DON'T BE SUCH A SCIENTIST
Talking Substance in an Age of Style

by
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Don't Be So Literal Minded

Let's talk about the "science" of communication. Imagine that it's 2004 and you are at the Super Bowl and happen to be backstage just before the halftime show. You turn around and there's Janet Jackson, adjusting her black leather outfit. You say to her, "Hey, Janet, I'll give you a million dollars if you'll let me write my slogan on your breast." She recognizes you from high school (forgot to mention, you were best friends back then), giggles, says, "Sure, why not," and pulls back the flap over her right breast. You pull out a felt-tip pen, write "Save Coral Reefs" in big letters, and then, ten minutes later, when Justin Timberlake rips off her boob cover and all the cameras on the entire planet zoom in, you will have scored the greatest environmental communication coup in history. It's nice to talk about the "science" of messaging, sound bites, and focus groups, but . . . where would all that fit into what you just staged?

The Shortest Distance between Two Points
What is the shortest distance between two points? You know the answer. But what's the most effective pathway to take in going between those two points? Is it always a straight line? If you're a scientist, you'll generally say yes to this. Why waste time and energy?
This is the way scientists tend to think. Because they are so analytical and caught up in their heads with the straightforward logic of the world, they tend to see things as fairly simple and direct. And if you want a good contrast, just think of posing the same question to an artist. The last thing in the world an artist wants to do is follow a straight line—how boring.

When I told my old science friends about the acting teacher screaming her head off at me that first night, their response was simple and literal-minded. They said, “She’s insane. Just tell her she’s incompetent and quit the class. You can find more level-headed instructors.”

Well, yes. I could have. But . . . it just wasn’t that simple. Obviously. I hung in there and went the distance, and here I am, a decade later, swearing by her teachings.

Here’s an anecdote to illustrate this literal-minded phenomenon of scientists. When I got ready to hire an editor for Flock of Dudes, I gave my rough cut of the movie to a German friend, Pascal Leister, to consider. He called me up and said, “I only had to watch ten minutes to know exactly what this story is about. It’s about the frustration scientists have in not being understood by the general public. I know this because my father is a nuclear energy engineer in Germany. I grew up listening to his frustration. He would walk around the house saying, ‘Why don’t they get it? We have all the data to show that nuclear power is completely safe nowadays, yet people just don’t want to listen to it.’”

He went on to explain that the Green Party had done such an effective job of creating a fear-based communication campaign (reaching down into people’s guts) about nuclear energy that scientists couldn’t get the public to listen to their information showing that the actual risks are minimal. The result is that, while France is tripling its commitment to nuclear power, Germany is on course to get rid of it in a little over a decade.

Dreamland for Scientists
So the poor nuclear scientists are stuck with their literal mindedness. They think that if you see a member of the public, all you have to do is explain the facts of nuclear power and assume that the person will listen and think. If only it were that simple—that would be a dream come true.

To illustrate the problem of literal mindedness among scientists, I offer three examples, which I label “dreams”—as in “You’re dreaming if you think it’s this simple.”

Dream One: Instant Messaging
I’m not talking about using your thumbs to send funny text messages back and forth on your cell phones. I’m talking about the delusion of literal-minded people that communicating to the mass audience is as simple as blurt out what you have to say—that you can put together your “message,” say it, and people will instantly get it. Let me tell you about one of my run-ins with this. It’s a story of people wanting to take an elegant message and make it disappointingly dull.

When marine ecologist Jeremy Jackson tracked me down in 2001, we began our film collaboration by making a short film on ocean conservation that was well received by the environmental crowd. Then, in the spring of 2002, he began telling me about a new term, “shifting baselines,” coined in the mid-1990s by fisheries biologist Daniel Pauly. The term refers to the idea of losing track of the initial conditions of nature to the point where you can no longer accurately say how far nature has been degraded. Jeremy kept explaining it to me and saying, “Don’t you think it’s a very broad concept—almost the same as ‘lowered standards’—that everyone who has lost track of the quality of their lives can connect with?”

I felt that was true, plus the term itself had a cool “ring” to it. And the clincher came when I explained it to my former film school friend Kevin Norton, who was working at a movie production company. He has no background in science, the environment, or any of the worlds I live in. I told him about it one evening at his apartment. He didn’t seem to show any interest, and I just figured I had misfired.

But that night I got a call from him at 3:30 a.m. He was on his way home from a party, sounding happy, and said, “Hey, you know that term you told
me about—I was just at this party and told these three hot chicks about it and they started saying, 'Wow, I need that term for my dating life—the guys I'm going out with these days are such schlubs, I've forgotten about how cool the guys I used to date were—I've shifted my baseline!' and they ended up telling everybody else and the whole night turned into a shifting baselines party!"

He called again the next day and said, "Hey, the guys here at the production company say you need to come over here and make a shifting baselines film about how things have changed here because nobody can remember the old days when they made really good shows—they've shifted their baseline!"

And thus the Shifting Baselines Ocean Media Project was born. The concept had been on tenuous ground prior to those two phone calls. It had been just Jeremy and me having a hunch that this could work as a communications theme. But Kevin's two phone calls removed the doubt for me. Not because it was an extensive scientific survey complete with focus groups and messaging analysis (like the Janet Jackson stunt), but rather because I could just hear it in his voice, and I sensed it as well. Sometimes that's better than a bunch of polling data. It's the old gut versus the head—which are you gonna trust?

So we scored our first $50,000 donation to begin building a mass communication campaign around this theme, we were on our way, and then ... I had a rather unfortunate meeting with a "communications guru."

I'll leave this character nameless, but suffice it to say he had the environmental community at his feet, believing he was their visionary communications swami. He charged huge sums of money to conduct workshops where he pontificated on how to "message" and do other communications things that environmental groups yearn to do.

A friend knew him, thought he was great with mass communication, and figured the two of us would be a natural match. After my friend set us up to meet and told me more about this "guru" I, too, thought we would be a natural match. When I e-mailed Mr. Guru our newly developed Shifting Baselines materials, including my Sunday op-ed piece for the Los Angeles Times, which had already been accepted, I thought we would be a natural match. But five minutes into the meeting with him, I realized that, in fact, we were not anywhere close to a natural match.

