In My Opinion

What Kind of Biology?

Several times during the last few years, René Dubos, one of the most eminent and respected biologists of our day, has expressed grave concern over the direction in which the science of biology is heading. He raises a question of great significance to biology teachers, and he has kindly granted permission to this journal to quote some of his comments.

> "The most influential assumption of modern science is that the best and indeed the only scientific approach to the study of . . . living organisms is to divide them into fragments and to investigate elementary structures and properties in greater and greater detail. While it is repeatedly, and properly, pointed out that this analytical approach has been immensely fruitful in discoveries, there is far too little recognition of the disturbing fact that it has led to neglect of other fields. . . .
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> In the course of reductionist analysis, the scientist tends to become so much involved intellectually and emotionally in the elementary fragments of the system, and in the analytical process itself, *that he loses interest in the organism or in the phenomenon which had been his first concern.* (Italics added.)
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> For example, the student of man who starts from a question singled out because of its relevance to human life is likely to progress *seriatim* to the organ or function involved, then to the single cell, then to the cellular fragments, then to the molecular groupings or reactions, then to the individual molecules and atoms; and he would happily proceed, if he knew enough, to the elementary particles where matter and energy become indistinguishable. Problems of great interest obviously arise at each step in the disintegration of the original phenomenon. *But in practically all cases the phenomenon itself is lost on the way.* . . . (Italics added.)
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> It would be out of place to discuss here the consequences of this aspect of scientific professionalism for the advancement of knowledge. But it is relevant to the present theme to suggest that therein lies in part the cause of estrangement of the general public from science. The primary interest of the public is in the phenomena of nature or in the living organism, whereas the deepest commitment of the professional scientist is to the results of his analytical processes. *In consequence, the scientist generally loses his public as he loses sight of the original problem."* (Italics added.)
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> Quoted from pages 236-237, *Science and Man's Nature,* René Dubos, Daedalus (Journal of the American Academy of Arts and Sciences), Vol. 94, No. 1, Winter 1965. Pages 233-244.

In these few paragraphs that we have selected from his broader theme, Dr. Dubos contrasts what the professional biologist wants to know about living things, with what the average person wants to know. And hidden in these remarks is a question that every biology teacher must consider: What kind of biology do we want to teach?

Evidently, even our professional leaders do not see eye to eye on what constitutes the most desirable biology for the high school level. We have recently witnessed the vast effort put forth by the BSCS in an attempt to upgrade high school biology teaching. But the eminent biologists who cooperated in this program saw fit to produce three different versions, each centered about a different basic concept.

At any rate, the question remains. What kind of biology should we teach? Should we, like the professional research biologists, dissect the organism into smaller and smaller fragments? Should we lay the greatest stress on the molecular aspects; the biochemistry; the fundamental particles?

Or should we deal mainly with the aspects of biology that are most apt to fall within the experiences of all people? Should we stress the whole, integrated living thing, and its relationship to the physical, chemical, and biotic forces of its environment?

This is by no means a simple question. There is room for argument on both sides of it, and probably all around it. But we must come up with the right answer.

If we make the wrong choice, we may find ourselves in the same position as our brethren, the research scientists. They have

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His main thesis in teacher preparation was one of broad understandings of specific subject matter. He criticized the common practice of permitting underprepared teachers to teach, and would say that this is unfair to students. He also told teachers to learn the facts of subject matter as a prerequisite to formulating generalizations based upon the inductive method. Agassiz pointed out that in order to understand a subject matter, we must first study the history of the discipline. He told teachers to have the courage to say, "I do not know."

Here was a man who, before Dewey, told us to use the students' environment, to use laboratory methods, to let students discover for themselves, and to teach students to think scientifically. Here was a man who, when asked what he regarded as his greatest work, replied, "I have taught men to observe." Surely it would profit a teacher to emulate his theories of teaching and scholarship.

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Bobwhite

If bobwhite quail could take out life insurance policies, they probably could not afford them. John L. Steele, Jr., an Oklahoma Conservation Department biologist, estimates it would cost a bobwhite $905 for the annual premium on a $1,000 insurance policy. "This premium is based," he said, "on the fact that 82 out of every 100 quail will be dead before they are a year old." Fifteen of 100 quail will live 1½ years; two may live three years, but only one in 1,000 will live five years. These mortality figures are based on Steele's quail study which also reached the conclusion that hunting does not regulate quail populations.

Arizona Quail

Some youths stole 20 Masked Bob White Quail from an Arizona research project recently and had what will probably be recorded as the most expensive meal of the year. The quail were being bred in an attempt to re-establish the species in Arizona and more than $20,000 had been spent on the project. More important than the money, however, is the fact that the birds, 30 of them, were the only remaining Masked Bob White Quail in the United States. Bureau of Land Management State Director Fred Weiler says additional breeders might be captured in Mexico, but the birds are near extinction there also

Squirrels

Squirrels are still the top targets of West Virginia hunters, according to a survey of licensed hunters last year made by the Game and Fish Division, West Virginia Department of Natural Resources. Some 85% of the hunters questioned said the bushtail rodent was their favorite game. Second in popularity was the rabbit, followed in order by grouse, deer, turkey, quail, raccoon, and bear.

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lost touch with the public because their experiments and their discoveries relate less and less to what the average human being can experience or understand.

If we make the wrong choice, and alienate the interest of *our* public, we may find ourselves to be biology teachers without an audience. And this, of course, would be tragic in more ways than one.

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