Guyot Hall at One Hundred

By 1908 Wilson could matter-of-factly tell the alumni that Princeton now had the top classics, physics, and mathematics departments in the country. To add to its luster as an emerging center of science, Palmer and Guyot Halls were opened for business in 1908 and 1909, respectively. Carefully designed by the faculty who would use them, after visiting the competition Wilson bragged that they were equal to any in the university world.” James Axtell, The Making of Princeton University, 2006 p. 394.

This was how university President Woodrow Wilson perceived the Natural Science Laboratory (Guyot Hall). Named for Princeton’s first professor of geology and geography, Arnold Guyot, faculty 1854-1884, the building was given to the university by the mother of Cleveland H. Dodge 1879 to house geology and biology. It represented a major expansion of the teaching and research space in the development of graduate education at Princeton. All the laboratories and collections of the various branches of the natural sciences now scattered over the campus – in Nassau Hall, the south stack of the Library, and several other buildings – were collected in this new building. William Berryman Scott, faculty 1880-1930, who was the first chair of both geology and biology, had Gilbert Van Ingen, faculty 1903-1925, work out the floor plans with those concerned. These were accepted by the architects with scarcely any changes. These and other aspects of the Guyot Hall project, as reported here, are from The New Natural Science Laboratory, by Van Ingen in The Princeton Alumni Weekly, Vol. VIII, No. 13, 1908, and in A Princeton Companion, 1978, by Alexander Leitch.

Originally, the building was conceived of as a quadrangle with a vivarium in the center. The main building would be 60 feet deep and 288 feet along the North front facing the Physical Science Laboratory (the Palmer Physics Laboratory, now part of the Frist Campus Center). However, only the North front with the northerly half of the east section (the L wing) would be erected with the funds provided—$400,000 and an additional sum of $200,000 assured for the maintenance of the building. It was in the Tudor Gothic style of architecture in close agreement with more recent structures on campus. These were the only sections to be constructed at that time, and they are the only portions of Guyot Hall to be in the same architectural style. Classrooms, laboratories, and offices were planned for the upper three floors as well as in the basement. As Van Ingen wrote, Guyot Hall “with marked individuality of expression is massive, simple, and elegant.”

Later additions to Guyot Hall were the “Hess Hole” (1960), a one-story geology addition to the south along the North building for rock storage and offices; the north-south Moffett Biological Laboratory (1960) attached to the southward original portion (the L wing) for biology and eventually connected to the Schultz Laboratory (1993); the north-south geophysics wing (1964), and in 1981 a north-south geology library wing was constructed with entrance from the middle south wall of the museum. This wing was converted in 2002 into undergraduate laboratory space for geology and biology, when the Library moved into the basement of Fine Hall (see Library article). None of these additions were in the original Tudor Gothic style of architecture – thus the visitor can easily identify the original 1909 structure that is Guyot Hall.

Aerial view of Guyot Hall and Palmer Physics in 1974 looking North. This shows the original 1909 Guyot North structure with additions on the south side, from left to right, the geophysics wing, the one-story Hess Hole, and the Moffat Laboratory. Isabella McCosh Infirmary (1925) and Eno Hall (1924) are on the left margin, center and lower corner, resp. Photo by Ted Forseman.
The original plan was that the entire first floor would be devoted to a museum. The thought was that this design would cause students to pass through the museum, and that such a location would greatly enhance the value of the museum as an aid toward the propagation of a scientific interest throughout the student body. Over the years only the central section of the Museum would remain, since biology constructed classrooms on and over the east end, and on the west end, geology would construct offices on the north and south sides of the main floor and balconies, but it retained the open central floor now known as the Great Hall.

The museum space lasted only until 2002, when the remaining central museum area was converted into an atrium with offices on the main floor and the balconies on north and south sides of the central hall for the Princeton Environmental Institute. The Antrodenmus (Allosaurus) dinosaur at 25 feet long and 12 feet high – kept in place in the center of the former museum – and a few side cabinets are all that remain of the museum displays in Guyot Hall. Most of the museum contents are in storage, but the Allosaurus remains, solely because the cost of moving him properly would be too large to consider his departure.

Added as an extra Gothic feature “were many extinct and living animals and plants represented by stone carvings on the moldings around the building – some 200 of them. These were constructed in the studio of Gutzon Borglum, sculptor of the Mount Rushmore presidential portraits, in South Dakota.” Leitch, p. 234.

After 100 years Guyot Hall with its additions continues as a very active place with many modern research and teaching laboratories, pleasant offices and classrooms. By retaining some of the wonderful vistas on the main floor with its 18-foot ceilings and pleasant balconies, the building maintains an atmosphere of quiet permanence for the years ahead. And as Van Ingen wrote a hundred years ago, Guyot Hall “with marked individuality of expression is massive, simple, and elegant.”

