

THE NICHE

Department of Biology Student-Faculty-Alumni Newsletter



Volume 6, Number 1

College of William and Mary

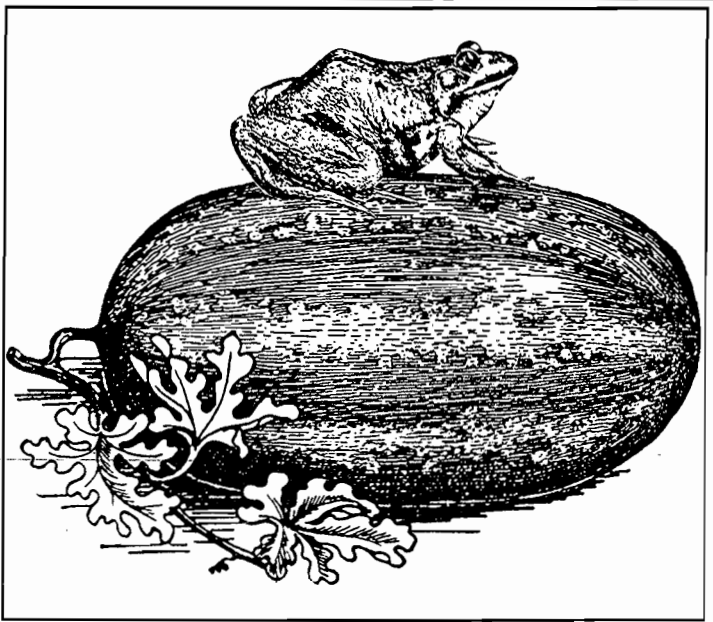
September 1993

Biology Department Welcomes New Faculty

Most New Faces In Twenty Years

In the largest single addition of new people to the Department in at least twenty years, Biology welcomes four new Assistant Professors and a new Technical Support person this Fall. Assistant Professors Nancy Pryer and Margaret Saha replace recently retired faculty members; Assistant Professor Dorothy Reilly replaces Greg Phillips who left William and Mary for Iowa State University; Assistant Professor Sharon Broadwater assumes a newly created tenure-track position; and Ilsa Kaattari begins her William and Mary experience in a newly created technical support position.

Probably nothing is more critical to departmental excellence than hiring new faculty, and the Department is fortunate to be welcoming such superb new people. We wish them great success. *(continued next page, New Faculty)*



Biology Graduate Establishes Fund For Undergraduate Research

Gail Wertz '66 Gives \$2,500 and Challenges Other Alumnae/i To Match Her Donation

Gail Williams Wertz '66, Professor of Microbiology at the University of Alabama at Birmingham, has given the Biology Department \$2,500 to establish a student research stipend in honor of four recently retired Biology faculty members. She was inspired to make her contribution after reading about Professors Black, Brooks, Byrd, and Hall in THE NICHE.

Human Genetics at the University of Michigan School of Medicine, and join the faculty at the University of North Carolina, Chapel Hill in the Department of Bacteriology and Immunology.

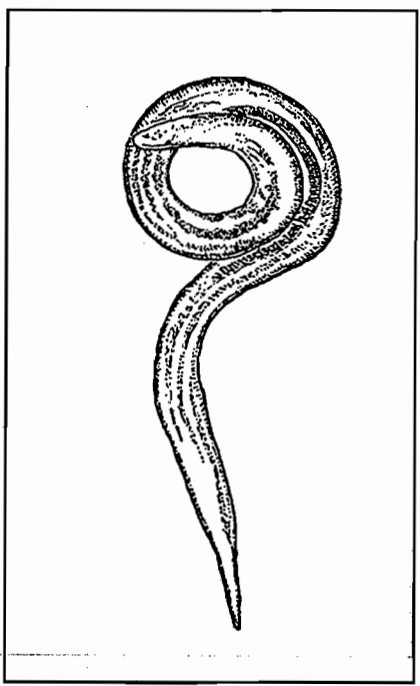
Among her many ongoing activities, Wertz serves on the Editorial Board of *Virus Research* and is doing research funded by NIH, WHO, and USDA. *(continued next page, Donation)*

Howard Hughes Undergraduate Fellows Spend Summer In W&M Laboratories

Six Biology students spent the summer as apprentice scientists, working one-on-one with department professors in many different areas of biological study. They were participants in the Howard Hughes Undergraduate Summer Research Fellowship, a program designed to allow undergraduates to dedicate eight to ten weeks solely towards getting experience in the world of modern biology research. These fellowships were created with a five-year \$1 million grant for undergraduate Biology education awarded to the College by the Howard Hughes Medical Institute in 1989.

The Howard Hughes program offers students a rigorous research experience. The fellowship provides an eight-week stipend of \$1600, with the option of expanding the research time to ten weeks, and thus raising the stipend to \$2000. Further, the program provides for a dorm room in on-campus housing. Students participating in the fellowship are prohibited from taking additional classes or holding other jobs while they are involved in the program. The reason for this condition is to ensure that students' time will be wholly dedicated to their research.

