

THE  
**SCIENCE  
WRITERS'**  
HANDBOOK

Everything  
You Need to Know  
to Pitch, Publish,  
and Prosper in  
the Digital Age

The  
Writers of SciLance

*Edited by*

Thomas Hayden  
*and* Michelle Nijhuis



DA CAPO LIFELONG BOOKS  
A Member of the Perseus Books Group



# CONTENTS

Foreword by Kendall Powell, ix

## PART I THE SKILLED SCIENCE WRITER

- 1 What Makes a Science Writer? *by Alison Fromme*, 3
- 2 Finding Ideas *by Emily Sohn*, 9
- 3 Making the Pitch *by Thomas Hayden*, 23
  - Box: Classic Mistakes We Can All Avoid *by Monya Baker*, 32
  - Box: Pitching Endurance *by Douglas Fox*, 33
  - Box: A Tale of Two Query Letters *by Thomas Hayden*, 36
- 4 Getting the Story, and Getting It Right  
*by Andreas von Bubnoff*, 40
  - Box: Making a Reporting Plan, 48
  - Box: A Science Writer's Emergency Question List, 49
  - Box: On and Off the Record, 50
  - Box: "So When Can I Read Your Draft?" 51
- 5 By the Numbers: Essential Statistics for Science Writers  
*by Stephen Ornes*, 53
- 6 Excavating the Evidence: Reporting for Narrative  
*by Douglas Fox*, 59
  - Box: Who Pays for Travel? 71

- 7 Sculpting the Story *by Michelle Nijhuis*, 75  
Box: Story Anatomy, 84
- 8 Working with Editors—and Their Edits *by Monya Baker and Jessica Marshall*, 87
- 9 Going Long: How to Sell a Book *by Emma Marris*, 99  
Box: Sample Query Letter, 112  
Box: The Six Steps to Authorship, 114
- 10 Multilancing *by Robert Frederick*, 116
- 11 Just Write the Friggin' Thing Already! *by Anne Sasso*, 123  
Box: Thirty Books in Thirty Days *by Emily Sohn*, 130

## PART II

### THE SANE SCIENCE WRITER

- 12 The Loneliness of the Science Writer *by Stephen Ornes*, 137
- 13 Good Luck Placing This Elsewhere: How to Cope with Rejection *by Hillary Rosner*, 142
- 14 Beyond Compare *by Michelle Nijhuis*, 149  
Box: Measuring Success in a World Without Performance Reviews *by Alison Fromme*, 154
- 15 An Experimental Guide to Achieving Balance *by Virginia Gewin*, 157  
Box: How the &%@ Do I Take a Real Vacation? 163  
Box: Balance, Schmalance *by Liza Gross*, 165
- 16 Creating Creative Spaces *by Hannah Hoag*, 167
- 17 Avoiding Domestic Disasters *by Bryn Nelson*, 175
- 18 Children and Deadlines: A Messy Rodeo *by Amanda Mascarelli*, 183

### PART III

## THE SOLVENT SCIENCE WRITER

- 19 Minding the Business *by Anne Sasso and Emily Gertz*, 195
- 20 Networking for the Nervous *by Cameron Walker*, 215
  - Box: The Introvert's Survival Guide for Conference Cocktail Parties, 221
- 21 Paid to Grow *by Robin Mejia*, 223
- 22 Contract Literacy *by Mark Schrope*, 230
  - Box: Time and Money: Can I Afford This Project?  
*by Stephen Ornes*, 244
- 23 The Ethical Science Writer *by Brian Vastag*, 246
  - Box: The Journalism-Promotion Divide *by Helen Fields*, 256
- 24 Social Networks and the Reputation Economy  
*by Emily Gertz*, 259
  - Box: Blogging: My Digital Calling Card *by Sarah Webb*, 265
- 25 The Diversity of Science Writing *by Sarah Webb*, 267
- 26 Sustainable Science Writing *by Jill U Adams*, 273

*Afterword: Finding, or Founding, Your Own Tribe*  
*by Kendall Powell*, 279

Box: I Started My Own Group and So Can You  
*by Helen Fields*, 281

*Acknowledgments*, 283

*Contributors*, 285

*Selected Resources*, 289

*Index*, 301



Our common mission is to explain very complicated things with both maximum simplicity and maximum accuracy. It's a puzzle with infinite variations and infinite solutions, and we science writers rarely tire of the challenge. After all, there's always more to learn about the subject at hand, and there's always a better, clearer, more graceful, or more charming way to communicate it to others.

While not all science writers are journalists, the writers of this book believe that all science writers can and should approach their subjects journalistically, with curiosity, an open mind, a healthy sense of skepticism about the material, and transparency about our methods, biases, and sources. Whether we're writing for the general public or for scientists themselves, our primary responsibility is to our readers, and we owe it to them to look at all aspects of the work at hand.

At the time of this book's printing, science-writing positions at many newspapers and magazines have been cut. Grim projections have been made about the future of traditional print publications and journalism itself. But we're not sulking. Our personal experiences and those of many other science writers show that while the field is full of uncertainty, it's also full of exciting opportunities.

Most of the writers of this book work as freelance science writers, and many of us find that the number, reach, and potential of new outlets are growing. Photos, videos, audio, and animation are all enriching the storytelling experience and making our work more collaborative. At the same time, scientists are continuing to make new discoveries, many of them useful (how to avoid heart disease), important (how poor neighborhoods are targeted by toxic industries), or wondrous (the physics of gecko feet). We believe that there will always be fantastically interesting science stories to discover, media to convey them—and a way to make a living telling them.

One warning: science writing, freelance or otherwise, is very, very seldom a path to riches. (In fact, for many people who try it, it's not even a path to middle-class respectability—you should see the cars some of us drive.) But with luck, hard work, and talent, you can make a decent living at it, and much of the advice in this book is shaped to help you do just that. In this chapter, we'll look at how to get started.

### **Where Science Writers Come From**

Perhaps you earned a journalism degree, landed a newspaper job, and found yourself drawn to the science desk, curious to learn more. Perhaps

THE SCIENCE WRITERS' HANDBOOK

you toiled in a graduate-school lab but found yourself wanting to explain your research—rather than actually complete it. Or perhaps you're happily working as a researcher and want to do your part to share science with the world. There are many paths into the science-writing world, but aspiring science writers often have similar questions. Here are the ones we encounter most often:

### *Do I Need to Finish My Graduate Degree in Science?*

A lot of science writers have a eureka moment during their undergraduate or graduate science courses: they realize that while they love science, their wide interests make them better suited to be science writers than scientists. The AAAS Mass Media fellowship and short-term science-writing workshops (such as the annual events in Banff, Alberta, Canada, and Santa Fe, New Mexico) offer opportunities to check out the science-writing profession before committing to it full-time. Whether to finish your science degree is a personal decision and might depend on how close you are to completion. But don't finish your degree because you think that those letters after your name will help you in journalism: editors know that while a PhD in physics might help you recognize great stories in the subject, it might also make it difficult for you to explain the field to outsiders. Your clips and your connections matter most.

### *Do I Need to Go to Graduate School in Journalism or Science Writing?*

Not necessarily, but doing so offers many advantages: you'll learn solid reporting skills, boost your résumé, have access to internships that might otherwise be unavailable, and meet professors and alumni who are well-connected, established, and successful writers. However, programs can be expensive and may saddle you with debt that limits your options after graduation.

### *Do I Need to Do an Internship?*

If you don't have any journalism or formal writing experience, probably yes. An internship offers a behind-the-scenes look at the way a publication operates: how editors plan content, how pitches are evaluated, the ins and outs of the editing and fact-checking process, and more. Plus, an



internship will connect you with the staffers at the organization, who might become valuable contacts later on in your career.

### *What About Alternative Paths?*

While some writers have broken into the profession through blogging alone, it's not easy to do, and it almost always takes months or years of unpaid labor. For most beginning science writers, blogging is not a stand-alone strategy but a tool for leveraging the experience they've gained from a graduate program, an internship, or a staff position. Regular, accurate, interesting posts can help writers of all levels build credibility, define their beat, and hone their skills. (See "Blogging: My Digital Calling Card" on p. 265.) More than a few members of the Science Online community ([www.scienceonline.com](http://www.scienceonline.com)) have taken blogging further, establishing stellar reputations and wide audiences: among the notable examples are Ed Yong of *Not Exactly Rocket Science*, Maggie Koerth-Baker of *BoingBoing*, David Dobbs of *Neuron Culture*, Maryn McKenna of *Superbug*, and Bora Zivkovic of *A Blog Around the Clock*. (While you're in the blogosphere, also check out *The Last Word on Nothing*, an independent group science blog that counts several SciLancers among its members.)

### *Am I Crazy to Consider This Career?*

No. Even though academia likes to divide the humanities and the sciences, a lot of people are interested in both. Storytelling and science define us as humans, and it's natural to be attracted to both of them.

### *Joining the Independents*

At some point in your career, whether out of choice or necessity, you may decide to strike out as a freelance writer. Parts II and III of this book cover many of the practical and emotional concerns of all writers working in the digital age, including freelancers. But how and when should your freelance adventure begin?

### *If You Can, Ease Your Transition*

Some people are forced into freelancing by a layoff or a family move. But if you're entering the freelance world by choice, experiment with freelancing

before you leave your full-time job, or hang on to a part-time job while you establish your freelance clientele. SciLancer Susan Moran juggled part-time adjunct teaching at a university journalism school while starting her freelancing career. "It was a steady—if small—paycheck, and it kept me connected to budding journalists and academia, and to the world beyond the little package called 'me and my stories,'" she says.

### *Plan for Your Financial and Health Care Needs*

Will you burn through savings? Lean on a spouse or partner? Buy an individual health plan? For me, security and flexibility were key: I had some savings, no mortgage, no kids, and a spouse to lean on. (Read more about financial considerations in Chapter 19, "Minding the Business.")

"I've come to think that the best way to start freelancing is to save up about six months' worth of living expenses before launching, do nothing else but pitch and write for three months, and then take stock to see if it's working," says SciLancer Stephen Ornes, who started freelancing after completing MIT's graduate program in science writing. And keep in mind, that's six months' expenses *on top* of whatever financial cushion you need to feel secure.

### *Consider Your Existing Connections*

New freelancers with staff experience can draw on relationships forged during years of casual conversations and editorial meetings. "It's great to have one solid client when you start freelancing—an editor or a group of editors who know you and trust your work," says SciLancer Michelle Nijhuis. "Whether that's a contact from an internship or a staff job, that kind of relationship can really protect you financially *and* emotionally—especially during the first few months of freelancing, when you realize no one cares about you or your career all that much!"

But even without staff experience, you can mine the depths of your résumé and get valuable help from past employers, colleagues, college professors, friends, and relatives. Tell everyone you know that you are starting your freelance career and ask (politely, of course) if they know of anyone who can help you. I started freelancing right out of grad school without many contacts in publishing, but the editor of my graduate school alumni magazine offered to send me a few assignments while I found my footing—a small gesture that mattered in those first uncertain

weeks. Read more about networking strategies in Chapter 20, "Networking for the Nervous."

### *Read, Read, Read Publications You Admire—Then Start Pitching*

Analyze your favorite media outlets to get a sense of their typical stories. Then target your pitch to the appropriate editor and department. Get much more advice on pitching in Chapter 3.

### *Foster Relationships with Editors and Other Writers*

Groups such as the National Association of Science Writers—and their regional chapters, such as the Northern California Science Writers' Association—offer advice and resources that will help you get started. I set an early goal to meet two or three new people at networking events every month, which meant I endured some awkward conversations. But those connections led to both assignments and professional friendships. If a formal group doesn't exist in your region, you can attend a national conference and reach out to local writers there.

### *Act Like a Businessperson*

A professional attitude and a structured schedule can help you navigate the confusing first months of freelancing. I budgeted for professional development and planned the number of pitches I'd send each week, the networking events I'd attend regularly, and the magazines I'd approach. I kept a regular daily schedule and tracked administrative tasks with spreadsheets. Chapter 19 includes many more tips on business management.

### *Gobble Up Opportunities, and Keep Your Sense of Humor*

As SciLancer Douglas Fox says, "I always think of Ernest Shackleton and his men trekking across the Antarctic sea ice in the Southern Ocean. They were in this incredibly harsh environment, but the universe kept sending things their way—penguins and seals and other animals that they shot and cooked and ate, yum, yum. Freelancing feels a little like that. Opportunities just kind of show up, and you cook and eat them. It's important not to get overconfident and to remember that the opportunities can disappear at any time. But really, it's incredibly exciting."

So, dear reader, off we go across the ice. Yum, yum.





## Chapter 2

# *Finding Ideas*

By Emily Sohn

● For my first real job as a science writer, I joined a crew of eight multimedia professionals on expeditions to remote and exotic international locations. Nearly every day during these weeks-long “Quests,” our team used a portable satellite device to send educational reports, videos, and images to a website, where hundreds of thousands of students in classrooms around the world followed our every move.

In the months before my first Quest, a six-week expedition to the Peruvian Amazon, my coworkers and I created a schedule, mapped out a route, and conducted a lot of background research to figure out what kinds of stories we might tell along the way. But none of that research prepared me for what we encountered one day during the second half of the trip.

We had already survived a treacherous week on inflatable rafts in a tiny Amazonian tributary. Now, we had upgraded to a larger river, the Ucayali, and a live-aboard boat that was patrolled twenty-four hours a day by armed guards keeping an eye out for Amazonian pirates. (Yes, pirates.)

It was early afternoon when our sun-scorched, bug-bitten crew stepped off the boat into a dusty, off-the-grid town called Roaboya. There, families live in thatched-roof huts that sit on low stilts for protection against floods, and kids spend the day in a one-room schoolhouse. In fluent Spanish, our team leader and our team anthropologist greeted the village leader. It was an unusual day, the leader told us. A hunter had gone missing in the jungle three days earlier. The village shaman had been enlisted to help.

As the sweltering afternoon wore on, we interviewed, photographed, and filmed the man’s family and neighbors, asking not just about him,



but also about their daily lives, their oral traditions, and the turtles they caught and cooked for dinner. As the sun sank toward the horizon, we watched in amazement and, by this point, joy and relief as the search crew returned with the missing hunter. They had found him exactly where the shaman had predicted he would be. When darkness fell, we sat cross-legged and witnessed an ayahuasca ceremony, during which participants drank a plant-based brew that induced wild hallucinations, and the shaman thanked the spirits for returning the man safely.

