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# Annual Meeting Abstracts

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*The 2015 WAAC Annual Meeting was held September 29 - October 2 at Asilomar in Pacific Grove, CA*

*The papers from the meeting are listed below along with summaries prepared by the speakers.*

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## **On the Road: a Renewed Look at the Transportation Environment**

Vincent Beltran, James Druzik, Kevin Marshall, Rita Gomez, Jerry Podany, Brian Considine, Julie Wolfe, and Foekje Boersma

The Managing Collection Environments (MCE) initiative at the Getty Conservation Institute examines issues associated with the control and management of collection environments in museums, libraries, and archives. Due to an increasing understanding of the environmental requirements of cultural heritage objects and concerns for environmental and financial sustainability, this initiative uses scientific studies in both the laboratory and field to test practical solutions and an educational component to support and extend the research activities.

While the MCE initiative is multi-faceted (e.g., epidemiological study combining object and climatic data, micro-/macro-scale mechanical testing of historic materials, direct tracing of object fracture), this presentation will focus on one of its components: the Transportation Environment Assessment (TEA), which looks at the conditions to which objects are exposed when traveling from venue to venue.

The increase in loans of objects between cultural heritage institutions has increased their exposure to the transportation environment. Though the length of travel for a loaned object is typically brief, the potential exists for exposure of the object to extreme shifts in temperature, relative humidity, shock, and vibration during transport that potentially increases its risk of damage.

The packing case in which an object is housed obviously provides the primary buffer against the exterior environment

during transport. While prior research has raised the level of packing worldwide – most prominently via the 1991 Art in Transit conference – the continued development of sensor technology (including the use of field data recorders from the Monterey-based Lansmont Corporation) makes this an opportune time to reassess the performance of packing cases currently in use. Though still in progress, this presentation will provide an update on the activities of the TEA project, including in-situ environmental monitoring of objects during transport, controlled testing of various packing case designs, and a description of our monitoring protocol.

## **California Adobe: from Mission to Modern**

Seth Bergstein (Keynote speaker)

Steeped in lore and developed for practicality, adobe has shaped California building construction since the arrival of the Spanish Missionaries in 1769. Adobe construction in California architecture began with the application of Spanish construction precedents to the rugged, remote, and arid California landscape.

Yet, this simple earthen construction method would become a symbol of the romance of California and influence construction practices well into the Modern movement. In Carmel and the surrounding hillsides, Hugh Comstock would depart from his Storybook cottages and develop the Post-adobe construction method for his Mid-century ranch houses. This lecture will survey the development and conservation of adobe buildings in California by focusing on Monterey county's rich stock of extant adobe buildings – from the Carmel Mission to Monterey Modern.

## **Matter Matters: a Nuanced Look at the Materials Used to Make Objects**

Lesley Bone

Recently my involvement in two very different projects made me realize that some culture's choice of materials, for making objects, are much less straight forward that I had appreciated and are

sometimes far from our own thought process for choosing materials to make objects.

This talk will discuss firstly the choice of materials of non-western cultures with reference in particular to a diverse group of objects from the African sub continent from a wide variety of traditional cultures that were made to use as tools for legislation, healing, and religious supplication.

In many of the traditional African cultures where animism was one of the prevailing belief systems the reasons why certain materials were chosen to make specific objects were complex and involved not only the aptness of the material for the particular job but careful observation of how the material related to its environment or sometimes because of the name of the material itself but many times the evaluation of the "life spirit" of the material, be it a rock, a tree branch, or a colored earth, was of prime importance.

The second project involved working on a French period room from the 18th century, where my review of contemporary documentation of materials used to make painted paneling brought to light my own simplistic view of materials and was a cautionary tale in my over simplification of analytical results.

## **Interpreting Reuse and Later Additions in the Paintings of James Ensor**

Karen Bonne

A lot has been written about *The Entry of Christ into Brussels*, 1888, probably the most famous painting of the Belgian artist James Ensor, currently in the collection of the Getty Museum in Los Angeles. However, most of his other works did not get any attention at all and a lot of questions still remain unanswered. In 2013, the Royal Museum of Fine Arts in Antwerp launched an Ensor Research Project, to try to get a better insight in the genesis and material history of the works. Although the project is still in its early stages, there are some preliminary results that show recurrent patterns.

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This talk will focus mainly on the reuse of canvas paintings and later additions and how to interpret these in terms of conservation. Distinguishing the hand of the painter from the one of a conservator proves to be problematic in some cases, especially in 19th and 20th century paintings. The use of technologies such as macro XRF-scanning can help to unravel a bit of the mystery.

