

College Corner

Attend a Summer Workshop of the Association for Biology Laboratory Education

Bette Nicotri

Have you ever wondered how to observe the interior of a honeybee colony? Or, once you've become intrigued with the possibilities for using a demonstration colony in the biology classroom, have you tried to find out how to obtain one and set it up? Have you wished for ideas on how to make plant anatomy interesting to students? Or for tips on where to obtain reliably healthy sea urchins? Need ideas for experiments clarifying DNA structure and function? If you're looking for practical tips and innovative, well-tested ideas for laboratory exercises on almost any biological topic, then a workshop meeting of the Association for Biology Laboratory Education (ABLE) may be just the place for you.

College faculty who teach laboratory biology share many common challenges and concerns. The foremost goal of most laboratory instructors is to develop interesting, reliable, practical exercises that motivate students to appreciate and understand biological phenomena. However, there are numerous hurdles that must be overcome to accomplish this goal. Many instructors must depend on commercially available laboratory manuals and these often contain traditional, uninspired exercises (heavy on listing and observing but short on challenging experimental work). Many exercises end up requiring material that is difficult or even impossible to obtain or involve procedures that are unreliable or inadequately explained. Although many elegant, exciting systems and techniques are explored by the research community, they often remain inaccessible to those involved primarily in teaching, even when

there is good potential for use in the classroom. Inadequate communication also results in great duplication of effort, with different instructors trying to "reinvent the wheel" and come up with exercises that have already been tested and debugged somewhere else. Many published articles in biological education are more philosophical than practical, a situation that compounds the problem; while the style and method of teaching are certainly important and deserving of attention, most instructors could use tips on how to translate the recommended broad philosophical tenets into concrete, workable exercises directly applicable to real students.

Once new ideas for laboratory activities are formulated, further obstacles remain before they can be put into effect. Dependable suppliers of necessary materials/organisms must be found. Living organisms often must be maintained and managed in the laboratory setting; doing this sometimes involves "tricks of the trade" that are passed on by word of mouth but which no one thinks to write down (with the result that such "tricks" are difficult for the uninitiated to discover). In addition, teaching assistants must be trained and students with special needs (physical handicaps as well as inadequate educational backgrounds) must be accommodated. And of course, all of this must be managed on tight operating budgets.

ABLE is a relatively new organization, founded in 1979 at the University of Calgary, that attempts to deal with some of these problems. Starting with some 40 charter members in

1979, ABLE has grown to include more than 500 members from all over the United States and Canada. The primary focus of the group is on instruction at the college and university level (in all areas of biology), although a number of advanced placement high school teachers have become involved as well.

The Annual Workshop Meeting

The most fundamental activity of ABLE is the annual workshop/conference, held in June at a host university having modern laboratory facilities and a strong teaching program. In order to reach as many people as possible, workshops are held in a different geographical area each year. Past meetings have been held at the University of Calgary, the University of Illinois at Urbana-Champaign, the State University of New York at Stony Brook, the University of Washington, Clemson University, and Memorial University of Newfoundland. The 1985 meeting will be at the University of Nevada at Las Vegas on June 3-7. Future meetings are planned for Cornell University, Harvard University and Marquette University among others.

Each meeting consists of three days of workshops in which two- to three-hour innovative, tested laboratory exercises are presented and actually worked through so participants get hands-on experience with the procedures and materials involved. Four workshops are presented each day and each exercise is repeated once, giving each participant the opportunity to "play student" in six major sessions. In addition, there is usually time at least briefly to view other sessions and get an overview of what is involved in each presentation. Written materials on all 12 exercises are available and provide all of the information necessary to evaluate and use each exercise at a participant's home institution, including extensive preparatory information, recipes for

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chemicals, quantities needed and sources of materials, etc. Everyone is urged to share information and adapt ideas to fit local needs.

Typical Workshops

A broad spectrum of topics is covered at each meeting. Some exercises are directed at introductory level courses (both for majors and for non-majors). For instance, there have been presentations relating soil and houseplant properties to plant physiology, describing the construction and use of a simple apparatus for studying skeletal muscle systems as levers, suggesting experiments with *Daphnia*, sowbug, and fish behavior, giving directions for making a kit illustrating DNA and RNA function, etc. Other exercises are more appropriate for upper division courses (genetic mapping with T₄ phage, experiments using rat cannulation, electrophysiology of plant and animal material, etc.). Of particular interest are exercises using nontraditional (and readily available) species; the spotlight has been turned on cockroaches, slugs, and lettuce seedlings amongst others. Some presentations simply review useful techniques on which instructors may wish to brush up (for instance, biological photography or culturing sea urchin embryos). Other workshops aim to introduce new information from the research community into the classroom (examples here include tips on performing microsurgery on *Stentor*, ideas for use of a marine red alga in studying development, a new technique for clearing thick sections of plant material for microscopical study, and so forth).

