Articles:

The Influence of Prey Assemblage Composition on Learning in Sunfish: Do Fish Learn? .............. 3
Ruth A. Darling

Problems With Teaching Large Numbers of Students in General Education Laboratory Classes Involving Many Graduate Assistants .... 7
Rita Ghosh

A Tale of Two Trees ........................... 13
Joseph E. Kapler

News & Views:

Editorial Information ........................... 2

Anticipation ... And ACUBE ...................... 12
A Letter from Our President -- Charles J. Bicak

My, How We Are Growing ...................... 16
Patricia S. Bowne

With or Without Popcorn: Controversy in Science .... 17

Call for Nomination - Officers and Steering Committee ... 17

The University of Wisconsin - River Falls ............. 16
Site of 1999 ACUBE Meeting

Preliminary Program -- 43rd Annual Meeting .......... 19

Call for Abstract -- 43rd Annual Meeting ............. 23

Bioscene Contributors Notice ........................ 24

Bioscene is published in April, August and December. Please submit manuscripts by June 30, 1999 for consideration in the next issue.

An archive of all publications of the Association of College and University Biology Educators (ACUBE) can be found at http://acube.org

Articles:

The Influence of Prey Assemblage Composition on Learning in Sunfish: Do Fish Learn? .............. 3
Ruth A. Darling

Problems With Teaching Large Numbers of Students in General Education Laboratory Classes Involving Many Graduate Assistants .... 7
Rita Ghosh

A Tale of Two Trees ........................... 13
Joseph E. Kapler

News & Views:

Editorial Information ........................... 2

Anticipation ... And ACUBE ...................... 12
A Letter from Our President -- Charles J. Bicak

My, How We Are Growing ...................... 16
Patricia S. Bowne

With or Without Popcorn: Controversy in Science .... 17

Call for Nomination - Officers and Steering Committee ... 17

The University of Wisconsin - River Falls ............. 16
Site of 1999 ACUBE Meeting

Preliminary Program -- 43rd Annual Meeting .......... 19

Call for Abstract -- 43rd Annual Meeting ............. 23

Bioscene Contributors Notice ........................ 24

Bioscene Contributors Notice ........................ 24

Accountable Educators, Accountable Students:
Practicing What We Teach .......................... 25
Camille V. Tipton

Right Answer - Wrong Question. .................... 27
A Light Hearted Look at Biology Teaching

ACUBE 43rd Annual Meeting Announcement .......... 28

Call for Applications - John Carlock Award .......... 28

ACUBE Steering Committee Minutes .................. 29
Fall Business Meeting

1999 ACUBE Meeting Notice - Riverboat Cruise ........ 34

Manuscript Guidelines for Bioscene: Journal of College Science Teaching .......................... 35

Membership Application ............................ 36

ACUBE On-the-Web ................................ back cover
Please submit all manuscripts to either co-editor, Tim Mulkey or Ethel Stanley. We prefer receiving rich text files (RTF) to facilitate distribution of your manuscript to reviewers and to make revisions. If you wish to attach a file to email, please address the subject line as BIOSCENE. Your submission should also include the title, author(s), name of your institution with the address, email address, phone and fax numbers, a brief abstract (200 words or less), keywords, and references in appropriate format that are cited in the manuscript. Graphics are welcome! Tables and graphs may be included in the manuscript file, but images should be submitted as individual files. If you are unable to provide an image in an electronic format such as TIFF for MacIntosh or BMP for Windows, please include a clean, sharp paper copy for our use. Your manuscript will be sent to two reviewers as coordinated through the Editorial Board. You will receive suggestions and comments from the reviewers prior to publication of the article. Once accepted, your article will appear in the Bioscene and will be posted on the ACUBE website: http://acube.org Authors retain copyright of their published materials.

Suggestions for manuscripts include: announcements, book reviews, labs/field studies that work, course development, technological advice, software reviews, curricular innovation, history of biology, letters to the editor, undergraduate research opportunities, professional school, funding sources, current issues, etc.
The Influence of Prey Assemblage Composition on Learning in Sunfish: Do Fish Learn?

Ruth A. Darling
Department of Biological Sciences
Westfield State College
Westfield, MA 01086

Abstract: The purpose of this behavioral ecology laboratory experiment is to examine the ability of fish to improve their foraging rate with experience (i.e. to learn). Students will compare the ability of fish to learn in single and two-species (i.e. mixed-species) prey assemblages. Students can design their own experiment, set up the equipment, collect the data, and analyze and interpret the results. This project is appropriate for ecology and animal behavior courses as well as for introductory biology courses with a component providing students with experience designing and conducting scientific experiments.

Key words: learning, experience, fish foraging, mixed-species assemblages

Introduction

Learning is defined as a change in behavior with experience (Shettleworth 1984). Learning allows animals to adjust their behavior to changes in the environment and contributes to the development of critical behaviors. Several previous studies have examined learning in fish and have found that fish can improve their foraging performance with experience (Hughes 1979; Milinski 1979; Vineyard 1982; Ehlinger 1989; Croy and Hughes 1991; Barnhisel 1991; Colgan 1991; Kieffer and Colgan 1991,1992; Darling 1995). For example, fish can learn to avoid evasive prey and select non-evasive prey (Vinyard 1982), and avoid spiny prey that are difficult to handle (Barnhisel 1991). Fish can also improve capture success and foraging rate by improving speed of attack, handling time and success at capturing and handling prey (Croy and Hughes 1991). Because the environment that fish encounter in the field is likely to change both spatially, as a fish moves from one location to another, and temporally as prey compositions change either diurnally or seasonally, learning may be critical to fish foraging success by allowing fish to change their foraging tactics as the prey assemblage changes.

It is well known that the zooplankton communities fish encounter in the field are extremely patchy in time and space. In the field, fish may encounter both single species zooplankton aggregations (Tessier 1983; Omori and Hamner 1982), and mixed-species patches (Folt et al. 1982; Omori and Hamner 1982). As a result of this patchiness, fish foraging on zooplankton encounter prey assemblages that vary in density and composition.

Several studies have found that fish may encounter difficulties when foraging in mixed-species prey aggregations because mixed-species assemblages often contain species that differ greatly in body size, profitability, and swimming behavior. Previous studies have shown that fish given mixed-species prey assemblages may have lower feeding rates than fish given single-species prey trials at the same prey density (Engelmayer 1992; Persson 1985; Visser 1982; Winkler and Orellana 1992; Darling 1995). This loss of efficiency results from factors such as a reduction in the ability of fish to form search images in mixed-
species prey assemblages (Curio 1976; Winkler and Orellana 1992), the need for mixed search strategies in mixed-species prey assemblages (Winkler and Orellana 1992) or a tendency for fish to continue to sample additional or novel prey types even at high densities of suitable prey (Ehlinger 1990).

Experience is one factor that may significantly influence the foraging success of individuals. Although fish may originally experience reduced foraging rates in mixed-species prey assemblages, with experience, fish may be able to learn to improve their foraging rates. Patterns of selectivity, predation rate and prey risk may change over time, resulting in increased foraging rates. I have found that in two-species prey assemblages, fish with experience decreased their capture rate of the smaller, less energetically valuable prey, and increased their capture rate of the larger, more energetically valuable prey, resulting in a net increase in the total biomass consumed per unit time (Darling 1995).

This study is designed to assess the ability of fish to improve foraging with experience in both single and mixed-species prey assemblages. In this exercise, students will present individual fish with prey (Daphnia and Tubifex worms) in either single-species or two-species prey treatments. Experience will be imposed by exposing individual fish to the same prey assemblage in sequential trials. Students will test the general hypotheses that learning results in improved foraging success in both single and mixed-species prey assemblages. Additionally, for the mixed-species prey assemblages, students will test the prediction that with experience, fish foraging success will increase, as they learn to choose profitable prey (i.e. large prey) from the mixed-species prey assemblages.

Methods

Experimental Tanks

Several days before the fish are brought into the lab, set up eight to ten experimental tanks (for example, 1 or 5 gallon fish tanks). Cover the back, sides and bottom of each tank with white paper to prevent fish from viewing each other and to provide a uniform background. Fill each tank with water and condition the water to remove chlorine (appropriate chemicals for removing chlorine can be purchased from pet stores or from Biological Supply Houses). Since fish will be housed individually in tanks, it is not necessary to have filters in each tank as long as any debris is siphoned out regularly and periodic partial water changes are performed (siphon out about 15% of the water from the tank and replace it with conditioned water). If cold-water fish species are used (see suggestions below), heaters will not be required. You may also want to set up a large holding tank (for example a 20 gallon tank) to house extra fish which can be used to replace experimental fish if any become sick or die.

Foragers

Depending on your resources, the time of year, and the availability of fish, a number of different species of fish can be chosen for this experiment. I have done this experiment with either Pumpkinsseed sunfish (Lepomis gibbosus), or Bluegill sunfish (Lepomis macrochirus) seined from a field site. Using field collected fish may work well if you coordinate this lab with a field collection lab scheduled earlier in the term. If field collected fish are used for this lab, select fish of one species that are all approximately the same size (age). You will need enough fish for replicates. If you collect approximately fifteen fish, then you should have enough to run foraging trials on eight to ten experimental fish. If you prefer, rather than collecting fish from the field, fish can be purchased from a variety of locations. Golden shiners can be purchased from some bait shops, and some local fish farms sell sunfish. This experiment will work with feeder goldfish which you can purchase inexpensively from fish stores.

Once the fish are obtained, house them (individually) in the experimental tanks to allow them to become accustomed to the tanks. Any extra fish can be housed in a large holding tank. A conditioning period of approximately two weeks will allow the fish to become accustomed to the lab and to the people feeding them. During this period, feed fish flake food daily.

Prey

There are a number of possible prey species that can be used for this experiment. It is best to choose two or three different kinds that differ in size and/or evasiveness. It is preferable to have one larger prey type and at least one smaller prey type. Depending upon your preferences, prey can either be purchased and cultured in the lab, or collected from the field. If you want to coordinate this lab with a field lab, then students can collect prey using plankton nets from a local pond or lake. An easier way to get prey anytime of the year is to purchase them. Daphnia can be purchased from Biological Supply Houses. Generally, I
use *Daphnia* as the smaller prey. Purchase them ahead of time and set up several culture jars in the lab and allow the populations to reproduce. Large glass jugs (gallon size) work well as culture jars. To the jars add pond water and the *Daphnia*. You can purchase *Daphnia* food from Biological Supply Houses. You can add algae to the culture (taken from a local pond, or purchased from Biological Supply Houses).

