

## Bruno Latour, the Post-Truth Philosopher, Mounts a Defense of Science

He spent decades deconstructing the ways that scientists claim their authority. Can his ideas help them regain that authority today?

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In the summer of 1996, during an international anthropology conference in southeastern Brazil, Bruno Latour, France's most famous and misunderstood philosopher, was approached by an anxious-looking developmental psychologist. The psychologist had a delicate question, and for this reason he requested that Latour meet him in a secluded spot — beside a lake at the Swiss-style resort where they were staying. Removing from his pocket a piece of paper on which he'd scribbled some notes, the psychologist hesitated before asking, "Do you believe in reality?"



Bruno Latour at his home in Paris.  
Christopher Anderson/Magnum, for The New York Times

For a moment, Latour thought he was being set up for a joke. His early work, it was true, had done more than that of any other living thinker to unsettle the traditional understanding of how we acquire knowledge of what's real. It had long been taken for granted, for example, that scientific facts and entities, like cells and quarks and prions, existed "out there" in the world before they were discovered by scientists. Latour turned this notion on its head. In a series of controversial books in the 1970s and 1980s, he argued that scientific facts should instead be seen as a product of scientific inquiry. Facts, Latour said, were "networked"; they stood or fell not on the strength of their inherent veracity but on the strength of the institutions and practices that produced them and made them intelligible. If this network broke down, the facts would go with them.

Still, Latour had never seen himself as doing anything so radical, or absurd, as calling into question the existence of reality. As a founder of the new academic discipline of science and technology studies, or S.T.S., Latour regarded himself and his colleagues as allies of science. Of course he believed in reality, he told the psychologist, convinced that the conversation was in jest. From the look of relief on the man's face, however, Latour realized that the question had been posed in earnest. "I had to switch interpretations fast enough to comprehend both the monster he was seeing me as," he later wrote of the encounter,

“and his touching openness of mind in daring to address such a monster privately. It must have taken courage for him to meet with one of these creatures that threatened, in his view, the whole establishment of science.”

Latour’s interlocutor was not the only person who felt that the establishment of science was under attack. The mid-1990s were the years of the so-called science wars, a series of heated public debates between “realists,” who held that facts were objective and free-standing, and “social constructionists,” like Latour, who believed that such facts were created by scientific research. To hint at any of the contention and compromise that went on behind the scenes, the realists feared, would give succor to the enemies of progress: creationists, anti-vaxxers, flat-earthers and cranks of all stripes. If scientific knowledge was socially produced — and thus partial, fallible, contingent — how could that not weaken its claims on reality? At the height of the conflict, the physicist Alan Sokal, who was under the impression that Latour and his S.T.S. colleagues thought that “the laws of physics are mere social conventions,” invited them to jump out the window of his 21st-floor apartment.

At the time, the science wars struck most people outside the academy, if they noticed them at all, as an overheated scholastic squabble. Lately, however, these debates have begun to look more like a prelude to the post-truth era in which society as a whole is presently condemned to live. The past decade has seen a precipitous rise not just in anti-scientific thinking — last year, only 37 percent of conservative Republicans believed in the occurrence of global warming, down from 50 percent in 2008 — but in all manner of reactionary obscurantism, from online conspiracy theories to the much-discussed death of expertise. The election of Donald Trump, a president who invents the facts to suit his mood and goes after the credibility of anyone who contradicts him, would seem to represent the culmination of this epistemic rot. “Do you believe in reality?” is now the question that half of America wants to ask the president and his legion of supporters.

