



THE NICHE

Department of Biology Student-Faculty Newsletter

Volume 5, Number 3

College of William and Mary

May 1993

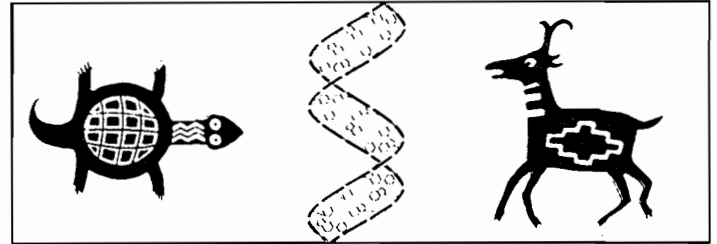
Chancellor Professor of Biology C. P. Mangum Elected President of American Society of Zoologists

Biology Professor Charlotte P. Mangum was recently elected President of the American Society of Zoologists, one of the oldest and most important biological professional societies in America. Mangum has been especially active in the ASZ's section on Comparative Physiology and Biochemistry, as have her many undergraduate and graduate students.



President-Elect Mangum will assume her official duties at the Annual ASZ meeting in December. The Society, which publishes *The Journal of Experimental Zoology* will, according to the new president, continue to be "more student oriented" than most other societies.

The Department of Biology is proud of Professor Mangum's accomplishments, and this important recognition by her peers is a happy occasion for William and Mary.



NICHE Contributions to Help Establish Computer Literature Search System

Alumnae/i Honor Four Retired Faculty

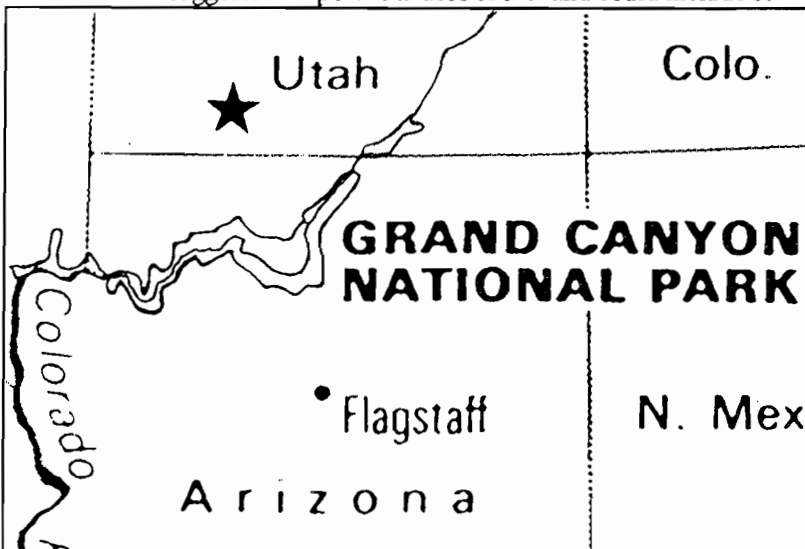
Last year long-time Biology Professors Black, Brooks, Byrd, and Hall retired. In their honor many former Biology students contributed money toward a new computer literature search system that will enable faculty and students to access more than 5,500 biological journals. The Department's share of the hardware cost is \$15,000.

The system should be operational by August and is being initiated as a cooperative venture among the Departments of Biology and Geology, Swem Library, and the Computer Center. At first, eight (continued next page, *COMPUTER SEARCH*)

Biology Department to Receive 20 Acres In Southern Utah

William and Mary's Athletic Educational Foundation (AEF) has agreed to give 20 acres of Utah land to the Department of Biology. The AEF was given the land (and more) about ten years ago, and when Professor Wiseman found out he approached Athletic Director John Randolph and the AEF's Bobby Dwyer about the possibility of getting some of it for the Department. "Both the Athletic Department and I thought their giving us a little land would be a great way for them to show support for the academic mission at W&M. Both John and Bobby, as well as the AEF Board, were very supportive of helping with the project," Wiseman said.

Wiseman suggests that potential uses of the land could include serving as a base camp for student trips to the Southwest. "This



land is in a great place, between the North Rim of the Grand Canyon, Zion National Park, and Bryce Canyon National Park. It is absolutely beautiful country." Last summer Wiseman visited the area and discussed the tract of land with Kane County Recorder Ver Caruso. "I realize that this department and most of our students are ocean and wet lands types. Personally, I like the desert. It would be wonderful if we could find some way to build a structure that would allow us to use the site for a high desert laboratory. That's my goal," says the outgoing Chair who will be visiting the area again this June.

Developing the site will not be a simple matter, but having the land does give the Department a chance to add a new kind of environment to its already-existing house on the Eastern Shore of Virginia. "William and Mary Department (continued next page, *UTAH*)

Class of 1993 Faces Life After Millington . . .

The following graduating seniors have told **THE NICHE** what they plan to do next year. If you are in the class of '93 and did not respond to our request to find out what you will be doing, please let us know where you'll be and your address so we can send you the newsletter next year. Good luck to all of our graduates and keep in touch!

Anne Rottenborn will be in D.C. working in the environmental branch of the Office of Budget for the Department of Energy. Also in D.C., **Jennifer Rios** will be with the FDA in a Marine Biochemistry laboratory where she has worked summers the past three years.

Three seniors told us they will be in the Peace Corps. **Kristin Callahan** will be in Paraguay. **Bruno Girl** will be in Nepal working on fish farming as part of an agricultural development program. **Liz Rettenmaier** is going to Cote d'Ivoire in West Africa for two years of Urban Environmental Management.

Volunteering as a music teacher at St. Joseph of Harwood's Catholic School in Los Angeles, **Elizabeth Torresson** will be working through the Sisters of Providence Volunteer Ministry. Also teaching, **Angela Marie Mullen** will be staying in her hometown—Williamsburg—to teach Biology to 9th and 10th graders.

Laura More hopes to be working in a research laboratory and **Sandra Sagle** wants to work as a lab technician at Medical College of Virginia. Similarly, **Mara Paul** is waiting to hear about biotech laboratory positions in Seattle where she will be moving and applying for graduate studies at the University of Washington. And **Erin Flaherty** is looking for a health field-related job in Northern Virginia while she takes additional biology classes at George Mason University.

Andrea Gubser and **David Norton** will be attending medical school in Charlottesville, while **Windy Mason** and **Alvin Leo Reaves** will be at Medical College of Virginia in Richmond. Also at MCV, **Noelle Parsons** will be attending Pharmacy School. **Kristin Lottig** is heading for medical school at Ohio State and **Peggy Holland** to Mercer University School of Medicine.

For the second consecutive summer, **Jon McKinsey** will be working with Professors Broadwater and Wiseman in the Virginia Governor's School in Science and Technology. Then he's off to medical school at the University of Florida.

A number of students are going to graduate school. **Timshel Purdum** will be attending graduate school in biology at the University of Maryland, Baltimore County. **Debbie Bayster** will be in graduate school in Zoology at the University of Florida in Gainesville. Off to California, **Joanne Adamkewicz** will be a Howard Hughes Medical Institute Fellow in the Department of Molecular and Cell Biology Ph.D. program at Berkeley.

Kimberly Karnas is going to graduate school, but doesn't know which one yet, while **Lori Snyder** is staying right here to work on her master's degree in Biology at William and Mary. **Chris Beck** doesn't know

COMPUTER SEARCH, continued from first page

people will be able to simultaneously use the system from any of dozens of personal computers on campus (including 15 in the micro-computer laboratory in Millington Hall). There will be 24 hour/day access.

As the Library and Computer Center work to install and test the system, Biologists will be looking forward to the time when access will be possible through modem connection in faculty offices. **Professor Norman Fashing** is coordinating the effort for the Department.

Because the disks will be on campus, searching the literature will require no telephone line charges. This is especially important for use in large classes such as the new introductory sequence for majors. With well over 300 students each semester in Biology 203 and 204, computer searching over telephone lines would be too expensive for the Department's budget.

The Department hopes that the system will be operational and students using it by Fall, and we thank all our friends and former students who helped make it possible.

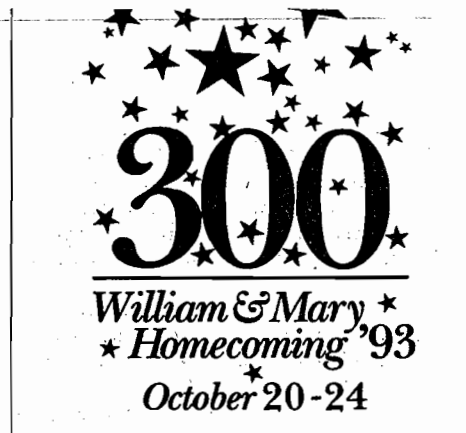
which graduate school he'll be attending, but he hopes to be "studying community ecology in an ecology department where only people who know the difference between an oak and a maple are allowed." An anonymous senior reports that she hopes to be "studying biology in a department where only people who know the difference between phosphofructokinase and cyclic AMP are allowed."

