

History 235: Drugs, Chemicals, & Health
Following substances through economies, environments, and bodies

Prof. Evan Hepler-Smith (evan.heplersmith@duke.edu)

Friedl 126, T/Th 12:00-1:15pm

Office Hours: TBD, 319 Classroom Building and by appointment
(I am also available by Zoom during office hours – see Sakai for link)

This course asks how we might think historically about synthetic chemicals, natural alternatives, and the benefits and hazards they pose to human health, society, and environments. Combining cultural, political, and economic history with interdisciplinary environmental history and science & technology studies, we will follow historical “biographies” and “genealogies” of drugs and chemicals through economies, environments, and bodies, from cellular to planetary scales, comparing and connecting different global settings (including North Carolina).



Sugar cane and refinery, Mississippi River corridor, Louisiana, 1998
[Misrach and Orff, *Petrochemical America* (New York: Aperture, 2012), 51. Photo by Richard Misrach.]

Acknowledgements*: What is now Durham was originally the territory of several Native nations, including Tutelo (*TOO-tee-lo*) and Saponi (*suh-POE-nee*) speaking peoples. Many of their communities were displaced or killed through war, disease, and colonial expansion. Today, the Triangle is surrounded by contemporary Native nations, the descendants of Tutelo, Saponi, and other Indigenous peoples who survived early colonization. These nations include the Haliwa-Saponi (*HALL-i-wa suh-POE-nee*), Sappony (*suh-POE-nee*), and Occaneechi (*oh-kuh-NEE-chee*) Band of Saponi. North Carolina's Research Triangle is also home to a thriving urban Native American community who represent Native nations from across the United States—including Duke's own [Native American/Indigenous Student Alliance](#). These Indigenous nations and communities contribute to North Carolina's ranking as the state with the largest Native American population east of Oklahoma.

Universities can be paradoxical places. Duke, with a [mission](#) to “help those who suffer, cure disease, and promote health,” is among the beneficiaries of industries (tobacco, electrical power generation) that also caused great harm to the health of humans and environments. Some of Duke's past patrons and leaders perpetuated exclusion, exploitation, and silencing of Black people, as did the long-segregated University itself. At the same time, Black students, faculty, staff, and affiliates—and Native members of the Duke community, women in the Duke community, LGBTQ members of the Duke community, and others who have had to fight for full inclusion—are and have long been pivotal contributors to the [university and its institutional evolution](#), including leadership in a present “journey to dismantle behaviors, practices, policies and institutions forged out of white supremacy.”¹

None of these facts are unique to Duke. Yet as members of the Duke community, our collective relationship to them is. The same goes for further facts we may seek out regarding Duke's history and other histories lived before, beyond, within, alongside, and despite it, and their legacies at present-day Duke. Further, we're a disparate “we,” each with our own individual and community histories we may wish to acknowledge and explore, histories inflecting our relationships to Duke's history and to each other.

What do we want to do about it? What does it mean to be responsible to these histories? This course is animated by the conviction that the study of history can be a stepping-stone toward an affirmative kind of responsibility. This means going beyond making a roster of who to blame for unjust harms and undeserved benefits, and beyond a search for the most efficient means to discharge, erase, and forget such debts. Rather, this course aims to make history a starting point for fashioning affirmative individual and collective responsibilities for ourselves based on these histories, and figuring out how to act on them.

This syllabus is a product of many conversations with colleagues, particularly Nicole Barnes, Angela Creager, Ruth Goldstein, Michelle Murphy, Lissa Roberts, Nicholas Shapiro, Gabriela Soto Laveaga, and Keith Wailoo.

¹ The Hurston-James Society, “Juneteenth: An Open Letter to Duke,” *The Chronicle*, 18 June 2020, <https://www.dukechronicle.com/article/2020/06/juneteenth-an-open-letter-to-duke>.

* These acknowledgements, a work in progress, draw on the Land Acknowledgement generously provided by Dr. Ryan Emanuel and Dr. Malinda Lowery of the Lumbee tribe to the Nicholas School, as a provisional measure until Duke University completes the process of working with tribe members statewide to come to agreement on a Duke-wide land acknowledgement. Please see [this link](#) for more information, including from Duke's Native American & Indigenous Student Alliance. These acknowledgements are also informed by conversations with Prof. Juliana Barr, the letter cited above, and Theresa Stewart-Ambo and K. Wayne Yang, "Beyond Land Acknowledgment in Settler Institutions," *Social Text* 39, no. 1 (146) (March 1, 2021): 21–46.