For the larger prey, I have used Tubifex worms which can be purchased from Biological Supply Houses or local pet stores. Using *Daphnia* as the smaller prey and Tubifex worms as the larger prey works well. However, there are many other potential prey that can be used (for example, you can use copepods collected from a local lake).

To compare learning in single-species prey assemblages to that in mixed-species prey assemblages, students will expose fish to both single and mixed-species prey assemblages. I have done this experiment using single-species assemblages of *Daphnia* and mixed-species assemblages of *Daphnia* and Tubifex worms. Students can determine the actual prey densities to use. They should choose densities so that the total prey density is the same in the mixed-species prey assemblage and the single-species assemblage. I’ve conducted this experiment using a density of 74 *Daphnia* for the single-species prey assemblage and 70 *Daphnia* and 4 worms for the mixed-species prey assemblage. I’ve also used a density of 77 *Daphnia* for the single-species prey assemblage and 70 *Daphnia* and 7 worms for the mixed-species prey assemblage. Counting out prey can be time consuming, and the students may prefer to use a lower density (such as 34 *Daphnia* for the single-species prey assemblage and 30 *Daphnia* and 4 worms for the mixed-species prey assemblage). 

Prior to running each feeding trial, students should prepare the prey assemblages that will be fed to the fish. Students should prepare a prey assemblage for each experimental fish. Students should count out the appropriate number of prey of each species and place each prey assemblage into a small labeled jar containing water treated to remove chlorine. Small beakers, or small plastic jars work well. Prey can be sorted by using plastic disposable pipettes to capture prey. The tips of the pipettes should be snipped off to make the opening wide enough for *Daphnia* to pass through.

**Experimental Design and Procedures**

To examine if foraging behavior changes with experience, each fish should be given the same prey assemblage for a set number of bouts (feeding periods). To assess, learning, fish should be given the same prey assemblage for at least four bouts. If time permits, additional bouts can be performed. I have experimented with ten bouts and discovered that after seven bouts foraging behavior does not improve. Each bout is relatively short (about three to five minutes) and successive bouts should be separated by a time period. For example, each fish could be given one bout per day over successive days. Alternatively, fish could be given two bouts per day, one in the morning and one in the afternoon. Because each bout is short, a group of students can run feeding trials on several tanks, doing one tank at a time.

During each feeding trial, known numbers of prey are introduced into the center of each tank by slowly lowering the small jar containing the prey and releasing the prey into the tank. Feeding trials last for several minutes depending on the experiment. Present individual fish with prey assemblages of either *Daphnia* alone or *Daphnia* and Tubifex worms. In order to equalize hunger level, fish can be fed to satiation with flake food at the end of each day.

The instructor can engage students in a discussion about the experimental design and assign teams for various designs. Points students can discuss include: What are the advantages and disadvantages of using only a few bouts versus using many bouts? Schedule for feeding trials. Which organisms will be used in the prey assemblages? What are the advantages and disadvantages of using low versus high prey densities? Why should the total prey density be the same in the single-species prey assemblage as in the mixed-species prey assemblage?

**Data Collection and Analyses**

There are a number of different variables students can analyze. They can determine capture rate for each prey type by recording data on the type of each prey captured in the first 30 seconds. After the prey are added to the tank it may take fish a few moments to orient to the prey. Timing of feeding trials should begin once fish orient to the prey (i.e. turn their body toward the prey and fixate their eyes on a prey item). At each tank, one student should keep track of time with a stopwatch and announce the start and end of each feeding period, another student should observe the fish feeding and call out the type of prey that is caught, and a third student should record each prey consumed and the time of consumption. Utilizing this data, the capture rate for each prey type can be calculated. Capture Rate (number of prey captures/sec-1) is the number of each prey type captured per second during the first 30 seconds of each bout. It is best to use the data from only the first 30 seconds to avoid the effects of prey depletion. If all available prey of a particular species were captured before the first 30 seconds, then capture rate for that prey type is calculated based on the time of the last prey capture.

**Results and Discussion**

Students can analyze the data to determine if fish improve their foraging with experience and compare learning in single versus mixed-species prey assemblages. Questions students can address include:
Do fish improve their capture rate in the single-species prey assemblages? Do fish improve their foraging success in the mixed-species prey assemblages? In the mixed-species prey assemblages, do fish learn to choose the more profitable prey (i.e. large prey)?

Plotting the data will help the students visualize the effect of experience on foraging success. Students can make the following graphs:

1) For the single-species prey assemblage: A graph of mean (mean ± SE) number of *Daphnia* captured per second (on the y-axis) versus bout (on the x-axis).
2) For the mixed-species prey assemblage:
   a) A graph of the mean (mean ± SE) number of *Daphnia* captured per second (on the y-axis) versus bout (on the x-axis).
   b) A graph of the mean (mean ± SE) number of *Tubifex* worms captured per second (on the y-axis) versus bout (on the x-axis).

In my classes, I have had students write laboratory reports (in a scientific format) outlining their experiments. However, for lower division courses, if the instructor prefers, students can write a shorter report by answering a series of questions provided by the instructor.

In conclusion, this laboratory exercise provides students with an opportunity to be involved with designing and conducting an experiment and analyzing and summarizing the results.

**LITERATURE CITED**

The Challenges of Teaching Large Numbers of Students in General Education Laboratory Classes Involving Many Graduate Student Assistants

Rita Ghosh
Dept. of Life Sciences
Indiana State University
Terre Haute, IN 47809

Abstract: Engaging students in science is one of the most challenging tasks of teaching General Ed. Lab. classes. The previous experience of these students varies considerably. They relate to diverse areas of science with varying degrees of success especially if the topics covered do not seem to touch their daily lives. It is little wonder that the science laboratory seems to be confusing to a majority of General Education students who usually enroll because the course is a requirement. Students who have a more extensive biology background may find the material too elementary to warrant their attention. In addition, Graduate Teaching Assistants come to Indiana State University with their own varying levels of biology background, teaching experience, and English language proficiency and further impact the General Education students’ interests, involvement, and accomplishments.

It is important for science teachers, strategists, and policy makers to devise ways to improve both the content of science education and its presentation to make it meaningful and understandable. To initiate dialogue in this important aspect of undergraduate education, I have focused on areas that are important to understanding and improving the teaching of General Education biology. Specifically, how can we improve our laboratory presentations and have them be interesting, yet focused.

1. How can we challenge students to think productively and arrive at their own answers to presented problems as well as design experiments to test their ideas?
2. How can we best select topics and experiments which the students are more likely to relate to their daily lives?
3. How can we help Graduate Teaching Assistants engage in effective teaching, communication, and attitude, as well as provide a degree of uniformity in all laboratory sections of the same course.

Key Words: General education labs., Graduate Teaching Assistants, Language problems, Teaching experience, Problem based learning, Class size.

Introduction
Biology as a subject is receiving a great deal of attention from educators and administrators. Because the world is simmering with biological problems and concerns ranging from the environment to an aging population, biology is important in the General Education curriculum. We need not only teachers and practitioners of science but a significant segment of society which can participate in matters of a biological nature as informed citizens, environmentalists, industrialists, and administrators in many facets of our society. How do we accomplish this and at the same time keep our students interested and excited about biology? I want to share my experience and understanding of teaching General Education Biology Laboratories, particularly the hands-on-experience for students that promotes a practical understanding of biology.

General Education and Its Problems
What is General Education? According to Indiana State University Student’s Handbook,

“General education provides an essential foundation and broad academic base for students in all curricula, both liberal arts and professional. It also encourages each student’s development as a round human being, and informed citizen, and an individual capable of functioning effectively in an evolving society.”
Although these goals are admirable, it is difficult to meet them due to the challenges that accompany teaching science in Gen. Ed. Classes. What are these challenges?

**Student Challenges:**

1. The large majority of our Gen. Ed. Students enroll in a science class only because it is a requirement.
2. Gen. Ed. Students come with varying degrees of preparation making it difficult for them to relate to diverse areas of science.
3. Many of the students are not interested in science.
4. Students with good scientific backgrounds find the standard course too limited to warrant their attention.
5. Many of the topics covered do not touch their lives.

**Instructor Challenges:**

1. The large number of students enrolled requires many sections and, therefore, many instructors.
2. Many graduate teaching assistants (GTAs) are involved in the one course.
3. These GTAs do not possess uniform academic and language backgrounds.
4. There is a wide range of attitudes among GTAs toward undergraduate general education students as well as a wide range of teaching ability.
5. The relatively rapid turnover rate of GTAs makes pedagogic development difficult.
6. There is a relatively high ratio of students to GTAs.

**Approaches to Student Learning**

Today there are many words and phrases that are becoming buzz words in the context of undergraduate science education: hands-on, investigative, research rich, inquiry-or-discovery-based, student-active, integration of teaching and research to mention some of them. What these terms have in common is that they all talk about strategies to provide opportunities for students to learn how scientists think and work. The hope is that students will develop an appreciation of how science is actually done and come to a better understanding of how biology and chemistry connect to the world outside the classroom and lab.

There is renewed interest in designing laboratory courses and curricula that emphasize student investigation and inquiry. According to Sundberg and Moncada, implementation of an investigative laboratory course for non-science majors challenges students’ misconceptions about biological science.

How can we as instructors satisfy the needs of all students at the introductory level? Does one size or plan fit all? What kind of laboratory experiences best facilitate student interest and support a solid grounding in the fundamentals?

Good teachers are able to recognize what works in a class. Recent research is helping to determine how the mind works and what type of teaching helps the learning process. Students learn best when they learn how to use the tools of science hypothesizing and testing and when they are involved in collaborative learning.

**Problem Based Learning**

Problem based learning (PBL) revolves around the use of “real-world” problems and initiates learning new concepts through group efforts. Students seem to learn best when they learn how to:

1. Use the tools of science to ask questions.
2. Generate a hypothesis.
3. Test their hypothesis.
4. Work in a collaborative manner.

PBL offers a number of challenges for all involved. Students are asked to admit to what they don’t know and to stretch themselves beyond the simple tasks of memorization and recall. Students must use their own strategies for solving problems. Instructors must learn to teach in a manner different from the way they themselves were taught and to give up control and predictability in the classroom.

Successful implementation of the PBL is easier if one instructor teaches the entire course. What do we do if there are large multi-section courses? What do we do if the instructors include new recruits of GTAs every semester? What do we do if the GTAs themselves come with different academic backgrounds and with language problems? How do we maintain uniformity and quality without losing PBL approach for student learning?