(continued third page, Howard Hughes Fellows)



"I date my involvement in scientific research to the summers of 1964 & 1965 when Dr. Byrd first made it possible for me to do independent research working in his parasitology laboratory," she says. Byrd and other faculty "consistently went the 'extra mile' to involve students in research and to give them an opportunity to learn and grow." Dr. Wertz left William and Mary to earn her Ph.D. in Microbiology at the University of Pittsburgh School of Medicine, do post-doctoral research in the Department of

Donation

(continued from first page)

"We investigate *cis*- and *trans*-acting factors involved in control of RNA virus gene expression and genome replication in order to understand at the molecular level how these agents may be controlled. Also, we are dissecting the role of individual viral gene products in the pathogenesis of viral diseases," Wertz told **THE NICHE**. Holder of several patents, Professor Wertz has published more than 80 scientific papers and book chapters and 60 abstracts. A recent paper of hers appeared in *Cell* entitled "Infectious defective interfering particles of VSV from transcripts of a cDNA clone (69:1011-1020). She also recently co-authored "Approaches to immunization against respiratory syncytial virus" (which is the major cause of pneumonia in infants), a chapter in *Vaccines: New Approaches to Immunological Problems*.

Dr. Wertz says she wants to issue a challenge to other Biology graduates to add what they can to this special fund she has established to support undergraduate research in Biology. She sees this as a fitting way to honor Professors Black, Brooks, Byrd, and Hall for the encouragement and support they have given to hundreds of William and Mary Biology students over the years. Furthermore, she says, "I should add that I am prompted to support W&M now in honor of the inauguration of **Tim Sullivan** as president; he is another individual who I am sure will give students every possible support."

If you are interested in joining Gail Wertz in supporting undergraduate research in Biology at William and Mary, please contact Department of Biology Chair Eric Bradley or NICHE Faculty Adviser Lawrence Wiseman or the College of William and Mary Development Office. As requested by Professor Wertz, a special fund account has been established for these contributions. In recent years about one-third of W&M Biology majors have participated in individual research while at the College. With your help, we hope to increase that number.



New Faculty

(continued from first page)

Sharon Broadwater, Visiting Assistant Professor since 1988, joins the Department in a permanent tenure-track position. This is an additional tenure-track position assigned to the Department by Arts and Sciences Dean David Lutzer as one of several new college-wide positions devoted especially to increasing undergraduate research opportunities at William and Mary. Dr. Broadwater, in addition to continuing to teach Human Physiology, will have responsibilities for certain Departmental outreach programs and cooperative ventures with the School of Marine Science, School of Education, and other organizations.

Broadwater received her B.A. from the University of Kentucky and both her M.A. (Biology) and Ph.D. (Marine Science) from William and Mary. Her interests are in developmental morphology, cell division, ultrastructure, and taxonomy of red algae. She has ten published papers and chapters in books. Her latest invited book chapter, published with Professor Joe Scott in *The Cytoskeleton of the Algae*, is titled "Cytoskeleton and mitotic spindle in red algae" (CRC Press, 1992).

Nancy Pryer comes to us from the University of California at Berkeley where she was a Howard Hughes Medical Institute Postdoctoral student in the Department of Molecular and Cellular Biology. She is interested in transport vesicle formation in cells. One of her latest papers, published in *The Journal of Cell Biology*, is "Cytosolic Sec13p complex is required for vesicle formation from the endoplasmic reticulum in vitro."

Pryer received her B.S. (Zoology) from the University of California at Davis and her Ph.D. (Biology) from the University of North Carolina, Chapel Hill. Dr. Pryer says, "I prefer to teach my classes with an emphasis on experiments.... Because cell and developmental biology draw extensively on genetics and molecular biology, I strive to integrate these approaches into my teaching of cell biology."

Dorothy Reilly uses the African clawed frog *Xenopus laevis* as a model system for defining the role of human disease genes in development. She comes to William and Mary from Children's Hospital of Philadelphia and the University of Pennsylvania School of Medicine where she was a postdoctoral student.

A Swarthmore undergraduate (B.A., Biology), Reilly received her Ph.D. (Genetics) from the University of Pennsylvania School of Medicine. One of her latest papers appeared in *The American Journal of Medical Genetics*: "Parental origin of de novo translocation in a patient with both an inherited and a de novo chromosomal translocation." She says, "I intend to develop short term research projects for undergraduates and beginning graduate students," for example extending "the X-OCRL cDNA sequence by screening additional libraries and by using polymerase chain reaction techniques."

Professor Reilly replaces Professor Greg Phillips as the Howard Hughes Medical Institute-supported Molecular Biologist and will, in addition to other departmental assignments, teach Molecular Biology.

Margaret Saha has two Ph.D.'s, one in History of Science and one in Biology. Her B.A. and M.A. degrees are both in History (from Case Western Reserve University) and her first Ph.D., in History also, (continued next page, *More New Faculty*)

Howard Hughes Fellows

(continued from first page)

Eric Baker worked with **Dr. Terman** under the Howard Hughes program this summer. Following Dr. Terman's discovery that wild populations of deer mice are reproductively suppressed during the months of May, June, and July, Eric worked to determine the mechanisms of reproductive recovery. He collected animals from the wild and studied the histology of the mouse ovaries as a way to understand their reproductive recovery.

