

JOURNAL OF THE LEPIDOPTERISTS' SOCIETY

Volume 61

2007

Number 1

Journal of the Lepidopterists' Society
61(1), 2007, 1–20

JOHN ABBOT'S BUTTERFLY DRAWINGS FOR WILLIAM SWAINSON, INCLUDING GENERAL COMMENTS ABOUT ABBOT'S ARTISTIC METHODS AND WRITTEN OBSERVATIONS

JOHN V. CALHOUN¹
977 Wicks Dr., Palm Harbor, FL 34684

ABSTRACT. Between 1816 and 1818, artist-naturalist John Abbot completed 103 drawings of insects for English naturalist William Swainson. The history of these illustrations is reviewed, leading up to their rediscovery in 1977 in the Alexander Turnbull Library, Wellington, New Zealand. Four of these drawings are figured. The adults in the 21 butterfly drawings are identified and the figures of larvae and pupae are assessed for accuracy. The illustrated plants are also identified and their status as hosts is examined. Aspects of Abbot's life history notes are discussed, including his spelling, grammar, and use of Latin names. His notes for Swainson are transcribed and analyzed. A review of Abbot's artwork indicates that he duplicated many of his compositions for 20–25 years. He sometimes portrayed erroneous figures of larvae, pupae, and hostplants. Figures of immatures were sometimes fabricated using other species as models. He also applied duplicate figures of larvae to more than one species. Abbot may have sent another set of insect drawings to Swainson in 1830. Ninety-nine smaller drawings at the Turnbull Library are attributed to both Abbot and Swainson. Six of these illustrations are figured. Abbot's notes for Swainson suggest that at least three butterfly species are now more abundant than during the early nineteenth century, while three others are probably less widespread than formerly.

Additional key words: Georgia, larvae, Lepidoptera, pupae, hostplants, watercolors

“To the scientist and the naturalist comes, then, the artist, to wait upon both, ever ready to translate into form and line the forms of the butterflies, to fix the colours of brocaded wings”—Vere Temple.

Thousands of natural history illustrations were rendered by Georgia artist-naturalist John Abbot (1751–ca.1840), but relatively few have been analyzed by more recent authors. Abbot's bird drawings have received the most attention through the studies of Faxon (1896), Rhodes (1918), Allen (1951), Larson & Rogers-Price (1983), Simpson (1984, 1993), Griffin ([1990]), and Rogers-Price (1992, 1997). Spider drawings were reviewed by Chamberlin & Ivie (1944). Scudder (1872, 1888–1889) documented a large number of Abbot's unpublished butterfly drawings, but his identifications were incomplete and partially inaccurate. Miscellaneous drawings of birds, insects, and spiders were figured and identified in biographical accounts, most notably by Rogers-Price (1983) and Gilbert (1998, 2000).

While conducting research for Calhoun (2003) I realized Abbot's profound influence on North American entomology. Abbot documented many species of

¹Research Associate, Florida State Collection of Arthropods, DPI, FDACS, Gainesville, Florida 32614, USA

Lepidoptera long before they were scientifically described. His drawings and specimens contributed to the original descriptions of numerous species. For many years, Abbot's illustrations and notes were the primary source of life history information for the Lepidoptera of America. Edwards (1868–1872) stated, “Even among our old and common species, the larvae are but little more known than in the days of Abbot.” Scudder (1888, 1888–1889) similarly remarked, “the transformations of not a few of our butterflies are even now known only through the observations and illustrations of Abbot.” Abbot's work is still valuable in understanding the life histories of poorly known species. His original drawings also help to clarify taxonomic concepts and historical distributions (Calhoun 2003). However, some of his illustrations and written observations are the source of dubious information that continues to plague the literature. Authors have repeated many of Abbot's erroneous hostplant associations without realizing their origin. Because of these discrepancies, extreme caution must be exercised when consulting Abbot's drawings for life history information. To fully appreciate Abbot's contributions, it is essential to analyze his artwork within its original context and over the course of his career in

America. I previously discussed Abbot's work in Calhoun (2003, 2004, 2005, 2006). I now present a review of Abbot's butterfly drawings in the Alexander Turnbull Library, Wellington, New Zealand. I also continue to investigate the artistic methods and manuscript notes that Abbot used to document his observations of American Lepidoptera.

METHODS

Digital images of drawings were received from the Alexander Turnbull Library. The adult butterflies were identified and the figures compared with those in other sets of Abbot's drawings that are deposited elsewhere. Figures of butterfly larvae and pupae were analyzed for accuracy using written descriptions, line drawings, and photographs of living specimens. Botanist Mark A. Garland provided identifications of the depicted plants, which were then evaluated as hosts. Also consulted were relevant manuscripts preserved in the Carl A. Kroch Library (Cornell University), Ernst Mayr Library (Museum of Comparative Zoology, Harvard University), Gray Herbarium (Harvard University), and the Linnean Society of London.

RESULTS

Background. Since his youth, the English naturalist William Swainson (1789–1855) was familiar with John Abbot through the published drawings in Smith & Abbot (1797) and Abbot's numerous specimens that were contained in the natural history cabinets of London. Swainson obtained some of Abbot's insect specimens in 1813 through Abbot's London agent, John Francillon (Swainson correspondence, Linnean Society of London). In September 1816, Swainson wrote directly to Abbot about his desire to purchase additional specimens, as well as drawings of the insects of Georgia. He later asked specifically for illustrations of butterflies and sphinx moths that were not figured in Smith & Abbot (1797). Without divulging Swainson's name, Abbot boasted to the Swiss naturalist Heinrich (Henry) Escher-Zollikofer (1776–1853) that he had received a letter from "a Gentleman in England of my acquaintance, who desires me to collect for him a General collection of Insects, and also wants to purchase a collection of Drawings" (Kroch Library, Cornell University). Abbot replied to Swainson in December 1816 that he had "commenced making a set of Quarto (large size) Drawings of the changes of Insects with notes, of such Insects that are not figured in Smiths Lepidoptera Insects of Georgia, indeed it is a continuation of that Work" (Linnean Society of London). Abbot expected to complete about 100 drawings by the time he collected all the insects that

Swainson wanted, but stated that he could "readily make at least 200 such Drawings not figured in Smiths work, among them is many of the principal Insects both for size & beauty" (Linnean Society of London). By the time Abbot sent his reply, Swainson had already departed London for a two-year expedition to Brazil. His letter was forwarded to Brazil by Swainson's father, John Timothy Swainson.

Abbot hoped that more of his drawings would eventually be published like those in *The Natural History of the Rarer Lepidopterous Insects of Georgia* (Smith & Abbot 1797). Abbot was probably unaware of this book for some time, but was familiar with it by 1813 when he referred to "Smiths Lepidoptera" in a letter to Escher-Zollikofer. Abbot also wrote Latin names from this book on drawings that he began in 1813 (Calhoun 2004). He repeatedly referred to his sets of drawings as "a continuation of Smiths Lepidoptera," presumably to induce patrons to publish them as such. The proposed Lepidoptera drawings for Swainson were to be completed in a comparable format, which Abbot described as "Quarto, containing the larva, & Fly, Male & female if any difference, on one of the plants it feeds on, or the particular plant, in Watercolors" (letter to H. Escher-Zollikofer, Kroch Library). Like his other life history illustrations, they would invariably portray only mature larvae and include pupae.

When Abbot was working on his drawings for Swainson, he was also attempting to complete a set for Escher-Zollikofer. In April 1817, Abbot sent 50 drawings to Escher-Zollikofer and applied 48 others to Swainson's order. Abbot often juggled specimens and drawings between patrons. By August 1817, he had completed at least 56 more drawings, telling the South Carolina botanist Stephen Elliott, "I have now 104 [drawings], finished for a 2d Vol. [of "Smiths Lepidoptera"]" (Gray Herbarium, Harvard University). Upon completion of the set for Swainson, Abbot entered notes about the habits and biology of each species in a separate manuscript.

Abbot finally sent his watercolors and accompanying notes to Swainson with 900 insect specimens on 1 May 1818. He advised, "I have sent under the cork at the bottom of the box (being a false bottom) 104 Q [quarto] Drawings of the changes of the Insects of Georgia making a 2d Vol. of Smith" (Linnean Society of London). The drawings were placed under the cork to conceal them from customs inspectors and avoid duty fees. Abbot asked Swainson, "If you shou'd not approve of them yourself, beg the favor to dispose of them to the best advantage for me" (Linnean Society of London). Although Abbot intended to provide 104 drawings, the same number published in Smith & Abbot (1797), he

apparently misplaced one of them prior to shipment. Despite Abbot's description, the set included more than just Lepidoptera.

Swainson examined the drawings upon his return to London in August 1818. He was immediately critical. In his reply to Abbot, Swainson complained that the drawings were "not so highly finished as those must have been from which the Plates in Dr Smith's work were taken," adding, "the greatest objection is that they are much smaller in size so they can never be bound uniformly with that work" (Linnean Society of London). In Abbot's defense, his original drawings for Smith & Abbot (1797) were of a comparable size, but the published plates were printed on larger paper. Per his earlier request, Swainson argued that he wanted only drawings of butterflies and sphinx moths, not the variety of insects that Abbot had included. As a friendly gesture, Abbot had already discounted the cost of the drawings from seven shillings and six pence to six shillings, but Swainson offered to pay only five shillings in light of his objections. At five shillings each, the cost of the drawings would have totaled £25 15s, currently valued at about £1,340 (\$2,520 US). Swainson also complained about Abbot's insect specimens, stating, "I should have liked a greater variety instead of 4 & 5 of a species." Swainson asked that replacement drawings be sent with another shipment of insect specimens. If Abbot could not provide more drawings, Swainson proposed to keep some from the first set and "dispose of the remainder if possible" (Linnean Society of London). Abbot acquiesced in June 1819, writing, "I will draw over again for you those that you want...and will leave you to dispose of those already sent at the best price you can get" (Linnean Society of London). In lieu of monetary payment for the drawings and specimens, Swainson offered to exchange Brazilian insects from his recent expedition. Swainson collected about 20,000 insect specimens during his trip (Natusch & Swainson 1987). Abbot graciously accepted and arranged for the Brazilian insects to be sent directly to Heinrich Escher-Zollikofer in Switzerland, who would then pay Abbot. However, Abbot apparently never completed the replacement drawings and Swainson kept the entire first series. As payment for Abbot's specimens, Swainson later sent Brazilian insects to Escher-Zollikofer, but Abbot was mortified to learn that the shipment was heavily damaged upon receipt.

Swainson ultimately lost interest in a project to publish more of Abbot's drawings, relating many years later, "another series of 103 subjects, not included in that which has been published, was executed for us, with the intention of forming two additional volumes to those edited by Dr. Smith, but the design is now

abandoned" (Swainson 1840). It is uncertain what species would have been included in such a book, since Swainson would likely have used the replacement drawings that Abbot intended to send. Because of his dissatisfaction with the drawings, Swainson missed a perfect opportunity to describe the numerous "nondescript" species that they portrayed, most of which remained unnamed for many years. Nonetheless, Swainson (1821) published an abbreviated version of one of the moth drawings to accompany his description of *Thyreus abbottii* (now *Sphecodina abbottii*), which dubiously honored Abbot with an incorrect double-t spelling of his name—a common mistake still made today. Abbot and Swainson continued to correspond for many years. A letter that Abbot wrote in January 1835 was possibly his last to Swainson (Alexander Turnbull Library). In November 1836, after learning that yet another shipment of Swainson's Brazilian insects for Escher-Zollikofer had arrived in deplorable condition, Abbot remarked, "I have had no dealings with him since" (letter to H. Escher-Zollikofer, Cornell University).

Swainson moved from England to New Zealand in 1840. After Swainson's death, his extensive correspondence was brought to England by one of his daughters and placed in the care of the botanist Sir Joseph D. Hooker. In 1900, the 934 letters, including nine from Abbot, were acquired for £50 by the Linnean Society of London (Günther 1899–1900). Albert C. L. G. Günther, then President of the Linnean Society, knew from these letters that Swainson had received drawings from Abbot, but their whereabouts were unknown. Prior to his departure to New Zealand, a large portion of Swainson's library and natural history collections were auctioned in June 1840 (Chalmers-Hunt 1976). Abbot's drawings, however, were not part of this sale. In September 1841, four months after Swainson's arrival in New Zealand, a ship carrying much of the remainder of his library sunk off the coast of South Africa en route to his new home (Parkinson 1984). Günther (1899–1900) bemoaned the possibility that Abbot's drawings were forever lost in this disaster, stating, "No one could appreciate their value better than Swainson, and their exquisite beauty and accuracy must have exercised a very beneficial influence on the work of his own pencil and brush." Swainson was also an accomplished artist who personally illustrated most of his publications (see Parkinson 1989).

