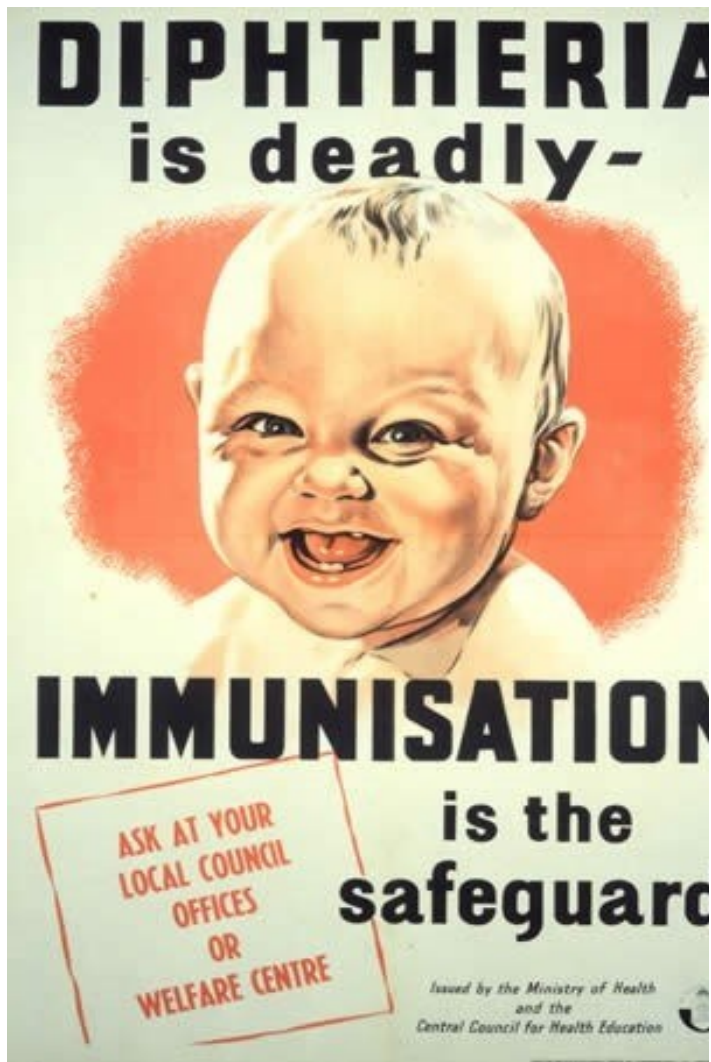


“The men the American public admire most extravagantly are the most daring liars; the men they detest most violently are those who try to tell them the truth.”  
~ H. L. Mencken (1880 - 1956)

# Phactum

The Newsletter and Propaganda Organ  
of the Philadelphia Association for Critical Thinking  
October/November/December 2016

editor: Ray Haupt email: [phactpublicity@aol.com](mailto:phactpublicity@aol.com)  
Webmaster: Wes Powers <http://phact.org/>



## Have you heard the recent news about Diphtheria?

You probably have not since that disease rarely enters the news in modern western countries where vaccination programs have been highly successful and the few cases that do occur are usually successfully treated.

Diphtheria is the result of infection by bacteria called *Corynebacterium diphtheriae* which release a toxin damaging to body tissues. Symptoms initially are similar to those of the common cold, but as the disease progresses a thick gray substance spreads over the nasal tissues, tonsils, larynx, and/or pharynx. Breathing obstruction is the usual effect.

The Center for Disease Control (CDC) states, “Diphtheria once was a major cause of illness and death among children. The United States recorded 206,000 cases of diphtheria in 1921, resulting in 15,520 deaths. Starting in the 1920s, diphtheria rates dropped quickly due to the widespread use of vaccines. Between 2004 and 2015, 2 cases of diphtheria were recorded in the United States. However, the disease continues to cause illness globally. In 2014, 7,321 cases of diphtheria were reported worldwide to the World Health Organization, but many more cases likely go unreported.

The case-fatality rate for diphtheria has changed very little during the last 50 years. The overall case-fatality rate for diphtheria is 5%–10%, with higher death rates (up to 20%) among persons younger than 5 and older than 40 years of age. Before there was treatment for diphtheria, the disease was fatal in up to half of cases.”

In 1890, Shibasaburo Kitasato and Emil von Behring immunized guinea pigs with heat-treated diphtheria toxin. The first cure of a person with diphtheria is dated to the 1891 Christmas holiday in Berlin. Von Behring won the first Nobel Prize in medicine in 1901 for his work on diphtheria. Von Behring’s discoveries did lead to cures for diphtheria but problems remained in that the cured patient remained a carrier for the disease and a vaccine to prevent the disease did not yet exist.



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## *Phactum*'s Roster of I.R.E. (Infamous Rational Errors)

*Phactum* contributor Paul Schlueter III has accumulated over time a vocabulary listing of many of the egregious flaws of thinking, devious tactics of argument, and some pretty cool Latin phrases that might sound impressive used at a social gathering. This listing is nowhere near complete, but has been made into a pamphlet that is available free and only at PhACT Meetings.

Meeting attendees are invited to take one and are invited to participate in expanding the listing in the next edition as it is intended to be a collaborative project. Definitions and examples should be short and to the point and may be submitted to the *Phactum* editor at: [phactpublicity@aol.com](mailto:phactpublicity@aol.com)

**New entry: ANCIENT WISDOM FALLACY** - The belief that a particular group of "ancients" had wisdom to which modern people are blind, or which is inaccessible through modern science. Particularly, relating to ancient superstitions, magical practices, and/or natural/herbal medicines and foods. May also be present in the practice of traditional religions. (a.k.a., the argument from antiquity) (see also: Appealing to Tradition)

Diphtheria research continued, a vaccine was developed, and in the 1920's large-scale vaccination efforts began. The diphtheria infection rate in the United States during the early 1920's was 200,000 cases per year, ten percent of them fatal.

Scottish physician Alexander Fleming in 1928 isolated penicillin but unfortunately his work was largely ignored for over a decade. In 1942 penicillin finally became available to a very small number of patients and in 1943 mass production commenced. By the end of World War 2 many billions of doses were manufactured on an annual basis. Penicillin proved itself to be effective to kill the bacteria in diphtheria carriers.

In 1952 an even more effective drug, Erythromycin, which is useful in treating skin and upper respiratory infections, was developed.

And so, medical science in the course of about 60 years has been highly successful in efforts to prevent and cure diphtheria, a dreadful disease. In the last decade there has been but a single reported case of diphtheria in the United States. By any measure this is a spectacular success.

A century ago diphtheria was not the only communicable disease causing great anguish throughout the world, but many of those other diseases have also become largely under control because of the same process of methodical application of science that yielded splendid results with diphtheria and vastly improved public health.

On Saturday, November 19, 2016 PhACT lecture goers will have opportunity to learn more about the process of disease eradication by attending a video presentation about a most remarkable scientist, Dr. Maurice Hilleman (1919 - 2005), who in the course of his career as a microbiologist developed more than 40 vaccines. The CDC maintains a listing of Vaccine-Preventable Diseases and the Vaccines that Prevent Them. There are 14 diseases in that listing and of those Dr. Hilleman was the remarkable scientist responsible for developing vaccines for eight of them.

Dr. Paul Offit, a major scientist and vaccine developer in his own right, will be on hand after the video to answer questions about Dr. Hilleman and other questions and concerns that arise in the realm of controlling communicable diseases. See Page 5 for more information.

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## **Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases** by Paul A. Offit, M.D.

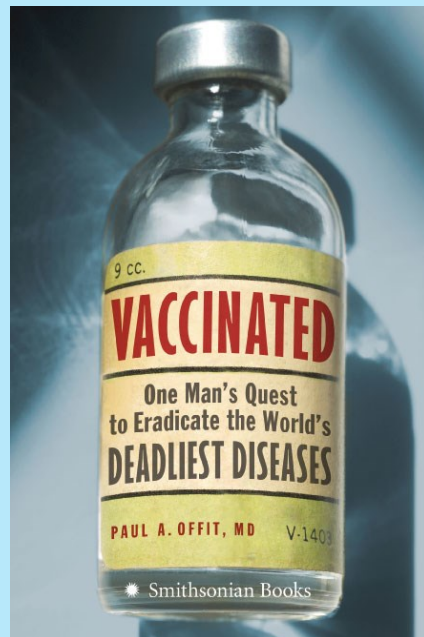
**Paperback: 272 pages**

**Publisher: Harper Perennial; Reprint edition (August 5, 2008)**

**ISBN-10: 006122796X ISBN-13: 978-0061227967**

His goal—to prevent every disease that commonly attacked children—was unattainable. But Maurice Hilleman came close.

Maurice Hilleman is the father of modern vaccines. Chief among his accomplishments are nine vaccines that practically every child gets, rendering formerly deadly diseases—including mumps, rubella, and measles—nearly forgotten. Author Paul A. Offit's rich and lively narrative details Hilleman's research and experiences as the basis for a larger exploration of the development of vaccines, covering two hundred years of medical history and traveling across the globe in the process. The history of vaccines necessarily brings with it a cautionary message, as they have come under assault from those insisting they do more harm than good. Paul Offit clearly and compellingly rebuts these arguments, and, by demonstrating how much the work of Hilleman and others has gained for humanity, shows us how much we have to lose.



# UPCOMING PHACT EVENTS

**Dr. David Cattell, Chairman of the Physics Department of Community College of Philadelphia** hosts meetings of PhACT - at 2:00 PM on the third Saturday of most months at Community College of Philadelphia. Parking is easily available and costs \$4.00 for all day. Enter the college parking garage on 17th Street which is one way south bound. It opens at 1:00 PM and closes at 6:00 PM. This meeting site is handicap accessible. **PhACT Meetings are Free and open to the public unless otherwise noted.**



Lectures are generally at Community College of Philadelphia in Lecture Room C2-28 in the Center for Business and Industry at the corner of 18th and Callowhill Streets, at 2:00 PM, unless otherwise noted. **Please try to arrive a few minutes early as the College now requires that meeting attendees sign in for security reasons. ID must be shown.**

**Saturday, October 15, 2016 at 2:00 PM - In Lecture Room C2-28 in the Center for Business and Industry at the corner of 18th and Callowhill Streets.**  
**Richard Saunders will discuss:**

## Thinking Critically about Money and Investing

**MCHUMOR.com** by T. McCracken



"I'm afraid we can't use your other outstanding loans as collateral."

You are the best defense for your own fiscal health. Unfortunately, we are surrounded by both harmful incompetence and those who would scam us out of our money and do harm to our finances. While most are savvy enough to avoid investing in 'machines that turn sand into gold', or 'free energy franchises', there are other scams that, on the surface, seem to make sense. What do you say to an opportunity that seems too good to be true, or offers you a chance to 'get in on the ground floor?' The purpose of this meeting is to empower people with knowledge so they will avoid being victimized. Avoidance is the key because restitution orders, if obtained, are rarely enforced. Mr. Saunders will also discuss steps to avoid identity theft as well as critical thinking concerning money and investing.

**Richard Saunders** worked in an administrative capacity for 25 years for the Philadelphia District Attorney's office and has been with AARP's Consumer Task Force for 10 years.

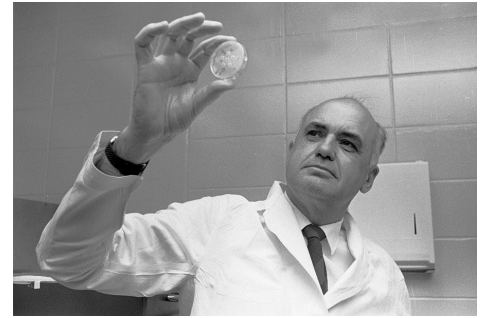
Cartoon by T. McCracken  
<http://www.mchumor.com/>  
 Used by Permission

(Continued on page 5)

**Saturday, November 19, 2016 at 2:00 PM - In Lecture Room C2-28 in the Center for Business and Industry at the corner of 18th and Callowhill Streets. Dr. Paul Offit, M.D. will present a documentary film with Q&A Session to follow:**

## ***HILLEMAN - A Perilous Quest to Save the World's Children***

This hour long video production by **Dr. Paul Offit** and **Don Mitchell** tells the story of the greatest scientist of the 20th century, and no one knows his name. This documentary tells the inspiring story of Dr. Maurice R. Hilleman, a man with a singular, unwavering focus: to eliminate the diseases of children. From his poverty-stricken youth on the plains of Montana, he came to prevent pandemic flu, develop the measles-mumps-rubella (MMR) vaccine, and invent the first-ever vaccine against human cancer. Now through exclusive interviews with Dr. Hilleman and his peers, rare archival footage, and 3-D animation, this film puts a human face to vaccine science, revealing the character that drove this bold, complex, and heroic man.



**Dr. Maurice Hilleman**

To get a sense of this amazing film and the impact of science on modern health, see:

<http://hillemanfilm.com/> (you must view this with Google, not Internet Explorer).  
or at: <http://www.vaccinemakers.org>

After the video presentation we are fortunate to have Dr. Offit on hand to discuss the film, the achievements of Dr. Hilleman, and other matters concerning vaccines and their lifesaving benefits for children.

Dr. Paul Offit is an internationally known vaccinologist based locally at Children's Hospital of Philadelphia

We do hope that you can attend the PhACT event on November 19 to view this important film, but if not there are at least two other local opportunities:

November 1 at the College of Physicians of Philadelphia (see page 40)

November 3 at The American Philosophical Society ( see page 41).

## **Books by Paul Offit**

Offit, Paul (2015). *Bad Faith: When Religious Belief Undermines Modern Medicine*. Basic Books. ISBN 0465082963.

Paul A. Offit (2013). *Do You Believe in Magic? The Sense and Nonsense of Alternative Medicine*. Harper. ISBN 0062222961.

UK title: *Killing Us Softly: The Sense and Nonsense of Alternative Medicine*

E. Allison Hagood; Stacy Mintzer Herlihy; Paul A. Offit (foreword) (2012). *Your Baby's Best Shot: Why Vaccines Are Safe and Save Lives*. Lanham, Md: Rowman & Littlefield Publishers. ISBN 1-4422-1578-X. CS1 maint: Multiple names: authors list (link)

Offit, Paul A. (2011). *Deadly Choices: How the Anti-Vaccine Movement Threatens Us All*. Basic Books. ISBN 978-0-465-02149-9.

Offit, Paul A. (2008). *Autism's False Prophets: Bad Science, Risky Medicine, and the Search for a Cure*. Columbia University Press. ISBN 978-0-231-14636-4.

Offit, Paul A. (2007). *Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases*. Smithsonian Books/Collins.

*(Continued on page 6)*

ISBN 978-0-06-122795-0.

E-book version: Offit, Paul A. (2009). *Vaccinated: Triumph, Controversy, and An Uncertain F.* HarperCollins. ISBN 9780061871511.

Offit, Paul A. (2005). *The Cutter Incident: How America's First Polio Vaccine Led to the Growing Vaccine Crisis.* Yale University Press. ISBN 978-0-300-10864-4.

Marshall, Gary S; Penelope H. Dennehy; David P. Greenberg; Paul A. Offit; Tina Q. Tan (2003). *The Vaccine Handbook: A Practical Guide for Clinicians.* Lippincott Williams & Wilkins. ISBN 978-0-7817-3569-8.

Offit, Paul A.; Louis M. Bell (1999). *Vaccines: What Every Parent Should Know.* Macmillan. ISBN 978-0-02-863861-4.

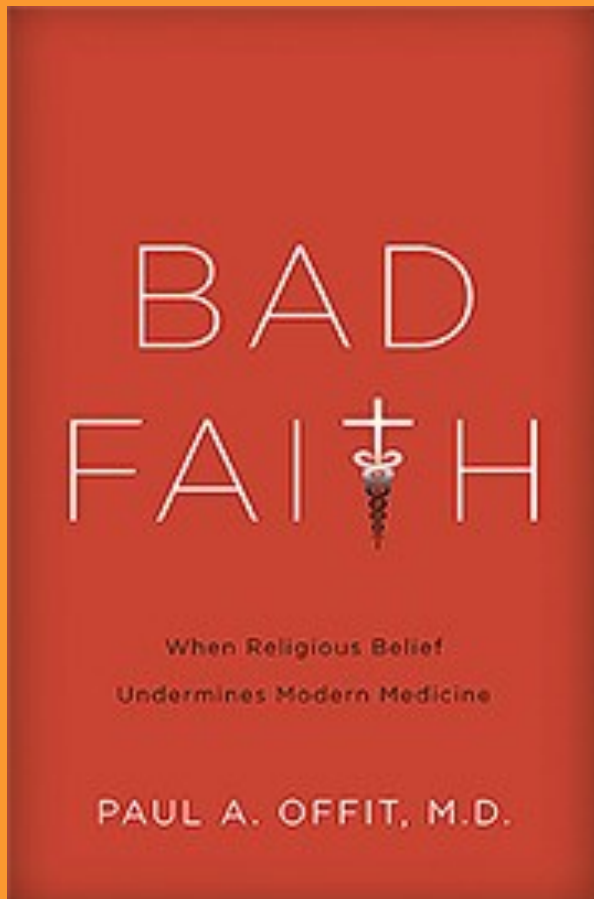
Offit, Paul A.; Louis M. Bell (2003). *Vaccines: What You Should Know ((third edition) ed.).* Wiley. ISBN 978-0-471-42004-0.

Offit, Paul A; Bonnie Fass-Offit; Louis M. Bell (1999). *Breaking the Antibiotic Habit: A Parent's Guide to Coughs, Colds, Ear Infections, and Sore Throats.* John Wiley. ISBN 978-0-471-31982-5.

## **Bad Faith: When Religious Belief Undermines Modern Medicine by Paul Offit, M.D.**

**Hardcover: 272 pages Publisher: Basic Books (March 10, 2015)**

**ISBN-10: 0465082963 ISBN-13: 978-0465082964**



In recent years, there have been major outbreaks of whooping cough among children in California, mumps in New York, and measles in Ohio's Amish country—despite the fact that these are all vaccine-preventable diseases. Although America is the most medically advanced place in the world, many people disregard modern medicine in favor of using their faith to fight life threatening illnesses. Christian Scientists pray for healing instead of going to the doctor, Jehovah's Witnesses refuse blood transfusions, and ultra-Orthodox Jewish mohels spread herpes by using a primitive ritual to clean the wound. Tragically, children suffer and die every year from treatable diseases, and in most states it is legal for parents to deny their children care for religious reasons. In twenty-first century America, how could this be happening?

In *Bad Faith*, acclaimed physician and author Dr. Paul Offit gives readers a never-before-seen look into the minds of those who choose to medically martyr themselves, or their children, in the name of religion. Offit chronicles the stories of these faithful and their children, whose devastating experiences highlight the tangled relationship between religion and medicine in America. Religious or not, this issue reaches everyone—whether you are seeking treatment at a Catholic hospital or trying to keep your kids safe from diseases spread by their unvaccinated peers.

Replete with vivid storytelling and complex, compelling characters, *Bad Faith* makes a strenuous case that denying medicine to children in the name of religion isn't just unwise and immoral, but a rejection of the very best aspects of what belief itself has to offer.

# Letters to the Editor

Letters and Rants to the Editor are encouraged.  
Send to [PhACTPublicity@aol.com](mailto:PhACTPublicity@aol.com)

**Editor:** One of my first cousins, once removed, moved to Denmark. According to family lore he was the world's first hippie. Factoid: He was an acquaintance of Ira (The Unicorn) Einhorn, until the latter's criminal activity came to light. In fact, the Unicorn, on the run, sought assistance from my cousin, who turned him down flat.

Said cousin and his family, more cousins, live or lived in a town called Silkeborg. I had never heard of it. Has anyone? He explained to me that it was outside Aarhus, Denmark's second-largest city, which I had at the time also never heard of either (though perhaps I should have).

The Chesapeake & Delaware Canal cuts through the isthmus of the Delmarva Peninsula. (Does that make it the Delmarva Island? Probably the convention is no.) When the canal is dredged the dredgings are dumped on the banks of the canal. They're rich in Cretaceous fossils, and my daughter and I went fossil-hunting there. While there, a ship was passing through the canal. It was the Silkeborg. What are the chances? (I snapped a photo and gave it to one of my first cousin's sons--my second cousin once removed, if I've got this re-



ing through the canal. It was the Silkeborg. What are the chances? (I snapped a photo and gave it to one of my first cousin's sons--my second cousin once removed, if I've got this re-

moval thing right--next time I saw him. He was greatly amused, and brought it back to Denmark to show his friends.)

Howard J. Wilk  
Philadelphia

Editor's note: Howard is an avid collector of coincidental happenings in his daily life and, coincidentally, I the Phactum editor, during my junior high school years lived near the aforementioned Ira Einhorn. Furthermore, I had browsed through that canal dump site and had found dozens of fossils, mainly belemnites. Belemnites were similar to squid but have been extinct for millions of years.



**Editor:** I thought we discussed your use of faux Benjamin Franklin quotes. Franklin never said or wrote the quote about beer you've attributed to him. Wikiquote says it's probably a misquotation of something Franklin wrote about wine, but even that quote is entirely missing from his papers.

In future please confine your Franklin quotations to what you can find at [franklinpapers.org](http://franklinpapers.org).

Howard J. Wilk  
Philadelphia

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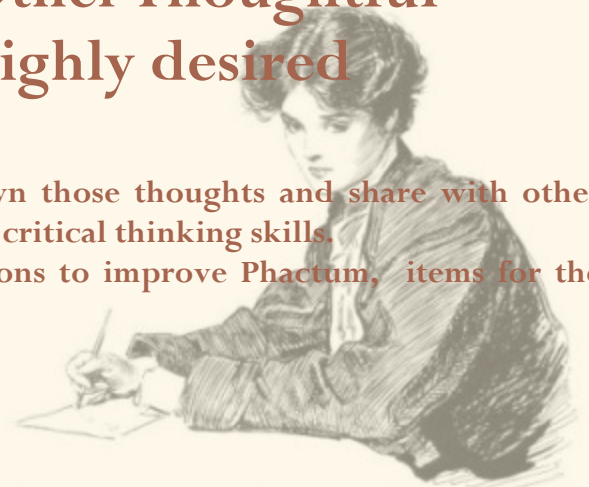
## Letters to the Editor and Other Thoughtful Correspondences are highly desired

If you have thoughts on some matter why not write down those thoughts and share with other Phactum readers? Writing is a great way to hone and refine critical thinking skills.

Articles, poetry, Letters and Rants to the Editor, suggestions to improve Phactum, items for the calendar, and other matters of interest are wanted.

Almost all topics are welcome - no partisan politics please.

