



WILLAMETTE UNIVERSITY
BIOLOGY

Celebrating 100 years: 1908-2008







Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world. Science is the highest personification of the nation because that nation will remain the first which carries the furthest the works of thought and intelligence.

— Louis Pasteur (1822–1892), b. Dôle, France



Dear Friends,

I write on behalf of the Willamette community to recognize the centennial year of the Willamette University Department of Biology. The last two and half decades represent a bewildering and dizzying time of scientific discovery. This has been especially true in biology.

New biologic phrases and biologic sub-disciplines entered our academies. Relatively new genomics research will eventually enable us to understand how cells work in all of their diversity and complexity, as well as allow us to ask the philosophical — and for some — the religious question of what knowing our own blueprint can tell us about the evolutionary history of humankind. The new biology has and will continue to challenge our notions of who we are and what we hope to be. Agricultural genetics will permit us to expand crop yields, grow certain products year-round and greatly reduce the perishability of certain foods. By comparing the sequence of genomes of different organisms we will be able to identify the molecular defects of human diseases and find new cures.

Scientists tell us that the relatively new field of computational biology will give us new ways of approaching problems that range from how proteins assemble to form the intricate building blocks of our bodies, to how memories take shape in our brains (from *Working Together in the Biology Revolution*, by Thomas Cech in *The Chronicle of Higher Education*, February 16, 2001). Yet, however powerful these new discoveries may be, Willamette's science community has sought to ensure that 21st century science has a human form and human face. It — like all other academic disciplines — must serve human society and human needs.

When Morton Peck started the biology department in 1908, he could never have imagined that biology, over the course of 100 years, would consistently be one of the most popular majors for Willamette students. He would be very curious about Willamette biology alumni who today work in fields unknown in 1908, including cytogenetics, pediatric oncology and chronic autoimmune disease. While Professor Peck and his colleagues would be impressed by the many developments in the biology classroom, they would not be surprised by the caliber of scholarly inquiry, the faculty/student research collaboration or the overall commitment of the academic community. Through the decades, the basics of exceptional teaching remain the same.

From our capacity to study approximately 23,000 genes in human DNA to our ability to view the stars in a distant galaxy, we have science to thank for many of the things that improve our lives and engage our imagination.

To the biology faculty and emeritus faculty, biology alumni and current biology students, we offer our congratulations on this centennial anniversary and thank you sincerely for your contributions to the world of science and to this academic community.

Warm regards,

A handwritten signature in black ink that reads "M Lee Pelton".

M. Lee Pelton
President

MORTON E. PECK

Willamette Biologist *Creates Habitat for Growth*

In 1905, Morton Eaton Peck took his wife on one wild honeymoon. The man who would later establish Willamette's Biology Department had married Jessie Grant, a botany student from "one of the substantial families of north Hardin, Iowa." They must have caused a stir, for after they waded through the wedding shower of rice and old shoes, they caught a ship for Belize. They didn't return for two years.

As money ran low in Central America and Jessie came down with malaria, Peck fretted that he had described the trip to her "in I fear too brilliant colors." After all, she had never been away from home. But she recovered and they managed to survive, and ended up having "glorious times" collecting birds, mammals and plants. They added 50 to 60 new species to the flora and fauna of what is now known as British Honduras. Both grew increasingly fond of their wilderness excursions and only came home to avoid becoming "out of step with civilization."

Peck had caught his infectious enthusiasm for the natural world from his father, who carried his son on his back into the woods behind their log house in Iowa. There, they lost track of time and became "acquainted with the wild life."

A year after returning from Belize, Peck — who had a master's degree from Cornell College — accepted an offer at Willamette, to become the sole biology professor in the College of Liberal Arts. His only colleague in the sciences was Florian von Eschen, a professor of chemistry and physics.

Peck didn't take the academic post for the money. Faculty members in those days "lived on a pittance," had almost non-existent insurance and pensions, and were elected on an annual basis with no promise of tenure. They chose to stay out of dedication to their profession and their students.

Peck, in particular, was well liked by students, who called him "Prof." His gentle, modest character and quick sense of humor, along with his "broad perfect knowledge of his work," made



him a favorite. He probably took students along the banks of the Mill Stream to find native wildflowers and grasses, and he and Jessie hosted students in their home, along with a steady stream of visiting botanists. Peck was “more conversant in small groups,” but Jessie regaled them with some of the “tallest stories” around, including plant-collecting expeditions along the “old Indian trail over Cape Lookout on the Oregon coast.”

At Willamette, Peck quickly settled into a non-routine routine. He painted watercolor illustrations of fungi for classroom use, and he and Jessie spent weekends and summers collecting plant specimens in every region of the state, traveling on foot, on horseback and by car. All together, they collected more than 21,000 Northwest plants, and the Peck Herbarium of Willamette University — now housed at Oregon State University — once contained the most nearly complete collection of Oregon plants. Many Oregon plants are named after him.

As Peck's knowledge grew, so did his stature. He studied and networked with scientists around the world, and his flora and fauna specimens found their way into major collections, including those at Harvard University, the New York Botanical Gardens, the United States National Herbarium and the Carnegie Museum of Natural History in Pittsburgh. He published profusely and was named Outstanding Scientist of the State of Oregon. His major work, *A Manual of the Higher Plants of Oregon*, went on sale for \$5 a copy in 1941. The book, which covered more than 3,000 Oregon ferns and flowering plants, was geared for lay audiences and hailed as one of the best — if not the best — books of flora on the Pacific coast.

Willamette President Carl Doney found Peck endearing. “Morton E. Peck can be excited when he runs across a rare flower or a particularly hairy bug,” Doney said. “He cuddles down to the flower, mumbling Latin jargon, or smooths the bug's back and asks whether it has used Pear's soap.” But the president didn't underestimate

Peck's professional skills, and “as for common sense and straightfire good judgment, he is a mingling of Lincoln and Coolidge.”

Peck's scholarly pursuits didn't diminish a rich personal life. He figured prominently in the writers section of the Salem Arts League and published a volume of poetry. And he was an early conservationist. As he explored Oregon's old-growth wilderness, he developed a fervent interest in protecting biodiversity within “some kind of primitive area.”

Willamette students lost one of their favorite professors in 1941 when Peck retired. “For many years Peck was the Department of Biology at Willamette,” says current Biology Professor Scott Hawke. The *Bulletin of the Torrey Botanical Club* wrote, “Such teachers of the 'old school' can never quite be replaced,” and the *Collegian* proclaimed, “Professor Peck is beloved as a friend of the students, admired as a professor, and respected as a man.”

Peck's health began to fail in his later years, but he dedicated his remaining energy to his herbarium. In 1959, at age 88, he passed away. One student reminisced at his funeral service, “To me, he has always been one of the Immortals.” His publications and his collections gave forward momentum to the biological sciences, but perhaps his most enduring legacy was the passion and knowledge he shared with hundreds of students in Willamette's early biology program.



Peck built this botanical press for use in the field. He and his wife, Jessie, collected plant specimens for 33 years in Oregon and the Pacific Northwest. Peck may have used this turn-of-the-century microscope, now housed in the biology department.

A Legacy of Teaching and Scholarship

1908–2008: Biology Faculty & Years of Service



Morton Peck, 1908–1941

Morton Peck established the biology program at Willamette in 1908. He and his wife, Jessie, collected more than 21,000 Northwest plants, then the most complete collection in existence, and established the Peck Herbarium. Peck's flora and fauna specimens found their way into major collections around the world, and he was named Outstanding Scientist of the State of Oregon. His major work, *A Manual of the Higher Plants of Oregon*, became a classic. It covered more than 3,000 Oregon plants.



Cecil Monk, 1927–1968

Zoologist Cecil Monk taught at Willamette for 41 years, becoming department chair in 1942 and serving until his retirement in 1968. He pursued marine research at Friday Harbor Laboratories on San Juan Island, and was instrumental in founding the Oregon Academy of Science. In 1947, Monk was asked by the U.S. Department of State and the Venezuelan government to set up a biology department at the University of Venezuela in Caracas.