Callan Bentley studied cattle egrets, a species of heron, with **Dr. Watts**. Logging numerous hours watching the only inland cattle egret colony in the state, Callan spent time at a local fish hatchery, where the egrets fed. He observed the birds' foraging behavior, turnover rate at the hatchery, and flight directionality. Further time was spent at the colony itself, in the James River, where more directionality data was obtained.


Cathy Chesnutt dedicated her summer to several projects supervised by **Dr. Sanderson**. She analyzed an underwater videotape of a Floridian fish, the amberjack, filter feeding, scrutinizing the tape frame by frame. The amberjack is not a known filter-feeder, so it is considered surprising that this one would be doing so. This fall, Cathy will obtain a dead amberjack and examine its gill rakers, looking for evidence of such filter-feeding activity. She also performed an extensive search of the literature about the amberjack, for the purpose of finding out whether such activity had been previously noted. Finally, Cathy compared the flow velocities of water through the mouths of two species of fish: the gizzard shad and the river herring.

Seth Factor also worked under Dr. Watts, studying bald eagles along the James River. Getting up at 4:00 am in order to watch the birds at dawn, Seth noted age of the eagles he saw, flight patterns, presence or absence of prey, and whether the prey was alive or dead. In addition, Seth joined **Dr. Byrd** in weekly eagle surveys, spent cruising up and down the river and counting numbers of eagles and locations.

Bryan Rourke was another participant in Dr. Sanderson's lab. Using a fiberoptic endoscope and a thermistor flow probe, Bryan was able to observe the inside of fishes' mouths as they fed, and shared in many of the same projects as Cathy. He attempted to figure out whether the fish in question, gizzard shad, used their gill rakers as a net to catch tiny food particles, or whether the suspended nutrients were directed somewhere else.

Tina Tenenhaus worked with **Dr. John Graves** at VIMS, where she spent her summer looking at populations of oysters in the Chesapeake Bay. Tina evaluated the magnitude of gene flow between oyster populations by studying restriction fragment length polymorphism in mitochondrial DNA.

All participants seemed to enjoy the program, learning much and gaining valuable research experience. The program is open to all biology undergraduate students.



WILLIAM & MARY

BIOLOGY

More New Faculty (continued)

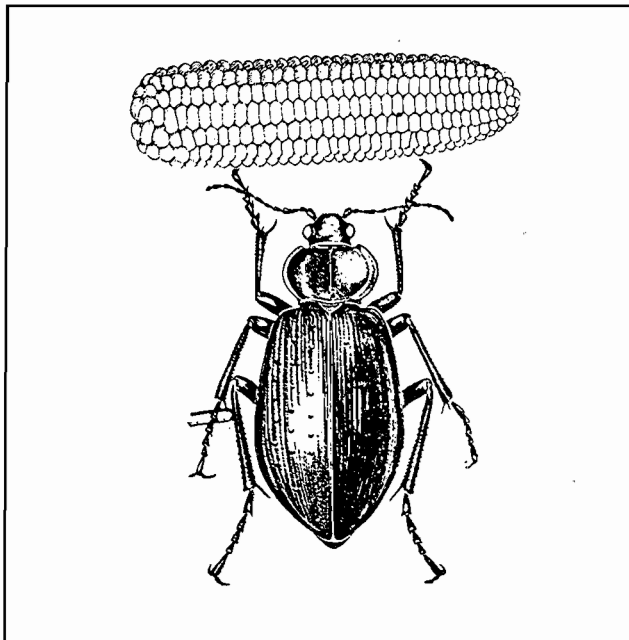
is from Michigan State University. But as she learned more and more about biology she decided that she'd rather do it than study about others who already did it. So she went on to the University of Virginia for a Ph.D. in Biology.

Saha comes to Williamsburg from Charlottesville where she continued as a postdoctoral student. One of her most recent papers, "Opsin expression precedes photoreceptor differentiation in *Xenopus*," was published in *Molecular Brain Research*. She is a developmental neurobiologist who will, in addition to teaching in the area of neurobiology, teach Developmental Biology as Professor Wiseman goes on leave for two years to direct the College's ten-year Self-Study.

Lisa Kaattari leaves her position as Senior Instructor of Microbiology at Oregon State University to join the Department in a new Technical Support position created for the Department by the Dean's Office to support faculty and students in teaching and research. Her spouse joins the faculty at the School of Marine Science.

Kaattari received her B.S. (Biological Sciences) and M.A. (Microbiology) from the University of California at Davis, and is a Ph.D. candidate in Education (Postsecondary and Technological Education) at Oregon State. She is also a Medical Technologist (M.T.), certified by the American Society of Clinical Pathologists. She was a clinical laboratory technologist in both California and Oregon. While at Oregon State she was adviser for students interested in medical technology and taught Microbiology, Immunology Laboratory, and Virology Laboratory.

The Department welcomes its new faculty and wishes them the best as a new academic year begins.



