



THE NICHE

Department of Biology Student-Faculty Newsletter

Volume 5, Number 1

College of William and Mary

October 1992

THE NICHE Begins Fifth Year -- Alumni Subscriptions Climb To \$6,592

This issue of **THE NICHE** begins our fifth year of publication. From a modest beginning with circulation of several hundred, we now send out 1,500 copies to Biology faculty, staff, and students on campus, as well as more than 400 alumni subscribers and dozens of on-campus friends and administrators at the College. (subscription information inside)



Search Begins for Two New Faculty Members

The retirements of Professors Black, Brooks, Byrd, and Hall at the end of last year are bringing a new look to the Department. Vertebrate Biologist Laurie Sanderson (see story on page 2) joined the faculty after a search last year which produced over 260 applications. Two additional searches are underway this year, with a fourth search beginning next year.

In making a report to the faculty about the kinds of biologists to hire, the Department's elected Development Committee (Professors Bradley, Fashing, Sanderson, Scott, and Wiseman) examined student course preferences over the past several years, last year's department assessment report and outside evaluator's comments (story this issue), the current mix of faculty interests and expertise, and the nature of contemporary biological sciences.

The unanimous recommendation, approved by the Department, was to search this year for a Vertebrate Neurobiologist and a Cell Physiologist. Next year's search will focus on a Plant Biologist. The job description, which will appear in *Science* magazine this month, advises: "Successful applicants must be committed to excellence in teaching and research and must establish a vigorous research program involving undergraduates and beginning graduate students." Review of applications will begin in mid-November.

New Biology Courses Begin Majors Introductory Course Has 335 Students

The Department's new curriculum began this Fall with 335 students enrolled in the new first course for majors, Principles of Biology: Molecules, Cells, Development (Biology 203). This enrollment is 100 students more than expected. The new introductory course for those not expecting to major in science or go on to medical school has 225 students. This course, Principles of Biology for Non-concentrators (Biology 100) taught by Professor Coursen, has an optional laboratory with about 200 students. The majors course has a required lab.

Professor Wiseman, Biology 203 instructor, says that the most difficult part of the new curriculum so far is the required laboratory in the majors course: "It is very difficult to involve

faculty in one-on-one laboratory interactions with students when there are 340 students meeting in 12 sections. We're asking a lot of our faculty. Probably no introductory course in the country with this large an enrollment has as many research faculty actually teaching students directly." The laboratories are being designed as modules in which research faculty teach one- or two-week segments in areas of their own

research interest. For example, Professors Broadwater and Scott spent two weeks showing students how to use the transmission and scanning electron microscopes, as well as instructing them in phase and fluorescence microscopy. Professors Phillips and Vermeulen will teach two weeks of laboratory each in molecular genetics. (continued page 2, NEW COURSES



New Vertebrate Biology Class Gets Off To A Good Start

by Laura Romano

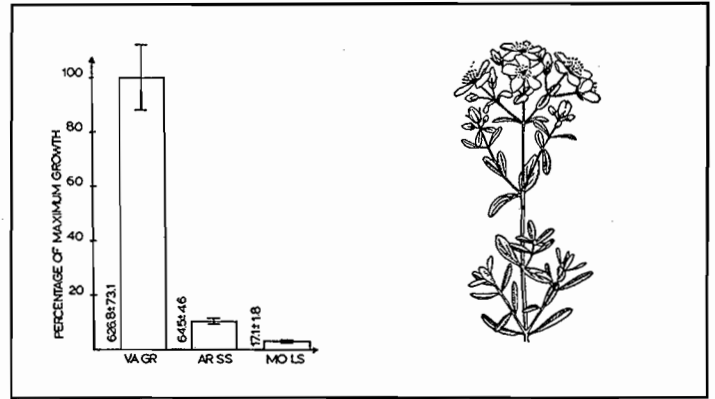
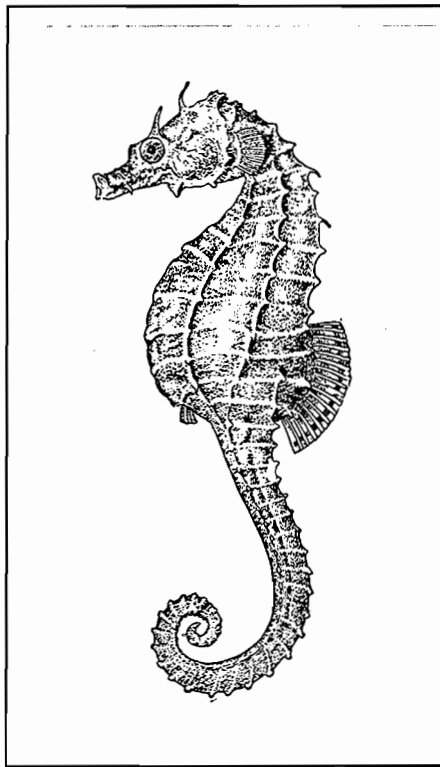
With the retirement of Professor Jack Brooks last spring, the Biology Department was in immediate need of a vertebrate biologist. Hundreds of well-qualified scientists applied for the position. After months of intense discussion, interviews, and public seminars, the department named Dr. S. Laurie Sanderson as Brooks' replacement.

Given her academic accomplishments, which include a Ph.D. from Harvard in 1987, it is hardly surprising that students enrolled in vertebrate biology describe Dr. Sanderson as "smart" and even "brilliant." "She definitely knows her material," says Jon McKinsey, a student enrolled in the class. McKinsey's evaluation is based on only three weeks' worth of material which has included lectures on the morphology and classification of fish as well as various modes of swimming. Dr. Sanderson says that she has organized the material in evolutionary terms, beginning with fish, followed by amphibians, "reptiles," birds, and mammals. Dr. Sanderson insists that the classification of "reptiles" is inaccurate.

To aid in their understanding of the information, Dr. Sanderson requires her students to write weekly summaries of assigned readings in the text. Andrea McClellan claims that these summaries help students assess the significance of what they are reading. In addition to these assignments, the laboratory is designed to supplement information discussed in the lecture. Both McKinsey and McClellan agree that Dr. Sanderson's labs are extraordinarily creative. For instance, students had the opportunity to do Gyotaku, which involves painting a dead fish and pressing it against some material, such as paper. As Dr. Sanderson explains, Japanese fishermen utilize this technique in order to record the size and species of a catch. Dr. Sanderson's students, however, performed Gyotaku as a means of studying the external morphology of fish.

Labs have also been conducted outside of the classroom. Dr. Sanderson arranged for a trip on the Bay Eagle, a small research vessel owned by the Virginia Institute of Marine Science. The purpose of the lab was to sample the York River fish population, although other kinds of organisms, including horseshoe crabs, were collected as well. Students also had the opportunity to capture organisms at Herring Creek, where they found blue gill and striped bass.

Considering the quality of her instruction, Dr. Sanderson seems to have adjusted quickly to teaching at a new institution. Students such as McKinsey and McClellan have expressed satisfaction and even excitement about being in her class. The Biology Department has obviously chosen its newest faculty member wisely.



Former Student Joins Faculty As Instructor

Nora Ann Bennett, with both B.S. (1983) and M.A. (1987) degrees in Biology from the College, joined the Department as Instructor in Biology. In the one-year position, Bennett will assist in introductory teaching laboratories. Before joining us, she was Adjunct Professor at J. Sargeant Reynolds Community College where she taught General Biology. Before that she taught Biology and Chemistry at King William High School in King William County, Virginia.

Mrs. Bennett's M.A. research was done with Professor Stewart A. Ware. Her thesis title was "Tolerance to Soil Type in Rock Outcrop Plants." The Department is happy to welcome our new instructor back home.

Two Win Goldwater Scholarships

Cheryl Granger, senior Physics/Biology double major, and Frank Probst, senior Biology/Chemistry double major, have been awarded Barry M. Goldwater Scholarships which cover tuition, fees, books, and room and board up to \$7,000 annually for college science students.

From a pool of 1,800 nominees nationally, only 276 scholarships were awarded. Being nominated is an honor itself because colleges and universities select only their best students for the competition. William and Mary nominated six students. Four were successful.

