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Editorial

Despair & Specialization

My favorite students are the enthusiastic, idealistic ones. They work hard and have the solutions to the world's problems as their goal. However, they must be carefully nurtured and advised lest they fall victim to despair or early specialization.

The world's problems are increasingly complex and deeprooted, yet it seems to be human nature to seek simpler solutions as problems become more complex. The student who wants to "cure" cancer or end all pollution is not only naive, he or she is in danger of experiencing frustration and depression upon learning more about how messy and intractable these problems are. Such a student might resort to fanatical faith in a simple doctrine, such as a religious cult or extremist environmental group. More likely, he or she will just give up in despair.

A second kind of student recognizes the complexity of problems, and perhaps even is realistic about his or her role in their partial solution. Unfortunately, these students often want to begin immediately. I understand that delaying gratification for years or decades is beyond the maturity level of most teenagers, but it is unrealistic to approach difficult problems with minimal academic skills. In high school, these are the students who perhaps do well on a science fair project while their coursework is neglected, or take anatomy and physiology, marine biology and microbiology while avoiding chemistry, physics, math and foreign languages. In college, these are the students who want to complete the equivalent of the first year of medical school while still undergraduates, or who take all their major courses first and leave the general requirements for their senior year. Their educations usually lack the breadth and perspective essential for dealing with complex issues.

We need all these students, for the world's problems will require all the talented problem-solvers we can train. We must gradually and gently introduce them to the vagaries and complexities of the world, and we must be sensitive to the mental turmoil associated with the realization that the world is not black and white, good and bad. And it is our duty as teachers and advisers to direct these students into broad, general curricula that will give them the background for appreciating how the world functions and how much an individual can contribute to the solutions of important problems.

Dan Wivagg
Associate Editor

Letters to the Editor

Dear Editor:

The NABT Executive Board recently made an official statement that "The National Association of Biology Teachers supports alternatives to dissection . . . where possible"*. The board acted to establish an Ad Hoc Committee to develop more detailed policies. These May 1988 decisions modified a previous October 1987 position not to establish a policy on dissection because at that time the board "felt it was too controversial" (Winter *News & Views*, pg. 3). These new developments are welcome.

Increasingly students and teachers are challenging the value and place of dissection of dead animals in their biology education. In fact, there have been a number of recent cases where students have refused to dissect frogs and other animals. Protests about dissection appear to be increasing. Some teachers, students and school districts are already having to grapple with difficult issues surrounding dissection in ongoing court cases and in proposed state laws. Potentially many more persons could be involved since some 75 percent of schools include dissection in their curricula (Orlans 1988).

Teachers turn for guidance to their professional association, NABT. From whom else can direction be sought with confidence? Guidance on policies governing dissection could be an immense service to members.

May we make some beginning recommendations of topics that we believe should be addressed in any national policy on dissection.

*The board also made the important statement that NABT supports alternatives to vivisection, but this issue is not here addressed.

1. At what grade level, K through 12, should vertebrate animal dissections be introduced, if at all? We would personally recommend that only those students committed to a career in the biological sciences receive such instruction—that is, 12th grade students and above. The older the student, the more meaningful the exercise is likely to be. Recently, one of us (F.B.O.) has encountered dissection of frogs, pigeons, fetal pigs and rats in grades 1 through 4. Such practices are highly questionable.
2. Should students who object to dissection of dead animals on conscientious grounds be allowed alternative service? Inasmuch as religious and moral objections are made to dissection and cultural differences exist, we believe it is wise to acknowledge conscientious objection. It is the responsibility of teachers to be knowledgeable about alternatives to dissection. A number of alternatives for comparative anatomy studies—videotapes, computer simulations of dissection and other ideas—are listed in the references.
3. In curricula where dissection *is* included, what species of vertebrate/invertebrate animals should be selected, and how many dissections are needed? In certain school districts, some students do four vertebrate animal dissections before graduating from high school—for instance, frog in eighth grade, fetal pig in ninth grade, cat in eleventh grade and dog in Advanced Placement twelfth grade. Students we know who have completed such courses complain that this is excessive and they derived little benefit from it. In general, at most no more than one vertebrate animal dissection need be done through twelfth grade. Domestic species such as dogs and cats should be avoided —the rationale being that pet animals closest to human beings can create emotional conflict and disturbance. Dampening such sensitivities may not be in the students' best interests. Perhaps more than one invertebrate animal and also some plant dissections could be included for comparative purposes.
4. What several health and safety factors need to be addressed?
   a) As a general rule, dead animals should not be brought in from the wild for dissection because of potential health hazards. Obtain dead animals from slaughterhouses, grocery stores, or licensed biological suppliers.
   b) Dissection or any similar activities should be performed in designated school areas and with instruments intended for these activities. The students must receive faculty supervision at all times. The faculty member is responsible for insuring that the area is completely cleaned afterwards. We have encountered a recent episode where 11th grade students were required to take dead cats home because there was incomplete class time to complete tasks. In our opinion, this is highly inappropriate.
   c) At no time should food or drink be permitted, nor smoking allowed during the dissection of an animal. The teacher should be responsible for maintaining complete decorum and respectful attitudes of the students toward the dead animal.
5. How can the numbers of animals used for dissection be kept to a minimum? The teacher may wish to demonstrate one professionally dissected animal to the class rather than assigning an animal to each student or each group of students. Not only does this have the desirable effect of reducing the number of animals used, but it reduces costs and insures that high standards of dissection are maintained. Other options, such as student-sharing, should be considered.

The five topics and recommendations are just a suggested starting place. Much input is needed from teachers and students in suggesting additional topics and other recommendations. We realize that discussing ANY issues involving animal experimentation is provocative. Nevertheless, rational, unemotional discussion can take place and sensible guidance be given.

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Operation: Frog [Computer-simulation program]. New York: Scholastic Software.

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Dear Editor:

In special Microbiology issues of *The American Biology Teacher,* Walter and Via published a paper in August 1968 titled "Making a Leeuwenhoek Microscope Replica." This followed a project undertaken by several high school biology teachers attending an NSF-sponsored bacteriology summer institute that I directed.

Antonie van Leeuwenhoek was born in Delft Holland more than 350 years ago. Today we realize he was a remarkable man with unusual powers of observation, patience, skill and ingenuity. One of his greatest contributions was to use the talents he developed in grinding lenses and to incorporate these into simple microscopes, with which he discovered a new world of "little animals." His writings to the Royal Society in England established him as an authority concerning an unseen world.

His miscroscopes generally were made by mounting one of his lenses between two brass, copper, silver, or gold plates riveted together at the four corners. A specimen mount was attached to the plates, and vertical and horizontal movement was accomplished by elevating and focusing screws. Reports indicate that probably between 300 and 400 instruments were fabricated so that he could examine specimens left mounted over extended periods. Few remain.

From his detailed letters to the Royal Society, it is clear that Leeuwenhoek was the first to observe microscopic life.

We have been making modified replicas of his microscopes since 1965. These modified scopes are available for $35; with a walnut base and brass holder, the price is $40. If payment in U.S. currency does not accompany an order, add $5 to cover billing, postage and insurance.

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