“I think we were so happy to develop all this critique because we were so sure of the authority of science,” Latour reflected this spring. “And that the authority of science would be shared because there was a common world.” We were seated at the dining-room table of his daughter’s apartment in the 19th Arrondissement of Paris, where Latour, who is 71, was babysitting for his 8-year-old grandson, Ulysse. The apartment, he told me proudly, was purchased with the money that came with the award of the 2013 Holberg Prize, known as the Nobel of the humanities, for what the jury heralded as his “reinterpretation of modernity.” He was wearing a purple turtleneck sweater, his favorite burgundy slacks and sensible black walking shoes. He has a full head of dark, disheveled hair, and his vigorously overgrown eyebrows sweep several unsettling centimeters up beyond the rim of his round spectacles, like a nun’s cornette. “Even this notion of a common world we didn’t have to articulate, because it was obvious,” he continued. “Now we have people who no longer share the idea that there is a common world. And that of course changes everything.”

Those who worried that Latour’s early work was opening a Pandora’s box may feel that their fears have been more than borne out. Indeed, commentators on the left and the right, possibly overstating the reach of French theory, have recently leveled blame for our current state of affairs at “postmodernists” like Latour. By showing that scientific facts are the

product of all-too-human procedures, these critics charge, Latour — whether he intended to or not — gave license to a pernicious anything-goes relativism that cynical conservatives were only too happy to appropriate for their own ends. Latour himself has sometimes worried about the same thing. As early as 2004 he publicly expressed the fear that his critical “weapons,” or at least a grotesque caricature of them, were being “smuggled” to the other side, as corporate-funded climate skeptics used arguments about the constructed nature of knowledge to sow doubt around the scientific consensus on climate change.

But Latour believes that if the climate skeptics and other junk scientists have made anything clear, it’s that the traditional image of facts was never sustainable to begin with. “The way I see it, I was doing the same thing and saying the same thing,” he told me, removing his glasses. “Then the situation changed.” If anything, our current post-truth moment is less a product of Latour’s ideas than a validation of them. In the way that a person notices her body only once something goes wrong with it, we are becoming conscious of the role that Latourian networks play in producing and sustaining knowledge only now that those networks are under assault.

This, in essence, is the premise of Latour’s latest book, “Down to Earth,” an illuminating and counterintuitive analysis of the present post-truth moment, which will be published in the United States next month. What journalists, scientists and other experts fail to grasp, Latour argues, is that “facts remain robust only when they are supported by a common culture, by institutions that can be trusted, by a more or less decent public life, by more or less reliable media.” With the rise of alternative facts, it has become clear that whether or not a statement is believed depends far less on its veracity than on the conditions of its “construction” — that is, who is making it, to whom it’s being addressed and from which institutions it emerges and is made visible. A greater understanding of the circumstances out of which misinformation arises and the communities in which it takes root, Latour contends, will better equip us to combat it.

Philosophers have traditionally recognized a division between facts and values — between, say, scientific knowledge on one hand and human judgments on the other. Latour believes that this is specious. Many of his books are attempts to illuminate, as he has written, “both the history of humans’ involvement in the making of scientific facts and the sciences’ involvement in the making of human history.” In a formulation that was galling to both sociologists and scientists, he once argued that Louis Pasteur did not just, as is commonly accepted, discover microbes; rather, he collaborated with them.

Latour likes to say that he has been attuned from an early age to the ways in which human beings influence their natural environment. His affluent family, proprietors of the prominent winemaking business Maison Louis Latour, had been cultivating the same Burgundy vineyards for more than 150 years when Bruno, the youngest of eight children, was born there in 1947. An older brother was already being groomed to run the family firm, so Latour was encouraged to pursue a classical education. At 17, he was sent to Saint-Louis de Gonzague, one of the most prestigious schools in Paris, where he mingled with other young members of the French elite. Although he was a wealthy and well-read Catholic, he found himself completely unprepared for the virulent snobbery of the capital. He was

made to feel like the proud, provincial hero of a Balzac novel who arrives in Paris and soon discovers how little he knows about the ways of the world. It was at Saint-Louis de Gonzague that he began to study philosophy, a compulsory subject in the final year of French high school. The first text he was assigned was Nietzsche's "The Birth of Tragedy"; unlike "all the confusion of mathematics," it immediately struck him as clear and perfectly rational.

