

## CUTTING THE WORLD AT ITS JOINTS: AN INTERVIEW WITH D. GRAHAM BURNETT

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In the late eighteenth century, the emerging science of comparative anatomy began to reclassify animals according to the organization of their internal forms and organs. Few animals proved as problematic for this novel taxonomy as the whale. In his new book, *Trying Leviathan* (Princeton University Press), D. Graham Burnett, historian of science at Princeton University, uses an early nineteenth-century trial over whether a whale was legally a fish or a mammal in order to investigate the implications of moving the most mythic of sea creatures into the same category as cows, mice, and humans. Sina Najafi met with Burnett to discuss the book.

### Your book is about a trial—what’s at stake?

*Trying Leviathan* centers on a trial that took place in 1818 in Manhattan, where a jury had to determine whether a whale was a fish for the purpose of New York State law. This question had come up under a statute requiring that all fish oil be inspected and taxed. A savvy merchant in New York City, one Samuel Judd, who had three barrels of spermaceti in his possession (spermaceti is a waxy goo found primarily in the heads of sperm whales), turned the inspector away, pointing out that, according to the latest scientific authorities, whales weren’t fish, so he was off the hook for the fees. The dutiful inspector, James Maurice, chortled (“Whales not fish? OK, wiseguy!”) and slapped the cuffs on him. The issues at play in the trial—human taxonomy, oceanic monstrosity, the interpretation of Genesis, atheistical French philosophy, power politics in the early Republic—turned a minor legal fracas into a major sensation. For three days, the papers wrote about little else, and *Maurice v. Judd* would be the subject of endless jokes, scurrilous poems, double-entendres, angry Op-Eds, and backroom gossip for years to come. Before it was over, the trial had become a pivotal test case not just for whales and fish, but for comparative anatomy, natural history, and finally, really, for science itself in the US.

The case makes a great story, but I am after bigger game: my aim, in the end, is to use *Maurice v. Judd* to look at changing ideas about natural order between Linnaeus and Darwin, roughly between 1750 and 1850. The trial opens an interesting window onto this large issue.

### Whales have always been highly symbolic, going all

the way back to the Bible, but when did these creatures become an explicit problem for natural history?

I was drawn to the case because I’m interested in problematic and anomalous organisms. No question: whales are weird, and they have long terrified sea-going peoples and befuddled the learned. Moreover, they turn out to be a decisive organism around which to build the new taxonomy of comparative anatomy in the late eighteenth century. Taxonomy—the business of sorting things into categories—had been an important aspect of the study of nature for a very long time. But during the period I’m investigating in the book, a major transition was in the works. Out went systems based primarily on the external characteristics of plants and animals, and in came taxonomy concerned centrally with the *internal* forms and arrangements of bones and organs. It may strike us as self-evident that the categories of living things ought to be based on their internal anatomical details, but in fact there are other approaches that make plenty of sense: you can use milieu, for instance (land animals, water animals, sky animals; or, as Genesis puts it, beasts that creep, fish that swim, and birds that fly); obvious external features, like color or, say, number of feet, work well too. The term *quadruped* (“four-foot”) was certainly the category you would see most regularly in works of European zoology through the seventeenth century.

The shift to using internal structure, rather than external characteristics, is going to re-align some key points in the taxonomic spectrum. Whales (and bats, interestingly) will be crucial in this respect. In their external characteristics and mode of life, whales are basically fish (if by that you mean, as people did, “a creature living exclusively in the water”), but in their internal anatomy they are pretty much indistinguishable from a big carnivore. And it was in moving the cetaceans out of the category of fish and into the emergent category of “mammals” that comparative anatomy had its triumph in the late eighteenth and early nineteenth centuries. Did whales and fish all have fins? Sure. But when you got out your scalpel, you discovered that the whale’s “fin” secreted the bones of a human hand! [see page 83] This wobbled the old certainties of natural order and implied new and troubling kinships. We don’t any longer hear the word “breast” (*mamelle* in French) in “mammal,” but people very much *did* hear that in the beginning of the nineteenth century, and it raised eyebrows. Much resistance to the non-fish whale hailed from anxiety about this newfangled taxonomy: lots of folks agreed that there was something *louche* about organizing God’s creation according to these intimate, bedroom details.