The stories we produced that day were among the most vivid and gripping of the entire trip—even the ones that had nothing to do with the main drama. While waiting for the search party to return, for example, I watched some men chop down a tree near the village. They needed the wood and, having already gained an intimate view of these people's lives, I was able to reflect on deforestation in the Amazon in a more nuanced way. Before the trip, I'd thought cutting down trees in the rain forest was a universally bad thing. By the end of my day in Roaboya, I was conflicted, and I explored my uncertainty with my on-line audience of kids.

My brief time in that tiny community, along with experiences in other Amazonian villages, had a profound influence on the way I look for story ideas today. No matter where you are, I've learned, the key to finding a man lost in the jungle—or any great story that no one else has—is to get yourself into positions where you are likely to bump into a story telling itself. When you do stumble across a scoop, all you need is the ability to take furious notes and the willingness to forget everything you thought you came for.

This smart luck—or planned serendipity—can serve any writer well. And you don't have to go to the Amazon to find ideas that will wow editors. Once you learn how to look for them, you will find a never-ending supply of science stories.

### **Anatomy of an Idea**

No matter the publication you work for or the kind of stories you write, it's essential to distinguish between topics and stories. During a summer internship at a newspaper science section more than a decade ago, I suggested an article about the origins of oil. I still remember listening with a twinge of embarrassment as my editor explained that while it was an

interesting *topic*, it was not a newspaper *story*—at least, not until it was important to understanding current events. I make this mistake far less often than I used to, but I still catch myself doing it.

After all, for a person who makes a living off of curiosity, it's easy to get excited about a cool natural phenomenon, an endangered animal, or a breathtaking place without having a clear idea of what the story is. A story, in its most basic form, contains characters engaged in some kind of journey or conflict. It follows those characters toward a discovery or resolution through a series of linked events, progressing through a clear beginning, middle, and end. Journalists' stories must also have a news "hook"—a reason to tell the story *now*—and a connection to a larger idea. In other words, it's usually not enough for your story to be really cool. It has to be important, too.

Robert Irion, director of the science communication program at the University of California, Santa Cruz, says he uses some form of the following dialogue to help his science-writing students turn topics into stories:

**STUDENT:** So, Rob, I want to write about elephant seals.

**IRION:** Okay, that's a topic, not a story. What about them?

**STUDENT:** Well, they are charismatic megafauna, and they have big brown eyes.

**IRION:** That might help attract readers, but what will make them read the story?

**STUDENT:** Researchers are studying how deep they dive and where they go to eat.

**IRION:** Yes, but those studies have been going on for twenty-five years. What's new?

**STUDENT:** The scientists attach GPS devices to the elephant seals and track where they go in the ocean in real time, and how deep they dive along the way.

**IRION:** Okay, that's a cool technique, and it could be part of your story. But what have they found?

**STUDENT:** Elephant seals go to this one place out in the middle of the Pacific Ocean every year to bulk up for the winter. It's a feeding frenzy—other GPS tags show that sharks and albatross go to this same place. It's a new picture of how marine animals make a living.

**IRION:** There you go. Now find some characters, and I think you've got a story.



Reading lots of top-level nonfiction is one of the first and easiest things you can do to refine your sense of story. And even if you want to write solely about science, you can learn valuable lessons from stories about other subjects. "Sometimes it's harder to see the story elements in science than in music, or sports or politics or whatever," says Thomas Hayden, a SciLancer who teaches science communication at Stanford University. That might be because scientists are trained not to express the hope, frustration, jealousy, and other emotions they feel in the course of their work, he says. "But once you get the knack of it," says Thomas, "you see that the world is full of pitchable, executable science stories."

When you think you've hit on an awesome new idea, make sure it's interesting to other people, too. To gauge whether readers, and in turn editors, are going to bite, try telling friends about it. If you can get the essence of the story across in just a few sentences, you're on the right track. Even better, suggests SciLancer Robert Frederick, try out your idea on strangers at a bar. "If your audience has no follow-up questions, that's a warning sign that the story isn't worth your time," he says.

### The Chase

Most people encounter science and scientists through the work of science writers. That means we have a responsibility to understand how science works, and when science is ready to be written about. For better or worse, the academic journal system is the major driver of daily and weekly science news for general audiences.

Here's how it works: After toiling for months or years on their work, researchers write up their results and submit papers to one journal at a time. After a period of review by other experts in the field—referred to as "peer review"—acceptance leads to eventual publication. (Rejection leads to edits and resubmission to another, usually smaller and more specialized journal.) In some ways, it's not unlike the process we writers go through when pitching an article idea.

Major journals, such as *Science*, *Nature*, and the *Proceedings of the National Academy of Sciences* (PNAS), publish studies on a wide range of subjects. Specialty journals, such as *Nature Neuroscience*, *Molecular Ecology*, or *BMJ* (formerly the *British Medical Journal*), focus on narrower themes. Many journals also use embargoes, which set a day and time before which journalists are not allowed to publish news of the work. These journals often send out abstracts and press releases about upcoming

studies a few days before the publication ban lifts, however, giving writers a chance to conduct interviews and write stories that will be ready to run when the embargoes expire. Publishing even an hour before an embargo expires can result in major repercussions for you and the publication you are writing for, including public embarrassment and being shut out of future embargoed material.

Once you understand the journal system and embargo schedules, you will begin to notice recurring patterns in news coverage. Stories based on *Science* articles begin to appear in news outlets every Thursday at 2 p.m. Eastern time. The same happens when *Nature* embargoes lift on Wednesday at 1 p.m. and when *PNAS* allows press coverage to begin on Monday at 3 p.m.

Pitching news stories on these studies can be tough. Editors get the study summaries from major journals, too, and they're likely to assign the stories they're interested in to staff writers, or to freelancers already associated with their publication. But even if you're a new freelancer, or one looking to break into new markets, these press releases can be useful.

If you already have connections with news editors and can work fast, you may be able to turn press releases into rapid turnaround stories that pay relatively quickly. For the past few years, I've been a contributing writer on contract with *Discovery News*, and these "me-too stories"—stories based on papers from major journals—account for at least half of the dozen or so articles I write for the site every month. Writing these stories generally requires two basic interviews: one with the lead author of the new study and one with an expert who wasn't involved in the work but can comment on why it's important or what its limitations are. And since news story structures tend to be fairly formulaic, incorporating these quickie articles into my work mix helps boost my bottom line.

To get in on the receiving end of the press release feed, start with online news services, such as EurekaAlert! and Newswise, which require you to request password access but are free once you're deemed a legitimate reporter. Daily e-mails from both services include press releases from a wide variety of journals, universities, and research institutions. I highly recommend sorting this stream of news alerts into an e-mail folder to avoid being totally overwhelmed by them. Regularly dipping into this folder when you have time can help you stay up-to-date with research fields that interest you, and help you learn to recognize news when you see it. (A carefully sorted social-media stream can work the same way. See Chapter 24 for more on the uses of social media in science writing.)



Press releases can yield more than just daily news stories. As you read through study summaries and the coverage that follows them each week, you might also start to notice trends and patterns. Then it's just a matter of finding the right spin to distinguish your idea.

For example, press releases on several related studies may lead you to a story about a larger issue. Maybe a researcher mentioned in a press release has an interesting backstory that would make him or her a good profile subject. Maybe a national story has local angles—or vice versa. Next time you get a press release or promotional e-mail, imagine that it contains hidden pictures: look at it from a different angle, and you might see a great story hiding beneath the predictable one being sold to you.

That's what SciLancer Mark Schrope did in 2007, when he received an e-newsletter from a local design group announcing some advertising awards it had won. The winning project involved graphics and animations created for another local company, which was planning to build multiple offshore cargo-monitoring bases. Instead of covering the design group, he decided to write about the new bases: how they worked, who was building them, and why. The resulting story filled a two-page spread in *Popular Science* and also ran on CNN.com.

To meet the insatiable editorial desire for fresh stories, it can help to cast a wide net. A few e-mails and phone calls will get you on mailing lists for overlooked journals, universities, research institutions, and even private companies. Most lesser-known journals receive very little press attention and do not use embargoes.

When SciLancer Douglas Fox first started freelancing, he trolled through journals at a medical library, where he focused on second- and third-tier publications, such as the *Journal of Experimental Biology* and *Biochemical and Biophysical Research Communications*. He found that these journals were filled with quirky, surprising studies that crossed disciplinary boundaries. His first feature for *New Scientist* came from a paper he saw in the journal *Biopolymers* describing attempts to make synthetic spider silk.

It's also useful to look abroad. European journals and research institutions churn out a lot of fascinating work that US reporters often miss. I recently signed up for a daily e-mail about Scandinavian research, and I've already written several news stories about studies not covered by other US publications.

As you find your own rhythm in the news cycle, a few short pieces can quickly add up to more in-depth story possibilities. SciLancer Virginia

Gewin, who writes a short news story every month for the journal *Frontiers in Ecology and the Environment*, says the gig forces her to stay up-to-date on the ecology beat, giving her an insider's view into broader trends in the field. More than once, she has uncovered feature ideas that she has sold to other publications.

### Going Deeper

Press releases, tables of contents, and study abstracts are standard sources of inspiration for science writers, but they aren't the only types of reading material that can feed you ideas. Local newspapers and regional magazines are often full of characters and anecdotes that speak to bigger issues.

A few years ago, SciLancer Jill Adams noticed an article in the *Albany Times Union* about scientists at a nearby museum who had unearthed a fossil that earned them a paper in *Nature*. Since the museum was just fifteen minutes away from her house, Jill followed up and found that non-degreed scientists had done the bulk of the work. Her story about them turned into a short narrative for *The Scientist*. She wrote about the same work for *Discover's* top-science-stories-of-the-year issue.

Everything in the paper is fair game. After noticing an obscure ad for isolation tanks in *New York* magazine, SciLancer Bryn Nelson sold a story about them to the business news website Portfolio.com. "I dug a little deeper and found that isolation tanks were not only a business and health trend, but had a fascinating history," Bryn says. "And the session was so relaxing that I fell asleep in the tank."

### Get Out!

To find the freshest story ideas, you need to talk to real people, and one of the best places to find them is on the conference circuit.

As a reporter, you can get free admission to major scientific conferences, such as those hosted by the American Association for the Advancement of Science, the Society for Neuroscience, the American Geophysical Union, the American Chemical Society, the American Astronomical Society, and so on. You can also gain access to much more specialized gatherings of scientists—small meetings where you may well be the only reporter. Unlike some journal articles, posters and presentations at meetings are not embargoed and are fair game for all reporters.



Getting into these conferences often requires signing up through a press liaison, and if you are a freelancer, you may have to explain why they should let you in. Usually, mentioning a publication or two that you've written for does the trick, but simply using the word "freelancer" often is enough. Whichever kind of meeting you choose, start by sitting in on sessions that sound interesting to you. Listen for "by the way" comments—passing mentions of upcoming studies or emerging trends. Look at posters. Talk to researchers and public-relations contacts—not just in lecture rooms, but also at wine-and-cheese receptions. And ask lots of questions.

At one AAAS conference a few years ago, Robert attended a dermatologist's presentation on the use of lasers to treat skin cancer. During his talk, the skin doctor mentioned his work with a quarter-mile-long tunable laser at Jefferson National Lab in Newport News, Virginia. When the session was over, Robert asked the researcher more about the technology, and ended up with a story for National Public Radio about the use of advanced laser technology to remove tattoos.

Conferences may be intimidating at first. But they are full of uncovered ideas that anyone can snatch up, including beginners. Early in her freelance career, SciLancer Robin Mejia heard a conference presentation about forensics that led to a story for *New Scientist*, another for the *Los Angeles Times*, and eventually to a documentary she worked on for CNN. (She tells the story in more detail in Chapter 21.)

A single conference often fuels story ideas for months. So, no matter which lecture rooms you choose to sit in, don't forget your notebook. (For more on networking at conferences, see Chapter 20.)

### Talk to Anyone, Talk to Everyone

One holiday season, SciLancer Michelle Nijhuis opened a Christmas letter from a friend who is an avid caver. The letter mentioned another spelunker, a microbiologist named Hazel Barton, and Michelle wrote down Barton's name as a potential future source or profile subject. Eventually Michelle called Barton and learned that she was frantically busy trying to understand white-nose syndrome, a fungus that had been killing bats with alarming speed.

White-nose syndrome was something Michelle had wanted to write about for a while, but felt she needed a character to make the story accessible. Barton was that character, and the cold call turned into an award-winning story for *Smithsonian*. Her experience points to the value of taking

the time to dig during the development of an idea—before the pitch—to find the right combination of characters and action that will make a story sell. “Editors rarely bite on a sliver of a story,” Michelle says. “So those few calls and the extra work of developing the pitch can give a good idea a fighting chance.”

Even talking to people at home can yield great ideas. SciLancer Sarah Webb’s husband, who religiously reads the *New York Times* Arts section, pointed her to an article about musician Yo-Yo Ma, who was scheduled to play the cello for Barack Obama’s 2009 inauguration. Since the forecast called for cold weather, Ma was debating whether to play his multi-million-dollar wooden cello or a carbon-fiber instrument. Sarah turned that nugget into a fun-to-report story for *Scientific American* about synthetic-material cellos.

Strangers can be excellent resources, too. After SciLance member Jessica Marshall met someone at a friend’s wedding who told her that earthworms were an invasive species in most of the United States, she wrote a short feature about the problem for *New Scientist*.

One caveat: when people learn you are a journalist, they may throw ideas at you like sand bags at a carnival dunking game. Do not feel you have to follow up on everything. Your mother-in-law wants you to write about a great new recipe she got at a church picnic? Nod politely and blame your editors for saying no if she brings it up again.

### Play First, Write Later

I firmly believe that one of the best ways to drum up interesting story ideas is to prioritize playtime. By getting out in the world and doing what excites you, you may find that ideas come along and grab you.