NEW COURSES (from page 1)

According to Wiseman, the students are doing well. "I didn't know what to expect with our first class full of potential majors and science students only. I made the first examination fairly difficult because I wanted to see what they could do. All in all I was pleased with the ability of so many first-year students to answer experimental design questions as well as standard facts questions. We do have really fine students."

After this first year, faculty involved in the new courses (including Professor Grant, lecturer in the second majors course, Biology 204), will make appropriate changes based upon their own experiences and student recommendations. "A modern, flexible new Biology curriculum is our own way of celebrating William and Mary's 300th birthday," says Wiseman.

Alumni From 37 States Support Biology Program Through NICHE Subscriptions

Biology Department alumni have contributed more than \$6,500 to THE NICHE fund through subscriptions and gifts. Some of the money has been used to help the Biology Club and Phi Sigma Biology Honorary Society to foster student research.

Last year 242 alumni contributed more than \$4,000, up from 213 contributions totaling about \$2,500 the previous year. The excellent response last year was in support of our four retiring faculty members, Professors Black, Brooks, Byrd, and Hall. The Department is in the process of buying a computerized biological journals reference system for the Reading Room. This will be a gift from Biology alumni to current students in honor of the four professors who together represent 128 years of service to William and Mary Biology.

THE NICHE will keep you informed of the status of the new system. Because the University itself is now trying to decide how to modernize reference searching through the main library, the Department wants to make sure that we use our alumni contributions for additional equipment (not merely to pay for what the University will soon buy us).

The following contributions as subscriptions and gifts were received from Biology alumni the past two years. We sincerely appreciate your support.

Amount of Gift or Subscription X Number = Total

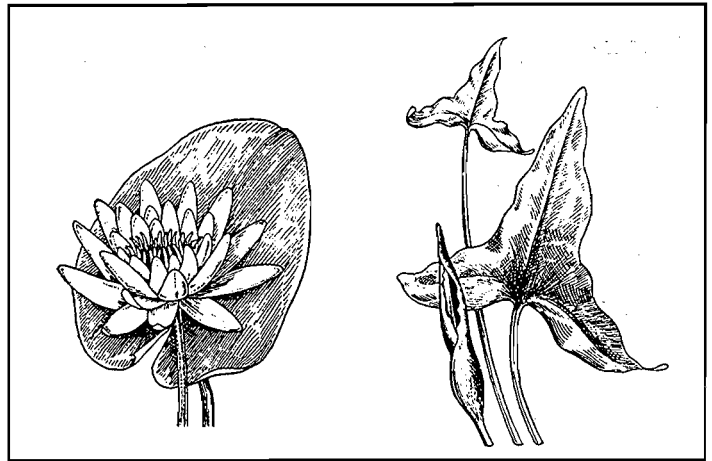
\$100	X	1	=	\$	100
\$ 60	X	1	=	\$	60
\$ 50	X	15	=	\$	750
\$ 40	X	1	=	\$	40
\$ 35	X	3	=	\$	105
\$ 30	X	7	=	\$	210
\$ 25	X	37	=	\$	925
\$ 21	X	1	=	\$	21
\$ 20	X	48	=	\$	960
\$ 15	X	5	=	\$	75
\$ 12	X	1	=	\$	12
\$ 10	X	332	=	\$	3,320
\$ 7	X	1	=	\$	7
\$ 5	X	1	=	\$	5
\$ 2	X	1	=	\$	2

455 \$6,592

Our 372 contributors live in the following 37 different states: Virginia (141); Maryland (30); North Carolina (23); California (21); New Jersey (19); Pennsylvania (17); New York (14); Massachusetts (11); Illinois (9); Florida, South Carolina (6); Georgia, Minnesota, Ohio (6); Missouri, Oregon, Texas, Washington (5); Michigan (4); D.C., Delaware, New Hampshire, Wisconsin (3); Colorado, Oklahoma, West Virginia (2); Alabama, Arkansas, Connecticut, Indiana, Kentucky, Kansas, Maine, Nebraska, New Mexico, Rhode Island (1).

If you want to subscribe to THE NICHE, send your name, address, and \$10 (or your own contribution) to:

Lawrence Wiseman, Department of Biology, College of William and Mary, Williamsburg, VA 23187-8795.



The Baldwin and Speese Memorial Award Presented to Biology and Geology Majors

The Baldwin and Speese Memorial Award was established by Mrs. Christine Kurtz Fuerhoff, '80, to recognize the many contributions made to the College and the community by former Biology Department Professors J.T. Baldwin and Bernice M. Speese.

The award generated by this memorial endowment is given each year to a graduating senior in any field whose studies or activities have added to our knowledge of native plant species or ecosystems, or to their protection.

This year's award was shared by Katherine P. O'Neill in Geology and Kimberly J. Pieslak in Biology. Each received a certificate of recognition and \$600.

Kathy O'Neill, working with Dr. Joel Levine at NASA, used satellite data to assess the extent of savannah grassland burning in Africa and the amount of pollutants produced. Her work has been cited as the first accurate assessment of this phenomenon. She founded the William and Mary Student Environmental Action Coalition and is President of the Campus Recycling Organization.

Under Biology Professor Greg Capelli's direction, Kimberly Pieslak examined Lake Matoaka nutrient concentrations in relation to other physical and chemical variables. Largely because of her early work, the project was expanded to include a total review of lake eutrophication and possible ways to reclaim polluted lakes. Her work will be relied upon in making recommendations to the University about pollution problems in Lake Matoaka.

Announcements, Session 1969-1970

Biology

206. **Plant Taxonomy.** Second semester; lectures two hours, laboratory six hours; four credits. Prerequisite: Biol. 101. MR. BALDWIN.

Phyletic relationships of flowering plants and of ferns; principles of classification; collection and identification of representative native and cultivated plants.

208. **Morphology and Phylogeny of Plants.** Second semester; lectures two hours, laboratory six hours; four credits. Prerequisite: Biol. 101. MISS SPEESE.

The morphology of representative lower plants is studied in the laboratory and in the field. Some experiments are performed.

WHAT I DID THIS SUMMER.....

Students Involved In A Variety Of Activities

by Chong Shin

NEONATAL INTENSIVE CARE

As a volunteer at the Children's Hospital of King's Daughters, **Nancye Donahoe** went on rounds with the Chief Pediatric Resident in the neonatal intensive care unit. All the babies in that unit were premature. She saw infants that ranged from crack babies, FAS babies, to LBW babies. Nancye witnessed 3 regular births and one c-section. She had limited experience with patient care because all the babies were so closely monitored by machines. However, there were some ethical questions raised while she was there. For instance, the issue of keeping a very ill infant alive came up. Also, she was occasionally introduced as Dr. Donahoe to make procedures run smoother.

A NEW AND IMPROVED ELUTION TECHNIQUE

Since February of 1992, **Jon McKinsey**, a senior Biology concentrator, has been working on improving an elution technique. He also was a member of the Governor's School team this past summer, along with **Professors Broadwater and Wiseman**. He started working with **Dr. Phillips** in the Molecular Biology Laboratory two summers ago after receiving a **Howard Hughes Research Grant**. Jon's new elution technique saves a lot of time over the old technique. Other students in the lab also use this technique, proving that it actually works. So now Jon is waiting for a picture that he can use in his paper. He hopes to get this paper published because it could save time for every one who currently uses the old elution technique.

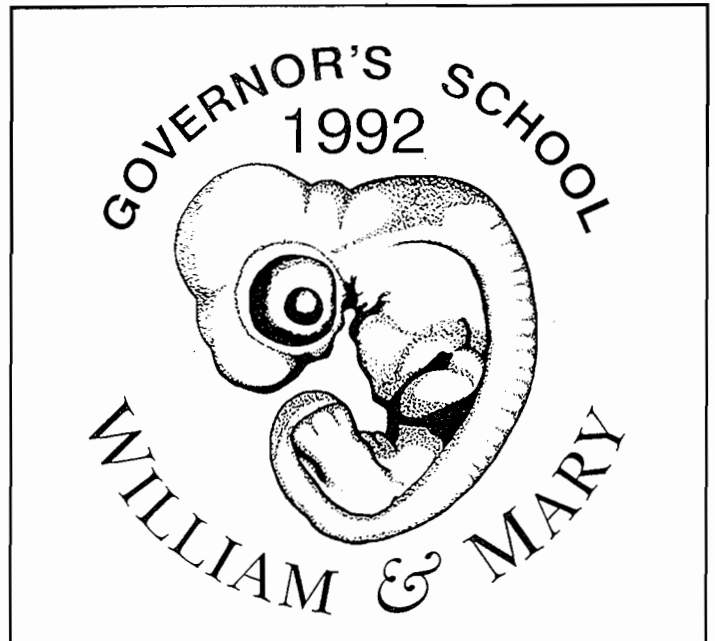
PARALYTIC SHELLFISH POISONING

For her 3rd summer, **Jenny Rios** worked at the FDA Office of Seafoods, Division of Research with a research Marine Biochemist. They have been working with the unicellular dinoflagellate, *Alexandrium*. This organism produces a neurotoxin that causes paralysis from the extremities in towards the heart when ingested, Paralytic Shellfish Poisoning (PSP). Fortunately, this is only a temporary condition. Jenny's job in the lab was to produce this neurotoxin, saxitoxin, in mass quantities.