**Results of Students’ Performance as Correlated with the Variables Associated with Teaching A Multi-Section Course with a Large Number of GTAs**

First we determined the distribution of students in the various sized sections based upon their SAT scores. Figure 1 shows that the percent of students with SATs below 1000 is about 45% for both the small (up to 15 students) and medium (16-28 students) classes and about 35% for the large (29-36 students) classes. If SAT scores were the only deciding factor, we would expect students in large classes to perform better. Instead, the data illustrated in Figure 2 shows that the smaller the class size the better the student performance as measured by final grades.
Small Class (Mean SAT=960)

Large Class (Mean SAT=940)

FIG. 1: "SAT" DIVERSITY IN TYPICAL GEN ED LAB SCIENCE CLASSES

FIG. 2: SMALL CLASS SIZE VS MEDIUM AND LARGE CLASS SIZE
FIG. 3: GRADE DISTRIBUTION IN CLASSES TAUGHT BY GTAs WITH EFFECTIVE COMMUNICATION SKILLS AND BAD COMMUNICATION SKILLS

FIG. 4: GRADE DISTRIBUTION IN CLASSES TAUGHT BY EXPERIENCED GTAs AND INEXPERIENCED GTAs
We next examined data to determine the correlation between student grades and the communicative skills of the GTA. Figure 3 shows a direct correlation between the GTA’s communicative skill and the grades obtained by the students.

Analyzing the performance of the students based on the relative teaching experience of the GTA (Figure 4), there is a significance at the “A” level and the “D” and “F” levels with a positive correlation with experience and “A” grades and a negative correlation with the “D” and “F” grades.

Possible Solutions

In our University, we offer a Gen. Ed. Biology lab course for non-science majors so that they can obtain hands-on experience with science. Previously, all the lab exercises were structured, but we are replacing them with PBL exercises. We introduce the problem to be considered in that week’s laboratory. The goal is to recognize the problem and list some reasonable, working hypotheses. Quizzes attempt to follow the same format as do discussions of previous lab reports. Some laboratory exercises are still structured and are designed to test several hypotheses and develop basic laboratory measurement skills. Students are taught how to gather data and how to analyze them. They are also introduced to simple laboratory apparatus and equipment for measuring such things as length, mass, volume, pH, optical density, and cellular inclusions. These skills will help them in designing their own experiment in order to test their hypothesis.

A major problem to teaching this lab course is that we have many sections (15) and an average of 8-10 GTAs supervised by one instructor. The language skills, varied backgrounds, and attitudes toward teaching of the GTAs vary. In an effort to maintain quality teaching in all sections, the supervising instructor monitors every GTA’s teaching methods, communication skill, and attitude. Unannounced visits are made to every section to observe the GTA in action. Effective use of time by the GTAs is given attention. The instructor holds regularly scheduled weekly meetings with the GTAs to discuss problems, including what to cover and methods of presenting the material.

New GTAs are encouraged to attend seminars for GTA training. GTAs with language problems are encouraged to take a remedial course in spoken English. An attempt is made to assign two instructors to each lab section in an effort to maintain one instructor per 15 students. Whenever possible, a new GTA is matched with an experienced one, and during the first few weeks of the semester the experienced GTA serves as the main instructor. Inexperienced GTAs are encouraged to observe a class taught by an experienced, full-time faculty member.

In an attempt to maintain uniform standards, students in all sections take the same tests. In addition, the supervising instructor meets with the GTAs to insure a similar grading scale for all sections.

Conclusions

On the basis of our data and observations the following conclusions can be made:

1. Students benefit by being exposed to PBL and by being able to relate the topics covered in class to their personal experiences.
2. Sections must be maintained at a proper size in order to adequately handle PBL.
3. Obviously, small class size means many sections and thus the need for a rather large number of GTAs. The GTAs must be properly prepared and monitored so that they have the proper attitude and provide effective teaching.
4. Improving the communication skills of GTAs enhances student learning.

References

A Letter From Our President

ANTICIPATION . . . AND ACUBE

Dear Colleagues,

Meeting in February with ACUBE colleagues in River Falls, WI reminded me of the central place this organization now has in my professional life. As we move into the second full year with the name change from AMCBT to ACUBE, there is an infectious enthusiasm within the membership. We can be proud of our accomplishments and our promise for the future. As Past President Karen Klyczek reminds us, ACUBE is increasingly recognized as the primary undergraduate biology education organization in the United States. Executive Secretary Marc Roy notes the increasing international interest in the organization with the recent addition of European members.

I think there is a growing sense of anticipation in ACUBE. This anticipation may be connected to Y2K, the end of one millennium and the start of another. It may also be a sense of anticipation related to the drive toward integration of process and content within biology and across other disciplines. This is, in fact, the theme for the 43rd Annual Meeting; "Integrating Process and Content: Flexibility for the Future". Meetings through the 1990s have addressed aspects of teaching as scholarship (1994 - Henderson Community College), technology in the classroom (1995 - Alverno College), linking biology learning (1996 - Loras College), coherence in curriculum development (1997 - Beloit College), and the development of students as global citizens (1998 - Rockhurst College) to list just the most recent topics. I think it is appropriate that the final meeting of the decade, of the century, indeed of the millenium, ought to draw us into some very fundamental discussions about just what it is we do in the biology classrooms and why we do what we do.

Integrating process and content presumes a student-centered classroom. Like many of you, I wrestle with incorporating the best tactics in my classroom to shift ownership of the learning enterprise to my students. To make learning an internal and student-oriented activity requires, that we all consider the sorts of questions voiced by Buzz Hoagland, President-Elect and Program Chair for the 43rd Annual Meeting to be held at the University of Wisconsin, River Falls. Buzz asks how anticipated career changes by our students ought to affect our teaching of biology: How should we equip them? What content do they need to know? Also, to be sure, the discipline of biology itself is changing rapidly; there is occurring a certain coalescence of our view of the biotic world. The human genome project, the holism of landscape ecology, and the embedded nature of technology in our biology teaching are just a few examples of the exciting and synthesizing nature of our discipline.

I look forward with great anticipation and genuine enthusiasm to the fall 1999 ACUBE meeting. I know all of you have much to share in relation to the fall meeting's theme in particular and to biology teaching in general. Keep in mind the great value of publishing your efforts in Bioscene, our refereed journal. Also, as the 1998-99 academic year draws to a close, consider making a presentation or developing a workshop for the fall 1999 meeting. A new year and a new millenium lies before us!

With warm regards,
Charles J. Bicak
President
A Tale of Two Trees

Joseph E. Kapler
Professor Emeritus
Biology Department
Loras College
Dubuque, IA  52004

Abstract: Students can learn about the campus environment by studying individual trees. Two trees, a mature eastern cottonwood and a large white oak that recently fell victim to a windstorm, on the Loras College campus are described. The natural distribution, growth rate, seasonal changes, life history and their value to the campus environment are discussed.

Keywords: eastern cottonwood, white oak, life history, growth rate, seasonal changes, campus environment

This account first appeared in the Loras College student newspaper, The Lorian, as separate stories about two trees on February 28 and September 3, 1998. They were submitted with the intention of stimulating awareness and interest in the natural environment of the campus, especially its trees. Over the years I have encountered students who were almost totally ignorant of the different species of trees and the important role they play in our environment. It is possible to learn a good deal of biology from studying an individual tree and its ecological niche. Perhaps this can be utilized as a teaching tool on our individual campuses. I have obviously borrowed from Charles Dickens for the title of this article.

The Cottonwood

Trees are an important component of our campus environment. One of the largest trees in the city of Dubuque is on our campus. This tree is not along any well-beaten path, so it may be unnoticed by many. It is in an area of campus known as Keane Oaks. This area is a remnant of the upland hardwoods formerly found on the hills in the Dubuque area. If you are in the Zoology laboratory in the Science hall, look to the north from the windows and you can see it. If you walk along the drive from the Science Hall to Rohlman Hall, look to your left to the other side of the ravine and there it is. Better yet, walk over to the tree to get the full impression of its size.

It is a cottonwood tree, the largest tree native to Iowa and also found throughout most of eastern United States. There are about 25 species of cottonwoods in the world, with 11 of them in North America. This tree is the eastern cottonwood. Its botanical name is *Populus deltoides*. The trees of this group are of ancient origin and the genus name *Populus* may refer to the early Roman expression *arbor populi*, the people’s tree. The species name *deltoides* refers to the broadly triangular leaf of this tree. According to a legend, the Indian discovered the design for the tepee by rolling a cottonwood leaf with his fingers, producing a conical form. The leaves of cottonwoods and related aspens, especially quaking aspen, have thin, flattened leaf stalks (petioles) that cause the leaf to flutter in the slightest breeze and produce a distinctive rustle.

In the wild, cottonwood trees are found in river bottoms, along streams, ponds, and other wet places. Cottonwood seeds must contact moist, exposed mineral soil within a few hours of being released from the parent tree if they are to germinate and grow. Stream banks, mud flats, etc. provide such sites and this explains the natural distribution of this species. It is not surprising, then, that cottonwood trees are tolerant of flooding. Cottonwood trees, however, can grow well if transplanted to dry, upland sites. Cottonwoods are easily transplanted and were extensively planted by townspeople and farmers for shelter and ornament when they first settled on the treeless prairies. Fifty years ago, many of the original transplants were still present, but now few remain.

Trees of the genus *Populus* produce flowers (catkins) in early spring before leaves appear, and the male and female flowers appear on separate trees. The female catkins produce tiny seeds surrounded by a tuft of cottony hairs, hence the name cottonwood. These seeds are produced in tremendous quantities, released and carried by the wind for considerable distances.

Until just recently, cotton-bearing cottonwoods and other cotton-bearing poplars were deemed by Iowa law to be “public nuisances” in cities. This was because cottonwood seeds flying about in the spring could plug the intakes of air conditioning units, or because of perceived allergies. This law was generally not enforced (necessitating removal at the homeowner’s or city’s expense) unless someone
complained loudly. A change in the Iowa law, effective July 1, 1998, has removed cottonwoods and other cotton-bearing poplar trees from the list of public nuisances. Now the remaining cottonwood trees on our campus are no longer “outlaws”. The city of Dubuque has never had an ordinance regarding cottonwood trees.

The male catkins produce pollen grains which are windblown to the female flowers. Pollination is necessary for seed production. Our large cottonwood is a “male” tree and its catkins are bright red when they first appear. Watch for them in late March or early April. This is a conspicuous phenomenon and is visible from the ground. In warm weather, the male catkins mature very quickly, release their pollen and then drop from the trees.

Although it has a variety of uses, the lumber from cottonwood is not highly valuable in today’s market in our area. In the Netherlands, wooden shoes are made from a native cottonwood because it is suitably light in weight and is easily worked.