The fate of these Abbot watercolors remained a mystery until 1977 when a librarian at the Alexander Turnbull Library discovered an uncataloged collection of drawings. Parkinson (1978) initially associated them with drawings that Abbot supposedly shipped to

Swainson in 1835, but Wilkinson (1982) correctly identified them as those completed between 1816 and 1818. In 1866, eleven years after Swainson's death, the drawings were deposited into the Colonial Museum in Wellington, New Zealand. There they remained until 1876 when they were given to Walter B. D. Mantell, son of famed British paleontologist Gideon A. Mantell. The Turnbull Library acquired the library of W. B. D. Mantell in 1927 from the widow of his son, Walter G. Mantell (Parkinson 1983a, 1984, Parkinson & Rogers-Price 1984).

During the early 1980s, the Alexander Turnbull Library Endowment Trust embarked on an ambitious project to publish these drawings as Abbot had hoped. They would be issued in annual fascicles consisting of six to ten plates each. The text would be formatted similar to that of Smith & Abbot (1797), but Abbot's notes for each drawing would be photographically reproduced from his manuscript. The drawings themselves would be reproduced as six-color photolithographic prints measuring 40.0 × 25.0 cm (15.7 × 9.8 in) and printed on Process Dove 25 percent rag paper. The first fascicle was offered in May 1983 for \$50 NZ. Individual plates could be ordered for \$10 NZ (editor's note in Rogers-Price 1984). Six plates were included in this fascicle: one katydid and five butterflies from drawing nos. 6, 10, 11, 12, 21, and 28 (ATLET 1983). The insects were identified by Matthew E. Dakin, John G. Franclemont, and Paul E. S. Whalley. The plants were determined by C. Richie Bell. The second fascicle of ten plates was being prepared in 1984 for publication the following year, but poor sales of the first fascicle forced the discontinuation of the project, leaving the remainder of the drawings unidentified (M. Calder pers comm., P. Parkinson pers comm.). Although Parkinson (1978) listed all the drawings, he tentatively identified them using only Abbot's manuscript names.

Analysis. In January 2003, I received digital images of all 103 drawings, as well as photocopies of Abbot's accompanying notes. The drawings are unbound, but appear to have once been protected between pink marbled boards, which are preserved with the drawings. The front board bears a pasted paper label, probably created by Swainson, reading, "Original drawings of insects by J. Abbott." On the verso of the board is the bookplate of W. B. D. Mantell and a Turnbull Library classification label dated 1929.

The drawings are rendered in watercolor and graphite on cream-colored wove paper and most measure 34.2 × 24.6 cm (13.5 × 9.7 in). Twenty-five of them possess watermarks of "T G & Co." This paper was manufactured by Thomas and Joshua Gilpin, whose mill was located north of Wilmington, Delaware from 1787

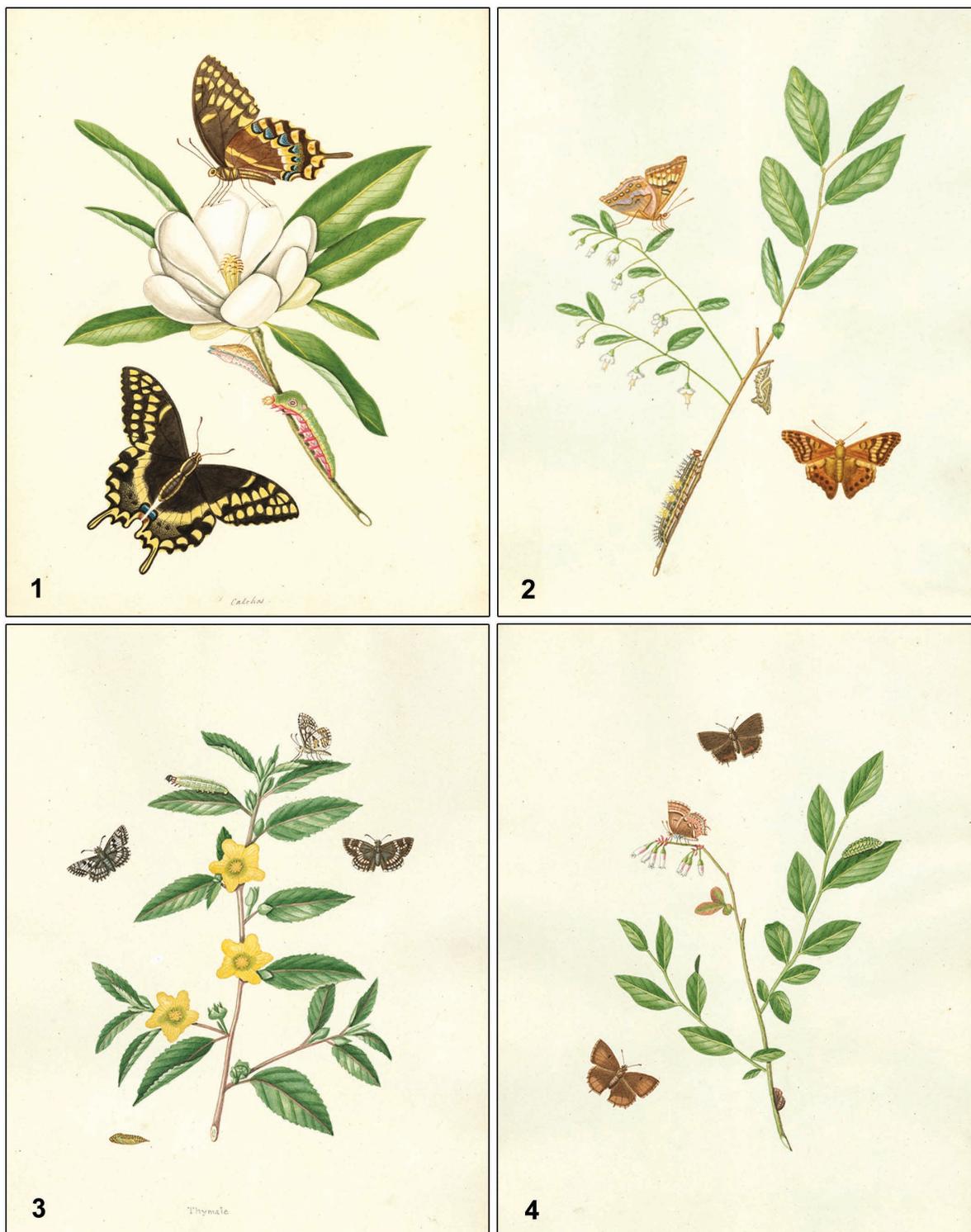
until 1837 (Gravell & Miller 1979). Three other sheets bear the watermarks of "Ruse & Turners 1810" and "W B." The Ruse & Turners paper mill operated in England from 1805 until 1845 (Churchill 1935). Beginning in 1808, William Barber (Barbour) produced paper with the "W B" watermark from mills located in Berks County, Pennsylvania (Gravell & Miller 1979). This reveals that Abbot was using American paper by this time, which he probably purchased in Savannah. He initially employed English papers, such as those from the Whatman mills (Calhoun 2006a).

Although high in quality, these watercolors are not as detailed as the original drawings for Smith & Abbot (1797), which were completed *ca.* 1783–1792 (see Calhoun 2006a). At the top right of each drawing are numbers written by Abbot that correspond to the entries in his notes. Several drawings bear names and other notations in Swainson's hand.

The set includes illustrations of Coleoptera (7 spp.), Hemiptera (1 sp.), Hymenoptera (1 sp.), Lepidoptera (85 spp.), and Orthoptera (2 spp.). Seventeen of the watercolors (nos. 3, 6, 8, 10–12, 14, 17, 18, 21, 32, 35, 37, 49, 53, 72, 78) were figured by Parkinson (1978), Reynolds (1983), Rogers-Price (1983, 1984), Parkinson & Rogers-Price (1984), and Calhoun (2003, 2004). The Lepidoptera drawings are like those published in Smith & Abbot (1797), depicting adults, early stages, and a supposed hostplant (Figs. 1–4). They include 21 species of butterflies.

The accompanying eleven pages of annotations, entitled "Notes to the Drawings of Insects," are written in Abbot's hand on cream wove paper measuring 34.0 × 20.5 cm (13.4 × 8.1 in). The entries are numbered to correspond to the drawings and several sheets bear undated watermarks of "J M," indicative of paper manufactured after 1817 by John Matthews of Pennsylvania (Gravell & Miller). The pages have been stitched into a fawn wove paper cover. The front cover bears a misspelled ink title, probably written by Swainson, reading, "DISCRIPTION OF ABBOTTS DRAWINGS." Preserved with this collection is a leather cover that may have been removed from boards that once protected the notes. It bears gilt tooling and edging, as well as a gilt crest in the center. The crest possibly pertains to the Mantell family.

With the help of six other specialists, I compiled a nearly complete list of identifications for all the insects and plants in these drawings. This list was provided to the Turnbull Library in September 2003. As part of my study of John Abbot's butterflies, I present a review of the butterfly drawings that are preserved in the Turnbull Library with transcriptions of Abbot's accompanying manuscript notes (Table 1).



FIGS. 1-4. John Abbot butterfly drawings in the Alexander Turnbull Library. 1, *Papilio palamedes* (E-272-f-009) (erroneous hostplant). 2, *Asterocampa clyton* (E-272-f-016) (erroneous larva, pupa, and hostplant). 3, *Pyrgus communis* (E-272-f-023). 4, *Callophrys henrici* (E-272-f-027).

TABLE 1. Adult butterflies, early stages, and plants depicted in John Abbot drawings in the Alexander Turnbull Library. Also Abbot's original manuscript entries for each (Abbot's grammar and spelling are preserved). Insect nomenclature follows Opler & Warren (2002). Adult insect figures: D=dorsal, V=ventral, m=male, f=female. Early stages: L=larva, P=pupa, a=acceptable, u=unacceptable. Status of figured hostplants (in brackets): C=confirmed, NC=needs confirmation, E=erroneous.

Drawing No.	Figured adults and early stages	Plant species and host status	Manuscript entry by J. Abbot
8	<i>Papilio glaucus</i> L. Df, Vf, La, Pa	<i>Styrax americanus</i> Lam. (Styracaceae) [C] "Styrax laevigata" is a synonym of <i>S. americanus</i> . "Swamp Ash" (probably <i>Fraxinus pennsylvanica</i> Marsh.) (Oleaceae) and "Hicory" [hickory] (<i>Carya</i> sp.) (Juglandaceae) are also confirmed hostplants.	8. <i>Papilio Glaucus</i> . The Caterpillar feeds on the <i>Styrax laevigata</i> , Swamp Ash and Hicory, Tied itself up 11 th Octr Changed 13 th bred 2 ^d April. It also breeds again in the Summer. The Caterpillar is very rare, and the Butterfly not common.
9	<i>Papilio palamedes</i> Drury Dm, Vm, La, Pa	<i>Magnolia virginiana</i> L. (Magnoliaceae) [E]	9. Large yellow spotted black swallow tailed Butterfly. Feeds on the Bay figured. Tied up 30 th May, changed the 31 st bred 14 th June. Another that changed the 18 th Sepr was bred the 24 th March. The Caterpillar is not common to be met with. But the Butterfly is frequent all over the Country.
10	<i>Papilio glaucus</i> L. Dm, Vm, La, Pa	<i>Ptelea trifoliata</i> L. (Rutaceae) [C] "Swamp Ash" (probably <i>Fraxinus pennsylvanica</i> Marsh.) (Oleaceae) is also a confirmed hostplant.	10. <i>Papilio Turnus</i> . Feeds on the <i>Ptelea trifoliata</i> , and Swamp Ash, Tied itself up 19 th June. changed 20 th bred 4 th July. May be met with thinly scattered over all parts of the Country.
11	<i>Papilio crespontes</i> Cramer Dm, Vm, La, Pa	<i>Zanthoxylum clava-herculis</i> L. (Rutaceae) [C] "Prickly Ash" refers to <i>Z. clava-herculis</i> . "Orange tree" (<i>Citrus</i> sp.) (Rutaceae) is also a confirmed hostplant.	11. <i>Papilio Thoas</i> . Feeds on the Prickly Ash, and the Orange tree, Tied up the 6 th May, changed the 7 th bred the 27 th another that changed the 15 th May, was bred 3 ^d June, and another that changed the 30 th June, bred 19 th July. Is to be met in the Gardens of the City of Savannah, and the neighbourhood, but not a few miles back in the inland parts.

NOTES: only the dark form of the female is portrayed. This drawing was figured by Parkinson (1978) and Parkinson & Rogers-Price (1984). Duplicate figures by Abbot were reproduced for Plates 8 and 9 of Boisduval & Le Conte (1829-[1837]). "Glaucus" is penciled on the drawing in Swainson's hand. It is interesting that Abbot followed contemporary wisdom in treating this form as a separate species from the butterflies in drawing no. 10, especially since he reared both and noted that each fed on "Swamp Ash". Moreover, he portrayed slightly different immatures in these drawings. Abbot possibly knew the truth about this form, but was hesitant to refute more "learned" naturalists who were also paying customers.