The Guyot Great Hall with the portraits of Harry Hess and Arnold Guyot on the staircase walls. The portraits were recently returned after having been stored at the art museum during the renovation. Part of the Gem and Mineral Collection is housed in the glass-fronted oak cabinets flanking the space. The Great Globe can be viewed through the glass doors at the far end of the hall.

Got news? Moved recently?
E-mail or write and let us know!

Departmental Overview

From the Chair

Geoscientists face a unique challenge in seeking to understand the complexity of the Earth’s physical and biogeochemical systems. The surface environment of the Earth is controlled by myriad interactions between the deep Earth, the atmosphere, the hydrosphere, and the biosphere. These interactions occur on timescales ranging from picoseconds for chemical reactions on mineral surfaces to the billions of years over which plate-tectonic processes and biological evolution have radically altered the composition of the atmosphere. The modern geosciences, as exemplified by the research programs in the Department of Geosciences (GEO), are in the midst of a revolution in understanding these systems and their interdependence. Increasingly powerful probes of the deep interior, using seismology and laboratory mineral-physics experiments, provide new insights into the inner workings of our planet. More powerful computers allow us to model the molecular aspects of chemical reactions, and, at the opposite spatial scale, the convective motions of the atmosphere, oceans, mantle, and core with a resolution that could only be imagined 15 years ago. Twenty-five years ago most geoscientists ignored the role played by the biosphere in shaping the physical and chemical evolution of the Earth, but today it is recognized that many, if not most, near-surface chemical transformations are mediated by microbial activity.

The geosciences are also fundamentally different from other scientific disciplines in the manner in which our subject matter affects society. Population growth, environmental degradation, emission of greenhouse gases, and depletion of natural resources will continue to produce increasingly severe physical and chemical consequences. The complexity of Earth-system processes provides not only challenges but also great opportunities for both research and teaching. Our 18 current faculty are approximately equally divided between the solid-earth and environmental geosciences. Climate, biogeochemical cycles, and planetary tectonics are the three basic processes that shape the environment. In recent decades it has become apparent that important changes in the nature of the environment derive from the interactions of these three realms.

The solid-earth program seeks broadly to understand the structure and evolution of the planet’s subsurface realm. We perceive our mission to involve linking modes of crustal deformation that occur over different timescales, understanding the physical connections between deep-earth and surficial processes, identifying and understanding the major events in Earth history and understanding the structure, composition and evolution of the Earth’s interior.

The core research mission of the environmental geosciences group is to understand fundamental processes of climate and biogeochemistry that influence the environment of Planet Earth, and to understand how the interaction of these evolving processes has shaped the surface environment over all timescales. This task involves studies of the continents, ocean, and atmosphere, of microbial processes, and of ancient environments.
Michael Bender’s research centers on studies of the climate cycle and Earth’s recent climate history. It is based mainly on ultra-high precision measurements of the concentration and isotopic composition of O2 and Ar in samples of air, dissolved gases in seawater, and fossil air trapped in glaciers. He uses these data in various ways to interpret past climate history, and to estimate primary production in the ocean.

Thomas Duffy studies the physical and chemical properties of minerals relevant for understanding large-scale geophysical properties of the Earth and planets. Current projects involve the study of elastic properties of materials in response to pressures of the Earth’s upper mantle and examination of crystal structures and phase transitions at conditions of the Earth’s deep lower mantle and outer core.

Lincoln Hollister has field projects in the Coast Mountains of British Columbia and in the Himalayas of Bhutan. He combines metamorphic petrology, structural geology, and age dating to determine rates and kinematics of tectonic displacements in the deep crust at convergent plate boundaries.

Gerta Keller is investigating Deccan volcanism as a likely cause for the K-T mass extinction. Recent advances in Deccan volcanic studies suggest that the main phase of eruptions occurred rapidly over tens of thousands of years near the end of the Maastrichtian and may have caused the mass extinction as initially detailed from quarries in Rajahmundry.

Adam Maloof is an Earth historian who uses sedimentary and volcanic rocks to extract information about Earth’s ancient magnetic field and the relative motion of continents, perturbations to the global carbon cycle, climate change, and processes related to small meteorite impacts.

Nadine McQuarrie is a structural geologist and tectonicist who is interested in deciphering the large-scale deformational histories of entire mountain belts at timescales ranging from tens of years to tens of millions of years. Her recent research has taken her to the Bhutan Himalaya, western North America and to the central Andes in South America.

François Morel is a geochemist focusing on the interactions between aquatic microorganisms and trace elements at the molecular level. Marine phytoplankton are responsible for about half of the global primary production and how, by exporting organic matter to the deep sea, they maintain a low concentration of CO2 in surface waters and in the atmosphere. What physical and chemical factors control the growth and activity of phytoplankton in the sea is the overarching question addressed in his research.

Satish Myneni is interested in exploring the fundamental interactions among various components of the Earth’s surface environment, which includes mineral oxides, biota and their byproducts, and the atmosphere. His work involves the evaluation of the chemical state of water in different geologic media and how this modifies the biogeochemical behavior of different inorganic and organic moieties in the natural systems, and the chemical state(s) of important geochemical species to develop predictive patterns for explaining their macroscopic behavior.

