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1

Introduction

Why This Book?

An observer on another planet looking back on human history in the twentieth and, especially, the first part of the twenty-first century will shake whatever passes for their head in amazement that the humans spent so much more money to find out how better to kill people than how better to heal or understand them. That they even turned their most spectacular tool for the betterment of life on earth into a partisan political weapon.

We are now living in that era when politicians in some democratic countries, particularly the United States, have found it convenient to go to war against research. Their ammunition is ignorance: If people don't recognize research, they won't notice if it's taken away; if people don't understand research, they won't be able to defend it. Their policies are shaped by that same ignorance, for why else would they go about trying to damage the very thing that gives them power? This book about research is therefore offered as a remedy for

our time. For the only defense we have against weaponized ignorance is active knowledge.

Something as important, valuable, and pervasive as research simply must be understood. But before it can be understood, it has to be seen. And yet, for something so pervasive, research is invisible. The effects are all around us—better health, higher living standards, and an ever better understanding of the world. The cause isn't seen, though, so the connection isn't made. Moreover, the practice, even when seen, is unintelligible. Pictures of people in lab coats standing in a fluorescently lit space with banks of machinery or people in tweed sitting hunched over wooden library tables bathed in pools of light against the surrounding darkness: We live with the stereotypes of research only. Understanding how research *actually* works means understanding something about humans and creativity and passion. It's way more complicated than putting a coin in one slot and getting a product to pop out from another. In fact, our exploration of research in this book could also be reframed as an exploration of creativity; our history of research a chapter in the history of creativity.

Because research hitches a ride on the idea of excellence, it is vulnerable to collateral damage from the populist attack on meritocracy, real or imagined. I get it: If you hear about something all the time but you don't understand it, and you don't see it in action, and you don't see the supposed benefits of it, and it's very expensive and you don't have money—well, that's a pretty volatile set of ingredients. But tearing down a research architecture that has been building for almost a century is certainly not going to make things better. If research isn't delivering the goods, however defined, the answer is more research,

not less. I have written this book about the history and meaning of research so that we can better care for one of humanity's greatest achievements. For research shapes our daily experience, from technologies to medicines to materials; from deep in the earth to the farthest reaches of outer space. It is the modern god, and a fully human-made one. It represents our ambition to know more and know better. For good and ill, research has given birth to much that we take for granted. And like the work of the gods, its action is mostly invisible.

In the last year for which complete statistics are available (2024), global research and development work was valued at nearly \$3 trillion and constituted nearly 2 percent of global GDP.¹ Yet with all of that, researchers themselves do not consider research an important subject. The Library of Congress catalog contains 175 million items. But if you wanted to know where research came from, you would find no Library of Congress subject heading such as “research—history of,” nor one devoted to “research—research on.”² There's neither a single volume history of it—no Oxford *Very Short Introduction*, for example—nor a comprehensive multivolume project of the *Cambridge History of* type, and there is only a scant handful of publications on it, all of them narrowly focused.³ The actual working of research is treated by those who study knowledge and knowledge production as something self-evident that needs little explanation or clarification.⁴

When research makes it into the news, it is because of either scientific discoveries, or going the other way, because of cuts to funding. Both usually occur with little discussion of what research is, how it works on a day-to-day basis, and why anyone should care. If we want to understand fully what is at

stake in the current hostilities, we are going to need to take a wider and deeper look at this thing called research. All of us have a stake in conversations about research because we are all the beneficiaries, in the shorter or the longer term, of what research produces.

Research also has a history, and we can find in that history many shades of meaning. But the history of the term is fairly short, and the history of active reflection on it even shorter. Sure, some dispositions and practices that became bound up with research, such as curiosity, exploration, empirical observation, and trial and error learning may be bred in the bone, and may also have been encouraged in different social contexts at different times. I'm not going to get into the question of whether a thing can exist before it is named—conceptual formation is much more complicated than that—but I will say that the full grouping of ideas that we recognize in the term “research” did not come together before the nineteenth century *and* people did not talk about “research” before then. As Lorraine Daston and Peter Galison have explained in their study of “objectivity” (just replace objectivity with research in the following), “The aim of a non-teleological history of scientific objectivity must be to show how all these elements came to be fused together . . . designated by a single word and translated into specific scientific techniques. . . . We want to know when objectivity became ubiquitous and irresistible.” For them, as for me, it's the nineteenth century when things come together in a self-aware way, so that is the center of gravity of this book.⁵

