period (*12*), it has not been comforting to observe inferences too frequently based on little or no actual quantitative analysis of a meaningful kind.

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6. The method of "mean period length," as termed here, was described by both DeCoursey (*8*) and Rawson (*9*).
7. See, for example, *Cold Spring Harbor Symp. Quant. Biol.* **25**, (1960).
8. P. J. DeCoursey, *Science* **131**, 33 (1960); see also, for example, *Cold Spring Harbor Symp. Quant. Biol.* **25**, 49 (1960).
9. See, for example, K. S. Rawson, *Cold Spring Harbor Symp. Quant. Biol.* **25**, 105 (1960).
10. The equipment in our laboratory is described in Sage *et al.* (*3*).
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Selective Forces in Papilio glaucus

Burns (*1*) presents data on selective mating bearing on the problem of mimetic polymorphism in *Papilio glaucus*. His data suggest the possibility that the females of the dark, mimetic form are less successful in mating than are those of the nonmimetic form, and he concludes that this selective disadvantage of the dark form is in some way balanced by the selective advantage of the dark form due to its mimicry of *Battus philenor*. He states, "Reproductive advantage [of the light form] and mimetic advantage [of the dark form] are opposed forces that may sustain female dimorphism. . . ."

It appears that Burns is suggesting that opposing selection in two different fitness components within one generation will result in a stable polymorphism. In fact, the fate of a gene in future generations is governed, as always, by the net fitness, which is the product of all fitness components within each generation. It is highly unlikely that the two fitness components in this case (survival and mating) just cancel so as to render the dark form neutral with respect to the light form. It would appear, therefore, that additional reasons must be sought for the evidently stable polymorphism in *P. glaucus* in the regions in which it is sympatric with its model, *B. philenor*.

Possible reasons are the continual migration of genes for light color into such sympatric regions from monomorphic light populations, or the often suggested hypothesis for mimetic polymorphisms of frequency-dependent selection in which the mimetic form is assumed to lose its former advantage when it gains sufficient abundance relative to its model, or both.

Burns's data on selective mating do play a role in this latter hypothesis since they explain the selective disadvantage of the mimic relative to the nonmimic which will become more important as the mimic loses its mimetic advantage (net) due to its increased frequency.

Perhaps it is this sort of scheme which Burns meant to indicate by his phrase "opposing forces." Even so, it would appear worthwhile to point out to his readers that a system of opposing fitness components cannot, by itself, produce a stable polymorphism.

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Prout suggests that I am concerned with opposed selective forces of reproductive advantage and mimetic advantage in *Papilio glaucus* (*1*) without sufficient regard for certain phenomena that are generally believed to accompany mimetic polymorphism. It seemed unnecessary in my short report to review the elements of mimicry theory, which date from the last century. That the relative numbers of model and mimic should affect the selective advantage of mimetic resemblance is self-evident.

I had thought this background involving frequency-dependent selection was satisfactorily indicated by sentence three of the abstract, paragraph two of the main text (particularly the statement that "The occurrence of the mimic . . . is correlated with the distribution and abundance of the model . . ."), and Table 1, which quantitatively documents major geographic variation in the relative frequencies of mimetic and nonmimetic morphs. I have explicitly discussed frequency-dependent selection in mimicry in an earlier paper (*2*).

Prout may be overstating the "stability" of the dimorphism, the "balance point" of which certainly shifts in space, probably fluctuates locally, and, in view of our nearly complete lack of quantitative data collected at the same place at different times, may be shifting unidirectionally in time. Contrary to widespread opinion, which I endorsed in stating (*1*) that "the dark morph . . . apparently . . . nowhere totally replaces the light morph . . . ," females of *P. glaucus* now appear to be virtually or quite monomorphic for dark in some, at least, of the southwestern part of the species range. It would not be surprising to find the mating preference evolving and hence varying geographically, with dark females becoming increasingly acceptable where they have come to make up most of the female population.

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