TOP TEN LIST

Top Ten Ways To Pretend You're NOT A Freshman

10. Forsake the Caf --eat **only** at the Market Place.
9. Forego the urge to buy new books at the Bookstore --buy used or not at all.
8. Never, ever admit you're lost.
7. Never walk in a group with more than 3 people.
6. Throw away all of your Top 40 music.
5. Join the Biology Club (subliminal hint completely unrelated to the Top Ten).
4. Talk about how nice the Wildflower Refuge looked before construction of the new University Center.
3. Blue jeans and T-shirts make up your entire wardrobe --forget dressing up for class.
2. Call your T.A. by his or her first name --not Mr., Ms., or Dr.
1. Why pretend? Welcome to W&M Biology!

Biology Students Receive Major Awards at Graduation

A number of graduating Biology majors received major college-wide and departmental awards at Commencement last May.

Frank Probst won the College's most prestigious student academic award. The Lord Botetourt Medal is awarded annually to the graduating senior "who has attained the greatest distinction in scholarship." Frank accepted the award from President Sullivan in Zable Stadium before thousands of students and their families, faculty, and staff. Biology students have won this award, on average, about every two or three years for the past twenty-five years (even though Biology majors are only 8-9% of the graduating class each year).

A double major, Frank also received the William George Guy Prize in Chemistry given each year to the outstanding Chemistry graduate. Winner of a prestigious Medical Scientist Training Award, Frank begins work toward a combined M.D./Ph.D. at the University of Michigan this Fall. The MSTP award, given to only a few students each year, will fully support him for six to eight years.

Joanne Adamkewicz won the Phi Sigma Award for Outstanding Biological Research for work done in former Professor Greg Phillips' laboratory. Joanne, winner of a Howard Hughes Medical Institute Predoctoral Fellowship, is beginning work on her Ph.D. in Molecular and Cell Biology at Berkeley.

Mike Fitch shared the Cornell Award with Frank Probst. This award was established in 1991 by the family and friends of a 1930 William and Mary graduate, Dr. Albert Cornell, to be given to a "most promising premedical student." Mike also won a Medical Scientist Training Program award which will fully support him in his pursuit of both the M.D. and Ph.D. at Case Western Reserve University in Cleveland.

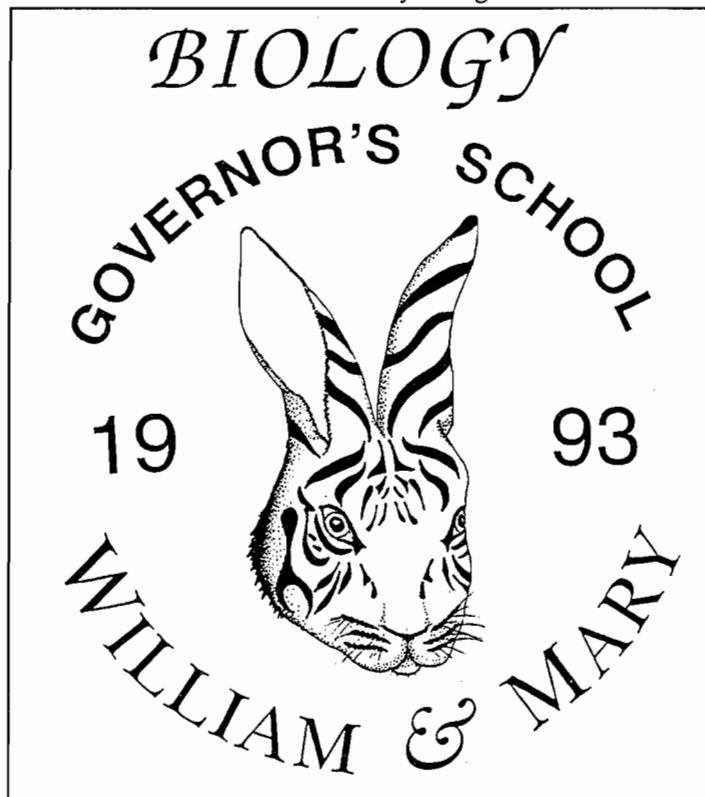
Governor's School Again

The Governor's School for the Gifted in Science and Technology was held at William and Mary this past summer for the fourth consecutive year. Approximately 40 high-achieving Virginia high school science students, mostly rising seniors with just a few rising juniors, participated in the Biology part of the School. A similar number of students studied with faculty and students in four other departments: Chemistry, Computer Science, Geology, and Physics.

Again this year, principal faculty in the Biology section of the program were **Professors Broadwater and Wiseman**. For the second year **Jon McKinsey '93** assisted. Lectures, laboratories, field trips, discussions, and other activities were planned for the students who lived on campus for four weeks. A typical day consisted of early morning lectures on various topics in cellular and developmental biology and a late morning discussion of various topics such as fetal tissue research, the national debate on abortion, chaos and complexity, and the life of a scientist. Following lunch, laboratory and field trip experiences included work with embryonic chicks, gel electrophoresis, botany scavenger hunt, and a wide variety of other topics.

A number of Department faculty and students took the students looking for birds, sea creatures, plants, and other delights. A viewing of the movie *Jurassic Park* accompanied discussion of techniques for cloning frogs.