Martha Springer, 1947–1981

Martha Springer entered Stanford University as a teen, given the green light because of her intelligence. The Willamette botanist combined intellect with caring; even though she taught more than 100 students each semester, every student was invited to her home for book reports and dessert. Springer was also not intimidated at the idea of taking 120 students to the coast. Susan Kephart established the Martha Springer Botanical Garden, which now provides an outdoor classroom, in Springer's memory.



Donald Breakey, 1954–1992

Donald Breakey received his biology degree from Willamette in 1950 before coming back as a faculty member. His teaching specialties were general ecology and field zoology. He was an expert on small mammals and once had

a colony of nearly 1,200 mice on campus for a coat-color genetic study. Breakey worked with geology Professor Harry Rorman in the early '70s to develop the University's first post-session courses. He was instrumental in developing the Malheur Field Station in southeast Oregon.



Libby Yocom, 1961–1993

Laboratory Educator Libby Yocom focused her master's degree research on high altitude experiments, with work done at the Lovelace Clinic in Albuquerque, N.M. She came to Willamette in 1955 with her husband "Buzz," and began to teach part time in 1961. She taught biology labs and later lectured in biology and nutrition, eventually becoming a full-time instructor. She and Buzz promoted international friendships, leading student trips to Asia and alumni trips to Europe.



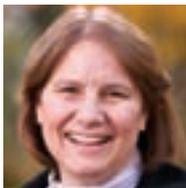
Grant Thorsett, 1967–

Grant Thorsett teaches a variety of genetics courses, including human heredity, gene structure and function, and molecular genetics. His research background is in the molecular genetics of bacteria and bacterial viruses. He and Sharon Rose collaborated with Linfield College faculty to analyze the soil microbiota of the Linfield oak grove. Thorsett taught the first biochemistry and molecular genetics courses at Willamette. He is a longtime proponent of computers in undergraduate education, and he developed genetic simulation programs.



Scott Hawke, 1971–2008

Animal physiologist Scott Hawke just completed a six-year term as director of Willamette's Science Collaborative Research Program (SCRCP). He is currently on sabbatical to develop an understanding of fluorescence microscopy — conventional and confocal — and this spring he will direct Willamette's study abroad program in Perth, Australia. As a physiologist, Hawke first recorded data with kymographs and finished with computerized electronics. He has been a primary force in the development of the concept and planning for the centennial celebration.



Susan Kephart, 1981–

Susan Kephart's reintroduction of a rare coastal plant at Cascade Head, a United Nations Biosphere reserve, made the cover of *American Journal of Botany* last year. As a result, the systematist's research on native plant restoration, hybridization and pollination mutualisms is generating international inquiries. Closer to home, Kephart enjoys linking students, citizens and Earthwatch volunteers from around the world in returning camas lilies — once a food source for Native Americans — to a restored wetland near the Willamette campus.



Sharon Rose, 1988–

Microbiologist Sharon Rose's areas of expertise include mycology, plant microbe relationships, and the role of women in natural science history. Rose has researched women naturalists of the 1800s and early 1900s, and she curated a Hallie Ford Museum of Art exhibition featuring botanical illustrations by scientist Helen Margaret Gilkey. Rose also directs the Webber Science Outreach Program, which provides scholarships to women science majors and creates an opportunity for them to mentor elementary school girls in the sciences.



John Koprowski, 1992–2000

John Koprowski and his students kept an eye on an animal found everywhere on the Willamette campus: squirrels. As part of his specialty in behavioral ecology, Koprowski examined the eating and social habits of the Eastern gray squirrel, first introduced to Oregon in 1919 by Governor Ben Olcott. Koprowski also traveled with students to the Chiricahua National Monument in Arizona to study the Chiricahua fox squirrel. He now teaches at the University of Arizona.



Nan Perigo, 1993–2000

Nan Perigo changed from being a PhD student in genetics to a master's student in science education when she realized how much she enjoyed teaching. At Willamette, she coordinated and taught many biology labs and was asked to chair the Institutional Review Board after she helped establish the Animal Use Committee. She worked on local restoration efforts and managed the Science Education section of the Oregon Academy of Sciences for several years.



Gary Tallman, 1996–

Gary Tallman, the Taul Watanabe Endowed Chair in Science, specializes in plant molecular cell biology. He has led students in an ongoing research project studying guard cells, the kidney-shaped cells on leaves that regulate a plant's carbon dioxide uptake and water loss. He and his students have researched the responses of cells to high temperatures to determine what might happen to the world's crops as a result of global warming. Tallman also directs the Office for Faculty Research and Resources.



Barbara Stebbins-Boaz, 1998–

Barbara Stebbins-Boaz is the current chair of the department. With a teaching specialty in developmental biology, she is interested in the molecular, biochemical and cellular events that surround early development. She collaborates with undergraduates in research on endocrine disruptors, chemicals in the environment that alter important hormone-mediated functions such as reproduction. She and her students have published studies describing how the widely used herbicide 2,4-D blocks egg formation, using South African clawed frogs as a model.



Jennifer Butler, 2000–

Laboratory Educator Jennifer Butler '94 teaches labs in introductory and intermediate-level biology courses. Her areas of interest include plant ecology and conservation/restoration ecology, and she co-authored a column in the *American Biology Teacher*. She also published an article as a Willamette undergraduate on her work at Cascade Head. She has fond memories of student field trips to the coast on the famously slow (25 mph) "Magic Bus" and summer research in Arizona's Chiricahua Mountains and at Cascade Head.



David Craig, 2001–

David Craig, whose specialty is behavioral ecology, has done extensive research on birds, particularly Caspian Terns. He and his students examine the migration, breeding and other living habits of the terns in the Columbia River estuary, home to the largest Caspian Tern colony in the world. Craig has been a board member of the Salem Audubon Society, is widely published in ornithology and wildlife journals, and regularly gives public presentations about his work with seabirds, jays and squirrels.

A professor of Evolutionary Ecology will be hired in 2007.

CECIL R. MONK

'Mr. Fix-It'

Builds a Department



In 1927, when Cecil Monk stepped off the Oregon Electric train and walked into the depot across from the Elsinore Theatre, he was approached by Willamette fraternity members who tried to rush him, thinking he was a student.

Willamette only admitted students of "good moral character," and yet the students, once they arrived, were not too stiff for a little fun. They taunted those who lost Glee bets with a toss in the Mill Stream, making the stream one of the "best loved, and yet most feared features of the Willamette Campus."

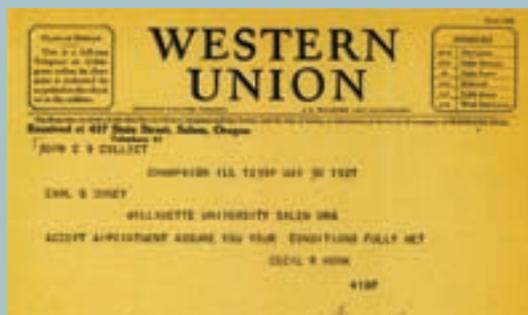
Monk's salary was so meager he sold tickets at the Oregon State Fair to supplement his income, and when he became department chair in 1942, he retained his frugal habits. Instead of beakers and flasks, department researchers used recycled mayonnaise jars. Every purchase of a new microscope had to be carefully approved by the University president, and so Monk improvised, becoming known as "Mr. Fix-It." For many years the department had only one phone. It sat on Monk's desk, and a buzzer system was rigged up; professors were beeped when they received a call.

Monk felt strongly about fostering department camaraderie, and so a database tracked all graduates, giving the biology department some of the best alumni records of any office on campus. When Monk went on a trip, he would visit all alumni in the area, just to keep in touch.

Many alumni remember the gentle, humorous administrator from his holiday newsletter greetings, which began, "To W.U. Biology Grads Everywhere." The cheery newsletter updated alumni on news about the department and each other. As a precursor to *The Scene's* Class Notes, Monk recognized professional and personal alumni accomplishments, even listing those "who have fallen to Cupid's arrows."