Jenny also started a new project with the diatom, *Pseudo-nitzschia australis*. This organism produces the neurotoxin, domoic acid, which causes Amnesiac Shellfish Poisoning (ASP), an irreversible condition. Her electron micrographs were used at conferences to show the organism's anatomy.

EVMS

Khiet Trinh, along with 30 other pre-medical students participated in a summer medical program at Eastern Virginia Medical School (EVMS). They took introductory courses in Physiology, Anatomy, and Biochemistry. He felt the most significant part of the program was their participation in clinical rotations. Once a week, he chose a particular department in which he wanted to observe a doctor at work. Khiet got to witness a surgery, follow a doctor in Pediatrics, and also Ophthalmology.



Dan Shelly Elected Graduate Student Representative

Dan Shelly, a second year graduate student working with **Professor Mangum**, has been elected by the graduate students as the Graduate Student Representative. In that capacity, Dan will represent the students to the Graduate Committee and the Department. He will also be involved in the Graduate Curriculum Review which is beginning this year under the direction of **Professor Hoegerman**, Chair of the Department Graduate Committee.

According to Dan, the duties of the Graduate Representative include fostering "a sense of community" among the graduate students and faculty. Dan came to us from Lehigh University.

Department Assessment Completed

Professor Norman Fashing presented the Department's detailed undergraduate assessment report to the Dean and the College Assessment Committee last June. The lengthy report (23 pages of narrative and 210 pages of Appendix, including three past issues of **THE NICHE**) concluded that the "undergraduate Biology program...serves its concentrators well and accomplishes the educational goals set forth by the Department." More than 97% of last year's seniors and alumni rated the overall program in the good/excellent category.

Virginia Senate Joint Resolution 83 called for all Virginia's colleges and universities to assess their programs. William and Mary has been working for several years to accomplish its formal assessment.

The Department thanks all of those who helped out, especially the alumni who answered the long questionnaires we sent out and the seniors who volunteered to take the Biology Field Test. We have learned a lot. Suggestions for improvement that have come out of the process will be studied this year.

In the next issue of **THE NICHE**, we will include some of the interesting details and data that we collected. If alumni have particular interests (i.e., certain things they'd like to know from the information we gathered), please let us know.

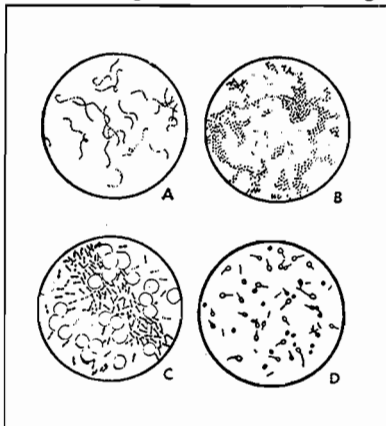
Thirteen Senior Honors Research Students Working On A Variety Of Projects In Eight Different Faculty Laboratories

by Dan Stimson

The Biology Department's Honors thesis program provides senior biology majors with the opportunity to collaborate with professors who share their scientific interests and research goals. Reasons for doing an honors project may vary. Gaining research experience, building up resume's, and satisfying fundamental curiosities are top motivators. Even more diverse than the students' motives are the objectives of the projects themselves. Molecular genetics, ecology, endocrinology, botany, entomology, and developmental biology are among the disciplines represented by this year's honors projects. From greenhouse plants to trees, from bacteria to birds, here's a preview of the topics that the honors students are exploring:

Frank Probst is working with **Dr. Phillips** to determine the function of the *sTsy* gene in *E. coli*. The gene, which is essential to cell viability, appears to be involved in regulating protein transport across the cell membrane. Probst is manipulating the gene in various ways in order to evaluate its role in cell maintenance.

Joanne Adamkewicz is also studying *E. coli* with **Dr. Phillips**. She is using site-selected mutagenesis techniques to disrupt



proper functioning of the *Ffh* gene and thereby create a temperature-sensitive mutant. By observing impairments in the functioning of mutant cells, she will be able to define essential activities of the *Ffh* gene.

Debbie Bayster is employing mtDNA techniques to help the Inter-American Tuna Commission discriminate between two morphologically indistinguishable species of tuna larvae. Bayster will be matching DNA samples extracted from adult tissue to DNA samples taken from larval tissue in order to clearly identify the larval forms of yellow fin and big eye tuna. **Dr. Graves** is supervising her work at VIMS.

Letter From Recent Honors Research Student

The following letter (shortened here) was received from a graduating senior who participated in the Honors Research Program in Biology last year. We believe it reflects the views of most Honors research students about the value of their research experience and relationship with their faculty research advisor. You may want to consider doing Senior Honors Research yourself. If so, see **Professor Norman Fashing**, Chair of the Department's Honors and Undergraduate Research Committee. It is never too early to begin thinking and planning about Senior year.

Dear Dr. -----,

This letter will reflect only a hundredth of my appreciation and gratefulness to you....

I think that the honors thesis and everything that went into it was the most challenging and satisfying event that has ever happened to me. I remember all those times of frustration when you just told me to do my best and things will turn out.... It was a priceless experience.... Those...who'll never do research will miss out on what I think Biology is.

I don't think there will be any way for me to thank you enough for helping me, teaching me, and believing in me. I really learned to do things for myself and to challenge myself this past year....

Sincerely,

Katie Malooly is interested in evolutionary genetics. Under the guidance of **Dr. Grant**, she is examining the relationship between mutation rates in a population and the number of intervening sequences (non-coding segments of DNA) in the gene pool. Using the "gene bank," a computerized record of all the gene sequences ever identified, she will be able to determine the degree to which organisms have changed throughout evolution.

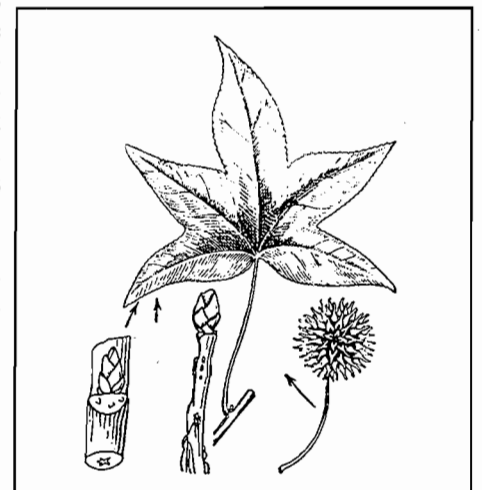
Dan Stimson is working with **Dr. Grant** to determine the effects of non-visual cues in the color development of *Biston betularia* (peppered moth) larvae. These caterpillars mimic the appearance of their substrates to avoid predators. One researcher found that they seem to respond to visual stimuli to accomplish this feat. Stimson is investigating the possibility that chemicals within leaves and/or textures of branches may also influence larval color.

Sally Hunsucker, working in with **Dr. Mathes**, is studying hormonal regulation of

embryonic development in the plant *Kalanchoe pinnata*. Hunsucker is preparing tissue cultures of leaf sections where the foliar embryos form. She will be applying cytokinins, auxins and giberellins (all plant hormones) to the cultures to examine their effects upon embryonic growth.

Alex Cole is assaying the abundance and distribution of trees in the Cumberland State Forest. Cole has set out to answer two ecological questions in which he and **Dr. S. Ware** share interest.

