Narrative Section of a Successful Application

The attached document contains the grant narrative and selected portions of a previously funded grant application. It is not intended to serve as a model, but to give you a sense of how a successful application may be crafted. Every successful application is different, and each applicant is urged to prepare a proposal that reflects its unique project and aspirations. Prospective applicants should consult the Division of Preservation and Access application guidelines at http://www.neh.gov/grants/preservation/sustaining-cultural-heritage-collections for instructions. Applicants are also strongly encouraged to consult with the NEH Division of Preservation and Access staff well before a grant deadline.

Note: The attachment only contains the grant narrative and selected portions, not the entire funded application. In addition, certain portions may have been redacted to protect the privacy interests of an individual and/or to protect confidential commercial and financial information and/or to protect copyrighted materials.

Project Title: Improving Environmental Conditions for Historical Collections

Institution: American Precision Museum, Inc.

Project Director: Ann Lawless

Grant Program: Sustaining Cultural Heritage Collections
I. INTRODUCTION

The American Precision Museum (APM) is housed in the 1846 Robbins and Lawrence Armory, a National Historic Landmark, in Windsor, Vermont. It was here in this building that Robbins, Lawrence, and their associates perfected the system of making guns with interchangeable parts. Windsor is considered the cradle of “Precision Manufacturing,” and developments here led to the foundation of the machine tool industry in America. That industry in turn led to the development of mass production, which makes possible mass communication, rapid transportation, modern standards of sanitation and medical care, abundant food and clothing, and the leisure for universal education. Ours is not the well-known story of the New England textile mill operators, but the lesser-known story of inventors and machinists who made possible the mass production of interchangeable parts.

The armory building itself is significant for its architectural integrity. Both inside and out, it shows visitors the size, scale, and operation of a 19th century factory. With structural brick walls, timbered framing, heavy floors and a cupola, it is a typical example of a mid—nineteenth century northern New England factory building. In 2001, it was designated a special project of Save America’s Treasures; and in 2003, APM received a Save America’s Treasures award of $200,000 for the installation of a new slate roof to replace the deteriorated original. In 2007, APM and other town partners in Windsor, Vermont, were awarded a Preserve America grant to create interpretive signage and to update and expand an architectural walking tour. APM is a heritage site along the Connecticut River Byway, designated a national scenic byway by the federal Highway Administration in 2005. The American Society of Mechanical Engineers designated it an International Heritage Site and Collection in 1987. For each of these designations, the site was deemed not only a place where pivotal events occurred in the history of American industry, but also a site that lends itself to thorough interpretation of that history through its outstanding machine tool collections.

The Project

The purpose of this year-long project is to develop plans to improve environmental conditions at the Armory building where most of the collections are stored. The plan will promote the longevity of the building itself. Collections stored offsite at the museum’s Annex building and those in rented storage at the Blanchard building (also called Cone or Cone-Blanchard) will also be considered. This planning project will bring together a team of museum staff, two key trustees and four consultants including a conservator and a preservation architect working with a civil and a mechanical engineer. The consultants will study existing information in advance and explore on-site, then draft architectural and engineering strategies, and convene again together to review these
ideas for consistency and compatibility. The plans will be finalized to a level sufficient to seek implementation funding. The consultants will also assist in developing proposals for implementation.

Organizational Profile APM was founded in 1966 by Windsor native and engineering historian Edwin Battison, who spent most of his career as a curator of horological collections at Smithsonian. Today APM has three full time staff, an executive director, collections manager and collections technician who also acts as custodian. One part time development clerk/visitor services position is supplemented on a consulting basis with both a development/communications expert approximately half time and a part time finance manager. We contract for curatorial, exhibit design and education services. The operations budget is $400,000 in the current fiscal year and capital projects have recently ranged from $300,000 to $50,000 annually. The museum is open daily from late May through October and we welcome 5,000 visitors annually. A team of volunteers and trustees fulfill 35 reference requests each year as well as other volunteer duties.