Our large cottonwood tree may have been planted by someone many years ago, or it may have grown from a seed that fell on moist, exposed soil at that spot. The Keane Oaks area was not acquired by Loras College until 1916. The first fork in the trunk of this tree is about 30 feet from the ground, indicating that in its early years it grew in forest conditions. The presence of other trees close around forced it to grow straight up in competition for the available light. Open-growing cottonwood trees develop large branches early in their growth and the spread of the branches may be as wide as the tree is tall.

Cottonwoods are very fast-growing for about the first 40 years, then the growth rate slows down. These trees are relatively short-lived, with few trees surviving beyond 125 years. It is estimated that our large cottonwood is about 100 years old. How much longer will it live? No one can say precisely, so admire it while it is here. It appears to be in good condition at the present time, and I expect it to live a few more years perhaps a decade or more, before serious decline sets in.

If nothing happens to this tree for another two years, it will have lived for all of the 20th century. It has survived many seasons with varied weather conditions. It has survived drought, wind storms, hail storms, sleet storms, lightning strikes and extremes of heat and cold. How much oxygen has this tree recycled into the atmosphere in this century through the processes of photosynthesis and transpiration? How much has it contributed to the cooling of our urban environment in hot summers and the moderation of cold temperatures in the winter?

How many thousands of birds have rested in its branches. In Iowa, large cottonwood trees are favored by bald eagles for perching and nesting. This tree was the favorite perch for Cooper’s hawks when they nested in Keane Oaks. The largest bird I have seen perched in this tree was a wild hen turkey in early spring a few years ago. How many woodpeckers, chickadees, nuthatches and brown creepers have found sustenance in the various forms of insects hidden in the crevices of its bark? How many squirrels have climbed this tree, or large mammals such as the opossum, woodchuck and raccoon? There is a hollow cavity in one of the branches of this tree and it serves as a nesting site for the resident gray squirrels. Judging by all the tracks in the snow, this tree is frequently visited by neighborhood squirrels. Perhaps squirrels climb large trees for the same reason humans climb the highest mountains - because they are there.

How many thousands of students have come and gone in all the years this tree has been on our campus? This tree is older than any building on campus and it is a living landmark connecting us to the past.

What would a college campus be like without grass, trees, shrubs, flowers and wildlife attracted to these areas? On some campuses which have become completely cluttered with buildings, older buildings have been removed to create green spaces with appropriate plant forms to provide a more livable environment. An environment with room for a little of the natural world is a daily reminder that we and other life forms are interdependent residents of planet Earth.

The Fallen Oak

A mighty oak has fallen. A large white oak, a symbol of strength and longevity, fell victim to a wind storm on August 24, 1998. This tree was standing east of the Science Hall, adjacent to the Rohlman Hall parking area. There is now a great void in the sky where this tree stood.

The tree was not uprooted, but was broken off at ground level by the force of the wind. This happened because the base of the trunk was rotten on the inside with only a thin shell of sound wood remaining under the bark. This condition is known as heart rot, caused by a fungus. The fungus may have gained entry through an injury to the bark at the base of the tree.
many years ago. The freshly exposed rotting wood quickly attracted a number of German wasps which were investigating it as a potential food source. This insect, introduced from Europe, is similar to our native yellowjacket hornet. The German wasp becomes abundant in the late summer and fall seasons, and it can be a pest at outdoor picnics where they are attracted to our food and beverages as much as we are. Only the queen survives the winter to restart a new colony each year.

This large white oak was one of the oaks in the area of campus known as Keane Oaks. The predominant species of oak is the white oak, *Quercus alba*. *Quercus* is the Latin name for oak, and *alba* refers to its light colored bark. The white oak is found throughout most of the eastern half of the United States, except for the southernmost regions. There are eleven species of oak native to Iowa. In 1961, the Iowa General Assembly declared the oak to be Iowa’s state tree, but they did not designate which species it should be. The white oak would be a good candidate for such a distinction. Our state bird is the eastern goldfinch and our state flower is the wild rose.

Longevity is one of the characteristics of white oak. Some white oaks in Iowa are more than 400 years old, while some in eastern states have been known to be 800 years old. How old was the oak tree that was lost to the storm? At a cross section of the trunk 18 feet above the base, I counted 154 growth rings. To reach this height from a germinating acorn, at least another 20 to 25 years were required, as white oaks are slow-growing. A conservative estimate of this tree’s age is about 175 years. It was already growing when Loras College was first established in 1839. It was about 38 years old when the Civil War started, and it was about 93 years old when Keane Oaks became part of Loras College in 1916.

An examination of the growth rings showed that this tree did not grow at the same rate throughout its lifetime. In the last ten years of its life (1989-1998), the diameter increased two inches. In the ten years of 1919-1928, only one inch was added, but in the decade of 1845-1854, three inches of growth were added to its diameter. Availability of moisture and nutrients during the growing season and competition for sunlight from other trees affect the growth rate, and these factors can vary from year to year. The chronology of a tree’s lifetime is written in the annual concentric growth rings.

Oak trees provide shelter and nesting cover for wildlife and acorns form a significant part of the diet of many species of wildlife. The wood of white oak has many uses and is noted for its strength and durability. It is a standard against which many other woods are compared. The famous warship, “Old Ironsides,” despite it name, was constructed largely of white oak 200 years ago. It is scheduled to lead a procession of the world’s sailing ships to Boston Harbor in the year 2000. The wood of white oak is watertight, hence its use in shipbuilding and cooperage. Federal law requires that all domestic whiskey be aged in white oak casks.

A cubic foot of air dried white oak weighs 48 pounds, just twice the weight of the same volume of cottonwood. White oak is an excellent firewood because of its density. Some of the wood of the tree that blew down will be used as fuel, so some of the solar energy captured by this tree in the last 175 years will be recovered.

Each fall, white oak leaves turn to a rich burgundy color. This reaches its peak about mid-October, and then the leaves fade to a dull, reddish-brown and finally to a light brown. The leaves may remain on the tree for some time in the winter. Watch for these color changes this fall. The large white oak now gone was in a prominent location, so the color display this fall will be diminished.

Oaks are very sensitive to changes in the woodland environment. Their root systems can be adversely affected by changes in the forest soil caused by digging, filling, compaction and the use of impervious coverings of concrete and asphalt for street, sidewalk and parking lot construction. Replacing the natural understory and decaying leaf litter with mowed lawn is also a drastic change for oak trees. All these
changes from a natural environment are detrimental and can cause decline and even death of a mature tree even if no damage is done to the trunk or branches. They may survive, but it makes them more susceptible to serious decline.

The Keane Oaks environment has undergone considerable change in the time I have known it (54 years). The large white oaks have enhanced the appearance of the buildings constructed in this area by providing an attractive setting for them. This is particularly true of the Science Hall which is framed by white oaks. What would this part of the campus look like if all the large trees were gone? It would present a much bleaker appearance.

Of the 50 mature white oaks remaining on our campus today, about six to eight are in poor condition and may not last much longer. The remainder appear to be in relatively good condition considering all the changes that have occurred, and should live for some time to come. We may not fully appreciate the value of trees on campus until they are gone, so we should plant more trees in available spaces where no construction is planned. Trees planted now would have a head start in replacing the older trees in the years ahead.

Literature Cited

van der Linden, P.J. and D.R. Farrar. 1993. Forest and Shade Trees of Iowa. Iowa State University Press. 139 pages

MY, HOW WE ARE GROWING!

AMCBT THEN --

At the first meeting in 1957, there were 44 members from 11 states

ACUBE NOW --

As of April 15, 1999, there are 373 members from 33 states

Note: You can see where we need to recruit. Help ACUBE as well as your colleagues by letting them know of the benefits of your organization.
With or Without Popcorn:
Controversy in Science

Patricia S. Bowne

'Keep your mouth shut in washrooms!' Dr. Henderson advises the alienated outsider Banting, ranting about his wrongs in the movie "Glory Enough for All." Henderson's right; those feet in the stall belong to Banting's supervisor (and now, enemy), J.J.R. McCloud. Banting and McCloud will share the Nobel prize for discovering insulin, but will hate one another to the bitter end.

For three years I've started the philosophy of science class with this movie. It provides a common basis for the students to work from, and analyzing it can take you far in explaining some of the controversies and terms in philosophy of science. Take the divide between the "prescriptive," "internalist" philosophers of science and the "descriptive," "externalist" or "historicist" studies of today. You can lecture on this distinction, or students can discover it themselves in analysis of a movie.

Prescriptive analysis tries to tease out the scientific method. How did Banting design his experiment, what did he do right and what mistakes did he make? What rules for doing science would the students derive from this example? My students will see more of this kind of analysis when they read Karl Popper.

Even before they've written their rules, my students begin to revise them. They notice that Banting would have done much better if he could have explained his work to peers. They criticize his habit of drinking lab alcohol out of beakers. These factors, apparently irrelevant to the chain of scientific reasoning, are what catch the viewer's interest. But how irrelevant are they?

The longer students analyze the movie, the more personality traits intrude into our discussion. The same passion that led Banting to throttle a colleague drove him to spend his own money on experimental animals. Can we really come up with cut and dried rules of how to conduct science, picking out some points as more important than others? My students fall between internalist observers of science like Jacob Bronowski, who try to distinguish relevant from irrelevant events, and externalists or historicists like Bruno Latour who analyze the lab as an alien culture, any of whose aspects may be relevant to the results.

Students don't usually think it relevant that all the scientists in the film are white males, only one with any child care responsibilities. They don't notice tensions between old world and colonial scientists, or between eastern and western Canadians. I can cite these, though, when we discuss social analysts of science like Evelyn Fox Keller and Marion Namenwirth. We'll look at the movie as an artifact when we discuss the heroic model of science and its assumptions. We'll use the movie all semester for data, for examples, for a common language. It's a good investment of class time, with or without popcorn.

"Glory Enough for All" is based on the book "The Discovery of Insulin" by Michael Bliss, who also wrote "Banting: a biography." The movie is available from Cyclops Communications Corporation, 44 Gibson Avenue, Toronto, M5R 1T5, Canada. It runs three hours.

Call for Nominations

President-Elect
Secretary
Steering Committee Members

ACUBE members are requested to nominate individuals for the office of President-Elect and Secretary as well as for two at large positions on the ACUBE Steering Committee.

If you wish to nominate a member of ACUBE for a position, send a Letter of Nomination to the chair of the Nominations Committee:

Dr. Nancy Sanders
Division of Science
Truman State University
Kirksville, MO 63501-0828
Voice -- (816)785-4619 FAX (816)785-4045
E-mail -- sc26@nemo.mus.edu
The University of Wisconsin-River Falls
River Falls, WI

Site of the 43rd annual ACUBE fall meeting
October 15-17, 1999

Located in the scenic St. Croix River valley, 25 miles from the twin cities of St. Paul and Minneapolis, MN, the University of Wisconsin-River Falls offers an engaging site for the 43rd annual meeting of ACUBE. Excellent university facilities, surrounded by extraordinary natural beauty, and access to cultural, educational, and other features of the Twin Cities will provide many opportunities for interesting meeting sessions and events.