He began with the term "shifting baselines," which he very, very confidently said was "too technical, too jargony, too sciencey." He kept saying, "Of course, I know what it means, but most people wouldn't." He warned me that the final report of the Pew Oceans Commission would be coming out in a few months and would be sweeping the nation's media. He said that our little communication effort would only end up being "noise" to the general public that would just confuse them about what's going on in the oceans.

I kept trying to tell him it was already a done deal—we already had the first infusion of funding. So he ended the meeting by saying, "If you feel you have to do this thing, my one suggestion is that you change the name of the campaign to something more clear, like, maybe, 'The Oceans Are in Trouble' campaign. With that title, you'll never have anyone end up confused over what you're talking about."

Well, do you think that a year after creation of "The Oceans Are in Trouble" campaign, anyone would perceive it as different from all the hundreds of other "Save Our Seas" and "Protect the Oceans" campaigns? When a field gets crowded, there's a need to create a unique identity in order to stand out. That doesn't happen by making a plain, dull statement.

By then I had all sorts of friends around Hollywood talking about how much they liked even just the sound of "shifting baselines" as a name. To jump to the end of the story, seven years later the Shifting Baselines Ocean Media Project is still going strong, having produced a series of successful television ads, Flash videos, and short films.

But also, a little side note that really brings the syndrome to life. The following year I organized a stand-up comedy contest with my buddy Jeremy Rowley of the Groundlings. We got to thinking about how general this theme of "lowered standards" is for stand-up comics (we've all heard
countless routines from comics talking about how far down their standards have dropped for dating, shopping, dressing, and countless other aspects of their lifestyles.

We ended up recruiting about fifty up-and-coming stand-up comics to deliver their best three minutes of material about lowered standards and shifting baselines. Wanting some ethnic diversity, I asked my friend Ifeanyi Njoku, a Nigerian filmmaker (and, years later, costar of my movie *Sizzle*), to recruit some African American comics as contestants. He called me a few days later and said, “It’s not gonna happen—they say your environmental theme is ‘too white’—they’re all inner-city folk and can’t relate to saving the oceans.”

This was a disappointment, so I asked him to take a video camera and record what they had to say. He and his comic actor friend Alex Thomas (also a star of *Sizzle*) went down to Crenshaw Boulevard, in the heart of South Central Los Angeles, and walked up to randomly chosen African American folks to quiz them about this. Ifeanyi and Alex tossed out keywords and got all sorts of hilarious responses—especially for the word “Greenpeace”—for which people replied, with zero hesitation (not as if they were trying to craft a clever answer), “Marijuana,” “The chronic,” “That bomb-ass shit that knocks you on yo’ ass.”

When they asked people, “What comes to your mind when I say the term ‘shifting baselines’?” the responses were clear and immediate—again, no confusion or hesitation. The first guy said, “That’s like in rap music when you shift the bass line.” The second guy said, “Oh, that’s like in basketball when you drive the baseline.” And the last guy, standing out in front of a fast-food joint, said, “Well, you see, the baseline is like the waistline—you gotta grab her by the hips and shift her baseline when you hit that ass,” as he made the gestures of having sex.

The point of the entire exercise was that it showed how non-“sciencey” the term “shifting baselines” was. Had the name of our project been “Hyperstatic Metastable States,” when these people on the street heard it they would have looked cross-eyed. But it wasn’t. And not only did the “baselines” part resonate with sports culture, the word “shifting” has been the central theme of Nissan’s car commercials (shift your horizon, shift your perspective, shift your driving) for nearly a decade. Both words are in the zeitgeist. Kevin and I somehow knew that—actually, it’s more as if we intuited it. The communications guru didn’t. And he, I’m afraid, just ends up being another example of the blind leading the blind in the communication of science and environmental issues.

Getting back to the original point of this chapter, there is a spectrum for any given piece of information, stretching from boringly blunt to incomprehensibly elusive. Naming a campaign “The Oceans Are in Trouble” is the former, as dull as dishwater—nothing intriguing, nothing inviting, nothing that arouses the curiosity—while “Hyperstatic Metastable States” is the latter—so technical that the public is lost, with nothing to grab onto. The object is to find something, like “shifting baselines,” that falls right in the middle. Elusive enough to sound a little intriguing but familiar enough to roll off the tongue.

And this is where the overly literal-minded thinking of the scientist falls short for mass communication. The “Why waste time! Just tell ’em what it is” philosophy may work for science students, but it doesn’t for the broader audience. This is where so much of the art of communication resides.

Others besides the communications guru have questioned whether this sort of indirect communication works with the public.

In 2005, Ken Auletta addressed this issue in a *New Yorker* article titled “The New Pitch: Do Ads Still Work?” He talked about the breakdown of traditional advertising markets with the advent of new media—how it’s left old-timers adrift and many questioning whether advertising still works. But, after examining how complex it’s all become, he brings it back down to simple elements with the story of an ad executive who, while walking to lunch one day, kept repeating his company’s name until he finally realized it sounded like something a duck would say.
Thus was born the highly successful ad campaign for Aflac, built around an obnoxious duck quacking the company name. But, as Auletta points out, in the beginning there were literal-minded skeptics who thought the concept was a terrible idea for an advertising campaign because a duck quacking said absolutely nothing about the attributes of the insurance company. And yet... four years later, without making any major changes in its business practices, Aflac had doubled its sales.

Someone should have said to those skeptics, “Don’t be so literal-minded.”

Of course, it’s difficult to know what’s too elusive and what’s too literal. When we were preparing to take Flock of Dodos to the Tribeca Film Festival, we interviewed a number of film sales representatives—the people who serve as agents in selling your movie to distributors. One fellow loved the movie, but there was one hitch—he didn’t like the title and wanted to change it. His reason was that he didn’t like titles that don’t tell you what the movie is about. He wanted something more literal, like Unintelligent Design. But we had already created the opening animation of dancing dodos, which everyone loved, so there was no changing the title. It was a deal breaker. A few days later, I realized how passionate the guy was about this issue when I looked again at the name of his company—it’s called the Film Sales Corporation. Guess what they do.

