

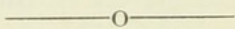
period, and rendered them exceedingly scarce thereafter. *Tityrus* in its more southern limits feeds largely on one or more species of wild bean, which is commonly found in marshes and along small streams, and which is very sensitive to dry weather. It is very evident that if constantly compelled to subsist on an insufficient diet both in quantity and quality (lacking moisture), *Tityrus* would soon develop, in the brood so subjected, a strong tendency toward the *Zestos* form; and as this is exactly what any brood of larvæ attempting to feed during the dry season in the tropics must be subjected to, it seems entirely natural to find that form not uncommon there.

Therefore, until further light is thrown upon the subject, I shall catalogue the species as at the beginning of this paper.

I have dwelt upon this subject much more fully than I should have done had I not considered it a typical case of the unfortunate work that has been done on the *Hesperidæ*. In this case, as in scores of others, characters that are found, on examination of a large series of specimens, to be inconstant, and which, however constant they might have been, were unworthy of specific distinction, have been employed in a manner that can only prove unfortunate for the authors using them, and for the science so abused.

Mr. Worthington's mistake in supposing his *Oberon* to be a new species was quite natural, and a mistake that any one who described with limited material from only one locality would be likely to make, especially as he probably had not access to Hübner's Sammlung. But what reason Mr. W. F. Kirby can give for placing these forms, so nearly devoid of constant colorational characters, in different genera of his catalogue, using *Thymeles* for *Tityrus*, and *Telegonus* for *Zestos*, when their structural, or generic characteristics are identical throughout, is beyond our powers of conjecture.

Their being so placed, however, accomplishes good, inasmuch as it calls attention to the utter worthlessness of these genera as at present separated by cataloguers.



## NOTES UPON *COLIAS CHRISTINA* Edw., and *C. ASTRÆA* Edw.

BY W. H. EDWARDS.

**C. Christina** was described, Proc. Ent. Soc. Phil., 1863, from 4 ♂  
1 ♀ received from Mrs. Christina Ross, and taken at the Portage of Slave River, about Lat. 60°. So far as I know, these examples were the only representatives of the species in collections until 1883. The male was yellow, with a large deep orange patch on the disk of each wing; the borders broad, black, and like those of *Eurytheme*; the under surface of fore wings yellow, of hind wings covered uniformly with



fine black scales; the discal spot of same wing small, white, in a red-brown circlet, about which were scales of same color; no patch at outer angle; no sub-marginal spots in three of the examples, but traces of such spots in the fourth. On the Plate, in But. N. A. Vol I., this fourth male is represented with three points in the three lower interspaces on fore wing, and three in the middle of hind wing.

The female was wholly pale yellow, without any border; under side thickly dusted, the discal spot as in the male; no patch at outer angle; no sub-marginal spots.

**C. *Astræa*** was described Trans. A. E. Soc., 1872, from a single male taken in Yellowstone region by the Hayden Expedition. Upper side pale ochraceous, a little orange-tinted on disk of hind wing; border pale black, of medium width. Under side of fore wing yellow, of hind wing so thickly covered with blackish scales as to conceal the whole surface; the discal spot of hind wing small, white, without a ring, and like that of *Alexandra*; no patch at outer angle, no sub-marginal spots. Subsequently I received another male, from Yellowstone, agreeing in all these points with the type. So far as I remember, this comprises all that was known of *Astræa* up to 1883.

In the summer of 1883, Mr. Wm. M. Courtis, M. E., then at Judith Mts., Montana, sent me four males, *Astræa*. The specimens before received had been much rubbed, and were old and faded before capture. The Mt. Judith males were in fair condition, and the peculiar ochraceous shade was deeper than in the type. This color occupies the same parts of both wings as does the deep orange in *Christina*. But one of these four showed the entire wing covered with ochraceous, except just at base, where yellow prevailed. The type *Astræa* had the discal spot of under hind wing small, white, with no edging. These Judith males all differed from the type here, having a few roseate scales around the white spot, or else a mere thread of roseate. All were immaculate and thickly dusted. With these males came one other which approached *Christina*, but the orange was rather a decided tint than a solid color. There came also two males, E, of deep lemon yellow, with orange-ochraceous on the disks of fore wings only, restricted to the median interspaces, which it filled to the marginal borders. Both had the discal spots as in the first mentioned, were thickly dusted and immaculate.

