ON SPECIES OF CATOCALA.

BY A. R. GROTE,

*Director of the Museum, Buffalo Society Natural Sciences.**Catocala simulatilis* Grote.

The male is now taken by Mr. Jas. Angus. The species is larger than *obscura*, agreeing with it in tone and in the white fringes of hind wings; it may be distinguished by the strongly marked median lines of primaries with a deeper toothing. The lines in *obscura* are thread-like, inconspicuous, and with shallower indentations. The opinion expressed that *simulatilis* is the ♀ of *obscura* must be the result of error; as I remarked at the time of describing the species, such a sexual variation would be without a parallel in the genus. *Residua* is distinguished from *obscura* and *simulatilis* by its blackish fringes to the hind wings.

Catocala flebilis Grote.

There occurs a variety of *C. resecta* with shaded fore wings, which may be mistaken for *C. flebilis*, which has peculiar pearly ash fore wings with the outer margin more oblique. Whether Mr. Strecker has figured a variety of *resecta* for *flebilis* is uncertain from the coarseness of his figure. This suffusion of the primaries occurs in *amatrix* among the red-winged species (Group 3).

Catocala Angusi, n. s.

♂ ♀. Six specimens received from Mr. Angus belong to a new form with black hind wings and blackish fringes, except at apex. It belongs then with the series of *C. insolabilis* and *C. residua*, and is similarly sized. It may be distinguished from *residua* by its paler, evenly grayish primaries and by the t. p. line having a longer costal tooth, as in *simulatilis*. Lines distinct; subreniform open. From *insolabilis* it varies by the want of the bright blue gray tint of fore wings and the absence of the darker shade on internal margin. It varies by having in some specimens a basal black shade, and again another from reniform to below apex. Behind the t. p. line its last sinus is usually a blackish shade. Beneath the body is white and the wings as in allied forms, with the outer white bands very narrow. One specimen has the black suffusions very broad, the ground color of the wing very pale gray, and the subterminal gray band distinct, as it usually

is in *residua*. The latter species may be known by the deeper tone of primaries from base to subterminal line. The forewings in *Angusi* are not dusky as in *residua*, *simulatilis* and *obscura*, but slightly greenish gray, not very bright.

Catocala mira Grote.

This form is mentioned by Prof. Snow. It is as large as *polygama*, without determinate greenish or brown shades on fore wings. Lines black; t. a. more denticulate than in the three allied forms, *crataegi*, *polygama*, *pretiosa*. The pale shade over the sub-reniform from costa is without dark irrorations, distinct. The primaries are pale, more gray and smoother than in contrasted forms. The hind wings are of a deeper yellow, bands very similar, while the internal margin is notably free from dusky hair and scales. Beneath the black band is broader than in its allies. I do not think that any of these four forms now intergrade. They may be considered as distinct "species."

Catocala cerogama, var. *Bunkerii*.

This form of *cerogama*, received from Mr. Robert Bunker, has the band on secondaries extremely narrow and the yellow basal shade entirely lost. On the fore wings the median space is deeply brown tinted, setting off the white sub-reniform.

Catocala habilis, var. *basalis*.

Differs from the type in the presence of a basal black ray on primaries. On hind wings the median band is broader; the fringe is medially scalloped in black. The terminal inflection of the t. p. line on primaries is deeper and more distinctly black marked. The form seems to be a little larger than the type. Specimens received from Mr. Robert Bunker, taken about Rochester, N. Y.

In studying the black-winged series we may divide them by the fringes in sub-groups.

Fringes white:

1— <i>epione</i> .	6— <i>desperata</i> .
2— <i>sappho</i> .	7— <i>retracta</i> .
3— <i>agrippina</i> .	8— <i>flebilis</i> .
4— <i>lacrymosa</i> .	9— <i>simulatilis</i> .
5— <i>viduata</i> .	10— <i>obscura</i> .
	11— <i>Robinsonii</i> .

Fringes blackish:

12—*Levettei*.

15—*residua*.

13—*insolabilis*.

16—*tristis*.

14—*Angusi*.

It is somewhat strange that there are as yet no black-winged species known from California. One is described from Siberia, *C. dissimilis* Bremer.

Catocala relictæ.

In my first general paper on the North American species of *Catocala* (Proc Ent. Soc. Phil., Jan., 1872), the brief notice of *C. relictæ* includes the statement that "the narrow central fascia of the secondaries is pure white." Up to this time I find no notice of a distinct powdering of blue scales which edge this fascia (more noticeably sometimes about the middle of the wing) on my present examples. It is not easy to see these blue scales at first, but the attention once directed to them, they become apparent. This discovery leads me to compare more closely our species with the European *fraxini*, which it is held to "represent," and which has the central fascia of the hind wings entirely bluish. The European species seems to be larger than *relictæ*; the transverse posterior line less perpendicular, more deeply notched and more outwardly exerted opposite the cell, with more prominent teeth. Above the primaries are evenly dusted with dark scales in *fraxini*, and consequently more unicolorous; the darkest specimens of *relictæ* evidently owe their color to a spreading of transverse blackish shades, the ground color, however narrowed, being white. The edge of the hind wings is white in *relictæ*, gray in *fraxini*. Beneath both the species are pure white. The similarity of the under surfaces in these two species led me to reflect on the fact that in the Noctuidæ variation seems to be shown first on the upper surface of the primaries; it will be recollected that these are the more often exposed. There is, then, more white on *relictæ*, on both wings; the central and principal portion of the fascia on the hind wings being pure white. With a large material in all stages it would be interesting to more fully compare the two species, which have probably a common origin. It is interesting, meanwhile, that the blue color is retained in both forms, although in one it may not always be expressed. If the two species had a common parentage, the blue color has been affected most probably by the different surroundings of the now separated forms.

The fact that the under surface in *fraxini* is bright and white as in *relicta*, while the upper surface of the wings is more obscure than in the American species, is worthy of note. I think that if we may localize the features of variation in markings as occurring first on the upper surface of the wings, especially on the primaries, we may draw some conclusions as to the relationship between different species of Noctuidæ from the degree of similarity beneath. I have elsewhere shown that the variability of *C. relicta* in the tone of the fore wings is not a sexual character.

NOTES ON SOME OF THE GENERA OF MR. SCUDDER'S
"SYSTEMATIC REVISION."

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After reading Mr. Peabody's paper in the August number of the CANADIAN ENTOMOLOGIST, I determined to verify some of the measurements given as characterizing Mr. Scudder's genera, as it seemed hardly possible that many of the numerical relations there given should prove absolutely constant; and after examining a large number of species and specimens, these relations proved variable beyond all expectation. The measurements of the venation were taken directly from the wings by the aid of a thin sheet of transparent gelatine ruled with lines 1/50 of an inch apart, the wings having been bleached by Mr. Dimmock's admirable process.

Recently I have carefully gone over the measurements of the same specimens, of the groups of *Lycaeides*, *Glaucopsyche* and *Cyaniris*, with a microscope, measuring by means of an eye-piece micrometer and mechanical stage to the nearest thousandth of an inch, and find that the former measurements coincide sufficiently with these to warrant confidence in accepting the remainder as substantially correct.

The results prove that the venation of the wing is very variable even in specimens of the same species, and that no generic distinctions whatever can be based on slight differences in the proportionate length of the cell and wing, or the origin of the first and second branches of the subcostal nervures of primaries.

I have reduced the proportions of these parts mentioned by Mr. Scudder to percentages, so that comparisons will be easy. The species