Tullis Onstott’s research focuses on two principal areas: 1) the environmental factors that control the microbial diversity and activity in Martian analog sites, primarily Arctic permafrost and subpermafrost ecosystems, and primarily on the microorganisms involved in the cycling of methane; and 2) establishment of underground laboratories in South Africa and the U.S. where subsurface microbial processes can be further illuminated by in situ experimentation.

Michael Oppenheimer has a joint appointment among Geosciences, WWS and ENV. His work focuses on global climate change resulting from atmospheric increases in CO2 concentration. He works on the physics of ice sheets and their response to warming, and collaborates with GFDL scientists to incorporate ice sheets into global climate models. He is also involved in the policy aspects of climate change, for example, in examining what constitutes dangerous anthropogenic interference with the climate system.

George Philander is an atmospheric/ocean scientist interested in climate fluctuations. Last year he started integrating his activities at Princeton and the University of Cape Town, where he has spent half of each year. In 2008 ACCESS, the African Centre for Climate and Earth System Science, was formally established with funding from the South African Department of Science and Technology.

Allan Rubin’s research is devoted to developing a better theoretical understanding of earthquake nucleation. He has shown that deformable faults have multiple length scales relevant to nucleation, and that these interact in complex ways. These analytical solutions can be used to interpret the results of more complicated numerical experiments in intuitive ways.

Jorge Sarmiento is a biogeochemist who works on the global carbon cycle, mostly from a modeling perspective. Two major questions that drive his research include the response of the ocean carbon sink to the major increase in Southern Ocean winds that has occurred over the past several decades and a major increase in the land carbon sink that appears to have occurred around 1990.

Blair Schoene (MIT Ph.D.) is just finishing his post-doctoral work at University of Geneva and will join the Geosciences faculty in July 2009. He is a geochronologist who develops and uses new techniques in laboratory dating methods to generate Earth historical records from sedimentary materials. His field sites include South Africa and Swaziland, mapping and sampling Archaean rocks for geochemistry and geochronology.

Daniel Sigman’s work has two distinct but complementary research goals. First, to provide integrative constraints on nitrogen cycle processes in modern environments, mostly in the ocean but also in terrestrial systems and the atmosphere using the isotopic composition of dissolved nitrogen species (such as nitrate and dissolved organic nitrogen). Second, to understand the underlying controls on the physical and biogeochemical fluxes of the environment using the record of marine sediments and glacial ice as an archive of natural experiments.

Frederick Simons is a seismologist who, among other pursuits, uses autonomous instrumented floats in the ocean for global tomography. On land, he also studies regional seismic surface-wave tomography, investigating the seismic, mechanical, and thermal properties of the lithosphere. He has recently completed a series of papers on theoretical spectral analysis on the sphere, an approach with potential applications as diverse as geodesy, geomagnetics and planetary science.

Jeroen Tromp is a geophysicist who joined the Department of Geosciences in September 2008. He uses high performance computing to solve both forward and inverse problems in seismic wave propagation and to generate high-resolution images of the Earth’s interior.

Bess Ward, Department Chair, is a biological oceanographer, who works on microbial nitrogen cycling in the ocean. Her current work combines stable isotope tracer methodology to measure the rates of nitrogen transformations, such as nitrification, denitrification and N assimilation, with molecular ecological investigations of functional diversity of the microbes involved in these processes.
On September 11th, 2008, the new and exciting Peter B. Lewis Library was officially opened. The views below are from Guyot Hall during construction. Since this is now the home of the Geology Library, it is appropriate that *The Smilodon* explore the history of the excellent geology collection we have today. Alexander Leitch ’24, in his unique volume, *A Princeton Companion*, traces the sites on campus of various library collections. In tracing the origins of the geology library at Princeton, we trace the origins of the natural science collections. When Guyot Hall was completed in 1909, a space was designed specifically for a library supporting study and research in geology, paleontology, and biology. Until then, the natural sciences books moved around with the College of New Jersey’s library collection in its various homes on campus and separate book collections in departments and programs in other academic buildings.

The Early Library Collection: 1756 - 1860

The first home of Princeton’s Library was on the second floor of Nassau Hall, where two large boxes of books were conveyed in 1756. To this collection was added Governor Jonathan Belcher’s collection of 474 books, of which 23 were science. By 1760 when the library’s first catalog was compiled, there were 781 books (1,281 volumes). Among the titles in this early collection were Charles Leigh’s *Natural History of Lancashire…* (1700) with engravings of fossils, caves and other geological sites; Griffith Hughes’ *Natural History of Barbados* (1750) and other important works on medicine, mathematics, physics, astronomy and natural philosophy. By 1775, the collection had grown to 2,000 volumes. When Nassau Hall was occupied by Cornwallis’s army during the Revolutionary War, most of the collection was destroyed or stolen.