NOTES: see Fig. 1. Duplicate figures of the larva and pupa by Abbot were reproduced for Plate 5 of Boisduval & Le Conte (1829-[1837]). "Calchas," a misspelling of the junior synonym *Papilio calchas* Fabricius, is penciled on the drawing in Swainson's hand. *Magnolia virginiana* is often listed as a hostplant of this species, but it is toxic to the larvae (Scriber 1986, Scriber et al. 2000). Brooks (1962) noted that larvae of *P. palamedes* would not accept this plant in Georgia. Two other Abbot drawings of *P. palamedes* with *M. virginiana* are preserved at The Natural History Museum, London. They are duplicates of one another, but slightly different from the drawing in New Zealand and probably completed about a decade earlier. Scudder (1888-1889) examined one of these and identified the depicted plant as *Magnolia glauca* (L.), now considered to be a synonym of *M. virginiana*. This drawing was figured by Rogers-Price (1984) and Gilbert (1998, 2000). Scudder's discussion of this drawing is the source of all subsequent claims that this butterfly feeds on *M. virginiana*. Abbot portrayed this butterfly only with *M. virginiana*. He identified the plant in two duplicate drawings as "Magnolia glauca," but this appears to have been an aesthetic substitution or he incorrectly recalled the host when he later illustrated the life history of this butterfly. Scudder (1888-1889) also remarked that Florida naturalist William Wittfeld reported the hostplant to be "red bay," which Wittfeld identified as "Magnolia glauca." However, Wittfeld probably associated the wrong Latin name with his report of "red bay," which is applicable to *Persea borbonia* (L.) Spreng., the only acceptable host of this butterfly in Florida (Scriber et al. 2000). *Magnolia virginiana* is known as "sweet bay." The pupa is too colorful, but conceptually accurate.

NOTES: see drawing no. 8. This drawing was reproduced in ATLET (1983) and figured by Rogers-Price (1983). Duplicate figures by Abbot were reproduced for Plates 6 and 7 of Boisduval & Le Conte (1829-[1837]). "Turnis", a misspelling of the junior synonym *Papilio turnus* L., is penciled on the drawing in Swainson's hand. Abbot also used this name.

NOTES: this drawing was reproduced in ATLET (1983) and figured by Parkinson & Rogers-Price (1984). Duplicate figures by Abbot were reproduced for Plates 12 and 13 of Boisduval & Le Conte (1829-[1837]). The cultivation of orange trees was probably responsible for the occurrence of this butterfly "in the Gardens of the City of Savannah." The name "*Papilio Thoas*" (i.e. *Papilio thoas* L.) was used for *P. crespontes* until these very similar butterflies were recognized as different species many years later.

TABLE 1. Continued.

Drawing No.	Figured adults and early stages	Plant species and host status	Manuscript entry by J. Abbot
12	<i>Ascia monuste</i> (L.) Dm, Df(2), Vf, La, Pa	<i>Cleome gynandra</i> L. (Capparaceae) [C] “ <i>Cleome pentaphilles</i> ,” a misspelling of <i>C. pentaphylla</i> L., is a synonym of <i>C. gynandra</i>	12. <i>Papilio Danai</i> <i>Cleome</i> . Feeds on the <i>Cleome pentaphilles</i> . Tied up 16th July, changed 17 th , bred 23 ^d . Many of the female Butterflies varies being of a dingy black as figured. This Butterfly is some Summers very plenty in Savannah breeding in the Gardens & yards where the plant grows in plenty but is rare in the Inland parts.
NOTES: this drawing was figured by Calhoun (2004) and a duplicate drawing was figured by Gilbert (1998). Duplicate figures by Abbot were also reproduced for Plate 16 of Boisduval & Le Conte (1829-[1837]) (Calhoun 2004). Pencil on the drawing in Swainson's hand is “no 12”. Abbot's name for this species is derived from the Linnaean classification system, where <i>Papilio</i> is the genus and <i>Danai</i> is a group that includes the Pieridae. “ <i>Cleome</i> ” is a name that Abbot coined based on the hostplant. Abbot's notes aptly describe the irregular migratory presence of the subspecies <i>A. m. phileta</i> (Fabricius) in coastal Georgia (Calhoun 2004).			
13	<i>Cercyonis pegala</i> (Fabricius) Dm, Df, Vf, La, Pa	<i>Panicum</i> sp, possibly <i>P. dichotomiflorum</i> Michx. or <i>P. rigidulum</i> Nees (Poaceae) [NC]	13. Great meadow brown Butterfly. Feeds on the grass figured, and other grasses, Tied up 19 th June, changed 20 th bred 5 th July. Frequents the pine woods &c. Is not common.
NOTES: portions of a duplicate drawing by Abbot were reproduced for Plate 59 of Boisduval & Le Conte (1829-[1837]) (the figure of the larva was reversed). The plant was identified in ATLET (1983) as <i>Panicum</i> [sic] <i>agrostoides</i> Sprengel, now considered to be a synonym of <i>P. rigidulum</i> . This drawing prompted Parkinson (1983b) to question the subspecific arrangement of <i>C. pegala</i> , particularly the identity of <i>C. pegala abbotti</i> Brown. This subspecies was named in honor of John Abbot by Brown (1969), who believed that the butterflies figured by Boisduval & Le Conte as <i>Satyrus alope</i> (= <i>C. pegala alope</i> Fabricius) actually portrayed an undescribed subspecies found in southeastern Georgia and northern Florida. Parkinson argued that the adult figures in the drawing in New Zealand, as well as the duplicates in Boisduval & Le Conte (1829-[1837]), are inconsistent with this phenotype as defined by Brown (1965). I agree, as Abbot's figures are consistent with <i>C. p. pegala</i> that occurs in eastern Georgia. Abbot's English name for this butterfly was derived from its superficial resemblance to the common European butterfly, <i>Maniola jurtina</i> (L.), known in Britain as the “meadow brown” since the early eighteenth century. In 1769, Abbot illustrated specimens of this species that he had collected in England, using this name to identify them (Library of the Carnegie Museum of Natural History).			
14	<i>Hermeupychia sosybius</i> (Fabricius) Dm, Df, Vm, Lu, Pa	<i>Carex</i> sp., possibly <i>C. hyalinolepis</i> Steudel (Cyperaceae) [NC]	14. Small Ringlet. Feeds on the Twisted Grass, figured, and other Grasses, Tied up Aug 23 ^d changed 24 th bred 1 st Sepr. Frequents the Swamps and fields, is not very common
NOTES: this butterfly is known to feed only on grasses (Poaceae). Abbot may have collected the wrong plant for his illustration, possibly confusing it with the host of <i>Neonympha areolatus</i> (J. E. Smith), which feeds on sedges (Cyperaceae). Abbot supplied the same notes and used the name “Twisted Grass” for the plant illustrated in another drawing of <i>H. sosybius</i> now deposited at The Natural History Museum, London. That drawing portrays a twisted-leaved species of yelloweyed grass, probably <i>Xyris caroliniana</i> Walter, not a true grass but a member of the Xyridaceae and an erroneous host. Because Abbot figured a different plant for Swainson, he crossed-out “Twisted” to reflect this change. To Abbot, sedges were simply “grasses.” The depicted larva lacks the pair of posterior appendages that are present in this species. Abbot included a more accurate larva in at least two other drawings of this species, but later applied it to <i>Cyllopsis gemma</i> (Hübner). Abbot's English name for this butterfly was derived from its remote similarity to the widespread European species, <i>Aphantopus hyperantus</i> (L.), which has been known as the “ringlet” in Britain since the mid-eighteenth century. In 1769, Abbot illustrated specimens of this species that he had collected in England, using this name to identify them (Library of the Carnegie Museum of Natural History).			
15	<i>Asterocampa celtis</i> (Boisduval & Le Conte) Dm, Df, Vm, Lu, Pa	<i>Celtis</i> cf. <i>tenuifolia</i> Nutt. (Celtaceae) [C] “Sugarberry” refers to the figured <i>Celtis</i> .	15. <i>Papilio Portlandia</i> . Feeds on the Sugarberry, tied up 6 th May, changed 7 th bred 20 th . Is very rare.
NOTES: portions of a duplicate drawing by Abbot were reproduced on Plate 57 of Boisduval & Le Conte (1829-[1837]) to accompany the original description of this species. The larva, and possibly also the pupa, is <i>A. clyton</i> (drawing no. 16). Boisduval & Le Conte (1829-[1837]) and Scudder (1888-1889) identified the depicted plant as <i>Celtis occidentalis</i> L. (Celtaceae). Abbot repeatedly misapplied the name “ <i>Papilio Portlandia</i> ” (i.e. <i>Papilio portlandia</i> Fabricius) to this species (see text).			

TABLE 1. Continued.

Drawing No.	Figured adults and early stages	Plant species and host status	Manuscript entry by J. Abbot
16	<i>Astererocampa clyton</i> (Boisduval & Le Conte) Dm, Vm, Lu, Pu	<i>Vaccinium stamineum</i> L. (Ericaceae) [E] "Sugarberry" refers to <i>Celtis</i> .	16. Orange coloured Butterfly. Feeds on the Sugarberry, Tied up 20 th May. changed 21 st bred 9 th June. Is very rare
<p>NOTES: see Fig. 2. The immatures and plant in this drawing are all unrelated to the adults (see text). Despite the figured <i>Vaccinium</i>, this butterfly is known to feed only on <i>Celtis</i> trees (Celtaceae). Abbot identified the plant in a duplicate drawing as "Wild gooseberry." Two additional drawings of this species by Abbot portray the same figures. Abbot incorrectly associated the larva, and possibly also the pupa, with the closely related <i>A. celtis</i>, which feeds on the same hosplants (see drawing 15). He probably found few immatures of these species and misidentified those that he later collected for his drawings. Abbot ultimately fabricated immatures for <i>A. clyton</i>, modeling them after <i>Polygonia interrogationis</i> (Fabricius) (see text). Abbot probably observed that the adults of these species even shared similar color forms, reinforcing this perceived relationship. He duplicated these erroneous figures for all his subsequent life history illustrations of <i>A. clyton</i>. Boisduval & Le Conte (1829-[1837]) apparently recognized this mistake. Although their Plate 56 of <i>Apatura clyton</i> was credited to Abbot, it appears to have been constructed using figures from other sources, including an altered version of Abbot's larva of <i>A. celtis</i> (actually <i>A. clyton</i>). The hostplant on the published plate was equally erroneous, being a species of <i>Ilex</i>, possibly <i>I. decidua</i> Walt. (Aquifoliaceae). Scudder (1888-1889) identified the larva as <i>P. interrogationis</i> and the pupa as <i>Polygonia comma</i> (Harris). I have found no evidence that Abbot encountered <i>P. comma</i> in Georgia, nor does the depicted larva resemble that species.</p>			
17	<i>Chlosyne gorgone</i> (Hübner) Dm, Df, Vf, La, Pa	<i>Helianthus divaricatus</i> L. (Asteraceae) [C] "Cross wort" apparently refers to <i>H. divaricatus</i> (see Calhoun 2003). This is possibly a misapplication of an English name for the British yellow-flowered herb, <i>Cruciata laevipes</i> Opiz (Rubiaceae). "Sunflower" probably indicates another species of <i>Helianthus</i> .	17. Cross wort Fritillary Butterfly. Feeds on the Cross wort, and sunflower, Tied itself up by the tail 16 th May, changed 17 th bred 26 th . Frequents the Oak Woods of Burke County but is not common.
<p>NOTES: this drawing was figured in Parkinson & Rogers-Price (1984) and Calhoun (2003). Duplicate figures by Abbot were reproduced for Plate 46 of Boisduval & Le Conte (1829-[1837]) to accompany the original description of the enigmatic taxon <i>Melitaea ismeria</i> (Calhoun 2003, 2004, 2005, 2006b). The depicted larva is conceptually consistent with <i>C. gorgone</i>. "Fritillary" is a misspelling of the British name "Fritillary."</p>			
18	<i>Libytheana carinenta</i> (Cramer) Dm, Vm, La, Pa	<i>Celtis</i> cf. <i>tenuifolia</i> Nutt. (Celtaceae) [C] "Sugarberry" and "Hackberry" refer to <i>Celtis</i> .	18. Snout Butterfly. Feeds on the Sugarberry, or Hackberry, Tied up 28 th April, changed 29 th bred 8 th May. Is rare.
<p>NOTES: this drawing was figured in Calhoun (2004). With the exception of the adult figures, most of a duplicate drawing by Abbot was reproduced for Plate 64 of Boisduval & Le Conte (1829-[1837]) (Calhoun 2004). Scudder (1888-1889) identified the plant in duplicate drawings as <i>Celtis occidentalis</i>. Species of <i>Libytheinae</i> have long been called "Snout" butterflies.</p>			
19	<i>Pyrisitia lisa</i> (Boisduval & Le Conte) Dm, Df, Vm, La, Pa	<i>Senna occidentalis</i> (L.)Link (Fabaceae) [C] "Cassia <i>tochida persova</i> " is an allusion to <i>Cassia foetida</i> and its author, C. H. Persoon (see text); a synonym of <i>S. occidentalis</i> . "Cassia <i>chamacusta</i> " is a misspelling of <i>Cassia chamaecrista</i> L., which is a synonym of <i>Chamaecrista fasciculata</i> (Michx.)Green (Fabaceae). This is also a confirmed hostplant.	19. Little yellow Butterfly. Feeds on the Cassia <i>tochida persova</i> but is most frequent on the Cassia <i>chamacusta</i> . Tied up 6 th Sepr changed 7 th bred the 13 th .
<p>NOTES: duplicate figures were reproduced for Plate 19 of Boisduval & Le Conte (1829-[1837]) to accompany the original description of this species.</p>			

TABLE 1. Continued.

