

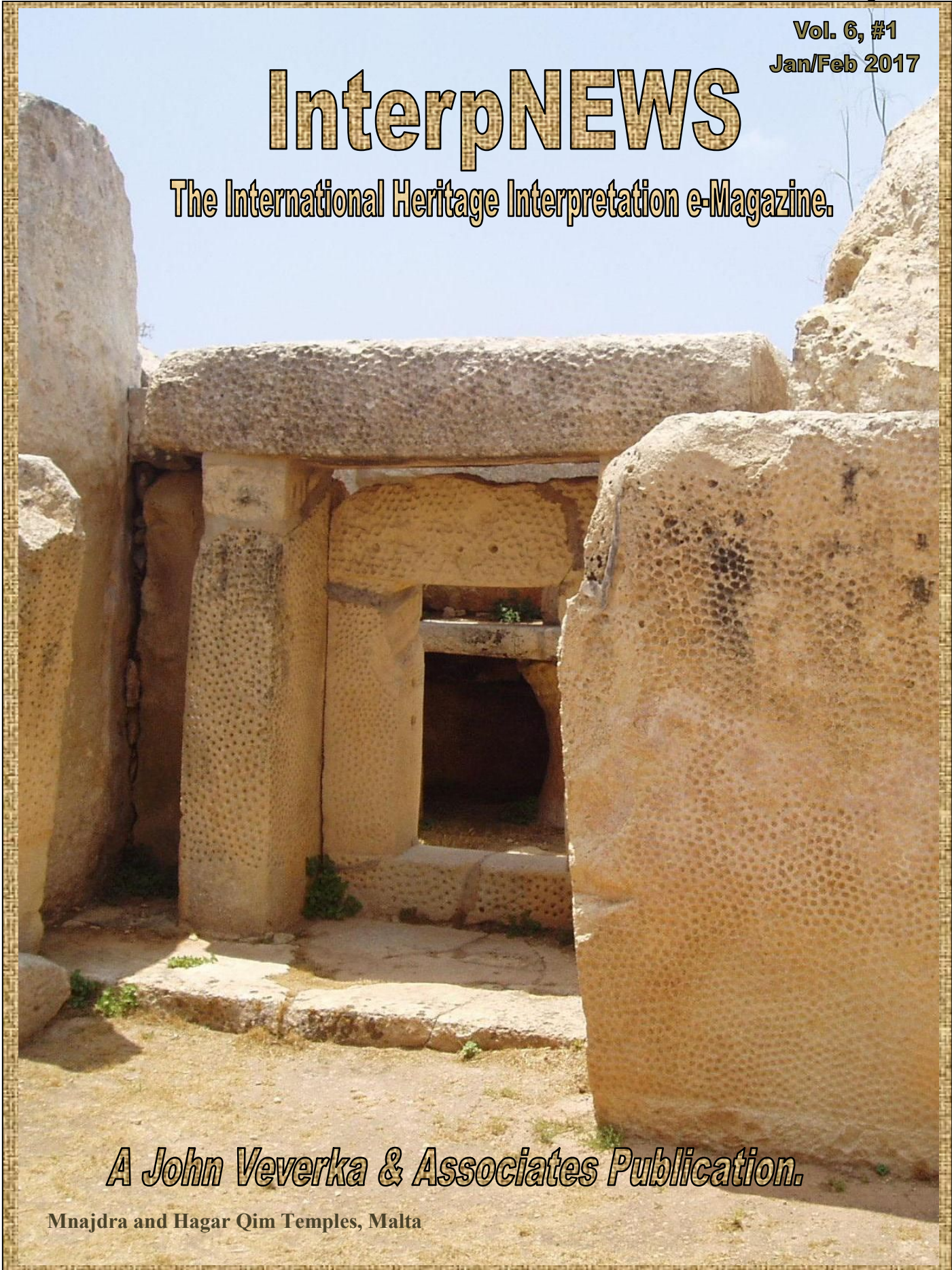
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InterpNEWS

The International Heritage Interpretation e-Magazine.

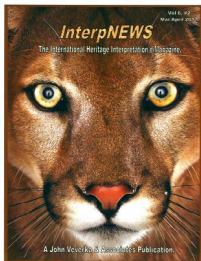
A John Veverka & Associates Publication.

Mnajdra and Hagar Qim Temples, Malta





**John Veverka, IN
Publisher.**



Here we are getting ready to start a new year. Wow - I was just getting used to the old one! Oh well. This issue of IN is one of our largest yet, over 75 pages, more than any other interpretive publication and with a wider range of topics and articles as well. I have already started putting together the March/April issue, so if you have an article you would like to submit I would welcome it. IN reaches over 300K individuals, organizations and agencies in 60+ countries - not to bad a distribution.

NEW - I have started including paid advertising in IN and want to thank our first advertisers in the Jan/Feb 2017 Issue. If you would like to advertise with us and reach more interpreters and agencies/organizations than any other magazine, you can check out our new **advertisers web site page:** Place your ad in our Mar/April issue (cover on the left), http://www.heritageinterp.com/interpnews_advertising_details.html

I hope you all will keep supporting InterpNEWS with your articles and sharing your InterpNEWS with others. Remember, all back issues of Interpretive News can be found here: www.issuu.com/interpnews. If you have ideas for articles or like to chat with me about advertising, feel free to get in touch with me at: jvainterp@aol.com. Cheers and happy and successful new year! JV

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InterpNEWS is published six times a year as a **FREE** John Veverka & Associates publication and published as a service to the interpretive profession. If you would like to be added to our mailing list just send an e-mail to jvainterp@aol.com and we will add you to our growing mailing list. Contributions of articles are welcomed. If you would like to have an article published in InterpNEWS let me know what you have in mind. **Cover photo: Mnajdra and Hagar Qim Temples, Malta.**



Interpreting Malta

Mnajdra temple on Malta.

John A. Veverka

*Interpretive Planner
Editor, InterpNEWS*



Several years ago I had the honor and pleasure of being invited by the Ministry of Tourism of Malta to present a 5-day in-depth interpretive training program on interpretation philosophy, techniques and principles for all of the historic and heritage sites management and interpretive staff on Malta. This included a chance to see, experience and discover the remarkable history of Malta and its' amazing collection of world heritage sites/temples. The cover photo is of one of them and here's the story of this one.



Photos of Mnajdra temple on Malta. Like Hagar Kim, Mnajdra is a megalithic temple dating back to 3600-3000 BC which, according to some researchers, would present particular solar arrays designed to detect the exact day of the summer solstice and winter, when the dawn of that day (and only on that day) illuminates a stone.

The Republic of Malta boasts historical and architectural monuments, amazing recreational areas. Malta is well-known for its lovely warm climate. The archipelago of Malta lies in the eastern basin of the Mediterranean. Comino, Gozo and Malta are the only three islands that are inhabited. Malta lies approximately eighty kilometers south of Sicily.

The Acts of the Apostles tells how Saint Paul was shipwrecked on the island while he was on his way to Rome to face trial. Saint Paul's Grotto is one of the earliest places of Christian worship on Malta. It is believed that Saint Luke painted a picture of Madonna in the grotto at Mellieħa.

Although small, the country's history goes back to almost 400 BC and is home to the world's most ancient and religious sites, such as the Mnajdra and Hagar Qim Temples situated on the West Coast on top of stunning cliffs from where it offers a magnificent view of Filfla.



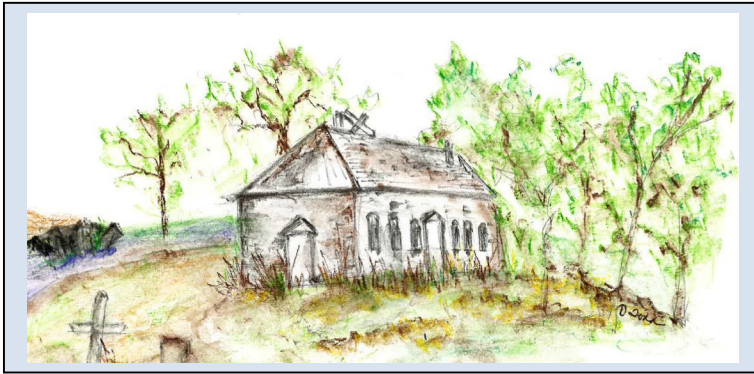
Mnajdra and Hagar Qim Temples

The Megalithic Temples of Malta are often referred to as unique architectural masterpieces. Globigerina limestone was used in the Hagar Qim temple's construction. Tourists are usually stunned to see how these temples were built with the tools that were available 5,000 years ago. The temple also accommodated animal sacrifices. Bones of numerous sacrificial animals have been found. The northern ruins are considered older than the temple itself. The temple's architecture is similar to the Mnajdra, Tarxien and Ġgantija temples.

The stone balls alongside the walls of the northern temple are theorized to have been used to transport the large and ancient upright stones. Hagar Qim is the best preserved of the several old temples in Malta. A remarkable characteristic of this temple is the larger upright stones at the corners, which are notched to take the second of horizontal courses above. The contact number for visiting the temples: phone – +356 21 424 231.

Mdina, also referred to as the Silent City, is located in the center of the island and boasts history and architecture. Surrounded by the beautiful town of Rabat, this area is romantic and becomes quiet in the evenings. Mdina is a fantastic place to wander around and enjoy a cup of good coffee.





“A Case of Bad Interpretation,”

by

Dr. Martha Benn Macdonald

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and performer.*

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All the ninth graders at Traveler’s Hill scrambled onto the bus headed for a tour of Holy Trinity Episcopal Church, a late eighteenth-century church partially destroyed by a hurricane after the Civil War. Even though the church was in ruins, parishioners celebrated on the last Sunday of each month and on Easter Sunday. Vestry members gave tours in an effort to raise money for restoration.

Because a river ran alongside the church, just below the ancient cemetery, students were overjoyed. Despite the chill that day, some planned to jump into the river, the teachers, of course, completely unaware of their scheming.

Dr. Mary Soapwort, a native of Canterbury and a scholar in Anglican history, was the tour guide that day.

She welcomed the ninth graders and showed everyone where the port-a-johns were and offered hot chocolate and donuts. “The rector’s office is unlocked; it is a two-room do just behind the church. Vestry said the priest need some sort of office. I suppose so.” She sighed as the teenagers hastened for refreshments.

Marlowe and Raleigh Hamilton, identical twins whose mother directed the community theatre and whose father was an attorney, were especially delighted to be there because they were members of Holy Trinity Episcopal Church.

“Have any of you ever attended services here at Holy Trinity?”

Marlowe and Raleigh raised their hands. “We are members.”

“And our dad is a vestry member,” Raleigh boasted. “I thought you knew us.”

“Oh, I should have known,” the woman wearing a long cape and a mink cloche peered over her glasses, her Cerulean blue eyes watering. You need to rub your face with charcoal and paste; why the blend will eliminate that acne.” Dr. Soapwort sneezed. “I have a terrible cold, but I’m glad you have come today, and we hope you’ll contribute generously to the fund. There’s a little box on what remains of the altar. I’ll unlock it for you. We’re such a small parish, so maybe some of you will consider membership. Now I want to tell you about the church, its importance in history, and the significance of the river in days gone by.

Don’t shuffle from one foot to the other, boys and girls; I imagine you want to play, but I get paid a minimum wage to do this, and I dragged myself out of bed to come here this icy morning because no one was available. Now, it is January the 20 or 21st, and legend has it that on this night, St. Agnes Eve, young girls got undressed in certain cathedrals long ago and waited for their lover to appear. Keats wrote a beautiful poem entitled *Saint Agnes Eve* about a young woman, Madelaine, who waited for her lover. Agnes who was tortured many years ago inspired Keats. Various legends were associated with her. Some say she was dragged through the streets, was tortured, or beheaded. Agnes was later martyred. Let me read a few lines from Keats’ poem (begins reading).

Some say that Susannah Belle Sims undressed here years ago and lay on the altar waiting for her lover who appeared later that evening when the moon was full. A much older gentleman, who, as it turned out, was the rector of the church, appeared, gave her supper, and within a week, married her. They argued early in their relationship, but became very close over the years. She helped Dr. Beale with his homilies. She died childless years before he did. You can see her grave down near the water. Thirty-two years later in 1831, her husband died. He was buried beside her, and over time, a rose grew up between the graves. The miraculous thing is that the rose never dies even if a gardener cuts it down. You see, it always grows back. I so longed for a suitor that I came here and undressed once, but, alas, no one ever appeared to me. Guess now with my withered limbs, liver spots, and blood-shot eyes, no man would have me (cackles). Well, run along, and enjoy your time on the grounds of this historic church. Oh, and don't forget to drop some money in the pot. Imagine it's a bubbling cauldron. Do you know about the three witches? 'Double-double, toil and trouble. . .' Thank you for coming."

Watching the guide crank up her black Saab and churn off, the teachers whispered among themselves. "What a disappointment! What that woman said was so inappropriate. I'm sure we'll have parents calling us. She didn't do what I've read every good interpreter should do," murmured Mrs. Knowles, an interpreter at a plantation site nearby."

"What do you mean?" asked another instructor.

"It's what Dr. John A. Veverka, leading authority on interpretation, among others, calls provoking, relating, and revealing in his volume one of *Interpretive Master Planning* (38-39).

"Good job," Eleanor."

While other students read tombstones, one or two tracing, one or two others jumping into the river, Marlowe hid in the woods. A lover of folklore and legends, she decided to play hooky when the kids boarded the bus for home.

"Nobody will miss me, not even Raleigh. She's sweet on that new boy from the mountains, and by the time she gets home, well, I don't know. But I'm going to hide in the church once the sun goes down. Maybe a young man will come to me." Marlowe heard her friends boarding the bus. Tired, cold, and disappointed, the teachers all forgot to check register of students and never missed the younger twin.

As the sun was setting, a dark orange ball spreading behind the pines, Marlowe crept into the church. She was so weary her eyelids were drooping. She fell asleep. When she awakened, it was late, the sky dark, the pines rustling. She dared to take off her clothes and wait. Nothing happened. She heard a mouse. Then, a rotten beam fell, and she thought she heard a voice.

"Marlowe Hamilton, thou shalt not see thy lover tonight, but on another night you must come. "Tears flowing down her cheeks, she quickly dressed and realized how hungry she was. She had only a half peanut butter sandwich, for she'd given the other half to Raleigh. She longed for a little water. "Now I wish I hadn't poured my water on the snowdrops," she sighed. Marlowe remembered her cell phone in her jacket pocket. She fished it out and called her father.

"I'm sorry, Daddy. I promise I won't ever do this again."

"What did you do?" His voice was calm.

"I'm out at the church. I didn't get on the bus," she sobbed.

"Honey, I'll be right there. I was just ready to call the police. I got in late, and your mom is still at the theatre. Raleigh was in her room. Anyway, Gran is here, so you just hold tight. I'll be there in five minutes. I love you, and, no, I'm not angry with you."

Within minutes, Marlowe heard his Mazda convertible park and her dad running into the church. He cradled her in his arms. "Pumpkin, tell me all about it." He listened as his daughter sobbed and related everything that had happened that day.

"Let's get home. Aren't you cold?"

"Uh...huh," she wept. "Mom won't be angry either."

"We won't tell her. Don't worry. It's okay. Just promise me you won't do anything like this ever again."

"I won't."

"And I'll call Katie, our rector, and members of the Vestry tonight. That woman has to go; she will go."

"I bet Marlowe told Gran," Marlowe continued as her father led her out of the church.

"Maybe your mother would train a few docents; that may be wishful thinking. She's so busy. Maybe Gran would take it on. I think she used to be an interpreter at one of the historic homes in Franklin, Tennessee."

When they got home, Marlowe told her grandmother all about the woman, and Gran who was chic and stylish at 70, smiled and shook her head. "That woman doesn't know a thing about interpretation. Why she should have followed her theme sentence, whatever it was."

"She promised to tell us about the history of the church, its importance in history, and the role of the river in days gone by. She didn't follow her theme at all. Instead, she told us all about St. Agnes and the poet, John Keats. She even read lines from his poem."

"A beautiful poem, and such tangible imagery. I could always feel the cold (fill in here) and to tell you about her experience. Canterbury or Anglican scholar, I don't care. She can't be doing that. What did you say her name was?"

"Dr. Soapwort."

"Well, she needs to have objectives: learning, behavioral, and emotional, along with tangibles, intangibles, universals, and more. If your mom and dad really want me to stay, I would like to, and I could train you and a few members of your class to become junior docents. I'm sure somebody from the schoolboard will contact the priest and put an article in the local paper. That's bad press, but we can overcome that. You know, I was just reading an article in a summer issue of *Legacy* by Johanna Lombard who wrote that two major mistakes are not knowing your audience and thinking facts are interpretation (11-13). She is absolutely correct.

Marlowe cuddled up against her grandmother's warm robe. "What are all those objectives you were talking about, and what do you mean by tangibles? That all sounds hard to me."

"Not really, darling. Let me explain. First, this woman should never have been the interpreter."

"I don't want to hear her again."

Gran laughed gently. "I doubt if you will have to. Now, if something is tangible, most people can relate to it. For example, even though I don't love her, I've read that people sometimes traveled by boat to church in days gone by. Most people could probably relate to that if the roads were rough.