Learning objectives:

- Through completing readings, responding to readings with questions and observations, participating in lecture and discussion, and completing individual "Reflecting, Connecting, Noticing" writing exercises, students will be able to:
 - Explain several aspects of the significance of drugs and chemicals in global history in general, with reference to specific features of the histories of several such substances that are the focus of course readings, lectures, and discussion.
 - Describe methods for addressing chemical substances as historical subject matter, and apply these methods to new substances and historical contexts
 - Analyze texts and images, including scientific publications, as historical primary sources
 - Synthesize arguments about substances and society based on *both* natural science arguments & data *and* historical arguments & primary source evidence
 - Notice chemical substances in our everyday lives, work, and environments, ask historical questions about their origins, the places and people they connect, and their positive and negative consequences, and reflect on what it might mean to be responsible to these histories.
- Through the multi-stage, term-long collaborative Compound Histories group project, culminating in preparation of a web presentation, podcast, or other major presentation of the group's design, students will be able to:
 - Find and analyze historical primary sources pertaining to a specific substance, including experience analyzing scientific publications in historical context
 - Assess the strengths, weaknesses, and applicability of arguments of secondary sources, and apply secondary source arguments in constructing their own arguments.
 - Design and carry out a collaborative team project with several interconnected components and themes, develop shared guidelines for accountability and mutual support, and combine individual contributions into a unified argument

Syllabus subject to change at instructor's discretion. Latest version posted on Sakai.

Course requirements and grading:

**** Since group Compound Histories Projects are a significant component of the course grade, this course may not be taken S/U. ****

- Participation 30%
- Welcome and Compound Histories surveys 5%
- Compound Histories project
 - Group submissions 3 * 12%
 - Individual submissions (reflecting, connecting, noticing) 3 * 10%

Course logistics: A typical class session will include:

- a) **Readings**, available digitally via Sakai.
- b) **Brief lectures** providing historical context or introducing methods of historical analysis, followed by full-class **discussion** of readings.
- c) An **exercise** (on your own, in small groups, or in large groups) applying ideas from lecture, readings, and discussion and getting practice with a task that is part of the Compound Histories group project
- d) Once a week, time to **check in with your project group** and plan next steps

Participation: To do your part in our work together, please:

- a) **Read** each week's assigned texts.
- b) **Post once a week on our Sakai Forum, by 9am on the morning of class, so *either* Tuesday or Thursday**, beginning in Week 2. We'll use these posts to help kick-off our in-class discussions. Your post may:
 - a. Respond to discussion questions for a reading or readings to be discussed in the upcoming class.
 - b. Respond constructively to another student's post for this week, being sure to relate your comments to our readings.
 - c. Circle back to an idea from a preceding week (from a student post, a class discussion, or a reading) that you'd like to return to in light of this week's readings and/or themes.
 - d. *If you are responsible for a Project Source for the week:* Post a source or a portion of a source, along with a bit of information about the source, how it fits into your group's project, and a discussion question or two about your source pertinent to the session reading and topic (**due by the morning of the day BEFORE our class meeting, so 9am Monday or 9am Wednesday**)
 - e. *If you are a Discussion Reporter for the class:* post notes summarizing a group discussion (**due by the end of the week, Friday at 5pm**)
- c) **Attend** class sessions, engaging as both **speaker** and **listener**.
- d) **Present** work in progress as a group, prior to each checkpoint.

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Discussion and attendance: You are responsible for all material covered during all class meetings. (Lecture slides will be posted on Sakai.) Since discussion is a crucial component of our course, attendance is required. But things come up! You are permitted three “personal day” absences, no questions asked. Additional absences will be excused provided you a) submit a note from a physician or documentation of required university activities and b) complete a make-up exercise.

Compound Histories project: As a semester project, in groups of five, you will investigate aspects of the history, life cycle, and beneficial and/or harmful health consequences of a chemical substance. We will carry out this project in three stages, each concluding with a group submission and individual short essays reflecting on your research and drawing connections to class-wide readings and discussions. This project will give you the chance to address your substance in contexts, uses, and perspectives of your choice. Our readings, class discussions, and in-class exercises are geared toward supporting your work on this project, and we will regularly make time during class for project work. Details on Sakai.

