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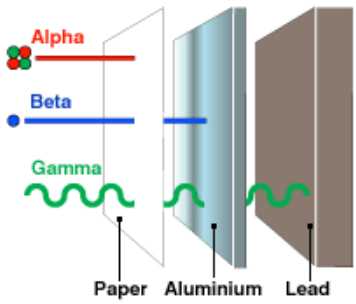
Today in Chemical History

Ernest Rutherford was born on this date in 1871



Ernest Rutherford
1871 - 1937

Rutherford discovered the difference between alpha and beta radiation. He also discovered that elements have a half life and that one radioactive element would spontaneously turn into another by expelling a piece of the atom at high velocity. Many scientists of the day scorned the idea as alchemy. They stuck with the age-old belief that the atom is indivisible and unchangeable. But by 1904 Rutherford's publications and achievements gained recognition.

Several of the century's giants in physics studied under him, including Niels Bohr, James Chadwick, and Robert Oppenheimer.

Upcoming ACS Webinars™

www.acswebinars.org

Thursday, September 6, 2012

Finance 101 – Aligning Your Options With Your Business Goals

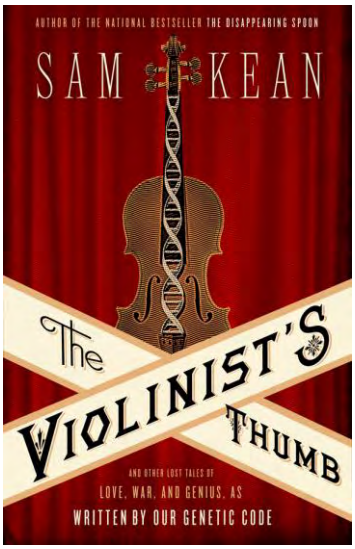
Jospeh Steig, ecosVC

Thursday, September 13, 2012

Green Chemistry in the High School Classroom

Rachel Pokrandt, Beyond Benign
David Wylie, ACS Green Chemistry Instutute

Join us for our next Extreme Chemistry Webinar



Genes and Geniuses: How Humans Became "All Too Human"
November 27, 2012

Our DNA makes us who we are, but what made our DNA the way it is? Trace the history of our DNA with *New York Times* bestselling author Sam Kean as he highlights some of the subjects covered in his book, "The Violinist's Thumb." You will learn more about our DNA and its history than Mendel and his pea plants ever could have hoped for. There will also be some interesting facts about Einstein's Brain to boot.

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ACS WEBINARS™
August 30th, 2012

How to Catch a Poisoner

Download slides after webinar:
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How to Catch A Poisoner

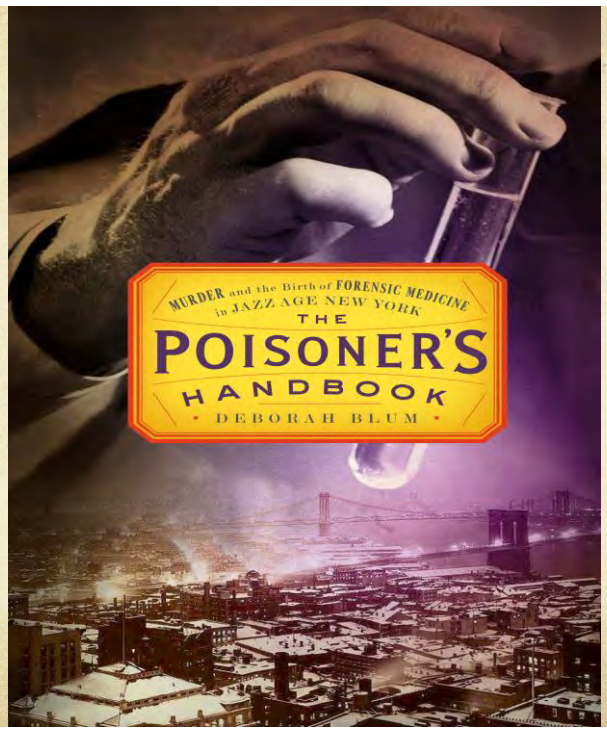
(Or How I Learned to Love the Homicidal History of Chemical Compounds)