We need the history of research so that we can talk about the meaning of research. I don't believe we can tell one story

without the other. The past is always the platform from which we look toward the not yet, and half of this book is about the future. Capturing the interwoven history and meaning of research reminds me of something the historian of philosophy and philosopher Michel Serres once said to the philosopher of science and historian Bruno Latour. Serres, tongue-in-cheek perhaps, asserted that the best preparation for original thinking was knowing the history—and then forgetting it all.⁶

So let's start here, with misconception number one: research isn't learning. Learning is an activity that applies to a closed, fixed canon; you learn some *thing*, such as Homer, Confucius, or mathematics. That's learning. What you do in a course in high school or university is learning; anything that you can know by the end of a semester or in an internship is learning. If it exists, if it can be put on a shelf, between covers, or in a vitrine, then it's learning. It can be venerated because it exists. And it can be attacked if it changes. It is sanctioned by authority.⁷

Research is different from learning. It isn't about keeping but about doing. Research is a process, not an artifact. You can't put it on a shelf or in a box. And it doesn't have an ending. If you stop your research, someone else can pick it up and keep it going. If you succeed at finding what you're looking for, it just becomes the platform on which the next inquiry is built. Moreover, whenever you say, "I'm done. The problem's solved," you know that someone else will come along, sooner or later, and show what you missed or got wrong. Research is like a relay race with no end. Relative to existing learning, research is dialectical. Seen from the distance of decades and centuries, it is insurgent.

Humans want to know. Aristotle put this thought into words twenty-five hundred years ago.⁸ Research is the child of that desire to know. It is a commitment to the value of knowledge that subjects knowledge to constant revision in the cause of knowing better. And of course, this same drive to know—lust after knowing—also leads humans into morally complex territory. More than one philosopher or physicist has made Faust's pact with the devil of the day, sometimes in search of power, yes, but usually in search of better research funding or facilities. The neutrality of research-as-process may not always be morally neutral.

That brings me to misconception number two. If you search for all the references to research in *The New York Times*, *The Economist*, or your favorite periodical, you would think that research was identical with scientific research. In fact, the very idea of research was invented by humanists. And once we take this seriously, we see a fundamental connection between scientists and humanists that goes beyond the mere fact that they both do research. It's now an accepted truism that there is a fundamental gap between the "two cultures" of science and humanities. But from the perspective of research, there is only one culture: those who inquire.⁹

This has been largely obscured by a fascinating transformation that will be an important axis of my story. I just wrote that "the very idea of research was invented by humanists." Research, though, was soon taken over as a guiding idea by scientists. And then, somewhat later, the scientists rebranded research as "the scientific method." With that, not only was the identity of science detached from a practice shared by the hu-

manistic disciplines but the specific dependency of science on history for its key term was completely effaced as well.¹⁰

Thinking about research purely as a science category, which as we'll see later was born amid the twentieth century's world wars, created the mistaken assumption that research is related to objectivity. And talking of objectivity immediately brings with it a distancing from anything related to individual human beings—the subjective. But in fact, as Daston and Galison show us, the birth of objectivity coincides with that of subjectivity; they come together as necessary parts of a whole. Research, whether conducted by humanists or scientists, is a domain of rigor, systematicity, and self-discipline. These, along with my personal favorite, *Sitzfleisch*, or “sitting power,” a virtue that only exists in German, we would think of as belonging to objectivity. Yet research also requires imagination, intuition, and conjecture, all of which we think of as very subjective because to do research well, you need the artist's ability to imagine what isn't there. Above all, research asks questions, and questions are as personal, as uniquely personal, as a fingerprint.

Why Has No One Else Written This Book Yet?

The Anthropocene is what more and more people call the period from roughly 1850 to the present—the era in which humans became a climate-shaping force. Inventions such as the steam engine, railroad, and telegraph spread and together changed the world. We could also call it the “age of research” because it was during this same period that the idea of

research crystallized and was self-consciously discussed and then was put into practice around the planet.

That self-aware discussion—the invention of the “idea” of research—happened in mid-nineteenth-century Germany. It was then globalized along with the “research university,” also, and not coincidentally, invented in nineteenth-century Germany. From Europe, this vision of the apex institution of higher education came to the Americas, Africa, and Asia. Research traveled the world inside the modern university like the stowaway fish in the ballast of oceangoing freighters. That is how research came to be the global phenomenon it is today. But the fact that the modern university traveled the world was no triumph of intellectual achievement alone: Imperial expansion, competition, and funding boosted its prospects as it did that of many other corporations. Just as world war accelerated research in the twentieth century, empire did the same in the nineteenth. We oughtn’t, therefore, romanticize research as an expression solely of individual genius the way, until fairly recently, the early oceanic explorers were romanticized; it is also part of the history of power.