Send submissions to the editor at [phactpublicity@aol.com](mailto:phactpublicity@aol.com)



# Various Ruminations of Woo Woo and Real Science and some Gossip

Collected/Written by Ray Haupt  
(with help from others)

## New Book by PhACT Speaker

Our friend and past PhACT speaker, Paul Barnett, aka John Grant, has written a new book, *Eureka!*, that should be of interest to Skeptics and Critical Thinkers. See page 28 for description and details. Paul is a prolific and gifted writer having won many awards including twice winner of the HUGO Award for Science Fiction.

## 89 Percent

I happened to hear a radio news report late in August stating that a forest fire in California had been “89 percent” contained. That is good news, I suppose, in that the fire is mainly contained; “89 percent” contained to be exact. How precise.

I am curious as to how officials manage to so finely measure the percentage of fire containment in a dynamic and quickly changeable situation like a forest fire. A containment estimate, a SWAG, of “90 percent” would not have piqued my interest in the progress of fire fighters at this blaze beyond the fact that officials are reporting that a roaring fire is substantially under control. On the other hand, “89 percent” sounds quite declarative and authoritatively based on some scientific objectivity; not at all like an estimate. This is poor reporting in my opinion but perhaps I am being an irritable curmudgeon in this matter. Perhaps 89 percent a curmudgeon? Let me know.

## Witchcraft then and now

Early on in the history of the United States belief in witches and their evil powers had followed the Pilgrims and other European settlers of the 17th Century. The tragic 1683 incident in Salem, Massachusetts resulting in 20 executions was the most dramatic manifestation in the Colonies of belief in witchcraft, but it was not the only one. On page 21 Clarissa Dillon, Ph.D., a historian of 17th and 18th century American history, describes witch trials that had occurred here in Pennsylvania in the World of William Penn. Mercifully, those trials led to no executions.

Sadly, in some parts of the world witchcraft is believed to exist and persecution of accused witches is large scale. The following internet link gives details of accusations and severe punishment of people in Ghana, mainly women, accused of using supernatural powers to control others. It is a grim story that should not exist in our modern age, but sadly it does.

<http://www.express.co.uk/news/world/708997/Witches->

## imprisoned-Ghana-witchcraft-prison-camp-world

The modern western world has mainly gotten past superstition of witches leading to drastic persecutions, but superstition does continue to exist in milder forms such as magical thinking found in pseudoscientific notions, especially those of healthcare. On page 29 Dr. Bernie Garrett (University of British Columbia, Canada) and Dr. Roger Cutting (University of Plymouth, UK) explore some of the questions surrounding pseudoscientific thinking and the various prejudices leading to or coming from that thinking.

“Don't you believe in flying saucers, they ask me? Don't you believe in telepathy? — in ancient astronauts? — in the Bermuda triangle? — in life after death?”

No, I reply. No, no, no, no, and again no.

One person recently, goaded into desperation by the litany of unrelieved negation, burst out “Don't you believe in anything?”

Yes”, I said. “I believe in evidence. I believe in observation, measurement, and reasoning, confirmed by independent observers. I'll believe anything, no matter how wild and ridiculous, if there is evidence for it. The wilder and more ridiculous something is, however, the firmer and more solid the evidence will have to be.”

~ Isaac Asimov (1920 - 1992), American writer and biochemist

## UK homeopathic product sales decline further

Dr. Stephen Barrett reported in *Consumer Health Digest* of August 21, 2016 on the matter of Homeopathic Prescriptions drastically on the wane in the UK.

The number of National Health Service prescriptions filled in England's community pharmacies has fallen steadily and is 95% lower than its peak nearly 20 years ago. In 2015, there were just 8,894 prescriptions, down from 10,238 in 2014. The total cost of these prescriptions has dropped to £94,313, the first time it has been below £100,000. [Homeopathy on the NHS: at death's door. The Nightingale Collaboration, April 26, 2016] In recent years, NHS review bodies have issued very unfavorable reports and the British Advertising Authority has banned efficacy claims in advertising. Homeopathy is pseudoscience based on notions that (a) a substance that produces symptoms in a healthy person can cure ill people with similar symptoms and (b) that infinitesimal doses can be highly potent. [Barrett S. Homeopathy: The ulti-



mate fake. Quackwatch, Aug 22, 016]

That surely must be a good thing but at least for the time being homeopathy enthusiasts have plenty of resources and manage to have an optimistic outlook. In Australia, for example, the publication Homeopathy Plus seemed pleased to announce in the October 5, 2016 edition that a randomized controlled trial is ramping up toward recruitment at McMaster University in Hamilton, Ontario, to compare the immunological response of homeopathic vaccines, also known as "nosodes," to that of a placebo or a conventional vaccine.

Researchers are recruiting participants 18 to 24 years old for the trial. Participants will be randomly assigned to receive either a nosode, a placebo or a vaccine. The researchers will take blood samples to look for changes in antibody levels for diphtheria, pertussis, tetanus, mumps and measles. The study will be blinded, meaning that the researchers and participants will not know who received which treatment.

Nosodes are homeopathic products promoted as safer alternatives to traditional vaccines by some naturopaths and homeopaths in Canada. They are made by taking bodily fluids from an individual infected with a particular ailment and diluting it until there is no active ingredient left. Homeopaths argue that water has a memory, which enables nosodes to protect against disease even though they contain no active substance.

We remain skeptical.

Dr. Barrett's newsletter, Consumer Health Digest, is free and available to all who wish to subscribe. To subscribe send a blank email to send a blank message to

[chd-subscribe@lists.quackwatch.org](mailto:chd-subscribe@lists.quackwatch.org)

Dr. Barrett's main website is [www.quackwatch.org](http://www.quackwatch.org)

### FDA warns against using homeopathic teething products

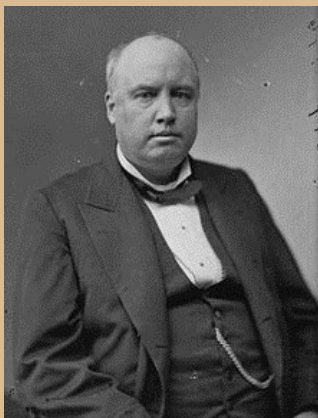
Dr. Stephen Barret reported in the September 25, 2016 edition of Consumer Health Digest on the matter of homeopathic teething products.

The U.S. Food and Drug Administration is warning consumers that homeopathic teething tablets and gels may pose a risk to infants and children. [FDA warns against the use of homeopathic teething tablets and gels. FDA news release, Sept 30, 2016] The FDA recommends that consumers stop using these products and dispose of any in their possession. Homeopathic teething tablets and gels, distributed by CVS, Hyland's, and possibly others, and sold in retail stores and online. In a news release, the agency stated:

- The agency is not aware of any proven health benefit of products that are labeled to relieve teething symptoms in children.
- Consumers should seek medical care immediately if their child experiences seizures, difficulty breathing, lethargy, excessive sleepiness, muscle weakness, skin flushing, constipation, difficulty urinating, or agitation after using homeopathic teething tablets or gels.

The FDA is analyzing adverse events reported to the agency regarding homeopathic teething tablets and gels since 2010 when it issued a safety alert and recall about homeopathic teething tablets. The agency is also testing product samples.

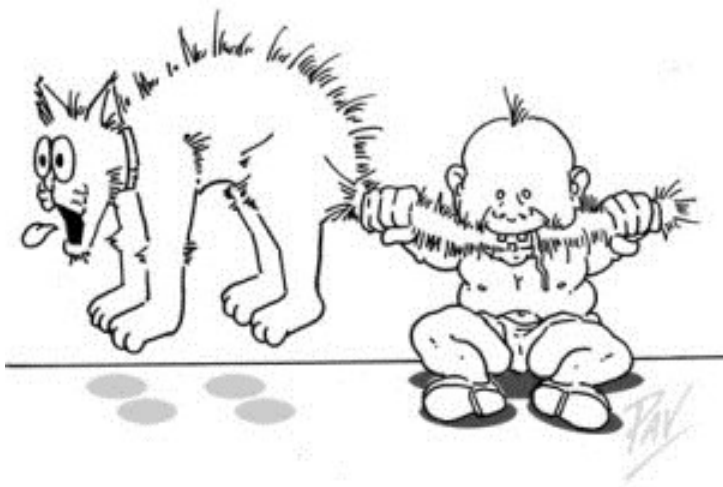
The FDA is evaluating its regulatory framework for homeopathy. Dr. Stephen Barrett has recommended that (a) no health claims be permitted for homeopathic products unless they are approved through the FDA's standard drug approval process and (b) that the FDA should advise consumers not to buy homeopathic products. The current action indicates that such a warning is legally feasible.



"...There may be for aught I know, somewhere in the unknown shoreless vast, some being whose dreams are constellations and within whose thought the infinite exists. About this being, if such a one exists, I have nothing to say. He has written no books, inspired no barbarians, required no worship, and prepared no hell in which to burn the honest seeker after truth."

~ Robert Green Ingersoll, (1833 - 1899), Orator, atheist, from "Some Mistakes of Moses" 1879

That does little to advance the self-serving myth propagated by the homeopathy industry that their products are completely safe and effective. To be fair, homeopathy likely is safe except for the matter that sick



patients may be self-deluded in believing that they are receiving useful medication for their ailment when in fact they are not. This could be dangerous for some conditions. It seems that in this case the product in question is tainted in manufacture and not safe.

The FDA issued the warning September 30, recommending that consumers stop using the tablets and gels immediately and “dispose of any in their possession” while the FDA investigates reports of seizures and other health problems.

According to the FDA:

“Consumers should seek medical care immediately if their child experiences seizures, difficulty breathing, lethargy, excessive sleepiness, muscle weakness, skin flushing, constipation, difficulty urinating, or agitation after using homeopathic teething tablets or gels.”

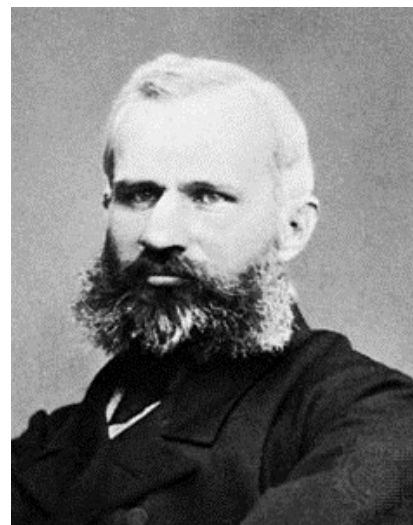
The FDA has been monitoring reports of adverse reactions since 2010, when they issued a health alert over Hyland’s Teething Tablets after a lab found that levels of belladonna, a substance harmful in large doses, were inconsistent in the product.

Hyland’s temporarily took the tablets off the market, but has since re-released the product after changing their manu-

facturing process to ensure consistent levels of belladonna.

### Measurement of Very Small Things

Those of us who are not physicists likely marvel that scientists can measure things such as molecules and wavelengths of the light spectrum. The unit of measurement often employed is the Angstrom Unit. According to Encyclopedia Britannica an Angstrom Unit is equal to  $10^{-10}$  meter, or 0.1 nanometer, or one ten billionth of a meter. It is named for the 19th-century Swedish physicist Anders Jonas Ångström.



**Anders Jonas Ångström (1814 - 1874)**  
Picture c. 1865

Angstrom received a doctorate at Uppsala University in 1839, and he became an observer at Uppsala Observatory in 1843. He succeeded to the chairmanship of the physics department in 1858.

Ångström’s most important work concerned heat conduction and spectroscopy. He devised a method of measuring thermal conductivity, showing it to be proportional to electrical conductivity. In 1853 he pointed out that an electric spark yields two superposed spectra, one from the metal of the electrode and the other from the gas through which it passes. From Euler’s resonance theory Ångström deduced a principle of spectrum analysis: that an incandescent gas emits light of the same wavelength as the light it can absorb.

Ångström’s studies of the solar spectrum led to his discovery, announced in 1862, that hydrogen is present in the

**“I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.”**

~ Isaac Newton (1643 - 1727), English physicist and mathematician

Sun's atmosphere. He was the first, in 1867, to examine the spectrum of the aurora borealis and to detect and measure the characteristic bright line of oxygen in its yellow-green region at 5577 angstroms, but he was mistaken in supposing that this same line is also to be seen in the zodiacal light. In 1868 he published his great map of the solar spectrum in *Recherches sur le spectre solaire* ("Researches on the solar spectrum"), in which wavelength values were given in units of 10–10 metre, a unit that came to be called the angstrom. He and his collaborator Robert Thalén measured the spectral lines of many chemical elements, both in the solar spectrum and in the laboratory. Ångström and Thalén's work soon became authoritative. However, Ångström suspected that their work contained a systematic error, and it was not until 1884, 10 years after Ångström's death, that Thalén published results that corrected the wavelengths of some lines by as much as an angstrom. (The culprit was that Ångström and Thalén had used a value for the length of their metre standard that was too small.)

Ångström's son Knut Johan Ångström was also a physicist who worked in spectroscopy and taught at Uppsala University.

#### **Pediatricians urge states to get tough on parents who don't want to vaccinate their kids ...**

says the headline of a Los Angeles Times article on August 29, 2016 written by Melissa Healy that "the nation's pediatricians are pushing back against parents who resist having their children vaccinated against a broad range of dangerous diseases by calling on states to stop offering waivers to those with non-medical objections to the practice."

Good.

The story continues, "the American Academy of Pediatrics also said that if parents continue to refuse vaccinations despite exhaustive efforts to change their minds, it would be "acceptable" for doctors to exclude these families from their practices."

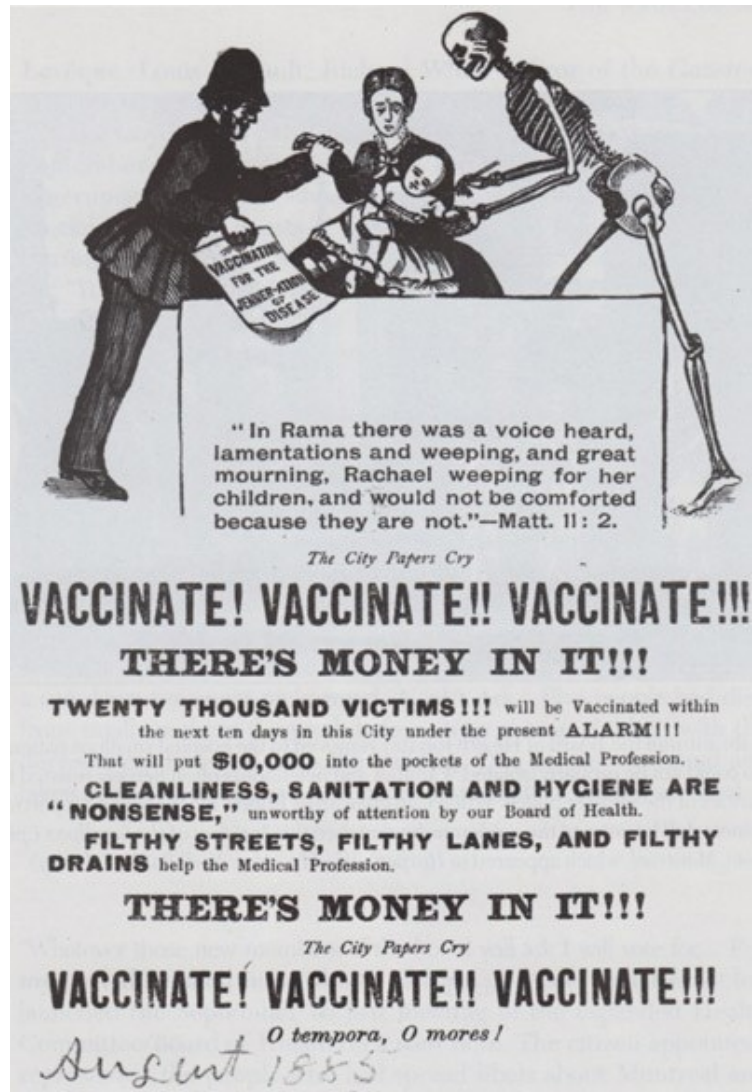
And apparently a growing number of pediatricians are turning away parents who refuse to vaccinate their children. Doctors are in an ethical quandary here as they have an oath to tend to patients, but on the other hand the presence of those patients can be a danger to other patients.

The LA Times story can be found at:

<http://www.latimes.com/science/sciencenow/la-sci-sn-pediatricians-vaccines-exemptions-20160828-snap-story.html>

The story is quite interesting, perhaps even more interesting in a perverse way are the comments which are heavily weighted on the anti-vaccination side despite the fact that the overwhelming percentage of parents do indeed seek vaccinations for their children. Protestors of this issue are a noisy minority. That is unfortunate but the situation is not new as attested by the anti-vaccination poster from 1885.

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Anti-vaccination poster from the 1880's

**“At present, intelligent people do not have their children vaccinated, nor does the law now compel them to. The result is not, as the Jennerians prophesied, the extermination of the human race by smallpox; on the contrary, more people are now killed by vaccination than by smallpox.”**

**~George Bernard Shaw (1856 - 1950),  
Irish playwright**

## Meeting Report - September 2016

Reported by Brandon Foltz, a Physics student of Dr. David Cattell at  
Community College of Philadelphia.

### Dr. Rob Brotherton discussed: The Psychology of Conspiracy Theories Saturday, September 17, 2016

Reported by Brandon Foltz

The presenter at the PhACT meeting held on September 17, 2016 was Mr. Rob Brotherton, American psychologist and author of the book *Suspicious Minds – Why We Believe Conspiracy Theories*. He spoke to the attendees about a number of topics including features that believers of conspiracy theories have in common, how conspiracy theories might be defined, and how these ideas relate to the greater population.

Mr. Brotherton began his presentation by asking the audience whether they would be willing to participate in conspiracies to do such things as “fake the moon landing”, “kill Princess Diana”, or “cover up the existence of extra terrestrials”, given appropriate circumstances such as participation being required by their employer. A few attendees raised their hands to suggest that they might participate in such conspiracies. Mr. Brotherton explained that research has shown that people who would be willing to participate in such conspiracies, are far more likely to believe in what might be referred to as “conspiracy theories”.

In order to talk more about the believers of conspiracy theories, it’s important to ask “How do we define conspiracy theories?” to which Rob presented a so-called “Conspiracy Theory Checklist”. It included the following items:

- ◆ Are the conspirators unusually evil?
- ◆ Are they unusually competent?
- ◆ Is it based on anomaly hunting?
- ◆ Is it unproven?
- ◆ Can it be proven false?

The list defines features that many conspiracy theories have in common, but no single point should define a conspiracy theory. Since the idea of a “Conspiracy Theory” is highly subjective and difficult to define well, the list can only be used as a guide. The point of “Anomaly Hunting” refers to the process of looking for errors or inconsistencies in the “Official” story, rather than finding hard conclusive evidence to support conspiratorial claims. The assumption is that the conspirators left hardly any clues about their activity, and so the only “evidence” of it is indirect and subjective at best. This leads common conspiracy theories to be both difficult to prove, as well as difficult to disprove.

Mr. Brotherton went on to ask, why is it important that we research conspiracy theories and the thought process around them? Superficially conspiracy theories seem like harmless entertainment of ridiculous claims by a small number of people, and surely they couldn’t be of any real harm. The unfortunate truth is that very many people believe in at least a few conspiracy theories. The most common according to 2013 data is with regards to the assassination of John F. Kennedy, for which 57% of those polled said they believed some variation of the theory. These are some of the same people involved in media, social policy, education, and other offices that can have far reaching impact. A severely dangerous belief in current times is that some vaccines cause Autism, and it should be obvious why this is an especially perilous idea. Some more examples of conspiracy theories leading to direct harm include those ideas presented in *The Protocols of the Learned Elders of Zion*. This publication described a purely fabricated plan by which the Jewish people were to assert world domination. Though we would find it difficult to believe such a conspiracy to be possible at all, it was very influential to political figures including Adolf Hitler and thus could be considered directly contributing to the acts of the Holocaust.

To tie everything together, Rob presented a series examples showing how all (or at least, most) people possess the necessary “equipment”, as it were, to believe or even manufacture conspiracy theories. Humans are inherently pattern seeking, and this

can be demonstrated by viewing the *Kanizsa Triangle* illusion. A simple image with just a few shapes, it is constructed in such a way that the mind finds it very difficult to avoid perceiving additional shapes which are not literally there. The human mind is readily prepared to do this with images composed of purely random data which obviously has no intent, but can sometimes be impossible to view without it. He continued with an example displaying human disposition for “Intention Seeking”. Meeting attendees were asked to view short film which portrayed some shapes moving around, and afterwards asked to describe what they had seen. Often viewers were found to construct a narrative around the movements of the shapes, despite none being explicitly provided. This shows the propensity of people to interpret intentions surrounding otherwise ambiguous events, where they may in fact be no intention at all.

The conclusion to be drawn from his presentation is that everyone is capable of being a conspiracy theorist, though perhaps some may be more than others. It is important to consider the psychological mechanisms involved in conspiracy theorizing, because they are deeply rooted in human psychology and affect us in more ways than merely inclining us to concoct “imaginative” narratives for the events in our lives.

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## Suspicious Minds: Why We Believe Conspiracy Theories by Rob Brotherton

**Publisher: Bloomsbury Sigma (19 Nov. 2015)**  
**Hardcover: 304 pages**  
**ISBN-10: 1472915615 ISBN-13: 978-1472915610**

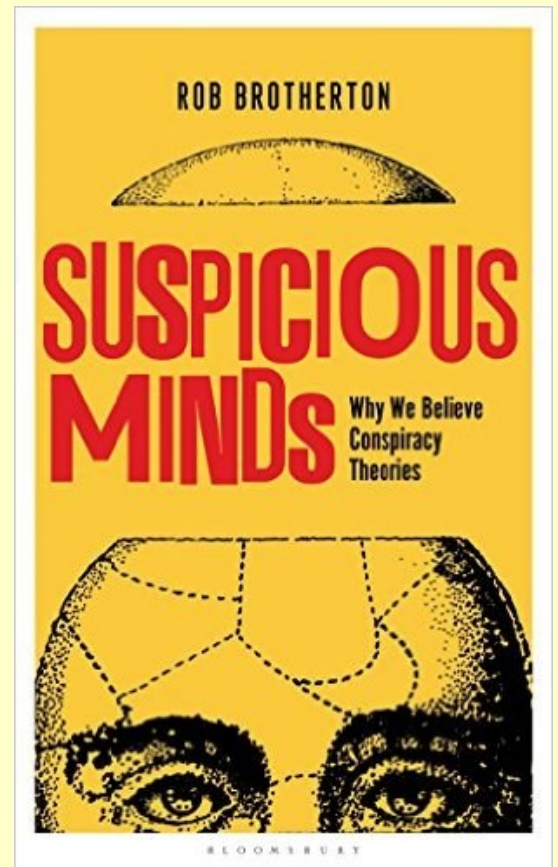
**We're all conspiracy theorists. Some of us just hide it better than others.**

Conspiracy theorists do not wear tin-foil hats (for the most part). They are not just a few kooks lurking on the paranoid fringes of society with bizarre ideas about shape-shifting reptilian aliens running society in secret. They walk among us. They are us.

