

gether, instead of giving away what we consider to be excess baggage.

The "lifeline ethic" would lead to a more equitable world government; and until we have such an array of juxtaposed lifeboats, all floating together and providing far greater buoyancy, each lifeboat will exploit every other lifeboat. In the face of increasingly depleted resources, any species of higher animal begins to war. It will become crucial for all lifeboats to merge before the threshold for aggression is surpassed. We must construct international inhibitions to warring, as we have constructed social inhibitions to overt aggression. Otherwise no lifeboat will remain afloat. It is foolish to think otherwise.

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## DUBIOUS METHODOLOGICAL VALIDITY

Once before I wrote to indicate my concern about the publication in *ABT* of research studies that have dubious methodological validity. The September issue in another case in point with the article by L. A. Seymour et al. on "A Successful Inquiry Methodology" (*ABT* 36[6]:349). The small differences between IRA and non-IRA students could easily be accounted for by the fact that the two samples were not random samples. There is a good probability that the teachers who were selected or volunteered to use IRA materials were either better teachers or were in more favorable school settings. This kind of potential systematic bias completely vitiates the conclusions drawn in the study.

My concern is to increase the number of educational decisions we make on the basis of valid research results. If we continue to publish in *ABT* studies that are of dubious validity, we discourage the use of such studies as a basis for decision making in the long pull. Increasingly, teachers learn that from decade to decade there are new fads, all backed by some kind of "research" findings, and they begin to lose faith in this approach to decision making. Granted that good research studies are very hard to find (I found only about 20 in some 600 I reviewed for the ERIC summary of research published recently), but we must keep on trying.

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### L. A. Seymour comments:

The "small differences between IRA and non-IRA students" were actually quite large in the case of cognitive inquiry and associated attitudes. The IRA students exceeded the non-IRA students by wide margins, despite the fact that non-IRA students had superior abilities as measured by the Differential Aptitude Test. Covariance was not used and thus the differences in favor of the IRA students were, in fact, larger.

The teachers designated IRA and non-IRA were in the same high schools. They were recommended by their supervisors as having similar abilities and experience. Because funds were limited, however, extensive data were not collected on the teachers to determine which group may have been "better." Also, funds were inadequate to randomly assign a large number of teachers in a national sample. This procedure would obviously be preferred.

Let me remind you of the four questions raised and answered in the article: (i) Can students develop inquiry skills? (The answer was definitely yes.) (ii) How does development in the inquiry-oriented class compare with development in other biology classes? (See the preceding discussion.) (iii) Do students prefer classroom settings in which inquiry is emphasized and developed. (The answer was definitely yes.) (iv) Can teachers learn and execute the new methodology adequately to attain the intended outcomes? (Again, the answer was definitely yes.) You comment directly on only one of these four questions. I would welcome your comments on all four.

## "FROG CONSERVATION"

The Committee on Social Responsibility of the Society for Developmental Biology conducted a workshop last summer to discuss the decrease in supply of living leopard frogs (*Rana pipiens*) and the poor general vigor of animals which are captured in the wild. Biologists and commercial suppliers have offered many suggestions about probable causes of this "frog problem." It seems likely that decreased habitat (especially drainage of breeding ponds), increased pollution by agricultural runoff, recent unusual spring weather in some production areas, as well as various undetermined factors, have lowered the frogs' resistance to common bacterial and viral pathogens. Not only has the adult population been affected; there are reports of unusually high incidences of developmental arrests in egg masses in the field.

Normally, heavy harvesting does not seem to affect frog population sizes significantly, but the present situation may be a special one. The very frogs which could be the hardy core of a regenerating population seem to be the ones most easily harvested now because they are able to carry on normal activities in traditional collecting areas. With this in mind, we appeal to biologists to consider reducing their current use of living frogs.

Although the large populations that have supported heavy harvesting have been badly depleted, no expert we consulted believes that *Rana pipiens* is in immediate danger of extinction. In addition, it is highly unlikely that conservation by biologists will be a major factor in bringing about a quick return to former population levels. Nevertheless, responsible biologists should contribute to efforts to conserve this organism, which has served so many of us so well in teaching and in research. Because there are an estimated five frogs used in teaching for every one used in research, a heavier responsibility falls on those of us who use *Rana pipiens* in teaching laboratories.