This greeting hails from the late 1930s or early 1940s: *We have been wondering how to write a Christmas Greeting for a day on the threshold of the on-rushing space age, but can think of nothing any more appropriate than an Ultra Hi-Fi wish that that well-known space traveler, S. Claus, may be both perceptive and generous to you and your families.*

Monk pursued marine research at Friday Harbor Laboratories on San Juan Island in Washington State. He initiated Willamette's memorable Biology Beach Trip for inter-tidal study and played a key role in the founding of the Oregon Academy of Science. In 1947, the U.S. Department of State and the Venezuelan government asked Monk to set up a biology department at the University of Venezuela in Caracas, where he spent two years.

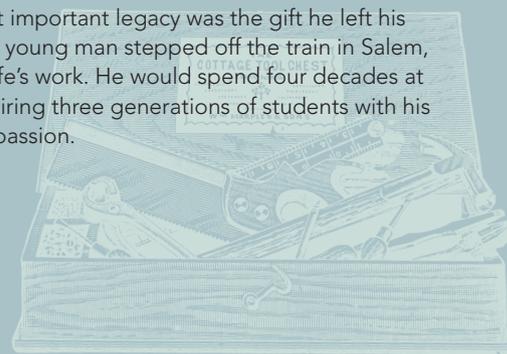


The telegram Cecil Monk sent to President Carl Doney in 1927, after Doney offered him a teaching position, "conditioned upon your being [a] church member and not using tobacco."

Monk retired in 1968 to take up travel, photography and woodworking. By that time, the "on-rushing space age" Monk referred to had arrived; spacecraft had landed on the moon. The Vietnam War was raging, the civil rights movement had been born, and Robert Kennedy was running for president. That year at Willamette, student protests ended compulsory chapel attendance and the football team ranked third in the nation. The following year Willamette would purchase its first computer.

For decades, "Mr. Fix-It" patched together a department with recycled jars and outdated microscopes. Monk sent a steady stream of requests to the president for equipment and money, and his persistence paid off. Equipment was modernized, four additional tenure-track faculty members were hired, and the biology department slowly gained solid footing.

But Monk's most important legacy was the gift he left his students. As the young man stepped off the train in Salem, he took up his life's work. He would spend four decades at Willamette, inspiring three generations of students with his generosity and passion.





Revisiting the Past

How do you capture the personalities, teaching methodologies, scholarship and scientific advances in the 100-year history of the Department of Biology at Willamette University? For the purpose of this publication, we made it up...some of it anyway.

Lacking historic files, photographs, personal letters and the usual evidence of the passage of time, we approached members of the biology faculty and asked them to engage in a bit of time travel — between 1910 and 2006.

The four essays that follow are the fictional creations of current biology faculty members David Craig, Susan Kephart and Gary Tallman. We thank them for indulging us and for helping us make this centennial publication both distinctive and fun.

We hope you enjoy these colorful compositions.



WHEN OREGON WAS YOUNG: *Musings from the Pages of Morton Peck's Journal*

November 10, 1910

My father gave me a pair of Pinyon Jays he had shot near his farm on the outskirts of Salem. Both birds were males taken from a flock of six, which had been in the area for some days. The skins were in good condition, but were somewhat soiled by red clay mud on the belly and feet. These noisy, cerulean kin of the crow have a most amusing society amongst themselves — always gabbing away and always in a group. It is a mystery why they are here though, as they are dearly wed to their love of pine trees and big pine seeds. Salem is a savannah of camas and white oak with the odd Douglas fir — a home made for the much less social Steller's Jay. The retiring nature of Steller's Jays is a riddle for they are essentially the same form as the crested jay, the Blue Jay that I knew as a boy in Iowa. Blue Jays have a brash boldness that Stellers rarely show even though it is a larger, more powerful being.

January 17, 1913

The following reflections are from notes taken on my field trip to Netarts Bay from Dec. 27, 1912, to Jan. 13, 1913, when I and a few of my students were in the field continuously with Mr. S. G. Jewett of the State Fish and Game Commission. Classes officially started on Wednesday (Jan. 15), but four of the students enrolled in this quarter's botany and zoology courses were free to assist on this, my second surveying trip for the State Game Warden, Mr. William Finley. In the next few years we intend to thoroughly survey all of Oregon and build up scientific collections of birds, mammals and plants.

We experienced severe storms especially that of December 28–29, when rain and sleet fell in torrents accompanied by strong winds. On our second night, I feared my students would drown on their sleep cots under a cold wet shroud of heavy canvas! But finally, the clouds parted and the storm revealed a scientific bounty delivered by the hand of divine forces. I know the thrill of dropping a Western Gull with my 18-gauge shotgun or digging out a rare Western Lily with my spade, but O Joy, a joy unique to the scientist, is the harvest of dead and dying who were carried from the sea to the beach for easy collection. In all we salvaged a dozen bird species, and I was especially pleased we were able to make six specimens of Pacific Fulmars (*Fulmarus glacialis glupischa*) that preserved the dark, mottled, and light phases of plumage.

We also found two murrets that had suffered not from the storm, but the mischief wrought by the increasing prevalence of crude oil on the sea. The practice of oil-carrying ship, "tankers," to heave to and clean their tanks before entering a port may be illegal, but commerce is master and the interests of man a subsidiary. Hope upon hope we don't see the proliferation of lawless tankers like that in San Francisco Bay. My colleague William Dawson says they have nearly made a bird-less waste of a region that was once a wonder of the scientific world. How horrible to

consider Oregon losing her murrets, especially after President Roosevelt declared Three Arch Rocks a National Wildlife Refuge, the first west of Mississippi only a few years ago (1907).

It is hard for a young man or women of 18 or 19 years to imagine the pace of change over a decade, but they can appreciate the pursuit of knowledge and are ready for any collecting adventure. I hope to do another survey after school lets out in May to collect coast bird eggs and adults in breeding plumage. If all goes well, I will send a letter to the Cooper Club of Ornithology. They published my last letter about Pinyon Jays in the March 1911 issue of *The Condor*. I find my students are as proud as I am to see the Willamette University name in print. Our humble institution is part of this great age of scientific discovery!

The heavy rains ruined most of our dried salt beef, so we spent most of the last day of 1912 fishing for 'scientific' discoveries on the North Fork of the Nehalem praying for a steelhead dinner on New Year's Eve. The river, torrid with storm water, did not share her fish. Since the rain had stopped though, we were satisfied to eat salmon from the can. I always choose Tenino Brand salmon from the Celilo Falls-Wasco area because they have the Latin binomial *Salmo gairdneri* on their label.

We went into Happy Camp where there is a small store for loggers and the rare summer tourist to restock their larder. The owner, George Phelps, is surely a speculator, but he is sure that big changes are coming. He might be right as in the last two years the old lamp in the Cape Meares Lighthouse was replaced with an incandescent oil vapor lamp and an automobile drove from Newberg to Tillamook. More important for seaside tourists is the railroad line that just opened from Portland to Tillamook. Phelps heard that the dirt track we traversed with our horse-drawn wagons might be replaced by plank road as early as next year.

May 9, 1914

The Class of 1914 presented me with a beautiful cut plate of Hall's Violet (*Viola Hallii Gray*) based on a drawing by my Oregon Agricultural College friend, Dr. Helen Gilkey. I hope to use this cut for the frontice in a book I am writing that will describe all of the higher plants in Oregon. Although the type specimen of the species was collected in 1870 on campus it is getting hard to find the plant in Salem. Specimens were last collected locally in my botany class of 1912. A few of the women who took that class have worked for me preparing herbarium specimens for commercial sale to support my salary. Our collection is growing fast and I am sure Willamette has and will have the greatest plant collection in Oregon. It is with some sadness that I contemplate we might have driven the little spring nymph from our daily life. There is so much work to be done to complete the Biological Survey of Oregon and I wonder if we will meet success before a plow, a factory, or an automobile changes every wild place.

— David Craig, Associate Professor of Biology



PRAIRIES AND SAVANNAS, TIDE POOLS AND PASTURES

Between the Great Depression and 1958, the year George Beadle and Edward Tatum won a Nobel Prize for the “one gene-one enzyme” hypothesis — an idea that revolutionized our understanding of how genes regulate the expression of the diverse traits we observe in living organisms — what topics engaged and fascinated Willamette biology majors? In this reflective essay, I hope to inspire interest in this period of Willamette University biology, and spur our alumni to share their own stories of the “WU field experience.”