Late submissions: Except with prior consultation and written consent of instructor, a **half letter grade** (A to A-, A- to B+, etc.) will be deducted from assignments submitted after the deadline listed on the syllabus. An **additional half-letter grade** will be deducted for each additional two days of late submission (including weekends). Questions? Ask! (I mean it: please do ask. Deadlines are there to support your progress, not to burden you.)

Collegiality and mutual support: We all bring different perspectives, experiences, identities, and concerns to this class. Some topics may be a matter of positive personal experience to come, negative personal experience to others, and entirely unfamiliar to still others. You will all disagree (we hope!) with some of the arguments advanced by our authors, instructors, and each other. We ask that you join in supporting our mutual growth by posing frank questions, presenting sincere arguments, testing uncertain ideas, and listening and responding to each other in a tough-minded spirit of generosity. Please keep an eye on the syllabus and our communications regarding what’s coming up; if you have any concerns, please let us know.

Unforeseen conflicts: We’re committed to being flexible and making accommodations that are fair to you and your fellow students. If you anticipate trouble, please speak with your instructors as soon as possible. The more we can stay ahead of challenging circumstances, the better we’ll be able to navigate them.

Collaboration and academic integrity: Group project submissions are evaluated as the collective work of all group members. You are warmly encouraged to consult with others in

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and outside of class on all aspects of this project. Individual assignment submissions should reflect your own reading, thinking, and writing. As a matter of intellectual generosity, please acknowledge any substantial assistance you receive from anyone other than the course instructor by including an “acknowledgements” note in your individual or group submission.

This course is subject to the [Duke Community Standard](#)—make sure you’re familiar with it. If you have questions on collaboration, [citation](#), or [appropriate use of sources](#), please ask!

Electronics, accommodations and accessibility: Like drugs and chemicals, classroom electronics are a *pharmakon*—at once remedy, poison, & scapegoat for our limitations and successes.

We will make substantial use of electronics for in-class exercises, so please bring laptops or tablets with you to class. With the exception of emergencies, please join me in directing in-class multitasking toward activities that feed into our course (taking notes; consulting readings; searching for answers to questions that come up during discussion) rather than distract from it. As much as is feasible and in accord with accessibility, please join me in using laptops or tablets rather than phones for these purposes, keeping phones away during lectures and discussions. For technology and accessibility support, please contact the [Academic Resource Center](#), [OIT](#), or other relevant campus resources.

We want to do all we can to ensure that this class is accessible, inclusive, and equitable for all students. Please notify us within the first two weeks of class (or as soon as possible thereafter, for concerns arising mid-semester) with information about accommodations that we can provide to ensure accessibility, per the [Student Rights and Responsibilities](#) of the Duke accessibility office. If you have other concerns about classroom inclusiveness, please let us know. We will work with you!

Duke University is committed to providing equal access to students with documented disabilities. Students with disabilities may contact the Student Disability Access Office (SDAO) to ensure your access to this course and to the program. There you can engage in a confidential conversation about the process for requesting reasonable accommodations both in the classroom and in clinical settings. Students are encouraged to register with the SDAO as soon as they begin the program. Please note that accommodations are not provided retroactively. More information can be found online at access.duke.edu or by contacting SDAO at 919-668-1267, SDAO@duke.edu.

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Spraying DDT in Oregon, 1955.

[USDA Forest Service, Pacific Northwest Region, State and Private Forestry, Forest Health Protection. Portland Station Collection, image PS-1429; <https://www.flickr.com/photos/151887236@N05/32213742634/>]

UNIT 1: TELLING HISTORIES OF CHEMICALS AND DRUGS

Week 1: Fertilizers, dyes, fossil fuels, sugars, plastics, ...

Tues, Aug 30 *Pharmakon planet*

- *Suggested*
 - Benjamin Labatut, *When We Cease to Understand the World*, trans. Adrian Nathan West (London: Pushkin Press, 2021), 1-33 (“Prussian Blue”).
 - Podcast: Ezra Klein and C. Thi Nguyen, “Are We Measuring Our Lives in All the Wrong Ways?,” *The Ezra Klein Show*, 25 Feb 2022, <https://www.nytimes.com/2022/02/25/opinion/ezra-klein-podcast-c-thi-nguyen.html>.