First, Cole intends to determine the ecological succession of this piedmont forest should it remain undisturbed. Second, Cole is analyzing the differences in successional directions between the forests in piedmont and coastal plain regions. (continued next page)



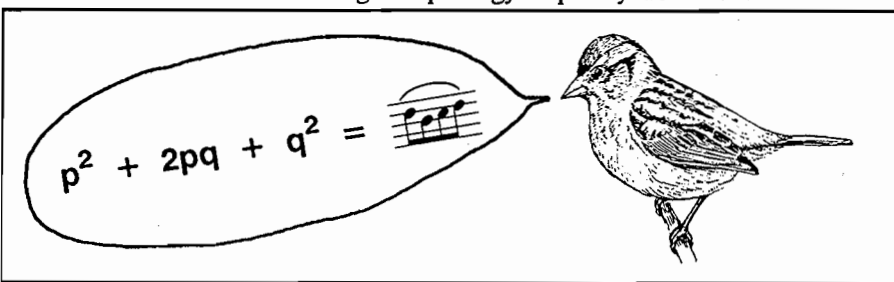
Honors Research (continued)

Chris Beck and **Dr. Watts** are interested in the ecology of winter sparrow communities. Beck will be utilizing a previously devised mathematical model to determine how the conflict between the need for foraging grounds and the risk of predation affects the sparrows' community structure. Beck expects that the changing ratio of predatory risk to foraging rights will significantly alter the distribution of the birds in their habitat.

Mike Fitch is attempting to determine if general wound healing in rats is influenced by processes that facilitate regeneration of the rat liver. To ascertain the regenerating liver's effect upon the rat's health, Fitch is measuring the regrowth of axons in lesions of the spinal cord. Fitch and **Dr. Guth** suspect that growth factors secreted in the blood to promote liver repair may be non-specific, promoting healing in other areas as well.

Barbara Piasecki is also studying rats in Dr. Guth's laboratory. She is investigating how the interplay between immunomodulators and macrophages directs peripheral nerve regeneration. Recent evidence demonstrates that immunomodulators promote secretion of growth factors by macrophages (large phagocytic cells in the immune system). Piasecki will first test the efficacy of various immunomodulators on the system. Then, she will analyze the degree to which these substances stimulate macrophage activity in regeneration.

Laura Romano is using the scanning electron microscope to analyze the feeding apparatus of several species of mites (microscopic arachnids) in the family Alloglyphagidae, a group whose feeding morphology is poorly documented. Romano



plans to relate the mites' mouth structures to observable aspects of their feeding behavior, and infer from these data the functions of the mouth components identified. She is working with **Dr. Fashing**.

Unfortunately, two honors candidates, **Katherine Joubin** (working with Dr. Guth) and **Mark Stoetzer** (working with Dr. S. Ware) were unavailable for interviews.

Research is also an option for those students who do not wish to pursue Honors projects. Both types of research provide students with valuable learning experiences and contribute to the enrichment of the biological sciences. **If you are interested in participating in undergraduate research**, contact a Professor, your advisor, the Department Chair, or **Professor Fashing**, Chair of the Undergraduate Research Committee.

First Person Account: The New Curriculum From A Guinea Pig Perspective

by *Katherine Lieberknecht*

When I arrived on the first day of school and found a seat amongst hundreds of identical hard desks, I realized how similar this year's Biology Intro course is to an animal research lab. Millington 150 is a cage surrounding 340 guinea pigs being tested with a new biology curriculum instead of a new hairspray product.

As Dr. Wiseman entered the room and waved his arms like a researcher flourishing a syringe, the lecture hall became deathly silent. Squeaks, rustles, and all movement stopped. All eyes were focused on Wiseman as he prepared to inject our brains with biology information.

Sprays of untested solutions and colorful pills were replaced with the steps of the Krebs cycle and the importance of hydrogen bonds. Dr. Wiseman hit a high point of the lecture and his gesticulating arms and rapid-fire mouth could have easily been mistaken for a research scientist who had just found the solution to stop frizzy hair.

Just as research scientists experiment to find the perfect hairspray, the William and Mary Biology Department is trying to design a better introduction to biology. Instead of finding formulas for better hair hold in humid weather, the elimination of limp hair, and better manageability, Dr. Wiseman and his colleagues are trying to create a program combining a well-rounded biology education with a preparation for future careers. If they both succeed, we'll all be biology geniuses, and bad hair days will be eliminated forever.

There are dangers in testing a new curriculum on us, just as there are dangers in testing unknown and possibly lethal solutions on guinea pigs. The guinea pigs could have unfavorable reactions to the hairspray: their hair might fall out, infections could be caused, eyes may become blind. Death could occur. To my knowledge, no one has died because of Bio 203, but then again, we haven't received our final grades yet.

However, there are dangers for us human guinea pigs, too. Since the introduction to biology is divided into two courses, one for majors and one for non-majors, non-majors who become interested in biology may have a difficult time switching into the curriculum. The division might also cause a loss of diverse points of view. Science-freaks sometimes miss important points poets notice. Also, the curriculum could prove to be a lot of work for not much difference. Just as thousands of guinea pigs could die for an only slightly improved hairspray, many hours of faculty and student time could be wasted for not much improvement.

If the new curriculum works, though, it will be like we were being tested for an AIDS vaccine, not hairspray. We will have a better introduction to science, know how to use current science technology, and will get to know the faculty better through the laboratory program. Dangers of being experimented on aside, this guinea pig thinks that it is definitely worth it. Hairspray, on the other hand, is a completely different story.

TOP TEN LIST

Top Ten Reasons to Become a Field Biologist

10. The fruit flies all look normal
9. Mosquitos, ticks, and chiggers
8. The sweet smell of "off"
7. Muddy shoes
6. You get to carry surveyor's tape everywhere you go
5. "No, we're not lost. I know exactly where we are..."
4. Everything you see is alive
3. Getting to wear blue jeans to work
2. Not being in the lab
1. Sunrises

Clayton-Grimes Biology Club

Meetings are held Tuesday evenings at 7:30 in Millington Hall, room 117. The Clayton-Grimes Biology Club is having upcoming events such as Lake Matoaka Cleanup, canoe trips, films, speakers, and more. Please come to our meetings; we welcome any new members! If you have any questions, please feel free to call any of our officers listed below:

Jason Ridgel, President	220-1023
Jamie Han, VP of Education	221-4958
Sally Hunsucker, VP of Philanthropy	221-4779
Natalie Weber, VP of Publicity	221-5583
Mike Stebar, VP of Recycling	221-4187
Mark Stoetzer, VP of Social Affairs	221-4216
Cathy Unrine, Treasurer	220-0639

1992 Schedule:

- Oct. 24 Trip to the Dismal Swamp
- Oct. 27 Meeting, autopsy film
- Nov. 3 Meeting - graduate work in biology presented by W&M graduate students
- Nov. 10 Meeting - movie: The Lorax
- Nov. 17 Decision on the Mary Ferguson Grant Winner(s)
- Nov. 24 Meeting
- Dec. 1 Last meeting of the semester

Last week of classes: After Seminar Bash for Students and Professors

Watch the Biology Bulletin board outside Millington Room 117 for any changes in schedule and information on upcoming events.



Bio Students Sing Praises Of The BEATLES

The BEATLES are clearly the "best rock and roll act ever" according to the 130 students in last semester's Developmental Biology course (data from a bonus question on the final exam). Interestingly, all the top vote getters are groups popular years ago. According to an anonymous source, "This proves once and for all that rock and roll was better in the good old days...." Acts receiving more than one vote were:

1. Beatles (27 votes)
2. Rolling Stones (13)
3. The Doors (10)
3. Led Zeppelin (10)
5. Elvis Presley (8)
6. Grateful Dead (4)
7. Jimi Hendrix (3)
8. Bruce Springsteen (2)
- Eric Clapton (2)
- Fishbone (2)
- Pink Floyd (2)
- Simon and Garfunkel (2)
- The Who (2)



Acts receiving one vote: ac/dc, Aerosmith, Alarm, Bee Gees, Bon jovi, Chicago, Concrete Blonde, Creedence Clearwater Revival, Genesis, Jefferson Airplane, Milli Vanilli, Phlegm, Police, Queen, Rush, U2, Village People; Chuck Berry, Chubby Checker, Neil Diamond, Buddy Holly, Billy Joel, John Melloncamp, Steve Miller, Van Morrison, Ted Nugent, and Tom Petty.