Circa 1936: *The State Capitol and the Willamette campus with Professor Cecil Monk and vertebrate zoology and systematic botany students:*

“What have you got?”

“Weird, this squirrel looks different somehow from the Western gray squirrels that you said had prevailed in these oak savannas since at least the time of Lewis and Clark.”

“You’re right...that’s one of the new eastern invaders; they thrive in disturbed urban environments, unlike the more reclusive western grays. What’s more is that a male western gray can wait months to mate with a female who is sexually active for less than a day.”

“Gads, I guess it’s good news that the newly founded National Wildlife Federation and Wilderness Society are around to help us manage the western grays for posterity.”

“Maybe Tansley’s new integrated concept of an ‘ecosystem’ will help us link their conservation to both the physical and biological parts of a landscape. Professor Morton Peck says Native Americans periodically burned Oregon’s prairies and oak savannas, which also maintained the source of essential acorns for squirrels. In systematic botany, we’re helping Peck identify which native plants best characterize the Willamette Valley and other diverse vegetation regions for his manual of Oregon’s flora.”

Fast Forward to 1993: *Bush Pasture Park and Willamette ecology students:*

“Have you radio-collared it yet? This eastern gray squirrel is too darn active...Koprowski wants us to check these baited traps multiple times so the animals stay healthy until release, but this is really tough, especially knowing how invasive this species has become since its introduction on the state capitol grounds in 1919. You really had it easy last year for field zoology with Breakey.”

“Right! And how many of these invert and vert species do you know? It’s not like we could bluff.... Breakey knew nearly all of them!”

“I can’t believe he’s retired.”

“He still comes around, and we have a few new options too. I plan to head to the Chiricahua mountains in Arizona soon to conduct research on the food preferences and behavior of endangered red squirrels.”

“I figure that by deciphering the factors that threaten rare animals we may learn a bit about how to live more sustainably on this planet. After all, as biologist and writer Lewis Thomas once wrote, we are “a fragile species, still new to the earth, at risk of fumbling, in real danger at the moment of leaving behind only a thin layer of our fossils...”

Circa 1958: *Tide pools along Oregon coast, Boiler Bay, with Professors Don Breakey and Martha Springer with field zoology and botany students:*

“Geez look at these critters — three different types of chitons... black, gumboot, mossy...each with eight plates...and these are mollusks, same as lemon nudibranchs? Oh yeah...the mantle gives it away! Do you think that someday WU students will be able to tell them apart and track their evolution by isolating their DNA?”

“I dunno, but get a load of that bull whip kelp Ma Springer is holding. I’d hate to see her wield it after tomorrow’s exam that I’ve not even started to study for!”

“Me either, and I need to be on good behavior...I signed up as a senior scholar with her this fall. The biology of mosses fascinates me...that’s her expertise, in both ecology and taxonomy.”

Fast Forward to 2008: *Bush Pasture Park with evolution, genetics and systematics students:*

“Hey Thorsett said in genetics class that we once had a eugenics-type course at WU, both before and after World War II! It’s hard to believe how readily politics can shape mistaken ideas of human and other biological relationships within the biosphere.”

“True, and I think the most fascinating aspect of evolution is how new species arise in nature... You’d think Darwin had it all figured out in 1859, but the 1940s spawned a rash of new species concepts and discussions of whether hybridization is important in evolution...right about the time that Peck was publishing his *Manual of the Higher Plants of Oregon*.”

“Now we have QTLs and molecular studies that show how quickly species can arise in response to ecological selection or to pollinator shifts, and that hybrid speciation occurs, creating novel species that not only persist in time but may generate new variants of both crops and weeds, with or without human-inserted transgenes!”

So — what inspires you? A colorful flash, or an idea or vocation that engages the mind and allows each of us enjoy life and use our talents effectively? I close this fanciful essay with an inspired quote from the German scientist and writer Johann Wolfgang Goethe, who wrote, “Whatever you can do, or dream you can, begin it. Boldness has genius, power and magic in it.”

— Susan R. Kephart, Professor of Biology

A Century of Milestones in the Department of Biology



Morton Peck establishes department of Biology



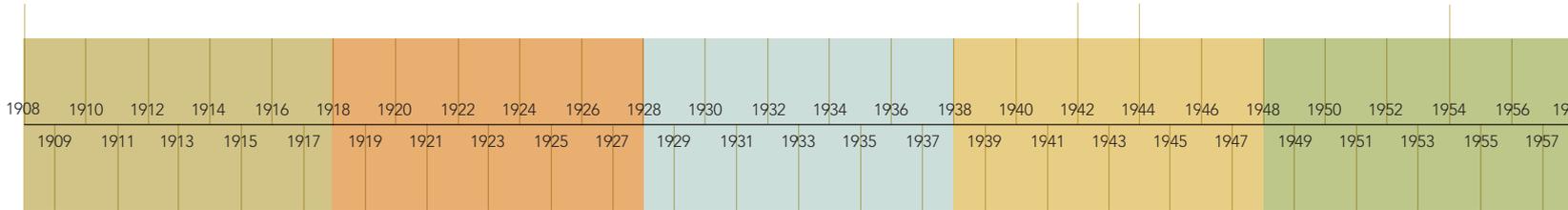
In the 1920s, scientist and botanical artist Helen Gilkey worked in the Peck Herbarium, established by friend, Morton Peck.



Willamette University Centennial observed
Five giant sequoias (The Star Trees) planted north of Collins Science Hall

Biology Professors Cecil Monk and Robert Tschudy collaborated with Salem physicians to develop the mold from which penicillin is obtained, according to the *Coos Bay Times*. The research was conducted in the biology laboratory at Willamette.

Three tenure-track faculty in Biology



College of Medicine closes

15 CLA faculty welcome
184 students

Professor salaries reach \$1,500



Two tenure-track faculty in Biology



Everell Stanton Collins Science Hall dedicated, Biology department located on second floor
A Manual of Higher Plants of Oregon, 1st Edition, by Morton E. Peck



In the late 1950s biology senior scholars and departmental assistants prepare for the next lab.

One Hundred Years of Global Biological Discoveries

Immunity unlocked

Arsenic treats syphilis

Penicillin

The urea cycle is discovered

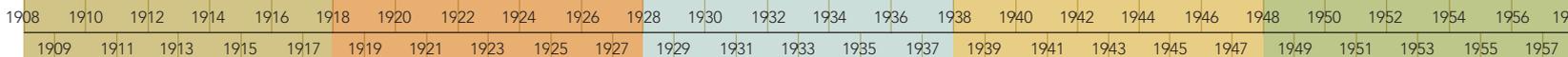
Neurotransmitters ID

Bacterial resistance to virus infection is caused by random mutation and not adaptive change

That DNA carries the genetic code in pneumococci bacteria is discovered
Quinine is synthesized

In DNA the number of guanine units equals the number of cytosine units and the number of adenine units equals the number of thymine units

The chromatographic analysis of the insulin amino acid sequence is completed
Radioactive tracers are used to show that DNA is the genetic material in bacteriophage viruses



Proposed that Mendelian factors are arranged in a line on chromosomes

Insulin

The sugar deoxyribose is discovered in nucleic acids

The tobacco mosaic virus is crystallized
The imprinting behavior of young birds is documented

Tricarboxylic acid cycle is discovered
Evolution and genetic mutation is linked in *Genetics and the Origin of Species*