Deborah Blum

ACS Webinar

August 30, 2012

7



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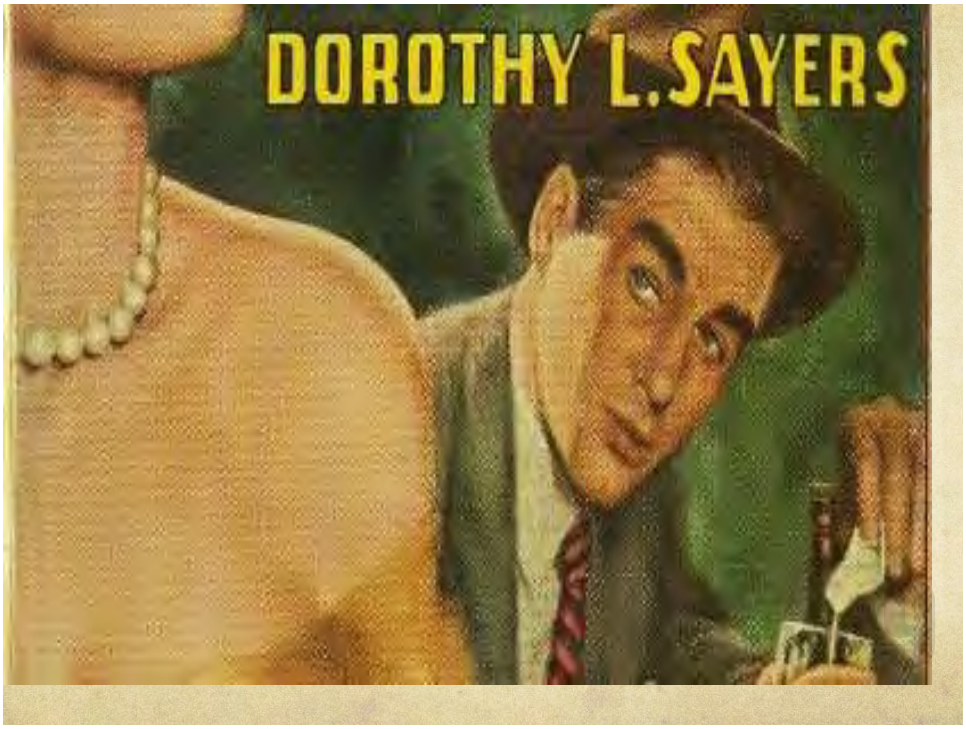
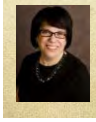
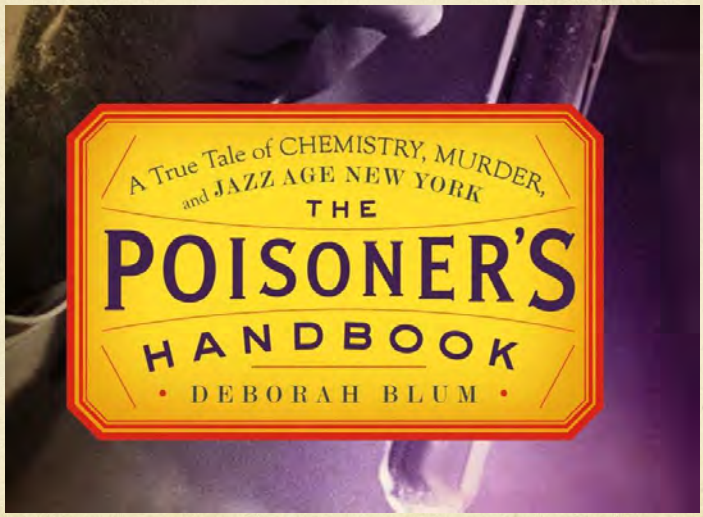
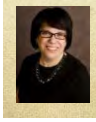

DOROTHY L.SAYERS


POISON
100 DISPENSING TABLETS
No. 14
ATROPINE SULFATE
1/4 Grain (0.016 Gm.)
For use in compounding prescriptions only.
Lilly
ELI LILLY & CO., INDIANAPOLIS, U.S.A.
No. 643—100 SMALL
POISON
DIAMOND
ANTISEPTICS
BERNAYS
FOR EXTERNAL USE ONLY
Antidote—Give
BLUE
Lilly
POISON
100 DISPENSING TABLETS
No. 80
STRYCHNINE SULFATE
1/4 Grain (0.016 Gm.)
For Use in Compounding Prescriptions Only
Lilly
ELI LILLY & CO., INDIANAPOLIS, U.S.A.







11

COMMENTARY | INSIGHT

Communicating chemistry for public engagement

Matthew R. Hartings and Declan Fahy

The communication of chemistry to wider society is difficult because of 'chemophobia', its inherent complexity and its lack of unifying grand themes. To engage with citizens about the benefits and related dangers of the field, chemists must improve their dialogue with broader sections of the public — but how?