### **Flexible Approaches to Preserving Wall Paintings at an Historic Site: Conservation of Historic Painted Surfaces at Mission San Juan Capistrano, Orange County, CA (2006-2015)**

Rachel Burch and Debra May

This paper describes some of the methods and approaches we have used to conserve a number of painted interior schemes at Mission San Juan Capistrano over the past decade. Our interventions have ranged from the protective covering of 18th-century original limewash finishes, through conservation of early 20th-century historic finishes, to the restoration of later 20th-century repainting of historic schemes.

Founded in 1776, the Mission has been subject to multiple changes in fortune over the last 240 years. At an historic site with a history of continuous rebuilding and architectural modification and many phases of restoration efforts dating back to the 1920s, conservation decision-making can be particularly challenging as surviving original material is often fragmentary and its authenticity already significantly compromised. Our work there has therefore had to meet the Mission's needs for adaptive reuse and presentation of rooms to the public, while ensuring the preservation of the historic paint and plaster layers that do still survive.

### **Bouquets to Art: Risk Management for an Annual Flower Invasion**

Debra Evans

Every year for the past 31 years, up to 140 floral designers have been invited to pay tribute to artworks in the Fine Arts

Museums of San Francisco's Bouquets to Art week, the largest event of its kind in America. Teams of florists install outlandish and remarkable displays, which bring in record breaking numbers of visitors, providing the institution with its biggest fundraiser of the year.

The event also provides a big potential for insect entry and physical damage to artworks. This talk presents the story of the conservation department's collaboration in management of the risks of this extravaganza. FAMSF conservators have developed guidelines and installation aids that help to prevent ingress of harmful insects and protect works of art during a week of unusual activity.

### **Investigation and Display of an Inuit Bird Skin Parka**

Anne Getts

This presentation will focus on the investigation and display of an Inuit bird skin parka from the early twentieth century, which was chosen as one of eleven objects for a conservation-themed focus exhibition, *Featherwork: A Conservator's Approach*, at the de Young Museum in San Francisco.

The parka was examined closely using a variety of techniques including x-ray fluorescence spectroscopy, x-radiography, microscopy, and fiber identification. In addition, species identification was pursued with a visit to the ornithology collection at the California Academy of Sciences, related examples researched in collections worldwide, and contemporary sources consulted regarding the production of similar garments.

When taken together, the information gleaned from these diverse sources combines to produce a comprehensive look at the object's construction and materials, as well as contextualizing it within the evolving arctic traditions of bird skin and related clothing.

Due to the fragility of the garment, a number of display options were considered – a process that led to the construction of a custom interior metal

armature to support the parka. An interior silk lining was fabricated and the parka was then padded with bags of virgin polystyrene beads – a material that is both lightweight and malleable, allowing it to conform to the interior topography of the garment.

### **Fast and Furious: Operation, Maintenance, and Repair of Chris Burden's *Metropolis II* at LACMA**

Mark Gilberg and Alison Walker

Chris Burden's *Metropolis II* is an intense kinetic sculpture, modeled after a fast paced, frenetic modern city. Steel beams form an eclectic grid interwoven with an elaborate system of 18 roadways, including one six lane freeway, and HO scale train tracks. Miniature cars speed through the city at 240 scale miles per hour; every hour, the equivalent of approximately 100,000 cars circulates through the dense network of buildings.

According to Burden, "The noise, the continuous flow of the trains, and the speeding toy cars produce in the viewer the stress of living in a dynamic, active, and bustling 21st-century city."

In this paper the authors will discuss the on-going exhibition of this unique contemporary sculpture focusing on specific maintenance and repair issues - foreseen and unforeseen - that illustrate many of the problems inherent to the acquisition of kinetic works of art. LACMA's overall philosophy and approach to its operation and maintenance will be discussed in light of the artist and owner's expectations and the demands of the museum's exhibition program.

### **The Herculaneum Figurative Scene Survey**

Geneva Griswold and Leslie Rainer

Excavations at the archaeological site of Herculaneum, located twelve kilometers southeast of Naples, Italy, began in the eighteenth century and revealed exceptional Roman wall paintings. Of particular significance are the walls decorated with centrally-located

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figurative scenes and architectural or floral elements painted on monochrome backgrounds. Each hand-painted figurative scene is unique, depicting mythological figures, architectural landscapes, or still life compositions.