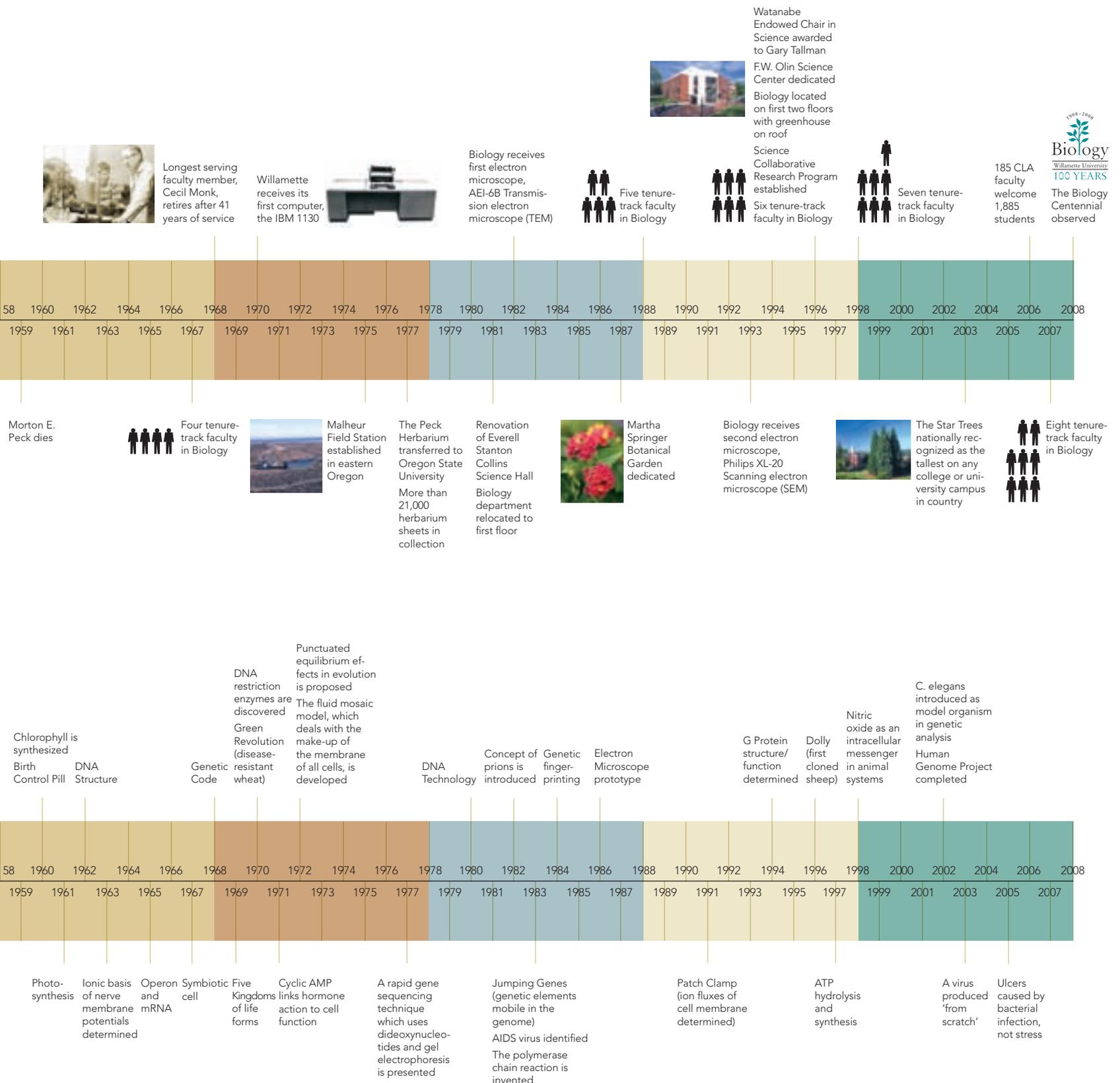
DDT developed

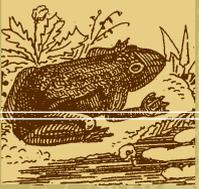
Dancing Bees (Bee dance=food source)

Cholesterol and cortisone are synthesized

A double helix structure for DNA is proposed

Polio Vaccine





FROG LEGS

1958

The lab still smells of burning kerosene. It reminds Jeff of the smell of the oil lamps his parents used when the power would go out on their farm in eastern Oregon. Earlier that day, Jeff and his lab partner, Bill, had “smoked the drum.” The drum is a big metal cylinder with wax-coated graph paper on the outside. While Jeff held the drum, Bill carefully applied an even coating of soot from the burning kerosene flame to the waxed paper, being very careful not to set the paper on fire. “Nice job!” Jeff said, thankful that not more of the soot had ended up on his clothes.

Both Jeff and Bill are now mesmerized by the isolated frog muscle dancing back and forth, suspended between two thin wires. Every time the muscle twitches, it pulls the wire, which in turn pulls on a lever with a very fine tip that etches a pattern in the soot on the drum.

“Wow, look at that!” Bill said. “That acetylcholine really made him twitch!” “Yeah,” Jeff responded. “What did you do?” Bill waited for a couple of minutes for the muscle to stop twitching and then squirted an eyedropper full of the same solution on the muscle. The result was the same.

“Yow. He did it again,” Jeff said. “That’s amazing! Do you think it would still work if we diluted it?” Bill quickly grabbed a lab pipette and diluted the solution, one part of acetylcholine to nine parts of Ringer’s solution. His hands were shaking as he irrigated the muscle with the new, more dilute solution. “Holy cow,” Jeff said, “it’s just as strong a response as the undiluted solution—how much can we dilute that stuff and still get a response?” “I don’t know,” Bill said, “but we’re going to have to smoke another drum. We’re running out of paper.”

Over the course of the warm fall afternoon, the boys smoked three more drums, diluted the solution one hundred thousand fold, and warmed and cooled the solutions to see what the effect on muscle contraction would be. Eventually, the frog muscle seemed to tire; so did the boys. They sprayed the “kymograms” with sweet-smelling shellac to preserve the precious results etched in the carbon.

As they were cleaning up the lab, Bill said, “Professor Hawke is gonna have to buy some more kerosene, we used it all up, and your mom is gonna have a fit when she sees your clothes!” “That’s the least of our worries, Bill,” Jeff said, “look outside.” Bill peered out the window into the darkness of the cool night. “We missed dinner,” he said before a look of panic crossed his face. And then Bill and Jeff mouthed the words together, “We missed football practice!”

1983

Stacey and Miranda were sort of dreading the lab. The campus was bathed in the warm glow of the fall sun with leaves turning

color everywhere—it seemed a little unfair to have to work in the lab on such a nice day. Stacey was also looking forward to her sorority’s “Dynasty” party. She had invited two friends to come to the house for dinner and then stay for the party—her contribution was Death by Texas Chili and she needed a few hours to get the ingredients to the “will melt cast iron” stage. Professor Hawke zipped through the pre-lab lecture and both girls wrote furiously to keep up. “Maybe we should have read the handout before we came,” Miranda said. “No problem,” Stacey shrugged, “We get most of this stuff. Don’t we?”

Miranda was cautious around the lab frog. It seemed nervous, and she knew if she did not grab it firmly, the frog would probably hop off the table and leap for the door. Except for her cat, she had limited experience with animals. Stacey was not the model of confidence either. She was a city kid who experienced animals from the safe side of a fence, but they both agreed that this particular frog was the key to having the rest of the day to themselves.

The frog jumped. Miranda deftly captured it in Stacey’s new jacket. “Thanks Miranda,” Stacey said. “I was going to wear that tonight to my sorority party.” Miranda laughed. “Considering what you’re cooking, I think you should wear something less flammable.” Frog captured, they euthanized it and excised its leg muscle. Miranda was able to connect the muscle to the transducer that was hooked to the electronic chart recorder. Pretty soon, paper was running smoothly over the recorder’s surface, pretty vermilion ink flowing gently in a fine, silky stream out of the pen.

Both girls noticed that the machine was recording every little nuance of the muscle’s movement. As they treated the muscle with the various chemicals prescribed, Miranda said, “I think this is working pretty well. I’m actually enjoying it a little bit!” “Well, it’s a little slow for my taste,” Stacey replied, “I’m pretty anxious to move on to medical school and see some real action!”

To their delight, the two finished all of the prescribed experiments within a couple of hours. Stacey would have plenty of time to make her contribution to the group dinner and Miranda was thinking that she would be on time for her cello lesson.

As the classmates made their way down the corridor to the exit, Miranda said, “Amazing that you can remove a muscle from a frog’s leg and keep it alive long enough to find out what makes it tick.” Stacey paused. “Yes but think how cool it would be to transplant that muscle into the leg of a second frog and make it work. Or transplant it into another species.” Miranda laughed. “I think that might require way too much lab work for this music major.”