Sexual organs? What was wrong with nice, clean external characteristics?

### Had doing this with plants met with less resistance?

You're referring to the fact that Linnaeus's botany, which had been enormously successful, had used as its primary discriminant for categorization the numbers and configurations of the pistils and stamens, the reproductive parts of the plant. Interestingly, Mary Wollstonecraft's *Vindication of the Rights of Woman* from 1792 contains a diatribe against male professors who would not permit women to study botany because of a lingering sense that it was inappropriate for them to spend so much time basically counting flower-penises, etc. So there were real questions well into the nineteenth century about the propriety of women's familiarity with these systems.

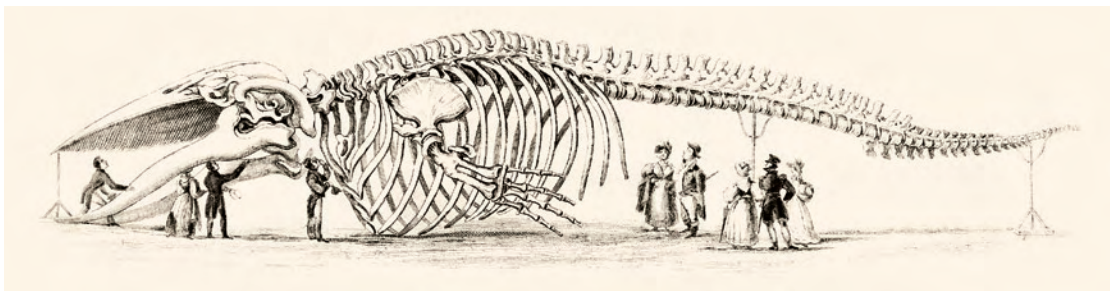
But in the trial it becomes clear that the primary anxiety about moving whales into the mammal category derived from the worrisome implications of the new taxonomy for the position of human beings in the natural world. According to these systems, humans too were mammals ("quadruped" had conveniently maintained the distance between people and beasts). The idea that humans and whales were in the same category seemed particularly grotesque and absurd to many people.

It's also worth pointing out that the question of who was authorized to speak on taxonomy in general, and human taxonomy in particular, was very much at issue in *Maurice v. Judd*. At one dramatic point in the trial, one of the plaintiff's attorneys says, "If you permit these natural philosophers to tell us that whales are not fish, who is to stop them from coming in here with an orangutan and saying that the orangutan ought to be permitted to vote, because, after all, it's in the genus

*homo* according to this new taxonomic system, and it has two hands, two feet, walks upright, and nurses its young?" That was an only slightly veiled allusion to the sharp debates going on in New York State at the time about whether free blacks ought to be allowed to vote. So the power of science to define the boundaries of the human was explicitly debated in the courtroom.

**Your book goes after theories of knowledge: you want to show who knew what about whales in 1818, but also how they knew it, and how they defended their knowledge. For this reason, your account of the trial is structured around the various classes of people who testify — each brings a distinct knowledge of whales and their anatomy ...**

At one point, one of the lawyers cross-examining a scientific witness says to him, "You've mentioned three classes of men: fishermen, artisans, and men of science. There's a much larger class, those who neither fish, manufacture, nor philosophize. Have you ever thought it worthwhile to pay attention to their opinion?" And I use that moment in the trial to set up a kind of human taxonomy that is at the same time a taxonomy of the different kinds of knowledge represented at the trial. So in separate chapters I take up what fishermen and whalers knew about whales (they had a great deal of practical, intimate craft knowledge; what we might call "lay expertise"); what artisans and manufacturers knew about whales (these being men of affairs who dealt in whale products—oil, whale bone, all that sort of stuff); what the "philosophers" knew about whales (i.e. the comparative anatomists and professors of natural history); and finally, what "everyone else" knew about spouting sea creatures. Here I am talking about ordinary New Yorkers, with no particular stake in any of this.



