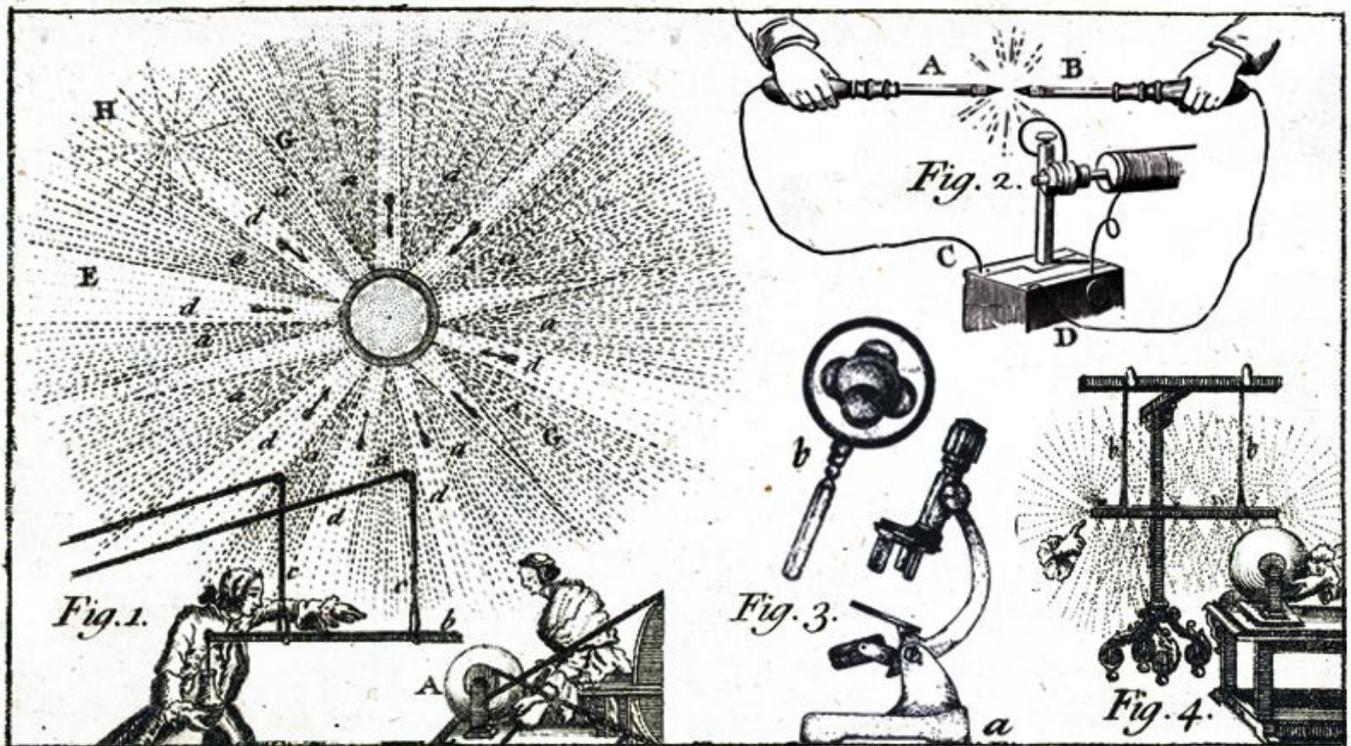


## ShiFt happens, but it's not always good science

Written by Christopher J. Borgert on 10 October 2016



Scientific theory | *Photo credit: Aimee Wachtel Holyrood Magazine*

**Scientific revolutions may be on the horizon, but most of this shift isn't credible science or a step forward, argues Christopher J. Borgert.**

Have you ever wondered why some scientists self-identify as revolutionaries? In his 1962 book, "The Structure of Scientific Revolutions," physicist Thomas Kuhn promoted the concept of a "paradigm shift" to describe new ways of thinking that can only be ushered in by scientific revolutions, not by working within the framework of accepted scientific knowledge.

Regardless of whether he was correct, most scientists would agree that when technological developments provide surprising new measurements of the natural world that can't be explained by established scientific theories, a paradigm shift may be necessary to move forward. But just as important, new ideas that violate scientific methodology should be discarded quickly to avoid stepping backward. At least, that is the way science ought to work.

Increasingly, however, paradigm shift alone is being used to justify frightening public health claims. To name a few, these range from blaming vaccinations for autism and genetically modified (GM) foods or common chemicals, pesticides and consumer products for nearly every adverse health condition imaginable - from diabetes to obesity to attention deficit hyperactivity disorder. With so many allegations and "new paradigms" being demanded, it's fair to ask: Why is the revolution taking so long and why aren't we taking action now?

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The standard answer from proponents of these various new paradigms is that financial conflicts of interest generated by corporate money in science prevent progress by sowing doubt about new ideas. This convenient excuse ignores the fact that all parties derive profit from arguing their own side of the issue: pushing for these serious public health claims earns research grants and media prominence for scientists and advocates, defence of commercial products allows their continued sale by corporations, and addressing the controversy increases the prominence of regulatory authorities and politicians.

But blaming the influence of corporate money is a tired excuse. A more compelling answer comes from closely examining each new paradigm on its own merits and asking whether it will shift science forward or backward.

And so we might ask: Have new, reproducible observations been made that cannot be sufficiently explained by established scientific knowledge? Interestingly, for many of these serious public health claims, the answer is no. Rather than making discoveries that established science cannot explain, advocates are simply making new allegations, using unique interpretations that have already been rejected by established scientific theory. Put simply, it's not that we have new discoveries that demand new ways of thinking; we have new interpretations that only a paradigm shift could justify. Established scientific theory can explain the data perfectly well, but opposite to the alarmists' claims.

Nevertheless, new paradigms could be correct even if generated by nothing more than the imagination and conviction of their advocates. New paradigms often fail, however, because their supporters overlook one simple but critical question: Does the new paradigm adequately explain the facts we already know? For a new paradigm to move science forward rather than backward, it must explain both the old and the new, not just the new.

For example, advocates of a new paradigm for so-called "endocrine disruptors" claim that dozens of oestrogen-like chemicals contained in household products cause disease and birth defects, even at doses well below those found to be safe in studies used by government agencies to regulate drugs and chemicals. If this new paradigm were correct, then low doses of pharmaceutical oestrogens contained in birth control pills would also cause disease in offspring and birth defects because they are even more potent than so-called endocrine-disrupting chemicals.

But that doesn't occur. Children born to mothers who continued taking oral estrogenic contraceptives through the early months of pregnancy do not suffer the diseases and birth defects supposedly caused by estrogenic "endocrine disruptors." Neither do children whose mothers consume an Asian diet high in botanical oestrogens, such as soy.

Similarly, the claims of anti-GM organisations fail to explain how the health of humans, livestock and domesticated animals improved despite countless genetic modifications of food crops by traditional plant breeders over the last two centuries. Traditional plant breeding also produced GM foods, but with less precision and with much higher risks of unintended genetic outcomes than does modern biotechnology. If genetic modification really created "Frankenfood," our great grandparents would have suffered severely.

Everyone loves a good revolution, but if we accept every new paradigm blindly, we should also be prepared to give up many life-improving and disease-sparing drugs, countless innovative modern technologies and many plentiful, healthy foods. After all, some of these new paradigms lead to the conclusion that birth control pills cause birth defects and the corn from grandma's garden killed grandpa.

Scientific revolutions may be on the horizon, but most of this shift isn't credible science or a step forward.

### **About the author**

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