In 1966, he began his undergraduate study at the University of Dijon, where he developed an interest in epistemology — the branch of philosophy concerned with how knowledge is made — but even then he had started to suspect that most of what he was learning was "probably wrong." Philosophers talked about science as though it were a purely cognitive enterprise, a matter of sheer intellectual virtuosity, and about scientists (when they talked about them at all) as logical, objective, heroic.



Bruno Latour at a theater in Strasbourg, France, in March, rehearsing for his show "Inside," a performance lecture about climate change.  
Luca Locatelli for The New York Times

These suspicions only deepened over the following years, which Latour spent in the Ivory Coast, under the auspices of a sort of French Peace Corps to avoid military service. As he wrote his doctoral dissertation, he taught philosophy at a technical school in Abidjan and volunteered to work on a study commissioned by the French government. His task was to find out why French companies, which still owned and operated many of the factories in postcolonial Abidjan, were having such difficulty recruiting "competent" black executives. It took less than a day for Latour to realize that the premise was flawed. "The question was absurd because they did everything not to have black executives," he told me. In the French-run engineering schools, black students were taught abstract theories without receiving any practical exposure to the actual machinery they were expected to use. When they were subsequently unable to understand technical drawings, they were accused of having "premodern," "African" minds. "It was clearly a racist situation," he said, "which was hidden behind cognitive, pseudohistorical and cultural explanations."

In Abidjan, Latour began to wonder what it would look like to study scientific knowledge not as a cognitive process but as an embodied cultural practice enabled by instruments, machinery and specific historical conditions. Would the mind of a scientist or an engineer from, say, California seem any more "modern" or "rational" than that of one from the Ivory

Coast if it were studied independent of the education, the laboratory and the tools that shaped it and made its work possible?

Before leaving Dijon for Abidjan, Latour met Roger Guillemin, a biologist who would soon go on to win the Nobel Prize for his work on hormone production in the brain. Guillemin later invited him to study his laboratory at the Salk Institute in San Diego, and so beginning in 1975, Latour spent two years there as a sort of participant-observer, following scientists around as they went about their daily work. Part of Latour's immersion in the lab involved conducting actual experiments, and his co-workers would often gather around to watch. They couldn't believe that someone could be, as he put it, "so bad and clumsy." He found pipetting especially difficult. Anytime the slightest thought crossed his mind, he would forget where he placed the instrument and have to start all over again. He later realized that it was precisely his lack of aptitude for lab work that led him to pay such close attention to the intricate, mundane labor involved in the manufacture of objectivity.

When he presented his early findings at the first meeting of the newly established Society for Social Studies of Science, in 1976, many of his colleagues were taken aback by a series of black-and-white photographic slides depicting scientists on the job, as though they were chimpanzees. It was felt that scientists were the only ones who could speak with authority on behalf of science; there was something blasphemous about subjecting the discipline, supposedly the apex of modern society, to the kind of cold scrutiny that anthropologists traditionally reserved for "premodern" peoples. Not everyone felt the same way, however. The previous year, in California, Latour met Steve Woolgar, a British sociologist, who was intrigued by his unorthodox approach. Woolgar turned Latour on to the work of other sociologists and anthropologists, like Michael Lynch, Sharon Traweek and Harold Garfinkel, who had also begun to study science as a social practice. Latour, in turn, invited Woolgar to spend a few weeks with him studying his primates at the Salk Institute.

The two men collaborated on "Laboratory Life," which after its publication in 1979 became a founding text in the nascent field of science and technology studies and, by academic standards, a breakthrough success. The book continues to challenge some of our most deeply held notions about how knowledge is made. No one had ever contested that scientists were human beings, but most people believed that by following the scientific method, scientists were able to arrive at objective facts that transcended their human origins. A decade and a half earlier, in his best seller, "The Structure of Scientific Revolutions," the physicist-turned-philosopher Thomas Kuhn had done much to weaken the Whig interpretation of science by showing how historical advances were governed by contingency and debate. What Latour observed firsthand in Guillemin's lab made the traditional view of science look like little more than a self-serving fiction.