The title of a product often ends up being a direct struggle between the marketing voice and the artistic voice. I once had the wonderful experience of meeting a famous political activist from South Africa, a black man named Don Mattera, who had spent years in prison and engaged in the struggle against apartheid. He had published a best-selling book in South Africa titled Memory Is the Weapon. With such an evocative title, you can imagine how powerful it was. But he told me that when an American company picked it up for distribution, its marketing people changed the title to Memoirs of an Apartheid Protester. That’s called stomping the life and beauty out of a piece of art. But if I had been one of the marketing people, I’d have probably recommended that title to make sure it sold at least a few copies in the United States, where no one knew of the author.

Dream Two: Instant Victory (by Going for the Jugular)

“It was okay, but we were hoping he would have ‘gone for the jugular’ more.”

That was what friends told me a number of major evolutionists had to say about Flock of Dodos in 2006. They were expecting the movie to be an all-out assault that would use “the facts” to grab the intelligent design movement by the throat and use information to slit it, right at the jugular. As if that were actually possible.

In the end, it was another aspect of the hazards of literal-minded thinking. In fact, it was this sort of thinking that had drawn me into making the film in the first place.

In May 2005, as I got started on the movie, I began calling my old evolutionist friends and listening to their stories. One thing I heard from a number of them was that evolutionists were conducting public debates against proponents of intelligent design and consistently losing. And they were furious about this.

I spoke with one of my old buddies, a professor of evolutionary biology at a small college in Massachusetts, who told me he debated an advocate of intelligent design and lost. He said he had stood on the stage and laid out the facts showing how there was no way intelligent design could possibly be tested and falsified and therefore was “not science” and shouldn’t be taught in the classroom. He had been proud of himself as he finished his presentation and looked at the audience. But all he saw were expressions of resentment and looks that seemed to say, “You think you’re such a smarty-pants.” He was beginning to learn that sometimes it’s not as simple as “see audience, hurl facts at audience.”

His opponent had scored much better, not by arguing “the facts” but by issuing impassioned, heartfelt pleas about the need to teach students “critical thinking” and, supposedly, to support the American principles of
freedom of expression by allowing students to question whether evolution and "Darwinism" were really the airtight bodies of knowledge they supposedly claim to be. Most important, he came across as more likeable by not being overly confident and so caught up in "the facts." His approach was less literal but ended up being more effective.

The evolutionists were going down in flames on the stages of America, and it got bad enough that the National Center for Science Education eventually established a simple recommendation, which was never to debate a creationist or an advocate of intelligent design in public. The main reason for this is the imbalance between evolution, which is largely intellectual in nature and thus comes from the head, and creationism and intelligent design, which, being religious in nature, come from the heart. Just recall the four organs concept and you can see the automatic difference in audience size—it's just not a fair fight. The heart audience is bigger. And in fact if you look at the size of the major evolutionary science organizations in this country (probably tens of thousands) versus the size of all the churches (millions of members)...well, case closed.

But there is also this dynamic of literal-minded scientists believing it's just as simple as slaying them with the facts. My Shifting Baselines partner Steven Miller, a marine biologist, is fond of saying that the science establishment often thinks it just needs to "argue louder"—meaning use the same fact-based approach, just more forcefully. And this was the situation with the major evolutionists: they wanted me to damn the intelligent design believers with data. But it's just not that simple.

There is no jugular to go for. If there were, someone would have managed to have severed it long ago. In the great "Scopes Monkey Trial," famed lawyer Clarence Darrow used wit and logic to out-argue William Jennings Bryan. And, though the fictional portrayal of the great creationism/evolution debate presented in the play Inherit the Wind made it seem like the forces of "the head" won in that conflict, the fact is that the court ruled against Scopes and creationism continued to spread through the land like wildfire.

This is not to say that there aren't ways to defeat heart-driven creationists in a debate—there are, and I'll get to that later. But what's most important is to realize it takes more than just the straightforward blunting out of facts.

Dream Three: Instant Enlightenment

I like to refer to this tendency to believe that "the facts speak for themselves" as "science-think." It is truly wishful thinking, though every once in a while a single, simple idea is enough to catalyze change. If you find the cure for a disease or create an amazing invention, you don't really need a public relations campaign to make it take off, at least somewhat. And yet, in America, even the best ideas still need help. That help comes through communication, whether it's an advertisement for a product or news stories about a project.

But scientists fall victim to the belief that information alone is enough to effect change. They think, "If I can just put these facts together into this specific argument, when people see it all assembled they will change their outlook." Which might be true if people actually see it. But that's the problem.

For a specific case study in this problem, I turn to the final report of the Pew Oceans Commission, released June 2, 2003. It's a textbook case of a group of technical types who, succumbed to science-think. They thought they would be speaking with a loud and powerful voice, but in the end, they didn't.

In the spring of 2003, as we began to get our Shifting Baselines Ocean Media Project off the ground, with plans to film our first television commercial using comic actors, I began to get pushback from the ocean conservation world. A number of communications directors for ocean conservation groups told me about the "firestorm of media attention" that was about to be unleashed. "The final report of the Pew Oceans Commission is coming out, and when it does, it's going to take the nation by storm," said one ocean
communicator. "It will be the lead on every evening news channel, will be on the cover of *Time* and *Newsweek*, and will be the talk of the nation. The conclusions of the report are devastating."

The Pew Oceans Commission's study was a three-year project with a budget of $3 million. The goal was to pull together the first overall assessment of coastal waters and resources of the United States since the Stafford report of the early 1970s. By the time of its completion, the head of the commission, former White House chief of staff Leon Panetta, was saying that when the American public reads the report they will be "angry" about the devastation of our coastal resources.

Well . . . maybe they would have been. If a lot of people really had ended up reading it. But they didn’t.

As the date of the report’s release approached, I began to hear from insiders that they had made a little tactical error. No money had been set aside in the budget to create a media campaign around the findings of the report. I spoke on the phone with Justin Kenney—one of the only staff members left in the commission’s offices as it ran out of money—who said, “I’m not sure we’ve even got enough money for coffee at the press conference.”

A press conference was held, colorful brochures for the final report were handed out, and the members of the commission were present and suitably outraged over how bad the deterioration of our oceans had become. But when the news of the report hit the media, it ended up not on the cover of *Time* and *Newsweek*, not on the evening news, not even on the front pages of the major newspapers, but on page A22 of the *New York Times*. Instead of a big bang, there was hardly a whimper.