Mission Statement The American Precision Museum (APM) is a national center for the collection, preservation and interpretation of the history of precision manufacturing. Our mission is to enhance public understanding of the importance of precision manufacturing, the ingenuity and entrepreneurial spirit which drive it and its effect on our everyday lives. (2007-04-28)

Strategic Plan This project ties together preservation priorities for both facilities and collections outlined in APM’s strategic plan adopted Jan. 24, 2009. (excerpts in attachment 8, strategic_plan_and_reports) Regarding the collections, the preservation goals are to improve humidity control in storage areas; separate the Archival/Rare Book collections into their own climate controlled area, as their needs may be more stringent than those of most of our three dimensional artifacts; and write a Preservation Plan for the collections. Planning for the buildings entails four priorities, which must be addressed simultaneously as they are all related: routine maintenance, restoration (as it is an historic building), rehabilitation (meaning changes for adaptive reuse of this former factory), and long term real property planning (particularly in regards to the Annex property and needs for collections storage). The plan asserts that an architectural master plan is needed to plan for both space and land use, and it must encompass priorities for collections care.
II. COLLECTIONS AND THEIR SIGNIFICANCE

Collections Overview The museum’s holdings include an unparalleled collection of industrial machinery spanning the first hundred years of precision manufacturing, along with fine examples of early machined products including rifles, sewing machines, and typewriters and a collection of models. Archival and book collections provide additional resources supporting the artifact collections. Three dimensional collections consist of approximately 5,000 artifacts, which are used in exhibits here, loaned to other museums, and the subject of education programs and research inquiries by both scholars and the public.

Machine Tools Included are single and multiple spindle lathes, shapers, planers, milling machines, single and multi spindle drills, and grinding machines. The highlight of the collection is a group of machines developed in the museum’s building by Robbins & Lawrence in the 1840s for the quantity production of firearms with interchangeable parts. The remainder of the collection spans over two hundred years, representing the major advances in precision manufacturing from the earliest uses of the slide rest up to the introduction of computerized numerical controls. The collection includes machines that were powered by foot, water, and electricity. Measuring Devices and Hand Tools The collection includes measuring devices such as comparators, calipers, and gauges that were used to measure parts of machines and their products. Artifacts in this category include precision measuring devices made by Brown & Sharpe and Starrett, along with machinists’ tool chests, complete with their hand tools, ranging in date from approximately 1890 to 1950. The collection also includes measuring devices from the lab of Thomas Edison, including a set of Johannson Blocks. Sewing Machines After 1850, many of the gun making machines were retooled to make sewing machines, such as Edwin Clark's Revolving Looper, made by Lamson, Goodnow and Company in Windsor. Many of the earliest sewing machines in the collection are extremely simple and entirely functional. Later machines, built after the mechanical technology improved, are beautifully crafted. Painted trim, mother-of-pearl inlays, and manufacturers’ medallions decorate the machines, which are mounted in carefully crafted wooden cases. The major manufacturers represented in the collection are Howe, Singer, and Willcox & Gibbs. Typewriters The typewriter collection includes examples by Barlock, Remington, Oliver, the Northern Typewriter Company, and many others. The Hammond No. 12 Multiplex, developed in the 1890s, prints with the hammers striking the paper from behind. The Blickensderfer, first introduced at the Columbia Exposition at the Chicago World's Fair in 1893, has a changeable type wheel, allowing the use of different fonts or languages. The variety and ingenuity of these early typewriters is well represented by over fifty typewriters in the collection. Firearms The museum's extensive gun collection traces the history of firearm design and construction in the Connecticut Valley,
beginning with custom guns made by Nicanor Kendall, David Hall Hilliard, and Asa Story. Moving into the era of the factory-made gun, the collection includes examples of every gun manufactured in the museum’s building over its long history, including the Enfield Minie rifle and the 1841 Mississippi Rifle made by Robbins & Lawrence, the Model 1861 Special Musket manufactured by Lamson, Goodnow & Yale, the Jennings rifle, the Palmer carbine, the Ball repeating carbine and the rare Windsor Sharps rifle.