Everyone loves a good conspiracy. Yet conspiracy theories are not a recent invention. And they are not always a harmless curiosity. In *Suspicious Minds*, Rob Brotherton explores the history and consequences of conspiracism, and delves into the research that offers insights into why so many of us are drawn to implausible, unproven and unprovable conspiracy theories. They resonate with some of our brain's built-in quirks and foibles, and tap into some of our deepest desires, fears, and assumptions about the world.

The fascinating and often surprising psychology of conspiracy theories tells us a lot - not just why we are drawn to theories about sinister schemes, but about how our minds are wired and, indeed, why we believe anything at all. Conspiracy theories are not some psychological aberration - they're a predictable product of how brains work. This book will tell you why, and what it means.

Of course, just because your brain's biased doesn't always mean you're wrong. Sometimes conspiracies are real. Sometimes, paranoia is prudent.





## At the Wagner Free Institute of Science

1700 W. Montgomery Ave., Philadelphia, PA 19121 215-763-6529 Tuesday-Friday 9am-4pm  
<http://www.wagnerfreeinstitute.org>

### Lectures and Other Events at the Wagner

**Thursday, October 13, 2016, 6:00-8:00**

**Archives Month Philly - Thursday, PM  
Philadelphia Lantern Slide Salon**

Celebrate Archives Month Philly at the Wagner Free Institute of Science as we showcase glass lantern slides from the special collections of the Chemical Heritage Foundation, Fairmount Park Historic Resource Archives, Jefferson University, Penn Museum of Archaeology and Anthropology, Philadelphia Museum of Art, Temple University, and the Philadelphia Area Consortium of Special Collections Libraries during the 4th annual Philadelphia Lantern Slide Salon.

**Saturday, October 22, 2016 - Noon-4 PM**

**Wagner on the Weekend - Spooky Creature Feature: Bones!**

**Wednesday, October 26, 2016 at 6:00 PM at the Wagner Free Institute of Science, 1700 West Montgomery Avenue, Philadelphia, PA 19121**

[www.wagnerfreeinstitute.org](http://www.wagnerfreeinstitute.org) ph 215-763-6529

**Un-Leeched: The History and Science of Leeches: An Illustrated Presentation featuring Robert Hicks, Mütter Museum and Daniel Shain, Rutgers University**

Slimy, bloodsucking creatures with three jaws are taking over our hospitals. No, it's not the plot of a horror movie—it's the story of medicinal leeches. For thousands of years, healers promoted the use of these tiny annelids to treat everything from infections to flatulence. Today, leeches play a huge role in transplants, reattachments, and other complicated surgical procedures. Join us to hear from both a medical historian and contemporary biologist who will teach you to love leeches instead of fearing them—we'll have some real, live leeches on hand so you can profess your love after the talk!

**Saturday, November 12, 2016 - 5:00-8:00 PM**

**A SIP of SCIENCE - 2016 Benefit Cocktail Party**

Honoring Dr. Stephen Tang, President and CEO of the University City Science Center.

Open to the Public. This is a fund raising event.

**Adult Education Fall 2016 Course Schedule**  
**(Wagner courses are FREE and open to the general public. Contributions are gratefully received. Courses are taught at introductory college level)**

**The Cosmos: A History of Early Astronomy, Professor Darin Hayton, Haverford College**

6 Wednesdays, September 21-November 2, 2016, 6:15 - 7:45 PM. Independence Branch of the Free Library, 18 S. 7th Street (between Market and Chestnut). The history of astronomy is a journey through foreign lands populated with cultures that struggled to understand the heavens, as we still struggle to do today. This course will explore some of these cultures to learn why they invested considerable time and effort in studying the heavens and the uses to which they put their knowledge of the stars and planets.

No preregistration necessary. Register by attending the first course.

**FIELD COURSE - Wild City Plants, Professor Alfred E. Schuyler, Academy of Natural Sciences of Drexel University**

First class: Thursday, September 22, 2016, 6:30 - 7:45 PM, at the Pennsylvania Horticultural Society. 5 Saturdays: September 24, October 1, 8, 15, & 22, 2016, 10AM - 1PM in different parts of Philadelphia. This field class will take 5 Saturday walks to different sites in Philadelphia and will focus on plants that grow wild in disturbed habitats and places densely populated by humans.

This course requires preregistration and is limited to 25 students. Pre-registration opens on Monday, September 12, 2016. Location information will be provided at the first class. Due to space limitations, preference will be given to people who can attend all 6 class meetings.

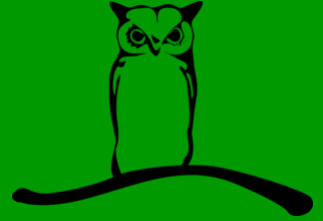
**Urban Entomology, Professor Greg Cowper, Academy of Natural Sciences of Drexel University**

6 Mondays, October 17-November 21, 2016, 6:15 - 7:45 PM. Fishtown Community Branch of the Free Library, 1217 East Montgomery Ave.

No preregistration necessary. Register by attending the first course.

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## Off the Beaten Path By Kim A. Sheridan



# In the Garden of Stone

It was to be a simple river ramble, inspired by a single photo. It led my friends and me to an unexpected Shangri-La. Slipping our kayaks along Lower Bear Island, we found ourselves in a garden of stone.

Tiny islets stood no more than a foot high, every one home to a gnome's garden of tiny pine saplings, grasses and bright wildflowers. Upstream, little islands became bigger islands, some large enough for a small village of cottages. Fantastical sculptures emerged from the rocky cliffs. I started



**The Susquehanna River Gorge below Holtwood Dam.  
June 6, 2015.**

to give the formations names: Mt. Rushmore. The Fist of God.

Pines, red maples and river birch dotted the shores, underlain with bear oak, ferns and grasses. Zebra swallowtail and great spangled fritillary butterflies flitted among the wildflower blossoms, while a northern racer snake sunned himself on exposed rock. Vultures and bald eagles soared overhead. Through twenty-foot tall stone walls, a narrow passage led to a secluded cove.

A canyon adventure deep in some mountain fastness, a

wilderness way off the beaten path? Not at all. This magical place is the Susquehanna River Gorge, 90 minutes from Philadelphia.

The magnificent gorge lies between Lancaster and York Counties. It is the southern end of the Susquehanna River, which flows 464 miles from Cooperstown, New York to the Chesapeake Bay in Maryland. For 40 miles the gorge runs, hundreds of feet deep and in places no more than a quarter mile wide. Most rivers have their steepest gradient near their headwaters. The Susquehanna turns that concept on its head by being steepest near its mouth, dropping nearly 6 feet per mile here.

Great boulders of metamorphic schist laced with gneiss and quartz litter the river bed and form the cliff faces. The



**The rocky river bed directly below Holtwood Dam, abloom  
with late spring wildflowers. June 13, 2015**

pronounced angles of the layered rocks bear testament to the extreme geological forces that twisted the bedrock as continents collided hundreds of millions of years ago. The depth of the gorge is evidence of the powerful torrents of water and sediment swept downstream when glaciers melted in the up-



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**Adventurers Don Nigroni and Robb Kerr paddle through the Garden of Stone. June 6, 2015**

per Susquehanna watershed during the ice ages.

Much of that geological evidence is hidden today. The steep descent of the river through the gorge created ideal conditions for hydroelectricity. Three dams were construct-

ed, each with its own lake upstream. The river passes through Safe Harbor dam and Lake Clarke (built in 1930); Holtwood and Lake Aldred (1919); and Conowingo and Conowingo Pool (1925.)

The waters of the ponds hide the rocky river bottom, and a secret – the deeps. Long trenches in the river bed run parallel to its course. Up to two miles long and 125 feet deep, the bottoms of some deeps lie below sea level. They were discovered when the river was diverted for dam construction. Though some speculate that they were created in the great glacial melt of the ice ages, the origins of the deeps remain a mystery.

Below the dams, the rocky bottom reappears in a wonderland of stone, giving a sense of what the river looked like before the dams were built. Many of the rocks are pock-marked with potholes. Sediment and pebbles, collected in small depressions in the rock, were swirled by strong flood-water currents, acting as grindstones to erode ever-larger circular holes.

The dramatic Conowingo Islands lie below Holtwood



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**The Susquehanna River is lovely in all seasons. October 25, 2015.**





**From Pinnacle Overlook, Lake Aldred is a wonderland of snow and ice. January 29, 2016.**

dam: Upper and Lower Bear Island, Peavine, Crow, Big and Little Chestnut, Sicily, and many more too small to have names. Hidden passageways and secret coves beckon. It's a paddler's paradise, a watery garden of stone.

#### **IF YOU GO:**

The PA Fish and Boat Commission maintains a launch at Muddy Creek on the York County side; be aware launch permits are required. Also be aware that dam releases can raise the river level quite rapidly. Listen for the warning sirens, and get to shore as soon as possible if they sound. If you want to rent a boat, there are a few outfitters in the gorge area; contact information is below.

Near Holtwood are several old canal locks, the remnants of the Susquehanna and Tidewater Canal. Constructed between 1836 and 1840, the canal was closed in 1894. Locks 12 and 15 have been preserved as historic areas.

Many overlooks throughout the gorge give a bird's eye view of the river. Near Holtwood are two wonderful spots. Hawk Point Overlook in Susquehannock State Park showcases the Conowingo Islands, and the Pinnacle Overlook upstream of the dam looks down on Lake Aldred - and often vultures and eagles soaring below. Other overlooks include Chickies Rock County Park, Turkey Hill Overlook, and Urey Overlook. Numerous hiking trails crisscross the area, like the Mason-Dixon Trail on the York County side and the Conestoga Trail on the Lancaster side. Shenks Ferry Wildflower Preserve and the Indian Steps Museum are also worth a look.

For boating on the Susquehanna:

**PA Fish and Boat Commission:**

<http://fishandboat.com/>

**Muddy Creek Boat Launch:**

39° 47.930'N 76° 18.387'W

**Other Boat access areas on the Susquehanna River:**

<http://susquehannawatertrail.org/trail>

**River Outfitters:**

<http://susquehannawatertrail.org/services>

For land exploration, it's best to go first to the office at the Holtwood Environmental Preserve. There are maps and brochures available, and staff can provide detailed information on various sites in the area.

**Holtwood Environmental Preserve (Office)**

9 New Village Road, Holtwood, PA 17532

<http://www.visitpa.com/pa-state-national-parks-forests/holtwood-environmental-preserve>

**Safe Harbor Recreation Areas**

<http://www.shwpc.com/recreation.html>

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**Kim Sheridan** is an ardent amateur naturalist and wildlife observer based in Havertown, Pennsylvania.. She may often be found in forest or marsh with camera in hand. Her blog site is dedicated mainly to nature photography at:

<http://thewildededge.net/>

**“A true conservationist is a man who knows that the world is not given by his fathers, but borrowed from his children.”**



**John James Audubon  
(1785 – 1851), American ornithologist, naturalist, and painter.**

## *Winged Victory of Samothrace*

*by Albert Fried-Cassorla*

Striding forward without a face,  
she announces Victory for the human race  
But is her announcement premature,  
perhaps an unwise praise of war?

Or an adumbration of belief in power which  
will haunt us in our direst hour?

Perhaps so, but even... even  
we know she stands triumphant for all of us  
landing on the prow of some primordial ship  
a trireme that once gave defeat the slip  
inviting us to celebrate, even though we do not deserve  
to stand with her on that ancient bark  
to pretend we have wings with as grand a span  
and a sculpted bodice to amaze any man

No, we can only hope to deserve the Victory  
presaged in that universal Hellenistic place  
by the Winged Nike of Samothrace



**Albert Fried-Cassorla** is a resident of Montgomery County, Pennsylvania and is a poet, philosopher, playwright, and English Professor.

# The Stone Age Grows Older

by Paul Schlueter III

In a pair of articles by Bruce Bower, Science News has shared the results of archaeological surveys which push back the dawn of the Stone Age, and the presence of humans in the Americas. In both "Mystery hominid settles Sulawesi" (Feb. 6, 2016) and "Arrival to South America pushed back" (Dec. 26, 2015), stone tools provide evidence of human presence even without the presence of human bones.

Creationists are fond of alleging that science "can't know that people made stones into tools," arguing that natural stones break into pieces through several natural processes. However, archaeology is far more sophisticated than its deniers will admit. A trained analyst can easily identify natural breaks from those deliberately done by human (or proto-human) hands. One example is the rounded "hammer" stone, which seems natural enough, except that it has a high count of discrete, shallow impact chips, all closely grouped in areas of the stone which are more pointed than the rest; the statistical probability forces us to the conclusion that such multiple impacts are human artifacts, not the result of random natural impacts. Chipped/broken stones also often show one or more edges which clearly were (or remain) sharp, yet the sharp edge bears evidence of damage that indicates it has been used to chop or slice some other material (sometimes this evidence is more obvious under a microscope). Certain stones have grooves worn into them by persistent, deliberate rubbing against another object, indicating that they were once used for grinding or bound to a shaft. None of these (or several other) clear instances of tool making/use can seriously be argued, no matter how intent some people are on denying the facts before them.

In the Sulawesi article, Bower describes reports of hundreds of stones unearthed at various locations. In just one location, at Talepu, Gerrit van den Bergh (Univ. of Wollongong, Australia) led a team of archaeologists in the discovery of 315 stones which are "securely dated" to 194 - 118 Kya, and their report is published in the Jan. 14, 2016 issue of Nature. Their dating involved measuring the time the soil bearing the stones was last exposed to sunlight. There were four distinct sites covered in this one survey, alone.

For some time perspective, Homo sapiens diverged approximately 200 kya, in Africa, and the earliest direct evidence (bones) of their presence on Sulawesi is dated only 40

Kya. This leaves it somewhat a mystery which proto-human species created the Sulawesi artifacts, though it has long been known that several of our evolutionary relatives had mastered the making/use of stone tools and fire well before



Sulawesi stone tools

we turned up on the scene.

Stone tools have been found dating back at least 1.8 million years, made by several species throughout southeast Asia. Excavations on Flores (near Sulawesi) have turned up stone tools made 1 Mya, and fossil evidence has indicated that *H. floresiensis* (the "Hobbits") lived on Flores at around the same time that the Sulawesi artifacts were being made (the islands are about 500 miles apart). However, Denisovans left a DNA legacy throughout the region, and may have lived on or near those islands. Also, *H. erectus* (van den Bergh's preferred choice) was widely dispersed at the time, and fossils put *H. erectus* on nearby Java between 1.5 Mya and 140 Kya; as it happens, higher sea levels connected Java to the mainland at various points in that time range.

Ocean currents would have pushed tsunami and storm debris from the mainland toward Sulawesi, and it is proposed that multiple animal species were transported to the island in that manner, which would not have required deliberate intention.

Bower's article states that Sulawesi and Flores are the only islands known to have hosted hominids before humans reached Australia around 60 - 40 Kya. So far, no one has

been able to distinguish the stone tools made by various hominids, probably indicating that the proto-human toolmaking techniques were so simple and self-evident that they developed independently in several times and places, rather than being spread by cultural transfer (teaching).

The South America article describes a much more recent period; there is absolutely no evidence (Bigfoot sightings notwithstanding) of the presence of ANY pre-H. sapiens



**Oldest known stone tools found in Monte Verde, Chile.  
18,500 years ago.**

hominid anywhere in the Americas.

All the same, science is being challenged continually by older and older evidence of human occupation. The latest find is in regard to the earliest humans who foraged in the southern tip of Chile 18.5 Kya (pushing back the widely-accepted date by as much as 3,500 years). The Monte Verde site revealed 39 stones that date between 18.5 and 17 Kya. Other stones were found in soil that dates as old as 25 Kya (scientists concede that further evidence is needed to confirm

that people were in South America that long ago - there might be other reasons why 4 stone artifacts were in dirt so old.)

About a third of the recent Monte Verde artifacts (reported in PLOS ONE, November 18, 2015) originated far away from the Chilean site, reinforcing the idea that the inhabitants who left them were itinerant. Work at Monte Verde in the '70s and '80s located a campsite dating to 14.5 Kya. Tom Dillehay (Vanderbilt Univ., Nashville) is quoted as proposing that South American residents "trekked widely, and perhaps traded with other groups," rather than forming permanent settlements in that seasonally-harsh environment. He also asserts that his team's finds were not related to the Clovis people, who were once thought to represent the earliest human Americans. Clovis sites in the U.S. and Mexico date to only 13,390 years ago, and they hunted with a distinctive type of spear point and cooked at large hearths.

Dillehay's team also identified 12 places where small fires had burned, leaving ash, burnt wood, and charred or heated animal bones. The burned material was used in helping to date the stone artifacts. Because of this utility, and because they are relatively easy to spot, ancient cook fires are recommended by Dillehay as a good indicator for possible sites of pre-Clovis humans in the southern continent.

Whether in the New World or in the Old, stone tool usage has long been considered a hallmark of human (and pre-human) presence. It still has not been determined when our VERY distant relatives, otters, first began using stones as clamshell-shattering anvils while backstroking the northeastern Pacific region. Chimps in Africa have been observed to use pairs of stones to break open the shells of tough nuts, as well. Could our ancestors have first copied such techniques from animals? Hmmm...

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**“Just as our solar system has a certain idiosyncratic assortment of planets and moons, different from any neighboring system yet categorically equivalent, so each distinct period of human history might have special qualities and individuals, characteristics and events, yet still be essentially akin beneath the surface to all the others.”**

**~ Paul Di Filippo ( b. 1954), American Science Fiction author**

# A Crime Punishable by Death

by Clarissa F. Dillon, Ph.D.



As Hallowe'en approaches, discussions of witches often appear. The Salem, Massachusetts trials are rehashed, but seldom is there mention of the context in which they existed or of the trials that occurred in "the world of William Penn."

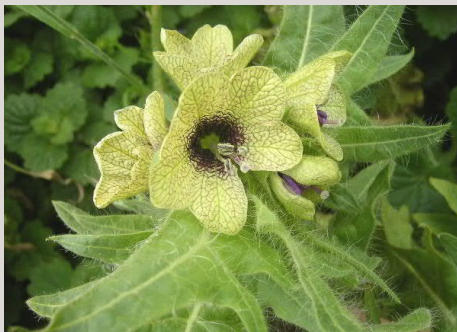
The practice of witchcraft has existed as long as people have desired to control the forces of nature, determine the future, and/or to achieve certain results. Practitioners were often women; an 18th-century dictionary defined *witch* as "A woman given to unlawful arts."<sup>1</sup> She was the opposite of the "wise" or "cunning woman," a healer and often a midwife, considered a "...generall helper to the distressed."<sup>2</sup>

Women knowledgeable about plants could provide healing medicines, love potions, and death drinks. If a love potion were successful, its use might be followed by an unwelcome result for an unwed girl. There are plants that can "bring down the terms" or, in our words, stimulate the onset of menstruation.<sup>3</sup> Such use might result in an abortion, illegal as well as sinful. It is difficult to find direct references, but if the effects of a plant described in positive terms, allusions can be found.

[calamint] ...bringeth downe the monthly sickness, and expelleth the child, which also it doth bring but only applied.....

[it] also is maruellous good for young maidens that want their courses, if their bodies be first well purged; for in continuance of time it bringeth them down very gently without force.<sup>4</sup>

Terminating an unwanted pregnancy was sometimes desirable for married women, and would have been performed just as secretly.



*Hyoscyamus niger*, commonly known as henbane, is a poisonous plant in the family *Solanaceae*. It has medicinal uses but the leaves and stems are highly toxic to most mammals. Common effects of henbane ingestion include hallucinations, dilated pupils, restlessness, and flushed skin. Less common effects are tachycardia, convulsions, vomiting, hypertension, hyperpyrexia, and ataxia.

There are poisonous plants that will kill any who ingest them. Reasons for death drinks could have been kind, like euthanasia, or malevolent, impelled by hate, greed, or revenge. Henbane, the nightshades, thorn apple, hemlock, and wolfs-bane were considered so dangerous that people were warned NEVER to ingest them.

Witch-hunts occurred in Europe when unexplainable things, like the Black Death, happened. Fear and ignorance about causes led to an explanation based on evil powers. A search for those "responsible" found witches. The religious upheavals of the Protestant Reformation led to the creation of many sects, each sure its way was the only way to salvation. Disbelievers, non-believers, and heretics were pursued like witches--tried, often by torture, and executed. Some were hanged, others burned.

In England, Henry VIII created the Church of England, with himself as the head. The result was an unstable environment for those who clung to the Roman Catholic religion as well as for those who embraced the new. His son, Edward VI, was only on the throne from 1547-1553. Henry's elder daughter, known as "Bloody Mary," tried to re-establish the Church of Rome during her reign (1553-1558). Elizabeth I valued stability; the Anglican Church was restored as the official church and all were required to belong to, attend, and support it.

She was succeeded by James VI of Scotland, who became James I of England and ruled from 1609 to 1625. He was very concerned about witchcraft, wrote a book about it, and encouraged a surge of witch-hunts. Many people were seized, interrogated, and executed. Superstition, fear, ignorance, and religious turmoil all contributed to the outbreak of trials that continued well beyond James' death.

During James' reign, permanent English colonies were established in North America. Jamestown, Virginia was founded in 1607; the Pilgrims arrived at Plymouth in 1620, and were later absorbed by the Massachusetts Bay Colony. All colonists brought with them their language, beliefs, and customs, so it is not surprising that belief in witches and fear of their powers should have crossed the Atlantic.

The first New England trials were in Hartford, Connecticut in 1662 and 1663. According to one historian, the "sins" of New England witches were: discontent, anger, envy, malice, seduction, lying, and pride.<sup>5</sup> The accused were women over 40, without family, but not necessarily poor. Legal action was taken against at least 144 people, 58 of whom were men. Accusations were followed by investigations. The step was handled within the household ruled by the husband/father/master. Then, the community became involved, followed by church intervention: sermons, prayers, and explications of Scripture that attempted to remove or solve the problem. The legal system headed by a judge, was more formal: grand jury hearings, followed by trials with petty juries; a final determination occurred in the Court of Oyer and Terminer, a process not always impartial: "The examining magistrates were assuming the guilt of everyone brought before them, regardless of sex or station."<sup>6</sup>

The 1692 Salem witch trials are the famous ones today and have provided material for historians, playwrights, novelists, and others. They involved many of the same factors: accusations that used "fits" in the presence of the accused; the presence of familiars, often cants; the touching of the afflicted by the accused to remove the spell; family history of witches, and physical examinations. People from various Massachusetts families, some in important social, economic,

## The Execution of Bridget Bishop



Bridget Bishop (c. 1632 - June 10, 1692) was accused as a witch in the Salem witch trials of 1692 and was the first person executed in that series of trials.