— Gary Tallman, *Professor of Biology and the Taul Watanabe Endowed Chair in Biology*

BIOLOGY AND POLITICS



1981

Brian and Katie agreed that they had both been looking forward to taking the Department of Biology's new intro course in cell biology. "This stuff is awesome," Brian said, skimming through the just-published lab manual for the course. "Yeah," Katie added. "Imagine that you can clone a human gene in a bacterium...that's amazing. Do you think we'll get to do that in this course?" "I don't know," Brian replied, "looks like mostly proteins to me." As she skimmed the lab exercises in the book, Katie noticed that several of them involved separating proteins from blood serum in an electrical field. "How do you pronounce that?" he asked. "I think it's EEEE-LEK-TRO-FOR-EEEE-SIS," Katie replied, "but don't quote me." "Do you think we'll use our own blood? I don't particularly like the idea of bleeding, even for the sake of science," Brian laughed. Katie gave him a reassuring glance. "Don't worry," she grinned. "You can use a few drops of mine if you want." As they read on, Brian noted that electrophoresis was used commonly in hospitals to diagnose heart attacks, certain types of tumors, and liver damage. "Geez," he laughed, "what if we have some fatal disease? I'm not sure I'd want to know that."

Two days later, Brian and Katie were in the lab together, ready to do electrophoresis. Brian poked his finger with a little lancet, collected a few small drops of blood in a tiny glass capillary, and separated the fluid part of the blood from the cells by spinning the tube on a motorized wheel called a centrifuge. "This only takes a micro liter of blood, Katie," he offered. "That's barely enough to see." Brian loaded the blood serum into an applicator and pressed it onto the piece of plasticized paper in preparation for the experiment. "Oops," he said, "I didn't do that very well. Looks like I smeared it." "Let me try," Katie said. Brian handed her the delicate applicator and Katie deftly deposited the tiny little drop of serum squarely on the paper. "There," she said, proud of her skill. "Wow," Brian echoed, "you should be a surgeon Katie; that was impressive." "Well, actually I've been thinking about medicine lately," she said. "Seems like it would be nice to use this stuff to help people who are sick."

They loaded the paper in a little plastic box. It looked to Katie like someone with art deco taste had a hand in its design. The paper was soaked in a conductive liquid and spanned two little tanks, each containing a shiny platinum wire electrode. Brian hooked up the power supply and Katie turned on the power. After thirty minutes, they took the sheet out of the box and dipped it in a stain for proteins. Katie said, "This stuff is really red. It reminds me of the dye we used to use for Easter eggs." "Yeah," Brian agreed, "but look, I can already see bands of protein on the paper, and looking at the picture in the lab manual, it looks like all the proteins that are supposed to be there are, and they're there in the right amounts." "Well, that's a relief," Katie sighed, "I'm glad to know you're normal." "Was there ever any doubt?" Brian grinned.

2006

After the molecular cell biology exam, Ali, Chris, Jay and Kellen headed out into the spring rain for coffee. "Man that was rough," Jay said, "where does he come up with that stuff?" "Who knows," Ali shot back, "but it seems like this stuff just gets more and more complicated the more you learn about it." "Well, that's true," Chris added, "but I love the lab for this course. Where else can you learn to isolate a gene from a plant, express it in a bacterium, and then detect the protein it produces?" "That's true," Kellen agreed, "and we are learning the stuff at the cutting edge, and it's pretty technical stuff!" They turned into Ali's favorite shop. "Oh, I didn't know we were going to Burn the Bean again," Jay whined. "Me neither," Kellen laughed, "they should call this place 'Grounds for a Suit.' Look at all of the up-and-coming young legal eagles in that line."

He was pointing at the 30 or so neatly groomed and tailored young law students waiting to order. "Well, don't complain too much," Chris warned. "You may need one of those guys one of these days. Now that we know the coding sequence of every human gene, I hear insurance companies are trying to make sequencing affordable so that they can get the DNA sequence for each person they insure. If they can figure out which of your genes is defective at birth they can deny you coverage for each genetic disease as a prior condition." "Well that's not fair!" Ali yelled so loudly that many of the briefcase-toting suits turned to look. "What about the breast cancer gene—that runs in my family!"

Kellen added, "How did the lines become so blurred? There are so many new breakthroughs each week—a pill for chronic myeloid leukemia, soybeans genetically engineered for resistance to insects, and even pills that can stop HIV in its tracks—but it seems like no matter what kind of scientist you want to be—a researcher, a physician, or a teacher—in the future you'll need a team of attorneys, accountants, and counselors to work through the patent laws, the audits, and the moral issues for you."

Kellen's comments made the group go silent. When the students were working in the biology lab, the experiments that demanded their concentration seemed absolute and very black and white. In the coffee shop, in the company of future litigators, their work took on new meaning. Lost in their own thoughts, the students drank their coffee in silence.

— Gary Tallman, *Professor of Biology and the Taul Watanabe Endowed Chair in Biology*



From the Alumni Mailroom

As part of the centennial celebration, current biology majors offered to contact biology alumni to ask them to share their post-Willamette stories. Edited for length, here are some of the responses we received.

PHOEBE (WILSON) CORTESSIS '54
Walnut Creek, Calif.



I really enjoyed my biology classes at WU. Right now I can visualize myself seated in the lab across from Grace Link, each of us dissecting a stinking cat. I had labs back to back and had to petition to graduate because I had taken too many biology classes. I majored in biology because you could see what was going on: Chemistry — can't see electrons. Astronomy — oh yeah, too far away to believe. Dissect a frog or a cat — there it is, baby. Check out tissue — see those cells. My father was a winter trapper and I was the only kid in the family who would hold the back feet when he skinned them!

The breakthrough was DNA. We were told about it in seminar. Too new for textbooks. Back in those days we still had 48 chromosomes.

What was a girl to do graduating with a major in biology in 1954? Oregon Department of Fish and Game handed us a steno application — refused to let us apply for biologist, but assured us we made good stenos because we knew the terminology. Similar problem with teaching in the high schools, our transcripts were overloaded with biology courses, but we didn't have enough education courses. What's left? Graduate school? I took the Graduate Records Exam; with my Willamette University biology department background, I cooled the biology section with a 98th percentile. I was accepted at the University of Miami in Coral Gables, Fla., and assigned to the Bio 101 labs as a graduate teaching assistant. My teaching assistant, Paul, was in the 36th percentile and was assigned to upper-division labs.

I became a medical records librarian. We later changed our names to medical records administrator. I had an interesting career in the field and retired several years ago from Chabot (Community) College as program director/instructor.

My life's mental approach is that of a biologist. I believe I see many topics within the structure and rationale of life sciences. It clarifies issues for me that leave others in the dark.

Dr. Springer was my favorite teacher. Nothing was more important to her than teaching her students, nothing. I didn't carve much of a swath at WU. In order to graduate, we had oral exams. These worried us greatly, mostly we stewed about them, not having a clue either how to prepare or how to present ourselves. My sorority gave me a corsage to wear. I'm not much of a flowerpot, so exerted my independence (and lifted my confidence) by hiding it under the bushes as I started my long walk to campus to greet my questioners.

It was sort of funny. There I sat across from Dr. Monk and Dr. Springer and another professor, whose name I have forgotten, chosen by me, from another field. They would ask me a question. I had paper and pencil before me. As I considered each question, starting at a point on the paper, I folded it into little half-inch segments, upward, one fold upon the other, until my mind had decided how to answer the question. I then faced them, but watching my little paper, answered their questions, paced with the unfolding of my paper...ending my answer and flattening my paper corner in synch. (I have not a clue how I came up with this method of maintaining my composure and thought process and presentation.)

It must have been both original and amusing, but effective to watch, because as I was excused to leave, and as they contemplated if I should receive a degree or not, I heard them laugh as I trudged down the hall to await my fate at the top of the stairs. They called me back shortly and to my amazement, they told me that they had completely missed me. They had no idea of how much I knew and how good of a student I really was. So, how do you like them apples. To this day, I ponder the question.





Martha Springer used to joke about how many University presidents she had 'advised,' because she never failed to tell them what she thought!

— *Biology Professor Grant Thorsett*



CHRISTIE BROMS HOCHTL '68
Vail, Colo.