Two of our seniors are off to get both an M.D. and a Ph.D. **Mike Fitch** will be attending Case Western Reserve University in Cleveland on an NIH Medical Scientist Training Program Fellowship. With the same award, **Frank Probst** will be in the M.D./Ph.D. program at the University of Michigan.

Doing what many people would like to do (i.e., be their own boss), **Margaret Elizabeth Powell** will be self-employed as an experienced commercial crabber in Norfolk.

Two graduates may be the envy of all. **Sue Bonhoff** will be camping through the United States and Canada, picking a medical school. **Josette Wallace** will be "taking an extended vacation—possibly touring the country and enjoying my freedom before deciding what I want to be doing for the rest of my life."

Finally, probably like a number of others, **Sally Hunsucker** says, "not sure yet!" Good luck in your search, Sally, and good luck to all of our graduates.



Biology Homecoming

*Charlotte Mangum, Chair
Biology Department Tercentenary Committee*

Once again, if you haven't already done so PLEASE send us something about your present activities for the Homecoming Tercentenary exhibit. The scientific publications filled a whole wall in Millington at our Charter Day celebration, but we would like to fill two at Homecoming. Actually, some of the most interesting items were the newspaper clippings, flyers, posters and one volume of local New England history. The last issue of **THE NICHE** went out to more than 2,500 individuals, and we haven't had nearly that many responses: PLEASE help.

Send information on your activities together with your name (maiden, if not presently in use), professional address, W&M degree(s), and graduation year to **Dr. Charlotte Mangum**.

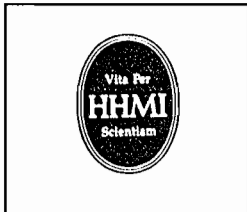
UTAH, continued from first page

of Biology High Desert Field Station is the sign I'd like to see hanging out front one day," said Wiseman. Any graduates or current students with experience in the Four-Corners region are encouraged to get in touch with Professor Wiseman, in care of the Department, if they have suggestions or wisdom to share about the prospects of such a field station.

Adamkewicz, Fitch, and Probst Win Major Graduate Fellowships

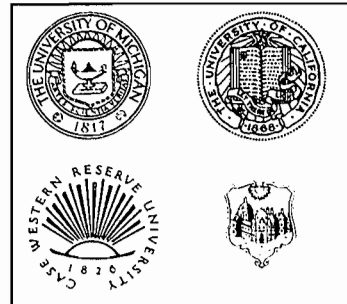
At least three graduating Biology students have been awarded top graduate fellowships. In fact, two of them had to turn down prestigious National Science Foundation Graduate Fellowships to accept even more prestigious awards.

Joanne Adamkewicz, an Honors research student in Professor Phillips' laboratory working in the area of molecular genetics, has been awarded a Howard Hughes Medical Institute (HHMI) Predoctoral Fellowship which will pay for her graduate education. This extremely competitive award was given to only 69 of 1,493 applicants. Joanne will be entering the University of California at Berkeley Ph.D. program in Molecular and Cell Biology. She turned down an NSF Graduate Fellowship (740 awards offered to 7,316 applicants) to accept the HHMI award.



Mike Fitch has been awarded a Medical Scientist Training Program (MSTP) award through the National Institutes of Health to pursue a combined M.D. and Ph.D. This most lucrative of all awards will cover all graduate costs for seven or eight years. Mike, whose Honors research was done on spinal cord regeneration with Dr. Lloyd Guth in the Department, will attend Case Western Reserve University in Cleveland. Only 160 MSTP awards were given this year. Mike is the Director and founder of the William and Mary men's a cappella harmony group, Gentlemen of the College.

Frank Probst, a Biology/Chemistry double major, has also been awarded an MSTP Fellowship and will attend the M.D./Ph.D. Program at the University of Michigan. Frank, another molecular biology Honors research student with Professor Phillips, was awarded an NSF Fellowship as well. Frank is a member of William and Mary's swim team in addition to his academic work.




Phi Sigma Biological Honor Society Inducts New Members

Amy Thompson Elected President

Outgoing President David Norton, Vice President Barbara Piasecki, Secretary Noelle Parsons, and Treasurer Laura Moore inducted thirty-six new members into the Phi Sigma Biological Honor Society. The new members then elected Amy Thompson as their President, Kristin Albright as Vice President, Anna Finley as Secretary, and Laura Eubank as Treasurer. This past year Phi Sigma, under the able leadership of its officers, began a tutoring service for students in introductory biology courses. The new officers and members expressed interest in continuing and improving the fine beginning established by this year's group.

Professor and Chair Larry Wiseman delivered a brief address and gave the group a check for \$500 with the challenge: "It makes no sense to me for so many biologists to try to divide us into molecular and cellular types and ecological and organismal types. Give this money to a student or a faculty member or to a group which is working on something that is obviously both: molecules and organisms. Use it for pulling people together not for pushing them apart." New Treasurer Laura Eubank accepted the check for the group.

New members of Phi Sigma are: Kristin Albright, Deborah Bayster, Tina Bongiorno, Michelle Breton, Kelly Butler, Eric Cairns, Lori Chaffin, Victoria Currall, Erica Dearstyne, Laura Eubank, Anna Finley, Joshua Hawley, Lance Hoffman, Elizabeth Hoffman, Elizabeth Hollis, Patricia Houston, Phillip Joy, Indra Kancitis, Karyn Kolman, Kristin Lottig, Richard Mansfield, Barbara Miller, Shannon Miller, John O'Keefe, John Perry, Adrienne Prestridge, Aaron Reeves, Seth Roberts, Bryan Rourke, Victoria Smith, Danell Stimson, Karyn Stocks, Amy Thompson, Michelle Trabert, Lisa Wallace, and Leanne Yanni. For information about Phi Sigma or to find out about qualifications for membership contact any of the new officers.



THE NICHE


Department of Biology Student Faculty Newsletter

Volume 4, Number 2
College of William and Mary
January 1992

Department's New Biology Curriculum Will Begin This Fall

A new Biology curriculum was approved by The Faculty of Arts and Sciences Educational Policy Committee on 11/2/91. The new curriculum, approved by the Department in a series of meetings over the past two semesters, was developed through intense Departmental discussions over the past two years and an ongoing curricular debate (more than 60 years). The changes were strongly supported by an undergraduate student committee which reported to the Biology faculty last year as an 11-page class-student questionnaire last Spring.

The new curriculum was designed to meet three objectives: (1) to offer a more substantial and penetrating introduction to Biology for potential majors and others interested in life sciences by expanding the first course to a full year; (2) to add flexibility and increase choice for Biology majors in upper-level courses by increasing the number of categories of elective courses from five to ten; and (3) to create a general education curriculum in Biology for non-science majors. (A summary of the changes appears on page 2.)



PITAGORAS

Sir Cyril A. Clarke and Nobel Prize-Winner Gertrude Elion to Give Department Seminars

On Friday, February 7th, at 4 P.M. Sir Cyril A. Clarke, Emeritus Professor of Medicine and Honorary Nuffield Re-

Sally Hunsucker Graduates After Three Years as NICHE Co-editor

by Larry Wiseman

Five years and fifteen issues ago we began THE NICHE. It has gotten bigger and we hope better. As the adviser to the students who help put it together I want to thank all of them, but I want to give a special thanks to Sally Hunsucker who has stuck with it, us, me for three full years --the first two years with Biology graduate Lisa Jones as co-editor and this past year with Chris Beck. Sally is always there with a smile. Always ready to help. I'll miss her and wish her well after William & Mary.

And even though I won't be Chair of Biology next year, new Chair Eric Bradley has asked that I continue to shepherd THE NICHE through another academic year. Helping me next year will be rising Sophomore and new student editor Callan Bentley. Callan has lots of experience. He is Features Editor for the undergraduate student newspaper, *The Flat Hat*, and is also a fine cartoonist (as you can see from this issue). I look forward to working with Callan who knows what to expect from someone like me, having taken both my large Fall course (Principles of Biology: Molecules, Cells, and Development) and my large Spring course (Developmental Biology) his first year with us. He will be superb.

Least Terns, Piping Plovers, and a Biology Club

by Callan Bentley

A sunny April Saturday saw the Biology Club gathering at the Millington loading dock. Their objective was the semiannual visit to Grand View Beach in Hampton, Virginia, where the club takes an active role in preventing the decline of two species of endangered birds.

The species in question are the least tern and the piping plover, which make the grassy beach head at Grand View Beach their summer home. The terns are colonial beach nesters, and the plovers are solitary beach nesters. Every spring, as part of a project supervised by Professor Beck, Biology Club volunteers post signs advertising the threatened birds' presence and warning human beach users not to trespass.