That would be tangible. But the river also had a canal nearby, so that goods on boats could be transferred via the canal to the other side because the river was known for the rapids in this area. It was hard for boats to navigate, to put it simply. That might be an intangible if we're not familiar with the concept of canals."

"I get that. Now what about the objectives?" Marlowe yawned.

"A learning objective is what the audience remembers. These students will probably remember only a babbling, old hag who didn't talk much about the church at all. Why she could have talked more about the original priest and his wife, not all of the dates. Their relationship is a story in itself. She could have talked about the church's role in history. I think it was used as a hospital during the American Revolutionary War and during the Civil War. I think I have read that in history books. An interpreter has to capture the audience's attention with stories. An interpreter has to provoke, relate, and reveal."

"Gran, you're funny."

"Why?"

Marlowe shrugged her shoulders as her grandmother continued, "Now a behavioral objective is one that arouses people to take an interest in the project, maybe make a contribution, and the emotional is the strongest one. Maybe somebody in the audience wants to change. Do you understand a little better? That's what Dr. Veverka says, and he is a world-renowned authority on interpretation."

"Uh...huh. I think so. I want you to be the interpreter, Gran, at the church, and I'll help you out. So will Raleigh, and if she won't, I'll get some friends at school."

"Honey, we'll see what the rector and Daddy say. Let me kiss you good night."

Marlowe wrapped her arms around her grandmother. "Do you think I could stay home from school tomorrow since I am so tired?"

"Probably. Good night, and sweet dreams."

"I love you, Gran."

"Love you, too. And I still need to tell you more about provoking, relating, and revealing."

"Think I get that. You get the audience's attention with a question or something to spark their interest. You relate when you give interesting examples, and you reveal when you go back in some way to the provoke."

"Smart girl. How did you learn all that?"

"We did career units, and I want to go into communication when I grow up, so I interviewed a professor at the community college nearby. She sometimes does interpretations. Guess she's familiar with Dr. Veverka, too."

"That's pretty groovy, Marlowe."

"Groovy, Gran? What does that mean?"

"It's a word we used in the sixties. It meant cool. And we'll have to develop a mission statement for the church."

Marlowe blew her grandmother a kiss and ran up the stairs where she found Raleigh fast asleep, her cell phone nearby.



Passion for the Resource

*Brian C. Westfall
Natural Resources Specialist
Ouachita Project Management
Office
US Army Corps of Engineers*

Interpretation – An educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, by illustrative media, rather than simply to communicate factual information.

Freeman Tilden, widely known as the father of interpretation, created and detailed six principles of interpretation in his 1957 book, entitled *Interpreting Our Heritage*. These building blocks of interpretation, are still utilized today. The six principles of interpretation are:

- 1. All interpretive efforts must relate to a visitor's personality, experience or interests.* Talk to your visitors before a program or presentation and relate your program to them using information you may have gained from your conversation with them – their interests, beliefs in what the Corps does, etc. Take people's recreation interests and make them interpretive (having an "interpretive" fishing clinic or boating and water safety program).
- 2. Information does not equal interpretation, but all interpretation contains information.* The main difference between interpretation is not what the message or program contains - the information - but how the information is presented.
- 3. Interpretation is an art which combines many arts regardless of subject material. Any art is to some degree teachable.* You might use acting, puppets, artwork, photos, props, storytelling or other artistic skills in developing your interpretive program or service.
- 4. Interpretation does not equal instruction, but rather provocation.* Ask provocative questions like "Why do you think we need to do prescribed burning of project lands to help understory plants live?" instead of just giving reasons managers use burns for forest management.
- 5. Interpretation should aim to present a whole rather than a part.* In general, all interpretation for your project should illustrate one main interpretive theme and related sub-themes. Interpretation should be sure to interpret to visitors: a. who you are (who is the Corps of Engineers?) b. What you do (at this project – flood damage reduction, hydropower production, resource management etc.) and C. Why you do it (benefits to communities, people, the environment).

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6. *Interpretation for children must be designed specifically for children, and not simply a dilution of programs and information for adults.* Interpretive programs for children need to have fun, hands-on, and edutainment (education with entertainment) with a clear theme or purpose in mind. Analogies and examples need to be geared for children as well.

To make remembering Tilden's principles easier, use the acronym, **TIPS**, a short hand version of the main principles. The Interpretive TIP's (Tilden's Interpretive Principals shorthand) are: **Provoke**- attention, curiosity and interest, **Relate**- to the everyday life of your visitors, **Reveal** – the main concept or theme through some creative or unusual viewpoint, **Address the whole** – make sure your program relates to your main project theme and **Strive for message unity** – use the correct supporting elements in your program to illustrate your theme or main concept.

For decades, through Freeman Tilden's passionate persuasion and delight, interpreters have tried their hand at adding interpretive principles. If I were asked to name and describe a 7th principle of interpretation, I would definitely choose **passion!** Without passion, the interpreter's effort is often received as a generic and sterile rendition of a history book passage. To fully promote and sustain a public resource, the interpretive ranger must exude passion and enthusiasm. It must be the norm. If not, please make it the new normal!

John F. Kennedy's famous quote "Ask not what your country can do for you; ask what you can do for your country," is the perfect passionate challenge for all Americans to stand for. Moreover, it should be the "*Just Do it Card*" for all public land stewards. Our story must be told with passion for customers to support, understand and join in.

To effectively promote, protect and to sustain the public resource, the interpreter must provoke, relate and reveal the reasons for stewardship. Without this commitment, the information share on behalf of the resource is not heartfelt. Passion is that feeling in your heart when you feel that you must make a difference. It would purely be shameful for an interpreter to promote stewardship for 30plus years and not make a difference. Passion is the difference maker, the interpreter's legacy.

Intimacy for the resource grows over time. It is a learned behavior that is earned from boots-on-the-ground successes and failures. For example, as a beginning Corps of Engineers ranger, I didn't fully understand the importance of water safety. It was not until I assisted with my first drowning victim recovery that I began to understand the reason why the Corps promotes wearing life jackets and learning to swim well. Conducting interviews with drowning victims' families sealed the deal for me regarding the critical importance of being safe around the water. Now, as the Past President for the National Water Safety Congress, I fully and passionately understand the importance of boating and water safety and I have dedicated my career to continuing and improving water wise education.

After serving as the shoreline cleanup coordinator at DeGray Lake for many years, I understand the importance and power of environmental education. I'm very passionate about teaching children to care enough not to litter. We have worked with children who cleaned up the lake a generation ago, that are now bringing their children out to clean up *their* lake. Passion promotes ownership. Ownership is catalyst for action.

Mentoring is an extremely important ingredient in passing along the torch of passion and intimacy for public land resources. Good mentors utilize knowledge management and make every effort to explain “why?” They are not afraid to share their knowledge. They are empowered by it!

Your audience also knows passion when they see it. Passion brings out your credibility and charm. Enthusiasm for your subject, the resource, is solidified through the form of passionate persuasion. Your audience is more likely to support your efforts when they realize that you are truthful, a virtue of a passionate person.

Passion is the glue that bonds the arts with the sciences and forms the building blocks for interpretation. I know that I have exceeded my customer’s expectations when they mention that I’m so passionate about resource stewardship. Respect is earned through passion for natural and cultural resources and humanity is bettered for it.

Using Tilden’s original principles, go forward and create your own principles of interpretation. The additional principles must interface and explain “why” to the next generation of recreation seekers. Freeman Tilden would be passionately proud!

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From top: Northern Red Oaks, trees 80 81 at Poe cottage, Poe Park; Tree Museum Haiku Hike, with Mr. Brunelle Griffith's freshman honors class, All Hallows High School, Joyce Kilmer Park, 2009

The Tree Museum - Public Art Project.

KATIE HOLTEN



Left: Katie Holten, *Excavated Tree*, 2007, Contemporary Art Museum St. Louis, mixed media. Photo: Mike Schuh Right: Katie Holten, *Grand Concourse street trees (149th - 150th Street)*, 2008, ink on paper, 30" x 22". Photo: Martin Seck

ABOUT TREES

Robert MacFarlane writes "There is no lone tree language, but a forest of tree languages."

In *About Trees*, I invite the reader to enter some of these forests. I created a Tree Alphabet and used it to translate a compendium of well known, loved, lost and new writing that takes readers on a journey from 'primeval atoms' and cave paintings to the death of a 3,500 yearold cypress tree, from Tree Clocks in Mongolia and forest fragments in the Amazon to Emerson's language of fossil poetry. Along the way we unearth a grove of beautiful stories.

About Trees is the first book in Broken Dimanche Press's series: [Parapoetics a Literature beyond the Human](#). " *The Anthropocene forces us to revise grammatical categories and experiment with alternative modes of representation within a 'we' of monstrous planetary proportions. It forces the questions: Who speaks, and on behalf of whom? How does the nonhuman articulate itself, and how do we identify such articulations?*" – Ida Bencke, Editor, Broken Dimanche Press.

Recognizing a crisis of representation as our species adapts to life in the Anthropocene, *About Trees* considers our relationship with language, landscape, and perception. The result is an astonishing fusion of storytelling and art, which celebrates trees and our understanding of them, their past and their future, their potential and their ubiquity. It is a book to leaf through, again and again.

About Trees grew out of a series of drawings that I made for the group exhibition [About Trees](#) at the Zentrum Paul Klee in Bern, Switzerland, October 17, 2015 – January 24, 2016.

About Trees includes words, essays, poems, lyrics, conversations, and artwork by contributors including: **Jorge Luis Borges** Andrea Bowers **Inger Christensen** William Corwin **Charles Darwin** Nicole Davi **Tacita Dean** Åse Eg **Brian J. Enquist** Amy Franceschini **Futurefarmers** Charles Gaines **James Gleick** Fritz Haeg **Amy Harmon** César A. Hidalgo **Natalie Jeremijenko** Franz Kafka **Paul Klee** Eduardo Kohn **Elizabeth Kolbert** Irene Kopelman **Prem Krishnamurthy** Ursula K. Le Guin **Ada Lovelace** Lucretius **Robert Macfarlane** E.J. McAdams **Susan McKeown** Agnes Martin **Roz Naylor** Arianna Occhipinti **Conny Olsson** Katie Paterson **Plato** Thomas Princen **Radiohead** Colin Renfrew **Pedro Reyes** Zadie Smith **AnnaSophie Springer** Robert Sullivan **Rachel Sussman** Extinction Symbol **Nicola Twilley** Jules Verne **Gaia Vince** Aengus Woods **Andrea Zittel**.

TREE MUSEUM

The *TREE MUSEUM* (2009-2010) was a public artwork commissioned to celebrate the communities and ecosystems along the Grand Concourse, a 100 year old boulevard in The Bronx, New York. From June 21, 2009 February 28, 2010 the Grand Concourse became a virtual museum. Visitors could listen in on local stories and the intimate lives of trees offered by current and former residents: from beekeepers to rappers, historians to gardeners, school kids to scientists. One hundred trees give voice to 100 perspectives featured in the Grand Concourse's TREE MUSEUM.

Visitors could start their visit to the TREE MUSEUM at any point along the Grand Concourse. Sidewalk markers identified the one hundred trees with stories to tell. Copies of the bilingual Visitors Guide were available at the Bronx Museum, Wave Hill or selected venues along the Grand Concourse. Visitors were invited to call a local number (7184082501) to access the audio guide. Tree hugging was encouraged but was not mandatory!

TREE MUSEUM was organized by **The Bronx Museum of the Arts** and **Wave Hill**, with the **NYC Department of Parks and Recreation**, cooperation from the NYC Dept. of Transportation and support from **The Greenwall Foundation's Oscar M. Ruebhausen Commission**.

CREDITS

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MORE ABOUT *ABOUT TREES*

About Trees is a book about trees written in trees. It's a collection of texts about trees, about the notion of trees, and a constellation of tangential tree related things. Everything is translated into *Trees*, a new typeface that I made especially for the project. At the core of the book is a *Tree Alphabet* with trees replacing each of the 26 letters of the standard English/Latin alphabet. These characters were transformed into a font, the typeface called *Trees*.

The book is a limited edition artist's book. It's 260 pages deep, stitched, printed throughout using a forest green spot color with a hand painted, lime green fore-edge. It started out like a collage, a collection of found and mostly 'recycled' texts. Some were commissioned especially for the book and others happened along the way during conversations with people. There's an essay on "Tree Clocks and Climate Change," a hunt for "Liberty Trees," and a conversation asking "Why are There no Trees in Paleolithic Cave Drawings?" Trees are a metaphor, a way to filter the enormous, tangential web of information available to us—a way to focus the discussion. Everything is printed in the typeface Walbaum (which has *baum*, the German word for tree, in its name) and translated into *Trees*. Each text becomes its own forest.

I think of the book as an archive of human knowledge filtered through branches of thought. It traces a shift in consciousness from anthropocentric thinking to a contemporary realization that our way of life has probably created a new geological epoch, the Anthropocene. The book maps the move from Darwin's "I think," written beside his sketch of the tree of life illustrating human consciousness as the highest step on the evolutionary tree, to Eduardo Kohn's "How Forests Think," an anthropology beyond the human. The writings of Bruno Latour and Timothy Morton have been useful for me to understand my own work and current thinking around object oriented ontology, which puts *things* at the center of the study of existence.

ARTIST STATEMENT

As a visual artist I use drawings, sculpture, books, ephemeral works and public art projects to investigate geopolitical landscapes and the natural systems that structure our day to day life. Deeply committed to environmental causes, I often work on site to explore the history, ecology, and other invisible aspects of a landscape. Trees have been a recurring feature in my work, most recently I created a [Tree Alphabet](#) and published a book [About Trees](#) (2015). At the root of my practice is a fascination with the contingency of life's systems – both organic and manmade. Since 1997 my work has interrogated the notion of nature and I continue to explore the inextricable relationship between humans and the natural world in the age of the Anthropocene.

I grew up in rural Ireland and studied Fine Art and History of Art at the National College of Art & Design in Dublin, the Hochschule der Kunst in Berlin and Cornell University in New York. I recently completed a course on Complexity at the Santa Fe Institute in New Mexico. In 2003 I represented Ireland at the 50th Venice Biennale with a public artwork that examined the ecosystem of the city. In other commissioned public artworks such as *G ran Bazaar* in Mexico City (2006), *Tree Museum* in the Bronx (2009), and *On the Nature of Things* in Dublin (2011), I worked on specific sites to explore people's relationship with the nature of the city.

I have had solo museum exhibitions at the New Orleans Museum of Art (2012); Dublin City Gallery The Hugh Lane, (2010); The Bronx Museum, New York (2009); Villa Merkel, Esslingen, Germany (2008); Nevada Museum of Art, Reno (2008) and the Contemporary Art Museum St. Louis (2007). I have received numerous awards including multiple bursaries and project awards from The Arts Council of Ireland, a Fulbright Scholarship, and a Pollock Krasner Award.

Personal website: <http://www.katieholten.com>

Tree museum website: <http://www.treemuseum.org>

About Trees website: <http://www.katieholten.com/AboutTrees.html>

The Trees typeface is available for free download here:

<http://www.katieholten.com/AboutTrees.Trees.Typeface.html>

KATIE HOLTEN



Creature Feature: The Banana Slug is Living Proof that a Slimy Little Gastropod Mollusk Can be Loaded with Charisma!

By **Bob Janiskee**

Reprinted from National Parks Traveler

Can a small, slimy, shell-less, forest-dwelling gastropod whose diet includes animal droppings and other dead stuff develop an enthusiastic fan following? You're darn right. Consider these facts about the banana slug:

- It's the star of several community celebrations, including the nationally-publicized Russian River Banana Slug Festival.



The slug fest is on - with slug racing - kid style.

- It's the official sports mascot of UC-Santa Cruz, and ESPN Sports Travel has named it one of the ten best team nicknames in college basketball.
- It's the name of an environmental musical group, the Banana Slug String Band.
- It provides the *raison d'être* for the **International Slugfest**, an organized campaign to locate and document exceptionally large banana slugs.
- It's one of the leading contenders (along with the geoduck and the giant Pacific octopus) for designation as the official state mollusk of Washington. Only a gubernatorial veto prevented it from becoming California's official state mollusk in the late 1980s.

We could go on, but the point is made. Banana slugs have charisma – loads of it. That said, it remains that they are odd creatures that most Americans know little about.

The Pacific banana slug, a cousin of the snail, is a shell-less gastropod mollusk belonging to the genus *Ariolimax*. This genus includes three main species -- *columbianus*, *dolichophallus*, and *californicus* – as well as two known subspecies. To the unschooled eye, of course, these differences count for naught.



Banana slugs grow six to ten inches in length -- making them the second-largest slugs in the world (after the *Limax* genus in Europe) -- and can live for as long as seven years. They are named for their roughly cylindrical shape and characteristic golden yellow color (often with dark spots). Banana slugs do come in other colors, including greenish-brown, nearly black, and even white. Though the less common colors may reflect the influences of diet, available light, moisture, age, health, and other factors, the basic coloration evolved to blend well with detritus and help slugs avoid detection by salamanders, garter snakes, raccoons, foxes, porcupines, crows, ducks, beetles, and other predators. Some predators avoid slugs so they won't have to deal with the mucus coating (as by rolling the slug in the dirt).