UW-River Falls will celebrate its 125th anniversary in 1999. Founded as a State Normal School in 1874, it joined the University of Wisconsin System in 1979 as a comprehensive university. It is organized into Colleges of Arts & Sciences, Agriculture, and Education, and a School of Business & Economics. There are approximately 5,500 students enrolled in 45 majors. Masters programs (MS and MSE) are offered in several education fields.

The Biology Department includes ten full-time faculty and offers a range of field and laboratory courses to over 400 students majoring in Biology, Biotechnology, and pre-professional programs. Experience with modern laboratory equipment, infusion of computer technology, and an emphasis on active learning prepares students for a variety of career paths.

UW-River Falls boasts a newly-remodeled library, which also houses six computer labs (four PC and two Mac). The new Educational Technology building, which will house the College of Education, will be completed fall 1999. The largest vertical sundial in North America can be found on the Fine Arts building.

The city of River Falls is on the Kinnickinnic River, one of the best trout streams in the Midwest. The South Fork of the Kinnickinnic runs through the UW-River Falls campus. The river ends at the confluence of the St. Croix River, where it is surrounded by Kinnickinnic State Park. The St. Croix stretches 150 miles as the boundary between Minnesota and Wisconsin and is the only river in the world protected along its entire length. Meeting attendees will be able to enjoy its natural beauty, since the meeting banquet will be held on a St. Croix River cruise.

Those traveling to the meeting by plane will fly into the Minneapolis/St. Paul International Airport, where you can rent a car or take a shuttle to get to River Falls. The Twin Cities offer a wide variety of entertainment and educational options, including museums, restaurants, theaters, and the prestigious University of Minnesota. The most popular tourist destination in the area is the Mall of America, the largest enclosed shopping area in the country. Five minutes from the airport, it includes over 400 stores plus restaurants, night clubs, an amusement park, Lego Imagination Center, and Underwater World aquarium.

Join us for a great meeting! Visit the ACUBE web page for more information about the schedule, registration, etc.
Friday, October 15th

2:00 - 5:00 PM  The Natural and Not-so-Natural History of the Kinnickinnik River Watershed (pre-meeting field trip; limited to 14 participants)  Clarke Garry, University of Wisconsin-River Falls

6:00 - 8:00 PM  Registration and Reception

8:00 - 9:00 PM  Opening Session

Welcome for ACUBE
ACUBE President: Charlie Bicak, University of Nebraska at Kearney

Welcome to the University of Wisconsin-River Falls
Gordon Hedahl, Dean, College of Arts and Sciences
Program Chair: Buzz Hoagland, Westfield State College
Local Arrangements Chair: Karen Klyczek, University of Wisconsin-River Falls
OPENING ADDRESS (Public Welcome to Attend)
REARING ENDANGERED SPECIES
Speaker: Jim Pickner
Saturday, October 16th

7:00 AM - 5:00 PM  Registration table will be open all day  Ag-Science Lobby
   Please check your membership; Inquire about audiovisual needs; General information.

7:00 - 8:00 AM  Buffet Breakfast (by Interest Group)  Freddy's  Hagestad Student Center

7:15 - 10:15 AM  Geology Field Trip, Geologist, University of Wisconsin-River Falls  Ag-Science Lobby

9:00 AM - 12:00 PM  SUSTAINING MEMBER EXHIBITS  Ag-Science 211

8:15 - 9:45 AM  CONCURRENT WORKSHOP SESSIONS I

1. Accessing and Analyzing Student-generated Data: Integrating Process and Content via the WWW, Buzz Hoagland, Westfield State College
2. Using Family-level Biotic Indexing as a Lab Experience with Applicability in Local Environmental Assessment I, Clarke Garry, University of Wisconsin-River Falls
3. 
4. 

9:50 - 10:20 AM  POSTER SESSION I  
(Refreshments available Ag-Science 211)

10:30 AM - 12:00 PM  CONCURRENT WORKSHOP SESSIONS II

1. Inquiring Minds Want to Know: Tools and Instructional Strategies to Support Student Inquiry, Ethel Stanley, BioQUEST at Beloit College, Dave Palmer, Caribiner, International, & Mike Kornely, SMART Technologies
2. Using Family-level Biotic Indexing as a Lab Experience with Applicability in Local Environmental Assessment II (continuation from part I), Clarke Garry, University of Wisconsin-River Falls

10:30 - 11:10 AM  CONCURRENT PAPER SESSIONS I

1. Concept Building Using Powerpoint in the Classroom, James Rooney, Lincoln University
2. Science as a process: A web-based timber wolf radiotelemetry lab for Introductory Biology students, Mark Bergland, University of Wisconsin-River Falls

11:15 - 11:55 AM  CONCURRENT PAPER SESSIONS II

1. Oceanography Field Course for Missouri High School Teachers: A Report on an Eisenhower Project, Nancy Sanders, Truman State University

20 Volume 25(1) April 1999 Preliminary Program
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:15 - 1:00 PM</td>
<td>Luncheon and First Business Meeting</td>
<td>Ag-Science Freddy's, Hagestad Student Center</td>
</tr>
<tr>
<td>1:00 - 1:45 PM</td>
<td>Integrating Bioinformatics Into the Curriculum</td>
<td>Student Center</td>
</tr>
<tr>
<td>2:00 - 5:00 PM</td>
<td>SUSTAINING MEMBER EXHIBITS</td>
<td>Ag-Science 211</td>
</tr>
<tr>
<td>2:00 - 2:45 PM</td>
<td>CONCURRENT PAPER SESSIONS III</td>
<td>Ag-Science</td>
</tr>
<tr>
<td></td>
<td>1. Integrating Process and Content in a Workshop Course,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marc Roy, Beloit College</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>2:50 - 3:20 PM</td>
<td>POSTER SESSION II (Refreshments available)</td>
<td>Ag-Science Second Floor</td>
</tr>
<tr>
<td>3:30 - 5:00 PM</td>
<td>CONCURRENT WORKSHOP SESSIONS III</td>
<td>Ag-Science</td>
</tr>
<tr>
<td></td>
<td>1. Semester Long Creative Projects: An Educational Instrument</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for Maximizing Student's Learning and Understanding of Science and Mathematics, Abour Cherif, Columbia College Chicago; Stefanos Gialamas and JoElla Eaglin Siuda, Illinois Institute of Art</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. LifeLines and ICBL: Accessible, investigative science for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>community college biology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Margaret Waterman, Southeast Missouri State University &amp; Ethel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stanley, BioQUEST at Beloit College</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>5:05 - 5:45 PM</td>
<td>Web Page Committee Meeting</td>
<td>Ag-Science St. Croix Room,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hagestad Student Center</td>
</tr>
<tr>
<td>6:00</td>
<td>Buses depart for Hudson City Dock</td>
<td>Hagestad Student Center</td>
</tr>
<tr>
<td>6:00 - 6:30 PM</td>
<td>River Boat Loading</td>
<td>Hudson City Dock</td>
</tr>
<tr>
<td>6:30 PM</td>
<td>River Boat Departs</td>
<td>Hudson City Dock</td>
</tr>
<tr>
<td>6:00 - 7:00 PM</td>
<td>Social</td>
<td>River Boat</td>
</tr>
<tr>
<td>7:00 - 9:00 PM</td>
<td>BANQUET</td>
<td>River Boat</td>
</tr>
<tr>
<td></td>
<td>Interactive Learning, Mario Caprio, Volunteer Community College</td>
<td></td>
</tr>
<tr>
<td>9:30 PM</td>
<td>River Boat Landing, Buses return to River Falls</td>
<td>Hudson City Dock</td>
</tr>
</tbody>
</table>

**Sunday, October 17th**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 - 8:45 AM</td>
<td>Buffet Breakfast (by Interest Group)</td>
<td>Freddy's, Hagestad Student Center</td>
</tr>
<tr>
<td></td>
<td>(Bioscene editorial board get food, take to St. Croix Room)</td>
<td></td>
</tr>
<tr>
<td>7:45 - 8:45 AM</td>
<td>Bioscene Editorial Board</td>
<td>St. Croix Room, Hagestad Student Center</td>
</tr>
<tr>
<td></td>
<td>Ethel Stanley and Tim Mulkey, presiding</td>
<td></td>
</tr>
</tbody>
</table>
8:30 - 10:30 AM ***Open Balloting***
Ag-Science Lobby

9:00 - 9:45 AM CONCURRENT PAPER SESSIONS IV

1. Teaching Biology Through Cooperative Learning, Mary Haskins, Rockhurst College
2. Ag-Science
3. Ag-Science
4. Ag-Science

9:45 - 10:00 AM Morning Break
Ag-Science 211

***Balloting Closes at 10:30 AM***

10:00 - 10:45 AM CONCURRENT PAPER SESSIONS V

1. Using Dinosaur Models to Teach Deductive Reasoning in Comparative Vertebrate Labs, Nada Chang, University of Illinois at Springfield
2. Ag-Science
3. Ag-Science
4. Ag-Science

11:00 AM - 12:15 PM Luncheon and Third Business Meeting
Freddy's, Hagestad Student Center

BUSINESS MEETING

Presidential Address:
.....Charlie Bicak, UN-Kearney and Buzz Hoagland, Westfield State College

Election Results:
.....Nancy Sanders, Truman State University

Bioscene:
.....Ethel Stanley, Beloit College
.....Tim Mulkey, Indiana State University

2000 Meeting at Indiana State University:
.....David Prentice, Indiana State University
.....Margaret Waterman, Southeast Missouri State

Executive Secretary Report:
.....Marc Roy, Beloit College

ADJOURNMENT OF REGULAR MEETING

12:30 - 1:15 PM Steering Committee Meeting
St. Croix Room, Hagestad Student Center
Includes newly elected Steering Committee members!

Submit Your Abstract Today!!
Mail your completed abstract form, found in this issue, to: Buzz Hoagland, Biology Department, Westfield State College, Westfield, MA 01086-1630, phone 413-572-5308, e-mail: bhoagland@wsc.mass.edu, or submit your abstract on-line at http://acube.org/1999_meeting.html
# Call for Abstracts

**Association of College and University Biology Educators**  
**43rd Annual Meeting**

**University of Wisconsin - River Falls**  
River Falls, Wisconsin  
October 15-17, 1999

**Integrating Process and Content: Flexibility for the Future**

Most students in our introductory biology courses and many students in our advanced biology courses will not enter careers in biology. Moreover, those entering careers in biology are likely to have their careers change. Does this influence the content and process skills we teach? Should it? How many facts should we expect our students to learn in introductory courses? Advanced courses? What process skills do we teach our students in introductory courses? Advanced courses? How do we equip our students with the flexibility to change jobs and careers multiple times throughout their lives? We know that many of you have addressed these issues in creative ways in your classes. Please consider sharing your ideas and techniques at the 43rd ACUBE Annual Meeting in River Falls in 1999.

