

## SYSTEMATICS OF MOTHS IN THE GENUS *CATOCALA* (NOCTUIDAE). III. THE TYPES OF WILLIAM H. EDWARDS, AUGUSTUS R. GROTE, AND ACHILLE GUENÉE

LAWRENCE F. GALL

Entomology Division, Peabody Museum of Natural History, Yale University, New Haven, Connecticut 06511, USA

AND

DAVID C. HAWKS

Department of Entomology, University of California, Riverside, California 92521, USA

**ABSTRACT.** Nomenclatural status is assessed for the 75 *Catocala* names authored by William Henry Edwards, Augustus Radcliffe Grote (including Coleman T. Robinson), and Achille Guenée. Three neotypes and 46 lectotypes are designated, and six new or revised synonymies are presented. Historical and biographical notes on these authors and the collections on which they based their descriptions are provided. Additionally, the unpublished *Catocala* paintings by the early North American naturalist John Abbot are analyzed in detail for the first time.

**Additional key words:** taxonomy, neotypes, lectotypes, collections, history, biography.

The holarctic genus *Catocala* Schrank (1802) is one of the most species-rich genera in the large moth family Noctuidae, with over 210 species split approximately equally between the Nearctic and Palearctic regions. Despite the fact that *Catocala* are large, colorful, and common moths that have been popular with lepidopterists for centuries, there has been no definitive systematic revision published for the entire genus, and the most current work treating all the Nearctic species is now approaching nearly a century old (Barnes & McDunnough 1918b; the most recent checklist covering the Nearctic taxa is Hodges et al. 1983).

The present paper is the last in a series on the taxonomy of the Nearctic *Catocala* appearing in advance of a Fascicle on the genus for the Moths of America North of Mexico. In the first two papers in the series (Gall 1990, Gall & Hawks 1990) we addressed 56 of the 347 names comprising the synonymy of the Nearctic *Catocala*, focusing on type material at the Field Museum of Natural History (Chicago) and the Museum of Comparative Zoology (Harvard University), and designating 32 lectotypes. Herein, we address 75 of the remaining Nearctic *Catocala* names authored by William H. Edwards, Augustus R. Grote, and Achille Guenée during the 19th century, designating 46 lectotypes and 3 neotypes, and establishing six new or revised synonymies and status amendments. Table 1 summarizes our taxonomic decisions.

This paper is divided into separate sections for Edwards, Grote, and Guenée, to highlight the biographical and type disposition issues particular to each author. Each section treats available names (species and subspecies) and then unavailable names (infrasubspecific entities such as “aberration”), respectively, in alphabetical order. Although names deemed to be infrasubspecific are unavailable under the International Code of Zoological Nomenclature (ICZN 2000), and

do not require formal treatment, we treat them here because we feel omitting them is a false economy that ultimately hampers revisory work, especially for groups like *Catocala* with lengthy and complex synonymies and historical literatures.

### NOMENCLATURAL PROTOCOL

The terms “form” and “variety” were used habitually in descriptions of new taxa by the Nearctic *Catocala* workers of the late 19th and early 20th centuries, and the tradition in the genus at that time was to apply these two terms in an infrasubspecific manner. However, without knowing this custom, it is often impossible to deduce infrasubspecific intent from the texts of the original descriptions alone, and the custom was certainly not applied universally. Fortunately, the earlier *Catocala* monograph by Barnes and McDunnough (1918b) and the lepidopteran checklists of Barnes and McDunnough (1917) and McDunnough (1938) indicate the availability previously deduced for such names. Because this complex and species-rich genus has never been fully revised, we opted to reassess availability for each “form” and “variety” name. The reason we did this is that infrasubspecific names, which are otherwise excluded from zoological nomenclature, become formally available if they are used later in a clearly subspecific or specific manner. In such instances, the name takes the date and authorship of the person(s) who used it at the elevated rank (see Articles 10.2 and 45.6 of the Code). Thus, if an original description of a *Catocala* suggested subspecific rank according to Article 45.6.4, but the Barnes and McDunnough monograph and checklists indicated that infrasubspecific rank had been previously deduced, we traced the name through the literature to insure that infrasubspecific usage had indeed been intended and had remained consistent. Discrepancies are treated in the accounts for individual names.



The terms "type" and "types" were also used in the majority of the original descriptions of Nearctic *Catocala*, often loosely. Because the texts for many of the descriptions could be termed telegraphic at best, we assumed the existence of syntypes when the singular "type" was used but the number of specimens was not otherwise readily and explicitly determinable. Often, type specimens for particular names were present in two or more institutional collections. We usually found evidence leading us to favor material from one institution, either on the basis of the descriptions per se, specimen labels, or related published information. The order of preference among institutional collections varies by author, and we discuss these and related idiosyncracies (e.g., missexed specimens) as appropriate. When we were unable to determine a precedence among available syntypes, we normally selected the specimen from the institution containing most of the author's collection.

In most species of Nearctic *Catocala* there is complex individual variation in wing pattern, as well as parallel polymorphs that occur in both closely and more distantly related species. Largely because of this, a number of species boundaries among Nearctic *Catocala* remained poorly understood until our recent field and rearing studies covering the entire fauna. Moreover, many *Catocala* species are simply difficult to distinguish from one another, even when species' boundaries are well known (indeed, a number of the syntypic series for names in this genus contain more than one *Catocala* species). These problems are especially manifest in the group of large, pink-hindwinged *Catocala* that feed as larvae on willows and poplars. The principal issue with the willow/poplar feeding taxa is that the extent of intrapopulational variation is far greater than previously understood. The group in fact consists of a much smaller array of species than indicated in the most recent faunal checklist by Hodges et al. (1983). A large number of the available names is referable to only five wide-ranging, morphologically variable, and difficult to separate Rocky Mountain and Pacific coast species: *faustina* Strecker, *hermia* Hy. Edwards, *californica* Edwards, *semirelieta* Grote, and *junctura* Walker. Because these willow/poplar feeders also tend to have the most tangled nomenclatural histories, we feel it is imperative to fix all the involved names firmly. Thus, in this paper, we have designated a neotype for any available name that refers to a willow/poplar feeding taxon for which original type material is apparently no longer extant.

Nearctic *Catocala* type specimens are distributed in many institutional collections. However, the overwhelming majority of these types are at only eight in-

stitutions: the Academy of Natural Sciences of Philadelphia (ANSP), the American Museum of Natural History (AMNH), the Carnegie Museum of Natural History (CMNH), the Field Museum of Natural History (FMNH), the Museum of Comparative Zoology (MCZ), the Natural History Museum (London) (BMNH), the National Museum of Natural History (USNM), and the Yale Peabody Museum of Natural History (YPM). Types of *Catocala* are maintained in separate lepidopteran type collections at most of these institutions, but remain integrated with the general collections at others (e.g., the Strecker material at the FMNH, and the main historical series at the BMNH).

#### WILLIAM HENRY EDWARDS

W. H. Edwards was one of the most highly acclaimed American lepidopterists of the 19th century. His life and accomplishments have been well chronicled (see e.g., Mallis 1971), and he is probably best known for his monumental three-volume treatise *The Butterflies of North America*. W. H. Edwards was also the first American to focus on the Nearctic *Catocala*, naming a total of 10 new species in 1864.

During the 19th century, many of Edwards' *Catocala* types apparently were extant in Philadelphia in the American Entomological Society collection, but by the time Beutenmüller was working on his revision of the genus, many of the types had vanished. Beutenmüller (1918a:44) stated: "These were supposed to be with the American Entomological Society, but I could not find them there nor in any other collection. I consequently wrote to W. H. Edwards shortly before his death [in 1909] asking for information on the matter and he informed me that all his *Catocala* went to Mr. Julius Meyer, Brooklyn, N.Y. After Mr. Meyer's death his collection was bought by the Kny-Scheerer Co., New York, and Dr. G. Lagai writes me that the *Catocala* part of the same was sold to Hon. Walter Rothschild, Tring, London, England. If Edwards' types are still extant the same will probably be found in the Rothschild collection."

We have searched throughout the North American catocalines at the BMNH, and have not found any definite Edwards types in either the main systematic, Rothschild, or Oberthur collections. However, in the "Mixed Authors" type area at the BMNH is a drawer containing 34 specimens of 16 *Catocala* species, including representatives of each of the *Catocala* authored by Edwards, except for *similis* Edwards. The material in this drawer had been segregated out of the Rothschild collection. A single typed sheet accompanies this drawer, on which are listed Edwards' and Meyer's *Catocala* names, along with the statement:



TABLE 1. Synopsis of taxonomic assessments and actions taken in this paper pertaining to names in the moth genus *Catocala* Schrank. Institutional abbreviations are as listed in the text section Nomenclatural Protocol; additionally, RUPM = Roemer und Pelizaeus Museum, Germany, NYSM = New York State Museum, Albany. Note under the holotypes that a petition (Case 3210) is currently pending at the ICZN to suppress *polygama* Guenée, an unused senior synonym of *alabamae* Grote.

Taxon	Author	Date	Location	Rank assigned herein	Comments on rank
PREVIOUSLY DESIGNATED HOLOTYPES					
<i>arizonae</i>	Grote	1873	ANSP	synonym of <i>junctura</i> Walker (1858)	new synonymy
<i>beaniana</i>	Grote	1878	BMNH	synonym of <i>meskei</i> Grote (1873)	no change
<i>cara</i>	Guenée	1852	USNM	full species	no change
<i>clintoni</i>	Grote	1864	CMNH	full species	no change
<i>coelebs</i>	Grote	1874	BMNH	subspecies of <i>badia</i> Grote & Robinson (1866)	new status
<i>editha</i>	Edwards W. H.	1874	ANSP	synonym of <i>amatrix</i> (Hübner 1813)	new synonymy
<i>innubens</i>	Guenée	1852	USNM	full species	no change
<i>insolabilis</i>	Guenée	1852	USNM?	full species	no change
<i>lacrymosa</i>	Guenée	1852	USNM	full species	no change
<i>marmorata</i>	Edwards W. H.	1864	ANSP?	full species	no change
<i>messalina</i>	Guenée	1852	USNM?	full species	no change
<i>moderna</i>	Grote	1900	RUPM	synonym of <i>maestosa</i> Hulst (1884)	no change
<i>muliercula</i>	Guenée	1852	USNM?	full species	no change
<i>polygama</i>	Guenée	1852	USNM?	synonym of <i>grynea</i> (Cramer 1780)	no change
<i>uxor</i>	Guenée	1852	USNM?	synonym of <i>ilia</i> (Cramer 1780)	no change
PREVIOUSLY DESIGNATED NEOTYPES					
<i>californica</i>	Edwards W. H.	1864	CMNH	full species	no change
PREVIOUSLY DESIGNATED LECTOTYPES					
<i>adoptiva</i>	Grote	1874	MCZ	synonym of <i>delilah</i> Strecker (1874)	no change
<i>angusi</i>	Grote	1876	AMNH	full species	no change
NEOTYPES DESIGNATED HEREIN					
<i>connubialis</i>	Guenée	1852	BMNH	full species	no change
<i>micronympha</i>	Guenée	1852	AMNH	full species	no change
<i>walshii</i>	Edwards	1864	ANSP	synonym of <i>junctura</i> Walker (1858)	no change
LECTOTYPES DESIGNATED HEREIN					
<i>abbreviatella</i>	Grote	1872	ANSP	full species	no change
<i>alabamae</i>	Grote	1875	BMNH	full species	no change
<i>andromedae</i>	Guenée	1852	illustration	full species	no change
<i>androphila</i>	Guenée	1852	USNM	synonym of <i>amica</i> (Hübner 1813)	no change
<i>anna</i>	Grote	1874	BMNH	synonym of <i>amestris</i> Strecker (1874)	no change
<i>badia</i>	Grote & Robinson	1866	BMNH	full species	no change
<i>briseis</i>	Edwards W. H.	1864	ANSP	full species	no change
<i>cerogama</i>	Guenée	1852	USNM	full species	no change
<i>chelidonia</i>	Grote	1881	USNM	full species	no change
<i>coccinata</i>	Grote	1872	ANSP	full species	no change
<i>communis</i>	Grote	1872	ZMHU	synonym of <i>neogama</i> (J. E. Smith 1797)	no change
<i>desperata</i>	Guenée	1852	USNM	synonym of <i>vidua</i> (J. E. Smith 1797)	no change
<i>dulciola</i>	Grote	1881	AMNH	full species	no change
<i>flebilis</i>	Grote	1872	ANSP	full species	no change
<i>formula</i>	Grote & Robinson	1866	ANSP	synonym of <i>similis</i> Edwards (1864)	no change
<i>fratercula</i>	Grote & Robinson	1866	ANSP	synonym of <i>micronympha</i> Guenée (1852)	revised synonymy
<i>frederici</i>	Grote	1872	ZMHU	full species	no change
<i>gracilis</i>	Edwards W. H.	1864	YPM	full species	no change
<i>habilis</i>	Grote	1872	ANSP	full species	no change
<i>levettei</i>	Grote	1874	BMNH	synonym of <i>judith</i> Strecker (1874)	no change
<i>lineella</i>	Grote	1872	BMNH	full species	no change
<i>melanympha</i>	Guenée	1852	USNM	synonym of <i>antinympha</i> (Hübner 1823)	no change
<i>meskei</i>	Grote	1873	USNM	full species	no change
<i>minuta</i>	Edwards W. H.	1864	YPM	full species	no change
<i>mira</i>	Grote	1876	BMNH	full species	no change
<i>palaeogama</i>	Guenée	1852	USNM	full species	no change
<i>parta</i>	Guenée	1852	USNM	full species	no change
<i>parvula</i>	Edwards W. H.	1864	ANSP	synonym of <i>minuta</i> Edwards (1864)	no change
<i>phalanga</i>	Grote	1864	BMNH	synonym of <i>palaeogama</i> Guenée (1852)	no change
<i>piatrix</i>	Grote	1864	CMNH	full species	no change



TABLE 1. Continued.

Taxon	Author	Date	Location	Rank assigned herein	Comments on rank
LECTOTYPES DESIGNATED HEREIN (Continued)					
<i>ponderosa</i>	Grote & Robinson	1866	BMNH	synonym of <i>nebulosa</i> Edwards (1864)	no change
<i>praeclara</i>	Grote & Robinson	1866	CMNH	full species	no change
<i>residua</i>	Grote	1874	AMNH	full species	no change
<i>retracta</i>	Grote	1872	ANSP	full species	no change
<i>robinsoni</i>	Grote	1872	ANSP	full species	no change
<i>scintillans</i>	Grote & Robinson	1866	BMNH	synonym of <i>innubens</i> Guenée (1852)	no change
<i>semirelictus</i>	Grote	1874	BMNH	full species	no change
<i>similis</i>	Edwards W.H.	1864	YPM	full species	no change
<i>simulacris</i>	Grote	1874	BMNH	synonym of <i>obscura</i> Strecker (1873)	no change
<i>sinuosa</i>	Grote	1879	BMNH	subspecies of <i>coccinata</i> Grote (1872)	no change
<i>snowiana</i>	Grote	1876	AMNH	synonym of <i>palaeogama</i> Guenée (1852)	revised synonymy
<i>sordida</i>	Grote	1877	BMNH	full species	no change
<i>subnata</i>	Grote	1864	BMNH	full species	no change
<i>tristis</i>	Edwards W. H.	1864	ANSP	synonym of <i>andromedae</i> Guenée (1852)	revised synonymy
<i>verilliana</i>	Grote	1875	BMNH	full species	no change
<i>westcottii</i>	Grote	1878	BMNH	synonym of <i>amestris</i> Strecker (1874)	no change
NO ACTION					
<i>basalis</i>	Grote	1876	BMNH	synonym of <i>habilis</i> Grote (1872)	infrasubspecific name
<i>bunkerii</i>	Grote	1876	BMNH	synonym of <i>cerogama</i> Guenée (1852)	infrasubspecific name
<i>flavidalis</i>	Grote	1874	BMNH	synonym of <i>innubens</i> Guenée (1852)	infrasubspecific name
<i>guenei</i>	Grote	1887	no type	replacement name for <i>viduata</i> Guenée (1852)	no change
<i>hilli</i>	Grote	1883	NYSM	synonym of <i>concumbens</i> Walker (1858)	infrasubspecific name
<i>nebulosa</i>	Edwards W. H.	1864	ANSP?	full species	no change
<i>serena</i>	Edwards W. H.	1864	ANSP?	full species	no change
<i>viduata</i>	Guenée	1852	no type	replacement name for <i>vidua</i> (J. E. Smith 1797)	no change

"The following are W. H. Edwards' species which Beutenmüller stated went to the Meyer Coll. and types ought to be in Tring." The typed sheet is undated, but almost certainly predates 1974 (M. Honey pers. com. 1999).

A type of *Catocala gisela* Meyer is in this drawer, and this suggests the material is indeed from Meyer, and is that referred to by Beutenmüller (1918a). The representative specimens of Edwards' species in the drawer all bear labels in what appears to be A. Rogenhofer's handwriting, giving the collecting locality and other details, as well as stating "Type." However, the label data on most of these supposed Edwards types do not correspond to what appears in the respective original descriptions by Edwards. For example, the specimen of *Catocala marmorata* Edwards is labelled "Ky." (=Kentucky) whereas the original description calls for Yreka, California, and its abdomen is also intact, contradicting Strecker (1874:73), who figured the *marmorata* type and stated that the "abdomen is wanting in the single example so far known;" the specimen of *Catocala briseis* Edwards is labelled "Canada" whereas the original description calls for one specimen from the Catskills [New York] and one specimen from

Rhode Island, and both of these two syntypes have already been located in other collections; and so forth. Thus, we feel these BMNH specimens are not Edwards' types, but rather are specimens that were considered to be typical, or compared to the types (or perhaps even asserted to be types during the several transfers of Edwards' material, to enhance their monetary value).