Drawing No.	Figured adults and early stages	Plant species and host status	Manuscript entry by J. Abbot
20	<i>Eurema daira</i> (Godart) Dm, Df, La, Pa	<i>Chamaecrista fasciculata</i> (Michx.)Greene [C] “ <i>Cassia chamacusta</i> ” is a misspelling of <i>Cassia chamaecrista</i> L., which is a synonym of <i>Chamaecrista fasciculata</i> .	20. <i>Black streaked little yellow Butterfly. Feeds on the Cassia chamacusta</i> Tyed itself up 27 th August changed 28 th bred 5 th Sep. Both these kinds [this and <i>E. lisa</i> ; drawing no. 19] is common in all parts of the Country in Autumn, and settles so many together at times to suck moist places in roads &c, that I seen 20 in the compass of a hat, but this species is not quite so common as the last.
NOTES: the winter (dry season) form of the species is portrayed. A portion of a duplicate drawing by Abbot was reproduced for Plate 18 of Boisduval & Le Conte (1829–[1837]) (Calhoun 2004).			
21	<i>Thorybes bathyllus</i> (J. E. Smith) Dm, Df, Vf, La, Pa	<i>Desmodium</i> sp., possibly <i>D. paniculatum</i> (L.)DC. (Fabaceae) [C] “Begger’s lice” refers to the figured <i>Desmodium</i> .	21. <i>Brown Skipper. Feeds on the Beggars lice, spun up in the leaves 18th Octr bred 20th April. is not very common.</i>
NOTES: this drawing was reproduced in ATLET (1983). It was also figured by Reynolds (1983) and Rogers-Price (1983). Portions of a duplicate drawing by Abbot were reproduced for Plate 74 of Boisduval & Le Conte (1829–[1837]). Like the Abbot drawing used for the original description of <i>Papilio bathyllus</i> in Smith & Abbot (1797), the females in this composition may portray <i>Thorybes confusus</i> Bell (Calhoun 2006a). The plant was identified in ATLET (1983) as <i>Desmodium fernaldii</i> B.G.Schub. (Fabaceae).			
22	<i>Erynnis martialis</i> (Scudder) Dm, Df, Vf, La, Pa	<i>Indigofera caroliniana</i> Mill. (Fabaceae) [E] In this case, “Wild Indigo” apparently refers to <i>Indigofera</i> , not a species of <i>Baptisia</i> (Fabaceae).	22. <i>Least Dingy Skipper. Feeds on the Wild Indigo. spun up in the leaves 25th June. bred 8th July. Frequents the Oak woods. is much less common than the other Dingy Skippers.</i>
NOTES: this species is known to feed only on <i>Ceanothus americanus</i> L. (Rhamnaceae) in eastern North America. In fact, Abbot illustrated this skipper with <i>C. americanus</i> for an earlier composition, calling the plant “Red shank or red Root.” His notes for other drawings also refer to “Red Root or red shank.” Abbot’s mistaken recollection of an alternate host may have resulted in the inclusion of <i>I. caroliniana</i> . He called all the species of the genus <i>Erynnis</i> “Dingy Skippers,” after the European <i>Erynnis tages</i> (L.), which has long been called the “dingy skipper” in Britain			
23	<i>Pyrgus communis</i> (Grote) Dm, Df, Vf, La, Pa	<i>Sida acuta</i> Burm. f. (Malvaceae) [C]	23. <i>Black and white Skipper. Feeds on the plant figured. Spun up in the leaves 25th June bred 7th July. Is to be met with in the Oak woods and fields, is not common.</i>
NOTES: see Fig. 3. “Thymale” (a misspelling of the genus name <i>Thymele</i> Fabricius) is penciled on the drawing, probably in Swainson’s hand. The skippers portrayed in this drawing are almost certainly <i>P. communis</i> , as there is no evidence that the similar <i>Pyrgus albescens</i> Plötz occurred in Georgia during Abbot’s lifetime (see text).			
24	<i>Problema bulenta</i> (Boisduval & Le Conte) Dm, Df, Vm, La, Pa	<i>Panicum</i> sp., possibly <i>P. dichotomiflorum</i> Michx. or <i>P. virgatum</i> L. (Poaceae) [NC] “Broad grass” refers to this or a similar species of grass. Abbot misidentified the figured plant as “ <i>Zozani aquatica</i> ”, a misspelling of <i>Zizania aquatica</i> L. (Poaceae).	24. <i>Feeds on the Broad grass, Zozani aquatica folding itself up in the leaf, changed 25th bred 6th Augt. Frequents Rice fields, ditches, and the sides of ponds in the lower parts of Georgia—is not common.</i>
NOTES: duplicate figures by Abbot were reproduced for Plate 67 of Boisduval & Le Conte (1829–[1837]), representing the “original description” of this species (see text). Little is known about the biology of this skipper. Larvae have been found on <i>Spartina cynosuroides</i> (L.)Roth (Poaceae) in New Jersey (Cromartie & Schweitzer 1993) and southward it has been associated with <i>Zizaniopsis miliacea</i> (Michx.) Döll & Asch. (Poaceae) (Opler & Krizek 1984). Larvae have also been found and reared on <i>Phragmites australis</i> (Cav.)Trin. ex. Steud. (Poaceae) (Schweitzer 2006). Although confined females will oviposit on <i>Panicum</i> (Cromartie & Schweitzer 1993), Abbot probably did not find larvae on it. This skipper may feed on <i>Z. aquatica</i> as Abbot indicated, or he confused this grass with the similar <i>Z. miliacea</i> . <i>Problema bulenta</i> was possibly more plentiful in southern Georgia where rice plantations offered additional wetland habitat (see text). Although Abbot did not provide an English name for the insect in this drawing, he used “Broad grass Skipper Butterfly” for duplicate drawings.			

TABLE I. Continued.

Drawing No.	Figured adults and early stages	Plant species and host status	Manuscript entry by J. Abbot
25	<i>Ancyloxypha numitor</i> (Fabricius) Dm, Df, Vm, La, Pa	<i>Justicia ovata</i> (Walter)Lindau (Acanthaceae) [E]	25. <i>Least Skipper. Feeds on the plant figured, changed 12th Sepr bred 22^d. Is frequent in Rice fields and Meadowy parts of brooks</i>
NOTES: this species is a grass-feeder. <i>Justicia</i> grows in the wet habitats where this skipper occurs, thus Abbot may have confused the host. However, an earlier composition of <i>A. numitor</i> includes a different erroneous host, <i>Asclepias verticillata</i> L. (Apocynaceae), which occurs in dry soils. Abbot ambiguously referred to both plants as “the plant figured,” suggesting that he did not recall the proper host or inserted these more colorful plants to enhance his compositions.			
26	<i>Satyrium liparops</i> (Le Conte) Dm, Df, La, Pa	<i>Crataegus</i> sp., possibly <i>C. viridis</i> L. (Rosaceae) [C] “Parsley haw” refers to <i>Crataegus</i> . “Oaks” (<i>Quercus</i>) (Fagaceae) are also fed upon by <i>S. liparops</i> .	26. <i>Brown hair Streak Butterfly. Feeds on the Parsley haw, and Oaks, Tied up 16th April, changed 18th bred 5th May. This species frequents the Oak woods on the edge of Ogeechee River swamp. is very rare.</i>
NOTES: unlike his other butterfly compositions, the ventral surface of the adult is not portrayed. Another drawing by Abbot was reproduced on Plate 31 of Boisduval & Le Conte (1829-[1837]) to accompany the original description of this species, which remained poorly understood for over a century (See Calhoun 2004, 2005). For other drawings, Abbot called this species the “Ogeechee Brown hair Streak Butterfly,” a misspelled reference to the occurrence of this species in the vicinity of the Ogeechee River of eastern Georgia.			
27	<i>Callophrys henrici</i> (Grote & Robinson) Dm, Df, Vm, La, Pa	<i>Vaccinium corymbosum</i> L. (Ericaceae) [C] “Swamp huckleberry” probably refers to the figured <i>Vaccinium</i> , but the same plant is portrayed in drawing no. 28 under a different name. “Judas tree” refers to redbud (<i>Cercis canadensis</i> L.) (Fabaceae). The adults that Abbot saw frequenting the blossoms of redbud may have included ovipositing females, as this tree is also a confirmed host.	27. <i>Black brown hair streak Butterfly. Feeds on the Swamp huckleberry, tied itself up 18th April, changed the 20th bred 6th May. The Butterfly frequents the blossoms of the Red bud or Judas tree, on the borders of Swamps, is far from common.</i>
NOTES: see Fig. 4. Duplicate figures by Abbot of the larva and pupa were reproduced for Plate 31 of Boisduval & Le Conte (1829-[1837]). Abbot spelled “tied” in the notes for this drawing, but spelled it “Tyed” elsewhere. See the text and Calhoun (2006a) for discussions of Abbot’s uneven spelling and grammar. Pupae of this species typically overwinter, but Abbot’s notes suggest that his larva developed into an adult during the same season.			
28	<i>Calycopis cecrops</i> (Fabricius) Dm, Df, Vm, Lu, Pa	<i>Vaccinium corymbosum</i> L. (Ericaceae) [NC] “Black Huckleberry” apparently refers to the depicted <i>Vaccinium</i> , but the same plant is portrayed in drawing no. 27 under a different name.	28. <i>Small purple Hair streak Butterfly. Feeds on the Black Huckleberry &c. tyed up 28th April. changed 20th bred 20th May. the Butterfly is frequent in most parts of the Country.</i>
NOTES: the female butterfly in this drawing was misidentified in ATLET (1983) as the Neotropical species <i>Strymon martialis</i> Herrich-Schäffer. The depicted plant was identified in ATLET (1983) as <i>Gaylussacia frondosa</i> (L.) Torrey & A. Gray ex Torrey. The larva of this species is not green, but rather brown or pinkish-brown.			
29	<i>Cupido comyntas</i> (Godart) Dm, Df, Vm, Lu, Pa	<i>Phaseolus polystachios</i> (L.)Britton <i>et al.</i> (Fabaceae) [C] “Red Root or redshank” was Abbot’s name for <i>Ceonthus americanus</i> L. (Rhamnaceae), an unlikely host for this legume-feeder.	29. <i>Least blue Butterfly. Feeds on the kind of wild pea figured, Red Root or redshank &c. Tyed itself up June 16th bred 24th is not common in the lower parts of the Country.</i>
NOTES: duplicate figures were reproduced for Plate 36 of Boisduval & Le Conte (1829-[1837]). The larva exhibits dark pattern elements that are not associated with this species.			

DISCUSSION

Life History notes. Abbot arranged most of his sets of elaborate life history drawings in loose order, grouping similar species such as butterflies, moths, and beetles. He recorded information about each species on a separate manuscript, which he often entitled “Notes to the Drawings of Insects.” These remarks, largely copied from a set of master notes, included names, hostplants, rearing dates, habitats, and other pertinent information.

Although Abbot employed a legible English round-hand writing style, his spelling and grammar were decidedly irregular. Walton (1921) attributed this to several possible factors, including the approach of senility, but Abbot’s grammar improved over time (Calhoun 2006a). Dow (1914) believed that Abbot’s misspellings “reveal the man,” yet they reveal just as much about the period in which he lived. Spelling was not standardized during much of Abbot’s life. It was largely phonetic, often resulting in different spellings of the same word within a single document. For example, Abbot typically wrote “tyed,” but he spelled the word “tied” in the notes for a drawing that he sent to Swainson (Table 1, no 27). He even varied the spellings of people’s names. Following the conventions of the period, Abbot’s punctuation was sporadic and he routinely capitalized nouns within sentences. Swainson was similarly criticized for his spelling and grammar. Günther (1899–1900) observed that Swainson was “loose in his style of writing; he persistently misspelt not only technical terms, but also the names of foreign authors, and even of some of his familiar friends and correspondents.” Deane (1905) referred to Swainson’s “crude method of writing and expressing himself.” The widely publicized journals of the Lewis and Clark Expedition (1803–1806) contain countless examples of such casual spelling and sentence structure.