On some level, we already know all this. It’s why, when I came across the first and really still the only properly historical study of thinking about research, which focused on nineteenth-century Germany, I rolled my eyes in boredom. “Not another book about Germany, the nineteenth century, and research,” I groaned to myself. As someone who was then in the middle of a twenty-five-year long project studying a little-known early modern French researcher, I was not going to be taken in by a hoary chestnut. Fast-forward to today and I’m making that same argument myself. Why? First, because Germany actually

is where that self-conscious discussion about research first happened. Second, it's because Germany is where the idea of research first drove institutional restructuring. Third, because one particular German institution, the university, became the vector by which research became a global phenomenon.

Why haven't others written this book yet? One reason why is that scholars think they already know what research means. Or like David Foster Wallace's 2005 Kenyon College commencement address about fish and water, they don't even know that they don't know. The "mission statement" of the Max Planck Society, the world-leading German quasi governmental basic research agency, for instance, includes the word "research" in nearly every line. But it never stops to say what it means by research. Similarly, and illustrating just how slippery water can be, the act creating the National Endowment for the Humanities does not include the word "research" at all.¹¹

Another reason is that we sometimes look at scholarly practices in earlier periods and see them as steps toward what we later recognize as "ours." But that does not mean that the developers of these practices reflected on what they were doing, nor that those reflections would have been about "research," which strictly speaking, did not yet exist (here's where the inability to talk about something can be an inability to think it). This is yet another manifestation of the old problem of "Whig history," or post hoc, ergo propter hoc, or the confusion of history with genealogy. The smuggling in of contemporary values can happen easily. One has constantly to be on guard against unselfconscious presentism.¹²

And then, even people who do research for a living, and acknowledge this, may not realize how complex a process

research really is—complex not just for people in a specific field, but for anyone doing it. Let's take the example of Robert Caro, a famous American biographer whose studies of Robert Moses and Lyndon Baines Johnson are remarkable historical accounts. His large books are all based on deep archival research. He celebrates research on every page. But he sums up his philosophy of research in three words: "Turn every page." Yes, diligence and thoroughness are important, but they are neither the sole nor the most important part of research.¹³

Ultimately, I am writing this book about the meaning of research because someone has to. Though the idea of research was developed by and for historians, even historians do research without reflecting on what research is (or isn't). They are trained, and have been for the past two hundred years or so, depending on what you count as history, to view research as the foundation on which the achievement of the historian rests, but like all compulsory introductory training, it is discarded and put out of mind as fast as possible, the way a capable cyclist might relate to their early era on training wheels. Already nearly a century ago, the philosopher John Dewey explained that to "a large extent historians have not developed the habit of stating to themselves and to the public the systemic conceptual structures which they employ in organizing their data to anything like the extent in which physical inquirers expose their conceptual framework."¹⁴

I would argue that the measure of greatness in all the historical fields—whether we are talking about history, art history, archaeology, paleontology, astronomy, biology, or geology—is revealed in the way the scholar finds their subject in the mass of data, chisels it free with sharply tuned queries, and

then refines it ever more precisely with recursive question-and-answer sessions. And yet, almost none of this virtuosity is shown to the public. Like the work of the artist in their studio, it is only when presented to the public in a final form that we see and judge the work—but by then the art in that experimental give-and-take is either hidden away or hardened into the final form of the work itself. The invisibility of research, then, is a choice made by the historian.¹⁵

Why did this happen? One reason is that in order to do research, you don't actually need to reflect on what research is. On the contrary, describing its features and processes is like trying to freeze something living and dynamic; in trying to make the subject visible, it kills it. Like a golf swing or ballroom dancing, so the reasoning goes, overthink it and you mess it up. A great artist, like a great athlete or actor, doesn't need to be able to explain what they are doing, they just need to be able to do it. So, too, the researcher doesn't need to be reflective about research in order to do good research.¹⁶

The inverse is also true: as with household appliances, we tend not to think about things until they stop working. As long as research kept returning discoveries, there was no need to look into how it worked, let alone its history. And as long as research was funded “automatically,” we didn't need to talk much about why it was necessary.

Which brings me to why this book needed to be written *now*.