By the end of the 18th century, through generous gifts, the collection had surpassed its pre-war size, numbering 3,000 volumes. Most of the collection was again destroyed by the fire that consumed Nassau Hall in 1802, with only about 100 volumes saved. Might the list of geology books have included one by James Hutton (1726 -1797) – considered the father of modern geology – expressing his ideas on plutonism and uniformitarianism? Again, the collection was restored and numbered 4,000 volumes by 1804. While the library collection was housed in Geological Hall (now Stanhope) (1803-1860), one might speculate that Lyell’s *Principles of Geology* (1830-1833) or Dana’s *System of Mineralogy* (1850) would have been available.

Nassau Hall, Chancellor Green, and Arnold Guyot’s Request: 1860 - 1909

The Library returned to Nassau Hall (1860-1873). Although the natural and physical sciences grew during the latter half of the 19th Century, serious collecting of books on geology and paleontology began following the arrival on campus of Arnold Guyot, faculty 1854-1884. Did he see that a copy of Charles Darwin’s *On the Origin of Species* (1859) was on the shelves? Geology grew quickly in the 1870’s with the addition of new faculty members: Henry B. Cornwall (mineralogy), William Libbey ’77 *79 (physical geography), William Berryman Scott ’77 (vertebrate paleontology), and Henry Fairfield Osborn ’77 *81 (biology).

When the Library moved from Nassau Hall to the new Chancellor Green Library in 1873, the whole collection numbered 20,000 volumes. By 1879 the collection numbered 44,000 volumes and the Librarian was petitioned by departments to allow specialized books for those fields be located in the departments. Thus, the geology and paleontology books were moved back to Nassau Hall at the request of Arnold Guyot.

College of New Jersey Librarian Frederic Vinton traveled to Europe in 1881, with a copious list of authors prepared by Scott and Osborn. This consisted mainly of periodicals and transactions reporting the most advanced discoveries. Almost the entire list was procured. They numbered nearly 1,000 volumes, and cost about $5,000. “It is believed that so noble an apparatus for studying the ancient condition of the Earth, is not possessed by any other American college.” In the November 6, 1895, *Daily Princetonian*, a notice indicated that “The Library in Old North (Nassau Hall)
containing books purely to geology and mineralogy, has been placed in charge of librarians, who will be on duty every week day with the exception of Wednesday and Saturday, between the hours of one and two.” Through the efforts of Libbey, “many valuable books have been obtained, among them being some, which on account of their rarity, are found in very few libraries of geological and mineralogical objects.” In 1906, shortly before the new Guyot Hall opened, the geology collection in Nassau Hall numbered 2,400 books and a few thousand more periodical volumes.

**Guyot Hall: 1909 - 2004**

When Guyot Hall opened in 1909, it received the University’s geology, paleontology and biology collection containing 10,000 books from Nassau Hall and Chancellor Green/Pyne Library. In his *Princeton Alumni Weekly* (January 15, 1908) article, Gilbert Van Ingen, faculty 1903-25, described the space, “The feature of most interest on the second floor will be the large central reading room with lateral stacks of sufficient size to accommodate the departmental libraries..... The shelving capacity was 23,000 volumes... Three large reading tables provided seats for 24.” Later, in 1935, the library received the impressive book collection of William J. Sinclair, faculty 1905-35, and created the Sinclair Library of Vertebrate Paleontology on the fourth floor.

The collections quickly outgrew the space, and other rooms in the building were used for library storage. By 1948, the Guyot Hall Library occupied eight rooms on five floors and held 45,000 volumes. The completion of Firestone Library that year provided critical relief by enabling about 15,000 volumes of ‘lesser used’ materials to be transferred. The ‘ideal’ of having a departmental library hold all books in one subject was out of reach. In 1948, it was estimated that this ‘ideal’ would require a library with the capacity for 100,000 volumes. The library’s large working collection of maps – indispensable in any Geology Library – was crowded into a small seminar room.

In 1967 the Library split into separately operating Geology and Biology Libraries. Growth of the Geology Library required more space and the mezzanine above the Great Hall was converted to house the map collection and the geological survey reports. Some maps also occupied two rooms in the sub-basement, senior and Ph.D. theses were placed in storage closets and the Sinclair Library on the fourth floor. Transfers to the Forrestal Library Annex and later to the Fine Hall Library Annex continued through the 1970’s, as the collections grew.

**The New Wing in Guyot Hall: 1981 – 2004**

In 1978, the Department and the Library received the good news that planning could begin for a new Geology Library. Led by Chair Sheldon Judson ’40, faculty 1955-1987, the initiative was funded by alumni and industry. The new library, a three-story wing perpendicular to the main building, opened in 1981. It brought together all of the geology collections housed in Guyot. At that time the collection included 75,000 volumes and 100,000 maps. With 100 user seats and dedicated space for the map collection, it functioned extremely well for the next 20 years. In 1996, the library changed its name to Geosciences and Map Library reflecting its teaching and research focus.