On April 18, 1692 Bridget Bishop was arrested with others. The following day, magistrates John Hathorne and Jonathan Corwin examined Abigail Hobbs, Bridget Bishop, Giles Corey, and Mary Warren.

On June 2, Bridget Bishop was tried on charges of witchcraft before the Court of Oyer and Terminer on its first day in session.

Bishop was convicted of the charges, and sentenced to death. While she was not among the first to be accused, she was the first to be tried in that court, the first to be sentenced, and the first to die. She was executed by hanging on Gallows Hill on June 10.

Magistrate John Hathorne, coincidentally, was a paternal ancestor of American novelist Nathaniel Hawthorne. It is said that Nathaniel added a "w" to his name to distance himself from his Hathorne relative but there is little evidence to conclude that.

and political positions, were accused. Eventually the furor died down, but is remembered as a part of New England's colonial history.

It was different in the "world of William Penn." Not long after Penn and his colonists arrived, a woman named Margaret Mattson and her daughter, Yeshrom Hendrickson, were indicted by the Council on the charge of witchcraft. Penn himself sat as the judge and his Council was the jury.

.....  
 Henry Drystreet attested, saith he was tould 20 years agoe, that the prisoner at the Barr was a Witch, & that severall Cows were bewicht by her; also that James Saunderlang's mother tould him that she bewicht her cow, but afterwards said it was a mistake...it was not her Cow but an other Person's that should dye.  
 .....

Annakey Coolin attested, saith her husband tooke the Heart of a Calfe that Dyed, as they thought, by Witchcraft, and Boyled it, whereupon the Prisoner at the Barr...said they had better they had Boyled the Bones,...

Margaret Mattson saith that she Vallues not Drystreet's Evidence; but if Saunderlin's mother had come, she would have answered her;.....

Jno. Cook attested, sayth he Knows nothing of the matter.

Tho: Balding's attestation was ready, and Tho: Bracy attesteth, saith it is a True Copy.

The Prisoner denyeth all things, and saith that ye Witnesses speake only byhear say.<sup>7</sup>

The jury found her "Guilty of haveing the Comon fame of a witch, but not guilty in manner and forme as she stands Indicted." Her husband and another man, Antho. Nelson, posted bonds of fifty pounds each, for her good behavior for six months and her son-in-law did the same for his wife.

Another petition was filed less than twenty years later.

21 May 1701: A Petition of Robt. Guard and his Wife being read, setting forth That a Certain Strange Woman lately arrived in this Town being Seized with a very Sudden illness after she had been in their



The Witch Trial of Margaret Mattson

Company on the 17th Instant, and Several Pins being taken out of her Breasts, One John Richards, Butcher, and his Wife Ann, charged the Petitioners with Witchcraft, & as being the Authors of the Said Mischief; and therefore, Desire their Accusers might be sent for, in Order either to prove their Charge, or that they might be acquitted, they Suffering much in their Reputation, & by that Means their Trade.

Ordered, that the Said John & Ann Richards be sent for; appearing, the matter was inquired into, & being found trifling, was Dismissed.<sup>8</sup>

Another Pennsylvania incident occurred in Westtown in 1785. A solitary old woman, Moll Otley, was accused of bewitching a young girl from the Ashbridge family, local Quakers. A crowd, perhaps a mob, seized Moll and tested by weighing her against the Bible, having her touch the afflicted child, and by an unusual trial--shooting her picture was a silver bullet. If she were a witch, a bullet-hole would be found on her body. None of the tests proved her a witch so trial by water was suggested but not performed. She was then set free. This incident was described in an 1876 newspaper and was picked up by *The Philadelphia Inquirer*, 21 February 1999. Newspapers are not the most reliable sources and there was no formal charge or proceeding so we cannot be sure about the incident.

Another newspaper account can be found: the 22 October 1730 *Pennsylvania Gazette* printed a lengthy account of a witchcraft "trial" in Mount Holly, New Jersey. The article stated that "...some Persons...had been charged with making their Neighbours Sheep dance...and with causing Hogs to speak and sing Psalms, &c. to the great Terror and Amazement of the King's good and peaceable Subject..." After having been searched, each of the accused was weighed in a scale against a Bible, but "...to the great Surprise of the Spectators, Flesh and Blood came down plump, and outweighed the great Book by abundance." When all the accused had been so tested and found innocent, trial by water was administered. Stripped, bound hand and foot, and placed in the water horizontally, all "...swam very light upon the Water..." showing them guilty. "The more thinking Part of the Spectators were of the Opinion, that any Person so bound and plac'd in the Water (unless they were mere Skin and Bones) would swim till their Breath was gone, and their Lungs filled with Water...It is said they are to be tried against next warm Weather, naked."

Some have suggested that this report was a hoax, perpetrated by Benjamin Franklin.<sup>9</sup> However, there is an account of a trial in the memoirs of William Moraley who spent several years in the area.

[September 1734] ...to *Mount Holly*, where I was witness to one of the strangest Pieces of Folly that man ever acted. Certain old Women, of Melancholick Physiognomy, had got the Character of Witches; and being questioned on that Account, and not able to clear themselves, were obliged to undergo a Ducking, in order to prove whether or no they were such.

The Notion run, if they sunk, they were no Witches; but if they swam, they were, and shou'd be punished as such. But they miraculously escped the Censure of the Levy, by sinking, tho' they remained a considerable Time on the Surface of the Water. But this not satisfying one *Jonathan Wright*, he proposed to weigh them in Scales against the Bible, and concluded, if they were Witches, they would not weight so heavy as the Bible; but to the Surprise of the Beholders, they weigheddown both Prophets and Apostles.

After this foolish Adventure, I went back to *Burlington*...<sup>10</sup>

I would feel happier if there were a third source.

There is more evidence of the belief in witchcraft in colonial Pennsylvania. In an archaeological excavation of the Taylor family house, once thought erroneously to have been the Prinzhof or home of Governor Printz of New Sweden, in Tinicum Township, Delaware County, a witch-bottle was discovered; it had been buried upside-down near a chimney foundation. Inside the former wine bottle were six bent pins and buried with it were a bird's bone and a small redware shard. It may have contained urine along with the pins. It was supposed to work by identifying the person bewitching the owner of the bottle; when the perpetrator urinated, the pins in the bottle would cause great pain, thus identifying the ill-wisher. Many have been found in England.<sup>11</sup>



There may be other witch bottles waiting to be found here. No written references have been found to date. Since this bottle has been dated to circa 1740, it could have been put in place any time after that, but not before. Nothing is known about a suspected witch in Tincum Township.

Since we cannot talk with people involved in witchcraft trials of the 17th and 18th centuries, we can only consider what was reported at the time, and perhaps indulge in some speculation. Interpretations can change as more archaeological and written evidence is found, so we may perhaps some day know more. We do need to remember that this was no light-hearted or trivial matter. Witchcraft was a crime punishable by death.

### Footnotes:

<sup>1</sup> Samuel Johnson, *A Dictionary of the English Language*:... in 2 vols (London: Printed by W. Strahan... 1755; facsimile reprint by Longman Group UK Limited, Harlow, UK, 1990), n.p.

<sup>2</sup> Wallace Notestein, *A History of Witchcraft in England from 1588 to 1715*. (New York: Thomas T. Crowell Company, 1968), p. 21.

<sup>3</sup> John Gerard, *The Herball or Generall Historie of Plants*, rev, and ed. by Thomas Johnson. (London: Printed by Adam Islip...1633; facsimile reprint by Dover Publications, Inc., New York, 1975): pennyroyal, p. 342; smallage, p. 348; mugwort, p. 524

<sup>4</sup> *Ibid.*, p. 688.

<sup>5</sup> Carol F. Karlsen, *The Devil in the Shape of a Woman: Witchcraft in Colonial New England*. (New York: Vintage Books, A Division of Random House, Inc., 1987 & 1989), p. 119.

<sup>6</sup> Mary Beth Norton, *In the Devil's Snare: The Salem Witchcraft Crisis of 1692*. (New York: Alfred A. Knopf, 2002), p. 176.

<sup>7</sup> "Trial of Margaret Mattson and Yeshro Hendrickson," Council in Philadelphia 7 December 1683 - charged with witchcraft; pleaded not guilty. *Minutes of the Provincial Council of Pennsylvania*. (Philadelphia. Printed by Ja. Severns & Co., 1852), Vol. I, pp. 95-96.

<sup>8</sup> *Minutes of the Provincial Council*. (Harrisburg: Printed by Theophilus Penn, 1838), Vol. III, p. 15.

<sup>9</sup> Among them Don Nigrone, "The Delaware Valley Witchcraft Cases," *Phactum*, November-December 2008, p. 8.

<sup>10</sup> William Moraley, *The Infortunate*... 2nd ed., ed. by Susan E. Klepp and Billy G. Smith. (University Park, PA: The Pennsylvania State University Press, 2005), pp. 87-88.

<sup>11</sup> See article, "Witch Bottle," *PAST MASTERS News*, quarterly newsletter of PAST MASTERS in Early American Domestic Arts, 2002, Vol. V, No. 1, pp. 4-5.

### About the Author

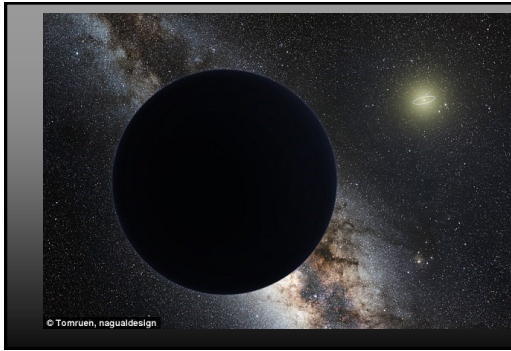
**Clarissa F. Dillon** received her doctorate in History from Bryn Mawr College and has been involved in "living history" since 1973. She has long tried to dispel the myth about tomatoes being considered poisonous. She designed and interpreted a display, "They did too eat Tomatoes" for the John Bartram Association at the Pennsylvania Horticultural Society's Harvest Show in September 1990. She had an article, "Exploding a Historical Myth About Tomatoes," published in *Living History*, Vol. 1, No. 2, Summer 1991. Its original title was "They Did Too Eat Tomatoes" but the editor insisted that it be changed. She also wrote an article, "Tomatoes, also called Love Apples, " for a column entitled "Mythbustherth" in *PAST Masters' News*, Vol. 8, No. 3, Summer 2005. She was delighted to receive a documentation for tomatoes as food from Joel Fry at Bartram's; that meant she could include tomatoes in the revised dissertation she makes available to historic gardeners and cooks.

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**“That there is a Devil, is a thing doubted by none but such as are under the influences of the Devil.”**

**Cotton Mather (1663 - 1728), On Witchcraft**

**“Thou shalt not suffer a witch to live.” Exodus 22:18**

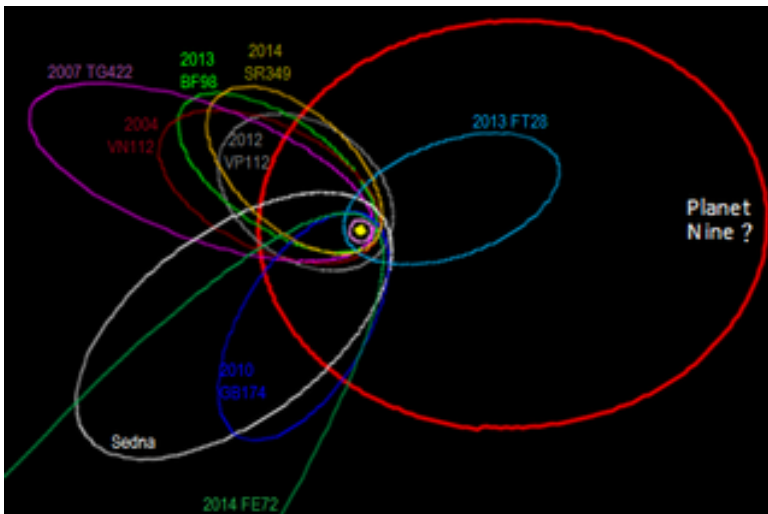


## A New Planet: For Real, This Time?

by Paul Schlueter III

They're calling it "Planet Nine," and it's NOT more of the old Nibiru bunkum. Looks like actual astronomers have been closing in on another planet within our solar system, in the same manner that they located Neptune in 1846 (when Urbain Le Verrier and John Couch Adams calculated that a huge, unknown mass was causing Uranus to speed up and slow down in its orbit, followed by astronomer Johann Galle actually finding the planet responsible.)

The hints for the new discovery go back to 2014, says Christopher Crockett in the Feb. 20, 2016 Science News (pp. 6-7).



At least twelve bodies in the Kuiper belt have odd orbits, and six of them seem to lie in the same plane, pointing in the same direction. Computer simulations suggest that a planet may be holding them in these unusual positions, and the proposed planet might be as much as 10 times the mass of Earth.

One reason the planet hasn't yet been seen is its great distance. One Astronomical Unit (AU) is the distance between the sun and Earth. The speculative ninth planet's orbit comes no closer than 200 AUs to the sun, about 30 billion kilometers. These findings have been published in the February 2016 issue of *Astronomical Journal*. While the causative planet has not yet been spotted in telescopes, astronomers involved in its pursuit have calculated that the Kuiper belt anomalies have only a 0.007% chance of being random. Dwarf planets Sedna and 2012 VP<sub>113</sub>, which are

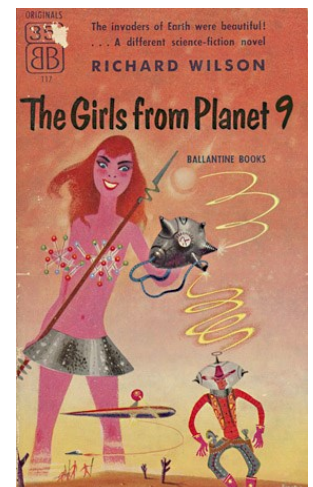
"far removed from the eight known planets," may have been flung into their positions by this same unseen mass.

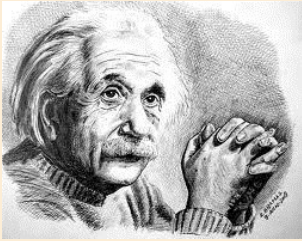
NASA has a satellite called WISE which has ruled out planets like Jupiter or Saturn within a band from about 4-12 trillion km from the sun, after an infrared sky survey lasting nearly nine months. However, a smaller, cooler planet might be further out, and it would be difficult to see against the Milky Way's stars. If we could mathematically determine its approximate position, astronomers might get lucky by watching for Planet Nine to transit distant stars (come in between us and them), dimming them slightly. Still, it's difficult to detect (by eye) the absence of stars in the dark area of the crescent moon in our night sky; finding Planet Nine that way would be immensely more difficult, and would depend on some very precise location predictions at the start. If its surface reflects sunlight, we may even have unrecognized images of Planet Nine, awaiting comparison surveys in which computers can detect the subtlest changes in the relative positions of points of distant light. As in many scientific pursuits, we are often backlogged with raw data which has yet to be analyzed.

SN's report suggests that the best telescopes for detecting the ninth planet are the Victor Blanco (Chile) and the Subaru (Hawaii); if it comes online as scheduled, the Large Synoptic Survey Telescope (Chile) should begin surveying the entire night sky every three days, beginning in 2023. It is quite likely that we'll be around to hear the news that this new planetary body has been verified.

As we all know, we won't have to wait quite so long for fictional speculations to appear. Planet Nine may very well be a major location feature in Science Fiction stories being written at this very moment. As word gets around, astrologers will surely begin claiming that they've known of Planet Nine all along, and they will happily describe its effects on our lives (for the usual fee). The unfortunate circumstance of Pluto's demotion from planet status, combined with word of a new ninth planet, will surely lend to the confusion and hucksterism. One of our roles in the next several years will be to help our acquaintances keep the facts separate from the woo- woo regarding this planet hunt.

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# Gravity Waves Finally Detected

by Paul Schlueter III

A hundred years ago, Einstein predicted them. Physicists have spent the last century predicting the form they'd take. They're unimaginably small (a fraction of the diameter of a subatomic proton), yet they're also an unimaginably big deal. Humans have finally directly detected actual gravitational waves.

About 1.3 billion years ago, a pair of black holes spun into the last 20 milliseconds of their merger, far across space. In doing so, they accelerated from an orbital rate of about 17 times per second to around 75 times per second. To hypersimplify Einstein's theory of relativity, it takes one heck of a lot of energy to accelerate such gigantic masses so rapidly, and that release of energy causes ripples in space-time itself which can be detected across the universe. Some physicists hope to eventually detect echoes of the Big Bang itself, in the form of these g-waves, and science has just checked off a major milestone in reaching for that capability.

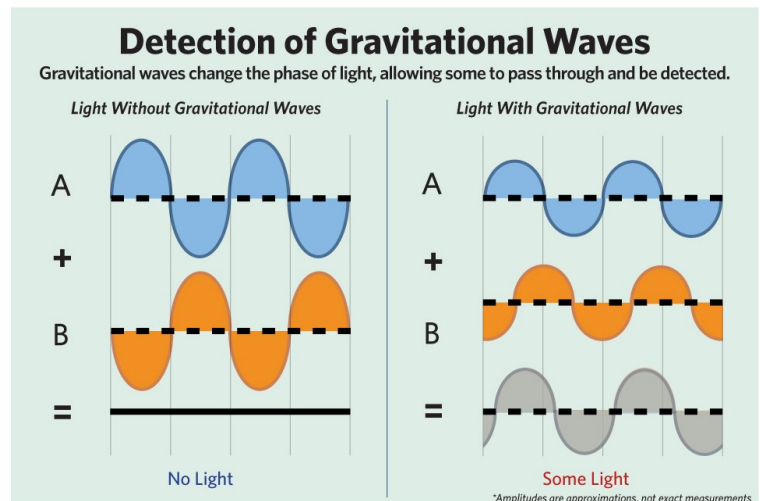
This is definitely a big deal. Last year, researchers detected the Higgs boson, the subatomic particle which is responsible for imparting "mass" to matter. Higgs had predicted that such particles were there, but to PROVE it somebody had to actually detect one. Now, science has proven Einstein's prediction by detecting gravitational waves, which go one step further in explaining the foundational nature of space-time itself. It's a good time to be a physicist, it would seem!

The March 5, 2016, Science News reports the news in a pair of feature articles. The 1.3 BYA date (and light speed distance) was reported (p. 24) by science writer Marcia Bartusiak, author of "Einstein's Unfinished Symphony" (2000). SN staff Physics writer Andrew Grant wrote the main news piece (p. 6) on the topic, which says that the black hole merger took place "more than 750 million light years away." This strikes me as a discrepancy, but I must surely be missing something important.

On Feb. 11, 2016, researchers at the Advanced LIGO (Laser Interferometer Gravitational-Wave Observatory) published their findings in Physical Review Letters. Astrophysicists say that this direct detection is comparable to Galileo's first telescope observation of the moon; gravitational waves will open a new way of observing the universe which reaches beyond the limitations that come with visible light, UV, and radio astronomy.

Advanced LIGO is the 2.0 version of a continent-spanning detector. In both Hanford, WA and Livingston, LA, there are stainless steel tubes (roughly a dozen feet in diame-

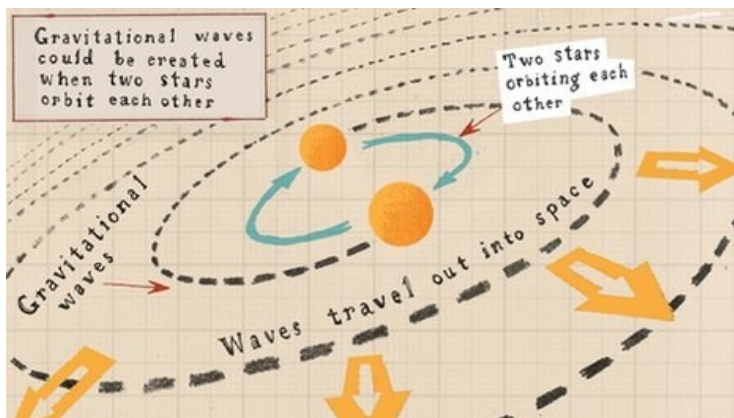
ter) 4 kilometers long, arranged in the shape of an L. Inside each tube, laser beams shine between mirrors aligned so perfectly that the light waves become exactly opposed, and cancel one-another out. A passing g-wave stretches one tube out (ever so slightly), while shrinking the other's length by the same amount. A fraction of a second later, the g-wave reverses the effect. As this happens, the phase alignment of the self-cancelling laser beams is slightly shifted, and light peeks through to trigger sensors.



LIGO was first put online in 2001, but it wasn't quite sensitive enough. In the last five years, sensitivity was improved by ongoing enhancements (which were made possible by LIGO's initial operations and further analysis), and almost as soon as the upgraded Advanced LIGO was switched on, the black hole merger was detected by receiving its g-wave. Scientists hope that this indicates a busy and revealing future for the detectors. Similar observatories are under construction (or in planning) in Germany (GE0600), Italy (VIRGO), India (INDIGO), and Japan (KAGRA). The European Space Agency is also in the proposal stages for a space-based unit they call the Evolved Laser Interferometer Space Antenna.

Still, g-wave sensors have a limitation when confined to Earth, or even near-Earth orbit. Since g-waves act across vast distances on the galactic scale, scientists are trying to figure out how to use distant pulsars (which give off "bursts" of light at very precise intervals) to detect minute compression/expansion of space-time over hundreds or thousands of light years, which should enable the detection of g-waves having ultra-low frequencies (ranging from nanoHertz to microHertz). The same Doppler effect that makes a train whistle

appear to drop in pitch when approaching, then receding the other direction, was initially the effect that allowed astronomers to detect the first exoplanets, from Dopler shifts in the frequency of wobbling stars' light. A similar effect would



subtly shift the rate of pulsars, too.