Mark’s first paid feature idea came out of a group kayaking lesson off the coast of Santa Cruz, California, where he met a paddling chemistry professor whose research—on the development of a new molecule that allowed for the precision formation of plastics—sounded interesting. More recently, he noticed massive numbers of jellyfish on the beaches near his Florida home following major ocean swells. The observation turned into a feature for *Nature*.

These success stories also serve as cautionary tales: as a science writer, a trip to the beach is never just a trip to the beach. But as long as your traveling companions are equally enthusiastic about learning new things, your professional status can open all sorts of unusual doors.



I want to stress the importance of just thinking when you're looking for good ideas. Seriously, when you have a nagging feeling about something, just listen to your gut and look deeper. This habit is tough to develop when we're constantly reading other people's ideas, but they can pay off in great stories. Give yourself permission to think deeply about the topics important to you.

—ALISON FROMME

On a vacation to India in 2004, I visited a camel research center. In Costa Rica with my husband and then two-year-old son, I met with two jaguar researchers. I love the way traveling makes my writing more interesting, and I love how the stories make the traveling more fulfilling. I also enjoy ending up in places I never would have seen—and meeting people I never would have known—if I were just an ordinary tourist.

If you're willing to give up on the idea of true leisure (but gain the ability to count many of your travel expenses as tax deductions), you'll need to dedicate some hours to research before setting off on your next trip. My usual strategy is to surf the Web and look through guidebooks for mentions of conservation organizations located near my destination. Then I send out a blitz of e-mails and phone calls asking about ongoing projects and researchers who might be working in the field while I'm there. It may take a dozen or more messages to yield one or two on-site interviews. But it takes only one good contact to lead to a great story.

Douglas has funded extensive trips around the world with what he calls the “brute force approach” to story scouting. His first step is to plant himself in front of a computer, where he begins a massive search through study abstracts. Before a trip to Australia in 2001, he looked through every paper with an Australian author published in *Science* and *Nature* over the previous five years. Next he scoured a wider array of journals by searching for Australian institutions in combination with dozens of location-specific or tantalizing words, such as “kangaroo,” “wallaby,” “stromatolite,” “crystal,” and “fractal.” From a scan of about 5,000 abstracts, he found twenty or so studies worth further investigation. Eventually he netted seven feature ideas.

This strategy can work for local adventures, too. SciLancer Alison Fromme had high hopes for a cold call she made to a salamander expert, but the interview didn't yield a story. Still, she figured it couldn't hurt to take him up on his offer to give her a tour of his university's vertebrate biology museum. There, he casually introduced her to another researcher, who was poring over maps of the Sierra Nevada in an attempt to retrace the steps of a biologist who had studied animals in the area eighty years earlier. Eventually that work became the basis of a story for *Backpacker*.

You can even find story ideas in your very own behavior. When Jessica sat down in front of the TV for another episode of *Buffy the Vampire Slayer*—even though she had work to do and small children who would

wake up before dawn—she wondered why good stories are so addictive. The thought eventually turned into a feature for *New Scientist* about the neuroscience of storytelling.

### Follow Your Nose and Dive into Holes

As you read, travel, and follow up on random conversations, you may find your interests leading you down rabbit holes. Do not fear. The trail may lead you into dead ends, but occasionally you will find yourself in very interesting places.

Alison was browsing articles online when she stumbled on an article about attempts to prevent light pollution in the national parks. She called the person in charge of the program, identified herself as a reporter, and asked him what he was up to. He invited her to join him as he collected data, and she wrote about his work for *Backpacker*.

Stories often beget stories, so while reporting one piece, keep an eye out for details that fascinate you but don't quite fit into the story at hand. Those errant thoughts might lead to their own assignments. Jessica wrote a series of three stories for *New Scientist* that began with a feature about the genetics of skin color. A comment by one interviewee led to a separate feature about sunscreen and UVA rays. And a reader comment on that story sparked a third feature about cancer and the hygiene hypothesis.

Using an assignment as an excuse to do some extra legwork can also help turn a story thread into a web of ideas. When SciLance member Hillary Rosner was looking for a character or project to anchor a feature assignment, she started by scanning websites of related departments at two universities near her. She picked out a handful of researchers who might have useful information and contacted them all. None became the focus of her original assignment, but she turned two of her conversations into separate projects. "Conversations lead in interesting directions—you never know what you're going to learn," Hillary says.

Many science writers on the hunt for ideas have found that they can avoid dry spells by periodically calling sources from projects they worked on months or even years ago. You might hit the jackpot with a quick "What are you up to now?"

Another favorite—and simple—technique is to end every interview with a basic question: "What else are you working on?" That's what SciLancer Stephen Ornes did while fact-checking another writer's story for *CR* magazine (now *Cancer Today*), a cancer research publication.



Stephen listened as the public-health official he was interviewing started lamenting the lack of public standards for tissue storage and the potential problems for tumor biology research. Stephen looked into the issue and eventually followed the path of a donated tumor through the corridors of Yale–New Haven Hospital—a journey he wrote about for *CR*.

No assignment is too small to serve as a gateway, adds Douglas. He once spun a feature out of something he noticed while writing a two hundred–word sidebar on, he says, “the then wacky-sounding idea that life might have originated in ice, rather than in some hydrothermal vent.” A paper he read while conducting research mentioned an experiment that had been running for twenty-seven years at  $-78$  degrees Celsius. That seemed unusual, and Douglas followed up—only to find a fascinating and surprisingly extensive backstory. His *Discover* feature about the experiment won a spot in *The Best American Science and Nature Writing* anthology.

And don’t throw out your notes: interesting topics can yield successive stories, sometimes for years. During an internship at *Nature* in 2004, SciLancer Amanda Mascarelli wrote a news story about a new worm species that was discovered growing on decaying whale skeletons, which had sunk to the seafloor. Months later, she sold *Nature* a feature story about the extreme lengths researchers go to in order to reach sunken whale carcasses. Three years later, an editor at *Audubon* who had seen the *Nature* piece asked her to write a story about these “whale falls,” which involved a full day of reporting on board a research boat. The story went over well and led to another feature assignment for the magazine.

### The Daily Grind

It’s true that ideas are everywhere. But don’t assume that they will always fall in your lap. Digging up ideas is part of any science writer’s job, and it takes constant vigilance to keep new ideas rolling in.

Some writers find that they fall into boom-and-bust patterns. A frenzy of ideas may keep things busy for a while, only to be followed by a long drought. Learning how to turn these spurts into a steady stream can be a never-ending work in progress.

But droughts can offer important lessons about how to get the ideas rolling again. Thomas has noticed that his idea well is fullest when he’s

busy going to lectures, making phone calls, and having drinks with scientists at conferences. Just engaging in the act of talking and thinking allows the ideas to flow. "The best way to find ideas is to be actively reporting on something, anything," he says.

And don't expect too much of yourself. Very few writers make a living solely by writing groundbreaking, long-form, one-of-a-kind stories on topics that nobody has read about before. More common is a mix of occasional passion projects with steadier, less glamorous work. As you sustain yourself with interesting-enough writing that pays the bills, keep your eyes and ears open for the winning elements that will turn an ordinary idea into something that you can't help but talk about at every party you go to.

### The Long View

Even when times are tough or stories get rejected, persistence often pays off. Any idea that doesn't pan out today might find a life a year—or a decade—from now.

In 1999, a graduate-level course drew Virginia's attention to the debate over marine reserves along the Oregon coast. Ten years later, proposals for the large-scale use of wave energy sparked an unprecedented coastal planning effort that brought together fishers, surfers, wave energy developers, and marine reserve advocates. Virginia followed every development. When the time seemed right, she made a few key calls and put together a feature for *Portland Monthly* about plans for the first wave buoy park in the continental United States.

Likewise, SciLancer Andreas von Bubnoff learned about John Ioannidis—a scientist who analyzes the accuracy of biomedical studies—while working at the *Chicago Tribune* in 2004. After he did some initial reporting on the work, Andreas's story fell through, but the topic remained in the back of his mind. About a year later, he unsuccessfully pitched another story about Ioannidis's work, but he refused to let go of the idea. More than another year later, after seeing Ioannidis talk at a scientific meeting, he finally found the right focus for the story; the piece ran in the *Los Angeles Times* and appeared in the 2008 edition of *The Best American Science and Nature Writing*. "It takes time for some ideas to mature," Andreas says. "It turns out that sometimes rejection can be a good thing."





## SCILANCE SAYS . . .

- The **elements of a good story** include: characters, a journey, conflict, linked events, a news hook, and a big-picture idea. These elements distinguish a *story* from a *topic*.
- One of the best ways to learn how to identify good story ideas is to **read top-level nonfiction**, including non-science articles.
- Test your ideas on strangers and friends at bars or cocktail parties. If you **hook them in a few sentences** or less, you're on the right track.
- Understand the news cycle, including the journal system and embargo schedules. **Never break an embargo.**
- To find stories everyone doesn't already have, look to **obscure and international journals**. They are often filled with quirky and interesting studies.
- **Conferences and meetings** can be excellent sources of story nuggets. Follow your interests and follow up on offhand comments.
- **Local newspapers** can offer local angles that might lead to stories with broader appeal.
- **Talk to anyone and everyone**, everywhere you go.
- Playtime is an often-overlooked source of observations and conversations that can spark sellable ideas. **Pursuing hobbies and interests** can lead to interesting work projects.
- With a little legwork before your next trip, you can **turn your travels into fountains of feature ideas**—as long as you're willing to give up on the idea of a work-free vacation.
- If at first your idea is rejected, **don't give up**. Many writers have tales of stories that were years in the making.



## Chapter 3

# *Making the Pitch*

By Thomas Hayden

● Online or on paper, written, spoken, or acted out with puppets: If you've got a story you want to tell, you're first going to have to convince an editor to give you the space and resources to produce and publish it. The traditional way to approach an editor is with a brief written proposal, or pitch, called a query letter. And if that letter isn't good, no one but the readers of your personal blog will find out whether your story could have been, too.

There are a hundred variations on the standard query letter, ranging from laboriously researched documents to hallway conversations between colleagues. (Yes, staffers have to pitch, too.) News stories—direct, to the point, and focused on a specific study or event—are fundamentally different from magazine-style features, which tend to play out as narratives with characters, plotlines, and maybe even a moral or two. The pitch for each story type is correspondingly different. (See “A Tale of Two Query Letters” on p. 36 for an example of each.) And there are as many individual preferences as there are editors. But the fundamental elements are the same, and no matter how you put them together, they are essential to the success of any pitch:

**The story idea:** What are you proposing to write, specifically? (See Chapter 2 for the difference between topics and stories.)

**Relevance:** Why does this story matter, and why is it a good fit for the specific publication? (Sometimes “because it’s cool” is reason enough. But you usually need more.)

**Timeliness:** Why should this story be assigned now, rather than, say, a year ago, or in six months? Is there breaking news, an upcoming anniversary, or some other “news peg” to hang the story on?

**Execution:** Are you proposing a 350-word news brief or a 3,000-word feature? A profile, an investigation, an essay? Will the story require travel, or hard-to-get interviews, or Freedom of Information Act requests?

**Extras:** Are there photo opportunities, or data for graphics or interactive maps, or other possible adornments to the primary story?

**Author:** Why are you the writer for the job? Reasons might include your writing experience or knowledge of the field, access to the key sites or sources, or a unique perspective on the issue.

Some editors prefer very brief query letters—a paragraph or two of plainly stated facts and figures. Others respond well to a more comprehensive approach, showing detailed research and analysis of the story idea and its context. And many publications post submission guidelines online, sometimes in considerable detail—read them carefully. With experience, you’ll find your own approach to pitching, and learn to shape it for different stories, publications, and editors. But as a general rule, an initial query letter should be a single page (about five hundred words) or less, even for longer stories.

There are two reasons. First, editors are universally busy, and thus tend to value clarity and brevity. The second reason is even simpler: in some ways, the best outcome of a query letter is an editor’s desire to know more.

That doesn’t mean you can just dash off a few lines, though. For anything more than a short news piece, a good pitch should be reported and written. That is to say, you should make a couple of preliminary phone calls, reaching out to key sources to confirm that they’ll speak with you and that your idea has a solid basis in reality. And the query letter should demonstrate both the strength of your idea and the strength of your writing. Some writers draft an opening paragraph or two that could work for the final story, and use them to open the query letter. It shows they’ve thought through the idea as a story and that they can capture the tone and style of the outlet they’re pitching.



"I rely a lot on the writing that I'm already reading: the writing in the e-mails, the writing in the pitch," says Adam Rogers, senior editor at *Wired*. "Those e-mails to me are auditions all on their own. So are the interactions I have on the phone. I want to feel like this is a professional that I'm going to be in good hands with."

You want to build your queries around good story ideas. But you also want to send another message: that working with you will be a low-risk proposition. When an editor assigns a story, he or she is making a bet—that a new writer will be able to deliver the goods, or that an expensive reporting trip will pay off. A clear, well-thought-out, and polished query can help an editor feel more secure in taking a chance on your proposal. "Quite often I think there's a good story behind the pitch, but the pitch is not well written," says Helen Pearson, lead features editor at *Nature*. "That tells me it's too much of a gamble" to make the assignment.

The newer you are to science writing, or to the specific editor you're pitching, the more formal and complete your query letter should be. For short news articles, which tend to be less complicated to report, write, and edit, a short, crisp memo is your best bet. For features, which tend to be longer, more complicated, and higher-risk for editors, you'll need to research and write a more comprehensive but still succinct query letter. (See "A Tale of Two Query Letters" on p. 36 for examples.)

How much research should you do before drafting your query? There's no hard-and-fast rule, but as a general guideline you should start by reading any scientific papers or other background material the story will be based on. Next, you should check to make sure the publication you plan to pitch hasn't run similar stories in the recent past. If you're pitching a news story, that may be plenty. But if you're pitching a longer feature, you've got more work to do. You won't always know the ending of the feature story you're pitching, but you do need to know enough to show that it *is* a story, not just a hunch.

When I first started working as a science reporter, I was amazed by how quickly people returned my phone calls requesting interviews—I had an easier time getting leading scientists on the phone than I did scheduling a meeting with my own PhD adviser. By and large, most scientists respond well to a polite, enthusiastic request, by phone or by e-mail, to discuss their research with a reporter—even if you don't have an assignment yet. It's easier if you have a staff job and can say you're calling from publication X or research foundation Y. For freelancers, transparency is best: simply explain that you're a science journalist looking

into a story you plan to propose to publication X, and ask for ten minutes to make sure you understand the key points.

