

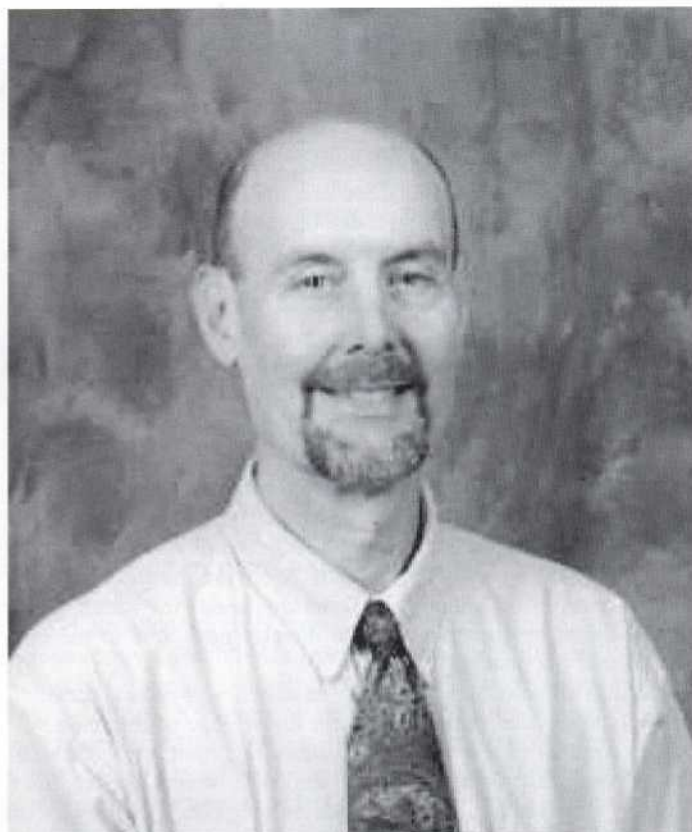
## PRESIDENT OF THE TENNESSEE ACADEMY OF SCIENCE FOR 2004

Like most who have come before me as President of the Tennessee Academy of Science, I am pleased to help carry on the tradition of leadership and service for which the Academy has been known for close to a century, 92 years to be exact. My path to this position started, I suppose, in the forest and creeks behind my boyhood home where I would wander during all seasons, reveling in the minutia of nature. Inside, the black and white television programs of Jacques Cousteau eagerly anticipating my own undersea adventures enchanted me. As a student at Brown University in the early 1970s, I was one of the first there to earn an interdisciplinary degree in Aquatic Sciences; a degree I hoped would lead me closer to Jacques. My interest in all things aquatic grew more intense as a summer intern and later as an entry-level Marine Ecologist at the Smithsonian Institution's Chesapeake Bay Center for Environmental Studies, jobs made possible by a chance meeting with David Challinor, then the Smithsonian's Undersecretary for Science and a kindly soul, who must have been impressed by my zeal for science because I had little else to offer at that time.

This early experience propelled me to graduate study in marine biology at the University of Miami and later fisheries biology at Oregon State University where I earned MS and PhD degrees between 1975 and 1982. While at Oregon State I worked under the tutelage of Carl Schreck, a fish biologist who serves as my exemplar of a scientist and human being—I have met no finer person, and I owe much to him for any professional success I have had. Together we studied various applied and basic aspects of salmonid genetics, stress physiology, and reproduction. Post-doctoral positions at the Museum d'Histoire Naturelle in Paris, France and again at Oregon State University greatly improved my research skills, including grant writing, but posed the problem of all soft-money jobs, and lack of security. The idea of a tenurable teaching position became more compelling as my family grew in number, and soon we were bound for Tennessee.

In the years since 1988 that I have been a professor of biology at Tennessee Technological University, I have filled my days with teaching, advising, and service. Research, the activity that excited my early passion for science, seems to only occasionally make itself heard, just enough to let me know that it's still alive and perhaps ready to climb to the front again if given a chance. I would suppose that many of us have similar career stories. Of course, what we all have in common now is our interest in the Tennessee Academy of Science (TAS), a far more interesting subject than any one man's career.

Our Academy was officially founded in 1912. The beginning of World War I and the opening of the Panama Canal were still two years away. Since that time the Academy has assembled 113 times; in the early years we met more than once per year. Drawing from about 87 Academy members, attendees at the first meeting in 1912 saw 13 presentations. Currently the Academy serves more than 800 individuals, most affiliated with academia but many from government and private groups. The TAS Annual Meeting is still the most obvious manifestation of our identity as an organization. We divide our interests into 13 separate, broadly



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defined scientific disciplines, each of which has its own meeting within a meeting during which our members and their students present their technical work. Attendees in recent years have had over 100 oral and poster presentations from which to choose. Twice during the last decade we have met jointly with the Kentucky Academy of Science, and in 2003 we shared our annual meeting with our in-state colleagues, the Tennessee Science Teachers Association, an event that we hope to repeat regularly.

The Academy's work includes much more than the Annual Meeting. Notably, since 1926, the Academy has published the *Journal of the Tennessee Academy of Science*. The *Journal* records deliberations and decisions of the Academy's Executive Committee, publically recognizes individuals whose professional science-related activities are deemed especially meritorious, prints abstracts of work presented at the Annual Meeting and at the three regional Collegiate Division meetings, recognizes students who have earned awards for their presentations at these meetings, and, most importantly, disseminates original, peer-reviewed research submitted by Academy members.

