

Guest Editorial

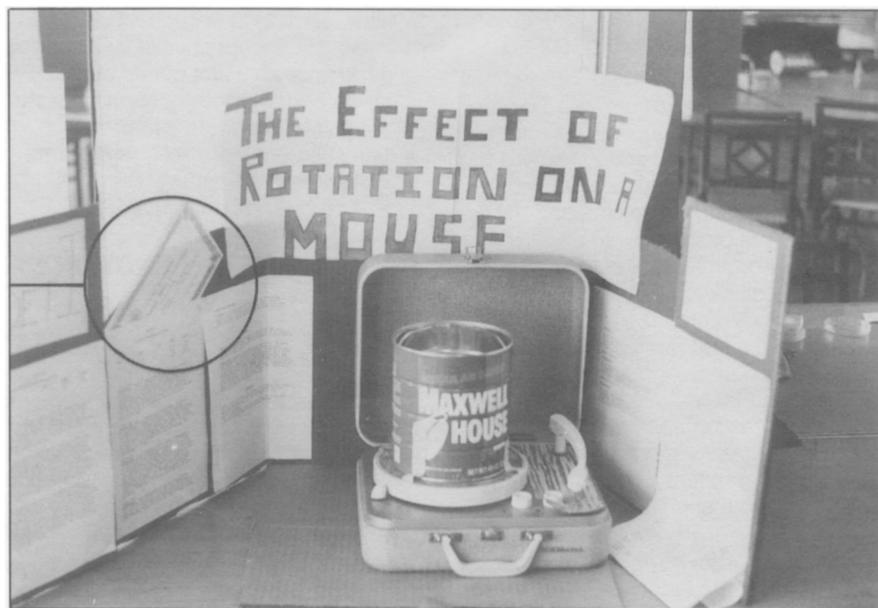
Should Students Harm or Destroy Animal Life?

Looking back on their biology education, what have recent high school graduates learned about the animal kingdom? In what animal-related projects have junior and senior high school students most likely participated?

Three types of vertebrate animal projects dominate pre-college biology education. One type is taking dead animals and dissecting them; the second uses live frogs and piths them; and the third includes projects encountered in science fairs in which small mammals are subjected to experimentation, some of which is painful, life threatening, or life-destructive. Although not all science fairs permit such projects, a major national competition, the International Science and Engineering Fair (ISEF) *does* permit invasive projects with animals. Therefore this third type of activity occurs in many, and possibly most, states. What these three situations have in common is the injury or destruction of a live, healthy and sentient vertebrate animal.

Do these animal projects represent the highest standards of biology education? Are these animal projects the best we can offer our students in terms of learning about the animal kingdom and the relationship of humans to animals? Do we want to retain dissection and pithing of frogs and harming small mammals, or is there a better way of studying life and life-processes?

Those who know me or my work will know that I am not raising these issues because I wish to see an elimination of animal-related projects in biology education. Quite the contrary. I would like to see a vast increase in the study of living organisms in introductory biology instruction. I am a physiologist who agrees with animal experimentation and have personally conducted animal research on heart disease at the National Institutes of Health for many years of my professional life. I am deeply committed to sound biology education because I be-



Humane Society of Utah

Figure 1. This winning entry in a junior high school science fair "proved" it is not good for mice to be spun for long periods of time on a phonograph turntable. Note the certificate of award.

lieve it is important to understand our own bodies, to appreciate the animal kingdom and to have some understanding of the relationship of humans to the animals with whom we share this world. I believe that biology education should address these issues. Many of my writings have been devoted to encouraging study of living organisms and making biology education relevant and humane.

There has been much discussion nationally (and some in the pages of *ABT* recently) about the stagnation and decline in biology education. We've not kept up with the times. Students are bored and think biology education irrelevant. A recent survey showed that high school students disliked their science classes because they perceived that science is destroying things.

So what do we think about dissection, pithing and these science fair projects? Are they perhaps part of this stagnation and decline? These three elements of biology education have

remained a dominant part of the pre-college education for 40 to 70 years or more. Dissection and pithing are established "rites of passage" through an introductory biology course.