This paper will present findings of a Figurative Scene Survey, developed and undertaken by the Getty Conservation Institute (GCI) in collaboration with the Herculaneum Conservation Project (HCP) and the Superintendency of Pompeii, Herculaneum, and Stabiae (SSPES), to approximate the number of in-situ figurative scenes across Herculaneum and to document these in terms of location, imagery, technique of execution, and condition. The second phase of the survey included ex-situ figurative scenes from Herculaneum housed in the collection of the National Archaeological Museum of Naples (MANN).

Observations based on comparisons between the scenes and their condition will be discussed. Survey results assist the field team to better understand the technique of execution and condition of the figurative scenes of the tablinum of the House of the Bicentenary, and to contextualize these within the larger body of painted scenes across the site as part of a GCI field project addressing the conservation of the tablinum.

### **Evaluating Coatings for Copper Alloys: the Step-by-Step Approach**

Arlen Heginbotham, Julie Wolfe,  
Vincent Beltran, Alessa Gambardella,  
Ruven Pillay, and Michael Schilling

This paper will present an overview of ongoing coatings research at the J. Paul Getty Museum, focusing on transparent coatings for both indoor and outdoor copper alloys. Our approach has been to take incremental steps in testing various properties of coatings, with the understanding that choosing an appropriate coating requires understanding and evaluating the relative importance of many different coating properties. We will discuss three individual studies: one completed and two ongoing. While some results will be presented, the discussion will focus

on different analytical methodologies and some practical lessons we have learned along the way about how to study coatings.

The focus of the presentation will be on a completed experiment that was designed to test indoor coatings for their ability to protect brass against atmospheric pollutants, as well as to evaluate the aesthetic qualities of the coatings. This section of the presentation will concentrate on 1) the pros and cons of colorimetry as a proxy measure for corrosion, 2) the use of a flatbed scanner with Nip2 software to generate reliable and precise color measurements of test coupons, and 3) the (im)practicalities of evaluating subjective appearance in an objective manner.

Further considerations in experimental design will be discussed in the context of an ongoing study of waxes commonly used on outdoor bronze sculpture. Of particular interest, this study offers an unusual opportunity to compare natural outdoor aging with accelerated aging and consider the significant differences. Finally, we present an ongoing study of transparent coatings for outdoor bronze sculpture, including an evaluation of several in-house formulations developed based on the published composition of Incralac®. In this context, we will discuss challenges in measuring and controlling for the effects of coating thickness, as well as our preliminary investigations into the use of electrochemical impedance spectroscopy as a tool for coating evaluation.

### **Readability and Reproducibility: An Exploration of Tool Impressions in Silver Worked Surfaces**

Jena Hirschbein

This research project, which explores the readability and reproducibility of silver tool marks, began with a technical study and treatment of silver Renaissance plaquettes at the Rijksmuseum, Amsterdam and 18th and 19th-century British silver objects at the Los Angeles County Museum of Art.

An experiment was conducted at the J. Paul Getty Museum using traditional

silversmithing tools to impress marks onto surfaces of a new silver sample. These marks were then examined and measured using conservation documentation tools. They were then compared and categorized using a methodology developed in the forensic science field that characterizes impressions by class and individual features. The categorization was successful in the freshly worked silver sample, but proved challenging when the technique was applied to the examination of an 18th-century French silver tureen.

Despite some difficulties interpreting tool impressions on this art object, similar tool marks were identified and measured. A proposed future avenue of this research would be the application of pattern recognition algorithms. These technologies may prove valuable for conservators and technical art historians to study tool impressions, particularly for the purposes of authentication.

### **Enhanced Understanding of a 19th-Century Haida Tunic**

Tracy Hudson

This presentation explores the conservation of a 19th-century Haida tunic. The case study demonstrates how understanding the making of the textile informs both conservation decisions and appreciation of the object's significance.

The textile piece, from the collection of the UBC Museum of Anthropology, was prepared for loan to the Haida Gwaii Museum for the *Gina Suuda t'l' Xasii* ("came to tell something") exhibition of Haida historical and contemporary art in 2014. This project was part of an 8-week internship, and the intern was given unlimited time to research and work on the Haida garment. The freedom to work in depth led to a thorough and enhanced exploration of the piece on the technical level, which elucidated certain aspects of its story that were not evident to curators.

The tunic is a rare example of a garment made from cut up pieces of Chilkat woven blankets. The textiles known as Chilkat blankets are ceremonial capes used for dance, potlatch, and funerals amongst several different bands of the northern Pacific Coast of North America.

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There is mention in historical literature of the cutting of blankets, and of patchwork garments, but few examples are seen and known today.

