

Reflections After Ten Years of Teaching High School Biology

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An experienced high school biology teacher tells of his joys and frustrations, presenting a realistic picture of the profession.

I entered biology teaching by the back-door having enrolled in college as a chemical engineer. Why engineering? Because my father was an electrical engineer and it was always accepted that I should go forth and do likewise. Fortunately for all concerned, I flunked Unit Operations, the basic course, and withdrew from engineering on the grounds that it was entirely too impersonal and dehumanized. This left either the ministry or teaching and having had more science than humanities, I chose the latter. Upon graduation, the Army made room for me and for two years I maintained teletype equipment. So far, no biology; just chemistry, physics, and math.

The G. I. Bill allowed my new wife and me to spend a year at Syracuse University where I gorged myself on biology courses, most of them with a natural history slant. The foundation for a career as a biology teacher had been laid, although I was not to enter a biology classroom for four years; my first teaching assignment was seventh grade science.

In 1960 the Biological Sciences Curriculum Study opened for business and our school became a test center for the experimental edition of *The Blue Version*.¹ Two years later

¹Biological Science: Molecules to Man, 1963. Houghton-Mifflin Co.

I had learned that (1) a chemistry background is extremely valuable in modern biology, (2) exciting things are happening in biology and (3) the National Science Foundation sponsors Academic Year Fellowships for biology teachers. Brown University accepted my suggestion that I spend a year there under this program and I was off on the single most academically profitable year of my life, which led to research on RNA synthesis in sea urchin eggs and a Master of Science degree in molecular biology. Now, three years later, I find myself a confirmed teacher, basically content to practice daily the art of teaching biology.

Surprisingly, as I talk to other biology teachers, I find that often they too entered the profession through side doors. Of the seven people teaching biology in our school only one entered college with the expressed intention of becoming a biology teacher; two trained for careers in agriculture, two com-

pleted pre-med courses and one was well along toward becoming a professional baseball player. Perhaps you should clip this article and place it in your personal time capsule to be opened and read when you are a college senior. Your present plans, if they do not include teaching, may not work out for perfectly valid reasons, including your own maturation, making teaching a real possibility.

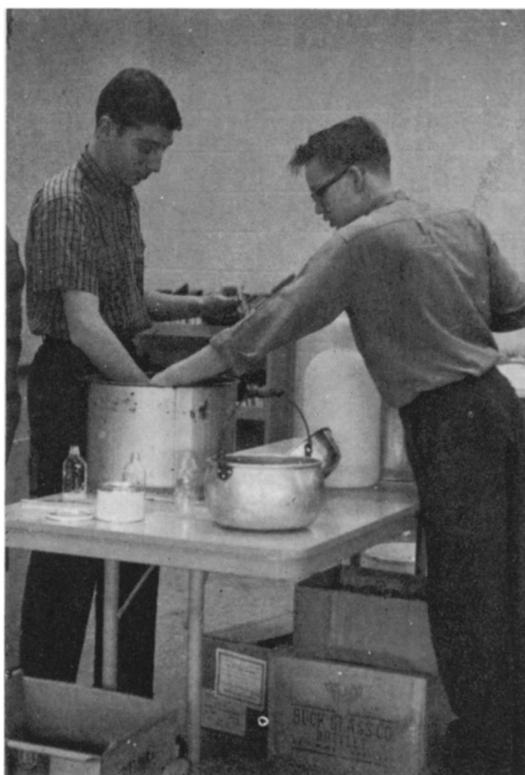
I suspect that some people will read my previous remarks and think of that old saw, "Those who can, do—and those who can't, teach." This is of course true for some people, but all my experiences indicates that the majority of today's teachers have made a mature decision to become teachers, fully aware of the limitations and rewards of the field and of their own capabilities. Keep in mind that the profession is fluid; members find it easy to move from teaching into industry or commerce while others, dissatisfied



with their jobs, find it relatively easy to re-train for teaching. Thus, we should rewrite that old saw: "Those who can, do—and some who can, teach."

The esteem in which teachers are held by the general public is certainly growing. Admit it or not, the majority of people look with some awe upon anyone who can stand in front of 30 teenagers day after day, keep order and teach besides. Better salaries are undoubtedly an important factor in this change of attitude, but increased competence of teachers, professionally and in their subject specialty, has played a major role. This esteem is extended to biology teachers by members of the scientific community who tend to judge their peers by their professional competence. Most research scientists, eager to help teachers and students, willingly give their time to address classes and help with projects or obtaining hard-to-get cultures.