After the press conference, the members of the commission went home to returned to their normal lives, and, by all accounts I heard, only one of them, Roger Rufe, who at the time was president of the Ocean Conservancy, found time to go out on the road and give a few talks in which he tried to convey to the general public how important this study was.

What happened? Science-think. The heavily academic/cerebral/scientific makeup of the commission (most members had advanced degrees) led them to believe the information in the study would be so immediately compelling, so jaw-droppingly profound, that it would sell itself by word of mouth. They believed that journalists would sit down, read the entire thirty-five-page document, and feel their world had been shattered, causing them to stay up all night producing urgent and compelling media. Instead, what they got was a collective yawn.

Did the Pew Oceans Commission’s report have to be such a dud? Is it just the case that any report is destined to be greeted with minimal interest? No. The final report of the 9/11 Commission the following year showed that such a study can have a significant impact if it’s accompanied by a solid communications effort. The *New York Times* reported on July 19, 2004:

Members of the independent Sept. 11 commission say they will mount an aggressive nationwide lobbying campaign to pressure the White House and Congress to overhaul the nation’s intelligence agencies, an effort they say will begin this week with release of a unanimous final report criticizing virtually every element of the way the government collects and shares intelligence.

The lobbying effort would be a break with tradition, since blue-ribbon federal commissions often disband almost as soon as they have completed a final report, the members returning home from Washington and leaving the report to speak for itself.

Granted, more Americans may be interested in terrorism than in the oceans, but the 9/11 report didn’t sell itself. It was released as both a hardcover book and a book on tape, and the committee members toured the country, lobbied, and eventually testified before Congress. Two years later they barely, just barely, managed to implement some of the report’s recommendations—which just shows how hard it is in the United States to bring
about change. But it is still possible if you couple the product with an effective communications effort.

And notice that last sentence—the part about the members scurrying home and leaving the report behind to speak for itself. Most committees do that and don't care. What was worse with the Pew Oceans Commission's report was that the folks associated with it actually deluded themselves into believing that their report's "speaking for itself" would be enough to make an impact.

A Turnable Tide?
This mode of science-think is deeply ingrained in the academic world in all different aspects. A 2003 study funded by the David and Lucile Packard Foundation revealed this for the world of ocean conservation. The team of environmental policy analyst David Wilmot and environmental lawyer Jack Sterne produced *Turning the Tide: Charting a Course to Improve the Effectiveness of Public Advocacy for the Oceans*, which dug to the bottom of this syndrome.

They examined why the ocean conservation movement has, in general, fared so poorly while others have succeeded. For comparison, they looked at relatively successful lobbying groups such as the National Rifle Association and Citizens for Tax Reform. And they came to a simple and blunt conclusion—that ocean conservationists, in general, tend to be drawn more to policy than to politics.

In other words, the powers that be in the ocean conservation world tend to be more comfortable with writing new laws, funding more studies, gathering more data, and sponsoring more workshops, in hope of putting the pieces together into that magical argument that will spring to life by itself, than with going to Washington, DC, and using money to hire lobbyists the way the big boys do it. They would rather stick to the objective elements (science, law, policy) than dabble in the subjective elements (communicating, lobbying, persuading).

I personally witnessed this trait in central California when I tried to get the ocean conservation "powers that be" to fund short videos explaining the overfishing issues to the fishing community and the general public. Representatives of a major funding organization eventually said to me, verbatim, "Why should we fund your communication efforts when we have the lawyers and the legal system on our side to simply override these fishermen?"

That's called the brute force approach to getting your way, which certainly can win, but it's a bit like leveling the village rather than trying to win hearts and minds through communication.

Suffice it to say, this aversion to communication, whether it's intentional or just the result of cluelessness, is real and can be quantified. The business community long ago figured out that you need equal efforts allocated to the objective part of your project (the creation of the product, whether it's a government report or an automobile for sale) and the subjective part of your project (communicating to the public that you have something they should check out, also known as advertising).

In Hollywood, this revelation hit home in 1977 with the release of the first *Star Wars* movie. I remember reading initial reviews saying that this was a weird and unusual movie that no one was certain would succeed, since there seemed to be a sort of cowboy western corniness to it. But *Star Wars* was the first true blockbuster movie to be accompanied by an enormously expensive marketing campaign. As money was spent on promotion and massive advertising of the movie, the skeptics sharpened their knives. But when the box office began to skyrocket, the entire industry was turned on its head, never again to be the same.

Decades later, by the summer of the Pew Oceans Commission report, the result of this shift in paradigm could be seen with any given movie. Figure 2-1 shows three representative movies from that summer. The proportional amounts spent on advertising range all the way up to *Napoleon Dynamite*, which was produced for only a few hundred thousand dollars, but the
Distribution company, knowing it had a winner on its hands, gambled $10 million in advertising—equaling 96 percent of the total budget for the movie.

I remember hearing quirky radio ads about the movie long before it arrived at theaters, playing sound bites of Napoleon saying, “Gosh, why do you have to be so stupid?” And the result of that gamble? Over $50 million at the box office, followed by a massive DVD release. The Hollywood folks know what they’re doing in terms of following through with their products. They know that “the product speaks for itself” is not a sufficient business strategy.

In contrast, we have the Pew Oceans Commission report, which had for its final communication effort about 3 percent of the entire budget. Is it any wonder that it failed to have much effect? Need I say more about science-think? The world has changed. The public no longer sits in patient silence, awaiting word from the science community. It’s a tough marketplace, but not impossible, as shown by both Hollywood movies and the 9/11 report.

This is the dilemma of science-think and yet again a situation in which scientists simply shouldn’t be such scientists. Bring in the professionals, and trust them when they tell you to invest in communication. It may be frustrating and seem like a frivolous waste of resources, but what’s the alternative strategy—to assume that people are rational, thinking beings? There’s a famous quote by Democratic presidential candidate Adlai Stevenson, who heard a woman shout to him that all the thinking people of America were with him. He replied, “That’s not going to be enough, Madam; I need a majority of the public.”