By 2000, as expanding research interests in the science departments brought in more faculty, researchers, and programs, the pressure to find additional office, lab and classroom space became a priority. Over the previous 20 years, the idea of a combined science library had been considered, but not pursued. Departments valued their departmental libraries, then totally print collections. Accessing offsite library materials was inconvenient to say the least. With the internet available to access publications and to provide access to remote collections, departmental libraries were no longer necessary. With physically-separate departmental libraries and traditionally-divided subject collections, it was difficult to respond effectively to new interdisciplinary science areas. With all this, as well as the departments’ need for the library spaces within departments, the time for a central science library had finally arrived.

**Across Washington Road: 2004-2008**

In 2002, planning began for a combined science library, designed by acclaimed architect, Frank Gehry and funded by alumnus and trustee, Peter B. Lewis ’55. The project broke ground in 2004 on the corner of Washington Road and Ivy Lane. The Department continued on page 8
The department has an art legacy in the Waterhouse Hawkins paintings, reproduced in the last issue of The Smilodon. In addition, there is the collection of paintings by Charles Knight, twenty-six of which are presented here. Today, after many years of public display, both collections are housed in the Princeton University Art Museum.

In 1948, Princeton acquired twenty-nine oil-on-canvas paintings from the American artist, Charles Knight (1874–1953). Alums might remember these paintings, depicting pre-historic animals and scenes of geological history, since they were on view in Guyot Hall on the walls near the world globe. The article in this issue on The Great Globe at 50, shows some of the Knight paintings above the elevator door. The Knight panels formed part of the exhibition on The Natural History of Man, which included the 1877-78 paintings on pre-historic life by the British naturalist-artist Benjamin Waterhouse Hawkins. When Guyot Hall was undergoing extensive

The Smilodon – American Artist

Charles Knight – American Artist

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renovations in 2001, all paintings were removed and stored at the Princeton University Art Museum.

The bronze tiger in Palmer Square is also the work of Charles Knight. He is best known, however, for his large murals of dinosaurs that decorated the atrium of the Field Museum of Natural History in Chicago, and one exhibited at the American Museum of Natural History in New York. Many of the paintings at Princeton are oil sketches for these important large murals.

Of particular relevance to Princeton is the depiction of the mooselike deer known as Cervalces scotti in the painting, PP377.16, Pleistocene Epoch, New Jersey (below). One of New Jersey’s treasures, the skeleton was excavated near Blairstown, NJ, in 1885, and was the basis of Knight’s painting. This remarkable Ice Age fossil is the only one in existence of this now-extinct variety of deer. It was described by William Berryman Scott ’77, faculty 1880-1930, and later, the species was named in his honor. Cervalces scotti has a commanding presence in the exhibition “Rising Tide: Climate Change and New Jersey” at the State Museum in Trenton, April 18 to January 24, 2010.

We thank Lisa Arcomano, Princeton University Art Museum, for many of these comments and for facilitating the reproduction of the Knight paintings.
The Gem and Mineral Collection

Alums, faculty, and area residents alike remember fondly the Natural History Museum, housed in Guyot Hall from the building’s completion in 1909 until the museum’s closure in 2000. The exhibits there represented the astonishing diversity of Princeton’s focus on the natural sciences, ranging from a celebrated vertebrate paleontology collection to an exquisite mineral collection.

The rich and varied history of this Mineralogical Museum Collection, now known as the Gem and Mineral Collection, demonstrates the close ties between Princeton and its alums. The Collection has benefited and grown primarily from the contributions of both alums and faculty.

A bequeathal by Archibald MacMartin, class of 1868, enriched Princeton’s holdings by some 2,500 specimens, representing a range of classic localities throughout Europe and the United States. The excellence of MacMartin’s personal mineral collection was noted in several publications upon his death. The volume of displayed and display-worthy pieces that came from his gift constitutes the strongest evidence for the quality and preparation of these specimens.

The Gem and Mineral Collection has additionally benefited from the generosity of Arthur Montgomery ’31. He remained a concerned and communicative advocate for the collection until his death in 1999. He often wrote to inquire about the condition of Princeton’s minerals and their care. Montgomery donated a significant portion of his personal collection, providing the department with exceptional and well-documented specimens. The Guyot Great Hall display, constituting the Alexander H. Phillips Mineral Gallery, is Montgomery’s tribute to his professor and dear friend. The display is an exhibit of many fine specimens from Princeton’s collection.

Over the years, the unique and valuable objects exhibited received funding to renovate the library wing in Guyot Hall into teaching laboratories before the Lewis Library had opened. Thus, in summer 2004 the Geosciences and Map Library, its staff, and collections, moved to B-Floor of Fine Hall. This space was renovated and the library operated there until the Lewis Library opened in September 2008.