A number of Governor's Schools participants from the past three years are now students at the College, many of them in Biology. Several have admitted that they hadn't actually considered applying to William and Mary, but that their Governor's School experience persuaded them that W&M is a place where they could get a first class education in Biology. The Department hopes, of course, that this current crop of high achieving young science students will, like the previous groups, produce a number of future William and Mary biologists.



Ornithology Lab Gets New Roost

By Seth Factor

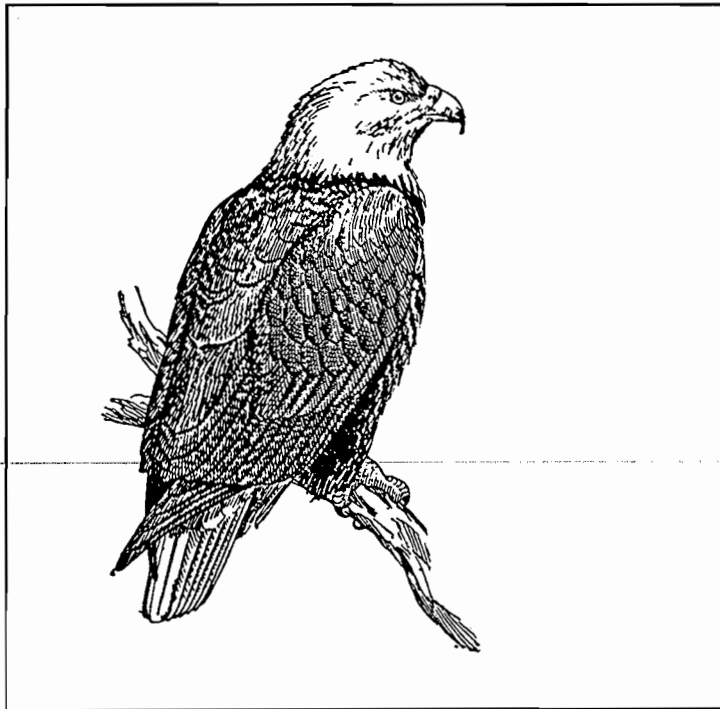
With a little practice and a sharp eye, you may be able to catch a glimpse of many familiar bird species as they begin their migration from the campus this fall. The experienced birdwatcher may even spot the migration of some birds which haven't flown for over 30 years -- due to their being dead -- and stuffed as part of the ornithology department's collection. The birds, which were initially reluctant to leave their perches in Millington's ornithology lab (which they have understandably become very accustomed to), will only be travelling as far as (#) Jamestown Road, where the College has recently purchased a small home. Part of the building will be designated as The Virginia Center for Conservation Biology.

Having studied birds for their entire lives, professors **Mitchell A. Byrd** and **Bryan D. Watts** immediately recognized the stuffed-bird migration to be the result of rapid multiplication of the responsibilities of the ornithology lab coupled with the sudden diminution of suitable ornithology habitat in Millington. In other words, the ornithology lab is still generating large amounts of literature, funding, and community, government, and student education, while the recent acquisition of new faculty has limited its already cramped working space. Thus, Byrd, Watts, and the ornithology lab have decided to make like a stuffed bird and migrate to their new space across from Barksdale Field.

All ridiculous anecdotes and puns aside, the Center for Conservation biology should prove to be a tremendous boon to students concerned with topics in ecology and conservation. The new building has afforded an opportunity not only for relocation, but also for an expansion of the duties associated with the lab. The general focus of the center is to find practical solutions to current environmental problems through research and education

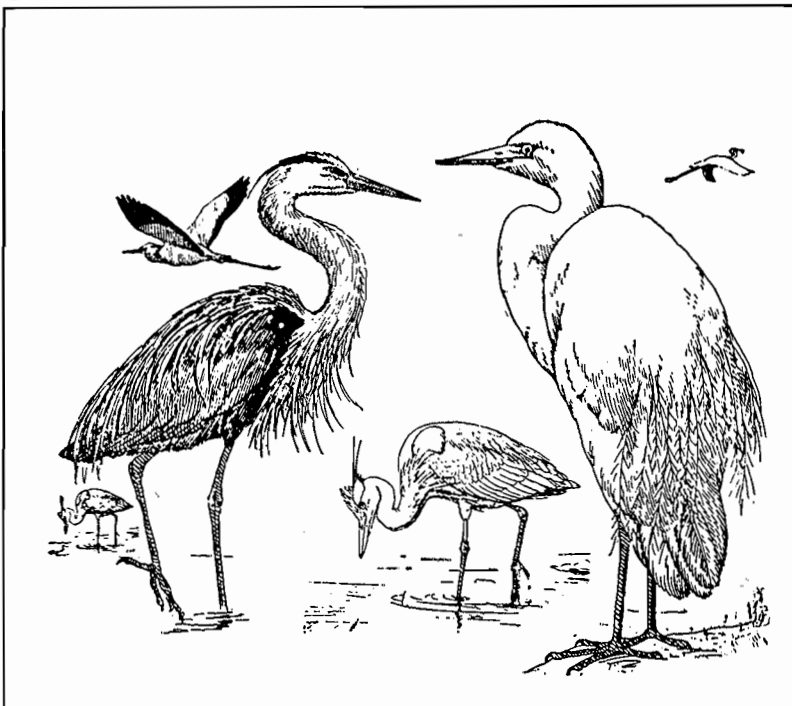
aimed at coastal ecosystems. They will also assist with the development of comprehensive policies for the management of coastal resources. According to Dr. Watts, the Center will provide "an opportunity to get hands-on experience in up-to-date

methods of ecological investigation that have a conservation bent to them."