The conservation task was merely to clean and stabilize the piece for travel and display in the loan exhibition, but the unique aspects of this garment compelled further study. Detailed examination of the piece, in comparison with traditional Chilkat blanket styles and weaving methods, revealed that pieces from several different weavings, not just one weaving, were used to construct the tunic. This information is important to the contextual understanding of the garment, and the value and status it would have had in its original community.

Engagement with this garment on the physical and technical levels, combined with cultural and historical research and consultation with curators allowed for enrichment of understanding, not only for the museum but also for the original community. This example demonstrates how a conservator can expand knowledge through material investigation, and share this expanded view with all those who have an interest in the value and significance of a given textile piece.

### **Holistic Environment Monitoring for Baseline Condition Assessment**

Mark MacKenzie

Recent Project and Innovative Advancements Within the Museum of New Mexico System: A small self-contained environmental monitor has been under development for the past year. Unlike most current environmental monitors used in museum artifact conservation, this monitor has greatly expanded sensing and recording abilities while maintaining a relatively small footprint and cost.

While it should be of general use within museums, a current project (presented at 2015 AIC conference) requires the collection of holistic environmental data for sensitive artwork on display. This new monitor records Rh, Temp, visible light (Lux and Ft-Candles), infrared radiation ( $\mu\text{Watts/cm}^2$ ), ultra-violet radiation

(UV A & UV C, in  $\mu\text{Watts/cm}^2$ ), and calculates Lux Hours, total infrared and ultra-violet radiation. The unit is built upon one of a number of readily available small micro-computers, uses a small organic LED screen, multiple sensors, real time clock, and writes data to a reusable SD (small digital) flash card or micro SD card for remote or in vitrine use or directly to a host computer.

As the monitor continues to be developed and refined, the presenter seeks feedback and input from conservators as well as others. This session will include a presentation on the monitor followed by an open forum.

### **Recent Treatments and Technical Examinations of Paintings from New Spain at LACMA**

Elma O'Donoghue, Joe Fronck, and Virginia Rasmussen

Since 2000, LACMA's collection of Mexican and South American paintings and decorative arts has grown considerably to include masterpieces from the early 17th century up to contemporary times. This presentation will share some recent conservation treatments and analysis carried out on new acquisitions of 17th and 18th-century paintings that might be of interest to conservators specializing in works from this period and culture.

The treatments go hand in hand with LACMA's ongoing investigation into colonial painting techniques in New Spain, the powerful Viceroyalty that once stretched from California to Chile.

The focus will be on a large, unlined canvas painting of the Virgin of Guadalupe, painted by Manuel de Arellano in 1691 that required an unusual cleaning approach. Also discussed will be the cleaning and removal of wax linings from 2 paintings of a set of 6 that feature Ecuadorean racial types in indigenous costume. Painted by Vicente Albán in the 1770s these lovely works exhibited typical problems with inherent pigment changes and the removal of overzealous repaints.

And of course the year wouldn't be complete without the discovery of a missing masterpiece, Miguel Cabrera's *From Spaniard and Morisca, Albino!* This painting, hitherto believed to be lost, was found here in Los Angeles and is the 6th of 16th from his famous and only set of Casta paintings. It is also the only one of the set to have retained its original format; that of a scroll painting suspended from decorative wooden elements.

An important aspect of these treatments was the interaction between curatorial and conservation on issues of aesthetics and the degree to which damages and patina are accepted as an inherent and valuable part of the history of a painting. With exhibition deadlines looming, LACMA's objects and textile conservators, art handlers, designers, outside conservators, and curators collaborated and advised, not just on critical stages of the treatments, but on interpretation and the authentic and safe display of these beautiful works of art.

### **3D Prints and Modern Archiving as an Adjunct to Conservation Techniques**

Martijn Remmen and Klaas Remmen

Historic engineering, militaria, and industrial heritage are in general mass produced utilities. In case of a restoration campaign of such heritage, they are often treated in a way that can be best described as maintenance rather than conservation of historical data and material.

In this case study the conservation treatment of a second world war German EM 4M R40 rangefinder is described. For documentation and museology purposes the object was measured by hand and 3D drawn in Inventor. These digital models were printed on scale 1/10 in ABS using SLS and painted by hand to clarify the archaeological remains of the rangefinder to the museum visitor.

Historical technical data on this type of object is often non-existent or very hard to find, making physical objects one of the few remaining sources. The approach of this case resulted in the ultimate conservation of historical material and

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information so it could still be used in future research, while the implementation of 3D prints and documentation made the disposition complete.