Frog dissection was probably first introduced into biology education between 1910 and 1920. It has been retained for some 70 years or more. It has held its place despite enormous competition for inclusion of other topics in the biological curriculum. Considering the vast increase in recent decades of biological knowledge that ought to be taught, why is dissection still found in some 75 to 80 percent of pre-college level classrooms? Is dissection *that* valuable a lesson to take up the inordinate time spent on it? Is retention of dissection perhaps a forceful indication of the failure of biology education to keep pace with the times?

A 1985 survey at the ISEF showed that when vertebrate animals were chosen for study, four out of five

projects did some harm to the animals. This predominance of harm-inflicting projects has been repeatedly documented and is typical of ISEF

standards throughout its 38 years of existence. It is estimated that several million vertebrate animals are harmed or destroyed for science fair projects

each year.

There is a stagnation about science fairs, and some of it is not even science. Some science fair projects that I saw 35 years ago are still permissible today. For instance, in the early 1960s, I was appalled at the inhumaneness of a student centrifuging mice until they were paralyzed. Last year I encountered two projects involving centrifuging conscious small mammals and several more that involved spinning animals on phonograph turntables (see Figure 1). These were accepted for public exhibition as being in compliance with science fair rules.

Science fair projects endlessly documenting the deleterious effects of aspirin, rock music, radiation, bad diets, tobacco smoke, insecticides and other poisons on sentient vertebrate animals are as common today in fairs affiliated with the ISEF as they were 38 years ago when this fair first began.

A project entitled "The Effect of Alcohol on a Hamster" won a 1987 NABT Science Fair Award. Yet the NABT animal guidelines clearly state, "Experimental procedures should not involve the use of . . . alcohol in any form . . . or other distressing stimuli." This project does not appear to meet NABT standards.

The photographs of exhibits that accompany this article (Figures 1-4) were taken at local science fairs and not at the ISEF. But inhumane studies such as those depicted do indeed occur and indeed win prizes in the ISEF. With this endorsement from "on top," it is no wonder that such projects continue to be conducted in the majority of states. Only in a handful of states are such projects forbidden. To my mind, they should be forbidden nationwide.

One reason for the persistence of projects in the ISEF that harm vertebrate animals is that these are the *only* projects mentioned in the ISEF rules. Helpful suggestions leading students into non-harmful projects do not appear. Specific sanction is given in ISEF rules for exposing animals to radiation, toxic substances, harmful drugs, deprivation diets, etc., so long as they are supervised. Students, observing that these are just the projects that have won substantial awards in the past, are thus encouraged to perpetuate this unfortunate tradition.

In the 1985 and 1986 ISEFs, approximately 20 prize-winning projects involved demonstrations of the deleterious effects of well-known toxic substances. Usually small mammals were the subjects, but sometimes fish were used. Toxic substances included