The 2008 Move to Lewis Library

Lewis Library is a visually exciting facility, an ‘information commons’ on a grand scale. It facilitates teaching, learning and research of interdisciplinary science. User spaces number 450 and offer a variety of tables, carrels, group study rooms and soft seating on four floors. The facility is both wired and wireless with public computers throughout. A grand reading room, the Treehouse is a sight to behold with its floating candle-like lights. The Astrophysics, Biology, Chemistry, Geosciences, Mathematics and Physics print collections from these branch libraries are interfiled here. The Map Collection, with over 340,000 print and digital maps, and the library’s GIS (Geographic Information Systems) Center are there as well. Knowledgeable professional librarians and support staff from these branches now work together to develop collections and new services. Lewis is also home to OIT’s (Office of Information Technology) New Media, Educational Technologies and Broadcast Centers, as well as the Princeton Institute for Computational Science and Engineering (PICSciE).

The most rewarding experience, however, is watching students from all sciences, and non-science disciplines as well, use the new facility to study and to collaborate on projects and interact with students, faculty and researchers. In a real sense, the nature of the library’s collection has returned to the combined collection that moved into the ‘new’ Guyot Hall Library back in 1909. However, now thanks to technological advances including the Web, remote access, electronic delivery and rapid access to collections at Princeton and other institutions, Princeton has access to the wealth of print and digital collections in geosciences and other sciences.

Crystals of vanadanite (lead chlorine vanadanate) on matrix, Old Yuma Mine, Arizona. 5 x 3.5 x 7.5 cm.

The Lewis Library Geosciences Staff: Left to right, Yili Fan, Patty Gaspari-Bridges, Berthalicia Harvey, Scott Sibio, Victoria McLoughlin, Sylvia Swain. Missing is Wangyal Shawa. Photo by Paula B. Entin.

We are indebted to Patricia Gaspari-Bridges, who supplied much of this article. She joined the Geology Library staff in 1977, and was promoted to Assistant Geology and Map Librarian in 1981 and to Geology and Map Librarian in 1989. In 1988 she was appointed Assistant University Librarian for Special Libraries, and in 2001 became Head of the Science and Technology Libraries. pattygb@princeton.edu

Finely crystalline azurite (hydrous copper carbonate) on matrix, Bisbee, Arizona. 12 x 14 x 5 cm.
“Blue John” fluorite vase in the 1970’s given by Edward Sampson ’14 *20, faculty 1925-59, marked one of the largest thefts. The recent disappearance of a claw from the skeleton of the Allosaurus received coverage in The Trenton Times, and Gerta Keller, faculty, sought to tighten security around the skeleton. In addition to such losses, lack of curatorial care for the collections contributed extensively to the gradual deterioration of valuable items. Upon closure of the Natural History Museum, some of the minerals on display there were moved into the Guyot Great Hall, and others were sequestered in various locations around Guyot until a large number were boxed and sent to University storage.

This past summer, Jesse Chadwick ’08 and Lincoln Hollister, faculty, oversaw the return of the Gem and Mineral Collection to temporary residence in Guyot Hall. This undertaking developed into an ongoing effort, currently the responsibility of Chadwick and Hollister. A faculty committee is now in place to oversee the work, which includes faculty members Tom Duffy, Adam Maloof, and Satish Myneni.

The collection has, as a whole, suffered from its numerous relocations, but with a renewed promise of attention and revival, its fine specimens may continue to grace existing and future exhibits throughout the University. Thanks to Jesse Chadwick ’08 for preparing this report.

Oceanic Overflows in Climate Models

Sonya Legg, AOS Research Oceanographer and Lecturer in Geosciences, is leading a team working to improve ocean climate models. In an effort to improve the representation of overflows in ocean models, the Gravity Current Entrainment Climate Process Team has undertaken a five-year collaborative study between climate-model developers, and researchers conducting observational, numerical, and laboratory process studies of overflows. Several new parameterizations of overflow processes, including the flow through narrow gaps, entrainment of overlying waters and frictionally-induced mixing at topography, have recently been implemented in the ocean models developed at the Geophysical Fluid Dynamics Laboratory (GFDL). This has led to significant improvements in the simulated ocean circulation, as described in a recent Bulletin of the American Meteorological Society publication (Legg and co-authors, 2009).

Oceanic overflows are bottom-trapped density currents originating in semi-enclosed basins or on continental shelves. They are the source of most of the abyssal waters of the ocean, and play an important role in the large-scale ocean circulation. Historically, overflows have been poorly represented in climate models, since most of the active processes occur well below the climate model grid-scale. As a result, deep waters are not simulated correctly, leading to errors and uncertainties in the climate simulation.

The climate process team was established by the US Climate Variability and Predictability Research Program (US CLIVAR) to address this problem, and includes members of AOS and NOAA-GFDL, as well as other partners at the National Center for Atmospheric Research and in academia. The climate process team is jointly funded by the National Science Foundation and NOAA.