Sure, sometimes a potential source will say no. But more often than not, she'll say yes. And when she does, be brief, polite, and focused. Don't subject your source to a fishing expedition. (For more on interviewing, see Chapter 4.)

### The Art of Conversation

I learned almost everything I needed to know about pitching from my very first query: a comically bad, justifiably unsuccessful pitch that happened to find a generous editor. I never did write the story I proposed, but I probably became a professional science writer because of it.

I was in graduate school at the time, studying biological oceanography at the University of Southern California. I had very little media experience, but I was a magazine junkie, and I had become the default reviewer of manuscripts in my department. I had never written about science for a general audience, but I had a vague sense that I would like to.

So I searched online for the e-mail address of an editor at the now-defunct Canadian magazine *Equinox* and fired off a long, meandering message about a set of experiments I was tangentially involved in. Specifically, the proposal was for a cover story on attempts to fertilize the oceans with iron, which might boost fish populations and help control global warming, or have horrific unintended consequences. It was a good story idea—and a terrible query letter. (See “A Tale of Two Query Letters” on p. 36 for two attempts at making it better.)

It didn't even deserve a response, but I got something more valuable than an assignment: an ongoing conversation. The editor explained to me, for example, that magazine cover stories are something one works up to over a professional career. He also offered me a much more modest assignment, a short roundup of geoengineering ideas. The editor offered me a tryout, essentially—a low-risk situation for him, and a great opportunity for me.

Nearly two decades later, I've pitched hundreds of science stories successfully, and taught scores of students to do the same. I've learned that while there are lots of common errors that can sink an otherwise decent pitch (see “Classic Mistakes We Can All Avoid” on p. 32), there is no golden secret that will guarantee the success of even a terrific one. It's pure black magic: a mixture of good luck, good timing, and benign



cosmic interference—and that's if you already have a great story idea. But a handful of guidelines can help give your pitch its best chance:

- *Know the outlet you're pitching.* I had read *Equinox* since its first issue, so I knew the types of stories its editors ran, and that they hadn't already covered the story I was pitching. You can do the same by reading back issues and combing through archives. You don't want to propose a story an outlet has already published, or something it never would.
- *Pitch a person, not a publication.* Look at the masthead, search online, ask friends and colleagues—anything to increase the chances that your e-mail will find a living, breathing editor and not wind up in an electronic slush pile at the far end of a “submissions@” e-mail address. And if you can find someone who knows the editor and is willing to introduce you, so much the better.
- *Practice.* Journalism conferences often feature a “pitch slam,” where a panel of editors hears and critiques story pitches from audience members. We've found a less harrowing way to get critical feedback in SciLance, by breaking into smaller groups online, reading and critiquing one another's pitches, and helping to brainstorm outlets for the stories.
- *Be both audacious and humble.* Have the courage to pitch ambitious stories and leading outlets—and the humility to be grateful for any response, whether or not it leads to an assignment right away.
- *Be flexible.* Be specific in your pitch, but adaptable in any follow-up conversations. It's great to be passionate about your own ideas, but especially early in your career, you'll get further, faster if you're eager to execute your editors' ideas, too.

## Finding Your Target

So . . . you have a story idea. The next step? Decide where you're going to pitch it. I tell my journalism students to think about pitching stories the same way they might have thought about applying to colleges: survey many possibilities and identify “match, stretch, and safety” options. For science writers, a safety option might mean a free blog outlet hungry for content. A match is probably an outlet you've written for previously, or a close equivalent. And a stretch is that next rung of audience size, prestige,



or pay—the publication you’ve long admired, and dream of breaking into. Knowing the full range of possible outlets for your work, and where they line up in that scheme, will be a key part of your success pitching science stories. The good news is that unlike when you had to choose a college, you can write for more than one publication at once, and you may well have different pitches out to publications at each level at any given time.

Keep in mind that for every famous national outlet, there are many smaller, less-well-known equivalents that are easier to break into. That quirky tidbit about a researcher that would make a great “Talk of the Town” item in the *New Yorker*? It might make an even better “lede” (journalism-speak for an opening paragraph or section) for a full profile in the alumni magazine of the scientist’s home institution. And sure, your idea for a long feature on new solutions to a socially relevant public health problem might work great at the *Los Angeles Times*. But it could work just as well in a free weekly newspaper that isn’t being bombarded with science story pitches every day.

The point is that there are more potential outlets for your work than you could ever read, and most have at least something to recommend them. They range from the news sections or websites of academic journals, to trade association newsletters, to annual reports put out by funding agencies and university departments or colleges. They include nonprofit groups’ home pages, museum catalogs, United Nations reports, and public radio station news blogs.

Some are small, some are specialized, and some are overseas—pitching relevant local stories to international publications can make you a foreign correspondent without ever leaving town. Not all outlets take freelance submissions, or pay for them if they do. But make discovering and charting all the possibilities one of your professional projects, and you’ll open whole new fields of opportunity. (For more, see Chapter 25, “The Diversity of Science Writing.”)

Each time you publish a story, you’ll be one step closer to the next rung of visibility and, hopefully, pay. No matter how obscure the outlet may be, a published “clip” always counts for more with new editors than an unpublished “writing sample.” And a terrific feature clip from a small regional publication can be worth more than a generic news brief in a glossy magazine with a million subscribers.

If science writing is your career, or you hope it will be, then money will be a crucial consideration, too. You’ll find more information about pay rates (and negotiating contracts) in Chapter 22, but when you’re

deciding where to pitch your ideas, you can't overlook the fact that some outlets simply pay more than others do. And some require a great deal more work for stories of the same length. As you build your science-writing business, you want to keep discovering new publications, and adding them to your list of potential outlets. When you do, make a note of how well they compensate you for your time.

## **Pulling the Trigger**

The best time to pitch a story idea is shortly after you've discovered or developed it, and well before anyone else does. You're seeking the sweet spot in an editor's mind between "I've never heard a word about this, therefore it's not important," and "This is so five minutes ago." Rest assured that if you sit on a good story, someone else will discover it and beat you into print.

Initial queries should be sent by e-mail, in the body of the message, not as attachments. (Distaste for e-mail attachments just may be the one thing all editors have in common.) When you're introducing yourself to a new editor, you can link to a few samples of your best work, or to your professional website, at the bottom of the query letter. You can also offer to send electronic copies of your published clips upon request—just don't attach them, or anything, to your initial query e-mail.

As a matter of courtesy and custom, you should send your query letter to just one publication at a time. This can get ticklish quickly, especially for time-sensitive pitches. Most editors say they do try to respond to pitches, yea or nay, as soon as they can, but every writer has stories of life-shortening stress as they waited for a response to a pitch whose news peg was rapidly approaching.

If your story's freshness will expire on a particular date, make sure that's clear in your query letter and include the phrase "time-sensitive pitch" in your e-mail's subject line. And then hit send, and wait.

How long should you wait? It depends on several factors, including the shelf life of your story's relevance and the publication frequency of the outlet you've pitched. For a daily outlet and a fast-approaching news peg, you might send a follow-up e-mail the next day. For monthly magazines and more shelf-stable stories, waiting two weeks or more for a response is pretty common.

Some writers note in their query letter that they will send the pitch to other publications if they haven't heard back by a certain date. But that's a



pretty aggressive move, and runs the risk of alienating your editor rather than spurring a response. Instead, if you don't hear anything within a reasonable amount of time for the story and outlet—say, a couple of days for a daily, or a couple of weeks for a monthly—follow up twice. And in the second follow-up, after about half as much time has gone by, let the editor know you're ready to move on. "I say something like 'Since this is a time-sensitive story, if I haven't heard back from you by the end of the week I'll assume you're not interested. Thanks again for your consideration, and I hope to work with you in the future,'" says SciLancer Michelle Nijhuis. That way, if the editor does pop up again after you've sold your story elsewhere, you'll have a digital trail that shows she had her chance. (Most writers stick with e-mail for their follow-ups, but some swear there's no substitute for picking up the phone: if nothing else, it tends to get you your rejection more quickly, so you can move on.)

Unfortunately, a pitch does not give you exclusive rights to a story idea. It's always possible that a publication you pitch, or a colleague you talk with too openly, will consciously or unconsciously take your idea. But in our experience, outright idea theft is rare: even moderately reputable outlets won't simply poach your story idea and assign it to someone else. More often, publications receive very similar pitches from multiple writers, and give priority first to staffers, then to freelancers who already have a working relationship with the outlet. The more original your idea is, and the more effective your query, the better chance you have of being the writer others resent. Er, admire.

But hopefully you'll get an answer quickly, and it will be either yes or no. If it's no, turn immediately to Chapter 13, on dealing with rejection. And if the answer is any variation on the word yes? Huzzah! Celebrate by reading Chapter 22, on contracts, and get ready to work.

Remember, you're pitching a story *idea*, not a finished article. If your pitch does find an interested editor, he or she will become a collaborator, helping you to shape and refine the original idea and plan out the execution. Well, the good ones do that, anyway. "You want to make sure as an editor and as a writer that the two of you are on the same page before the full scope of the reporting gets done," says Peter Aldhous, the San Francisco bureau chief for *New Scientist*.

So, if your assignment is anything more than a straightforward news story, pick up the phone and have a conversation with your editor—that will help you clarify expectations from the outset, collect answers to the editor's questions as you report, and write with confidence that your first



draft will be on target. After you talk, send an e-mail to your editor noting the key points of your discussion to make sure you understand each other—and that you've got a record to refer to in case of future disagreements. (Many publications will do the same for you in an assignment letter. But it never hurts to be proactive.)

## Dating Around or Settling Down

How often should you pitch? When it comes to frequency and number, there are two primary pitching strategies, each with its vocal proponents. You might think of them as the sea urchins and the sharks. Sea urchins are famously fecund, throwing off millions of eggs or sperm in the hopes that a few will bump into each other and mature into healthy adults. Most sharks are more circumspect. They mature later in life, breed rarely, and often brood their eggs internally, giving birth to just a few self-sufficient pups. Both strategies work, with sea urchins accepting steep rates of attrition while sharks invest much more to improve each offspring's chances of survival.

When it comes to pitching, you'll soon learn whether you're a natural broadcast spawner, reeling off dozens of pitches a month in the hopes that a few find their mark, or a brooder, who pours days or weeks of work into each query, relying on that effort to lead to an assignment almost every time. In practice, many science writers combine both approaches, and often metamorphose from echinoderm to elasmobranch as careers advance. The effort required to pitch also tends to change as you develop relationships with individual editors—once you're trusted, you can save time by pitching informally over the phone or in person. If the editor is interested in your informal pitch, you can follow up with a detailed written query.

One more sexual analogy: Some writers find they are happiest with solid, predictable professional relationships. They work on staff, or pitch most of their story ideas to just one or a few primary outlets. Others, literally speaking, are downright promiscuous, preferring to match each story idea with the best potential outlet, rather than shaping their ideas for publishing partners they already know. Ultimately, it doesn't matter which strategy you use, as long as you use one.

If you're reading this book, chances are you agree with us that the world needs great science writing. But that doesn't mean that the universe owes you a career, or that editors are standing by bemoaning their empty pages and unspent budgets. Still, there is more room and appetite

for quality science writing than ever before, and a near infinite variety of stories waiting to be told. Most important, there are people waiting to help you tell them, and to pay you for the pleasure. All you need is to convince them to let you do it.

## Classic Mistakes We Can All Avoid

By Monya Baker

### Dumb Typos

If you don't get the editor's name right, you won't get the assignment. All your hours of research, writing, and sweat—all that will count for nothing if you don't check the number of "l"s in Hillary or make sure Alex Nguyen is a man before you send an e-mail to "Mr. Nguyen." Even worse is a message addressed to someone other than the recipient. *Technology Review* is not going to accept a pitch if you leave in the "Dear Mr. Remnick" from your pitch to the *New Yorker*, or the sentence about why your story is just right for *Wired*. And believe us, pitches are one place where spelling and grammar count—a lot. Take care that a stray semicolon or three-second cut-and-paste doesn't sabotage your hard work.

### Inappropriate Informality in Early E-mails

Your initial e-mails to an editor should resemble digital business letters: formal, cleanly formatted, and succinct. Even if you've met an editor in person, addressing him or her in an e-mail with "hey" or without using a name at all will make a bad impression. Once you get to know an editor, you'll soon be on a first-name basis. But in your first e-mail, play it safe with a "Dr.," "Mr.," or "Ms."

### Wrong Magazine

*Nature* is not a wildlife magazine. If you don't take the time to know what kinds of stories a magazine runs, your ignorance will show. You won't get the assignment you pitched, and you'll lose credibility for subsequent pitches. Don't let this happen.

## Pitching the Story That Just Ran, or Is Sure to Be Running

If you see a story on the EurekAlert! online news service that looks perfect for a particular magazine, you can be sure that staff writers and regular freelancers have had first crack. (See Chapter 2 for more.) Don't even try to pitch these picked-over stories unless you can bring something special to them, such as on-site reporting or an unexpected take. Similarly, if a topic is hot or timely, don't pitch an obvious explainer or roundup. If an editor wants an everything-you-need-to-know-about-composting story for the gardening season, she'll assign it to someone she knows. Be sure to offer a specific narrative or special perspective.

## Forsaking the Phone

Insecure newbies often spend too much time on background research, trolling through countless articles on PubMed without actually contacting a practitioner in the field about their story idea. Sure, you need to read up a bit to know whom to call, but ultimately a reporter's job is to learn about what hasn't already been published. Writers who forsake the phone are losing the opportunity not just to find potential characters for their stories, but also to get expert guides to the literature and the latest data.

## Pitching Endurance

*By Douglas Fox*

**P**itching a story, especially a long, travel-intensive feature, usually requires patience, persistence, and luck—and sometimes megadoses of all three.

In March 2007 I secured a spot on an expedition to Antarctica, embedded with a team studying lakes hidden beneath the West Antarctic

*(Continues)*



## Pitching Endurance (Continued)

Ice Sheet. I would spend seven weeks on the ice, five of them sleeping in a tent just 375 miles from the South Pole. My editor at *Discover* was interested in the story, and I was about to send her a full proposal.