When Pulitzer Prize-winning science journalist Deborah Blum wrote *The Poisoner's Handbook* (2010), which described the evolution of forensic science in 1920s America, she proposed as its subtitle 'A True Story of Chemistry, Murder and Jazz Age New York'. But when the book was published, its subtitle was 'Murder and the Birth of Forensic Medicine in Jazz Age New York'. Blum explained the reasoning behind the title choice: "The Penguin sales team said that the weird chemistry on the book's cover would tank sales".

It's not that chemistry is too intellectually challenging for wider audiences. Bestselling books on complex, specialized scientific topics published in 2010 included Rebecca Skloot's *The Immortal Life of Henrietta Lacks*, which covered the biology of cancer, to Stephen Hawking's *The Grand Design*, which detailed the physics of the universe's beginnings, and Sam Kean's *The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of Elements* (note that chemistry is not mentioned explicitly in this title).

It seems that, paradoxically, books about chemistry need to avoid mentioning it in order to be popular. This is symptomatic of what chemist and popular science writer Pierre Laszlo termed 'chemophobia' on the part of the public[1], with the popular associations of the field, according to the editors of *The Public Image of Chemistry*, ranging from "poisons, hazards, chemical warfare and environmental pollution to alchemical pseudo-science, sorcery and mad scientists"[2].

This often pejorative connotation of chemistry is partly a consequence of its history. Steve Miller, a chemist and planetary scientist at University College London, and co-author of *Science in Public* (1998), noted that "during the nineteenth century, there was great excitement in the reality of

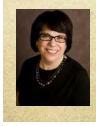
chemistry — dyes, drugs, new materials — that carried on into the early twentieth century. Perhaps the turning point was the First World War, often termed The Chemist's War, in which dynamite, high explosives and poison gas took such a terrible toll. That very much colored public perspectives on chemistry".

Other twentieth-century controversies followed. Lasting damage to the reputation of chemistry was caused by the thalidomide scandal, the Bhopal catastrophe and the pollution of both the Rhine in Europe and Love Canal in the US. The reaction of the chemical industry to some events often compounded the controversy; some chemical lobbyists tried unsuccessfully to smear the credibility of Rachel Carson after her book *Silent Spring* (1962) described the environmental consequences of pesticides, particularly DDT — and similar instances occurred with Nobel-winning Rowland and Molina after they published their study on CFC destruction of the ozone layer[3].

Communicating chemistry in contemporary culture, where the historical associations of chemophobia exist alongside a dependence on the products of chemistry, is challenging and complex: there is no guaranteed formula for success. A suitable metaphor for thinking about how to communicate chemistry is retrosynthesis: a chemist starts with their target audience and the desired outcome of their communication and works backwards, without assumption, to design the most appropriate communication strategy. To do this, we argue that chemists should move from viewing communication as being solely about improving scientific literacy to seeing it as a means of engaging audiences with their work. We argue that vague notions of a 'general public' should be understood more as a collection of different segments of the public, or different publics, each with its own values, knowledge, beliefs and motivations. Moreover, we argue that chemists should draw on the reservoirs of knowledge from research in science communication to better communicate their work in a way that fosters trust, builds relationships and creates a dialogue with multiple audiences — in a contemporary communications landscape that is social, pluralistic and participatory.

Challenges in communicating chemistry

Aside from chemophobia, the communication of chemistry faces several obstacles. Chemistry itself is a fundamentally difficult subject. For someone who has not immersed themselves in the field, it is not easy to develop a feel for how chemistry works. Take, for instance, chemists' reliance on molecular structures to communicate. To the initiated, a chemical structure is a wealth of information contained within an efficiently minimal package; each structure has chemical properties implicit in its representation.



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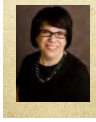

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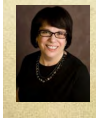
NYPD Evidence Collection, New York Municipal Archives, 1918



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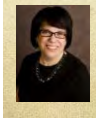
Toxicology Laboratory, Office of the Chief Medical Examiner, NYC, c1930



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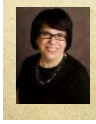
Mathieu Joseph Bonaventure Orfila



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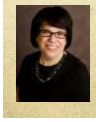
James Marsh



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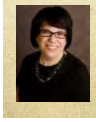
Performing the Marsh Test



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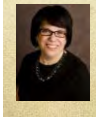
Brewing up an 1850 murder



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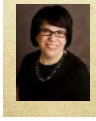
Jean Servais Stas