Please complete the following form or send the information via email to:  
Buzz Hoagland, Biology Department, Westfield State College, Westfield, MA 01086-1630,  
phone: 413-572-5308, e-mail: bhoagland@WSC.mass.edu

<table>
<thead>
<tr>
<th>Proposed Title:</th>
<th>______________________________________________________________________________</th>
</tr>
</thead>
</table>
| Presentation Type (circle one): | 90 min 45-min paper  
(circle one) Workshop Paper Poster |
| Equipment/facility needs: | 35 mm slide projector  
Macintosh projection system  
PC projection system  
Other: (explain)  
Overhead projector  
Macintosh computer lab  
PC computer lab |
| Name: | ______________________________________________________________________________ |
| Address: | ______________________________________________________________________________ |
| Phone No. | _______________________ email: _________________________________________________ |
| Abstract: | ______________________________________________________________________________ |
Make your motel reservations early!

Rooms for the 1999 ACUBE annual meeting at the University of Wisconsin-River Falls have been reserved at the following River Falls motels (each is located about 1.5 mile from campus; shuttle service provided)

Best Western Colonial Motor Inn, 715-425-6707
$50.32 single, $61.72 double

Super 8 River Falls, 715-425-8388
$69.88 single, $79.88 double

New! Opening Summer 1999: Country Inn & Suites, 800-456-4000
(reservations will be available approximately June 1999)

Other lodging options are available in the area; visit the St. Croix River Valley tourist information site for lodging and other information at http://www.uwrf.edu/scvrt/

Bioscene Contributors

Do you have a manuscript, announcement, book review, labs/field studies that work, course development materials, technological advice, software reviews, curricular innovation, letter to the editor, or undergraduate research opportunity to share?

Publish your work in Bioscene. We prefer receiving word processing files (Microsoft Word, Word Perfect, etc.) to facilitate distribution of your manuscript to reviewers and to make revisions as necessary. If you wish to attach a file to email, please address the subject line as Bioscene. Your submission should also include the title, author(s), name of your institution with the address, a brief abstract (200 words or less), keywords, and references in appropriate format that are cited in the manuscript.

Please note that the deadline for the August issue is June 30, 1999. The deadline for the December 1999 issue is November 15, 1999.
When I first learned of the title for the 1998 Association of College and University Biology Educators (ACUBE) conference ("Are We Preparing Global Citizens: Aware, Active, and Accountable?"), I was intrigued. What a good question, I thought to myself. Are we? Is that possible? What does it mean to be a global citizen? And are we - as scientific investigators and educators - practicing what we are teaching? Very likely, the term "global citizen" has different meanings for different people. In this article, I have defined the concept, attempted to explain various methods that may help accomplish this goal, and outlined my thoughts on the subject as a result of interactions at the ACUBE conference. As a result, I propose teaching various methods for students to become global citizens is not enough. Educators must teach awareness and understanding of global as opposed to parochial issues coupled with discussions of scientific ethics, thus providing an ethical compass by which a global citizen can make informed decisions.

Being a global citizen can have many meanings, but in essence it signifies a person who thinks in a global context and has an ethical compass that guides actions. A global citizen can be defined as a person who views obligations to humanity at large, not just to a particular race, tribe, religion, or nation. Thinking in a global context requires realizing how one person's actions can affect the entire world, not just the immediate surroundings. An ethical compass is a set of learned ethical guidelines that directs actions and choices; a global citizen's ethical compass should take into account long-term and far-ranging impacts, emphasizing those actions that minimize harm to the environment and the people, animals, and plants living within it.

As a second-year Ph.D. student in ethnomedicine, I am focusing my dissertation field research in the Ecuadorian Amazon, yet I am also dedicated to teaching at the university level. Currently, I teach the lecture and lab for an undergraduate biology course titled "Plants and People" at Lehman College, part of the City University of New York's 22-campus system. I tried to keep this course in mind as I listened to the various perspectives on global citizenship at the conference. It is easy to get caught up with the daily requirements of just teaching the information necessary to complete a course, let alone trying to incorporate mechanisms to help mold global citizens. At the conference, participants discussed many ideas on how to raise student awareness concerning global issues and integrate these goals into the natural course of teaching. For example, a workshop focusing on an outdoor classroom revealed that those instructors had great success in bringing the students to a permanent lab set in a woodland. Students saw a variety of invertebrate animals, insects, and plants in their natural habitat instead of just reading about them in a book or seeing them in a video.

Another workshop dealt with case-based learning, which outlined methods to encourage students to think of their own scientific question and then helped them figure out how to answer it. In case-based learning, students are given a written description of a particular scenario, a "case", which is left open-ended. Students have to think about the information presented and develop questions to solve the problems presented. Case-based learning could be particularly useful in teaching students about ethics in science, because educators can choose specific cases that highlight particular ethical issues. For example, students could examine conflicts of interest in working with indigenous people to develop ethnomedical knowledge into marketable pharmaceuticals. Cases touching on issues of a global nature, either directly or indirectly, will eventually bring up ethics, raise a student's awareness, and hone their ethical compass.

In addition to hands-on learning and case-based learning, the Internet and the World Wide Web are excellent for raising global awareness because students easily see the interconnectedness of cultures and information. Encouraging independent scientific research is perhaps one of the best ways to prepare students to become global citizens. This teaching method may seem more advanced - it contains elements of all the methods previously discussed - yet it can be employed at all levels of education. For
example, students in a high school or undergraduate biology class may perform experiments throughout the year, may take field trips to various locations to learn about the environment, and may now even have access to the WWW via increasing computer access in public schools. Why not combine all these excellent teaching methods and ask our students to turn in independent research projects that require not only book and computer research, but also independent interviews of local people with a knowledge of their subject?

High school students taking a field trip might expand on this project by choosing a plant that they had observed in the field. They could collect it, conduct independent research on the specimen using scientific journals and the WWW, and then discuss in a research paper any conservation or medicinal applications that it may have or has had in the past.

Undergraduate students could do a similar project, or they could choose a plant they encounter on a field trip and conduct a simple experiment on it in a class lab. The experiment might be chemical, biological, or strictly taxonomical. A lab report or research paper discussing results and relevant applications should accompany the experimental write-ups.

I always encourage my students to include in their ethnobotanical papers, uses by Native Americans and other cultures. This approach seems to make the plant more real to them and adds another dimension to the clinical experiment or research angle.

For graduate students in biology, their dissertation is usually some experiment or series of experiments that prove or disprove a hypothesis; however the ethical issues of biological or cultural conservation should be addressed. Graduate students do this on a more advanced level to earn their degree.

These kinds of projects could be appropriately scaled down and integrated at all levels of education so students are thinking critically at an earlier age and are more aware of the global context of actions. Students must make decisions and choices, ask themselves questions in order to develop the analytical framework necessary to complete the final paper or project, and deal directly with issues as opposed to passively learning in a classroom.

In conclusion, I would like to emphasize that teaching awareness of the environment is not enough. It is a first step and once students learn different world perspectives they begin thinking globally. However, we must teach these methods in tandem with teaching the ethics. We can use the methods to teach the ethics.

There is a growing awareness of the need to incorporate a global perspective to scientific ethics; organizations such as the Union of Concerned Scientists personify this. Teaching ethics is a difficult task, but one that must be faced and can be, by raising daily issues in the classroom as related to lecture topics and assigning more complex questions as essays on exams. Old-school scientists believed in distancing themselves from their subjects, whether they were plants, people, or animals. Although that was an effective approach at the time, modern scientists must realize that they cannot step away from their science and be absolved from the effects it may have on cultures or the environment.

Dr. Robert Oppenheimer, father of the atomic bomb, at one point hoped his research in nuclear fission would help end World War II in favor of the United States and its allies. That team of scientists did not consider the global impacts of their actions. Once the bomb was dropped, Oppenheimer knew the world would not be the same. At that point, it was too late for him to ask himself and his colleagues "What have we done?" They saw the global outcome of their actions after thousands of people died. Fifty years later, we are still faced with global crises.

Now we are more aware of our actions and society increasingly demands accountability for actions that have global consequences. Personally, I do not believe we as educators are truly preparing global citizens out of the students we teach. We want to prepare global citizens and I think that students as a whole want to be global citizens, too. There is definitely a greater awareness of the environment and its problems. There is definitely a greater awareness of the environment and its problems in part due to media coverage of climate change, disappearing rainforests, shrinking bio-diversity, and the world's burgeoning population growth. These issues, and more, have commanded and demanded our attention. The coming of the computer age and the WWW has linked up the world in ways that as a child, I never imagined. We have the desire and the tools to mold ourselves and our students into global citizens. We need to focus on methods and ethics in our classrooms, encourage more professional discussions like the ones held at ACUBE '98, and not forget to practice what we teach.

Note: I would personally like to thank Ethel Stanley, co-editor of Bioscene, for her gracious sponsorship of my attendance at the conference through the John Carlock Award. The Carlock award was established to encourage graduate student attendance at ACUBE's yearly meetings. I would like to thank the ACUBE officers for inviting me to speak about my dissertation work that I hope will play a part in promoting global responsibility among graduate students working with indigenous peoples. Thanks are in order to Mr. Carl E. Bruch, attorney with the Environmental Law Institute in Washington D.C. for all his advice and comments during the development of my ideas concerning these issues. The work described in this paper is supported by a National Science Foundation Graduate Fellowship.
RIGHT ANSWER

WRONG QUESTION

Teachers sometimes receive answers to test questions that appear irrelevant to the question. Closer inspection often reveals that the answer came from material included in the course but it just doesn’t apply to the specific information sought on the test.

Art Linkletter had a program entitled “Children Say the Funniest Things.” The children’s responses to Art’s questions were legitimate statements, they just didn’t fit the question he had asked. In our classes, when we ask questions to which the student does not know the correct answer, we are offered a piece of information the student has garnered during the course in the hopes that any biological information is better than no information.

With this understanding, we can procure some enjoyment from these “bizarre” answers rather than be disturbed that our students have not paid more attention to the pearls of wisdom we have bestowed upon them. Below are some questions and some rather unique answers from my last exam. Your challenge is to figure out what the correct question should have been.