Abbot identified most of the insects and plants in his drawings using either English or Latin names. While a few of the English insect names were of local origin in America, Abbot invented others based on appearance, habitats, hostplants, and localities. Examples include “Orange colored Butterfly,” “Broad grass Skipper Butterfly,” “Swamp brown Butterfly,” and “Georgia Skipper Butterfly.” He also adopted names used in Britain, such as “Meadow Brown,” “Ringlet,” and “Dingy Skipper” (Table 1). His general names of “swallow tailed Butterfly,” “Frittilary” (sic.), “Hair streak,” and “Skipper” are also of British origin, dating to the seventeenth and eighteenth centuries. Abbot used some of these names for drawings that he completed before leaving London (Library of the Carnegie Museum of Natural History). Some of his new

names, such as “Great Purple hair Streak Butterfly,” are still used.

By the time Abbot finished his drawings for Swainson, he was more often employing Latin names to identify American insects and plants. A set of early drawings that Abbot completed in London between 1766 and 1772 (Houghton Library) indicates that he was willing to use Latin names when he knew them. However, his access to scientific publications in America was limited. The notebooks of Dru Drury (1725–1804) at The Natural History Museum, London, record that Abbot subscribed to at least a portion of Drury’s “*Illustrations of Natural History*” (Drury 1770–1782), but Abbot did not always abide by its Latin names. Most of the Latin names that he initially used for American species are Linnaean and were probably suggested by Augustus G. Oemler (1770–1854), a naturalist of Savannah, Georgia, whom Abbot met in 1805. Oemler’s influence is supported by the lack of Latin names in Abbot’s earlier notes for Smith & Abbot (1797). Oemler was familiar with Linnaean classification, as shown by his 1834 remark that Abbot “never knew any thing of Linneus’ [sic] Classification till I demonstrated it to him” (Dow 1914) (this is misleading, as Abbot was probably long familiar with the work of Linnaeus). In an 1851 letter to Thaddeus W. Harris (Mayr Library), Oemler stated that he “had no new work on insects presenting modern classification,” implying that he possessed older publications, like those by Carolus Linnaeus (Carl von Linné) and perhaps also Johann C. Fabricius. Oemler may be responsible for Abbot’s repeated misapplication of the name “*Papilio Portlandia*” (i.e. *Papilio portlandia* Fabricius) for drawings of the butterfly *Asterocampa celtis* (Boisduval & Le Conte), which was not named until 1835 (Table 1, no. 15). In an 1851 letter, Oemler asked T. W. Harris to “correct some errors I may have committed in naming” the insects in Abbot’s drawings (Mayr Library).

John Francillon (1744–1816) may also have suggested Latin names to Abbot. Francillon served as Abbot’s London agent for many years, selling his specimens and illustrations to European patrons. He was acquainted with the prominent naturalists of the period, amassing a large library and collection of insects. At the time of his death, Francillon possessed up to 4,000 of Abbot’s insect specimens (King 1817, 1818) and nearly 3,000 of his drawings. Countless others passed through his hands during their long relationship. Francillon’s collection of Abbot drawings is now preserved at The Natural History Museum, London. Many bear Linnaean and Fabrician names that were written by an unidentified contemporary naturalist. Francillon later added these names to his accompanying transcriptions of Abbot’s

notes (Calhoun 2005). By 1813, Abbot was also using Latin insect names that were first proposed in Smith & Abbot (1797).

Abbot's master set of notes seems to have initially included only English names. His use of Latin names became more frequent as he grew older. His early name for the butterfly *Papilio palamedes* Drury was descriptive, but cumbersome: "Large yellow spotted black swallow tailed Butterfly." By the time he completed the drawings for Swainson, he had begun calling this species "*Papilio Chalcas*," a synonym of *P. palamedes*. More often than not, his Latin names were misspelled and they varied between sets of drawings. He probably did not own the reference publications and may have relied on memory. Among the drawings for Swainson, he identified a plant as "*Cassia tochida persova*," which is a severely corrupted spelling of *Cassia foetida* and its author, C. H. Persoon (Table 1, no. 19). In notes for Augustus Oemler (Houghton Library) he wrote the same name as "*Cassia tochida persoon*." Notes for an earlier drawing for John Francillon merely identified the plant as "yellow Indigo." In his notes for Swainson, Abbot also referred to "*Cassia chamaecrista*" instead of *Cassia chamaecrista* L. (Table 1, nos. 19, 20). Additional spellings of this plant for Oemler are almost unrecognizable; "*Cassia Arameecrista*" and "*Cassia Acamaecusta*." In earlier notes for Francillon he identified this plant as "Sensitive Flower." If Abbot did not know the identity of the plant, he referred to it as "the plant figured" or "the flower figured." He generally considered his written observations to be "rude notes" that did not require absolute accuracy (Calhoun 2006a).

Abbot frequently varied his written information on hostplants, thus the plants in his drawings are not always consistent with his accompanying notes. Abbot often updated his remarks to reflect new observations and also sought to keep the information from becoming too stale and repetitive. While some of the hostplants mentioned in his notes are erroneous, his other comments about the life cycles of Lepidoptera are essentially accurate. For most butterflies, he recorded the dates that each species "tyed up" (larva suspended prior to pupation), "changed" (pupated), and "bred" (eclosed as an adult). For skipper butterflies of the family Hesperidae, he recorded when the larva "spun up" or "spun up in the leaves" (pupated). Later on, Abbot usually omitted the dates when a species "tyed up." Regardless of a species' voltinism, he usually only documented a single brood and repeated this information, with little revision, for subsequent drawings. The American naturalist Titian R. Peale claimed that Abbot received larvae from others and

"generally only learned what species they belonged to when the butterfly or moth came from the chrysalid or pupa" (dos Passos 1951). This may have been true in some cases, but Abbot personally collected eggs and larvae in nature and reared them on the associated plants. He wrote that he had "taken" larvae on given plants and commented on the abundance of the caterpillars in nature, indicating that he actively searched for them in the field. Mature larvae were probably most often collected.

When discussing the abundance of insects in Georgia, Abbot used vague terms like "rare," "uncommon," "not very common," "frequent," and "abundant." Abbot wrestled with these definitions, stating in 1835, "I find it very difficult to know what Insects are rare & what are common, except a very few kinds" (transcribed letter to T. W. Harris, Mayr Library). Clearly frustrated, he observed that insects were "very local," noting that some occurred "on one side of a Creek, & none on the other." "Every Year," he remarked, "I have observed some few kinds to be plenty, if not common & then not to be met again with, for years after." Unfortunately, this uncertainty makes it very difficult to reconcile his comments with what we know today about the abundance of these species.

Duplication. Out of convenience, Abbot evidently relied on templates to produce duplicate illustrations of insects and birds. He probably maintained pattern books of individual figures, as well as entire compositions. The insect templates were numbered and corresponded to entries in his master set of notes. For a time, Abbot numbered his insect drawings and notes to coincide with the numbers that he used for his template compositions. These numbers were probably also used by Abbot and Francillon to take orders for specific drawings. Based on the numbers that Abbot used, his templates were arranged in order of completion. If so, the first butterfly template that he completed was of the dark form female of *Papilio glaucus* L., followed by *Papilio palamedes* Drury. The yellow form of *P. glaucus* was identified as no. 274. Abbot did not use these numbers for the drawings for Smith & Abbot (1797), indicating that he began using composition templates after about 1795. By the time Abbot completed his set for Swainson, he had begun listing his drawings in numerical order. Abbot's many references to Burke County, Georgia, suggest that the majority of his templates had been completed by 1806 when he moved from Burke County to Savannah, Chatham County.

An examination of Abbot's work indicates that he likely traced all of his figures. This is most obvious in six butterfly illustrations for Augustus Oemler (Houghton Library) that include uncolored plant figures, whose

graphite outlines are unbroken and clearly traced. Even when not using templates, he probably first sketched his figures on scrap pieces of paper to conserve his more expensive drawing paper. Abbot may have placed his templates and sketches against a brightly lit window pane, then traced the backlit images onto blank sheets. He could thereby produce multiple drawings and layouts with minimal effort. To avoid sending duplicates to the same patron, Abbot kept records of the illustrations that he sold. In 1818, he complained that he had “lost or mislaid the list of the last Drawings” that he had sent to Heinrich Escher-Zollikofer (Kroch Library). Despite his numerous duplicates, he did not rely entirely on templates and frequently rendered new figures to minimize repetition. This is especially true for his drawings that did not include plants.

Although Rogers-Price (1983) claimed that most of Abbot’s compositions appear only once within his existing corpus of artwork, this does not apply to his elaborate life history drawings of Lepidoptera. My comparison of over 180 of Abbot’s butterfly life history drawings reveals that he duplicated the majority of his compositions for 20–25 years. For others, he updated the layouts with new figures of adult insects and plants, replacing them to reflect new observations or merely to invigorate the designs. These revised compositions were copied for the remainder of his career, joining those that he had previously duplicated. Conversely, he illustrated the early stages of most species only once and duplicated these figures for subsequent drawings. He began this practice no later than during the preparation of his drawings for Smith & Abbot (1797). For a few species, he created alternate figures of larva and pupa that were also duplicated. Errors that were committed during the creation of his templates were consequently repeated for multiple drawings. These errors were reiterated for many years thereafter, as Scudder (1888–1889) reproduced many of Abbot’s figures. Holland (1898, 1931) copied many of Scudder’s reproductions, thus conveying the errors well into the twentieth century. Most, if not all, of the adult specimens in Abbot’s Lepidoptera drawings did not develop from the larvae and pupae portrayed with them.

The butterfly compositions for Smith & Abbot (1797), completed *ca.* 1783–1792, were not duplicated, probably because Abbot intended them for publication (he did duplicate some larvae and pupae for later drawings). Sometime around 1800, Abbot began producing a new series of butterfly life history compositions. With few exceptions, he duplicated these for many years, probably into the mid-1820s. During the late 1820s, the elderly Abbot seems to have

switched to less complex geometric designs of adults without hostplants or immatures. He perhaps abandoned the production of larger illustrations shortly after 1830, but continued to produce small drawings of single insects until at least 1835 (see below). Abbot’s compositions, numbering methods, names, and other notations aid in dating drawings of unknown provenance. Duplication is also common among Abbot’s bird drawings, where similarities are associated with dates of completion (Simpson 1984, 1993).

All 22 butterfly watercolors for Swainson are duplicated in other sets of Abbot’s illustrations, including the life history drawings that formed the basis of plates in Boisduval & Le Conte (1829–[1837]) (Table 1). These drawings, derived from three separate sets that are believed lost, were probably completed between 1810 and 1815. The Swainson set also shares duplicate figures of adults, larvae, and pupae with other plates in Boisduval & Le Conte (1829–[1837]) that were reproduced from drawings now in the Thomas Cooper Library (University of South Carolina) (Calhoun 2004). Based on comments in Abbot’s correspondence, these drawings were begun in 1813. Abbot even shared identical figures of plants between different insect species. A drawing of a katydid (*Amblycorypha floridana* Rehn & Hebard) for Swainson includes the same representation of *Ipomoea pandurata* (L.) G. Meyer (Convolvulaceae) as a drawing of a butterfly (*Achalarus lyciades* (Geyer)) for Oemler. Abbot also had a penchant for copying bird illustrations by other artists (Simpson 1984, 1993), but I have not found this to be true of his insect drawings.

Artistic license. The botanist William Baldwin of Savannah, Georgia, wrote in 1811, “I have looked over, with great pleasure, the interesting drawings of the amiable Mr. Abbott...They are, as far as I am qualified for judging, exquisitely beautiful and scientifically accurate.” Four years later, Baldwin complained, “Abbott’s drawings, though beautiful, are generally very defective” (Darlington 1843). Scudder (1888, 1888–1889) perceived “a mark of carelessness in some of the figures of early stages which is not found in others.” These contradicting interpretations expose the true nature of Abbot’s artwork. The quality and accuracy of Abbot’s drawings are inconsistent, seemingly supporting Swainson’s (1840) claim that Abbot employed “one or two assistants, whose copies he retouched.” Faxon (1896) suggested that Abbot may have redrawn bird sketches that he received from “assistants” without confirming their accuracy. However, there are no references to such assistants among Abbot’s numerous surviving letters and manuscripts, including those for Swainson. More likely,

Abbot's haste to fulfill orders sometimes resulted in a measure of complacency.