Biology Number One Choice Of Entering W&M Students Second Consecutive Year

At last May's commencement, 1,171 Arts and Sciences baccalaureate degrees were conferred. Biology graduated 104 students. Only English (140) and Government (130) had more. There were 149 School of Business graduates. Biology also graduated 4 Master of Arts students.

For the second consecutive year, more entering William and Mary undergraduate students have indicated Biology as their most likely major. Of the approximately 1,250 first-year students, more than 220 said they were most interested in Biology. English was a distant second with 150.

Chemists and Physicists: Age Of The Biologists

Around the country for the past several years, more and more undergraduates are choosing science majors, especially Biology. This is not surprising if we are, as futurist John Naisbitt claims in his book *Megatrends 200*, entering the Age of Biology. Several recent studies and articles have pointed out the shifting balance within science. Here are a few of them:

Megatrends 200: Ten New Directions For The 1990's (John Naisbitt and Patricia Aburdene): In Chapter 8, "The Age of Biology," Naisbitt and Aburdene contend, "We are shifting from the models and metaphors of physics to the models and metaphors of biology to help us understand today's dilemmas and opportunities."

The authors suggest that in the information era, the vocabulary of biology has assumed center stage. They even suggest that, "Biology rather than electronics may hold the key to a new generation of 'thinking computers.'"

The Chronicle of Higher Education: A story by Colleen Cordes last year in the *Chronicle* entitled "Dominance of Science Policy by Physicists Seen Waning With End of Cold War and Rise of Biological Research," argues that a "new balance of power in the sciences" is being established. "Some scientists," she says, "say that biological scientists are likely to claim an increasing number of the top scientific posts in government."

Quoting Rita R. Colwell, president of the Maryland Biotechnology Institute, reporter Cordes writes that "many of the most talented researchers went into physics in the 1930's and 1940's.... In the 1970's and 1980's...many of the 'best and brightest' chose the biological sciences instead, inspired by the scientific revolution of molecular biology."

Even D. Allan Bromley, a physicist and President Bush's chief advisor for science and technology, says that "in terms of the excitement and the wealth of new products and methods rapidly emerging from laboratories and industry, I'm afraid that we physicists have to admit that it's becoming the age of the biologists."

Money magazine's February, 1992 issue continues the Biology blitz. In it's "Jobs Ranking" of 100 occupations, **Biologist was number one**. The rankings were based on annual earnings, job security, prestige, job satisfaction, 1992 outlook for employment, and past 14-year growth in jobs. Other Biology-related occupations that ranked high were Physician (3rd), Pharmacist (7th), Veterinarian (10th), High School Teacher (15th), Dentist (18th), Lab Technician (42nd), and Physical Therapist (50th).

Science, the prestigious weekly journal of the American Association for the Advancement of Science, in its September 18, 1992 issue, reported on a poll of 2500 randomly selected members (1368 responded) concerning careers in science. The magazine found that even chemists, social/behavioral scientists, and physicists believe Genetics is the number one hot field today. Molecular and cell biology, as well as environmental sciences, are not far behind.

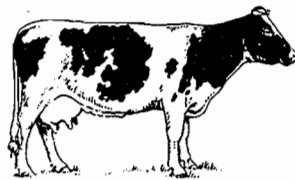
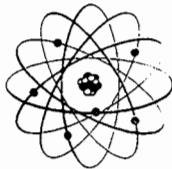
Biological fields are now seen as the "hot pursuits" in science.

"Asked what scientific specialty holds the greatest promise over the next decade, respondents favored certain fields --and not always their own! The fields listed below are ranked based on most mentions of specialties by respondents in that discipline." (p. 1735, *Science*, Volume 257)

Biologists	Medical Scientists	Physicists/Astronomers	Social/Behavioral Scientists	Chemists	Engineers	Earth Scientists	Math/Computer Scientists
1. Genetics 2. Molecular & cell biology 3. Biotechnology 4. Medical research & immunology 5. Environmental sciences	1. Molecular & cell biology 2. Genetics 3. Medical research & immunology 4. Neuroscience	1. Genetics 2. Physics 3. Molecular & cell biology 4. Astronomy * Materials science	1. Genetics 2. Molecular & cell biology 3. Social/behavioral science & psychology 4. Computers, information sciences & artificial intelligence * Environmental sciences * Neuroscience	1. Genetics 1. Molecular & cell biology 2. Biotechnology * Environmental sciences * Materials science	1. Computers, information sciences & artificial intelligence 2. Genetics 3. Materials science 4. Molecular & cell biology 5. Biotechnology * Environmental sciences	1. Environmental sciences 2. Genetics 3. Hydrogeology	1. Computers, information sciences & artificial intelligence 2. Biotechnology

* Asterisk indicates a tie.

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Chris Beck's Ghana Journal

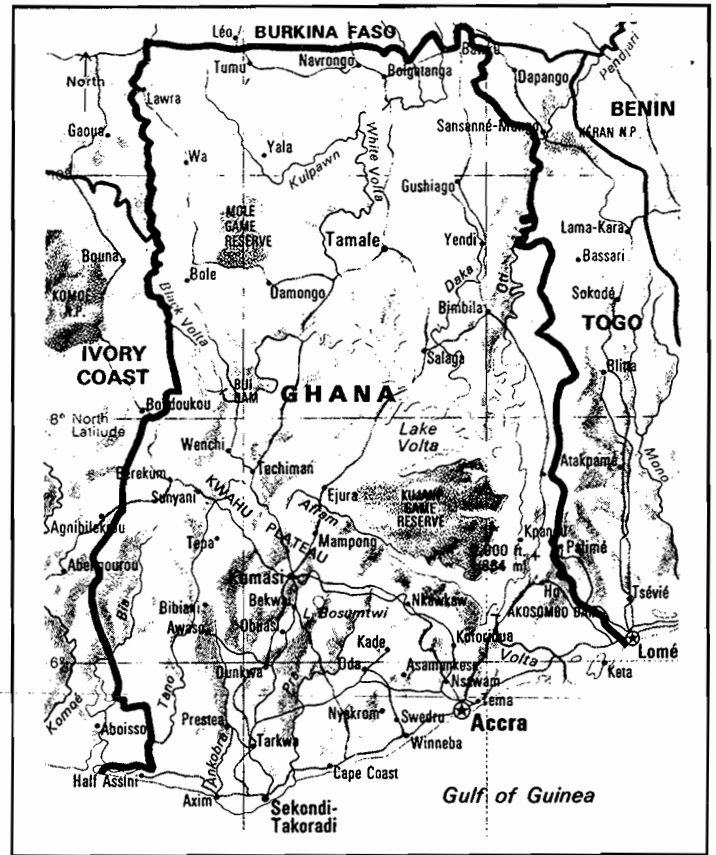
The following are excerpts from the journal I kept during my seven and one-half week trip to Ghana this summer. The majority of the expense for this trip were paid for by a Renick Scholarship from the College of William and Mary. Other funding came from Williamsburg Presbyterian Church, Valley Forge Presbyterian Church, the Presbytery of Philadelphia, and the Synod of the Trinity. While I was in Ghana I traveled under the auspices of the Presbyterian Church of Ghana and Habitat for Humanity International.

6/30/92 In Accra, the capital. The poverty of the people is everywhere, but in a way you don't notice it. The streets are filled with people selling food -- bananas, oranges, plantains, groundnuts, corn, bread, fish, and chickens. The people have housing, although in some cases only wooden shacks with metal roofs. The sanitation is exceedingly poor. The sewers run open in the streets. Yet, the people seem happy. They never appear to be ashamed of what they have. They have taken what they have been given in life and accepted it. In a sense, this is uplifting. Life is hard, but not oppressive.

7/5/92 An issue that I've been meaning to write about but haven't -- population. When you walk around Accra, the streets are crowded. There are people everywhere. However, whether there are truly more people than in any other city in the developing or developed worlds, it is difficult to judge. One thing can be said though and that is that the population is growing and is going to continue to grow. Why so? The one thing that you do notice walking the streets is that there are few older people and lots of children. A good percentage of women have a baby secured to their backs with a piece of cloth or toddlers playing around their feet. It is estimated that in sub-Saharan Africa over one-half of the population is under the age of eighteen. This means more and more people are reaching their reproductive maturity every year.