The departure date was November 8, 2007. Things started falling apart in July.

Several weeks after sending a full proposal to *Discover*, I received an apologetic voice mail from my editor informing me she couldn't assign the story after all, because another Antarctic feature had already been approved at the magazine without her knowledge. From there began a flurry of pitching and repitching the story.

August 7: *Wired* said no. The editors thought the science was too incremental, and they already had an Arctic story in progress that might overlap with mine, despite being poles apart.

August 8: *National Geographic* said no. They needed more lead time and would have to send one of their photographers along, which wasn't logistically possible at this point.

August 9: *Smithsonian* said no. They had already published a photo essay on the Antarctic volcano, Mount Erebus, the year before.

August 22: *Men's Journal* was interested but needed more time to decide. Who is this scientist, they asked, and what does he *look like*? I hadn't actually met him, so I drove down to the University of California in Santa Cruz to do that.

September 20: *Men's Journal* stopped answering e-mails or phone calls. I sent them a note telling them that I planned to take the story elsewhere.

October 3: *National Geographic Adventure* was intrigued, but tired of depressing stories involving melting ice. They suggested that I call to discuss further when I got back.

My frustration grew with each passing week. I couldn't back out of an opportunity that might never happen again. And yet I couldn't spend nearly two months and thousands of dollars on a trip without having a significant outlet signed up for a story.

Things finally looked up on October 17. At 11:16 a.m., an editor at the *Christian Science Monitor* agreed to take a couple of 1,200-word pieces. And then at 2:52 that afternoon, after a month's silence, *Men's Journal* e-mailed and told me the story was a go.

And so I went to Antarctica, with noncompeting assignments from *MJ* and the *Monitor*. The trip, as I describe in Chapter 6, exceeded expectations.

But by the time I returned home and filed the story with *MJ*, new problems were already emerging. The story was fine, but the photo editor wasn't happy with the shots. Rather than having the story languish, I negotiated with *MJ* to have it killed immediately so that I could pitch it elsewhere.

I knew that I had the best story I had ever written, and no one wanted to print it. I quickly obtained a second round of rejections from *Smithsonian* and *National Geographic Adventure*. I was getting desperate, and losing credibility with the people who had so generously taken me to Antarctica in the first place, when my editor at *Discover* asked out of the blue how the Antarctica trip had gone, and suggested that I pitch her the story again. I happily did this—but yet again, there were challenges.

*Discover* had run its other Antarctic story, the one that bumped mine, in November 2007. That story was devoted to subglacial lakes, just as mine was. It took some doing to reposition my story around climate change and the stability of the West Antarctic Ice Sheet. I did receive some help from an unexpected source: Michael Crichton had featured the work of my Antarctic hosts in his climate-skeptic novel *State of Fear*. That touch of controversy and the shift in focus were enough for *Discover*, and the story was published with my photos.

Ultimately I published six other stories from the trip: two for the *Christian Science Monitor* and four for science-focused publications. Was it worth it? For me, it was. But I learned that when it comes to time-consuming, travel-intensive stories, the pitching process should start as early as possible—and that I should prepare for the unpredictable.

## A Tale of Two Query Letters

By Thomas Hayden

**M**y first magazine pitch was a dismal failure—a solid topic, but with no structure, story arc, or sense of relevance beyond “it’s really cool.” So what should I have written instead? I attempt to redeem myself here with two versions written to demonstrate the differences between a news query and a feature query. Remember that even with a perfect pitch, you still need the reporting and writing chops to deliver the story: I probably could have executed the news story back then, with lots of help from an understanding editor. But I was far too green to handle a complex feature story—not to mention too close to the primary sources for most publications. (The most important thing there is disclosure, so that interested editors can decide whether you have a potential conflict of interest.) And before you pitch, be sure to check out the archive of real query letters at The Open Notebook ([www.theopennotebook.com](http://www.theopennotebook.com)), too.

### News Pitch

**Subject line: News Pitch | Making the ocean bloom**

Dear Mr./Ms. Editor,

For decades, scientists have struggled to understand why some regions of the global ocean teem with life, while other vast stretches can sustain only the sparsest of ecosystems. A unique experiment currently under way in the equatorial Pacific suggests the first clear answer: these biological “deserts” are apparently starved for iron. When oceanographers added small quantities of the metal to the seawater, it caused a dramatic bloom of microscopic plants, the base of the marine food web. The scientists insist they want only to understand how the ocean works, but this kind of deliberate oceanic “fertilization” on a larger scale could ultimately combat global warming and boost fish supplies—or create unintended consequences, such as oxygen-free “dead zones” and deadly toxic algae blooms.



The scientists return to port in one week and will release a statement to the press at that time. As an oceanography graduate student and colleague of two of the researchers, I have advance notice of the preliminary results and can be ready to go with a five hundred-word news story as the research vessel docks.

I've spoken with two of the scientists already, and expect interviews this week with the chief scientist (by electronic mail) and two prominent critics of the expedition. Headshots of key researchers and photographs of the expedition's departure are available from their home institutions' press offices.

I can be reached by return e-mail, or at (310) 555-1867.

*Thomas Hayden*

### **Feature Pitch**

***Subject line: Feature Pitch | The friendship behind the "experiment of the decade"***

Dear Mr./Ms. Editor,

Two thousand kilometers off the coast of Ecuador, the surface waters of the equatorial Pacific are all but devoid of marine life. For the scientists aboard the research ship *Melville*, more than a week into a unique, experimental expedition, the world was an uninterrupted sweep of blue sky and ocean. Until, that is, the oceanographers on board started dumping nearly five hundred kilograms of iron into the sea, over an area the size of Manhattan. After that, the ocean teemed with microscopic life, turning the water green, proving a decade-old theory, and potentially affecting everything from the global climate to the world's supply of seafood.

It's an experiment that oceanographer John Martin would have loved. There's just one problem: Martin died two years ago, as the first test of his radical "iron hypothesis" was being planned. The idea that certain

*(Continues)*

## A Tale of Two Query Letters (Continued)

"high nutrient, low chlorophyll" (HNLC) areas of the ocean could be made to bloom by fertilizing them with iron was so unpopular, it might well have died with Martin. But Kenneth Coale, a young colleague of Martin's at Moss Landing Marine Laboratory, near Monterey, California, refused to let that happen.

As lead scientist for what many are calling the most audacious experiment of the decade, Coale had to fight an uphill battle against dismissive colleagues, wary funders, and alarmed critics. With vindication finally in sight, it seems clear that his persistence had as much to do with the bond between two very different scientists—the older one fiery and iconoclastic, the younger one calmly determined—as it did with the underlying science.

I'm proposing a feature story on the IronEx II experiment, told through the lens of John Martin's and Kenneth Coale's struggles to make it happen. Sidebars could include one on the potential for iron fertilization to combat global climate change and augment seafood supplies, and another on possible unintended consequences, including toxic algae blooms and oxygen-deprived "dead zones." Graphics could include a time line of related ocean research, including future iron experiments, a map of the study area and other HNLC areas, and a graphic illustrating the chemistry and biology of iron fertilization. I have access to onboard photographs taken by several of the cruise participants.

I'm a third-year PhD student in biological oceanography. I know this field well and have access to most of the researchers involved in IronEx II, including two of my lab mates. (I'm not involved in the primary experiments, but I have run some chemical analyses for a side project.) My professional writing experience is limited to music reviews and the script for an interactive digital textbook on the Amazon rain forest. I would be happy to send samples on request.

I can be reached by return e-mail, or at (310) 555-1867.

*Thomas Hayden*



## SCI LANCE SAYS . . .

- Each time you pitch a new editor, you're not just trying to sell a story—you're introducing yourself to a potential employer, and trying to **sell your skills** and the quality of your ideas.
- Be sure you're **pitching stories, not just topics**.
- The right time to pitch is just **after you've confirmed** your story idea is real, and **before you write**. If your editor likes the idea, he or she will help you shape it.
- Develop a **diverse list of potential outlets**, to increase your chances of finding one that fits your idea.
- **Research and report your story ideas** enough to know they're real, and that key sources will talk with you.
- **Err on the side of formality**, especially when you're pitching a new outlet or editor.
- Many outlets list **submission guidelines** online, sometimes in considerable detail. Read them carefully. If you can't find them online, e-mail the general editorial address and request a copy.
- Pitch a **person, not just a publication**. Secure an introduction to new editors if you can—or introduce yourself in person at a conference or meeting.
- Make sure **your query represents you well**—no typos or grammatical errors.
- Find a friend or group and **critique one another's query letters**.
- Send your query **in the body** of an e-mail, not as an attachment.
- You can send your query letter to only **one publication at a time**, so work quickly and choose carefully.





## Chapter 4

# *Getting the Story, and Getting It Right*

By Andreas von Bubnoff

● Once you have landed that assignment and have a deadline, you may start to feel what we call “The Fear”: That this time, you won’t make it. That this time, “they”—your editor, your readers, your sources, your mother—will find out you’re a fraud. But if you break down the research process into steps, The Fear will fade, and even complicated projects will become manageable. This chapter discusses strategies for making your reporting more effective and efficient.

## Finding Sources

Often the first step in reporting is to find someone—the right someone—to talk to about your topic. If you’ve pitched or proposed the story to an editor, you already know the names of at least one or two of the main sources for your story. For a news brief on a research finding, an obvious place to start is with the researcher who conducted the main study. In my experience, the leader of the study—called the principal investigator, or PI, and generally the last author listed—is the best source for big-picture quotes about the meaning of the findings. Graduate students or postdocs, who often do the bulk of the work, can discuss the details of the research but may be afraid to say what they really think—or may simply be too close to the work to comment on its larger implications.

When you talk to the PI, ask her or him to recommend other researchers who can comment on the findings. Other potential sources and “sources of sources” are the authors of related papers, often cited in the original paper; scientists on relevant advisory panels; scientific societies; scientific publication databases; and even your own friends in

related fields. (While journalistic ethics prevent reporters from quoting friends or colleagues in an article, friends can suggest sources and give you their unvarnished opinion on the work, which may help inform your questions.) Many scientists are happy to talk about the criticism their work has received and direct you to their critics, so don't be afraid to ask.

For a feature story, the reporting process is more complex, partly because it can lead in multiple, unexpected directions. Often my first step is to look in PubMed (for biomedical research) or Google Scholar for researchers who have recently written review articles on the topic of the story, especially for leading journals such as *Science* or *Nature*. The *Annual Reviews*, which cover more than forty disciplines, are valuable summaries of current research and contain hundreds of citations. Online "expert" databases, such as ProfNet and the Newswise directory, and expert guides published by university public-relations offices can also provide good starting points. Make sure to check nearby institutions for possible sources when you're working for local outlets. When I talk to these researchers, I ask them to suggest other people working on the topic.

Investigative stories, which reveal information that sources would rather keep secret, often involve filing Freedom of Information Act requests and using other tactics to acquire key documents. (See the Resources section for further information on investigative reporting.)

When I first contact potential sources, I generally use e-mail, or call if there isn't much time. I've found that many scientists respond to e-mail surprisingly fast, often in a few hours or less, and e-mailing to arrange a time to talk can reduce the time both you and your source spend playing phone tag.

Your initial e-mail should be short, polite, and professional, including an appropriate salutation, a signature box, and, needless to say, good spelling and grammar. I usually introduce myself as a science writer, briefly describe the publication I'm writing for and the nature of the story, and ask if there is a convenient time to talk. I also mention how much of the interviewee's time I expect to need, and make it clear if my deadline is tight. If the researcher says he or she can't do it, I ask for suggestions of people to contact instead.

If a source doesn't respond within a reasonable time, send a reminder e-mail, call, or enlist the help of the institution's public information officer, or PIO. While it's almost always worth trying to contact your source directly first, some institutions will let you interview sources only



if you contact a PIO first; sometimes, if a researcher is a high-profile scientist or the story is attracting a lot of press, working with a PIO may be the only way to get your source on the phone. PIOs, especially those at government agencies and federal labs, may also want to sit in on phone or in-person interviews, which can be helpful or restrictive depending on the sensitivity of the interview topic and the attitude of the PIO.

Make sure you don't schedule more interviews in a day than you can handle: interviews of any kind can be oddly tiring, and you need time to process what you've been told. "I try to limit the number of in-person interviews in a day to two and the number of phone interviews to four," says SciLancer Robert Frederick, adding that it takes much more energy to do interviews in person than on the phone, because reporters have to be more actively attentive during in-person interviews.

### Preparing for an Interview

How much research you do before an interview depends on the type of story. Your preparation for news article interviews, during which you'll need to ask specific questions about new research, will be different than your preparation for, say, a profile piece, for which you may want to ask more personal questions about the subject's life and work. In general, prepare enough so you don't waste a source's time, but not so much that you lose your own sense of the big picture. "I read as much of the paper as I can, but always the abstract and the discussion," says SciLancer Hannah Hoag. "Other news coverage of the research is useful to a point, but sometimes very dated or wrong, and I don't like to read too much because I don't want it to influence my questions or reporting."

In some cases, though, extensive preparation can pay off, as it did for SciLancer Monya Baker. After struggling through a technical paper before interviewing its author, she still didn't understand a few details. She asked the researcher; he explained. "Then he said something to the effect that he'd just gotten the most exciting results he'd seen in years," she says. "They were so preliminary that he was reluctant to talk to reporters about them, but he thought I could handle them. Those results became my story."

Make sure you compile a list of questions, even if you have just five minutes to spare before the interview. This way, if for any reason you lose your train of thought, you have something to fall back on. If you're writing about a subject that's familiar to you, don't forget to ask more



general questions before delving into the details: put yourself in your reader's shoes and imagine the questions you might have if you were encountering the subject for the first time. (See "A Science Writer's Emergency Question List" on p. 49 for suggestions.)

The list of questions will also allow you to give the interview a structure, which may differ depending on the type of story. "I try to structure the interview chronologically if I'm really trying to get the story behind the work, or logically if we're talking about a particular piece of research," says Hannah.

For certain types of projects, such as question-and-answer-format (Q&A) interviews for print or audio, a structured list of questions and good preparation are especially important, because you will be less able to rearrange the material later for the finished piece.