Banana slugs are stenotopic, meaning that they can withstand only a limited range of variations in environmental conditions. The climate has to be reasonably mild because severe winter cold will kill them. They need moist environments because severe desiccation can kill them. Since detritus and related organic matter provides most of their food, rotting plant and animal material must be abundant. Mushrooms are a preferred food, but they'll consume lichens, algae, fruit, seeds, and even animal droppings and carcasses

All things considered, it's easy to understand why nearly all banana slugs live in the floor of temperate coniferous rainforests and similar rainy-foggy-damp habitats within the long, narrow, mountain-backed Marine West Coast climate zone that stretches along the North Pacific Coast. This encompasses a huge area extending from the Salinas Valley of central California northward through coastal Oregon, Washington, British Columbia (west of the Cascades), and southeastern Alaska. Only in a few places does this range extend inland more than a couple of hundred miles.

You can look for banana slugs in a number of national parks in the North Pacific Coast region, including **Muir Woods National Monument**, **Point Reyes National Seashore**, **Redwood National and State Parks**, **Olympic National Park**, the Fort Clatsop National Memorial unit of **Lewis and Clark National Historical Park**, and **Sitka National Historical Park**. The latter park is situated in the Alaskan panhandle near the northernmost outpost of banana slugdom.

JVA InterpNews

Banana slugs are generally nocturnal, but they aren't exclusively creatures of the night. You can often see them out and about in the daytime during chilly spells and the cooler rainy winter months. If it's a relatively dry time of year, check out detritus near creeks, in tree root tangles, and in other moist places. You're not likely to see slugs in their usual haunts during bad dry spells though, because they wait out those periods by covering themselves with mucus, leaves, and soil.

Wherever you find banana slugs, you'll recognize them when you see them. Nothing in the forest looks quite like a banana slug. (See the accompanying photo.)



The two distinctive sets of tentacles on the slug's head are superbly designed sensory organs. The shorter set is for feeling and smelling, and the longer set is for seeing. The dark dots at the end of the longer tentacles are the animal's eyes. If you watch those eye stems while the slug searches for food or copes with obstacles, you can see them functioning like a periscope as they stretch up and down and turn in all directions. The eye stems can even be retracted in the blink of an eye. The mouth, which is situated between the lower tentacles, is equipped with a radula, a tongue-like organ covered with a seemingly countless number of tiny teeth.

The mucus coating that most folks call slime is certainly a signature attribute. It actually serves many useful purposes. In addition to helping the slug avoid dehydration, the mucus helps the slug slide along the ground on the muscular foot covering its lower body, protects the animal's soft body from sharp rocks, twigs, and other hazards, and discourages predators with its foul taste and mouth-numbing anesthetic effects.

The slime also contains pheromones that help slugs find mates. Since the banana slug is a hermaphrodite -- each animal having both male and female reproductive organs -- the task is not especially difficult.

The more we learn about banana slugs, the more we come to appreciate that their presence enriches and helps to stabilize the ecosystems they inhabit. By feeding on detritus, they help to recycle nutrients and make them available for new growth. Slug excretions not only provide nitrogen-rich fertilizer, but also help to disperse spores and seeds needed for forest plant regeneration. Since the banana slug's ecological niche is not yet fully understood, we shouldn't be surprised to learn that there are other praiseworthy contributions.

In the words of proud UC-Santa Cruz sports fans – and slug fans everywhere -- **Go Slugs!**



Postscript: Let's be brutally honest here. Banana slugs are not universally loved, nor even appreciated, by many of the people who deal with them. During the rainy season they may squish under your feet on trails and walkways, invade yards, gardens, sheds, garages, and houses, and leave glistening slime trails all over the place. They'll get into the darndest places too, since they can climb walls, move upside down, and squeeze into small holes. BTW, if you want to hear some really over-the-top remarks about the species, just ask somebody who is not Bear Grylls to describe a banana slug's distinctive taste. Some people do eat them at festivals, you know, although only the Lord knows why.





Interpreting the Falun Great Copper Mountain World Heritage Site, Sweden.

*John Veverka
Director
The Heritage Interpretation Training
Center*

A few years ago while presenting some interpretive training courses in Sweden I had the privilege of being invited to experience the Falun World Heritage Site and its interpretation of the Great Copper Mountain. The photo above shows the mine as it looks today, long after it closed. But here is the surprise. The mine was underground - a honey comb of tunnels like a huge Swiss cheese. Because of the centuries of mining, the mine became so unstable from all the tunnels that one night they heard a loud rumble and thud - and the mine had collapsed leaving the huge pit you see today. Many of the old tunnels where they interpret the historic mining survived and are still part of the mine tours. When visiting the visitor center, visitors first see an amazing video with animation of the social life of the miners, the living conditions they endured, their wages (some were paid in firewood), and their mining techniques. Then you can take the mine tour to see where they worked and how they mined and sorted the copper ore. An amazing and wonderful interpretive experience.

Most of the buildings in the area are painted red - as red paint was free and a byproduct of the copper ore smelting process. A wonderful story, site and experience. Here's more information on the Great Copper Mountain and the Falun World Heritage Site. JV

Falun Mine (Swedish: *Falun Gruva*) was a mine in Falun, Sweden, that operated for a millennium from the 10th century to 1992. It produced as much as two thirds of Europe's copper needs^[1] and helped fund many of Sweden's wars in the 17th century. Technological developments at the mine had a profound influence on mining globally for two centuries. The mine is now a museum and in 2001 was designated a UNESCO world heritage site.

There are no written accounts establishing exactly when mining operations at Falun Mine began. Archaeological and geological studies indicate, with considerable uncertainty, that mining operations started sometime around the year 1000. The mine was definitely operating by 1080, but no significant activities had begun before 850. Objects from the 10th century have been found containing copper from the mine. In the beginning, operations were of a small scale, with local farmers gathering ore, smelting it, and using the metal for household needs.

Around the time of Magnus III, king of Sweden from 1275 to 1290, a more professional operation began to take place. Nobles and foreign merchants from Lübeck had taken over from farmers. The merchants transported and sold the copper in Europe but also influenced the operations and developed the methods and technology used for mining. The first written document about the mine is from 1288; it records that, in exchange for an estate, the Bishop of Västerås acquired a 12.5% interest in the mine.

By the mid 14th century, the mine had grown into a vital national resource, and a large part of the revenues for the Swedish state in the coming centuries would be from the mine. The then king, Magnus IV, visited the area personally and drafted a charter for mining operations, ensuring the financial interest of the sovereign.

The principal method for extracting copper was heating the rock via large fires, known as fire-setting. When the rock cooled down, it would become brittle and crack, allowing manual tools such as wedges and sledge hammers to be brought to bear. After the ore had been transported out of the mine it was roasted to reduce sulfur content in open hearths. The thick, poisonous smoke produced would be a distinguishing feature of the Falun area for centuries. After the roasting, the ore was smelted; the output of which was a copper rich material. The cycle of roasting and smelting was repeated several times until crude copper was produced. This was the final output from the mine; further refinement took place at copper refineries elsewhere. This process was used without any major change for seven centuries, until the end of the 19th century. It is likely that the methods and technology for fire-setting and drainage were imported from German mines, such as in the Harz Mountains.

The organizational structure of Falun Mine created under the 1347 charter was advanced for its time. Free miners owned shares of the operation, proportional to their ownership of copper smelters. The structure was precursor to modern joint stock companies, and Stora Enso, the modern successor to the old mining company, is often referred to as the oldest joint stock company still operational in the world.

In the 17th century, production capacity peaked. During this time, the output from the mine was used to fund various wars of Sweden during its great power era. The Privy Council of Sweden referred to the mine as the nation's treasury and stronghold. The point of maximum production occurred in 1650, with over 3,000 tonnes of copper produced.

The mountain had been mined for nearly half a millennium towards the end of its golden era. Production had intensified in the preceding decades, and by 1687 the rock was crisscrossed by numerous shafts and cave-ins were not unusual. Great effort went into producing maps of the mine for navigation, but there was no overall organization nor any estimation of the strength of the mountain. In the summer of 1687, great rumblings could be heard regularly from the mountain. On Midsummer's Eve of that year, the dividing wall between the main pits and the foundations gave way, and a significant portion of the mine collapsed. This could easily have become a great catastrophe, killing and trapping the hundreds of men working in the mine, had it not occurred on Midsummer's Eve, one of the two days of the year on which the miners were not working, the other being Christmas.

Life in the mine.

Fires were lit at the end of the day to heat the ore and allowed to burn through the night. The next morning the fires would be put out and the ore broken loose. In this manner, the miners could advance about 1 m (3 ft) per month. The miners working the fires and breaking the rock were the best paid and most skilled. Hand barrows were used to transport the broken ore, in relays of about 20 m (70 ft) with multiple teams working long distances. This was usually the work newcomers were assigned to prove themselves. The work was hard and the mines very hot from the constant fires so it was not surprising that the miners were good customers of local drinking establishments. Drunkenness was considered quite normal for miners.

Carl Linnaeus visited the mine and produced a vivid description of the life of the miners. He described that the miners climbed rickety ladders with sweat pouring from their bodies like "water from a bath". He continued: "The Falun Mine is one of the great wonders of Sweden but as horrible as hell itself". Linnaeus' description of the environment the miners worked in is as follows: "Soot and darkness surrounded them on all sides. Stones, gravel, corrosive vitriol, drips, smoke, fumes, heat, dust, were everywhere".

Sweden had a virtual monopoly on copper which it retained throughout the 17th century. The only other country with a comparable copper output was Japan, but European imports from Japan were insignificant. In 1690, Erik Odhelius, a prominent metallurgist, was dispatched by the King to survey the European metal market. Although copper production had already begun to decline by the time he made his report, something Odhelius made no secret of, he stated, "For the production of copper Sweden has always been like a mother, and although in many places within and without Europe some copper is extracted it counts for nothing next to the abundance of Swedish copper".

By modern standards, however, the output was not large. Peak production barely reached 3,000 tonnes of copper per year, falling to less than 2,000 tonnes by 1665; from 1710–1720 it was barely 1,000 tonnes per year. Present worldwide copper production is 18



The main museum building.

Copper production declined during the 18th century, and the mining company began diversifying. It supplemented copper extraction with iron and timber production. Production of the iconic [falu red](#) paint began in earnest. In the 19th century, iron and forest products continued to grow in their importance. In 1881 gold was discovered in Falun Mine, resulting in a short-lived gold rush. A total of 5 tonnes of gold would eventually be produced.

By the late 20th century, the mine was no longer economically viable. On December 8, 1992, the last shot was fired in the mine, and all commercial mining ceased. Today the mine is owned by the Stora Kopparberget foundation which operates the museum and tours shown below. Visit their web site at:

<http://worldheritagesweden.se/en/world-heritages-in-sweden/falun-world-heritage/>



Falun becomes a UNESCO World Heritage Site.

In 2001 Falun Mine was selected as a UNESCO World Heritage site, one of 15 in Sweden. In addition to the mine itself, the world heritage area covers the town of Falun, including 17th century miners' cottages, residential areas,^[14] and Bergsmansbygden, a wider area that the free miners settled and in which they often built estates mirroring their wealth. Photos below - another view of the copper mine pit, and a photo from part of the village - still painted red from the red paint byproduct of the copper smelting process.





The Guide as Agent of Political Change.

Justin Mattli

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Abstract: The cave in Plato’s Republic has been, and will continue to be, a focal point of much philosophical discussion. The following intends to investigate the catalytic agent of “philosopher king” or “guide” that exits the cave, accomplishes enlightenment, and then returns to the cave, in order to retrieve potential prisoners that are fit to (as al-Farabi states) “receive revelation” and commune with the “active intellect.” The goal here is to look further at the many processes a prisoner undertakes in exiting Plato’s cave with such assistance, thus reaching enlightenment in the sun via “dialectic” and “turning around.” Enhancing the analysis of these processes are contributions from political philosophers al-Farabi and Aquinas, whose views help to better gauge what results this process may have on the political state.

The Guide as Agent of Political Change

Within the works of classical political philosophy exists an underlying theme of transcendence that features an agent of change who induces individuals to traverse the path from the depths of inter-community unawareness toward a path of enlightenment. The subsequent journeys of these individuals can go on to influence the nature of the state (cave) in a variety of ways. An exploration of such movement is found in the works of Plato, al-Farabi, and Aquinas. Following is a breakdown of the catalytic actor’s chaperone of the led, the post-convoy action taken, and the direction of such movements as they pertain to archetypal characteristics of individual-level revolutions that can impact political society.

¹ Alfarabi, “The Political Regime,” trans. Fauzi M. Najjar, in *Medieval Political Philosophy*, ed. Ralph Lerner and Mushin Mahdi (Ithaca, NY: Cornell University Press, 1963), 35.

² Plato, *The Republic of Plato*, 2nd ed., trans. Allan Bloom (New York: Basic Books, 1991), 473d.

³ *Ibid.*, 502d.

⁴ Alfarabi, 46.

⁵ Plato, 519c.

The actor in question is called by al-Farabi a “guide”¹ and resembles, to an extent, the form of the Platonic “philosopher-king.”¹ Yet, upon more thorough analysis it is evident that this role is but an instrumental escort under direction of a ruling “regime savior”¹ who himself “is able to guide well all others to everything in which he instructs them.”¹ Therefore, under the employ of the ultimate leader, this actor is a guide within an elite class of micro-level educators that implements the philosopher curriculum to chosen individuals of proper stock. The guide is one who has spent much time “continuously educating”¹ himself in the rays of the Sun and has been compelled by a form of political obligation to go back to the cave and enlighten the community soul by soul.

The dynamics of the guide is not in the power of every man to guide others nor in the power of every man to induce others to these things ... He who has the power to guide another to a certain thing, to induce him to do it, and to employ him in it, is in that thing a ruler over the one who cannot do it on his own.⁶

Hence the guide seems to be a pre-philosopher king, or in the role of a temporary ruler, as it is unknown if he even desires to claim the community’s throne. It is likely that the guide perpetually rotates his time between basking in the light of true forms and leading individual-level revolts to virtue. This persistent provocation is contrary in some sense to Aquinas’ claim that “private persons cannot effectively induce others to virtue ... (as only) law should have coercive power.”⁷ However, it is possible that the guide is under lawful orders promulgated from a philosopher-king to do such deeds. This does not imply that the guide resides only in the virtuous city, for there are many forms of regimes ruled by leaders less benevolent than a “true prince,”⁸ and many of these do not tolerate the philosopher guide’s work. (Such are the potential obstacles of the cave to be touched upon later.)

The guide has experienced the true good found in the pure forms of “theoretical reason”¹ but must return to the masses to engage others who are not “disposed to know happiness on their own.”¹ We will refer to the latter individuals, in the Platonic sense, as “prisoners.” The guide, having himself once been a prisoner, now possesses “the overflow of the sun’s treasury”¹ at his disposal, which compels him to be “a steward of all things in the visible place”¹ who selects a few prisoners and to them “provide the truth to the things known ... the idea of the good.”¹ The prisoners chosen to evolve must meet the criterion of the philosopher-kings that they may one day emulate; they must display traits of “steadiness, courage, nobleness, toughness, love of labor, and good memory.”¹ Thus, only a few can, as al-Farabi states, “receive revelation” and commune with the “Active Intellect without an intermediary.”¹ These prisoners must be of good blood, have a high tolerance to pain and be willing to endure without the comforts of the cave.

⁶ Alfarabi, 36.

⁷ Aquinas, *Treatise on Law*, trans. Richard J. Reagan (Indianapolis: Hackett Publishing, 2000), 5.

⁸ Alfarabi, 36.

⁹ Aquinas, 35.

¹⁰ Alfarabi, 35.

¹¹ Plato, 508b.

¹² *Ibid.*, 516c.

¹³ *Ibid.*, 508e.

¹⁴ *Ibid.*, 535a-535d.

The philosopher-guide's first action is to break free of his own chains and scale to the pinnacle form of the good as it stations in the Sun's illumination. However, to be this agent of change in the political society, a recalibration within the exhibitor must take place that shifts his addling "work in geometry, calculation, and the like"¹ to the activation of descent and rescue. It is quite possible that the potential guide receives motivation from the philosopher-king to whom the former is an instrument. Al-Farabi makes such a reference:

Those of them that are in any way helpful and suitable, or in any way useful, in the achievement of happiness, (the prince) should maintain and emphasize.¹

This motivational form proceeds from law in accordance with the lens of Aquinas. The philosopher-king's order to the guide comes via human law with intention for the latter to commence a descent for the sake of "training."¹ Therefore, this particular human law "properly relates to natural law" as the latter's precept thus relates to practical reason.¹⁵ In this regard, practical reason being the application of theoretical reason, or indulging in the sun, allows for the participants to engage in the first principles of the former and seek the "good."¹⁶ Thus, moving from the sun back to the cave seems a natural progression for the reasoning philosopher looking to do "good" for the society, be it under command from his internal edict or the external decree of a virtuous societal ruler.

