

Nygaard Notes

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Climate Running AMOC

That headline probably looks like a typo, but it's not. I'm aware that the correct spelling is "amok," but what I am talking about here is the Atlantic Meridional Overturning Circulation – AMOC – which is a massive churning of the waters of the Atlantic Ocean. The AMOC was in the news recently, probably too briefly for anyone to notice. But it's worth noticing.

Many people will have heard of the Gulf Stream. The Gulf Stream is known in oceanography circles as the Atlantic Meridional Overturning Circulation, or AMOC. And it's a part of a global system of ocean currents that have been shaping and stabilizing global climate patterns since the start of the Holocene Period, perhaps 120,000 years ago.

The science-geek website Live Science explains AMOC this way: "The current begins near the Florida Peninsula, carrying warm surface water north toward Newfoundland before meandering east across the Atlantic. By the time it reaches the North Atlantic, that warm surface water becomes cooler, saltier and denser, sinking into the deep sea before being driven south again, where the cycle repeats." Scientists call this the thermohaline circulation because it's driven by temperature and salinity.

A scientist from the Potsdam Institute for Climate Impact Research says that the AMOC "works like a giant conveyor belt, carrying warm surface water from the equator up north, and sending cold, low-salinity deep water back down south. It moves nearly 20 million cubic meters of water per second, almost 100 times the Amazon flow." The huge movement of heat and freshwater associated with the AMOC is essential for regional and global climate.

The American Association for the Advancement of Science published a study this past November which said "In the background of global climate change, there have been rising concerns that the AMOC is slowing or

will do so in the future."

And here's where we get back to the news that came out on February 25th. A major study—the details of which I won't get into here—recently found that the AMOC is in fact slowing down. And it's *really* slowing down; the study I'm talking about shows that the AMOC is now moving more slowly than it has in at least 1,600 years. And the authors of the study make clear that the slowdown is a predictable effect of climate disruption.

Live Science explains: "Global warming increases annual rainfall and accelerates the melting of ice sheets, including the Greenland Ice Sheet in the North Atlantic. Both of these factors dump ever greater amounts of freshwater into the ocean, reducing the density and salinity of the surface water at the northern end of the Gulf Stream conveyor belt. According to the researchers, this freshwater inhibits how quickly the water can sink and begin its journey back south, weakening the overall flow of the AMOC."

"Profound and Likely Irreversible Impacts"

So, who cares if the AMOC slows down? Well, the science website *LiveScience* reports that "studies have linked severe heat waves and storm patterns in northern Europe and the eastern United States to the weakened current." Stefan Rahmstorf, one of the study's authors, tells us that "An increase in heat waves across Europe and stronger hurricanes closer to the US coastline because of warmer water drifting closer to the coast can be linked to the ocean circulation." The Weather Network says "The change in heat flow to the north could also lead to more extreme winter weather events in northern Europe. Additionally, slower currents would result in a rapid rise in sea levels along the east coast of the United States." And there is evidence that a slowing AMOC could contribute to major droughts in Africa.

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Greetings,

This issue's "Quote" of the Week refers to the climate crisis as "an everything issue." Meaning that the solution to the climate emergency will require us to change everything that we do as individuals and as a society. Indeed, as a species.

Actually, that's not quite right. Dialectics tells us that everything is always changing, so it's not that the climate crisis requires us to change, but rather that everything will change. We (humans, that is) do have a role to play in exactly how things change, and the stories we tell ourselves shape how we interact with the ever-changing earth and the beings residing on it. So, everything is an everything issue! Nygaard Notes is, in part, a record of my endless attempts to wrap my mind around that seemingly-simple idea. Yeow!

With that in mind, this issue of the Notes is once again about the climate. But, as the two pieces about scientific language hopefully illustrate, it's also about power, about naming, about who gets to decide what, and about how the language we use shape the stories we tell ourselves.

Thanks for making it possible for me to tell my stories. And thanks to all of you who have written to me lately to tell me yours!

Joining you on the journey,

Nygaard

AMOC from page 1

The London Guardian reminds us that, while it's humans who are causing the slowdown, it is not only humans who will suffer the consequences: "As well as causing more extreme weather across Europe and the east coast of the US," the paper reported on February 26th, "the weakening of the AMOC could have severe consequences for Atlantic marine ecosystems, disrupting fish populations and other marine life."

A press release accompanying the study says that "The consequences of the AMOC slowdown could be manifold for people living on both sides of the Atlantic," adding that "In Europe, a further slowdown of the AMOC could imply more extreme weather events like a change of the winter storm track coming off the Atlantic, possibly intensifying them. Other studies found possible consequences being extreme heat waves or a decrease in summer rainfall. Exactly what the further consequences are is the subject of current research."

As with climate disruption in general, we don't know

"exactly what the further consequences are" if humans don't address the slowing of the AMOC. But it could be catastrophic.

Andrew Meijers, the deputy science leader of polar oceans at the British Antarctic Survey, who was not involved in the study, was quoted by the Guardian saying "The AMOC has a profound influence on global climate, particularly in North America and Europe, so this evidence of an ongoing weakening of the circulation is critical new evidence for the interpretation of future projections of regional and global climate. The AMOC is frequently modeled as having a tipping point below some circulation strength, a point at which the relatively stable overturning circulation becomes unstable or even collapses. The ongoing weakening of the overturning means we risk finding that point, which would have profound and likely irreversible impacts on the climate."