Although Beutenmüller (1918a) indicated he could not find Edwards' *Catocala* types at the ANSP, we readily located one of his two *briseis* syntypes in the main ANSP collection that apparently had not previously been segregated into the type cabinets. We have also explored the CMNH collection for possible Edwards *Catocala* types, with limited success (see our notes on the ANSP and CMNH below under A. R. Grote). Another collection known to have been utilized heavily by Edwards, Grote, and Strecker in the 1860's and 1870's was that of Mrs. Bridgman, from Rhode Island. In 1991, the senior author located the Bridgman family's collection at the Smithfield branch of the Audubon Society of Rhode Island, and its specimen material was transferred to the Yale Peabody Museum of Natural History in 1992 (about 1800 specimens were





FIG. 1. Type specimens of moths in the genus *Catocala* Schrank. W. H. Edwards types. **a**, lectotype, *briseis*. **b**, neotype, *californica*. **c**, lectotype, *gracilis*. **d**, lectotype, *minuta*. **e**, lectotype, *parvula*. **f**, lectotype, *similis*. **g**, lectotype, *tristis*. **h**, neotype, *walshii*. 0.9–1.0 × natural size.

salvaged, and the Victorian-era cabinet remained with the Audubon Society; Gall 1995). A number of the Bridgham specimens bear Grote determination labels, and syntypes for all *Catocala* species that Edwards (1864) cited explicitly as coming from the Bridgham collection were extant and identifiable. The Bridgham collection is almost unquestionably an uncited source for all *Catocala* that Edwards authored that are native to the eastern USA. Our procedure for W. H. Edwards' names is therefore to give precedence first to type material from any explicitly cited collection, then to Bridgham (YPM), and then to ANSP/CMNH.

#### Available Names

*Catocala briseis* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:508

The original description states "I have seen but two individuals of this species, one of which was taken by me in the Catskills in July, 1861; the other is in the fine collection of Mrs. Bridgham, taken in Rhode Island." One unlabeled male ex Bridgham collection is at the YPM, and a female labeled as *briseis* by Edwards is at the ANSP. We give precedence to the labeled ANSP female, and to clarify application of the name we



hereby designate it as **LECTOTYPE** for *briseis* (Fig. 1a). The lectotype bears the labels “briseis” and “LECTOTYPE/*Catocala briseis*/Edwards 1864/Desig. Gall & Hawks 2002.” The type locality is hereby restricted to the Catskill [Mountain]s, [New York, USA]. We recognize *Catocala briseis* as a full species.

*Catocala californica* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:509

The original description does not state the number of types. Although Strecker claimed to have figured the type of *californica*, Barnes and McDunnough (1918b:24–25) provided credible evidence that Strecker's specimen was not from the type series. They also located a specimen at the CMNH with suitable locality data “which proved to be what has generally been known as *mariana* [Hy.] Edwards,” and stated “We propose, therefore, to consider this specimen as typifying the true *californica* and list *mariana* as a synonym.” We consider Barnes and McDunnough's discussion and subsequent proposal to constitute a valid neotype designation for *californica*, meeting the criteria listed in Article 75 of the Code. We show their neotype in Fig. 1b. The type locality is Yreka, [Siskiyou County,] California [USA]. We recognize *Catocala californica* as a full species.

*Catocala editha* W. H. Edwards, 1874. Trans. Amer. Entomol. Soc. 5:112

The original description states “a single specimen taken in Sonoto Valley, by Mr. Henshaw, July, 1874.” This specimen, the holotype by monotypy, is at the ANSP (ANSP Type #7719). The type locality is Sonoto Valley, [Arizona, USA]. The name *editha* has previously been tabulated in the Nearctic literature as a subspecies of *Catocala amatrix* (Hübner, [1813]). However, the *editha* holotype falls within the normal range of variation seen in nominate *amatrix* from elsewhere in North America (the infrasubspecific form “*pallida*” Barnes & McDunnough (1918b), with silvery-white forewing shading and a reduced hindwing medial band, is usually listed as a synonym of *editha*; specimens of “*pallida*” occur sporadically in the western Plains states and more consistently in the Rocky Mountains). We recognize *Catocala editha* as a synonym of *Catocala amatrix* (Hübner) (NEW SYNONYMY).

*Catocala gracilis* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:511

The original description does not state the number of types, but indicates “Mrs. Bridgham's Collection.” A series of 12 *gracilis* ex Bridgham collection is at the

YPM. One male bears a handwritten label “*gracilis*? Edw.” in Grote's handwriting, unquestionably dating from around the time of Grote's stated uncertainty about the name (Grote 1877:169–170). To clarify application of the name we hereby designate this male as **LECTOTYPE** for *gracilis* (Fig. 1c). In addition to the above label, the lectotype bears the labels “Samuel Willard Bridgham/Collection/Presented Rhode Island/Audubon Society, May 1992” and “LECTOTYPE/*Catocala gracilis*/Edwards 1864/Desig. Gall & Hawks 2002.” The type locality is not specified, but is probably Rhode Island, USA. We recognize *Catocala gracilis* as a full species.

*Catocala marmorata* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:508

Of the type of *marmorata*, Strecker (1874:73) rather amusingly stated “abdomen is wanting in the single example so far known . . . the unique type from which the annexed figure was drawn is in the Museum of the Am. Ent. Soc.; its sex can not be determined, as, unfortunately, the abdomen, as I before stated, is non est, but from the general appearances I should suppose the example in question to be a ♀.” Subsequently, Barnes and McDunnough (1918b:20) offered: “at the present time it is misplaced or lost . . . Fortunately, Strecker's figure leaves no doubt as to the identity.” We have not been able to locate this specimen at the ANSP, and the specimen of *marmorata* in the box of supposed W. H. Edwards types at the BMNH has an abdomen and bears the label “Ky.,” contradicting the stated type locality of Yreka, California. The original description did not state the number of types, but it seems clear from the early literature accounts that only one specimen was known at the time. We therefore accept the specimen figured by Strecker (1874, Plate IX, Fig. 6) as the holotype by monotypy for *marmorata*. The type locality of Yreka, California [USA] is erroneous, since *marmorata* has a well-defined distribution from the mid-Atlantic states west to Missouri and Arkansas (Peacock & Gall 2001). We recognize *Catocala marmorata* as a full species.

*Catocala minuta* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:512

The original description does not state the number of types, but indicates “Mrs. Bridgham's Collection. New York.” There are two specimens of *minuta* ex Bridgham collection at the YPM. One male bears a label “*minuta*/Ed.?” in Grote's handwriting, and another bears a label “undescribed A,” apparently in Edwards' handwriting. These correspond to *minuta* and its undescribed variety in Edwards' description, and we



hereby designate the male with Grote's label as LECTOTYPE for *minuta* (Fig. 1d). In addition to the above label, the lectotype bears the labels "Samuel Willard Bridgham/Collection/Presented Rhode Island/Audubon Society, May 1992" and "LECTOTYPE/*Catocala minuta*/Edwards 1864/Desig. Gall & Hawks 2002." The type locality is New York [USA]. We recognize *Catocala minuta* as a full species.

*Catocala nebulosa* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:510

The original description does not state the number of types, nor the collection from which Edwards made his description, indicating only "Philadelphia; Washington." There are no *nebulosa* ex Bridgham collection at the YPM. At the ANSP collection are two old, unlabeled male *Catocala nebulosa*. However, we are not certain that these ANSP specimens were among those available to Edwards. Since the original description of *nebulosa* is diagnostic, and there has been no confusion as to the applicability of the name, we choose not to take any formal action. We recognize *Catocala nebulosa* as a full species.

*Catocala parvula* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:512

The original description does not state the number of types, nor the collection from which Edwards made his description. At the ANSP collection is an old male bearing a label "C. minuta/v. parvula," pinned in a distinctive style that matches that of other *Catocala* labeled as types at the ANSP. To clarify application of the name, we hereby designate this male as LECTOTYPE for *parvula* (Fig. 1e). The lectotype bears the aforementioned label and "LECTOTYPE/*Catocala parvula*/Edwards 1864/Desig. Gall & Hawks 2002." The type locality is New York [USA]. The name *parvula* is a synonym of *Catocala minuta* Edwards, and represents specimens with a large dark patch along the forewing inner margin.

*Catocala serena* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:510

The original description does not state the number of types, but indicates "From Mr. Wilt's collection, Philadelphia." There are several old specimens of *serena* at the ANSP, as well as at the CMNH, but we are not certain these were among the specimens available to Edwards. Since the original description of *serena* is diagnostic, and there has been no confusion as to the applicability of the name, we choose not to take any formal action. We recognize *Catocala serena* as a full species.

*Catocala similis* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:511

The original description does not state the number of types, but indicates "Mrs. Bridgham's Collection." Three specimens of *similis* ex Bridgham collection are at the YPM, and to clarify application of the name we hereby designate a male as LECTOTYPE for *similis* (Fig. 1f). The lectotype bears the labels "Samuel Willard Bridgham/Collection/Presented Rhode Island/Audubon Society, May 1992" and "LECTOTYPE/*Catocala similis*/Edwards 1864/Desig. Gall & Hawks 2002." The type locality is not specified, but is probably Rhode Island, USA. We recognize *Catocala similis* as a full species.

*Catocala tristis* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:511

The original description does not state the number of types, but indicates "From Mr. Newman's collection, taken at Philadelphia; also Mr. Jung's collection, at Hoboken, New Jersey." There is an old male at the ANSP, pinned in a distinctive style matching other *Catocala* labeled as types at the ANSP. To clarify application of the name, we hereby designate this male as LECTOTYPE for *tristis* (Fig. 1g). The lectotype bears the label "LECTOTYPE/*Catocala tristis*/Edwards 1864/Desig. Gall & Hawks 2002." The type locality can not be specified further. Although Forbes (1954) treated *tristis* as a synonym of *Catocala andromedae* Guenée (1852), Hodges et al. (1983) re-elevated *tristis* as a northern subspecies of *andromedae*. The differences cited for *tristis* are indeed not geographically definable, as Forbes implied, and so we hereby place *tristis* as a synonym of *andromedae* (REVISED SYNONYMY).

*Catocala walshii* W. H. Edwards, 1864. Proc. Entomol. Soc. Phil. 2:509

The original description does not state the number of types, and indicates "Taken by Mr. B. D. Walsh in Southern Illinois." Grote (1873:163) stated that the species "is still unknown to me. I believe the types perished in the Chicago fire," and Smith (1893) apparently followed him in stating the types were destroyed. However, the 14 February 1879 minutes of the *Proceedings of the Monthly Meetings of the Entomological Section of the Academy of Natural Sciences, Philadelphia* indicate (Anonymous 1879:iii): "Mr. Cresson exhibited the type specimens of *Catocala editha* Edwards, and *Catocala walshii* Edwards, which had been sent to him by Mr. William H. Edwards, for the collection of the American Entomological Society." There



are several old specimens at the ANSP and CMNH labeled as *walshii*, but we can not say for certain which of these might be the Cresson specimen(s).

The type locality of southern Illinois suggests *walshii* refers to *Catocala junctura* Walker, the only large *Catocala* species in that geographic region that matches the original description, and *walshii* has been treated as a synonym of *junctura* since Barnes and McDunnough (1918b:29). However, because (a) we have been unable to locate a type, (b) other published type localities of Edwards are erroneous, and (c) a willow/poplar feeding taxon is involved, we feel the name *walshii* requires explicit clarification. We therefore designate a male from among the aforementioned specimens at the ANSP as NEOTYPE for *walshii* (Fig. 1h). The neotype bears the label "Catocala/walshii" and "NEOTYPE/Catocala walshii/Edwards 1864/Design. Gall & Hawks 2002." The type locality is southern Illinois [USA]. The name *walshii* is a synonym of *Catocala junctura* Walker.

#### AUGUSTUS R. GROTE

Augustus Radcliffe Grote was one of the foremost authorities on Nearctic moths in the 19th century. He published profusely throughout the Noctuidae, and authored 45 Nearctic *Catocala* names, more than any other worker. His earliest *Catocala* descriptions were published in 1864 and 1866 (with Coleman T. Robinson), and in 1872, Grote presented the first revision of the entire Nearctic *Catocala* fauna in the *Transactions of the American Entomological Society*. This revision would doubtless have been even more comprehensive, if it were not for the fact that Grote apparently lost the original manuscript for it.

Grote described new species from specimens in a wide array of personal and institutional collections, and hence his types are known to be widely scattered. The BMNH purchased most of Grote's collection in 1881/1882, and this is the principal repository of his type material. For Grote *Catocala* types, the ANSP is as important as the BMNH, as Grote remarked in his 1872 revision that "most of the material I have used is in the collection of the American Entomological Society, together with Mr. Edwards' specimens kindly loaned me for examination."

Although we located types for most Grote names fairly readily, we encountered some difficulties tracking down types from his earliest publications, notably the *Catocala* he authored with C. T. Robinson. This is hardly a novel situation, as lepidopteran systematists have speculated for some time on the whereabouts of apparently lost Grote and Robinson types. Beutenmüller (1892) provides an accounting of Lepidoptera

types known to be at the AMNH from the Grote and Robinson collection, but no *Catocala* are included in that list. Smith's (1893:12) discussion is instructive: "Mr. Grote writes concerning the work by Mr. Robinson and himself: 'The collection on which these and all our other joint entomological writings were based, is now in the possession of the American Entomological Society.' If that was true in 1872, it certainly is not so now, because but a very few of the species are at present in that collection. Of these, a very small proportion only have a written label. Some have a little printed 'type' label; but nothing to indicate of what it is the type. In at least two cases I found these 'type' specimens under names with which they had no possible relationship. Fortunately the excellent figures given in illustration of the papers referred to, make it possible to ascertain the names of which the specimens are typical. But many species have disappeared, leaving no trace; in whose hands they are at present I have been unable to ascertain."

Grote moved to Germany in 1884 after the sale of his collection to the BMNH, living first in Bremen and then later in Hildesheim until his death in 1903. He was actively collecting while at Hildesheim (e.g., Grote 1897, Stein 1999), and Horn and Kahle (1935:97) indicated that Grote's material was also deposited "ex parte 1893 an Mus. Bremen." Since it seemed possible that the missing Grote and Robinson material to which Smith (1893) referred could be in Germany, we visited the Museum für Naturkunde of Humboldt University in Berlin (ZMHU), the Übersee-Museum in Bremen and the Roemer- und Pelizaeus Museum in Hildesheim in April 2000 to search for types. We were able to review the entire lepidopteran holdings of the Roemer Museum, all the Nearctic Lepidoptera at the Übersee Museum, but only the catocalines at ZMHU. The ZMHU has 24 drawers of *Catocala*, and it contains the types for two Grote *Catocala* species that he explicitly indicated were in that institution, as well as a number of specimens that he and Robinson determined. The Übersee Museum collection has 4 drawers of Grote's Nearctic Lepidoptera, two drawers of which are exclusively *Catocala*, but no types. The Roemer Museum collection, presently housed at the Biology Department of Hildesheim University, has 13 drawers of Grote's Nearctic Lepidoptera, several of which contain *Catocala*, including the type of *Catocala moderna* Grote (as stated in the original description). The Roemer also has the Palearctic Lepidoptera that Grote assembled from Hildesheim and surrounding areas.

We have also examined the Lepidoptera collection at the Buffalo Museum of Science, which contains the holdings from the Buffalo Society of Natural History,



with which Grote was affiliated during the 1870's when he lived in Buffalo. We found no Grote *Catocala* types there. Arnett et al. (1993:209) state that "major portions of [Grote's] collection were given to the Museum of Natural History (BMNH) and to the Museum of Natural History of Sao Paulo," and thus Brazil is the only other potential repository for Grote and Robinson material of which we are aware. Insofar as *Catocala* are concerned, the Museu de Zoologia in Sao Paulo currently has only a small number of specimens, representing common Nearctic and Palearctic species. Among the Sao Paulo specimens are one *cara* Guenée, one *concumbens* Walker, and one *ilia* (Cramer), all bearing Grote determination labels in his handwriting (C. R. F. Brandao pers. com. 1999).

At this juncture we believe that the missing lepidopteran types of Grote and Robinson are probably not extant in Germany, and we are more confident still that this is the case for their *Catocala* types. In sum, then, definitive and probable type material for the *Catocala* authored by Grote, as well as Grote and Robinson, exist in the collections of the ANSP, BMNH, AMNH, ZMHU, CMNH and at Hildesheim University. The presence at CMNH of Grote *Catocala* is the result of an extensive exchange of material between ANSP and CMNH in the 1960's, that sent Lepidoptera from ANSP to CMNH, and Orthoptera from CMNH to ANSP (J. Rawlins pers. com. 1999). At CMNH, these former ANSP specimens are identifiable by labels indicating they were part of CMNH accession 20359.

In most instances, Grote types in the aforementioned institutional collections bear one or more labels indicating they are types, although this is not universally so (e.g., the BMNH holotype of *Catocala in-nubens* var. *flavidalis* Grote, mentioned by Beutenmüller 1903b). The label situation at the BMNH, where the bulk of Grote's collection resides, merits further elaboration. Many of Grote's *Catocala* types at the BMNH have apparently been identified as such by A. G. Butler (or his curatorial contemporaries), whose habit was to write the taxon name and the word "type" on the reverse of the attached BMNH accession label (M. Honey pers. com. 1991). Typically, these types also bear a red-bordered label with the taxon name followed by the word "type," handwritten by Grote. Most of Grote's other *Catocala* specimens at the BMNH bear no type labels, but a small number of these other specimens bear blue-bordered labels with only the taxon name, again in Grote's handwriting (in at least some other noctuid groups, Grote's habit appears to have been to use a red-bordered label when one type existed, and a blue-bordered label when more than

one existed; E. Quinter pers. com. 2001). The blue-bordered labels often appear on single exemplars of *Catocala* named by Grote in the 1870's, and by Grote and Robinson in 1866 (one such specimen of *scintillans* Grote & Robinson is also labeled as type by Butler, the only blue-bordered Grote & Robinson taxon so labeled at the BMNH). A few specimens with the blue-bordered labels also bear the red-bordered type labels: for example, the type of *sinuosa* Grote, named in 1879, and the types of *coelebs* Grote and *semirelictus* Grote, both of which were named in 1874. Based on the distribution of these red and blue-bordered labels among the BMNH *Catocala*, we believe that specimens bearing such labels were among those on which Grote based his type concepts, and so we treat them all as available type material.