Workshop presenters themselves are outstanding teachers, chosen for their enthusiasm and inventiveness. They can give innumerable pointers on pitfalls, possible spin-offs, and ways to spark student attention.

Miniworkshops

In addition to these three-hour workshops, a number of shorter (15 minutes - 1 hour) miniworkshops are also presented, covering single techniques or useful ideas that don't require a whole laboratory session. Typical miniworkshops have covered topics as diverse as Q₁₀ experiments with tadpoles, gene mapping using ascomycete *Sordaria*, germination of *Impatiens* pollen, use of videodisc technology, and a variety of ideas for field trips.

Additional lectures of general interest have sometimes also been scheduled. For instance, in one such session attention was focused on ways to make laboratories accessible to visually or orthopedically handicapped students. Other extra sessions have reviewed microcomputer software (with tips on how to evaluate program suitability for classroom use) or have surveyed general trends in biology courses and textbooks.

Informal Opportunities for Exchanging Information

Although these academic pursuits fill up large blocks of time on three days, there are numerous informal social activities. Since only about one hundred people can attend these meetings (due to limitations in laboratory size), an intimate atmosphere pervades and there is considerable personal interaction and a decided spirit of camaraderie. I have found the chance to talk to others facing the same problems and frustrations one of the most beneficial aspects of these meetings; it helps to realize that you are not alone. Contacts made here have led to new ideas and have opened up sources of information I would not have found on my own.

Participants are encouraged to come early and begin getting acquainted before workshops formally begin. There are usually short trips planned for Monday, exploring campus and/or nearby attractions. A Monday evening mixer gets everyone together in a relaxed, friendly atmosphere to prepare for the week ahead.

Field Trips

The Friday after the workshops are over is set aside for field trips to nearby sites of biological interest. For instance, after the University of Washington meeting, one group visited Friday Harbor Laboratories (a premier marine field station in Washington's unspoiled San Juan Islands) and another group stalked wildflowers in the Cascade Mountains. After the Clemson sessions, many participants went on an overnight visit to Carolina Biological Supply Co. headquarters; others explored the Smoky Mountains. The Newfoundland field trips included a visit to Cape St. Mary's Bird Sanctuary (the second largest gannet colony in North America) and an excursion to Salmonier Nature Park. These trips (accompanied by knowledgeable guides) provide more

time for informal sharing of ideas while viewing spectacular scenery and/or behind the scenes functioning of biological institutions normally unavailable to casual visitors.

Other ABLE Projects

ABLE has undertaken a number of other projects besides organizing these annual meetings. The workshops presented at each meeting are published in a proceedings volume; volumes I-IV are now available from Kendall-Hunt Publishing Company or through Carolina Biological Supply Company (or, for members, through ABLE at a substantial discount). A library of contributed laboratory manuals (now containing over 200 manuals) is being indexed so that ideas for laboratory exercises can be more easily shared. A newsletter, *Labstracts*, is periodically published, sharing tips, answering questions, etc. A compendium of advanced placement laboratory exercises is being developed.

If you are interested in participating in any of these activities or would like more information about the 1985 workshop meeting to be held June 3-7 at the University of Nevada at Las Vegas, please contact:

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Announcing the 1985 program of Biology Update workshops.

Suffolk University, the Greater Boston Biology Teachers Roundtable, and NABT present hands on workshops for secondary biology teachers at the university on June 21, 1985. Registration: \$20. For more information, contact: Samuel B. Rhodes, Biology Dept., Suffolk University, Beacon Hill, Boston, MA 02108.

Mt. St. Mary's College in Emmitsburg, MD is holding its second annual Biology Update, entitled "Techniques for the Laboratory," from Friday, August 9 to Saturday, August 10, 1985. Complete programs will be available by June 1. For more details, contact: Daniel Dobe, Dept. of Science, Mt. Saint Mary's College, Emmitsburg, MD 21727; Paul Hummer, Dept. of Science, Middletown H.S., Middletown, MD 21769; or A. J. Russo, Dept. of Health/Life Science, Frederick Community College, Frederick, MD 21701.