

The Chronicle

By Alice Loyd (through November 2, 2014)

CLIMATE

It's all about climate.



On Sunday, September 21, New York City saw what is being called the largest [mobilization](#) against climate change in the history of the planet. The crowd, estimated at 400,000 people of all ages and from around the world, filled midtown Manhattan streets to demand action to avert catastrophic climate change. The People's Climate March represented a broad range of participants: environmental activists, elected officials, celebrities, nationwide community organizing groups, LGBT groups, members of indigenous communities, students, clergy members, scientists, private citizens and uncountable other concerned parties. More than 1,400 partner organizations signed onto the march.

On Monday, September 22, several thousand activists gathered in the streets of New York City's financial district under the "[Flood-Wall-Street](#)" banner. As reported in the *Wall Street Journal*, "protesters occupied Broadway for nearly eight hours, with at least two hundred staging a sit-in while several thousand others joined them in support. A total of 102 people were arrested for disobeying orders to disperse."

Also on Monday, the Rockefeller Brothers Fund announced its divestment from fossil fuels.

Timed to precede the [United Nations Climate Summit](#) in New York City, the Fund's announcement conveyed that the \$860-million philanthropic organization founded on the family's Standard Oil income will join the divestment movement aimed at reducing greenhouse gas emissions.

On Tuesday, September 23, UN Secretary General Ban Ki-moon gathered world leaders in New York, asking them to spell out their national [action-plans](#) for climate change. "Climate change is the defining issue of our times," Ban Ki-Moon has said over and over again, urging that "now is the time for action."

At the summit, leaders pledged billions for a global climate fund to help developing nations, set specific targets to cut greenhouse gas emissions and promised greater use of clean energy. [Business leaders](#) were there as well, with many, including financial firms, pledging to cut carbon emissions from their operations and investment portfolios. President Obama made a speech that recognized the People's Climate March.

Nice words, but U.S. emissions are up 2.9 percent. As climate marchers were gathering on Sunday, [Global Carbon Project](#) reported carbon dioxide (CO²) emissions from fossil fuel burning and cement production rose 2.3% worldwide in 2013. As published in the journal *Nature Geoscience*, global emissions are now 61% above 1990 emissions (the Kyoto Protocol reference year). Emissions are projected to increase by a further 2.5% in 2014. The summary says, "In 2013, the ocean and land carbon sinks respectively removed 27% and 23% of total CO₂ (fossil fuel and land use change), leaving 50% of emissions in the atmosphere.

On November 2 the Intergovernmental Panel on Climate Change (IPCC) issued its Synthesis Report as the final part of the IPCC's Fifth Assessment Report (AR5). The document is based on the reports of the three Working Groups, including relevant Special Reports, and provides an integrated view of climate change.

From the ["Summary for Policymakers"](#) (with references to the sections of the [Synthesis Report](#)):

- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems. {1}
- Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen. {1.1}
- Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century. {1.2, 1.3.1}

- Climate change will amplify existing risks and create new risks for natural and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development. {2.3}
- Many aspects of climate change and associated impacts will continue for centuries, even if anthropogenic emissions of greenhouse gases are stopped. The risks of abrupt or irreversible changes increase as the magnitude of the warming increases. {2.4}
- Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change. Substantial emissions reductions over the next few decades can reduce climate risks in the 21st century and beyond, increase prospects for effective adaptation, reduce the costs and challenges of mitigation in the longer term, and contribute to climate-resilient pathways for sustainable development. {3.2, 3.3, 3.4}

The report is emphatic, but nevertheless cautious in its predictions. To see other scientific data pointing to greater risks, see [washingtonpost-theyre-too-conservative](#). To read the IPCC conclusions in less scientific language, see [grist10-things-you-need-to-know-from-the-new-ipcc-climate-report/](#)

Another reason estimates of ocean warming may be lower than the reality. Since the 1970s, according to a new [study](#) by Paul J. Durack of Lawrence Livermore National Laboratory and others, the underestimation was the result of decades of spotty sampling of water temperatures in the Southern Hemisphere, home to three-fifths of the world's oceans. Until 2004, when a worldwide system of autonomous floats, called Argo (see Argo visualization of the movements of autonomous floats, left) became operational, there were relatively few



temperature measurements south of the Equator. The study showed that the amount of heat absorbed by the top 2,200 feet of the oceans from 1970 to the mid-2000s may be as much as 58 percent higher than previously estimated.