Watts further stressed that the new center will capacitate the involvement of not only the College, but "the community, and the commonwealth" as well. For example, a series of Center-sponsored meetings, seminars, and workshops will afford students more opportunities to meet with regional experts. Furthermore, it is expected that the Center will serve as a central location where those interested in coastal problems

could assemble for free exchange of ideas and the sharing of those ideas with the student body and community. Plans are also underway for a newsletter targeted at students as well as state and federal regulatory agencies.



Dr. Watts believes that "this is just the beginning," ironically pointing out that throughout the past year over 30 people were involved with projects conducted through the lab, which generated nearly \$350,000 in external support for research. One of these projects, the construction of a Colonial Waterbird Atlas for the Coastal Plain, beautifully illustrates the mission of the Center. It will ultimately be used to "educate regulatory agencies" before they set policy which will affect the coastal zone, according to Watts. Externally funded work with Virginia's Bald eagles, Peregrine Falcons, and neotropical migrants have also been conducted through the ornithology lab this year, along with a myriad of other projects, many of which are still underway.

Dr. Watts and Dr. Byrd encourage interested biology students to become involved with the Center, the latest addition to our ever-expanding biology department. After all, according to Dr. Byrd, it is "a very positive thing for everybody's benefit."

Biology Goes South

William And Mary Students Trek To Costa Rica

By Callan Bentley

As dusk settles on the rain forest, the bats begin to stir and soon they drop one by one from their perch. Fluttering off into the fading light, the flying mammals begin a nightlong search for food. Perhaps each bat will consume twice its own body weight in insects during the course of the night. Joining the bats in this nocturnal jungle are other animals: giant tropical beetles, sloths, poison-arrow frogs, howler monkeys, the occasional jaguar, toucans, and the odd-looking tapir. The bats dip and soar, and scoop up a stunning variety of insects. The diversity of life in this habitat is shocking. And still, here comes yet another group of animals: they walk in a single column along well-worn paths on the forest floor and point at, discuss, and marvel at the creatures they share the jungle with.

But this latest group isn't native to the rainforest. They hail from an area far to the north - Williamsburg, Virginia. They are, you see, a group of biology students from the College of William and Mary on a month-long excursion in Costa Rica, and they are studying the amazing diversity of life in the tropical rain forest.

Costa Rica is a tiny but incredibly biodiverse country. Smaller than the state of West Virginia, it straddles a range of mountains with peaks higher than 12,000 feet. The waters of the Pacific Ocean lap at its western shores, and the Caribbean splashes against the opposite coast. The wet jungles part in places for active volcanoes. Coffee and bananas thrive on local farms. It is a world, notes a pre-trip flyer, "that is as lush as any that has ever flourished on earth."

The trip was orchestrated by department professors **Martin Mathes** and **Ruth Beck**. Eleven biology students participated in the expedition, and professor Norman Fashing joined the group on its tour of the Central American nation. Travelling through three study areas - tropical rain forests, cloud forests, and mangrove beaches - the students learned a great amount about tropical life. Professor Beck taught a course called "The Ornithology of Tropical Birds" and Dr. Mathes taught another, "Applied Tropical Botany." Dr. Fashing gave a lecture detailing the relationship between plants and insects, and Barbara Wallace, who works in the greenhouse, gave a lecture on orchids.

But the learning didn't stop at the classroom door. Students were also able to participate in a great number of other activities, including touring museums, taking night hikes, horseback riding, river swimming, boat trips, and plenty of free time to explore the tropics. The group saw 55 species of hummingbirds during their stay in Central America.

The trip was available to participants for the group-rate price of \$1,897 per person.

"It was a marvelous trip," said Dr. Mathes. "The students

really had a good time and learned a lot at the same time." Mathes plans to recommend that the department plan a trip to Costa Rica every two or three years.

Mathes has had previous experience leading such excursions, as he taught a class in last year's biology/sociology trip to Puerto Rico and Barbados. Next year will offer a similar sort of program, as Mathes joins sociology professors in teaching in St. Croix in the U.S. Virgin Islands.