**Archives and Library collections** include APM’s own institutional records, corporate records, personal papers, books, periodicals (an extensive collection of early editions of *American Machinist* and *Scientific American*, trade literature, and patent materials. Formats include photographic materials such as film and glass plate negatives, slides, prints, and sound and moving image materials, architectural and mechanical design drawings and blueprints. The most significant archives collections are:

- Jones & Lamson Company records, Photograph Collection, Reference Patent Collection
- Records of various of the Lamson companies, including payroll and account books, shop inventories
- Jones and Lamson Co. records, President James Hartness Files, 1891-1924
- Howard Finn Collection of Russell Porter drawings
- Philip Bayer Collection (brochures, catalogs, and manuals for machinery)
- Sloan & Chase Manufacturing Co. records, Newark NJ, blueprints
- Trade literature: manufacturers product catalogs and promotional publications, A – Z
- National Acme Co. records, c. 1940-70
- Flat file with drawings from Robbins & Lawrence (1840s), Sloan and Chase, Jones & Lamson
- Cone Automatic Machine Co. records
- D & H Scovil Company records, including ledgers from mid 19th century
- Cincinnati Milacron photographs
- Waltham Watch Company records

**Related artifact collections** are held at Smithsonian National Museum of American History. **Related archival materials** are held there as well as at Connecticut Historical Society (Photographs and Sketches of the Colt Patent Fire Arms Manufacturing Company, ca. 1864-1926. 425 photos, negatives, prints, catalogs, drawings. Includes views of the factories, portraits of employees, inventors, firearms, gun manufacturing equipment, mechanical drawings and advertisements); Henry Sheldon Museum, Middlebury, VT (Papers of Isaac Markham, c. 1810 cotton mill mechanic); Manchester Historic Association Research Center, Manchester, NH (Records of the Amoskeag Machine Company, includes materials on manufacture of firearms during the Civil War using machines made in Windsor, VT); National Archives, College Park,
MD (Records of the Springfield Armory, 1799-1924); **Norwich University** (The Guy Hubbard Collection of early Vermont firearms); **University of Vermont** (Papers of James Hartness of the Jones & Lamson Company); **Vermont Historical Society** (Albert Flanders Collection, memoir of Ernest V. Flanders, treating the machine tool industry; English-Livermore Collection contains business correspondence, legal papers, patent agreements, photographs, and family correspondence treating the work of machinists and inventors, 1789-1871; Daybook of Farnsworth & Hoit, woolen manufacturers, 1859-65; Records of Sam Daniels Manufacturing Company, 1892-1969, including photos, diaries (1892, 1894), brochures, scale models artifacts; Papers of Nathan Stone (1755-1918), includes papers of David Hall (1755-96), both early settlers and businessmen in Windsor.

Smithsonian’s **National Museum of American History Library** contains a large collection of trade literature. **California Institute of Technology, Institute Archives**, has papers from Russell W. Porter, architect and telescope maker. **Harvard University, Baker Library**, has the Waltham Watch Company Records, 1854-1941, and Smithsonian Institution, **National Museum of American History, Division of Work & Industry**, has Waltham Watch Company drawings, 1866-1928. **University of Vermont, Bailey/Howe Library, Wilbur Collection**, contains the personal papers of James Hartness, president of Jones & Lamson Machine Company. The **Cincinnati Historical Society Library** has records of Cincinnati Milacron and they did not want the collection APM acquired. **Rhode Island Historical Society** has the Brown & Sharpe Company records. No other repositories were found for records of Sloan & Chase Manufacturing, Gardner Machine Works, Cone & Blanchard Machine Company or the Cone Automatic Machine Company.

**The value of the collections** for research, education, and public programming in the humanities has been recognized by NEH. Many of the APM artifacts and archival materials described above were used in a 2008-09 interpretive planning project funded by NEH. The project resulted in a proposal pending with NEH for implementation to build a new exhibit *Shaping America: Machines and Machinists at Work* to open in 2013. The humanities themes we are developing are stated as follows: (1) **Innovation**—What is it? How does it occur? (2) **Work**—How are technical training, craftsmanship, and skill passed along? How important are these attributes today? (3) **American Culture**—How did the machinists and tool builders of “Precision Valley” influence the course of American history, helping drive rapid industrialization, the emergence of the United States as a world power, and the development of the consumer culture? Our work on these themes builds upon the scholarship of Merritt Roe Smith and David Meyer on the role and nature of innovation in 19th century America; Edwin Battison, David Hounshell, and Donald Hoke on the development of the American System; and Steven Lubar and Brooke Hindle on the role of machinery in the broad sweep of American history. (A support letter from Dr. Lubar is included in attachment 7, appendices.pdf.) Dr. Lubar and Dr. Smith are both advisors on our interpretive planning team. Our goal for the new exhibition and related programs is to encourage visitors to
make connections between American history, their own lives in the present, and the future of the American culture and economy.