Thurs, Sept 1 *Compound histories*

- Timothy Mitchell, “Can the Mosquito Speak?,” in *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002), 25–32 (through end of paragraph at top of 32 in ProQuest Ebook edition), <https://find.library.duke.edu/catalog/DUKE008585996>.
- Roland Barthes, *Mythologies*, trans. Annette Lavers (New York: Hill and Wang, 1972), 36-38, 58-61, 97-99 (“Soap-powders and Detergents,” “Wine and Milk,” and “Plastic”).
- *Suggested*:
 - Bernadette Bensaude-Vincent and Jonathan Simon, “Chemistry and Pollution,” in *Chemistry: The Impure Science*, 2nd ed. (London: Imperial College, 2012), 11-32, <https://find.library.duke.edu/catalog/DUKE009877275>.
 - Jeremy A. Greene and Sergio Sismondo, “Introduction,” in *The Pharmaceutical Studies Reader*, ed. Sismondo and Greene (Malden, MA: Wiley Blackwell, 2015), especially “Key Themes in Pharmaceutical Studies” (4-10), <https://find.library.duke.edu/catalog/DUKE008568396>.

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Week 2: Opium & PCBs

Tues, Sept 6 What is a drug?

- James F. W. Johnston, "The Narcotics We Indulge In—The Poppy and the Lettuce," in *The Chemistry of Common Life*, vol. 2 (New York: D. Appleton, 1855), 58-87, <https://catalog.hathitrust.org/Record/008630551>. [direct link to chapter]
- J. G. Bartholomew, "Opium, Drugs, etc." in *Atlas of the World's Commerce*, David Rumsey Historical Map Collection (London: George Newnes, Limited, 1907), 170-172 <https://www.davidrumsey.com/luna/servlet/s/d87uhi>. [direct link to 170-171] [direct link to 172]
- Amitav Ghosh, *Sea of Poppies* (New York: FSG, 2008), 1-9, 83-91.

Thurs, Sept 8 What is a chemical?

- Michelle Murphy, "Reimagining Chemicals, with and Against Technoscience," in *Reactivating Elements: Chemistry, Ecology, Practice*, ed. Dmitris Papadopoulos, Maria Puig de la Bellasca, and Natasha Myers (Duke University Press, 2021), 257-279, <https://read.dukeupress.edu/books/book/2991/Reactivating-ElementsChemistry-Ecology-Practice>.
- *Skim:*
 - Russel L. Jenkins, Rogers McCullough, and C. F. Booth, "Syntheses in the Diphenyl Series," *Industrial & Engineering Chemistry* 22, no. 1 (January 1, 1930): 31-34, <https://doi.org/10.1021/ie50241a008>.
 - Lemuel M. Aycock, "Some Notable Developments of Chemical Industry in the South," *Industrial & Engineering Chemistry* 22, no. 5 (May 1, 1930): 427-33, <https://doi.org/10.1021/ie50245a003>
 - Chester H. Penning, "Physical Characteristics and Commercial Possibilities of Chlorinated Diphenyl," *Industrial & Engineering Chemistry* 22, no. 11 (November 1, 1930): 1180-82, <https://doi.org/10.1021/ie50251a020>
- *Suggested:*
 - David A. Bell, "Two Cheers for Presentism," *The Chronicle of Higher Education*, August 23, 2022, <https://www-chronicle-com.proxy.lib.duke.edu/article/two-cheers-for-presentism>.

*****Welcome Survey & Compound Histories Survey due Fri, Sept 9, 5pm*******UNIT 2: SUBSTANCES & SOCIETIES****Weeks 3-4: Tobacco**

Tues, Sept 13 Networks and responsibility

- Nan Enstad, "The Bright Leaf Tobacco Network," in *Cigarettes, Inc.: An Intimate History of Corporate Imperialism* (University of Chicago Press, 2018), 86-119, <https://find.library.duke.edu/catalog/DUKE009690995>.

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SPECIAL EVENTS (optional):

Weds, Sept 14, 1pm: The Birth of a Movement: A 40th Anniversary Retrospective (Webinar)

Weds, Sept 14, 6pm: Panel Discussion featuring former protesters, photographer, former Congresswoman Eva Clayton and Rev. Ben Chavis (Duke University Chapel)

Thurs, Sept 15, 5:30 PM, Rev. Ben Chavis (Duke University Chapel)

Thurs, Sept 15 Materials and meanings

- Marcy Norton, *Sacred Gifts, Profane Pleasures: A History of Tobacco and Chocolate in the Atlantic World* (Ithaca: Cornell University Press, 2008), 1-27.
 - [\[Link to hi-res version of image on p. 25, from original source\]](#)
- Gina Boudreau et al., "Why the World Will Never Be Tobacco-Free: Reframing 'Tobacco Control' Into a Traditional Tobacco Movement," *American Journal of Public Health* 106, no. 7 (July 2016): 1188-95, <https://doi.org/10.2105/AJPH.2016.303125>.