In the fall, after the birds have finished rearing their young and have moved on, Professor Beck and her volunteers return to Grand View to take the signs down for the winter. Usually, there are fewer signs to take back than were originally put up, as illicit beach campers tend to use them for firewood.

There are between 300 and 450 pairs of least terns that use the area as a vernal refuge, and up to 5 pairs of piping plovers occupying the same beach.

The program to protect and study the birds is a joint project sponsored by the College of William and Mary, the Virginia Department of Game and Inland Fisheries, the U.S. Fish and Wildlife Service, Hampton Parks and Recreation (which owns the property on which the birds nest), and the Virginia Living Museum.

According to Beck, the project is a "management strategy that has been implemented to inform the public of the sensitive nature of the area."

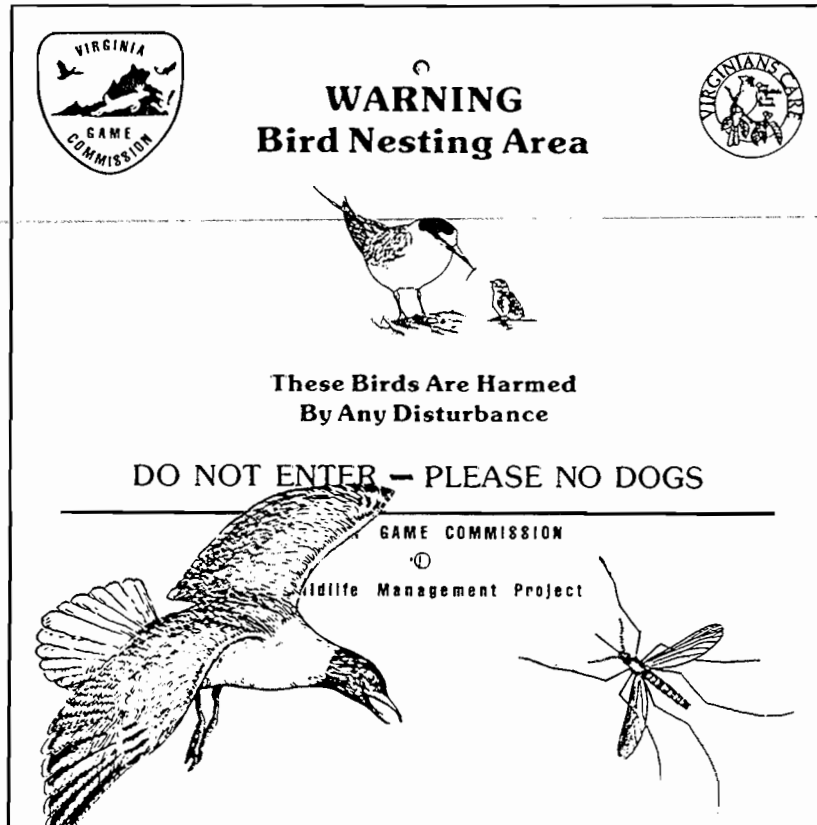
The Clayton-Grimes Biology Club has supplied physical labor to the project for four years. The volunteers' day proceeds in the following manner. After meeting at Millington, the crew piles into several cars, which then make the 45-minute drive to Hampton. Everyone gets out at a marina adjacent to the protected areas, and loads a fishing boat up with the necessary

supplies. Then a cheerful volunteer from the marina ferries the crew out to the beach head, sometimes at high speeds. Disembarking causes some wet feet, but everyone makes it to shore. Now comes the laborious part of the day. Posthole diggers are employed, and signs erected. The sun bears down, and strange patterns of sunburn occur as a result of wearing work gloves. The work is physically tiring, but it is over in less than two hours. A short wait and conversation fill the time until the boat returns. Back at the dock, Professor Beck breaks out the picnic and feeds and immensely satisfying lunch to all her volunteers. Then the group climbs back into the car and heads for Williamsburg.

This year, there were several variations on this theme. The cumbersome wooden signs and posts previously used were passed over for the more preferable metal posts. These signs were easier to post, and offered the additional advantage of being non-flammable. With any luck, they will represent a good investment for the project. At lunchtime, the food was copious and varied. Many leftovers resulted from the fact that Professor Beck and Biology Club President Jason Ridgel each brought lunch sufficient for the 15 volunteers, neither aware that the other was supplying food. Many people went home feeling very full indeed.

In addition, everyone took back with them a feeling of satisfaction. The signs would serve to defend the birds' territories this summer

when recreational boaters and beach users stopped there. As a result of the sign posting, more young least terns and piping plovers would be born and raised, causing the population to grow. The Biology Club volunteers had taken a significant step in protecting the future of the birds, and they were proud of it.



THE NICHE

Department of Biology Student-Faculty Newsletter
BIOLOGY



Editors: Chris Beck and Sally Hunsucker
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Herbarium Keeps Active

There are nearly 60,000 of them in Millington, and the number is growing daily. No, we are not discussing roaches, coat hooks, or mutated fruit flies. These are herbarium specimens - pressed and dried plants that record the flora of the Southeastern United States.

Herbaria have been in existence for over four centuries. The earliest herbaria were bound into books; later, Linnaeus began the tradition of stacking them in cabinets.

The William and Mary Herbarium (WILLI) was founded in 1968 with the help of the recently retired Dr. Byrd and Dr. Hall. When Millington was built, room 100 was designated as the Herbarium and was supplied with grey storage cabinets. The first year, Dr. Hall hired a graduate student, Alene Barans, to work in the herbarium. He established a specimen exchange program with the herbarium of the University of North Carolina at Chapel Hill. Ms. Barans prepared and deposited 600 specimens that served as the initial collection. Dr. Donna Ware became curator of the herbarium the next year. At first, specimens from North Carolina

dominated the collection, but students and professors at William and Mary soon changed that by depositing thousands of voucher specimens from Virginia. When collecting, they gather more than one of each plant so that the extras can be exchanged with other herbaria in the Southeast. In this way, the herbarium can produce a more varied collection. Significant numbers of specimens have also been donated to the herbarium from individual collectors. Important collections housed in WILLI include J.T. Baldwin's species of *Hevea* from Brazil, the native Virginia flora collected by William and Mary alumni B. Mikula and T.F. Wieboldt, the joint teaching collecting of J.T. Baldwin and B. Speese, and D. Demaree's collections from Arkansas. Because of limited space, the herbarium is mostly restricted to flora of the Southeast, although there are some exceptions.

Although relatively young, WILLI is the third largest herbarium in the state. Only VPI and Longwood's are larger.

Dr. Ware is in charge of loaning and exchanging specimens, identifying plants, maintaining the specimens, instructing the student staff, and answering requests for information from botanists, government agencies, and the public. She also does research on the coastal plain flora, particularly on endangered species, and is currently preparing a taxonomic treatment of the genus *Valerianella* for the Flora of North America project.

The current student herbarium staff includes Jay Bukzin, Matthew Campbell, Virginia Marbella, Brian Nicholson, Aaron Reeves, and Anne Rottenborn. They mount and label dried plant specimens, file them in the metal storage cabinets, and sometimes help collect plants. Elizabeth Crone, a former student assistant and now a graduate student at Duke, adapted the computer program *Paradox* to print herbarium labels and to store this information in a data bank.

Some biology students view the herbarium as little more than "dead plants glued on sheets of paper," so I asked Dr. Ware what she thought about this. She replied that they are "dead but dynamic." A herbarium is a place where plant materials can be stored and then referred back to when needed. These reference specimens can help identify local flora in study sites, and they

can be used for research data in many ways. Many of the plant distribution records in the *Atlas of the Virginia Flora* are based on voucher specimens on deposit in this herbarium. Research studies by our graduate students and undergraduate students have resulted in treatments for the proposed *Manual of the Virginia Flora*. Certain of WILLI's holdings are currently being loaned to other botanists who are

doing taxonomic treatments for the Flora of North America project. Morphological, distributional, ecological, and even chemical data can be obtained from the specimens or labels. Some chemicals, such as flavonoids, are preserved in pressed plants for years, and DNA is usually recoverable from specimens up to 10 years old. Doug Soltis, a former Biology major at William and Mary who is now on the faculty at Washington State University, is currently working on DNA sequences from material in the William and Mary herbarium. Although herbarium specimens are no longer living, they still contribute a great deal to our understanding of the native flora of this area.

HERBARIUM OF THE COLLEGE OF WILLIAM AND MARY

Williamsburg, Virginia

Virginia

Greene Co.

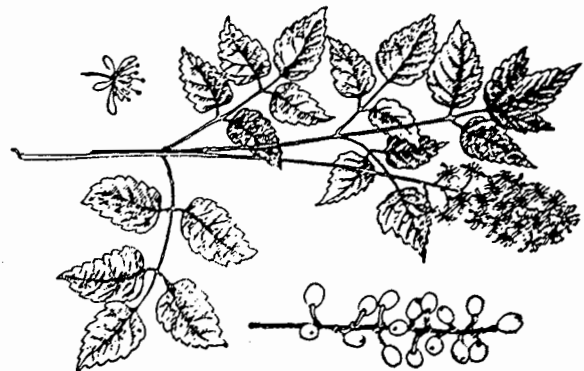
29 August 1971

Lechea intermedia Leggett

Dry exposed soil of recently clearcut area;
along St. Rt. 610, about 3/4 mi. SW of jct.
with St. Rt. 609.