Day-to-day research — what he termed science in the making — appeared not so much as a stepwise progression toward rational truth as a disorderly mass of stray observations, inconclusive results and fledgling explanations. Far from simply discovering facts, scientists seemed to be, as Latour and Woolgar wrote in "Laboratory Life," "in the business of being convinced and convincing others." During the process of arguing over uncertain data, scientists foregrounded the reality that they were, in some essential sense, always

speaking for the facts; and yet, as soon as their propositions were turned into indisputable statements and peer-reviewed papers — what Latour called ready-made science — they claimed that such facts had always spoken for themselves. That is, only once the scientific community accepted something as true were the all-too-human processes behind it effectively erased or, as Latour put it, black-boxed.

In the 1980s, Latour helped to develop and advocate for a new approach to sociological research called Actor-Network Theory. While controversial at the time, it has since been adopted as a methodological tool not just in sociology but also in a range of disciplines, like urban design and public health. From his studies of laboratories, Latour had seen how an apparently weak and isolated item — a scientific instrument, a scrap of paper, a photograph, a bacterial culture — could acquire enormous power because of the complicated network of other items, known as actors, that were mobilized around it. The more socially “networked” a fact was (the more people and things involved in its production), the more effectively it could refute its less-plausible alternatives. The medical revolution commonly attributed to the genius of Pasteur, he argued, should instead be seen as a result of an association between not just doctors, nurses and hygienists but also worms, milk, sputum, parasites, cows and farms. Science was “social,” then, not merely because it was performed by people (this, he thought, was a reductive misunderstanding of the word “social”); rather, science was social because it brought together a multitude of human and nonhuman entities and harnessed their collective power to act on and transform the world.

In the fall of 2016, the hottest year on record, Latour took a plane from Paris to Calgary, Canada, where he was due to deliver a lecture on “the now-obsolete notion of nature.” Several hours into the flight, above the Baffin ice sheets to the west of Greenland, he peered out the window. What he saw startled him. That year the North Pole was melting at an accelerated pace. The tundra below, rent with fissures, reminded him of the agonized face from Edvard Munch’s painting “The Scream.”

“It was as though the ice was sending me a message,” Latour recalled in March. Dressed in a striking suit (straw-colored tie, blue waistcoat), he was speaking to a sold-out theater of some 200 people in Strasbourg as part of the city’s biennial puppetry festival. Although Latour is a figure of international renown on the academic circuit, his lecture — a sort of anti-TED Talk on climate change featuring an array of surreal images and acoustical effects — was anything but a traditional conference paper. Throughout the performance, Latour’s looming figure was hidden behind images projected onto a screen, so that it seemed as though he were being swallowed by his own PowerPoint presentation. The effect was a bit like watching “An Inconvenient Truth,” if Al Gore had been a coltish French philosopher who said things like “Scientists, artists, and social scientists like myself are beginning to propose what we call — and maybe it’s too exaggerated — a new cosmology.”

The idea that we can stand back and behold nature at a distance, as something discrete from our actions, is an illusion, Latour says. This was the message that the melting ice sheets were sending him. “My activity in this plane going to Canada was actually having an effect on the very spectacle of nature that I was seeing,” he told his Strasbourg audience.



“In that sense, there is no outside anymore.” Appropriately enough, the show, which he has performed in several cities across Europe and will bring to New York this week, is called “Inside.” In our current environmental crisis, he continued, a new image of the earth is needed — one that recognizes that there is no such thing as a view from nowhere and that we are always implicated in the creation of our view. With the advent of the Anthropocene, a word proposed by scientists around the turn of the century to designate a new epoch in which humanity has become tantamount to a geological force, Latour’s idea that humans and nonhumans are acting together — and that the earth reacts to those actions — now sounds a lot like common sense. “He is really the thinker of the Anthropocene,” Philippe Pignarre, Latour’s French publisher of 40 years, told me. “A lot of scientists in France didn’t like him originally because he treated them like other workers, and they believed in having a special relationship to the truth. But now they are using his work. He is at the center of people who want to think about the world.”