No yellow females came from Mt. Judith, but there were two white females, and these at the time much puzzled me, as it did not occur to me that they must be albino *Astræa*. These are greenish white; one with a faint broad border reaching quite to inner angle of fore wing, with interior light patches; the other with a slight border on upper half of wing only. Beneath, both are thickly dusted; are without patches at outer angle, and without sub-marginal spots; the discal spot of one is



white in narrow edge of roseate, the other white in ring of red-brown. Captain Gamble Geddes sent me for inspection a large number of examples of *Colias* taken by him in 1883, in the N. W. Territories of British America. Among them were many male *Christina*, typical form. Others shading from deep orange to pale, and into ochraceous. There were also several forms of yellow female, including the immaculate one originally described and figured; also many white females, some of which were precisely like the albinos from Mt. Judith. After a brief and hurried inspection these insects were returned, and I am not able to speak of them now except in a general way. But I have lately received from Captain Geddes for my own collection four typical males, *Christina*; one male ( $E^2$ ) like E of Mt. Judith lot, that is, with pale orange on disk of fore wings only, the rest being yellow; and one ochraceous male, close to the typical *Astræa*. Of the four orange examples, two have the under side greenish yellow, as originally described for this species; both have a slight red-brown ring about the white discal spot; one has a small red-brown patch at outer angle (the only instance known to me where that mark has appeared in this species), otherwise immaculate. The other two examples have the under side deep yellow; in one of these the discal spot is in roseate edging, with red-brown scales interior to that; otherwise immaculate; the other has roseate edging only, and is immaculate, except that a few black scales in the sub-median interspace of fore wing gives a suggestion of an obsolete row of sub-marginal spots.

The pale male,  $E^2$ , is yellow beneath, immaculate, dusted; the discal spot duplex, each part white with rosy edge, and slight outer ring of red-brown. The sixth male, like *Astræa*, has also a duplex spot, and traces of the three lower spots of sub-marginal row on fore wing, otherwise immaculate, dusted.

The three yellow females differ from each other; No. 1 is like type *Christina* ♀, figured in the Plate; no marginal borders; immaculate beneath, densely dusted; discal spot duplex, the larger part white with some rosy scales amongst the white, a thin rosy edge, and red-brown outer ring. No. 2 is color of No. 1, but with the faintest shade of orange in median interspaces of fore wing; a few black scales about apex and down hind margin suggest a border; under side densely dusted, immaculate; discal spot white in thin rosy edging. No. 3 has decided but pale orange on both wings; and a decided pale black border, with a whitish space in middle instead of a series of spots. Under side immaculate, dusted thickly; discal spot duplex, each part in slight rosy edging.

Of the three white females, No. 1 is like yellow No. 2 except in color, and the white has a faint yellow tint; under side immaculate, dusted; discal spot white in slight red-brown edging. Nos. 2 and 3 are greenish white, with pale broad border entirely across wing; one



has light patches inside this border, the other has none; beneath immaculate, densely dusted; the discal spots small, one in rosy edging, the other in red-brown.

At this present writing I have also before me four yellow females, and six white ones, of Captain Geddes' collecting, but belonging to Mr. Neumoegen. Of these yellow ones, none are uniform in color, like the type; No. 1 has a flush of orange; 2 and 3, more orange; 4 decided orange on both disks. One has traces of sub-marginal series of spots, to wit, a few scales in three lower interspaces on fore wings; otherwise all are immaculate; all are thickly dusted; and the borders of upper side vary from a few scales at apex and along margin to a well defined broad border, with interior light patches; discal spots just as before described.