When we talk about "irreversible impacts," many use the term "tipping point. That's an interesting phrase, more interesting than one might think. Let's have a look at that language. ♦

"Quote" of the Week: "It's an Everything Issue"

Michael Brune, executive director of the Sierra Club, wrote this in a December 20th article:

The climate crisis isn't a single issue: It's an everything issue. To solve it, we'll have to change how we get around, how we grow food, how we heat and cool our homes, how we create electricity, and much else. We'll need an economy-wide, and society-wide, transformation that will create millions of family-sustaining jobs in clean energy, energy efficiency, and more. To achieve that economy-wide transformation, we need every part of our government working toward it, as well as a powerful movement pushing officials to be even more ambitious and inclusive.

Scientific Language #1: Racist History

The ocean scientist quoted above, Andrew Meijers, refers to something called a “tipping point,” which is a crucial concept in climate science—and systems thinking in general. But even when using seemingly-neutral scientific jargon one should be aware of possible racial connotations. Such as in the case of the phrase “tipping point.”

Merriam Webster (MW, the dictionary people) has a monthly feature that they call “Unhappy Beginnings of Popular and Clichéd Terms.” And they have looked at the popular term “tipping point.”

“Today,” they say in one of the installments of this feature, “‘tipping point’ is most often used to mean ‘a critical juncture at which unstoppable change takes place.’” That’s certainly what Meijers, the climate scientist, had in mind. But this phrase “had a curiously specific, and quite troubling, meaning when it first became popular as a figurative phrase in the late 1950s.” MW explains:

“When tipping point first began to be employed in general use, it was almost entirely in reference to the propensity of white families to move out of an area when a certain percentage of the neighborhood was composed of black families. It served as a precursor of sorts to the phenomenon of white flight.”

MW offers a couple of examples of how the phrase was understood by the general public.

One example is from an article in the New York Times of April 19 1959, which included this comment: “Some white parents may reluctantly accept integration to the extent of 10 to 15 per cent.... Exactly when the ‘tipping

point’ of white acceptance will be reached will depend upon the attitude of the individual white parent and upon the general white community attitude.”

In February of that same year the University of Pennsylvania Law Review informed its readers that “The percentage of minority occupancy that initiates a withdrawal of other tenants has been denominated the ‘tipping point.’”

Of course, it wasn’t “minority occupancy” that “initiated” the white flight (“withdrawal of other tenants”) referenced here. It was the racist fear and hate in the hearts of so-called “white” people socialized in a white supremacist culture.

I had no idea about the origins of this term until I ran across it when putting together this issue of Nygaard Notes. I’ve even used the phrase “tipping point” on a few occasions in these pages. The concept is useful when using systems thinking, but I’m going to try to use other language when referring to this type of change. Maybe “point of no return,” or “transformation point,” or “trigger.”

The point here is that all word people (like me) need to be responsible for finding words that help us communicate what we want to communicate. And if we don’t want to communicate a tacit or unconscious endorsement of a “blame-the-victim” understanding of how change works—which makes us more likely to commit microaggressions in the future—then we need to keep on the lookout for the “racial angles” that for centuries have shaped our language, in ways large and small. So I’ll hang onto the concept, but ditch the phrase “tipping point” and its “unhappy beginnings.” ♦

Scientific Language #2: “*A Persistent Human Imperialism*”

Even as I type these words there is a movement underway to officially recognize that the Holocene Epoch, which started at the end of the last Ice Age, is drawing to a close (or already has drawn to a close, there’s debate about this) and we are entering (or have entered) the Anthropocene Epoch. The transition is, or was, “the point at which human activity exploded to such a massive scale that it left an indelible signature on

the globe.”

Back in May of 2019 the scientific journal *Nature* reported that “A panel of scientists voted last week to designate a new geologic epoch — the Anthropocene — to mark the profound ways in which humans have altered the planet. That decision, by the 34-member continued on page 4

Anthro *from page 3*

Anthropocene Working Group (AWG), marks an important step towards formally defining a new slice of the geologic record — an idea that has generated intense debate within the scientific community over the past few years. The panel plans to submit a formal proposal for the new epoch by 2021 to the International Commission on Stratigraphy, which oversees the official geologic time chart.”

It doesn't look like that formal proposal has been submitted yet, but here's something to think about: Is “anthropocene” the best term to use here?

“Anthropos” is Greek for “human,” and the Harvard science professor Sheila Jasanoff points out that “the implication of a singular anthropos behind the term anthropocene hides ‘the great differentiation of responsibilities and incidences between the classes, sexes, and peoples of Gaia.’” Gaia, also drawn from the Greek, refers here to the whole, living Earth. Jasanoff notes that the term “anthropocene” is not neutral, but reflects a “struggle between a persistent human imperialism, expressed through the continued commodification of nature, and more humble ways of knowing and guiding humanity's planetary future from standpoints in ethics, politics and law.” And, she might have added, science.

Having said that, she notes that “attempts to fix the climate problem as if all emissions were created equal overlooks fundamental issues of justice and responsibility.”

In her provocative paper, entitled “Humility in the Anthropocene” (and just published last month) Jasanoff suggests other names for the current epoch. Names like “Anglocene,” to emphasize the role played by British-led global imperialism in creating the worldwide climate crisis. Or maybe “Capitalocene,” to emphasize “the intimacy of the connections between the making of capital and the making of the climate crisis.”

If you're in the mood for some geeky humor, read the chapter called “The Neologismcene” which appears in the 2019 book “Break Up the Anthropocene.” The word “neologism” (also from the Greek!) refers to a newly-coined word or expression. The author lists no fewer than 24 alternatives to “anthropocene,” including the “painful joke” he refers to as the Trumpocene. I love this stuff. ♦

The Jasanoff piece is not available yet to the general public, but you can read the neologisms piece here:

<https://manifold.umn.edu/read/untitled-069aacb3-e8a8-4787-8abd-e64a4e729f26/section/9c2ee2b2-eb35-46d3-ba40-98b93f7003f1>

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