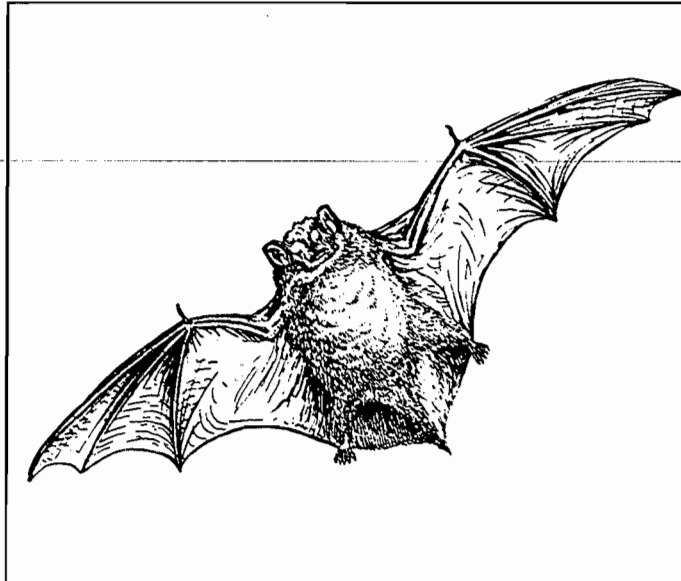
The trip led the William and Mary group through many areas of Costa Rica. From their arrival in the capital city of San Jose on July 4, the students and professors headed to destinations

with names such as Volcano Poas, Selva Verde (meaning "Green jungle"), Rara Avis ("Rare Birds"), and Monteverde ("Green mountain"). The return flight left San Jose almost a month later, on August 3.

Dr. Fashing conducted some work at the La Selva Biological Station for several days, where he collected mites for his ongoing research. La Selva is part of the Organization for Tropical Studies' consortium of 44 academic institutions in the U.S., Costa Rica and Puerto Rico.

A tense moment came one day when a poisonous coral snake slithered through the group's dining area, nosed around in the shower stall, and left again. The fearless biology students courageously tempered this encounter by standing on the table.

A final activity which the group participated in was the "purchase" of an acre of rainforest through the International Children's Rainforest program. This gesture serves to illustrate William and Mary's commitment to preventing the deforestation of one of the most varied of natural habitats. Costa Rica has made numerous advances in this area on its own, going so far as to set aside 8% of its land area as national parks, but support of conservation programs and the encouragement of ecotourism take the cause a step further. Unless more contributions of a similar nature are made, the resulting habitat loss will mean the extinction of thousands of species, some of which are as yet unknown to biology.



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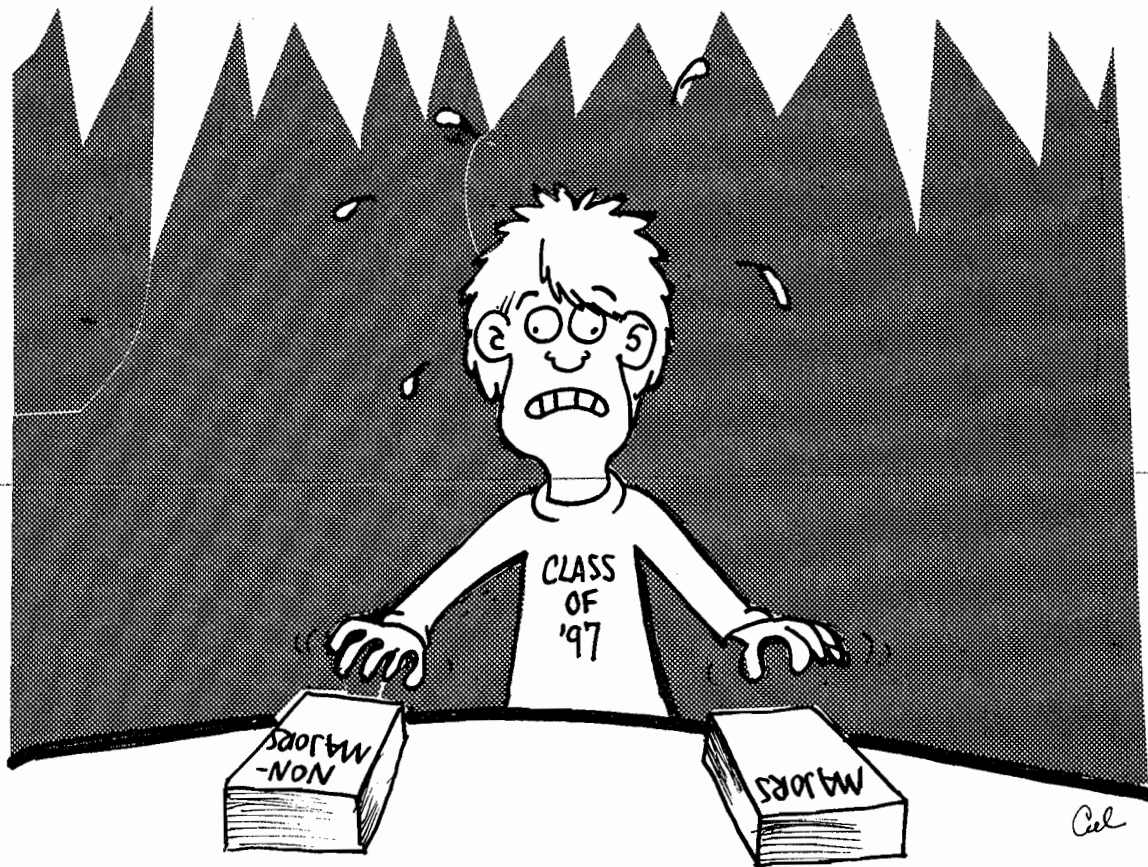
BIOLOGY



WILLIAM
& MARY

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203 OR NOT 203?