The specific forms of action the guide then performs configure like an admixed odyssey into the depths of the unknowing. Socrates put forth the following, as if to echo this call to action:

So you must go down, each in his turn, into the common dwelling and get habituated along with them to seeing the dark things. And, in getting habituated to it, you will see ten thousand times better than men there.¹

Hence, it is implied that once the guide becomes embedded in the caves of the city, amongst scores of the unaware, he must utilize his heightened awareness to scan for potential escapees. The guide must do this swiftly by identifying prisoners of quality whose shackles have become loose due to the restless boredom that comes with the repetitive predicting of shadows. The guide then "must compel the best natures to go to the study ... to see the good and go up that ascent."¹⁷ The danger and risk come immediately into play when the prisoner drops his shackles, for if the guide possesses inadequate disguise, the rulers and mob of the cave may threaten his well being. Socrates posits one such scenario:

If such a man were to come down again and sit in the same seat ... wouldn't he be the source of laughter, ... and his eyes [called] corrupted And if they were somehow able to get their hands on and kill the man who attempts to release and lead up wouldn't they kill him?¹

Once the guide and the escapee bypass the obstacles of the cave, a mad rush to the surface inflicts short-term discomfort in the former prisoner.

¹⁶ Plato, 510c.

¹⁷ Alfarabi, 40.

¹⁸ Aquinas, 49.

¹⁹ Ibid., 35.

²⁰ Ibid., 36.

²¹ Plato, 520c.

²² Ibid., 519c-d.

²³ Ibid., 516e-517a.

The escapee, as if suffering from a type of the bends, must endure symptoms of blinding pains that confront any “man who is released and suddenly compelled to stand up ... and walk and look up toward the light.”¹ Once the escapee’s disorientation subsides and his eyes better adjust to the light, the guide implements the second action phase. The “turning around” requires the guide to manipulate the escapee’s soul so it becomes a more precise “instrument” of learning. This action presumes an altering of the apprentice’s gaze “until it is able to endure looking at ... the brightest part of that which is ... good.”¹ In doing so, the guide intends to convince the escapee that “before he saw silly nothings, while now, because he is somewhat nearer to what is and more turned toward beings, he sees more correctly.”¹

The “art of this turning around” is easier said than done. To achieve this end of “rightly orienting” the escapee’s sight, a convening of the action of productive conversation called the Dialectic is in order.¹ The guide at this juncture utilize the “arts ... as assistants and helpers in the turning around” of the escapee, whose “eye of the soul is ... buried.”¹ The guide, now as mentor, employs the “dialectic [and] gently draws [the eye of the soul] forth and leads it up.”¹ Thus, the “journey” of the dialectic is, as all actions in this process, a most trying maneuver and the guide must maintain that the escapee “doesn’t give up before he grasps by intellection itself that which is good itself.”¹

Once the guide succeeds in freeing the prisoner from the cave, escorting him to the sun and adjusting the focus of the escapee’s soul, the individual’s next move is his own. Therefore, as the guide’s work comes to an end, this new “offspring of the good”¹ must select a post-ascent direction. The escapee, now more sun-formed, has a myriad of path options and the inertia of his subsequent choice can result in either his inflicting an upward or downward impact upon society.

The freshly aware pre-philosopher can in an upward, but stationary, fashion choose to remain in the light and move to selectively spend his moments “calculating” that which is not “attended to [by] visible or tangible bodies.”¹ Socrates states that some “who reach this point aren’t willing to attend to human affairs, but their souls are eager to spend time above.”¹ Another positive option for the former prisoner may consist of a virtuous ruler calling him forth to replicate the heroic actions of his own guide and thus go back to retrieve more shackled souls. He might also become a humble citizen or actualize the path to the philosopher-ruler throne itself. Other, and more tragic scenarios, also present themselves to the newly mobile pre-philosopher, as he may face death at the hands of cave masters and their loyal shadow finks that view his foreign discussion and perception as threat to their cavern’s status quo. Socrates does not overlook this risk for “such a man ... to come down again and sit in the same seat ... and once more compete with these perpetual prisoners in forming judgments about these shadows while his vision [is] still dim.”¹ Socrates own suicide with a cave-inflicted assist provides a great example of such pitfalls of maintaining an upward movement for the collective good.

²⁴ Ibid., 515c.

²⁵ Ibid., 518c.

²⁶ Ibid., 515d.

²⁷ Ibid., 518d.

²⁸ Ibid., 533c-d.

²⁹ Ibid., 533d.

³⁰ Ibid., 532a-b.

³¹ Ibid., 508b

³² Ibid., 525d.

³³ Ibid., 517c-d.

The downward motion of the enlightened escapee appears in ancient texts to be highly prevalent. This is the case when some surface dwellers disengage from their mentors prematurely and seek the path of least resistance, returning to the cave not for societal sake but to satisfy their desire for slothful comfort. Al-Farabi hints at such a scenario:

Some men need little guidance, others need a great deal of it. In addition, even when a man is guided to these two (that is, happiness and the actions leading to it), he will not, in the absence of an external stimulus and something to arouse him, necessarily do what he has been taught and guided to. This is how most men are. Therefore, they need someone to make all this known to them and to arouse them to do it.¹

This lack of intrinsic motivation upon the recently anointed apprentice is the dispositional precursor for the negative societal roles of puppet-handler, shadow-shackle-master, town sophist, cave hit man, and the like. The frequency, if high, of wasted and unfulfilled guidance by the enlightened can spell trouble for the community at large. Al-Farabi references such societal transactions:

When the activities of the citizens of a city are not directed toward happiness, they lead them to acquire bad states of the soul ... the sick in their souls ... do no listen at all to the words of a Guide, Teacher, or a Reformer. The souls of such individuals remain CHAINED.³⁴

This condition is obviously the byproduct of potentially virtuous souls becoming blind and out of alignment due to a decline in virtuous ambition and practice, thus precipitating a gravitation toward cavernous comfort. It is this potential post-escape descent of the few individuals that reach the surface and commune with the true forms wherein-lies the most danger for the community at large. Socrates makes mention of such downward moving:

The vision of those with a small soul who are said to be wicked but wise, sharply distinguishes the things toward which it is TURNED, so that the more sharply they see, the more evil they accomplish.³⁵

Therefore, it appears that the guide, either via his own relation to practical reason or from orders of the philosopher-king, has the capacity to create monsters by default. Although these beasts are few in number their individual-level contamination registers far and wide and if they are shown not to be “useful” then the philosopher-king has no choice but to “occupy” or “destroy” them.³⁶ These negative entities exist in numerous forms and classes from the Platonic “drone” to the “weeds” of al-Farabi’s “virtuous city.” They are the “opportunists, mis-interpreters, apostates, unconvinced/falsifying imaginers, and inadequate cognizers.”³⁷

³⁴ Ibid., 516e.

³⁵ Alfarabi, 35-36.

³⁶ Ibid., 38-39.

³⁷ Plato, 518e-519a.

To reach a positive conclusion of the enlightened prisoner's impact upon the city-cave-state, the guide must maintain a mentorship with the newly activated for as long as possible. The benefits of putting into proper working order a vanguard class of increasing number can easily manifest into a more perfect regime:

[I]t produces such men in the city not in order to let them turn whichever way each wants, but in order that it may use them in binding the city together ... And thus, the city will be governed ... in a state of waking, not in a dream as the many cities nowadays are governed by men who fight over shadows.⁴⁰

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- 38 Alfarabi, 40.
 39 Ibid., 53-55.
 40 Plato, 519e-520d.

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A Broken Leg in the Year 1350: Treatment and Prognosis

Analyzing and reconstructing medical treatments: unique approach to heritage interpretation through research and re-enactment.

Wiel van der Mark (NL)

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It is the year 1350 in Gravendam (the medieval town of the archaeological open-air museum, (AOAM) Archeon, in the Netherlands). Master Roelof, a wood-and-bone processor, lies unconscious on the stone floor. Shortly before this, he had been climbing the ladder to the attic to grab a log of wood, but it slipped from under him and he ended on the floor. Roelof fainted from the pain, and his leg now lay at a strange angle (See Figure 1). His wife Mette sees that it is not right and hastens to the barber-surgeon for help immediately (See Figure 2). Accidents did happen in the Middle Ages. What could the barber-surgeon have done for Roelof's broken upper leg? Could he have treated the fracture and the possible complications from this injury? What were Roelof's chances of survival? In this first article about medical medieval treatments in Archeon, the treatment of this medical problem will be described and interpreted.



Fig 1 Master Roelof laying on the floor; photo by Vera Bos. Fig 2. Master Roelof and his mourning wife, Mette; photo by Vera Bos.

Background Archeon aims to preserve Dutch cultural heritage. Dressed in authentic costumes, archaeo-interpreters make history tangible to a large audience. They are storytellers who bring prehistory, the Roman era and the Middle Ages to life. The archaeo-interpreters show how people lived, worked, and interacted with their environment and with each other. All 43 buildings in Archeon are either accurate reconstructions of archaeological finds, or based on architectural research



Fig 3. Archeon; the Herenstraat; photo by Hans Splinter.

The house of the wood-and-bone processor is situated in the Damstraat and that of the barber-surgeon in the Herenstraat. In the house of the barber-surgeon the visitor can experience standard medical knowledge in the year 1350. The interior gives insight and facilitates a comparison with contemporary medical treatment.

Early medicine

Humourism To understand how people used to think about medicine and health it is necessary to explain the idea of the body fluids (the humours) or *Res Naturalis*, and the rules of health (hygiene) or *Res non-Naturalis*. Medieval medicine was based on the insights of Hippocrates and Galen (Rosenman 2005: 214).

Hippocrates (460 to 377 BC) described the humoral doctrine as the four elements that were known to men. These four elements are air, earth, fire, and water, each of which have their own contrasting properties. He described these elements as the basic fluids of everything in the micro and macro cosmos. The humours were:

1. sanquis, or blood, which was hot and wet;
2. melanchos or black bile, which was cold and dry;
3. cholera, or yellow bile, which was hot and dry, and;
4. phlegma or mucus which was cold and moist.

Each individual person had a unique combination and mixture of these body fluids that were divided depending on one's nature. They either attracted or repelled each other, and had to be balanced. A balanced life meant order and health, but an unbalanced life could lead to illness. Hippocrates called them the four bodily fluids or humours.

Galen(131-210 AD) improved on the ideas of Hippocrates by using anatomical and physiological concepts. He placed the properties of the humours, divided by their dominance in a diagram where he also inserted the zodiac, the cycle of live and the seasons. His knowledge about anatomy was based on the dissection of monkeys and pigs. His idea was that all diseases originated from inside the body and were caused by the corruption of one of the four humours. Wounds, fractures, and abnormal swellings were able to heal as a result of the nourishing actions of humours in the blood (blood was a mixture of the four humours).

Rules of health In addition to the natural things, the *Res Naturalis*, there were influences from outside the bodily fluids, the *Res non-Naturalis*. In the book, *General Surgery*, by the French surgeon Guy de Chauliac (1300-1368), the ideas of Galen about these six non-natural things were mentioned in the general introduction. These six rules were called *Hygieos*, but have nothing to do with our understanding of hygiene. Moderation and balance of these six rules are preferable:

1. The air we breathe.
2. Nutrition, or the balance between eating and drinking.
3. Working and rest and the proper use of exercise.
4. The sleep cycle and being awake.
5. The control of the excretion and retention of bodily fluids.
6. Mastering of joy, anger, fear and sadness (those emotions being the passions of the soul)

Reconstruction in Archeon

Roelof's accident and the subsequent treatment were re-enacted two times, and followed the written script. The first rehearsal with archaeo-interpretors and the second performance with an audience.

The main medieval source One of the most important sources in Archeon is the medieval book *Cyurgia*, written by the Flemish surgeon Jan Yperman (1265-1335) in Dutch. He lived in the Belgian town of Ypres and dedicated his book to his son, who was to succeed him. Little is known about Yperman because the archives of his home town were lost during a bombardment in the First World War. We also do not know where and how he was trained as a barber-surgeon. It is possible that he was educated as a basic surgeon in his hometown and completed his education from 1297 to 1303 at the University of Paris, where the surgeon Lanfranc of Milan (1205-1306) may have been one of his teachers.

The Leiden Professor of Pharmacology and History of Medicine, Dr E.C. Leersum (1862-1938), compared and merged five copies of the original manuscripts in 1912. His book, *Cyurgia of Jan Yperman*, was our main source (Leersum 1912).

The *Cirurgia Yperman* divided the traumatic conditions and treatments of the human body into seven chapters, ranging from the head to the feet. In the seventh and final chapter ‘from the neck and throat down’ he addressed the fracture treatment. If necessary, the texts from the *Cirurgia* were supplemented with information from the book about the surgery of Yperman’s contemporary colleague, the Parisian surgeon Guy de Chauliac, who lived from 1300 till 1368.

Reconstructing of the necessary materials First the relevant medieval text files were translated and a team of archaeo-interpretors discussed the meaning of the medieval texts. We considered how to manufacture the requirements and attributes and which materials and techniques each craftsman would use in the fourteenth century. The **carpenter** used ash wood for manufacturing the splints because it is hard, tough, strong and flexible, and was well suited to absorbing large forces. The elder twigs were used for stretching the rope. The leg tray was made of oak, mainly because it was well available.



Fig 4. Master Jan the carpenter; photo by Hans Splinter.

The **roper** chose flax to twist the strings because in the 14th century flax was the most common and cheapest material while cotton was expensive material

The **felt-maker** made felt according to the conventional Flemish technique which used good quality wool that was utilised in the fourteenth century and that reached a good density and firmness.

Middle Dutch texts about fractures in the seventh book

*Of the neck and of the throat down to all limbs and all sites in the body. Chapter 31:
“About fractures” (Leersum 1912:162).*

In this section we start with the translation of the original text and give an explanation based on medieval insights and thoughts. The modern titles of the subsections in bold were made to give more insight and they are not in Yperman’s medieval text. The quoted and translated Middle Dutch texts are written cursive or italics. Sometimes the medieval text is translated literally.

About the diagnosis

If one has to deal with someone who has a broken leg, then it is imperative that the limb be taken in hand to assess where the bone is broken/get a sense of where the bone is broken. (Leersum 1912:162)

Explanation: The state of a broken bone was difficult to determine from the outside, especially if it was a complicated (multiple) fracture. If there was any doubt about the source of the pain, care had to be taken in the Middle Ages before proceeding with treatment of a fracture.



Fig 5. Fracture determination; photo by Hans Splinter.

Bone setting

Two individuals sit on either side of the injured party, a person at the top and the other at the foot of the patient. The Master (surgeon) kneels between both helpers and holds the leg with his hand and pushes the fractured parts together. If bone fragments pierce through the skin they should be massaged inwards if possible, or extracted. (Leersum 1912:162)



Fig 6. Bone setting; photo by Hans Splinter.



Fig 7. Bone setting with a visitor; photo by Hans Splinter.

Explanation: In the reconstruction, the person on top takes their place behind the patient with his arms under his armpits. His hands are then gripped together and placed on the chest as indicated in Figure 7. Repositioning would be very difficult due to pain and bodily resistance This will be discussed in more detail later.

Fastening the wound bandage

Take crack linen a half cubits long and half a span wide. Make it wet with the white of an egg, or any of the following: milk, mulled wine, hot water, black ointment or with popelioene. Wrap the crack linen seven or ten times around the leg wound. Then apply a felt bandage that is longer than a span. (Leersum 1912:162)



Fig 8. Cleaning the wound and application of black ointment; photo by Hans Splinter.

Explanation: A cubit is a linear measure of (at least in the Netherlands) approximately 69.4 cm. A span is also a linear measure and is the distance between the thumb and index finger. Measurements were different in most cities, so considerable variation is to be expected. We did not use all the different medicines or fluids in this reconstruction due to practical reasons, but used only black ointments as explained later.

The nature and strength of linen and felt A linen bandage was (in the practice of the fourteenth century) the best material to use since cotton was rare and costly. According to the rules of health and balance, linen was cold and dry and it tempered the heat of the body, dehydrated ulcers and was good for hot humours. On the nature of felt (compacted wool) it was said that it was hot and dry, and that it protected the body against cold and kept it warm (Arano 1992: XLVII, XLVI).

The **construction** of the splint cast:

Seven splints are applied on top of the felt, each one measuring a finger width and a span length or slightly longer. These are held with three cords, one in the middle of the fracture, the other above and below. Three hollowed elder branches are applied around each rope so tension can be applied to the bandage and the splint. A wooden pipe is inserted through the hollowed elder branches and prevents the ropes rolling down. (Leersum 1912:162)

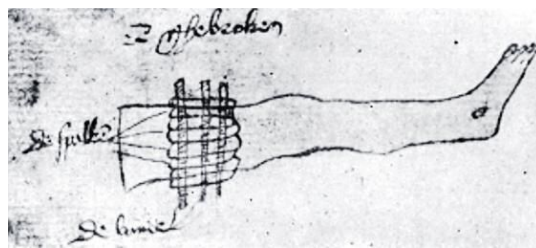


Fig 9. Drawing of the splint by Yperman (Leersum 1912: 292).



Fig 11. The splint bandage.

Explanation: preceding the reconstruction we experimented with the bandage of the splint to ensure best practice. This was due to the fact that the text and drawings were not accurate enough. Insight and understanding grew during the bandaging process.

Inspection of the fracture and wound

The master (surgeon) shall visit the patient every day to inspect the fracture and if necessary to loosen or tighten the strings. He will apply ointment of poplar buds from the knee to the foot if swelling occurs. A rag soaked in vinegar will cool the leg from the foot to the knee, many will benefit from this. (Leersum 1912:162)

Explanation: The swelling due to oedema and haematoma is most severe in the first days following the accident and it will increase or decrease due to healing or complications such as infection.