The Academy's byline, Providing a Forum for Science Education and Research in Tennessee, highlights one of its most important functions, education. Without a doubt, the value as-

signed to science and its corresponding educational enterprise, has risen dramatically during recent human history. Yet the natural sciences have not always been an important element of general public education. Of the relatively advanced educational establishment existing in England during the mid-1800s, Thomas Huxley (1869\*) noted with approbation, "I hear that some colleges have even gone so far as to appoint one, or, maybe, two special tutors for the purpose of putting the facts and principles of physical science before the undergraduate mind."

When we moderns see photographs from the Hubble space telescope, read about astounding biomedical advances, and communicate instantly with colleagues around the world, it may seem that science, and its bedfellow, technology, stand front and center among all societal pursuits. However, despite such obvious evidence of its current value, there are many in our society who regard science with disinterest, displeasure, or distrust. Given the negative forces of ignorance and politico-religious fundamentalism often allied against science, we cannot assume that the momentum of our current scientific juggernaut will propel us indefinitely toward a secure and improved future. We in the Academy subscribe explicitly to the proposition that only a concerted effort to educate society-at-large toward a better understanding of science will suffice if we pretend to a condition of future prosperity.

Certainly to us, the subset of humanity calling themselves scientists, it is axiomatic that science might contribute greatly to the betterment of mankind if practiced rightly. Again, Huxley (1869), "Now the value of a knowledge of physical science as a means of getting on is indubitable. There are hardly any of our trades, except the merely huckstering ones, in which some knowledge of science may not be directly profitable to the pursuer of that occupation."

While all scientists and most educated non-scientists would probably agree that science produces knowledge of immense value, the conduct of science itself is often regarded, regrettably, as beyond the grasp of all but the "nerdiest" of any cohort. Such derisive appellatives, all too commonly applied to those with some early affinity for science, should be doggedly countered with whatever means we can bring to bear. We should strive as an organization and as individuals to portray science as a logical, defensible, and perfectly acceptable way of knowing and relating to our world and each other.

"Science is not, as many would seem to suppose, a modification of the black art. . . . Science is, I believe, nothing but trained and organized common sense. The vast results obtained by Science are won by no mystical faculties, by no mental processes, other than those which are practiced by every one of us, in the humblest and meanest affairs of life (Huxley, 1854)."

In other words, science is for everyone.

Huxley (1869) enunciates an admirable goal for our educational system: ". . . no boy nor girl should leave school without possessing a grasp of the general character of science, and without having been disciplined, more or less, in the methods of all sciences; so that, when turned into the world to make their own

way, they shall be prepared to face scientific problems, not by knowing at once the conditions of every problem, or by being able at once to solve it; but by being familiar with the general current of scientific thought, and by being able to apply the methods of science in the proper way, when they have acquainted themselves with the conditions of the special problem."

Note the emphasis on what we educators call "critical thinking"—the ability to solve a novel problem by applying general concepts and methods. Late in his career, Huxley (1887) identified a failure of the educational system of his time, one that applies equally well today, I believe, ". . . it is too bookish, too little practical."

So what does the Academy offer to the enterprise of science education, other than mere words of encouragement and a visible symbol of scientific rectitude? We promote active involvement in scientific research by students via the Tennessee Junior Academy of Science, one of the oldest organizations of its type in our country. Student research sponsored by the Junior Academy generally demonstrates the virtues so prized by Huxley and others engaged in science, critical thinking and practicality. The Junior Academy provides substantial funding for students submitting proposals to conduct science projects, an annual meeting for the presentation of science projects by students throughout the state, monetary prizes for students judged to have the best presentations, and opportunities for two students to participate with funding in the annual meeting of the American Junior Academy of Science.

In addition to the Junior Academy, the Academy provides substantial monetary prizes for two students who present the best work at each of the several regional science fair competitions in Tennessee. For undergraduate students, the Academy organizes three regional (East, Middle, West) Collegiate Division Meetings for which abstracts are published and prizes are awarded. Graduate students co-authoring papers with Academy members are regular participants at the Annual Meeting where their work is judged for competitive awards.

Further supporting science education, the Academy presents awards to recognize excellence in science instruction by distinguished secondary school and college teachers. The Academy maintains a list of members who have volunteered to serve as Visiting Scientists in Tennessee schools, and as mentors or judges for local and regional science fairs and the Science Olympiad. Volunteer members also may serve as Network Scientists who are available for phone or email exchanges with interested students. Our members occasionally are asked to review textbooks being considered for adoption by the State Board of Education. At the national level, a representative of the Academy participates in the work of the National Association of Academies of Science and the American Association for the Advancement of Science, both of which have a major commitment to the promotion of science and science education.

There is much more that the Academy does to promote science in Tennessee with on-going and ad hoc activities, but that litany is unneeded here. I expect that anyone reading this essay is already a believer, one with a profound commitment to science as a way of knowing the world and ourselves. If you believe in the Academy's mission, as I do, help promote science in whatever way you can. Get involved. One very good way to do that is to volunteer for service in the Academy. I commend to you the satisfaction that derives from an active involvement with the Tennessee Academy of Science.

\* In this essay I draw frequently from the essays of Thomas H. Huxley compiled in his book, *Science and Education*, published by Collier & Son, 1902.