The Edinburgh-based Knox brothers spent three years preparing this 83-foot blue whale, known as the Great Rorqual, for display in the 1830s. Drawing from *The Natural History of the Ordinary Cetacea, or Whales* (1837) by Robert Hamilton, part of William Jardine's series "The Naturalist's Library."

I wanted to recover how each group understood these animals: it is a little like the story of the blind men groping the elephant; everybody had a different handle on the beast, and when they all started shouting in the courtroom, it was deafening and strange.

**Much of the best material in the book deals with the lost worlds of natural history in New York City: the weird underworlds of learning, centered around bizarre public cabinets of curiosity, and downtown naturalist-hucksters...**

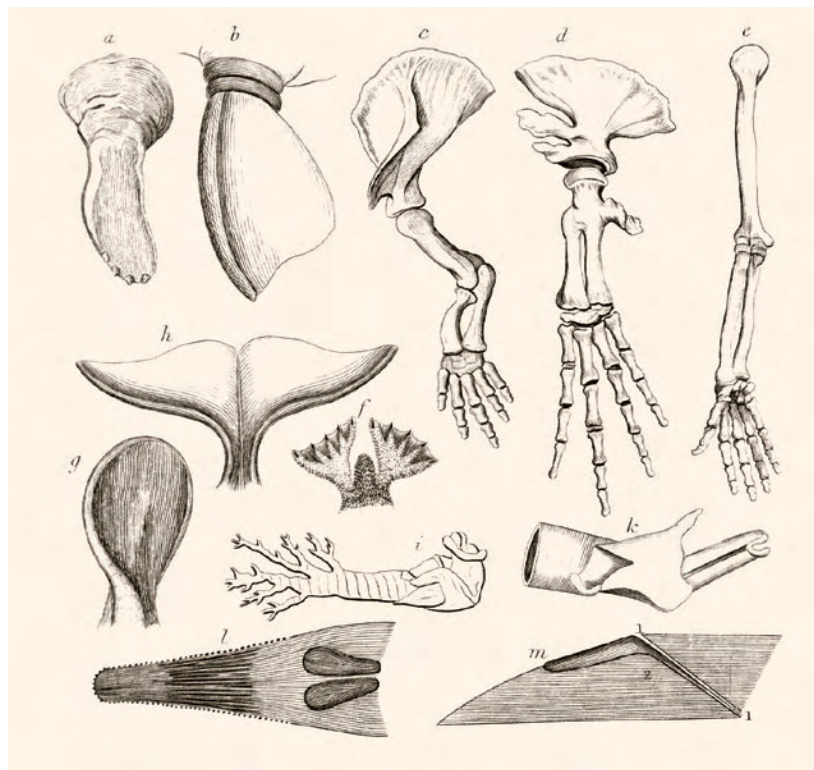
Yes, it is sort of like, "Psst, buddy, got a quarter? Wanna see a naked walrus?" Digging this material up was really great. There were a handful of these proto-museums in the city at that time, and in the era before P. T. Barnum they aspired to some cocktail of entertainment and enlightenment: whatever kept the money flowing. As I show, two of these collections held bits of whale skeleton in 1818, so I was able to figure out where a New Yorker who was curious could have gone to see

a whale—or at least its bones. I also found records of a couple of instances of whale strandings in local waters in those days. In several cases, enterprising showmen dragged a stinking carcass up from the Jersey Shore or the Delaware River in order to moor it off Wall Street and charge people 25 cents for a peek!

**I love the description of the orchestra playing on Broadway in front of a huge whale jaw and its six-foot curtains of baleen.**

Right! A group of dubiously Italian crooners—the so-called Pandean Minstrels—set up nightly under the fresh jaw of a North Atlantic right whale carted in from Long Island, and played for the throngs that came out to witness this fantastic monstrosity.