We also note here that the two published listings of Nearctic *Catocala* types at the BMNH (Beutenmüller 1903a, Hampson 1913; both were prepared by Hampson) are not concordant. The former tabulates 27 taxa, the latter 31 taxa. There are 25 taxa common to both the 1903 and 1913 listings. Six taxa appear only in the 1913 listing (*beaniana* Grote, *crataegi* Saunders, *electilis* Walker, *nurus* Walker, *selecta* Walker, *subnata* Grote), and two appear only in the 1903 listing (*bunkerii* Grote, *sordida* Grote). In addition, the types of *albomaculata* Butler, *flavidalis* and *scintillans* Grote & Robinson are omitted from both the 1903 and 1913 listings, despite the fact that the main collection at the BMNH has specimens of each that bear type labels written by Butler. Because of these omissions, the dropping of *bunkerii* and *sordida* between 1903 and 1913, and the inconsistent tabulation of the Walker types (these had long since been established e.g., see Grote & Robinson 1868), we view with some reservation Hampson's compilations of type specimens of Nearctic *Catocala* at the BMNH.

Thus, our approach for Grote *Catocala* is to give precedence first to specimens having the most appropriate label data in the most appropriate collections, and then to the BMNH and ANSP/CMNH collections, in that order. However, for taxa described in Grote's (1872) revision, the ANSP/CMNH is given initial precedence. For taxa for which we failed to locate a labeled type, we choose BMNH specimens with blue-bordered Grote labels, if possible. Although the published type localities for Grote names usually match data on the specimen labels, this is not universally so. The most common mismatches involve the handwritten locality data that were added subsequently to the printed "Grote Coll./81-116" accession labels by BMNH curatorial staff. In such instances, we give precedence to Grote's published type localities.





FIG. 2. Type specimens of moths in the genus *Catocala* Schrank. A. R. Grote types (authorship is Grote unless otherwise noted). **a**, lectotype, *abbreviatella*. **b**, lectotype, *alabamiae*. **c**, lectotype, *anna*. **d**, lectotype, *badia* Grote & Robinson. **e**, lectotype, *coccinata*. **f**, lectotype, *chelidonia*. **g**, lectotype, *dulciola*. **h**, lectotype, *formula* Grote & Robinson. **i**, lectotype, *communis*. **j**, lectotype, *flebilis*. 0.9–1.0 × natural size.

#### Available Names

*Catocala abbreviatella* Grote, 1872. Trans. Amer. Entomol. Soc. 4:14

The original description states “♂♀ . . . Two specimens from Texas (Belgrave).” There are only two *abbreviatella* at the ANSP, one male and one female,

both old and bearing no labels but pinned in a similar manner. In Drawer 25 at the BMNH is one male bearing a conflicting locality label of “Kansas.” The pair at the ANSP appear to be the syntypes, and to clarify application of the name we hereby designate the male as LECTOTYPE for *abbreviatella* (Fig. 2a). The lectotype bears the label “LECTOTYPE/*Catocala abbrevi-*



*atella*/Grote 1872/Desig. Gall & Hawks 2002." The type locality is Texas [USA]. We recognize *Catocala abbreviatella* as a full species.

*Catocala alabamiae* Grote, 1875b. Proc. Acad. Nat. Sci. Phil. 27:427

The original description does not state the number of types. In Drawer 29a at the BMNH is a female labeled as type by Grote, bearing a red BMNH type disc. To clarify application of the name we hereby designate it as LECTOTYPE for *alabamiae* (Fig. 2b). The lectotype bears the labels "Ala.", "Alabama/Grote Coll./81-116.", "Alabama/81-116 [and on the reverse:] *Catocala/alabamiae*/Type Grote", "Catocala alabamiae/Type Grote", "LECTOTYPE/*Catocala alabamiae*/Grote 1875/Desig. Gall & Hawks 2002." The type locality is Demopolis, [Marengo County,] Ala[bama, USA]. We recognize *Catocala alabamiae* as a full species.

*Catocala adoptiva* Grote, 1874c. Trans. Amer. Entomol. Soc. 5:96.

The male lectotype is at the MCZ, and was designated by Gall (1990:121). The type locality is Dallas Co[unty], Texas, [USA]. We recognize *Catocala adoptiva* as a synonym of *Catocala delilah* Strecker.

*Catocala angusi* Grote, 1876a. Can. Entomol. 8:229

We consider Beutenmüller's (1907:150) action to constitute a valid lectotype designation for *angusi* under Article 74 of the Code. The male lectotype is at the AMNH. The type locality is West Farms, New York City [Bronx County, USA], fide Beutenmüller's statements. We recognize *Catocala angusi* as a full species.

*Catocala anna* Grote, 1874c. Trans. Amer. Entomol. Soc. 5:96

The original description states "Texas. (Boll. No. 104)." In Drawer 25 at the BMNH is a male labeled as *anna* by Grote, but not as type. An identically labeled male is at the ANSP. A total of five other new *Catocala* were described by Grote in the article in which *anna* appeared, and the types for these five other taxa are at the BMNH. We thus give precedence to the BMNH specimen in Drawer 25, and to clarify application of the name designate it as LECTOTYPE for *anna* (Fig. 2c). The lectotype bears the labels "anna Grote", "U. S. America/Grote Coll./81-116.", "United States/81-116 [and on the reverse:] *Catocala/anna*/Grote", "Catocala/anna/Grote", "LECTOTYPE/*Catocala anna*/Grote 1874/Desig. Gall & Hawks 2002." The type locality is Texas [USA]. The name *anna* is a synonym of *Catocala amestris* Strecker.

*Catocala arizonae* Grote, 1873. Can. Entomol. 5:163

The original description states "I have received this species from Professor Townend Glover, of the Agricultural Department at Washington. It is labelled 'Borders of Arizona and New Mexico.—Dr. Palmer.'" This male, the holotype by monotypy, is at the ANSP (ANSP Type #7659). The type locality is the border of Arizona and New Mexico [USA]. The type of *arizonae* is a specimen of *Catocala junctura* Walker, and we hereby place *arizonae* as a synonym of *junctura* (NEW SYNONYMY).

*Catocala badia* Grote & Robinson, 1866. Proc. Entomol. Soc. Phil. 6:22

The original description states "Numerous coincident specimens from Massachusetts, Rhode Island, New York and Pennsylvania examined." Among five old specimens at the ANSP is a female bearing the machine-printed labels "Mass." and "Coll. of Acd./Nat. Sci. Phila." A male in Drawer 3a at the BMNH bears a blue-bordered Grote label. We give precedence to the BMNH specimen, and to clarify application of the name we hereby designate this male as LECTOTYPE for *badia* (Fig. 2d). The lectotype bears the labels "U. S. America/Grote Coll./81-116.", "United States 81-116 [and on the reverse] *Catocala/badia*/Gr. + Rob.", "Catocala Schrank/badia G + R.", "LECTOTYPE/*Catocala badia*/Grote & Robinson 1866/Desig. Gall & Hawks 2002." The type locality cannot be restricted further. We recognize *Catocala badia* as a full species.

*Catocala beaniana* Grote, 1878. Can. Entomol. 10:195

The original description states "Sent me by Mr. Thomas A. Bean, under the number 574, from Illinois." This female, the holotype by monotypy, is in Drawer 18 at the BMNH. The type locality is Illinois [USA]. The name *beaniana* is a synonym of *Catocala meskei* Grote.

*Catocala chelidonia* Grote, 1881c. Papilio 1:159

The original description states "♂♀ . . . Numerous specimens of this very distinct form in the collection [Neumoegen] before me." A male type is at the USNM, and to clarify application of the name we hereby designate it as LECTOTYPE for *chelidonia* (Fig. 2f). The lectotype bears the labels "Prescott/Arizona.", "Type No./33987/U.S.N.M.", "TYPICUM/SPECIMEN", "Catocala Type/chelidonia/Grote", "LECTOTYPE/*Catocala chelidonia*/Grote 1881/Desig. Gall & Hawks 2002." The type locality is Prescott, [Yavapai County,] Arizona [USA]. We recognize *Catocala chelidonia* as a full species.



*Catocala clintoni* Grote, 1864a. Proc. Entomol. Soc. Phil. 3:89

The original description states "Hab. Eastern States. A ♀ specimen in good condition given me by Mr. Wm. A. Nason, and now in the Coll. Ent. Soc. Philadelphia." There are four *clintoni* in the ANSP collection, two with locality labels indicating Kansas and two indicating Texas, none of which match the locality of "Eastern States." In Drawer 23 at the BMNH is a female *clintoni* from New York, ex Grote collection. An old female *clintoni* at the CMNH bears a label indicating it came from accession 20359. We know that at least one type of *praeclara* Grote & Robinson ended up at CMNH as part of the CMNH/ANSP exchange on accession 20359. Because Hampson (1913) and Beutenmüller (1903a) omit *clintoni* from their lists of Nearctic *Catocala* types at the BMNH, and because the original description calls for the ANSP, we believe that the CMNH specimen is more probably the holotype by monotypy. The type locality is Eastern States [USA]. We recognize *Catocala clintoni* as a full species.

*Catocala coccinata* Grote, 1872. Trans. Amer. Entomol. Soc. 4:6

The original description states "♂♀ . . . My specimens are from Pennsylvania." A male type is at the ANSP, and to clarify application of the name we hereby designate it as LECTOTYPE for *coccinata* (Fig. 2e). The lectotype bears the labels "Penn.", "TYPE No. 7663/Catocala/coccinata/A. R. Grote", "C. coccinata/Grote/A.R.G.", "LECTOTYPE/Catocala coccinata/Grote 1872/Desig. Gall & Hawks 2002." The type locality is Pennsylvania [USA]. We recognize *Catocala coccinata* as a full species.

*Catocala coelebs* Grote, 1874c. Trans. Amer. Entomol. Soc. 5:96

The original description states "St. Catherines, August 18, No. 182, Geo. Norman Esq." This female, the holotype by monotypy, is in Drawer 4 at the BMNH. The type locality is S[ain]t Catherines, [Regional Municipality of Niagara, Ontario, Canada].

*Catocala coelebs* and *Catocala badia* Grote & Robinson have been treated for some time as closely related, distinct species. Largely monomorphic populations referable to *badia* occur along the eastern seaboard from south central Massachusetts through New Jersey and Pennsylvania; similarly monomorphic populations referable to *coelebs* occur from the Maritime Provinces of Canada through Maine and northern New England, and westward to

northern Michigan, Wisconsin and the Prairie Provinces of Canada. However, the geographic ranges of these "pure" *badia* and "pure" *coelebs* populations are essentially parapatric—a small zone of overlap exists in New Hampshire, southern Maine, and northern coastal Massachusetts in which specimens with intermediate forewing patterns occur. These have been named *badia* form *phoebe* Hulst.

We have examined large series of *badia* and *coelebs* from the entire geographic range of both taxa, particularly in the zone of overlap in New England, and find no consistent way to distinguish material in the overlap area. Although we have reared a number of broods of "pure" *badia* from Connecticut and southern Massachusetts, and "pure" *coelebs* from northern Maine and Michigan, eggs from a female *coelebs* taken in southern York County, Maine produced progeny referable to both *coelebs* (several dozen adults) and *phoebe* (three adults) and intergrades. We have also found no constant differences between *badia* and *coelebs* in their larvae or the scanning electron micrograph patterns of their eggs. However, the larvae and eggs of *badia/coelebs* are separable from those of the two other closely related Nearctic Myricaceae-feeding species, *antinympa* (Hübner) and *muliercula* Guenée; in turn, the larvae of *antinympa* and *muliercula* are also separable from one another.

Accordingly, we feel the observed geographic variation in *badia* and *coelebs* is more indicative of two distinct subspecies, and we hereby place the name *coelebs* as a subspecies of *Catocala badia*, **new status**. Grote, who described both *badia* and *coelebs*, had arrived at an essentially similar conclusion (1883a:23): "But a sight of many specimens leads me to believe that the true *C. coelebs*, with black fore wings, grades into *badia*, and is only to be regarded as a variety of it. But this could not have been predicated of the type [of *coelebs*]. The two extremes are exceedingly distinct and different looking."

*Catocala communis* Grote, 1872. Trans. Amer. Entomol. Soc. 4:9

In a discussion of *Catocala neogama* J. E. Smith, Grote stated (1872:9) "I do not believe this [*neogama* sensu Guenée] to be the *Phalaena neogama* of Smith. In the Berlin Museum I have named this species *Catocala communis*, while two specimens from Texas therein contained differed from the present by their brighter colored secondaries, and otherwise more nearly resembled Abbot's figure [of *neogama* J. E. Smith]." A male type is in Drawer 155 at the Museum für Naturkunde of Humboldt University in Berlin



(ZMHU), and to clarify application of the name we hereby designate it as LECTOTYPE for *communis* (Fig. 2i). The lectotype bears the labels "10918", "communis/Grote & Rob./neogama Guen./ (non Sm.-Abb.)/Carolina [unintelligible]", "7158", "LECTOTYPE/Catocala communis/Grote 1872/Desig. Gall & Hawks 2002." The type locality is hereby restricted to [North or South] Carolina, [USA] on the basis of the lectotype label. The name *communis* is a synonym of *Catocala neogama* J. E. Smith.

*Catocala dulciola* Grote, 1881a. Papilio 1:5

The original description states "Five or six examples, all alike, have been collected by Mr. Pilate . . . The female type before me expands 44 millimetres." A female type is at the AMNH, and to clarify application of the name we hereby designate it as LECTOTYPE for *dulciola* (Fig. 2g). The lectotype bears the labels "Catocala ♀ Type/dulciola Grote", "No. 11742 H. Edw.", "Type No. AMNH", "Catocala/dulciola/Grote", "LECTOTYPE/Catocala dulciola/Grote 1881/Desig. Gall & Hawks 2002." The type locality is the vicinity of Dayton, [Montgomery County], Ohio [USA]. We recognize *Catocala dulciola* as a full species.

*Catocala flebilis* Grote, 1872. Trans. Amer. Entomol. Soc. 4:4

The original description states "Several specimens examined from Pennsylvania." A male type is at the ANSP, and to clarify application of the name we hereby designate it as LECTOTYPE for *flebilis* (Fig. 2j). The lectotype bears the labels "Penn.", "TYPE No. 7665/Catocala/flebilis/A. R. Grote", "C. flebilis/Grote/A.R.G./Type", "LECTOTYPE/Catocala flebilis/Grote 1872/Desig. Gall & Hawks 2002." The type locality is Pennsylvania [USA]. We recognize *Catocala flebilis* as a full species.

*Catocala formula* Grote & Robinson, 1866. Proc. Entomol. Soc. Phil. 6:27

The original description states "A number of specimens of both sexes examined. Habitat—New York State, Rhode Island. Coll. Ent. Soc. Phila.; our own Collection and that of Mrs. S. W. Bridgham, N. Y." A male type is at the ANSP, and to clarify application of the name we hereby designate it as LECTOTYPE for *formula* (Fig. 2h). The lectotype bears the labels "N. Y.", "TYPE No. 7662/Catocala/formula/A. R. Grote & Rob.", "C. formula G + R", "LECTOTYPE/Catocala formula/Grote & Robinson 1866/Desig. Gall & Hawks 2002." The type locality is hereby restricted to New York [USA] on the basis of the lectotype locality label. The name *formula* is a synonym of *Catocala similis* Edwards.

*Catocala fratercula* Grote & Robinson, 1866. Proc. Entomol. Soc. Phil. 6:24

The original description lists "Habitat,—New York State. Rhode Island. Several (♂ and ♀) specimens examined." A male type is at the ANSP, and to clarify application of the name we hereby designate it as LECTOTYPE for *fratercula* (Fig. 3a). The lectotype bears the labels "N. Y.", "TYPE No. 7661/Catocala/fratercula/A. R. Grote & Rob.", "C. fratercula/G + R/TYPE", "LECTOTYPE/Catocala fratercula/Grote & Robinson 1866/Desig. Gall & Hawks 2002." The type locality is hereby restricted to New York [USA] on the basis of the lectotype locality label. Although Forbes (1954) placed *fratercula* as a synonym of *Catocala micronympha* Guenée, Hodges et al. (1983) re-elevated *fratercula* as a northern subspecies. However, *fratercula* is indeed merely one of many infrapopulational variants found over a wide geographic range in this species, and so we return *fratercula* as a synonym of *micronympha* (REVISED SYNONYMY).

*Catocala frederici* Grote, 1872. Trans. Amer. Entomol. Soc. 4:14

The original description lists "Two specimens from Texas (Friedrich) examined in the Berlin Museum." These two female syntypes are in Drawer 157 at the Museum für Naturkunde of Humboldt University in Berlin (ZMHU), and to clarify application of the name we hereby designate the first female as LECTOTYPE for *frederici* (Fig. 3b). The lectotype bears the labels "10923", "frederici/Grote & Rob./Texas. Friedrich", "LECTOTYPE/Catocala frederici/Grote 1872/Desig. Gall & Hawks 2002." The type locality is Texas [USA]. We recognize *Catocala frederici* as a full species.

*Catocala guenei* Grote, 1887. Can. Entomol. 19:115.

The name *guenei* is the second published and hence unnecessary replacement name for *Catocala viduata* Guenée (1852). The first published replacement name for *viduata* is *Catocala maestosa* Hulst (1884). Since *guenei* is a replacement name, its type locality is the same as for Guenée's *viduata*, namely Georgia, [USA].