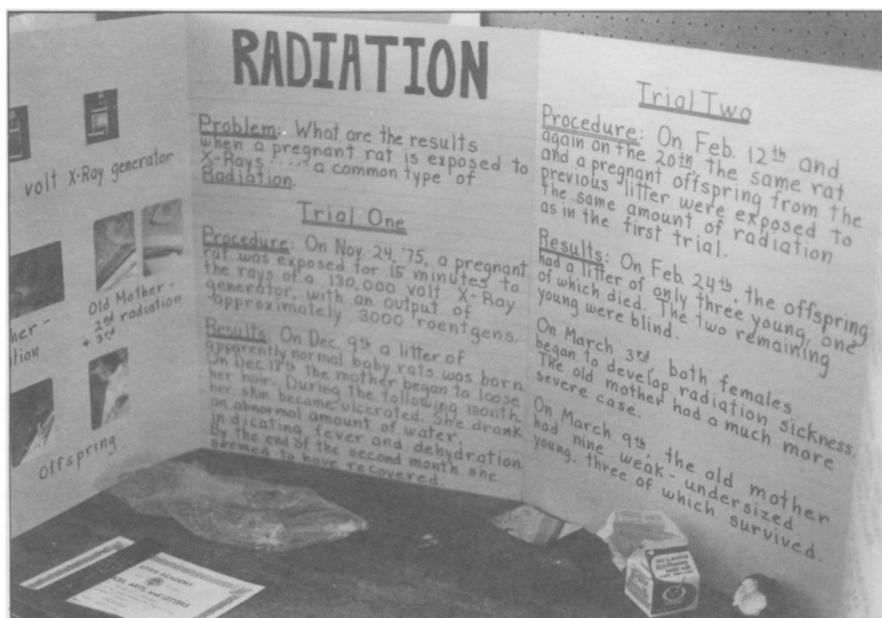


Figure 2. The purpose of this project was to demonstrate the already well-known deleterious effects of radiation on life. The student subjected a pregnant rat to a high dose of radiation for 15 minutes. As a result, the student reports, "the mother began to loose her hair [and] . . . her skin became ulcerated . . . [she developed] fever and dehydration." Later, the mother and a pregnant offspring were subjected to two bouts of radiation of the same intensity and duration as the initial bout. Both mothers suffered radiation sickness. "The old mother had a much more severe case," said the student. Out of the total of 12 offspring born to these two mother, three were "weak and undersized," two were blind and seven died. The project received a certificate of merit.

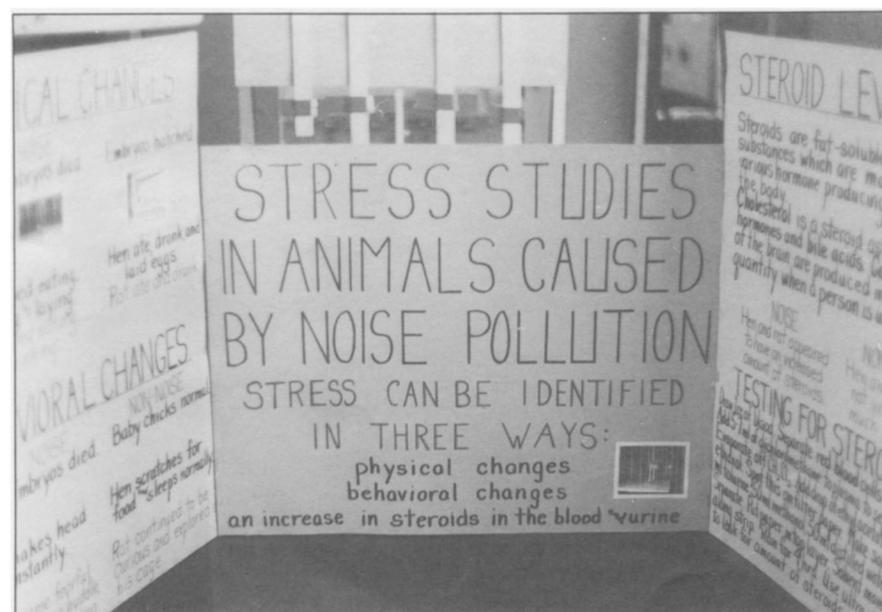


Figure 3. A rat and a hen were subjected to loud noise in order to induce stress. The student documented the deleterious effects. According to the student, the rat became "fearful and huddled in its cage." The stressed hen "shook its head constantly" and its eggs did not hatch.