We are standing on a precipice. Just as research was at the heart of the American post–Second World War II hegemony, the US government's disassembly of the postwar research model is closely tied to the passing of that geopolitical

hegemony. Research began its life speaking German. It thrived while speaking English. Many now think that in the future it will speak Chinese.¹⁷ It is because we are on this precipice, at this turning point, that it is important to reflect on what research really means. Max Weber once explained the value of the kind of inquiry I am making in this book by way of an analogy. It was not necessary, he wrote, to know anatomy in order to walk. But if you suffered an injury and had to relearn walking, then it would be absolutely crucial to know some anatomy.¹⁸ Up to now, the meaning of research may have been a matter of curiosity only. Historians and scientists alike could go about their business unconsciously doing the thing they could not explain, and whose workings they did not talk about. All of that has now changed. With eight of the ten top-ranked research universities in the world in China, and the US government intervening to tell its scientists what constitutes “gold standard science,” it has become critical that we all know what research is—researchers, knowledge managers, funders, politicians, and citizens.¹⁹

Opening the Black Box

Research is a bit of a black box. It’s what has helped scientific research, in particular, to develop an aura about it. And this aura, a combination of power and mystery, has kept funding flowing into the sciences even in situations where little enough flowed elsewhere. The human sciences haven’t benefited as much from this sense of the magical, humans being too superficially familiar for their unmasking to seem especially revelatory. (But it has made controversies about flawed or failed

research all the more delicious for the general public—the high priest’s secrets being revealed, so to speak, with all the *schadenfreude* associated with hypocrisy exposed—and ultimately, all the worse for the cause of research itself.)

We need to go ahead now and look inside the black box.

We need to do this in order to produce better scholarship, to produce better informed citizens, and to dispel the air of mystery around the workings of research so that it cannot be operationalized by the ill intentioned. But for us to be able to do this, we will have to do something like reproduce the research process itself. Scientists talk about the importance of repeatability as a validation of results. In the humanities, since no two people will do research in exactly the same way, nor produce exactly the same conclusion—and I leave aside the dawning realization that scientific results are quite often not exactly completely reproducible either—the only way to be sure that the research is done well is to reexamine the process, not just the outcomes.

And here, things get sticky. In the later seventeenth century, faced with a ravaging skepticism not unlike the one that has been unleashed by the Cerberus of internet, disinformation campaigns, and AI tools—they called it *Pyrrhonism* then, after the first century BCE movement associated with the hyperskeptic Pyrrho of Ellis—scholars developed a series of techniques and questions designed to secure the easy public certification of truth content. Foremost among them was the footnote (the other was recourse to unfalsifiable, because too widely diffused, material evidence such as coins).²⁰

The footnote advertises itself as an openness operation, like the scientists’ later dogma of repeatability. Everyone can look

up the source and check for themselves that what is said is backed up. Over time, though, footnotes became just another convention. They advertise substance and reliability. But by themselves, they don't—and can't—show that the scholar is actually reading the sources correctly rather than bending them, howsoever slightly, in the direction of the argument they want to make. The only way to be really sure that research work isn't tendentious is to redo the research. And that means reviewing the same sources that were used, and not just checking off that what was claimed to be on page 54 of this or that book actually was on page 54 but instead whether that text is being interpreted in the spirit of its generally accepted meaning.

Carlo Ginzburg, the great Italian historian, has called attention to the way a historian of the previous generation, Arsenio Frugoni, one of his teachers at Pisa, undercut the reigning interpretations of a legendary twelfth-century northern Italian hero by carefully rereading the relevant sources and showing how they, in turn, read and interpreted their evidence. Each of the chapters of his book examined one source, and presented, *Rashomon*-like, a distinct and different portrait of the same person as a result. Frugoni employed the metaphor of a mosaic, in which the documentary evidence constituted the individual pieces of colored glass, the *tesserae*. That there were such sources and that these were the ones used by the writer were what a footnote could confirm. But, and this was the strong point made by Frugoni and underscored for still greater emphasis by Ginzburg, what actually shaped an argument was the “matrix,” the way the pieces of evidence were arranged together.²¹ This work happened almost invisibly. This was the

real art of the researcher, and it could only be seen and assessed by reinhabiting their argument and rereading the sources from that perspective. The vertiginous difficulty of doing this—can we reinhabit the work of even a single scholar whose biography may barely be known to us, let alone the many whom we assemble, almost anonymously, into the arguments we claim for our own?—is a reminder that opening a black box is often only for those with strong stomachs.

And yet we must, for research is absolutely essential, not just for reliably knowing things, but for any kind of self-governing politics. At bottom, self-government is possible only because we have confidence in the ability of individuals to evaluate arguments. Without that confidence, we need people to explain the world to us, the way children need adults.

We can't despair of understanding research just because it's hard work or because we can't guarantee that we've gotten to the absolute bottom of that black box. We need to build research skills, not throw up our hands in despair, because research skills are all that stands between us and the fables told to children.

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