The improved representation of overflows developed by the climate process team is leading to better fidelity in climate simulations, and hence more credible climate change projections.
News

From Casper, WY, Baynard Rea ’51 took exception to our incorrect use of Big Horn versus Bighorn in the last issue of The Smilodon. His rule of thumb: in referring to a physiographic or geologic feature such as formation, mountains, river, and basin, use one word, for political entities such as towns and counties, use two words. He was disappointed that your editor, a long-time member of the Yellowstone-Bighorn Research Association (YBRA), did not catch it, and asks, “What would Taylor Thom, faculty 1927-1956, think?”

Ken Deffeyes ’59, faculty 1967-1998, reports that Sarah Hougen Poggi ’92 stopped in to see him in San Diego while attending an obstetrics convention (see more below). Ken picked her up in a Ford 150 pick up and Sarah says he remains as intellectually curious as ever. He has published a new book coauthored with his son (see Books). <deffeyes@aol.com>

Tim Anderson ’70 stopped by in January for a brief visit. He retired (early) in 2002 from Chevron, where he had worked in international exploration for many years. Several more years of consulting for Chevron ended last year. He has recently seen Milt Howe ’69 who is still living in Santa Cruz, where he spends some of his time in his vineyard. Tim also saw Bill Perkins ’69, who is presently teaching geology in Moraga at St. Mary’s College of California after taking early retirement from Chevron in 2002. <uandt@pacbell.net>

Last summer, Paul Bauman ’81 and a colleague carried out geophysical surveys at the site of a Nazi extermination camp in Poland, called Sobibor. Unlike the more widely known concentrations camps, Sobibor was a purpose-built factory whose only product was death. Records indicate 250,000 Jewish internees were brought into the camp and only 52 survived. After a breakout in 1943, the camp was destroyed, buried, and a forest was planted. All workers were killed, and the Nazi SS staff sent to the Russian front. Last July, Bauman and colleague carried out geophysical surveys (electromagnetic conductivity, magnetic gradiometry, ground penetrating radar, and time domain EM) and high-resolution aerial photography from kites and weather balloons with the objective of locating the gas chambers, the cremation area, mass burials, a narrow-gauge rail designed to transport infirm inmates to the gas chambers, and other specific targets. The test of their success will come with excavations planned for next October. Keep us informed. <Paul.Bauman@WorleyParsons.com>

Kate Miller ’82, professor of geophysics, University of Texas at El Paso, reports that with the NSF Earthscope Program plans to fund a group she is associated with to undertake a big geophysical - geological investigation of the Big Horn Mountains. She clearly remembers driving across the Bighorns in a Princeton van through the snow on the way to the Red Lodge Field Camp. “Like many geoscience students, field camp is where I learned what doing science is really about – in stark contrast to standard classroom activities, and that experience certainly helped launch me on my eventual career track.”

The year she was there (1981), Eric Erslev (now at Colorado State), a very young professor, led the metamorphic field mapping project. “He is one of the collaborators of this project and will lead the geologic side of the work. For all these reasons, this project has special meaning and a long history for me...” <miller@utep.edu>

Terrametrics LLC, a company founded by Gregory van der Vink ’83, faculty, and Christel Bottcher Hennet ’89 (below) to promote environmentally-sustainable development has expanded their poverty-reduction work in Africa. In addition to the solar salt facility in Ghana, they are now developing all-weather farm-to-market road systems and port facilities in Liberia using local materials and experimenting with new green-building technologies. <gvvd@princeton.edu; chennet@terrametricsllc.com>

In January Art Ferri ’86 stopped by to say hello. He was visiting the campus and hopes to teach finance at Princeton's Bendheim Center. <Art_Ferri@Yahoo.com>

Peter Fiske ’88 reports from the top of an elevated water tank 150’ up in Stockton, CA (right). His new company, PAX Water Technologies, designs and makes energy-efficient treatment equipment for the municipal water market. Here he is doing some tests on such a tank. “It’s so nice to have an outdoor component to my work again after years in a lab or office!” <peterfiske@yahoo.com>

Sarah Hougen Poggi ’92 responded to The Smilodon that she is now the Medical Director of the Perinatal Diagnostic Center at Alexandria Hospital in the DC suburbs and is an Associate Professor of Obstetrics at Georgetown Medical School. She notes that the foundation she got at Princeton has allowed her to publish and move up the academic ladder even though she is at an outside hospital. <Sarah.Poggi@inova.org>

Bamidele Otemuyiwa ’08 writes that since graduation he has been at Washington University, St. Louis, enrolled in the Ph.D. program in geochemistry. <b.otemuyiwa@gmail.com>

Patrick Schultz ’08 is now an associate with the Munich office of McKinsey & Company, a management consulting firm. <http://www.patrice-schultz.com; email@patrice-schultz.com>

Anita Adhitya ’09 is now in Perth, Australia, “where the sun shines and the skies are blue.” She looks forward to an eco-city design workshop in Huludao, China. She’ll be working with environmental engineers, who will provide eco-technology support on a project organized by Les Ateliers, a non-profit French organization. <aadhitya@alumni.princeton.edu>

Honors

Michael Bender, faculty, was awarded the 2008 Roger Revelle Medal by the American Geophysical Union (AGU) at its Fall meeting, for his seminal contributions to geochemistry and biogeochemistry, culminating in his work on O2 and its isotopes that transformed the use of glacial ice cores in paleoclimate studies. In 1993, Syukuro Manabe, AOS Senior Meteorologist, received the Roger Revelle Medal.
Around the Department

In the faculty area: Blair Schoene, a postdoc at the University of Geneva, has been appointed to the faculty. A specialist in geochronology and structural geology, he received his undergraduate degree from Colorado College and his Ph.D. from MIT.