Traditional Tobacco and Commercial Tobacco

[National Native Network, <http://keepitsacred.itcmi.org/2018/07/nnn-ihs-hpdp-webinar-southwest-tribal-tobacco-coalition/>]

Syllabus subject to change at instructor's discretion. Latest version posted on Sakai.

Tues, Sept 20 *What do chemicals have to do with race?*

- Keith Wailoo, *Pushing Cool: Big Tobacco, Racial Marketing, and the Untold Story of the Menthol Cigarette* (University of Chicago Press, 2021), 123-177 (“Building a Black Franchise”).
- *Suggested:*
 - Check out *Tobaccoland* exhibit (Mary Duke Biddle Room in Rubenstein & online at <https://exhibits.library.duke.edu/exhibits/show/tobaccoland/introduction>)

SPECIAL EVENT (optional):

Tues, Sept 20, 5:45-7:15pm: Keith Wailoo, Pushing Cool: Big Tobacco, Racial Marketing, and the Untold Story of the Menthol Cigarette (Nasher)

Thurs, Sept 22 *Reading primary sources*

- Project source 1: A primary source

UNIT 3: CHEMICAL EMPIRES

Week 5: Gold

Tues, Sept 27 *Plants, gold, alchemy, mining, gender, and sex*

- Tara E. Nummedal, *Anna Zieglerin and the Lion's Blood: Alchemy and End Times in Reformation Germany* (Philadelphia: University of Pennsylvania Press, 2019), 12-19, 70-100 (“Introduction: A Witch’s Chair?” and “The Lion’s Blood”; page numberings per ProQuest ebook), <https://find.library.duke.edu/catalog/DUKE008900300>.
- *Suggested:*
 - Gabriela Soto Laveaga, “Largo Dislocare: Connecting Microhistories to Remap and Recenter Histories of Science,” *History & Technology* 34, no. 1 (March 2018): 21–30, <https://doi.org/10.1080/07341512.2018.1516850>.

Thurs, Sept 29 *Unfamiliar sources and elusive historical actors*

- Project source 2: a primary source in which there’s some weird stuff going on and/or that sheds light on elusive historical actors.

Weeks 6-7: Checkpoint 1

Tues, Oct 4 *Checkpoint 1 work-in-progress presentations (Groups 1-2)*

Thurs, Oct 6 *Checkpoint 1 work-in-progress presentations (Groups 3-5)*

*****Compound Histories Project: Group Assignment 1*****
Due Friday, Oct 7, 5pm

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Mon, Oct 10 **INDIGENOUS PEOPLES' DAY**

- Some recommended reading:
 - Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants* (Milkweed Editions, 2013), <https://find.library.duke.edu/catalog/DUKE008473988>.
 - Max Liboiron, *Pollution Is Colonialism* (Duke University Press, 2021), <https://read.dukeupress.edu/books/book/2876/Pollution-Is-Colonialism>.
 - Ryan E. Emanuel (Duke faculty member in Nicholas), "Water in the Lumbee World: A River and Its People in a Time of Change," *Environmental History* 24, no. 1 (January 1, 2019): 25–51, <https://doi.org/10.1093/envhis/emy129>
 - Ryan E. Emanuel and David E. Wilkins, "Breaching Barriers: The Fight for Indigenous Participation in Water Governance," *Water* 12, no. 8 (August 2020): 2113, <https://doi.org/10.3390/w12082113>.