Although there are family planning clinics, family sizes are still beyond replacement. Most families have at least three or more children. I have met families with as many as ten children. At present, the strain is not on food resources, at least here in the South. The strain is on economic resources, housing, transportation, and, most importantly, education.

7/10/92 At Donkorkrom Presbyterian Hospital, a rural hospital in the Afram Plains. I spent the morning in the lab. The lab technician explained some of the basic tests they do for AIDS, sickle cell, anemia (Hb), schisto, oncho, *Giardia*, and malaria. All of them are quite simple, because they don't have electricity during the day. For the majority it's merely the addition of some chemicals or a stain to a sample and comparison to a standard or examination under the microscope.



I got to see a positive test for malaria, for *Giardia*, and for oncho. It was like a parasitologists dream. A good majority of the tests were for anemia associated with malaria in children. They see upwards of 80 cases of malaria here a week.

They do a good job with the equipment they have. They save everything here. All the slides and cover slips are washed off (in buckets of course, no running water) and reused. Even urine sample bottles are reused after cleaning. All their lab tests cost 150 cedis (about 30 cents), which most everyone here can afford. Maybe the health care system in the U.S. could learn something from the way things are done over here.

7/26/92 In Abokobi, a small village 15 km outside Accra. I continued through town toward the hills. The hills are totally denuded -- deforestation and the huge bush fires in 1983. Fields are carved crudely out of the landscape. Mostly maize and cassava are planted. In places the grasses are high and impenetrable along the dirt track. One often hears birds, but rarely sees them, other than the large white-breasted crows and a bird that brings one back to the age of *Archaeopteryx*. Fascinating insects and butterflies add color to the green and brown landscape. Being alone through there is peaceful, but eerily alone. I walked to the base of the hills where the Accra Plains end and then returned. The sights I have seen I can bring back
(continued next page)



Ghana Journal (continued)

on film; the sounds which make the experience complete must remain.

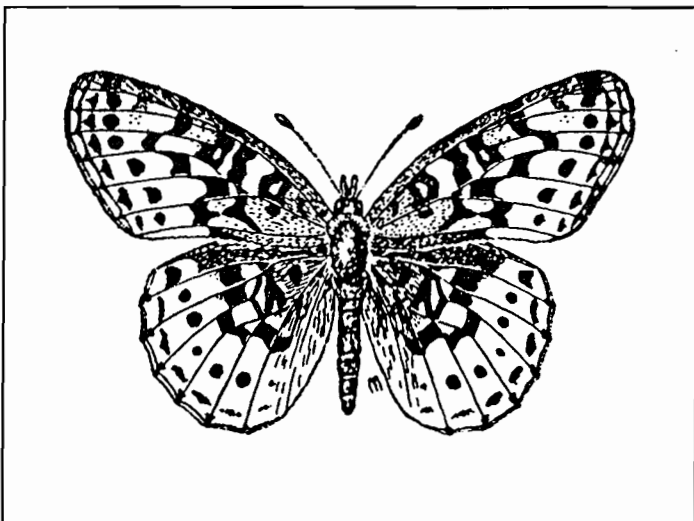
8/7/92 In Assin Fosu, where I worked building houses with Habitat for Humanity International. It was beautiful. Walking all alone, you feel totally isolated in nature. The grasses and trees reach above you on the side of the path. You are totally surrounded by vegetation. Everywhere you look, it's green. You can pick out different shapes and sizes, but there is just an overwhelming greenness in the forest. Every once in awhile, there is a burst of orange in some flowers, or the purple, white, and black of a passing butterfly. Everywhere you hear the singing of birds. You can pick out individual songs if you just stand quietly for a moment. Generally, I just got a glimpse of the bird as it was flushed from its cover in a burst of beating wings. After awhile, I just settled for listening to nature's composition, rather than looking to see the musicians.

When I came through the bush to the edge of the forest, I heard a rainfall of nuts from the trees above. I studied the treetops intently with my binoculars, but did not find the animal I expected to find up there feeding on the nuts and dropping the shells. After a closer examination, it appears that the interconnected shells that contain three nuts dry out until they explode outward dropping the three nuts and the shells.

As I walked through the forest I could hear people from a local village. It seemed to be hidden away in the bush. A small brown sparrow sat atop a dead tree and scolded me as if I had invaded its personal cassava patch. As I came to the stream on the way back, there was a mother, her son and daughter getting water from the stream. The little girl peered at me in horror, but her brother picked up his bucket of water, placed it on his head, and walked with me back to the village.

My experience in Ghana was one in which I learned much. It was the type of learning that you can't attach a price or a grade to. It was definitely learning through living. Ghana may not be a rich country materially, or even biologically, but it is holding its own.

If you have the chance to travel to Africa, take it. If you are in West Africa, go to Ghana. You will never meet people who are more friendly and willing to make you feel welcome.



West Indies Adventure and Credit, Too

by Michelle F. Pratt

It all started in Puerto Rico, where we stayed at the University center of the San Juan campus of the University of Puerto Rico and shared all our meals with scavenger black birds that flew in through the hurricane-tolerant walls. From there it was on to the west coast where we spent another week on the 7th floor of a university hotel at the Mayaguez campus of UPR before flying to Barbados and staying in campus housing of the University of the West Indies with athletes from Trinidad and Jamaica. No, this was no sightseeing expedition or narration of lifestyles of the young and privileged. It was, in fact, the William and Mary 1992 Caribbean study abroad program.

From July 4 to August 2, 13 students and Drs. Martin Mathes and Jon Kerner from the Biology and Sociology departments, respectively, studied Social Problems, Global Environmental Issues, and Applied Tropical Botany. We discussed poverty, racism, sexism, etc. We had a speaker on women's issues and student presentations on our most pressing environmental issues. We studied plants and visited the rain forest in El Yunque, Puerto Rico. We had a speaker on sugar cane production and discussed staple crops and plant development and genetic engineering.

Outside of formal class, however, we also went on educationally "unique" field trips. These included the forts of Old San Juan and the Bacardi rum distillery, the Tibes Indian ceremonial park in Ponce, a coffee plantation, the Mayaguez zoo, phosphorescent bay, and mangrove islands off the coast of Puerto Rico --one of which housed the UPR at Mayaguez marine science station and the manatee they were studying. In Barbados, these field trips included visiting the Andromeda Gardens and the Banks Brewery. There were trips designed expressly for fun as well, despite what we may have learned along the way. These included a trip to a volcano and sulfur springs during a weekend trip to St. Lucia, our group sailing trip on a catamaran, the dance clubs in Bridgetown, Barbados, and, of course, the beach.

Together with my fellow William and Mary students I learned more than just plant names, the economic importance of food crops, and how the human race is bringing itself to its own environmental destruction. I learned more than just rudimentary Spanish, currency exchange rates, and how much I like Bajan music. I learned that as the next generation of leaders in this country it is important that we ourselves not only understand how all of these things are interrelated and important, but take it upon ourselves to make sure everyone else understands, and hope that through this understanding everyone will be willing to work together to save the diversity of our world.

Professor Brooks Goes Down Under.....Again

by Callan Bentley

It is well known in the Biology Department that Professor Jack Brooks is a superb photographer. He prepares wondrous slideshows and has taught several extracurricular courses to acquaint students with the art of taking a good photograph. Examples of his handiwork hang in his office. What is not so well known is the incident that started Brooks on the hobby in which he has become so proficient.

Once upon a time (1987), in the middle of a flat orange land called the Australian Outback, Brooks climbed a rock. The white men called this rock Ayer's Rock, but the aborigines called it Uluru. Whatever its name, it has earned the honor of being classified as the largest rock on the planet.

It is a huge monolithic thing, bright orange, and rising up from the surrounding arid plain to provide the visitor with an amazing geologic anomaly. It takes one about five hours to simply walk around Ayer's Rock, and about two hours to climb it. Its sheer size is almost unimaginable, and it distorts everything around it.