And if you have any real doubts about the extent to which the United States is a media-driven society, first read David Halberstam’s brilliant The Powers That Be, a book that changed my life, and then read Jerome Groopman’s 2006 New Yorker article “Being There.” Groopman reports that just 15 percent of emergency room resuscitations in the United States succeed in saving the patient, but surveys of the general public reveal that, because of what they see on television, they expect about two-thirds of all resuscitations to be successful. Television shows like ER and Rescue 911 tend to tell uplifting stories with happy endings, skewing our perception of the success rate. It goes to show, once again, that we live in the land of media, where the boob tube is a major source of (mis)information.

**Solution: Remember the Octopus**

The whole idea of nonlinear thinking can be extremely difficult. It runs so counter to the notion of just seeing and responding. It makes me think of an encounter with an octopus a marine biologist friend of mine had many years ago.

He and I were part of a four-man team who spent a week living at a depth of sixty feet in the Hydrolab Undersea Habitat, which was operated by the National Oceanic and Atmospheric Administration in St. Croix, U.S.
Virgin Islands, until the late 1980s. On the last night of our stay in the habitat, my friend and another member of our group went out for a night dive. While out on a sand flat at a depth of about eighty feet, they encountered a substantial-sized octopus—about three feet long.

My friend wrote on his dive slate the famous last words, “Get a photo of me with this thing,” and then reached for the octopus.

Cut to me sitting inside the habitat, talking on the radio to the shore base as I see a blood-covered hand break the surface of the water in the hatch that leads into the habitat. My friend surfaces, calmly saying, “It’s only a flesh wound,” and then reveals a one-inch gash on his wrist that has already swelled up to look as if a golf ball had been inserted under the skin (the localized response to the venom injected by the octopus).

The next day his dive partner reenacted for us what had happened. After my friend picked up the octopus and posed for the photo, the octopus began clamping down on his arm. The photographer said he saw the smile vanish from my friend’s face and a look of terror become visible through his face mask. He had shifted from posing to panicking. When he tried to pull the beast off his arm, the octopus responded by simply clamping down harder. The more he pulled, the more fiercely the octopus held on. Until finally . . . the water was filled with a bloodcurdling scream from the diver as the angry octopus expressed his annoyance with his parrot-like beak.

The diver kept fighting, but the octopus remained clamped on. It wasn’t until he finally relaxed and quit pulling on the octopus that the animal let go and swam quickly off into the dark (with an awesome story to tell his friends).

The moral of the story is that sometimes the reactive response just doesn’t work. The diver fought and fought, trying to get free of the octopus, but the harder he fought, the tighter the animal held on. It wasn’t until he finally did the counterintuitive thing—relaxed—that he at last got what he wanted.

And that’s how it works with communication. Sometimes, particularly with the mass audience, people don’t want their information told to them directly. You can pound them with the facts all you want. They’re just going to clamp their hands over their ears until finally you figure out a more indirect pathway to their brains.

Just take a look at The Daily Show with Jon Stewart. In 2008 a critic for the New York Times posed the question “Is Jon Stewart the most trusted man in America?” And she wasn’t joking. The Daily Show has gained enormous popularity, and audiences increasingly view it as a source of serious news. But the packaging of the information is incredibly indirect and surrounded by all sorts of nonsense and silliness. Yet in an information-saturated society, it ends up being a popular source of news for many.

Whether it’s a television audience or an angry octopus, sometimes the answer isn’t sheer force or straightforward facts. It’s something less literal.

A Powerful Concept: Arouse and Fulfill
A pattern is now emerging in these basic dynamics. Most of what I’ve been talking about has two components—objective and subjective, direct and indirect, literal and nonliteral.

I’ve talked about how science has two parts, the doing and the communicating. I’ve talked about how communication has two parts, substance and style. And I’ve talked about how successful politics and business have two parts, the production of a report or product and the lobbying or advertising of it.

The two parts—the yin and the yang, the here and the there, the ebb and the flow. And once you look at things this way, you begin to see the dynamic everywhere. Which was the case for me when I made a video about giving scientific talks.

I emerged from USC film school having finished my master of fine arts degree in film production. I had left the academic world behind in 1994;
most of my old colleagues had written me off as having had a midlife crisis and never expected to see me again. I had immersed myself in the world of filmmaking, acting classes, Hollywood parties, movie premieres, and surfing. Academia had become a distant memory.

But in 1998 a group of my old science friends invited me to a symposium in Denver that was a tribute to Alan Kohn, one of my favorite professors from my undergraduate days at the University of Washington. They asked me to come and speak about my filmmaking in the middle of their science meeting. So I went. And I saw all these folks I hadn’t seen in five years. But more important, I sat through an entire day of twenty short talks by scientists about their current research.

The talks were exactly the same presentations I used to give when I was a scientist—people standing at a tiny screen, backs to the audience, pointing to their cluttered, confusing slides (this was in the days before PowerPoint), muttering “Um” with every other sentence, and rambling on with no beginning, middle, or end to what they were saying until finally the moderator cut them off by saying, “You’re out of time,” at which point they would snap out of their droning, turn to the audience, and say, “I guess that’s about enough for today.” I sat in the back listening, staring in disbelief, and asking myself, “How in the world did I ever sit through these talks?” By then, my little academic brain had been subjected not just to the screaming acting teacher but also to dozens of classes in shooting and editing film. I had watched films so hyperkinetically supercharged that they could reach inside your eyeballs and make your visual cortex vibrate.

In quantitative terms, I had spent five years working in the world of thirty frames per second (which is what you get with video). If a frame is a picture, and a picture tells a thousand words, you could say I was living in a world of 30,000 words per second.

And suddenly here I was, sitting through slow, monotonic, often imageless presentations with a pace of maybe two words per second. It was like a baseball batter being thrown a change-up pitch.

I returned to the University of Southern California and told some of my friends in the biology department how bad these presentations really are. They replied, “We know. We’re scientists; we’re terrible at giving talks.” I told them about some of the nifty things I had learned in film school about visual expression and the need for simple presentational elements such as sufficient screen size and sound quality for audiovisual presentations. They were intrigued, and so they pulled together some funds for me and I set to work on a twenty-minute video to explore this. The video was called Talking Science: The Elusive Art of the Science Talk.

I interviewed a number of faculty members from the cinema school and the theater department, a number of science faculty members, and—most important and interesting to me—several faculty members from the USC Annenberg School for Communication. A decade later, among all the interviews in that video, a single sound bite stands out, which I think gives one of the most powerful general rules for all of this communication stuff.