Tues, Oct 11 **FALL BREAK**

Thurs, Oct 13 No class -- work on Individual Assignment 1

*****Reflecting, Connecting, Noticing: Individual Assignment 1*****
Due Friday, Oct 14, 5pm

Week 8: Wonder drugs: antimalarials, antibiotics, vaccines

Tues, Oct 18 **Cures, resistance, and their origins**

- Youyou TU, "Artemisinin—A Gift from Traditional Chinese Medicine to the World (Nobel Lecture)," *Angewandte Chemie International Edition* 55, no. 35 (2016): 10210–26, <https://doi.org/10.1002/anie.201601967>.
- Julie Livingston, Keith Wailoo, and Barbara M. Cooper, "Vaccination as Governance," in *Three Shots at Prevention: The HPV Vaccine and the Politics of Medicine's Simple Solutions* (Baltimore: Johns Hopkins University Press, 2010), 231–253.
- Suggested:
 - Apoorva Mandavilli, "Polio Was Almost Eradicated. This Year It Staged a Comeback.," *The New York Times*, August 18, 2022, sec. Health, <https://www.nytimes.com/2022/08/18/health/polio-new-york-malawi.html>.

Thurs, Oct 20 **Locating Compound Histories**

- Project source 3: secondary source that appears useful for locating compound histories
- Bharat Jayram Venkat, "Of Cures and Curses: Toward a Critique of Curative Reason," *Public Culture* 30, no. 2 (May 1, 2018): 277–82, <https://doi.org/10.1215/08992363-4310918>.
- Suggested:
 - Bharat Jayram Venkat, *At the Limits of Cure* (Durham: Duke University Press, 2021), ix–xiv, 167–208 ("Preface" and "Wax and Wane"), <https://read.dukeupress.edu/books/book/2946/At-the-Limits-of-Cure>.

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Week 9: Waste and resources

Tues, Oct 25 The economics of poisons

- Adam Romero, *Economic Poisoning: Industrial Waste and the Chemicalization of American Agriculture* (Oakland: University of California Press, 2022), 75-97, 139-143 ("Manufacturing Petrotoxicity," "Conclusion").
- Vann R. Newkirk II, "Fighting Environmental Racism in North Carolina," *The New Yorker*, January 16, 2016.
- Boudia et al., *Residues: Thinking through Chemical Environments* (New Brunswick: Rutgers University Press, 2021), 7-16 (section "Things to Think With").
- "60 Years Growth of the Petroleum Tree, Socony Vacuum, November 1943," *The Visual Primer of Advertising Cliches* (blog), <http://advertisingcliche.blogspot.com/2013/08/60-years-growth-of-petroleum-tree.html>.

Thurs, Oct 27 Comparing Compound Histories

- Project source 4: one or two sources (primary or secondary) that present an opportunity to compare compound histories

Week 10: How substances meet

Tues, Nov 1 Traffic

- Ruth Goldstein, "Life in Traffic: Riddling Field Notes on the Political Economy of 'Sex' and Nature," *Cultural Anthropology* 37, no. 2 (2022): 251-85, <https://doi.org/10.14506/ca37.2.08>.

Thurs, Nov 3 Connecting Compound Histories

- Project source 5: one or two sources (primary or secondary) that present an opportunity to connect compound histories

Week 11: Checkpoint 2

Tues, Nov 8 Checkpoint 2 work-in-progress presentations (Groups 4-5)

Thurs, Nov 10 Checkpoint 2 work-in-progress presentations (Groups 1-3)

*****Compound Histories Project Part 2*****

Due Fri, Nov 11, 5pm

UNIT 3: CHEMICAL FUTURES

Weeks 12-13: Solutions or fixes?

Tues Nov 15 *Sustainable chemistry and the circular economy*
(Conversation w/ guest: Pratt PhD candidate Austin Wadle)

- *Suggested:*
 - David J. C. Constable, "Green and Sustainable Chemistry – The Case for a Systems-Based, Interdisciplinary Approach," *IScience* 24, no. 12 (December 17, 2021): 103489, <https://doi.org/10.1016/j.isci.2021.103489>.
 - Hervé Corvellec, Alison F. Stowell, and Nils Johansson, "Critiques of the Circular Economy," *Journal of Industrial Ecology* 26, no. 2 (2022): 421–32, <https://doi.org/10.1111/jiec.13187>.

Thurs, Nov 17 No class -- work on Individual Assignment 2

*****Reflecting, Connecting, Noticing: Individual Assignment 2*****

Due Fri, Nov 18, 5pm

Tues, Nov 22 *Precision medicine and essential drugs*

- Francis S. Collins and Harold Varmus, "A New Initiative on Precision Medicine," *New England Journal of Medicine* 372, no. 9 (February 26, 2015): 793–95, <https://doi.org/10.1056/NEJMp1500523>.
- Muin J. Khoury and Sandro Galea, "Will Precision Medicine Improve Population Health?," *JAMA* 316, no. 13 (October 4, 2016): 1357–58, <https://doi.org/10.1001/jama.2016.12260>.
- Jeremy A. Greene, "Making Medicines Essential: The Emergent Centrality of Pharmaceuticals in Global Health," *BioSocieties* 6, no. 1 (March 1, 2011): 10–33, <https://doi.org/10.1057/biosoc.2010.39>.