All that stuff is fun, but I also try to sift out the ideas about natural order that were implicit in these public displays. For instance, I can show that these cabinets were arranged to reflect taxonomic categories that were more or less *sui generis*. My favorite example is



A comparative anatomy of the hand from *The Natural History of the Ordinary Cetacea, or Whales* (1837), by Robert Hamilton. Diagrams C and D show the bony structures in the flippers of a dugong and a bowhead whale, respectively. Diagram E shows a human arm for comparison.



top: Captain Valentine Barnard's depiction of a right (or perhaps a bowhead) whale, ca. 1810. Courtesy the Collection of the New-York Historical Society (PR-145 #76, detail).

bottom: Captain Valentine Barnard's depiction of a sperm whale, ca. 1810. Courtesy the Collection of the New-York Historical Society (PR-145 #76, detail).

the collection that filed its whale bones under “miscellaneous,” right next to a ten-pound hairball (taken out of the bowels of a hog long resident on Spring Street), and an elaborate model of a French castle (complete with articulated troops), all carved from beef bones! In other words, whales weren’t really fish, and they weren’t really quadrupeds. They were anomalies, freaks, or, perhaps better, they were *wonders*.

### **Whalers also testify at the trial. What kinds of knowledge did they bring to bear on the case?**

Two whalemens are called in to give testimony. Disconcertingly, they disagree with passion. One says that whales are obviously not fish (he is a captain, and very proud to be a reader of the encyclopedia), and the other says, “As far as I know, they’re fish and that is always how we talked about them in the industry.” So to get at what whalers knew about these animals, to get at ideas about natural history in this expert community, I spent a lot of time in whaling archives in New England, reading logbooks. They’re curious texts. Some of them are pretty skeletal, just laying down wind direction, water currents, ship’s position and bearing—and, of course, whales seen and whales taken. But others are expanded into something like commonplace books or even diaries. Reading between the lines and doing a little hermeneutic voodoo, it’s possible to wrest from those texts some interesting insights into how whalers thought about their prey. Among other things, I show that whalemens had not only an idiosyncratic account of cetacean systematics—a taxonomy for these animals, and a sense of where they fit in the order of things—but also an anatomy and a physiology of some sophistication (though it bore little relation to book-learning on these topics). Sailors’ tactics for dismantling these huge creatures at sea amounted to a kind of elaborate dissection, and you can see traces of that on the cut-lines they drew on their pictures of whales: if you look closely at the whales drawn by Captain Barnard, [reproduced on page 84], you will see these incisions traced in red ink. In general, the whalemens’ nomenclature for the features of the bodies was remarkably detailed, but in almost precise antithesis to the concerns of formal comparative anatomy, since whalers were preoccupied by just the external eight inches of “blanket layer” (the blubber) on the animals. This was “superficial” anatomy in a deep sense!

### **In *Moby-Dick*, Ishmael has some dismissive things to say about bookish cetology, doesn’t he?**

Absolutely. In fact, those chapters in Melville were what first drew me to the whole subject. It was in trying to figure out where Melville was getting that stuff that I stumbled on the records of *Maurice v. Judd*. I think it is hard to read *Moby-Dick* in quite the same way after *Trying Leviathan*. For one thing, Ishmael’s definition of the whale—a spouting fish with a horizontal tail—emerges as polemical in a very particular sense.