“Inside” draws heavily on “Down to Earth,” his new book, which has been highly praised in France since its release there last fall. Scientists, he writes, have largely looked at the problem of climate-change denial through the lens of rational empiricism that has governed their profession for centuries; many limit their domain to science, thinking it inappropriate to weigh in on political questions or to speak in an emotional register to communicate urgency. Even though the evidence in support of global warming has long been overwhelming, some scientists continue to believe that the problem of denialism can be solved through ever more data and greater public education. Political scientists, meanwhile, have shown that so-called “irrational” individuals, especially those who are highly educated, in some cases actually hold onto their opinions more strongly when faced with facts that contradict them. Instead of accusing Trump supporters and climate denialists of irrationality, Latour argues that it is untenable to talk about scientific facts as though their rightness alone will be persuasive.

In this respect, “Down to Earth” extends the sociological analysis that he brought to bear on factory workers in Abidjan and scientists in California to the minds of anti-scientific voters, looking at the ways in which the reception of seemingly universal knowledge is shaped by the values and local circumstances of those to whom it is being communicated.

Latour believes that if scientists were transparent



The Vosges Mountains in Alsace-Lorraine, site of a critical-zone observatory that Latour visited recently.

Luca Locatelli for The New York Times

about how science really functions — as a process in which people, politics, institutions, peer review and so forth all play their parts — they would be in a stronger position to convince people of their claims. Climatologists, he says, must recognize that, as nature’s designated representatives, they have always been political actors, and that they are now combatants in a war whose outcome will have planetary ramifications. We would be in a much better situation, he has told scientists, if they stopped pretending that “the others” — the climate-change deniers — “are the ones engaged in politics and that you are engaged ‘only in science.’ ” In certain respects, new efforts like the March for Science, which has sought to underscore the indispensable role that science plays (or ought to play) in policy decisions, and groups like 314 Action, which are supporting the campaigns of scientists and engineers running for public office, represent an important if belated acknowledgment from today’s scientists that they need, as one of the March’s slogans put it, to step out of the lab and into the streets. (To this Latour might add that the lab has never been truly separate from the streets; that it seems to be is merely a result of scientific culture’s attempt to pass itself off as above the fray.)

Of course, the risk inherent in this embrace of politics is that climate deniers will seize on any acknowledgment of the social factors involved in science to discredit it even further. In a New York Times Op-Ed, a coastal geologist argued that the March for Science would “reinforce the narrative from skeptical conservatives that scientists are an interest group and politicize their data, research and findings for their own ends.” This was what happened in the infamous 2009 incident now known as Climategate, when emails to and from scientists at the University of East Anglia, a leading center for climate research in Britain, were hacked, revealing exactly the kinds of messy debates that Latour documented in “Laboratory Life.” Climate skeptics cited this as proof that the scientists weren’t really discovering climate change but simply massaging the data to fit their preconceptions. Certainly the incident did not, as scholars of science and technology studies might have hoped, lead the public to a deeper understanding of the controversy and negotiation that govern all good science in the making.

Some might see this discouraging episode as a reason to back away from a more openly pugnacious approach on the part of scientists. Latour does not. As pleasing as it might be to return to a heroic vision of science, attacks like these — which exploit our culture’s longstanding division between a politics up for debate and a science “beyond dispute” — are not going away. After all, when climatologists speak about the facts in a measured tone, acknowledging their confidence interval, the skeptics claim the mantle of science for themselves, declaring that the facts aren’t yet certain enough and that their own junk science must also be considered. And yet when prominent climate scientists present their facts with passionate conviction, climate skeptics accuse them of political bias. This toxic cycle has further corroded the classical view of science that Latour has long considered indefensible.