Application of a wax plaster

On the 12th day the surgeon will return to the patient to change the dressing. He wets the cloths with warm water in order to prevent the wound from being pulled open. The dressing is then removed and the leg washed and dried. He will then apply a plaster that is made of linen cloths soaked in wax, lard and white resin that has been melted in a pan. When the plaster is cooled slightly, apply it to the wound, wrap the linen cloth eight or ten times around the leg and tear off. Apply felt and the splint bandage as previously described. (Leersum 1912:162)

The broken leg in a cradle

One leg is placed next to the other for control if they are at the same length. The broken leg is laid in a cradle after the ninth day. The master surgeon is required to keep the leg stiff and straight up to the twelfth day and until the eighteenth day as the fracture begins to stabilize. (Leersum 1912:162)



Fig 11. The cradle; photo by Hans Splinter.

Explanation: Between the 12th and 18th day the body creates new bone tissue (callus formation). Yperman did not explain this in his text. The Chauliac mentioned in his chapter about fracture treatments that there is a period between days 12 and 14 where callus formation occurs. He told us; after twelve or more days, callus formation is indicated, by freedom of pain, the absence of swelling, and a limb with a healthy colour. (Rosenman 2005: 410)

The healing process

The broken leg is checked regularly for 8 to 10 weeks and is inspected or the fracture heals by the nutrition that it gets and the time (the moon days). You can see that because the bone "cross-links", which means that there will be a bulge on it. (Leersum 1912:163)

Explanation: The fracture heals due to nutrition, according to the rules of the humours. Bodily fluids that dissolve in the blood nourish the fracture and wind throughout the veins.

Rehabilitation

After that time, the patient is instructed to walk on crutches. But they should not get carried away as they have seen people walking too early and being too imprudent and the leg broke again. Also it happened that patients went to walk too early which resulted in a shorter leg and they stayed walking with a limp.
(Leersum 1912:163)



Fig 13. Master Roelof on crutches; photo by Hans Splinter.

Ointments used by Yperman

Black ointment In the first book Yperman wrote about the efficacy of this ointment; The ointment is good for festering wounds, it cools and refreshes, soothes and heals and it stimulates the formation of pus (Leersum 1912: 21).

Wax plaster In chapter 40 Yperman wrote about how Cirone or wax plaster was prepared; the plaster is made of bee wax and of lard, of sheep, or from the resin of pitch in which the resin is used the least. One adds this all together in a pan, melts it, then strains the mixture through a linen cloth and wraps it around the broken bone. (Leersum 1912:166)

Populos ointment Yperman used this ointment in swelling as you can read in the description of the wound on the 12th day later in the text. However according to the recipe in the Boec of medicinen in Dietsche this popular ointment was used in cases of extreme heat caused by high fever (Daems 1967: 191).

Additional information

Pain relief

Neither Yperman as any other surgeon or doctor wrote about pain relief, we know that people in the middle ages were familiar with herbs and plants that were analgesic and sopoforic. We are not sure why, it is an assumption that speaking of and treating pain was dangerous as most herbs were very poisonous and probably there was a religious taboo as Jesus refused the sponge with opium in his last hours of his live. It is difficult to find any sources in this matter.

In the modern view the long bones (upper and lower leg bones and upper and lower arm bones) are the largest, longest and heaviest bone in the human body. The muscles of the upper leg (the quadriceps muscle, the Sartorius and the Biceps femoris) are the most powerful in the human body. It was and is virtually impossible to successfully restore a broken bone without effective pain relief. (Kirchmann 1967:110,112)

Bone setting with the aid of a traction device

Yperman gave no information about the problems and difficulties that occurred in bone setting. His colleague de Chauiliac described in his book in the chapter about general treatment what the surgeon had to do:

If simple manual traction cannot align the fragments, you use thongs and instruments designed by Hippocrates, and later by Galen. I believe they consisted of a windlass and columns as described by Albucasis, and with pins to hold the position of the windlass. While the traction is in effect, the surgeon will manipulate the fragments and bring the limb to its proper length as compared with the normal side, as insisted by Galen.(Rosenman 2005: 407-8)

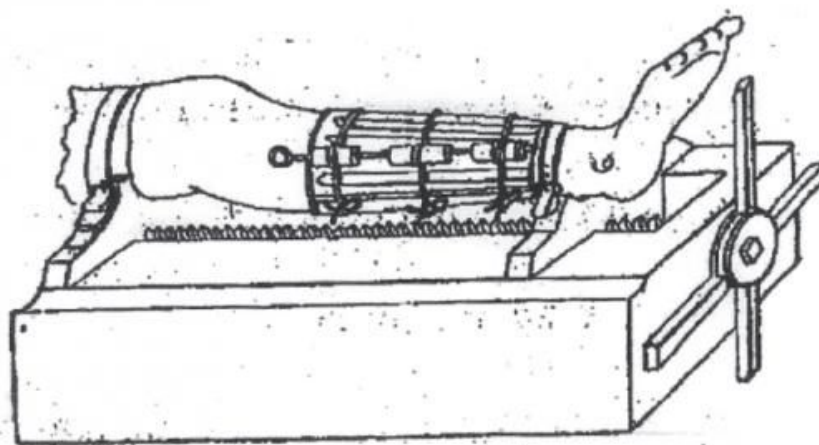


Fig 13. Albucasis Windlass Box drawing by Brunschwig (Rosenman 2005: 692).



Fig 14. Dummy in the house of the barber-surgeon; photo by Roelof Knijpstra. Fig 15. Reconstructed Windlass Box; photo by Roelof Knijpstra.

Prognosis

Yperman described in his chapter that (open) femoral and other long bone fractures were very dangerous but he did not write about the prognosis of such a fracture. Statistics about prevalence and healing is unknown. For now the only way to get an idea of the prevalence of fractures is archaeological research of exhumed bodies.

Bio-archeological study of medieval burials

This study of medieval burials on the site of St Mary Spital London describes more than 10,000 skeletons from the medieval cemetery of St. Mary Spital. The bodies were exhumed and examined for injuries. The total number of fractures and thus also the number of fractures of the femur have been studied and detailed. Because of the large number of patients with fractures in this study, an indication of prevalence and subsequent complications may be given (Connell et al. 2012).

The number of fractures was 8471 of which 550 or 1.1% were shaft fractures (Connell et al. 2012: 95). Of these, 23 thigh fractures were identified comprising 0.3% of the total number of fractures. From this low percentage it can be concluded that the relative occurrence of femur fractures was low and rare in medieval London.

The number of complications in the total number of shaft fracture was 105 (19.1%). Of these, five were identified as femoral fractures (21.7%). This was not significantly higher than the average (Connell et al. 2012: 106).

The complications in shaft fractures were identified by the following means: insufficient fracture healing by poor bone growth, infection, nerve damage, and vascular necrosis. (Connell et al. 2012: 106). Deformity by poor bone growing was identified in 23 femoral fractures (total 550) of which 17 were deformed, which accounts for 73.9% of the dataset.. This is exceptionally high. It was explained by the author of this chapter: The large muscle mass caused major contractions partly due to mobilizing too quickly, the latter was also mentioned by Yperman (Connell et al. 2012:107; Leersum 1912:162).

Conclusion

The reconstruction of medical treatment from the Middle Ages can not be seen as an archaeological experiment as described by Yvonne Lammers-Keyser (2005) as we did not perform archaeological experiments in humans or human remains. We translated and interpreted the medieval texts and we reconstructed the necessary attributes and medical devices. We performed the treatments described by Yperman in a role playing environment with the audience from the beginning of the accident to the rehabilitation. The whole process brought us a lot of new knowledge and understanding in relation to medieval medical treatments because we compared different treatments with each other. It also showed us how we have to translate this knowledge and insight and reflect the differences and similarities in the story we tell to our visitors.

Further developments

In 2016 we began with a performance using a dummy used in the education of nurses. We dressed the dummy as a medieval person and made a reconstruction of the traction device used by Albucasis. Showing the process of physical examination, observation of possible complications and treatment helped us in bringing our message to the audience in a vivid and convincing way. We will continue experimenting with the use of different materials such as other types of wood to construct the splints.

This paper is the first of three in which the findings of the historical research and the experience of presenting it to the public is published in written articles in the EXARC journal and power point presentations. Of course all material will be made available to all OpenArch partners.

The rehearsals with the audience in 2013 and 2014 will be improved by writing a script about the performance of the accident and the treatment. We will learn about the quality of our performance using the outcome of the adjusted visitor survey (thoughts before and after) that was developed for the OpenArch project in work package

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ASSOCIATION OF HERITAGE INTERPRETAION – AHI

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Eric Langham

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Every edition is aimed at building bridges of best practice and connecting a diverse range of people and institutions. The aim is to create an encompassing Journal that encourages thoughtful debate and new ideas. We are looking to widen our pool of contributors – with articles from within and beyond the interpretive profession – as we look to see how other disciplines, from film-makers to artists, communicate stories.

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The next Journal is all about entertainment, and we are looking for articles exploring the fun, playful, wonderful and entertaining side of interpretation. So if you have any ideas for contributions please send them to me, Eric Langham, (eric@barkerlangham.co.uk) the Journal's new Commissioning Editor.

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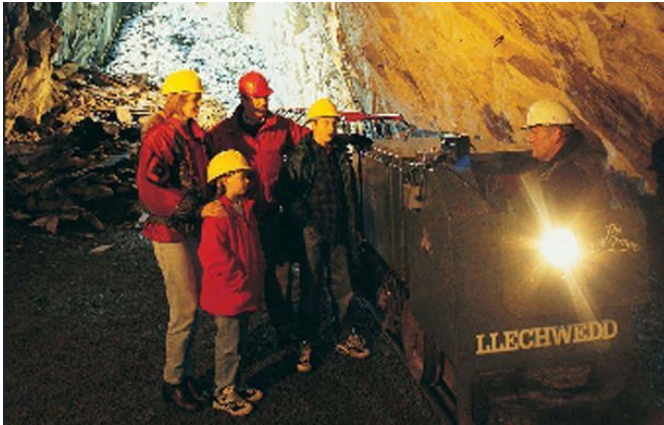
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We launched our brand new deep mine tour in **March 2016**. It is a completely unique experience – there really is nothing like this anywhere else in the world.

Our expert local guides – many of whom have multi-generational family links to the slate industry at Llechwedd and incredible family stories of their own – will accompany you on a journey back through time to the mid-nineteenth century.

You'll start your journey on the UK's steepest cable railway. The clock will turn back 160 years as you travel 500 feet underground into the belly of the mountain. Once you arrive in the tunnels of the old mine we will use a combination of leading-edge technology and traditional storytelling to bring the miners' stories to life.

Extraordinary light projection, enhanced reality technology and explosive special effects will transport you to another time and place.

You'll meet the mine's owner and founder John Whitehead Greaves, and some of the men and boys who spent up to 12 hours a day, 6 days a week, working underground in semi-darkness. You will even meet the quarry 'danger man' in person and witness the extraordinary Victorian safety checks that were conducted more than 100 feet above the mine's floor.

We think the best stories are the ones you can take part in, so there will be the opportunity to try out some of the miners' equipment and techniques for yourself.



Quarry Explorer Tours of Llechwedd's man-made mountains.

Llechwedd's mountains are completely unique: our towering summits were built by hand and hard graft – by the incredible men and boys who worked in our mines.

Colossal amounts of rock have been dug out of the earth since mining began here in the mid-19th century. Our mine extends down 16 floors – almost 1400ft down to sea level - and houses over 20 miles of hand-cut tunnels and caverns.

What is truly extraordinary is that an incredible 90% of the rock blasted out of the mines was unusable. The men heaved it to the surface using pulleys and carts, and now vast heaps of those discarded slate spoils tower above us.

From late May 2016, we will be operating Quarry Explorer tours of these man-made mountains: an extreme landscape 1400ft above the sea.

Travelling in a guide-driven military 4 x 4 truck you'll be able to drive to the top of the quarry and into some of the massive craters we made by blasting the tops off our hundred-year-old caverns.

You'll learn more about how this amazing landscape was formed, and why it is now the subject of a UNESCO World Heritage Status bid. You'll take in views of North Wales like no other and have the opportunity to snap some great photographs. On a clear day you can see as far as the sea at Porthmadog, from where the slate was shipped all over the world.

A brief history of the slate industry in North Wales.

North Wales has been supplying the world with slate for hundreds of years. It is an industry that changed the landscape of North Wales forever – as well as the lives of generations of Welsh men and women.

The story of slate starts as long as 500 million years ago when very fine mud was laid down on an ancient seabed. Over time, and during various continental shifts, it was compacted and squeezed at high temperature to form the slate we know today.

The quality of slate is dictated by its specific content and age as well as the pressures to which they were exposed in the millions of years of their formation. The seams around Blaenau Ffestiniog in North Wales are regarded as being of the highest quality in the world – their unique strength and structure allows the rock to be split into exceptionally fine uniform layers.

First quarried by the Romans, slate was also used extensively by Edward I when he built his Iron Ring of fortresses around Wales. In the 19th and 20th century it provided much of the roofing in Britain, as well as being exported to Europe and beyond.

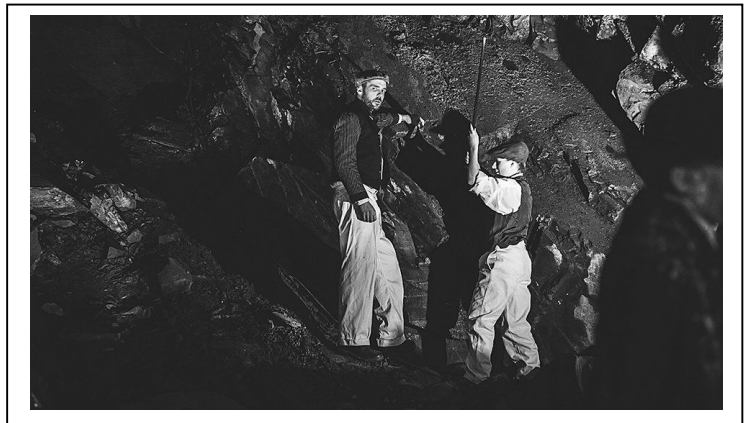
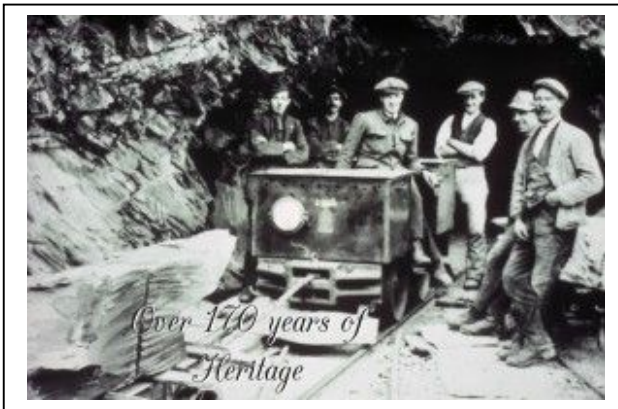
By the 1870s, slate was amongst Wales's most important industries and Blaenau Ffestiniog had grown from being a small farming settlement into a thriving and prosperous industrial town.



Slate splitting demonstration - some visitors can give it a try. It's not easy.

Initially slate was dug out by hand, using rudimentary tools and gun powder. It was perilous work which saw men suspended by a chain wrapped around one leg and working high above the cavern walls for hours at a time. Boys were able to start an apprenticeship from as young as eight years old and generally worked in a crew with other members of their family.

Miners worked by candlelight and would never see the vast caverns their years of work produced – it was simply too dark.



As the industrial age progressed, infrastructure was developed to cater for the industry and facilitate its transportation around the world. The narrow-gauge railway which ran from Llechwedd at Blaenau Ffestiniog to the new port of Porthmadog was one such advance - it was built to transport slates to the sea. The steam railway is now a world-famous tourist attraction and still operates a regular service today.

JW Greaves and Sons Ltd.

JW Greaves has been quarrying in Snowdonia since 1836 – that's 180 years. The company was founded by a 29-year old John Whitehead Greaves after he failed to take a transatlantic passage from Caernarfon to start a new life in Canada. A handful of generations later, it is still owned and operated by his descendants.

Greaves initially operated in Llanberis in partnership with a wealthy entrepreneur called Edwin Shelton, before beginning mining explorations at Llechwedd in 1846.

Disheartened by a lack of progress (they couldn't find the slate seams) Greaves' business partner left the partnership in 1848, just months before Greaves, on the brink of bankruptcy, finally discovered the deep slate beds which are still being worked today. His courage and tenacity paid huge dividends. The family subsequently won – and later lost – a great fortune and saw the rise of an amazing town at Blaenau Ffestiniog. Industrial decline set in with the First World War and it was only when the first underground tours started, inspired by the great-uncle of our current chairman in the 1970s, that the magnificent hand dug caverns came to be rediscovered and properly explored again.

Although underground mining operations at Llechwedd ceased in the 1980s, open cast quarrying is still ongoing. Llechwedd Slate Caverns still produces a variety of quality slate products from roof tiles, walling and flooring, to cheese boards and slate signs.

Say cheese

We are not just packed with heritage and adventure. The constant cool temperature in the caverns make them an ideal environment to mature cheese. Our delicious Welsh Slate Cavern Aged Cheddar is produced by the leading cooperative South Caernarfon Creameries. It is stocked by Sainsbury's and the Llechwedd Slate Cavern shop.