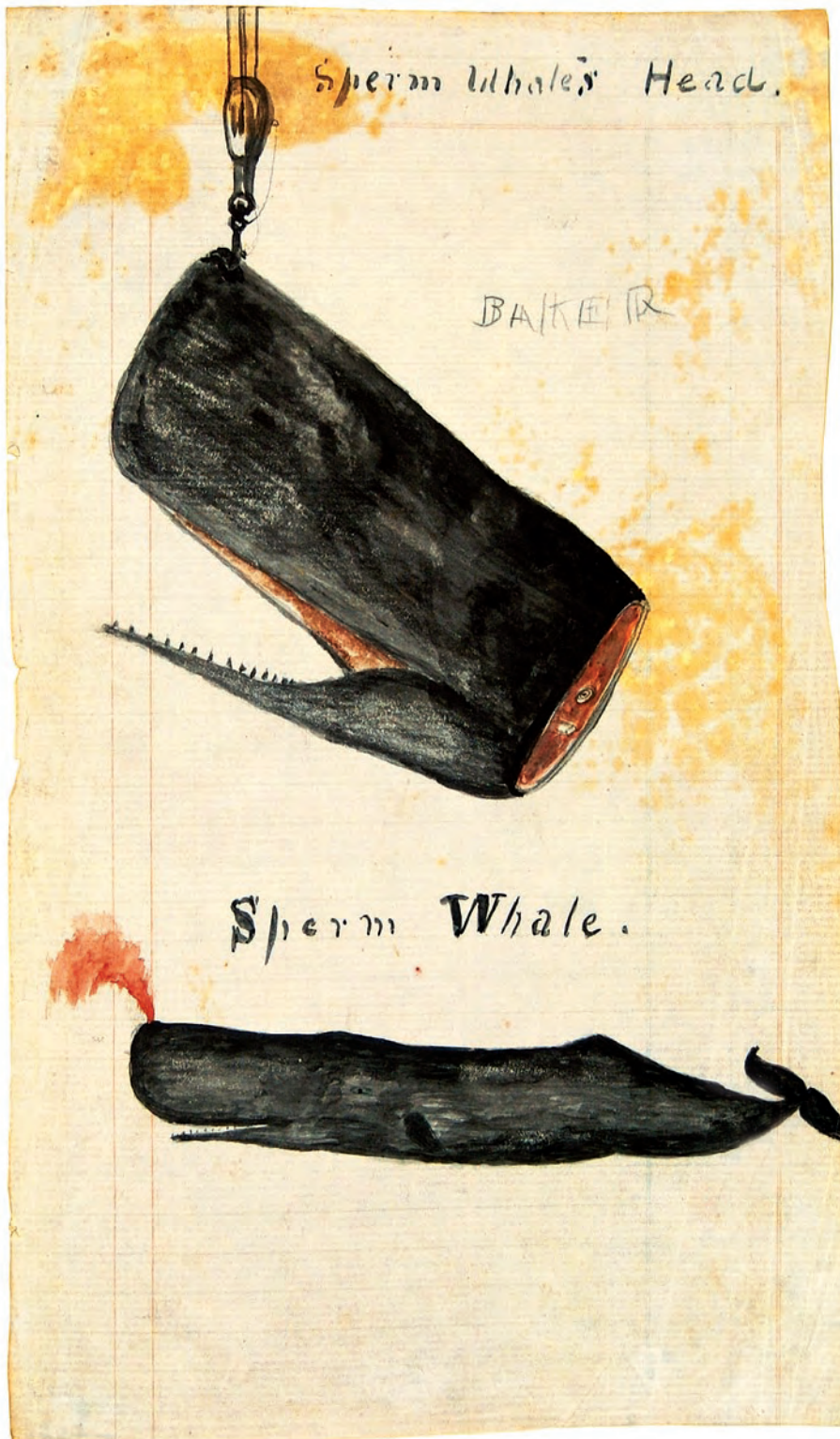
But put all that aside. To be sure, most whalemens called whales “fish,” but I can show that it’s even stranger than that, since they didn’t even call all whales “whales.” It turns out that in the US in the 1820s and 1830s, whalers pretty consistently referred only to commercially exploitable species of whales as “whales.” So you would have a whalman writing in his journal, “lots of finbacks and sulphur-bottoms, but no whales,” which is incomprehensible to us because finbacks and sulphur-bottoms (i.e. blue whales) are the very *whaleyest* of whales: big, huge, *textbook* whales. But they were whales that no one could turn into money in 1818. They were too big, and too fast: they were unkillable. “Whale” meant, in the technical sense, “money” to a whalman, and under this analysis a finback wasn’t really a whale.