During the course of my research, it quickly became apparent that Abbot's illustrations frequently deviate from reality. Some of his Lepidoptera drawings include figures of larvae, pupae, and plants that are inconsistent with the associated adults. Larvae can be very difficult to assign to species, while a few are clearly fictitious (Calhoun 2003, 2004, 2006a). He sometimes applied the same figure of a larva to more than one species. The majority of these discrepancies are likely due to misidentifications, presumption, and a lack of proper subjects.

Contrary to my previous assumptions (Calhoun 2006a), it is likely that Abbot did not always create his template when he reared each species. Instead, he probably returned to the field at a later date to collect specimens for his compositions. This disconnect would explain why he associated some larvae and pupae with the wrong species. It would also account for Abbot's inaccurate and outright inventive figures. For those larvae and pupae that he failed to relocate in nature, evidence suggests that he fabricated figures using other species as models and also "borrowed" figures from illustrations of other species. Among the drawings for Swainson, this is shown in his compositions of the life histories of the butterflies *Asterocampa celtis* (Boisduval & Le Conte) and *Asterocampa clyton* (Boisduval & Le Conte) (Table 1, nos. 15 & 16). Abbot mistakenly applied the larva (and probably also the pupa) of *A. clyton* to the closely related *A. celtis*. Apparently thinking that he could not find the early stages of *A. clyton*, he fabricated figures for this species, modeling them after *Polygonia interrogationis* (Fabricius), another orange butterfly that he found feeding on the same *Celtis* trees (Celtaceae) (Fig. 2).

In search of specimens to illustrate, Abbot probably forgot which plants had previously yielded certain larvae and confused many plants, particularly grasses and legumes. He repeatedly reminded correspondents that he was no botanist, "only an admirer of Nature's Beauties" (Linnean Society of London). Collecting specimens after the fact would greatly increase the probability of such errors. Abbot may have forced some larvae to feed on plants not normally fed upon in nature. He probably also found wandering mature larvae on adjacent plants that did not serve as hosts, leading him to assume that they were feeding on those plants. In addition, he confused similar species of Lepidoptera, resulting in erroneous hostplant associations (Calhoun 2006a).

Some of Abbot's dubious hostplants may prove to be valid. An example is his drawing for Plate 11 of Smith &

Abbot (1797), in which he associated *Polygonia interrogationis* with *Tilia americana* (L.) (Malvaceae). I initially considered this to be a possible forced captive rearing (Calhoun 2006a), but have since discovered that Titian R. Peale also recorded finding this butterfly "feeding on Linden" (*Tilia* sp.) in the vicinity of Washington, D.C. during the early nineteenth century (specimens in the Academy of Natural Sciences of Philadelphia). Despite the likely validity of some unconfirmed hosts, Abbot apparently inserted some plants strictly for their aesthetic appeal (Calhoun 2006a) (Figs. 1, 2). Using unpublished and published references, including Allen *et al.* (2005), Minno *et al.* (2005), Robinson *et al.* (2002), and Wagner (2005), I have attempted to evaluate the validity of the associated figures in Abbot's drawings for Swainson (Table 1). Larvae and pupae were considered to be acceptable if they exhibited fundamental characteristics of the given species.

It should be mentioned that Abbot's adult butterflies and moths can also be problematic. They often possess primitive bodies, simplified legs, distorted wing shapes, and imprecise color patterns. These inconsistencies became more prevalent as Abbot grew older and were recognized during the preparation of Boisduval & Le Conte (1829–[1837]). Subscribers of this book criticized the accuracy of the legs and bodies on the color plates, prompting Boisduval to promise that the defects would be corrected for future fascicles (Calhoun 2004). As a result, the original figures that were subsequently reproduced for the book show corrections to bodies, legs, and antennae. In addition, many of the dorsal figures used for the book are markedly asymmetrical, with one side more refined than the other. I previously attributed this to Abbot's carelessness (Calhoun 2004), but the figures were undoubtedly altered at a later date. Possibly based on specimens from Boisduval's collection, the wing modifications vary from minor color enhancements to nearly complete over-painting to create more precise figures. The colors are richer and the wing profiles tend to be more accurate than the figures that Abbot was producing at that time. These changes were probably made by Charles Émile Blanchard, an accomplished young artist who also contributed illustrations for the book (Calhoun 2004). Only the altered wings were used by the engraver to create the dorsal figures on the published plates (Calhoun 2005). The artistic style of the unaltered wings is more consistent with Abbot's other drawings, including those for Swainson.

Additional drawings for Swainson. Swainson's surviving correspondence with Abbot abruptly ceases in 1820, followed by only one additional letter from 1835.

However, there is a clue that Abbot produced a set of drawings for Swainson in 1830. In a letter to Thaddeus W. Harris, dated 4 June 1839, the British lepidopterist Edward Doubleday wrote, "A few days since I found at a Booksellers 84 drawings by Abbot containing 150 figures of Georgian Coleoptera & about 350 of Lepidoptera. They are bound in a small folio volume, & did belong to Swainson" (Mayr Library) (misquoted by Scudder (1869) to read, "& did not belong to Swainson"). Doubleday sent these drawings to Harris in 1839 as a token of their friendship. After Harris' death in 1856, they were purchased for the Boston Society of Natural History. They were later examined by Samuel H. Scudder who attributed them to an "inferior copyist" (Scudder 1888). Dow (1914) likewise proclaimed that they were by "a pupil or imitator" of Abbot. These drawings were acquired in 1946 by Harvard University, where they are now preserved in the Houghton Library. I personally examined these watercolors and found that they are consistent with other drawings that Abbot completed during the late 1820's, which were unknown to Scudder and Dow. Moreover, the set includes Abbot's handwritten title page, dated 1830. There is no reason to believe that these drawings were created by anyone other than Abbot. Because there is no known physical evidence that suggests Swainson's ownership, the bookseller must have informed Doubleday about their prior history. Swainson perhaps sold these drawings in preparation for his trip to New Zealand, as he offered drawings and specimens for sale in early 1839 (Parkinson 1984, Natusch & Swainson 1987). A forthcoming publication will discuss these drawings in more detail.

William Swainson was possibly also the intended recipient of Abbot's template drawings of insects, or at least a portion of them. Abbot wrote to Swainson in 1835, "I have now sent You with this Letter...my book of Drawings of Insects" (Swainson correspondence, Alexander Turnbull Library; reproduced by Parkinson 1978). He offered this "book of Drawings" to Swainson for seven guineas, currently valued at about £550 (\$1,038 US). It was shipped with "about 650 Drawings of single Insects on small papers," which Abbot separately referred to as "other Drawings." He stated that this shipment included "all the Drawings of Insects at this time in my possession." Parkinson (1978) proposed that the "book of Drawings" was the set of 103 watercolors now in New Zealand, but he soon realized that these were completed many years earlier (Parkinson 1983). Gilbert (1998) suggested that this was a copy of Smith & Abbot (1797), but it is highly unlikely that Abbot would have sent a copy of this book all the way back to England where it was published. Abbot

shipped his "book of Drawings" at the bottom of a box, beneath a layer of paper and plant specimens to conceal it from customs inspectors. He told Swainson that "no person or yourself would think there was any thing under the paper, if I did not inform you of it." The bulky folio volumes of Smith & Abbot (1797) would hardly escape notice under a thin layer of paper. Although this could refer to the set of drawings that Abbot completed in 1830, his possessive description ("my book of Drawings") implies that these were illustrations of more personal significance. There is also no evidence that Abbot produced any more insect drawings after 1835. He was then 84 years old and was possibly divesting himself of his possessions. He perhaps desired to entrust these unique illustrations to one of his few remaining correspondents. Unfortunately, they do not appear to have survived and may have been lost when the ship carrying a portion of Swainson's library sunk in 1841. It is also possible that Swainson sold them prior to leaving England in 1840.

The fate of the 650 small drawings that Abbot sent to Swainson is obscure. Like his "book of Drawings," Abbot offered the entire set to Swainson for seven guineas. Along with the 103 larger illustrations, the Turnbull Library received 99 smaller watercolors that were also owned by Swainson. Among them are 61 drawings of beetles that Parkinson (1978, 1983a) attributed to Abbot. The library catalog also ascribes them to Abbot, *ca.* 1830 (ref. nos. E-265-q-001 through 061). According to the library catalog these drawings vary in size from 13.0 × 17.2 cm to 23.2 × 17.0 cm (5.1 × 6.8 in – 9.1 × 6.7 in). Handwritten verso notations associate the figured specimens with the cabinets of "Papa," George Humphrey, Dru Drury, and others. The inscriptions denote that the specimens were collected in Australia, Britain, North America (including Georgia and Virginia), and South America. Many of the specimens originated from Cayenne, French Guiana. On one of the drawings is written, "From New Holland [Australia], in my own collection." I examined a digital photograph of one of these illustrations and found the writing to be in Swainson's hand.

Regarding allusions to "Papa's Cabinet," Abbot's father had little interest in natural history, while Swainson's father was a founding member of the Linnean Society of London who maintained collections of mollusks and insects (Swainson 1840, Natusch & Swainson 1987). Specimens from "Papa's Cabinet" were drawn on the same sheets as others that were collected in England in 1804, yet Abbot's father died in 1787 (Rogers-Price 1983). By 1804 Abbot had been living in America for over thirty years.

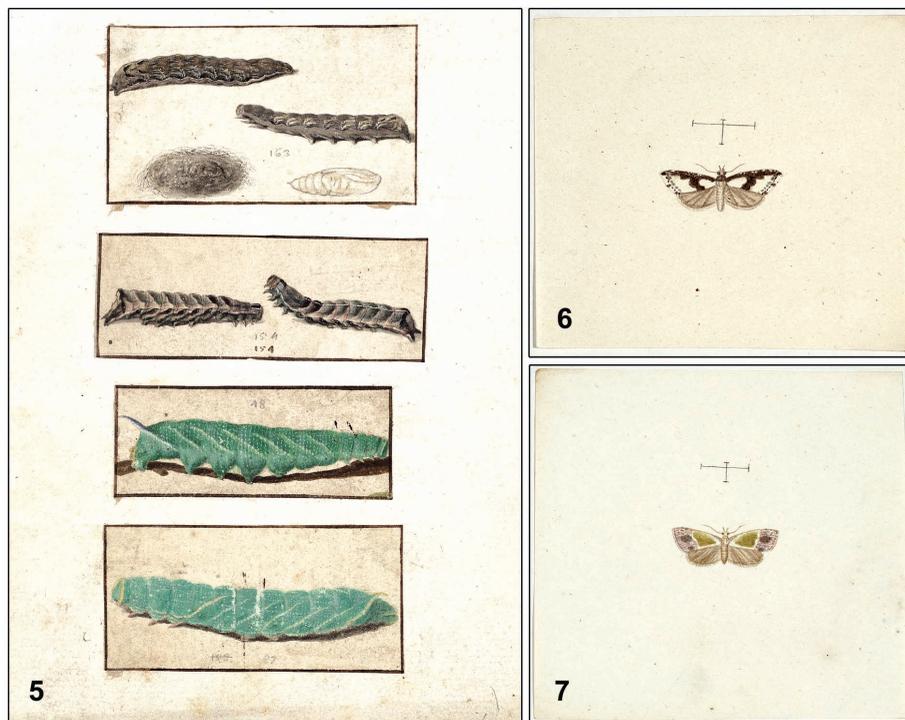
George Humphrey (1745–1830) was one of the

leading naturalist-dealers in London who included insects among his collections (Chalmers-Hunt 1976). Humphrey encouraged a young William Swainson to study natural history; "When, however, I could steal an hour to visit or had permission to spend a day with Mr. Humphrey, it was the greatest happiness of my life" (Swainson 1840). Swainson recalled that his youth was "divided between drawing and collecting" (Swainson 1840).

This evidence indicates that these watercolors were actually completed by Swainson before he began traveling abroad in 1806. The British specimens that were collected in 1804 were likely captured by Swainson himself. Those from Cayenne, French Guiana, may have been collected by Julius P. B. Rohr (1735–1792) who traveled to the Antilles and portions of South America (including Cayenne) in 1783, sending a large number of insects back to Europe (Zimsen 1964). Humphrey was a popular natural history dealer who organized the sale of specimens brought back from such expeditionary voyages. All the specimens from Georgia, and possibly also those from Virginia, likely came from Abbot. Many are credited to the collection of Humphrey, who may have obtained them directly from Abbot. Swainson wrote on one of the drawings "from Mr Abbot of Georgia." The drawing of another

specimen from Georgia bears Swainson's inscription, "Gave me by Mr Humphrey who received it from North America." Humphrey also owned bird specimens that were probably collected by Abbot prior to 1790 (Simpson 1984, Rogers-Price 1997). Humphrey may have obtained additional Abbot specimens in 1805 when the insect collection of Dru Drury was auctioned in London. This is suggested by Swainson's inscriptions on some drawings that read "from Mr Drury's Collection" and "from the cabinet of Mr Drury." Drury possessed a large number of Abbot's specimens from Georgia and Virginia (Wilkinson 1984). Some of the specimens from Cayenne may also have come from Drury, who purchased them from the statesman-naturalist Pierre Victor Malouet (1740–1814), Governor of French Guyana from 1776 to 1779 (Drury 1770–1782).