“It’s an important political moment,” says Donna Haraway, a leading feminist S.T.S. scholar and philosopher of science, describing the rise of anti-scientific thinking and the pro-science mobilization it has inspired. “But it’s also an important moment not to go back to very conventional and very bad epistemologies about how scientific knowledge is put



together and why and how it holds. Bruno has been incredibly creative and strong in making these arguments. We need to show the bankruptcy of this climate controversy without closing down the fact that science is a set of situated practices and not capital-S science.”

As the assaults on their expertise have increased, some scientists, Latour told me, have begun to realize that the classical view of science — the assumption that the facts speak for themselves and will therefore be interpreted by all citizens in the same way — “doesn’t give them back their old authority.” In an interview last year, Rush Holt Jr., a physicist who served for 16 years in Congress, described the March for Science as a turning point: People, he said, were realizing “that they need to defend the conditions in which science can thrive.”

Whether they are conscious of this epistemological shift, it is becoming increasingly common to hear scientists characterize their discipline as a “social enterprise” and to point to the strength of their scientific track record, their labors of consensus building and the credible reputations of their researchers. Some have even begun to accept that their factual statements about the world are laden with judgments and warnings — that, in Latour’s words, “to state the fact and to ring the bell is one and the same thing.” The alarmist tone of the most recent report from the United Nations Intergovernmental Panel on Climate Change, which spoke of the need for “rapid, far-reaching and unprecedented changes in all aspects of society,” marks a significant departure from the I.P.C.C.’s previous work, because it shows the scientific community, as the journalist David Wallace-Wells wrote for *New York* magazine, “finally discarding caution in describing the implications of its own finding.”

At a meeting between French industrialists and a climatologist a few years ago, Latour was struck when he heard the scientist defend his results not on the basis of the unimpeachable authority of science but by laying out to his audience his manufacturing secrets: “the large number of researchers involved in climate analysis, the complex system for verifying data, the articles and reports, the principle of peer evaluation, the vast network of weather stations, floating weather buoys, satellites and computers that ensure the flow of information.” The climate deniers, by contrast, the scientist said, had none of this institutional architecture. Latour realized he was witnessing the beginnings a seismic rhetorical shift: from scientists appealing to transcendent, capital-T Truth to touting the robust networks through which truth is, and has always been, established.

The great paradox of Latour’s life — one that is not lost on him — is that he has achieved a kind of great-man status even as so much of his work has sought to show that intellectual labor is anything but a solo endeavor. In the last two decades, he has become widely recognized as one of the most inventive and influential of contemporary philosophers, not just for his radical approach to science but also for his far-ranging investigations of modern life. His dozens of books include an ethnography of one of France’s supreme courts, a paean to the difficulty of religious speech, a mixed-media “opera” about the streets of Paris and a polyphonic investigation into the failure of an automated subway system — narrated, in part, by the subway itself. This work has inspired — or, depending on your

point of view, infected — everyone from literary scholars and object-oriented philosophers to management theorists and seminarians.

Unlike most philosophers, for whom thinking is a sedentary activity, Latour insists on testing our taken-for-granted ideas about the world against the world itself. In effect, he has been running a 50-year experiment, during which he has collected data at the Salk Institute in San Diego, in the Amazon rain forest and in the Kenyan savanna. The current phase of this never-ending research has found him taking on a region commensurate with his global ambition. Latour has recently been traveling the world to observe the scientists who study the effects of climate change on what's known as the critical zone — the thin layer of earth that stretches from the lower atmosphere down to the vegetation, soil and bedrock. It is “critical,” according to geologists, because it is the only place where terrestrial life can flourish. As Latour put it in his lecture in Strasbourg, “Everything we care for, everything we have ever encountered, is here in this tiny critical zone.” Much of his interest in the critical zone stems from his conviction that greater public understanding of it will more accurately show how climate science is made, before its hectic social dimension gets black-boxed.

