Life, Liberty and the Pursuit of Happiness

Three of the scientists who have helped preserve life, liberty and the pursuit of happiness, Francesca Dominici, Herbert Needleman, and Tyrone Hayes.

by: Jan Weaver

On the 4th of July we celebrate the signing of the Declaration of Independence by men who pledged their lives, their fortunes and their sacred Honor in support of the rights to life, liberty and the pursuit of happiness. We also honor those who over the course of our country’s history have fought and sacrificed to preserve those rights. But it is not just foreign enemies that can steal away life, liberty and a chance at happiness, and it is not just soldiers who have protected these rights. This month, I would like to share the stories of three people who have worked to raise awareness of environmental problems that shorten lives, steal the freedom to learn and grow, and threaten things essential to our happiness. In their way, the scientists, doctors, public health specialists and conservationists who have studied the environment, and gone on to raise the alarm as it was contaminated, used up or altered in ways that made it impossible to support life, are as deeply patriotic as the bravest soldier.

Life
Since the 1993 "Six Cities" study we have known that particulate matter from diesel emissions (PM2.5) could reduce life expectancy by 2 or 3 years where its concentrations were high. Regulating diesel emissions could prevent thousands of early deaths. However, the Six Cities data were "secret" to protect patient privacy. This opened up diesel emission rules to reversal under guidelines currently being considered by the EPA. Enter Biostatistician Francesca Dominici and her fellow researchers. They redid the study in 2017 using publicly available Medicare data that allowed them to pair individuals who were similar in every relevant area except their exposure to PM2.5. Not only did the public data strengthen the justification for current regulations, it showed they needed to be even stronger to protect the lives and well-being of racial minorities and low-income Americans.

Liberty
Until the 1960’s levels of lead less than 10 ug/l were assumed harmless to children. Then Pediatrician Herbert Needleman noticed troubling symptoms in kids from a low-income neighborhood in Philadelphia. He suspected lead, and started collecting shed baby teeth to measure accumulated lead. In a landmark 1979 paper he and his co-authors showed kids with the most lead lost four points on the IQ scale. They had more behavioral problems, were more irritable, and had more reading delays. Despite a relentless (and personal) campaign by the lead industry, regulations eventually passed removing lead from gas, tin cans, and paint. Thanks to Needleman, lead is now considered unsafe at any level in kids, and generations have now had the freedom to grow and learn without lead holding them down.

Pursuit of Happiness
Tyrone Hayes’ childhood passion for amphibians took him all the way to a professorship at Berkeley. In the 1990s, he was selected to evaluate the safety of the herbicide atrazine by its maker, Novartis (now Syngenta). While atrazine is considered non-toxic at the usual exposure levels, his research revealed that low doses of atrazine could cause male frogs to become feminized and sterile. This possible effect of low levels of a pesticide on vertebrate endocrine systems was a bombshell, and stoked a whole new field of study. The idea of low level effects was concerning because the EPA allows low levels of atrazine in public drinking water systems. And later research has connected atrazine exposure to reproductive changes in humans. As with Needleman, industry pushed back by attacking the science and scientists doing work that threatened their product. While other factors in the environment, like diet or other contaminants, may also affect endocrine systems, evidence against atrazine is accumulating. So while atrazine is still widely used in the US, it is banned in the European Union. Hopefully the question will be settled before the songs of frogs, or our hopes for children disappear.
By uncovering the connection between air pollution and death, people's lives were saved. By uncovering the connection between lead exposure and learning and behavioral difficulties, children were freed from a future of poverty and even prison. By uncovering the connection between pesticide use and endocrine disruption, we may still have a chance to pursue the things that make us happy, from the cheerful chorus of frogs to raising a family of our own. As you celebrate the 4th, be sure to include those who serve on the front lines of our environment.

Learn More
Lead - http://www.pbs.org/wgbh/nova/next/body/herbert-needleman/

Kudos to MEEA and MELAB Members!

- Kat Golden, Missouri Botanical Garden, was selected as a 2018 Linblad Expeditions and National Geographic Grosvenor Teacher Fellows, one of 40 educators who will travel to the Galapagos for hands-on professional development
- St. Louis Zoo chosen as best zoo by USA Today's Readers' Choice Awards

CALL for PRESENTERS!

Missouri Green Schools and Environmental Education Conference
November 2-3, Columbia MO

Four Formats - Hands On, Bright Spots*, Table Talks and Posters

Three Strands - PreK-5 Curriculum, 6-12 Curriculum, Nuts and Bolts

*We are seeking youth as well as adult presenters for the 10 minute Bright Spots. If you work with a youth or a youth group 12 to 23 that carried out a project they identified and selected, we would love to hear about it.

Deadline August 4, 2018

Things to Look for (or Look Out for) in July

- National Moth Week - Last full week of July -
- 16 World Snake Day (annually) - no sponsor
- 29 Global Tiger Day (annually) - http://tigerday.panda.org
- 31 World Ranger Day (annually) - http://www.internationalrangers.org/world-ranger-day/

Check out all the 2018 Green Holidays.

What to Look for Right Now - MDC's list of What's Out There in June!