Question: List an advantage of being a homeotherm. List a disadvantage.
Answer: Advantage - More traits from parents. Disadvantage - Hard to distinguish them.

Question: Compare amniocentesis to chorionic villi sampling as to when the samples can be taken.
Answer: The amniocentesis can be done before the birth and villi sampling can be done after birth.

Question: What is one of the problems associated with using immunosuppression drugs?
Answer: It will at the time make the body immune then it will, when taken off, throw the body for a loop. The body becomes dependent on it.

Question: Do all humans possess the same MHCs? Explain.
Answer: No, it is different in males and females.

Question: Can you think of any incidents in the life cycle of humans when they would be classified as osmoconformers? Explain.
Answer: During menstruation humans would be classified as osmoconformers.

Now that you are aware of the uniqueness and originality of students’ answers to the questions you select for them to answer, you may have a few examples that would further enlighten us on the topic of “Right Answer—Wrong Question”. Please submit your answers and questions to our humor columnist:

Norm Jensen
Biology Department
Millikin University
Njensen@mail.millikin.edu

Directions Better Not Given

Teachers say the funniest things as well! In keeping with the theme of light-hearted biology, we are also collecting examples of instructions that we would really rather not have written. The memorable typo on the fermentation lab handout used in the general bio lab is offered below as an example.

“Once the molasses has been added, place the Erlenmeyer flask under a warm desk lamb. If there are none on the bench top, please check your bottom bench drawer where they are usually stored.”

A really “baaaaaaad” direction that sent numerous students in a legitimate search of greener pastures…
Call for Applications

John Carlock Award

This Award was established to encourage biologists in the early stages of their professional careers to become involved with and excited by the profession of biology teaching. To this end, the Award provides partial support for graduate students in the field of Biology to attend the Fall Meeting of ACUBE.

Guidelines:
The applicant must be actively pursuing graduate work in Biology. He/she must have the support of an active member of ACUBE. The Award will help defray the cost of attending the Fall meeting of ACUBE. The recipient of the Award will receive a certificate or plaque that will be presented at the annual banquet; and the Executive Secretary will provide the recipient with letters that might be useful in furthering her/his career in teaching.

Application:
Applications, in the form of a letter, can be submitted anytime during the year, but must be received a minimum of two months prior to the Fall meeting. The application letter should include a statement indicating how attendance at the ACUBE meeting will further her/his professional growth and be accompanied by a letter of recommendation from a member of ACUBE. Send application information to: Dr. William J. Brett, Department of Life Sciences, Indiana State University, Terre Haute, IN 47809; Voice -- (812)237-2392 FAX (812)237-4480; E-mail -- lsbrett@scifac.indstate.edu

If you wish to contribute to the John Carlock Award fund, please send check to: Dr. Marc Roy, Executive Secretary, ACUBE, Department of Biology, Beloit College, 700 College St. Beloit, WI 53511.
ACUBE Steering Committee

First Fall Meeting
Thursday, October 15, 1998

Location: Richardson hall, Room 302, Rockhurst College, Kansas City, MO
Time: 9:30 p.m.

Present: Karen Klyczek, Mark Bergland, Charlie Bicak, Bill Brett, Ann Larson, Tom Davis, Terry Derting, Buzz Hoagland, Ed Kos, Suzanne Martin, Tim Mulkey, Mark Roy, Nancy Sanders, Leona Truchan, Margaret Waterman, Kevin Williams, Dick Wilson.

I. Called to order by Karen Klyczek, 9:30 p.m.

Motion to approve the agenda m/s/a

II. Approval of minutes of the January 1998 Steering Committee meeting.

One correction. Correct Marvin Williams’ name (from Mark) m/s/a

III. Announcements

A. Winter Meeting Program: Terry Derting, Dick Wilson, Kevin Williams
   1. The committee reported the developing plans for the 1999 meeting in River Falls.
   2. Discussion of the web site, electronic submission of proposals, and deadlines for submission of proposals.
   3. General issues of the size of the meeting, how many concurrent sessions/time slot, etc. were raised as we continued to consider the impact of the growth of ACUBE.

IV. Report of Officers of Standing Committees

A. Executive Secretary. Marc Roy
   See appended report for details.

   1. Membership: 370 members including 90 new members since last report. Of these, 1/3 were from the web site and the remainder from the mailing Tom Davis oversaw and WCBrown financed. Thirty one states are now represented. Also have 9 grad student members (up from 2) Members with more than three years of dues outstanding were dropped.

   Moved that an announcement be made in Bioscene starting 1/1/99 that members be dropped after two years of unpaid dues (instead of three) m/s/a

   2. Finances
   Total assets as of October 13, 1998 were $15,192.49. This includes $5,274.62 in the Carlock Memorial fund, savings of $6,590.06 and the remainder in checking. $157 still in unpaid dues.

   The costs of postage have increased and Marc will look in to bulk mailing.

Executive secretary’s report approved: m/s/a

B. Membership. Tom Davis.
See new business and the executive secretary report.

C. Nominations. Suzanne Martin
   For Member-at-Large: Cynthia Horst, Austin Brooks, Terry Derting, Robert Wallace
   For President: Buzz Hoagland, Ann Larson

Additional nominations will be called for at the noon and evening meetings on October 16, and closed at the Friday evening meal. Balloting is Saturday morning with results announced at lunch.
D. Honorary Life Membership and Carlock Awards  Bill Brett.

Requests a general announcement at this meeting for nominations for the 1999 awards.

1. Carlock Award nominees this year are: Camille Tipton, sponsored by Ethel Stanley and Peter White, sponsored by Tim Mulkey.

2. Process for Honorary Life Membership nominations. Nominations go to the committee and the committee will have the necessary information by the time of the winter meeting. Sr. Johnson has been asked to serve on this committee.

E. Bioscene Editors. Tim Mulkey presenting.

1. Two issues are complete, with third to be worked on at this meeting.

2. The editors request that steering committee designate people to be responsible for reporting to Bioscene various aspects of ACUBE business, such as nominations, requests, minutes of meeting, c.v.’s, changes in the constitution, etc. Karen Klyczek has a preliminary grid of items and who should be responsible for them. These will be finalized at the Winter 1999 meeting. See attached grid.

3. Dick Wilson’s students have completed retyping all the old mimeographed Bioscenes, an enormous job. New ones still need to be redone, and John Jungck has offered to help put these together since he has information on disk.

4. Changes in the way the board works. Tim Mulkey reported that Ethel Stanley is developing a set of guidelines for authors that the board will discuss. The steering committee will see this in January.

5. The ongoing problem on the difficulty of obtaining manuscripts was discussed as well as some ideas for ways to solicit more (e.g., advertising the journal/call for papers in the Chronicle of Higher Ed.). As ACUBE grows, we hope this problem will decrease.

F. 1999 Program Planning Committee. Buzz Hoagland

1. Theme will be “Integrating Process and Content: Flexibility for the Future” See attached announcement.

2. Dates will be October 15-17, 1999. This is a change to a Friday through Sunday format from the traditional Thursday through Saturday.

3. Much more to come in the January Steering Committee meeting.

G. Resolution Committee. Buzz Hoagland

The issue of the resolution on Human Population that was raised in January was raised. The resolution in its several hundred word entirety will be posted for people to read at this meeting. A vote by the membership attending the meeting as to whether or not to support this will be taken during the final business meeting.

V. Old Business

A. Future Meeting Sites

1999 University of Wisconsin, River Falls
2000 Indiana State, Terre Haute
2001 University of Nebraska at Kearney
Millikin and Westfield State have also offered to host the meeting in the future.

Discussion of criteria for hosting a site included ease of access to airports, the expected size of the meetings, and that the meetings continue to be held in different parts of the region, remaining in the midwest for the next few years as we watch how the membership grows and changes.

B. AIBS and CELS memberships

In July 1998, two meetings sponsored by CELS had ACUBE representation. At the meeting of education committee representative from biology professional organizations, several present learned about ACUBE for the first time.

AIBS is interested in directing education articles to Bioscene. Bioscience can put a half page ad for free in Bioscience - one ad per year. This needs to be developed and discussed in January.
Marc Roy is the ACUBE rep to AIBS. The rep attends the AIBS council meeting in November (which Marc cannot attend this year. He suggested one of the Bioscene editors attend in his place.

C. Name change committee. Tom Davis reporting
Letters have been sent to National Association of Biology Teachers and the American Society for Microbiology. The Chronicle of Higher Education still needs to be done.

D. Web Committee See minutes for Saturday 10/17/98 steering Committee.

Revision was brought and copies distributed, to be discussed at Saturday’s meeting.

F. Other

VI. New Business.
   A. ACUBE Logo. Tom Davis
   Tom had a graphic artist do up some sample logos for discussion purposes. It was decided that these would be posted at this meeting for the membership to comment upon. Executive committee will make the final decision at the winter meeting.

   B. Sustaining Member Benefits.
   1. Moved: That sustaining members receive a copy of the membership directory, including member’s email addresses. m/s/a
   2. Moved: That sustaining members have a link to their web site on the ACUBE home page. m/s/a

   C. Library subscriptions to Bioscene
   Moved: That ACUBE charge libraries $50 per year for a subscription to Bioscene. m/s/a

Adjourn 11:15 p.m.

ACUBE First Business Meeting
Friday Lunch, October 16, 1998

Place: Dining Hall, Rockhurst College
Time: 11:30 a.m.

I. Announcements:
   1. Dues can be paid to Marc Roy at this meeting.
   2. Several sample logos for ACUBE are posted in the atrium in Richardson Hall for your commentary.
   3. Announcement re: the location for departure of field trips.
   4. Call for nominations for Honorary Life - to be submitted to committee (Bill Brett)

II. Business
   A. Nominations. Suzanne Martin
   1. Call for nominees for Member at Large: Mary Ann McMurry is nominated from the floor. Other nominees are Cynthia Horst, Austin Brooks, Terry Derting, Robert Wallace
   2. Call for nominees for President from the floor. No additional nominees. For President: Buzz Hoagland, Ann Larson
   3. CV’s for the nominees are posted in the Richardson atrium for your perusal before Saturday voting.

   B. Resolutions. Buzz Hoagland.
   1. Announced that the resolution on Human Population Growth, published in the Journal of Mammology in 1993 is posted in the Richardson Hall atrium for the membership to read.
   2. Call for other resolutions: none at this time.

III. Program. Panel “Are We Preparing Global Citizens”
Adjourned 1:15 p.m.
ACUBE Second Business Meeting  
Friday Evening, October 16, 1998

Location: Dining Hall, Rockhurst College  
Time: 7:30 p.m.