Collector: Thomas F. Wieboldt

No. 676



TOP TEN LIST

Top Ten Things To Do With A Dead Frog

10. Bronze it and put it in the greenhouse pond.
9. Use it in the 203 lab.
8. Dump it in formaldehyde - then play "hot potato" with it.
7. Have the Biology Club sell it as a paper weight.
6. Let Dr. Mathes put it on a pointer.
5. Put it on the president's doormat.
4. Add a little whip cream and a cherry and leave it on the Trellis dessert cart.
3. Put it on the Crim Dell bridge with a sign that says "kiss me, I'm a prince."
2. Serve frog legs at the seminar receptions.
1. Give it to Dr. Wiseman.

Biology Professors Choose Favorite Non-Biology Disciplines and Undergraduate Courses

Biology professors were asked, "If you were a professor in a discipline other than biology, what would you want it to be?" Seven faculty were not afraid to have their names associated with such shenanigans (i.e., better than 33% response). They also told us what their "single favorite undergraduate non-biology courses" were in college.

New Chair **Eric Bradley** said International Relations is the other discipline he finds interesting. His favorite non-biology course was Social Psychology.

Professor **Broadwater** couldn't decide between being a Philosophy or Art professor. Her favorite course was Philosophy.

Geology (Paleontology) is the other discipline that Professor **Brooks** likes, and his favorite undergraduate course was History (War Between the States). {It should be pointed out that he went to the University of Richmond!}

Professor **Mangum** could see herself as a Historian. She liked History of Philosophy: 18th and 19th Centuries as a college course.

Good Californian **Joe Scott** answered Oenology as a good discipline other than biology. His favorite course was Gothic and Romanesque Art. {It should be pointed out here that some wineries have employed gothic architecture.}

Professor **Vermeulen** could see himself as a Paleontologist, and he couldn't decide between Medieval and Modern Philosophy, Modern Abstract Algebra, Scientific German, and Astronomy as his favorite course.

Professor **Wiseman** opted for the Fine Arts Department. His favorite undergraduate course was Art History.

Freshmen Honor Societies Honor Mike Fitch and Professor Wiseman

At the Spring induction ceremony of the William and Mary Freshmen Honor Societies, Alpha Lambda Delta and Phi Eta Sigma, both the faculty and student awards were presented to Biologists.

Mike Fitch '93 received the Alpha Lambda Delta Book Award which is given annually to the member of the Freshman honor society who has the highest grade point average at graduation. Mike completed an Honors research project on spinal cord regeneration in rats with **Professor Lloyd Guth**.

Outgoing Department of Biology Chair **Lawrence Wiseman** was awarded the 1992-93 Outstanding Teacher Award. Wiseman has also been selected by the Senior class as one of two faculty marshals to lead the Class of 1993 across campus to graduation ceremonies on commencement day.

Darwin Voted Greatest Scientist by 190 Developmental Biology Students

Students in Developmental Biology were asked who "is the scientist you think most important in the history of science?" Three biologists (OK, so maybe one was a kind of chemist) and two physicists made the top five, with Charles Darwin the easy winner. Students in this molecular/cellular/developmental course were congratulated on their broad view of biology.

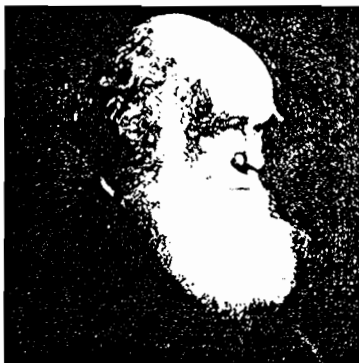
Darwin (47 votes)

Einstein (23)

Newton (14)

Pasteur (13)

Mendel (11)



$$E = mc^2$$

Malooly and Adamkewicz Win Alumni Society and Phi Sigma Biology Awards

The Alumni Society presented its annual Biology Award to **Katie Malooly '93**, an Honors research student in **Professor Bruce Grant's** laboratory who worked on a theoretical problem concerning introns. The award, which includes \$100, goes to a graduating senior "who has excelled in Biology."

The Phi Sigma Biology Honor Society awarded its annual research award to **Joanne Adamekewicz '93** who just completed her Honors research with **Professor Greg Phillips** on some aspects of mutagenesis in *E. coli*. The Phi Sigma award includes \$100 and a year's subscription to *Science* magazine.

Edward Abbey's Utah Desert: Do Not Disturb!!!

by Amanda Allen

Like "the ravens (that) cry out in husky voices, blue black wings against the golden sky," there is a voice that echoes across the desert sand of Moab, Utah. The words arise from the prose (and occasional poem) of the late Edward Abbey whose work, including *Abbey's Road: Take the Other*, *Desert Solitaire*, *The Monkey Wrench Gang*, form an improbable canon for a token few. While it is the latter book, *The Monkey Wrench Gang*, which touted him as an environmental radical when it inspired the formation of the group

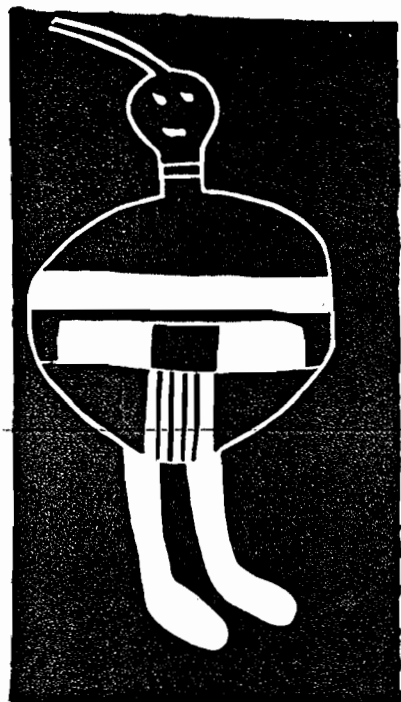
Earth First!, *Desert Solitaire* certainly lifted Abbey up on to the pedestal where many regard him. The book is a coveted icon toted about in backpacks; a ranger I know in Yosemite used to carry it with him during his two week duties in the backcountry and my own copy has survived three summers of hacking peregrine falcons in the mountains. Needless to say, Abbey should first be read outside, on a mountain or alone in nature. It is there that the solitude and beauty of which he writes can be appreciated.

Desert Solitaire is not merely a retelling of "a season in the wilderness" as subtitled, but a roller coaster ride through Abbey's stint as a seasonal ranger in Arches National Park, Utah. The passages he etches vary from the beatific to the horrific. From climbing the snowy slopes of Tukuñkivats and rafting down to Glen Canyon we are lead to the harsh and bitter reality of death in the desert. His sarcastic, often caustic, complaints about progress and the alienation of humans from the environment and one another ring loud.

Due to this harshness many dislike his work. Not all souls identify with Abbey and two disparate camps of readers seem to have formed. For my own sake, I call them "the ones who get it" and the "ones who don't" (getting it being rather loosely defined as the appreciation of wilderness and decrying "progress"). Critics slam his "prophet of doom" harshness which seems an explosive recoil against the masses. Nor does Abbey, the self proclaimed "desert rat," take measures to soften his complaints about park service bureaucracy and tourists who flee from the city to find wilderness and yet profane the land they enter. He vocally cries the alarm to "pry these people free."

They say it is the merciless tirade of a man angry with the world, but for many his tale is the requiem for a culture brimming with corruption, commercialism, and forsaken spirits. He makes us weep with the coming of "Progress" and bow down to our insatiable and often unrequited hunger for wilderness: "No, wilderness is not a luxury but a necessity of the human spirit, and as vital to our lives as water and good bread." His harshness is reality and within that reality beauty is found through respect and observation of the environment. The message of the story is a self proclaimed one, to be measured by the reader and carried forth as they please. We may be silent in our fights, but Abbey is not and so he reminds us:

"We are kindred all of us, killer and victim, predator and prey, me and the sly coyote, the soaring buzzard, the elegant gopher snake, the trembling cottontail, the foul worms that feed on our entrails, all of them, all of us. Long live diversity, long live the earth!"



"All American Man" pictograph, Canyonlands National Park, Utah

Dear Mr. Wiseman: Aug 6 '78
Thank you for the letter. Sorry
but I don't know much about the
'All-Am. Man' either.

