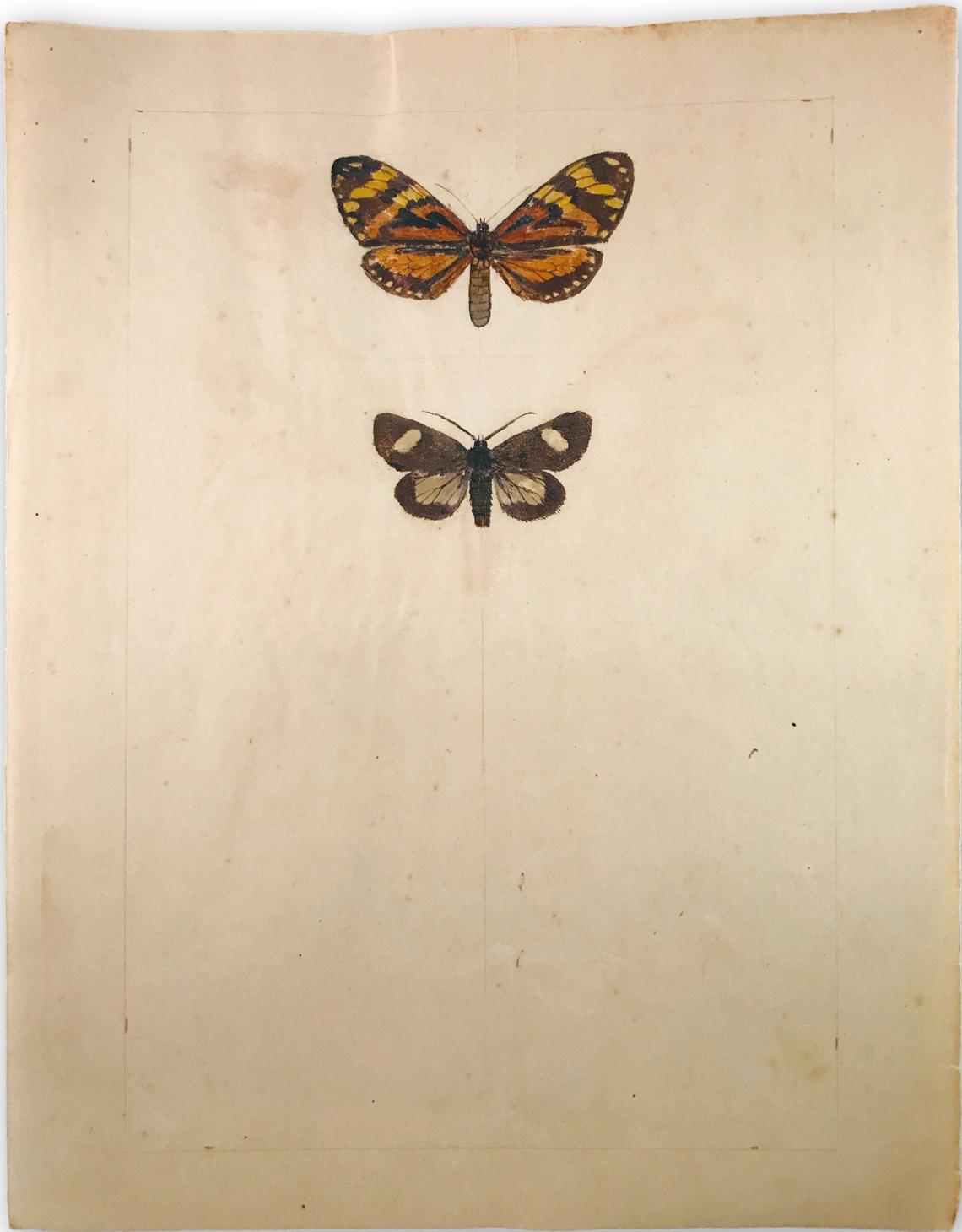


Plate 19. Erebidae (top to bottom): *Chetone angulosa* ♂; Noctuidae: *Rhusus pulverosa* (sex?).



Plate 20. Uraniidae: *Urania leilus* ♂.



Plate 21. Erebidae (center, top): *Cosmosoma helotes* (♂?); Papilionidae (center, second from top): *Heraclides thoas nealces* ♂; Pieridae (top left): *Archonias tereas critias* ♂; Erebidae (top right): *Calodesma amica* ♀; Papilionidae (center): *Heraclides homothoas* ♂; Riodinidae (center bottom): *Esthemopsis jesse jesse* ♂; Pieridae (bottom left): *Catantixia prioneris araguana* ♂; Nymphalidae (bottom right): *Heliconius antiochus araneides* ♂.