If you record your interview, make sure you have enough space on your recorder and spare batteries on hand. Oh, and before the interview, make sure you go to the bathroom.

### Conducting the Interview

There are different ways to start an interview. With sources who don't often speak with the media, it may help to begin with some brief small talk, but don't force it; other sources may find chitchat to be an annoying waste of time. It's always a good idea to briefly summarize the subject and scope of your assignment; after that, you can often get an interviewee talking by asking how he or she came to study the topic, or by asking for a summary of his or her findings and their implications.

Remember that your job as an interviewer is "not to translate the subject on behalf of your source, but to respectfully interrogate him or her for your audience," says SciLancer Thomas Hayden.

Also remember that you are in control. Think of yourself not just as a listener, but also as the director of what Thomas describes as a "weirdly focused, slightly augmented conversation." For example, it's perfectly reasonable to ask sources to repeat themselves; to ask for additional details in follow-up questions; to stop sources who give you too much information; or to ask them to speak more slowly if necessary.

Even as you direct, try to keep the conversation as natural as possible. Ask open-ended questions, as you would in casual conversation. Don't talk too much; sources often respond to a little silence with new and interesting information. As SciLancer Liza Gross discovered, "It's amazing

*For news stories, I like to get at the backstory first: "I'd love some background before we get into what you did and what you found and why it's important. So, what did you know going in and what were you hoping to learn with this study?"*

—EMILY SOHN

how often they end up saying something unexpected that I never would have heard if I'd butted in."

The purpose of an interview is not only to understand the material yourself, but also to get vivid, interesting quotes that will help your story come alive for your readers. So make sure you ask your interviewees to speak in lay terms so you will have to do less "translating" during the writing process. Ask them for metaphors so you won't have to find your own; for instance, you might ask a molecular biologist, "If cellular component X were big enough to hold in my hands, what would it look like?" Also ask them to put their research into context understandable to your readers, and to describe the general state of the field, including any controversies around the topic of your story. Jessica Marshall, another SciLance member, says, "I often blame my editor or the reader for my questions: 'I know my editor won't let me put (complicated word or concept) in the story. Can you say that a different way?' or 'Many of our readers won't know what X is.' That helps them remember who they're ultimately talking to."

And even for a news story, don't forget to ask about your interviewees' emotions. "Leave room for questions like 'Was this surprising?' or 'What was that like?'" says Jessica. Sometimes a personal comment—"I would have been terrified"—can get a subject talking about his or her own feelings.

Even if you've spent hours or days preparing, never assume you know everything: ask the questions you think you know the answers to as well as the ones you don't. The practice will help you not only avoid mistakes, but also get stronger quotes.

As for structuring the interview, print reporters often move from more general to specific questions. Audio and video journalists sometimes ask about specifics first and save their general questions for later, to make sure that the interviewee stays excited during the interview. If you have sensitive questions, you may want to ask them toward the end of the interview, after you've established some rapport with your source. (If you know you have extremely limited time with a high-profile or difficult-to-access source, however, ask your most important questions first.) If your source refuses to comment, you might want to point out that a mention of the refusal to comment in your article might be more damaging than any comment. You can also grant anonymity or go off the record, but make sure you carefully explain what that means beforehand, especially if you're speaking with someone who has never spoken to the media (see "On and Off the Record" on p. 50).



To save yourself work later, try to do as much fact-checking as you can during the interview. One way to do that is to paraphrase back to the source what you think he or she said and ask if your interpretation is correct. If you have a follow-up question but don't want to interrupt the flow of the conversation, make a note and ask at the end of the conversation.

The length of interviews varies widely: twenty to thirty minutes should be enough for news pieces and even most feature stories, although an hour can make sense for a feature story if the person is a major source. For certain story types, such as profiles, interviews can last several hours.

At the end of the interview, confirm how to spell the source's name, check their title, and of course ask who else you should talk to. The last minute or two of an interview are often the most important of the entire process: the source is usually comfortable with you and feeling expansive, and with a little prompting he or she may come up with unusually clear and reflective quotes. "I always ask, 'Is there anything we didn't cover that you feel is important?'" Often that leads to an exceptional nugget," says SciLancer Anne Sasso.

### Getting It All Down

This is where that typing class you took in high school may come in handy. Some reporters are more comfortable taking handwritten notes; the fastest way to do that is probably by learning shorthand or speed writing. Some develop their own version of speed writing or save time by dropping vowels when taking notes. "I scribble on a steno notepad, and use a kind of personal shorthand with lots of half-words and abbreviations I make up on the fly," says SciLancer Jill Adams, adding that she later types up her scribbles. Just make sure you can read your own shorthand!

Recording and transcribing an interview is one way to make sure you get everything. Turning on a small digital recorder also lets you focus on the interview and on the next question, rather than on your notebook or laptop. That can be especially important when you are in the field and moving around. Recording also allows you more time for taking notes on your own impressions—what you're seeing and hearing around you, how the source is behaving, and all the other details essential to any feature story.

If you do record, make sure you ask the source to state his or her name near the beginning (believe me, later you may have no idea who



is on the recording). And it's important to ask for permission to record, since several states require two-party consent to record a phone conversation.

If you combine typing with recording, turn on the tracking function in Microsoft Word so that you can time-stamp interesting passages, or note the time when the source says something important so that you can easily find it later in the recording. It's often helpful to write a brief summary just after the interview of the most important things an interviewee said. I've also found that for news stories with few sources, I can often just write a rough draft of the article while listening to the recording—no transcribing required.

Even partial transcribing of interviews can be time-consuming, and often impossible on a tight deadline. Also, recording can be a crutch that prevents you from focusing completely on the interview and what you really need from it. So practice doing interviews without your recorder—you may find that with time, you become a more efficient, and equally accurate, reporter.

Taking notes and recording in the field has its own challenges. For more, see Chapter 6.

### Structuring the Reporting Process

So how many interviews do you need? For news stories, you'll need to talk to at least one main source and one outside source not connected to the study. For a feature story, you'll likely need to interview several sources until you understand what's happening in a field of research and know who the main players are. It's also important to identify any controversies in the field you're covering, and then talk to all sides. For investigative stories, you may need to secure supporting documents or do extra interviews to confirm your findings.

In general, when you start hearing the same points made over and over again, and your sources start recommending sources you have already spoken with, you're nearing the end of the reporting process.

Robert Irion of the science communication program at the University of California, Santa Cruz, says that for any story longer than a few hundred words, reporters should interview at least one source for every 250 words. He's quick to add that the ratio varies depending on the length and complexity of the story and the style of the publication, but it is a useful rule of thumb.

After your first handful of interviews, you may want to start sketching out a draft. Many reporters find that an early draft helps them identify and focus on gaps during the rest of their reporting. "I used to do all my interviewing, then write," says SciLancer Douglas Fox. "But I find that the writing—or at least outlining—comes earlier and earlier." (For more on the process of structuring and writing your story, see Chapter 7.)

The downside of beginning to write too early, however, is to miss or not be open or prepared enough for unexpected turns and twists in the story. Sometimes it is that one last phone call that gives you the contrarian source who criticizes everything others have told you before. And that's not the only advantage of extra reporting: "I think a lot of great new story ideas come from over-reporting," says Douglas.

### Fact-Checking and Follow-up Questions

Journalism, at its most basic level, is truth-telling: everything a reporter writes should be verifiable, and based on firsthand observation, robust documentation, or reliable sources. And as we've said before, while not all science writing is journalism, we believe that all science writing can and should be done journalistically. So once the article is written, you'll need to make sure that it's completely correct—especially after the editing process, which often raises unanticipated follow-up questions and sometimes introduces errors. (For more on working with editors, see Chapter 8.)

For magazine features, you may work with a staff or freelance fact-checker, who will ask you to provide an annotated draft so that he or she can confirm all the facts in your story. But even in these cases, it's best to check all your facts yourself, and rely on the fact-checker as a triple-check. With any story, short or long, go through your final edited draft line by line, noting all the facts—names, titles, institutions, numbers, dates, places, interpretations of research findings. Then, even if you think you have them right, confirm them with your sources or with reliable documents.

When you check facts, whether on the phone or by e-mail, you may want to tell the source that the process is about accuracy, not style. To help a source focus on factual accuracy, it can be helpful to break down the facts you are checking into separate statements and present them in a different order than they appear in the story. (See "So When Can I Read Your Draft?" on p. 51 for more on sharing your copy with sources.)

*When I started out, I over-reported intensely, and wrote last. It worked, but it was also frustrating and inefficient. I slowly learned to report less, and in a more targeted way, but found some of the joy going out of the process, and some of the quality and richness out of the stories. I now try to match reporting intensity to the work. If it's a quick job or a rent-payer, I report less, and more briefly. If it's a "heart job"—something I'm doing for all the reasons that I started doing this stuff in the first place—I indulge myself and impose on my sources to do the kind of long, meandering, hyper-tangential reporting I really enjoy.*  
—THOMAS HAYDEN



Also, while all publications want you to check your facts, most will not want you to read a verbatim quote back to a source: once a source said it, it's fair game, and many sources, on hearing their original language, will want to water it down or make it less colorful. That said, you should check the facts within your quotes by paraphrasing them to your source or sources.

If all goes well, fact-checking is the last stage in your process. Soon you'll have a well-reported, accurate story in print—and another deadline on the horizon.

## Making a Reporting Plan

**P**eter Aldhous, San Francisco bureau chief of *New Scientist* and a lecturer at the University of California, Santa Cruz, science communication program, suggests that writers use a reporting plan to organize and streamline their research.

Even for short news stories that need to be done in a day, Aldhous says, it's helpful to make an initial list of sources to contact. For longer projects, Aldhous keeps track of his reporting progress in a spreadsheet that lists sources he has spoken to and needs to speak to, their contact information, and their relationship to the story. He notes the times of scheduled interviews in his Outlook calendar.

For projects that involve data or document-driven reporting, a reporting plan might also include a list of documents (court records, for example) or data sets that need to be obtained. For long-term projects, Aldhous includes a timetable for the completion of different stages.

Of course, reporting often leads to new information that changes the direction or focus of the story, and the plan should respond. "The plan evolves as you work on the story," Aldhous says.



## A Science Writer's Emergency Question List

**Y**ou should always prepare for your interviews. But sometimes you'll get an unexpected opportunity to ask a source a few questions. What then?

Frank Allen, a former environment editor for the *Wall Street Journal* and founder of the Institutes for Journalism and Natural Resources ([www.ijnr.org](http://www.ijnr.org)), suggests the mnemonic G-R-O-S-S to remember the essentials:

**G for Goals**—What is your source trying to accomplish?

**R for Reasons**—Why is your source trying to do what he or she is doing?

**O for Obstacles**—Who or what stands in the way of the goals?

**S for Solutions**—How can those obstacles be overcome?

**S for Start**—How will your source begin to overcome them (or, alternatively, how did your source start to be interested in the topic at hand)?

For stories about scientific research, it's also important to ask: Who pays? Who benefits? How do you know (X result)? Could you explain that again—in terms my readers will understand?

And finally, at the end of every interview, ask what's missing: Is there anything we didn't cover that you feel is important? Who else should I talk to?

## On and Off the Record

Terms such as "off the record" are often used to define the degree of anonymity a reporter grants to a source. Unfortunately, these terms are very poorly defined, even among reporters. If you decide to grant anonymity to a source, make sure that the two of you agree not just on a term but on the definition of that term.

"On the record" means that everything a source says during the interview can be used and the source can be identified as the person the comments came from (i.e., "with attribution").

"Not for attribution" typically means that the information a source told the reporter can be quoted but that the source can be identified only in general terms, such as "a government official."

"On background" is sometimes used as a synonym for "not for attribution," but it can also mean that information from the interview can be used in the story, but direct quotes may not be used.

"Off the record" means that nothing a source said can be used in the story and that the source cannot be identified, even in general terms. (This does not prevent the reporter from getting the same information from another source on the record, in which case it can be used.) For a remark to be off the record, it needs to be clear *before* the remark is made that what follows will be off the record. In other words, anything said to a reporter is on the record unless specified otherwise in advance. If you're interviewing a source with little media experience about a sensitive subject, do take the time to explain this convention.

## "So When Can I Read Your Draft?"

While it is good journalistic practice to check facts with sources, many of them—especially scientists accustomed to collaborative writing and the process of peer review—will ask you to run the entire article past them before publication. In academic and corporate settings, where the science writer and the major sources work together, that's standard practice. But most journalistic publications won't let you share prepublication drafts with sources, as it threatens reporters' independence from those sources. At some publications, the practice is banned outright. Others will allow sharing short passages, perhaps up to a few paragraphs, of technical material for fact-checking. Check your publication's policy with your editor, and when in doubt, don't do it.

There are different ways to explain this journalistic norm to your source. First, there's the practical matter of time: even if reporters wanted to show a draft to every source in their stories, most deadlines wouldn't leave them enough time to do so. You can also point out the general importance of journalistic independence: "I'll say something along the lines of, 'Well, city reporters don't run their stories past the mayor'—not in a snarky way, but to explain, by analogy at least, how journalism works," says SciLancer Jennifer Cutraro. Finally, you can make it clear to your sources that you are interested in accuracy and are a professional in your job just as much as they are in theirs, says SciLancer Hillary Rosner. "I usually try to make the point that I respect their work and defer to them on the science, and they need to do the same to me on the journalism," Hillary says. "And I explain to them that I've got a stake in getting it right, too, since otherwise I'll look bad and the next scientist I call might not want to talk to me."





## SCI LANCE SAYS . . .

- Before you start reporting, **make a reporting plan** that includes names and contact information for key sources and core questions you need to answer during your interviews.
- When you approach potential sources, **provide basic information** about your publication, your assignment, how long you expect the interview to take, and your deadline.
- Do **enough interview preparation** so you don't waste a source's time with too-basic questions, but not so much that you lose your own sense of the big picture.
- Make a **list of questions**, even if you have only five minutes to spare before an interview.
- During an interview, remember that **you are in control**. Keep the conversation as natural as possible, but don't hesitate to ask for more or less information if necessary.
- Be polite, but when sources are evasive or reluctant to talk, be **persistent**.
- Even when you're thoroughly prepared for an interview, **never assume you know everything**: ask the questions you think you know the answers to as well as the ones you don't.
- When you start hearing the same points repeated during interviews, and your sources start recommending sources you have already spoken with, you're **nearing the end of your reporting process**.
- Once the article is written and edited, make sure that it's completely correct by **thoroughly double-checking all your facts**, even those within quotes.
- **Don't show unpublished drafts to sources** unless your editor or publication requires you to do so.