Regards,
Edward Abbey
Moab, Utah



In Trouble Again by Redmond O'Hanlon

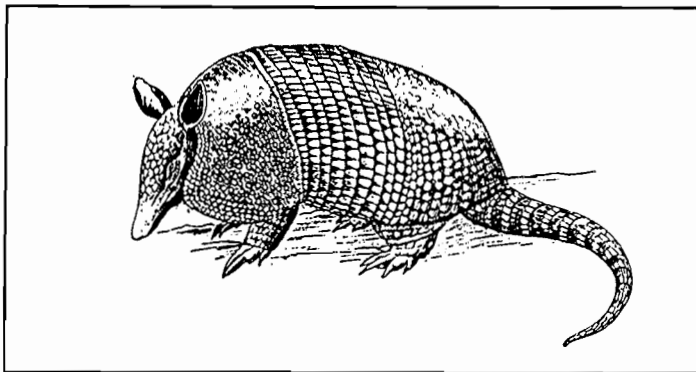
Book Review by Callan Bentley

Too often, William and Mary students become bogged down in a busy life of reading, writing, studying, and more reading. The consequence of the rigorous academic atmosphere is that too few opportunities arise for students to take on any pleasure reading for the sheer sake of entertainment. More often than not, breaks and vacations provide the only chance to take in a few good books. This is tragic, because it means that students, and biologists in particular, are likely to miss Redmond O'Hanlon's delightful book *In Trouble Again*.

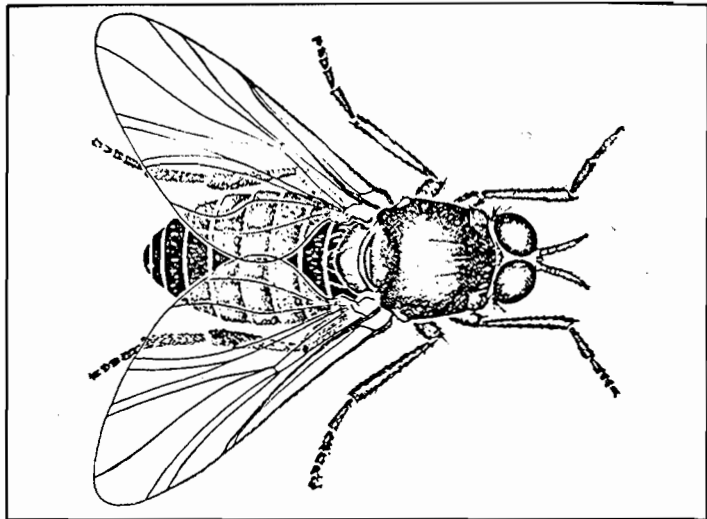
The story O'Hanlon tells is of his adventurous expedition along the swampy rivers of Amazonian Colombia. The grueling nature of the journey is emphasized by O'Hanlon's character. He is a pudgy, gray-haired English naturalist and academic. His eternally optimistic attitude, heartfelt fear of physical exertion, and crisp British humor make this account a wonderfully charming adventure story.

O'Hanlon, who is "43 and almost dead," (as quoted in *Outside* magazine) leaves his civilized home near Oxford every few years to go off on expeditions to far away locales, hoping each time to make it back home so that he may write books about his travels. He specializes in the world's few remaining unexplored areas. His first book, *Into the Heart of Borneo*, detailed his four month expedition through the primary rainforests of Borneo. O'Hanlon established his habit of meticulously describing the flora, fauna, and persona surrounding him. He follows this style in *In Trouble Again*, though his subject this time is the biology and anthropology of Amazonia. He recently completed another trip, this time through the Congo of Africa.

O'Hanlon specializes in ornithology, and his accounts of the exotic bird species found in these spots are both eloquent and specific. The reader can feel his wonder as he describes the glorious plumage of the hoatzin, or the twin tail feathers of the motmot. While he is at heart a birdwatcher, O'Hanlon also graces his readers with stories of how he meets other animals, including the nine-banded armadillo, giant otters, tapirs, and gigantic catfish.



Of particular note are O'Hanlon's carefully researched warnings about the dangers of travelling in the tropics. In the first three pages of *In Trouble Again*, he tells us of many possible maladies available in Colombia. There is Chagas' disease, caused by a protozoan which normally makes its home in the gut of the assassin bug. When the insect has finished making a meal of your blood, it defecates next to the bite. Unwittingly, the victim scratches the bite, rubbing the droppings and their endemic protozoa into his or her circulatory system. Sometime in the next twenty years, he or she will start dying from incurable heart and brain damage. Other diseases mentioned include "river blindness," (transmitted by blackfly and caused by small



worms which take up residence in one's eyeball) and leishmaniasis (a bit like leprosy but carried by sandflies; unless treated immediately, it eats away the warmest parts of one's body).

Then there are the large animals. The jaguar, the fer-de-lance and the bushmaster (both exceedingly poisonous snakes), anacondas, pirhanas, and electric eels are all things O'Hanlon must contend with in order to survive. There is also the candiru, or toothpick fish, which he would have us think about before we undertook such a journey. This is a tiny catfish which ordinarily lives in the gills and cloaca of large fish. However, should one urinate while bathing, a candiru may be attracted by the smell and swim up the unwary bather's stream of uric acid and into the urethra. There, it extends its spiny fins and becomes "agonizingly undislodgable." O'Hanlon says, "The pain, apparently, is spectacular. You must get to a hospital before your bladder bursts; you must ask a surgeon to cut off your penis." This is the sort of interesting tidbit that makes *In Trouble Again* the fascinating reading that it is.

Also on this trip, O'Hanlon must deal with mutinous guides, unnavigable rivers, and, in several nerve-grating encounters, the local Yanomamo Indians, quite possibly the most violent people on earth.

The reader may find himself racing through the book, both because the story is so gripping, and also because he worries about this doddering professor, lost in the jungle. You get genuinely concerned about poor Redmond O'Hanlon, and read more to assure yourself that he will make it out again.

The story might be something you should hear from Charles Darwin, Christopher Columbus, Alfred Russel Wallace, or any of the other great explorer/adventurers. (Wallace, incidentally, led the first of three expeditions into the area O'Hanlon explores in Colombia.) Despite the eighteenth century feel that O'Hanlon gives to his trip, it was undertaken in the early 1980s. The book is a perfectly glorious account of traditional exploration into uncharted territory, and it makes for fine reading.

Redmond O'Hanlon's *In Trouble Again* is published by Vintage Departures, and costs \$10 at Rizzoli's Bookstore.

Callan Bentley

Readers Respond to Chris Beck and to His Question: Are We Truly Biologists?

In the last issue of **THE NICHE**, Chris Beck wrote a piece with the title "Where is Biology Headed? (or Are We Truly Biologists?)" which inspired a number of students and faculty to answer. Beck's main points were that "biology is heading towards the greater glorification of the cell and the all-powerful DNA," that Biology is becoming over specialized, and that organismic biology is not getting the attention it deserves. "I find it unfathomable that a student can graduate with a BS in biology and not be able to tell the difference between an oak and a maple tree," Beck said in his opinion piece.

Printed below are all the responses we received without editing. We invite the debate to continue. Just write to **THE NICHE**, Department of Biology.

Response from Joanne Adamkewicz '93

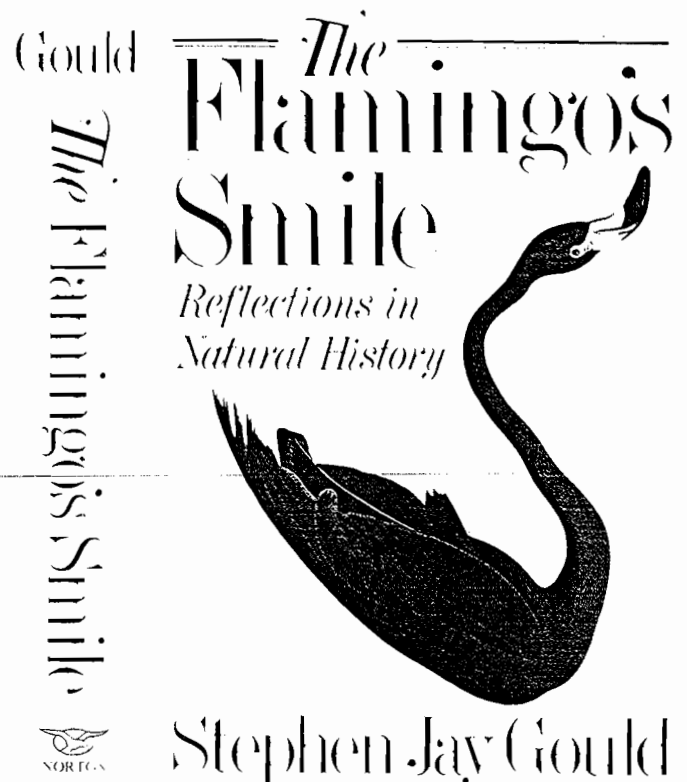
I have often been amused by our vulgar tendency to take complex issues, with solutions at neither extreme of a continuum of possibilities, and break them into dichotomies, assigning one group to one pole and the other to an opposite end, with no acknowledgement of subtleties and intermediate positions-- and nearly always with moral opprobrium attached to opponents.