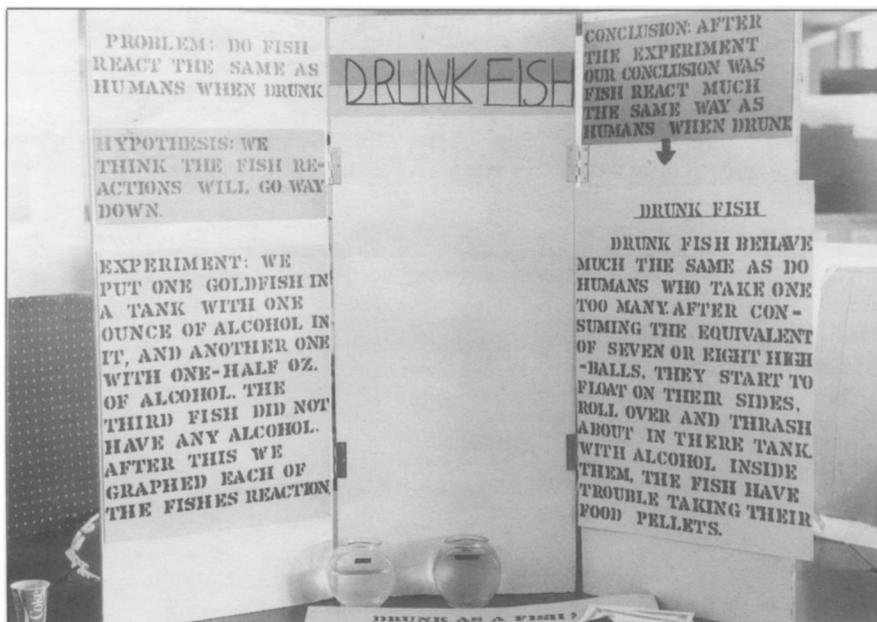


Figure 4. This youngster set out to show that fish can suffer toxic effects from alcohol. The student reports that the "fishes (sic) reaction [to alcohol] . . . is to float on their sides, roll over and thrash about in there (sic) tank." The significance of this so-called "science" project to the student's education is open to question. Note the inadequate tiny jars that housed the fish and the certificate of merit.

alcohol (three projects), marijuana, nicotine smoke (on gerbils), insecticides (two projects), bee sting, mushrooms, caffeine, sugar substitutes, zinc and various drugs. All involved inflicting harm on the animals, and no useful original knowledge that would benefit mankind was gained. The justification of such projects is open to serious question.

Pregnant animals as the subject of toxicological studies has gained wide popularity recently—perhaps because the results are so easy to obtain. Among the 1985 and 1986 ISEF prize-winners were projects involving administration to pregnant animals (rabbits, mice, rats) of alcohol, insecticides and various other well-known toxic substances. The inevitable deformities and death of newborn were recorded by the students.

Some beginnings of protests about science fairs are appearing in the pages of *ABT*, led by the able editors Randy Moore and Dan Wivagg (see for instance their editorial "Where's the Science in Science Fairs?" *ABT*, January 1987). Recently, *ABT* Lab Editor Don Igelsrud, to his credit, said that it was a legitimate concern that too many science fair projects utilize inhumane methods. He urged that students be encouraged to conduct projects that produce more positive attitudes toward animals (*ABT*, April 1987, p. 252-6).

In contrast to his views on science fair projects, Igelsrud is very defensive about making any changes in the

entrenched activities of dissection and pithing frogs. He advocates dissection and pithing. Indeed, in his article these are the *only* animal projects that he mentions. Why concentrate so much on two activities, both of which involve destroying animals, when there are so many thousands of educationally sound projects that do *not* involve destruction?

Igelsrud says, "If we eliminate [pithing] . . . we are implying that there is something morally wrong." The implication of his statement is that teachers should defend the retention of pithing because it wouldn't do to admit that we are wrong—and certainly we can't admit that we're *morally* wrong! But, maybe there is something morally wrong. Certainly some people think so and some organizations have issued policy statements to this effect. Perhaps the time has come to reassess the humaneness, relevancy and educational merit of pithing. Maybe it is time to think of new ways to demonstrate the way spinal reflexes and the brain work—perhaps by studying common human reflexes. This would have the benefit of sparing a frog's life and also possibly being far more interesting because the student is learning about himself or herself. Certainly, I am not persuaded by Igelsrud's mechanistic analysis and defense of pithing. His arguments are flawed because he fails to address the big issue—can the physiology of reflexes and brain function be taught without resorting to

harming or killing animals?

Igelsrud also argues in defense of dissection. In dealing with dissection we must recognize that for several generations, ever since class dissections were first introduced decades ago, some students have been turned off from an interest in biology because of their offense at having to dissect a dead animal. Many students don't like it. Some students believe dissection is irrelevant to their education and unnecessarily destructive. A current court case that has gained national attention involves a high school student who refuses to dissect a frog. Each year, a number of students refuse to participate in dissection, and some refuse to take biology at all because of deep-seated offense at dissection. In understanding these objections, it is important to appreciate that there are important cultural, ethical, religious and social taboos against handling dead material and taking life.

