

# Reports—Current Topics—Queries

## TEACHER-TRAINING USE OF ABT "CREATIONISM" CONTROVERSY

One of the major problems faced in any program designed to prepare future biology teachers is concerned with the nature of science. Most future teachers have a sincere desire to be fair and objective. They do not want to impinge upon any of their students' beliefs. A frequent result of this sincerity and sensitiveness is that they lose their own objectivity in the teaching of biology as a science dealing with phenomena of the real world.

Until recently I found it difficult to handle this problem. Prospective teachers as well as in-service teachers when discussing evolution were more than willing to give equal time to creationism or any other topic students wished to discuss as alternatives to evolution. My students were more than willing to bend their knowledge of the nature of science and its implications for biology teaching.

The recent interlocution in *American Biology Teacher* concerning special creation vs. evolution has proven to be a fertile subject for discussion. Use is made of the articles and letters in an effort to illustrate what science is not. Because I teach in California, I begin with the local comedy of errors by distributing photocopies of page 106 of *Science Framework for California Public Schools*—the guide for science instruction in the state. This page carries the suggestion that "some of the scientific data . . . may be best explained by a creation theory. . . ." The students, in their usual state of servility, agreed that although the definition of theory is stretched and the rationale is misleading, "theories of creation" should be included in their biology courses. This short introductory discussion is then followed with an assignment from the reading list (see below). Students are encouraged to read the material in the sequence given. The members of the class discuss each article or letter before the next assignment is given. The discussions usually take less than half of the class period, so time is available for other activities.

By the time the prospective teachers have perused and discussed each disquisition, including Robinson's article, "Incommensurability of Evolution and Special Creation," the neophyte educators not only have a better idea of the implications the nature of science has for their biology-teaching but also have learned something of the personalities involved in biologic education.

I doubt that any of the students ever abandoned any notions of special creation because of the course. However, I believe that they saw ". . . that the

theologic way of knowing represents a distinctly different and incommensurable process of developing knowledge from that of the natural sciences" (Robinson, p. 538) and thus does not belong in a biology course.

**READING ASSIGNMENTS.** Volume, number, and page references are to 1970–71 issues of *American Biology Teacher*.

### Introduction

CALIFORNIA STATE DEPARTMENT OF EDUCATION. 1970. *Science framework for California public schools, kindergarten—grades one through twelve*. Published by the department, Sacramento, Calif. P. 106.

### Assignment 1

GISH, D. T. A challenge to neo-Darwinism. 32 (8): 495-497.  
MAYR, E. [Letter.] 33 (1): 49-50.  
MAYER, W. V. [Letter.] 33 (1): 50-51.

### Assignment 2

HADOW, H. H. [Letter.] 33 (2): 112.  
WING, F. [Letter.] 33 (5): 301-302.  
HOLT, R. V. [Letter.] 33 (5): 302-303.  
TURNAGE, M. [Letter.] 33 (5): 303.

### Assignment 3

GISH, D. T. [Letter.] 33 (6): 362-363.  
NICHOL, E. [Letter.] 33 (9): 556.

### Assignment 4

ROBINSON, J. T. Incommensurability of evolution and special creation. 33 (9): 535-538.

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## A SIMPLE DEMONSTRATION OF DIGESTION AND ABSORPTION

Many laboratory manuals provide techniques for the demonstration of digestion—particularly of carbohydrate digestion, because of the simplicity and ease of performing tests for starch and sugar. However, few, if any, suggest an experimental demonstration to show that digestion is essential to absorption. The following simple portion of a laboratory study of digestion and the digestive system of animals has been set up to do this.

Two lengths of dialysis tubing are cut and sealed at one end. Into each of these a starch (wheat starch) solution is poured. Diastase or saliva is added to one, but no enzyme mixture is added to the other. The open end is then sealed, and these closed bags are placed in beakers of distilled water. After a period of several hours the water surrounding the bags is sampled by pipette and tested for starch, using Lugol's iodine solution. These tests should be nega-

tive; that is, they should indicate that starch molecules are too large to pass through the membrane. The water of each beaker surrounding the dialysis bags is then tested for sugar, using Benedict's solution. The bag to which enzyme had been added will give a positive indication that the starch has been digested to sugar (maltose and glucose), of which the molecules are small enough to pass through the dialysis membrane. The water surrounding the dialysis bag to which no enzyme had been added will give a negative test for sugar, indicating that no sugar molecules diffused through the membrane.