Where will you find us?

Our address is **A470, Blaenau Ffestiniog, Gwynedd LL41 3NB**

You'll find us in the heart of Snowdonia near the historic slate mining town of Blaenau Ffestiniog. We're a 10 minute scenic drive from Betws-Y-Coed, 20 minutes from Porthmadog and 50 minutes through the Welsh valleys from Llandudno.

If you are staying near Porthmadog you can get here on the fabulous Ffestiniog Steam Railway – with just a short connecting bus ride.

For more information, interviews and hi-res images:

Please contact Louise McWatt
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<http://www.llechwedd-slate-caverns.co.uk/>



Interpreting the Secrets of Viking Ships

By
Evan Hadingham
NOVA



With their invention of the longship, the Vikings spurred a literal sea change in medieval European affairs. Photo credit: © Svergies TV

For three turbulent centuries, the glimpse of a square sail and dragon-headed prow on the horizon struck terror into the hearts of medieval Europeans. Indeed, the Viking Age, from A.D. 800-1100, was the age of the sleek, speedy longship. Without this crucial advance in ship technology, the Vikings would never have become a dominant force in medieval warfare, politics, and trade.

The *drekar*, or dragon-headed long ships, were stealthy troop-carriers. They could cross the open oceans under sail and then switch to oars for lightning-fast hit-and-run attacks on undefended towns and monasteries. Far surpassing contemporary English or Frankish vessels in lightness and efficiency, longships carried Viking raiders from northern England to north Africa.

Viking expertise in naval craftsmanship soon led to the evolution of other types of ship. Among these were the *knarr*, or ocean-going cargo vessel, which facilitated far-flung trade networks and the colonization of Iceland, Greenland, and America. The *knarr* drew on similar design principles as the longship but was higher and wider in relation to its length and had only limited numbers of oars to assist with maneuvers in narrow channels. Cargo decks were installed fore and aft.

PROOF IN THE PLANKING

The secret of the Viking ship lay in its unique construction. Using a broad ax rather than a saw, expert woodworkers would first split oak tree trunks into long, thin planks. They then fastened the boards with iron nails to a single sturdy keel and then to each other, one plank overlapping the next. The Vikings gave shape to the hull using this "clinker" technique rather than the more conventional method of first building an inner skeleton for the hull.

Next, the boat builders affixed evenly spaced floor timbers to the keel and not to the hull; this insured resilience and flexibility. They then added crossbeams to provide a deck and rowing benches, and secured a massive beam along the keel to support the mast.



Discovered in Norway in 1906, the Oseberg ship, the best preserved Viking ship ever found, reveals its Norse shipbuilders' graceful construction style. Enlarge Photo credit: © Svergies TV

The longships' light, economic construction was a major factor behind their success. Modern replicas have achieved speeds of up to 14 knots. In marked contrast to modern sailboats, the ships' lack of a big, vertical keel meant that they were highly maneuverable and could easily penetrate shallow surf and river estuaries. Seafarers steered using a single side rudder on the right, the 'starboard' or "steering board" side. (The term 'starboard' is thought to have originated in the Viking era.) They could also reef the square sails in strong winds and adjust them to permit rapid tacking.

PRESERVED TO THE PRESENT

Famous discoveries of Viking ships at Gokstad and Oseberg, Norway, in 1880 and 1906, respectively, established the classic image of the dragon-headed warship. Longships from both sites were preserved almost intact, with lavish carved decoration, in the waterlogged clay of royal burial mounds. Built around A.D. 890, three quarters of a century after the Oseberg ship, the Gokstad vessel shows great improvements in design, particularly in the sturdiness of the mast supports. Not surprisingly, this era, during which the Norse perfected longship design, coincides with the eruption of seaborne Viking raids on the monasteries and towns of Europe.

JVA InterpNews



Astoundingly, a veritable flotilla of sunken Viking vessels turned up on the grounds of the very museum being built to house other Viking boats. EnlargePhoto credit: © Svergies TV

The modern phase of Viking ship investigation began with the recovery of five vessels at Skuldelev in Roskilde fjord, Denmark, between 1957 and 1962. The excavation involved building a coffer dam around the ships, which Norsemen deliberately sunk in a desperate bid to barricade the fjord against invaders.

The major revelation at Skuldelev was the variety of the vessels, which ranged from a stocky cargo ship with a capacity of 24 tons to two sleek longships. The larger of the longships, measuring 95 feet in length, had made at least one successful crossing of the North Sea, for [tree-ring analysis](#) of its oak timbers revealed that they had been cut down around A.D. 1060-70 near Dublin, suggesting the presence of a major shipyard at this key Viking stronghold in Ireland.

Even more remarkable discoveries were to follow in 1996, when contractors began expanding Roskilde's waterfront museum, originally built to house the finds from Skuldelev. As astonishing as it sounds, no fewer than nine wrecked medieval ships eventually turned up in different spots around the building site, including one under the museum's car park.

A STUNNING FIND

The most striking discovery was the biggest longship yet found, 119 feet long, with room for at least 72 oars and a crew of 100. With its draft of only about three feet and a huge, 2,175-square-foot sail, the ship must have been swift and formidable. The excavators speculate that this ship, like the others in Roskilde harbor, may have gone down in a severe storm, then become hidden in silt. Tree-ring analysis of the high-quality oak used for its timbers suggests a construction date of around A.D. 1025.

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A detail from the Bayeux Tapestry, which commemorates the Norman invasion of England. Enlarge Photo credit: © WGBH Educational Foundation.

Countless sailing experiments with replica ships continue to confirm the excellence of Viking ship design. Much less is known about Viking navigation methods on the high seas, although one of the Icelandic sagas—narratives of Norse history and legends written in Iceland in the 12th and 13th centuries—includes sailing directions from Norway to Greenland that rely on distant landmarks and the presence of birds and whales to signal the position of land. The Vikings had no compass but undoubtedly steered by the sun and stars.

Did they have other aids? The sagas contain intriguing references to *asolarsteinn* or 'sunstone' used for navigation. Scholars believe it possible this stone was feldspar, a mineral found in Iceland that polarizes light. Theoretically, a polarizing stone might have helped indicate the direction of the sun when clouds obscured the view. Its practicality is doubtful, however, since it would require some blue sky to work and would thus have proved useless in total overcast.



Did the Vikings, as the sagas suggest, really use a sun compass for navigation? If so, what form did it take? Enlarge Photo credit: © WGBH Educational Foundation

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The evidence for a so-called "sun-compass" is equally shaky. Some have viewed a fragment of a small wooden disk found in a Greenland monastery as a kind of bearing dial for finding north and south. The disk has a hole in its center, and the theory suggests that it originally fitted over a central pin or gnomon to cast a shadow. Markings around the edge of the disk could then have helped the navigator determine north-south. While similar modern devices do work successfully (as seen in the NOVA program "The Vikings"), many have questioned if the Greenland disc was actually used in this way. It is less than three inches across and the markings around the perimeter are so crudely carved as to make the interpretation doubtful.

"THE TOWERED SHIPS"

The impression that a Viking fleet must have made under full sail can scarcely be imagined today, but a rhapsodizing monk at the monastery of St. Omer, France, tried his best to evoke the sailing of the royal Danish fleet in A.D. 1013:

When at length they were all gathered, they went on board the towered ships...On one side lions molded in gold were to be seen on the ships, on the other birds on the tops of the masts indicated by their movements the winds as they blew, or dragons of various kinds poured fire from their nostrils...But why should I now dwell upon the sides of the ships, which were not only painted with ornate colors but were covered with gold and silver figures?...The blue water, smitten by many oars, might be seen foaming far and wide, and the sunlight, cast back in the gleam of metal, spread a double radiance in the air.



Interpreting 8 of the cutest **toxic** caterpillars

by

MELISSA BREYER

The mother nature network.



*PERNICIOUS PUSS: Cute as a kitten, contact with the puss caterpillar *Megalopyge opercularis* can cause shock and respiratory distress. (Photo: Caterpillar hunter/Flickr)*

Few other larvae are as captivating as the caterpillar. Maggots and grubs may inspire more ew's than aw's, but the larvae of butterflies and moths are likely to encourage cooing. Caterpillars inhabit the world of charming creepy-crawlies, like ladybugs and fireflies — the kind of insects that are more Lewis Carroll than Franz Kafka.

But cute critter status aside, there's a reason why the Swiss German word for caterpillar (*teufelskatz*) translates to "devil's cat." Caterpillars have a dark side, one that justifies entomophobia, the fear of caterpillars.

Caterpillars are high in protein and rather defenseless — making them an easy dinner staple for other animals — and many have evolved various means of protection. Their markings and body parts can make them seem larger in size or even poisonous. In fact, some of them are poisonous, both to consume and to the touch.

Stinging caterpillars have urticating hairs — hollow bristles that contain toxins from poison-gland cells. When touched, these structures can break and the poison is released. Reactions run the range from mild stinging and itching to intense pain and, in the case of the giant silkworm moth caterpillar, even death.

But before you go out and start squishing caterpillars, remember that they are not vicious and stinging only occurs when they are touched and feel threatened.

1. Puss caterpillar (*Megalopyge opercularis*)

The Cousin Itt of caterpillars, this guy (pictured above) goes by the name of puss caterpillar or asp — and both names make sense. Puss, because this total cutie pie is as fuzzy as a kitty; and asp, as in snake, because this is one of the most toxic caterpillars in North America.

The venom comes from poisonous spines neatly concealed by the irresistibly fuzzy surface. When touched, the spines break off and lodge in the skin, releasing the venom. Mother Nature at her sneakiest. According to the toxin library of the American Association of Clinical Chemistry ([AACC](#)), this is no simple sting: Intense throbbing pain develops within five minutes of contact, with pain extending up the affected arm. Other symptoms may include headaches, nausea, vomiting, intense abdominal distress, lymphadenopathy, lymphadenitis, and sometimes shock or respiratory stress.

Moral of the story: Step away from the world's cutest caterpillar.

2. Saddleback caterpillar (*Acharia stimulea*)



Photo: Gerald J. Lenhard/Bugwood.org

Taking the prize for “Caterpillar Most Resembling a Chinese New Year Dragon,” the cute and beautiful saddleback caterpillar is native to eastern North America, although it looks better suited for much more exotic climes.

The pert pompoms these caterpillars sport are more than decorative. Like much of the rest of this creature's body, the pompoms bear urticating hairs that secrete irritating venom. The stings are very painful, and they can cause swelling, nausea, and leave a rash that can last for days.

3. White cedar moth caterpillar (*Leptocneria reducta*)



Photo: Bidgee/Wikimedia Commons

As described by the Coff's Harbour Butterfly House, by day the white cedar moth caterpillar “hides in crevices on or near the ground. In the gloom of an evening, they swarm as a seething mass of hundreds of hairy brown bodies, undulating in eerie silent flow up the tree trunk and along the branches to the leaves, which they eat voraciously ... when a tree becomes defoliated, they wander everywhere looking for another one.”

This caterpillar that's reminiscent of an angora sweater can indeed pack a punch — the bristles are capable of inducing a frightful case of urticaria.

4. Io moth caterpillar (*Automeris io*)



JVA InterpNews

Animal, vegetable, mineral ... caterpillar! Like a tiny oasis of palm trees, the sweet, colorful io moth caterpillar has a broad range, from Manitoba and in the southern extremes of Ontario, Quebec, and New Brunswick in Canada, to Montana, North Dakota, South Dakota, Nebraska, Colorado, New Mexico, Texas, Utah, east of those states and down to the southern end of Florida. Io gets around.

And yes, those frond-like spines have a painful venom that is released with the slightest touch. Some people experience severe reactions and require medical attention, while some only itch or have a burning sensation.

5. Hag moth caterpillar (*Phobetron pithecium*)



Photo: Greg Dwyer/Wikimedia Commons

Question: Cute fuzzy octopus monster that could be a plush toy? Or, an arachnophobe's worst nightmare?

Whichever camp you're in, one thing's for sure: there's little mystery as to why this caterpillar garnered its nickname, the "monkey slug."

Complete with six pairs of curly projections densely covered in hairs — the "limbs" can fall off without harming the larvae, but the hairs can cause some fierce irritation.

6. Hickory tussock caterpillar (*Lophocampa caryae*)



Photo: Greg Dwyer/Wikimedia Commons

Such elegance! Dapper, with its velvety back and sweeping bristles, this creature looks more vintage feather boa than larva — but larva it is. And stinging larva, at that. Although some people have little to no reaction to this caterpillar, others have a reaction that ranges from a mild to a fairly severe rash comparable to poison ivy.

7. Pine processionary caterpillar (*Thaumetopoea pityocampa*)



Photo: Quartl/Wikimedia Commons

Somebody needs a haircut — but then somebody would be much less dangerous and not nearly as cute. The larvae of the pine processionary moth could be the model for caterpillar shampoo if there were such a thing.

But all that hair, touchable as it may look, should never be touched. Not only are the extremely irritating hairs harpoon-shaped, but the caterpillar can eject them when threatened, at which point they penetrate all areas of exposed skin, replete with urticating venom.

8. Giant silkworm moth caterpillar (*Lonomia oblique*)

Photo: Krol./Flickr

Nature got it right with this one — it's designed it to look as scary as it is. This is not the caterpillar you want to meet in a dark alley. Known as the “assassin caterpillar,” the South American larvae are responsible for at least 500 deaths, and probably many more.

The spear-like bristles penetrate the skin and deliver a dose of toxin which leads to headache, fever, vomiting and malaise before a severe bleeding disorder ensues leading to ecchymosis, hematuria, pulmonary and intracranial hemorrhages (yes, that's blood flooding the brain), and acute renal failure.

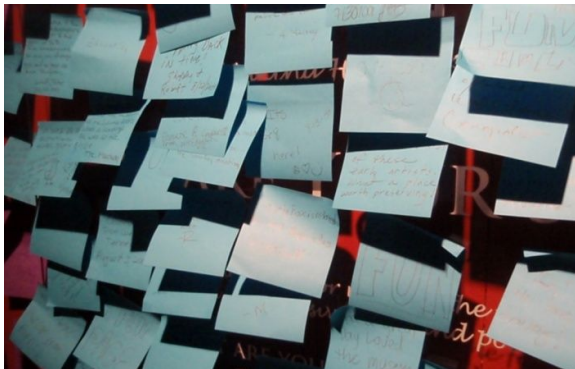
In case of stings

Should you get stung by a caterpillar, Florida Poison Information Center recommends this treatment: Place Scotch tape over the affected area and strip off repeatedly to remove spines. Apply ice packs to reduce the stinging sensation, and follow with a paste of baking soda and water. If the victim has a history of hay fever, asthma or allergy, or if allergic reactions develop, contact a physician immediately.

Reprinted from the Mother Nature Network.

Co-Curatorial Interpretation: A Step Beyond Participatory

*Chris Brusatte,
Interpretive Planner at Taylor Studios, Inc.*



Photos courtesy of Joel Kramer and the Miami Workers Center.

Are you often asked what the “museum or nature center of the future” will look like? At the exhibit firm that I work at – Taylor Studios, Inc. – we get that question all of the time. Despite our design and fabrication expertise, we cannot build a time machine (!), so the best that we can do is offer predictions based upon our own experience in the field. Building interpretive experiences for clients large and small, we have not only seen every type of exhibit that you can imagine, but we have also witnessed the larger trends impacting the field of natural and cultural interpretation. We have a unique pulse on what types of exhibits have gone out of style, and which are emerging as the most popular in our 21st century world. We interact with people all over the country, learning what excites, captivates, and inspires them when they visit their favorite zoo, museum, or nature center.

One trend that we have witnessed is the emergence of co-curatorial exhibits, and we have incorporated these into many of our latest projects. What exactly is a co-curatorial exhibit? Simply put, it is an exhibit or experience (within a museum, nature center, visitor center, zoo, science center, etc.) that is created jointly by both the site and the visitor. For example, in its simplest form, it could be a large blank wall or panel featuring a question chosen by the museum, on which visitors write their own responses on post-it notes. These post-it notes, written by the visitors, become part of the exhibit itself, for all future visitors to see.

Co-curatorial exhibits are the latest trend in participatory exhibits, which have flourished over the past two decades thanks to luminaries like Nina Simon. For most of the twentieth century, interpretive exhibits (whether in museums or elsewhere) were sterile, didactic, one-way conversations between the “site” and the “visitor.” The “site” (the museum, nature center, zoo, etc.) was seen as the “authority,” and its job was simply to teach the passive visitor through non-interactive text panels and display cases. Visitors did not participate in exhibits – they merely looked, read, and learned passively. They were given no chance to act, and no chance to lend their voices or opinions.

With the emergence of participatory exhibits towards the end of the twentieth century, however, the visitor experience became much more dynamic. Participatory exhibits, by definition, got visitors actively moving, thinking, and interacting with exhibit pieces. Visitors were no longer only passive readers and observers, but active learners in a hands-on environment. Science centers provide perhaps the best example of participatory exhibitry. Visitors learn about various scientific phenomena by playing games, handling inter-actives, and actively thinking and moving within the space. Taylor Studios has been honored to make dynamic and creative participatory exhibits for many science centers around the country.