It came from Tom Hollihan, a communications professor, who said simply and elegantly, “When it comes to mass communication, it’s as simple as two things: arouse and fulfill. You need to first arouse your audience and get them interested in what you have to say; then you need to fulfill their expectations.”

And that’s about it. Motivate, then educate.

When you begin to digest this, you realize that most failed communication efforts are the result of falling down on one side or the other. Academics tend to fail to motivate; they just jump right into the fulfillment part. I can’t tell you how many times I’ve asked scientists what they study and been immediately bombarded with every little detail of their research.

Conversely, Hollywood makes the other mistake, getting an audience fired up and then failing to deliver any substance. The classic flaky Hollywood environmentalist is filled with passion and can get others equally uptight about an issue. But then, when you want some specifics about exactly what’s going on, you get a bunch of heartfelt nonsense. I suppose it was a
little mean of me to parody this weakness in Sizzle, but it resulted in one of
my favorite lines in the movie: the producers turn to me and say, “We feel
very, very passionate about global warming, and we’re very, very upset about
it. We just don’t know why we’re upset.”

Academia and the Prearoused Audience
Back when I was a professor, I was proud of my oratorical skills. Students
would hang on my every word. Or so I thought—until, on an overnight field
trip to Maine, I spent much of the drive up telling the students in the van all
curiosities of my days in Australia studying the Great Barrier
Reef. They couldn’t seem to get enough of my tall tales.

But that night, we were camped out in tents and I overheard a group of
the students who didn’t realize I was right outside the tent. They were laugh-
ing about how they had been encouraging me to tell more stories because
they thought I was having fun doing it, and that would make me like them
better and thus give them better grades. That was my first awakening to the
fact that students are not a realistic audience.

In fact, to the contrary, they are a “prearoused” audience. They walk into
classrooms and lecture halls already “interested” in the material, not because
the lecturer is a brilliant speaker but simply because they want a good grade.
I know this sounds cynical, and no doubt a lot of the students are genuinely
interested, but seriously, let’s be honest about this. Most of them are there to
get a good grade. The professor doesn’t really need to waste time and energy
“arousing” them, and as a consequence many professors don’t.

The result is that professors tend after a while to look out at that sea of
attentive faces and think, “Damn, I’m a good speaker—these students eat up
everything I say.”

I can’t tell you how many of them I’ve known over the years who have
fallen victim to this. And it’s a shame because occasionally you come across
the ones who aren’t fooled and do realize you need both elements, and those
professors are magic to listen to.

Within my limited experience, the most wonderful of them all was also,
in my opinion, the greatest evolutionist of modern times, Stephen Jay
Gould. In graduate school at Harvard University, I was fortunate enough
to be a teaching assistant in the introductory biology course he taught.
He was a fantastic lecturer. And you can still see his gift for both sides of the
formula—to both arouse and fulfill—laid out bare in every single monthly
column he wrote for Natural History magazine for more than twenty-five
years.

Every one of his columns began with a few paragraphs of arousal (the
“hook,” as journalism professors like to call it). His arousal efforts consisted
of references to such nonscientific things as baseball, Mickey Mouse, archi-

tecture, opera, painting . . . all things that left the reader thinking, “Wow, this
is interesting, but what does it have to do with evolution?”

That question, that arousal of interest, was his entry point to descend
into the more sterile and less humanized world of science.

Why Scientists Need Artists
Gould led me to a minor revelation: that science, in itself, ain’t real interesting
to the broad audience. It simply isn’t enough for the general public—it’s
too cold, too complex, too informational. It needs to be partnered with a
more humanized element. This is why scientists need artists.

The typical cynical scientist looks at the work of an artist—some sort of

crazed painting or dance routine—and chuckles, like Butthead, “That seems
kinda dumb.” But the work of art arouses people. It reaches down into those
lower organs. Art stirs the heart, the gut, and even the loins. It motivates
people. And that motivation can lead people to want to engage their brains.
Which is when the scientist can go to work.

Arouse and fulfill. Supremely profound. Let no communicator fail to appre-

ciate this partnership of elements. And let no individual fall victim to

science-think, which in these terms turns out to be the mistake of believing
that the formula is “fulfill and fulfill.”
Heresy Warning: Film Is Not a Very Effective Educational Medium

So now the question becomes "How do you arouse your audience?" And this is where film comes in. It has enormous communication power. But before I talk about what it is good for, let me begin with how it has traditionally been misused in education.

My feelings about this go all the way back to 1967, to my seventh grade science class at Hocker Grove Elementary School in Shawnee, Kansas, where I was forced to watch the clickety-clacking, clattering, flickering educational science films on everything from the life cycle of the grubworm to human reproduction.

That was where I first developed my bitter hatred of boring "educational" films and my intuitive belief that film, by itself, just isn't a very effective way to teach students in the long run. Yet it took me the better part of a lifetime to move this gut instinct up to my head in order to come up with some logic to the premise.

The idea is that film is not a very effective educational medium but is indeed an incredibly powerful motivational medium. Let me start with some history.

Another Heresy Warning: Educational Technology Has Always Been Oversold

It's pretty much a rule that every piece of educational technology developed has been oversold. Every innovation, whether film, computers, or the Internet, is introduced as a panacea for the difficulties of getting students to learn.

The overall pattern has been well documented by Stanford University professor Larry Cuban. In _Oversold and Underused_, he examines the problem of computers in the classroom, and in _Teachers and Machines: The Classroom Use of Technology Since 1920_, he provides the definitive skeptical analysis of film's role in teaching. In the latter book, he offers up this wonderful quote from one of the inventors of cinema, Thomas Edison, who in 1922 said:

I believe that the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks. I should say that on the average we get about two percent efficiency out of schoolbooks as they are written today. The education of the future, as I see it, will be conducted through the medium of the motion picture... where it should be possible to obtain one hundred percent efficiency.

Sounds like Edison envisioned a sort of _Clockwork Orange_ future for education, where children show up at 8:00 a.m., sit in recliner chairs, have their eyelids propped open, and then watch movies until 3:00 p.m.