In the staff area: In a March ceremony, the university recognized several staff members for their years of service. Among the honorees were: Faculty Assistants Roseann Wurst (20 years), Susan Taxson (10 years), IT Director Brian Mohr (10 years), and AOS Graduate Administrator, Johann Callan (25 years).

Arrivals: Albert Tarantola, Visiting Professor from Institut de Physique du Globe, Paris will teach GEO546, Inverse Problems; Visiting Fellow Michael Slawinski, Memorial University of Newfoundland, is on sabbatical and will collaborate with faculty members Jeroen Tromp and Frederik Simons; Visiting Student, Hom Nath Gharti, Norsar (Geo-Scientific Research Institute in Norway) will work with Tromp and Visiting Fellow Ahmed El-Sabbagh, a Fulbright Council Exchange Scholar from Alexandria University, Egypt, and will collaborate with Gerta Keller, Faculty; and in AOS, postdoc Maxim Nikurashin from MIT will be working with Sonya Legg, Research Oceanographer, on a research project involving abyssal mixing in the ocean.

New staff arrivals: Joseph Majkut, Technical University of Delft, Netherlands, is an associate professional specialist, working with Jorge Sarmiento, faculty, developing and running computer models.

Farewells: Frank Yi Wang, lab manager for Dan Sigman, faculty, has taken a consultant position in San Diego; and Bruce Barnett, technical staff member with Michael Bender, faculty, has taken a Research Scientist position at CAMAS (Center for Archaeology, Materials, and Applied Spectroscopy) at Idaho State University, Pocatello, Idaho.

2009 Killington Winter Retreat

For three days in February, a group of 49 GEO and AOS graduate students, faculty, and postdocs headed north to Killington, Vermont, for the annual Geosciences winter retreat. As in years past, the goals of the retreat were to foster scientific interaction within the department by providing a forum for the presentation of student and post-doctoral research and to create an environment where personal relationships could be initiated or strengthened.

The weekend began with research presentations in Guyot Hall to the entire department was invited. In addition to four other fascinating talks, graduate student Ying Li, AOS, described atmospheric teleconnections between the Pacific and North Atlantic, and graduate student Sean Long detailed the advances he has made in understanding the tectonostratigraphy of Bhutan through field mapping, petrography and detrital-zircon geochronology. Next, retreat attendees piled into the bus for the ride north to Killington, Vermont. Their arrival in the Green Mountains was greeted by drifts of snow and smoke emanating from the chimney of Turn of River Lodge, where they spent a very comfortable weekend.

The level of skiing experience within the group ranged greatly, but everyone enjoyed themselves tremendously. After a day of playing in the snow and showers back at the lodge, the group headed to the Killington Grand for dinner and a poster session. Organizers had worried that a post-ski, post-dinner poster session might lack energy, but such fears turned out to be unwarranted. It seems that 40+ Princeton grad students confined to a room with 14 exciting research posters inevitably leads to lively scientific interaction and debate.

On the last day some of the group, led by intrepid department chair Bess Ward, opted to sweat their way up and down the hills of the Mountain Meadows cross-country ski area, while everyone else returned to the slopes for another wonderful day’s skiing. Alas, all too soon it was time to return to snowless New Jersey, where another year of hard work in the lab will hopefully warrant exciting results to present at next year’s retreat. Thanks to grad students, Nick Swanson-Hysell and Sarah Fawcett for this report.

Grad students Sarah Fawcett, Catherine Rose, and Jessica Hawthorne take to the slopes.

Books


The father and son team went on an enormous ego trip producing a successor to the 1964 book The Architecture of Molecules by Linus Pauling and Roger Hayward. They present 50 full-page computer-generated illustrations with short essays for each illustration. Examples are drawn from general chemistry, mineralogy, biology, and technology. Lord Ronald Oxburgh *60 comments, “...this volume is one of the first to give us a superbly illustrated glimpse of the micro-world that controls almost every aspect of our everyday lives -- both useful and enjoyable!”

Deaths

Allen Van Heyl, Jr. *50
October 24, 2008

Charles Bell Newmarch *51
December 21, 2008

Charles Henry Tenney II *41
April 10, 2008

The Smilodon 11 Spring 2009
Reunions Alumni/ae Reception
Friday, May 29
3:30 pm - 5:00 pm Guyot Hall

3:30 - 4:00 pm: Tours of the laboratories and research space in the Department
4:00 - 5:00: Visit with faculty and students in the Great Hall

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