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The latest trend – co-curatorial exhibits – simply takes participatory exhibits one step further. Not only are visitors given a chance to actively *participate* within an exhibit space, but they are also given the chance to help *create* this exhibit space. No longer is the site (the museum, nature center, etc.) the sole “authority” creating the learning experience within the exhibits. Visitors too are now given authority to create parts of the exhibit space, lending their words, thoughts, and (in some cases) their artwork to the permanent exhibit. The benefits are numerous. With shared authority, visitors feel like their voice matters, and this connects them ever deeper to the site. Similarly, the exhibits have an immediate relevance to the visitors’ lives, because the visitors become directly involved in creating them. Visitors also enjoy seeing the work of their fellow visitors, and a social atmosphere is present in these spaces that is lacking in many other exhibits.

Taylor Studios has had the honor of creating many leading-edge co-curatorial exhibits within our clients’ spaces. Although this trend is only recently emerging (within the last five years or so), we truly feel that momentum is building in such a way that co-curatorial exhibits will only increase as the years go on. These will most likely remain only one part of the wider experience at most sites, and we doubt that many sites will create entirely co-curatorial experiences where every exhibit involves visitor input. However, we would be very surprised if more and more sites did not begin enabling visitors to co-create exhibit experiences.

Of course, co-curation is not for everyone. Despite its many benefits, it simply might not fit certain organizations’ missions, goals, and objectives. Perhaps your target audience would not feel comfortable, or perhaps your mission requires curation to be left to the experts. We work intimately with our clients to see what methods fit them best. We encourage co-curatorial exhibits when we feel that it would benefit an institution’s main goals and central theme, and we discourage them for the organizations where it simply wouldn’t work. Like every type of exhibit out there, co-curatorial experiences work for some organizations and not for others.

What do you think? Is co-curatorial truly the “exhibit of the future”?



ZooWise: A global audience research, evaluation and monitoring project for zoos and aquariums

The ZooWise Research Team

Biodiversity loss is one of the biggest threats to our society. In recognition of this, the United Nations and national governments have committed to halting and eventually reversing the current unsustainable trend of increasingly threatened species. One way they aim to achieve this change is the official goal that “by 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably” (Strategic goal A: Target 1 of the Aichi Biodiversity Targets (CBD, 2011)).

Zoos and aquariums across the world have accepted the challenge of helping to meet this target. Zoo associations have committed to improving the general public’s understanding of biodiversity (Barongi, Fischen, Parker, & Gusset, 2015) and conservation and education are central to most zoo and aquarium mission statements (Patrick, Mathews, Ayers, & Dale Tunnicliffe, 2007). Zoos and aquariums attract vast numbers of visitors each year (Gusset & Dick, 2011) making them ideally positioned to raise public biodiversity awareness and inspire conservation action.

In order to maximise the learning potential of zoos and aquariums it is vital to understand the factors influencing visitor impact and experience and carefully evaluate zoo and aquarium interpretive programs. The new ZooWise project (zoowise.org) is providing robust and continuous evaluation of visitor experience and impacts to enable institutions to make informed improvements and evaluate where targets have been reached.

The ZooWise project

ZooWise is an international research project for zoos, aquariums and other wildlife organizations. The project is designed to improve public engagement practices and support conservation and biodiversity awareness within the general zoo-visiting public. Participating institutions can see how well they are achieving their public education mission and what factors affect the quality of their visitors’ experiences. ZooWise is a benchmarking project: This means that aggregate data from participating institutions is collated to create national and international averages. Zoos and aquariums can use these benchmarks as a performance target to assess their institution’s performance on key outcomes measures. The ZooWise project objectives are to:

1. Enhance Social and Environmental Impact

In order to deliver enhanced positive impacts, informal learning institutions need to better understand audiences and their needs (Dawson & Jensen, 2011). By providing such knowledge through automated systems, the ZooWise project supports and raises standards of zoo and aquarium educational provision, awareness of conservation and overall quality of zoo and aquarium experience.

2. Improve Practice

The ZooWise project helps zoo and aquarium stakeholders target improvement initiatives. Real-time data analysis provided by the project allows stakeholders to instantly evaluate the effectiveness of these initiatives. ZooWise uses established questions from multi-national surveys, and a repeated pre-/post- visit approach to data collection (Moss, Jensen & Gusset, 2015). This means that knowledge and attitude changes can be tracked and directly attributed to a specific visit. The robust nature of this methodology means that zoos and aquariums are provided with strong evidence of the impacts of a visit. ZooWise additionally encourages members to be part of a global community and to share best practice for the improvement of all.

3. Improve Research & Evaluation

Existing zoo and aquarium audience research and evaluation is of variable quality (Jensen, 2014). The ZooWise project helps address this issue by making world-class research expertise and analysis available to more institutions than ever before. The project employs survey questions and methods used in world-leading research on zoo audiences and educational impacts (Moss, Jensen & Gusset, 2015) and developed by leading experts in zoo audience research and evaluation design.

The ZooWise project's mission and objectives are enabled with innovative technology that automates the process of data collection and analysis, giving participating institutions a clear daily view of their visitors' demographics and needs. Additionally, ZooWise enables comparative impact evaluation at regional, national and global level. By promoting and facilitating the effective use of benchmarking standards, the project supports the spread of best practice. This will help the individual institutions and the sector as a whole to identify areas of improvement in delivering their services.

ZooWise question bank

A core feature of ZooWise is the project's question bank. The question bank contains expert designed questions, including items from the World Association of Zoos and Aquariums (WAZA) 'Biodiversity is Us' survey. The questions are organized into different categories, covering key factors affecting visitors' experiences and outcomes. These include topics relevant to marketing, fundraising, commercial experiences and educational impact.

Participating zoos and aquariums can use the question bank to create their own survey to meet their particular needs. Where questions are used by multiple institutions the system will automatically calculate benchmark averages based on aggregate responses across institutions. Where institutions have existing surveys, these can be integrated into the ZooWise system, after being reviewed by the project's expert research advisors (zoowise.org/advisors). If a suitable existing question is not available in the question bank, new questions can be developed by the ZooWise expert advisors.

Technology

Technological developments open up new and exciting ways to conduct visitor research and evaluation (Jensen, 2015). In the past, visitor research has relied on manual survey data collection and analysis. This is time and resource intensive, relies on having specialist staff and ultimately the data management and reporting is limited by researcher availability. Many zoos argue that they are not able to provide researcher expertise or staff time to carry out visitor evaluations and this has led to a deficit in robust impact evaluation knowledge (Roe & McConney, 2015).

ZooWise uses technology to overcome difficulties of past research and empower zoos and aquariums to bring about positive change. The cloud-based ZooWise system automatically distributes questionnaires, gathers and analyses data and reports results in formats that are easy to understand. The information is made available to each institution as a dashboard. Charts and other visualizations make it possible to track your own institution's performance both in real-time and longitudinally, as well as comparing performance against benchmarks.

The system is flexible and can be tailored to fit the needs of the individual institution without compromising the quality of the research. Questions can be made available in different languages depending on visitor requirements and reminders can be sent out automatically to increase response rate. The system can also be integrated with each institution's own user interface, branded with the institution's logo and communicated through the institution's email address. As such, the ZooWise evaluation system can become fully integrated into the institution's communication, education and marketing efforts.

Benchmarking

By bringing institutions together towards a common goal, the ZooWise project will help identify, understand and spread good practice. The project makes it possible for individual institutions to understand how they are doing relative to national and international averages across the Benchmarking Areas:

Benchmark 1: Visitor Demographics

Understanding the organisation's audience profile helps contextualize survey responses, which is essential for audience development initiatives. Data about visitor demographics can be used to target education provision and informs about visitor needs.

Benchmark 2: Visitor Experiences

An essential concern for any zoo or aquarium is the quality of the visitor experience. This is affected by everything from food and facilities to animal talks and interactions with staff. The experiences visitors have can facilitate public understanding of scientific concepts and contribute to animal conservation and educational impacts.

Benchmark 3: Increased Biodiversity Awareness

Public understanding about biodiversity, including the awareness of the impacts of its loss and the appreciation of the interdependence of all living things, is a major component highlighted in zoo and aquarium policy and association guidelines. ZooWise makes it possible for participating zoos and aquariums to see their impact on biodiversity awareness and attitudes by comparing visitor responses before and after a zoo or aquarium visit. By measuring public awareness of biodiversity over time, general trends can be established.

Benchmark 4: Understanding of Conservation

An important aspect of biodiversity awareness is an understanding of the threats to biodiversity and recognition of what personal actions can be undertaken to aid conservation. ZooWise enables robust evaluation of conservation-related interests, attitudes and knowledge. The project investigates the extent that visitors see conservation actions displayed in zoos and the understanding of actions that can be taken to lower environmental impacts. The project also includes automated analysis of factors that may affect these important outcomes. These benchmarking areas have been developed based on international zoo and aquarium association guidelines and national regulations. ZooWise provides measurable evidence of performance in these areas. Institutions can use ZooWise as a tool to evidence their educational and conservation achievements and to demonstrate improvements overtime.

Research audience and practical use

The ZooWise project aims at providing zoo and aquarium staff involved in management, evaluation, marketing and education with visitor experience and impact information. This can be used to evaluate the effectiveness of existing provisions at delivering conservation education. The findings can inform institutions about gaps in visitor awareness and verify whether objectives regarding public education about biodiversity awareness and actions are being met. In addition, the benchmarking scores within each area allow institutions to recognize their successes and target improvements. Institutions can share best practice as part of the ZooWise community and in turn influence educational practice in the zoo and aquarium sector as a whole.

Get involved

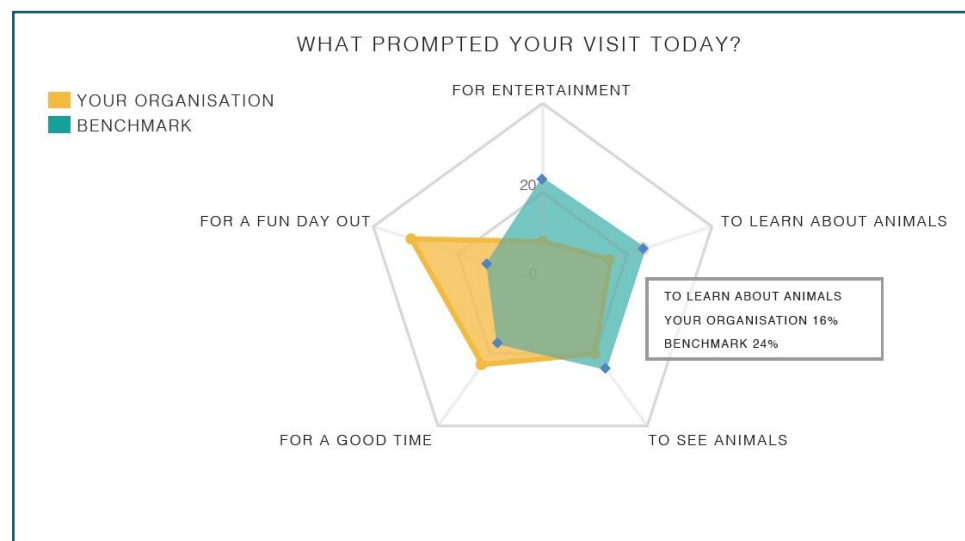
The ZooWise project provides robust and continuous visitor research and impact evaluation to inform practice within zoos and aquariums. To join the ZooWise project and be part of our global zoo and aquarium audience research community, contact us or visit our webpage www.zoowise.org.

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Good-by ...

Rare tree frog species
likely extinct.

Rabbs' fringe-limbed tree frog

*By: Bryan Nelson
Earth Matters.*

Toughie, the last Rabbs' fringe-limbed treefrog in the world. (Photo: Brian Gratwicke/Wikimedia Comons).

This charismatic little frog may have been the loneliest creature on Earth: Until September 2016, only one specimen was known to exist in the world, at the Atlanta Botanical Garden in Georgia. But Toughie, as the staff called him, has died; he was about 12 years old.

This is the latest species to fall victim to the devastating chytrid fungus, an infectious disease of amphibians believed to be the principle reason for the sharp decline in amphibian biodiversity around the world.

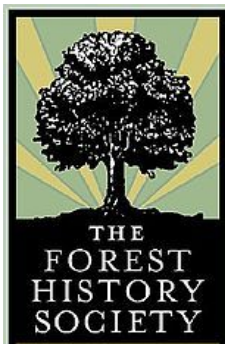
The Atlanta specimen previously had a companion — a male at Zoo Atlanta — until it had to be euthanized in 2012 after its health began to fail.

The last known recording of the species in the wild was in 2007. The region where it was heard later became infested with the chytrid fungus, and the frog's characteristic croaks haven't been heard since.

Studies suggest that up to 85 percent of the amphibians found on Toughie's home turf were gone and it is unlikely that any of his kind survived in the wild.

This only exacerbates the fact but other amphibian species are also at risk of getting wiped out. Scientists estimate that up to one-half of amphibian species all over the world are at risk of extinction.





Picture the Past, Looking to the

Future:

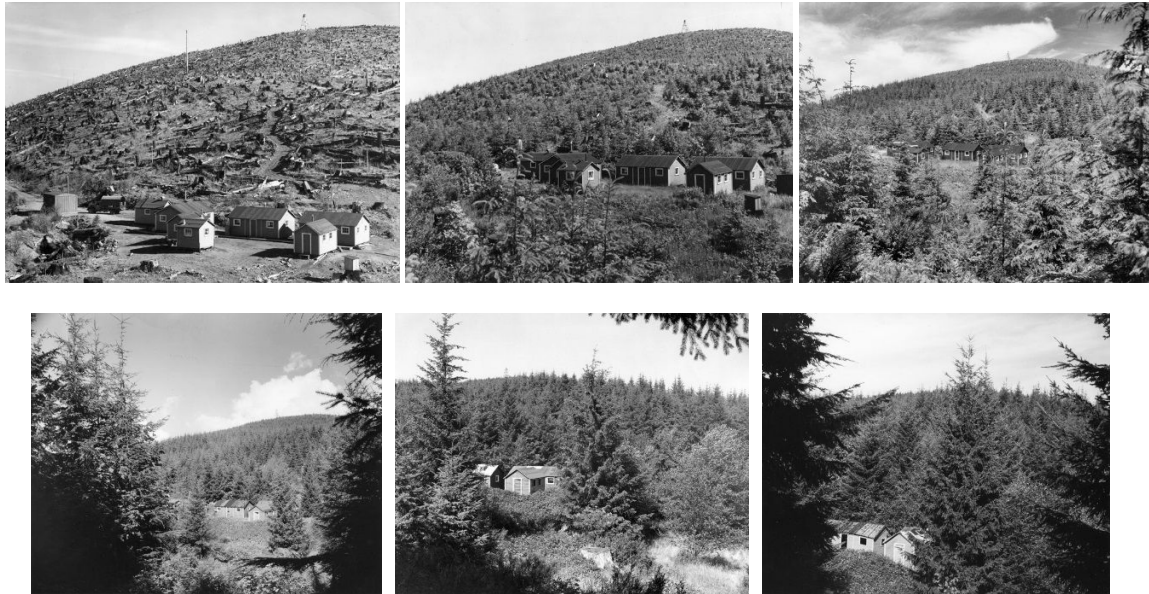
The Forest History Society's Repeat Photography Portal

*By Sara Pezzoni
Forest History Society*

Repeat photography is the practice of taking photographs of a specific location at two or more different times. It is a powerful visual resource for scientific study and education in forest and landscape management, and can be used to document the effects of processes or events such as ecosystem succession, fires, disease and pest outbreaks, natural disasters, regeneration, and climate change. Repeat photography is also useful as sociological evidence of change in human environments to display land use change, urban development, or demographic changes. Essentially, repeat photography is an important technology that provides a way of visualizing change and understanding the nature and effects of time. From working forests to wilderness areas, such photographic pairs or sequences can help us understand ecosystem processes, and effects of human and non-human disturbances. They can inform our concepts of sustainability, help us understand the implications of public policy, and assess the results of management decisions.

While many repeat photos of forested land exist, they are scattered in many locations, occur in widely different formats, and are relatively difficult to find. A centralized database will allow for photos to be searched by subject keyword, location, date, format, and photographer, among many other characteristics. Additionally, repeat photography sets will be presented with contextual information and individual images will be displayed at detailed resolution for comparison and analysis.

The Forest History Society is collecting sets of repeat photographs relating to land management and environmental research. Our goal is to provide a centralized location on the web for users to access, compare, and interpret such visual resources and to make these materials accessible to assist forest managers, land use planners, community leaders, teachers, policymakers, and journalists in understanding, communicating, educating, and entering into a public discourse about sustainable forests and communities. By providing an authoritative site on the subject we also hope to identify previously unknown repeat photographic pairs and sequences, promote the creation of new repeat sets, and foster interest in the future uses of repeat photography.



“Douglas Fir Regrowth at Weyerhaeuser Tree Farm” is a series of photos taken at 5-year intervals from 1940–1965. This series of photographs shows Douglas fir regrowth over a 25-year period on a Weyerhaeuser tree farm at Wolf Point in the St. Helens area of Washington. The area of land represented saw robust growth after being written off by the Secretary of the Interior as an example of poor forestry practice.