In fact, Cuban tells a story from the 1970s in which this basic idea was attempted in American Samoa. Being in such a far-flung location, the schools could recruit only limited numbers of qualified teachers. So they tried an experiment. Videotapes of some of the best teachers in the United States were made and shipped to the Samoan school district, where the students were forced to live out Edison's dream of watching the videos all day long. Within a few weeks the students rebelled and threw a television set out a window, and the program was ended. You can force-feed only so much media to people.

Though Edison's prediction that "books will soon be obsolete in the schools" still hasn't happened, his heart would probably be warmed to see the Internet playing the role he imagined for film.

Nevertheless, there exists this term "educational film," which I have concluded is largely a contradiction in terms. For starters, film is not effective for education because education revolves around one key trait—_inculcation_—the repetition of information as the brain creates the proper structure to retain it over time (do you need me to repeat this point?). We all recall having to repeat after the teacher in grade school. And much of the
reason I learned so much in my acting class is that the teacher repeated the basic principles over and over again. But this is anathema to film and even to storytelling.

At USC, this became glaringly obvious. It's almost a blanket rule that you get to use a piece of film only once unless you're doing some sort of memory scene later or a dream sequence, or maybe making a movie like _Groundhog Day_ or _Run Lola Run_. But even then it gets tiresome and even angering to watch the same scene repeatedly.

In genuine education, it is essential to stop periodically and repeat all that's been covered and to repeatedly work and rework the material in different contexts. This is why education can get so boring and is more active a process than watching a film. The bottom line is pretty much that you get what you pay for when it comes to education.

So does this mean that films should never be shown in an educational setting?

Of course not. It doesn't mean that at all. What it means is that it is essential for educators to know what they are dealing with when using the medium of film for education. And what they are dealing with is this...

Final (Good) Warning: Film Is an Excellent Motivational Medium

And that, very simply, is the truth. When _Top Gun_ came out in 1986, one of my friends from high school saw it ten times in a single week, and then, massively motivated, he joined the air force—along with a lot of other instantly motivated young men. The U.S. Air Force Academy saw a measurable jump in enrollments.

_Jurassic Park_ did the same thing for paleontology in the 1990s. And neither of those movies provided any statistics or logical arguments on why people should choose those careers. They provided motivation, not through the head but through the lower organs, by telling a good story with plenty of humor, excitement, and emotion.

—if there are countless examples of how movies, television shows, documentaries, and the stories they tell have motivated people in their career paths. But that doesn't mean films are good for conveying information and actually educating.

Let me tell you of a little exercise we did in one class in film school. An instructor showed two corporate training videos about how to run a drilling machine used in a manufacturing plant. In the first video, a man stood beside the machine and pointed out all the major parts, how they worked, and all the other details needed to run the machine. The camera never moved, and it was all very clear and thorough, but dull.

In the second video, there was no boring man speaking. Instead, the camera moved past the equipment, zoomed in on parts, and swished over the top of the machine as a seductive female voice narrated with lively music in the background. And the lighting was downright romantic.

Broad Audiences Prefer Style over Substance

Everyone voted the second film as the most effective. But when you analyzed the scripts, the second film had only half the informational content of the first and not nearly enough information to show how to run the machine.

The broad audience is very visual. The basic rule for making a film for the broad audience is "Don't tell us; show us." And the converse describes how this audience learns via film—things that are shown are much more powerful than things that are told.

The classic illustration of this in presentation videos is for a man to look into the camera and ask you to do as he tells you. He says, "Touch your ear," as you see him touch his ear, then "Touch your nose," as you see him touch his nose. But then he says, "Touch your chin," as he touches not his chin but his cheek.

The vast majority of the audience in this exercise will follow what they
see rather than what they hear, touching their cheek rather than their chin. That is the override of the audio channel by the visual channel. And it gives you an insight into how fickle the medium of film tends to be. Visuals are extremely powerful and are used to tell the story.

In fact, at USC film school, the faculty is so keenly aware of this that for our entire first year we were hardly allowed to use sound. All five of our first semester films had to be silent movies in which images told the story. No dialogue, no narrator, not even on-screen text.

Film Is a Visual Medium

"Film is a visual medium" was the phrase they pounded into our heads week after week. In many classes, the instructors would have us watch entire movies with the sound off, just studying the use of visual images. When you begin to add up all the different elements available to a filmmaker—visual expression, music, sound effects, narration, storytelling—and so many more—you begin to realize that a film is infinitely complex.

And this takes you back to my simple calculation. If a picture tells a thousand words, and there are thirty frames per second in video (twenty-four in film), just do the math. You get 1.8 million words per minute, or 108 million words per hour. A typical novel has about 100,000 words. So, presto, in an hour you're reading the equivalent of 1080 books!

Okay, that's total nonsense, because most of those thirty frames in a second look virtually identical. But the point is, you are indeed being given a great deal of information when watching a film, and most of it you don't really perceive or comprehend.

In the 1960s it was called "subliminal seduction," and for a while everyone thought it was everywhere. The idea was that films were full of hidden framings that made you want to buy more popcorn or have sex. Eventually people realized that subliminal stuff is effective only sometimes, and it's hard to predict exactly when. But there's no denying it can sometimes be powerful.

This is what Thomas Edison didn't realize with his new invention. He thought film was an educational panacea, applicable to anything that needed to be taught. It would take decades of exploration for people to understand that film is incredibly powerful for certain things and terrible for others. Most instructors still don't know this. But I can give you an example of how it works in my specific field of science.

There are about thirty-five major groups of invertebrates in the world. These are the animals that lack backbones. Some groups are innately more interesting than others. Some of the major groups just look like worms and are relatively boring. Other groups include things like octopuses and squid that are endlessly fascinating as they change their colors in a second and have eyes as complex as ours. Or giant crabs or lobsters or bombardier beetles or walking sticks—all kinds of amazing creatures.

When you teach the biology of invertebrates, you need for students to learn all of these groups, so in one lecture after another you go through them and do your best to make the worms interesting. It's not always easy, but that's what education involves—laying out the details in an organized, systematic manner, going back over the material, repeating the material the students find difficult or unclear. Back and forth, back and forth, creating the structure in the brain where it can all be retained.