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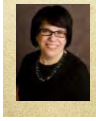
Mary Ann Cotton: The Rise of Everyday Poisoner



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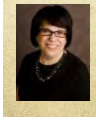
Third Avenue Elevated, undated, NYC Municipal Archives



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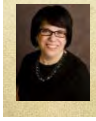
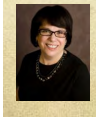


23

Everyday Murders – 1920s Style

- The poison pie murders (and a note about serial killers)
- The Leah Friendlich murder (and a note about the rise of forensic toxicology)
- The murderous career of Mary Frances Creighton



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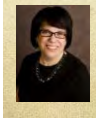

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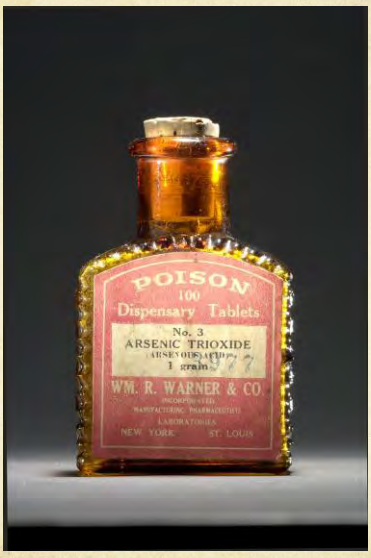
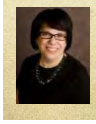

POISON
100
Dispensary Tablets
No. 3
ARSENIC TRIOXIDE
1 gram
WM. R. WARNER & CO.
NEW YORK
ST. LOUIS



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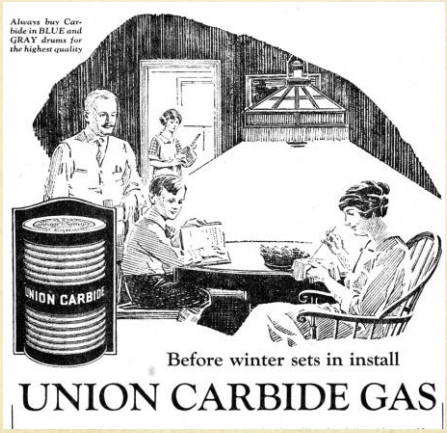
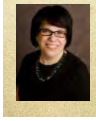
Illuminating Gas





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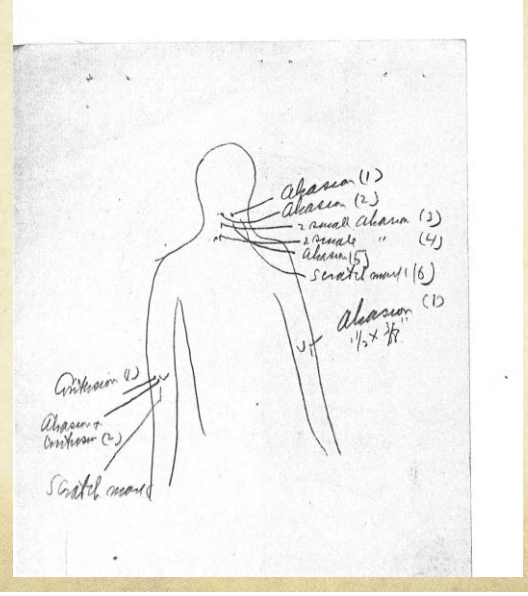
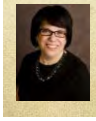
Autopsy sketch, Leah Freindlich, 1923, Office of the Chief Medical Examiner, NYC





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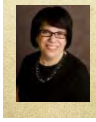
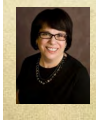


29

Three Points About Public Health

- "Our Essay in Extermination" – poison alcohol during Prohibition
- Tetraethyl Lead
- The Radium Girls



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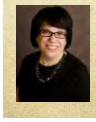

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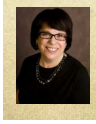

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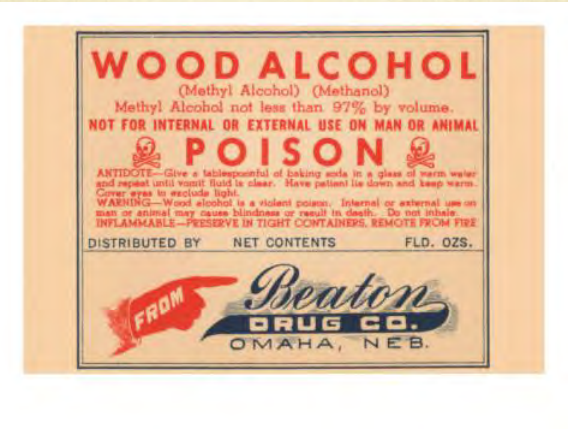
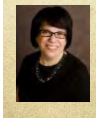
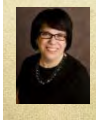

