

which educators are unaware or are doing their utmost to ignore. That is the question of professional integrity and credibility involved in presenting one-sided arguments to young people. Darwin (1896) described *The Origin of Species* as "one long argument from the beginning to the end." Neo-Darwinists and textbook authors have followed Darwin's lead and have continued to present scientific evidence based upon an *a priori* belief in evolution. Educators had better consider, what the public is beginning to realize, that in presenting a one-sided argument, Darwin as scientist does not qualify as Darwin as teacher.

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Reference

DARWIN, F. (ed.) 1896. *Life and letters*
I. New York: D. Appleton and Company.

Moyer Responds

The professional integrity of educators requires that they teach science as defined by the scientific community not by religious groups, the state, or school administrators. They are licensed by their states to teach science, not theology.

McReynolds Responds

Amen! A real and growing problem.

Extended Discretion Approach

I was delighted to see William H. Leonard's article, "Using the Extended Discretion Approach in Biology Laboratory Investigations," in the September, 1980 *ABT* (42:6).

When several high schools in our district (Jefferson County, Colorado) went on a year-round calendar, we were faced with some students coming in and some leaving biology clas-

ses each eight and one-half weeks. (The school calendar has students going to school for two eight and one-half week quarters, then having an eight and one-half week vacation; one third of the student body and faculty is on vacation at any given time.) To avoid having the biology course totally sequential, our school chose to make an introductory eight and one half-week course (Biological Processes) a prerequisite to any of the other four eight and one-half week courses, which could then be taken in any order.

Advice from colleagues and common sense cautioned us to avoid a straight "techniques" course. Though we include such (microscope work, review of the metric system, some basic chemistry), we have built the introductory course around some of the best quantitative lab exercises often done in a Biology I course.

We begin with the yeast/molasses lab used in Chapter 1 of the *BSCS Green Version* (3rd edition), done with explicit directions but with emphasis on making a prediction and drawing a conclusion. This is followed (interspersed with techniques and some basic background on concepts like photosynthesis) by several other quantitative investigations. With each succeeding lab, students are expected to provide more of the work themselves. For example, the second lab requires students to write their own hypotheses. By the fourth lab, discussion questions are omitted; students must write their own discussion/conclusion paragraphs. For the last class investigation, students work in groups to solve the problem of how salt water affects radish seed germination. They plan their own procedure with a few hints like "ocean water is about 3.5% salt." Testing "solutions" of 20% salt is not uncommon in spite of the hints, allowing students to experience the frustration that often accompanies scientific work and giving them practice revising hypotheses. Students also have an opportunity to do an

unguided individual investigation dealing with the heart rate of a mammal. Most students require a few hints to get started; many need individual help. But the opportunity for creativity is there and many students relish it.

Although the subject matter of the labs is unrelated, we remind students that the investigations are related in that they exemplify the process of investigating biological phenomena.

We have not collected any data on how much this approach improves later performance or affects attitudes or understanding of science. However, the subjective impression is that laboratory performance in Advanced Biology, Chemistry, and Physics has improved since we instituted Biological Processes.

The frustration part of this is that when we continue the other Biology I courses, studying subject matter more than process, the laboratory investigations (*BSCS Green Version*) are, in many instances, less quantitative and often in cookbook style. Therefore, I am writing William Leonard for copies of existing Extended Discretion approach (ED) investigations and will work to adapt others to this format. If the textbook writers really believe what we all verbally accepted during the "biology teaching revolution" of the 1960s, we will see more ED investigations in textbooks.

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Leonard Responds

Thanks very much for your enthusiastic letter to the *ABT* editorials in response to my September *ABT* article describing the Extended Discretion Laboratory Instructional Approach. I share your perception that existing commercial laboratory programs are definitely lacking in activities which promote creativity, independence, planning, and the use of science processes.