LIGO was built by the National Science Foundation (NSF) on around \$300 million granted by Congress. It was the first NSF project to need direct Congressional funding. Over 1,000 people collaborate on the LIGO and VIRGO pro-

jects at this time. Laser interferometry itself was first proposed by Russians in 1962, and independently by Rainer Weiss (MIT) in '66. Weiss has been joined by Kip Thorne (Caltech) and Ronald Drever (also at Caltech) in scaling up theoretical designs into the working experimental system. One finding has been reported, but Advanced LIGO ran for three months, and its data is still being analyzed for further evidence.

We're here at the birth of g-wave astronomy, and it's far too early to predict what sort of amazing news it will bring us about the universe. The predicted detection of actual residual g-waves from the Big Bang (which we cannot "see" with any other form of astronomy) may be within reach. Black hole science will almost certainly leap forward in the near future (g-waves are so subtle that it takes events on that black hole scale to create waves big enough for us to observe at this stage), but closer events (proportionally stronger, from proximity alone) may make it possible to detect planetary impacts within our galactic neighborhood, perhaps even asteroid-scale events within our own solar system... we'll just have to wait and see.

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# Eureka!

by John Grant

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**Pages:** 224

Galileo, Einstein, Curie, Darwin, Hawking . . .

We know the names, but how much do we really know about these people? Galileo gained notoriety from his battle with the Vatican over the question of heliocentrism, but did you know that he was also an accomplished lute player? And Darwin of course discovered the principle by which new species are formed, but his bold curiosity extended to the dinner table as well. (And how many people can say they've eaten an owl!) In *Eureka!*, John Grant — author of *Debunk It!*, *Discarded Science*, *Spooky Science*, and many others — offers fifty vivid portraits of groundbreaking scientists, focusing not just on the ideas and breakthroughs that made them so important but also on their lives and their various . . . quirks.



## Magical Science: Discriminating Science and Pseudoscience with Undergraduate Students.

Dr. Bernie Garrett (University of British Columbia, Canada)  
&  
Dr. Roger Cutting (University of Plymouth, UK)

A number of surveys have reported magical thinking is widespread in the general public. An Ipsos Reid poll in Canada in 2005 revealed that 47% of Canadians believed in ghosts. More recent surveys also substantiate this: a 2014 US Harris poll found that 46% of participants believed in ghosts and a 2016 YouGov survey in the UK that revealed 28% of participants definitely did believe in ghosts. Previous work has also identified that media messaging, and the types of media engaged with, can influence magical belief and how people perceive reports of paranormal events. However, there is a lack of empirical work exploring the nature of these beliefs in students, and considering what sort of things might influence the ongoing prevalence of such beliefs in populations engaged in science-based education, despite training in critical thinking and scientific methods. This research explores these earlier findings in the context of higher education students working in science-based professional disciplines.

### THE POWER OF THE MEDIA

A number of studies have found that media output could influence magical thinking and shape supernatural beliefs about reported paranormal events (reported phenomena such as telekinesis, clairvoyance or haunting that are beyond the scope of normal scientific understanding). In experiments conducted by Sparks and collaborators in 1994 the researchers manipulated exposure to an episode of a television series about paranormal investigations and found that such exposure led participants to express a greater belief in paranormal phenomena. On the other hand, watching a version that included a disclaimer reduced belief in such phenomena. Paul Brewer found similar results in his work in 2012. He examined the influence that media messaging about paranormal investigations had on perceptions of how scientific and credible such investiga-

tors were, as well as on beliefs about paranormal phenomena such as ghosts and haunted houses. His experiment tested the effects of three different versions of a news story about paranormal investigators on the public: one version presented them with the trappings of science including technology and jargon, another presented them in terms of traditional supernaturalism, and yet another debunked them as unscientific. The analyses tested whether these different forms of media use supported predictions of belief and credibility in paranormal investigators and the reported phenomenon. The results suggested that inclusion of a pseudoscientific narrative in a media story did influence the credibility of magical thinking and a belief in the paranormal.



There is also considerable research and debate on how media can affect the brain and behavior, especially in children. For example, a 2007 study by Mistry et al, found that children who watched television for more than two hours per day aged 2½ to 5½ were more likely to develop sleep, attention, and aggressive behavior problems than those who watched less. Similarly, a research team led by Hao Lei in China carried out brain scans of 35 young people aged between 14 and 21. Seventeen of them were classed as having Internet Addiction Disorder (IAD). Functional MRI brain scans showed multiple structural changes of the brain in the IAD subjects.

However, the correlation between media viewing and brain and behavioral changes remains unclear. The dilemma researcher's face is determining whether viewing media (such as television) causes changes in brain and behavior or if pre-existing personal traits or other conditions predispose people to excessive media use. Nevertheless, work by Gary Small at UCLA suggested that experienced web users might develop distinctive neural pathways. Therefore, it is at least reasonable to hypothesize that specific media use may lead to observable behavioral changes.

One aspect of such research has targeted the relationships between type and amount of media use and paranormal beliefs. Many sceptics worry that the media may help foster belief in the paranormal and perceptions of paranormal research as scientific, particularly in light of uncritical coverage of paranormal research. In another study, Sparks and his colleagues examined how both overall television viewing and the viewing of paranormal-themed programs were related to paranormal beliefs. They found no clear evidence that the former predicted beliefs in the paranormal, but they did find that the latter was positively related to belief in supernatural beings. A follow-up study by Paul Brewer in 2012 produced similar findings.

### **A NEW STUDY WITH PROFESSIONAL DISCIPLINE STUDENTS**

We undertook a small study in 2015 to explore:

- Is there evidence of magical thinking amongst professional nursing and education students, and if so how it is enacted?
- Are professional nursing and education students more likely to believe in magical explanations if they read a paper from authority that uses pseudoscientific language to describe the phenomena?

A quasi-experimental research design following the approach of Brewer's 2012 study was implemented. Two geographically, professionally and culturally disparate cohorts

were used for comparison of magical thinking: one undertaking the final year of nursing studies in Vancouver, Canada, and the other the final year of education studies before qualifying as primary school teachers in Plymouth in the UK. Both of these professional cohorts were exposed to programmatic content on scientific inquiry and evidence-based practice as a part of their disciplinary training.

This study explored the nature of supernatural beliefs in these students. Firstly they were given a paranormal belief survey (the revised paranormal belief scale: RPBS) to see what their beliefs were. Then, they were put into three groups (evenly matched on their RPBS scores) to see whether the influence of attributing a scientific-sounding narrative and authority to descriptions of a paranormal phenomenon would influence the student's acceptance of a ghost story. The different groups of students received three different versions of a news story (an investigation of a reported ghostly apparition of a murdered child seen in a picture of her school). As in Paul Brewer's work, in one story a simple news narrative was given (the control). In another, a pseudo-scientific explanation of the phenomenon given and in a final version a scientific rebuttal of the phenomenon was provided. A post exposure questionnaire then explored their perceptions of believability (acceptance of being true), credibility (trustworthiness) and how scientific (based on the methods and principles of science) their story was seen to be.

## **Internet Health Scams Survey.**

Dr. Bernie Garrett and his research team at UBC, Vancouver, Canada are studying the incidence of deceptive internet marketed health practices, and need your help. You have probably encountered those annoying side-bar or pop-up advertisements or e-mails selling miracle cures, or sites making unsubstantiated health claims about their products. This is becoming a growing trend, so they would appreciate you filling in a short online questionnaire about your experiences with health-related products and health scams promoted on the Internet.

This questionnaire can be accessed at the following link: <https://survey.ubc.ca/s/healthscams/>

Anyone who fills in the survey will be entered into a prize draw for one of two \$100 Amazon gift Vouchers, if they wish.

What is involved?

The short online questionnaire contains questions to elicit your feedback on the various aspects of health-product advertising and scams promoted through the Internet. It will take about 10 minutes to complete and all respondents are eligible for entry into a prize draw for one of two \$100 amazon gift vouchers.

You will need to enter the identity number: 001 when you fill in the survey (simply to track which responses came through PhACT)

Feel free to pass on this message to any friends or colleagues who may be interested, and please e-mail Dr. Bernie Garrett ([bernie.garrett@nursing.ubc.ca](mailto:bernie.garrett@nursing.ubc.ca)) if you need more information, or if you have any questions, concerns or suggestions about this or any aspect of the study.

## RESULTS

Seventy students took part, and there were no significant differences between the UK and Canadian cohorts and so all results reflected both sets of students combined. The initial questions related to religious and spiritual beliefs and established that, 45% of respondents believed in a god, and 52% believed the soul continues after death, 43% believed that reincarnation may occur and 31% believed there is a heaven and a hell. These are similar to figures found in the general population. However, 33% also believed it is possible to communicate with the dead, and only 21% reported they believed a devil (e.g. Satan or Iblis) actually existed. Another related aspect of paranormal beliefs explored in the RPBS was astral projection, the belief that the spirit can leave the body, and 23% believed that during altered states, such as sleep or trances, the spirit could leave the body and a similar number that the mind or soul could leave the body and travel. No significant differences were seen between the Canadian and UK based student cohorts in this respect, or for any of the other questions explored in the study.

Relative to beliefs around psychic prediction and astrology 37% believed some psychics can accurately predict the future, and 31% believed that some people have an unex-

plained ability to predict the future. Mind reading and telekinesis were also explored in the survey and 34% believed mind reading was possible. However, few participants believed it was possible to levitate or move objects by mental forces (13%). In relation to witchcraft and magic spells 32% believed there were actual cases of witchcraft, and a similar number of participants believed black magic exists and witches are likely to exist. Somewhat contradictorily though, only 13% reported that they believed that it was possible to cast spells on persons.

The lowest RPBS belief scores appeared to relate to belief in monsters and luck.

Only 23% believed that the Abominable Snowman of Tibet probably exists and less than 14% believed the Loch Ness Monster probably exists. In terms of luck, 22% believed that breaking a mirror would bring bad luck, 17% believed the number 13 was unlucky and 12% of respondents thought black cats would also bring bad luck.

Interestingly, there was no difference in overall responses between the three groups who were exposed to the different papers, and no significant differences between overall belief, perceived credibility or of the scientific nature of the stories, and no significant differences between groups when accounting for the quantity of television and web use reported by students. However, we did find those students who reported watching paranormal reality television found the study stories they were given as more credible and believable. However, there was no evidence that this affected how scientific the students found the stories. Exploring the impact of watching paranormal drama shows on television revealed no effects were evident upon perceived credibility and scientific value of the stories. However, like the effects of watching paranormal reality shows, there was a strong correlation between watching paranormal dramas and believability of the ghost stories. There was also a significant correlation between personal paranormal experience and the perceived believability of the stories. Examining the impact of watching science documentary television shows, and science web browsing, also revealed no significant effects overall or between groups.

Lastly, the impact of participants pre-existing paranormal beliefs (RPBS scores) identified that higher RPBS scores were significantly correlated with seeing the paranormal explanations as scientific, seeing the paranormal phenomenon as credible, and as believing in the paranormal phenomenon. Here the between group comparisons revealed a significant difference between the simple story as opposed to the scientific rebuttal story groups for perceived scientific value and believability when paranormal belief scores were accounted for .

### DO STUDENT'S EXISTING BELIEFS IN THE PARANORMAL AFFECT THE WAY THEY INTERPRET A NEWS STORY?

Although well-established levels of magical belief were

**MCHUMOR.COM** by T. McCracken



“Take two eyes of newt,  
and call me in the morning.”

Cartoon by T. McCracken  
<http://www.mchumor.com/>  
Used by Permission

evident in these students, this appears lower than in previously reported work. Nevertheless, this was still somewhat surprising, given that these students were studying professional degree programmes in education and healthcare, and as such were trained to be research-led, evidence-based practitioners. It may be assumed that students arrive at university with their belief in the supernatural already established, and what it is interesting here, is the degree to which their chosen study challenged those beliefs. Some of these beliefs persist in spite of programmatic content that would challenge the basis for them. Here the use of a pseudoscientific and authoritative narrative did not influence their views; an intriguing finding and contrary to the outcomes of Brewer's earlier work. These results likely reflect the higher educational attainment of the sample, whereas the previous studies were based on wider groups of subjects drawn from the general public. Hopefully, this is also the result of the greater criticality and promotion of critical thinking skills associated with professional degree level studies.

Like Brewer's prior work, those students who watched paranormal reality television shows displayed significantly different responses to the articles than those students who eschewed such predilections. Students who watched paranormal reality and drama television found the study stories they were given as more credible and believable, and those who browsed many paranormal websites, found them more credible, believable and scientific. This suggests that student's criticality and critical thinking skills are influenced by these specific forms of media, although correlation does not indicate causation. It may simply be that students with a predilection for paranormal media may be more susceptible to its influence on their criticality in certain circumstances. It may also be that browsing paranormal websites may have had a more powerful influence on perception of the scientific value ascribed to paranormal narratives than television.

Intriguingly, watching paranormal dramas appeared to have no influence on the student's assessment of the credibility and scientific value of the stories. This suggests the students could critically differentiate between fiction, and reported experience, and supports Brewer's earlier findings to that effect. However, in terms of believability of the stories, those who watched paranormal dramas were found more

likely to believe in the phenomenon. This may reflect the more widespread growth in production of paranormal focused media in recent years, with the differentiation between reportage and media becoming more blurred (such as the trend in the found video footage drama genre). In terms of critical reasoning, it appears students differentiated between reported experience and fictional media accounts in their influence on perceived credibility of a report, and neither influenced their perception of the scientific nature of the report. However, both drama and reality genres influenced their believability in the phenomenon. It appears that watching paranormal drama and reality television and reading websites had a more pronounced effect on our sample than watching science shows and accessing science websites did. Overall, these findings give some validation of the influence of specific forms of broadcast media and the web on the student's ability to appraise and evaluate reportage and to potentially promote a belief in the paranormal.

Students who reported a personal paranormal experience thought the stories were more believable than those who did not. This would suggest that personal experience and perception is as powerful than any form of media influence, again supporting Brewer's earlier findings with the general public. This presents an interesting paradox. On the one hand those stu-

dents who report some form of personal paranormal experience are no more likely to see reported supernatural events as being scientific or credible than those who have not. However, their personal experience clearly influenced believability, and it would seem that their recognition of the impact of bias from their own personal experience was limited here. It might be expected that possibility of the existence of supernatural phenomenon would be raised in such students, but in this case, they found a rather implausible ghost story more believable than their counterparts did.

Overall, higher paranormal belief scores can usefully predict an increased likelihood of students finding paranormal reports scientific, believing them and finding them credible. Additionally, the effects of accounting for the RPBS scores in the between group comparisons confirmed that those students with higher levels of pre-existing paranormal beliefs exposed to a simple supernatural story would be more likely





to perceive it as having scientific value, compared to those with a similar level of paranormal belief exposed to a scientific rebuttal story.

Given the nature of the participants in this study, these findings have significantly wider implications, particularly in relation to teaching and learning in science-based professional education in the university sector.

## CONCLUSIONS

Aside from religious beliefs, well-established levels of magical belief were clearly evident in the students, although lower than in previously reported work in the public. Overall, this would suggest that, contrary to Brewer's findings in the general population, the nature of the narrative presented did not affect the student's belief in the phenomenon and or how credible or scientific they saw the different stories to be. Nonetheless, we found that RPBS scores can usefully predict the likelihood of students finding paranormal reports scientific, believing them and finding them credible. Although the students here appeared to be able to differentiate between scientific and pseudoscientific rationales, pre-existing supernatural beliefs did significantly influence their thinking. The results here undoubtedly show that students have developed some higher critical reasoning skills, generally discriminating between scientific and pseudoscientific narratives. But also that these are apparently abstracted, being deployed and suspended at different times and in different situations, dependent upon other belief systems. Whether this constitutes authentic critical thinking is questionable. These findings stand not as a criticism of personal belief systems, but rather the potential failure of professional degree level programmes to address authentic, transformative, criticality and scientific thinking as a primary learning outcomes and essential skills for professional practice.

## ACKNOWLEDGEMENTS

The authors acknowledge the assistance of Dr. Paul R. Brewer, University of Delaware, Newark, USA, in undertaking this work, and Rick White Managing Director, Applied Statistics and Data Science Group, Department of Statistics, University of British Columbia.

**Bernie Garrett, PhD. RN**, is Associate Professor at The University of British Columbia School of Nursing in Vancouver, British Columbia. Dr. Garrett's current work is focused in two main camps. 1) Nursing science, philosophy, and the use of deceptive and non-evidence based practices in contemporary healthcare (including alternative medicine). 2) The use of virtual and augmented reality in clinical applications. Prior to this he worked in the field of information technology particularly in the use of educational technology, simulation, e-portfolios, virtual and augmented reality at UBC. His work is underpinned by a passion for the philosophy of science and evidence-based practice.

**Dr Roger Cutting**, Associate Professor (Senior Lecturer) in Environmental Studies at Plymouth Institute of Education (Faculty of Arts & Humanities) in Plymouth, Devon. His research interests are primarily in the areas of Education for Sustainability and Global Education. His doctoral thesis, while based more around the science of sustainability, also addressed the nature and loss of indigenous knowledge and practice in relation to environmental management and practices. Dr. Cutting's subsequent research and writing has addressed different aspects of pedagogy adopted in Education for Sustainability (EfS) and has attempted to provide rigorous and critical expositions of them. More recently he has become interested in the potential influences of EfS in distinct the areas of activism, radicalism and extremism.

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"The great enemy of the truth is very often not the lie - deliberate, contrived, and dishonest - but the myth - persistent, persuasive, and unrealistic."

- John F. Kennedy (1917 -1963), 35th President of the United States

# PHACT CALENDAR

## Upcoming PhACT Events

**Dr. David Cattell, Chairman of the Physics Department of Community College of Philadelphia** hosts meetings of PhACT - at 2:00 PM on the third Saturday of most months at Community College of Philadelphia., Parking is easily available on the free parking garage on 17th street on the left hand side before Callowhill Street. It opens at 1:00 PM and closes at 6:00 PM. 17th Street is one way south bound. This meeting site is handicap accessible. **PhACT Meetings are Free and open to the public unless otherwise noted.**



**Saturday, October 15, 2016 at 2:00 PM - Lecture**  
**Richard Saunders will discuss Thinking Critically about Money and Investing**  
**See Page 4 for more details.**

**Saturday, November 19, 2016 at 2:00 PM - film presentation / Q&A**  
**The new video production “Hilleman—A Perilous Quest to Save the World’s Children” will be shown. Dr. Paul Offit will be present for Q&A. See Page 4 for more details.**

**Saturday, January 21, 2017 at 2:00 PM - Lecture**  
**Program TBA**

**Saturday, February 18, 2017 at 2:00 PM - Lecture**  
**Program TBA**

The **PhACT Calendar** is open to members and non-members who wish to announce meetings and events of other groups of which they are interested or affiliated. These events should be of some general interest to the Skeptical or Scientific community and should be within a reasonable radius of Philadelphia. Send submissions to the editor at [phactpublicity@aol.com](mailto:phactpublicity@aol.com). Keep the announcements brief. Space is limited and insertions will be made on a first come-first served basis after the needs of PhACT are accomplished. *Phactum* does not accept paid advertising.



**The Philadelphia Area Center for the History of Science (PACHS)** maintains an extensive calendar of events about the history of science, technology and medicine that may contain some interesting events not listed in the *Phactum* Calendar. Check out their website at:

<http://www.pachs.net/events>

**Tuesday, October 4, 2016 at 6:00 PM** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103  
[http://www.collphyphil.org/prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

**Poe: An Immersive Performance of the Masque of the Red Death**

On the week of the anniversary of Edgar Allan Poe's death, the Mütter Museum presents an immersive performance of his short story "The Masque of the Red Death," to be followed by a discussion of the representation of illness in Poe's works. The event begins at 6pm, upstairs in our beautiful ballroom.

Dress for the occasion!

**Tuesday, October 4, 2016 at 7:00 PM** at Washington Memorial Chapel, on Route 23 in Valley Forge.

Friends of Valley Forge Park

<http://www.friendsofvalleyforge.org/speaker-series.shtml>

**Whatever Did They Eat?**

**Clarissa F. Dillon, Ph.D.**

With two armies nearby, foraging and hungry, families in Eastern Pennsylvanians during the winter of 1777-78 found themselves severely pinched for food.

Free and Open to the Public.

**Tuesday, October 4, 2016 - 6:00pm - 7:00pm** at Eastern State Penitentiary, 2027 Fairmount Avenue, Philadelphia, PA 19130 phone: (215) 236-3300

<http://www.easternstate.org/home>

**The Searchlight Series: Lecture.**

**Dee Hibbert-Jones and Nomi Talisman: Last Day of Freedom**

An award-winning animated short film telling the story of Bill Babbit's decision to stand by his brother in the face of war, crime and, eventually, capital punishment. (32 minutes followed by Q&A with the filmmakers).

This event is part of Eastern State's ongoing Searchlight Series of events addressing issues in contemporary corrections. The Searchlight Series discussions take place the first Tuesday of every

month, free and open to the public. No reservations required.

The Searchlight Series is supported in part by a grant from The George W. Rentschler Foundation.

Free. Reception to follow

**Wednesday, October 5, 2016 at 6:00PM - 8:00PM** at University of Pennsylvania Museum, 3260 South Street, Philadelphia, PA 19104

<http://www.penn.museum/events-calendar>

**Great Beasts of Legend Lecture Series**

**ANZU: THE LION-HEADED EAGLE WHO WANTED TO RULE THE UNIVERSE**

Dr. Steve Tinney, Associate Curator, Babylonian Section, Penn Museum

The Penn Museum's popular monthly evening lecture series kicks off with a fresh theme: Great Beasts of Legends. Throughout history, great beasts and monsters fabled or not have terrorized, enchanted, and eluded humans. Join leading Penn scholars on an exploration of some of the best stories from the around the world, and meet some memorable beasts, including Centaurs, Hobbits, and Sphinxes. Dr. Steve Tinney, Associate Curator, Babylonian Section, starts off the series with an in-depth look at Anzu, one of ancient Mesopotamia's iconic monsters, a giant eagle with a lion's head, depicted in art from as early as 2500 BCE. As a symbol of the gods and friend of heroes, Anzu's early career seems benign, but somewhere along the way his ambition gets the better of him. Dr. Tinney follows Anzu from artistic masterpiece to cosmic threat to his eventual ignominious demise by a fatal twist.

Admission: nine lecture series subscription \$40 (\$15 Penn Museum members); \$5 single lecture advance ticket (\$2 Penn Museum members); \$10 at the door.