It is no wonder that Brooks would make the week-long trip through the surrounding featureless desert to get a glimpse of this incredible rock. The climb up is very steep and rather harrowing for those less fit than the average Olympian, but what really takes one's breath away is the view. While climbing, Brooks' camera, an old and well-used Pentax Spotmatic fell out of his backpack and hit the rock, damaging it irreparably.

It was in professor Brooks' quest to replace his camera that he bought an entirely new photographic system. Soon, he began to realize what taking photographs could actually mean. He was immediately hooked. "[It] literally launched me into photography," he said.

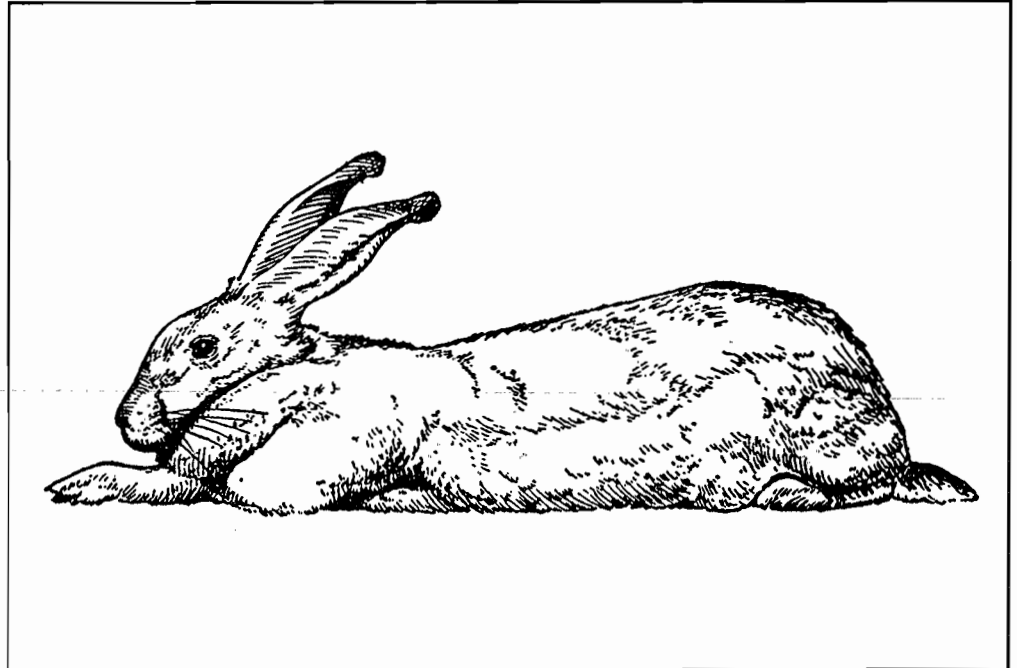
The incident did more than to just give Brooks a new hobby, however. It also gave him a second home, as he has gone back to visit Australia many times since. He has become a specialist on the most isolated of continents.

In 1987, Brooks was teaching a summer school course entitled the "Natural History of Australia" to students of William and Mary. It was a successful program, and he continued teaching the course in 1988. Due to high costs, the next trip was not a College-sponsored trip, and Brooks was thus able to eliminate high tuition payments.

In the summers of 1990 and 1992, he conducted camping tours of Australia, each having a duration of approximately six weeks.

Australia attracts Brooks because, from a biological standpoint, "Australia is noted for its isolation," as well as the fact that "it's reptile heaven, and I'm an ecologist interested in lizards."

Most importantly, though, Brooks emphasizes the southern night sky. "If you haven't seen the stars at night in the desert," he said, "you haven't seen stars." Enthusiastically talking about seeing the edge of the Milky Way, he added, "that's the greatest."



While the country is undoubtedly attractive to any tourist, it has been more than just fun and games for Brooks. In addition to his duties as a trip leader, Brooks has worked at The Flinders University of South Australia in Adelaide. Specifically, he did a project that determined the potential of an omnivorous lizard to be a seed disperser. The project's results were positive, and Brooks is pleased that it worked out so well.

More recently, though, the camping tour has kept Brooks occupied. His itinerary while "down under" offers a comprehensive sampling of Australia. Upon arrival in Sydney, Brooks and his companions pile into his Toyota Land Cruiser which stays with friends of Brooks during the school year, and set off to the north. They drive up the eastern coast, through sugarcane fields and tropical rainforests, eventually reaching Cape Tribulation. The group takes a day trip out to the Great Barrier Reef, where they may snorkle or scuba dive, according to individual preference. Then they visit Kakadu World heritage Park, and head west towards the town of Darwin, located approximately halfway across the continent. The Toyota turns southward at this point, heading on the only paved road in this part of the country, through various national parks and deserts. They stop in the Ayer's Rock area, and spend several days there.

In South Australia, they buy opals from the mines of Coober Pedy and head through the Barossa Valley into Adelaide. From Adelaide, the group travels to Melbourne, where they encountered the Queen Victoria Market, the largest market in all Australia. Dr. Brooks emphasizes that anything and everything is for sale at the Queen Victoria Market. From Melbourne, it's a relatively short drive to Wilson's Promontory National Park and nearby Canberra. The trip comes full (*continued next page*)

circle when they drive back into Sydney and board the plane for the fifteen hour flight back to the United States.

The cost of the trip for students is \$2000 at this point, plus the round trip coach class airfare. Generally, the students who travel with Brooks are Biology majors, while there have been exceptions. Brooks stresses that of all the students he has ever taken, only one offered any sort of trouble, and in general, "everyone has been good."

Brooks' group cooks their own food and, as this has resulted in a few culinary disasters, eats out now and then.

Over the course of his many trips, Brooks has become something of an expert on Australia, its people, wildlife, and culture. Of the people, Brooks says, "I've never met an unfriendly Australian." Amazingly enough, he adds, "They still like Yanks."

Brooks claims as his two favorite areas the outback desert of the Northern Territory and the tropical climate of the Townsville region. His favorite city is Melbourne, as it is so relaxed. Adelaide, too, he says, is a nice town. "It's very laid back," he said.

Though he enjoys Australia so much, and plans to take students on his camping tour again, Brooks has no plans to settle permanently there. Claiming it might be possible if he were younger, Brooks cites high Australian taxes and unpredictable labor strikes as rationale not to move.

At the time of this writing, one space remains open on Brooks' upcoming trip.

An Explosive Issue In Millington Hall?

by Katie Eminger

On Monday, August 31, Millington Hall was evacuated for the second time in one week due to a possibly explosive chemical called picric acid. Stored items were being moved due to incoming and outgoing faculty members when some old bottles of the acid were discovered. Nearly two pounds were removed from the building.

Picric acid is commonly used by cell biologists as one of the primary ingredients in a fixative to preserve tissues for microscopic examination. When the acid dries out (it is usually kept under water), it crystallizes. In its crystallized form it can be a contact explosive, that is it has the potential to explode if it is dropped or shaken hard.

"I have never heard of a picric acid explosion," said Dr. Larry Wiseman, Chair of the Biology Department. "Every biology building in the entire world probably has picric acid. Although I think the College over-reacted to the presence of the acid, it is good to have the old, dried out material removed. The Department Safety and Building Committee has outlined steps to more efficiently store toxic and potentially hazardous chemicals. The University is now committed to buying explosion-proof cabinets for Millington. So, something good came out of the experience."

Students Travel To National Zoo To Hear Paul Ehrlich

On September 11, Chris Beck and Sarah Gottlieb, undergraduate Biology concentrators, along with Amanda Allen '92, new graduate student in the department, travelled to the National Zoo to hear Dr. Paul Ehrlich speak at the close of a conference on migratory birds, sponsored by the Smithsonian's Migratory Bird Center. Much of the conference was arranged by Jamie Doyle '92, who works at the center.

