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A POSSIBLE CASE OF MIMICRY BETWEEN LYCAENID BUTTERFLIES (LYCAENIDAE)

Mimicry is a relatively common phenomenon among lepidopteran insects. Familiar North American examples have been studied extensively (e. g. Brower 1958, *Evolution* 12: 32–47, 123–136, 273–285). Recently, Downey (1965, *J. Lepid. Soc.* 19: 165–170) suggested a mimicry complex with several blues (Plebejinae, especially *Plebejus icarioides* Boisduval) serving as models for the noctuid moth *Caenurgina caerulea* Grote. Another possible case of mimicry with blues as models involves the male Blue Copper (*Lycaena heteronea* Boisduval). The striking superficial resemblance of the dorsal wing surface of the latter and blues has been noted often (Ehrlich and Ehrlich 1961, *How to Know the Butterflies*; Comstock 1927, *Butterflies of California*; Brown et al. 1957, *Colorado Butterflies*). The difference in coloration of the male *L. heteronea* from that of other coppers immediately suggests mimicry.

I suggest that the male of *L. heteronea* is a mimic of *Glaucopsyche lygdamus* Doubleday and possibly other sympatric blues. The dorsal coloration of *L. heteronea* is nearly identical to that of *G. lygdamus*. The geographical range and flight period of the copper appear to be entirely within those of the blue.

Furthermore, Batesian mimicry is indicated by at least three sets of data. The dorsal resemblance is nearly perfect. Batesian mimics tend to be more perfect than Müllerian (Ford 1964, *Ecological Genetics*). The food plant of the copper is *Eriogonum*; those of *G. lygdamus* include *Lupinus* and *Astragalus* among other legumes (Ehrlich and Ehrlich, op. cit.). *Lupinus* contains alkaloids (Robinson 1968, *The Biochemistry of Alkaloids*) and many *Astragalus* contain selenium; both are known to be poisonous to vertebrates (Kingsbury 1964, *Poisonous Plants of the United States and Canada*). If these compounds are incorporated into insect tissues, such insects may be poisonous or unpalatable to their predators. The mimic appears to be less common than its model (Comstock, op. cit.; Brown et al., op. cit.). In June and July, 1963, in Garfield County, Colorado (Coffee Pot Springs, White River Plateau, 10,000 feet), I found *G. lygdamus* to be about ten times as common as *L. heteronea*; the latter was ecologically sympatric with the former and could not be distinguished in the field.

If this is found to be a true case of mimicry, it is apparently the only one among butterflies involving only the male (the female *L. heteronea* is a typical copper). Other cases of Batesian mimicry in butterflies are restricted to the female, or both sexes are involved (Ford, op. cit.). Also of interest is that *L. heteronea* is nearly allopatric with another blue mimic (*C. caerulea*), overlapping only in eastern California (Downey, op. cit.). Additionally, the several species of lupine feeding blues may form a large Müllerian complex.

I hope that these observations will stimulate further research on mimicry in these butterflies, both in the field and the laboratory. For example, I have seen remains (wings) of blues at mud puddles. It would be of interest to have counts of each species represented and to compare these with their abundance.

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THE USE OF CHLOROETHANE FOR IMMOBILIZATION OF FIELD SPECIMENS

Chloroethane (ethyl chloride) is a colorless, volatile liquid used in the medical profession as a topical anesthetic. Its low vapor pressure causes quick evaporation at normal atmospheric temperatures and cooling of any object in contact with it.

In 1969 I began using chloroethane to "freeze" butterflies caught in the field. The spray is easily directed at the specimen in the net and almost immediately immobilizes it. Although many species do not regain activity after adequate immobilization, a killing jar is still used because some species do become active several minutes post-exposure.

The chloroethane immobilization allows for better specimens to be brought back from field collecting. It lessens the battering of specimens in net and killing jar and prevents their escape in the transfer from the net. The substance has not caused any residue on wings or any pigmentation changes in any species to date.

Chloroethane is supplied in four-ounce glass bottles with fine, medium or course nozzles. I have found the fine nozzle to be adequate for most Lepidoptera and the medium nozzle to be adequate for even the largest. The four-ounce fine nozzle will do 250–300 specimens and the medium nozzle 150–200 specimens. If the bottles are stored in a refrigerator when not in use the chloroethane evaporates very slowly and may be used over many weeks with almost no loss between usages. I have found that wrapping the bottle in crumpled tinfoil is also useful. This acts as an insulator, keeping the fluid cooler longer, lessening evaporation and so allowing the chloroethane to be used for more specimens. The tinfoil also protects the glass bottle from breakage should it be dropped.

The main disadvantage to chloroethane is that it is flammable. It burns with a light green flame and liberates hydrogen chloride as a by-product. Except for the flammability, chloroethane is a relatively safe chemical when compared to other poisons used in entomology.

Chloroethane is a prescription drug and some difficulty may be encountered in obtaining it for non-physicians. Presently it may be obtained only from hospital pharmacies with a prescription from a physician. If sufficient interest is expressed from collectors, manufacturers may make it available to biological supply houses for use in entomology.

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