Back to the Old Arouse and Fulfill

So if you want to make a so-called educational film about the invertebrate groups, you have two choices. Option one, you plod through all thirty-five groups one at a time, spending an equal amount of time on each group, telling about one worm group after another. By the time the students have gotten through their fifth worm group they are hating the film, hating the animals, desperately awaiting the group with the octopus, and mostly just wanting to get the entire experience over with. And then, every so often, you stop and go back and review all the groups to make sure everyone is up with
you. And that is just too much for the students as they throw the movie projector out the window like the Samoans did.

The other option is to make a film that, instead of focusing on education (i.e., covering all the material), focuses on entertainment—telling only about the groups that are immediately fascinating and compelling. The film is light and breezy, highlights some of the more interesting features of the more interesting groups, and leaves the students wanting to know more. The film is only ten minutes long, and when it ends, the students are full of questions about how the cone snail manages to capture fast-moving fish or why the male isopod crustacean lives as a parasite on the female.

In other words, back to the old arouse and fulfill. Use the film to arouse—it’s a mighty powerfully stimulating medium when used properly—and then step in to deliver the fulfillment. This is exactly the model we developed around Flock of Dodos. The film is a fairly light eighty-five-minute romp that touches on some elements of the evolution—intelligent design controversy. It arouses the interests of the audience but doesn’t really fulfill them. Which is why we have held so many events in which the movie is followed by a panel discussion with several experts in evolution, theology, communications, and government. They are the fulfillment. And on the home DVD version we added a bonus feature—the ten most commonly asked questions in the panels, answered by several experts.

The Magic of Juxtaposition
As I’ve said here, film is simply not a very powerful literal medium. Sitting a bunch of experts down for interviews and having them talk directly to the camera is instantly boring to most viewers. Anything short of Elvis Presley or a serial killer and the mass audience tunes out. And just think of watching talking heads with the volume turned off. You’d have no idea what the film was about, meaning it could communicate only through sound; the weaker channel.

But film has the potential to be an incredibly powerful nonliteral medium. For instance, if in 1964 you had made a television commercial in which a man looked into the camera and said that Republican presidential nominee Barry Goldwater was dangerous, it would have had little, if any, effect on the election. But if you had produced an ad about Goldwater in which a scene of an innocent little child was followed immediately by footage of an atomic bomb explosion . . . well, put it this way. His opponents did. It ran only once and was enough to undermine Goldwater’s entire public image.

That’s the magic of juxtaposition—two unrelated images lined up against each other, producing something more powerful than their sum. My acting professors tried to teach us the concept by showing montages by Sergei Eisenstein and Luis Buñuel. It took over a decade for the idea to really percolate into my brain, but I’ve intuitively tried to use creative juxtaposition since I first got involved with filmmaking.

One of my first reasons to begin experimenting with film was that, by the late 1980s, I was bored, frustrated, and disappointed with most of the nature documentaries about coral reefs I had seen on television. I had spent years diving on some of the most eye-poppingly inspiring reefs in the world. My brain was still fresh with memories of the swimming pool–clear waters of the Great Barrier Reef, where you could see schools of sharks chasing fish a few hundred feet away. Those experiences left me exhilarated. Why couldn’t the documentaries do the same?

Literalists would say, “They can’t; they’re just pieces of film. It’s not the same thing as being there.” Nonliteralists would say, “They could through juxtaposition, but they don’t because the filmmakers just aren’t very good.”

I still believe in the latter—that film has infinite power. And guess what—that’s not a falsifiable hypothesis, so you can’t tell me I’m wrong!

One of my experiments in this direction, even before I went to film school, was my barnacle music video, Barnacles Tell No Lies. I thought
barnacles were cool, and I wanted to convey this to a broader audience. The literal thing to do would have been to show footage of barnacles while a narrator said, "Barnacles are amazing creatures that have a fascinating ability to move their appendages rhythmically with the flow of the water." That would have been a case of *telling* the viewer that the creatures were amazing and fascinating.

Instead I opted to *show* the viewer by setting footage of the appendage movement to the rhythm of a jazz song and then throw in a little of the lower organ elements by having a sexy jazz singer with a seductive smile serenade the barnacles as the film reveals they also have the longest penis relative to body size of any animal. Suffice it to say, unlike most of my embarrassingly bad early film efforts (which, other than *Lobstahs*, are not listed on my filmography in appendix 3), the barnacle movie has stood the test of time. Nearly two decades later, viewers still laugh and walk away impressed, realizing that barnacles are much more amazing and fascinating than they thought. And the reason why is the juxtaposing of serious science with silly and even sexual humor. It does something. It transcends. It's nonliteral. And it has the potential to be extremely powerful in mass communication.

And Now It's Time for a Story . . .
So, arouse and fulfill. I can't emphasize its importance enough.

And yet . . . there is another way to deliver information that is different from this two-step process. Instead of partitioning the arousal and the fulfillment, there is an age-old way to mix the two together into a single, endlessly digestible stew. It's called storytelling, and guess what? It remains today the most powerful means of mass communication. And, sad to report, scientists have some problems with it, as you will learn in the next chapter.

Don't Be Such a Poor Storyteller

I want to share with you the single most humiliating public experience of my life. In the spring of 1990, Spike Lee's movie *Do the Right Thing* was hitting America, I was a professor at the University of New Hampshire, and suddenly Spike was on campus for a simple event called "Open Mike with Spike." More than a thousand students packed a huge room in the student union just to ask him questions from two standing microphones. I decided to take a shot. I had just made my first foray to Hollywood with a screenplay, so I began telling him about my trip, my meeting at Columbia Pictures studios, what the executives I met with said, and a whole lot of other things—but something strange started happening about five minutes into my comment/question. I began hearing this reverberating, echoing sound that was bouncing around the massive auditorium. I couldn't quite make it out at first except I realized it was voices—a lot of voices—student voices—hundreds of them—a chorus—and then I finally paused my speech for a moment and heard what they were chanting, "Get to the point, get to the point, get to the point!" A wave of terror swept over me. I looked back at Spike and finished my speech by quickly blurting out, "So, like, what's up with that?" Then I put my tail between my legs and walked, head down, to the back of the hall. It turned out the event was being broadcast live on the student radio station. The next day a student stopped me in the hallway of the biology department and said, "Professor Olson, was that you last night asking that half-hour question?"