Abbot was also familiar with Humphrey, whom he met prior to leaving London in 1773. In his unfinished autobiography entitled "Notes on my Life" (ca. 1834), Abbot recalled that in the summer of 1773 he was briefly employed by an unnamed gentleman to make natural history drawings, particularly shells, through the recommendation of "a Mr Humphreys" (Mayr Library). Nearly 50 years later, Abbot wrote to Swainson in 1818, "I think you know an old acquaintance of mine, a Geo. Humphreys dealer in shells and Natural Curiosities, is he



FIGS. 5–7. Small drawings attributed to William Swainson and John Abbot. 5, European moth larvae, Swainson, ca. 1804. 6, moth, *Nigetia formosalis* Walker, Abbot, ca. 1835. 7, moth, possibly *Maliattha synochitis* (Grote & Robinson), Abbot, ca. 1835.

dead, or still living. If alive where does he reside at present as I wou'd wish to write to him." Swainson replied that "Mr. G. Humphrey is still living but very old. Yet with all his spirits he is a very worthy character." Swainson did not provide Humphrey's address, leading Abbot to respond in 1819, "not knowing where Mr Humphreys lives, I have enclosed a Letter for him" (Linnean Society of London). Remarkably, these letters include four different spellings of Humphreys' name. Swainson also varied the spelling of Humphrey's name on his small drawings at the Turnbull Library.

Thirty-eight other small drawings are mostly attributed to Abbot by the Turnbull Library catalog. I examined digital photographs of several of these illustrations. One of them (ref. no. E-265-q-066), watermarked 1801, depicts two moths sketched in pencil. Three others (ref. nos. E-265-q-063 through 065) portray the early stages of European Lepidoptera. Another (ref. no. E-265-q-067), also watermarked 1801, illustrates a European ichneumon wasp. The size of these drawings is consistent with the 61 beetle drawings and they are most likely the work of Swainson, completed prior to 1806. Six smaller drawings (E-265-q-066-1 through 066-4, E-265-q-073-1, E-254-q-073-2), measuring from 3.0 × 7.5 cm to 4.5 × 12.0 cm (1.2 × 3.0 in – 1.8 × 4.7 in), are pasted onto two larger sheets of paper. They also depict the early stages of European moths. Handwritten numbers, at least one written with the same paint used for the associated illustration, are not in Abbot's hand. They are characterized by a robust paint application, unlike Abbot's subtle transparent watercolors (Fig. 5). They are probably also by Swainson.

The remaining 27 watercolors (ref. nos. E-265-q-80 through 106) depict single adult moths on papers as small as 9.3 × 9.2 cm (3.7 × 3.6 in). I examined digital photographs of two of these drawings (Figs. 6, 7). They lack inscriptions, but the size, format, and artistic style are consistent with Abbot's other small drawings at The Natural History Museum, London, and others attributed to Abbot at the American Philosophical Society Library, Philadelphia (Calhoun 2006c). They likewise portray species that occur in Georgia. In this case, Parkinson (1978) was correct in attributing them to Abbot and they are possibly all that remain of the numerous small watercolors that were sent to Swainson in 1835. Abbot's advanced age (84 years) surely contributed to the lack of detail in these figurers. Some are very difficult to identify (Fig. 7).

Georgia, then and now. Even in Abbot's time the wilderness of Georgia was rapidly being transformed. Between 1790 and 1800 the population of Georgia doubled from 82,000 to 162,000. By 1820 it had reached

340,000 (Coleman 1977a). In Burke County, where Abbot lived for many years, the population swelled from 30,000 in 1790 to over 150,000 in 1820 (Hillhouse 1985). Prior to 1810 the growing population of Georgia was limited to the lands between the Ocmulgee and Savannah Rivers, the same area that Abbot explored. Stretching to the west were untamed Indian territories. Abbot noted in 1813 that the settled lands of Georgia yielded a "comparative small Quantity of Insects, one great cause may be the annual burning of the woods which must destroy an immense quantity of Insects" (letter to H. Escher-Zollikofer, Kroch Library). Five years later, Abbot told Swainson, "this Country fails much" to provide as many insects and birds as it "furnished formerly" because the countryside was "being more cleared and settled, and the woods being burnt every spring for the benefit of their cattle" (Linnean Society of London). By 1820 the frontier had moved beyond the lands between Augusta and Savannah where Abbot made his home (Coleman 1977b). After 56 years of studying the insects of Georgia, Abbot recalled in 1832, "as to the number of Butterflies I can recollect having caught 75 or 6 different Species, but dont know if I can take half that number of a Year now." He added, "it was much better formerly" (letter to H. Escher-Zollikofer, Kroch Library). In 1834, he reported to T. W. Harris that "there is many kinds I have formally [formerly] met with, that I now cant find a single specimen of" (Mayr Library). Among the butterfly species portrayed for Swainson, *Erynnis martialis* (Scudder) (no. 22) was possibly more frequent in eastern Georgia than it is today.

At least three butterflies that Abbot illustrated for Swainson may actually be more abundant today: *Hermeuptychia sosybius* (Fabricius) (no. 14, "not very common"), *A. celtis* (no. 15, "very rare"), and *Libytheana carinenta* (Cramer) (no. 18, "rare") (Table 1). The hostplants of these species thrive in secondary habitats that are created in the wake of human activity. I have personally found *L. carinenta* to be locally abundant near *Celtis* (Celtaceae) trees growing along a roadside in the Savannah River floodplain of Burke County. Nearby, *H. sosybius* flew in a disturbed grassy clearing. Nonetheless, such local abundance could have been interpreted by Abbot as generally rare or uncommon.

Abbot also illustrated *Pyrgus communis* (Grote) (no. 23) (Fig. 3), which he considered "not common." This species has been greatly affected by the recent spread of the very similar *Pyrgus albescens* Plötz into eastern North America (see Burns 2000). For reasons unknown, many populations of *P. communis* have been completely

displaced by *P. albescens*. This process was rapid in Florida where *P. communis* may no longer occur (Calhoun 2002). *Pyrgus albescens* reached McIntosh County in southeastern Georgia by 2000 (Calhoun 2002) and Richland County, South Carolina by 2002 (John M. Burns pers comm.). In April 2006, I discovered a thriving population of *P. albescens* not far from Abbot's former home in Burke County. No *P. communis* were found among them.

Problema bulenta (Boisduval & Le Conte) (no. 24), considered "not common" by Abbot, may have been more widespread in wetlands associated with coastal rice plantations that have long since disappeared (Table 1). Rice was a major crop in colonial Georgia, comprising as much as one third of all exports (Spalding 1977). Abbot illustrated this species at least as early as the 1790s, but it remained unknown beyond his drawings for over a century. The first published illustration of the species in Boisduval & Le Conte (1829–[1837]) was reproduced from an Abbot drawing that was completed ca. 1813 (Calhoun 2004). No text was included with this illustration, but entomologists generally assumed that Abbot had found it in Georgia. This is confirmed by Abbot's mention of its occurrence in the "lower parts of Georgia" in his notes for other drawings of the species (Table 1). The species remained unknown beyond Abbot's illustrations, thus subsequent authors either doubted its validity or tentatively associated it with other taxa. Abbot was vindicated in 1925 when *P. bulenta* was rediscovered in coastal marshes near Wilmington, North Carolina (Jones 1926). It is now known to be a localized coastal inhabitant from Georgia to New Jersey and is locally abundant in tidal marshes of the Savannah River in Georgia. This is probably the same general area where Abbot first encountered this species.

Those who take the time to enjoy Abbot's illustrations will learn much about the butterflies of an unspoiled Georgia. Exploring within his compositions will expose many secrets about the artist himself.

ACKNOWLEDGEMENTS

Thanks are extended to all those at the Alexander Turnbull Library who assisted with this project: Margaret Calder arranged for the reproduction of some materials and discussed her desire to share these drawings with the world; Marian Minson answered my numerous inquiries, supplied digital images, and helped in so many other ways; Phil Parkinson provided copies of his publications and allowed me to discuss his unpublished manuscript on *C. pegala*. Margaret Calder also generously provided sets of the published drawings and asked that I distribute them to other interested researchers—a request I gladly fulfilled. I relied on the expertise of several other specialists when preparing identifications for the library: James K. Adams (Dalton College) and Brian G. Scholtens (College of Charleston) greatly assisted with moths; John L. Capinera &

Thomas J. Walker (University of Florida) and Michael C. Thomas (Division of Plant Industry, Gainesville, Florida) helped with other insects. Mark A. Garland patiently identified all the plants. Beverly Pope (Division of Plant Industry Library, Gainesville, Florida) and Florence Turcott (Smathers Library, University of Florida) supplied literature. Robert M. Hicklin, Jr. provided unpublished manuscripts about a set of Abbot's bird drawings. Gina Douglas, Mary Ellen Brooks, and Bernadette Callery graciously permitted access to manuscripts in the Linnean Society of London, Hargrett Library, and the Library of the Carnegie Museum of Natural History, respectively. Librarians of the Houghton Library were very helpful during my visit. Patrick J. Stevens (Kroch Library) provided copies of numerous Abbot letters. Lisa DeCesare (Gray Herbarium) supplied a copy of a letter from Abbot to Stephen Elliott. John M. Burns (NMNH, USNM) related his experiences with *P. albescens* in South Carolina. John B. Heppner (Florida State Collection of Arthropods, Gainesville) identified one of Abbot's small moth drawings. Finally, I am grateful to John A. Shuey and Brian Scholtens for critically reviewing the manuscript and providing helpful suggestions.

LITERATURE CITED

- ALLEN, E. G. 1951. The history of American ornithology before Audubon. Russell & Russell, New York. 591 pp.
- ALLEN, T. J., J. P. BROCK, & J. GLASSBERG. 2005. Caterpillars in the field and garden: a field guide to the butterfly caterpillars of North America. Oxford Univ. Pr., New York, New York. 232 pp.
- ATLET (ALEXANDER TURNBULL LIBRARY ENDOWMENT TRUST). 1983. John Abbot's insects of Georgia. Reproduced from the original watercolours in the Alexander Turnbull Library, Wellington, New Zealand. Fascicle one. Alex. Turnbull Lib. Endowment Trust, Wellington, New Zealand. [18] pp., 6 pl.
- BOISDUVAL, J. B. A. D. DE & J. E. LE CONTE. 1829–[1837]. Histoire générale et iconographie des Lépidoptères et des chenilles de l'Amérique septentrionale. Librairie Encyclopédique de Roret, Paris. 228 pp., 78 pl.
- BROOKS, J. C. 1962. Foodplants of *Papilio palamedes* in Georgia. J. Lepid. Soc. 16:198.
- BROWN, F. M. 1969. *Cercyonis pegala abbotti*, new subspecies (Lepid.: Satyridae). Ent. News 80:194–196.
- BURNS, J. M. 2000. *Pyrgus communis* and *Pyrgus albescens* (Hesperiidae: Pyrginae) are separate transcontinental species with variable but diagnostic valves. J. Lepid. Soc. 54:52–71.
- CALHOUN, J. V. 2002. Sibling rivalry in Florida: the displacement of *Pyrgus communis* by *Pyrgus albescens* (Hesperiidae). J. Lepid. Soc. 56:98–103.
- _____. 2003. The history and true identity of *Melitaea ismeria* (Boisduval & Le Conte): a remarkable tale of duplication, misinterpretation and presumption. J. Lepid. Soc. 57:204–219.
- _____. 2004. *Histoire générale et iconographie des Lépidoptères et des chenilles de l'Amérique septentrionale* by Boisduval & Le Conte (1829–[1837]): original drawings for the engraved plates and the true identities of four figured taxa. J. Lepid. Soc. 58:143–168.
- _____. 2005. An early drawing of *Chlosyne gorgone* (Hübner) (Nymphalidae) by John Abbot. J. Lepid. Soc. 59:121–122.
- _____. 2006a. A glimpse into a "flora et entomologia": *The Natural History of the Rarer Lepidopterous Insects of Georgia* by J. E. Smith and J. Abbot (1797). J. Lepid. Soc. 60:1–37.
- _____. 2006b. More on *Melitaea ismeria* Boisduval & Le Conte: the discovery of Boisduval's specimens of *Chlosyne nycteis* (Double-day). News Lepid. Soc. 48:56–58.
- _____. 2006c. John Abbot's "lost" drawings for John E. Le Conte in the American Philosophical Society Library, Philadelphia. J. Lepid. Soc. 60: 211–217.
- CHALMERS-HUNT, J. M. (ed.). 1976. Natural history auctions 1700–1972: a registry of sales in the British Isles. Sotheby Parke Bernet, London. 189 pp.
- CHAMBERLIN, R. V. & W. IVIE. 1944. John Abbot and the "Spiders of Georgia", pp. 7–24. In Chamberlin, R. V. & W. Ivie, Spiders of