**Saturday, October 8, 2016 at 10 am** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**The Hot Spots and Storied Plots**

In life and in death, we all have stories to tell and what better place to hear tales of wonder than

Philadelphia's most famous home of the dead? Join Laurel Hill Cemetery for an informative overview of Laurel Hill's long and colorful history, which will include many of the marble masterpieces, stunning views and legendary stories that afford the cemetery its WOW factor. This is the perfect tour for first-time visitors to Laurel Hill, and anyone else who enjoys beautiful art, scenic nature and fascinating history. "The Hot Spots and Storied Plots" will be presented monthly as part of Laurel Hill Cemetery's Fourth Friday and Second Saturday tour series.

The walking tour will take place on Saturday, June 11 at 10:00am, departing from Laurel Hill Cemetery's Gatehouse entrance at 3822 Ridge Avenue, Philadelphia, PA 19132. Free parking is located in the lot across the street from the Gatehouse.

**Saturday, October 8, 2016 at 5pm** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**8th Annual Rest in Peace 5K Run**

Trick or treat...move your feet! Kick off your Halloween season the right way. Organized by the Friends of Laurel Hill Cemetery with the help of Presenting Sponsor, East River Bank, the Rest in Peace 5K Run is the ONLY Halloween costume run and after-party in a Cemetery at night in the region!

Unique and challenging, the run winds through the headstones in Laurel Hill Cemetery. Participants and spectators alike are encouraged to attend in

Halloween attire. Don't forget your wallets... Directly following the run, prizes are awarded for the best costume as well as to the winners of the run at an after-party that features food, free beer, live music and a chance to win top-notch prizes.

Proceeds benefit the Friends of Laurel Hill Cemetery, a nonprofit dedicated to the preservation of Laurel Hill Cemetery, a National Historic Landmark. In addition to being a good thing, the run is also a very community minded event, connecting runners, local businesses and



**SOCRATES CAFE** is nationwide network of philosophical discussion groups. Free and open to the Public. All are welcome.

- At 7:00 PM every Monday evening except holidays (on Tuesdays after a Monday holiday) at the Springfield Township Public Library (215-836-5300) at 1600 Papermill Mill Road, Wyndmoor, PA. 19038.
- At 2 PM on the first Thursday of each month and at 7 PM on the third Thursday of each month at Glenside Free Library, 215 S. Keswick Avenue, Glenside, PA.
- At 10:30 AM to Noon on the second Wednesday of each month at Abington Free Library, 1030 Old York Road, Abington, PA.



organizations together through fellowship, fitness and fun! For those looking for a charity fitness event that is cool albeit creepy, the RIP 5K is the perfect choice!

The RIP 5K Run will take place on Saturday, October 8 at 5:00pm (registration opens at 4:00pm), and is a rain or shine event. Runners and spectators should enter via Laurel Hill Cemetery's Gatehouse entrance at 3822 Ridge Avenue, Philadelphia, PA 19132. Free parking is located in the lot across the street from the Gatehouse.

Runners can register at [www.rip5k.org](http://www.rip5k.org). Advance, online registration is \$35/adults 20+; \$20/teens 13-19 years; and \$15/children 8-12 years. Cost includes complimentary gift bag and t-shirt. Walk-ups are welcome, but t-shirt sizes cannot be guaranteed. Day-of registration for adults is \$40. For additional information, please call (215) 228-8200 or email [info@rip5k.org](mailto:info@rip5k.org).

**Sunday, October 9, 2016 at 10am-3pm at Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurehillcemetery.org>

#### Cruise-In Car Show

Take a trip down memory lane on a crisp, autumn afternoon in the Cemetery. Presented by the Roxborough Ridge Runners, the Cruise-In Car Show is open to all clubs and lone wolves with antiques, classics, hot rods, customs, muscle cars, lowriders and any other vehicle that is mobile and interesting. No entry fee required; simply come and display your rolling work of art along the meandering lanes of historic Laurel Hill Cemetery.

The show will take place on Sunday, October 9 from 10:00am – 3:00pm, departing from Laurel Hill Cemetery's Gatehouse entrance at 3822 Ridge Avenue, Philadelphia, PA 19132. Exhibitors must check in upon arrival. For more info, please contact 215-228-8200. Free parking for spectators is located in the lot across the street from the Gatehouse.

The event is FREE and open to the public; refreshments will be available for purchase.

**Monday, October 10, 2016 at 6:00 PM at National Mechanics, 22 S. Third Street, Philadelphia, PA 19106**  
Science on Tap

A monthly gathering that features a brief, informal presentation by a scientist or other expert followed by lively conversation. Good food and beer.

Must be 21 or accompanied by parent. Free and open to the Public.

<http://scienceontapphill.com/>

**Monday, October 10, 2016 at 6:30 PM** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103

[http://www.collphyphil.org/prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

#### Leonardo at 500

Leonardo da Vinci was arguably the most creative person who ever lived. Exquisitely gifted in both arts and science, he practiced them as a "scientist of art and an artist of science." Five hundred years later, his anatomical drawings remain testimony to his unique way of engaging the world both artistically and scientifically. From pioneering the injection of molten wax into ventricles, to multiple views of specimens, to the recurrent use of cross-sections and cutouts, those drawings remind us of a brain that always thought in pictures. Yet, they also challenge us to understand what made Leonardo so creative. This may be especially worthwhile in times when medical education has been accused of hindering creativity.

This event is part of Ciao Philadelphia.

**Tuesday, October 11, 2016 at 5:30 PM** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103

[http://www.collphyphil.org/prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

Exposed: Philadelphia Physicians in Photographs, an Archives Month Event Save the date for the Historical Medical Library's Archives Month Philly event. The Library will be displaying highlights from its rarely shown collection of photographs featuring physicians, patients, and all things medicine in the 19th and early 20th centuries.

Tickets are extremely limited.

**Wednesday, October 12, 2016 at 7:15 PM** at the Fels Planetarium, The Franklin Institute, 222 North 20th Street, Philadelphia, PA 19103

#### The Rittenhouse Astronomical Society

Astronomy lecture open to the General Public. See website for more details:

<http://>

[www.rittenhouseastronomicalsociety.org/](http://www.rittenhouseastronomicalsociety.org/)

Thursday, October 13, 2016 at 6:00-8:00 PM at the Wagner Free Institute of Science, 1700 West Montgomery Avenue, Philadelphia, PA 19121  
[www.wagnerfreeinstitute.org](http://www.wagnerfreeinstitute.org) ph 215-763-6529

#### Archives Month Philly -

#### Philadelphia Lantern Slide Salon

Free and Open to the Public. Contributions are welcome.

**Thursday, October 13, 2016 - 7:00pm to 10:00pm** at The Franklin Institute Science Museum, located in Center City Philadelphia, at the intersection of 20th Street and the Benjamin Franklin Parkway.

<http://www.fi.edu>

#### NIGHT SKIES IN THE OBSERVATORY

#### SETI/AstroBiology

#### Fels Planetarium, Bloom Observatory, Franklin Theater

Hosted by Franklin Institute Chief Astronomer Derrick Pitts, Night Skies in the Observatory is a monthly stargazing event held in the Joel N. Bloom Observatory. View celestial objects in the night sky, including stars, planets, nebulae, and if conditions are right, a galaxy or two, from 5 different rooftop telescopes in the Observatory. The evening includes shows in the Fels Planetarium and a lecture or presentation appropriate for ages 8 and up on an astronomical or space science topic. The Observatory is staffed with knowledgeable observers and free star maps are provided.

Due to the popularity of this event, we strongly recommend that you purchase tickets in advance as capacity is limited and it may sell out.

**Friday, October 14, 2016 at 7:00 PM** in the Radnor Township Municipal Building, 301 Iven Ave, Radnor, Pennsylvania 19087

#### Delaware Valley Amateur Astronomers

<http://dvaa.org/>

**The Curiosity Rover at Gale Crater**, insights from a New Member of the Mars Science Laboratory Mission

**Dr. Christopher House**, Professor of Geosciences at Penn State University

The Curiosity Rover is the most advanced rover to ever explore another world. Were conditions ever favorable for microbial life on Mars? That's what the Curiosity Mars rover team is determined to discover. Christopher House, one of six new scientists tapped for the NASA team, will give us a guided tour of the surface of Mars and explain how the curiosity science team is studying the past habitability of Gale Crater.

Free and Open to the Public.

Refreshments are provided. A sales table and library are also available.

at Eastern State Penitentiary, 2027 Fairmount Avenue Philadelphia, PA 19130

Phone: (215) 236-3300



#### The Searchlight Series: Conversations About Crime, Justice, and the American Prison System

Eastern State Penitentiary Historic Site partners with nationally recognized penologists and educators to present an ongoing discussion series about crime, justice, and the American prison system. The Searchlight Series discussions take place the first Tuesday of every month, free and open to the public. No reservations required. See website at:

<http://www.easternstate.org/searchlight-series>

**Friday, October 14 & Saturday, October 15, 2016 at 7pm at Laurel Hill Cemetery, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200**

<http://www.thelaurehillcemetery.org>

### **Soul Crawl: Haunted Halloween History Tours**

Laurel Hill Cemetery's classic Halloween flashlight tours have become a mainstay of the season. Experience the enchanting art and landscape after dark, as an experienced tour guide leads you along winding, dimly-lit pathways. The extended nighttime walking tours will focus on the cemetery's rich history, and of course, some of the liveliest spirits buried within. Tours will last approximately two hours, and will be followed by seasonal refreshments and cocktails aside blazing fire pits.

Two evenings of the Soul Crawl: Haunted History Halloween Tours are scheduled at Laurel Hill: Friday, October 14 and Saturday, October 15 at 7:00pm, sharp. Attendees are advised to wear comfortable clothes and shoes, and to bring a flashlight.

The cost for Soul Crawl is \$20/person general admission. Purchasing tickets in advance is suggested, and appreciated. Tickets can be purchased at the door or online.

Upon arrival, register at Laurel Hill Cemetery's Gatehouse entrance, 3822 Ridge Avenue, Philadelphia PA, 19132. Free parking is located in the lot directly across the street from the Gatehouse.

## **PhACT Lecture**

**Saturday, October 14, 2016  
at 2:00 PM**

**Richard Saunders will discuss:  
Thinking Critically about Money  
and Investing**

**See Page 4 for more details.**

**Saturday, October 15, 2016 at 3:30PM - 4:30PM** at University of Pennsylvania Museum, 3260 South Street, Philadelphia, PA 19104

<http://www.penn.museum/events-calendar>

### **CRAFTS AND CONSUMERISM IN PRE-DYNASTIC EGYPT**

Dr. Emily Teeter, Egyptologist, Research Associate, and Coordinator of Special Exhibits at the Oriental Institute, Chicago, speaks at this American Research Center in Egypt Pennsylvania Chapter program. A close look at artifacts of Egypt's Predynastic Period (ca. 4500-

3100 BC). Dr. Teeter asserts, have the potential to tell us much about life and society in the era before writing. Changing styles of stone vessels, the decoration of painted pottery, and the choice of specific materials all attest to early consumerism, links between craftsmen and the market, and to claims of status through personal possessions. The rich archaeological record documents an ancient society marked by surprising similarities to today's consumerism.

Admission: \$10 for the general public, \$7 for Penn Museum members and PennCard holders, \$5 for students with ID, and free for ARCE members and children under 12.

**Sunday, October 16, 2016 at 1pm at Laurel Hill Cemetery, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200**

<http://www.thelaurehillcemetery.org>

### **The Worlds of Thomas Jefferson at Laurel Hill**

Adopted sons, signers of the Declaration, painters, sculptors, men of science, ladies of belle letters, famous physicians, pariahs of free press, purveyors of fine wine and, of course, political provokers both friend and foe: all recognized by Thomas Jefferson as luminaries in our nation's early "Constellation of Worthies." They now rest peacefully at Laurel Hill; but their stories refuse to conform to those tenets, boldly demanding to be told. This walking tour will be led by foremost Jefferson scholar and acclaimed portrayer of America's third President, William David Barker ([www.thethomasjefferson.com](http://www.thethomasjefferson.com)), who will be visiting Laurel Hill from his home in Williamsburg, Virginia.

The tour will take place on Sunday, October 16 at 1:00pm, departing from Laurel Hill Cemetery's Gatehouse entrance at 3822 Ridge Avenue, Philadelphia, PA 19132. Free parking is located in the lot across the street from the Gatehouse.

The cost is \$12/person, \$10/students and seniors, or \$9/members. Tickets can be purchased at the door or online.

Tour Guide: Bill Barker

**Monday, October 17, 2016 at 12:00pm - 1:00pm** at the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106

<http://www.chemheritage.org>

Brown Bag Lecture with Mark Waddell

See online for more details.

Free and Open to the Public.

**Monday, October 17, 2016 at 6:30 PM** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103

[http://www.collphyphil.org/prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

### **Perfect Vessels: Skulls, Symbols & Symmetry**

For his series **Perfect Vessels**, Los Angeles artist David Orr photographs then mirrors a human skull to create perfectly symmetrical results. David will speak about influences for this work (including the Memento Mori and the Vanitas traditions in classic art; the use of human skulls as bowls in ancient cultures; symmetry as

a cultural signifier of perfection; links to transcendental mysticism) as well as the individual histories of some of the skulls he has photographed from the Hyrtl Collection at the Mütter Museum.

**Tuesday, October 18, 2016 at 6pm at Laurel Hill Cemetery, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200**

<http://www.thelaurehillcemetery.org>

### **Seven Deadly Sins**

The Victorian era is often noted for moral, straitlaced behavior—but Laurel Hill residents had their share of vices. Underneath all of the proper behavior lurked the temptation of the seven deadly sins: greed, lust, wrath, envy, pride, sloth and gluttony. Join us for an after-work twilight tour of the grounds to hear more about the residents who gave into temptation! A sinful spread of desserts and cocktails will follow in the Cemetery's Gatehouse.

The tour will take place on Tuesday, October 18 at 6:00pm, departing from Laurel Hill Cemetery's Gatehouse entrance at 3822 Ridge Avenue, Philadelphia, PA 19132. Free parking is located in the lot across the street from the Gatehouse.

The cost is \$20/person, \$18/students and seniors, or \$17/members. Tickets can be purchased at the door or online.

Tour Guide: Sarah Hamill

**Tuesday, October 18, 2016 at 6:00 PM - 7:00 PM** at World Cafe Live, 3025 Walnut Street, Philadelphia

<http://www.upenn.edu/pennnews/science>

### **PENN LIGHTBULB CAFÉ**

Michael Leja, professor of history of art, and graduate group chair, School of Arts & Sciences "**A History of Print Advertising in the Presidential Race**"

Michael Leja is a visual arts scholar in various media from the 19th and 20th centuries, including painting, sculpture, film, photography, prints and illustrations. His work focuses on understanding visual artifacts in relation to contemporary cultural, social, political and intellectual developments and in a historical context. In this Café, Leja will explore what it was like when presidential candidates first began using print advertisement

Free and Open to the Public.

**Wednesday, October 19, 2016 at 7:30 p.m** at the Free Library of Philadelphia, 1901 Vine Street, 19103

<http://libwww.freelibrary.org/authorevents/>

### **The American Presidency | Curt Smith | King of the Hill Meets the Sultans of Swat: Presidents and Baseball**

A leading authority on politics and sports, Curt Smith, will cover baseball, the presidency, and the complex relationship between the two. Mr. Smith is an author, media host, columnist, and former Presidential speech writer. His new



book about the topic will be published in spring 2017.

Introduced by Doug Bauer, President of the Clark Foundation.

Free and Open to the Public.

**Wednesday, October 19, 2016 at 5:30 PM** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103

<http://www.collphyphil.org/>

[prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged

**Grand Rounds: Tobacco, Retail Stores, and the Marketing of Disease**

by The College of Physicians of Philadelphia

Tobacco is heavily marketed in retail spaces, particularly in urban communities. Combined with ready availability, advertising can increase consumption of unhealthy products and contribute to poor health. In particular, outdoor and point-of-sale tobacco advertising has been shown to increase smoking initiation among adolescents, undermine smokers' quit attempts, and promote relapse among former smokers. In this Grand Rounds, panelists will discuss retail tobacco advertising in Philadelphia, its role in Philadelphia smoking rates and disease, and solutions for addressing the problem.

This event is free to the public, but requires pre-registration.

**Friday, October 21, 2016 at 7pm.** Laurel Hill Cemetery, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**Gravediggers' Ball**

The Gravediggers' Ball is the annual fundraiser of the Friends of Laurel Hill Cemetery, a 501(c)(3) nonprofit organization working to preserve, interpret and promote the site for which it exists. Since its establishment in 1836, Laurel Hill Cemetery has been maintained as a free and fully accessible educational, environmental and recreational resource for both nearby communities and faraway visitors. It has served equally as a place of enjoyment for the living and one of peaceful rest for the dead for 180 years. All proceeds from the Gravediggers' Ball directly support the ongoing public accessibility, preservation and interpretation of historic Laurel Hill Cemetery.

To learn more about the 12th Annual Gravediggers' Ball, please visit [gravediggersball.org](http://gravediggersball.org).

**Saturday, October 22, 2016 at 9:30 AM to 2:30 PM at the 1696 Thomas Massey House in Broomall, PA.**

**An 18th century hearth-cooking workshop**

**A mid-autumn meal.**

**Cost: \$35.00**

**For information call Clarissa Dillon ... 610-642-4269**



**Monday, October 24, 2016 at 12:00pm - 1:00pm** at the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106  
<http://www.chemheritage.org> Tel: 215-925-2222

**Brown Bag Lecture: Ink Chemists of the Industrial Revolution**

Join us for a talk with **Lynne Friedmann**, our 2016–2017 Société de Chimie Industrielle Fellow.

The Industrial Revolution marked a turning point in history, with almost every aspect of daily life influenced in some way. None was more important than global changes in communication as handcrafted printing became industrial printing production. Heretofore, books and news publications tended to be expensive and oriented toward the elite. New steam-powered presses allowed mass media to enter an industrial phase. With many more readers, advertisers found they could reach more customers, and the cost of printing a newspaper came down even more. The effect was to free the press from financial dependence on political parties and, with the rapid spread of information, to democratize politics.

Free and Open to the Public

**Monday October 24, 2016 at 7:00 PM** at MaGerks Pub and Grill, 582 South Bethlehem Pike, Fort Washington, Pennsylvania 19034.

**American Revolution Round Table of Philadelphia**, <http://arrtop.com/>  
**The Battle of Crooked Billet**

Join us on Monday, October 24, 2016 as we welcome Scott Randolph as he presents **The Battle of Crooked Billet**.

On the night of April 30th, the British marched out of Philadelphia with 850 men on foot and horse. Their destination was The Billet, present-day Hatboro. Their mission was to stop the Militia from disrupting supplies reaching Philadelphia. Their other objective was to capture the leader of the Militia General John Lacey. Three hundred militiamen were encamped with Lacey at the Billet; most of them were unarmed and untrained. The British marched through the Fox Chase area of Philadelphia down the Huntington Pike where they split. The Queens Rangers, a loyalist regiment continued down the Second Street Pike and the 500 British regulars went left toward Old York Road.

In 2009, Randolph's documentary *The Battle of Crooked Billet*, based on the Revolutionary War battle waged in his home town, won two Telly Awards for Excellence for a Historical/Biography and Excellence in Videography. In 2010, the marketing video he directed and produced for the Friends of Washington Crossing was shown at the Liberty Medal Ceremony in Philadelphia for British Prime Minister Tony Blair, presented by former Present Clinton. In 2013, he won another Telly Award and a Communicator Award for the orientation video for the National registered site Graeme Park State Park in Horsham, PA.

In 2012 he became the director for the national PBS television show *Christina* (formerly

known as *Christina Cooks*). Under his guidance, along with business partner Rick Lombardi, it became the number one cooking show on cable.

In 2014 he began producing three television pilots, including working with a former cast member of *Saturday Night Live* and *Second City Television*. Also, he has begun work on a documentary on the National Shrine of Our Lady at Czestochowa with partner Rick Lombardi, American Czestochowa.

In 2015 he earned another Telly Award for the music video *Power* from national gospel recording artist Kevin Jarido and Nu Virtu.

In 2006 Randolph founded Arrival Video Productions, LLC, in Southampton, Pennsylvania, and continues to serve as its owner.

Free and Open to the Public.

**Monday, October 24, 2016 at 7 PM** at Commonwealth Chateau, Chestnut Hill College, 9230 Germantown Avenue, Philadelphia, PA 19118

**The Institute for Science and Religion**  
**Outsourcing Memory? Can we Upload our Memory to a Computer?**

**Noreen Herzfeld, PhD**

Professor Herzfeld will examine how our increasing dependence on computers as our outsourced memory alters not only our recollection of the past but the present as well, affecting how we relate to one another and how we understand ourselves.

<http://www.irands.org>

Free and Open to the Public. A free will donation is requested.

**Monday, October 24, 2016 at 6:30 PM** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103

<http://www.collphyphil.org/>

[prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

**"The Embalmed Head of Oliver Cromwell: A Memoir" Reading & Author Talk**

Oliver Cromwell led the charge in the beheading of England's King Charles I in 1649. But little did he know that his own head would soon roll. And roll and roll-for the next three hundred years across the Commonwealth. The execution of Charles I ended the monarchy, and Cromwell became the Lord Protector of England until his own death from natural causes in 1658. His body was embalmed and buried in Westminster Abbey, only to be exhumed by King Charles II three years later. The new king had restored the monarchy and wished to avenge his father's death by hanging Cromwell and beheading him posthumously. Now, for the first time, the memoirs of Oliver Cromwell's embalmed head have surfaced, making it the first account of any world leader-or any human being for that matter-chronicling the afterlife.

This remarkable memoir recounts its journey through the centuries, beginning with Cromwell's decapitation and the head's impalement on a post at Westminster Hall, where it stayed for more than twenty years before being freed by a heavy



## Calling All Astronomers! Rittenhouse Astronomical Society

**Monthly Meetings! Bring all of your out-of this-world questions!** Join The Rittenhouse Astronomical Society the second Wednesday of each month at 7:30 p.m. in the Fels Planetarium at the Franklin Institute. The society offers all persons an opportunity to participate in the activities of an astronomical group at the laymen's level. They aim to spread knowledge, awareness and enjoyment of astronomy and astronomical issues. It is a popular science club that keeps its members up-to-date on the latest developments. No experience is necessary to attend the FREE meetings. Come with your astronomy questions!