A historical survey shows the rise in sea levels over the past century unmatched by any period in the past 6,000 years. Here's a [report](#) for sea-level-rise over millennia. The reconstruction of 35,000 years of sea level fluctuations finds that there is no evidence that levels changed by more than 20 centimeters in a relatively steady period that lasted between 6,000 years ago and about 150 years ago. This finding makes the past century extremely unusual in the historical record, when there has been a 20 centimeter rise since the start of the 20th century. Scientists have identified rising temperatures, which have caused polar ice to melt and thermal expansion

of the sea, as the primary cause of the sea level increase. A two-decade-long collection of about 1,000 ancient sediment samples off Britain, North America, Greenland and the Seychelles formed the basis of the research, led by the Australian National University.

U.S. military officials have long warned that changes in climate patterns, resulting in increased severe weather events and coastal flooding, will have a costly impact on military operations. At a [conference](#) of military leaders in Arequipa, Peru, in October, Defense Secretary Chuck Hagel reiterated, "Our militaries' readiness could be tested, and our capabilities could be stressed." He called climate change "a threat multiplier that could exacerbate terrorism," and said that food and water shortages could fuel disputes and instability around the world. His statements reflect findings published in a US Department of Defense report on the issue: [2014 Climate Change Adaptation Roadmap](#).

As for example, U.S. pursuit of more high-risk fossil fuel extraction. As early as next spring the oil and gas [exploration](#) will begin again off the East Coast. In a McClatchy Washington Bureau story that appeared on September 18, Mayor Bob Edwards of Nags Head, North Carolina, said he's terrified about what the intense sound waves can do to dolphins and endangered North Atlantic right whales, of which only 500 remain.

The seismic surveys are done with compressed air guns that blast as loud as a howitzer under the sea, repeated every 10 seconds or so for weeks at a time. Echoes from the blasts are used to produce three-dimensional maps that help company geologists figure out whether sub-sea rock formations are likely to contain fossil fuels worth drilling.

Which foods will become scarcer as the climate warms? Some analysts have argued that an increase in CO₂ is a good thing for farming. [David Lobell](#), deputy director of the Center on Food Security and the Environment at Stanford University, disagrees, noting, "There's a point at which adding more and more CO₂ doesn't help." Factors such as the availability of water, the increasing occurrence of high and low temperature swings and the impact of stress on plant health may outweigh the benefits of a CO₂ boost. Lobell observes that yield data from corn and wheat production indicates they are already being negatively affected by the changing climate.

Here's a list of favorite foods Lobell sees threatened by warm temperatures.

- Corn: A global rise in temperatures of just 1C (1.8F) would slow the rate of growth by 7%. Lower corn yields could mean higher meat prices, since many beef cattle are fattened on corn.
- Coffee: Coffee rust fungus and invasive species are hurting coffee production in Latin America, due to higher-than-average temperatures. In Africa, the number of regions suitable for growing coffee is predicted to fall anywhere from 65% to 100% as the climate warms.
- Chocolate: the International Center for Tropical Agriculture (CIAT) predicts rising temperatures and falling water supplies will make cacao beans, the raw ingredient in chocolate, less plentiful over the next few decades.
- Seafood: Ocean acidification threatens calcifying organisms such as oysters, and almost all fish are slow to adapt to acidification. Tropical fish are more susceptible to parasites

in warmer water. Fish migrating to cooler waters are taking the food of native species that might otherwise survive.

