

Optics' Terminological Affliction

The issue of the proposed name change for the Optical Society of America generated a lot of heat last year (see *PHYSICS TODAY*, January 1990, page 68; April 1990, page 118; and August 1990, page 67). Unfortu-

nately less light was shed on the real issues, such as: Why is optics treated as an ancillary topic and not a core subject? Is the term "optics" itself a disincentive for bright youngsters to opt for careers in optics? What should be done to give optics its due place in classrooms as well as research laboratories?

The term "optics" evokes mixed feelings. Feelings of ecstasy arise primarily because optics is the best visual science. It also is an intriguing science, because the answer to the question "What is light?" still eludes us. Feelings of agony arise because optics is taken for granted as a subfield of physics concerned solely with such things as vision and optical components. Further, there is the myopic view that light is only the visible portion of the electromagnetic spectrum. But to light means to illuminate, and the entire spectrum is useful for this purpose.

It is the quest for understanding light as a carrier of energy and information that makes education and research in optics a challenging adventure. The laser has galvanized the science of the interaction of radiation with matter, which epitomizes the energy-handling capabilities of light, and this field has been undergoing yet another revolution with the advent of techniques for the generation of ultrashort optical pulses. Exciting contemporary developments illustrating the capabilities of light as an information carrier include the formation and manipulation of images using optical systems (equipped with conventional or holographic optical elements) powered by coherent or partially coherent light, information transmission using optical fibers, holography and its many applications, and optical computing. The fundamental optical phenomena—namely polarization, absorption, reflection and refraction, amplification, diffraction and dispersion, interference, scattering and emission, which collectively can be described by the acronym PARADISE—can all be used for handling energy as well as information. Therefore education in optics should really mean education in the underlying concepts and the engineering uses of these phenomena.

The unhappy status of optics education and research can be remedied by finding a conceptually rigorous term with a touch of modernity to replace the worn-out and imprecise "optics." Would electromagnetism make any impact if it were taught as a theory of the ether? What would happen if ultrasonics were taught as "inaudible sound"? Would electronics have the status it enjoys if it had been nurtured as "electron physics"? Because the photon is the fundamental unit of all radiation (or light), I advocate replacing "optics" with "photonics."

As a logical next step one can conceive of futuristic areas such as protonics, neutronics or phononics, where the corresponding particles

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Two-Year College Faculty's Burden

Sallie Watkins's Opinion column (February 1991, page 87) raises many important points regarding physics in the two-year colleges.

Watkins points out that the teaching load of 15 hours plus college duties presents a real time burden. What she neglected to mention is that the one-on-one contact with our students many of these tasks involve frequently characterizes the community college experience as radically different from the university experience. This difference is probably what gives us an opportunity to reach student groups that may be the future pools of engineers and physicists.

Unfortunately for faculty, these time constraints make participation in research during the school year far more difficult than it is for a university physics teacher. Most two-year colleges only pay lip service to scholarly research activities. I have found it necessary twice in my career to take a leave of absence to pursue research interests, but I have had to pay a price in salary. Although I have seen proposals to bring high school teachers into the research environment, I haven't seen any proposals to help a group of teachers who already have well-developed research skills and strong physics backgrounds.

In my experience two-year college physics faculty have more often than not arrived at our institutions because of conditions that existed in the job market when we finished our graduate work. Most two-year college physics people involved with research have had the good fortune of maintaining an ongoing relationship with the institutions where they did their graduate work. That was a situation I enjoyed until the death of my mentor, but it only worked because I was at a two-year college close to where I had studied.

An NSF- or industry-sponsored program supporting summer and interim employment in research for two-year college physics teachers would be extremely valuable to all parties. It could be made versatile enough to stand alone or to work as an "add on" to existing research grants.

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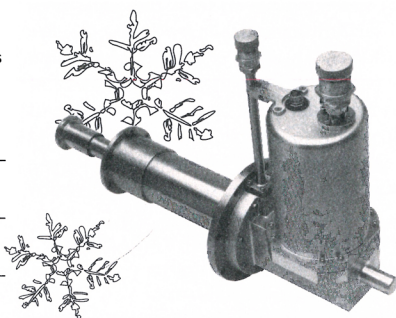
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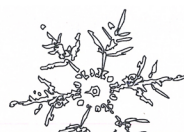


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