One afternoon during the week before his trip to the Strasbourg puppetry festival, Latour met Jérôme Gaillardet, a soft-spoken geochemist, and Alexandra Arènes, a landscape architect whom Latour has described as a latter-day Copernicus, at the Institut de Physique du Globe de Paris, one of the country's top research universities for earth and planetary sciences. Latour had paired his usual aqua Lacoste messenger bag and burgundy slacks with a brown suede jacket, pumpkin scarf and flat tweed cap, which gave him the appearance of a Wes Anderson character. The three of them were gathering to discuss a paper they had written for *The Anthropocene Review*, a transdisciplinary journal.



Latour (in red ascot) with scientists at a critical-zone observatory in the Vosges Mountains. At the site, temperature-conductivity and pressure probes (like the one shown in the center) measure water parameters and hydrostatic pressure several meters underground.

Luca Locatelli for *The New York Times*

Latour first met Gaillardet and Arènes through Sciences Po, one of France's leading universities, where he is an emeritus professor and served as the director of research. Under the guidance of Gaillardet, who directs the network of critical-zone observatories, or C.Z.O.s, in France, Latour has traveled to interview scientists at a handful of the more than 200 sites that informally constitute the international C.Z.O. network. He has become something of a celebrity on the critical-zone circuit, attending meetings at which prospective research is decided, giving talks about this

highly heterogeneous region of the earth, publishing papers with environmental scientists (most recently in *Science*) and encouraging scientists to include humans as a variable in their studies.

The authors sat around a circular table in Gaillardet's office. It was functionally decorated with an equation-strewn whiteboard, pedagogic rocks, geochemistry textbooks and a perpetually spinning desk globe. The idea for the paper emerged after Latour told Gaillardet that the standard representations of the critical zone were "a total disaster." In contrast to the standard image of the earth, in which the critical zone is represented merely as a thin layer, their paper proposed a new representation in which the critical zone, the most fragile and threatened area of the earth, is the center of attention.

They tackled the comments with playful self-deprecation. Arènes realized they had to change the word "concrete," which had a more material connotation for geologists than for philosophers. Gaillardet wondered whether a rock could be described as an agent, and pointed out several other flourishes that were "very rare" in scientific articles, such as the literary epigraph and the fact that a whole sentence was in parentheses. Latour proudly noted that theirs was most likely the only scientific paper ever to have cited Peter Sloterdijk. As they went through and made line edits to the text, Latour saw I was taking notes and turned to me with a wry smile. "Don't say we are manipulating facts!" he said. "This is normal science. There is nothing untoward here."

An hour into the discussion, during a tea break, Gaillardet presented Latour with a thick stack of books on geochemistry, several of which contained equations and problem sets. Latour considered his homework wistfully. The books seemed useful, but he wasn't sure when he would find the time to give them the attention they deserved. He was especially interested in the monograph by Linus Pauling, whose work he had recently been revisiting. Impressed by Latour's dedication, Gaillardet remarked that Latour could have been a scientist. The idea seemed almost too much for him to bear.

"I could have been a scientist," Latour said with arch gravity. "I've wasted my life."

"Oh, Bru-*no*!" Gaillardet said, in the way in which one might comfort a wounded bird.

"To produce one fact!" Latour sighed, and pointed a finger in the air, as though to demonstrate its indisputable solidity. There was an ache in his eyes. "Can you imagine the pleasure of producing one fact?"

The week after we met in Paris, Latour traveled to the Vosges mountain range in Alsace-Lorraine, two hours southwest of Strasbourg, to observe Gaillardet and other scientists at work at the Strengbach Critical Zone Observatory. It was a clear, cold morning, and after a week of intermittent snow, the landscape was draped in white. In addition to several sweaters and a coat, Latour was wearing a brightly patterned red ascot, which seemed to be his way of subtly acknowledging the significance of the business at hand. Strengbach, one of the oldest C.Z.O.s in France, was originally established in 1986 to measure the effects of acid rain. In recent years, the 200-acre hillside forest, equipped with sensors and an array

of high-tech devices, has become a site for studying the impact of climate change on water chemistry, soil content and vegetation.