5 (Continued)

history, an unanswered question has driven your protagonist for

but more field time usually

vesting in, even taking some big one" carefully, and it can say you might never imagine.

like years to gestate.

## Chapter 7

### *Sculpting the Story*

By Michelle Nijhuis

Whether you're researching a news brief, producing a radio short, or turning six weeks of Antarctic science into a feature story, you'll gather loads more material than will fit within your assigned word limit. Writing or producing nonfiction of any kind requires you to whittle that stack of research material down to its essential elements, organize those elements within a story structure, and communicate them in a way that makes sense to your audience. And you have to do it on time, correctly, with a minimum of crying.

But don't fear. As difficult as the process can be at times, I also find it fun and uniquely satisfying. There's nothing quite like seeing a strong story emerge from a chaotic pile of information. And the act of writing is fascinatingly complex, intensely individual, and not entirely rational—the process itself varies wildly from writer to writer, and every writer I know has a beat-up chair, or time of day, or obscure type of pencil that they think helps them do their best writing. (For the record, I have a favorite teacup. Don't even *think* about touching it.) So while this chapter can't hope to be comprehensive, I'll cover some general strategies that help me and others through the process of science story sculpture. I'll focus on writing, the medium I'm most familiar with, but most of these methods can be applied to audio and visual work as well.

#### Write Before You Write

Ideally, you'll start thinking about writing during the pitching stage. The best pitches, as SciLance member Thomas Hayden mentioned in Chapter 3, not only describe a great story but also propose a preliminary



structure for it. A strong feature-story pitch will, for instance, identify a potential main character or characters and outline the journey those characters have taken—or might take during your reporting.

Even if your story is a three hundred-word news brief with a boilerplate structure, it's worth taking a minute, during the pitch stage, to consider and articulate what your story is really about. Not the noun, the verb. It's not enough to say your story is about, say, salmon. Is it a story about bears that eat salmon? Salmon that eat bears? The scientist who discovered the rare bear-eating salmon, and her struggle to be believed?

Seriously: For any story I work on, no matter the length, I try to come up with a full sentence (okay, maybe two) during the pitch stage that captures my best guess at the core action. I might eventually use that sentence in a headline, or it might become part of my lede paragraph (see "Story Anatomy" on p. 84 for more on story structure terminology). Then again, I might never use it in print. And I almost always tweak it during my reporting; after all, if we knew exactly what our stories were about from the outset, we wouldn't have to do any reporting. But I do use that sentence as a lodestone as I do my research. Reporting takes all of us on fascinating detours and into dead ends, but a clear focus will lead you back out, helping to remind you what's relevant and what's not.

When SciLancer Kendall Powell profiled a father-son pair of climate-change researchers for *Nature*, she found that while the duo were viewed by many as pesky agitators, they were, in person, the "nicest guys you'd ever want to meet." She struggled to portray that contrast until she and her editor drafted what journalists call the "dek" or (if you're a Brit) "standfirst" of the story, the subtitle that runs under the main headline. "The two Roger Pielkes can be obstructionist pains in the neck, say their colleagues," the dek read. "So why is this likeable father-son pair such a welcome addition to the debate on global climate change?" That pithy summary not only guided Kendall as she wrote the story, but also ran as the dek on the published piece.

Another step I take, very early in the process, is to figure out what type of story I'm going to tell. We all recognize archetypal narratives; they're the story types that occur over and over again in books and movies and campfire tales around the world. An old dictum, often credited to Leo Tolstoy, is that all great literature is one of two stories: either a man goes

on a journey or a stranger comes to town. (And those two stories are, of course, just different views of the same story.) Christopher Booker's *The Seven Basic Plots* examines the classic plots of Comedy, Tragedy, Rags to Riches, Voyage and Return, Overcoming the Monster, Rebirth, and Quest.

Sticking too closely to an archetype creates a cliché, of course, and can distort the facts. But straying too far from one of these familiar story types risks alienating your audience. These archetypes are the patterns we all unconsciously use to identify a story as a story—without a supporting narrative, a story is likely to collapse into nonsense. Even the most experimental fiction or drama usually draws on story archetypes, if only to rebel against them. I've found that putting some thought into possible archetypes at the beginning of my reporting helps me recognize useful scenes during my research, structure my first draft, and eventually find that sweet, surprising spot between cliché and confusion.

Science stories are often told as Quests of some sort, but many can also be told as Overcoming the Monster stories, Rags to Riches, or even Comedies. Remember that the "hero" doesn't have to be a person: some very powerful science stories have used animals, diseases, and even cell lines as main characters. Consider a few possible approaches, and of course always be open to changing your strategy as you research.

As SciLancer Douglas Fox described in the previous chapter, it's always useful to take advantage of downtime, in the field or at home, to organize your notes and begin to sketch out your story. During that time, I also scrutinize articles from the publication I'm working for. Even if I'm already familiar with the publication, I take another look at its overall tone and at the story structures, ledes, and kickers it favors. I also look at how its writers build scenes and bring in other sources, and whether they use the first-person voice. That way, I have the publication's particular approach fresh in my mind as I report.

### **Draw the Blueprint**

When I return from my field research, or, with a phone story, when I sense that I'm about two-thirds or three-quarters done with my research, I will—assuming I have enough time—type up my handwritten notes, fully or partially transcribe my recorded notes, and read everything I've



collected so far. Many of us find software programs such as Scrivener, DEVONthink, and OneNote useful for storing and sorting notes and background information at this stage. SciLancer Helen Fields uses OneNote, but when it's time to organize her notes for writing, good old paper works best for her: "I print out all my notes in tiny print, two columns to a page, and reread them, writing short summaries in the margins and marking promising quotes," she says.

After Hillary Rosner, another SciLancer, reads her notes, she tests out the highlights on willing friends. "I like to talk about the story informally with a friend or two, because I think that the details you select when telling someone a story over dinner should be a good guide to what's going to end up in your article," she says. "Sometimes I have no idea what these details are until they're out of my mouth."

At this stage, I start outlining my story. Ideally, the steps I talked about in the previous section have already helped me start thinking in scenes: I'll have had an eye out for a natural climax to the story, and for scenes that might start and end the piece. In my outline—usually scrawled on an envelope, definitely not as formal as the Roman-numeral version from middle school—I'll make a list of those potential scenes, either scenes I witnessed or scenes from the past that I know will be important to reconstruct. I'll also list bits of ideas, context, history, and anything else that I think needs to be included in the piece.

Most writers have developed their own approach to outlining: "I don't usually do an official outline, but I often break a story into various sections and come up with little captions for each section," says SciLancer Cameron Walker. (Magazines generally manage their readers' attention spans with subheadings, so it can be useful to divide your story into these sections early on.) Douglas, for his part, uses large pieces of blank sketch paper to map out his stories with boxes and arrows, including interesting scenes, natural breaks in the narrative that might require a subhead, and key facts, insights, ideas, and characters.

Many writers use their original proposal as a starting point for their outline. You may find, after delving deep into research, that your proposal needs to be substantially revised, or you may see that your earlier view of the story holds up surprisingly well. Either way, returning to the proposal can remind you of what your editor is expecting, and clarify your view of the story's theme. (See "A Tale of Two Query Letters" on p. 36.)



## Build the Skeleton

There are several classic story structures in journalism (see “Story Anatomy” on p. 84) but all of them are chronological in some way. If you already have a story archetype in mind, and you’re using a chronological structure, the order of events in your outline should be fairly obvious. (Some stories have two or more intertwined narratives, in which case the structure may be more complex, but each narrative is still usually chronological.) In general, the biggest decisions you’ll have to make are where to begin and end your story.

Writers like to fret over what we call the lede sentence, paragraph, or section of a story, and with good reason. We all know that readers aren’t required to read our stories, and often the first few lines will determine if readers go further. It’s tempting to choose the grabbiest, sexiest scene you have as a lede, but be cautious; ledes have to not only get readers’ attention but also prepare them for the rest of the story, so the most exciting scene you have might not necessarily have the right content or tone. It’s also wise to save some of your most dramatic material for later on in the story, using it to draw readers through your piece.

As you outline, don’t let the specific language of the lede hold you up. If you start fiddling, try SciLancer Stephen Ornes’s technique: “I write a dummy lede—basically, the most banal and uninteresting introduction to the piece—just to get it over with temporarily. Then, after I’ve written about half the first draft, I can go back and improve the lede.”

Most feature stories also have what journalists call a “billboard” or a “nut graf”—a sentence or paragraph, usually at the end of the opening section—that hints at what the story is about. Resist the urge to summarize your entire story in the nut graf. As veteran journalist and teacher Jacqui Banaszynski has said, the nut graf shouldn’t give away the ending of your story, but simply tell the reader what kind of boots to put on for the journey.

While we obsess about beginnings, we often don’t spend enough time sculpting our endings, or kickers, and that’s too bad. Endings are our last word to the reader, and often what readers will remember most. I like to end with a small scene that serves as a coda to the rest of the story, but there are infinite possibilities: consider powerful quotes, pithy observations, or just a strong statement in your own voice. “I think the kicker is just as structurally important as the lede,” says SciLancer Jessica

Marshall. "When you know the kicker from the beginning, you know where you have to end up, and that is just really, really helpful." (Writers are especially prone to clichés in both ledes and kickers, so be wary. If a line comes to mind suspiciously quickly and easily, it might well be a tired phrase.)

The work of outlining doesn't end with the lede and the kicker. Internal ledes and endings are important, too. When outlining my stories, I often break them up into five or six sections, as Cameron does, and choose a possible lede and ending for each section. That practice reminds me that just like the story as a whole, every section needs to draw readers in and usher them out. It keeps me from letting things bog down in the middle of a draft.

Once I've sketched an outline, I'll try to ease the important ideas and bits of background into the scenes. Not all will fit, but the more information that can be communicated within a scene, the more smoothly a story will flow. I cut and paste quotes into each scene, add in pieces of description and phrases from my notes, and make note of questions and uncertainties. Stephen takes a chemist's approach: "I drop in the best quotes from my interviews and the best lines from my notes so I know where they'll go. Once the outline is supersaturated, I wait for something to crystallize."

At this point, I often stop and do some more reporting, as I invariably find some factual and conceptual holes. It's a great time to ask more focused, detailed questions of your sources. "I love the feeling of the second round of interviews," says SciLancer Emily Sohn. "I know exactly what I need to learn, and I can avoid asking all those general, vague questions I asked at the outset."

### Now Go!

It's certainly possible to just start writing without the sort of planning and outlining I've described. But when I write without a plan, I find that it's terribly tempting to jump straight into micro-level work, to start playing around with vocabulary and punctuation before I've figured out the main point of my story.

When I have enough of a structure in place, and enough information on hand, I find I feel much more comfortable just *telling* the story—that is, letting my personal writerly voice, or the combination



of my voice and the publication's voice, take the floor and go. Especially with a long, complicated story, I want to feel in command of the information, not the other way around. It's that feeling of authority that makes my voice trustworthy. I sometimes have a moment, usually toward the end of the first draft, when I feel like I've almost physically flipped my research on its back and wrestled it to the floor. That's a good feeling.

But even as I take charge of the facts, I keep in mind that the reader and I are on a joint expedition into new terrain, one that evokes excitement and uncertainty, humility and awe. I try to use my voice to express those emotions, too. "The goal is to show how some new discovery looks to an interested outsider, writing for other interested outsiders, using metaphor instead of mathematics," writes longtime *New York Times* contributor George Johnson, author of *The Cancer Chronicles* and other books. "I want the reader to feel that we are both on the same side—outsiders seeking a foothold on the slippery granite face of a new idea."

With that delicately balanced stance in mind, I start with the outline I've developed—that saves me from facing the dreaded blank screen—and work through it, using it as raw material to build full sentences and paragraphs. This is when I let myself start having fun with description, analogy, metaphor, and rhythm (created by varying word, sentence, and paragraph lengths). These tools are especially important when you have to step back from your narrative and do some explaining. Interesting language, good quotes, and humor can help these necessary but often-dull sections—the vegetables, or what a radio-producer friend of mine calls the "sawdust sandwich"—go down smoothly.

As with outlining, I try to move quickly through my first draft, saving the finer details for revision. But I do pay attention to the word order within sentences—the most emphatic words go at the end—and to the transitions between sentences and between paragraphs. Ann Finkbeiner, who runs the graduate program in science writing at Johns Hopkins University, suggests smoothing transitions with what she calls her "AB/BC" rule: the end of each sentence should echo the beginning of the next, as in the example below.

Astronomers' biggest problem has been that they have to see stars through the earth's distorting atmosphere. The atmosphere is effectively a moving stream made of patches of varying temperatures.

Each temperature patch sends incoming starlight off in a different direction.

"This rule shouldn't be overdone and works best for descriptions of some little machine," Finkbeiner says. "But every time I get stuck in a paragraph and muddled about where I'm going, the AB/BC rule saves me." With time, AB/BC becomes second nature.

Many writers work without notes at this stage, filling in the details later. "I'm a big proponent of 'TK'—journalese for 'to come,'" says Hillary. "I use it for everything from explanations I can't be bothered to write yet, to details I can't remember and need to double-check, to quotes I need to find in my notes, to bits I see are missing and need to be further reported." And remember that you don't have to write your first draft from beginning to end. Maybe you've already talked about a sidebar with your editor: you can start with that, using a smaller, less intimidating task to get you going. Or work on a basic explanatory section that you know you'll need, using it to move past the horror of the blank screen before you tackle the challenging work of crafting the perfect lede.

Whatever you do, don't let the voice of your internal critic—and yes, we all have one—kill your momentum. At this point, you've earned your authority on your subject. Use it. "How do I stay sane while I'm writing? Coldplay and jellybeans," says Helen. "Seriously, I usually just try to keep plowing through and hope that eventually I'll end up with something. Even if it sucks, it's so much easier to revise than write."