So much for the social setting. What of teaching itself? Basically it is a lonely profession. When you close that door and face the class, you are completely on your own. Except for gross incompetence, you must answer only to your students, and never forget that their criticism can be devastatingly candid. In some ways the teacher can be compared to the doctor who must satisfy only his patients and his conscience. He too must rely upon his on-the-spot judgment in prescribing



for those in his care. Unlike the doctor, however, the teacher can see only the superficial effects of his teaching. The profound effects, good or bad, will not be apparent for five or even ten years.

This is not to say that there is no reward for all your effort, in the sense of a doctor curing his patient. There are many rewards in teaching, including those that have almost become clichés. As I look back, it is the small things that I remember best. Do you remember the first time that you *really* saw a rotifer? I do; it was in a wet mount of pond water that our biology club had collected the previous afternoon. I also remember the first time that I grasped the beauty and profoundness of the Watson-Crick model of DNA; it was while answering questions one morning in class. I remember the sheer fun of spending a weekend this Fall with my advanced biology class exploring one of our state forests. Science is exciting and so are the young people who will be in your classes. Bringing the two together is what teaching is all about.

When it comes down to it, teaching is a rather free-wheeling mixture of art and tech-

nique that requires an astonishing degree of concentration and energy. You must deal constantly with three elusive factors: your own personality, your students with whatever mental and emotional baggage they choose to bring to class, and the subject of biology. It used to be that the curriculum was the one dependable constant, but now even that has acquired the habit of changing overnight. Despite this instability (or perhaps because of it), teaching has never been more exciting.

Fortunately the basic techniques of instruction are easily learned by any reasonably intelligent person. They are the subject of those seemingly endless "methods" courses. Take them seriously, for without a thorough grounding in technique you will never become a disciplined, creative teacher. Just as the young artist must study history of art, brush technique and sculpting, so the young teacher must study philosophy of education, audio-visual techniques, and curriculum construction. The parallel between artist and teacher is a complete one in that good teaching is a creative process, which, when practiced diligently, gives the same feelings of elation and accomplishment normally associated with the fine arts.

Diligent practice is the key. The sharpened awareness, the ability to split one's mind between subject and students while exercising professional detachment, the versatility to quickly shift techniques as needed, all require daily practice. Increasingly the teacher is the director of an orchestra of techniques: overhead projectionals, small group discussion, film loops, laboratory instruction, the library, special projects, lectures, tests, individual conferences and the text book. Each technique and tool has its place, its unique advantages, and its special skills. By the time you graduate from college, some teachers will be in charge of an instructional team which will include laboratory and teacher aides, teaching interns, and other certified

teachers. The team will have access to an extensive resource center, group and individual laboratories, a computer, a guidance center, and individual study centers. The emphasis will be away from mastery of a set curriculum and toward the acquisition of learning skills by the student, who will be a true partner in his own education.

One final thought. In your training, go out of your way to become an expert in some specific area of biology, expert enough to discuss the area as an equal with anyone working in it professionally and to conduct a meaningful research program. Only direct participation in the scientific process will give you the insight to teach the experimental method as well as give you a feeling of personal involvement in your subject. Choose carefully and choose early; many a high school hobby has turned into a valuable career or life-long avocation.

My original objective in writing this paper was to present a personal view of high school biology teacher as a career. It will be met only after I admonish you to put yourself first. No matter how lofty your intentions, if you are not happy as a teacher, you will inevitably do more harm than good to your students and yourself. Just as they are quick to recognize genuine enthusiasm, so the converse is true. Give yourself room in which to grow, for, as Dr. Paul Brandwein often says of teachers in his talks, "What you are speaks so loudly that I can not hear what you say."

Become a biology teacher if you must, but first take off the rose-colored glasses and have an honest look at the field. Then ask yourself this question: "Is this what I want to be doing ten years after I have graduated from college?"

Illustrations

The photographs are all of East Brunswick High School Biology classes which I taught during the 1962-63 school year. The students are working on the BSCS Microbiology Block.