Stephen J. Gould, Essay 25, *The Flamingo's Smile*

Gould was writing about the 19th century dispute between vitalists and mechanists, but his words apply equally well to the debate at hand. As Moses parted the Red Sea, so Mr. Beck has divided biology: field vs. lab, organism vs. molecule, ecology vs. biochemistry.

The first half of Mr. Beck's essay is fraught with the very animosity he ascribes to others. He claims that field biologists have "higher goals" than molecular types, who "flaunt their flashy equipment". He is also guilty of arrogance. While faculty across the nation struggle to define what should constitute a universal curriculum, he states categorically that biology majors shouldn't be allowed to graduate if they can't distinguish between oak and maple trees. Where does he get the authority (or wisdom) to judge my fitness as a biologist? And would you care to be quizzed on the glyoxalate pathway, Mr. Beck?

Aside from the fallacy of claiming that certain facts are more "essential" than other facts, Mr. Beck is ignoring the basic problem that the capacity of the human mind is finite. Since we can't possibly learn all there is to know about biology, we must choose our studies with care. I took Dr. Donna Ware's excellent vascular plant taxonomy course last semester, and can visually identify well over 75 native Virginia plants. But ask me about insects or birds and I'm clueless-- I haven't had the time to take entomology or ornithology as well. Are trees so much more important than insects or birds? (Or carbohydrate metabolism?) Of course not. But the Department can't make every course mandatory, and most of us can't afford to stay in school long enough to get a seven-year bachelor's degree.



The key to this dispute between organisms and molecules is that it doesn't exist! Mr. Beck writes, "Perhaps some of these reasons [for studying molecular biology] are valid, but do they make the reasons for maintaining a strength in field biology **AS WELL** any less valid?" (Emphasis is mine.) The answer is no, there is no reason why we shouldn't study both. But there are plenty of reasons why we shouldn't focus on ecology to the exclusion of molecular biology, as Mr. Beck seems to suggest. By hiring "molecular" faculty to supplement its traditional strengths in organismal studies, our Department may finally achieve a healthy balance between the two, which would benefit students and faculty alike.

I agree with Mr. Beck's point about overspecialization at the undergraduate level. The basic premise is sound: students need to have an appreciation for life at all levels before they choose which level to study. But after that, disciplinary specialization must occur. As our knowledge base increases, basic competence in a particular field requires more and more years of study. Long gone are the days of the British amateur scientist who could write learned essays on taxonomy one week and astronomy the next.

There are benefits to this: people are very, very good at what they do. Should we require a neurosurgeon to conjugate a French verb and scan a Shakespearean sonnet before operating? No, because that would probably decrease his competence as a surgeon.

(continued next page)

Of course, overspecialization and lack of interaction between disciplines has negative effects. But from what source or experience does Mr. Beck conclude that biology is moving in this direction? One article in *Bioscience* does not constitute a proof. My experience, in fact, has been the exact opposite: the best institutions and the best researchers are moving towards "inter-disciplinary" approaches. While interviewing recently at four graduate schools, I found without exception that the emphasis was on communication and collaboration. Researchers try to attack a problem from all sides, not work on the same side of a narrow set of problems.

A good example of this interface between disciplines is the work of Dr. Terrance Leighton of the Molecular and Cell Biology Department at the University of California - Berkeley. He and a host of other scientists are using genetic engineering of bacteria to solve California's problem with selenium toxicity in ground water. Or how about cheetahs? A population ecologist may have listed them as an endangered species, but "lab" scientists have provided evidence that this is partly due to increased disease susceptibility caused by lack of polymorphism at the major histocompatibility complex loci. Some ecological problems just can't be solved without knowledge of molecular biology.

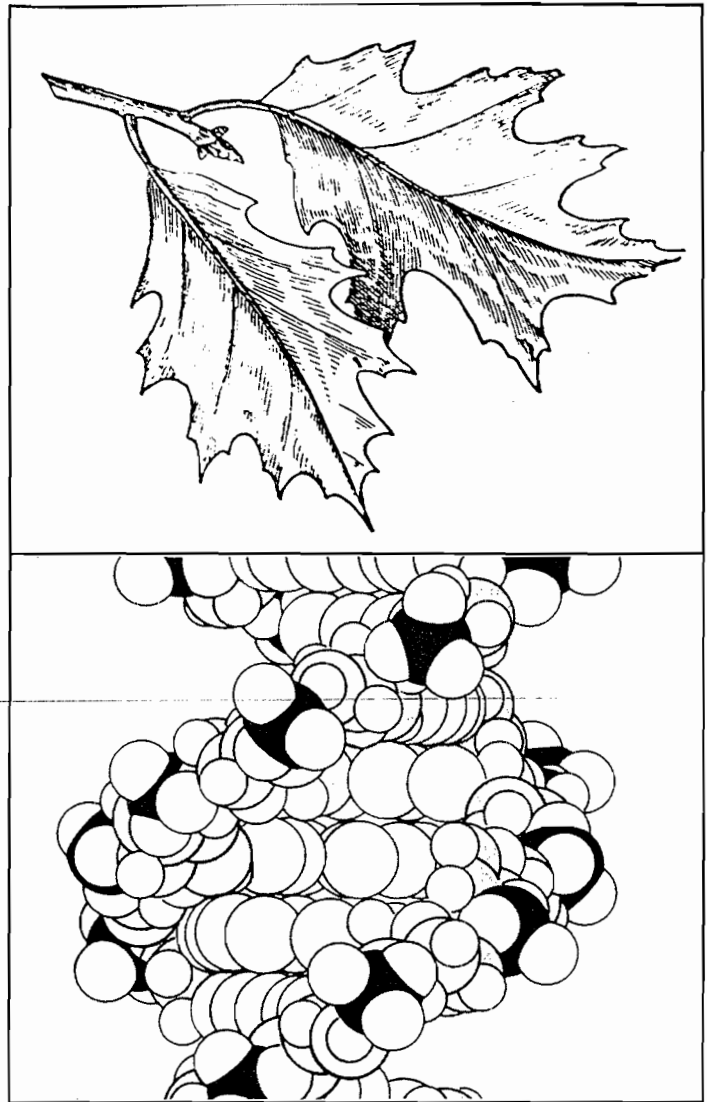
Perhaps the most offensive (and ridiculously narrow-minded) statement of the entire essay is that field biology has "higher goals" than cellular/molecular research. When the underlying purpose is the understanding of life, one goal is not and can not be "higher" than another.

*Joanne Adamkewicz
Biology major, class of 1993*

Response from Chancellor Professor of Biology Charlotte P. Mangum

Several of Chris Beck's points are right on the mark: 1) Some cell biologists have always supposed that their approach is the (read: only) way; some "molecular" (read: hi-tech) biologists are equally naive. 2) Some Biology Departments (not including Swarthmore, however, where classical zoology, organismic physiology and marine ecology are all alive and well despite a faculty one-third the size of ours) have reconstituted themselves into a disproportionate number of hi-technicians and a handful of ecologists, with no organismic and systemic level biologists in between. 3) At some megaversities that have whole colleges of biological sciences, the unsuspecting undergraduate does have considerable difficulty putting together a sound and coherent curriculum. That's probably why we, the W&M students and faculty, are all here.

"Field" biology, however, lies in one category right along with "molecular" biology: both are techniques, not subdisciplines or subjects of investigation. Neither is any less specialized than the other, although the techniques of one approach are more time-consuming to master and more expensive to apply. Nor are community ecologists who focus entirely on the forest without thinking about the trees any less specialized than molecular biologists who never think about the cells in which the molecules are found. Finally, it is probably true that more cell/molecular biologists suffer from tunnel vision than ecologists, but the distinction is quantitative at best. Many marine ecologists suppose

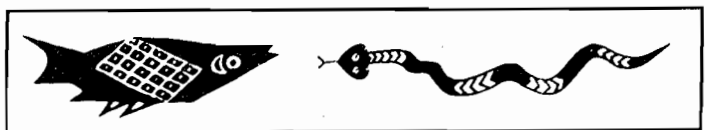


that their approach is the (only) way, and that the rest of us are outside of the mainstream.