The collections’ relevance to the institution’s mission is extraordinary, and steps are underway to guide its future development. The Collections Management Policy was first adopted in 1994 and most recently amended in January 2009 to define a permanent collection distinct from a programmatic collection. The permanent collection requires the highest standards of care and use, and the standards for the programmatic collection are more relaxed. Although the policy addresses collections planning in a very preliminary way, its primary function is to provide guidelines for administration of accessions, deaccessions, and loans.

III. CURRENT CONDITIONS

Armory Current temperature and humidity conditions in the Armory are threatening to the collections and the building itself. The main block of the Armory is 40 x 100 feet, three stories high plus basement and attic. The exhibit hall occupies the main floor and the storage areas occupy the 2nd and 3rd floors, and a few artifacts are in the basement and attic. The Armory’s biggest issue is too much humidity. The problem results from difficult site terrain adjacent to the west end of the building. Runoff finds its way to the lowest point, which is a stone lined wheel pit in the dirt floored basement. The wheelpit is one of only a few remaining features of the original 1846 power system that diverted water from the adjacent brook to a breast wheel positioned in the pit, which in turn, drove a system of gears and pulleys to power line shafts connected with leather belts to machine tools on the factory floors above.

In December 2009 the Historic American Engineering Record (HAER), a program of the National Park Service, will wrap up a two year study of the waterpower system and the evolution of the Armory building from 1846 to the present. The report will be transmitted to the Library of Congress where it will be posted on the American Memory website. APM leadership felt it was inappropriate to make any changes that might adversely affect any of the building’s significant historic features, including those in the basement, prior to completing this documentary project. Now that the study almost completed, it is time to address the moisture problems in this building whose design and purpose entailed bringing water into the basement.

In addition to the main block, the Armory also has a 30 x 40 ft. wing on the eastern side which houses the lobby/exhibit/program area on the 1st floor and office space, book storage, and a storage closet on the 2nd floor. Both floors of the wing are equipped with window air conditioner units and baseboard heat. The main block is unheated and no air conditioning units are used.

Annex The Annex is a dilapidated former video store adjacent to another APM property, the site of the foundation of the former 1760 Israel Curtis gristmill. At the time of purchase, there was talk of making it a visitor center. The 1999 Conservation Assistance Project (CAP) report on the Armory included an urgent recommendation to remove heavy books and papers from the Armory upper floors. They were moved to the Annex. A 2006
assessment of the Annex building concludes that it has no historic value and is in such poor condition it would make more sense to create a new resource on the site.

**Blanchard Windsor** Extremely large and heavy artifacts are stored in rented space at the Blanchard Windsor building (also called Cone or Cone-Blanchard).

Please refer to the graphs.pdf attachment for temperature and relative humidity data for exhibit and storage locations at all three sites.

**Collections Management** Following a 1999 Conservation Assistance Project (CAP) report on the collections, APM completed a Museum Assessment Program (MAP) Collections survey in 2005. (See the executive summary in strategic_plan_and_reports.pdf.) That led to a three year IMLS grant in 2006, enabling us to hire our first Collections Manager to gain intellectual control of the artifact collection and improve storage and care. *PastPerfect* collections management software was put in use and corresponding paper files were created for each artifact to hold acquisition, deaccession, loan, conservation information, photographs and reference material. Standards for data entry, legal title, inventory, recordkeeping, object marking, and access to the collections were adopted. Preventive conservation tools and practices now in place include a Housekeeping Manual, use of condition report forms, artifact dust covers made of tyvek which allows moisture to pass through, window shades in exhibit and storage areas, and acid free folders and boxes as we proceed with rehousing. An emergency response plan has been in place since 2007, the year we also adopted Conservation Guidelines to discontinue the prior “Adopt a Machine” program in which volunteers “restored” machine artifacts. In 2008 we completed an upgrade to the security detection system. NEH Preservation Assistance grants helped us to set up a monitoring program in 2004 and we have been recording temperature and relative humidity conditions in 11 exhibit and storage areas in the three buildings. In 2006 we purchased rehousing materials, and in 2008 we brought conservator Ms. Clara Deck from The Henry Ford, Dearborn MI, to assess our priorities for the large metal artifacts and advise and train our staff and trustees in special techniques and materials for preventive conservation. (A report excerpt and photos are enclosed in strategic_plan_and_reports.pdf.) The