MEEA News

- People Team
  - Memberships - Welcome to new members Sandra Arango, Carol Dalton, Michele Gastreich, Kate Henderson, Caitlin Horn, Julie LaConte, Brenda Ladin, Mark Laury, Cassandra Lentz, Dawn Meyer, Jennifer Pruitt, Myronna Pryor, Erin Sind, Britt Tate, Brandon Walker, Denise Willis, and Susan Zareh
  - Networking - Jan attended Webster University's Sustainability Institute in St. Louis on June 21. She also made a short presentation on Missouri Green Schools to the Columbia Office of Sustainability, and representatives from Columbia Public Schools and Columbia Independent School.

- Purpose
  - Conference - We are looking for PRESENTERS! Check 2018 MOGSEE page for details and to submit a presentation proposal. DEADLINE AUGUST 4
  - Missouri Green Schools - All four Missouri US Department of Education Green Ribbon School Honorees are planning on attending the awards ceremony in Washington DC, September 19, 2:00 to 4:30 pm EST.

- Resources
  - Accounting - In July, Jan will prepare the 2nd quarter financials for the accountant's review
  - Fund Development - No Updates

- Governance Team
  - Board of Directors - At the June Conference Call, the board approved the 2017 990 EZ, adding Jennifer Grabner's name to the bank accounts, and changing board conference calls from 12 times a year to 4 times a year. In between the board calls, there will be Team calls to work on People tasks (membership, membership...
engagement and networking), Purpose tasks (conference planning, green schools, grants, etc.), and Resources and Governance. The board can call special meetings for any issues that come up between quarterly meetings

- **Administration - No Updates**

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### Coming Up in the Next Two Months

- **Grants, Contests and Awards Deadlines [details here]**
  - Captain Planet Ecosolution Grants (7/15); Clark Fund (8/1); DNR Photo Contest (9/1); MDC Community Conservation Grants (9/9)

- **Conferences and Meetings [details here]**
  - September 11-14 - Association of Missouri Interpreters Annual Workshop: Cross the Streams: Bring Interpretation and Education Together to Accomplish Shared Goals, Echo Bluff State Park - [http://www.mointerp.net/conference/](http://www.mointerp.net/conference/)

- **Workshops and Events around Missouri [details here]**
  - Exploring Insects - July 18 - Hannibal
  - Getting Little Feet WET and PLT’s Environmental Experiences for Early Childhood - July 21 - Kansas City
  - Adventure Birding - July 14 - Jefferson City
  - Discover Nature Schools - multiple dates - St. Louis
  - Project Learning Tree - July 10 - Prairie State Park
  - Discover Nature: Fishing Lessons 1 & 2 - July 31 - Twin Pines Conservation Education Center
  - Missouri’s Aquatic Worlds - July 7-12 - Castor River Conservation Area

(These count for Environmental Educator Certification categories 1, 2 or 3. Visit the EE Certification page [here](#))

- **Outdoor, Nature, Environmental and Sustainability Event Calendars** - visit our page of organization and agency calendars - If you would like to have your organization’s regularly updated calendar added, email Executive Director Jan Weaver

### EE Jobs [details here]

- Environmental Education Manager, Lake Co. Forest Preserves, Libertyville IL; Education Intern, Shaw Nature Reserve, Gray Summit; Emergency Response Team Member, Americorps, St. Louis; Healthy Food Americorps, Columbia

### Teaching and Learning

#### Air Pollution

**Air Quality Index (AQI) Toolkit for Teachers** K-2 Students learn about the role of air in health, the difference between gases and particles, how breathing changes with activity, how to test for air pollution, how to use the index and steps they can take to protect their health. 3-5 lessons cover ground level ozone, role-play the effects of particle pollution, conduct a traffic study to understand its role in pollution, learn how temperature inversions can affect pollution, and how air pollution affects life and what people can do about it. 6-8 lessons cover symptoms of air pollution, the impact of weather on air pollution, create smog in a jar, use data to determine whether a temperature inversion has occurred, and identify sources of pollution in their communities. AirNow.Gov [https://airnow.gov/index.cfm?action=resources.aqi_toolkit](https://airnow.gov/index.cfm?action=resources.aqi_toolkit)

**Lead**

**Lead Blockers** K-8 Students learn which foods can block lead absorption and help prevent lead poisoning. K-4 uses a relay race, 5-8 uses a game of tag. Includes background on how lead became widespread in the environment. EPA [https://www.epa.gov/sites/production/files/documents/leadblockers.pdf](https://www.epa.gov/sites/production/files/documents/leadblockers.pdf)


**National Lead Poisoning Prevention Week** - [https://www.epa.gov/lead/national-lead-poisoning-prevention-week](https://www.epa.gov/lead/national-lead-poisoning-prevention-week)

#### Endocrine Disruptors

**Endocrine Disruptors** 9-12 Students learn how the public has been “surprised” by the unintended effects of some environmental contaminants and how scientific uncertainty makes it difficult to address the issues of endocrine disruptors. AAAS [http://sciencenetlinks.com/lessons/changing-world-1-endocrine-disruptors/](http://sciencenetlinks.com/lessons/changing-world-1-endocrine-disruptors/)

The Frog Scientist 2: Schoolyard Field Investigation 6-8 Students will study the school yard, develop scientific questions to guide their discovery and share their results. Based on the previous lesson and includes tips on setting students up for a field investigation and journaling. AAAS http://sciencenetlinks.com/lessons/frog-scientist-2/