Near the top of a winding mountain path, Gaillardet explained to me that some of the questions Latour had been asking the group, in particular about the influence of living organisms on geological processes, were difficult to answer because they forced scientists to reckon with knowledge outside their specialized fields. Part of the trouble with climate change has been that its breadth and complexity defy disciplinary boundaries, making it difficult for specialists to convey the implications of atmospheric patterns from their data alone. What the critical-zone observatories had done, Gaillardet said, was to draw together scientists working in Balkanized disciplines to describe minute environmental changes that more general models of earth-systems science could not detect. But even though human beings were the cause of these changes, earth-systems science had until recently focused on the natural world to the exclusion of the social.

With Latour's appearance on the scene, labs like Gaillardet's have started to study environmental changes with a thorough recognition that humans and nonhumans, society and nature, are inseparable, bound together in a web of reciprocal influence. This is not simply philosophical conjecture. As Latour has long maintained, critical-zone scientists themselves — like many environmental researchers — play a part in the cyclical processes they study: Others use their research to make changes to the very environment they are measuring, in turn challenging the traditional image of scientists as disinterested observers of a passive natural world. "I think what we've done with Bruno goes further than simple combination," Gaillardet told me. "It changes the way that social science and earth science think."

As we continued to climb, a view began to emerge of the cove of Germany's Black Forest dotting the edges of the Rhine Plain. Recent storms had blown several large trees over our path, and at one point, we took a precarious shortcut, clambering over fallen branches while trekking downhill through thick snow.

Shortly after noon, we reached the summit of the mountain, where we discovered a low concrete bunker. Inside was the observatory's gravimeter. A blue cylindrical machine, it measures differences in the mass of the water collected in a catchment farther down the mountain by tracking infinitesimal changes in gravitational force. The old Dell computer to which it was attached was taking a while to turn on. As we waited, Jacques Hinderer, an amiable geophysicist, explained some of the difficulties in obtaining precise data. Gaillardet kept his eye on Latour, who wore an expression of beatific delight, to make sure he was understanding the technical details.

When the computer finally came to life, its screen displayed a simple animation — green waves of varying thickness undulating against a blue background. Strictly speaking, they represented the gravitational effects of the ocean waves and the tide. But these tremors also reminded me of Latour's description of the earth in the Anthropocene as "an active, local, limited, sensitive, fragile, trembling and easily irritated envelope." He stood before the small monitor, rapt. "It's beautiful that ocean waves can actually be heard in the middle

of the Vosges,” he said. “The whole earth is made sensitive here. It’s very moving.”

Had they been among our circus that day, Latour’s critics might have felt that there was something odd about the scene — the old adversary of science worshipers kneeling before the altar of science. But what they would have missed — what they have always missed — was that Latour never sought to deny the existence of gravity. He has been doing something much more unusual: trying to redescribe the conditions by which this knowledge comes to be known.



The scientist Jacques Hinderer, left, showing Latour a gravimeter, which measures the shifts of weight in sections of the so-called critical zone, the thin layer of Earth that is, according to Latour, “everything we care for, everything we have encountered.” Luca Locatelli for The New York Times

Crowded into the little concrete room, we were seeing gravity as Latour had always seen it — not as the thing in itself, nor as a mental representation, but as scientific technology allowed us to see it. This, in Latour’s view, was the only way it could be seen. Gravity, he has argued time and again, was created and made visible by the labor and expertise of scientists, the government funding that paid for their education, the electricity that powered up the sluggish computer, the truck that transported the gravimeter to the mountaintop, the geophysicists who translated its readings into calculations and legible diagrams, and so on. Without this network, the invisible waves would remain lost to our senses. For a few moments, Latour stood reverently before the rolling waves on the screen. Then he said to the assembled scientists, as though he were admiring a newborn child, “Beautiful — you must be really proud.”

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