



## **Better to believe climate scientists**

Gunnar Schade

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Three years ago my father, in his early 70s, was told after his annual physical that something is not right with his heartbeat. His general practitioner referred him to a specialist in a nearby hospital, and, after evaluation, he was kept in the hospital.

His condition was life threatening and the operation that followed a few days later confirmed the diagnosis and saved his life. He has lost weight and eats a healthier diet now, plays tennis again, and enjoys his retirement.

Why am I telling this story?

Last Saturday, the likely new science advisor to the president, William Happer, had a column in The Eagle that was the equivalent of a dentist friend telling my father that his doctor's suspicions about his heart were nothing to worry about, that the murmurs he heard were a good thing, and that diet and exercise had nothing to do with a healthy heart.

Happer repeated several contrarian talking points about climate change science that have appeared in newspapers and popular media outlets since the early 1990s. They are opinions unsupported by evidence. They do not appear in the peer-reviewed scientific literature, in which expert reviewers quickly would show them to be pseudoscience, not evidence-based scholarship.

He claimed "warming in the past few centuries" is "minor" and "mostly from non-human causes." What the science actually says is that the recent warming (since the 1950s) is unprecedented in its speed, and almost entirely caused by human greenhouse gas emissions. Our emissions are changing the climate faster than at any scientifically accessible point in Earth's history. And while changes may appear slow from a human lifetime viewpoint, they are faster than what nature, including human society, are able to adapt to.

Using a strawman, claiming that the "previous administration" argued that "carbon dioxide will destroy the planet," Happer moved on to assert that plants cope "with a carbon dioxide famine" and "historical norms" of carbon dioxide are "thousands of parts per million." As any farmer, forester, and gardener knows, plant growth is not limited by carbon dioxide, but rather water, temperature, and nutrients. And two of these factors, namely worsening heat waves and reduced water availability, already exert climatic stresses on our food production as the droughts of 2011 and 2012 have shown. Yet Happer wants us to believe that returning to the hothouse climate of the dinosaurs, when carbon dioxide was at "thousands of [parts per million]," levels known to affect human well-being, is nothing to worry about.

Happer rehashed the more-CO<sub>2</sub>-is-good argument, referring to "dramatic greening of the Earth." While Earth's land-based biomass has indeed increased in response to increasing atmospheric CO<sub>2</sub>, that increase is only offsetting 20-25 percent of human CO<sub>2</sub> emissions, of which roughly 50 percent remain in the atmosphere, heating it and the surface. Meanwhile, the increased availability of carbon is reducing our crops' nutritional value, and more frequent and intense heat waves due to warming increase the risk of crop yield reduction and loss.

Even though Happer's claim of a warming "hiatus" has been debunked over and over, he falsely reckoned that warming will be "modest," beneficial via "lessening human mortality," and not cause "dangerous sea level rise." None of these assertions are supported by the science either. Surface warming has been "modest" on average (1.7 degrees F) so far, but the concern is less about what warming already has occurred than about ongoing warming due to continued, high human greenhouse emissions; excess human mortality during cold snaps is similar to that during heat waves, and while the former will decrease, the latter undoubtedly will increase; and sea level rise continues for hundreds of years after warming stopped, slowly inundating our coastlines, and thus coastal property.

How do we know Happer is wrong and you are right?

The peer-reviewed scientific literature, where scientists exchange their experimental evidence with other experts, has been consistent on the science of climate change for nearly 30 years. When the scientific consensus -- namely that the climate is warming and the cause are human greenhouse gas emissions -- became clear in the early 1990s, a large public disinformation campaign was launched, initially footed by the fossil fuel industry, later carried by "think tanks" such as the Cato Institute or the Competitive Enterprise Institute.

Happer, with Cato, is known as a fake expert, the kind of expert the tobacco industry used to claim that smoking does not affect your health.

He never has published a peer-reviewed article on climate science or plant science; his expertise is in optics.

Would you rather have him explain the intricacies of photosynthesis to your child, or her/his nerdy biology teacher? Does your child run to the class bully for help with homework, or rather ask the class nerd? Did my father listen to a dentist friend about his heart problem, or did he go to the heart specialist for treatment? And would you rather believe front groups' fake experts and their endless repetition of sciency sounding talking points on climate change, or would it rather make more sense to believe climate scientists, aka the nerd squad?