*Catocala habilis* Grote, 1872. Trans. Amer. Entomol. Soc. 4:11

The original description states "A number of coincident specimens examined from Pennsylvania." A male type is at the ANSP, and to clarify application of the name we hereby designate it as LECTOTYPE for *habilis* (Fig. 3d). The lectotype bears the labels "Penn.", "TYPE No. 7664/Catocala/habilis/A. R. Grote", "Catocala/habilis/Grote/TYPE", "LECTOTYPE/Catocala habilis/Grote 1872/Desig. Gall & Hawks 2002." The type



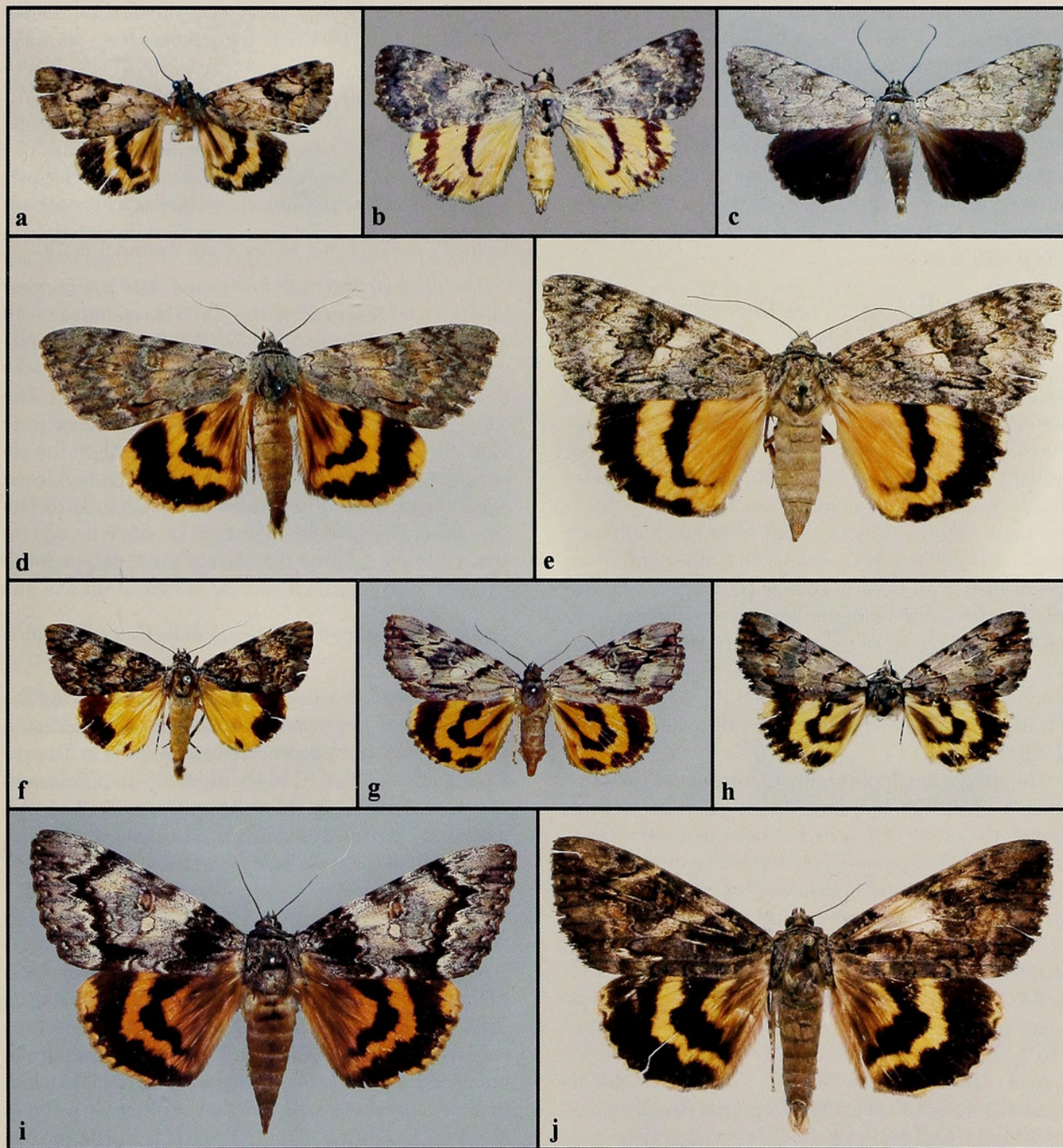


FIG. 3. Type specimens of moths in the genus *Catocala* Schrank. A. R. Grote types (authorship is Grote unless otherwise noted). **a**, lectotype, *fratercula* Grote & Robinson. **b**, lectotype, *frederici*. **c**, lectotype, *levettei*. **d**, lectotype, *habilis*. **e**, lectotype, *meskei*. **f**, lectotype, *lineella*. **g**, lectotype, *mira*. **h**, lectotype, *praeclara* Grote & Robinson. **i**, lectotype, *phalanga*. **j**, lectotype, *piatrix*. 0.9–1.0 × natural size.

locality is Pennsylvania [USA]. We recognize *Catocala habilis* as a full species.

*Catocala levettei* Grote, 1874c. Trans. Amer. Entomol. Soc. 5:95

The original description does not state the number of types. A male labelled as type by Grote is in Drawer

1 at the BMNH, bearing a red BMNH type disc. The specimen label indicates Ohio, but the original description calls for Indianapolis. Hampson (1913) and Beutenmüller (1903a) stated the type of *levettei* was at the BMNH, and we have no other reason other than this probable labeling error to believe this BMNH male is not an available syntype. To clarify application



of the name we hereby designate it as **LECTOTYPE** for *levettei* (Fig. 3c). The lectotype bears the labels "Ohio./Grote Coll./81-116.", "Ohio/81-116 [and on the reverse:] Catocala/levettei/Type Grote", "Catocala/levettei/Type. Grote", "LECTOTYPE/Catocala levettei/Grote 1874/Desig. Gall & Hawks 2002." We give precedence to Grote's original description and retain the type locality as Indianapolis, [Marion County, Indiana, USA]. The name *levettei* is a synonym of *Catocala judith* Strecker.

*Catocala lineella* Grote, 1872. Trans. Amer. Entomol. Soc. 4:18

The systematics of the '*amica* complex' of small Nearctic *Catocala* species has been the recent focus of breeding and field work by D. F. Schweitzer and ourselves. We know of four species, three of which have available names, and one undescribed sibling species that lacks an available name. *Catocala jair* Strecker is the rarest, most distinctive, and most geographically restricted of the four species. The other three are widespread, with *Catocala amica* (Hübner) and *Catocala lineella* Grote being the most frequently encountered in most areas of eastern North America. *Catocala lineella* had been treated as a subspecies or synonym of *Catocala amica* during the 20th century, but it was restored to the rank of full species by Gall (1990).

The usage and applicability of *amica* and *jair* have been fixed in the literature for some time, and although the usage of *lineella* has been modestly stable, Barnes and McDunnough (1918b) were unaware of a type. The original description of *lineella* indicates "a number of coincident specimens." In Drawer 34 at the BMNH is a male with a blue-bordered Grote label. To clarify application of the name we hereby designate it as **LECTOTYPE** for *lineella* (Fig. 3f). The lectotype bears the labels "E. U. S. America/Grote Coll./81-116.", "19/6", "8.", "E. States/81-116 [and on the reverse:] Allotria/lineella/Grote", "Catocala /Schk./lineella/Grote", "LECTOTYPE/Catocala lineella/Grote 1872/Desig. Gall & Hawks 2002." Grote listed the type locality for *lineella* as "Same localities as *C. androphila*," which was "Eastern States, southward." We recognize *Catocala lineella* as a full species.

*Catocala meskei* Grote, 1873. Can. Entomol. 5:161

The original description states "Lent me by Mr. O. Meske, after whom I name the species, from near Albany, N. Y., and who writes me that it has been taken in considerable numbers by a collector in that vicinity." Although this suggests a single specimen, the number of types is not explicitly stated. To clarify application of

the name we hereby designate the female at the USNM as **LECTOTYPE** for *meskei* (Fig. 3e). The lectotype bears the labels "August/1873.", "Catocala/meskei/Grote/Type", "Type/No. 305/U.S.N.M." "Collection/O. Meske", "LECTOTYPE/Catocala meskei/Grote 1873/Desig. Gall & Hawks 2002." The type locality is Albany, [Albany County,] N[ew] Y[ork, USA]. We recognize *Catocala meskei* as a full species.

*Catocala mira* Grote, 1876a. Can. Entomol. 8:230

The original description does not state the number of types. In Drawer 29 at the BMNH is a female with a red-bordered Grote type label, bearing a red BMNH type disc. To clarify application of the name we hereby designate it as **LECTOTYPE** for *mira* (Fig. 3g). The lectotype bears the labels "388", "U. S. America/Grote Coll./81-116.", "United States/81-116 [and on the reverse:] Catocala/mira/Type Grote", "C. mira/Grote/Type", "LECTOTYPE/Catocala mira/Grote 1876/Desig. Gall & Hawks 2002." The type locality is hereby restricted to the USA on the basis of the lectotype locality label. We recognize *Catocala mira* as a full species.

*Catocala moderna* Grote, 1900. Can. Entomol. 32:191

The original description states "Accompanying the fresh type [of *moderna*] are examples of *C. viduata*, Guen." The male holotype by monotypy is in Drawer 33 of Cabinet "Neu 3" at the Roemer- und Pelizaeus Museum (RUPM) in Hildesheim, Germany. The type locality is Dolores, Texas [USA]. The name *moderna* is a synonym of *Catocala maestosa* Hulst.

*Catocala phalanga* Grote, 1864a. Proc. Entomol. Soc. Phil. 3:86

The original description states "Coll. Ent. Soc. Philadelphia . . . Possibly a variety of *Catocala palaeogama*, but, as several coincident specimens have occurred, it may be distinct." There are several old, unlabeled specimens of *phalanga* at the ANSP, including one pinned in a style like that of other Grote types at ANSP. In Drawer 4 at the BMNH is a male bearing a blue-bordered Grote label. We give precedence to the BMNH male labeled by Grote, and to clarify application of the name hereby designate it as **LECTOTYPE** for *phalanga* (Fig. 3i). The lectotype bears the labels "U. S. America/Grote Coll./81-116.", "var. phalanga/Grote", "United States/81-116 [and on the reverse:] C. palaeogama/var. phalanga/Grote", "LECTOTYPE/Catocala phalanga/Grote 1864/Desig. Gall & Hawks 2002." The type locality is Middle States [USA]. The name *phalanga* is a synonym of *Catocala palaeogama* Guenée, and represents specimens with a



prominent black postmedian line and black basal patch on the forewing.

*Catocala piatrix* Grote, 1864a. Proc. Entomol. Soc. Phil. 3:88

The original description states "Coll. Ent. Soc. Philadelphia," but does not indicate the number of specimens. In Drawer 5 at the BMNH is a male bearing a blue-bordered Grote label. There are several old males at the ANSP, but none labeled by Grote. A male now at the CMNH, ex ANSP via accession 20359, is labeled as *piatrix* by Grote, and bears a machined locality label like that on other ANSP *Catocala* types. We give precedence to the CMNH male, and to clarify application of the name hereby designate it as LECTOTYPE for *piatrix* (Fig. 3j). The lectotype bears the labels "N.Y.", "Catocala/piatrix/Gr./A.R.G.", "Exch. A.N.S.P./C. M. Acc. 20359", "LECTOTYPE/Catocala piatrix/Grote 1864/Desig. Gall & Hawks 2002." The type locality is hereby restricted to N[ew] Y[ork, USA] on the basis of the lectotype locality label. We recognize *Catocala piatrix* as a full species.

*Catocala ponderosa* Grote & Robinson, 1866. Proc. Entomol. Soc. Phil. 6:23

The original description states "Habitat.—Illinois, New York, Pennsylvania. Coll. Ent. Soc. Philadelphia. Several specimens examined." Two unlabeled male *nebulosa* are at the ANSP. In Drawer 4a at the BMNH is a female bearing a blue-bordered Grote label. We give precedence to the BMNH female labeled by Grote, and to clarify application of the name hereby designate it as LECTOTYPE for *ponderosa* (Fig. 4a). The lectotype bears the labels "6", "U.S. America/Grote Coll./81-116", "Catocala/ponderosa/G + R", "United States/81-116 [and on the reverse:] Catocala/ponderosa/Gr. + Rob.", "LECTOTYPE/Catocala ponderosa/Grote & Robinson 1866/Desig. Gall & Hawks 2002." The type locality can not be restricted further. The name *ponderosa* is a synonym of *Catocala nebulosa*.

*Catocala praeclara* Grote & Robinson, 1866. Proc. Entomol. Soc. Phil. 6:25

The original description states "Our Collection and that of Ent. Soc. Phil., numerous (♂ and ♀) coincident specimens examined." At the CMNH is a female *praeclara*, ex ANSP via accession 20359, bearing a handwritten label in pencil stating "presumed TYPE." This penciled label is in the same handwriting as penciled "TYPE" designations on other types at the ANSP. To clarify application of the name we hereby designate this CMNH female as LECTOTYPE for *praeclara* (Fig. 3h). In addition to the above label, the lectotype bears the la-

bels "N. Y.", "praeclara", "Exch. A.N.S.P./C. M. Acc. 20359", "LECTOTYPE/Catocala praeclara/Grote & Robinson 1866/Desig. Gall & Hawks 2002." The type locality is New York [USA]. We recognize *Catocala praeclara* as a full species.

*Catocala residua* Grote, 1874a. Proc. Boston Soc. Nat. Hist. 16:242

The original description lists "Hab. New York (in Coll. Buf. Soc. Nat. Sciences); Canada (J. Petit). Three coincident specimens examined," and Smith (1893:354) states "The type of *residua* is in the American Museum of Natural History from the Angus Collection." This female is at the AMNH, and to clarify application of the name we hereby designate it as LECTOTYPE for *residua* (Fig. 4b). The lectotype bears the labels "No. 486/Coll. J. Angus/West Farms/New York City.", "Type/No./A.M.N.H.", "C. residua/Grote/var.", "LECTOTYPE/Catocala residua/Grote 1874/Desig. Gall & Hawks 2002." Because Angus often affixed a printed West Farms label as a "return address," rather than as a locality label, we cannot be certain whether the AMNH female is from New York or Canada, and so we leave the type locality as originally published. We recognize *Catocala residua* as a full species.

*Catocala resecta* Grote, 1872. Trans. Amer. Entomol. Soc. 4:4

The original description states "A few specimens examined from the Middle States." A male type is at the ANSP, and to clarify application of the name we hereby designate it as LECTOTYPE for *resecta* (Fig. 4c). The lectotype bears the labels "7", "TYPE No. 7660/Catocala/resecta/A. R. Grote", "LECTOTYPE/Catocala resecta/Grote 1872/Desig. Gall & Hawks 2002." The type locality is Middle States [USA]. We recognize *Catocala resecta* as a full species.

*Catocala robinsoni* Grote, 1872. Trans. Amer. Entomol. Soc. 4:20

The original description states "After writing so far my kind friend, Mr. Charles A. Blake, sends me specimens of two black winged species from Pennsylvania . . . ♂♀ . . ." There are several old *robinsoni* at the ANSP, pinned in a style like other Grote types at ANSP. A male and female in Drawer 3 at the BMNH bear conflicting locality and date labels, and no type designations. To clarify application of the name, we hereby designate a male from the ANSP collection as LECTOTYPE for *robinsoni* (Fig. 4d). The lectotype bears the labels "Penn.", "LECTOTYPE/Catocala robinsoni/Grote 1872/Desig. Gall & Hawks 2002." The type locality is Pennsylvania [USA]. We recognize *Catocala robinsoni* as a full species.



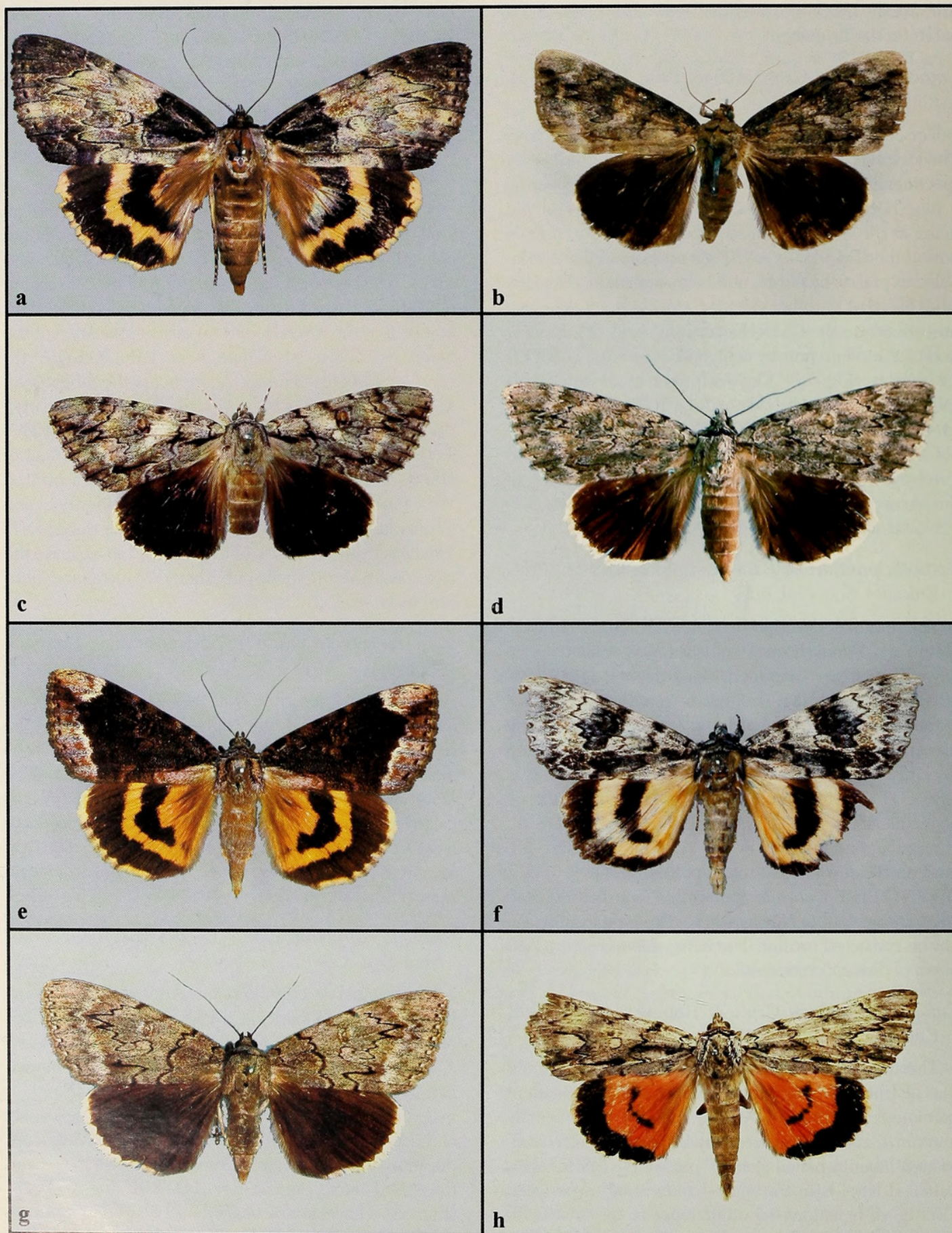


FIG. 4. Type specimens of moths in the genus *Catocala* Schrank. A. R. Grote types (authorship is Grote unless otherwise noted). **a**, lectotype, *ponderosa* Grote & Robinson. **b**, lectotype, *residua*. **c**, lectotype, *recta*. **d**, lectotype, *robinsoni*. **e**, lectotype, *scintillans* Grote & Robinson. **f**, lectotype, *semirelecta*. **g**, lectotype, *simulatilis*. **h**, lectotype, *sinuosa*. 0.9–1.0 × natural size.