[www.rittenhouseastronomicalsociety.org/](http://www.rittenhouseastronomicalsociety.org/)

storm. Over the centuries, the head enjoyed a series of unexpected adventures, encountering a host of bizarre and well-known characters—from its many owners, curious anatomists and misled but obsessed phrenologists to other preserved decapitated heads

**Tuesday, October 25, 2016 at 6:00 PM - 7:00 PM** at World Cafe Live, 3025 Walnut Street, Philadelphia

<http://www.upenn.edu/pennnews/science>  
**PENN SCIENCE CAFE**

Alain Plante, associate professor and undergraduate chair, earth & environmental science, School of Arts & Sciences

**“The Carbon Beneath Our Feet”**

There is more carbon in the earth's soils than in the atmosphere and plants combined. There is also six times more carbon exchanged annually between soils and the atmosphere, primarily as carbon dioxide, compared to annual fossil fuel emissions. Yet, as Leonardo DaVinci said, “We know more about the movement of celestial bodies than about the soil underfoot.” In this talk, Alain Plante will describe the role soils play in the global carbon cycle and in sustainable agriculture and land use.

Free and Open to the Public.

**Wednesday, October 26, 2016 at 7:30 p.m.** at the Free Library of Philadelphia, 1901 Vine Street, 19103

<http://libwww.freelibrary.org/authorevents/>

**Gino Segré and Bettina Hoerlin | The Pope of Physics: Enrico Fermi and the Birth of the Atomic Age**

In conversation with **Larry Gladney**

The most revered Italian scientist since Galileo, Nobel Prize winner Enrico Fermi was one of the most prolific and consequential figures of the 20th century. Though a modest and unassuming man, he became one of the fathers of the nuclear age whose contributions to the modern world loom large still. Presenting his personal and scientific story are University of Pennsylvania professors Gino Segré and Bettina Hoerlin. In addition to Penn, Segré has taught at M.I.T. and Oxford, was Director of Theoretical Physics at the National Science Foundation, and has authored three books of scientific history. Hoerlin served as Health Commissioner of Philadelphia, was a visiting lecturer at Haverford College and Oxford, and is the author of *Steps of Courage: My Parents' Journey from Nazi Germany to America*.

Please allow extra time to get to Parkway

Central, due to extensive road work in the area.  
Cost: FREE

**Wednesday, October 26, 2016 at 6:00 PM** at the **Wagner Free Institute of Science**, 1700 West Montgomery Avenue, Philadelphia, PA 19121  
[www.wagnerfreeinstitute.org](http://www.wagnerfreeinstitute.org) ph 215-763-6529

**Un-Leeched: The History and Science of Leeches:**

**An Illustrated Presentation featuring Robert Hicks, Mütter Museum and Daniel Shain, Rutgers University**

Slimy, bloodsucking creatures with three jaws are taking over our hospitals. No, it's not the plot of a horror movie—it's the story of medicinal leeches. For thousands of years, healers promoted the use of these tiny annelids to treat everything from infections to flatulence. Today, leeches play a huge role in transplants, reattachments, and other complicated surgical procedures. Join us to hear from both a medical historian and contemporary biologist who will teach you to love leeches instead of fearing them—we'll have some real, live leeches on hand so you can profess your love after the talk!

**Daniel Shain, PhD**, has traveled the world to sample and study leeches and worms, from glaciers in Alaska to the heart of the Amazon. Interesting finds include his discovery of a rare, foot-long terrestrial leech that makes New Jersey its home. Daniel is a professor of zoology and chairman of the Biology Department at Rutgers, The State University of New Jersey, Camden Campus. A graduate of the University of New Hampshire, he earned his doctorate from Colorado State University and held a postdoctoral fellowship through the National Institute of Health at UC Berkeley. When not in the lab or out in the field, he likes to kayak and build tree houses.

**Robert D. Hicks, PhD**, is the director of the Mütter Museum and Historical Medical Library of The College of Physicians of Philadelphia. He has worked with museum-based education and exhibits for over three decades, primarily as a consultant to historic sites and museums. Robert has a doctorate in maritime history from the University of Exeter, United Kingdom, and degrees in anthropology and archaeology from the University of Arizona. He shares his office with his medicinal leech, Horatio.

Free and Open to the Public

**Thursday, October 27, 2016 at 5:30pm to 7:00pm** at the **American Philosophical**

**Society**, Benjamin Franklin Hall, 427 Chestnut Street, Philadelphia

<http://www.amphilsoc.org/>

**Of Arms and Artists: The American Revolution through Painters' Eyes**

The images accompanying the founding of the United States—of honored Founders, dramatic battle scenes, and seminal moments—gave visual shape to Revolutionary events and symbolized an entirely new concept of leadership and government. Since then they have endured as indispensable icons, serving as historical documents and timeless reminders of the nation's unprecedented beginnings.

**Paul Staiti** is the Alumnae Foundation Professor of Fine Arts and Mount Holyoke College. His new book, *Of Arms and Artists: The American Revolution through Painters' Eyes*, explores the lives of five American artists of the Revolutionary period — Charles Willson Peale, John Singleton Copley, John Trumbull, Benjamin West, and Gilbert Stuart, and their Revolutionary subjects.

This event is free and open to the public. Please register to attend. The lecture begins at 6:00 p.m. following a reception at 5:30 p.m.

**Friday, October 28, 2016 at 10am** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**The Hot Spots and Storied Plots**

In life and in death, we all have stories to tell and what better place to hear tales of wonder than Philadelphia's most famous home of the dead? Join Laurel Hill Cemetery for an informative overview of Laurel Hill's long and colorful history, which will include many of the marble masterpieces, stunning views and legendary stories that afford the cemetery its WOW factor. This is the perfect tour for first-time visitors to Laurel Hill, and anyone else who enjoys beautiful art, scenic nature and fascinating history. “The Hot Spots and Storied Plots” will be presented monthly as part of Laurel Hill Cemetery's Fourth Friday and Second Saturday tour series.

The walking tour will take place on Friday, October 28 at 10:00am, departing from Laurel Hill Cemetery's Gatehouse entrance at 3822 Ridge Avenue, Philadelphia, PA 19132. Free parking is located in the lot across the street from the Gatehouse.

The cost is \$12/person; \$10/students and seniors; or \$9/members. Tickets can be purchased at the door or online.

Tour Guide: Steve Chawaga

**Friday, October 28, 2016 at 7pm at Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurehillcemetery.org>

#### True Tales from the Tomb

This Halloween weekend, performers will regale you with true tales from Laurel Hill Cemetery's historic tombs. Complete with scandal, mystery and murder, True Tales from the Tombs will feature stories of the Cemetery's most provocative and memorable permanent residents, as they return from the dead to tell their stories. Featuring The Not Ready for After-Life Players as storytellers of these tormented tales, the candlelit tours will depart every half-hour through the stones and mausoleums of Laurel Hill. Afterwards, slow your heart rate with seasonal refreshments and cocktails aside blazing fire pits.

One evening of True Tales from the Tombs is scheduled at Laurel Hill: Friday, October 28 at 7:00pm (with a pre-scheduled rain date of Saturday, October 29 at 7pm). Tours will last approximately one hour and depart every half-hour, with the final tour departing at 9:30pm. Attendees are advised to wear comfortable clothes and shoes, and to bring a flashlight.

The cost is \$20/person general admission. Advance reservations are requested for groups. Tickets can be purchased at the door or online. Upon arrival, register at Laurel Hill Cemetery's Gatehouse entrance, 3822 Ridge Avenue, Philadelphia, PA, 19132. Free parking is located in the lot directly across the street from the Gatehouse.

**Sunday, October 30, 2016 at 1-3pm at Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurehillcemetery.org>

#### Fall Family Day

Spend an autumn afternoon exploring the many wonders and mysteries of Laurel Hill



Cemetery while celebrating Halloween! Fall Fun for the Family at Laurel Hill will thrill and chill both the young and old! The cemetery's primary location overlooking the Schuylkill River will offer visitors majestic views of the colorful fall foliage and vibrant landscape along Kelly Drive. Activities will include arts and crafts, a pumpkin patch, Halloween games and goodies, and festive readings by the Storybook Fairy.

Feast on festive snacks, or bring your own picnic. Attendees are advised to wear

comfortable clothes and shoes, and children are encouraged to show off their Halloween costumes! This program is recommended for families with children ages 4-12.

**Monday, October 31, 2016 at 12:00pm - 1:00pm** at the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106

<http://www.chemheritage.org> Tel: 215-925-2222

#### Brown Bag Lecture with Thomas Apel

Free and Open to the Public

**Tuesday, November 1, 2016 at 6:00 PM - 7:00 PM** at World Cafe Live, 3025 Walnut Street, Philadelphia

<http://www.upenn.edu/pennnews/science>

#### PENN LIGHTBULB CAFÉ

Daniel Hopkins, associate political science professor, School of Arts & Sciences

#### "Ethnicity, Race and Voting Behaviors of Americans"

In the final Penn Lightbulb Café before the 2016 presidential election, political scientist Daniel Hopkins will discuss what has driven the campaign, from how people decide on a candidate to who will likely turn out to vote. Generally, he studies questions related to racial politics, ethnicity, immigration and urban politics and is writing a book about the nationalization of Americans' voting behavior. Hopkins has a secondary appointment at Penn's Annenberg School for Communication.

Free and Open to the Public.

**Tuesday, November 1, 2016 at 7:00 PM** at Washington Memorial Chapel, on Route 23 in Valley Forge.

Friends of Valley Forge Park

<http://www.friendsofvalleyforge.org/speaker-series.shtml>

#### The Storm

#### Sam Katz

The founder of History Making Productions shares his award-winning video about Philadelphia before, during, and after the Revolutionary War.

Free and Open to the Public.

**Tuesday, November 1, 2016 - 6:00pm - 7:00pm** at Eastern State Penitentiary, 2027 Fairmount Avenue, Philadelphia, PA 19130 phone: (215) 236-3300

<http://www.easternstate.org/home>

#### The Searchlight Series:

#### Johnny Perez: The Truth about Solitary Confinement

Free. Reception to follow.

Johnny Perez will speak about the policy and practice of solitary confinement in U.S. prisons. He will discuss the psychological consequences of prolonged isolation, as well as reform efforts at the state and national levels.

Johnny Perez is a reentry advocate for the Urban Justice Center in New York City. He spent three years out of a 13-year sentence for armed robbery in solitary confinement, and he draws on his personal and professional experience in his work as a national advocate for solitary reform.

He also co-chairs the Communications Committee for the Campaign for Alternatives to Isolated Confinement.

This event is part of Eastern State's ongoing Searchlight Series of events addressing issues in contemporary corrections. The Searchlight Series discussions take place the first Tuesday of every month, free and open to the public. No reservations required.

The Searchlight Series is supported in part by a grant from The George W. Rentschler Foundation.

Free. Reception to follow

**Wednesday, November 2, 2016 at 6:30pm** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103, (215) 563-3737 x304

<http://www.collphyphil.org/>

[prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

#### The Samuel X Radbill Lecture: Back to the Breast

After decades of decline during the twentieth century, breastfeeding rates began to rise again in the 1970s, a rebound that has continued to the present. While it would be easy to see this reemergence as simply part of the naturalism movement of the '70s, Jessica Martucci reveals that the true story is more complicated. Despite the widespread acceptance and even advocacy of formula feeding by many in the medical establishment throughout the 1940s, '50s, and '60s, a small but vocal minority of mothers, drawing upon emerging scientific and cultural ideas about maternal instinct, infant development, and connections between the body and mind, pushed back against both hospital policies and cultural norms by breastfeeding their children.

As Martucci shows, their choices helped ideologically root a "back to the breast" movement within segments of the middle-class, college-educated population as early as the 1950s. That movement - in which the personal and political were inextricably linked - effectively challenged midcentury norms of sexuality, gender, and consumption, and articulated early environmental concerns about chemical and nuclear contamination of foods, bodies, and breast milk.

The Samuel X Radbill Lecture is presented by The Section on Medical History at The College of Physicians of Philadelphia and the Radbill Endowment.

**Wednesday, November 2, 2016 at 6:00PM - 8:00PM** at University of Pennsylvania Museum, 3260 South Street, Philadelphia, PA 19104

<http://www.penn.museum/events-calendar>

#### Great Beasts of Legend Lecture Series

#### CENTAURS, SIRENS AND CHIMAERA:

#### THE GREEKS AND THEIR MONSTERS

**Dr. Jeremy McInerney**, Davidson Kennedy Professor Department of Classical Studies, University of Pennsylvania

The Greek imagination was populated with



all sorts of hybrids and monsters, from the half-horse, half man centaur to the chimaera, a blend of lion, snake and goat. What function did these creatures play in Greek culture? In this lecture we'll look at some of the most extraordinary monsters and fabulous creatures of the Greeks and try to explain where they came from and why the Greeks were fascinated by them. Open to the Public. Admission \$10.00 at the door.

**Wednesday, November 2, 2016 7:30 p.m.** at the Free Library of Philadelphia, 1901 Vine Street, 19103

<http://libwww.freelibrary.org/authorevents/>  
**Margot Shetterly | Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race**

Check website for more details.

Cost: FREE

**Thursday, November 3, 2016 at 5:30pm** at the **American Philosophical Society**, Benjamin Franklin Hall, 427 Chestnut Street, Philadelphia

<http://www.amphilosoc.org/>

**Rhoads Medal Award Ceremony and Lecture: The Vaccine Wars, Who's Winning?**

**Paul Offit** will deliver the Rhoads Medal Lecture, "The Vaccine Wars: Who's Winning?" He will present a history of the anti-vaccine movement, starting with opposition to the smallpox vaccine, then the whooping cough and MMR vaccines.

The Jonathan E. Rhoads Commemorative Lecture was established in 1996 to honor the man who made significant contributions to medicine and to the three institutions sponsoring this program. Dr. Rhoads served as President of the American Philosophical Society and The College of Physicians of Philadelphia, and as Chair of the Department of Surgery of the University of Pennsylvania. He was known to many as a true renaissance man in the image of Benjamin Franklin.

**Paul A. Offit, MD** is the Director of the Vaccine Education Center at the Children's Hospital of Philadelphia as well as the Maurice R. Hilleman Professor of Vaccinology and a Professor of Pediatrics at the Perelman School of Medicine at the University of Pennsylvania. He is a recipient of many awards including the J. Edmund Bradley Prize for Excellence in Pediatrics from the University of Maryland Medical School, the Young Investigator Award in Vaccine Development from the Infectious Disease Society of America, and a Research Career Development Award from the National Institutes of Health.

Dr. Offit has published more than 160 papers in medical and scientific journals in the areas of rotavirus-specific immune responses and vaccine safety. He is also the co-inventor of the rotavirus vaccine, RotaTeq, recommended for universal use in infants by the CDC; for this achievement Dr. Offit received the Luigi Mastroianni and William Osler Awards from the University of Pennsylvania School of Medicine, the Charles Mérieux Award from the National Foundation

for Infectious Diseases; and was honored by Bill and Melinda Gates during the launch of their Foundation's Living Proof Project for global health.

He is the author of six medical narratives: *The Cutter Incident: How America's First Polio Vaccine Led to Today's Growing Vaccine Crisis* (Yale University Press, 2005), *Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases* (HarperCollins, 2007), for which he won an award from the American Medical Writers Association, *Autism's False Prophets: Bad Science, Risky Medicine, and the Search for a Cure* (Columbia University Press, 2008), *Deadly Choices: How the Anti-Vaccine Movement Threatens Us All* (Basic Books, 2011), which was selected by Kirkus Reviews and Booklist as one of the best non-fiction books of the year, *Do You Believe in Magic?: The Sense and Nonsense of Alternative Medicine* (HarperCollins, 2013), which won the Robert P. Balles Prize in Critical Thinking from the Center for Skeptical Inquiry and was selected by National Public Radio as one of the best books of 2013, and *Bad Faith: When Religious Belief Undermines Modern Medicine* (Basic Books, 2015), selected by the New York Times Book Review as an "Editor's Choice" book in April 2015. Dr. Offit has also written *Pandora's Lab: Seven Stories of Science Gone Wrong* (National Geographic Press/Random House, publication date February 2017) and *Lost in Translation: Some Hard-Earned Advice on How to Communicate Science to the Public—Or Die Trying* (manuscript in preparation).

**This event is free and open to the public.** Please register to attend.

A reception will begin at 5:30 p.m., followed by the lecture at 6:00 p.m. and the medal presentation

**Saturday, November 5, 2016 at 1 PM 7 pm** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**Having the Last Word: Epitaphs and Grave Writings of Laurel Hill**

See website for details.

**Monday, November 7, 2016 7:30 p.m.** at the Free Library of Philadelphia, 1901 Vine Street, 19103

<http://libwww.freelibrary.org/authorevents/>

**Blanche Wiesen Cook | Eleanor Roosevelt, Volume 3: The War Years and After, 1939–1962 with Candice Millard | Hero of the Empire: The Boer War, a Daring Escape, and the Making of Winston Churchill**

Blanche Wiesen Cook is the author of *Eleanor Roosevelt*, a "spirited and absorbing ... impassioned and sensitive" (New York Times) multi-volume Los Angeles Times Book Prize-winning biography of the quintessential American First Lady. The Distinguished Professor of History at John Jay College, she has also written *The Declassified Eisenhower* and *Crystal Eastman on Women and Revolution*. From a world at war to FDR's death to the founding of the U.N., the final volume in Cook's

biography examines the visionary former First Lady's most trying and influential years.

Candice Millard's bestselling *The River of Doubt*, the story of Theodore Roosevelt's near-fatal exploration of the Amazon, was named one of the best books of the year by the New York Times, the Washington Post, and the San Francisco Chronicle, among many other periodicals. A former National Geographic writer and editor, she charted the life and death of President James A. Garfield in her second book, *Destiny of the Republic*. It won the Edgar Award for Best Fact Crime Book and was named to several best-of-the-year lists. In her latest offering, Millard chronicles Winston Churchill's extraordinary Boer War exploits.

Ellis Wachs Endowed Lecture

Please allow extra time to get to Parkway Central, due to extensive road work in the area  
 Cost: \$15 General Admission, \$7 students.

**Wednesday, November 9, 2016 at 7:15 PM** at the Fels Planetarium, The Franklin Institute, 222 North 20th Street,

Philadelphia, PA 19103

**The Rittenhouse Astronomical Society**

Astronomy lecture open to the General Public. See website for more details: [http://](http://www.rittenhouseastronomicalsociety.org/)

[www.rittenhouseastronomicalsociety.org/](http://www.rittenhouseastronomicalsociety.org/)

**Thursday, November 10, 2016 - 7:00pm to 10:00pm** at The Franklin Institute Science Museum, located in Center City Philadelphia, at the intersection of 20th Street and the Benjamin Franklin Parkway.

<http://www.fi.edu>

**NIGHT SKIES IN THE OBSERVATORY**

**SETI/AstroBiology**

**Fels Planetarium, Bloom Observatory, Franklin Theater**

Hosted by Franklin Institute Chief Astronomer Derrick Pitts, Night Skies in the Observatory is a monthly stargazing event held in the Joel N. Bloom Observatory. View celestial objects in the night sky, including stars, planets, nebulae, and if conditions are right, a galaxy or two, from 5 different rooftop telescopes in the Observatory. The evening includes shows in the Fels Planetarium and a lecture or presentation appropriate for ages 8 and up on an astronomical or space science topic. The Observatory is staffed with knowledgeable observers and free star maps are provided.

Due to the popularity of this event, we strongly recommend that you purchase tickets in advance as capacity is limited and it may sell out.

**Thursday, November 10, 2016 at 10 AM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**Marine Corps Anniversary Service**

See website for details.

**Friday, November 11, 2016 at 7:00 PM** in the Radnor Township Municipal Building, 301 Iven Ave, Radnor, Pennsylvania 19087

**Delaware Valley Amateur Astronomers**

<http://dvaa.org>

### Microwave Polarization as a Window to the Infant Universe

**Dr. David Chuss**, Associate Professor, Dept. of Physics, Villanova University

Our understanding of cosmology has undergone a revolution in the past two decades. The universe has expanded and cooled over the past 13.8 billion years, and the action of gravity has grown the small deviations from uniformity in the early universe into the large scale structure observed today. The energy content of the universe is also known. The elements of the periodic table make up about 5% of the energy in the universe. Nearly a quarter of the universe consists of mysterious dark matter, which is necessary for structure formation, but does not interact with light. Finally, roughly 70% of the universe consists of an even more mysterious "dark energy," which is currently accelerating the expansion of the universe.

In addition to the mysteries of dark matter and dark energy, our current model of the universe provides strong hints that the universe underwent a rapid expansion in its first fraction of a second. This expansion, called "inflation" is predicted to produce gravitational waves that imprint a small polarized signal on the cosmic microwave background, the relic radiation left over from an epoch when the universe was a mere 380,000 years old. Finding this signal would test the inflationary paradigm and provide a means to explore physics at energy scales a trillion times those accessible to earth-bound experiments. The Cosmology Large Angular Scale Surveyor (CLASS) is a telescope array located in Chile that is searching for this signal. Free and Open to the Public. Refreshments are provided. A sales table and library are also available.

**Saturday, November 12, 2016 at 10 AM Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

#### The Hot Spots and Storied Plots

See website for details.

**Saturday, November 12, 2016 at 1 PM at Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

#### Love of Country Leads: Union League Founders at Laurel Hill

See website for details.

**Saturday, November 12, 2016 at 5:00-8:00 PM at the Wagner Free Institute of Science**, 1700 West Montgomery Avenue, Philadelphia, PA 19121

[www.wagnerfreeinstitute.org](http://www.wagnerfreeinstitute.org) ph 215-763-6529

#### A SIP of SCIENCE - 2016 Benefit Cocktail Party

**Honoring Dr. Stephen Tang, President and CEO of the University City Science Center**

Open to the Public. This is a fund raising event.

**Monday, November 14, 2016 at 6:00 PM at**

**National Mechanics, 22 S. Third Street, Philadelphia, PA 19106**

#### Science on Tap

A monthly gathering that features a brief, informal presentation by a scientist or other expert followed by lively conversation. Good food and beer.

Must be 21 or accompanied by parent. Free and open to the Public.

<http://scienceontapphill.com/>

**Tuesday, November 15, 2016 at 6:00 PM - 7:00 PM** at World Cafe Live, 3025 Walnut Street, Philadelphia

<http://www.upenn.edu/pennnews/science>

#### PENN SCIENCE CAFE

(See website)

Free and Open to the Public.

**Tuesday, November 15, 2016 at 6:30pm** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103, (215) 563-3737 x304

[http://www.collphyphil.org/prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

#### The Robert L. Sadoff Lecture: The Rabbit's View of Shaken Baby Syndrome

Violence against children has existed for centuries and has taken many forms among which is violent shaking of infants. There is well-established clinical, bio mechanical and pathological evidence that this mechanism of injury leads to serious neurological damage or death. Utilization of this evidence has led to conviction of the perpetrators but about 13 years ago these convictions were challenged as it was claimed that the clinical and pathological findings in the infants resulted from a 'natural disease', not trauma.