I. Announcements
   1. Carlock Awards. This is an open-ended fund and contributions are accepted at any time.  
      Awards: Peter White and Camille Tipton  
   2. Honorary Life Membership  
      Ann Larson  

II. Business
   A. Nominations. Call for further nominations. No further nominations were given from the floor.  
      Moved that nominations for Member at Large be closed. m/s/a  
      Moved that nominations for President be closed. m/s/a
   B. Resolutions
      1. Host resolution thanking Rockhurst College, Buzz Hoagland  
      2. Second announcement of the resolution on Human Population Growth.
   C. Other
      1. Tom Davis announced that ACUBE has 300 brochures for us all to distribute to colleagues  
      2. Tim Mulkey called for manuscripts and requested that presenters write up their work for publication in Bioscene.

ACUBE Third Business Meeting  
Saturday, October 17, 1998

Location: Rockhurst Dining Hall  
Time: 11:00 a.m.

I. Announcements
   In a nonbinding vote, the membership chose logo “A” from among the four presented.

II. Presidential Address  Karen Klyczek (outgoing) and Charlie Bicak (incoming)

III. Business
   A. Resolutions. Buzz Hoagland
      1. Moved that the Human Overpopulation resolution from the 1993 Mammology meeting will be reprinted in Bioscene. m/s/a  
      2. Move to accept the host resolution. m/s/a
   B. Election results. Suzanne Martin
      Members at Large: Terry Derting and Robert Wallace  
      President Elect: Buzz Hoagland
   C. Bioscene and ACUBE web site. Tim Mulkey
      Changes in Bioscene: graphics being improved, better printing, 3+ manuscripts per issue, new library rate.  
      But . . . we need more from members. Manuscripts. Also, consider serving on the editorial board, four members are retiring from the board next year. Three year term.
      Web site has had over 2 million hits.
D. Executive Secretary Report. Marc Roy. See details on the October 15 minutes.

At University of Wisconsin, River Falls, October 15-17, 1999. This will be the 43rd annual meeting.

Adjourned 12:20 p.m.

---

ACUBE Steering Committee
Second Meeting
Saturday, October 17, 1998

Place: Richardson Hall, Room 302, Rockhurst College
Time: 12:40 p.m.

Present: Charlie Bicak, Mark Bergland, Bill Brett, Tom Davis, Buzz Hoagland, Karen Klyczek, Ed Kos, Ann Larson, Tim Mulkey, Marc Roy, Nancy Sanders, Robert Wallace, Margaret Waterman, Dick Wilson

I. Call to order, Charlie Bicak

II. Business

A. Sites for Meetings
      It was suggested that a central location might be best for 2002.
   2. The idea of holding future ACUBE meetings near another meeting, such as NABT or AIBS was discussed, and caution was recommended. We need to see when and where NABT, AIBS and others are meeting and at what time of the year.

B. Web Page Committee. Members are: Ethel Stanley, Tim Mulkey, Bill Brett, Karen Klyczek
   1. We need to add information on how to join ACUBE, with a button on the first page.
   2. For those of us with our own homepages, we need to consider linking to ACUBE
   3. The idea of having a list of resources for biology educators was enthusiastically discussed.
      Margaret will send her collection of bookmarks to Buzz.

   Please review before the winter meeting. Email Ann any changes. We will see the handbook again at the January meeting.

D. Committee Assignments
   Nominations: Nancy Sanders, Terry Derting
   Membership: Tom Davis (continuing)
   Honorary Life Bill Brett
   Carlock Award Bill Brett
   Resolutions Dick Wilson
   Constitution Committee Karen Klyczek

E. Membership
   Tom raised some questions that need further consideration
   1. Do we want to do a planned mailing about ACUBE in WC Brown texts this Spring?
   2. How big does ACUBE WANT to be? The issue is, How big could the meeting be and still have the strengths of ACUBE meetings?
3. Might we want to have a membership board, separate from the executive committee, similar in idea to the editorial board?

F. ACUBE Logo
   An ad will go in Bioscene, with a deadline of January 15th for other ideas.
   Note, this was not a motion, but an idea.

G. Dues
   Moved that ACUBE will retain nonpaying members only two years before dropping them, instead of three. m/s/a
   Marc Roy will work out the details of implementing this new policy.

H. Report from local arrangements on the current meeting. Dick Wilson.
   1. The shuttle was used extensively, but it is difficult to administer. Don’t ask students to drive.
   2. Consider having fewer papers per concurrent session. Six papers/session were too many for a meeting of only 100 people.
   3. There were many interesting field trips, perhaps too many since attendance was low.
      Consider having 1-2.
   4. One of the two keynote talks might be History of the Organization, CUEBS, etc.

I. Meeting Dates for the Winter Board Meeting
   Noon Sat through noon Sunday, at UWRF.
   Feb. 6-7, with Feb. 13-14 or Feb. 20-21 as backup date. Karen will decide about backup date.

Adjourned 1:30 p.m.

Margaret A. Waterman
Secretary, ACUBE

Join us for a scenic cruise on the St. Croix River!

The 1999 ACUBE annual meeting banquet will be held on riverboat cruise. Enjoy fine food, beautiful scenery, good company, and stimulating discussion, all while cruising down the St. Croix River, a national scenic waterway

Don’t miss it!
Manuscript Guidelines for
*Bioscene: Journal of College Science Teaching*

A publication of the Association of College and University Biology Educators

Manuscripts submitted to the Bioscene should primarily focus on the teaching of undergraduate biology or the activities of the ACUBE organization. Short articles (500-1000 words) such as introducing educational resources provided by another organization, reviews of new evolution software, suggestions for improving sampling methods in a field activity, and other topics are welcome as well as longer articles (1000-5000 words) providing more in depth description, analyses, and conclusions for topics such as introducing case-based learning in large lectures, integrating history and philosophy of science perspectives into courses or initiating student problem solving in bioinformatics.

Please submit all manuscripts to editor(s):

**Ethel Stanley**  
Department of Biology  
Beloit College  
700 College St.  
Beloit, WI 53511  
stanleye@beloit.edu  
FAX: (608)363-2052

**Timothy Mulkey**  
Department of Life Sciences  
Indiana State University  
Terre Haute, IN 47809  
mulkey@biology.indstate.edu  
FAX: (812) 237-2418

We prefer receiving manuscripts as rich text format or RTF files to facilitate distribution of your manuscript to reviewers and to work on revisions. You can mail us a disk or attach your file to an email message with the subject line as BIOSCENE. All submissions should be double-spaced and may follow the style manual for publication you are currently using such as APA. You will also need to include:

- title
- author(s) information: full names  
  name of your institution with the address  
  email address, phone number, and/or fax number
- brief abstract (200 words or less)
- keywords
- references in an appropriate format

Please refer to issues of the Bioscene from 1998 or later for examples of these items. You can access these issues at: [http://acube.org/bioscene.html](http://acube.org/bioscene.html)

Graphics are desirable! Lengthy sections of text unaccompanied by tables, graphs or images may be modified during layout of the issue by adding ACUBE announcements or other graphics. While tables and graphs may be included in the manuscript file, images should be submitted as individual files. If you are unable to provide an image in an electronic format such as TIFF for Macintosh or BMP for Windows, please include a clear, sharp paper copy for our use. At this time, graphics will be printed as grayscale images with a minimum resolution of 300 dpi and a maximum resolution of 1200 dpi. Cover art relating to an article is actively solicited from manuscript contributors.

Upon receipt of your manuscript, an email or fax will be sent to the author(s). The editor will forward your manuscript to the chair of the editorial board. Within the next two weeks or so, your manuscript will be sent to two reviewers. You should receive comments when changes are recommended from the reviewers prior to publication of the article. Manuscript format is usually retained as accepted; however, limits of publishing the issue may effect the length of an article. Graphics may added by the editors when lengthy sections of text are unaccompanied by tables, graphs or images. Previously published work should be identified as such and will be reviewed on a case by case basis. Your article will appear in the Bioscene and then on the ACUBE website: [http://www.acube.org](http://www.acube.org) shortly after the issue date.
NAME: ___________________________________________________  DATE: ___________________

TITLE: ______________________________________________________________________________

DEPARTMENT: ______________________________________________________________________

INSTITUTION: _______________________________________________________________________

STREET ADDRESS: __________________________________________________________________

CITY: __________________________________  STATE: ______________  ZIP CODE: ____________

ADDRESS PREFERRED FOR MAILING: _________________________________________________

____________________________________________________________________________________

CITY: _______________________________  STATE: _____________  ZIP CODE: ________________

WORK PHONE: ___________________  FAX NUMBER:  ____________________________________

HOME PHONE: ___________________  EMAIL ADDRESS: ____________________________________

MAJOR INTERESTS SUB DISCIPLINES: (Mark as many as apply)
(   )  1. Biology (   )  A. Ecology (   )  H. Molecular
(   )  2. Botany (   )  B. Evolution (   )  I. Developmental
(   )  3. Zoology (   )  C. Physiology (   )  J. Cellular
(   )  4. Microbiology (   )  D. Anatomy (   )  K. Genetics
(   )  5. Pre-professional (   )  E. History (   )  L. Ethology
(   )  6. Teacher Education (   )  F. Philosophy (   )  M. Neuroscience
(   )  7. Other ________________ (   )  G. Systematics (   )  N. Other _____________

RESOURCE AREAS (Areas of teaching and training): ________________________________________

____________________________________________________________________________________

RESEARCH AREAS: __________________________________________________________________

____________________________________________________________________________________

How did you find out about ACUBE? ____________________________________________________

Have you been a member before: ______________ If so, when? _____________________________

Regular Membership $25.00                  Student Membership $15.00               Retired Membership $5.00

Return to:  Association of College and University Biology Educators, Attn:  Marc Roy, Executive Secretary,
Department of Biology, Beloit College, 700 College Street, Beloit, WI 53511-5595
The Association of College and University Biology Educators (ACUBE), formerly the Association of Midwestern College Biology Teachers, placed the organization’s rich archive of materials online for the benefit of the membership and interested undergraduate biology educators. Nearly 42 years of society’s publications and resources are currently accessible.

Featuring the online ACUBE archives for:

* Bioscene: Journal of College Biology Teaching (1975-present)
* AMCBT Newsletter (1964-1974)
* AMCBT Proceedings (1957-1972)

ACUBE information of interest includes:

* ACUBE Executive Committee
* Editorial Board of Bioscene
* ACUBE Annual Meeting Information
* Meeting Abstract Submission Form
* Searchable Membership Database
* Online Membership Application
* ACUBE Listserv Information
* Scientific Meetings of Interest
* ACUBE in the News
* Sustaining Member Links

Web Site Manager: Tim Mulkey
Web Committee: Bill Brett, Buzz Hoagland, Karen Klyczek, Ethel Stanley