As for physiology, the whalemens, like any good hunters, were very interested in what kept these creatures alive, since they hoped to kill them. So these guys had terms for specific points on the bodies of the animal—what they called the “life” of the whale, for instance, which was a point on the center back above the fin that was thought to be the critical spot to hit with the lance in order to strike the heart—that were the external mapping of internal physiological processes.

### **What about the “men of affairs?” You deal here with what you call the “taxonomy of the market.”**

This is where things get juicy. It turns out that *Maurice v. Judd* was by no means a funny little commercial transaction gone awry. Rather, it was nothing less than a formal test case in which two powerful and rival communities in New York City were squaring off in a fight for dominance. I won’t try to talk through all of this craziness for your readers, but suffice it to say that there are some heavy-hitters pulling strings behind the curtain. Whether you thought a whale was a fish or a mammal in New York City in 1818 was effectively like declaring yourself a Guelph or a Ghibelline!

This is entertaining and odd, but there is a larger point at issue: there has been a lot of scholarly work in the last twenty years on the place of natural history in the formation of American national identity. The gist of



Drawing of a whale's head being hoisted upward, from the journal of Rodolphus W. Dexter, kept aboard the bark *Chili* in the early 1860s. Courtesy the New Bedford Whaling Museum.

this stuff argues that natural history served as a powerful tool for “conjuring” the young nation: identifying, defining, and codifying the distinctive American flora and fauna is supposed to have served a crucial role in identifying, defining, and codifying the US as a collective entity. My story swims upstream against much of this analysis, because I show that the language of natural history was a deeply unstable language with which to try to articulate nationhood, precisely because it was readily deployed divisively. It could split, as well as lump, if you like. Take *Maurice v. Judd*, where, in the end, a kind of regional biogeography of the early Republic—the difference between Massachusetts and New York—can be spoken in the language of natural history, and ultimately *decides* the whole whale-fish controversy.

**But this is a history of science, right? I feel we have wandered some distance from the science of whales.**

In the end, the whole trial can be read, I think, as a turning point for the history of science in the early Republic. At the time of *Maurice v. Judd*, New York City had just gone through a period of substantial public investment in new institutions of learning, including fitting out a massive palace of science and philosophy, the “New York Institution,” just opposite the new, white marble City Hall building—the City Hall that still stands, of which New Yorkers were very proud. This new set-up was supposed to be a sort of Royal Society-type arrangement, home to scientific societies and public lectures, and it represented a vision of science as the handmaiden to governance. The whole thing was very Francis Bacon, a fantasy of knowledge and power locked in mutually beneficial association. The undertaking was part of an effort by a group of politicians to raise the intellectual profile of New York, which had always been a little down-at-the-heels in this department with respect to both Philadelphia and Boston. New York had a reputation as a mercenary city: lots of trade, lots of fortunes being made, but no serious intellectual culture.

The leading figure in this new institution, a European-educated doctor/philosopher named Samuel Latham Mitchill, was the lead witness for the defendant in *Maurice v. Judd*. The founder of what would become the New York Academy of Sciences, and a published ichthyologist (fish-scientist), Mitchill walked out the back door of the New York Institution and crossed the green to the courtroom in City Hall where the trial was held in order to teach everybody that whales were not fish. What happens next isn’t pretty. Instead of getting to lecture a docile audience of eager students, Mitchill

gets lambasted by a character who is probably the most gifted lawyer in the country at the time, an ebullient rhetorician and renegade Irish Jacobin named William Sampson. I don’t want to spoil the story, but it is fair to say that when Mitchill walks back across the green that afternoon the two buildings are a great deal farther apart—in the collective imagination—than when he started out. I argue the episode marks the termination of one vision of the relationship between learning and political culture in the city: the New York Institution folds a few years later, its lease is not renewed, and a different kind of popular political intellectual culture emerges in its place. So there are implications for Mitchill’s failure, just as there are long-term implications for Sampson’s rhetorical dash. I think it’s tempting for people who came of age during the “science wars” to see in a figure like Sampson something of the radical social-constructivist science-attacker, in that he comes in fighting the elite pretensions of formal scientific learning and is willing to do pretty much anything to undermine the purported objectivity and rationality of science.