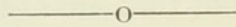
Of the six white females, two have slight borders, mere traces of the inner and outer edges of a border; one has the half of border on margin distinct; the other three have full width borders, with interior whitish spots; one of these has also a border to hind wings, made up of separated patches lying at the ends of the nervules. No other female, white or yellow, has shown a border to hind wing. Beneath, all are heavily dusted; one has two little clusters of scales on fore wings on lower two interspaces, otherwise all are immaculate; the discal spots of all small, white, in either roseate or red-brown edging.

After seeing this material from localities widely separated, from Montana, and British America as far north as Lat.  $60^{\circ}$ , I am of the opinion that all the examples are members of one species, to wit, *Christina*. The type male has deep orange disks. *Astræa* is a well marked form or variety; the disks orange-ochraceous, and one style of color grades into the other. One of the Montana examples approached *Christina* in coloring, but the usual Montana type appears to be not orange, but ochraceous. All the males from the far North were deep orange. So also were most of the males taken by Captain Geddes (about Lat.  $50^{\circ}$ , along Can. Pac. R. R.), but a few showed a change towards the *Astræa* type. It is probable that in Lat.  $60^{\circ}$  there is but a single brood of the butterfly, and if that is the case, *Christina* is the winter form. If in Montana there are two broods, *Astræa* may be the second brood, the species being seasonally dimorphic. But it seems to me more probable that the case is like that of *Satyrus Nephele*, there being a Northern form and a Southern form, and between the areas occupied by the two, a belt of dimorphism. *Nephele* passes into this belt, and on the other side of it emerges *Alope* (or the reverse takes place), as I have clearly shown in But. N. A., Vol. II. So *Christina* may represent its species in the far North, *Astræa* in the Southern area, while between the two is a belt in which both are found. The species passing through this belt loses one form and emerges under the other. The case of *Occidentalis* and *Chrysomelas* is perhaps one of the same nature.



Of the females, there are several distinct types; the pure yellow, immaculate; the yellow with more or less of a marginal border; the pale orange with medium border; the decided orange with heavy border; and there are intergrades between these. In addition to these are the white females, which seem to constitute a very high percentage of the whole, perhaps fifty per cent., a remarkable number as compared with *Eurytheme* or *Philodice*, for instance, where the albinos probably do not constitute one per cent. I have seen no white female absolutely without traces of a border, but the traces are sometimes very slight, and there are grades just as among the yellow females up to a heavy border, and even a border on hind wing, which is unusual.

As a rule, the discal spot of fore wing is black, but if there is a clear space within the black spot, in the orange examples, this is orange; the spot of upper hind wing is usually orange, but sometimes ochraceous, the latter color perhaps always in albinos. The under side is always densely dusted, often so as to conceal the color of the hind wing. The discal spot of this wing is white, but occasionally a few rosy scales are mingled with the white ones; and either there is no edging at all, or there is a slight edge of roseate or of red-brown. One instance only has been noted of a patch at outer angle; and one only of distinct sub-marginal spots on hind wing. This is the male figured on the Plate, and the spots are seen to be very small, and limited to middle of the wing. On the fore wing never more than three small spots have been noticed, and these are in the lower three interspaces. Some examples have traces of one or two spots, always in the lower interspaces. Both these spots and the patch are exceptional, and are caused by reversion. That is, the original of this and many of our species had a patch at outer angle, and a series of sub-marginal spots on both wings, such as is seen in all the members of the *Eurytheme* sub-group to-day. *Christina* lies between that sub-group and the one which contains *Alexandra*, the type *Astræa* ♂ approaching *Alexandra*.



## CAPITALIZING SPECIFIC NAMES.

BY W. H. EDWARDS.

Lepidopterists have followed quite strictly the rules of Zoölogical Nomenclature adopted by the British Association, 1842, and amended by Section D, 1865, even where to many of them a further modification in certain points has seemed desirable. At the meeting of the Association, 1865, a report of a new Committee appointed 1863 was submitted and adopted by Section D. Moved by Mr. Gwyn Jeffreys, seconded by Dr. Sclater, "That the report now read be approved and adopted by the Section, and that the rules or propositions, as thereby



Edwards, William H. 1884. "Notes on *Colias christina* Edw., and *C. astra* Edw." *Papilio* 4(2), 30–34.

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