### **It Takes a (Technological) Village: a Marriage of Traditional and Modern Conservation Methodologies to Reveal Invisible 18th-Century Spanish Colonial Frescoes Found on the Sacristy Walls in the Alamo**

Pamela Jary Rosser, Dennis A. Baltuskonis, and Michelle M. Bushey

A combination of modern scientific, coupled with more traditional conservation methodologies, has been successfully employed to discover and document 18th-century colonial mission artwork. This abstract reports on the implications of recent technical and scientific discoveries regarding the interpretation of early 1700s Spanish frescoes and how three conservation specialties joined together to make the invisible- once again visible.

Traditional conservation cleaning techniques first uncovered the existence of Spanish colonial era frescoes on the interior walls of the sacristy in the Alamo Shrine, San Antonio, TX in 2000. The stencil designs discovered encompass the entire room; at wainscot level, frieze band above entry doors and along the arches of walls.

However, the traditional conservation cleaning methods did not determine all of the early 18th-century design elements. Some stencil patterns were inconclusive, other designs remained hidden. Some of the other fresco designs and pigments were only visible with UV lamps.

Two major technological advancements, multi-spectral imaging (MSI) and portable X-ray fluorescence (XRF) analysis, were then enlisted to gain further insights into the nature of the designs (uncovered through traditional methods). The ability to capture digital images in distinct (relatively narrow), wavebands of the electromagnetic spectrum, (MSI) proved indispensable in elucidating fresco design nuances, e.g. the use of "pouncing," and even the

existence of significant design features which could only be visualized under UV illumination.

These discoveries when further combined with XRF analysis verified the existence of the designs and suggests the sophisticated use of pigments of red and yellow ochre, earth green, copper green (likely verdigris), vermilion, black, possible lead white, and most unusual copper leaf. The extensive decoration, which includes the use of precious materials, suggests the source of their manufacture in both the Old and New worlds.

### **Treatment of Barbara Hepworth's *Figure for Landscape***

Julie Wolfe, Christina Simms, Herant Khanjian, and Arlen Heginbotham

Barbara Hepworth (1903-1975) is considered one of Britain's most notable modern sculptors. The J. Paul Getty Museum owns the final cast of the seven editions of *Figure for Landscape*, 1960 by Hepworth. The sculpture was donated to the Museum in 2005 by the Ray Stark Revocable Trust in good condition and despite regular maintenance, the large-scale bronze required treatment due to failing coatings and incipient corrosion.

The surface became mottled from outdoor exposure and previous restoration campaigns, making it unclear how the original surface appeared. The latter was a concern, as Hepworth was known to be particular about the color and texture of her sculptures.

The paper will discuss our approach to the project and include details about an extensive technical examination of the sculpture and our better understanding about the fabrication of the object, previous restoration history, and current condition. The treatment followed a step-by-step process with periodic analysis to understand the coating removal process. Carbon dioxide blasting and solvent cleaning removed old wax and Inralac coatings which exposed a well preserved original patina overall and dramatically improved its appearance.

The treatment of *Figure for Landscape* is the most recent work done at the Getty Museum as part of a 5-year plan to restore acrylic coatings on all fifteen of the outdoor bronzes in the collection

### **The Conservation of Mission Art: Rewards and Challenges**

Patty West and Teen Conlo

Introduced to their first Mission project in 1980 by noted historian and mission scholar Dr. Norman Neurerberg, South Coast Fine Arts has since completed work at 18 of the California Missions. Over the span of 35 years the studio has worked on the preservation of paintings, polychrome and sandstone sculptures, wall paintings, altars, tabernacles, a Rererdos, and even the old crypts in a mausoleum.

The conservation of art at the Missions has been rewarding because of the historical nature of the Missions themselves. However, along with the rewards of working on this important part of California history, there have been many challenges. From changing politics within the Mission system, the on going challenge of funding for each project, natural disasters past and present and most importantly reversing the many destructive restorations previously done.

The presentation will address these rewards and challenges and will include several before, during and after photos illustrating our journey of discovery and the uncovering of the original art of the California Missions.

### **The Conservation Project of Metal Icons and the Church Goods Collection of the Hagia Sophia Museum**

Irmak Güneş Yüceil and Tuğçe Pamuk

The Hagia Sophia Museum has a very special collection which belongs to a Slavic-Orthodox ethnic community who originally settled in Caucasia until the beginning of 1700s. A group of them took part in the Bulavin Rebellion in opposition to reforms of Peter the Great.

