fested in the heterogeneity of isozyme patterns among leopard frog species (*4*).

We wish to emphasize that the various leopard frog species possess different biological characteristics that must be considered when they are used for experimentation.

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## Engineering Ph.D.'s

A statement is made in John Walsh's article "The state of academic science: Concern about the vital signs" (News and Comment, 10 June, p. 1184) which I feel requires correction. Walsh says, "Engineering is in the midst of one of its cyclical booms in undergraduate enrollment but finds the opposite effect in its doctoral programs, apparently as a result of industry's current coolness to engineering Ph.D.'s."

It is true that engineering doctoral enrollment has been declining in recent years, but the evidence does not support the reason suggested by Walsh. Certainly there are some employers who are critical of Ph.D.'s, but surveys conducted by the Engineering Manpower Commission since 1970 show that 92 to 97 percent of engineering Ph.D.'s have been employed (or had other personal plans) by the time of graduation. This employment record is even better than that for B.S. holders in engineering, who in recent years have been 86 to 96 percent employed (or had other personal plans) by commencement time. Since only a third of engineering Ph.D.'s go to educational institutions and only 3 percent into postdoctoral positions, it is difficult to find in this fine employment record any evidence of industrial coolness.

A more likely explanation for the numerical decrease in engineering Ph.D.'s is to be found in the federal government's restrictive attitude toward training grants and a very negative report of the National Science Foundation (NSF) in 1971 (*1*). In that report NSF predicted that there would be a 40 percent surplus of engineering Ph.D.'s by 1980. However, the prediction was partially based on the assumption that the production of engineering Ph.D.'s would continue to increase during the 1970's. Overlooked was the fact that engineering doctoral enrollment had already begun to decline 3 years earlier, in 1968. Doctoral enrollment declined even further after publication of the NSF report. No surplus has yet developed, but it could not realistically be argued that there is a shortage, either. Perhaps the adverse prediction of the report, even though erroneous, prevented the occurrence of the very event it warned against.

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## "Kerfuffle" Identified

The word "kerfuffle" questioned by Frank M. McMillan (Letters, 3 June, p. 1041) is recognized as a noun in volume 2 of the supplement to the *Oxford English Dictionary*.

"Kerfuffle" is also "curfuffle" (1813) and "gerfuffle" (1943). Kerfuffle was first spotted in 1959.

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McMillan appears to suffer from a deficiency of dictionaries. If he looked, he would find "kerfuffle" in the supplement portion of Eric Partridge's *A Dictionary of Slang and Unconventional English* (Macmillan, New York, ed. 7, 1970).

McMillan's brilliant analysis is merely another example of an unnecessary hypothesis based on a faulty premise.

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McMillan discusses the word "kerfuffle" as if it had been invented by Nicholas Wade. While I cannot give any definitive origin of the word, its meaning, to me at least, is perfectly clear and very expressive. I first heard it while visiting a friend in Uganda over a quarter of a century ago. The friend was British, an official in the Uganda Survey. He was de-

scribing what happened when a leopard got into his chicken coop. To me, it suggested a picture of chickens flying every which way amid great cackling and confusion. This is the picture evoked by the use of the word by Wade. A language grows through current use, and I would welcome this addition.


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### The U.S. Birthrate

In our *Science* article of 29 August 1975 (p. 693) we set forth a number of considerations which led us to conclude "that the American birth rate may have bottomed out and that the country is likely to see a rise in reproduction." Campbell Gibson (29 April, p. 500) undertakes "to review [our] interpretations and to examine data pertinent to more recent fertility trends." For one, Gibson argues that our use of California data to predict the direction of national trends was invalid. While we indeed relied heavily upon California data, we did not, as Gibson suggests, merely extrapolate California's aggregated fertility rate to the country as a whole. On the contrary, we examined disaggregated rates for the state (by legitimacy status and race, age, and parity of mother) to gain insight into the internal dynamics that might be working to push up the birthrate. Because California frequently is a forerunner of national social and economic trends, we thought the state offered a significant clue to future demographic events in the country.

Gibson's finding that California's fertility experience has not been predictive of national trends comes from his use of a model that assumes the relationship between California and the rest of the country should have been the same before and after legalization of abortion. This procedure throws away important information about the advent of legal abortion in California. As Gibson's data show, between 1960 and 1970 California and the rest of the nation experienced similar annual changes in fertility; and after 1970, when a time lag developed between California and the nation in the availability of legal abortion, a time lag also developed in the decline of fertility. We recently showed that still another time lag had developed, this one in the renewed rise in illegitimacy, which now has appeared nationally, as it did earlier in California, as the influence of legal abortion has been overwhelmed by other social forces (*1*). These trends indicate that California's experience can indeed be useful for anticipating changes in national fertility.

Gibson agrees in general with one of our major premises, namely, that postponed childbearing among young married women is likely to be made up. He offers two different birth-timing models prepared as Census Bureau projections to show how much increase would occur in the total fertility rate assuming that the currently reported lifetime fertility expectations of these women are fulfilled. Both sets of projections, series II and series II-L, assume a relatively late mean age of childbearing. Series II generally projects current timing patterns, while II-L assumes an even greater postponement. Using II-L, Gibson shows a negligible increase in fertility. His results with II, however, indicate an increase in the total fertility rate of 10 percent between 1975 and 1980. This is in fact an increase of 17 percent in the crude birthrate (*2*). Gibson characterizes this increase as "moderate," which it may be when compared with the dramatic rise of the 1950's. Even so, the magnitude of increase shown by the series II projections has important economic and social implications which cannot be dismissed.

Moreover, the series II assumptions appear incomplete in that they do not allow for the possibility of a reversion to a pattern of earlier childbearing. But in our article we presented evidence from California showing that in addition to the making up of postponed births by older women, just such a pattern of more youthful childbearing was emerging in 1974. In California the detailed 1976 data show an estimated rise in the legitimate birthrate of 2.3 percent, with rises occurring among women over and under age 25 (*3*).

The final point in Gibson's article concerns the influence of economic conditions on fertility. He argues that "a substantial increase in fertility in the face of adverse economic conditions is unlikely." In our article we reported that California's birthrate rose in 1974 despite an unfavorable financial climate, and we cited this as empirical evidence that adverse economic conditions do not necessarily prevent women from going ahead with childbearing. We recognized that economic conditions influence fertility, but we considered that this influence has limits because of the unique role, discussed by Judith Blake and Kingsley Davis (*4*), that children play in people's lives. All told, how far the birthrate will rise or fall depends on the balance of a