*Catocala scintillans* Grote & Robinson, 1866. Proc. Entomol. Soc. Phil. 6:28

The original description states "Pennsylvania. Coll. Ent. Soc. Phil." In Drawer 3a at the BMNH is a female bearing a blue-bordered Grote label, and labeled as type by Butler. This female bears a conflicting and probably erroneous locality label indicating Ohio as the locality. At the ANSP are two old specimens of *scintillans*, one female from Ohio ex Strecker collection and one unlabeled male pinned in a style matching other Grote types at the ANSP. We place greater confidence in the blue-bordered label on the BMNH female, and hereby designate it as LECTOTYPE for *scintillans* (Fig. 4e). The lectotype bears the labels "Ohio", "Ohio/Grote Coll./81-116.", "Ohio/81-116 [and on the reverse:] Catocala/scintillans/Type Grote & Robinson", "Catocala/scintillans/G + R.", "LECTOTYPE/Catocala scintillans/Grote & Robinson 1866/Desig. Gall & Hawks 2002." We retain the originally published Pennsylvania [USA] as the type locality. The name *scintillans* is a synonym of *Catocala innubens* Guenée, and represents specimens with a crisply delimited, wide white distal area on the forewing.

*Catocala semirelictica* Grote, 1874b. Sixth Ann. Rep. Peabody Acad. Sci., p. 35

The original description does not state the number of types. In Drawer 17a at the BMNH is a male bearing a blue-bordered Grote label and a red-bordered type label, and a red BMNH type disc. To clarify application of the name we hereby designate it as LECTOTYPE for *semirelictica* (Fig. 4f). The lectotype bears the labels "U. S. America/Grote Coll./81-116.", "This spec. was exhibited in the/Can. Coll. at the Centennial 1876/and has lost its color from exposure", "United States/81-116 [and on the reverse:] Catocala/semirelictica/Type Grote", "Catocala/semirelictica/Grote", "Catocala/semirelictica/Type Grote", "LECTOTYPE/Catocala semirelictica/Grote 1874/Desig. Gall & Hawks 2002." The type locality is Grimsby, Ontario [Canada]. We recognize *Catocala semirelictica* as a full species.

*Catocala simulatilis* Grote, 1874c. Trans. Amer. Entomol. Soc. 5:94

The original description states "Ohio, Dr. Hodge, two specimens." In Drawer 2 at the BMNH is a female, bearing a red BMNH type disc, and labeled as type by Grote. Although this specimen claims to be from New York, this is probably a mislabeling, and we place greater confidence in Grote's published statement. To clarify application of the name we hereby designate this specimen as LECTOTYPE for *simu-*

*latis* (Fig. 4g). The lectotype bears the labels "N. Y./Grote Coll./New York", "New York/81-116 [and on the reverse:] Catocala/simulatilis/Grote Type", "C. simulatilis/Type Grote", "LECTOTYPE/Catocala simulatilis/Grote 1874/Desig. Gall & Hawks 2002." We retain the originally published Ohio [USA] as the type locality. The name *simulatilis* is a synonym of *Catocala obscura* Strecker.

*Catocala sinuosa* Grote, 1879. Can. Entomol. 11:15

The original description states "Two specimens. Florida, Mr. Albert Koebele." In Drawer 26a at the BMNH is a male, bearing a blue-bordered Grote label and a red-bordered type label, and a red BMNH type disc. To clarify application of the name we hereby designate it as LECTOTYPE for *sinuosa* (Fig. 4h). The lectotype bears the labels "U.S. America/Grote Coll./81-116.", "No. 3", "United States/81-116 [and on the reverse:] Catocala/sinuosa/Type Grote", "Catocala/sinuosa/Grote", "Catocala/sinuosa/Type/Grote", "LECTOTYPE/Catocala sinuosa/Grote 1879/Desig. Gall & Hawks 2002." The type locality is Florida [USA]. We recognize *sinuosa* as a subspecies of *Catocala coccinata* Grote with lighter forewings and a greatly reduced, sometimes obsolete hindwing median band. Specimens from peninsular Florida are referable to *sinuosa*, whereas nominate *coccinata* occurs elsewhere in North America. We have, however, seen occasional specimens similar to *sinuosa* from the Gulf Coast outside of Florida.

*Catocala snowiana* Grote, 1876b. Checklist Noct. Amer., p.41

The original description does not state the number of types. A female at the AMNH is labeled by Grote as type of "snowi," and to clarify application of the name we hereby designate it as LECTOTYPE for *snowiana* (Fig. 5a). The lectotype bears the labels "390", "No. 11876/Collection/Hy. Edwards.", "Type/No./A.M.N.H.", "Catocala/snowi/Type", "LECTOTYPE/Catocala snowiana/Grote 1876/Desig. Gall & Hawks 2002." The type locality is Kansas [USA]. The lectotype of *snowiana* is a specimen of *Catocala palaeogama* Guenée. Thus, *snowiana* is hereby transferred from the synonymy of *Catocala neogama* J. E. Smith to that of *palaeogama* (REVISED SYNONYMY).

*Catocala sordida* Grote, 1877. Can. Entomol. 9:170

The original description states "In Mrs. Bridgham's collection is (or rather, was) a specimen labeled *similis* by Mr. Edwards, which belonged to what I consider as a variety of *gracilis*, having the primaries mixed bluish gray, and the basal dash of *gracilis* is wanting. This last



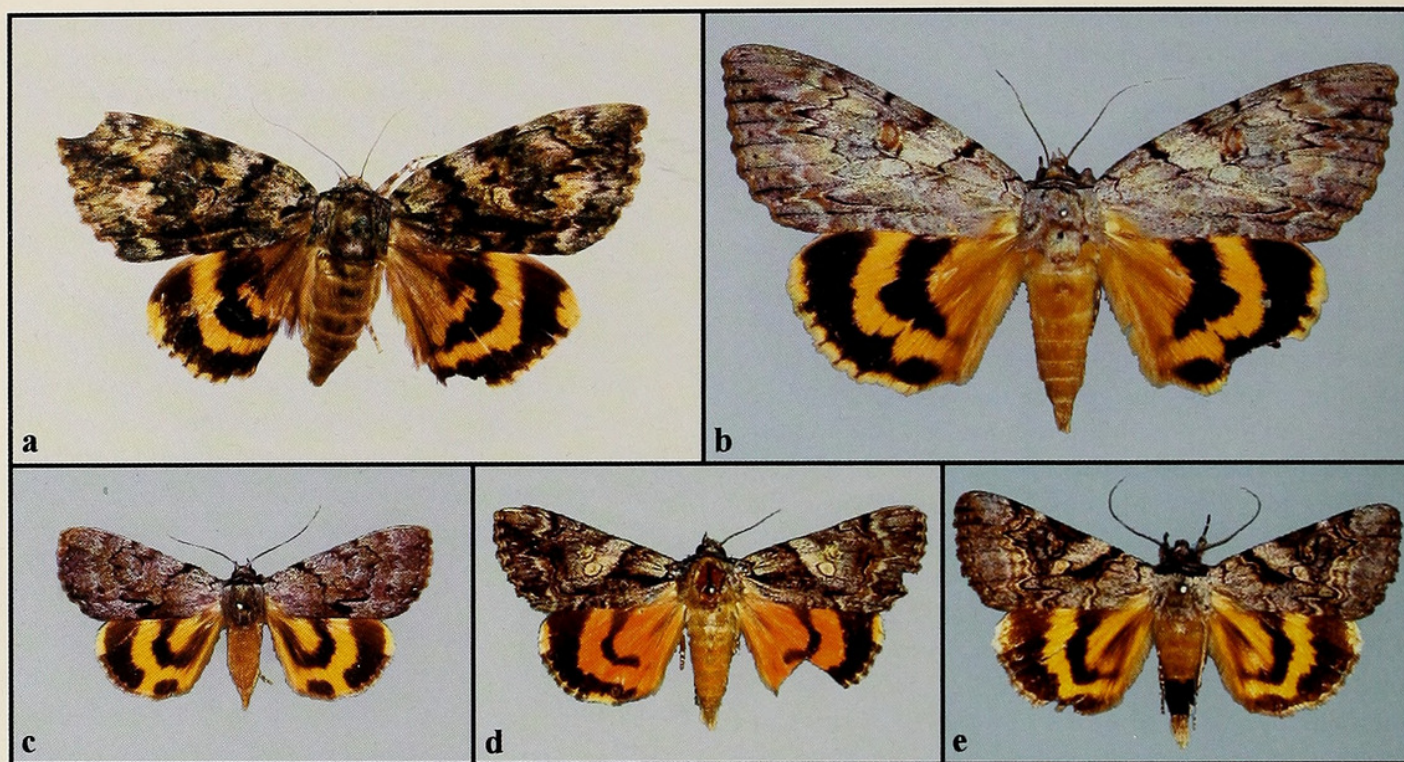


FIG. 5. Type specimens of moths in the genus *Catocala* Schrank. A. R. Grote types (authorship is Grote unless otherwise noted). **a**, lectotype, *snowiana*. **b**, lectotype, *subnata*. **c**, lectotype, *sordida*. **d**, lectotype, *verilliana*. **e**, lectotype, *westcottii*. 0.9–1.0 × natural size.

seems the only important character . . . This dark form (which seems also a little shorter winged) has been taken with the type by myself near Buffalo, and by Dr. Bailey near Albany. I have seen it also from Pennsylvania . . . This mixed dark blue-gray form, with distinct black lines and without the small basal streak of *gracilis*, I propose to designate by the name *sordida* . . . A female ex Bailey collection is in Drawer 23 at the BMNH, bearing a red-bordered type label, and a red BMNH type disc. As Grote correctly noted, there is no specimen of *sordida* labeled *similis* by Edwards in the Bridgman material now at the YPM, although there is a series of 12 *gracilis*. To clarify application of the name we designate the female at the BMNH as LECTOTYPE for *sordida* (Fig. 5c). The lectotype bears the labels "Grote Coll./81-116.", "Centre, N.Y./July 12, 1877./Dr. J. S. Bailey./Collector", "New York/81-116 [and on reverse:] C. *gracilis*/var. *sordida*/Type Grote", "var. *sordida*/Type Grote", "LECTOTYPE/*Catocala sordida*/Grote 1877/Desig. Gall & Hawks 2002." The type locality is hereby restricted to Centre, [Albany County], N[ew] Y[ork, USA] on the basis of the lectotype locality label. We recognize *Catocala sordida* as a full species.

*Catocala subnata* Grote, 1864b. Proc. Entomol. Soc. Phil. 3:326

The original description states "Hab. Maryland. (Coll. Ent. Soc. Phil.)." There are two old unlabeled males at the ANSP. A female *subnata* is in Drawer 5 at the BMNH, bearing a red BMNH type disc and labeled as type by Butler, but with a conflicting locality label "Kansas." This female also bears a red-bordered label without type attribution, stating only "*Catocala subnata*," and not in Grote's handwriting. In the same series in Drawer 5 is a male *subnata* bearing a blue-bordered Grote label.

The text of the original description of *subnata* was based on the male, and the accompanying illustration in Fig. 4 of Plate 5 is definitely a male, lacking the basal dashes and darker scaling on the forewing typical of female *subnata*. The BMNH specimen purporting to be a type is a strongly marked female, and it clearly does not match the illustration in Fig. 4 of Plate 5. We are willing to accept Hampson's (1913:39) statement that the BMNH holds a type of *subnata*, but challenge his assertion that this is the female with two contradictory labels, as the male therein bearing Grote's blue-bordered label is a far more plausible candidate. We suggest an erroneous association occurred, and we hereby designate the male in Drawer 5 as LECTOTYPE for *subnata* (Fig. 5b). The lectotype bears the labels "U. S. America/Grote Coll./81-116.", "United States/81-116 [and on the reverse:] *Catocala/sub-*



nata/Grote", "Catocala/subnata/Grote", "LECTOTYPE/*Catocala sordida*/Grote 1877/Desig. Gall & Hawks 2002." The type locality is Maryland [USA]. We recognize *Catocala subnata* as a full species.

*Catocala verrilliana* Grote, 1875a. Can. Entomol. 7:185

The original description does not state the number of types. In Drawer 27 at the BMNH is a male labeled as type by Grote, bearing a red BMNH type disc. To clarify application of the name we hereby designate it as LECTOTYPE for *verrilliana* (Fig. 5d). The lectotype bears the labels "499", "U. S. America/Grote Coll./81-116", "United States/81-116 [and on the reverse:] Catocala/verrilliana/Type Grote", "Catocala/verrilliana/Type/Grote", "LECTOTYPE/*Catocala verrilliana*/Grote 1875/Desig. Gall & Hawks 2002." The type locality is Bosque Co[unty], Texas [USA]. We recognize *Catocala verrilliana* as a full species.

*Catocala westcottii* Grote, 1878. Can. Entomol. 10:195

The original description discusses two specimens: "I have the male from Illinois, Mr. Bean, number 577; the female from Wisconsin, Mr. O. S. Westcott, for whom I name the species." The male is in Drawer 25 at the BMNH, bearing a red BMNH type disc, and to clarify application of the name we hereby designate it as LECTOTYPE for *westcottii* (Fig. 5e). The lectotype bears the labels "577", "U. S. America/Grote Coll./81-116.", "United States/81-116 [and on reverse:] Catocala/westcottii/Type Grote", "Catocala/westcottii/ Grote/Type", "LECTOTYPE/*Catocala westcottii*/ Grote 1878/Desig. Gall & Hawks 2002." The type locality is hereby restricted to Illinois [USA] on the basis of the lectotype labels. The name *westcottii* is a synonym of *Catocala amestris* Strecker.

#### Infrasubspecific Names

*Catocala habilis* var. "**basalis**" Grote, 1876a. Can. Entomol. 8:230

The original description states "Specimens received from Mr. Robert Bunker, taken about Rochester, N. Y." There is a female in Drawer 5 at the BMNH, labeled as type by Butler and bearing a red BMNH type disc, with a locality label "Oneida Co./Aug. 1876/Dr. J. S. Bailey./Collector." Oneida County is about 80 miles from Rochester proper, and is not inconsistent with the statement "taken about Rochester." We leave the type locality as Rochester, N[ew] Y[ork] USA, as originally published. The name "**basalis**" is a synonym of *Catocala habilis* Grote, and represents the typical female of this species.

*Catocala cerogama* var. "**bunkeri**" Grote, 1876a. Can. Entomol. 8:230

The original description does not state the number of types. In Drawer 22 at the BMNH is a female bearing a red-bordered Grote label that lacks the word type, but with a type designation by Butler. The type locality is New York [USA]. The name "**bunkeri**" is a synonym of *Catocala cerogama* Guenée, and represents specimens with the hindwing "yellow basal shade entirely lost."

*Catocala innubens* var. "**flavidalis**" Grote, 1874c. Trans. Amer. Entomol. Soc. 5:95

The original description states "I have received from Prof. S. A. Forbes, Normal, Illinois, a specimen with the number '2' attached to it." In Drawer 3a at the BMNH is a male labeled by Grote as "var flavidalis/Grote," and bearing a handwritten label "2." Neither Beutenmüller (1903a) nor Hampson (1913) list the type of "flavidalis" as being among the Nearctic *Catocala* at the BMNH, but Beutenmüller (1903b) indicates the type is there, and from the label data we are confident the BMNH male is the holotype by monotypy. The type locality is not stated in the original description, but is presumably [Illinois, USA]. The name "flavidalis" is a synonym of *Catocala innubens* Guenée, and represents an aberration with yellowish hindwing bands.

*Catocala concumbens* ab. "**hilli**" Grote, 1883b. Papilio 3:43

The original description states "This very singular aberration has been taken by Mr. W. W. Hill at Center, N. Y." This female, the holotype by monotypy, is at the New York State Museum (NYSM) in Albany. The type locality is Center, [Albany County,] N[ew] Y[ork] USA. The name "**hilli**" is a synonym of *Catocala concumbens* Walker, and represents an aberration with yellowish hindwing bands.

#### ACHILLE GUENÉE

As was the case with many lepidopteran groups, comparative study of the Nearctic species of *Catocala* did not really commence until the 1850's, with the publication of A. Guenée's (1852) *Species General* and F. Walker's ([1858]) *List of the specimens of lepidopterous insects in the collection of the British Museum*. Guenée described 17 Nearctic *Catocala* in 1852, and he and Walker are the most important European workers to have published on the Nearctic species. Guenée obtained *Catocala* for his own collection from several North American sources, and had



the opportunity to study Boisduval's collection and that of the BMNH, which included Doubleday and Abbot material. Most of Guenée's original descriptions cite specimens, but he also described two Nearctic *Catocala* from unpublished paintings by John Abbot.

Identifying many of Guenée's noctuid species was an odyssey for Nearctic workers. Although Grote traveled to France to visit Guenée and examine his type material, Grote was unable to resolve noctuids that Guenée had based on Abbot paintings. In a biography of Guenée, he summarized his opinion as follows (Grote 1881b): "[Guenée] drew up descriptions of several species [of North American noctuids] from drawings by Abbot, and none of these have been satisfactorily identified and probably cannot be." J. B. Smith toured many of the European collections for his noctuid catalogue, and stated therein (1893:9) "I did succeed in getting at most of the species marked 'M.N.' in the Species General. I was in hopes of being able to get track of the Abbot drawings, from which Guenée described a number of species; but I did not succeed in this;" he also indicated that while at the BMNH his "time was limited, I did not study *Acronycta*, which Dr. Riley had already studied on a prior occasion, nor *Catocala*, which Messrs. Grote and Henry Edwards had compared."