- the Georgia region of North America. *Bull. Univ. Utah* 35 (Biol. Ser. 8):1–267.
- CHURCHILL, W. A. 1935. Watermarks in paper in Holland, England, France, etc. in the XVII and XVIII centuries and their interconnection. Hertzberger & Co, Amsterdam. 94 pp, 432 pl.
- COLEMAN, K. (ed.). 1977a. A history of Georgia. Univ. Georgia Pr., Athens. 445 pp.
- _____. 1977b. 1775–1820, pp. 69–126. In Coleman, K. (ed.), A history of Georgia. Univ. Georgia Pr.
- CROMARTIE, W. J. & D. F. SCHWEITZER. 1993. Biology of the rare skipper, *Problema bulenta* (Heaperiidae) in southern New Jersey. *J. Lepid. Soc.* 47:125–133.
- DARLINGTON, W. (ed.). 1843. Reliquiae baldwinianae: selections from the correspondence of the late William Baldwin, M.D. surgeon in the U.S. Navy. Kimber and Sharpless, Philadelphia, Pennsylvania. 346 pp.
- DEANE, R. 1905. William Swainson to John James Audubon (hitherto unpublished letters). *Auk* 22:248–258.
- DOS PASSOS (ed.). 1951. The entomological reminiscences of William Henry Edwards. *J. NY Entomol. Soc.* 59:129–186.
- DOW, R. P. 1914. John Abbot, of Georgia. *J. New York Entomol. Soc.* 22:65–71.
- DRURY, D. 1770–1782. Illustrations of natural history. Wherein are exhibited upwards of two hundred and forty figures of exotic insects, according to their different genera; very few of which have hitherto been figured by any author, being engraved and coloured from nature, with the greatest accuracy, and under the author's own inspection, on fifty copper-plates. With a particular description of each insect: interspersed with remarks and reflections on the nature and properties of many of them. B. White, London. 3 vols. 296 pp., 150 pl.
- EDWARDS, W. H. 1868–1873. The butterflies of North America. *Amer. Ent. Soc., Philadelphia* 1:[i], ii, [163], v, 52 pp., 50 pls.
- _____. 1886. On the history and the preparatory stages of *Feniseca tarquinius*, Fabr. *Can. Entomol.* 18:141–153.
- FAXON, W. 1896. John Abbot's drawings of the birds of Georgia. *Auk* 13:204–215.
- GILBERT, P. 1998. John Abbot: birds, butterflies and other wonders. Merrell Holberton, London. 128 pp.
- _____. 2000. Butterfly collectors and painters: four centuries of colour plates from the collections of the Natural History Museum, London. Beaumont Publ., Jurong, Singapore. 166 pp.
- GRAVELL, T. L. & G. MILLER. 1979. A catalogue of American watermarks 1690–1835. Garland Publ., New York, New York. 230 pp.
- GRIFFIN, W. W. (ed.). [1990]. Identification of current common and scientific names of bird and insect species in a set of watercolor drawings by John Abbot (1751–ca.1840). Unpubl. ms. for Robert M. Hicklin Jr. Inc. [7] pp.
- GUNTHER, A. C. L. G. 1899–1900. The President's anniversary address. *Proc. Linn. Soc. London* 112:14–61.
- HILLHOUSE, A. M. 1985. A history of Burke County, Georgia 1777–1950. Magnolia Pr., Swainsboro, Georgia. 339 pp.
- HOLLAND, W. J. 1898. The butterfly book. A popular guide to a knowledge of the butterflies of North America. Doubleday, Page, & Co., New York, New York. 382 pp, 48 pp.
- _____. 1931. The butterfly book. A popular and scientific manual, describing and depicting all the butterflies of the United States and Canada. New and thoroughly revised edition. Doubleday & Co., Garden City, New York. 424 pp, 77 pl.
- JONES, F. M. 1926. The rediscovery of "*Hesperia bulenta*" Bdl.-Lec., with notes on other species (Lepid. Hesperidae). *Entomol. News* 37:192–198.
- KING, T. 1817. A catalogue of rare and beautiful insects, being the duplicates of the celebrated cabinet of the late John Francillon, Esq. of No. 24, Norfolk Strand: which will be sold by auction, by Mr. King, at his great room, No. 38, King Street, Covent Garden, on Friday, the 25th of July, 1817, and following day, punctually at half-past twelve o'clock. Smith, London. 12 pp.
- _____. 1818. A catalogue of the very superb and celebrated collection of foreign insects of the late John Francillon, Esq., being undoubtedly the most magnificent cabinet of insects that has ever been brought to sale in this country, containing many unique and remarkable specimens, and generally in a high state of preservation, which will be sold at auction, by Mr. King, at his great room, 38 King Street, Covent Garden, on Thursday, the 11th day of June, 1818, and eight following days (Sunday excepted), punctually at half past twelve o'clock. Richard & Arthur Taylor, London. 74 pp.
- LARSON, M. J. & V. ROGERS-PRICE. 1983. John Abbot, an early naturalist-artist in North America: his contribution to ornithology, with particular reference to a collection of bird skins in the Merseyside County Museums, Liverpool. *Arch. Nat. His.* 12:231–252.
- MINNO, M. C., J. F. BUTLER, & D. W. HALL. 2005. Florida butterfly caterpillars and their host plants. Univ. Pr. Florida, Gainesville. 360 pp.
- NATUSCH, S. & G. SWAINSON. 1987. William Swainson of Fern Grove F.R.S., F.L.S., &c.: anatomy of a nineteenth-century naturalist. S. Natusch, Wellington, New Zealand. 184 pp.
- OPLER, P. A. & G. O. KRIZEK. Butterflies east of the Great Plains: an illustrated natural history. Johns Hopkins Univ., Baltimore, Maryland. 294 pp., 54 pl.
- OPLER, P. A. & A. D. WARREN. 2002. Butterflies of North America. 2. Scientific names list for butterfly species of North America, north of Mexico. *Contrib. C. P. Gillette Mus. of Arth. Biodiv., Colorado State Univ., Ft. Collins, Colorado*. 79 pp.
- PARKINSON, P. G. 1978. Natural history drawings and watercolours by John Abbot, "the aurelian," naturalist of Georgia, in the Alexander Turnbull Library. *Turnbull Lib. Rec.* 11:26–36.
- _____. 1983a. An Introduction, pp. [1–5]. In Alexander Turnbull Library Endowment Trust. John Abbot's insects of Georgia. Reproduced from the original watercolours in the Alexander Turnbull Library, Wellington, New Zealand. Fascicle one. Alex. Turnbull Lib. Endowment Trust, Wellington, New Zealand.
- _____. 1983b. A note on *Cercyonis pegala* (Fabricius, 1775) (Lepidoptera: Nymphalidae). Unpubl. manuscript. 11 pp.
- _____. 1984. William Swainson 1789–1855: relics in the antipodes, pp. 49–63. In Hoare, M. E. & L. G. Bell (eds.). In search of New Zealand's scientific heritage. *Royal Soc. New Zealand Bull.* 21.
- _____. 1989. William Swainson, F.R.S., F.L.S., 1789–1855. A Commemorative Exhibition. Alex. Turnbull Lib., Wellington, New Zealand. [10] pp.
- PARKINSON, P. G. & V. ROGERS-PRICE. 1984. Pioneer naturalist revived. John Abbot emerges from cocoon of neglect. *Australian Antique Coll.* 28:55–58.
- REYNOLDS, E. P. 1983. John Abbot, pioneer naturalist. *Georgia Review* 37:816–824.
- RHOADS, S. N. 1918. Georgia's rarities further discovered in a second American portfolio of John Abbot's bird plates. *Auk* 35:271–286.
- ROBINSON, G. S., P. R. ACKERY, I. J. KITCHING, G. W. BECCALONI, & L. M. HERNÁNDEZ. 2002. Hostplants of the moth and butterfly caterpillars of America north of Mexico. *Mem. Amer. Entomol. Inst.* 69:1–824.
- ROGERS-PRICE, V. 1983. John Abbot in Georgia: the vision of a naturalist artist (1751–ca.1840). *Madison-Morgan Cult. Ctr., Madison, Georgia*. 149 pp.
- _____. 1984. John Abbot in England and North America: his accomplishments as artist and naturalist. *Turnbull Lib. Rec.* 17:61–80.
- _____. 1992. John Abbot and his "Birds of Georgia": eighteen new watercolors in the collection or Robert M. Hicklin, Jr., Inc. Unpubl. ms. for Robert M. Hicklin Jr., Inc. [18] pp.
- _____. 1997. John Abbot's birds of Georgia. Selected drawings from the Houghton Library, Harvard University. Beehive Pr., Savannah, Georgia. I–xlii, 25 pl.
- SCHWEITZER, D. F. 2006. *Problema bulenta* (Boisduval and Leconte). NatureServe Explorer: An online encyclopedia of life. Version 5.0. Homepage: <http://www.natureserve.org/explorer>.
- SCRIBER, J. M. 1986. Origins of the regional feeding abilities in the tiger swallowtail butterfly: ecological monophagy and the *Papilio glaucus australis* subspecies in Florida. *Oecologia* 71:94–103.

- SCRIBER, J. M., N. MARGRAF, & T. WELLS. 2000. Suitability of four families of Florida "bay" species for *Papilio palamedes* and *P. glaucus* (Papilionidae). *J. Lepid. Soc.* 54:131–136.
- SCUDDER, S. H. (ed.). 1869. Entomological correspondence of Thaddeus William Harris, M.D. Boston Soc. Nat. His., Boston, Massachusetts. 375 pp., 4 pl.
- _____. 1872. Abbott's [sic] notes on Georgian butterflies. *Can. Entomol.* 4:73–77, 84–87.
- _____. 1888. John Abbot, the aurelian. *Can. Entomol.* 20:150–154 (reprinted in *Nineteenth Ann. Rpt. Entomol. Soc. Ontario* 1888:48–50).
- _____. 1888–1889. Butterflies of the eastern United States and Canada. 3 vols. Cambridge, Massachusetts. 1958 pp., 89 pl.
- SIMPSON, M. B., JR. 1984. The artist-naturalist John Abbot (1751–ca. 1840): contributions to the ornithology of the southeastern United States. *North Carolina Hist. Rev.* 61:347–390.
- _____. 1993. Artistic sources for John Abbot's watercolor drawings of American birds. *Arch. Nat. His.* 20:197–212.
- SMITH, J. E. & J. ABBOT. 1797. The natural history of the rarer lepidopterous insects of Georgia, including their systematic characters, the particulars of their several metamorphoses, and the plants on which they feed, collected from the observations of Mr. John Abbot, many years resident in that country. 2 vols. J. Edwards, Cadell & Davies, and J. White, London. 214 pp., 104 pl.
- SPALDING, P. 1977. Colonial period, pp. 7–67. *In* Coleman, K. (ed.), *A history of Georgia*. Univ. Georgia Pr.
- SWAINSON, W. 1821. Zoological illustrations, or original figures and descriptions of new, rare, or interesting animals, selected chiefly from the classes of ornithology, entomology, and conchology, and arranged on the principles of Cuvier and other modern zoologists. Baldwin, Cradock, and Joy & W. Wood, London 1: pls. 19–66 + text.
- _____. 1840. Taxidermy; with the biography of zoologists, and notices of their works. *The Cabinet Cyclopaedia*. Longman, Brown, Green & Longman's, London. 392 pp.
- WAGNER, D. L. 2005. Caterpillars of eastern North America: a guide to identification and natural history. Princeton Univ. Pr., Princeton, New Jersey. 512 pp.
- WALTON, W. R. 1921. Entomological drawings and draughtsmen: their relation to the development of economic entomology in the United States. *Proc. Entomol. Soc. Wash.* 23:69–99.
- WILKINSON, R. S. 1982. John Abbot's drawings and notes for a proposed supplement to Smith and Abbot, "The Natural History of the Rarer Lepidopterous Insects of Georgia" (1797). *Entomol. Rec. & J. Var.* 94:159–160.
- _____. 1984. John Abbot's London years. Part IV. *Entomol. Rec.* 96:273–285.
- ZIMSEN, E. 1964. The type material of I. C. Fabricius. Munksgaard, Copenhagen. 656 pp.

Received for publication, 4 January 2006, accepted 11 April 2006