After their defeat the Don Cossacks left their residential area and took refuge to the Ottoman rule. They have lived in the Lake Manyas, Kocagöl, and Akşehir districts for 300 years. After the establishment of the Russian Federative Soviet Republic, Cossacks who were living in Lake Manyas district turned back to Russia in 1927. By custom, the Cossacks could marry neither outsiders nor community members related by less than seven degrees of kinship. Because of this, Kocagöl residents returned to Russia in 1962 while residents of Akşehir choose to settle in the USA.

Church goods and other items more than a century old required by custom to be left behind were registered to the Hagia Sophia Museum's inventory as cultural property. Conservation of 475 metallic church goods consisting of icons, crosses, bone casings, chalices, plates, spoons, incensory, etc. has been carried out since 2013 under the authorization of Central Laboratory for Restoration and Conservation in Istanbul. The conservation process is handled in three parts: investigation, planning, and practice.

The investigation step involves identifying the general condition of the collection and storage environment; examination of various stamps on the objects; and the differentiation among surface layers which require removal and those which should be kept. Function and techniques of manufacture are also studied. Analytical investigations consist of visual examination of the objects by digital microscopes; determination of elemental compositions of both original surfaces and degradation products by XRF, XRD, and Raman Spectroscopy.

Four remarkable issues encountered during the examination and treatment of four objects are addressed in this study. The micro-climatic environment of storage is also discussed in accordance with ICP-OES and IC analysis of the water samples collected from the storage area.

This project is being carried out by conservators at the Central Laboratory for Restoration and Conservation in

Istanbul, in collaboration with art historians of the Hagia Sophia Museum and physicists from the Turkish Atomic Authority.

### **Using Magnets as a Conservation Tool: a New Look at Tension Drying Damaged Vellum Documents**

Tammy Zavinski

It is the responsibility of the conservator to develop innovative treatment methods when existing methods may compromise the natural history of an object. In this light, how might magnets be used as a tool when objects have unique characteristics which prohibit current conservation treatment methods?

Vellum documents in particular present challenges when they exhibit a variety of damage, planar distortion, adhered objects and media which require humidification and drying methods that allow the conservator the ability to manipulate the document itself while controlling external factors. This paper examines the treatment of a vellum document which necessitated alternatives to current methods for humidifying and tension drying while retaining elements of its unique natural history.

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*"The fundamental purpose of scientific discourse is not the mere presentation of information and thought but rather its actual communication.*

*It does not matter how pleased an author might be to have converted all the right data into sentences and paragraphs; it matters only whether a large majority of the reading audience accurately perceives what the author had in mind."*

*from The Science of  
Scientific Writing  
by George Gopen and  
Judith Swan*

### **"V&A's Indian Textiles have Stories to Tell,"** *The Art Newspaper*, 10/11/2015

A 500-year-old "wearable book" kept in storage at London's Victoria and Albert Museum (V&A) for 80 years has made its public debut this month, thanks to the institution's textile conservators, who have painstakingly prepared it for display in a new exhibition, *The Fabric of India*.

The talismanic shirt, beautifully inscribed with all 6,000 verses from the Koran, would have been worn by those seeking protection in battle and from other dangers such as disease, famine, travel and childbirth. Many such garments were made in Iran and Turkey, but the Bihari script written on its starched cotton suggests that this one was made in India between 1480 and 1520.

There are no records to show how long it took to create the piece, but an example in the Topkapi Palace Museum in Istanbul took three years to complete. The object's "hybrid" status required the textile conservator Elizabeth-Anne Haldane to work with colleagues specialising in paintings and works on paper. Pigment analysis revealed that the artist used black ink, red lead, vermilion, lead white and lapis lazuli; gold was reserved to record the 99 names of God.

Haldane found the pigments to be highly fugitive, or impermanent, making it too risky to attempt to remove stains, especially the noticeable sweat marks under the arms. "I couldn't use any wet adhesives because of the pigment," she says. Creases caused by the shirt having been folded into a neat square and sent by post to the museum in 1935 can still be seen.

### **"How To Document Heritage Sites Under Threat,"** *The Art Newspaper*, 10/19/2015

A major conference in Berlin from 19-20 October will bring together heritage advocates and technology for a major conference on how digital technology is being used to preserve the world's heritage sites.

**Resilience Through Innovation** has been organised by CyArk, a California-based non-profit organisation that uses digital scanning to create a free-to-access online three-dimensional archive of the heritage sites. To date CyArk has archived data