**In your book, much of what was at issue was changing economies of judgment: the professionalization of science is part of this story, but so is the codification of expertise in new social technologies, and the rise of new political economies that generate their own mechanisms for producing and authorizing knowledge. Talk a bit about the aftermath of the trial and what it shows us about the philosophy of history.**

“Economies of judgment” is a nice phrase with which to capture the dynamics at issue. Like many historians of science, I’m concerned with the disjunctive, idiosyncratic, and contingent character of the production of knowledge in particular situations. In the course of the trial, both Sampson and Mitchill offer explicit accounts of the place of natural historical knowledge in a republic. Sampson claimed very powerfully that in a democracy courts make facts: some guy in a natty suit or a white coat showing up and saying he’s going to present some facts that stand outside the agonistic space of cross-examination—this, in Sampson’s view, is anathema to democracy itself. Was he just grandstanding? I don’t know, but it’s an extraordinarily radical position to assert that all knowledge in a republic must be subjected to a “trial by ordeal” in the civic setting of raw democracy: the jury room.

**How is that connected to the question of plain language, which comes up in the trial at various points?**



Drawing of a sperm whale at the water's surface, from the log of the ship *Columbia*, early 1840s. Courtesy the New Bedford Whaling Museum.

The epilogue looks at the aftermath of the trial and shows that *Maurice v. Judd* wouldn't die. The case enjoyed an extended afterlife in a set of debates in the nineteenth and even twentieth centuries about the proper relationship between science and society, and between scientific and demotic language. It turns out that the whole affair was reported in the news abroad and came to the attention of both William Whewell, the master of Trinity College, Cambridge (an important philosopher of science), and John Stuart Mill, his admirer and critic. Both of them were enormously concerned with the language of science and with the logical structure of scientific reasoning, and both of them used the problem at issue in the case—whether the whale was a fish—to exemplify different positions on the proper relationship between science and social organization. It is hard to do all of this fast, but the core issue is really a version of the Sampson/Mitchill problem: Who should tutor whom? When? Where? While Whewell was content to let whalers have their ways of talking about all this and scientists (a word he himself coined!) to have theirs, Mill ultimately stumped for convergence of usage, and his argument speaks volumes about the emergence of modern science. Basically, Mill says, "Look, the kinds of categories for which we should strive should be those that would be generated by a person who had the most complete knowledge of the objects that we need to categorize, and no particular interest in any of those characteristics." That is, this fictionalized person would

know everything that could be known about the characteristics but wouldn't really care about any of them. In other words, science is a kind of knowledge that has no hunger, that needs no salary. This is a very powerful idea, though who gains this kind of knowledge—we all get hungry!—is much harder to explain. The emergence of this vision of disinterested knowledge is a central problem for the historian of science.

**But isn't this vision also central to the practice of history? Isn't *Trying Leviathan* a *disinterested* book?**

I feel like you've slightly pinched me there, because I do wink at Mill's view as if we all recognize a kind of a move that is being made to elevate knowledge-production out of the grubby, fleshy world of human beings, and up onto the ethereal chessboard of reason. Do I understand the appeal of this move? Its virtues? Yes. But anything worth having is worth having both ways. After all, we're not angels, and if science is angelic knowledge, it is, therefore, not our own. As a historian of science, I work to show how science is indeed ours: it is made by human beings and has human fingerprints all over it. But I certainly don't consider this an attack, or an effort to trivialize. On the contrary, it is an effort to show that these seemingly transcendent achievements are exactly *human* achievements—arguably the very greatest we have.