Since I wrote the article over a year ago, I have tested the approach against a commercial program in a university general biology course, with similar encouraging results. The next step is to make ED-style activities available commercially. Unfortunately, textbook publishers respond more to what is marketable than to what is educationally sound. Therefore, those of us interested in fostering ED and similar approaches in commercial curricula must make ourselves known. Letters such as yours provide a mechanism to provide such information to publishers. We need to encourage all other biology teachers to speak out also.

Smoking at the NABT Convention

I was appalled at the number of my colleagues at the NABT Convention held in Boston in October who disregarded the requests not to smoke during Convention sessions.

Certainly, all biologists are aware of the delicate nature of the respiratory tissues. To inflict smoke on one's own system is certainly a personal decision; to inflict smoke on others is unpardonable! (Smoke from pipes is just as irritating as cigarette smoke.)

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Controversy at NABT Conventions

In an otherwise high level, informative National Convention in Boston, I am compelled to note, in my opinion, a serious trough. I refer to the address on nuclear dangers by Dr. Helen Caldicott at Saturday's General Session.

Her approach to a serious, controversial topic—highly deserving of attention by biology educators—was more than wanting. It was riddled with the snide, punctuated with innuendo, and obvious in its omissions. (Parenthetically, I must empha-

size that I, myself, am not bland about the absolute safety of nuclear reactors.) Let me detail a few of the more glaring examples.

The overall approach was to link the *possible, suppositional, predicted* dangers from reactors with the *positive, actual, and demonstrated* destruction of nuclear armaments. In the former, the destruction would be an *accident*, in which all efforts of containment had failed. In the latter, the devastation is a *design goal* in which every effort for successful damage has been made. It is as if to say that a TNT charge used to dig a tunnel is no different from a charge set off by a madman in a school! This linkage is an overworked approach. It signifies either a wanton disregard of facts, or an unconscionable skewing of a point of view. If I am not mistaken, Dr. Caldicott, early on, referred to nuclear reactors as “bomb factories.” Surely she knows that the military could find easier ways to develop plutonium! It ill behooves a physician, trained in science, to transmit such hyperbole to a group of educators, also trained in the sciences.

Squat in the middle of her description of possible reactor accidents, she took the trouble to give a detailed and gruesome description of the violence caused at Hiroshima and Nagasaki. Again, to put it kindly, this was out of context.

Her dire predictions of cancers resulting from Three Mile Island are totally at variance with those of the most reputable scientists in the world.

To a floor question on possible dangers from coal, she gave a glossy answer about radon. Never a mention of Black Lung. . .the carbon dioxide blanket. . .the acid rains. . .

Many times she alluded to her organization, *Physicians for Social Responsibility*. Are all other physicians irresponsible Dr. Strangeloves?

But now to a positive action: What should NABT do? In the future, when there's a scheduled speaker on a controversial topic way off in one corner, the Convention Committee

owes us another speaker—on the same platform. This year, the *ABT* Editor should actively solicit a reputable scientist to prepare a rebuttal. The reputable science journals, the respected and learned scientific societies, and renowned scientists know at least as much about this subject as Dr. Caldicott. Our readership deserves to hear it.

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Who Should We Believe?

Professor McReynold's Letter to the Editor in the September issue of *ABT*(42:363) raises the interesting question of the degree of reverence with which we should receive the opinions of those holding higher degrees in science.

The basis should not be a university degree a person holds but whether or not the person has the experience, background, and ability to make authoritative statements. No scientist can be an authority in more than a minute portion of science. I hold a Ph.D. degree in science—the highest earned degree that one can achieve, yet it would be ridiculous for me to attempt authoritative statements in Astronomy, Physics, Chemistry, Geology, Psychology, and related areas. In fact, even in Biology, there are few areas where I can speak with any authority.

Those who cite the opinions of scientists of the Creation Research Society should ask themselves this question: Are these the scientists who, on the basis of studying fossils and living organisms, have become authorities? Are they the people who publish in the scientific journals devoted to paleontology and evolutionary biology? Do they even present “scientific creationism” in a form that can be evaluated by the procedures of science?

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