The first person to claim to know the identity of the Guenée *Catocala* names *connubialis*, *messalina* and *micronympha* was G. D. Hulst (1884). Hulst was unfamiliar with these taxa just a few years earlier (Hulst 1880), and apparently based his 1884 opinions not on comparisons of specimens but on a letter he received in the intervening years from A. G. Butler of the BMNH. Hulst's prior nomenclatural actions in the genus had already come under blistering attack by Grote (1881c), and Hulst's rather sudden "understanding" of the Guenée names simply became additional fodder for the long-running feud between these two workers (e.g., Grote 1891, 1892; Hulst 1881, 1892). Nevertheless, over the ensuing several decades, Hulst's concepts of *connubialis*, *messalina*, and *micronympha* became fixed in the Nearctic literature.

In his diagnosis of *messalina*, Hulst (1884:34) stated that "Mr. Charles Oberthur, of Rennes, France, to whom Guenée's types came, informs me that when they came into his possession, all were found to be destroyed beyond the possibility of recovery by the larvae of *Anthrenus* [dermestids]. So no identification can be made of any of Guenée's American species described from imagines, from the types themselves." Although Hulst's statement may be true for *messalina*, since we have not located any types, it is demonstrably false for Guenée's other *Catocala*, as W. Barnes obtained both

these and Guenée's other North American moth types from C. Hofer in 1927 prior to the transfer of the Oberthur collection to the BMNH. The Guenée *Catocala* types are at the USNM, bearing Guenée, Oberthur, and Barnes collection/accession labels, as well as Guenée's distinctive handwritten type labels in French.

Because Guenée described a number of lepidopteran species based on paintings by John Abbot, we wish to elaborate here on the pioneering work of this man, one of the most productive early naturalists in North America during the late 18th and early 19th centuries. John Abbot reared, collected, and painted native birds, insects, and plants of the southeastern United States, and was one of the primary sources of specimen material for customers in Europe and North America at the time. He executed thousands of paintings, the vast majority of which was never published. A meticulous and revealing book on Abbot's life and accomplishments was published recently by Gilbert (1998).

Only four of Abbot's paintings of Nearctic *Catocala* were published, in *The Natural History of the Rarer Lepidopterous Insects of Georgia* (Smith [ & Abbot] 1797). In that tome, four new species of *Catocala* were described from the four Abbot paintings, these being *amasia* (J. E. Smith), *consors* (J. E. Smith), *neogama*, and *vidua* (J. E. Smith). The identity of the latter three names as separate species was settled quickly by the 19th century Nearctic *Catocala* workers, whereas the applicability of the name *amasia* was not completely resolved until well into the 20th century (see Gall 1992, and our treatment below of *connubialis* Guenée; the name *amasia* J. E. Smith was recently suppressed [ICZN 1994]).

Abbot painted many other species of Nearctic *Catocala*, and these paintings survive today in several locations. The two most notable compilations are the bound volumes in the Entomology Library of the BMNH (ex Francillon collection) and the Houghton Library at Harvard University (ex Oemler collection), both of which we have examined. Among the 17 quarto volumes at the BMNH are 14 plates illustrating 18 individual *Catocala*, and at Houghton are 16 plates illustrating 21 individual *Catocala* (see Table 2). Together, the BMNH and Houghton plates depict at least 18 different species. Ten plates are common to both BMNH and Houghton, showing the same species on the same backgrounds, and these likely represent standard illustrations that Abbot's clients could request (see Gilbert 1998).

Perhaps not surprisingly, given his keen eye and long-term residency in Georgia, Abbot knew of and painted several rare and/or local *Catocala* species from





FIG. 6. Type specimens of moths in the genus *Catocala* Schrank. A. Guenée types. **a**, lectotype, *andromedae*. **b**, lectotype, *androphila*. **c**, neotype, *connubialis*. **d**, lectotype, *cerogama*. **e**, lectotype, *desperata*. **f**, lectotype, *melanympha*. **g**, neotype, *micronympha*. **h**, holotype, *polygama*. **i**, lectotype, *palaeogama*. **j**, lectotype, *parta*. 0.9–1.0 × natural size.

the southeastern United States that were not “discovered” and described until late in the 20th century. For example, one of the plates present at both BMNH and Houghton clearly shows *Catocala grisatra* Brower (undescribed until 1936) at the top and *Catocala similis* at the bottom. Among the non-corresponding plates, one at Houghton depicts *Catocala louiseae* Bauer (unde-

scribed until 1965), and another at Houghton appears to depict the as yet undescribed species in the *Catocala amica* complex. At this juncture, we believe none of the 19th and early 20th century Nearctic *Catocala* workers studied Abbot’s unpublished paintings; species such as *grisatra* and *louiseae* are, in our opinion, far too distinctive to have escaped being named,



TABLE 2. The identity of Nearctic *Catocala* Schrank species figured in unpublished paintings by John Abbot, in the bound volumes housed at the Houghton Library (Harvard University, Cambridge, Massachusetts) and the Entomology Library at the Natural History Museum (London, England). For plates with two listed names, the first appears above the second on the plate.

Source	Taxon
Houghton Library (Oemler)	
pl. 123	<i>epione</i> (Drury)
pl. 124	<i>ilia</i> (Cramer)
pl. 125	<i>ultronia</i> (Hübner)
pl. 126	<i>consors</i> J. E. Smith, <i>muliercula</i> Guenée
pl. 127	<i>louiseae</i> Bauer
pl. 128	<i>lineella</i> ? Grote, <i>jair</i> ? Strecker
pl. 142	<i>sappho</i> Strecker, <i>maestosa</i> Hulst
pl. 143	<i>andromedae</i> Guenée
pl. 144	<i>amatrix</i> (Hübner)
pl. 145	<i>carissima</i> Hulst
pl. 146	<i>coccinata</i> Grote
pl. 147	<i>nebulosa</i> W. H. Edwards
pl. 148	<i>consors</i> J. E. Smith, <i>muliercula</i> Guenée
pl. 149	<i>grisatra</i> Brower, <i>similis</i> W. H. Edwards
pl. 150	<i>micronympha</i> Guenée
pl. 151	<i>amica</i> (Hübner), <i>jair</i> ? Strecker
Natural History Museum (Francillon)	
vol. 8, pl. +52	<i>carissima</i> Hulst
vol. 8, pl. 264	<i>amatrix</i> (Hübner)
vol. 8, pl. 265	<i>coccinata</i> Grote
vol. 8, pl. 266	<i>maestosa</i> Hulst
vol. 8, pl. 267	<i>nebulosa</i> W. H. Edwards
vol. 8, pl. 270	<i>amica</i> (Hübner)
vol. 8, pl. 271	<i>micronympha</i> Guenée
vol. 8, pl. 273	<i>andromedae</i> Guenée
vol. 17, pl. 29	<i>carissima</i> Hulst
vol. 17, pl. 30	<i>sappho</i> Strecker, <i>maestosa</i> Hulst
vol. 17, pl. 89	<i>ilia</i> (Cramer), <i>ilia</i> (Cramer)
vol. 17, pl. 126	<i>amica</i> (Hübner), <i>amica</i> (Hübner)
vol. 17, pl. 140	<i>grisatra</i> Brower, <i>similis</i> W. H. Edwards
vol. 17, pl. 280	<i>consors</i> J. E. Smith, <i>muliercula</i> Guenée
vol. "Tring", pl. 23	<i>amatrix</i> (Hübner)
vol. "Tring", pl. 24	<i>coccinata</i> Grote

had the paintings been seen. One complicating aspect of the bound Francillon and Oemler volumes is that the plates are labeled haphazardly. For example, at the BMNH are plates bearing the labels *vidua* (Plate 30), *amasia* (Plate 126), *consors* (Plate 140) and *neogama* (Plate 280), that is, the four J. E. Smith names of 1797. However, these plate names do not in any way match Smith's published usages. Instead, Plate 30 depicts *sappho* Strecker, Plate 126 depicts *amica*, Plate 140 depicts *grisatra* and *similis* and Plate 280 depicts *consors* and *muliercula* Guenée. In addition, plates often bear confusing subsequent annotations. For example, at Houghton, "*C. marmorata*?" appears on Plate 123 next to a painting of *Catocala ilia* (Cramer), and

"*grynea*? Cr." appears on Plate 127 next to a painting of *Catocala louiseae*.

There are two Nearctic *Catocala* names whose descriptions were made from reference to unpublished Abbot paintings. Both names were authored by Guenée (1852), these being *Hypogramma andromedae* and *Catocala connubialis*. Hulst (1884) first placed the name *connubialis* into the synonymy of Nearctic *Catocala* under his new species *sancta* Hulst, and Barnes and McDunnough (1918b) later introduced *andromedae* as the senior synonym of *tristis* Edwards, based on information from Hampson. Guenée's original description of *andromedae* is distinctive, and Hampson's association of this name with the previously published name *tristis* has been universally accepted. We have located unpublished Abbot plates matching the description of *andromedae*. In contrast, Guenée's original description of *connubialis* could apply to infrapopulational morphs of at least two *Catocala* species, and Hulst's association of this name with the previously published *amasia* and *cordelia* Hy. Edwards met with immediate resistance. Fortunately, Hulst's concept of *connubialis* is readily established from his type of *sancta*. However, we have not located an Abbot painting that matches Hulst's concept. We discuss these situations below.

We note here that the Entomology Library at the BMNH contains a bound volume, in excess of 450 pages and handwritten by Guenée in French, that contains extensive notes by him on the synonymy of holarctic Lepidoptera (Guenée [ca. 1857]). It also contains descriptions with manuscript names for non-European species that were never published, including *Catocala*. We were unable to glean any additional data about Guenée's published Nearctic *Catocala* names from this volume, but we recommend that lepidopteran systematists routinely consult this work when studying Guenée types, as it clearly holds significant information that complements the *Species General*.

#### Available Names

*Catocala andromedae* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:36

Guenée described *Hypogramma andromedae* from a painting by John Abbot. The name *andromedae* was not included in the major works on Nearctic *Catocala* during the 19th century, probably because the species was originally described in another genus. The combination *Catocala andromedae* appears to have been used first in Barnes and McDunnough's (1917) checklist, and the following year in their *Catocala* mono-



graph, where they stated (1918b:36) "This species has been generally known as *tristis* Edwards but Sir Geo. Hampson has recently called our attention to the fact that Guenée's description of *andromedae* (a name heretofore unplaced) fits this species very well; we concur with him in using Guenée's name, which has priority." We agree with this placement, and further note that the larval illustration of *andromedae* by Guenée (1852, fig. 11, Plate 2) is a *Catocala* and clearly matches larvae in the small group of Nearctic Ericaceae-feeding species, to which *tristis* belongs.

We have recently examined the compilations of Abbot's unpublished works at the BMNH and the Houghton Library at Harvard University. Paintings that are readily identifiable as *tristis* appear in both compilations. To clarify application of the name we hereby designate the specimen figured (and now presumed lost) on Plate 273 in bound Abbot Volume 8 at the BMNH as LECTOTYPE for *andromedae* (Fig. 6a). The accompanying text reads "No 273. Noctua. Numeria. Caterpillar feeds on Oaks, bred 10th June, frequents Hammock, Rare, called in Savannah, small black underwing." The foodplant association is erroneous, as are a number of Abbot's. Guenée's original description states "Amerique Septentrionale," and on the basis of the text for Plate 273 and the published accounts of Abbot's activities (see Gilbert 1998) we hereby restrict the type locality to Georgia, USA. We recognize *Catocala andromedae* as a full species.

*Catocala androphila* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:106

The original description states "Amerique Septentrionale. Coll. Gn." Three Guenée males labeled as *androphila* are at the USNM. Two are *Catocala amica*, and one is *Catocala lineella*. Guenée's large label in French is affixed to an *amica*, and indicates that the first two specimens in his series (both *amica*) are "ordinaire" whereas the third in the series (the *lineella*) is "var A. Gn. p. 107" (this confirms that Grote 1872:18 had correctly surmised that his new species *lineella* was Guenée's var A). The label also says "Amer. Boreale. 1845," and then "I have not seen since then a large enough number, all alike, sender also [unintelligible] Baltimore, but I have not seen the female." To clarify application of the name we hereby designate the male bearing Guenée's large label in French as LECTOTYPE for *androphila* (Fig. 6b). In addition to Guenée's label, the lectotype bears the labels "Ex Musaeo/Ach. Guenée", "Oberthur/Collection", "Barnes/Collection", "LECTOTYPE/*Catocala androphila*/Guenée 1852/Desig. Gall & Hawks

2002." The type locality is hereby amended to Amer[ique] Boreale on the basis of the lectotype locality label. Barnes and McDunnough (1918b:45) pointed out that Guenée intended the name *androphila* to replace the name *amica* (Hübner), which Guenée mistakenly believed was preoccupied by the Palearctic species *Hadena amica* Treitschke (1825). The name *androphila* is a synonym of and unnecessary replacement name for *Catocala amica* (Hübner).

*Catocala cara* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:87

The original description states "Coll. Gn. Un ♂." A male bearing a large Guenée label in French stating "No. 1" is at the USNM. This specimen also bears another label "Type/see label" by F. H. Benjamin, and we consider it to be the holotype by monotypy. The type locality is the vicinity of Baltimore [Maryland, USA]. We recognize *Catocala cara* as a full species.

*Catocala cerogama* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:96

The original description states "Coll. Feisth. Gn. et M. N." A male and female are at the USNM, both bearing Guenée labels in French. The two labels were once part of a single label, and indicate: "[on the male] 1. Poor ♂ from the collection of Feisthamel. / [on the female] 2. Good ♀ vicinity of Baltimore, purchased M. Becker in 1852." To clarify application of the name we hereby designate the female as LECTOTYPE for *cerogama* (Fig. 6d). In addition to Guenée's label, the lectotype bears the labels "Ex Musaeo/Ach. Guenée", "Oberthur/Collection", "Barnes/Collection", "LECTOTYPE/*Catocala cerogama*/Guenée 1852/Desig. Gall & Hawks 2002." The type locality is hereby restricted to the vicinity of Baltimore [Maryland, USA] on the basis of the lectotype locality label. We recognize *Catocala cerogama* as a full species.

*Catocala connubialis* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:105

Guenée described *Catocala connubialis* from a painting by John Abbot. Eventually, nearly a century later, as a result of life history and related studies, the names *amasia* and *connubialis* were recognized to be infrasubspecific morphs (along with *cordelia*, *sancta* and *virens* French) of one of the most variable Nearctic *Catocala* species. Since 1938, the name *connubialis* has been applied to the species because *amasia* (published by J. E. Smith in 1797) was considered preoccupied by *Catocala amasia* Esper (1787), an unrelated Palearctic species thought to have been published in



1796. However, Heppner (1981) showed that Esper's work dates from 1804, not 1796. The applicable history was reviewed by Gall (1992) in a petition accepted by the ICZN (1994) to conserve the name *connubialis* Guenée and suppress the name *amasia* J. E. Smith.

As noted above, Hulst was the first Nearctic *Catocala* worker to claim to understand the identity of *connubialis*. He first mentioned the name (1884:34) in his account of *Catocala messalina*: "Connubialis heretofore not identified, was described from a colored drawing of Abbott which is now, I understand, in the British Museum." Later in the same paper, Hulst (1884:38) described *Catocala sancta* as new, placing *connubialis* as its synonym. The description of *sancta* follows: "These last two species [*amasia* and *similis*] have been much confused. Abbott's upper figure, from which Smith says his description was made, is undoubtedly the insect afterwards named *cordelia* by Hy. Edwards. Guenée describes the lower figure of Abbott as *amasia*; but Abbott's description of the upper figure, holds good against that of Guenée. Mr. Grote identified the more southern form as *amasia*, and thus it is generally labelled in collections. Mr. A. G. Butler [of the BMNH] writes me, this latter is *connubialis*, Guen.: but the description does not fit, and it was described from a drawing, and so the name does not in any case hold." At the end of the same paper, Hulst (1884:56) commented further on the Butler letter, stating "Page 38, line 15, after 'writes me' insert 'his opinion is.' I do not understand that he has ultimate evidence. At any rate the description being based on a picture, can not stand."

Hulst (1892:74) later elaborated his position: "Prof. French says 'var. *Virens* is not a variety of *Cordelia*, Hy. Edw., but of *Amasia*; and *Cordelia* is not the one figured by Dr. Strecker, pl. 9, f. 12.' But *cordelia*, Hy. Edw., is a synonym of *amasia*, Ab. & Sm., and Dr. Strecker's figure is not *amasia*, Ab. & Sm. The error comes from the fact that Abbot & Smith figured two species as male and female of *amasia*, the description being of the upper one only. The insect represented by the lower figure of Abbot & Smith was distributed by Mr. Grote, and figured by Dr. Strecker as *amasia*. Of course the name attaches to the figure described, as afterwards Guenée located it, calling the lower figure *connubialis*. The lower insect I afterwards described as *sancta*, regarding Guenée's name as without authority, as the description was from a picture. Whether I was right or not I will not here say, but the insect distributed by Mr. Grote, and figured by Dr. Strecker as *amasia*, is either *connubialis*, Gn., or *sancta*, Hulst; while the *amasia* of Abbot & Smith is the *cordelia* of Hy. Edwards, as Mr. Edwards afterwards acknowledged to

me." This last sentence is Hulst's most succinct diagnosis of *connubialis*.

The two species shown on Smith and Abbot's Plate xc are indeed not conspecific, and not even that close morphologically. This was first noted by Grote and Robinson (1866), who restricted the name *amasia* to the upper illustration and applied the name *formula* to the lower illustration (*formula* was later transferred to the synonymy of *similis*). This interpretation of Plate xc was followed by all the Nearctic *Catocala* workers, and Hulst (1884:37) had already unequivocally adopted this interpretation in his synonymies for both *similis* ("pl. 90 lower figure") and *amasia* ("pl. 90, upper fig."). Hulst described *sancta* in the same 1884 paper as distinct from both *similis* and *amasia*, and his type of *sancta* is identical to Strecker's Plate 9 Fig. 12 and not in any way confusable with *similis*. Yet later, Hulst (1892:74) equally unequivocally assigned his *sancta* to the lower illustration of Plate xc. Unless one is willing to assume that by 1892 Hulst felt his *sancta* was conspecific with *similis*, for which we have no evidence whatsoever, his 1884 and 1892 synonymic treatments appear to be irreconcilable.

