

Lessons from History and Science Studies

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Lesson 1: In facing unprecedented challenges, it is good to seek historical precedents. Some climate engineers insist they are the “first generation” to propose the deliberate manipulation of the planetary environment. History says otherwise.

In the 1840s the first serious large scale engineering proposal to emulate “artificial volcanoes” was advanced by James Espy, employed by the U.S Army as the first national meteorologist. Espy proposed lighting huge fires to control and enhance rainfall, arguing that it would not only eliminate droughts, but also heat waves and cold snaps and would render the air healthy by clearing it of miasmas.

In 1901 the Swedish meteorologist Nils Ekholm wrote of the “grand possibility” that it might be possible “to regulate the future climate of the Earth and prevent the arrival of a new Ice Age” or CO₂-induced climate warming by opening up and burning coal seams or “by protecting the weathering layers of silicates from the influence of the air and by ruling the growth of plants.”

In 1955 the famous mathematician John von Neumann warned that the dangers of global climate control may be greater than those of nuclear proliferation. In 1962 his colleague Harry Wexler, Head of Research at the US Weather Bureau, used computer models and satellite surveillance to study techniques to change Earth’s heat budget. It was Wexler, in the era of JFK, who first claimed climate control was now “respectable to talk about,” even if he considered it quite dangerous and undesirable. Wexler also warned, notably, that the stratospheric ozone layer was vulnerable to inadvertent or intentional damage from small amounts of a catalytic agent such as chlorine or bromine.

Lesson 2: Ancient myth and storytelling reveal the dangers involved in the perennial quest to control nature. A recent (2006) NASA meeting pursued the topic of “Managing Solar Radiation.” A meeting coordinator apologized for not being able to control the temperature of the room. In Greek mythology Phaeton thought he could control the sun chariot of his father Helios—he was horribly mistaken. Also recently, a prominent meteorologist recently suggested we “take up Phaeton’s reins” to control climate. He too is wrong. Is technology providing us with long, stronger, and more precise “Archimedean levers” to move the Earth? The modern day Archimedes still has no place to stand and still cannot predict where the climate system would roll if tipped. Quoting MIT’s Ron Prinn, “How can you engineer a system whose behavior you don't understand?”

3. Commercial and military interests inevitably influence what scientists might consider purely technical issues.

Agricultural interests drove the nineteenth-century charlatan rainmakers in the American west, also Irving Krick’s commercial cloud seeding in the 1950s. In the early Cold War era the military sought to control clouds and storms as weapons and in the service of an all-weather air force. There was a “weather race” with the Russians and secret cloud seeding in Vietnam. The 1978 United Nations Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification

Techniques (ENMOD), a landmark treaty, may have to be revisited soon to avoid or at least try to mitigate possible military or hostile use of climate control.

4. Climate change is an international, intergenerational, and interdisciplinary issue. We need to seek a full range of diverse perspectives. Geoengineering is not an American issue, nor is it the purview of Western engineers.

5. Geoengineering, like climate change, is quintessentially a hybrid socio-technical issue. As the draft statement of the American Meteorological Society recommends, we need a concerted study of the human historical, ethical, and social dimensions of intervention.

References:

Fleming, James Rodger. *Fixing the Sky: The checkered history of weather and climate control*. Book under contract with Columbia University Press, in press.

Fleming, James Rodger. "The Climate Engineers: Playing God to Save the Planet," *Wilson Quarterly* (Spring 2007): 46-60.
<http://www.colby.edu/sts/climateengineers.pdf>

Fleming, James Rodger. "The Pathological History of Weather and Climate Modification: Three cycles of promise and hype," *Historical Studies in the Physical Sciences* 37, no. 1 (2006): 3-25.
http://www.colby.edu/sts/06_fleming_pathological.pdf

Fleming, James Rodger. "Global Climate Change and Human Agency: Inadvertent influence and 'Archimedean' interventions," *Intimate Universality: Local and Global Themes in the History of Weather and Climate*, J.R. Fleming, V. Jankovic, and D.R. Coen, ed. Sagamore Beach, Mass.: Science History Publications/USA, 2006. pp. 223-248. http://www.colby.edu/sts/06_fleming_archimedean.pdf

Fleming, James Rodger. "Fixing the Weather and Climate: Military and Civilian Schemes for Cloud Seeding and Climate Engineering." Pp. 175-200 in *The Technological Fix: How people use technology to create and solve problems*, Lisa Rosner, ed. Hagley Center Studies in the History of Business and Technology. New York: Routledge, 2004. http://www.colby.edu/sts/04_fleming_fixing.pdf