SORRY, LEVI, BUT THANKS FOR THE MEMORIES:

AN ELEGY FOR A HISTORIC MINERAL COLLECTION

Peter J. Heaney

The Columbian Exposition of 1893 celebrated the discovery of the New World four centuries earlier, and many regard it as the greatest of the World's Fairs. Sited on 700 acres in the burgeoning metropolis of Chicago, it showcased America's natural and technological bounty just as the United States was emerging as a dominant global power. This was the place where Aunt Jemima syrup, Cracker Jacks, Juicy Fruit gum, and Pabst beer were introduced to the public. Ninety-nine foreign countries participated in the event, and 27 million people—a quarter of the US population at the time—attended the fair over its six-month duration. Because the mineral discoveries of the American West were a continuing source of wonderment and pride, an entire building dedicated to the mining industry was included for the first time at an international exposition. It was an unprecedented opportunity for the population to admire prime examples of the nation's mineral wealth, and Henry Ward (of Ward's catalog fame) displayed his vast collection over an area of 5000 square feet.

Other mineral enthusiasts paraded their specimens alongside, and the top prize for beauty went to a spectacular set of nearly 700 minerals that had been assembled by a mineralogist at Colorado State University. This suite contained some of the finest examples of velvety azurite and malachite from the Copper Queen Mine in Bisbee, Arizona. Levi Smith, a driller of oil wells in western Pennyslvania, purchased this blue-ribbon set, and before his death in 1917, he donated the collection as a memorial to the local high school in his small town of Warren in northwestern Pennsylvania. The Warren County school district lacked the financial means to exhibit the minerals properly, however, and in 1935 the school loaned the suite to what was then the Pennsylvania State College to assist in the education of prospective engineers enrolled in the School of Mines and Metallurgy. The faculty installed the Levi Smith collection in the Mineral Industries building, where it became the centerpiece of the Earth and Mineral Sciences Museum at Penn State for over half a century. There it served as an integral laboratory component for budding geoscientists, materials scientists, mineral engineers, and chemists, and thousands of school children and tourists visited it each year.

By the time this article is published, the Levi Smith collection will no longer exist. On December 3, 2006, in Los Angeles, Bonhams and Butterfields will auction it piecemeal for an estimated $250,000 to $350,000. How can this have happened?

Well, it happened at Penn State in the same way that it is happening to historic mineral collections at innumerable universities and small museums throughout the US. What follows is a fairly typical recipe:

Step 1: Starve the beast. Considerable financial resources initially were directed towards the creation and curation of the Earth and Mineral Sciences Museum at Penn State. Wood and glass cabinets lined nearly every inch of the spacious hallways in the Steidle Building, and a large room with a security system was designed to highlight the more valuable members of the collection, particularly the Levi Smith specimens. A full-time curator was hired to maintain the cases, design new exhibits, and provide a bridge that linked the museum to the faculty, the surrounding schools, and the general public. Guards were paid to maximize museum hours, especially on Saturdays to take advantage of football traffic.

Over the last decades, however, the museum budget shrank to nearly zero; the college allocated no funds for new acquisitions or for updating old displays. The full-time curator retired and was replaced by a graduate student still working towards his doctorate. Support for security drastically decreased, and the museum had to close on Saturdays. Inexorably, the museum adopted a forlorn and bedraggled character as the broken fluorescence booth remained unattended for years, the displays grew grimier, and the number of visitors diminished.

Step 2: Carve up the space. The 1970s launched a steep decline in the US mining industry, and student enrollments in economic geology dropped concordantly. As schools of mining and metallurgy struggled, healthier programs grew at their expense and out-competed them for resources. Materials science long has been a juggernaut in Penn State research, and the materials group steadily engorged the laboratories and offices once occupied by faculty in mining and metallurgy. The space occupied by the aging mineral collection was unable to withstand the pressing tide. And so it was that three years ago the EMS gallery was formally ceded to the materials science department.

Step 3: Box the minerals for "safekeeping." No administrator worth his three-piece suit will look a geology professor in the eye and admit that a historic mineral collection is a logistical headache he could happily do without. And so promises are made, sometimes benevolently, that a new and better space will be created for the display of the prime specimens. In the meantime, however, the minerals have to be packed into boxes and stored until the arrival of the big donor who will resurrect the museum. This, of course, is the tipping point at which the deterioration has become terminal.

Penn State did renovate a smaller space on the ground floor of the geology building for a new museum, but this will be a museum about ideas and not objects. The space will focus on the processes that govern Earth systems so as to highlight the diverse interests of all faculty. Video and computer graphics are a versatile and efficient means of conveying such information, and three such stations already have been installed.

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Inanimate mineral specimens are anachronistic in this reconception of the Earth sciences museum, and nearly all of the EMS collection was sealed in cartons. Finding secure and climate-controlled storage space has proved to be devilishly difficult. The Levi Smith collection alone filled 65 boxes. For reasons that remain between him and his god, the former curator suggested to his recently arrived successor that he could ameliorate this problem by returning the entire set to the Warren County school district. Not realizing the historic and scientific value of the collection, and without asking the questions that might have been asked, the new curator agreed. The Warren County school district was delighted. They contacted Bonhams and Butterfields and eagerly await the financial windfall from this forgotten asset. The Pittsburgh *Post-Gazette* reports that the Levi Smith income will allow the school district to "maintain and update its buildings."