In his noctuid catalogue, Smith (1893:334) did not resolve this problem when he indicated: "Dr. Hulst cites this species [*connubialis*], as well as *amasia*† Grt., to *sancta*, perhaps not justly. There is really no evidence that Guenée intended the *amasia*†, and indeed, Dr. Hulst says the description does not fit. It [*connubialis*] should not therefore be cited as a synonym to *sancta*, which it must otherwise replace. Guenée's species based on Abbot's figures have been universally accepted, and if the figures are still in existence there is no reason why positive knowledge should not yet be obtainable."

Even though Guenée's concept of *connubialis* had not yet been adequately established, Smith's statement probably cemented the link between *connubialis* and *sancta*. Hulst's contemporaries could readily determine Hulst's concept of *connubialis* by reference to the type of *sancta* and Strecker's illustration on his Figure 12 on Plate 9. On the other hand, Hulst's own understanding of *connubialis* was apparently based solely on the letter sent to him by Butler, and this letter was undoubtedly not generally available to other *Catocala* workers at the time (we have been unable to locate any letters from Butler to Hulst in the archives of Rutgers College, or in the Butler correspondence at the BMNH). Moreover, Butler's concept of *connubialis*, and hence Hulst's, unquestionably stems from Walker's *List* (1858:1207–1208), in which specimen material at the BMNH is attributed to *connubialis*. Indeed, in Drawer 32a at the BMNH are two similar



males labeled as *connubialis* by Butler. These BMNH specimens match Hulst's type of *sancta* at the AMNH and Strecker's illustration, and are also consistent with Guenée's original description of *connubialis*. The undersurface of Butler's label on one of the males reads "Catocala/connubialis var./Type Walker."

We had hoped to locate an Abbot painting that matched the BMNH specimens Butler labeled as *connubialis*, but we found no matching painting at either the BMNH or at the Houghton Library, nor in the collections of Abbot *Catocala* plates at the CMNH, the ANSP, or the Atlanta History Center. Because (a) no Abbot painting unequivocally attributable to *connubialis* has been located, (b) the original description of *connubialis* is also consistent with some infrapopulational morphs of Guenée's *micronympha*, (c) no type for *micronympha* has been located, and (d) the early Nearctic *Catocala* workers had trouble differentiating the small yellow-hindwinged species, we consider it essential to fix the name *connubialis* firmly. To clarify application of the name, we hereby designate the BMNH male labeled as type of the variety by Butler as NEOTYPE for *connubialis* (Fig. 6c). The neotype bears the labels "United States/-? [and on the reverse:] Catocala/connubialis var./Type Walker", "NEOTYPE/Catocala connubialis/Guenée 1852/Desig. Gall & Hawks 2002." Guenée gives a type locality of "Amerique septentrionale," but because Abbot does not seem to have ever figured this morph, and the neotype bears no precise locality data, we leave the type locality as stated by Guenée. We recognize *Catocala connubialis* as a full species.

*Catocala desperata* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:95

The original description states "Amerique Septentrionale, environs de Baltimore. Coll. Gn. Un ♂, une ♀." A Guenée male labeled "desperata/Baltimore" is at the USNM, and to clarify application of the name we hereby designate it as LECTOTYPE for *desperata* (Fig. 6e). In addition to Guenée's label, the lectotype bears the labels "Ex Musaeo/Ach. Guenée", "Oberthur/Collection", "Barnes/Collection", "LECTOTYPE/Catocala desperata/Guenée 1852/Desig. Gall & Hawks 2002." The type locality is the vicinity of Baltimore [Maryland, USA]. The name *desperata* is a synonym of *Catocala vidua* J. E. Smith.

*Catocala innubens* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:98

The original description states "Amerique Septentrionale. Coll. Bdv. Un ♂. Parait rare." A male labeled "innubens/Gn. 25" and "Ex Musaeo/A. Kuwert 1894"

is at the USNM (Oberthur obtained the noctuid portions of Kuwert's [1828–1894] collection, and other Guenée *Catocala* type material at the USNM bears Kuwert collection labels). We consider this USNM male to be Guenée's holotype by monotypy, since the handwriting on the first label matches that on other USNM Guenée types. The type locality is "Amerique Septentrionale." We recognize *Catocala innubens* as a full species.

*Catocala insolabilis* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:94

The original description states "Coll. Gn. Une ♀ . . . [Variety] A . . . Coll. Gn. Un ♂," indicating a female holotype by monotypy. There are four male *insolabilis* at the USNM that are apparently from Guenée's collection, although only two bear his accession labels. We have not located a female, and Guenée appears to have accurately sexed all his other Nearctic *Catocala* types. The first Guenée male in the USNM series is worn, and the second male is in good condition. The worn male bears a large Guenée label in French that states: "Baltimore ♀ M. Becker. The ♂ that I have described is [unintelligible] poor [unintelligible] into a collection. I doubt [unintelligible] variety, in all, as I have supposed, [unintelligible] the No. 1 ♂ which arrives since is quite similar to the female." We believe the worn male is the one on which Guenée's variety A was based. In the original description, Guenée was uncertain whether variety A represented the typical male of the species, but his specimen label seems to corroborate a correct association of the sexes. Because the original description is diagnostic, and there has been no confusion regarding the applicability of the name, we choose not to take any formal action. The type locality is hereby restricted to Baltimore [Maryland, USA] on the basis of Guenée's label. We recognize *Catocala insolabilis* as a full species.

*Catocala lacrymosa* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:93

The original description states "Coll. Gn. Un beau ♂." This Guenée male, the holotype by monotypy, is at the USNM. Its large Guenée label in French offers no substantive additional information beyond that provided in the original description. The type locality is "Amerique Septentrionale." We recognize *Catocala lacrymosa* as a full species.

*Catocala melanympha* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:98

The original description states "Canada. Coll. Gn. Parait rare." Three Guenée males labeled *melanympha*



are at the USNM, and to clarify application of the name we hereby designate the male bearing Guenée's large label in French as LECTOTYPE for *melanympha* (Fig. 6f). In addition to Guenée's label, which indicates the specimen was sent by Feisthamel, the lectotype bears the labels "Ex Musaeo/Ach. Guenée", "Oberthur/Collection", "Barnes/Collection", "LECTOTYPE/*Catocala melanympha*/Guenée 1852/Desig. Gall & Hawks 2002." The type locality is Canada. The name *melanympha* is a synonym of *Catocala antinympha* (Hübner).

*Catocala messalina* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:107

The original description states "Amerique Septentrionale. Coll. Bdv. Un ♂." Grote (1872:19) translated Guenée's original description of *messalina*, and stated "Not identified by me. . . . This species should be recognisable from the continuous hind border of the secondaries, an exceptional character of this group." Hulst (1884) embellished Grote's translation but correctly identified the species, listing *jocasta* Strecker and *belfragiana* Harvey as synonyms. We have been unable to locate a type of *messalina* at the USNM or at the BMNH. However, the original description of this unique species is diagnostic, and there has been no confusion regarding the applicability of the name since Hulst's diagnosis, so we choose not to take any formal action. The type locality is "Amerique Septentrionale." We recognize *Catocala messalina* as a full species.

*Catocala micronympha* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:102

As with *connubialis* and *messalina*, Hulst (1884:34) was the first Nearctic worker to claim to know the identity of *micronympha*. However, unlike *connubialis* and *messalina*, Hulst offered no justification whatever for his placement of *micronympha*, stating only "An extraordinarily variable species. Atarah is slightly lighter than type form." Although Grote (1891:281) properly protested that "without the slightest reason, Mr. Hulst quotes *fratercula* [the previous oldest name] as the species intended by Guenée as *micronympha*," the name *micronympha* was used in the catalogue by Smith (1893) and as the species name by subsequent authors.

The original description of *micronympha* states "Amerique Septentrionale. Un ♂." There are no Guenée specimens labeled by Guenée as *micronympha* among the type material at either the USNM or the BMNH. However, there are two worn male Guenée specimens of *micronympha* at the USNM that are labeled by Guenée as *amasia*, and the large label in French on one male indicates it was used

for his 1852 description of *amasia*. The confusion among the 19th century *Catocala* workers regarding *amasia* sensu Guenée (which does not correspond well to Abbot's painting of *amasia* J. E. Smith) is now much more readily understandable, given the label data affiliated with the two USNM *micronympha*. These two USNM *micronympha* represent an intrapopulational variant lighter than "hero" Hulst that occurs in *micronympha* from the southern United States viz., forewings of a dull cream color, with variable brown shading in the postmedial area and the outer margin.

Because (a) we have not located the *micronympha* holotype, (b) Hulst's placement of *micronympha* was made without substantiating published evidence, (c) the original description of *micronympha* is consistent with some intrapopulational morphs of *connubialis*, and (d) the early Nearctic *Catocala* workers had trouble differentiating the small yellow-hindwinged species, we consider it essential to fix the name *micronympha* firmly. Accordingly, we hereby designate a male from the AMNH as NEOTYPE for *micronympha* (Fig. 6g). The neotype bears the labels "USA: Georgia: Liberty Co./St. Catherines Island/May 1991/Rozen, Quinter & Sharkov", "NEOTYPE/*Catocala micronympha*/Guenée 1852/Desig. Gall & Hawks 2002." The type locality is hereby amended to S[ain]t Catherines Island, Liberty Co[unty], Georgia, USA on the basis of the neotype label. We recognize *Catocala micronympha* as a full species.

*Catocala muliercula* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:97

The original description states "Amerique Septentrionale. Coll. Bdv. Un ♂." We have not been able to locate Guenée's holotype at either the USNM or the BMNH. However, the original description is diagnostic, and we further note that the larval illustration of *muliercula* by Guenée (1852, fig. 15, Plate 2) matches the distinctive larvae in the small Nearctic group of Myricaceae-feeding species, to which *muliercula* belongs. Since there is no indication in the early Nearctic *Catocala* literature of confusion as to the applicability of this name, we choose not to take any formal action. The type locality is "Amerique Septentrionale." We recognize *Catocala muliercula* as a full species.

*Catocala palaeogama* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:97

The original description states "Amerique Septentrionale. Coll. Bdv. et Feisth." and then "A . . . Memes localities. Coll. Gn. Un ♂." (Guenée's variety A is *phalanga* Grote). There are two male Guenée *palaeogama* at the USNM. One male bears a large Guenée label in



French that discusses four specimens, and indicates “♂ vicinity of Baltimore purchased Becker;” the other male is labeled simply “*palaeogama*.” To clarify application of the name we hereby designate the male bearing Guenée’s large label as LECTOTYPE for *palaeogama* (Fig. 6i). In addition to Guenée’s label, the lectotype bears the labels “Ex Musaeo/Ach. Guenée”, “Oberthur/Collection”, “Barnes/Collection”, “LECTOTYPE/*Catocala palaeogama*/Guenée/Desig. Gall & Hawks 2002.” The type locality is hereby restricted to the vicinity of Baltimore [Maryland, USA] on the basis of the lectotype locality label. We recognize *Catocala palaeogama* as a full species.

*Catocala parta* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:84

The original description states “Amerique Septentrionale, Canada. Coll. Gn. Trois examplaires.” Three male and one female Guenée *parta* are at the USNM. Two males and one female bear sections of what had previously been a single large Guenée label in French, and the fourth male only bears a label stating “Canada.” The three Guenée label segments together indicate “Amerique du Nord. 1. male purchased from Becker? / 2. ♀ id. id. in 1851. Baltimore. / 3. ♂ poor from coll. Feisthamel.” To clarify application of the name we hereby designate the female as LECTOTYPE for *parta* (Fig. 6j). In addition to Guenée’s label, the lectotype bears the labels “Ex Musaeo/Ach. Guenée”, “Oberthur/Collection”, “Barnes/Collection”, “LECTOTYPE/*Catocala parta*/Guenée 1852/Desig. Gall & Hawks 2002.” The type locality is hereby restricted to Baltimore [Maryland, USA] on the basis of the lectotype locality label. We recognize *Catocala parta* as a full species.

*Catocala polygama* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:105

The original description states “Amerique Septentrionale, Canada. Coll. Bdv. Un ♂.” We have not been able to locate Guenée’s type at either the USNM or the BMNH. Although *polygama* has been tabulated as a junior synonym of *Catocala grynea* (Cramer 1780) since the early part of the 20th century, reanalysis of the original description and especially of Guenée’s accompanying illustration on Fig. 2 of Plate 16 (reproduced in our Fig. 6h) reveals that *polygama* is in fact an unused senior synonym of *Catocala alabamiae* Grote (1876a). A petition is currently pending at the ICZN (Gall 2002) to suppress the name *polygama* and conserve the name *alabamiae*. We review the history and evidence here.

Following Guenée’s description, Grote (1872:15–16)

applied *polygama* to “[specimens from] (Canada to Virginia) which differ in appearance among themselves but which I cannot separate . . . I think we have to do with a single variable species.” Grote distributed specimens determined by him as *polygama* to many workers, and thus the name *polygama* sensu Grote became widely used for a common and well-collected *Catocala* species from northeastern North America—viz, what lepidopterists currently call *blandula* Hulst. For example, Saunders (1876:72) described *Catocala crataegi* from Ontario, Canada as a new species, and provided detailed larval and adult descriptions of both it and *polygama*, showing significant points of distinction; Saunders’ description of the larva of *polygama* is a precise match for the larva of *blandula*, and matches the larva of no other *Catocala* species from eastern Canada.

In the first of his two treatises on *Catocala*, Hulst (1880:6–7) placed Grote’s *alabamiae* as a variety of *grynea*; and *pretiosa*, *crataegi* and *mira* Grote (1876a) as “sub-varieties” of *polygama*. In his second treatise, Hulst (1884:35–39) returned *crataegi* and *mira* to full species status, and noted, correctly, that Grote had misidentified Guenée’s *polygama*. To resolve this, Hulst placed *polygama* sensu Guenée as a synonym of *grynea*, and proposed the new name *blandula* for the previously misidentified species *polygama* sensu Grote. Hulst (1884:35) did not unequivocally resolve *polygama* sensu Guenée, as indicated by his use of “*C. polygama*, Guen. Noct. 7, 105, pl. 16, f.2, (?)” in his synonymy for *grynea*. Hulst (1884:36) elaborated: “The description of *polygama*, Guen., seems to fit this species [*grynea*]; the figure [given by Guenée], which is poor, seems more like var. *alabamiae*; neither description nor figure approach the insect identified as *polygama* by Grote.” Under his treatment of *blandula*, Hulst (1884:39) added: “With regard to *polygama*, Guen., a glance at his figure Noct. 3, pl. 16, f. 2, will convince any one that this species [*blandula*] could not have been intended. The primaries and secondaries are entirely different. The description accords with *grynea*, and the figure fits it as well as any species known to me.”

Smith (1893) followed Hulst in placing both *polygama* sensu Guenée and *alabamiae* as synonyms of *grynea*, and *polygama* sensu Grote as a synonym of *blandula*. Dyar (1903) apparently skirted the issue of Grote’s misidentification, and listed *polygama* as a full species with *blandula* as its synonym, and treated *alabamiae* as a full species. Hampson (1913) placed *polygama* as a synonym of *grynea*, both *blandula* and *mira* as synonyms of *crataegi*, and treated *alabamiae* as a full species. In their monograph of the Nearctic *Catocala*, Barnes & McDunnough (1918b:40) treated



*polygama* as a synonym of *grynea*, and both *blandula* and *alabamae* as full species, indicating: "It should be borne in mind that the '*polygama* Guenée,' referred to by Lintner, Saunders, and others of the older authors is not the true species but probably what we have designated as *blandula* Hulst . . . Guenée's figure of *polygama* is very poor but we do not see to what other species [i.e., *grynea*] it can be referred; it is certainly not *blandula*." McDunnough's (1938) checklist followed Barnes and McDunnough's taxonomy, and *polygama* has not been used as a species name since that time. Forbes (1954:336) placed *polygama* back under *alabamae* "(probably *polygama* Guenée)" as had Hulst, but Nearctic works after 1954 have listed *polygama* under the synonymy of *grynea* (e.g., Tietz 1971, Hodges et al. 1983, Covell 1984, Poole 1989) as had Barnes & McDunnough. Note that some early 20th century authors, notably R. Rowley, used *polygama* in error as the species name for *mira* (e.g., Rowley & Berry 1910, cf. comments by Barnes & McDunnough 1918a:172–173; in his account of *mira*, Forbes 1954:335 indicated "*polygama* of American authors in large part, not Guenée").

Unquestionably, Grote's initial misidentification of *polygama*, Hulst's (1884) placement of both *polygama* and *alabamae* as synonyms of *grynea*, and the relative scarcity of specimen material for this group of closely related yellow-hindwinged species were all responsible for the volatile position of *polygama* in the 19th and early 20th century Nearctic literature. Some adults of this species group can be difficult to determine, but as a result of life history work during the first half of the 20th century, and, especially, more recent studies by ourselves and colleagues (e.g., H. D. Baggett, W. A. Miller, D. F. Schweitzer, J. R. Slotten) it is now firmly established that *alabamae*, *blandula*, *crataegi*, *grynea*, *mira*, and *pretiosa* are all distinct species. The adults breed true, with multiple broods of each species having been reared ex ovo; many specimens of each species also have been reared ex wild larvae and the larvae of most are separable.

Guenée's (1852) Fig. 2 on Plate 16 of *polygama* is clearly not *blandula*, and just as clearly is neither *crataegi*, *mira*, nor *pretiosa*. However, *polygama* is also not *grynea*. Instead, Guenée's figure of *polygama* is an acceptable albeit stylized rendering of *alabamae*, as suggested both by Forbes (1954) and originally by Hulst (1884:36) when he named *blandula* and corrected Grote's misidentification. Guenée's figure of *polygama* agrees with Grote's description of and type of *alabamae* at the BMNH (accounting for sexual differences: the *alabamae* type is a female, whereas the *polygama* figure is a male), as well as to other speci-

mens of *alabamae* from along the Gulf Coast of the southern United States, especially Florida. Specific points of distinction include: (1) the forewing ground color of Guenée's figure of *polygama* is warm light gray with brown shading, like *alabamae*, rather than deep cool greenish gray as in *grynea*; (2) the basal portion of the forewing postmedial line and anal dash of *polygama* and *alabamae* are not profusely marked with rich, chocolate brown as in *grynea*; (3) the forewing antemedial and basal lines of *polygama* are present and distinct, as in *alabamae*, rather than wanting as in *grynea*; (4) the hindwing medial band of *polygama* and *alabamae* is thinner than in *grynea*, and not heavily suffused with dark scaling along the inner margin as in *grynea*; (5) the black hindwing margin is not as wide in *polygama* and *alabamae* as in *grynea*; (6) and the black hindwing margin is sharply discontinuous (separating into a distinct basal dot) in *polygama*, as in *alabamae*, rather than continuous as is typical in *grynea*.