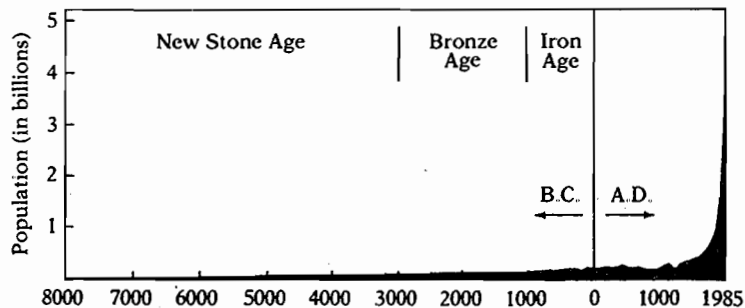


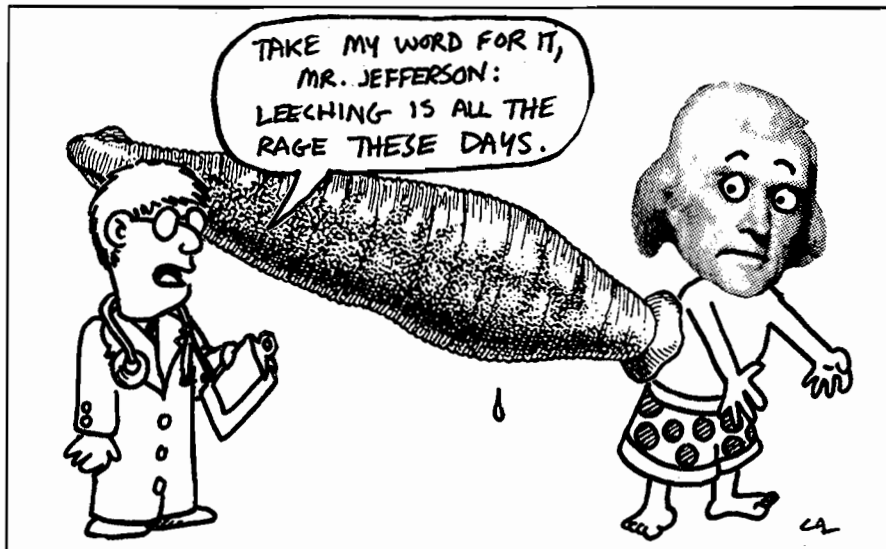
Ehrlich did not concentrate solely on the decline in numbers of migratory birds, but also commented on such topics as population pressures (no kidding!), economics, education, and politics. His comments on population concentrated on the impact that a given population has on its environment. He stressed that although population problems are often thought of as exclusive to the developing world the impact of the population of the developed world was much higher. This follows from the fact that the impact of a population is not solely related to its size, but also to the impact of its technology and the consumption of resources per capita. It is these last two factors that cause the impact of the

developed world to be so high. He suggested that in order to solve the problems caused by population pressures the developing world will have to decrease its population growth rate, while at the same time the developed world will have to decrease its consumption and improve its technologies.

Ehrlich brought in the economic concept of externalities as a possible solution to bringing about better technologies and reducing consumption. For example, if the amount of environmental degradation caused by the drilling, refining, and burning of oil were included in the price of oil, then it would be as cheap or even cheaper to use alternative energy sources. However, such changes will not take place, he argued, until it is recognized that the environment is a "non-renewable resource."

According to Ehrlich, the key to many of the changes that need to take place lies in education. He lamented the poor standards of our public education system. Much of his criticism focused on the inability of the Bush administration to recognize and attempt to solve the educational, economic, and environmental problems that the country faces. He urged that as a gift to future generations our short term goal should be to remove Bush from the White House.





18th century physicians must seem sparse. Although there were medical colleges, many doctors received training through apprenticeships or acquired knowledge through trial and error or even out of necessity. While there are thousands of doctors today, colonial times found doctors few and far between. The clergy, who were educated, often found that they were the only ones who could read a book of medicine and diagnose the diseases of country parishioners. Their services often went unrewarded, as many patients felt that the clergy should not be paid extra for acting as doctors. Some apothecaries, too, later became physicians as they learned more about medicine. A few were even hired as hospital physicians and were respected by their more prestigiously trained colleagues.

Medicine in the 18th Century: A Visit to Colonial Williamsburg

by Sally Hunsucker

"Do you see that doctor over there? He's a quack." The woman says this firmly. She is seated on a mat on the damp ground, with animal skins and various plant cuttings --leaves, stems, flowers-- in jars around her. "He says he's had formal training. I heard that he had three months apprenticeship under another 'doctor'. For that he'll charge you ten times more for services, such as amputation."

When asked how much she charges, she says she wants something good --such as skins or a bucket of turnips. The price varies depending on how much you can afford and how much she needs at the time. But don't bring cash --that is here today, gone tomorrow. She wants something of value.

Methods of amputation? It doesn't take much. She holds up a saw and a kitchen knife and smiles. Anesthesia? "Oh, you'll probably pass out halfway through, and there would be four people to hold you down until then." To seal off the wound, she will heat a pair of metal tongs and burn the area.

She explains other less painful remedies. The leaves of a small, common weed can be used to treat sore feet. You just put them in your shoes and walk around on them all day. Corns and bunions, however, will have to be treated by the doctor. That's real surgery!

Farther along the row of tents that line Colonial Williamsburg's re-creation of 18th century market days, the doctor and his apprentice explain a cure for congestion that seems to be based on scientific principles. A small glass jar is filled with paper, which is then set on fire. The rim of the jar is pressed against the chest of the patient, sealing off the oxygen and immediately putting out the fire. As the air cools, it creates a vacuum, which pulls on the skin and tears some layers below the surface. Blood rushes in to heal this area, which, because of its proximity to the lungs, also helps heal the congestion --or so the doctor says.

Such was medicine in colonial times --a confusing blend of "real" doctors and part-time practitioners out for some spare change. It was a time when "night air," not mosquitos, brought malaria and other diseases. To modern M.D.'s, the training of

Quacks existed in colonial times. Claiming a knowledge of diseases they did not understand, many "doctors" lied about their training and sold magic cure-alls. Because there were no societies to successfully govern such practices, doctors had to rely mainly on their reputations.

Medicine was not as prestigious a practice in the 18th century as it is today. Doctors did not specialize; they treated everything that came their way. Most doctors had planned to pursue other fields, such as law or the ministry, which would have guaranteed them a high rank in colonial society. While these disciplines were approached from the tedious study of books, medicine was a hands-on discipline. Although it was recognized by many physicians that a good doctor ought to read medical journals, perform autopsies on his patients, and give discounts to his poorer clients, these ideals were rarely found in practice. Physicians outside large towns often had to take on extra jobs because of their low income. Charity for poorer patients was an exception to the rule.

Colonial Williamsburg offers unique opportunities to view 18th century medicine. The Public Hospital, located at the intersection of Francis Street and Henry Street, was the first asylum for the mentally ill in America. Displays give the visitor insight into the changes that have taken place in the treatment of the patients, from an 18th century prison-like atmosphere to the more comfortable rooms of the 19th century.

The Pasteur-Galt Apothecary (on DOG Street, near the Capital) is a reconstruction of an 18th century Apothecary shop which stood on the same site. Antique jars and bottles hold medicine, about one third of which are still used today. Tools of the apothecary are also displayed, from knives to leeches to a nifty little device for pulling out teeth. The McKenzie Apothecary on Palace Street sells 18th century items, including medicinal herbs. Admission to all three is free with a W&M ID.

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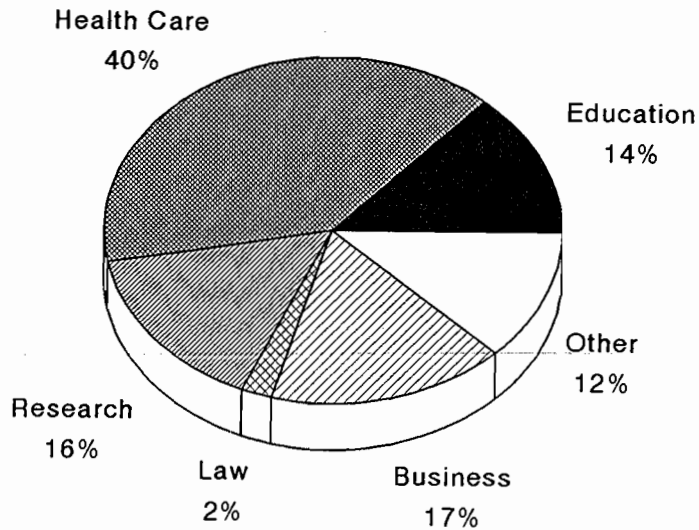
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Biology Alumni Employment From Alumni Assessment Surveys



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