The above procedure provides for continuous use of the same materials by many students. An even more realistic demonstration could be made by filling the dialysis bags with distilled water and placing the sealed bags in beakers containing starch solution, one of which contains enzyme (amylase). The bags could then be opened after a few hours to sample for the presence of starch and sugar. The techniques described by F. W. Price (1972: *American Biology Teacher* 34 [1]: 23-24) for the detection of specific sugars could increase the meaning of this experiment by demonstrating the specific sugar moieties of amylose.

This experiment provides a significant demonstration of (i) the products of starch digestion and (ii) the necessity of digestion—the breaking of large molecules into small molecules—before absorption can take place.

The use of chromatography and other modern chemical techniques makes this experiment applicable to the digestion of proteins and the absorption of amino acids as well as the digestion of fats and the absorption of fatty acids.

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## LIVING WITH CONFLICT

• A slightly longer version of the following article appeared in the 15 February 1972 issue of *UU World*, the news journal of the Unitarian Universalist Assn.; © 1972 by the journal. It is reprinted here, as edited, with the kind permission of *UU World* and the author.

Myriad generalizations can be made regarding the nature of the developing human. The ones most germane to this discussion are:

1. Each being is unique from the moment of conception and is possessed of a drive toward survival, growth, individuation, autonomy.
2. Each being is in constant interaction with a nurturing environment and is possessed of a drive toward assimilation, relatedness, attachment, and belongingness.

The existence of these twin drives—toward individuation and toward attachments—creates a field

of energy, comparable to the energy field of opposing magnetic poles, in which life takes place.

There is no escape from the tension that man's conflicting drives create. There is no "solution" to the problem. There are just temporary states of relative equilibrium.

Visualize the embryo struggling to maintain and enhance itself, to separate itself from its host. And at the same time it struggles to retain its altogether essential dependence upon the nurture and protection of that host.

The image of the developing embryo is more than an analogy of man's lifelong struggle between dependence and independence. It is simply the first stage of a process that continues until death. We see this process in dramatic perspective when the toddler pushes himself off the lap of his mother. He strikes out in exploration, only to come scurrying back for reassurance and comfort when confronted by the too strange, the too threatening. We see him crawl back into her secure embrace, reestablish his beachhead, and venture forth once more.

The paradox is at work in reverse during adolescence. The young person who is the most autonomous, who has the strongest sense of identity, is the one who can afford to retain his ties with family. He can adopt a submissive stance when appropriate. He can fuse himself with the essence of another human being in an intimate relationship.

It is only by serving his conflicting needs simultaneously that man creates himself in his full humanity.

What this implies to me is that conflict is a condition of life, ever-present *within* the human being, inescapable, and, in fact, an energizing agent in the life process. That conflict can be overwhelming is apparent from a reading of statistics on mental illness, violence, drug addiction, suicide.

The stress of harmonizing life's conflicting drives is minimized in societies where two conditions obtain:

1. There is a stable socializing unit, which nurtures and reinforces the developing child — such as the extended family in Asian societies, the tribe in parts of Africa, the kibbutzim in Israel.
2. There are limited but clearly defined, accessible, and patently acceptable routes by which the child can move toward individuation within the society.

Certainly it is clear that these two conditions do not obtain in contemporary American society. Our socializing unit is the nuclear family, defined by many as isolated, unstable, and vulnerable to stress. The community, which in turn should nurture and support the family, is beset by the twin woes of industrialized urban existence: anonymity and mobility. Thus the developing human, be he an infant, a teenage parent, a retired widower, must constantly work to maintain roots in a shifting, unstable, and often indifferent social milieu.

To add to our stress, the contemporary society