The recently described *Catocala charlottae* Brou (1988) is the remaining taxon to which the name *polygama* could potentially apply. Brou's original description (1988:116, Figs. 1–4) distinguished *charlottae* in detail from *alabamae*, which is the only other similar species occurring with *charlottae* at its Louisiana type locality: *charlottae* differs from *polygama* on points 1 and 4–6 above in the same manner as *grynea* does from *polygama*. Moreover, the dark brown around the forewing anal dash is even more extensive still in *charlottae* than in *grynea*, normally continuing into the anal margin. Thus, *polygama* does not refer to *charlottae*.

In summary, since McDunnough (1938), the name *polygama* Guenée (1852) has been erroneously treated in the Nearctic *Catocala* literature as a junior synonym of *grynea* (Cramer 1780), rather than as a senior synonym of *alabamae* Grote (1875b). Until the ICZN issues a ruling on Case 3210, we maintain existing usage, retaining *polygama* under the synonymy of *grynea*.

*Catocala uxor* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:92

The original description states "Amerique Septentrionale. Coll. Bdv. Un ♀." We have not located Guenée's type, but there is no indication in the early Nearctic *Catocala* literature of confusion as to the applicability of this name, and so we choose not to take any formal action. The type locality remains "Amerique Septentrionale." The name *uxor* is a synonym of *Catocala ilia* (Cramer), and is preoccupied in the genus by *uxor* Hübner (1788), a synonym of the Palearctic species *Catocala nymphagoga* Esper (1787).



*Catocala viduata* Guenée, 1852. Hist. Nat. Spec. Gen. Lepid. 7:400

Guenée offered the name *viduata* in his Errata section (p. 400) as a nominal modification of J. E. Smith's name *vidua*, a species which Guenée had misdiagnosed earlier in his text (pp. 94–95). Hulst (1884) rectified this by proposing the replacement name *maestosa* Hulst for *viduata* (see discussion in Barnes & McDunnough 1918b:14 and Forbes 1954:325). The type locality of *viduata* is Georgia, [USA].

#### ACKNOWLEDGMENTS

We are grateful to the following individuals for providing access to collections under their care, loans and/or photographs of type material, hospitality during our visits over the past decade, and related assistance: D. Azuma and J. Weintraub at the Academy of Natural Sciences (Philadelphia, Pennsylvania, USA); J. Miller, E. Quinter, and F. Rindge at the American Museum of Natural History (New York, New York, USA); W. Gall at the Buffalo Museum of Science (Buffalo, New York, USA); N. Penny at the California Academy of Sciences (San Francisco, California, USA); J. D. Lafontaine at the Canadian National Collection (Ottawa, Ontario, Canada); J. Rawlins at the Carnegie Museum of Natural History (Pittsburgh, Pennsylvania, USA); J. Franclemont and J. Liebherr at the Cornell University Insect Collection (Ithaca, New York, USA); W. Naessig at the Forschungsinstitut und Naturmuseum Senckenberg (Frankfurt, Germany); P. Parillo at the Field Museum of Natural History (Chicago, Illinois, USA); C. Brandao and A. Vasquez at the Museu de Zoologia (Sao Paulo, Brazil); W. Mey and W. Speidel at the Museum für Naturkunde of Humboldt University (Berlin, Germany); D. Bowers and S. Shaw at the Museum of Comparative Zoology of Harvard University (Cambridge, Massachusetts, USA); D. Ferguson, D. Furth, M. Pogue, and R. Poole at the National Museum of Natural History (Washington D.C., USA); M. Honey and G. Martin at the Natural History Museum (London, United Kingdom); T. McCabe at the New York State Museum (Albany, New York, USA); G. McGavin and C. O'Toole at the Oxford University Museum of Natural History (Oxford, United Kingdom); H. Stein and H. Sturm at the Roemer- und Pelizaeus Museum and Hildesheim University (Hildesheim, Germany); C. Hauser at the Staatliches Museum für Naturkunde (Stuttgart, Germany); M. Nuss at the Staatliches Museum für Tierkunde (Dresden, Germany); and P. Becker and H. Riemann at the Übersee Museum (Bremen, Germany).

For help with bibliographic matters, we also thank: C. Spawen at the Academy of Natural Sciences; M. Rose at the Atlanta History Center (Atlanta, Georgia, USA); R. Dirig at the Bailey Hortorium of Cornell University; B. Williams at the Field Museum of Natural History; M. Epstein at the National Museum of Natural History; M. May at Rutgers University (New Brunswick, New Jersey, USA); and J. Harvey at the Natural History Museum. Many helpful comments on the manuscript were provided by R. Hodges (Eugene, Oregon, USA), D. Lafontaine, E. Quinter, D. Schweitzer (Port Norris, New Jersey, USA) and an anonymous reviewer.

#### LITERATURE CITED

- ANONYMOUS. 1879. [Minutes of the 14 February 1879 meeting]. Proceedings of the monthly meetings of the Entomological Society of the Academy of Natural Sciences, Philadelphia. Trans. Am. Entomol. Soc. 7:iii.
- ARNETT, R. H., G. A. SAMUELSON & G. M. NISHIDA. 1993. The insect and spider collections of the world. Second ed. Sandhill Crane Press, Gainesville, Florida. 310 pp.
- BARNES, W. & J. H. MCDUNNOUGH. 1917. Checklist of the Lepidoptera of boreal America. Herald Press, Decatur, Illinois. 392 pp.
- . 1918a. Life histories of North American species of the genus *Catocala*. Bull. Am. Mus. Nat. Hist. 38:147–177.
- . 1918b. Illustrations of the North American species of the genus *Catocala*. Mem. Am. Mus. Nat. Hist. (n.s.) 3:1–47.
- BAUER, J. 1965. A new *Catocala* from Florida (Lepidoptera: Noctuidae). Entomol. News 76:197–198.
- BEUTENMÜLLER, W. 1892. List of types of some species of Lepidoptera, described by Grote and Robinson, in the American Museum of Natural History. Bull. Am. Mus. Nat. Hist. 4:59–64.
- . 1903a. List of types of *Catocala* in the British Museum. Entomol. News 14:287.
- . 1903b. Notes on some species of *Catocala*. Bull. Am. Mus. Nat. Hist. 19:505–510.
- . 1907. Notes on and new descriptions of new forms of *Catocala*. Bull. Am. Mus. Nat. Hist. 23:145–151.
- . 1918a. On W. H. Edwards' types of *Catocala*. Lepidopterist 2:44.
- BROU, V. A. 1988. A new species of *Catocala* from the southeast United States. J. Lepid. Soc. 42:116–119.
- BROWER, A. E. 1976. New *Catocala* of North America. J. Lepid. Soc. 30:33–37.
- COVELL, C. V. 1984. A field guide to the moths of Eastern North America. Houghton Mifflin, Boston. 496 pp.
- CRAMER, P. 1779–1780. Die Uitlandsche Kapellen Voorkomende in Drie Waereld-Deelen Asia, Africa en America. Vol. 3. S. J. Baalde and Utrecht. Bartholemy Wild, Amsterdam. pp. 1–128 (1779), pp. 129–176 (1780).
- DYAR, H. G. [1903] 1902. A list of North American Lepidoptera and key to the literature of this Order of insects. Government Printing Office, Washington, D.C. 723 pp.
- EDWARDS, W. H. 1864. Descriptions of certain species of *Catocala*, found within the United States. Proc. Entomol. Soc. Phil. 2:508–512.
- . 1874. Description of a new species of *Catocala* from Arizona. Trans. Am. Entomol. Soc. 5:112.
- ESPER, E. J. C. [1787]. Die Schmetterlinge in Abbildungen nach der Natur mit Beschreibungen. Theil 4 (Die Eulenphalenen). Band 2. Walthers, Erlangen. pp. 1–372, pls. 80–183.
- FORBES, W. T. M. 1954. Lepidoptera of New York and neighboring states. III. Noctuidae. Mem. Cornell Univ. Agric. Expt. Sta. 329:1–433.
- GALL, L. F. 1990. Systematics of moths in the genus *Catocala* (Lepidoptera: Noctuidae). II. Type material at the Museum of Comparative Zoology, Harvard University, with lectotype designations. Psyche 97:121–129.
- . 1992. *Catocala connubialis* Guenée, 1852 (Insecta, Lepidoptera): proposed conservation of the specific name. Bull. Zool. Nomenclature 49:196–199.
- . 1995. Notulae Remingtonio Oblatae. J. Lepid. Soc. 49:259–271.
- . 2002. *Catocala alabamiae* Grote, 1876 (Insecta, Lepidoptera): proposed conservation of the specific name. [Case 3210]. Bull. Zool. Nomenclature 59(2):117–120.
- GALL, L. F. & D. C. HAWKS. 1990. Systematics of moths in the genus *Catocala* (Lepidoptera: Noctuidae). I. Type material in the Strecker collection, with lectotype designations. Fieldiana (n.s.) 59:1–16.
- GILBERT, P. 1998. John Abbot. Birds, butterflies and other wonders. Merrill Holberton, London. 128 pp.
- GROTE, A. R. 1864a. Descriptions of North American Lepidoptera, no. 3. Proc. Entomol. Soc. Phil. 3:73–92.
- . 1864b. Descriptions of North American Lepidoptera, no. 4. Proc. Entomol. Soc. Phil. 3:322–327.
- . 1872. On the North American species of *Catocala*. Trans. Am. Entomol. Soc. 4:1–20.
- . 1873. On the genus *Catocala*. Can. Entomol. 5:161–164.
- . 1874a. Descriptions and notes on the Noctuidae. Proc. Boston Soc. Nat. Hist. 16:239–245.
- . 1874b. On the Noctuidae of North America. Sixth annual



- report of the trustees of the Peabody Academy of Sciences for the year 1873. Salem Press, Salem, Massachusetts. pp. 21–38.
- . 1874c. Remarks on North American Noctuidae with descriptions of new species. *Trans. Am. Entomol. Soc.* 5:89–98.
- . 1875a. On *Catocala verrilliana* with notes on *Catocala relictata*. *Can. Entomol.* 7:185–186.
- . 1875b. On North American Noctuae. *Proc. Acad. Nat. Sci. Phil.* 27:418–427.
- . 1876a. On species of *Catocala*. *Can. Entomol.* 8:229–232.
- . 1876b. Checklist of the Noctuidae of America, North of Mexico. II. Noctuelitae (Fasciatae), Deltoidea and Noctuo-Phalaenidi. Reinecke & Zesch, Buffalo. pp. 31–50.
- . 1877. Notes on Catocalae. *Can. Entomol.* 9:168–170.
- . 1878. Description of two new species of *Catocala*. *Can. Entomol.* 10:195–196.
- . 1879. A new *Catocala* from Florida. *Can. Entomol.* 11:15.
- . 1881a. Description of four new species of moths. *Papilio* 1:4–6.
- . 1881b. Biographical sketch of M. Achille Guenée. *Papilio* 1:31–32.
- . 1881c. New moths from Arizona, with remarks on *Catocala* and *Heliothis*. *Papilio* 1:153–168.
- . 1883a. New species and notes on structure of moths and genera. *Can. Entomol.* 15:23–31.
- . 1883b. *Catocala concumbens* ab. hilli. *Papilio* 3:43.
- . 1887. Note on mistaken identifications. *Can. Entomol.* 19:113–115.
- . 1891. On *Catocala flebilis* and *C. fratercula*. *Can. Entomol.* 23:281.
- . 1892. *Catocala amica*, Hubn. *Can. Entomol.* 24:155.
- . 1897. Die Schmetterlingsfauna von Hildesheim. Mittheil. aus dem Roemer-Museum zu Hildesheim 8:1–44.
- . 1900. A new *Catocala* from Texas. *Can. Entomol.* 32:191–192.
- GROTE, A. R. & C. T. ROBINSON. 1866. Lepidopterological notes and descriptions—no. 2. *Proc. Entomol. Soc. Phil.* 6:1–30.
- . 1868. Notes on the North American Lepidoptera in the British Museum and described by Mr. Francis Walker. *Trans. Am. Entomol. Soc.* 2:67–88.
- GUENÉE, M. A. 1852. Histoire naturelle des insectes. Species general des Lepidopteres. Tome Septieme. Noctuelites. Tome 2. Roret, Paris. 441 pp.
- . [ca. 1857]. [Manuscript containing Guenée's observations on the synonymy of European Lepidoptera with an additional section giving provisional descriptions with manuscript names of exotic species]. One bound volume, handwritten by the author. ca. 450 pp. [deposited at the Entomology Library, Natural History Museum, London].
- HAMPSON, G. W. 1913. Catalogue of the Lepidoptera Phalaenae in the British Museum. Volume 12. Taylor & Francis, London. 626 pp.
- HEPPNER, J. B. 1981. The dates of E. J. C. Esper's Die Schmetterlinge in Abbildungen . . . 1776–[1830]. *Arch. Nat. Hist.* 10:251–254.
- HODGES, R. W. (ED.). 1983. Check list of the Lepidoptera of America north of Mexico. E. W. Classey Ltd. & Wedge Entomol. Res. Foundation, London. 284 pp.
- HORN, W. & I. KAHLE. 1935. Über entomologische Sammlungen, Entomologen & Entomo-Museologie. *Entomol. Beihefte aus Berlin-Dahlem* 2:1–160.
- HÜBNER, J. 1786–1789. Beiträge zur Geschichte der Schmetterlinge. Band I. [no publisher given], Augsburg. [154 pp.], 16 plates.
- . [1800–1838]. Sammlung Europäischer Schmetterlinge. Volume 4. Eulen. J. Hübner, Augsburg. [24 pp.], 185 plates.
- HULST, G. D. 1880. Remarks upon the genus *Catocala*, with a catalogue of species and accompanying notes. *Bull. Brooklyn Entomol. Soc.* 3:2–13.
- . 1881. Some remarks upon the *Catocalae*, in reply to Mr. A. R. Grote. *Papilio* 1:215–218.
- . 1884. The genus *Catocala*. *Bull. Brooklyn Entomol. Soc.* 7:14–56.
- . 1892. Prof. J. B. Smith's list of Lepidoptera. *Can. Entomol.* 24:74–75.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE. 1994. *Catocala connubialis* Guenée, 1852 (Insecta, Lepidoptera): specific name conserved. *Bull. Zool. Nomenclature* 51:178.
- . 2000. International Code of Zoological Nomenclature. Fourth Edition. Tipografia la Garangola, Padova. 306 pp.
- MALLIS, A. 1971. American entomologists. Quinn & Boden, Rahway, New Jersey. 549 pp.
- MCDUNNOUGH, J. H. 1938. Check list of the Lepidoptera of Canada and the United States of America. Part I. Macrolepidoptera. *Mem. So. Calif. Acad. Sci.* 1:1–275.
- PEACOCK, J. W. & L. F. GALL. 2001. Immature stages of the marbled underwing, *Catocala marmorata* Edwards (Noctuidae). *J. Lepid. Soc.* 54:107–110.
- POOLE, R. W. 1989. Noctuidae. Part 3. *Lepidopterorum Catalogus* (N. S.) Fascicle 118:1015–1314.
- ROWLEY, R. R. & L. BERRY. 1910. Notes on the life stages of Catocalae: a summer's record and incidental mention of other Lepidoptera. *Entomol. News* 21:441–455.
- SAUNDERS, W. 1876. Notes on Catocalas. *Can. Entomol.* 8:72–75.
- SCHRANK, F. P. 1802. Fauna bioca. Durchgedachte Geschichte der in Baiern Einheimischen und Zahmen Thiere. Zweyter Band. Zweyte Abtheilungen. J. W. Krull, Ingolstadt. 173 pp.
- SMITH, J. B. 1893. A catalogue bibliographical and synonymical of the species of moths of the lepidopterous superfamily Noctuidae found in boreal America. *Bull. U.S. Natl. Mus.* No. 44. 424 pp.
- 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. Volume II. T. Bensley, London. pp. 105–214, plates 53–104.
- STEIN, H. 1999. Der Schmetterlingsforscher August Radcliff Grote. Hildesheimer 1999 Heimatkalender. Verlag Geburder Gerstenberg, Hildesheim. pp. 98–102.
- STRECKER, F. H. H. 1874. Lepidoptera, Rhopaloceres and Heteroceres, indigenous and exotic; with descriptions and colored illustrations. Owen's Steam Book & Job Printing, Reading, Pennsylvania. pp. 71–80.
- TIETZ, H. M. 1972. An index to the described life histories, early stages and hosts of the Macrolepidoptera of the continental United States and Canada. Sarasota: Allyn Museum of Entomology, Sarasota, Florida. 1041 pp.
- TREITSCHKE, F. 1825. Die Schmetterlinge von Europa. Volume 5. Abtheilung I. Gerhard Fleischer, Leipzig. 414 pp.
- WALKER, F. [1858] 1857. List of the specimens of lepidopterous insects in the collection of the British Museum. Vol. 13. Edward Newman, London. pp. 983–1286.

Received for publication 4 December 2001; revised and accepted 24 July 2002.





Gall, Lawrence F. and Hawks, David C. 2002. "Systematics of moths in the genus *Catocala* (Noctuidae). III. The types of William H. Edwards, Augustus R. Grote and Achille Guenee." *Journal of the Lepidopterists' Society* 56(4), 234–264.

**View This Item Online:** <https://www.biodiversitylibrary.org/item/128079>

**Permalink:** <https://www.biodiversitylibrary.org/partpdf/260583>

**Holding Institution**

Smithsonian Libraries and Archives

**Sponsored by**

Biodiversity Heritage Library

**Copyright & Reuse**

Copyright Status: In Copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.