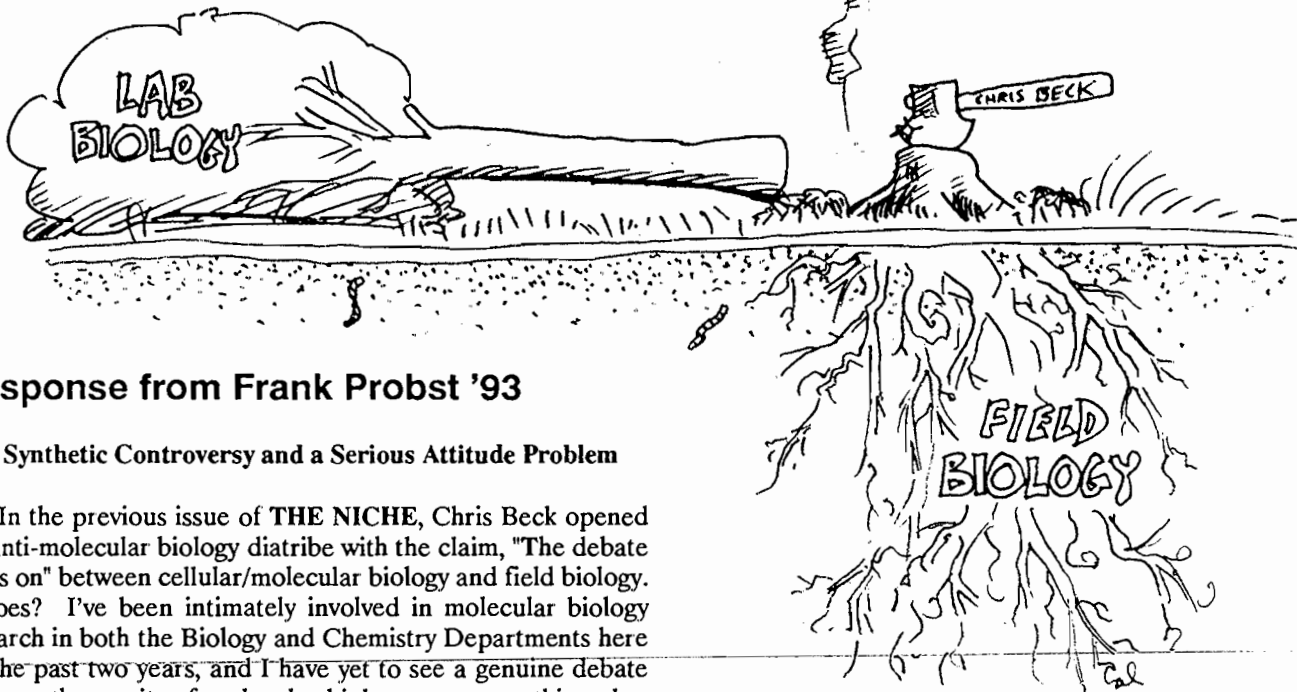
This biochemical/physiological/organismic zoologist, who is presently focusing on natural populations, believes that our Department will benefit from the addition of cell biologists who have wisely and appropriately acquired hi-tech skills. Not because an eminent outside cell biologist recently and predictably (see 1 above) told us so, but because our faculty has been somewhat unbalanced by almost any criterion.

I worry far more about the dangers of point 2. In my field we call it reasoning from the molecule to the mudflat, which often ends up as a molecule in search of a mission. As a famous protein chemist once said to me: you can't learn very much about a book unless you open up its pages. To which I couldn't resist the reply: you won't learn very much about its chapters if all you do is describe the frequency of the letters in its sentences....

*Charlotte P. Mangum
Professor of Biology*



More responses on following three pages....



Response from Frank Probst '93

A Synthetic Controversy and a Serious Attitude Problem

In the previous issue of *THE NICHE*, Chris Beck opened his anti-molecular biology diatribe with the claim, "The debate rages on" between cellular/molecular biology and field biology. It does? I've been intimately involved in molecular biology research in both the Biology and Chemistry Departments here for the past two years, and I have yet to see a genuine debate between the merits of molecular biology versus anything else. What I *have* noticed is that both departments seem to have a generalized sort of animosity toward molecular biology. This is not a feeling which is being reciprocated; I have yet to run in to anyone in any of the labs I've worked in who feels that anyone else's work in the department is inherently worthless. We're basically a live-and-let-live bunch, and none of us have any real idea what all the hostility is about.

What I do know, unfortunately, is that this attitude is taking its toll on the College. Students who are now seeking out advisers for molecular research are liable to be trampled by the current exodus of resigning faculty. For those of you who haven't been keeping score, we've lost three of our molecular biologists in the last year. Dr. Kane from the Chemistry Department resigned at the end of last summer, and Drs. Phillips and Reese of the Bio Department will be leaving as of June. Why are all of these talented people leaving? While they all listed various reasons for wanting to depart the College, I am certain that the anti-molecular attitude we have here has contributed significantly to each of their departures.

A major part of this attitude has been encapsulated in a number of myths that Beck brings up in his piece. My personal favorite: "This lab hasn't seen a living creature for years." Please. Such a claim is so grossly ignorant of the fundamentals of molecular biology research that I'm amazed it made it past your editors. The molecular biology lab here does the bulk of its research on *Escherichia coli*, a one-celled bacterium that normally inhabits your digestive tract. The generation time for this little organism is around twenty to thirty minutes, so we can regularly grow single cells to cultures of five billion in a matter of days. Five billion organisms. Think about that number for a minute. That's more oaks or maples than you'll see in your entire lifetime, and they're all contained in the tiny volume of five milliliters. It is an entirely different world in there. Evolution, which most students view as some abstract phenomenon that occurs over centuries, can and will occur in a matter of hours in this environment. I personally have had whole experiments wrecked because the cells have evolved before they did what I

expected them to do. So much for lifeless research.

Another notable point about *E. coli* is that, since it is a single-celled organism, there can be no cellular/organismal rift, as a cell and an organism are one and the same. I did not see this simple fact addressed at any point in Beck's essay.

Another myth Beck brings to light is the seemingly widespread belief that molecular people have access to a wide array of "flashy equipment." I haven't seen any of it yet, and anyone expecting a grand laser-light show when they walk into our lab is in for a serious disappointment. The major pieces of equipment that are regularly used in our lab are refrigerators, incubators, water baths, a microwave oven (also makes popcorn), and centrifuges. The gel electrophoresis techniques that Beck seems to hold so much disdain for are not hi-tech at all, nor do they involve any major equipment. Running a gel involves zapping a slab of JELL-O with a little bit of electricity. Why is this such a big deal? (By the way, you most certainly can tell the difference between an oak and a maple by running the DNA of each on a gel. The specific technique is known as DNA fingerprinting, and before you scoff at it, keep in mind that this same technique has been responsible for exonerating a growing number of accused but innocent rapists in our legal system. I would imagine that they now have a healthy respect for this type of work.)

Finally, I'd like to respond to Beck's concerns that field biology seems to be splitting into a number of subdisciplines. This is a natural and necessary response of a broad field that is growing so rapidly that it is impossible to teach everyone the specifics of everything. Perhaps we have become so specialized that we are no longer biologists, as Beck seems to fear. I do not see this as some fatal flaw of my education. I will still admire the simple beauty of the Crim Dell ducks and the splendor of the hawks that occasionally soar over the Sunken Garden, even though I may not know the faintest details about them. I would hope that Beck can look upon the surprisingly few number of molecules that form the basis of life, and do the same.

Frank Probst '93

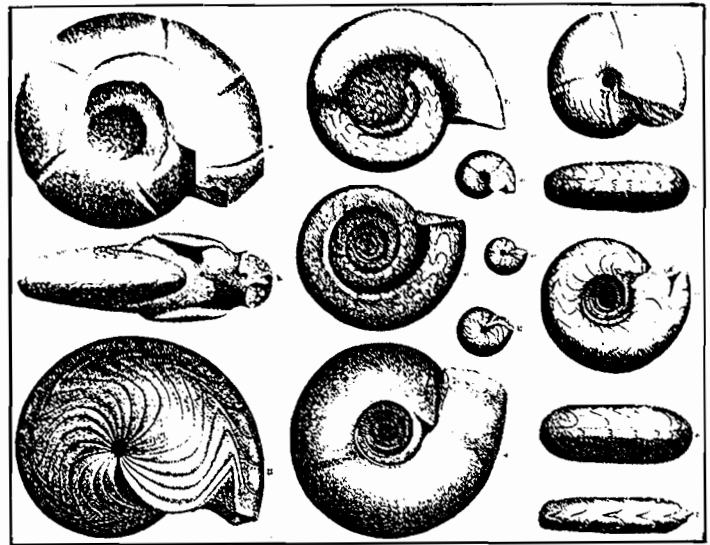
Response from Amanda Allen '92, Graduate Student, W&M

Dear Editor:

To be a biologist is to be a jack of all trades, a diverse individual with the ability and the desire to explore all avenues of the sciences. My favorite adage "it all relates" holds true in the discipline of biology. Thus, to be a biologist one must be a modern renaissance architect using the foundation of cells and molecules, genetics and physiology to build an organism, be it an alga, fungi, or vertebrate. Beyond that you delve into the ecological relationships between organisms and environments; to understand the whole you need to dabble in the parts although admittedly each of these "foundations" can form entire departments. Likewise, the reverse is true. Remember the saying "you can't see the forest for the trees". As a former undergraduate and now a graduate student in the department, I acknowledge that there is a base of introductory courses with which to initiate the building of the foundations of biology. Diverse exposure at the introductory level is key, however, in accordance with Chris's article, I feel (and have for some time) that beyond the first-year orientation the department is taking a sharp turn in the direction towards cellular and molecular studies at the expense of organismal and ecological studies.