This presentation by Lucy Rorke-Adams, MD, FCPP, will define the features of shaken baby syndrome, evolution of the current challenge to its validity, the tumultuous consequences and its impact on the health of children and the role of the legal system in interfering in the practice of medicine.

This lecture is presented by the Robert L. Sadoff endowment.

**Wednesday, November 16, 2016 at 7:30 p.m.** at the Free Library of Philadelphia, 1901 Vine Street, 19103

<http://libwww.freelibrary.org/authorevents/>

#### The American Presidency | Foreign Press Panel | The Whole World Was Watching: Foreign Perspectives on the 2016 Election

A panel discussion on how the US election is portrayed to the world will reveal the views of foreign journalists and their post-election analyses. Chris Satullo, noted media figure, will moderate the conversation between Paul Koring of Toronto's The Globe and Mail; Andrei Sitov of the Russian News Agency, TASS; and Michael Wilner of The Jerusalem Post.

Free and Open to the Public.

## PhACT Lecture

**Saturday, November 19, 2016 at 2:00 PM**

### Video Presentation:

**"Hilleman—A Perilous Quest to Save the World's Children"**

**Dr. Paul Offit will lead discussion afterwards.**

**See Page 5 for more details.**

**Sunday, November 20, 2016 at 1 PM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

See website for details.

**Monday, November 21, 2016 at 6:30pm** at College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia, PA 19103, (215) 563-3737 x304

[http://www.collphyphil.org/prog\\_calendar.htm](http://www.collphyphil.org/prog_calendar.htm)

Pre-registration for all programs and events is strongly urged.

#### The Secret of the Care

In reading and reflecting on poems from The Wound Dresser, Dr. Jack Coulehan explores the mysterious tension between tenderness and steadiness in medical practice and the healing power of human contact and engagement. In so doing he invokes the tender care shown by "America's world poet," Walt Whitman, as he comforted wounded soldiers during the Civil War. With directness, passion, and often humor, these poems speak to an ethic of compassionate solidarity - between patient and doctor, person and family, the individual and the human community.

Jack Coulehan, MD, MPH, is a poet, physician, and medical educator whose work appears frequently in medical journals and literary magazines. He is the author of six collections of poetry, including most recently The Wound Dresser, which Robert Pinsky selected as a finalist for the 2016 Dorset Prize. In 2012 he received the Nicholas Davies Scholar Award of the American College of Physicians for "outstanding lifetime contributions to humanism in medicine."

The Civil War exhibit in the Mütter Museum will be open to attendees after the lecture.

**Monday, November 21, 2016 at 7:00 PM** at MaGerks Pub and Grill, 582 South Bethlehem Pike, Fort Washington, Pennsylvania 19034.

**American Revolution Round Table of Philadelphia, <http://arrtop.org/>**  
**Abductions in the American Revolution**

Join us on Monday, November 21st as we welcome back Christian McBurney who will talk about his new book "Abductions in the American Revolution". A short business meeting will start around 7:15pm. The lecture will start at 7:30pm. MaGreks Pub and Grill will be running a 1/2 price special on burgers that night.

George Washington called such efforts "honorable" and supported attempts to kidnap the British commander-in-chief (twice), Benedict Arnold (after he turned traitor), and Prince William Henry (a future king of Great Britain). Of course the British did target Washington at his Morristown NJ winter headquarters by British dragoons who crossed the frozen Hudson River among other military and civilian leaders of the United States.

Christian was raised in Kingston, Rhode Island in a home built in 1809. In high school, he wrote a book on the history of Kingston, which was not a bad effort for a teenager! He graduated from Christian McBurney South Kingstown High School in 1977 and from Brown University in 1981. At Brown, he wrote a 300-page undergraduate history thesis on colonial South Kingstown planter society. After graduating from

Kingston, Maryland, where they have raised three wonderful children, Ryan, Kyle and Victoria. He has renewed his interest in history writing by writing the adult version of the history of Kingston, which was published in 2004. Please go to <http://christianmcburney.com/> to learn more about Christian McBurney.

This book covers more than thirty major attempted and successful abductions of military and civilian leaders from 1775 to 1783, from Maine to Georgia, and including two in Great Britain.

**Free and Open to the Public.**

**Friday, November 25, 2016 at 10 AM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA 19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**The Hot Spots and Storied Plots**

See website for details.

**Monday, November 28, 2016 at 12:00pm - 1:00pm** at the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106

<http://www.chemheritage.org> Tel: 215-925-2222

**Brown Bag Lecture: Père Castel and the Cogs of Chymistry**

Join us for a talk with **Jean-Olivier Richard**, one of our 2016-2017 Cain Fellows.

The Jesuit geometer and natural philosopher Louis-Bertrand Castel (1688-1757) had something to say on just about every topic. Best remembered today for his "color harpsichord" (a musical instrument that purported to harmonize colors with sounds), for his popularization of mathematics, and for his quarrels with Newtonians, he was also a prolific "journalist," authoring hundreds of essays and book reviews, which together form a vast historical commentary on contemporary arts and sciences. Alchemy, chymistry, and matter theory are no exception to this.

Free and Open to the Public

**Saturday, December 3, 2016 at 1 PM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA 19132. 215-228-8200

<http://www.thelaurelhillemetery.org>

**Footprints of Angels**

See website for details

**Monday, December 5, 2016 at 12:00pm - 1:00pm** at the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106

<http://www.chemheritage.org>

Tel: 215-925-2222

**Brown Bag Lecture: Plastics Now**

Please join us for a talk with Billie Faircloth, an architect and guest lecturer.

In her lecture **Billie Faircloth** will discuss the use of plastics in architecture over time. She will draw from her recent book, *Plastics Now: On Architecture's Relationship to a Continuously Emerging Material*, to address one primary question: why do we build with plastics the way that we do?

Free and Open to the Public

**Tuesday, December 6, 2016 at 6:00 PM - 7:00 PM** at World Cafe Live, 3025 Walnut Street, Philadelphia

<http://www.upenn.edu/pennnews/science>  
**PENN LIGHTBULB CAFÉ**

Daniel Q. Gillion, Presidential Associate Professor, political science and Africana studies, School of Arts & Sciences

**"Governing With Words"**

Daniel Q. Gillion studies racial and ethnic politics, political behavior, public policy and the American presidency. In his latest book, *Governing With Words: The Political Dialogue on Race, Public Policy and Inequality in America*, Gillion tackles the direct influence politicians' race-conscious speeches has had on government productivity and changes in societal behavior. He also examines how a shift to "colorblind" policies has unexpectedly reduced discussions of racial inequality. But, he says, for politicians talking about race is not as harmful as once thought and can actually be beneficial.

Free and Open to the Public.

**Tuesday, December 6, 2016 - 6:00pm - 7:00pm** at Eastern State Penitentiary, 2027 Fairmount Avenue, Philadelphia, PA 19130 phone: (215) 236-3300

<http://www.easternstate.org/home>

**The Searchlight Series:**

**Jennifer Murphy: The Enduring Stigma of Drug Addiction**

**Free. Reception to follow.**

Is drug addiction a disease that can be treated, or is it a crime that should be punished? In her probing study *Illness or Deviance?* Jennifer Murphy investigates our various perspectives on addiction, and the myriad ways American courts handle it—incarcerating some drug users while putting others in treatment.

Jennifer Murphy is Associate Professor of Criminal Justice at Penn State Berks. She received her Ph.D. in sociology from Temple University in 2008.

This event is part of Eastern State's ongoing Searchlight Series of events addressing issues in contemporary corrections. The Searchlight Series discussions take place the first Tuesday of every month, free and open to the public. No reservations required.

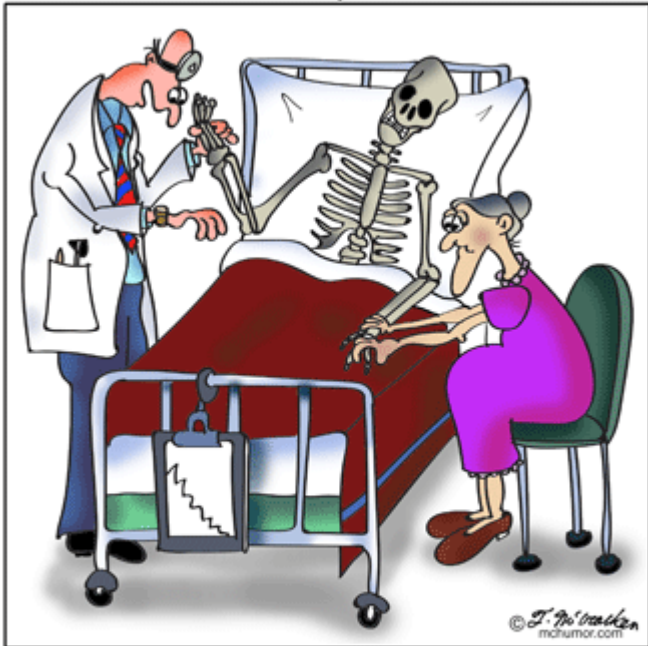
The Searchlight Series is supported in part by a grant from The George W. Rentschler Foundation. Free. Reception to follow

**Tuesday, December 6, 2016 at 7:00 PM** at Washington Memorial Chapel, on Route 23 in Valley Forge.

Friends of Valley Forge Park

<http://www.friendsofvalleyforge.org/speaker-series.shtml>

**MCHUMOR.COM** by T. McCracken



**"NOT TO WORRY, MA'AM. WE'RE FAR FROM EXHAUSTING OUR TREATMENT OPTIONS."**

©T. McCracken mchumor.com

New York University School of Law in 1985, he embarked on a career as an attorney. Currently, he is a partner with the law firm of Arent Fox LLP. He lives with my wife, Margaret, in

### **An Inventory of an Army: What the British Surrendered at Yorktown**

**Bob Sullivan**

A unique perspective on the British Army through the equipment and accoutrements surrendered on October 19, 1781.

Free and Open to the Public.

**Wednesday, December 7, 2016 at 6:00PM - 8:00PM** at University of Pennsylvania Museum, 3260 South Street, Philadelphia, PA 19104

<http://www.penn.museum/events-calendar>

#### **Great Beasts of Legend Lecture Series**

**THE STRONG SILENT TYPE: THE SPHINX**  
**Dr. Jennifer Houser Wegner**, Associate Curator, Egyptian Section, Penn Museum

Egyptian religious imagery gives us an awesome assortment of fantastic hybrid beings and deities that are half human, half animal, or a composite of numerous creatures. Perhaps none of these beings are as evocative as the sphinx. Usually depicted as a human-headed lion, the sphinx was a protective entity and sphinx imagery appeared in Egyptian art, architecture and texts for thousands of years. This lecture will examine the varied roles of the sphinx in ancient Egypt. Open to the Public. Admission \$10.00 at the door.

**Saturday, December 10, 2016 at 10 AM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurehillcemetery.org>

#### **The Hot Spots and Storied Plots**

See website for details.

**Monday, December 12, 2016 at 6:00 PM** at **National Mechanics**, 22 S. Third Street, Philadelphia, PA 19106

#### **Science on Tap**

A monthly gathering that features a brief, informal presentation by a scientist or other expert followed by lively conversation. Good food and beer.

Must be 21 or accompanied by parent. Free and open to the Public.

<http://scienceontapphilly.com/>

**Monday, December 12, 2016 12:00pm - 1:00pm** at the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106

<http://www.chemheritage.org> Tel: 215-925-2222

#### **Brown Bag Lecture: Lessons from a List of Paracelsians Alive in 1579**

Free and Open to the Public

**Tuesday, December 13, 2016 at 7:30 p.m.** at the Free Library of Philadelphia, 1901 Vine Street, 19103

<http://libwww.freelibrary.org/authorevents/>

**Dava Sobel | The Glass Universe with Priyamvada Natarajan | Mapping the Heavens: The Radical Scientific Ideas That Reveal the Cosmos**

**Dava Sobel** is one of the most prominent, critically acclaimed, bestselling narrative nonfiction writers working today. A former

science reporter for the New York Times, she is the recipient of the National Science Board's prestigious Individual Public Service Award, the Boston Museum of Science's Bradford Washburn Award, and many others. She has served as the editor for The Best American Science Writing, and even had an asteroid (#30935) named for her. A long-time contributor to The New Yorker, Audubon, Discover, Life, Omni, and Harvard Magazine. Sobel is the author of five books, including the New York Times bestsellers *Longitude*, *Galileo's Daughter*, and *The Planets*.

Renowned for her work in deciphering the mysteries of dark matter and dark energy, Yale astrophysicist Priyamvada Natarajan is the recipient of a Guggenheim fellowship, the India Abroad Foundation's "Face of the Future" Award, and fellowships from Harvard and the Joint Institute for Laboratory Astrophysics. A member of the Royal Astronomical Society and the American Physical Society, she also serves on the scientific advisory board of PBS's NOVA scienceNOW. Exploring everything from the big bang to the possibility of other universes, *Mapping the Heavens* is a greatest-hits tour of the cosmological findings that have changed our modern understanding of the universe.

Please allow extra time to get to Parkway Central, due to extensive road work in the area.

Cost: FREE

**Wednesday, December 14, 2016 at 7:15 PM** at the Fels Planetarium, The Franklin Institute, 222 North 20th Street, Philadelphia, PA 19103

#### **The Rittenhouse Astronomical Society**

Astronomy lecture open to the General Public. See website for more details:

<http://>

[www.rittenhouseastronomicalsociety.org/](http://www.rittenhouseastronomicalsociety.org/)

**Saturday, December 17, 2016 at 1 PM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurehillcemetery.org>

#### **Spirits of Christmas Past: Laurel Hill's Yuletide Connections**

See website for details.

**Monday, December 19, 2016 at 7:00 PM** at MaGerks Pub and Grill, 582 South Bethlehem Pike, Fort Washington, Pennsylvania 19034.

**American Revolution Round Table of Philadelphia**, <http://arrtop.org/>

See website for topic.

Free and Open to the Public.

**Friday, December 23, 2016 at 10 AM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurehillcemetery.org>

#### **The Hot Spots and Storied Plots**

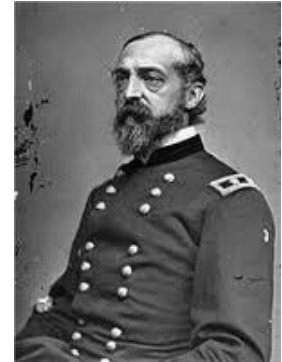
See website for details.

**Saturday, December 31, 2016 at 12 PM** at **Laurel Hill Cemetery**, 3822 Ridge Avenue, Philadelphia, PA19132. 215-228-8200

<http://www.thelaurehillcemetery.org>

#### **General Meade Birthday Celebration presented by the General Meade Society**

See website for details.



**Tuesday, January 3, 2017 - 6:00pm - 7:00pm** at Eastern State Penitentiary, 2027 Fairmount Avenue, Philadelphia, PA 19130 phone: (215) 236-3300

<http://www.easternstate.org/home>

#### **The Searchlight Series: Discussion Topic TBA.**

This event is part of Eastern State's ongoing Searchlight Series of events addressing issues in contemporary corrections. The Searchlight Series discussions take place the first Tuesday of every month, free and open to the public. No reservations required.

The Searchlight Series is supported in part by a grant from The George W. Rentschler Foundation.

Free. Reception to follow

**Tuesday, January 3, 2017 at 7:00 PM** at Washington Memorial Chapel, on Route 23 in Valley Forge.

Friends of Valley Forge Park

<http://www.friendsofvalleyforge.org/speaker-series.shtml>

#### **Preview of the Museum of the American Revolution**

**R. Scott Stephenson, Ph.D.**

Philadelphia's Museum of the American Revolution, opening April 19, 2017, will tell the dramatic story of the founding of our nation through immersive gallery experiences, object theaters, and recreated historical scenes.

Free and Open to the Public.

**Wednesday, January 04, 2017 at 6:00PM - 8:00PM** at University of Pennsylvania Museum, 3260 South Street, Philadelphia, PA 19104

<http://www.penn.museum/events-calendar>

#### **Great Beasts of Legend Lecture Series**

**THE HOBBITS OF FLORES ISLAND: MYTH, MAGIC, MAJESTY OF HOMO FLORESIENSIS**

**Dr. Janet Monge**, Associate Curator of the Physical Anthropology Section, Penn Museum

"If Mike (Morwood – the person who found

the skeleton) had said he'd found evidence of an alien spaceship on Flores, I would have been less surprised."

Peter Brown in Nature 514: 424

Standing at 3 ½ half feet tall, and about 75 pounds, Homo floresiensis is the smallest adult skeletal in the whole of human evolutionary history. Found in 2003, the "hobbit" or "halfling" was so named because of its diminutive size. Some have claimed that the hobbit is a pathological specimen, showing features of microcephaly, Down syndrome, or dwarfism, others consider it to be a new species within the human lineage eventually becoming extinct when modern humans arrived on the island. There seems to be no end in sight on the debates that surround this hot button issue in human evolution. As recently as half a year ago, reanalysis of the cave deposits, forced a new time frame for the sediments and fossils within the cave. Given the supporters and detractors, and the ensuring war in the literature, the hobbit find has confounded our view of human evolution. Beast? OR Ancestor? Open to the Public. Admission \$10.00 at the door.

**Monday, January 9, 2017 at 6:00 PM at National Mechanics, 22 S. Third Street, Philadelphia, PA 19106**

#### Science on Tap

A monthly gathering that features a brief, informal presentation by a scientist or other expert followed by lively conversation. Good food and beer. Must be 21 or accompanied by parent. Free and open to the Public.

<http://scienceontaphilly.com/>

**Wednesday, January 11, 2017 at 7:15 PM at the Fels Planetarium, The Franklin Institute, 222 North 20th Street, Philadelphia, PA 19103**

#### The Rittenhouse Astronomical Society

Astronomy lecture open to the General Public. See website for more details:

[www.rittenhouseastronomicalsociety.org/](http://www.rittenhouseastronomicalsociety.org/)

## PhACT Lecture

**Saturday, January 21,  
2017**

**At 2:00 PM**

**Program TBA**

**Monday, January 30, 2017 at 7:00 PM at MaGerks Pub and Grill, 582 South Bethlehem Pike, Fort Washington, Pennsylvania 19034.**

**American Revolution Round Table of Philadelphia, <http://arrtop.org/> Benjamin Franklin's Experiments**

We all think we know the story of Benjamin Franklin, we know the story of him flying a kite in a thunderstorm, but do you know the other inventions he worked on?

Join us on Monday, January 30th, 2017 as we welcome Mike Kochan who will be presentation and demonstrating some of Benjamin Franklin's Experiments.

Mike will bring some reproductions of Franklin's machines he used in his experiments as well as audience participation in some experiments to help tell the story of Benjamin Franklin's involvement in these scientific experiments.

Mike's presentation will show Franklin's place in the history of the discoveries in electricity. The presentation will start with the Greeks, move to the seventeenth century then the eighteenth century and finish in mid eighteenth century with a demonstration of his famous kite experiment. The talk will use a combination of a power point as well as replicas of some of his experiments that the guests can do themselves bringing the history of developments in electricity to life. Mike has the ability over the years to make museum quality examples of the technology of the eighteenth and nineteenth century technology and is currently portraying Franklin in venues that include children

as well as adults.

**Free and Open to the Public.**

**Wednesday, February 1, 2017 at 6:00PM - 8:00PM** at University of Pennsylvania Museum, 3260 South Street, Philadelphia, PA 19104

<http://www.penn.museum/events-calendar>

**Great Beasts of Legend Lecture Series  
MONSTERS OF THE MAYA COSMOS**

**Dr. Simon Martin**, Associate Curator, American Section, Penn Museum

The Maya universe was populated by a variety of strange beasts and hybrid entities, some as actors in mythic narratives, others as symbolic representations of the sky, earth, and netherworld. However bizarre and complex their form, each had a coherent part to play in a wider religious system. One of the more energetic areas in Maya studies today is the effort to fathom their meanings and, by doing so, enter the imagination and consciousness of an ancient American people.

**Tuesday, February 7, 2017 at 7:00 PM** at Washington Memorial Chapel, on Route 23 in Valley Forge.

Friends of Valley Forge Park

<http://www.friendsofvalleyforge.org/speaker-series.shtml>

**Ben Franklin's Navy by Tim McGrath**

## PhACT Lecture

**Saturday, February 18,  
2017**

**At 2:00 PM**

**Program TBA**

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**“Reality is that which, when you stop believing in it,  
doesn't go away.”**

**~ Philip K. Dick (1928 - 1982) ,  
American science fiction writer**

I support the aims of PhACT and would like to join/rejoin for the next year. The annual membership is \$15 and \$10 for students which includes e-mail delivery of *Phactum*.

If you wish **US Mail delivery annual membership is \$25.** Checks should be payable to **PhACT**.

Membership dues of \$ \_\_\_\_\_ enclosed to pay for \_\_\_\_\_ years of membership.

Donation of \$ \_\_\_\_\_ enclosed for additional support

Donation of \$ \_\_\_\_\_ dedicated for High School Science Fair prizes

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Phone: \_\_\_\_\_ E\_mail \_\_\_\_\_

**Mail checks to:**  
**PhACT**  
**653 Garden Road**  
**Glenside, PA 19038**

or to pay online go to  
[www.PhACT.org](http://www.PhACT.org)

## The Philadelphia Association for Critical Thinking is grateful

for the hospitality extended by Community College of Philadelphia and especially Dr. David Cattell, Chair of the Physics Department, for hosting PhACT and giving us access to such excellent facilities. Part of CCP's mission is to serve Philadelphia as a **premier** learning institution and PhACT is pleased to support this goal by having talks on wide ranging, engaging, and educational topics. Students and faculty are invited to be active participants in our activities.

### The PhACT Council 2016/17

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David Cragin, Ph.D., Vice-President	Jeffrey Craigin, Teen Member of Council
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If you are not a supporting member/subscriber we invite you to become one. \$15 for a one year membership to PhACT with email *Phactum* subscription. \$25 for US Mail subscription. Donations are welcome.

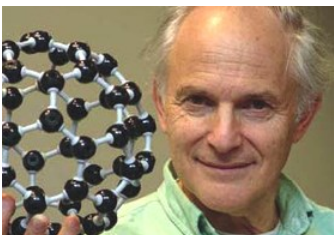
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The PhACT website is: [www.phact.org](http://www.phact.org)



"Although knowledge cannot guarantee good decisions, common sense suggests that wisdom is an unlikely consequence of ignorance."

~ Harry Kroto, (1939 - 2016), Scientist, secular humanist, Nobel laureate (Chemistry, 1996)