Just as the loss of a loved one sensitizes a person to the distress of others in a way to which no other experience is commensurate, my anguish over the destruction of this unique and beautiful collection forces me to ask whether we are doing enough to preserve our mineralogical heritage. In the words of Jeff Post, curator of the mineral collection at the Smithsonian Institution, "Once a collection is treated as a commodity rather than a scientific resource, then the scientific community has abdicated its responsibility to the donors who have endowed museums to safeguard their collections and to future generations of scientists who may require that collection for ground-breaking research."

Perhaps it is time for mineralogical societies to join together in a formal effort to prevent the repetition of this sad story. We are all aware of academic collections that are currently at risk. We must make it a priority to educate our colleagues and their administrators at those institutions

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Meet the Authors

Abdesselam Abdelouas is an assistant professor at the École des Mines de Nantes (France). He received a PhD in geochemistry from Louis Pasteur Université, Strasbourg (France). His PhD work focused on the corrosion of natural and nuclear glasses in salt solutions. He then joined the University of New Mexico as a postdoc and a research scientist, where he worked on nitrate and uranium bioremediation. In 2004 he completed his *habilitation* in radiochemistry at the Université de Nantes. His recent areas of interest include the biogeochemistry of radionuclides, such as technetium, iodine, and selenium, and also the effects of α, β, and γ radiations on nuclear materials, including glasses and crystalline ceramics, under aqueous conditions.

Jordi Bruno was born in Barcelona, Spain, and received his MS in analytical chemistry at the Autonomous University of Barcelona in 1977. He did his PhD in inorganic chemistry, studying the thermodynamics and structure of Be(II) hydroxy-carbonate complexes at the Royal Institute of Technology of Stockholm (KTH), Sweden, with Prof. Ingmar Grenthe. In 1986–87 he obtained a post-doctoral position with Prof. Werner Stumm at EAWAG-ETH, Switzerland. In 1983, he had already started working on the chemistry and geochemistry of actinides, with particular emphasis on the processes controlling the stability of spent fuel under geological disposal conditions. At present he is international director of Enviros Ltd, managing director of Enviros Spain, and head of the Enresa-Enviros Sustainability and Waste Management Chair at the Technical University of Catalonia (UPC) in Barcelona, Spain.

Peter C. Burns is professor of mineralogy and chair of the Department of Civil Engineering and Geological Sciences at the University of Notre Dame. He received a BS in geology from the University of New Brunswick, an MS from the University of Western Ontario, and a PhD from the University of Manitoba. His research interests include the structure, stability, and occurrences of low-temperature minerals, especially those containing essential uranium. He also studies the solid-state and solution chemistry of neptunium and plutonium, and factors that impact the mobility of these elements in the environment.

Rodney C. Ewing is the Donald R. Peacor Collegiate Professor and chair of the Department of Geological Sciences at the University of Michigan. He is also a professor in the Departments of Nuclear Engineering & Radiological Sciences and Materials Science & Engineering. His research focuses on radiation effects in minerals, ion beam modification of materials, and the crystal chemistry of actinide minerals and materials. He has written extensively on issues related to nuclear waste management and is a co-editor of two volumes on this subject: *Radioactive Waste Forms for the Future* (1988) and *Uncertainty Underground* (2006). Rod is a past-president of the Mineralogical Society of America and the International Union of Materials Research Societies and currently serves on the Nuclear and Radiation Studies Board of the National Research Council.

Bernd Grambow graduated from the Freie Universität Berlin in chemistry. He is a full professor in radiochemistry at the École des Mines de Nantes. After working for one year at Pacific Northwest National Laboratory, ten years at Hahn-Maitner Institut Berlin, and eight years at INE-FZ-Karlsruhe, Germany, he is currently head of the radiochemistry laboratory of SUBATECH, a mixed research unit in Nantes, France, operated by the École des Mines de Nantes, the IN2P3, and the Université de Nantes. He is coordinator of various European research projects in the EURATOM programme. His main research interests are in nuclear waste form alteration kinetics, the migration of radionuclides in the geosphere, actinide and fission product geochemistry and thermodynamics, and the development of a methodology for long-term performance predictions.

Amanda L. Klingensmith is a graduate student in environmental mineralogy and actinide chemistry at the University of Notre Dame. She received her BS from Miami University of Ohio in 2002. Her research focus is the experimental investigation of the incorporation of Np(V) into the structure of uranyl minerals in the context of the performance of a geologic repository for nuclear waste.

Gregory R. Lumpkin was born in Richmond, Virginia, and became interested in geology and mineralogy at a young age, visiting many classic mineral deposits in the eastern USA and Canada. He obtained BSc and MSc degrees in geological sciences at Virginia Tech, then worked in the Physics Department at the University of California, Berkeley. Thereafter, he obtained a PhD in geology at the University of New Mexico and went on to work at the Australian Nuclear Science and Technology Organisation as a materials scientist. He was employed by the University of Cambridge for four years, where he worked on the solid-state chemistry and physics of high-temperature oxides, prior to moving back to Australia this year.

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to make them understand that old collections contain specimens that are unique, that future directions of science are unpredictable and may hinge on the accessibility of specific materials, and that once these trusts are in private hands they no longer are objects of science.

On December 3, Penn State will be bidding online for one or two specimens from the Levi Smith suite as mementos of the collection that once graced the best part of our museum. Wish us luck.

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