Thurs Nov 24 **THANKSGIVING**

We will be happy to provide feedback on partial or full drafts of project Final Submission materials. Drafts are due by 5pm Monday, Nov 28. We will return feedback by 5pm Monday, Dec 5.

Tues, Nov 29 *Anticolonial science*

- Max Liboiron, *Pollution Is Colonialism* (Duke University Press, 2021), 113-156 ("An Anticolonial Pollution Science"), <https://read.dukeupress.edu/books/book/2876/Pollution-Is-Colonialism>.
- *Suggested:*
 - Robin Wall Kimmerer, "The Serviceberry: An Economy of Abundance," *Emergence Magazine*, December 10, 2020, <https://emergencemagazine.org/essay/the-serviceberry/> (essay or podcast).

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Weeks 14-15: Putting history to work

Thurs, Dec 1 Final submission work-in-progress presentations (Groups 1-5)

Tues, Dec 6 Wrap-up: Final thoughts and open questions

Thurs, Dec 8 Open office hours, in classroom: Continuing conversations, project questions

*****Compound Histories Project Final Submission*****

Due Friday, Dec 9, 5pm

*****Reflecting, Connecting, Noticing: Individual Assignment III*****

Due Saturday, Dec 17, 5pm

SUPPLEMENTARY BIBLIOGRAPHY

Overviews and miscellanies

- *General chemical and pharmaceutical reference works:*
 - See <https://guides.library.duke.edu/chemistry/gettingstarted>
 - *Ullmann's Encyclopedia of Industrial Chemistry*, 6th-7th ed. (Weinheim: Wiley-VCH, 2003-2020), <https://onlinelibrary-wiley-com.proxy.lib.duke.edu/doi/book/10.1002/14356007>.
 - *Merck Manual of Diagnosis and Therapy*, <https://www.merckmanuals.com/professional>
- *Blogs and series:*
 - *Global interconnections of materials and society in the Anthropocene: Technosphere Magazine*, <https://technosphere-magazine.hkw.de/>, esp. the issues on "Materials," "Metabolic Systems," "Phosphorus," "Spheres," and "Substances."
 - *Drug discovery: Derek Lowe, "In the Pipeline,"* <https://blogs.sciencemag.org/pipeline/>
- *Chemicals and "chemistries"*
 - Lissa L. Roberts and Simon Werrett, eds., *Compound Histories: Materials, Governance and Production, 1760-1840* (Leiden: Brill, 2018), <https://brill.com/view/title/33694>.
 - Roald Hoffmann, *The Same and Not the Same* (New York: Columbia University Press, 1995), esp. xiii-51.
 - Lissa Roberts, "Exploring Global History through the Lens of History of Chemistry: Materials, Identities and Governance," *History of Science* 54, no. 4 (2016): 335-61.
 - Projit Bihari Mukharji, "Parachemistries: Colonial Chemopolitics in a Zone of Contest," *History of Science* 54, no. 4 (2016): 362-82.
 - Evan Hepler-Smith, "Molecular Bureaucracy: Toxicological Information and Environmental Protection," *Environmental History* 24, no. 3 (2019): 534-60.
 - Carsten Reinhardt, ed., "Focus: What's in a Name: Chemistry as a Nonclassical Approach to the World," *Isis* 109, no. 3 (2018): 559-607.
 - Bernadette Bensaude-Vincent and Jonathan Simon, *Chemistry: The Impure Science*, 2nd ed. (London: Imperial College Press, 2012).
 - W. H. Brock, *The Chemical Tree: A History of Chemistry* (New York: Norton, 2000).
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Residents protest a lead smelter near Mombasa, Kenya, in 2013.

Photo by Norbert Allen, in Human Rights Watch, “Kenya: Toxic Lead Threatening Lives,” 24 June 2014, <https://www.hrw.org/news/2014/06/24/kenya-toxic-lead-threatening-lives>, accessed 21 June 2018.

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