![2nd floor storage before – a chaotic jumble](image1)

![2nd floor after – the typewriter collection](image2)
current level of intellectual control of the artifact collection is very high, with a full inventory completed, detailed location information recorded. The storage areas are better organized, cleaner and free of debris. In January 2009, the final year of our three-year IMLS funded project, with the guidance of our IMLS project advisors, we began working intensively with the Collections Committee of the Board of Trustees to write a Collecting Plan. A draft of the intellectual frameworks that will underlie the plan is nearly complete as of December 2009. Plans are underway to bring in outside experts early in 2010 to begin assessing collections groups in relation to the frameworks, and funding proposals are pending to continue this work throughout 2010.

Archives and Library The archives collection is not processed however we have location tools including a physical inventory of all storage cartons and container units, and a three ring notebook organizing information about location, content, related collections, dates, formats, and more. We estimate we have 800 linear ft. of books, including several duplicate sets of bound volumes of both patent gazettes and American Machinist slated for removal, bringing the estimate of what we would keep to about 500 linear feet. We have a detailed inventory of about 70 rare and notable volumes. In Nov. 2007 an archivist from the Archives Center, National Museum of American History, Smithsonian, completed a survey of the archives with recommendations. A brief summary of the categories of holdings is included in the Strategic Plan excerpt.

IV. PROJECT HISTORY

For the last six years, we have been working intently to create a realistic scope and plan for the activities of the museum, to preserve the collections and the historic Armory building as an artifact in its own right, while outfitting it appropriately so the museum’s functions can be carried out. This project is timely because we are now able to address the biggest concern affecting both the building and the artifacts, the excessive relative humidity. Clara Deck states in her report summary: “Plainly stated, because they are generally made of cast iron and steel and therefore prone to corrosion, the overall risks to collections due to lack of humidity controls throughout storage and exhibition spaces far outweighs any other preservation risk to the collections.” Although there is always need for more curatorial research, we have basic intellectual control of and detailed location information for the artifact collections, and we continue to move forward on the archives and library collections. The 2009 strategic plan calls for the library and archives collections we retain and collect to play a supporting role to the artifact collections. “The Museum should focus on being the best machine tool museum it can be, and leave the job of being a comprehensive history research center to those who have the resources to do so more effectively.” Thus we may assume the library and archives collections will take up no more space than they do at present, probably less, and we can now plan for the space they should occupy.

Very little historic fabric about the original water power system is extant in the basement, water power is well interpreted at many other sites, and our story could be told here with exhibits and
models. For these reasons as well as expense and liability, APM has chosen not to bring the public into the basement. The wheelpit study will provide an extremely rich documentary record that includes exhaustive background research contained in a 35 page study with a 3 page pictorial appendix, large format black and white photos of the entire building, and 12 conjectural drawings showing how the waterpower system worked and how the building evolved over time.

Many of the recommendations made in the 1999 Conservation Assessment Program (CAP) building report have been completed. In 2005-06 with a Save America’s Treasures grant, we installed a new slate roof to replace the deteriorated original which was leaking heavily, and restored over 100 of the 166 historic wood windows. In 2007 we completed extensive interior structural repairs on all three floors and the cupola framing in the attic. In 2008 we completed safety and access improvements, installed new wiring throughout the main block, and upgraded the security detection system. In 2009 we will complete the stabilization phase of a five phase, $1M masonry restoration plan written with expert input in 2008. In September 2009, using a backhoe and a camera, we located the remains of the old mill race that brought water from the adjacent mill pond in the brook into the wheelpit, information now incorporated into the report. We also investigated prior perimeter drainage efforts and why they failed. A trustee who is a civil engineer is donating survey work that will locate the positions of ledge and sloping ground, baseline data that will be essential for devising a solution to divert runoff away from the basement. There is more to do in building preservation per se - complete the masonry work, restore the remaining 40 windows, and install storm windows to protect the restored sashes. This work can proceed as funding allows.