- Maple syrup: Wetter winters and drier summers are putting more stress on sugar maples. The trees need freezing winter temperatures to fuel the expansion and contraction process that they use to produce the sap.
- Beans: Higher temperatures affect flowering and seed production in bean vines, reducing yields by as much as 25%. “Beans are very sensitive to climate,” says CIAT’s Jarvis. “High temperatures, especially at night, can significantly affect the productivity of the crop.”
- Cherries: Stone fruits, particularly cherries, require chill hours to bear fruit; too few cold nights, and the trees are less likely to achieve successful pollination.
- Wine grapes: Fluctuations in temperature and moisture levels in Europe, Australia, North American, and South Africa will hit the wine industry hard. In Australia 73% of the land could be unsuitable for growing grapes by 2050, and in California the loss could be as much as 70%.

INEQUALITY

The companion issue to climate change is inequality. While the events cited below that concern economic and racial inequality don’t explicitly make the connection, they are related. The richest 1% are getting richer from fossil fuel and other extraction industries that drive global warming, and people of color bear the brunt of injustice.

Inequality grows as the wealthy share less of their wealth. On October 5, *The Chronicle of Philanthropy* [published figures](#) that show the wealthiest Americans—those who earned \$200,000 or more—reduced the share of income they gave to charity by 4.6 percent from 2006 to 2012. Middle- and lower-income Americans increased the share of income they donated to charity, even as they, on average, earned less, than they did six years earlier.

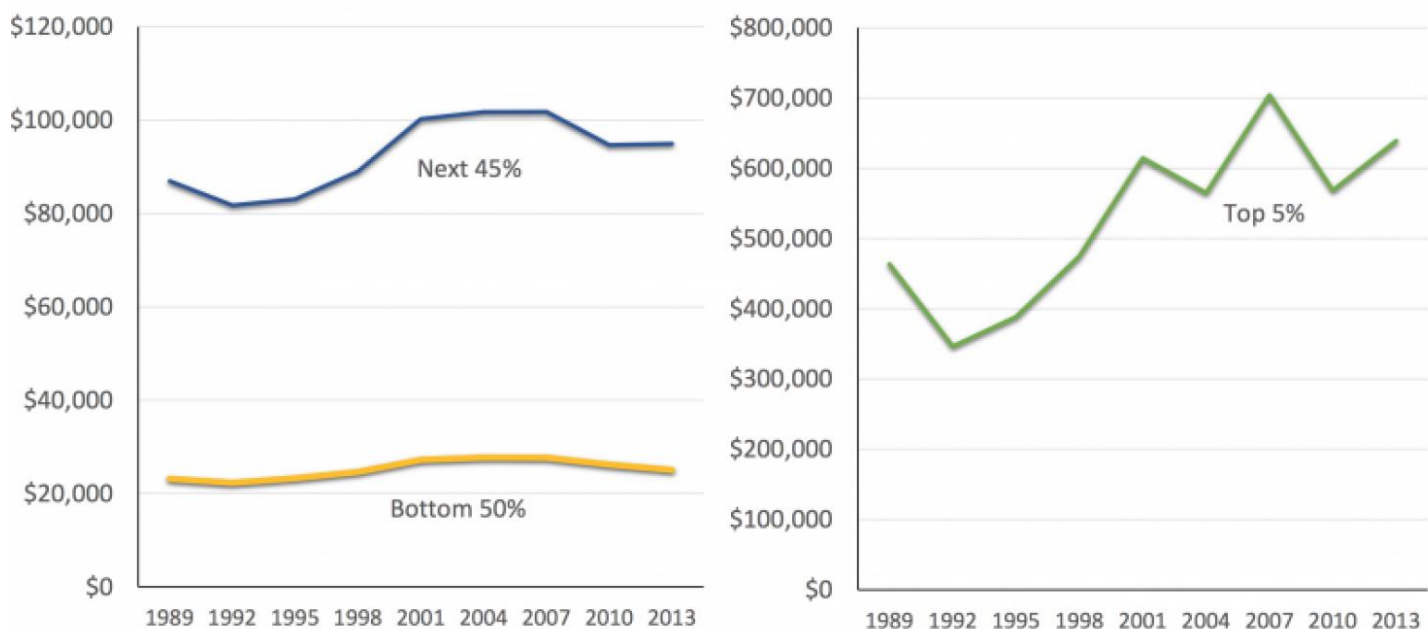
On October 8 the World Bank and International Monetary Fund released its Global Monitoring Report 2014/2015, [monitoring progress](#) on the Millennium Development Goals. The report notes that much success has been achieved in reducing extreme poverty—those living on less than a \$1.25 a day. However, the number of extremely poor remains unacceptably high, at just over 1 billion people (14 percent of the world population) in 2011, compared with 1.2 billion (19 percent of the world population) in 2008. Kaushik Basu, Senior Vice President and Chief Economist of the World Bank Group, stated, "If it is shocking to have a poverty line as low as \$1.25 per day, it is even more shocking that 1/7th of the world's population lives below this line." Forecasts in the report show that poverty will remain stubbornly high in the South Asia and Sub-Saharan Africa regions, where an estimated 377 million of the world’s 412 million poor will likely reside in 2030. In 2011, the two regions were home to 814 million of the world’s 1 billion extremely poor.