But it's not just ordinary dissection of an already dead animal that Igelsrud advocates. Oh no, he says, using a dead animal is "the easy way out." What he advocates is starting with *live* animals. His introductory zoology students administer an anesthetic, then kill the animals themselves before dissecting them. This ups the ante of ethical costs considerably. It opens up the possibility that the animal's anesthetization and killing may be improperly performed in the unskilled hands of a student. Furthermore, the emotional cost and potential negative effects on the student are increased because these beginning students are personally implicated in taking a healthy animal's life. I am frankly amazed that such an activity should be advocated in the pages of *ABT* and that it can be considered to be in compliance with the National Association of Biology Teacher's policy on student use of animals.

Not surprisingly, Igelsrud encounters resistance among some of his students to these activities, but he tries to talk them out of it. For the majority, he thinks that the emotional evolution of the youngsters participating in this killing and dissection is to go "from fear, to caring, to killing, to wonder." I wonder. Perhaps some students went from fear, to killing, to desensitization and an ability to kill more easily next time. It is a real possibility that must be faced.

In conclusion, I suggest that the biology teaching profession seriously

address whether pithing, dissection and science fair projects involving harming and killing vertebrate animals is what we need in today's world. I believe these outdated activities should be abandoned. Instead, why don't we encourage more study of human physiology, human behavior and projects on plants and invertebrate animals, as well as vertebrate animal projects that don't involve their harm or death? Examples of projects that can readily be done on plants, protozoa and/or invertebrate animals include field studies and natural history (life cycle, incidence in nature, social structure, etc.); germination; genetics; reproduction; effect of light, temperature and other environmental factors on growth and development; feeding behavior; activity cycles and biological clocks; responses to gravity and light; perception to touch, humidity and vibration; communication; pheromones; observation of food chains and interdependence of one species on another.

Examples of non-painful, non-hazardous projects on vertebrate species (including, in some instances, human beings) include some of those already mentioned and also group behavior;

Reference

Orlans, F.B. (1977). *Animal Care: From Protozoa to Small Mammals*. Menlo Park, CA: Addison-Wesley Publishing Co.

normal growth and development; properties of hair; pulse rate and blood pressure; various normal animal behaviors such as grooming and the tendency to "hug" the wall when walking along corridors; reaction to novelty or alarm; nervous reflexes and conditioned responses; special senses (touch, hearing, taste, smell and proprioceptive responses) and respiration. Details about many of these projects are found in the reference. None of these projects requires infliction of pain or interference with normal health.

Let us look for fresh ideas that will challenge young minds and leave them with a positive attitude toward biology. Let us look for ways to replace projects involving destruction and death of sentient creatures with alternatives that foster the conservation of life, that accentuate health (not disease) and that convey ethical values that are in keeping with today's thinking.

F. Barbara Orlans

Director, Scientists Center for Animal Welfare

Note: The opinions expressed are the personal views of the author.



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Letter to the Editor

Dear Editor:

This letter is in reply to the guest editorial appearing in the May 1987 issue of your magazine.

I regret that William Mayer did not contact me about the nature of my involvement with the Foundation for Thought and Ethics (FTE) before the publication of his editorial. Had he done so, the following facts may have dissuaded him from using the name of my company in such a prejudicial manner. Contrary to Mayer, the major effort of my company has not been "the distribution of a 'when did you stop beating your wife' type of questionnaire."

Austin Analytical Consulting (AAC)

was retained to tabulate a survey for FTE and to provide assistance in the interpretation of the results of the survey. FTE constructed the questions, provided names and mailed the questionnaires. It is common practice for clients conducting marketing research to mail under the name of the company they are employing, in the interest of objectivity. AAC was hired by FTE to carry out market research. My company makes recommendations, but has little control in how a client chooses to use the information that a survey provides.

Mayer asserted that AAC has an anti-evolution agenda that it is attempting to hide. Nonsense. I hold a Ph.D. in biological anthropology. I taught anthropology, including human evolution, at Southern Meth-

odist University for six years. I have made several pro-evolution presentations before local anti-evolution groups. I have a pro-evolution agenda that I do not try to hide, and FTE is aware of this. Despite my own personal opinions and beliefs, my company undertook the FTE survey with the same objectivity we use with all of our clients.

Donald M. Austin
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Note: Letters to the Editor do not necessarily reflect the views of the National Association of Biology Teachers, publisher of the *American Biology Teacher*.