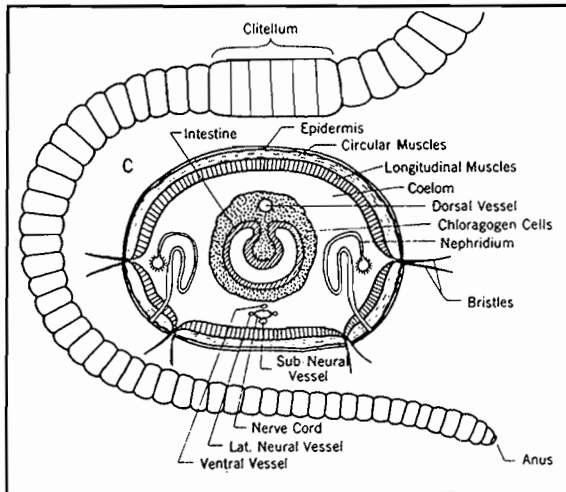
An ecologically oriented field biologist myself I have questioned whether I am biased with my feelings about this lack of diversity of upper level organismal courses (discluding the opportunities with classes at VIMS) and active research opportunities (especially on the graduate level). However, I repeatedly hear from colleagues that they are frustrated with the program here and would not recommend it for anyone seriously considering ecological studies. One VIMS faculty member remarked to me "isn't it a shame about the new direction the department is taking..." The balance is being lost and we in the department are not the only ones mourning it.

Three faculty members whose research and courses were organismal and field oriented retired last year to be replaced with one new faculty member. Two new positions in neurobiology and cell biology have recently been opened and filled. Yet, will the organismal positions ever be filled and, I question, how will the position of organismal biologist be defined. Will the plant taxonomist be more of a molecular biologist who dabbles in plants? The argument that cellular and molecular techniques are the wave of any future in biology might be true and, if so, such topics deserve to be taught. Certainly the departmental assessment carried out by an outside molecular biologist repeatedly pointed out the vogue of molecular and cellular orientation. As written in the assessment:



Another challenge in providing a comprehensive undergraduate biology background arises from an astounding increase in knowledge over the past decade, especially at the molecular level. The structures and functions of DNA are being revealed and manipulated at a rapid rate, and applications of this understanding extend to all areas of biology as well as to areas far beyond (e.g. agriculture, forensics, ethics). Other areas of biology of increasing importance include immunology, neurophysiology, computer simulation and bioethics.

What about ecology? This list is completely non-organismally based. What about the overwhelming interest and concern in conservation and tropical biology? I would gamble that a seminar or lecture course in conservation biology, a definite "new wave", would be filled with undergraduate and graduate students with little question. The desire for such a course is overwhelming. Needless to say the perpetual overlooking of organismal field related research is not conducive for those of us in the field. Having adamantly lobbied for more of these courses during the assessment discussions I was shocked to discover no mention of these desires; contrarily the report noted that the department would actually be more balanced with the loss of the three ecologists.



Not every student desire is feasible in a department but it appears to me (and obviously others outside the department) that the departmental focus is becoming lopsided and our diversity, which we so pride ourselves is being lost. As quoted from the 1989 William and Mary Magazine: "A biology department can be too focused on one aspect of biology. That's not good for William and Mary. In a department that's strictly developmental or cell biology oriented, they weed out people who don't fit in with that". Faculty

and graduate students need colleagues involved in active research to collaborate with and stimulating upper level courses; without it they will leave or never be attracted. Without the professors available to teach diverse courses such as ornithology, field ecology, mammalogy, or conservation biology (and on the same token the cellular courses) the undergraduates will rarely be exposed to ecology and field research.

True, this department has graduated numerous extremely fine organismal field and ecological biologists; however, I would
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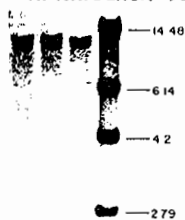
argue that the majority of these students were hooked on ecology as children or before coming to college; their interests were not initiated in this department. Unfortunately I see a downward trend in field oriented students which perhaps relates to the increased shift to an inside, television watching generation who never learn to appreciate the outdoors and literally detest getting their feet muddy. Exposure to a diverse realm of research areas is key in fostering neophyte biologists and sharpening those already bent towards a tract of study. Without the courses taught by professors involved in active research in current ecological topics, this fostering will never occur at the level needed and desired.

Thereby, the responsibility of fostering such studies is placed in the hands of the few ecologists and field researchers to make the department desirable to them and students via field oriented discussion groups, simple bulletin board displays to publicize work, and generally showing their complete enthusiasm and love for their work all of the time and actively engaging new students. We must go above and beyond to seek out opportunities and thus, perhaps, we will produce a few, select and hardy ecologists who excel because they can initiate new and creative studies in a stagnant atmosphere.

The potential for this department to be a well known ecological and molecular center for learning, on the undergraduate and the graduate level, and research exists if fostered correctly and in balance. A more active meshing with VIMS needs to be addressed as does the potential for the development of the Center for Conservation Biology (which a handful of us are striving for). Regardless, the loss of faculty members (and thus classes) of one orientation without instigation of replacement with properly matched hires is frustrating to both faculty and students in the fields slighted and tensions arise, unfortunately. It is a shame that the age of a well-rounded scientist of all trades (a rather Darwinian naturalist versed on phylogeny, ecology, genetics ...) has waned. Not every student of biology will choose to become ecologists (yet alone choose to become biologists) but, the opportunity for exposure to this field is imperative for increased awareness of the environment in which we live, and it must be maintained in balance with the other biological disciplines.



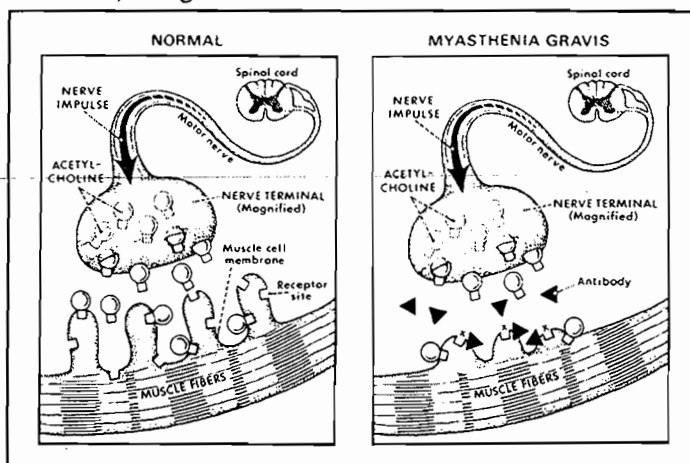
Amanda Allen '92



Response by Chong Shin '93

Hey Chris, are we jealous? I mean, if the situation were turned around, and it was the "ecology-type" classes in such high demand, would you be complaining so much?

In any case, for William and Mary to be competitive with the larger research-type universities, the opportunity to specialize, at either end, needs to be there. However, this is not to say that the new biology curriculum forces early specialization down the student's throats. Because not everyone is focused in what he/she wants to study when they get here. The new curriculum still allows a student to take a range of classes. And just because they have the freedom not to, does not ensure that they won't. I mean, William and Mary usually attracts pretty intelligent students. So, let's give them some credit.



Second of all, in every cellular/molecular-type course that I have taken, all the experiments that we have learned about have much broader implications. For instance, learning about oncogenes and what they do have great importance in our lives today as we try to understand cancer. Also, learning about gene regulation is really at the heart of many biological processes. And most of this research is being done to make our lives longer and healthier. So, how can you truly say that this is not biology? Certainly, biology is not limited to this type of research, but it is an important component. This is not to say that the other life forms in the environment, and those who study them, are not important. It is just that some biologists have their priorities at one end of the spectrum and some at the other. So why should they be reprimanded because they want to pursue their interests?

Furthermore, I don't think that the molecular biologists are trying to take over BIOLOGY, nor are they keeping YOU out of their labs (just try not to mess with the expensive equipment). In fact, they are actually providing a better understanding of what has been in a black box for so many years. Is that so wrong?

So, to Chris Beck, and all you Chris Beck-types out there, there is no reason to feel threatened. Because we all can benefit from the advances in technology. Would you that really bother you? Besides, it's about time the biology department at William and Mary has tried to balance the types of courses offered. Lastly, why don't you address a real problem like the sexism that still prevails in the scientific community. (Except at William and Mary where at least two of the new faculty members will be female!)

Chong Shin '93

THE NICHE

*Department of Biology Student-Faculty Newsletter
College of William and Mary*

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