WOOD ALCOHOL
(Methyl Alcohol) (Methanol)
Methyl Alcohol not less than 97% by volume.
NOT FOR INTERNAL OR EXTERNAL USE ON MAN OR ANIMAL
POISON
ANTIDOTE—Give a tablespoonful of baking soda in a glass of warm water and repeat until vomit fluid is clear. Have patient lie down and keep warm. Cover eyes to exclude light.
WARNING—Wood alcohol is a violent poison. Internal or external use on man or animal may cause blindness or result in death. Do not inhale.
INFLAMMABLE—PRESERVE IN TIGHT CONTAINERS. REMOTE FROM FIRE
DISTRIBUTED BY
NET CONTENTS
FLD. OZS.
FROM
Beaton
DRUG CO.
OMAHA, NEB.



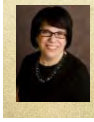
33


Try! CORN
ALCOHOL
GASOLINE
10% BLEND



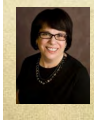
34


LADIES HOME JOURNAL
Ethyl
IS TO GASOLINE what
VITAMINS are to FOOD
DOCTORS SAY, "Give your children fruit. It adds needed vitamins to the meat-and-bread they get from other foods."
Oil companies say, "Give your car Ethyl. It evens the explosions of gasoline inside the engine; delivers more of gasoline's energy to your motor as power, leaves less of it as wasted heat."
But oil companies go one step further. They add Ethyl to good gasoline—and off you run! Ethyl Gasoline already mixed in the right proportion.
And this month, oil companies are announcing an even higher standard of quality for Ethyl Gasoline—offering you still greater value for your gasoline money.
The new high compression cars, built by automobile companies to take advantage of Ethyl's universal distribution, require this better motor fuel. Older cars find Ethyl a real economy because it prevents harmful knock, overheating, and power-loss.
Stop at the Ethyl pump tomorrow. You'll notice the difference immediately. Ethyl Gasoline gives you more power on hills, faster pick-up and less gear-shifting in traffic, a smoother, more responsive motor. It is the easiest motor fuel for your car. Ethyl Gasoline Corporation, New York City.
Buy ETHYL
GASOLINE



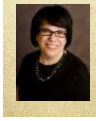
35


FOR USE AS A
MOTOR FUEL ONLY
CONTAINS
LEAD
(TETRAETHYL)



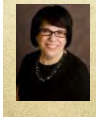
36


A BATSCHARI
CIGARETTEN
RADIUM
A BATSCHARI
CIGARETTES
RADIUM



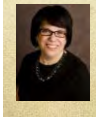
37


Radium and Beauty
Radior
Radior
Toilet Requisites
Radior Co., Ltd., of London



38

Radium watch dial



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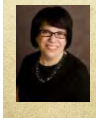
U.S. Radium Corporation, Orange, N.J.



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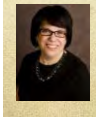

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Poll Question 1

1. This would be a perfect poison if it didn't make your hair fall out.

- Sodium cyanide
- Strychnine
- Thallium
- Mercury

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Poll Question 2

- 2. This poison can famously keep a corpse looking fresh.
- Phosphorus
- Arsenic
- Tetraethyl Lead
- Methanol

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Poll Question 3

3) This poison's 1930s use in cough syrup caused a scandal that helped create the modern FDA.

- Radium
- copper sulfate
- diethylene glycol
- formaldehyde

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Deborah Blum
University of Wisconsin

Darren Griffin
University of Kent

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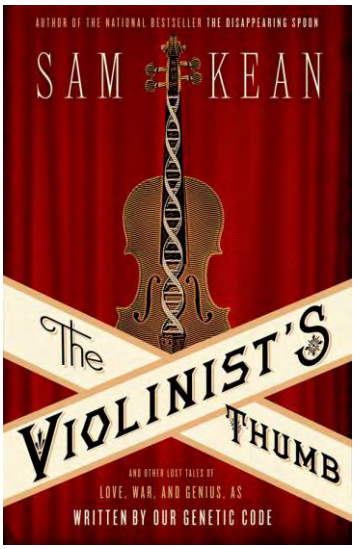

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