I graduated from Willamette in 1968. My professors were Drs. Cecil Monk, Don Breakey and Martha Springer. My favorite class was field zoology with Dr. Breakey. There were seven of us in the class, and we traveled all over the state from the ocean to Malheur Refuge.

In my field zoology class were Jay Brunner, Tom Williams, Laurie Monnes Anderson (state representative), Connie Euler and two others. One unique aspect of this class was that we were allowed to wear pants. (Women were not allowed to wear pants until April of my senior year.)

So much has changed in the world of science since I graduated, but I think a great deal has changed in the field of genetics and biochemistry. We were taught there were 48 chromosomes. There was a great closeness and camaraderie in the department at that time. I still keep in contact with some of my biology major friends, including Tom and Laurie and others who were sorority sisters. I am sure the number of women going to medical school has changed. In the '60s and earlier, many of us became lab techs or went into teaching.

I taught high school biology years ago and am now a substitute teacher at the grade school next door. I apply my biology daily — observing birds and wildlife and identifying flowers, plants and mushrooms in the summer. I also remember senior seminars at Dr. Springer's house, Dr. Breakey swimming on his lunch hour, and cooking mushrooms from Shady Oaks on Bunsen burners in Dr. Springer's botany class. I have very fond memories of Collins Hall. My son graduated from Willamette in 1999 and also has great memories.

KATHLEEN SCRIVNER '71
Seattle, Wash.



My biology education at WU certainly is not limited to work. I still bird watch (started in field zoo with Dr. Breakey) and think of Dr. Springer's classes when I'm working in the garden. My cell biology class with Dr. Thorsett is now woefully outdated...but probably would be even if I had taken it five years ago instead of 35 years ago. It did however, get me thinking about how things work in nature...still amazing to me after so many years and so much more information.

I attended the U of O for a year after graduation for certification in medical technology. I am currently working in the Immunology Lab (part of Laboratory Medicine) at the University of Washington Medical Center in Seattle. We do clinical lab work, not research. I find clinical work very interesting. Our patient base is full of individuals with chronic autoimmune diseases...many of whom we have been testing for the 22 years I have been in this department. Having a hand in their care is an important reason the work is satisfying.

I have helped pass on the scientific process for many years in my kids' classrooms, at numerous science fairs and through the Seattle Public School's Hands-On Science curriculum committees. I guess the WU biology department has reached many unsuspecting recipients through countless alumni!

One of my favorite memories of the department was the February 12 celebration of Charles Darwin's birthday... cake and coffee included. (And one memorable year when fellow student Brad Anderson showed up in a gorilla suit). Good luck with the centennial project.





LISA PETERSON '85
Bend, Ore.



I currently teach at a magnet school where I teach all subjects, mixed age, K-8. We integrate and write our own curriculum. My biology knowledge and experiences come in handy. I have fond memories of my time at Willamette and my classes.

MICHAEL BROWN '92
Klamath Falls, Ore.



After graduating from Willamette I did indeed continue working as a nurse technician at Salem Hospital but also went on to get my master's degree at PSU in biology/neurophysiology. I then took additional post-bac courses and worked for the Oregon Department of Health and Epidemiology. Concurrently, I worked for the Orthopedic Department at OHSU and later the Medical Affairs/Quality Management Department, also at OHSU.

I then attended medical school in California and am now finishing my first year of a three-year residency in family medicine. I'm in Klamath Falls and plan to return to the Salem area to practice.



JOHANNA TIFFIN (GRAVELINE) SCHROETER '92
An den Weiden, Germany



I finished my BS in 1992 with a double major in biology and German. During my undergraduate program, I pursued several internships including one at the U of O in neurology (zebra fish) and one at Peace Health Medical Center (fetal diagnostics). The internship in prenatal diagnosis was so interesting for me that I decided to pursue a master's degree in genetic counseling at Sarah Lawrence College in New York, which I concluded in 1994.

I worked in genetics at Mount Sinai Hospital in New York City and later at Peace Health in Eugene.

In 1997 I moved to Mainz, Germany, where I worked in laboratory cytogenetics. I analyzed blood, amniotic fluid, and fetal placenta for chromosome disorders such as Down's syndrome, and examined blood specimens for various forms of leukemia. After three years behind the microscope counting chromosomes, I needed a change.

In 2000 I found a position with a contract research organization that provides clinical research services to the pharmaceutical industry. For the past five years, I have been working on pediatric pneumococcal vaccines against meningitis, pneumonia and ear infections. I check the quality of the data collected by the physicians regarding the vaccines before the data is sent to the pharmaceutical companies for statistical analysis.

For me, this is the perfect balance involving medicine (biology) and German, which I speak daily. I love being involved in evolving medicine, and I'm relieved not to have the stress of direct patient care.

Please forward this email to Professor Hawke, who will certainly remember me by the name of Johanna Graveline. In case you are interested, my fellow graduate Sampsa Lehtonen (also a 1992 biology major) went on to the University of Rochester Medical School and was an MD in New York, Colorado and Missouri before moving to New Zealand two years ago.

JOHN VAN DOORNINCK '93

Los Angeles, Calif.



After Willamette, I attended the Vanderbilt University School of Medicine, where I developed an interest in cancer and blood diseases of children. After graduation, I trained at Children's Hospital Los Angeles, completed a residency in general pediatrics, and now I'm in my second of four years of additional training in pediatric hematology/oncology.

I am also developing an interest in international health. This has been a long-standing interest, but it was sharpened last year when I visited four hospitals in the country of Mali, Africa. The needs for goods and services in this county is staggering. As a result of these travels, we are currently working to procure and ship equipment to two hospitals in Mali (one in the fabled city of Timbuktu). This hasn't been as easy as one might think. I have initiated studies at the University of Southern California School of Public Health, which will jointly advance my interests in international health and in pediatric hematology/oncology.

Willamette was invaluable in preparing me for life after graduation. The professors never wavered in their belief in me, and without their support I probably wouldn't have had the guts to think about a post-graduate degree. Willamette professors served as living examples of curious people who were passionate about their field of expertise. I found myself being inspired and feeling positive when surrounded by such people, and consequently I sought to develop these traits in myself.

In this way, the Willamette professors helped me discover my own sense of curiosity. Any successes I've had in my post-Willamette life I directly attribute to discovering my sense of curiosity. Mind you, this curiosity is not limited to the natural sciences. Religion, music, literature, you name it. The world has become much more interesting since a sense of curiosity took over. I've probably made eight or nine international trips since leaving Willamette, and I don't think this would've happened without the sense of curiosity that Willamette professors instilled in me.



AARON JENSEN '95

Dulles, Va.



I made it into the Foreign Service after a year of grad school at the University of Chicago. I entered in July 2000 and they immediately sent me to Guangzhou, China, to do visas. After that, it was seven months of intensive Spanish and a two-year tour in Madrid. I then opted for a year in Afghanistan. I'll leave here in about three months. Currently I work in the political section as the external affairs and societal unit chief. I cover Afghanistan's international relations (Pak-Afghan and Iran the main neighbors of interest), corruption, provincial governance, tribal issues and anything else that's not women's issues, Parliament or political-military.

Later this fall I go back to D.C. to work on the Romania Desk. I'll be the one person who reads everything coming in and out of our embassy in Bucharest. It'll be quieter, but Romania is coming up for EU membership and has troops in Iraq and Afghanistan. It's been more of a challenge than fun here, but all in all in a good way. We have a lot of work to do in Afghanistan.

I'll probably stick with the Foreign Service a while. I like the lifestyle and I like moving from place to place, but I do miss Oregon and the West Coast. Granted, last time I was in the Rogue Valley, it looked very different. Adios pear orchards, hola subdivisions. Take care.



Charting the Next *Hundred Years*

Willamette University's biology department has changed dramatically since revered program founder Morton Eaton Peck lovingly collected tens of thousands of plants, sharing his love for flora and fauna as the sole teacher of the department's first students. Today's professors — seven in all — are studying everything from global warming's impact on plant cells to the effect of herbicides and pesticides on animal development. And who knows what the future of research could hold.

That's the nature of science — always changing, new discoveries constantly being made, unique research stemming from people's perspectives or concerns about the world.