William and Mary Number One In Scientific Publications Among Primarily Undergraduate Institutions

What we all thought to be true is. William and Mary scientific research is going strong. *Current Contents*, the journal that helps scientists keep up with the most recent publications in their respective fields, reports that for scientific publications from 1981 through 1992, among primarily undergraduate institutions, "The College of William & Mary had the highest output with about 1,500 papers. Wesleyan University is the only other institution that produced over 1,000 papers" (June 7, 1993, p. 7). More than 74 institutions were compared.

The current survey suggests that not only have primarily undergraduate institutions "produced a disproportionate share of science graduates and PhDs, compared with larger...universities," they have also contributed substantially to the discovery of new knowledge as evidenced by publications in peer-reviewed journals.

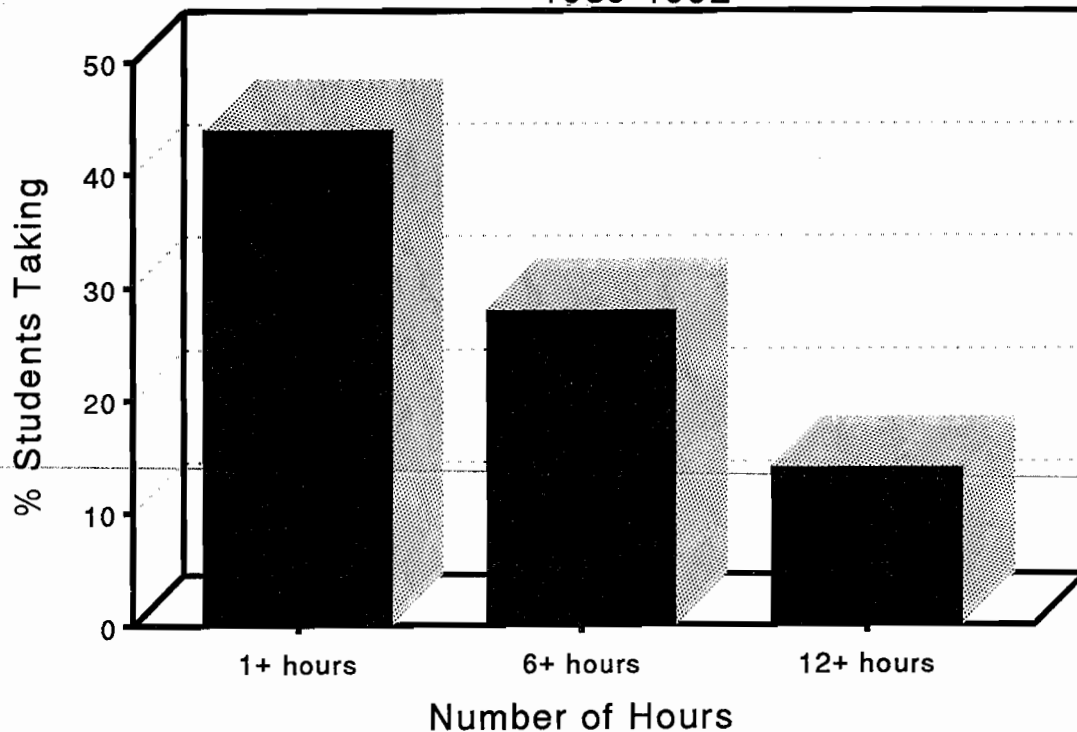
Besides publishing the most papers over the period surveyed, W&M science departments also had the highest number of citations of their papers by other published papers. Often, rightly or wrongly, the importance (or impact) of a scientific paper is judged by the number of times it has been cited by other papers. The more a paper is read and cited, the more impact it has on the development of its field. William and Mary's "impact" tied for 8th with Wesleyan University. W&M had 7.7 citations per published paper. Number one Haverford College had 11.2 (the world average for institutions is 5.5 citations per published paper for the years 1981-1992).

William and Mary ranked somewhat higher in the physical sciences than it did in the biological sciences, probably in part because of the Ph.D. program in Physics and the current development of CEBAF (Continuous Electron Beam Accelerator Facility) in Newport News. William and Mary's impact rankings by area were: 4th in Chemical and Physical Sciences; 5th in Engineering and Technology; 9th in Clinical Medicine; 14th in Agricultural and Biological Sciences; and 23rd in overall Life Sciences.

This kind of survey leaves open many questions. How many of the papers are multiple-author publications in which faculty collaborate with scientists at nearby major research institutions? How many of the publications include undergraduates as co-authors? What kind of institutional support is provided for research? Any way you look at it, the inescapable conclusion is that William and Mary scientists are active participants in discovery, not merely purveyors of what is already known.

THE NICHE

W&M Graduates Taking Biology Courses 1989-1992



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