On October 13 in St. Louis, the “Weekend of Resistance” rally looked at racial disparity, with the younger [speakers](#) growing impatient with a series of speeches at St. Louis University that

failed, in their view, to measure the problem. “The older generation has been too obsessed with being successful rather than being faithful to a cause that was zeroing in on the plight of the poor and working people,” said one young speaker. Voices from the audience nearly broke up the formal gathering before the keynoter, intellectual and activist Cornel West, came to the podium. He agreed that “the older generation has been too obsessed with being successful rather than being faithful to a cause that was zeroing in on the plight of the poor and working people.” The Sunday gathering was followed by a day of civil disobedience modeled on “Moral Monday” demonstrations launched over political policies in North Carolina. Churches ran a “faith in action mobilizing training” session on Sunday afternoon that included the occupation of a police station. At other sessions, volunteers were instructed in blocking traffic and sit down resistance.

On October 17 Federal Reserve Chair Janet Yellen called inequality in America a serious problem that strikes at the core of the country's social and economic values. She made her case through dramatic charts that she hopes will provide "a factual basis for further discussion."

Mean Income by Income Group



Inflation-adjusted 2013 dollars

Source: Board of Governors of the Federal Reserve System, Survey of Consumer Finances

SHORTS

Scientists from Nanyang Technological University, Singapore, have developed a new battery that can be recharged up to 70 per cent in only 2 minutes. The [battery](#) will also have a longer lifespan of over 20 years. Expected to be the next big thing in battery technology, this breakthrough has a wide-ranging impact on many industries, especially for electric vehicles which are currently inhibited by long recharge times of over 4 hours and the limited lifespan of batteries.

Increasingly owners of electric vehicles are powering their cars with sunlight. Solar panels installed on the roof of a home or garage can easily [generate enough electricity](#) to power an electric or plug-in gas-electric hybrid vehicle. No one knows exactly how many electric cars are being powered by solar energy, but the number of electric and plug-in hybrid cars in the U.S. is growing. Last year, 97,563 were sold in the U.S., according to Ward's AutoInfoBank, up 83 percent from the year before. Meanwhile, solar installations grew 21 percent in the second quarter of this year, and more than 500,000 homes and businesses now have them, according to the Solar Energy Industries Association.

Scientists have declared animals have conscious awareness, just like we do. A group of scientists attending the Francis Crick Memorial Conference on Consciousness in Human and Non-Human Animals has signed a [declaration](#) proclaiming their support for the idea that animals are conscious and aware to the degree that humans are. The open acknowledgement is big news, indicating that we cannot ignore the capacities of animals to “experience affective states,” to quote the language in the declaration. The declaration states, “Convergent evidence indicates that non-human animals have the neuroanatomical, neurochemical, and neurophysiological substrates of conscious states along with the capacity to exhibit intentional behaviors.” Prominent signatories include Christof Koch, David Edelman, Edward Boyden, Philip Low and Irene Pepperberg.