"We recognize this centennial as a special moment to commemorate what we've done and to chart a course for the next hundred years," says David Craig, associate professor of biology.

Charting the course at Willamette means continuing to attract top-notch professors and students who are curious about the world and who can turn that curiosity into the next major biological discovery. It also means building upon the already existing tenets that make Willamette's biology program so successful — one-on-one work between professors and students, personal attention that cultivates students' interest in the subject, the perception of biology as one component in the entire liberal arts education. "We believe in the importance of a comprehensive undergraduate curriculum," says Associate Professor Barbara Stebbins-Boaz, department chair. "Students come away with knowledge of a broad spectrum of biology. We know they will have ample opportunity to specialize as soon as they walk out the gate. We give students a sweet opportunity to explore widely."



Personal attention and one-on-one research with faculty cultivates students' interests and provides opportunities lacking at larger research universities.

Biology consistently is one of the most popular majors at Willamette, with between 30 and 50 graduates each year. While they're here, many of those students are spending weeks in the lab or the field, working with their professors to contribute to ongoing research or spearhead their own project. And once they leave, many go on to competitive PhD programs, where they impress both new peers and new professors with their passion for biology and their easy way of communicating in person or in writing.

That chance to be directly involved in major research as an undergraduate is not something students are likely to get at a larger, top research institution, professors say. Willamette students have multiple opportunities to engage in research, including the Science Collaborative Research Project, which includes all the sciences and allows undergraduates to conduct summer research with faculty. They also can apply for Carson Undergraduate Research Grants that allow them to undertake scholarly, creative or professional research projects. Recent Carson Grant-funded biology projects include a field guide to the birds of Washington Park in Portland and an analysis of plant-pollinator diversity in wetlands.



Jacquie Grace '07 spent the summer after her sophomore year researching Caspian terns with Craig. Grace studied the terns' parental care and the development of prey handling skills among chicks. She has traveled to international conferences in France and Mexico; at the Mexico event, she gave an oral presentation on her research, an opportunity most scientists don't receive until at least the graduate level. "At a larger university, you don't get the same research opportunities while you're an undergraduate," Grace says. "If they do have undergraduates involved, they're usually just doing lab work and not developing their own ideas and testing them."

Jennifer Bufford '08 has worked with Professor Gary Tallman in his research on the heat tolerance of plant cells. "What I think is the most valuable at Willamette is the time and energy the professors give their students, both in class and in the lab," she says. "I have friends attending other larger universities, including Harvard, and I feel like my research opportunities are as good as or better than theirs, mostly because I can work directly with my professor to design and conduct my own experiments."

Even though biology professors and students already have built a successful program, they know that more will be needed in the future. As scientific research continues to change and become more complex, more resources and equipment will be necessary to remain cutting edge. "Biology is a labor- and infrastructure-intensive subject," says Tallman, the Taul Watanabe Endowed Chair of Science. "The techniques change under-

People are forming their identities and missions in life mostly at the undergraduate stage. Because we are helping students explore that passion, that curiosity in their lives, they catch fire and burn for the rest of their lives.

— David Craig
Associate Professor of Biology

neath us, so there's always a need for repairing and replacing equipment."

As the biology department embarks upon its next 100 years, finding money for new facilities and equipment is just one issue program leaders will address. The department would like to provide more endowed scholarships for biology students who need financial help to reach their goals. For instance, the

Webber Scholarship supports women majoring in the sciences and creates for them an opportunity to serve as role models to elementary school girls. Adding a second endowed chair also would be beneficial. Endowed chairs can add bold, imaginative ideas to the department, Stebbins-Boaz says, and they can inspire other faculty when they bring in new research programs.

Creating a Centennial Fund for Collaborative Research is another goal, one Stebbins-Boaz believes is essential to maintaining that department tradition of students working side-by-side with professors. "Collaborative research with faculty is life-changing for students," she says. "They learn about their strengths and weaknesses, and they gain confidence to intelligently plan their future."

Reaching the students at a younger age and helping them shape their talent into a successful biology career is essential, Craig says. "People are forming their identities and missions in life mostly at the undergraduate stage. Because we are helping students explore that passion, that curiosity in their lives, they catch fire and burn for the rest of their lives."

The Campaign for Willamette

from exceptional to extraordinary

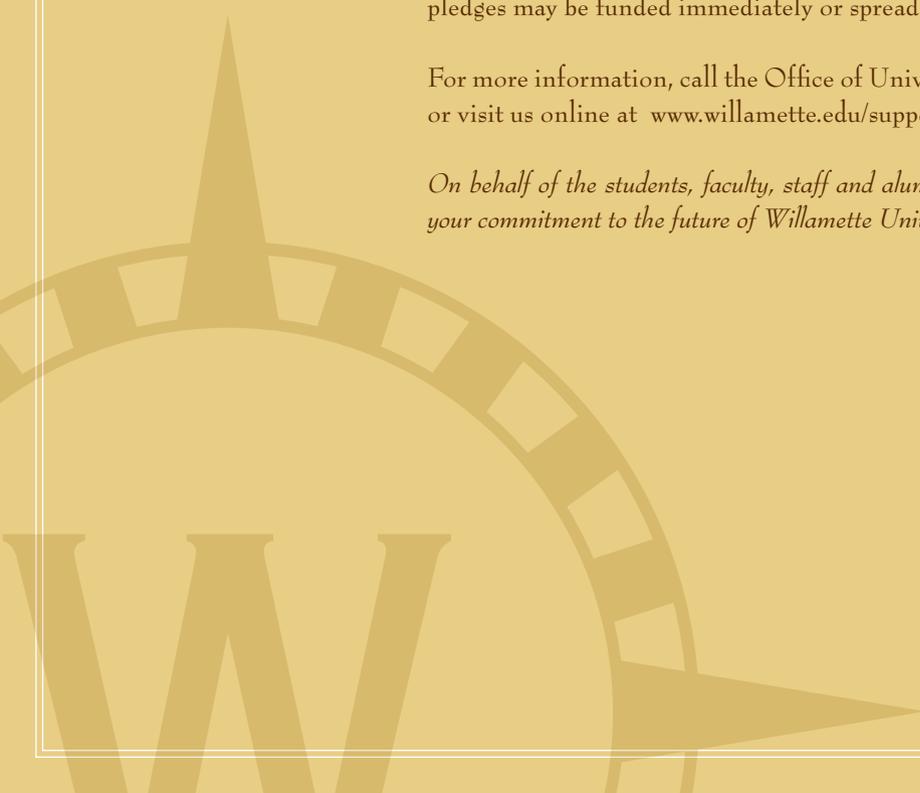
Biology Centennial Funding Opportunities \$3.5 million
toward \$89.5 million in campaign initiatives supporting the College of Liberal Arts

Endowed Chair in the Natural Sciences \$1.5 million
Science Facilities and Equipment \$1 million
Endowed Scholarships \$500,000
 Biology Centennial Scholarship \$250,000
 Don Breakey Scholarship \$100,000
 Other Biology Scholarship funds — New or Existing \$150,000
Centennial Fund for Collaborative Research \$500,000

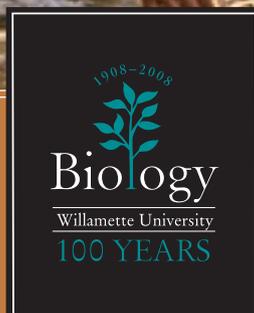
Willamette University is proud to pursue the historic \$125 million comprehensive Campaign for Willamette. For all involved, it is a campaign of opportunity. For those individuals who wish to support Willamette, the campaign offers limitless opportunities to name gifts for those we love, for those we wish to honor and especially for those we wish to remember. Named gifts and other pledges may be funded immediately or spread over a period of up to five years.

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On behalf of the students, faculty, staff and alumni, thank you for your generosity and your commitment to the future of Willamette University.







Visit the biology department online:
www.willamette.edu/cla/biology



WILLAMETTE UNIVERSITY

COLLEGE OF LIBERAL ARTS
COLLEGE OF LAW
ATKINSON GRADUATE SCHOOL OF MANAGEMENT
SCHOOL OF EDUCATION

*Willamette is the first university in the West,
founded in Salem, Oregon, in 1842.*