### Get Some Distance

While you need to turn off your internal critic while you write your first draft, you need to turn it on again before you hand in a draft to your editor. Once I finish a draft, I try to get some distance from it so that I can see it more clearly. If I have time before my deadline, I'll take a week away; if not, I'll take a shower before I reread it. That way, I can better spot awkward or confusing language, clichés, and slow sections that need to be cut, shortened, or spiced up.

Even changing locations or printing out the story can refresh your eye. "If I have a couple of hours to work on a story, I always end that time by printing out whatever I've written," says SciLancer Alison Fromme.



"Then, when I return to it, I read that printed copy and mark it up like crazy before I turn my computer back on."

Showing drafts to spouses and friends can be tricky, and writers have a wide variety of approaches. Some use their spouses as their very first readers; others wait until their second draft, or even later, to show the story to anyone but their editor. (See Chapter 17 for the pitfalls and benefits of sharing writing with spouses and partners.) My husband—who's not a journalist, but is a close reader and good critic—is usually the first person to read my drafts, and I almost always show early drafts to one or two SciLancers or other writer friends. These editing friendships can take time to develop—the exchange of tough, honest criticism requires a lot of trust on both sides—but when they mature, they're invaluable.

Especially when time is short, it's tempting to skip this stage and just get the story off your desk and into your editor's hands. But sending your internal critic on vacation is risky business. Consider this clearly unsupervised lede from an *Esquire* science story, aptly described by the science writer Carl Zimmer as a "noxious martini of mixed metaphors topped with an olive of ridiculous hype":

First thing that happens when you have a heart attack, an unlucky part of your heart turns white. The blood's stopped pumping to that spot, so it becomes pink-speckled bloodlessness, coarse and cool like grapefruit gelatin.

Next comes the back-alley bruise of organ death. The cells turn from white to black, all shitted up like a body pit in a war, two weeks after. Suddenly, soldier, this part of your heart is dead. . . . But the dead part can't fix itself. And the healthy part can't throw it a bloody rope. So the whole heart begins to die. . . .

But now look here, a woman. She is a pretty lady of Pakistani heritage who highlights her soccer-mom layers, which you don't expect from a lab-worn doctor-lady. Hina Chaudhry believes she can do what the body can't: fix the dead parts.

Yikes. So before you submit that draft, enlist your internal editor—and, for good measure, some trusted friends and family. They won't save you from the formal editing process, but you can count on them to throw you a bloody rope.

## Story Anatomy

**Classic newspaper style, often called *Associated Press* or inverted-pyramid style:**

**Headline (or "hed"):** Short and direct, with active verbs. Gives a clear sense of the story.

**The news lede:** What's new? Who's involved? Where, when, and how did it happen?

**Most important point:** Fleshes out the lede and its implications.

**Substantiating points,** in decreasing order of importance (so that space-squeezed editors can shorten the story quickly and easily).

**Background/context/reactions,** in decreasing order of importance (ditto).

**Classic magazine-feature style, sometimes called *Wall Street Journal* style:**

**Headline:** Can be more whimsical or evocative, but should be catchy, and for online stories, should include searchable terms.

**Dek/Standfirst:** The "subtitle" to the headline. Gives a clear sense of the story in a line or two.

**Lede:** Opening line, paragraph, or section that lures the reader into the story. Often includes characters or quotes. Can be somewhat tangential to main story, but should match the tone and style of both the publication and the rest of the story. Can be a long anecdote that introduces a character or characters, or can be extremely simple. SciLancer Emily Sohn once led a *Los Angeles Times* health story with two words: "Ah, salt."

**Billboard/nut graf:** Line or paragraph, usually at the end of the first section, which partially summarizes the story. Identifies the main news and its significance, suggests or states where the story is going, introduces conflict if any. In science news features, billboards are often variations on



"In a new study published this week," or "Scientists have long thought X. Now, they report Y."

**Body 1:** Context, history, or explanation. Can loop back to the lede to tie up loose ends, or loop forward to start telling the story. May include quotes, often introduces or fleshes out characters.

**Body 2:** Carries the story forward. Provides "what happened" information, substantiates claims, fleshes out characters and conflicts. Usually contains a quote.

**Etc. . . . :** This form is expandable, at least up to a few thousand words.

**Kicker:** A firm, crisp ending that ties the story together and leaves a sense of completion. Often refers back to the lede, or spins forward to implications or next steps in an unresolved story.

### Variations on classic magazine-feature style:

**Pure narrative:** A story told entirely within a series of linked events, without the writer's stepping in to add context or explanation. (In personal narratives, the writer becomes a character in the story.) Often requires deep research to accurately reconstruct characters' thoughts and actions. A classic science-story example of pure narrative is the Pulitzer Prize-winning "Mrs. Kelly's Monster," by Jon Franklin, a moment-by-moment reconstruction of a brain surgery told from the perspectives of surgeon and patient.

**Layer cake:** A feature story that alternates between sections of narrative and explanatory sections of context or history. Pure narratives are very difficult and time-consuming to produce, and not every story lends itself to the form or to the extensive reporting access required. So when editors say they're looking for "narrative" stories, they often mean that they're looking for layer cakes—stories knit together by narrative, but not entirely dependent on it.



## SCILANCE SAYS . . .

- The writing process starts well before you sit down at your computer. Ideally, you'll start thinking about the structure of your story **during the pitching stage**.
- Early in the process, **come up with a full sentence** that captures your best guess at the core action.
- Also early in the process, **figure out what type of story you're going to tell**. Does it echo an archetypal narrative?
- When you return from your reporting trip, or near the end of your first round of phone calls, **organize your notes**—with digital tools, analog tools, or a combination of both.
- Try out what you consider **the best details and anecdotes** on willing friends.
- Before you start writing, **outline your story as thoroughly as possible**. Assuming your story will be told chronologically, decide where it will begin and end.
- Use your outline as **the raw material of the sentences and paragraphs** of your first draft. Turn off your internal critic, and write quickly. Allow yourself to play with description, analogy, metaphor, and rhythm.
- If possible, **get some distance** from your first draft before revising.
- When you return to your draft, look for awkward or confusing language and clichés. Look for points where your story slows down, and consider shortening, cutting, or spicing up those sections.
- When you do begin revisions, consider **asking a family member or trusted writer friend to read it**. Are their take-aways the ones you hope your eventual readers will have? If not, why not?



## SELECTED RESOURCES

*Writing about writing means standing on the shoulders of giants. Here, we list some of our sources of inspiration—and some places to dig more deeply into the topics covered in this book.*

### Part I: The Skilled Science Writer

#### Chapter 1: What Makes a Science Writer? by Alison Fromme

The National Association of Science Writers, [www.nasw.org](http://www.nasw.org), is the nerve center of the science writing community. New science writers can find information, advice, mentors, and colleagues through the NASW website and at the organization's annual meetings.

ScienceOnline, [www.scienceonline.com](http://www.scienceonline.com) and [www.scienceonlinenow.org](http://www.scienceonlinenow.org), organizes a popular annual gathering (and other events throughout the year) for science bloggers, journalists, students, educators, and others interested in communicating science online.

Other organizations that may be of interest to science writers include the Society of Environmental Journalists, [www.sej.org](http://www.sej.org); the Association of Health Care Journalists, [www.healthjournalism.org](http://www.healthjournalism.org); Investigative Reporters and Editors, [www.ire.org](http://www.ire.org); and the American Society of Journalists and Authors, [www.asja.org](http://www.asja.org).

Find a directory of US courses and programs in science journalism and science communication at [dsc.journalism.wisc.edu](http://dsc.journalism.wisc.edu).

The Poynter Institute, [www.poynter.org](http://www.poynter.org), a nonprofit organization dedicated to professional education for journalists of all types, offers a wide range of courses at its St. Petersburg, Florida, campus, at selected locations nationwide, and online through its News University, [www.newsu.org](http://www.newsu.org).

The *Columbia Journalism Review*, [www.cjr.org](http://www.cjr.org), has been reporting on the state of journalism in the US and beyond for more than fifty years, and the

perspectives in its pages are well worth the price of a subscription. The Observatory, an online *CJR* column, takes a close look at science journalism. Similarly, the Knight Science Journalism Tracker, [ksj.mit.edu](http://ksj.mit.edu), posts a daily critique of recent science reporting.

### *Chapter 2: Finding Ideas by Emily Sohn*

In "Progression," a 2011 article for the *New Yorker*, master nonfiction writer John McPhee suggests taking a deeper look at subjects that interest you, even if you don't have a clear idea yet where they'll lead. "For nonfiction projects, ideas are everywhere," he writes. "They just go by in a ceaseless stream."

For inspiration of a more general sort, I often turn to Annie Dillard's *Pilgrim at Tinker Creek*. It reads like a long ode to nature. At its heart, it is simply about the details the author notices in the world around her. It goes to show that anything can become a story if you look at it closely and write about it well.

### *Chapter 3: Making the Pitch by Thomas Hayden*

The weird art of pitching is not well codified. Though general references for freelancers, such as *Writer's Market*, list the basic ingredients of a good pitch, magazines and individual editors often have their own preferences. The best way to learn is to study examples of successful pitches: an excellent selection of science-oriented magazine pitches is available at The Open Notebook, [www.theopennotebook.com](http://www.theopennotebook.com). The American Society of Journalists and Authors, [www.asja.org](http://www.asja.org), also maintains a database of successful pitches by members. The detailed submission and writing guidelines at *ScienceNOW*, [news.sciencemag.org/pitching-sciencenow.html](http://news.sciencemag.org/pitching-sciencenow.html), are essential before pitching this online news arm of *Science* magazine. They also serve as a reliable guide to pitching science news stories anywhere.

### *Chapter 4: Getting the Story, and Getting It Right by Andreas von Bubnoff*

*Reporting and Writing: Basics for the 21st Century* by Christopher Scanlan is a great resource for beginners.

*Writing to Deadline: The Journalist at Work* by Donald Murray covers the newswriting process from beginning to end. Written in an accessible, lively style, it includes case studies and interviews with working journalists.



*The Investigative Reporter's Handbook: A Guide to Documents, Databases and Techniques* by Brant Houston and Investigative Reporters and Editors, is an invaluable guide to investigative work, and useful to reporters of any stripe.

*The Craft of Interviewing* by John Brady discusses the interviewing process in great detail.

*The Fact Checker's Bible: A Guide to Getting It Right* by Sarah Harrison Smith outlines the typical fact-checking process at major magazines. Useful for learning to fact-check your own work, or for smoothing your relationships with fact-checkers.

#### Chapter 5: By the Numbers: Essential Statistics for Science Writers by Stephen Ornes

Read the *Health News Review*, [www.healthnewsreview.org](http://www.healthnewsreview.org), for a critical look at current coverage of health research, including the use and interpretation of statistics by the media.

STATS, [www.stats.org](http://www.stats.org), a group of statisticians based at George Mason University, can provide an expert voice for your news story or help you with background statistics questions. Click on the "Are you a journalist?" link at the top of their web page.

For a deeper look at the misuse of numbers in public discourse, read *Proofiness: The Dark Arts of Mathematical Deception*, by New York University journalism professor Charles Seife.

#### Chapter 6: Excavating the Evidence: Reporting for Narrative by Douglas Fox

A good starting point for improving, expanding, or polishing your narrative skills is *Telling True Stories: A Nonfiction Writers' Guide from the Nieman Foundation at Harvard University*, an anthology of short essays on craft by well-known narrative writers. *You Can't Make This Stuff Up*, by Lee Gutkind, provides strategies, insights, and examples to help readers understand and create powerful nonfiction writing.

The Open Notebook, [www.theopennotebook.com](http://www.theopennotebook.com), mentioned above, publishes interviews with the authors of outstanding science stories, with an emphasis on narrative.

Find wonderful examples of new and old long-form journalism and great discussions about narrative craft on the Nieman Storyboard, a project of the Nieman Foundation for Journalism at Harvard: [www.niemanstoryboard.org](http://www.niemanstoryboard.org).

### Chapter 7: Sculpting the Story by Michelle Nijhuis

I'm a habitual collector of how-to-write books, and a few that I regularly pull down from my shelf are: *Telling True Stories*, mentioned above; *A Writer's Coach: An Editor's Guide to Words That Work* by Jack Hart; and *The Elements of Story: Field Notes on Nonfiction Writing* by Francis Flaherty.

*Follow the Story* by James Stewart is a good in-depth look at what's often referred to as the *Wall Street Journal* feature structure. *The Sound on the Page* by Ben Yagoda is a terrific exploration of writers' personal voices. I also like to check out the annual *Best American Magazine Writing*, *Best American Science and Nature Writing*, and *Best American Science Writing* anthologies for inspiring examples.

John McPhee, also mentioned above, is a past master of structure. You can read his books, read his many articles in the *New Yorker*, or read about his process in a lengthy 2010 *Paris Review* interview with journalist and former student Peter Hessler, available in full at [www.theparisreview.org](http://www.theparisreview.org).

### Chapter 8: Working with Editors—and Their Edits by Monya Baker and Jessica Marshall

In the classic writing guide *On Writing Well*, William Zinsser publishes a couple of pages from a draft of the book, showing how he was able to trim and improve his own writing. Zinsser's book is a great place to hone your self-editing skills. Also read "Why William Zinsser's Writing Book Is Still Number One," an ode to the book and its advice on editing, at [www.poynter.org](http://www.poynter.org).

Other insights into the writer-editor relationship and the editor's world can be found in *The Art of Making Magazines: On Being an Editor and Other Views from the Industry*, edited by Victor S. Navasky and Evan Cornog; *Coaching Writers: Editors and Writers Working Together Across Media Platforms* by Roy Peter Clark and Don Fry; and *The Elements of Editing: A Modern Guide for Editors and Journalists* by Arthur Plotnik.

And finally, "The Manifesto for the Simple Scribe," a collection of mantras by Tim Radford, former science editor at *The Guardian*, will make you smile—and help you turn in the best possible product to your editor. Available at [www.guardian.co.uk](http://www.guardian.co.uk).

### Chapter 9: Going Long: How to Sell a Book by Emma Marris

Ready to write a book? First try reading *The Forest for the Trees: An Editor's Advice to Writers* by Betsy Lerner and *Thinking Like Your Editor: How to*