However, we have enough information now to proceed with a planning project that relates the building to the collections. The outcome we seek is a plan designed by a conservator/preservation architect team that integrates improvements that will preserve the building and the collections.

V. METHODS AND STANDARDS

At the implementation phase, we want to be in compliance with Secretary of the Interior’s Standards for Historic Preservation and any Section 106 reviews that may be required. A support letter from Ms. Nancy Boone, Vermont’s Acting State Historic Preservation Officer is enclosed in appendices.pdf. A retired Deputy State Historic Preservation Officer for the State of Vermont is a member of our Board of Trustees and will be involved in the project. Our architect will consult with Vermont officials as our plans develop. Our Trustee engineer who is completing the survey of the west side to help with the drainage issues will also participate. We plan to continue to work with Efficiency Vermont, the state’s energy efficiency agency, as we did in 2007-8 installing new wiring and lighting and a new energy efficient heating system. It is critically important to have a conservator on our team who is a leader in caring for collections stored in historic buildings, who is up to date on standards for all our types of artifacts, and who can analyze the monitoring data, and help us plan and budget for the staff time needed to fulfill many more preventive conservation recommendations. The engineers we have chosen respect historic structures, do not over-engineer, and can address energy efficiency and sustainability. Work planned must be reversible to allow for future design developments with better tools and products than those available at present.

VI. WORK PLAN
Our project will begin in December 2010 when our team will review all prior reports, and then share a day long site exploration and team meeting. The architect and engineers will develop strategies for eliminating water from the basement, possibly through site drainage improvements, and consider providing a vapor barrier to prevent migration of moisture from the dirt floor and the wheelpit. We will explore HVAC options to provide a different range of temperature and humidity conditions to meet the requirements of different collections. Insulation and expanding the capacity of the propane furnace to provide zoned heat may also be explored. Passive measures, mechanized systems, and equipment proposed for managing or controlling conditions will be looked at, while keeping in mind the small staff size, ongoing management, energy consumption, and system performance concerns. Following consultants’ research and preliminary design work, the team will reconvene again to review the proposed options, and then complete the plans. The conservator will assist in drafting implementation proposals to put the plan in place. The project will be completed by November 2011.

VII. PROJECT TEAM

The team will consist of three staff members, two trustees, and four consultants: a conservator and an architect assisted by a civil and a mechanical engineer. Executive Director since 2003, Ms. Ann Lawless will serve as project director. Mr. Harris has served as Collections Manager since July 2009 and he will provide information about the collections. Mr. Alexander has served as Collections Technician, custodian, and facilities assistant since 1998. He will provide “institutional memory” about the buildings and any follow up monitoring and photographic documentation needed by the consultants. Trustees include Mr. Bob Dufresne, a civil engineer and Mr. Eric Gilbertson, who recently retired as Deputy State Historic Preservation Officer for the State of Vermont and now works with Vermont’s statewide non-profit preservation agency, the Preservation Trust of Vermont.

Mr. Richard Kerschner is a conservator who directs the preservation and conservation program at Shelburne Museum where he manages over 15 buildings, most with collections on exhibit or in storage. Mr. Thomas Keefe, Keefe & Wesner Architects, P.C., Middlebury VT, is a preservation architect who wrote the CAP report on the building in 1999 and has been working with us since then. Assisting Mr. Keefe will be Mr. Robert Neeld, P. E., President of Engineering Ventures P.C., a firm in Burlington VT which provides structural and civil engineering services. Mr. Neeld may be assisted by Mr. Kevin P. Worden, P.E., also from Engineering Ventures. Mr. Dan Dupras, a mechanical engineer and principal at Lane Associates in Rutland VT, will bring expertise in HVAC and energy efficiency planning. Mr. Kerschner, Mr. Neeld and Mr. Keefe have worked together before as have Mr. Keefe and Mr. Dupras. This team will be able to hit the ground running. (Resumes and letters of commitment are included in the participants.pdf attachment.)

VIII. IMPACT

This planning project will enable the American Precision Museum to move forward to fulfill its mission as never before. It will provide a blueprint for action that will enable APM to preserve the artifacts and historic building for generations to come. It will generate a self-awareness and confidence that will form a strong foundation for raising the necessary funds to implement the plan.