The project is a collaboration between the Forest History Society (FHS) and project partners across the country including private landowners, conservation groups, national associations, government units, forest-reliant communities, and many others. Thus far, FHS has collaborated with several different institutions for this project, including the U.S. Geological Survey’s Northern Rocky Mountain Science Center and their collection of repeat photos from Glacier National Park; the University of Arizona and their collection of repeat photos of the Santa Rita Experimental Range; and the Bureau of Land Management’s collection of photos from their “Historical Comparison Photography” book series of repeat photographs from three different sites in Montana.

Structure and Navigation

The Repeat Photography database consists of sequences of photos taken from the same location. For each sequence, there is a slideshow of all images in the sequence along with contextual information such as sequence name, dates, location, and subject keywords. Users can also view each photo and its associated metadata by scrolling through and clicking the individual photos seen in the sequence.

There are several different ways to access images in the database: 1) the “Browse” tab allows users to view images grouped according to Subjects, Landscapes, and Sequence titles; 2) the map on the sites homepage allows users to access images by the specific geolocation data associated with the photographs; and 3) the “Search” function returns relevant images from the entire database and offers users the ability to sort results by sequence name, sequence order, or original date of the photograph.



Repeat Photography Collections
For Sustainability and Working Forests

Intro Background Browse Contribute Photos Support Contact Search Images

Sort By: Choose Option Displaying 1-284 of 284 for (")

Click image to view *Item* metadata and scroll through all images in the Sequence.

Click *Sequence* title below image to view *Sequence* metadata and slideshow.

Titles above images are *Collection* titles.

Narrow Your Results by:

Subjects [Show More](#)

- Landscape Change (173)
- Forest Management (97)
- Land Management (93)
- Reforestation (92)
- Experimental Forestry (74)

Landscapes [Show More](#)

- Desert (76)
- Pine Forest (45)
- Pacific Northwest Forest (42)
- Glacier (38)

NAU James J. Hanks Collection
Naatsis'áan (Navajo Mountain) Sequence 2005

NAU James J. Hanks Collection
Naatsis'áan (Navajo Mountain) Sequence 1927

American Forestry Association Collection
Crater Lake at Wizard Island Sequence August 2008

American Forestry Association Collection
Crater Lake at Wizard Island Sequence February 1934

USDA Flagstaff Lab Images
Fort Valley Experimental Forest, Coconino National Forest Sequence August 1995

USDA Flagstaff Lab Images
Fort Valley Experimental Forest, Coconino National Forest Sequence May 1941

USDA Flagstaff Lab Images

USDA Flagstaff Lab Images

American Forestry Association Collection

A screenshot of the Repeat Photography database and its navigational capabilities. Users can simply browse, search by location on the map, or use the “search” function to find specific sets of repeat photographs.

To reiterate, the focus of this project is on paired photos that show changes of landscape and ecological disturbances over time; regeneration and growth of forests; and human effects on the forest including transportation, conversion, and restoration. Users, including students, teachers, landowners, and journalists, will improve their understanding of landscape change, sustainability, and working forests. Foresters, natural resources managers, landowners, and conservation groups will be able to point to specific pairs and landscapes of interest, thereby assisting their own training and communication with the public. There will also be many opportunities to utilize the photographs in K-12 and higher education programs, including those like Project Learning Tree. The end result will be a central resource that provides such information in an engaging and easy-to-use manner.

We welcome insights, recommendations, and collaboration in making this valuable historical information more widely available. If you have photos, research ideas, or any other input that might help, please contact the project’s photo archivist Sara Pezzoni at sara.pezzoni@foresthistor.org. **The Repeat Photography Project can be accessed through www.repeatphotography.org.**

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The Colors Teach Us.



Barbara Buls Boudreau
Department of Conservation and
Recreation, Regional Interpretive
Coordinator,

Richard Louv spoke at Brookwood School in Manchester-by-the-Sea the other day. His new book *Vitamin N* follows on the heels of his other two ground-breaking works *Last Child in the Woods* and *The Nature Principle*. *Last Child* was a wake-up call to our nation to recognize the necessity of outdoor creative play for children to develop into sound, complete adults. *Nature Principle* is targeted more toward adults and the restorative period we are now entering, the most creative period in history. *Vitamin N* contains 500 suggestions about how to incorporate nature and outside time into our kids' lives. Nature provides peace, essential microbes, fresh air, exercise. Though we live in houses, nature is essentially our "home," and knowledge of surroundings increases our safety and enhances our life experience.

I have followed Louv's writings since *Last Child*. As an Interpretive Coordinator for Massachusetts State Parks, I have experienced fear and hesitation from parents of small children about being outdoors, but more than anything, unfamiliarity. Of course we want to infuse our children with nature, the natural order, sunshine, and clean air. But in order to succeed, we need the parents.

Anytime is a good time to start. Parents sometimes feel inadequate about teaching their kids about nature, but lucky for you, there are materials everywhere. And the season for ease of identification of plants and trees is hot upon us.

The magic has begun. The natural changes in autumn provide parents with a brilliant opportunity to teach children – a virtual science project surrounding us on all sides, the sensory delight of color, technical lessons of chemical reactions, all contained in a spiritually magical setting – the fall colors emerge.

The process is complex; terms like *anthocyanin* and *carotenoid*, chlorophyll of every persuasion, biological processes that can blow the mind, all manifested in a gorgeous display of nature's best. The best part is – you don't have to know all the scientific details to introduce your kids to natural species.



And for the nature lover – a chance to easily put names to key species. Every plant has its own composition and as a result, its own unique color and window of change.

At this writing, the red maples are at peak, and are concentrated in wet environments, stream beds, and low-lying areas. These are the reds that drive the fall leaf peeping schedule. The change of colors continues for weeks, yet as different species of trees attain their hues, we experience several peaks of color.

Early in the autumnal change, nature spotlights one of the more ubiquitous species in New England – poison ivy. Right now, poison ivy is visible from hundreds of yards, particularly the tree and telephone climbing individuals. It is bright red and surrounds the trunk sometimes as high as 15 or 20 feet, a spectacular and successful species that also provides plenty of berries for wildlife winter repast. Now is the time to teach children about this noxious plant. Once they can identify it, they can avoid it, unlike yours truly, who suffered from horrible episodes every summer of childhood. Look closely at the leaves and learn them now. Your kids (and you!) will remember what they look like.



Blueberry bushes turn their gorgeous red-purple, Virginia creeper scarlet (both anthocyanins), and invasives become show pieces. Just drive on any highway at this time of year. The oriental bittersweet becomes bright yellow and lays in virtual sheets over trees on the side of the road. This time of year, you can see how pervasive this introduced plant has become.

Following the red maples with their brilliant scarlet, the sugar maples bloom in orange and yellow combinations that will make your heart sing. They are unique beacons in the less brilliant surrounding palette. Identifying the sugars now will allow you to collect sap in the spring with your kids, providing yet another opportunity to teach the amazing lessons of nature, and consume its products.

When a child eats something they have harvested themselves, it takes on a whole new meaning and can make them feel more secure in nature. We have gotten so far from the circle of life in recent history that food appears to originate from a store, rather than from natural foodstuffs in the world. If children see themselves as part of nature rather than separate from it, the fear of outdoors melts away and becomes a stage for creative exploration.



These red maples really stand out

Take your time. Pick up a couple of field guides and page through them. Learn and then teach one or two basics. Feel the texture of the bark, of the leaves. Press some colorful leaves (but not poison ivy!) to laminate later. They make cute refrigerator magnets; a taste of New England you can send in a Christmas card. Your kids' knowledge will impress their friends and draw them closer to the natural world.

And remember to have fun. Exploring nature is enjoyable as well as educational, and has the added benefits of fresh air and exercise. Find your local parks and make friends with the trees, now shutting themselves down for the winter and giving us the true magic of autumn colors.

Barbara Buls Boudreau works for the Department of Conservation and Recreation as a Regional Interpretive Coordinator, teaching kids and adults about the amazing resources of Massachusetts State Parks. She is also the author of numerous articles and her first novel "The Frenchman." barbara.buls@state.ma.us



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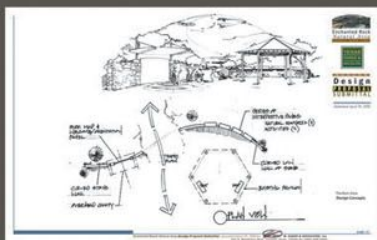
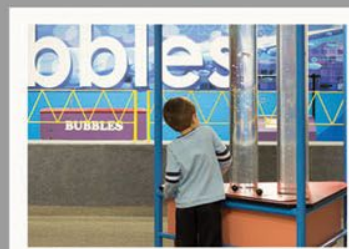


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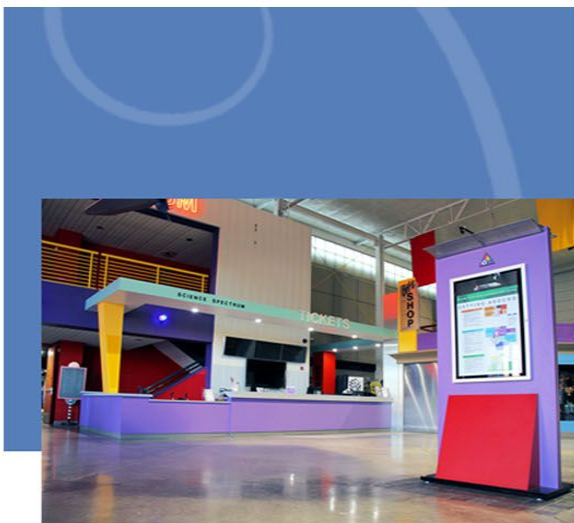
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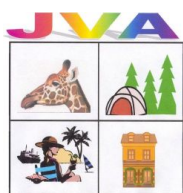
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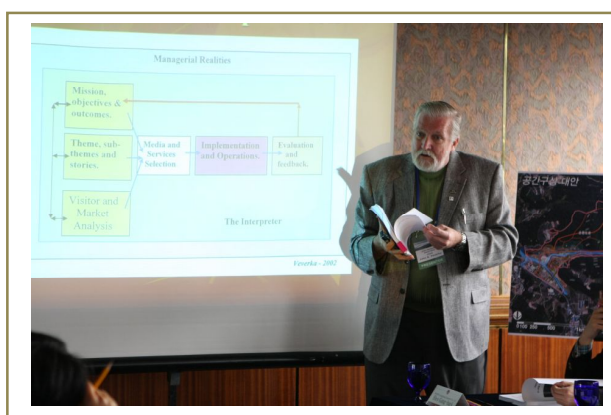


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JVA has been contributing to and helping to advance the interpretive profession for over 40 years. From teaching university courses in interpretation (Michigan State University, Ohio State University and New York State University and the State University of West Georgia - heritage interpretation institutes), and years of field experience doing interpretation, we are growing still.

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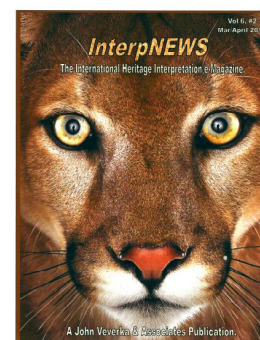
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Rich Pawling's History Alive! joins the Heritage Interpretation Training Center Team



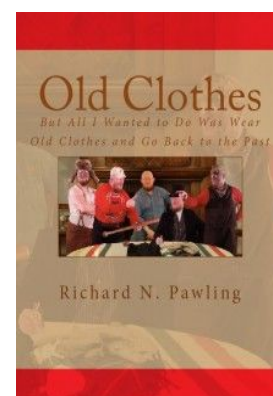
The Heritage Interpretation Training Center is very pleased to announce that **Rich Pawling's History Alive!** has developed one of our newest courses for 2016:

Introduction to Developing Living History Characters and Delivering Living History Programs

10 Units, 3 CEU Credits (\$275)

The Course Units include:

- **Unit One - Interpretation Defined**
- **Unit Two – The Value of Interpretation**
 - * The Interpreter/Living Historian vs. the Reenactor
 - * Where to start? Choosing the character to portray
- **Unit Three – Selecting the Best Interpretive Method**
 - * Methods of Interpretation - 1st person, 3rd person, spirit past
- **Unit Four – Designing the Character**
- **Unit Five – Making the Character Come Alive!**
- **Unit Six – Continually Adapting Your Character to Your Audience**
- **Unit Seven – Preparation Builds Confidence**
- **Unit Eight – Controversy Builds Interest**
- **Unit Nine – Safety is #1**
- **Unit Ten – The Total Package = Success!**



About the Instructor: Professor Richard Pawling

Rich Pawling has over thirty-five years of experience interpreting the natural and cultural heritage of the United States. Beginning his interpretive career as an environmental educator and later historian-naturalist at local and state parks, his evolution into living history began while employed as a National Park Service ranger at Hopewell Furnace National Historic Site. To help visitors there understand that this now pristine site was actually a dirty, smoky iron furnace in the 1830s, he chose to portray the charcoal dust-covered, tobacco-chewing filler of the furnace in first person. He was honored with the **Freeman Tilden Award** for the Mid-Atlantic Region of the NPS for his efforts in designing and presenting this program about the "forgotten heroes" of the past - the common laborers. In 1991, he launched **Rich Pawling's History Alive!** - his own entrepreneurial venture. His unique teaching style twice won him the **Outstanding Adjunct Professor of the Year** award at Penn State Berks. Most recently, he was a full-time instructor of natural and cultural interpretation at Hocking College (Ohio)--inspiring the next generation of interpreters and retiring from in-class teaching in 2010.

For course content details and registration information you're invited to visit the course webpage at: www.richpawling.com (clicking on "e-LIVE Course" under the "Training" tab) or contact Rich at: richpawling@yahoo.com. The course fee includes pdf segments of Rich's book: *Old Clothes: But All I Wanted to Do Was Wear Old Clothes and Go Back to the Past*.

Interpretive Master Planning Course**10th – 13th October 2017****Plas tan y Bwlch (Snowdonia National Park Training Center, Wales, UK).****<http://www.eryri-npa.gov.uk/study-centre>**

Join Interpretive Planner/Trainer and author Prof. John Veverka for his 2017 Interpretive Master Planning Course at Plas tan y Bwlch. John will provide training/coaching in developing new state-of-the art interpretive planning documents and strategies for parks, gardens, zoos, historic homes, heritage sites, museums and facilities to include:

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- * Experience inventories and visitor psychology.
- * Planning for "markets of one" and "outcome based interpretation".
- * Financial aspects of interpretive planning - what things cost and budget phasing.
- * The Model of Interpretive Planning
- * Interpretive plan content - planning forms.
- * New interpretive media options and old ones that still work.
- * Interpretive writing overview for labels and panels.
- * Objectives of the interpretive plan and how it will be used.
- * Marketing aspects of interpretive planning for audience development and market creation.
- * Developing marketing plans as part of interpretive plans.
- * Using interpretive plans for grant applications.
- * Cost/contact and cost effectiveness - making interpretation successful.

This is a very hands-on course and participants are asked to **bring an interpretive planning project with them to work on during the course**. One-on-one consultation on your project will be provided by Prof. Veverka. Leave with a good draft of your interpretive plan with post-course follow up via SKYPE and e-mail available with the course instructor. The course is limited to 15 participants to allow maximum contact time with the instructor.

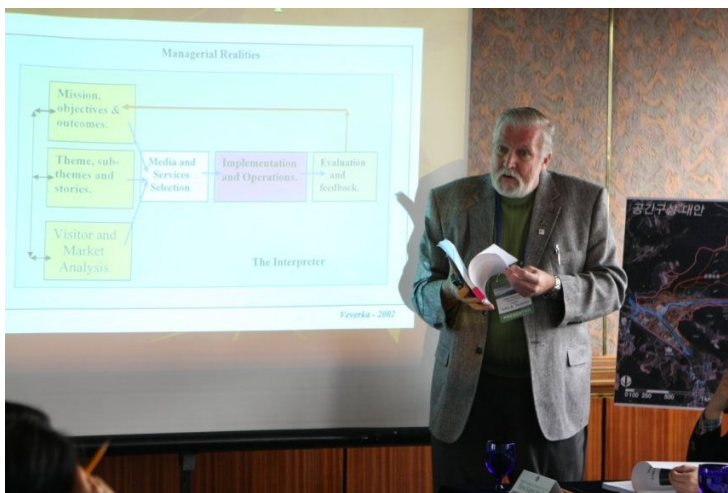
Course Instructor:

Prof. John Veverka. John is a **certified interpretive planner and trainer and author** with 35 years of interpretive planning and teaching/coaching experience. John is the author of several interpretive planning text books, of which e-book copies will be available to participants as part of the course fee as well as an interpretive planning resource CD. John is the author of:

- *Interpretive Master Planning - Strategies for the New Millennium*
- *Interpretive Master Planning - Philosophy, Theory and Practice.*
- *The Interpretive Trainers Handbook*
- *Advanced Interpretive Planning*
- *The Interpretive Trails Book*
- *Publisher of **InterpNEWS** - the international heritage interpretation e-magazine.*

<http://www.heritageinterp.com/interpnews.html>

You are invited to visit John's web site: www.heritageinterp.com.



For course registration details and costs and to be placed on the course mailing list for more details, please contact the course manager at **Plas tan y Bwlch**, Andrew R J Oughton at: Andrew.Oughton@eryri-npa.gov.uk (Tel.: 01766 772600). For course content details please feel free to contact John Veverka at: jvinterp@aol.com.